

BEFORE
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY
(NEPRA)

APPLICATION FOR
A LICENSEE PROPOSED MODIFICATION
OF
GENERATION LICENSE

PURSUANT TO
ENABLING PROVISIONS OF NEPRA ACT 1997, READ WITH ENABLING PROVISIONS OF
RULES & REGULATIONS MADE THEREUNDER, INCLUDING
THE NATIONAL ELECTRIC POWER REGULATORY AUTHORITY LICENSING (APPLICATION
& MODIFICATION PROCEDURE) REGULATIONS & THE NATIONAL ELECTRIC POWER
REGULATORY AUTHORITY LICENSING (GENERATION) RULES 2000

ON BEHALF OF

TAPAL ENERGY (PRIVATE) LIMITED

FOR NEPRA'S APPROVAL OF MODIFICATION OF TAPAL ENERGY (PRIVATE) LIMITED'S
GENERATION LICENSE No. IPGL/010/2003

RELATING TO A THERMAL POWER GENERATION FACILITY OF 126 MW (GROSS)

LOCATED AT

DEH GONDPASS, TAPO GABOPAT, HUB RIVER, TALUKA & DISTRICT KARACHI (WEST),
KARACHI, SINDH, PAKISTAN

DATED: November 29, 2018

LEGAL & REGULATORY CONSULTANT

HAIDERMOTABNR & Co.

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APPLICANT / LICENSEE

TAPAL ENERGY (PRIVATE) LIMITED

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TAPAL ENERGY (PRIVATE) LIMITED

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THE REGISTRAR,
NATIONAL ELECTRICAL POWER REGULATORY AUTHORITY,
NEPRA Tower, Attaturk Avenue (East)
G-5/1,
Islamabad

Date: - 29th November 2018
Ref. No.: - TEL/NEPRA/009/19

SUBJECT: APPLICATION FOR A LICENSE PROPOSED MODIFICATION OF GENERATION LICENSE NO. IPGL/010/2003 RELATING TO 126MW (GROSS) THERMAL POWER PROJECT TAPAL ENERGY (PRIVATE) LIMITED LOCATED AT DEH GONDPASS, TAPO GABOPAT, HUB RIVER, TALUKA & DISTRICT KARACHI (WEST), KARACHI, SINDH, PAKISTAN.

Dear Sir,

1. Pursuant to the applicable laws of Pakistan, including the 'Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997' (the NEPRA Act) and the rules and regulations made thereunder (including regulation 10(2) of the 'National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999' and the 'National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000') (the Applicable NEPRA Laws) submit, on behalf of the Licensee, to the National Electric Power Regulatory Authority (the Authority) an application (together with the documents attached thereto) (the Generation License Modification Application) relating to modification (the Licensee Proposed Modification) of the Licensee's Generation License No. IPGL/010/2003 read with its Modification-I dated 20th November 2018 (the Generation License) and apply, on behalf of the Licensee, to the Authority for the Licensee Proposed Modification. TAPAL ENERGY (PRIVATE) LIMITED hereby submits for NEPRA's kind consideration and approval, the Generation License Application (together with the information and annexures attached thereto).
2. The Application for a License Proposed Modification of Generation License (including its annexures) are submitted in triplicate, together with:
 - (a) a Bank Draft No. PO. 00261330 dated 06th November 2018 amounting to PKR 815,680/- (Pakistani Rupees Eight Hundred and Fifteen Thousand Six Hundred and Eighty Only) drawn in favour of NEPRA, as the application fee for a License Proposed Modification of Generation License (as communicated to us by NEPRA);
 - (b) Board resolution of Tapal Energy (Private) Limited; and
 - (c) Statements of Authorized Representatives of Tapal Energy (Private) Limited, Mr. Tabish Tapal and Mr. Mustafa Lakdawala.



**TAPAL
ENERGY**

3. In light of the submissions set out in the License Proposed Modification of Generation License and the information attached to the same, NEPRA is kindly requested to process the License Proposed Modification of Generation License Application at the earliest, thereby enabling Tapal Energy (Private) Limited to proceed further.

Respectfully submitted for and on behalf of:
TAPAL ENERGY (PRIVATE) LIMITED

.....
MUSTAFA LAKDAWALA

CHIEF FINANCIAL OFFICER AND AUTHORIZED REPRESENTATIVE



CERTIFIED TRUE COPY OF RESOLUTION
OF THE BOARD OF DIRECTORS OF
TAPAL ENERGY (PRIVATE) LIMITED
PASSED ON OCTOBER 11, 2018

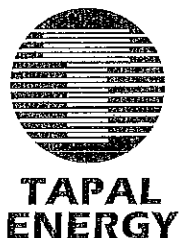
"It is hereby unanimously resolved that:

(A) TAPAL ENERGY (PRIVATE) LIMITED *(a private company duly established and existing under the laws of Pakistan with its registered office located at 155-A, Street no. 37, Sector F-10/1, Islamabad, Pakistan) (the Company):*

- (i)** having engaged a third-party engineering consultant, i.e. the renowned engineering consultant, M/S CONTINENTAL MARINE ENERGY SDN BHD (CME), MALAYSIA (the **RULA Consultant**), to carry out the detailed and exhaustive remaining useful life assessment (RULA) study of the technical installations of the Facility;
- (ii)** being in receipt of the report entitled "*Remaining Useful Life Assessment (RULA) Study Report*" dated October 1, 2018 from the RULA Consultant that has assessed and concluded, *inter alia*, that the overall condition of engines is good and the expected remaining life is more than 10 years (the **Remaining Useful Life**); and
- (iii)** being in process of extending the current term by five (5) years (the **PPA Term Extension**) (on such terms as are mutually agreed and subsequently approved by the board of directors of the Company (the **Board**) of its 'POWER PURCHASE AGREEMENT' dated September 26, 1995 entered into with **K-ELECTRIC LIMITED** *(a public limited company duly established and existing under the laws of Pakistan with its registered office located at KE House, 39-B, Sunset Boulevard, Phase-II, Defence Housing Authority, Karachi, Pakistan)* (**KE**) in respect of its 126 MW (Gross) thermal power generation facility located at Deh Gondpass, Tapo Gabopat, Hub River Road, Taluka & District Karachi (West), Karachi, Sindh, Pakistan (the **Facility**);

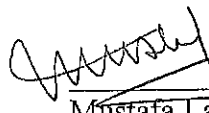
BE AND IS HEREBY AUTHORIZED to prepare, finalize, deliver, file, apply and submit, pursuant to the applicable laws of Pakistan, including the '*Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997*' (the **NEPRA Act**) and the rules and regulations made thereunder (including regulation 10(2) of the '*National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999*' and the '*National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000*') (the **Applicable NEPRA Laws**), an application (together with all documents attached thereto) (the **Generation License Modification Application**) before the **NATIONAL ELECTRIC POWER REGULATORY AUTHORITY** (the **Authority**) for the Authority's approval of the modification (the **Generation License Modification**) of the Company's generation license No. IPGL/010/2003 (the **Generation License**) to cater for, *inter alia*, the Remaining Useful Life and, as a result, the PPA Term Extension, enter into and execute all required documents, make all filings, attend all hearings, provide all required information and pay all applicable fees, in each case, of any nature whatsoever.

(B) Further Resolved That, in respect of the matters relating to the Generation License Modification Application, **Mr. Tabish Tapal** (being the chief executive officer of the Company and having CNIC No 42301-2385059-9) and **Mr. Mustafa Lakdawala** (being the chief financial officer of the Company and having CNIC No 42201-3140375-9) **Be And Are Hereby** singly and jointly appointed as authorized



representatives of the Company and are **Hereby** authorized and empowered for and on behalf of the Company, as the Company duly appointed **Authorized Representatives**, to address, perform, negotiate, decide, execute, implement and/or undertake all matters of any nature whatsoever in relation to the Generation License Modification Application including, without limitation:

- (i) review, execute, submit, and deliver the Generation License Modification Application and any related documentation required by the Authority for its approval of the Generation License Modification including any contracts, documents, powers of attorney, affidavits, statements, letters, forms, applications, deeds, guarantees, undertakings, approvals, memorandum, amendments, letters, communications, notices, certificates, request statements and any other instruments of any nature whatsoever;
- (ii) represent the Company in all negotiations, representations, presentations, hearings, conferences and/or meetings of any nature whatsoever with any entity (including, but in no manner limited to the Authority, KE, any private parties, companies, partnerships, individuals, governmental and/or semi-governmental authorities and agencies, ministries, boards, departments, regulatory authorities and/or any other entity of any nature whatsoever);
- (iii) sign, execute and deliver, for and on behalf of the Company, all necessary documentation (including any contracts, documents, powers of attorney, affidavits, statements, letters, forms, applications, deeds, guarantees, undertakings, approvals, memorandum, amendments, letters, communications, notices, certificates, request statements and any other instruments of any nature whatsoever), pay the necessary fees, appear before any entity (including the Authority, KE, any private parties, companies, partnerships, individuals, governmental and/or semi-governmental authorities and agencies, ministries, boards, departments, regulatory authorities and/or any other entity of any nature whatsoever), as required from time to time, and do all acts necessary for processing and further approval of the Generation License Modification, as applied pursuant to the Generation License Modification Application, by the Authority;
- (iv) further sub-delegate any or all of the aforementioned powers and authorities to one or more officers of the Company or any other person or persons, singly and/or jointly; and
- (v) do all such acts, deeds and things as may be necessary for carrying out the purposes aforesaid and give full effect to the above resolutions.


Mustafa Lakdawala
Company Secretary

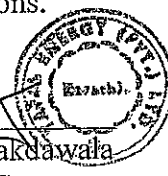


TABLE OF CONTENTS

1.	INTRODUCTION TO LICENSEE & THE PROJECT	15
2.	BACKGROUND TO THIS GENERATION LICENSE MODIFICATION APPLICATION	20
3.	TEXT OF PROPOSED GENERATION LICENSE MODIFICATION.....	24
4.	A STATEMENT OF THE REASONS IN SUPPORT OF THE PROPOSED GENERATION LICENSE MODIFICATION.....	26
5.	A STATEMENT OF IMPACT ON THE TARIFF, QUALITY OF SERVICE AND PERFORMANCE BY THE LICENSEE OF ITS OBLIGATIONS UNDER THE GENERATION LICENSE.....	31
6.	CONCLUSION	32

SECTION 1

INTRODUCTION TO LICENSEE & THE PROJECT



1. INTRODUCTION TO LICENSEE & THE PROJECT

1.1 THE LICENSEE & PROJECT DEVELOPMENT BACKGROUND

- 1.1.1 **TAPAL ENERGY (PRIVATE) LIMITED** (a company duly established and existing under the laws of Pakistan with its registered office located at 155-A, Street No. 37, Sector F-10/1, Islamabad, Pakistan) (the **Licensee**), being the applicant under this application for licensee proposed modification to generation license (this **Generation License Modification Application**), was set up and established on 1st March, 1995, for the purposes of undertaking the project (the **Project**) relating to development, setting up, implementation, construction and operation of a 126 MW (Gross) thermal power generation facility (the **Facility**) located at Deh Gondpass, Tapo Gabopat, Hub River, Taluka & District Karachi (West), Karachi, Sindh, Pakistan (the **Site**).
- 1.1.2 The following supporting documents relating to the Licensee are attached herewith as follows:
- (a) **ANNEXURE A** (*Shareholding Pattern*);
 - (b) **ANNEXURE B** (*Memorandum and Articles of Association*); and
 - (c) **ANNEXURE C** (*Certificate of Incorporation*).
- 1.1.3 It is highlighted that the Project was undertaken and implemented pursuant to Government of Pakistan's (the **GoP**) "*Policy Framework and Package of Incentives for Private Sector Power Generation Projects In Pakistan*" dated March 1994 (the **1994 Power Policy**). Key milestones relating to the developmental phase of the Project are noted below:

MILESTONE	DATE OF ACHIEVEMENT
Submission of application	June 16, 1994
Issuance of Letter of Interest	June 28, 1994
Issuance of Letter of Support	September 18, 1994
Date of Financial Closing	April 18, 1996
Commissioning Date	June 20, 1997

1.2 THE GENERATION LICENSE

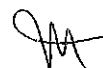
- 1.2.1 In January 1997, the Licensee initially obtained license under the Electricity Act, 1910 following satisfaction of the required legal requirements.
- 1.2.2 Following enactment of '*Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997*' (the **NEPRA Act**) and the rules and regulations made thereunder, the Licensee applied to the **NATIONAL ELECTRIC POWER REGULATORY AUTHORITY** (the **Authority**) for procurement of a generation license for its Facility and on August 26, 2003, the Authority granted the Licensee a generation license No. IPGL/010/2003 (the **Generation License**). A copy of the Generation License is attached herewith at **ANNEXURE D (Copy of Generation License)** for the Authority's reference.

1.3 THE CONTRACTUAL ARRANGEMENTS

- 1.3.1 For the purposes of the Project, the Licensee entered into various contractual arrangements, which included the following:

MILESTONE	DATE OF ACHIEVEMENT
IMPLEMENTATION AGREEMENT	August 8, 1995
POWER PURCHASE AGREEMENT	September 26, 1995
FUEL SUPPLY AGREEMENT	March 7, 1996
GOP GUARANTEE	April 18, 1996

- 1.3.2 In addition, the Licensee also entered into:
- (a) engineering, procurement and construction (**EPC**) arrangements for the Facility with world-class EPC contractors /suppliers Power Construction Company BV of Holland, Wartsila Diesel and ABB Industry of Finland; and
 - (b) operations and maintenance contractual arrangements with Wartsila Diesel Pakistan (Private) Limited.
- 1.3.3 It is however noted that since the past ten (10) years, the Licensee has been operating and maintaining the Facility through its experienced and highly skilled in-house resources and the performance of the Facility (including its efficiency and reliability) are evidence of its in-house team's excellence.



1.4 THE FACILITY TECHNICAL SUMMARY

- 1.4.1 The Facility owned, operated and maintained by the Licensee has, over two (2) decades, been a source of supply of reliable power generation for its power purchaser and exemplary in the country's power sector. Briefly, the salient technical features of the Facility, as certified and confirmed in the detailed and exhaustive remaining useful life assessment (RULA) study contained in the report entitled "*Remaining Useful Life Assessment (RULA) Study Report*" dated 1st October, 2018 and authored by the renowned engineering consultant, M/S CONTINENTAL MARINE ENERGY SDN BHD (CME), MALAYSIA, as attached hereto in ANNEXURE G (*Remaining Useful Life Assessment (RULA) Study Report*) (the RULA Study Report), are provided below for the Authority's reference:

FACILITY GROSS CAPACITY	126 MW
NET DEPENDABLE CAPACITY	123.5 MW
FUEL & TECHNOLOGY	HFO/LFO – Diesel Engine, Stork - Wartsila, Model 18V38
FACILITY CONFIGURATION	12 Internal Combustion Diesel Engines

- 1.4.2 Further, it is highlighted that the Facility (as confirmed by the RULA Study Report):

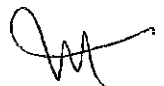
- (a) was designed, engineered and constructed by POWER CONSTRUCTION COMPANY BV of Holland with WARTSILA DIESEL and ABB INDUSTRY of Finland being the equipment suppliers;
- (b) was designed for continuous operation on heavy fuel oil with start and stops on light fuel oil;
- (c) is equipped with modern fuel handling, storage and purification system;
- (d) has an operation method that is automatic, with automatic synchronizing and load sharing using a PLC based control system; and
- (e) generates power at 11 kV, which is stepped up to 132 kV through three main transformers and subsequently supplied to the power purchaser's grid system.

1.5 THE GENERATION LICENSE FIRST MODIFICATION APPLICATION

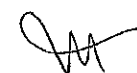
- 1.5.1 It is highlighted for the Authority's benefit that the Licensee previously submitted an application dated May 22, 2018 (the **Generation License First Modification Application**) for modification of its Generation License. The reason for submission of

the Generation License First Modification Application was to request for an extension of the term of the Generation License in order to bring the same in line with the current full term of its Power Purchase Agreement i.e. till June 19, 2019.

- 1.5.2 The Authority's approval in relation to the Generation License First Modification Application was received by the Licensee vide the Authority's communication on November 20, 2018 (the **NEPRA First Modification Approval**) through which the Generation License of the Licensee was extended up to June 19, 2019. The NEPRA First Modification Approval is attached herewith as **ANNEXURE E (NEPRA First Modification Approval)** for your ready reference.



SECTION 2
BACKGROUND TO THIS GENERATION LICENSE
MODIFICATION APPLICATION



2. BACKGROUND TO THIS GENERATION LICENSE MODIFICATION APPLICATION

2.1 THE REMAINING USEFUL LIFE

- 2.1.1 As highlighted in Section 1 (*Introduction To Licensee & The Project*), the Licensee engaged a third party engineering consultant, i.e. the renowned engineering consultant, M/S CONTINENTAL MARINE ENERGY SDN BHD (CME), MALAYSIA (the **RULA Expert**), to carry out the RULA study of the technical installations of the Facility. As further detailed in Section 4.2 (*Considerations In Respect Of Useful Life Of The Facility*), it is preliminarily noted that the RULA Expert has concluded, based on its extensive analysis (as contained in the RULA Study Report), that the overall condition of engines is 'Good' and the expected remaining life is more than Ten (10) years (the **Remaining Useful Life**).
- 2.1.2 In view of the RULA study carried out by the RULA Expert and the conclusions asserted by the same in the RULA Study Report, the Licensee submits to the Authority that this Generation License Modification Application primarily aims to extend the term of its Generation License so as to match it with the Remaining Useful Life of the Facility i.e. June 19, 2029 (the **Proposed Generation License Expiry Date**).

2.2 THE POWER PURCHASE AGREEMENT

- 2.2.1 For the purposes of, *inter alia*, sale of the power generated by the Facility and to set out the terms and conditions relating to the same, the Licensee entered into an agreement entitled 'POWER PURCHASE AGREEMENT' dated September 26, 1995 (the **Power Purchase Agreement**) with **K-ELECTRIC LIMITED** – formerly Karachi Electric Supply Corporation Limited (*a public limited company duly established and existing under the laws of Pakistan with its registered office located at KE House, 39-B, Sunset Boulevard, Phase-II, Defence Housing Authority, Karachi, Pakistan*) (**KE**).
- 2.2.2 It is highlighted, specifically for the purposes of this Generation License Modification Application, that the current term of the Power Purchase Agreement, as set out therein in terms of its section 4.1(a), is twenty-two (22) years, unless terminated earlier (the **Current PPA Term**).
- 2.2.3 In addition, it is noted that the Power Purchase Agreement also contemplates a mechanism for renewal of the Power Purchase Agreement prior to its expiry in terms of its section 4.1(c), which states as follows:

"Following the end of the twentieth (20th) Agreement Year, at the request of either Party, the Company and KESC agree to enter into good faith negotiations for a renewal of this Agreement for an additional term of five (5) Agreement Years on terms and conditions mutually agreed to by the Parties."

- 2.2.4 It is highlighted that the Licensee, as part of performance of its obligations under the Power Purchase Agreement, has a very significant role in supply of power to the west

side of KE transmission network as the entire power generated by the Licensee is transmitted to KE grid stations of Baldia and Hub – the same being the power suppliers to major industrial and commercial customers of KE. During the peak summer months, the Facility runs as a base load plant that dispatches as high as ninety-five percent (95%).

2.3 THE CONTEMPLATED EXTENSION OF THE TERM OF THE POWER PURCHASE AGREEMENT FOR OPTIMIZATION OF THE REMAINING USEFUL LIFE

2.3.1 Considering, *inter alia*, that the Licensee has successfully operated its Facility; has catered for KE's consumer requirements by generating around 745.543 GWH per annum; has met its obligations under the Power Purchase Agreement over nearly twenty-one (21) years; and the Remaining Useful Life of the Facility, the Licensee and KE, in pursuance of their rights emanating from section 4.1(c) of the Power Purchase Agreement, have been engaged in discussions for extending the term of the Power Purchase Agreement for an additional period of five (5) years (the **PPA Term Extension**).

2.3.2 It is highlighted, for the Authority's benefit, that the Licensee has already requested KE to issue a letter of consent to purchase power for the PPA Term Extension. In response to the Licensee's request, KE has issued its consent vide KE's letter (Ref No. BD/AH/TEL-0286/2018-1022) dated October 22, 2018 (the **KE Power Purchase Consent**) to purchase power during the PPA Term Extension. A copy of the KE Power Purchase Consent is attached hereto at **Annexure F**. The Licensee takes this opportunity to highlight that in the KE Power Purchase Consent, KE notes that:

"the continued availability of [the Facility] is an integral part of our strategy to meet our future demand and its contribution to the system stability of the 132 kV network due to [the Facility's] strategic location in Karachi's North West zone."

2.3.3 The integral nature of the Facility's continued operation to KE's strategy in meeting its future demand and maintaining system stability is corroborated further by KE's commitment to separately file a power acquisition request for acquisition of power from the Licensee prior to submission by the Licensee of its reference generation tariff petition. Summarily, the Licensee and KE are committed to the PPA Term Extension and will satisfy all regulatory requirement to achieve the same.

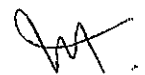
2.4 THIS APPLICATION FOR MODIFICATION OF GENERATION LICENSE

2.4.1 Based on the objective assessment verifying the Remaining Useful Life of the Facility and in an effort to ensure effective utilization of the same; the KE Power Purchase Consent; and the PPA Term Extension being currently finalized between the Licensee and KE and in light of matters set out in this Generation License Modification Application, the Licensee has prepared and submitted this Generation License Modification Application for modification of its Generation License to request a modification that extends the term of the Generation License until the Proposed Generation License Expiry Date – the text of such modification being expressly set out

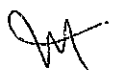
in Section 3 (*Text Of Proposed Generation License Modification*) (the **Proposed Generation License Modification**).

2.5 SUBMISSION

- 2.5.1 PURSUANT TO the applicable laws of Pakistan, including the NEPRA Act and the rules and regulations made thereunder (including regulation 10(2) of the '*National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999*' and the '*National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000*'): **TAPAL ENERGY (PRIVATE) LIMITED HEREBY SUBMITS**, for the Authority's kind and gracious consideration, this Generation License Modification Application for approval of the Proposed Generation License Modification to ensure that the Generation License is valid until the Proposed Generation License Expiry Date.
- 2.5.2 This Generation License Modification Application is submitted in triplicate.
- 2.5.3 This Generation License Modification Application is being submitted with the required generation license modification fee (as communicated by the Authority) through a non-refundable bank draft/pay order in the amount of PKR 815,680/- (Pakistani Rupees Eight Hundred Fifteen Thousand Six Hundred and Eighty Only) dated November 06, 2018 drawn in favor of the Authority.



SECTION 3
TEXT OF PROPOSED GENERATION LICENSE
MODIFICATION

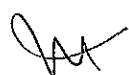


3. TEXT OF PROPOSED GENERATION LICENSE MODIFICATION

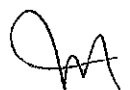
3.1 THE PROPOSED TEXT

- 3.1.1 In view of the matters set out in this Generation License Modification Application, including, without limitation, to ensure that the term of the Generation License caters to ensure its term is valid until the Proposed Generation License Expiry Date, the Proposed Generation License Modification amends article 4 of the Generation License as follows:

“(1) Pursuant to Rule 5 of the Rules, this License is granted for a term of Twenty five years and Ten Months (25 years and 10 months), i.e. until June 19, 2029.”



SECTION 4
A STATEMENT OF THE REASONS IN SUPPORT OF
THE PROPOSED GENERATION LICENSE
MODIFICATION

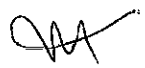


4. A STATEMENT OF THE REASONS IN SUPPORT OF THE PROPOSED GENERATION LICENSE MODIFICATION

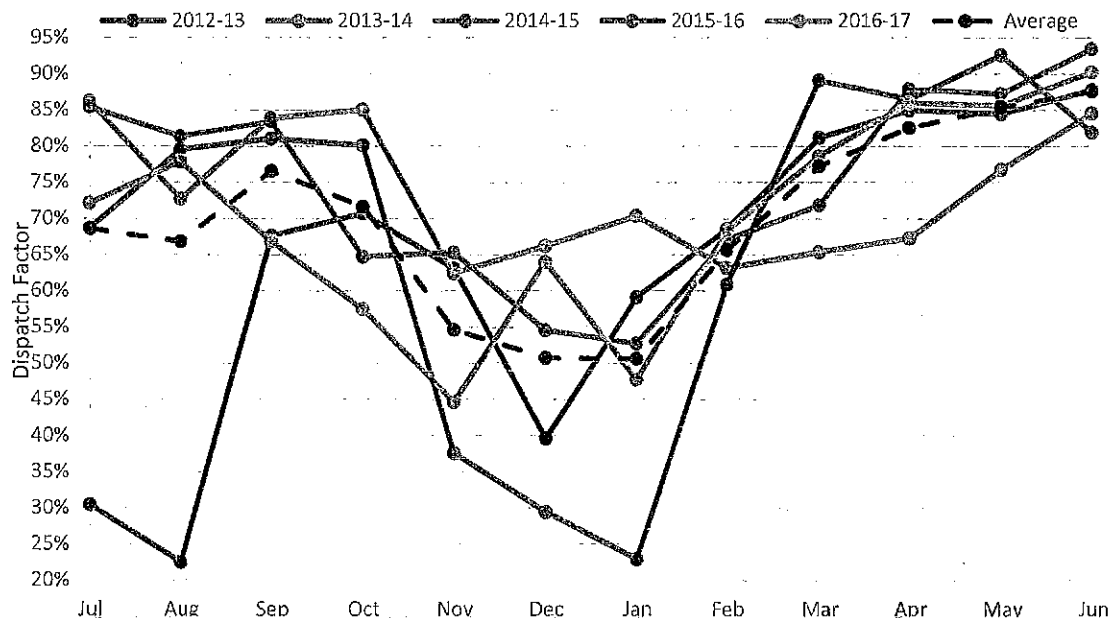
4.1 SUBMISSIONS RE-EMPHASIZED

4.1.1 Without in any manner limiting the submissions made in other sections of this Generation License Modification Application (which shall stand deemed incorporated in this Section 4 (*A Statement of The Reasons In Support Of The Proposed Generation License Modification*) for the benefit of the Authority), it is re-emphasized that:

- (a) the Licensee has successfully operated its Facility; has catered for KE's consumer requirements by generating around 745.543 GWH per annum; and has met its obligations under the Power Purchase Agreement over nearly twenty-one (21) years (commencing from 'Commercial Operations Date' (*as defined in the Power Purchase Agreement*), the Licensee and KE, in pursuance of their rights emanating from section 4.1(c) of the Power Purchase Agreement, have been engaged in discussions in respect of PPA Term Extension and which discussions are at an advanced stage and are expected to be finalized prior to the expiry of the Current PPA Term;
- (b) the Proposed Generation License Modification aims to ensure that the term of the Generation License caters to the Remaining Useful Life of the Facility as, in terms of the applicable laws of Pakistan (including the NEPRA Act and the rules and regulations made thereunder), the Authority's approval of the Proposed Generation License Modification is an essential requirement for effective utilization of the Facility (including implementation of the PPA Term Extension) until the Proposed Generation License Expiry Date;
- (c) the Authority's approval of the Proposed Generation License Modification and the subsequent implementation by KE and the Licensee of the PPA Term Extension will ensure continued supply of reliable electricity to the consumers of KE until June 19, 2024 – a critical consideration in light of the current power generation capacity and demand in KE's distribution area; and
- (d) the Licensee has a very significant role in supply of power to the west side of KE transmission network as the entire power generated by the Licensee is transmitted to KE grid stations of Baldia and Hub – the same being the power suppliers to major industrial and commercial customers of KE. It is highlighted that during the peak summer months, the Facility runs as a base load plant that dispatches as high as 95%. The monthly load pattern of dispatch from the Facility is set out below for the Authority's reference and the same evidences the Facility's contribution during the peak summer months and the Licensee's role as part of the embedded generation projects of KE:



5 Years Dispatch Pattern of the Licensee



4.2 CONSIDERATIONS IN RESPECT OF USEFUL LIFE OF THE FACILITY

4.2.1 The Authority is highlighted rule 5(1) of the National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000 (the Rules) that states as follows:

5(1) *Except where an applicant for a generation licence consents to a shorter term, the term of a generation licence shall be commensurate with the “maximum expected useful life of the units comprised in a generation facility demonstrated to the satisfaction of the Authority. [Emphasis Added]”*

4.2.2 As highlighted in Section 1 (Introduction To Licensee & The Project), in view of the afore-stated criteria laid out by rule 5(1) of the Rules and for the purposes of conclusively evidencing compliance with the same, the Licensee engaged a third party engineering consultant, i.e. the renowned engineering consultant, M/S CONTINENTAL MARINE ENERGY SDN BHD (CME), MALAYSIA, to carry out the RULA study of the technical installations of the Facility. The RULA study was completed at the end of September and the RULA Study Report was submitted by the M/S CONTINENTAL MARINE ENERGY SDN BHD (CME), MALAYSIA to the Licensee, as attached hereto at ANNEXURE G (Remaining Useful Life Assessment (RULA) Study Report).

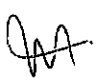
4.2.3 For the Authority’s benefit and reference, without in any way limiting the comprehensive analysis presented in the RULA Study Report, section 13 (Conclusion & Recommendation) is set out below:

“13.0 Conclusion & Recommendations

The study carried out to assess the condition of engines and critical electrical components covering generator and power transformer concluded with ratings Very Good, Good and Acceptable condition and expected remaining useful life. It is pertinent to mention that the qualitative condition assessment and expected life is based on good O&M management practices, well maintained inspection, maintenance and other monitoring records, timely execution of inspection and maintenance work order, replacement of component as per preventive spares and follow instructions of troubleshooting as per OEM practices.

Based on study, following recommendations are made:

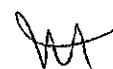
- (a) The overall condition of Engines is 'Good' and the expected remaining life is 10 years. The condition of Generator units is generally found to be in range from 'Good' to 'Acceptable' with expected safe remaining useful life of up to 10 years. The condition of all Power Transformers have been found to be 'Very Good' with expected life more than 15 years.*
- (b) The condition of storage tanks at the plant facility is 'Very Good'. Despite the quantitative remaining life reported in the recent inspection reports are suggesting beyond 15 years. However, due to aging corrosion is expected to increase specially at attachments (Nozzles, Saddles, Staircase and other Structure, base plates, top sides of tanks etc.). At present, the rates of corrosion currently are under acceptable limits. More robust risk based inspection and fabric maintenance, coating and external inspection monitoring over the years is needed together with audits of the safety and fire systems.*
- (c) Tapal Energy (Pvt.) Ltd. (the Asset Owner) to continue existing O&M Practices for the upkeep of the assets, follow OEM recommended guidelines for the time driven maintenance and inspection of engines and other critical assets.*
- (d) Asset Owners may evaluate the requirements for further Condition Based Maintenance practices, such as continued focus on Vibration Monitoring, Thermographic Imaging and other use of NDT advanced methods (Acoustics). This can be done by independent plant machinery vibration analysis methods at a periodic level. The objective is to collect data, identify vibrations zones and therefore, based on these studies improve Maintenance strategy and control on aging, failures and leakages.*
- (e) Some of the critical Engine components such as Camshaft, Pistons, and its associated mechanical components require continued focus in the inspection and maintenance reporting e.g. photographic recordings, sample micro examination of cam shaft wear etc. The objective is to capture signs of wear, aging etc. It is also recommended that OEM guidelines for the camshaft inspection pertaining to wear may be consulted for further improvement in inspection reporting.*
- (f) It is recommended that condition assessment methodology followed in this study be practiced at regular levels to validate the findings. Next Condition Assessment can be done in 5 years (2023) and further*



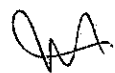
ascertain the expected life of engines and critical machinery components and other assets. The condition assessment may support asset owner in cost benefit and end of economic life assessments to benefit the business.

- (g) *It is recommended to follow the testing and inspection activities as suggested through LEAP test results for all Generators in order to ensure the updated assessment of their conditions and subsequent corrective actions (if any) to be taken."*

- 4.2.4 In light of afore-stated, the matters set out herein and the conclusions drawn in the RULA Study Report, the Licensee expects and intends to operate the facility for at least another Ten (10) years. Thus, the Licensee submits to the Authority, so that the Licensee may continue to generate power for sale to KE, to approve the Proposed Generation License Modification to ensure utilization of the Facility until the Proposed Generation License Expiry Date (including the implementation of the PPA Term Extension) – it being clearly evident that the Remaining Useful Life of the Facility stands confirmed by the RULA Study Report.



SECTION 5
A STATEMENT OF IMPACT ON THE TARIFF,
QUALITY OF SERVICE AND PERFORMANCE BY
THE LICENSEE OF ITS OBLIGATIONS UNDER THE
GENERATION LICENSE



5. A STATEMENT OF IMPACT ON THE TARIFF, QUALITY OF SERVICE AND PERFORMANCE BY THE LICENSEE OF ITS OBLIGATIONS UNDER THE GENERATION LICENSE

5.1 IMPACT ON TARIFF

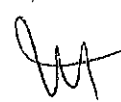
- 5.1.1 The Authority is highlighted that the Licensee has (simultaneously with submission of this Generation License Modification Application) submitted before the Authority, for its kind consideration and approval, and has filed (in accordance with the applicable laws of Pakistan (including the NEPRA Act and the rules and regulations made thereunder) a tariff petition for determination of the Licensee's reference generation tariff beyond the Current PPA Term and for the PPA Term Extension.

5.2 IMPACT ON QUALITY OF SERVICE & PERFORMANCE

- 5.2.1 The Licensee confirms that the Licensee's quality of service and its performance under the Generation License will not be affected during the period relating to the Remaining Useful Life. The Licensee, over two (2) decades, has been fully diligent and has dedicated itself to providing highest quality services -- setting a benchmark for exceptional performance and excellence in the power generation sector of Pakistan. The Licensee aims to continue with such performance and anticipates to play a continued pivotal role in reducing the electricity demand supply gap in the KE network.

5.3 IMPACT ON THE OBLIGATIONS OF THE LICENSEE UNDER THE LICENSE

- 5.3.1 The approval of the Proposed Generation License Modification would enable the Licensee in fulfilling its obligations under the Power Purchase Agreement upon implementation of the PPA Term Extension and, beyond that, until the Proposed Generation License Expiry Date. The Authority is highlighted that the Licensee has to-date always strictly complied with the terms of the Generation License and commits to continue to do the same.



6. CONCLUSION

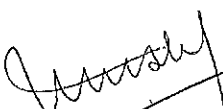
6.1 CONCLUSION

- 6.1.1 In light of the submissions, the relevant analysis and information contained in this Generation License Modification Application, along with the Annexures attached hereto, this Generation License Modification Application is submitted (pursuant to the applicable laws of Pakistan, including the 'Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997' and the rules and regulations made thereunder (including regulation 10(2) of the '*National Electric Power Regulatory Authority Licensing (Application & Modification Procedure) Regulations, 1999*' and the '*National Electric Power Regulatory Authority Licensing (Generation) Rules, 2000*')) for the Authority's kind consideration and for its approval of the Proposed Generation License Modification.

Respectfully submitted,

FOR AND ON BEHALF OF:

TAPAL ENERGY (PRIVATE) LIMITED




.....
MR. MUSTAFA LAKDAWALA

CHIEF FINANCIAL OFFICER & AUTHORIZED REPRESENTATIVE OF
TAPAL ENERGY (PRIVATE) LIMITED

Annexure G – Remaining Useful Life Assessment (RULA) Study Report



OCTOBER 1, 2018

REMAINING USEFUL LIFE ASSESSMENT (RULA) STUDY REPORT

TAPAL ENERGY (PRIVATE) LTD, KARACHI, PAKISTAN

AUTHORED BY: CONTINENTAL MARINE ENERGY SDN BHD

KUALA LUMPUR, MALAYSIA

www.cm-energy.com.my

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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DOCUMENT CONTROL

Document No		PP-5031/RULA - Volume No. 1		
Revision	Dated	Prepared By	Approved By	Reason for Revision
0	19 th September 2018	YAH, MAs, UMS	Shoaib Arshad, Plant Manager	Draft Report
1	1 st October 2018	YAH,MAs	Tapal Energy (Pvt.) Ltd	Final

DISCLAIMER STATEMENT

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CONTENTS

About this Report	5
Salient Information of Facility	6
Definitions	7
1.0 Introduction	10
2.0 Executive Summary	11
3.0 Purpose of Study	13
4.0 Context of Asset Life	14
4.1 Design Life	14
4.2 End of Economic Life	14
4.3 End of Physical Life	15
4.4 End of Service Life	16
4.5 End of Financial Life	16
4.6 Expected Remaining Useful Life	17
4.7 Obsolescence	17
4.7.1 Technological obsolescence	18
4.7.2 Regulatory obsolescence	18
4.7.3 Functional obsolescence	18
5.0 Approach of Study	19
6.0 Methodology of Condition Assessment	20
7.0 Data Requirements	23
8.0 Scope of Study	25
8.1 Mechanical Components	25
8.2 Electrical Components / Systems	25
8.3 Storage Tanks & Pressure Vessels	26
9.0 Plant Design & Construction	27
10.0 Operations & Maintenance Practices	30
10.1 Process Safety Management Systems	31
10.2 Maintenance Management System	32

10.3	Plant Availability Factor	33
10.4	Environmental Management System	34
10.5	Historical Major Modifications Summary	35
10.6	Spares Management	35
11.0	Condition Assessment of Mechanical Components	36
11.1	Engine Block with Bearings, Cylinder Liner & Oil Sump	37
11.2	Crankshaft, Connecting Rod and Piston	38
11.3	Camshaft	39
11.4	Valve Drive Mechanism	40
11.5	Turbochargers	41
11.6	Air Cooling	42
11.7	Lubrication Oil System	43
11.8	Starting Air System	44
11.9	Exhaust System	45
11.10	Cooling Water System	46
11.11	Condition Assessment of Storage Vessels	47
12.0	Condition Assessment of Electrical Components	49
12.1	Electrical Generators	49
12.1.1	Life Expectancy Analysis Program (LEAP) & Electrical Tests	50
12.1.2	Summary of RUL Assessment of Electrical Generators	51
12.1.3	Physical Inspection and Review of O&M Practices	52
12.2	Power Transformers	53
12.2.1	Oil Analysis Results	54
12.2.2	Winding Temperature Analysis	56
12.2.3	Physical Inspection	56
12.3	Summary of RUL Assessment of Power Transformers	57
12.4	RUL Assessment of Transformer Unit 01 (TR-01)	58
12.4.1	TR-01 Oil Analysis Results	58
12.4.2	TR-01 Winding Temperature Analysis	62

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
---	---	---

12.4.3	TR-01 Physical Inspection and Review of O&M Practices	63
12.5	RUL Assessment of Transformer Unit 02 (TR-02)	64
12.5.1	TR-02 Oil Analysis Results	64
12.5.2	TR-02 Winding Temperature Analysis	69
12.5.3	TR-02 Physical Inspection and Review of O&M Practices	71
12.6	RUL Assessment of Transformer Unit 03 (TR-03)	72
12.6.1	TR-03 Oil Analysis Results	72
12.6.2	TR-03 Winding Temperature Analysis	76
12.6.3	TR-03 Physical Inspection and Review of O&M Practices	78
13.0	Conclusion & Recommendations	79
14.0	References & Bibliography	81
Appendix – A	Tapal Energy Pvt. Ltd. Organogram	83
Appendix – B	18V38 OEM Recommended Inspection & Maintenance Schedule.....	85
Appendix – C	Operations Records, Availability Factor	95
Appendix – D	Environment Performance Monitoring Report 2017-18.....	100
Appendix – E	Summary of Historical Modification Records	119
Appendix – F	Plant Critical Spares Records	127

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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About this Report

This report is prepared by M/s Continental Marine Energy Sdn Bhd (CME), Malaysia. CME is appointed by the asset owners, Tapal Energy Pvt. Ltd. as independent Consultants. The role of CME is to conduct condition assessment study under agreed scope of equipment and provide conclusion on remaining useful life.

The report is structured in two Volumes (Volume No. 1 and Volume No. 2). The Volume No. 1 is the main report covering executive summary, definitions, approach, methodology, condition assessment results, conclusion and recommendations with cited Appendix (Appendix A to F). Whereas, the Volume No. 2 mainly covers Appendix (Appendix G1 and G2), citing historical O&M (Operations and Maintenance) records, OEM assessments, third party reports and other inspection records with physical verification data that have been referred during the condition assessment analysis in this study and as stated in the Volume No 1 of this study report.

For technical enquiries about this report, the first point of contact are asset owners (Tapal Energy Pvt. Ltd.). However, CME Sdn. Bhd. Malaysia as Consultants can also be approached at info@cm-energy.com.my citing reference number of this report and specific enquiry.

Salient Information of Facility

Below is the summary of plant assets important information.

Plant Gross Capacity	126 MWe (Gross)
Net Dependable Capacity	123.5 MWe
Plant Location	District West, Karachi, Sind, Pakistan
Fuel and Technology	HFO/LFO – Diesel Engine, Stork - Wartsila, Model 18V38
Plant Configuration	12 Internal Combustion Diesel Engines
Plant Commissioning Date	June 20, 1997
Plant / Facility Design Life	30 Years



Definitions

Assessment	Putting the inspection and other data into context and making a judgment as to the condition of the system or asset
Asset	A physical component of a facility that has value, enables services to be provided, and has an economic life of greater than 12 months or business specified timeframe based on accounting principles.
Asset Failure	When an asset is no longer providing the service or function for which it is intended.
Asset Management	The combination of management, financial, economic, engineering and other practices applied to assets with the objective of providing the required level of service to customers and the environment at acceptable levels of risk and in the most efficient manner
Asset Observation	All information that relates to assets, their environment, and operation, upkeep, spares in case of failure and bringing them back to needed function to operate.
Condition Assessment	Structured engineering approach which require review of asset life cycle activities such as design, construction and operational data along with physical verification to conclude the condition of the asset (s).
Inspection	To collect and verify asset observations relating to condition and performance of a given asset or its component or sub component.



Remaining Useful Life Study Report Tapal Energy (Private) Ltd.



Intervention	To undertake capital or operational works to repair, replace or renovate an asset (s).
Levels of Service	Defined measures of performance or benefit as received by the community and environment. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability, and cost
Maintenance	All actions necessary for retaining an asset as near as practicable to its original condition, excluding renewal.
Monitoring	The repeated observations over time of some aspect of an asset especially to detect and give warning of change
Performance	A measure of a system or asset's ability to function in accordance with expected requirements or defined targets given the local operating context and intended purpose
Preventive Maintenance (PM)	A pre-defined scheduled maintenance activity based on OEM recommendation to restore the function of the system or sub system and ensure the desired reliability of function.
Rehabilitation	Works to rebuild or replace parts or components of an asset, to restore it to a required functional condition, which may incorporate some modification
Remaining Life	It is defined as the remaining operational life that asset can perform to accomplish the stated function without any risks. Mathematically it is obtained by subtracting the expected service life from asset current age. Remaining life = (Expected service life) – (Asset current age)

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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Renewal	Works to rehabilitate or replace existing assets with assets of equivalent capacity or performance capability
Replacement	Provide a new asset in place of an existing asset that has reached the end of its life, so as to provide a similar function or level of service
Repairable	The terms used in the study to define or cover the components who have specific life (hours etc.) and are recommended to be replaced at time scale based on design/OEM guidelines to ensure the system reliability is maintained.
Risk	A measure of the combination of the consequence of an event occurring and the probability or likelihood of the event occurring. Often defined mathematically as the product of the probability and consequence of failure
Structural Condition	The state of an asset at a particular time as it pertains to the degree of physical deterioration and/or propensity for failure
Technique	A defined procedure or methodology used to accomplish a specific activity or task
Tool	An instrument, device or software package used to collect or interpret asset observations

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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1.0 Introduction

Tapal Energy Private Limited (short TEL) is a joint venture Independent Power project of local and international investors set-up to build, own and operate a 126 MW thermal power (Gross) plant to supply electricity to K-Electric Limited (Formerly Karachi Electric Supply Corporation).

The Project has entered into various key agreement namely the Implementation Agreement with Government of Pakistan which provides Sovereign Risk cover to the company and guarantees the payments of the relevant public sector entities; the Power Purchase Agreement with K- Electric Limited. for bulk sale of electricity and the Fuel Supply Agreement with Pakistan State Oil Company Ltd. for supply of fuel.

The plant has been designed, engineered and constructed by Power Construction Company BV of Holland, Wartsila Diesel and ABB Industry of Finland are the equipment suppliers. The Diesel Power Plant is designed for continuous operation on Heavy Fuel Oil with start and stops on Light Fuel Oil. The plant is equipped with modern fuel handling, storage and purification system. The operation method is automatic, with automatic synchronizing; load sharing using a PLC based control system. Power is generated at 11 kV and is stepped up to 132kV through three main transformers and supplied to the K-Electric Limited grid system. The plant meets the Government of Pakistan's Environment and safety standards. The Company prides in employing highly technically trained locals who are capable of performing complex mechanical or electrical repair and maintenance with minimum input from the OEM.

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2.0 Executive Summary

This remaining useful life assessment study report is carried out from August to October 2018 covers main mechanical and electrical assets. The scope is to perform technical assessment and evaluate the current condition of assets and hence estimate the expected remaining useful life of each of the twelve (12) diesel engine generator sets and three power transformers. The approach and methodology in para 6 and 7 respectively follows the international best practice, widely followed for the remaining life assessment of marine internal combustion diesel engines. The study approach in para 6 focuses on the data review of the operation and maintenance (O&M), third party inspection and testing reports, review of condition based trends covering temperature, pressure, oil samples, site physical inspections, review of mechanical wear on critical components; where available and supported quantitative assessments of the components to facilitate the qualitative decision making. The methodology as stated in para 7 for condition assessment follow a rating scale of 1 to 4 (1 being 'Very Good' condition, having expected remaining life > 15 years and 4 being Poor or Not acceptable, having expected remaining life less than 5 years). In this study, Unit no 11 was taken off for the routine overhaul and was thoroughly examined by the team of engineers from owners and consultants as part of the study.

After critical assessment and review of O&M, condition monitoring information, it is concluded that the twelve units including power transformers are all found in sound condition and are fit for the continued service for another 10 years, provided Tapal Energy Pvt. Ltd O&M team

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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team continue to manage and upkeep assets as per current management standards and practices. The report also generates some recommendations in para 12, to support the upkeep and good maintenance of assets in line with OEM recommended and good engineering practices. The power transformers are condition assessed, and found to be in sound condition. They are expected to have remaining useful life of 10 years. The storage tanks, vessels were also condition assessed and are found in very good condition with expected remaining life of 15 years.

Table 1.1 outline the summary of the Condition assessment and provides the estimated remaining life (years) unit wise.

Condition Assessment - Diesel Generating Sets													
DG Unit #	Block, Bearings, Liner	Crank Shaft, Connecting Rod	Cylinder Head , Valves	Camshaft, Driving Gears	Valve Drive Mechanisms	Turbocharger	Injection System	Fuel System	Lubrication Oil system	Cooling Water System	Starting Air System	Generator	Expected Remaining Life (Years)
1	VG	G	G	G	G	G	G	G	G	G	G	VG	10 Years
2	VG	G	G	G	G	G	G	G	G	G	G	A	10 Years
3	VG	G	G	G	G	G	G	G	G	G	G	G	10 Years
4	VG	G	G	G	G	G	G	G	G	G	G	G	10 Years
5	VG	G	G	G	G	G	G	G	G	G	G	A	10 Years
6	VG	G	G	G	G	G	G	G	G	G	G	G	10 Years
7	VG	G	G	G	G	G	G	G	G	G	G	G	10 Years
8	VG	G	G	G	G	G	G	G	G	G	G	A	10 Years
9	VG	G	G	G	G	G	G	G	G	G	G	A	10 Years
10	VG	G	G	A	G	G	G	G	G	G	G	A	10 Years
11	VG	G	G	G	G	G	G	G	G	G	G	A	10 Years
12	VG	G	G	A	G	G	G	G	G	G	G	A	10 Years

Table 1.1 Condition Assessment Rating for Engines,
Very Good (VG); Good (G); Acceptable (A); Not Acceptable (Poor) NA

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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3.0 Purpose of Study

Condition and Remaining Useful Life Assessment is aimed at determining and assessing the actual technical condition of engines (mechanically) and critical electrical installations (limited to Power Transformers) at a given point of time. This is done by reviewing the historical design, construction, maintenance, repairs, monitoring, inspection and testing programs in place by the skilled and competent TEL O&M team at plant facility.

This study is part of the TEL Management initiatives to get independent assessment of current condition of the assets through a structured approach, methodology based on good engineering practices. The outcome of this study shall facilitate the independent and impartial decision making and further business and commercial planning.

TEL management is aware of ageing assets and challenges to face the issues of materials degradation and technology obsolescence can potentially limit the expected life. However, this study is part of the Plant life management, is focused to understand the O&M practices, OEM recommended maintenance and upkeep of assets and assess the estimated life for service. Under certain conditions prospects on operational asset risks will be done as needed to support the qualitative basis of the condition assessment of sub components as stated.



4.0 Context of Asset Life

The context of asset life which fundamentally differ for the repairable component vs non repairable components due to theories of asset reliability at a component and system levels. However, in this study report, the context of asset life is subject to discussion and assessment of repairable systems only with defined life measured in hours, years or cycles. The context of asset life is based on OEM (Original Equipment Manufacturer's) specification or where not known based on good engineering practices.

4.1 Design Life

Asset design life is the period of time over which the asset is expected to be available for use and able to provide the required level of service at an acceptable cost and level of risk. Design life is inherently associated with the expected life of the asset at the start of the asset's life cycle. It is based on OEM's or Manufacturers or Design basis. The service life of an asset is taken to be the length of time over which the asset is actually available for use and able to provide the required level of service at an acceptable cost and level of risk. An asset may be operated past the point where it should be replaced for financial, risk or service considerations, thus the asset's operational life may exceed the 'service life', as defined above. Normally, the Internal Combustion engine based power plants are designed for 25 to 30 years as design life.

4.2 End of Economic Life

Asset renewal is inherently linked to the economics factors that underline the replacement decision. In turn, this means that the concept of remaining asset life is intimately linked with economic factors. The question is frequently not whether the asset is at the end of its physical



life (i.e., is structurally derelict), but whether it is more economic to retain or substantially rehabilitated or replace it. A range of factors can influence this. The life of an asset is not only determined just by deterioration, but also by unit costs of repair and rehabilitation work, and by changes to technical specifications/requirements and service standards. Similar assertions can be made for other asset categories. When considered in this light, an asset will thus have an optimal time of renewal, which may vary as technical and commercial innovations occur. The period over which it is more economic to retain an asset can be referred to as the economic life, and the end of economic life can be taken to be the point in time where renewal is the most beneficial option available. In summary, the end of the economic life for an asset can be defined as the point in time when the present value of the future operation, maintenance and risk costs exceeds the current costs of replacing or rehabilitating the asset.

4.3 End of Physical Life

At a fundamental level, remaining asset life is related to structural integrity of an asset, in that once structural integrity has passed beyond an acceptable level, such that the asset can no longer provide the required functionality and cannot be repaired, it can be considered to be at the end of its physical life. Such assets will need a significant level of investment (in proportion to the cost of the asset) to bring back to the state where function can be provided or will need to be replaced.



4.4 End of Service Life

The service life of an asset is defined as the period of time over which the asset is actually available for use and able to provide the required level of service at an acceptable risk; e.g., without unforeseen costs of disruption for maintenance and repair. End of service life implies that the asset is no longer able to provide the required level of service and/or there are unforeseen maintenance costs and/or repairs. In some cases, end of service life is driven solely by service provision considerations, rather than financial ones. A good example is a sewer that blocks repeatedly. From a purely financial perspective, it may be more advantageous to keep on clearing the blockage. However, minimum service provision considerations (In this case, expressed in terms of acceptable blockage rates) can mean such an option is not, in practice, available. It is also sometimes necessary to consider service risk: i.e. assets may be replaced because they pose a risk to future service provision, rather than because of a poor service history. In summary, the end of service life occurs when the asset is no longer able to provide the required level of service at an acceptable level of risk.

4.5 End of Financial Life

Every asset owned by a power plant is subject to deterioration over some time scale (whether months to decades) resulting in a reduction in future service potential. This consumption of service potential is recognized in financial reports as a loss of capital value; this loss of value is termed depreciation. In financial accounting, depreciation is a method for attributing the cost of an asset across its life. In practice, the capital value of the asset is spread over the period in which it is expected to provide service. The capital value of the asset can be expressed in historical terms (i.e. the original cost of acquiring the asset in question), or in 'modern equivalent terms' (i.e. the cost of replacing the asset with a modern equivalent asset;



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the modern equivalent could be cheaper or more expensive due to technical innovation and other commercial factors). The fact that an asset is fully depreciated does not mean that it is at the end of its useful life.

4.6 Expected Remaining Useful Life

The expected remaining asset useful life is defined as the remaining life of the asset at its component or sub component level. It is the remaining useful life of the component or system that is obtained based on sound technical assessments/judgment. This can be done based on O&M and upkeep of assets across the asset life cycle.

4.7 Obsolescence

Another factor that can influence when an asset is considered at the end of its life is obsolescence. Assets can become obsolete as a result of developments in technology. In some cases, this can lead to the situation where it is cost-effective to replace the asset well before its design life has been reached. The asset may still be functioning, but improvements in performance available with the latest generation of the equipment can make it desirable or essential to upgrade

Equipment can also become obsolete due to changes in regulations covering its use, including changes in health and safety regulations that cannot be met by retrofitting existing equipment in a cost effective way. For example, changes in electrical regulations can lead to equipment being replaced because they cannot be modified to meet the new regulations.

Environmental regulations can similarly drive replacement of assets that can not meet new standards. From the above descriptions, it is clear that obsolescence can be driven by a number of issues that are not directly related to the state of the asset itself. As such, various types of obsolescence can be identified; for example:



4.7.1 Technological obsolescence

This occurs when assets have been superseded by assets using more cost-effective methods of providing the same level of utility; e.g., more efficient and less expensive pumps (IPWEA, 2006). Technical obsolescence can also be considered to occur when spare parts or technical skills for supporting/maintaining an asset are no longer available.

4.7.2 Regulatory obsolescence

This type of obsolescence is brought about by modifications to regulatory requirements;

4.7.3 Functional obsolescence

This type of obsolescence arises when existing equipment cannot be brought into line with new (non-regulatory) operating requirements.

Obsolescence is most likely to occur with long-life equipment or equipment that is subject to rapid technological development such as computers, software, monitoring instrumentation and control systems (i.e. ICA assets, see Chapter 1.0). In the later case, production lifetimes are short and support for the equipment may be withdrawn by the manufacturer.

The decision to replace obsolete assets will be driven by a range of factors including the availability of spares, the requirement to integrate new equipment with old, the economic benefits of updating (e.g., cost/performance) and any requirement to comply with more stringent operational or safety standards.

5.0 Approach of Study

The Remaining useful life assessment study or in short RULA for the assets covered in this study report followed a structured approach based on industry recognized and generally acceptable good practices. The approach explained in figure 1 below, starts from accessing the asset owner requirements, developing scope of the study based on the assets design, operation & maintenance (O&M) historical records, plant operations data, followed by developing a methodology. Based on RULA study methodology, the study scope covers compressive plant and asset inspections and developing a study report before the asset owner make technical decision to apply for life extension to the regulating authority as applicable to the business needs of the Tapal Energy Pvt. Ltd.

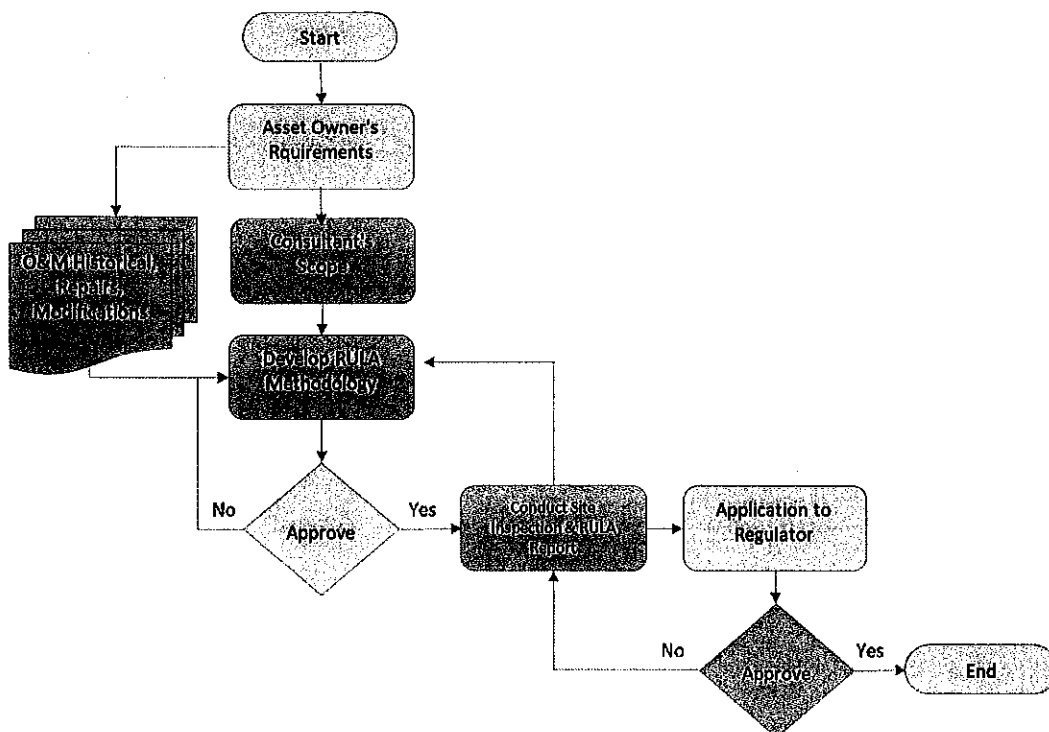


Figure 1: Remaining Useful Life Study Approach

6.0 Methodology of Condition Assessment

Following methodology is used throughout the report for assessing the condition of each of the mechanical and electrical components:

Rating	RULA through Condition Assessment		Tests, Analysis * – Operations & Maintenance Records
Scale of 1 to 4	Main Components	Systems or Auxiliaries	
1 Very Good Condition	Component with no evidence of wastage, wear and tear. e.g No mechanical wear, electrical degradation in reported inspections/maintenance or overhaul/shutdown. Reports, tests, analysis results are falling generally in "Good" condition. Timely replacement of spares as per OEM guidelines. Good O&M Practices. Expected Remaining life > 15 Years.	Components and systems found with no deficiencies affecting the safe operation and/or normal performance. Maintenance and operations documentation is found in very good order. Good Historical O&M records, no immediate maintenance or repair considered necessary. No major failure in the system(s) was reported. System performance is as per OEM specifications.	Performance/Rated Capacity or Strength evaluation according to current valid OEM recommendations. The overall asset (Engine or Transformer) rated reduction capacity is under 0 % to Actual OEM specified. *Tests, Analysis, Inspection & Maintenance reports as recommended by OEM.
2 Good Condition	Component with negligible deficiencies showing mechanical wear, electrical degradation or signs of defects not requiring corrective maintenance or repair. Reported tests, analysis results are falling generally in at least "Fair" condition. No historical record of premature failures(s). Expected Remaining Life	Components and systems found with minor deficiencies not affecting the safe operation and/or normal performance. Maintenance and operation documentation found to be in good order. No immediate corrective maintenance or repair considered necessary.	Performance/rated Capacity or Strength evaluation according to current valid OEM recommendations. Will affect the overall asset (Engine or Transformer) rated reduction capacity is under 2 to 5 % to Actual OEM specified. *Tests, Analysis, Inspection & Maintenance reports



Remaining Useful Life Study Report Tapal Energy (Private) Ltd.



Rating	RULA through Condition Assessment		Tests, Analysis * – Operations & Maintenance Records
Scale of 1 to 4	Main Components	Systems or Auxiliaries	
	> 10 years but less than 15 years.		as recommended by OEM.
3 Acceptable Condition	Pre mature failure (s) of the component was reported once in the last 10 years of operations or before the specified time of planned intervals/replacements. e.g mechanical wear, electrical degradation. O&M effective control on re-occurrence. Evidence of life expectancy assessments at components level. Expected remaining life is ≤ 10 years.	Components and systems found with deficiencies but not affecting the safe operation and/or normal performance. Overall reliability/availability is acceptable. Maintenance and operations documentation is considered to be satisfactory, However, occasional failures/replacements have been carried out in the last 10 years. No immediate corrective maintenance/ replacement is considered necessary.	Performance/rated capacity or strength evaluation according to current valid OEM recommendations. Will affect the overall asset (Engine or Transformer) Rated reduction capacity is under upto 10 % to Actual OEM specified. *Tests, Analysis, Inspection & Maintenance reports as recommended by OEM.
4 Un acceptable Condition	Pre mature failure (s) of the component was reported more than once in last 5 years of operations or before the specified time of planned intervals/replacements. Failures, of Component which may affect the engine's/Transformer performance and Risk** to remain in services. e.g multiple failures/replacement, obsolescence of spares, non-availability of spares, skill/craft related O&M challenges. All resulting in "Poor"	Components and systems found with deficiencies affecting the safe operation and/or normal performance. System availability and reliability is deteriorated. Multiple failures are reported. Operation and Maintenance documentation is found to be poor (No records or no basis for assessment). Maintenance and repairs as required to reinstate serviceability with	Performance/Rated Capacity or Strength evaluation according to current valid OEM recommendations. Will affect the overall asset (Engine or Transformer) Rated reduction capacity is under or up to 20 % to Actual OEM specified. No Test Data or basis is available or no basis for inspection and testing being done over the last 5 years.

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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Rating	RULA through Condition Assessment		Tests, Analysis * – Operations & Maintenance Records
Scale of 1 to 4	Main Components	Systems or Auxiliaries	
	condition of the component or non-availability of component. Expected remaining life is < 5 years.	immediate CAPEX or replacement decisions.	*Tests, Analysis, Inspection & Maintenance reports as recommended by OEM.

***Tests, Analysis** as OEM recommended practices for components or system as a whole; such as Lube Oil Analysis, Vibration Measurements, Temperatures, Transformer Oil Analysis, Dissolved Gas analysis (DGA), Furan Analysis, Insulation resistance, winding resistance, Visual inspections, Life Expectancy Assessment Program tests (LEAP), OEM specified tests/reports, thickness measurements, Non-Destructive Testing (NDT), physical measurements, tolerance, clearances etc.

****Risk** is the product of likelihood (Failures/ year) x Consequences (cost \$ in terms of total Component Cost + company lost business cost + penalties); Risk is often expressed in High, Medium and Low. Below is the Condition rating in terms of expected remaining life:

Rating	Expected Remaining Life
Very Good	>15 Years
Good	10 to 15 Years
Acceptable	≤ 10 Years
Not Acceptable	< 5 Years

7.0 Data Requirements

S.No	Description of Data / Document / Information	Business Case	Design	Construction	Commissioning	Operation	Maintenance	ITP / Testing Reports	Study Scope (Applicable)
1	Feasibility Study (Project Basis)	x	x						No
2	Safety Studies (e.g. Environmental Impact Assessment, Risk Assessments)		x	x			x		Yes
3	FEED Documents, Sizing and Selection Basis		x						No
4	Mechanical Completion, Acceptance Reports, As Build Data			x	x	x			No
5	Operations & Safety Procedures					x	x		Yes
6	Maintenance Procedures (Lubrication, PM Frequencies etc.)					x	x		Yes
7	Operations Log (Duty Hours, down time, availability etc.)					x	x		Yes
8	ITP (Inspection, Testing and Preventive Maintenance)						x	x	Yes
9	3rd Party Inspection and Testing Reports for Engine Mechanical Components						x	x	Yes
10	OEM Supplied Manuals (Engines and Transformers)					x	x		Yes
11	Transformers Historical ITPs (3rd Party Test Reports , Calibration, Analysis etc.)						x	x	Yes
12	Transformers Maintenance Procedures						x		Yes
13	TEL Organization Chart (Plant O&M), Business Requirements.					x			Yes

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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S.No	Description of Data / Document / Information	Business Case	Design	Construction	Commissioning	Operation	Maintenance	ITP / Testing Reports	Study Scope (Applicable)
14	Spares Critical / Insurance, Non Critical , Inventory and critical records						x		Yes
15	3rd Party Report / Engine Exhaust etc.							x	Yes
16	Transformer Oil Analysis Reports , DGA and FURAN Results						x	x	Yes
17	Log for Tripping, Failure Analysis Reports etc.					x	x	x	Yes
18	Change / Modifications records Unit wise					x	x	x	Yes
19	Regulatory Standards as applicable / Guideline from IPP Power Purchaser etc.	x				x	x		Yes
20	Budget (OPEX / CAPEX) outline Summaries (Yearly Historical Data)					x	x		No
21	Information regarding Outsourced Activities					x	x		No

Notes: TEL Provided the data as required for this RULA study. Some data is noted to be either not available or not to be covered in the study as per study scope agreed between the parties.

8.0 Scope of Study

This remaining useful life study using condition based approach covers mainly engines and power transformers. Total No of Units covered are 12 nos., the make is WARTSILA, Model: 18V38, rated Capacity of each unit is 10.5 MWe, Year of Installation is June 1997 with running hours ranging from 122k to 144k. The scope covers broadly Mechanical and Electrical as bellow:

8.1 Mechanical Components

Assess the condition of Mechanical oriented Engine Components:

- Engine Block with Bearings, Cylinder Liner & Oil Sump
- Crankshaft, Connecting Rod and Piston
- Cylinder Head with Valves
- Camshaft
- Valve Drive Mechanism
- Turbocharger
- Air Cooling
- Lubrication Oil system,
- Starting Air System,
- Exhaust System
- Cooling water System etc.

8.2 Electrical Components / Systems

- Power Transformers, Type ONAF, Rating: 58.6 MVA (132/11 KV), Quantity: 3 nos.
- Generator of Each Unit

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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8.3 Storage Tanks & Pressure Vessels

The report also covers condition assessment of storage tanks for HFO and utilities like heat exchangers and other stationary assets. The condition assessment approach considers inspection reports from the authorized inspection companies. The main basis is the corrosion rate estimation, design condition, inspection findings of the wall loss of the tanks bottom plate, roof plate and attachments.



9.0 Plant Design & Construction

The TEL facility consists of one land-based power plant comprised of twelve (12) residual fuel oil ('RFO') fired diesel generating sets (each a 'Unit'). Following design ratings and construction information [10]:

- a) Gross Capacity, Diesel generating unit at alternator terminals is 10,500 kWe per Unit, Multiplied by twelve (12) Units, 126,000 kWe for the Complex
- b) Estimated auxiliary consumption for the Complex 2,500 kWe for the Complex
- c) Estimated Dependably Capacity of the Complex at the 132kV busbar under Reference Conditions 123,500 KWe
- d) The Site is located off Hub River Road, South of Hub Chowki, in the District of Karachi West, Sindh Province. The Site area is characterized as tropical. Average rainfall is 175 mm per year, but this amount falls in short durations.
- e) Reference Conditions at the Site are:
 - I. Ambient Air Temperature = $T_{ra} = 30 \text{ deg. C} = 303 \text{ K}$
 - II. Charge Air Coolant Temperature = $T_{cra} = 40 \text{ deg. C} = 313 \text{ K}$
 - III. Total Barometric Pressure = $p_r = 1031.2 \text{ mbar}$
 - IV. Relative Humidity = 80 %
- f) A maximum earthquake design factor of 0.1 g is utilized for the design of the plant buildings and structures and the design wind speed is 40m/sec.
- g) The Site is at elevation <65 m with respect to mean sea level (MSL). All structures have a ground floor elevation of at least 20 m above MSL. Access to the Site is provided by a road. The main power block consists of twelve (12) RFO fired diesel generating sets. Other



plant buildings and structures outside of the main power block include, but are not limited to, the following:

- I. Fuel Storage Area;
 - II. Combined Fuel Treatment / Boiler (for heating RFO only) / Water Treatment House;
 - III. Fire Fighting Basin
 - IV. Workshop / Stores;
 - V. Office Building;
 - VI. Switchyard;
 - VII. Guardhouse.
- h) Cooling is supplied via a radiator cooling system. The primary fuel is RFO, with Light Fuel Oil ('LFO') being used for flushing the engines and for LFO fired boilers.
- i). Each generator is nominally rated at 13,125 kVA, 0.8 lagging and 0.9 leading power factor, 11,000 V, 3 phase, 50 cycle, not less than 0.55 short circuit ratio. Each generator is air cooled.
- j) The Complex is capable of operation within a voltage range of + 10% on the 132 kV system.
- k) The Complex have three main step-up transformers, each rated not less than 58.6 MVA, 132/11kV, ONAF.
- l) Interconnection with the K-Electric Limited system is via a 132 kV, switchyard located inside the battery limits of the Complex.
- m) A common control room is provided to monitor and control the Complex. Operator interfaces for control of the Complex is via control panel and PC operating stations and

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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each Unit is capable of being started and stopped locally. The plant control systems include a data acquisition system.

- n) Fuel supply to the Complex is via road tanker delivery. The Site have sufficient RFO storage capacity to support operation of the Complex for the equivalent of 100 % of full load for 30 Days.
- o) All material, plant, equipment and machinery incorporated in the construction of the Complex were new and unused by the Construction Company M/s Stork-Wartsila Diesel B.V.
- p) The Management has a structured organogram [1] with a skilled and experienced team of management and technical professionals who is maintaining the assets and responsible for the operations and maintenance of the assets. The TEL Organogram is attached as

Appendix A



10.0 Operations & Maintenance Practices

The TEL facility after commissioning and startup has been operational without any major incident on account of Quality, Health, Process Safety and Environment. This is mainly due to observed good O&M practices and skilled plant operations team from its commercial operation date. Summary of Operations Hours for Each Engine is appended below:

Unit #	Running Hours
1	138,814.00
2	124,532.00
3	124,370.00
4	141,664.50
5	141,826.00
6	119,385.00
7	124,420.00
8	118,839.00
9	134,238.00
10	124,569.00
11	119,229.00
12	118,837.00

Following paragraphs covers the O&M related practices.



10.1 Process Safety Management Systems

Plant Management has well established Process Safety Procedures covering below:

- i. Chemical Handling
- ii. CO₂ Flooding System Operations
- iii. Contractor Safety Management
- iv. Fire Protection Impairment Procedure
- v. Hazard Identification & Risk Assessment
- vi. Plant Hot Works
- vii. Impact and Aspect Analysis (part of Risk Management)
- viii. Incident Classification
- ix. Incident Prevention
- x. Occupational & Environmental Noise Monitoring
- xi. Oil Spill and Containment
- xii. Safety Committee Management
- xiii. Solid Waste Disposal
- xiv. Working at Height



10.2 Maintenance Management System

The plant O&M team is using Computerized Maintenance Management System (CMMS) for Inspection, Maintenance and Repairs Jobs planning, scheduling and execution. OEM provided inspection and maintenance schedules are the basis of all maintenance plans including timely replacement of spares. All the Preventive Maintenance, Condition based maintenance and Corrective Maintenance is managed through the plant CMMS Software. The OEM Manual specify below Inspection and Maintenance Intervals.

Maintenance Intervals	Frequency Hours
Special	-
Daily	24 Hours
Weekly	168 Hours
	500 Hours
	1,000 Hours
	2,000 Hours
	4,000 Hours
	12,000 Hours
	36,000 Hours

The Inspection and Maintenance Schedule of the Engines [2] were thoroughly referred and verified in this study to ensure that the O&M practices are adhered. The OEM provided guideline for the ITP (Inspection, Testing and Preventive Maintenance) is attached as **Appendix B**. The same ITPs for each unit are attached in **Appendix G1** of Volume 2 of this study report.



10.3 Plant Availability Factor

Plant has a good historical records from outage and availability point of view. The operations data is critically reviewed for this study comprising of last 3 years' operations log (2016 to 2018 with every quarter) for each of the 12 units. On average the Availability Factor (AF) is noted to be in the range of 0.87 to 0.97.

Below is the summary of the lagging key performance indicator, the Availability Factor (AF).

Availability Factor (Available Hours / Period Hours)											
Units	Q1 2016	Q2 2016	Q3 2016	Q4 2016	Q1 2017	Q2 2017	Q3 2017	Q4 2017	Q1 2018	Q2 2018	Average
1	0.87	0.98	0.99	0.95	0.00	0.99	0.98	0.97	1.00	0.97	0.87
2	0.98	0.97	0.98	0.66	0.96	0.95	0.82	1.00	0.99	0.95	0.93
3	1.00	0.96	0.90	0.96	0.98	0.94	0.77	0.97	1.00	0.98	0.94
4	0.90	0.87	0.99	0.92	0.98	0.96	0.97	1.00	0.75	0.99	0.93
5	0.88	0.92	0.99	0.96	0.99	0.92	0.95	0.98	0.81	0.97	0.94
6	0.99	0.96	0.95	0.99	1.00	1.00	0.97	0.99	0.99	0.97	0.98
7	0.83	0.93	0.99	0.96	0.95	0.96	0.96	0.99	0.97	0.87	0.94
8	0.99	0.97	0.87	1.00	0.81	0.96	0.95	0.96	0.92	0.98	0.94
9	0.99	0.98	0.95	0.96	0.96	0.76	1.00	0.99	0.96	0.98	0.95
10	0.99	0.98	0.99	0.74	0.99	0.97	0.99	0.79	0.81	1.00	0.93
11	1.00	0.95	0.88	0.96	0.99	0.96	0.98	0.99	0.98	0.97	0.97
12	0.90	0.97	0.96	0.98	0.98	0.89	0.79	0.99	0.99	0.94	0.94

The Complete operations log for the 12 months (2017 to 2018) is analyzed [3] as part of the study and is attached as **Appendix C**.

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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10.4 Environmental Management System

The Environmental Management System is found to be embedded in the plant management system. Environmental Performance Monitoring of Tapal Plant which is being carried out by independent consultants on regular basis in compliance with Pakistan Environmental Protection Act (1997), Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000, Sindh Environmental Protection Agency Review 2014 and World Bank Guidelines for Engine Driven Power plants 1998. Environmental monitoring at Tapal Plant included evaluation of data generated on fuel oil usage during of operation of the 12 diesel generating (DG) sets, stack emissions from the 40 m high stacks, and noise emission from the DG sets in terms of impact on the microenvironment and macro-environment measured by recording the level of primary pollutants in the engine hall as well as at different points inside and outside the boundary wall of Tapal Plant, besides quality and quantity of wastewater, oily sludge and solid waste disposal. Recent Report submitted to SEPA as per statutory requirement is found in compliance to the requirements, attached as **Appendix D**. Gaseous and noise emissions levels which have Impacts on the environment are within the acceptable levels. These levels cover SO_x, NO_x, CO and are compared to the NEQS/SEQS complying to the WB/IFC guidelines.

The plant in-house waste management including lubrication oils and chemicals are complying to the SEPA requirements.

The air quality (ambient) based on dispersion data analysis, suggest that the effective control along with ground water and soil pollution (duck pond, bring and soak pit areas)

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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10.5 Historical Major Modifications Summary

Major Modification and improvements have been made and are found to be documented and in line with the guidelines provided by the OEM of Engines. Sallient historical modifications [5] were analyzed in this study, same are attached as **Appendix E**.

10.6 Spares Management

The company has employed an efficient spares and inventory management system with bard coding and maintained a MOQ (Minimum Order Quantity) of all Critical spares required for the Engines and Electrical Systems. During the site visits, a good sample of random spares were audited and verified through the stock count. The list of spares [6] verified during the site visits were matching to the inventory levels. The list is attached as **Appendix F** of this report. It is concluded that to maintain the assets, these spares play a critical role during the asset life.



11.0 Condition Assessment of Mechanical Components

Since an asset passes through a range of condition and/or performance states as it deteriorates, condition and performance assessment can be used to understand remaining asset life. In particular, acceptable asset condition states can be defined that characterize the threshold above which risk is deemed to be unacceptable. Condition assessment can then be used to determine whether the current state of an asset, expressed in terms of failure likelihood, is acceptable. Acceptability criteria, as laid down in this study for assessing degraded condition can be obtained from a number of sources including the use of expert opinion, condition grading, detection of critical defects and performance monitoring over the asset life span.

All this inputs in the form of periodic maintenance, inspection and testing program, historical records and sampled inspections are the inputs of the condition assessment. The following trends obtained for the qualitative decision making were looked into where applicable to the condition assessment of components under Condition based maintenance records.

- a) Bearing Temperatures
- b) Charge Air Pressure and Air Temperatures
- c) Cylinder Liner, Cylinder Valves Temperatures
- d) Engine Vibration data for the past 12 Months
- e) Exhaust Gas Average Temperatures
- f) Fuel and Lube Oil Temperatures
- g) Fuel Oil Viscosity
- h) Pressure Gradients of Watery Supply
- i) Starting air control pressures

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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11.1 Engine Block with Bearings, Cylinder Liner & Oil Sump

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Engine Block Visual Records	Liner Wear Inspection Records	Landing surface Records	Bearing s Condition	Rating Category	Rating Score	Expected Life
1	Yes	Yes	Yes	Yes	VG	1	15 Years
2	Yes	Yes	Yes	Yes	VG	1	15 Years
3	Yes	Yes	Yes	Yes	VG	1	15 Years
4	Yes	Yes	Yes	Yes	VG	1	15 Years
5	Yes	Yes	Yes	Yes	VG	1	15 Years
6	Yes	Yes	Yes	Yes	VG	1	15 Years
7	Yes	Yes	Yes	Yes	VG	1	15 Years
8	Yes	Yes	Yes	Yes	VG	1	15 Years
9	Yes	Yes	Yes	Yes	VG	1	15 Years
10	Yes	Yes	Yes	Yes	VG	1	15 Years
11	Yes	Yes	Yes	Yes	VG	1	15 Years
12	Yes	Yes	Yes	Yes	VG	1	15 Years

The records are enclosed as **Appendix G1**



Remaining Useful Life Study Report
Tapal Energy (Private) Ltd.



11.2 Crankshaft, Connecting Rod and Piston

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Crank Shaft Deflection	Axial Clearance Records	Crank Pin Ovality	Piston Crown Inspection	Piston Ring Groove Clearances	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	Yes	G	2	10 Years

The records are enclosed as **Appendix G1**

11.3 Camshaft

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Visual inspections	Spares	Monitoring Program	Historical Checks	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

Cam shaft is inspected at each 1000 Hrs, 4000 hrs and 12000 Hrs., major over hauls. Condition Based Monitoring and replacement procedure is adopted as per OEM recommendations. CBM (Condition Based Maintenance) covers visual inspection and replacement based on mechanical checks, examination of surface cracks, surface finish of profiles and condition of chrome on profiles specially loading areas of Fuel pump, Exhaust and inlet valves. Overall the condition is noted as good. The O&M records are enclosed as **Appendix G1**



Remaining Useful Life Study Report
Tapal Energy (Private) Ltd.



11.4 Valve Drive Mechanism

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Inspection	Spares	PMs	Shop Testing	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

The O&M records are enclosed as **Appendix G1**

11.5 Turbochargers

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	CDB	OEM Spares	MAN ITPMs	Shop Balancing	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	1	15 Years
2	Yes	Yes	Yes	Yes	G	1	15 Years
3	Yes	Yes	Yes	Yes	G	1	15 Years
4	Yes	Yes	Yes	Yes	G	1	15 Years
5	Yes	Yes	Yes	Yes	G	1	15 Years
6	Yes	Yes	Yes	Yes	G	1	15 Years
7	Yes	Yes	Yes	Yes	G	1	15 Years
8	Yes	Yes	Yes	Yes	G	1	15 Years
9	Yes	Yes	Yes	Yes	G	1	15 Years
10	Yes	Yes	Yes	Yes	G	1	15 Years
11	Yes	Yes	Yes	Yes	G	1	15 Years
12	Yes	Yes	Yes	Yes	G	1	15 Years

The turbochargers are found in a sound condition. The inspection and maintenance program is reported to cover broadly good engineering practices and based on OEM (MAN) supplied guidance. It is important to mention that the plant O&M team carried out a study and have replaced the turbochargers based on techno commercial benefits.

The other O&M records are enclosed as **Appendix G1**

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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11.6 Air Cooling

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Temp. Monitoring	OEM Spares	PMs	Condition Monitoring	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

The O&M records are enclosed as **Appendix G1**

11.7 Lubrication Oil System

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Temp. Monitoring	PMs	Lube Oil Analysis	Spares	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

The photographic & other O&M records are enclosed as **Appendix G1**



Remaining Useful Life Study Report Tapal Energy (Private) Ltd.



11.8 Starting Air System

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Condition Monitoring	PMs	Valve inspection	Spares	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

The O&M records are enclosed as **Appendix G1**

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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11.9 Exhaust System

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Condition Monitoring	PMS	Piping, Assembly	Spares	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years

The O&M records are enclosed as **Appendix G1**

11.10 Cooling Water System

Based on the historical maintenance and inspection records, below is the summary of the Condition assessment and expected remaining life of components:

Unit #	Condition Monitoring	PMS	Piping, Assembly	Spares	Rating	Score	Expected Life
1	Yes	Yes	Yes	Yes	G	2	10 Years
2	Yes	Yes	Yes	Yes	G	2	10 Years
3	Yes	Yes	Yes	Yes	G	2	10 Years
4	Yes	Yes	Yes	Yes	G	2	10 Years
5	Yes	Yes	Yes	Yes	G	2	10 Years
6	Yes	Yes	Yes	Yes	G	2	10 Years
7	Yes	Yes	Yes	Yes	G	2	10 Years
8	Yes	Yes	Yes	Yes	G	2	10 Years
9	Yes	Yes	Yes	Yes	G	2	10 Years
10	Yes	Yes	Yes	Yes	G	2	10 Years
11	Yes	Yes	Yes	Yes	G	2	10 Years
12	Yes	Yes	Yes	Yes	G	2	10 Years



11.11 Condition Assessment of Storage Vessels

In this section, the condition assessment for the storage tanks and pressure vessels is assessed. Under condition assessment, inspection carried by authorized and certified inspectors (API 510/653) were reviewed as an evidence to assess the conditions.

The inspections have been carried out in 2016, 2017 by the authorized above surface storage tanks Contractors along with hot works (repairs) at site. The scope of inspection covers internal and external inspection, estimate of the corrosion rate and estimate the quantitative remaining life. The inspection reports provide almost all the tanks and pressure vessel inspection intervals, the scope of NDT (Non Destructive Testing) and the Condition monitoring and thickness locations. Overall the tanks are in "Very Good" condition. Only tank V-965 whose detailed inspection is scheduled in 2018 is assessed as "Good". Also, Tank V-695 has no basis to assess the corrosion rate, it is therefore, assessed as in "Good" Condition.

Below table 1.2 is the summary of the condition assessment based on critical parameters:



Remaining Useful Life Study Report Tapal Energy (Private) Ltd.



Pressure Vessels & Storage Tanks	Description	Design Code	Last Inspection Done	Next Inspection Due	Wall Thickness (Shell / Dish/Bottom)	Operating Envelope	Material of Construction	Corrosion Rate	Score	Rating	Expected Life
V-731 A	Lube Oil Storage	NK	2017	2022	7mm/8.5 mm	ATM (60C)	CS	0.035 mm/yr	1	VG	15 Years
V-731 B	Lube Oil Storage	NK	2017	2022	7.6mm/ 8.3 mm	ATM (60C)	CS	0.025 mm/yr	1	VG	15 Years
V-693 A	HFO Buffer Tank	NK	2016	2021	8.9 mm/ 9.72 mm	ATM (60C)	CS	0.017 mm/yr	1	VG	15 Years
V-693 B	HFO Buffer Tank	NK	2016	2021	9.79 mm/ 9.91 mm	ATM (100C)	CS	0.019 mm/yr	1	VG	15 Years
V-691 A	HFO Day Tank	NK	2017	2022	9.17 mm/ 9.53 mm	ATM (100C)	CS	0.034 mm/yr	1	VG	15 Years
V-691 B	HFO Day Tank	NK	2017	2022	7.18 mm/ 9.39 mm	ATM (100C)	CS	0.07 mm/yr	1	VG	15 Years
V-695	HFO AST	NK	2016	2026	8mm	ATM (100C)	CS	-	1	G	10 Years
V-965	HFO Tank	NK	NK	2019	7.18 mm/ 9.39 mm	ATM (100C)	CS	-	1	G	10 Years
V-694 B	HFO AST	NK	2016	2026	7.89 mm	ATM (100C)	CS	0.124 mm/yr	1	VG	15 Years
V-832 A	Starting Air	ASME Sec. VIII Div I	2016	2026	15.9 mm / 17.1 mm	(-20 to 200 C) / 19.5 bar	CS	0.001 mm/yr	1	VG	15 Years
V-832 B	Starting Air	ASME Sec. VIII Div I	2016	2026	15.8 mm / 17.5mm	(-20 to 200 C) / 19.3 bar	CS	0.001 mm/yr	1	VG	15 Years
V-832 C	Starting Air	ASME Sec. VIII Div I	2016	2026	15.8 mm / 17.5mm	(-20 to 200 C) / 19.3 bar	CS	0.001 mm/yr	1	VG	15 Years
V#6	Vessel # 6	ASME Sec. VIII Div I	2016	2026	20.1 mm / 23.1 mm	(-20 to 200 C) / 16.9 bar	CS	0.001 mm/yr	1	VG	15 Years
V-222	Steam Drum	DIN	2016	2026	9.8mm/ 11.8 mm	184 C/ 10 Bar	CS (DIN 17155)	0.01 mm/yr	1	VG	15 Years
V-861	Compressed Air	AD-Markbletter	2016	2026	5.12 mm/ 7.15 mm	(-20 to 200 C) / 6.6 bar	CS	0.001 mm/yr	1	VG	15 Years
V-871	Compressed Air	AD-Markbletter	2016	2026	5.12 mm/ 7.15 mm	(-20 to 200 C) / 6.6 bar	CS	0.001 mm/yr	1	VG	15 Years

Table 1.2: Summary of Condition Assessment of Storage Tanks



12.0 Condition Assessment of Electrical Components

12.1 Electrical Generators

This section covers the Remaining Useful Life (RUL) Assessment of twelve Electrical Generator units Installed at Tapal Energy Pvt. Ltd Power Plant. Specifications of the identical Generator units are as follows:

- Rating: 13125 kVA
- Power Factor: 0.8 lagging / 0.9 leading
- Terminal Voltage: 11kV ($\pm 10\%$)
- Number of phases: 3
- Number of Poles: 10
- Frequency: 50 Hz ($\pm 6\%$)
- Speed: 600 RPM
- Insulation Class: F
- Manufacturer: ABB

The RUL Assessment of these Electrical Generators is based on the review of Life Expectancy Analysis Program (LEAP) reports and in-house electrical test results. Following are the details of these test results:

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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12.1.1 Life Expectancy Analysis Program (LEAP) & Electrical Tests

Life Expectancy Analysis Program (LEAP) is a diagnostic tool developed by ABB for condition assessment of stator winding in high voltage electrical machines. The method consists of several tests to evaluate the winding with respect to factors such as Contamination, Condition of Corona Protection Shield, Condition of Stress Grade System, Ageing of Insulation and Partial Discharge. The results provide estimation on Remaining Useful Life of the stator windings. The tests have been carried out on all units during past few years. LEAP test reports are available in Appendix G2 Generator-01.

For the purpose of this study, the results of LEAP reports have been conservatively normalized to cover the time period between the last tests and present time.

There is an in-house Electrical Testing and Maintenance regime followed at the plant. This consists of performing Insulation Resistance (IR) and Polarization Index (PI) tests on Stator Windings, Rotor Windings and Field Windings. Last five test results, covering a span of more than a year have been reviewed for this study. The test results are available in Appendix G2 Generator-02.

The resultant condition assessment against both LEAP test results and in-house electrical test results is mapped together to identify the overall condition of each unit as per the Methodology of this study outlined in Section 6.

12.1.2 Summary of RUL Assessment of Electrical Generators

Following is the summary of RUL Assessment of Units:

Unit #:	LEAP			Winding Insulation Resistance			Polarization Index			Overall Assessment	Expected Remaining Life (Years)
	LEAP Test Date	Calculated Expected Life (Hours)	Normalized Expected Life (Hours)	Stator Winding	Rotor Winding	Field Winding	Stator Winding	Rotor Winding	Field Winding		
DG-01	Oct, 2013	183,600	139,800	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Very Good	> 15 Years
DG-02	May, 2016	82,100	64,580	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤ 10 Years
DG-03	May, 2016	139,600	122,080	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Good	10 to 15 Years
DG-04	May, 2016	123,300	105,780	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Good	10 to 15 Years
DG-05	Oct, 2013	87,300	43,500	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤ 10 Years
DG-06	May, 2016	129,800	112,280	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Good	10 to 15 Years
DG-07	May, 2016	111,600	94,080	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Good	10 to 15 Years

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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Unit #:	LEAP			Winding Insulation Resistance			Polarization Index			Overall Assessment	Expected Remaining Life (Years)
	LEAP Test Date	Calculated Expected Life (Hours)	Normalized Expected Life (Hours)	Stator Winding	Rotor Winding	Field Winding	Stator Winding	Rotor Winding	Field Winding		
DG-08	May, 2016	78,600	61,080	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤10 Years
DG-09	May, 2016	71,400	53,880	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤10 Years
DG-10	May, 2016	61,600	44,080	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤10 Years
DG-11	May, 2016	67,200	49,680	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤10 Years
DG-12	May, 2016	88,500	70,980	Healthy	Healthy	Healthy	Healthy	Healthy	Healthy	Acceptable	≤10 Years

Table Generator-01: Summary of RUL for all Electrical Generators

12.1.3 Physical Inspection and Review of O&M Practices

The on-site physical inspection and review of O&M Practices was also carried out. Overall installation condition of all units was found satisfactory. In-house inspection, testing and maintenance regime is followed regularly. The Plant Management has also planned future LEAP testing and manufacture recommended inspections in line with the plant business objectives.



12.2 Power Transformers

This section covers the Remaining Useful Life (RUL) Assessment of three Power Transformer units installed at the outgoing transmission line of Tapal Energy Pvt. Ltd Power Plant. Specifications of the identical Transformer units are as follows:

- Power Rating: 58.6MVA
- Rated Voltage: 132/11 kV ($\pm 10\%$)
- On-Load Tap Changer: ± 13 Taps
- Frequency: 50 Hz ($\pm 6\%$)
- Vector Group: Ynd5
- Temperature Rise (Winding/Oil): 55/50 °C
- Type of Cooling: ONAN/ONAF
- Manufacturer: ABB

The RUL Assessment of Power Transformers is based on the analysis of provided Oil Analysis results, Winding Temperature, Physical Inspection and Review of Operations & Maintenance practices. The resultant condition assessment of each contributing factor is then mapped together to identify the overall condition of the unit as per the Methodology of this study outlined in Section 6. Following are the brief details of each contributing factor evaluated:



12.2.1 Oil Analysis Results

Transformer Oil Analysis results have been evaluated based on three distinct characteristics, as follows:

- **Physical Characteristics:**

Key Physical characteristics have been evaluated and categorized as Good, Fair or Poor based on the limit values as per IEC 60422

- **Dissolved Gas Analysis (DGA):**

Individual and Total Dissolved Combustible Gases (TDCG) have been trended and evaluated against the limit values as per IEEE Guide C57.104. The limit values provide a 4-tier classification criterion as follows:

Condition 1 (C1): TDCG below this level indicates the transformer is operating satisfactorily. Any individual combustible gas exceeding specified levels should prompt additional investigation.

Condition 2 (C2): TDCG within this range indicates greater than normal combustible gas level. Any individual combustible gas exceeding specified levels should prompt additional investigation.

Condition 3 (C3): TDCG within this range indicates a high level of decomposition. Any individual combustible gas exceeding specified levels should prompt additional investigation.

Condition 4 (C4): TDCG within this range indicates excessive decomposition. Continued operation could result in failure of the transformer. Proceed immediately with precautions.

Doernenburg's Ratio and Roger's Ratio methods shall also be considered where applicable as per IEEE Guide C57.104.

- **Furan Analysis** for Transformer Winding Remaining Useful Life Assessment as per Chendong's Calculation method.

This three-pronged analysis of oil not only provides a condition assessment of the oil itself but also indicates the internal fault situation and ageing of the winding insulation paper. Table Trafo-01 Provides details of the Oil Analysis results received for evaluation:

			Mar, 2016	June, 2017	Dec, 2017	July, 2018
TR-01	Tank Top	Routine Test	X	X	X	
		DGA		X	X	
		Furan		X	X	
	Tank Bottom	Routine Test	X	X	X	X
		DGA		X	X	X
		Furan		X	X	X
TR-02	Tank Top	Routine Test	X	X	X	
		DGA		X	X	
		Furan		X	X	
	Tank Bottom	Routine Test	X	X	X	X
		DGA	X	X	X	X
		Furan		X	X	X
TR-03	Tank Top	Routine Test	X	X	X	
		DGA		X	X	
		Furan		X	X	
	Tank Bottom	Routine Test	X	X	X	X
		DGA	X	X	X	X
		Furan		X	X	X

Table Trafo-01: Details of Oil Test Results received for evaluation



12.2.2 Winding Temperature Analysis

Daily Average and Maximum values of Transformer Winding Temperature have been evaluated and compared against the provided relative ageing speed by the Manufacturer as tabulated below:

Winding Hotspot Temperature (°C)	Relative Ageing Speed
80	0.125
86	0.25
92	0.5
98	1.0
104	2.0
110	4.0
116	8.0
122	16.0
128	32.0
134	64.0
140	128.0

Table Trafo-02: Winding Hotspot Temperature & Relative Ageing Speed

12.2.3 Physical Inspection

On-site physical inspection of the units was carried out to identify any immediate physical concerns with respect to the condition of the transformer units, spares and their accessories. This also included interviews of on-site personnel to find out any historical issues/concerns, routine O&M practices and general condition assessment.

12.3 Summary of RUL Assessment of Power Transformers

Following is the summary of RUL Assessment of Power Transformer Units. Subsequent sections detail the assessments for individual units.

Unit #:	Oil Analysis			Winding Temperature Analysis	Physical Inspection and O&M Practices	Overall Assessment	Expected Remaining Life (Years)
	Physical Properties	DGA	Furan				
TR-01	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	>15 Years
TR-02	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	>15 Years
TR-03	Very Good	Very Good	Very Good	Very Good	Very Good	Very Good	>15 Years

12.4 RUL Assessment of Transformer Unit 01 (TR-01)

12.4.1 TR-01 Oil Analysis Results

Physical Characteristics of TR-01 Oil as per IEC 60422 observed during different samplings are as follows:

TR-01 - Tank Top									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	20	51	86	N/A	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	38	32.8	31.6	N/A	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.028	0.028	N/A	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	8	57.9	9.8	N/A	Good
DI-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.014 @25 °C	0.0197	0.0048	N/A	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	119.71	93.95	N/A	Good
TR-01 - Tank Bottom									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	20	72	98	94	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	38	33.6	32.4	31.9	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.024	0.026	0.024	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	8	26	6.9	10.2	Good
DI-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.014 @25 °C	0.0111	0.0044	0.0053	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	102.42	106.92	107.3	Good

Table Trafo-03: Physical Characteristics of TR-01 Oil

Please note the following considerations:

- DI-Electric Dissipation Factor for March, 2016 samples has been calculated @ 25 °C.
- Abrupt spike in Moisture Content values for June, 2017 Samples indicate sampling error. Subsequent sampling results are within prescribed limit values.
- N/A indicates, result not available.

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DGA results for TR-01 from Tank Top sampling point are tabulated as follows:

		June, 2017		Dec, 2017		July, 2018	
Hydrogen (H₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	34.842	C1	39.473	C1	37.557	C1
Methane (CH₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	12.55	C1	13.428	C1	19.899	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	40.171	C1	55.798	C1	68.881	C1
Ethylene (C₂H₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	1.574	C1	2.557	C1	2.557	C1
Ethane (C₂H₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	11.347	C1	10.939	C1	10.942	C1
Acetylene (C₂H₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0.033	C1	0.093	C1	0.093	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	100.517	C1	122.288	C1	139.929	C1
Oxygen (O₂)	2000-35000	6280.919	Normal	6506.565	Normal	6127.183	Normal
Nitrogen (N₂)	10000-100000	35410.825	Normal	34188.365	Normal	32820.831	Normal
Carbon Dioxide (CO₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	1804.838	C1	2180.064	C1	1884.175	C1

Table Trafo-04a – DGA Result for TR-01 Tank Top Sampling Point



Remaining Useful Life Study Report
Tapal Energy (Private) Ltd.



DGA results for TR-01 from Tank Bottom sampling point are tabulated as follows:

		June, 2017		Dec, 2017	
Hydrogen (H ₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	29.366	C1	36.888	C1
Methane (CH ₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	12.1	C1	17.716	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	38.731	C1	64.369	C1
Ethylene (C ₂ H ₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	1.518	C1	2.389	C1
Ethane (C ₂ H ₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	10.94	C1	10.222	C1
Acetylene (C ₂ H ₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0.031	C1	0.087	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	92.686	C1	131.671	C1
Oxygen (O ₂)	2000-35000	5782.162	Normal	6080.385	Normal
Nitrogen (N ₂)	10000-100000	32991.373	Normal	31949.027	Normal
Carbon Dioxide (CO ₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	1551.819	C1	1805.423	C1

Table Trafo-04b – DGA Result for TR-01 Tank Bottom Sampling Point

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The DGA results for TR-01 indicate that all individual gases and TDCG lie within Condition 1 (C1) limits as prescribed in IEEE Guide C57.104. This is an indication of overall very good health of the transformer. No abrupt spike for any key gas in subsequent samples is observed.

Furan Analysis for TR-01 Oil samples is as follows:

	TR-01 - Tank Top	TR-01 - Tank Bottom	
	Dec, 2017	June, 2017	July, 2018
Furan Analysis (2FAL)	0.325 ppm	0.026 ppm	0.033 ppm

Table Trafo 5 – Furan Analysis for TR-01

Since, the sampling period between all the samples is less than a year; the worst case scenario of 0.325 ppm reading as observed in Tank Top sample taken in Dec, 2017 is considered for evaluation of RUL.

2FAL Furan Concentration = 0.325 ppm or 325 ppb

This corresponds to Degree of Polymerization Value = 586.82

This implies that RUL for TR-01 Winding is **77.65%** as per Chendong's Calculation Method.

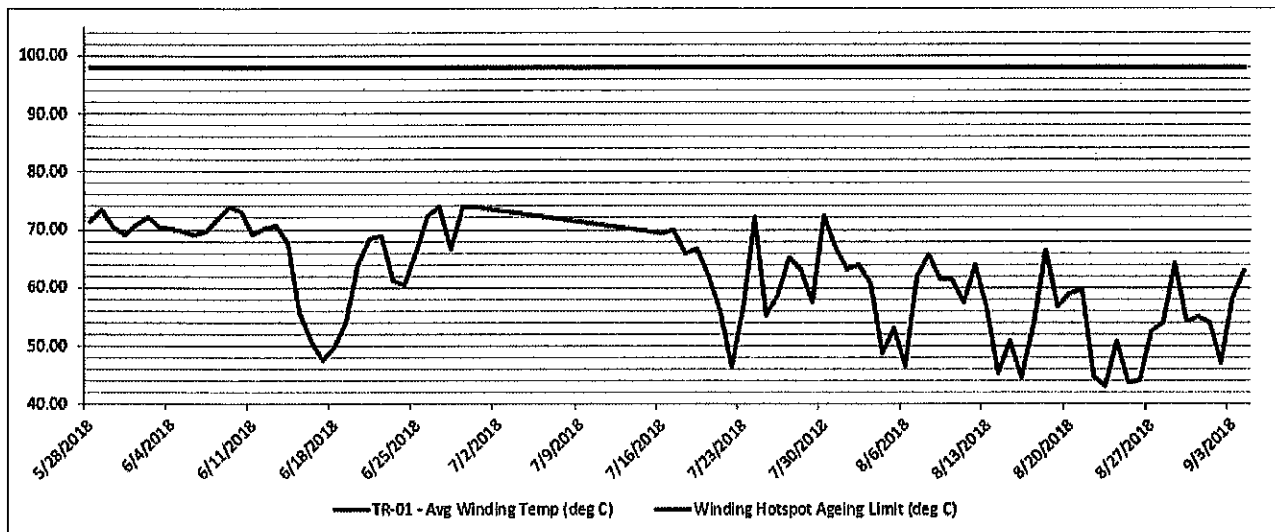
This provides an evidence to consider TR-01 oil and active part (winding) to be considered in 'Very Good' condition against the proposed Methodology in Section 6.

The transformer oil result reports are available in Appendix G2 Trafo-01.



12.4.2 TR-01 Winding Temperature Analysis

The daily average and maximum values of Winding Temperature are trended and compared against Winding Hotspot Ageing Limit value of 98 °C provided by the Manufacturer (Refer Appendix G1 Trafo-02). The trend covers a period of 84 days from end-May, 2018 until start of September, 2018. This is also the hottest ambient temperature period during a year.



The observed values are way below the winding hotspot temperature limit value, indicating that the transformer winding is not subjected to severe thermal loading even under maximum ambient temperature conditions.

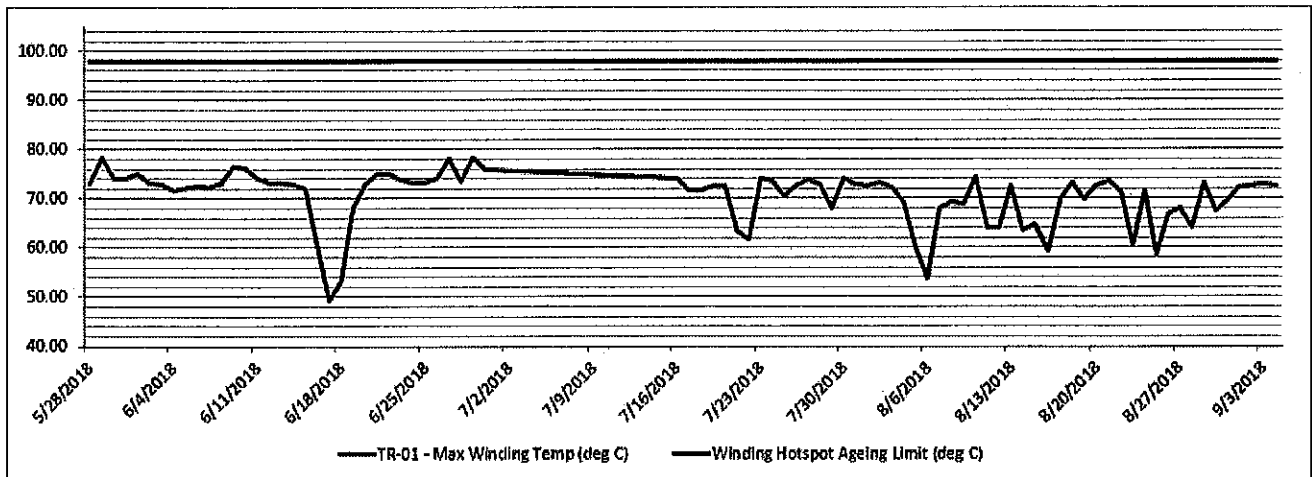


Fig Trafo-1b - TR-01 Daily Maximum Winding Temperature trend compared to Winding Hotspot Ageing Limit

The trend of daily maximum winding temperature values for TR-01 is observed to follow the similar trend to that of daily average winding temperature values thus indicating no severe temperature fluctuations within a day. The maximum winding temperature values for each day are also way below the winding hotspot temperature limit value. Record of Temperature readings is available in Appendix G2 Trafo-03.

The above trends indicate that an ageing rate of < 0.125 may be considered for TR-01. This further strengthens the case for considering the overall condition of the transformer as 'Very Good'.

12.4.3 TR-01 Physical Inspection and Review of O&M Practices

The on-site physical inspection of TR-01 shows that the unit is installed and maintained as per design recommendations. The accessories like On-load Tap Changer (OLTC), Bushings, Temperature Gauges, Silica Gel Breather and Protective Devices were found in Very Good condition. OLTC has a strict maintenance regime whereby, the oil is changed on yearly basis and regular overhauls are undertaken.

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The unit and its accessories are well covered against the natural elements through design and O&M practices. Annual planned shutdown activities are regularly undertaken to ensure proper inspection and cleaning of the unit and its accessories.

12.5 RUL Assessment of Transformer Unit 02 (TR-02)

12.5.1 TR-02 Oil Analysis Results

Physical Characteristics of TR-02 Oil as per IEC 60422 observed during different samplings are as follows:

TR-02 - Tank Top									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	23	72	96	N/A	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	37	32.1	32	N/A	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.024	0.033	N/A	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	6	24	7.8	N/A	Good
Di-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.026 @ 25	0.0141	0.005	N/A	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	120.44	92.26	N/A	Good
TR-02 - Tank Bottom									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	23	50	94	91	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	37	34	33.4	33.2	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.024	0.03	0.035	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	6	55.7	7.9	10.1	Good
Di-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.026 @ 25	0.0195	0.0045	0.0053	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	136.77	101.87	102.01	Good

Table Trafo-06: Physical Characteristics of TR-02 Oil

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Please note the following considerations:

- Di-Electric Dissipation Factor for March, 2016 samples has been calculated @ 25 °C.
- Abrupt spike in Moisture Content values for June, 2017 Samples indicate sampling error.
Subsequent sampling results are within prescribed limit values.
- N/A indicates, result not available.

DGA results for TR-02 from Tank Top sampling point are tabulated as follows:

		June, 2017		Dec, 2017	
Hydrogen (H₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	20.37	C1	21.265	C1
Methane (CH₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	9.27	C1	11.319	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	72.218	C1	77.493	C1
Ethylene (C₂H₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	1.425	C1	1.869	C1
Ethane (C₂H₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	7.25	C1	8.961	C1
Acetylene (C₂H₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0.007	C1	0.019	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	110.507	C1	120.926	C1
Oxygen (O₂)	2000-35000	4418.617	Normal	4805.749	Normal
Nitrogen (N₂)	10000-100000	22037.221	Normal	23714.487	Normal
Carbon Dioxide (CO₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	2288.589	C1	2577.846	C2

Table Trafo-07a – DGA Result for TR-02 Tank Top Sampling Point

DGA results for TR-02 from Tank Bottom sampling point are tabulated as follows:

		Mar, 2016		June, 2017		Dec, 2017		July, 2018	
Hydrogen (H ₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	0	C1	25.897	C1	22.002	C1	22.431	C1
Methane (CH ₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	1.1	C1	8.339	C1	9.933	C1	11.224	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	98	C1	64.966	C1	62.261	C1	66.47	C1
Ethylene (C ₂ H ₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	21	C1	1.282	C1	1.831	C1	2.02	C1
Ethane (C ₂ H ₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	0	C1	6.522	C1	5.115	C1	5.579	C1
Acetylene (C ₂ H ₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0	C1	0.006	C1	0.018	C1	0.02	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	120.1	C1	107.012	C1	101.16	C1	107.744	C1
Oxygen (O ₂)	2000-35000	30700	Normal	3974.914	Normal	4708.148	Normal	22.431	Abnormal (Sampling Error)
Nitrogen (N ₂)	10000-100000	64500	Normal	19824.317	Normal	23232.868	Normal	24803.364	Normal
Carbon Dioxide (CO ₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	1480	C1	1495.185	C1	1968.334	C1	2211.462	C1

Table Trafo-07b – DGA Result for TR-02 Tank Bottom Sampling Point

The DGA results for TR-01 indicate that most individual gases and TDCG values lie within Condition 1 (C1) limits as prescribed in IEEE Guide C57.104. Following exceptions are observed, which may be subjected to sampling errors and can be ruled out through subsequent sampling results:

- Tank Top: CO₂ value during last sample taken in Dec, 2017 is found to lie within Condition 2 (C2) limits.

- Tank Bottom: O₂ value during last sample taken in July, 2018 is found to be out of normal range.

No abrupt spike for any key gas in subsequent samples is observed. This is an indication of overall very good health of the transformer.

Furan Analysis for TR-02 Oil samples is as follows:

	TR-02 - Tank Top	TR-02 - Tank Bottom	
	Dec, 2017	June, 2017	July, 2018
Furan Analysis (2FAL)	0.598 ppm	0.019 ppm	0.023 ppm

Table Trafo 8 – Furan Analysis for TR-02

Since, the sampling period between all the samples is less than a year; the worst case scenario of 0.598 ppm reading as observed in Tank Top sample taken in Dec, 2017 is considered for evaluation of RUL.

2FAL Furan Concentration = 0.598 ppm or 598 ppb

This corresponds to Degree of Polymerization Value = 511.16

This implies that RUL for TR-02 Winding is **67.69%** as per Chendong's Calculation Method.

This provides an evidence to consider TR-02 oil and active part (winding) to be considered in 'Very Good' condition against the proposed Methodology in Section 6.

The transformer oil result reports are available in Appendix G2 Trafo-01.



12.5.2 TR-02 Winding Temperature Analysis

The daily average and maximum values of Winding Temperature are trended and compared against Winding Hotspot Ageing Limit value of 98 °C provided by the Manufacturer (Refer Appendix G1 Trafo-02). The trend covers a period of 84 days from end-May, 2018 until start of September, 2018. This is also the hottest ambient temperature period during a year.

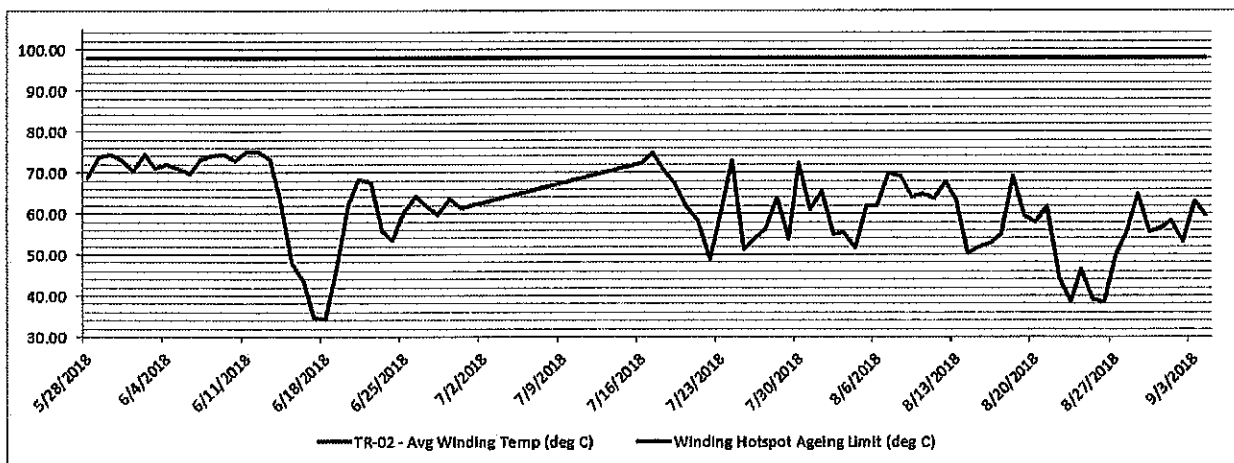


Fig Trafo-2a - TR-02 Daily Average Winding Temperature trend compared to Winding Hotspot Ageing Limit

The observed values are way below the winding hotspot temperature limit value, indicating that the transformer winding is not subjected to severe thermal loading even under maximum ambient temperature conditions.

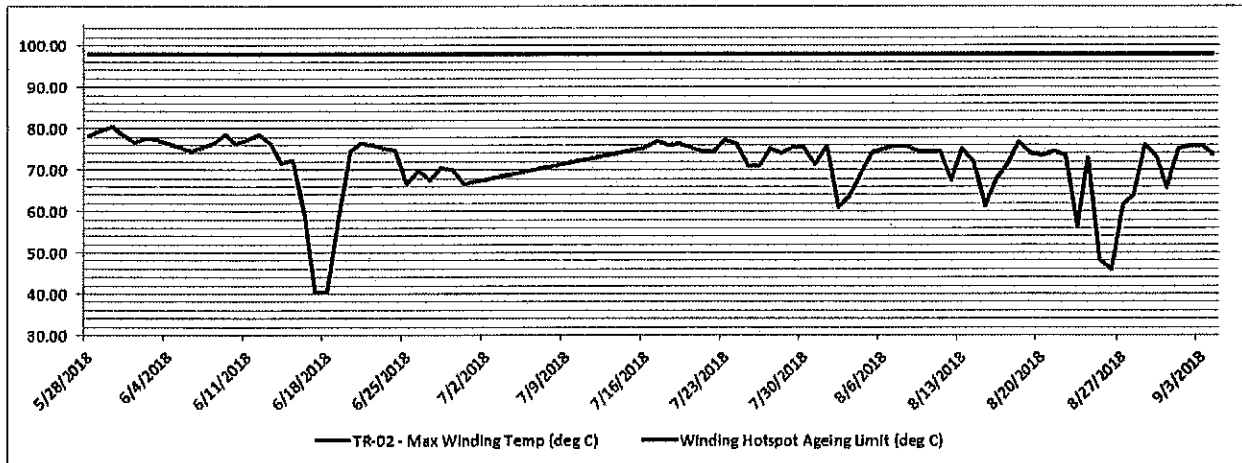


Fig Trafo-2b - TR-02 Daily Maximum Winding Temperature trend compared to Winding Hotspot Ageing Limit

The trend of daily maximum winding temperature values for TR-02 is observed to follow the similar trend to that of daily average winding temperature values thus indicating no severe temperature fluctuations within a day. The maximum winding temperature values for each day are also way below the winding hotspot temperature limit value. Record of Temperature readings is available in Appendix G2 Trafo-03.

The above trends indicate that an ageing rate of < 0.125 may be considered for TR-02. This further strengthens the case for considering the overall condition of the transformer as 'Very Good'.

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12.5.3 TR-02 Physical Inspection and Review of O&M Practices

The on-site physical inspection of TR-02 shows that the unit is installed and maintained as per design recommendations. The accessories like On-load Tap Changer (OLTC), Bushings, Temperature Gauges, Silica Gel Breather and Protective Devices were found in Very Good condition. OLTC has a strict maintenance regime whereby, the oil is changed on yearly basis and regular overhauls are undertaken.

The unit and its accessories are well covered against the natural elements through design and O&M practices. Annual planned shutdown activities are regularly undertaken to ensure proper inspection and cleaning of the unit and its accessories.

12.6 RUL Assessment of Transformer Unit 03 (TR-03)

12.6.1 TR-03 Oil Analysis Results

Physical Characteristics of TR-03 Oil as per IEC 60422 observed during different samplings are as follows:

TR-03 - Tank Top									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	22	69	97	N/A	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	36	33.8	33	N/A	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.03	0.031	N/A	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	10	25	7.2	N/A	Good
DI-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.015 @ 25	0.0114	0.0044	N/A	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	144.09	117.76	N/A	Good
TR-03 - Tank Bottom									
Parameters:	Limit Values:			Measuring Unit:	Mar, 2016	June, 2017	Dec, 2017	July, 2018	Evaluation:
	Good:	Fair:	Poor:		Value:	Value:	Value:	Value:	
Breakdown Voltage Level	>50	50-40	<40	kV	22	62	89	92	Good
Interfacial Tension (IFT)	>28	22-28	22	mN/m	37	33	N/A	33.9	Good
Neutralization Number (Acidity)	<0.1	0.1-0.15	>0.15	mg KOH/gm	0.02	0.021	N/A	0.034	Good
Moisture Content	20 for 60 °C Avg Oil Temp			ppm	10	23	9.5	12.7	Good
DI-Electric Dissipation Factor @ 90 °C	<0.1	0.1-0.2	0.2	ratio	0.015 @ 25	0.0117	0.0045	0.0052	Good
Resistivity @ 90 °C	>10	1-10	<1	GΩm	N/A	140.46	113.97	114.21	Good

Table Trafo-09: Physical Characteristics of TR-03 Oil

Please note the following considerations:

- Di-Electric Dissipation Factor for March, 2016 samples has been calculated @ 25 °C.
- Abrupt spike in Moisture Content values for June, 2017 Samples indicate sampling error. Subsequent sampling results are within prescribed limit values.
- N/A indicates, result not available.

DGA results for TR-03 from Tank Top sampling point are tabulated as follows:

		June, 2017		Dec, 2017	
Hydrogen (H ₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	49.803	C1	52.753	C1
Methane (CH ₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	16.715	C1	20.107	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	48.118	C1	69.441	C1
Ethylene (C ₂ H ₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	4.603	C1	4.049	C1
Ethane (C ₂ H ₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	16.391	C1	18.6	C1
Acetylene (C ₂ H ₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0.019	C1	0.065	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	135.649	C1	165.015	C1
Oxygen (O ₂)	2000-35000	2465.877	Normal	5799.509	Normal
Nitrogen (N ₂)	10000-100000	22352.042	Normal	26868.003	Normal
Carbon Dioxide (CO ₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	1571.221	C1	1799.312	C1

Table Trafo-10a – DGA Result for TR-03 Tank Top Sampling Point

DGA results for TR-03 from Tank Bottom sampling point are tabulated as follows:



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		Mar, 2016		June, 2017		Dec, 2017		July, 2018	
Hydrogen (H ₂)	C1: 100 C2: 100-700 C3: 701-1800 C4: >1800	0	C1	45.376	C1	48.957	C1	52.138	C1
Methane (CH ₄)	C1: 120 C2: 121-400 C3: 401-1000 C4: >1000	1.1	C1	14.996	C1	18.66	C1	19.873	C1
Carbon Monoxide (CO)	C1: 350 C2: 351-570 C3: 571-1400 C4: >1400	98	C1	49.276	C1	64.444	C1	66.423	C1
Ethylene (C ₂ H ₄)	C1: 50 C2: 51-100 C3: 101-200 C4: >200	21	C1	4.194	C1	3.758	C1	4.002	C1
Ethane (C ₂ H ₆)	C1: 65 C2: 66-100 C3: 101-150 C4: >150	0	C1	14.934	C1	17.262	C1	18.792	C1
Acetylene (C ₂ H ₂)	C1: 35 C2: 36-50 C3: 50-80 C4: >80	0	C1	0.017	C1	0.061	C1	0.068	C1
TDCG	C1: 720 C2: 721-1920 C3: 1921-4630 C4: >4630	120.1	C1	128.793	C1	153.142	C1	161.286	C1
Oxygen (O ₂)	2000-35000	30700	Normal	2246.688	Normal	5382.177	Normal	5731.897	Normal
Nitrogen (N ₂)	10000-100000	64500	Normal	20365.194	Normal	24934.587	Normal	27096.277	Normal
Carbon Dioxide (CO ₂)	C1: 2500 C2: 2500-4000 C3: 4001-10000 C4: >10000	1480	C1	1218.911	C1	1284.633	C1	1368.105	C1

Table Trafo-10b – DGA Result for TR-03 Tank Bottom Sampling Point]

The DGA results for TR-03 indicate that most individual gases and TDCG values lie within Condition 1 (C1) limits as prescribed in IEEE Guide C57.104.

No abrupt spike for any key gas in subsequent samples is observed. This is an indication of overall very good health of the transformer.

Furan Analysis for TR-03 Oil samples is as follows:

	TR-03 - Tank Top	TR-03 - Tank Bottom	
	Dec, 2017	June, 2017	July, 2018
Furan Analysis (2FAL)	0.145 ppm	0.017 ppm	0.02 ppm

Table Trafo 11 – Furan Analysis for TR-03

Since, the sampling period between all the samples is less than a year; the worst case scenario of 0.598 ppm reading as observed In Tank Top sample taken in Dec, 2017 is considered for evaluation of RUL.

2FAL Furan Concentration = 0.145 ppm or 145 ppb

This corresponds to Degree of Polymerization Value = 686.96

This implies that RUL for TR-03 Winding is **89.02%** as per Chendong's Calculation Method.

This provides an evidence to consider TR-03 oil and active part (winding) to be considered in 'Very Good' condition against the proposed Methodology in Section 6.

The transformer oil result reports are available in Appendix G2 Trafo-01.



12.6.2 TR-03 Winding Temperature Analysis

The daily average and maximum values of Winding Temperature are trended and compared against Winding Hotspot Ageing Limit value of 98 °C provided by the Manufacturer (Refer Appendix G2 Trafo-02). The trend covers a period of 84 days from end-May, 2018 until start of September, 2018. This is also the hottest ambient temperature period during a year.

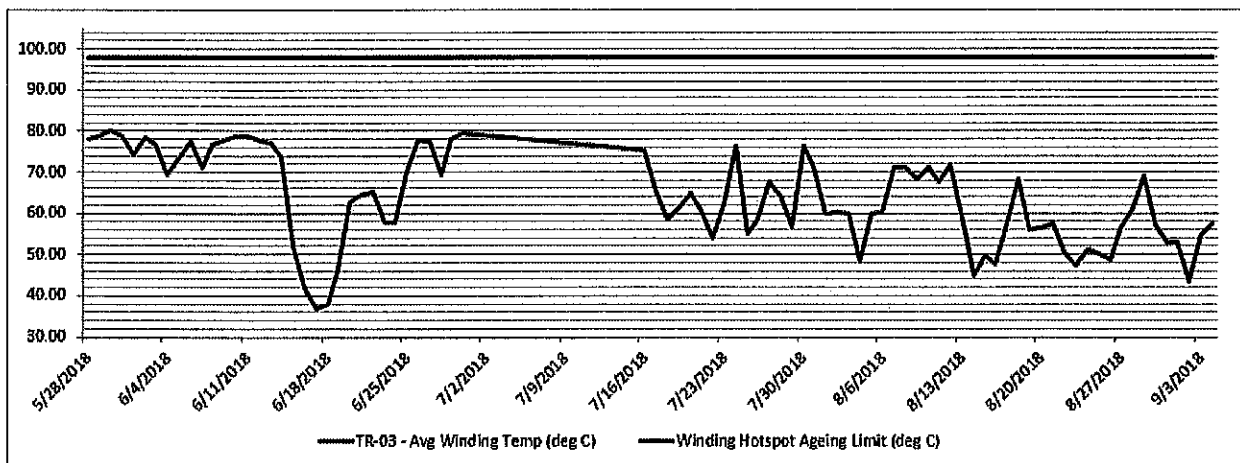


Fig Trafo-3a – TR-03 Daily Average Winding Temperature trend compared to Winding Hotspot Ageing Limit

The observed values are way below the winding hotspot temperature limit value, indicating that the transformer winding is not subjected to severe thermal loading even under maximum ambient temperature conditions.

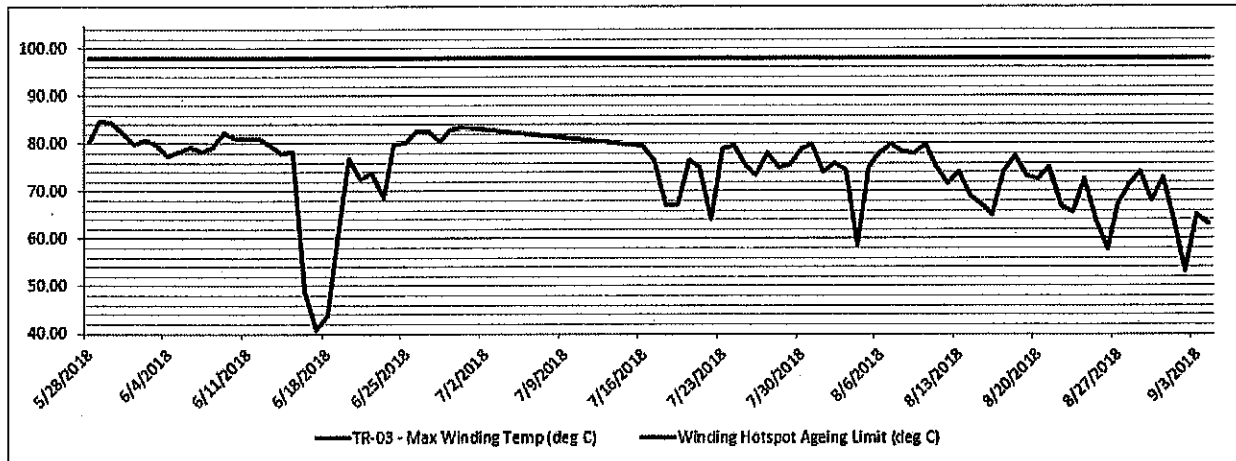


Fig Trafo-3b - TR-03 Daily Maximum Winding Temperature trend compared to Winding Hotspot Ageing Limit

The trend of daily maximum winding temperature values for TR-03 is observed to follow the similar trend to that of daily average winding temperature values thus indicating no severe temperature fluctuations within a day. The maximum winding temperature values for each day are also way below the winding hotspot temperature limit value. Record of Temperature readings is available in Appendix G2 Trafo-03.

The above trends indicate that an ageing rate of < 0.125 may be considered for TR-03. This further strengthens the case for considering the overall condition of the transformer as 'Very Good'.

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12.6.3 TR-03 Physical Inspection and Review of O&M Practices

The on-site physical inspection of TR-03 shows that the unit is installed and maintained as per design recommendations. The accessories like On-load Tap Changer (OLTC), Bushings, Temperature Gauges, Silica Gel Breather and Protective Devices were found in Very Good condition. OLTC has a strict maintenance regime whereby, the oil is changed on yearly basis and regular overhauls are undertaken.

The unit and its accessories are well covered against the natural elements through design and O&M practices. Annual planned shutdown activities are regularly undertaken to ensure proper inspection and cleaning of the unit and its accessories.



13.0 Conclusion & Recommendations

The study carried out to assess the condition of engines and critical electrical components covering generator and power transformer concluded with ratings Very Good, Good and Acceptable condition and expected remaining useful life. It is pertinent to mention that the qualitative condition assessment and expected life is based on good O&M management practices, well maintained inspection, maintenance and other monitoring records, timely execution of inspection and maintenance work order, replacement of component as per preventive spares and follow instructions of troubleshooting as per OEM practices. Based on study, following recommendations are made:

- a) The overall condition of Engines is 'Good' and the expected remaining life is 10 years. The condition of Generator units is generally found to be in range from 'Good' to 'Acceptable' with expected safe remaining useful life of up to 10 years. The condition of all Power Transformers have been found to be 'Very Good' with expected life more than 15 years.
- b) The condition of storage tanks at the plant facility is 'Very Good'. Despite the quantitative remaining life reported in the recent inspection reports are suggesting beyond 15 years. However, due to aging corrosion is expected to increase specially at attachments (Nozzles, Saddles, Staircase and other Structure, base plates, top sides of tanks etc.). At present, the rates of corrosion currently are under acceptable limits. More robust risk based inspection and fabric maintenance, coating and external inspection monitoring over the years is needed together with audits of the safety and fire systems.

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- c) Tapal Energy Pvt. Ltd. (the Asset Owner) to continue existing O&M Practices for the upkeep of the assets, follow OEM recommended guidelines for the time driven maintenance and inspection of engines [2] and other critical assets.
- d) Asset Owners may evaluate the requirements for further Condition Based Maintenance practices, such as continued focus on Vibration Monitoring, Thermographic Imaging and other use of NDT advanced methods (Acoustics). This can be done by independent plant machinery vibration analysis methods at a periodic level. The objective is to collect data, identify vibrations zones and therefore, based on these studies improve Maintenance strategy and control on aging, failures and leakages
- e) Some of the critical Engine components such as Camshaft, Pistons, and its associated mechanical components require continued focus in the inspection and maintenance reporting e.g photographic recordings, sample micro examination of cam shaft wear etc. The objective is to captures signs of wear, aging etc. It is also recommended that OEM guidelines [4] for the camshaft inspection pertaining to wear may be consulted for further improvement in inspection reporting.
- f) It is recommended that condition assessment methodology followed in this study be practiced at regular levels to validate the findings. Next Condition Assessment can be done in 5 years and further ascertain the expected life of engines and critical machinery components and other assets. The condition assessment may support asset owner in cost benefit and end of economic life assessments to benefit the business.
- g) It is recommended to follow the testing and inspection activities as suggested through LEAP test results for all Generators in order to ensure the updated assessment of their conditions and subsequent corrective actions (if any) to be taken.



14.0 References & Bibliography

Below is the list of normative, internal and external references as applicable, cited and used in this study report:

- [1] Tapal Energy Pvt. Ltd Internal Management Systems/ Procedures
- [2] STORK WARTSILA Engine Manual, Vol 2A, Version 1996
- [3] OEM Supplied Manuals for Inspection and Testing
- [4] WARTSILA Guide for Judging Condition of Components, Vol 3, Version 2.1, 2014
- [5] WARTSILA Dynamic Maintenance Planning and Condition Based Maintenance, Vol 4, Version 2.9, 2014
- [6] M-53, IACS Publications for the Combustion Engines Inspection, Maintenance and Testing Rev 2017
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- [8] Guidelines for Marine Diesel Engines Crankshafts, DNVGL CF 0037, Edition 2015
- [9] IFC Guidelines for Power Plants, July 1998
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- [11] National Environmental Quality Standards (NEQS) for Municipal and Liquid Industrial Pollutants
- [12] Regulation of Generation, Transmission and Distribution of Electric Power Act, 1997
- [13] EPRI USA Guideline for the Remaining Useful Life assessment for Power Plants, Edition 8, year of Publication 2005
- [14] DIN 6271 Standard for Reciprocating ICE Performance, power tolerances; supplementary stipulation to DIN ISO 3046, 1991.



- [15] ISO 3046-5 Standard for Reciprocating IC Engines – Performance Part 5 for Torsional Vibrations
- [16] ISO 8258-9 Measurement and Evaluation of Mechanical vibrations, 1995
- [17] ISO 8178-1 IC Engines Exhaust emissions measurement 2006
- [18] API 653, Above Surface Storage Tanks Inspection Codes by API (American Petroleum Institute USA)
- [19] API 510, Pressure Vessels Inspection Codes by API (American Petroleum Institute USA)
- [20] ASME Section VIII Division I/II – Pressure Vessel & Boiler Design code
- [21] IEC 60422 - Mineral insulating oils in electrical equipment - Supervision and maintenance guidance
- [22] IEEE Standard C57.104 - IEEE Guide for the Interpretation of Gases Generated in Oil-Immersed Transformers



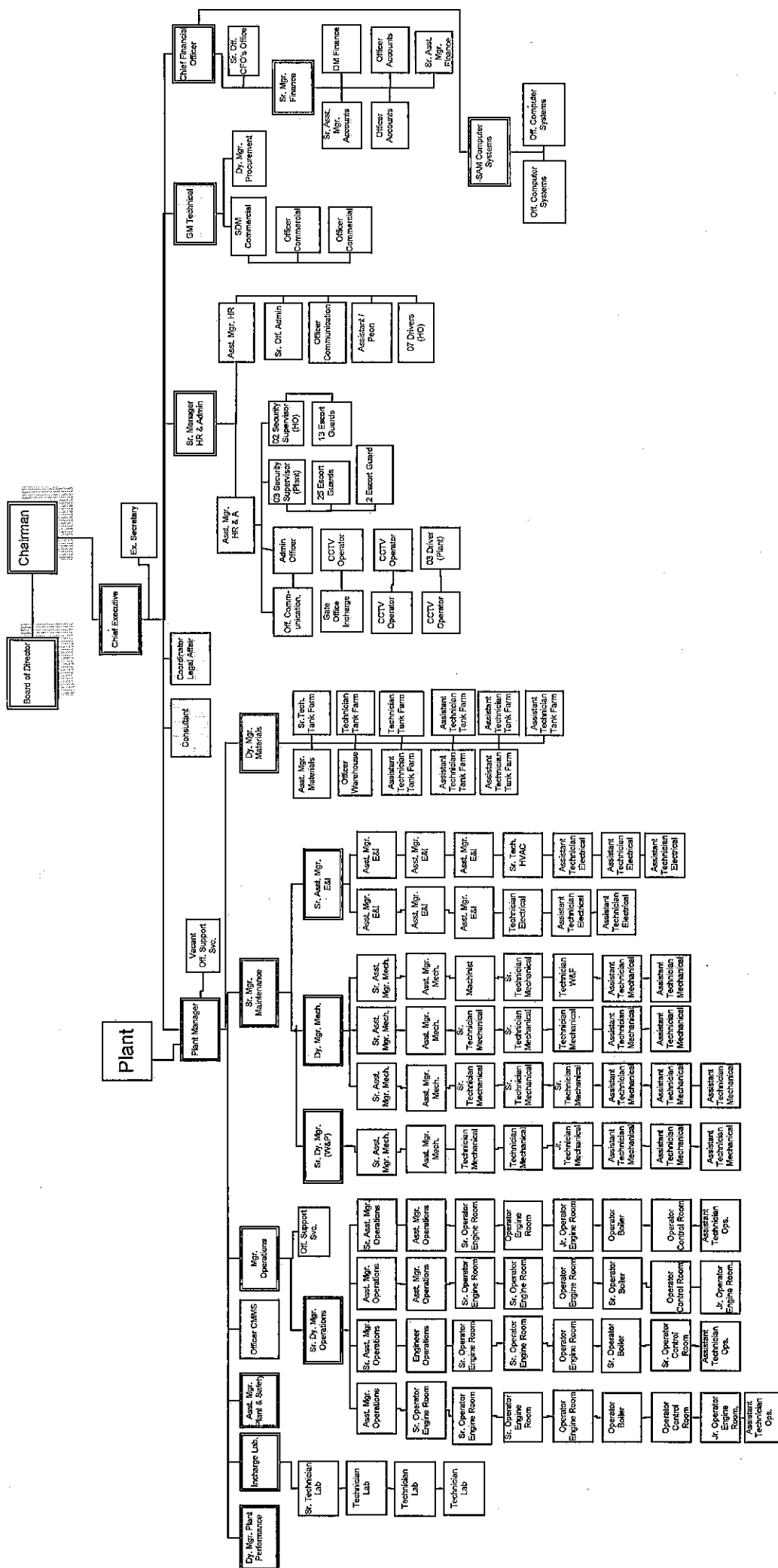
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Tapal Energy (Private) Ltd.



Appendix – A Tapal Energy Pvt. Ltd. Organogram

Chairman

Board of Directors



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Appendix – B 18V38 OEM Recommended Inspection & Maintenance Schedule

04.3.3. Maintenance schedules

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
General		Check the engine on leakages and bolt connections.	1000-005		D	D	D	D	D	D	D	D	D
	15.4.1	Check the telltale hole of the charge air receiver on possible water.	6102-006		D	D	D	D	D	D	D	D	D
	03.6.6	Record performance data in the engine log sheet.	1000-002		D	D	D	D	D	D	D	D	D
		Check level of: - Turbocharger sumps - Engine lube oil drain tank - Cooling water systems - Governor.	1000-003		D	D	D	D	D	D	D	D	D
		Record firing pressures	1000-016				D	D	D	D	D	D	D
		Check foundation bolts and chocks /girders. For stationary the first year every 2 months.	8703-006	D									
		Check foundation bolts and chocks/girders .	8703-002							D	D	D	D
		Inspect elastic engine mounting elements (if applicable).	8703-003							D	D	D	D
		Check reference points of epoxy resin chocks (if applicable).	8703-004							D	D	D	D
		Inspect elastic elements of flexible coupling.	9203-001							D			

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Start, stop, operation	03.2	Test start process in stand-by position.	1000-009			D	D	D	D				
	03.8.2	Carry out a test run.	1000-006							D	D	D	D
		Carry out a running-in program and record readings.	1000-007								D	D	D
	03.	Check operation of turning and start interlock device.	4005-002							D	D	D	D
	03.10	Refresh lube oil of turning device.	4005-004									D	
Engine block	11.2.2	Make endoscopic inspection of cylinder liners.	1302-001	D									
		Inspect one cylinder liner after the first 4000 running hours	1302-012	D									
		Make endoscopic inspection of cylinder liners.	1302-001							D			
		Overhaul of cylinder liners including honing.	1302-006								D	D	D
		Inspect visually the crankcase	1101-001							D	D	D	D
		Inspect the cooling water spaces.	1301-004								D	D	D

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Engine block	10.2	Inspect one main bearing and one main journal.	1102-002 1111-008									D	D
		Renew main bearings and inspect the main journals.	1102-005 1111-009										D
	11.1.1	Check crankshaft deflections, thrust bearing clearance and alignment between the engine and engine driven machinery	1111-001								D	D	D
	11.1.2		8703-001										
		Sample fluid of vibration damper(s).	9205-001									D	D
	10.4.1	Inspect one camshaft bearing. Renew camshaft bearings after 48,000 running hours.	2100-016										D
	10.4		2100-004	D									

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Crankshaft connecting rod and piston	11.1.2	Inspect the camshaft.	2100-014								D	D	D
	11.2.2	Inspect one gudgeon bearing and gudgeon after the first 4000 running hours.	1400-007	D									
	11.2.2	Inspect one gudgeon bearing and gudgeon.	1400-003								D		D
	11.3.1	Inspect gudgeon bearings and gudgeons.	1400-004									D	
	11.2.2	Inspect one connecting rod after the first 4000 running hours.	1401-014	D									
		Inspect one connecting rod.	1401-011									D	D
		Inspect / overhaul connecting rods.	1401-010									D	
	11.2.2	Inspect one crankpin journal and crankpin bearing.	1111-006 1401-001									D	D
	11.2.2	Inspect crankpin journals.	1111-007										D
	11.3.1	Renew crankpin bearings.	1401-004										D
	11.2.2	Inspect one piston with piston rings, without dismantling of pistonrings after the first 4000 running hours.	1421-011	D									
		Inspect / overhaul pistons + renew piston rings.	1421-010									D	D

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Cylinder head	12.2.4	Check valve clearances, after the first 100 operating hours in new and overhauled engines.	1504-003	D									
	12.2.1	Inspect one cylinder head after the first 4000 running hours.	1511-015	D									
		Make endoscopic inspection of cylinder heads.	1511-010								D	D	D
		Overhaul cylinder heads.	1511-006										
	12.7	Inspect safety valves.	1503-004								D	D	D
	12.2.4	Check valve clearances.	1504-001					D	D	D	D	D	D
	12.3.2	Check function of valve rotators.	1511-012								D		
		Make endoscopic inspection of valves and valve seats.	1504-002							D			
		Inspect / overhaul valves.	1504-004								D	D	D
		Renew exhaust valves.	1504-006									D	
		Renew inlet valves.	1504-005										D
Camshaft driving	13	Inspect driving gear camshaft.	1620-011								D	D	D
Valve mechanism and camshaft		Inspect one fuel camfollower assembly.	2100-013								D	D	D
		Inspect one inlet and exhaust camfollower assembly.	2100-018								D	D	D
		Check pushrod pivots.	1531-001								D	D	D
		Check bearing clearances of rocker arms.	1530-009								D		D
		Inspect / overhaul rocker arms and support.	1530-007									D	

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Turbo- charging and charge air cooling	15.3.2	Clean turbine every 24 ... 150 operating hours. Clean the turbine by water or granulate injection.	6120-011	D									
	15.4.1	Clean compressor by water injection.	6120-004		D	D	D	D	D				
		Inspect / clean the entire turbocharger after the first 4000 running hours.	6120-012	D									
		Refresh lubricating oil in turbocharger(s).	6120-001					D	D	D	D	D	D
		Inspect and clean the compressor and turbine mechanically, depending on turbocharger performance.	6120-013	D									
		Overhaul turbocharger(s).	6120-006								D	D	D
		Renew compressor wheel after 50,000 running hours with load limited to 100%.	6120-008	D									
		Inspect / clean air filter.	6108-004			D	D	D	D	D			
		Renew the air filter material if applicable.	6108-003									D	D
		Make endoscopic inspec- tion of the air side charge air cooler after the first 4000 running hours.	5302-007	D									
	15.6.2	Check / clean the water- side of the charge air cooler. Renew the protection anodes, if applicable.	5302-001						D	D	D		D
	15	Overhaul the charge air cooler.	5302-004									D	

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Injection system	16	Check the spill fuel quantity.	2106-010		D	D	D	D	D	D	D	D	D
		Inspect / overhaul the fuel injectors.	1501-005							D	D	D	D
		Inspect one HP fuel pump, after the first 4000 running hours.	2106-011	D									
		Inspect / overhaul the HP fuel pumps.	2106-005								D	D	D
		Renew the O-rings in supply and discharge lines of the HP fuel pumps.	6201-003								D	D	D
		Check the fuel injection timing.	2100-002								D	D	D
Lubricating oil system	18.2.1	Remove the commissioning lube oil filters after the first 100 running hours.	1101-008	D									
	18.4	Clean centrifugal filter and renew insert.	6303-010			D	D	D	D	D	D	D	D
		Inspect / overhaul the thermostatic valve.	9004-006								D	D	D
		Sample and analyse the lube oil.	6303-001					D	D	D	D	D	D
		Operate the lube oil filter elements according to manufacturer's instructions.	6303-009					D	D	D	D	D	D

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Cooling water system	02.3.3	Check cooling water quality.	6404-003				D	D	D	D			
		Check and clean the cooling water system on corrosion and check the deaeration device.	6404-005								D	D	D
		Inspect / overhaul the thermostatic valve.	9004-005								D	D	D
Exhaust system		Inspect / repair the exhaust gas lines, expansion bellows, insulation etc.	6104-004									D	
Starting air system		Drain starting air vessels and air treatment unit(s). Check the entire system on leakages, oxidation and water.	2107-002		D	D	D	D	D	D	D	D	D
	21.3	Inspect / overhaul the starting air valves.	1520-006								D	D	D
		Inspect / overhaul the main starting air valve.	2107-004									D	
	21.2.2	Inspect the starting air distributor and drive.	2107-001									D	D

Maintenance intervals			Job code	S P E C I A L	D A I L Y	W E E K L Y	5 0 0 0	1 0 0 0	2 0 0 0	4 0 0 0	1 2 0 0	2 4 0 0	3 6 0 0
Title	Chapter	Description											
Control mecha- nism	22.5	Check and lubricate the control mechanism.	2301-001			D	D	D	D	D	D		D
	22.5, 22.6	Inspect / overhaul the control mechanism.	2301-006									D	
	22.2	Refresh oil in governor.	3001-002							D	D		
		Inspect / overhaul the governor.	3001-005									D	D
	22.2.2	Inspect the governor drive.	3005-001							D	D		D
	22.2.2	Overhaul the governor drive.	3005-004									D	
Instru- mentation and auto- mation	22.6.4	Check functioning of fuel limiter.	8203-014							D	D	D	D
		Check functioning of load limiter.	8203-015		D	D	D	D	D	D	D	D	D
	23.2, 23.3	Check the alarm and safety system in operation	8203-016		D	D	D	D	D	D	D	D	D
		Check and calibrate the alarm and safety system.	8203-012				D	D	D	D	D	D	D
		Check the measuring devices on proper working.	8203-017		D	D	D	D	D	D	D	D	D
		Calibrate the measuring devices.	8203-018							D	D	D	D
Gear box		Check functioning of the oil mist detector.	8203-013		D	D	D	D	D	D	D	D	D
		Inspect driving gear of the built-on pumps.	1620-010							D	D	D	D

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	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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Appendix – C Operations Records, Availability Factor

Company Name
For the Month (s)

Tapal Energy (Private) Limited
Jul 01, 2017 to Sep 30, 2017

FORM - I
{See rule 5(2)}

Units	Installed Capacity (MW)	Ref. Capacity (RC) (MW)	Net Generation (MW-HR)	Period Hours (PH)	Service Hours (SH)	Reserve Shut Down or Standby Hours (RSH)	Available Hours (SH+RHS)	Planned Outage Hours (POH)	Unplanned Outage Hours (UOH)	Total Outage Hours (POH+UOH)	Availability Factor (AF=AH/PH)
1	10.50	10.29	19701.6	2208.00	1847.36	315.67	2163.03	3.27	41.70	44.97	97.96%
2	10.50	10.29	14391.1	2208.00	1356.29	447.8	1804.09	351.54	52.37	403.91	81.71%
3	10.50	10.29	13610.6	2208.00	1292.58	398.61	1691.19	477.60	39.21	516.81	76.59%
4	10.50	10.29	19463.1	2208.00	1833.77	301.59	2135.36	-	72.64	72.64	96.71%
5	10.50	10.29	18829.0	2208.00	1750.43	346.1	2096.53	39.85	71.62	111.47	94.95%
6	10.50	10.29	19991.9	2208.00	1882.91	268.95	2151.86	20.45	35.69	56.14	97.46%
7	10.50	10.29	16448.6	2208.00	1547.62	566.73	2114.35	54.35	39.30	93.65	95.76%
8	10.50	10.29	18462.5	2208.00	1730.07	367.39	2097.46	-	110.54	110.54	94.99%
9	10.50	10.29	21102.6	2208.00	1966.18	231.33	2197.51	-	10.49	10.49	99.52%
10	10.50	10.29	18317.5	2208.00	1728.54	463.55	2192.09		15.91	15.91	99.28%
11	10.50	10.29	15573.9	2208.00	1789.72	384.64	2174.36	16.95	16.69	33.64	98.48%
12	10.50	10.29	18333.0	2208.00	1481.26	255.47	1736.73	215.80	255.47	471.27	78.66%
COMPLEX	126.00	123.48	214225.38	26496.00	20206.73	4347.83	24554.56	1179.81	761.63	1941.44	92.67%

Note:

- 1 Column not relevant to particulars generation facilities may be left blank.
- 2 Data is to be entered for each individual unit except in the case of combined cycle where it would be entered as the "block" i.e. 2 Gas Turbines and 1 Steam Turbine would be defined as "Unit"
- 3 Installed Capacity is the ISO Capacity of the Unit

Units	Installed Capacity (MW)	Ref. Capacity (RC) (MW)	Net Generation (MW-HR)	Period Hours (PH)	Service Hours (SH)	Reserve Shut Down or Standby Hours (RSH)	Available Hours (SH+RHS)	Planned Outage Hours (POH)	Unplanned Outage Hours (UOH)	Total Outage Hours (POH+UOH)	Availability Factor (AF=AH/PH)
1	10.50	10.29	10356.6	2208.00	1038.11	1,106.73	2144.84	19.12	44.04	63.16	97.14%
2	10.50	10.29	13964.7	2208.00	1379.31	820.34	2199.65	-	8.35	8.35	99.62%
3	10.50	10.29	12023.9	2208.00	1192.59	954.9	2147.49	55.54	4.97	60.51	97.26%
4	10.50	10.29	14405.4	2208.00	1416.88	786.82	2203.70	-	4.30	4.30	99.81%
5	10.50	10.29	11503.0	2208.00	1152.31	1003.25	2155.56	35.05	17.39	52.44	97.63%
6	10.50	10.29	11752.0	2208.00	1182.84	1011.71	2194.55	8.97	4.48	13.45	99.39%
7	10.50	10.29	6241.4	2208.00	707.03	1483.4	2190.43	-	17.57	17.57	99.20%
8	10.50	10.29	8164.9	2208.00	835.37	1288.98	2124.35	64.98	18.67	83.65	96.21%
9	10.50	10.29	18608.5	2208.00	1756.87	432	2188.87	-	19.13	19.13	99.13%
10	10.50	10.29	8126.2	2208.00	828.13	924.73	1752.86	450.78	4.36	455.14	79.39%
11	10.50	10.29	7660.4	2208.00	776.00	1411.04	2187.04	-	20.96	20.96	99.05%
12	10.50	10.29	12454.3	2208.00	1209.93	974.84	2184.77	20.75	2.48	23.23	98.95%
COMPLEX	126.00	123.48	135261.33	26496.00	13475.37	12198.74	25674.11	655.19	166.70	821.89	96.90%

Note:

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- 3 Installed Capacity is the ISO Capacity of the Unit

Company Name
For the Month (s)

Tapal Energy (Private), Limited
Jan 01, 2018 to Mar 31, 2018

FORM - I
{See rule 5(2)}

Units	Installed Capacity (MW)	Ref. Capacity (RC) (MW)	Net Generation (MW-HR)	Period Hours (PH)	Service Hours (SH)	Reserve Shut Down or Standby Hours (RSH)	Available Hours (SH+RHS)	Planned Outage Hours (POH)	Unplanned Outage Hours (UOH)	Total Outage Hours (POH+UOH)	Availability Factor (AF=AH/PH)
1	10.50	10.29	15392.0	2160.00	1479.33	673.27	2152.60	-	7.40	7.40	99.66%
2	10.50	10.29	15626.9	2160.00	1503.88	627.13	2131.01	26.79	2.20	28.99	98.66%
3	10.50	10.29	14086.3	2160.00	1351.50	798.12	2149.62	2.98	7.40	10.38	99.52%
4	10.50	10.29	14676.0	2160.00	1426.08	192.9	1618.98	520.22	20.80	541.02	74.95%
5	10.50	10.29	15604.4	2160.00	1492.71	249.62	1742.33	411.65	6.02	417.67	80.66%
6	10.50	10.29	16577.3	2160.00	1591.02	550.01	2141.03	13.73	5.24	18.97	99.12%
7	10.50	10.29	14289.2	2160.00	1418.02	678.44	2096.46	29.84	33.70	63.54	97.06%
8	10.50	10.29	10394.7	2160.00	1007.89	986.05	1993.94	96.65	69.41	166.06	92.31%
9	10.50	10.29	17798.1	2160.00	1710.40	358.37	2068.77	57.62	33.61	91.23	95.78%
10	10.50	10.29	13345.6	2160.00	1271.20	481.04	1752.24	-	407.76	407.76	81.12%
11	10.50	10.29	11980.7	2160.00	1152.15	958.16	2110.31	26.86	22.83	49.69	97.70%
12	10.50	10.29	13780.4	2160.00	1301.76	843.23	2144.99	-	15.01	15.01	99.31%
COMPLEX	126.00	123.48	173551.58	25920.00	16705.94	7396.34	24102.28	1186.34	631.38	1817.72	92.99%

Note:

- 1 Column not relevant to particulars generation facilities may be left blank.
- 2 Data is to be entered for each individual unit except in the case of combined cycle where it would be entered as the "block" i.e. 2 Gas Turbines and 1 Steam Turbine would be defined as "Unit"
- 3 Installed Capacity is the ISO Capacity of the Unit

Company Name
For the Month (s)

Tapal Energy (Private) Limited
Apr 01, 2018 to Jun 30, 2018

FORM - I
{See rule 5(2)}

Units	Installed Capacity (MW)	Ref. Capacity (RC) (MW)	Net Generation (MW-HR)	Period Hours (PH)	Service Hours (SH)	Reserve Shut Down or Standby Hours (RSH)	Available Hours (SH+RHS)	Planned Outage Hours (POH)	Unplanned Outage Hours (UOH)	Total Outage Hours (POH+UOH)	Availability Factor (AF=AH/PH)
1	10.50	10.29	19916.7	2184.00	1913.58	208.36	2121.94	10.95	51.11	62.06	97.16%
2	10.50	10.29	19360.6	2184.00	1870.87	205.49	2076.36	59.64	48.00	107.64	95.07%
3	10.50	10.29	19500.5	2184.00	1931.14	213.73	2144.87	11.93	27.20	39.13	98.21%
4	10.50	10.29	22134.7	2184.00	2141.26	12.51	2153.77	16.26	13.97	30.23	98.62%
5	10.50	10.29	20120.2	2184.00	1959.54	169.33	2128.87	14.10	41.03	55.13	97.48%
6	10.50	10.29	19538.2	2184.00	1914.48	194.14	2108.62	7.32	68.06	75.38	96.55%
7	10.50	10.29	17522.2	2184.00	1701.34	202.29	1903.63	222.78	57.59	280.37	87.16%
8	10.50	10.29	20339.1	2184.00	1957.69	186.09	2143.78	9.58	30.64	40.22	98.16%
9	10.50	10.29	20203.6	2184.00	1956.14	184.95	2141.09	23.47	19.44	42.91	98.04%
10	10.50	10.29	12140.2	2184.00	2016.75	161.78	2178.53	-	5.47	5.47	99.75%
11	10.50	10.29	19242.5	2184.00	1931.87	196.6	2128.47	12.28	43.25	55.53	97.46%
12	10.50	10.29	19327.3	2184.00	1839.49	212.48	2051.97	70.55	61.48	132.03	93.95%
COMPLEX	126.00	123.48	229345.80	26208.00	23134.15	2147.75	25281.90	458.86	467.24	926.10	96.47%

Note:

- 1 Column not relevant to particulars generation facilities may be left blank.
- 2 Data is to be entered for each individual unit except in the case of combined cycle where it would be entered as the "block" i.e. 2 Gas Turbines and 1 Steam Turbine would be defined as "Unit"
- 3 Installed Capacity is the ISO Capacity of the Unit

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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Appendix – D Environment Performance Monitoring Report 2017-18

**ENVIRONMENTAL MONITORING REPORT
FOR DECEMBER 2017 – MAY 2018**

**ENVIRONMENTAL
PERFORMANCE
MONITORING OF
TAPAL ENERGY LIMITED
POWERPLANT OPERATIONS**

**PREPARED FOR
TAPAL ENERGY LIMITED
F-25, CLIFTON
KARACHI-75600**

**PREPARED BY
DR. MIRZA ARSHAD ALI BEG
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136-C RAFAHE AAM HOUSING SOCIETY
MALIR HALT
KARACHI-75210**

June 23, 2018

ENVIRONMENTAL MONITORING REPORT ON IMPACT OF OPERATIONS AT TELP DECEMBER 2017 – MAY 2018

EXECUTIVE SUMMARY

Environmental Performance Monitoring carried out for the December 2017 – May 2018 period finds the gaseous and noise emissions levels as well as other environmental parameters of concern in the engine driven power production systems at Tapal Energy Limited Power Plant (TELP) to have impacts on the environment within acceptable limits.

The DG sets operated for a total of 38501.0 engine hours, with 73.05% capacity utilization during the December 2017 – May 2018 period; consumed a total of 85763.52 tons HFO at an average rate of 468.653 tons per day to produce 399097.8 MWh energy @ 0.2148 ton/MWh.

SO₂ emission from the 12-stack cluster was @ 26.73 tons/day at 12.248 kg/MWh by calculation based on fuel consumption, and an average 26.18 tons/day and 12.00 kg/MWh by measurement. The other stack NO_x emission was @44.786 tons/day at an overall rate of 15.00 g/kWh. SO₂ and NO_x emission are both within the recommended values: 13.0 kg/MWh and 17.0 Kg/MWh respectively, while particulate matter: 0.9350 ton/day for an average 73.05 percent capacity utilization. The emissions and estimates from HFO quantities are in reasonable agreement, while the values being at acceptable levels of NEQS/SEQS, meet the WB/IFC Guidelines.

TELP used a total of 387.37 tons lubricating oil at a rate of 0.9706 g/kWh during the period, 139.66 tons oily sludge and 919.28 tons oily water produced within the fuel oil and lubricating oil systems during the June - November 2017 period. The oily wastes were lifted as per past practice by a SEPA approved contractor to dispose of oily wastes through recognized channel.

Assessment of light intensity in terms of Luminance level suggests that the Engine Hall and its outside comprising the microenvironment and macroenvironment respectively are both illuminated to levels acceptable for Movement and orientation requiring 40 Lux, and Rough intermittent tasks requiring 80 Lux during the day and night time as per Australian and New Zealand Standards on the subject. Illumination of the uncovered area was reduced during night time but was at acceptable levels for moderately difficult tasks as per the said Standards.

The high level of noise emission: 102.1 dB and 111.1 dB during the day and 100.3 to 107.7 dB during the night inside the Powerhouse was reduced at the 25 meter periphery of the powerhouse from 58.9 to 76.9 during the day and 63.9 dB to 73.9 during the night. Noise level on the outside of 25 meter periphery ranged from 49.8 to 52.5 dB at the boundary wall during the day and 48.0 to 50.8 during the night; the level being much within the limit: 75 dB(A), set by SEPA guidelines for continuous exposure for 8 hours, above which it is mandatory on the workers at TELP to wear ear plugs/mufflers.

Operation of garbage trucks on the access road to TELP to carry solid waste from different parts of Karachi District and dump it at the unhygienic Govind Pass landfill site constitutes the most environmentally undesirable activity at the microenvironment of TELP. The adverse impact of dumping is compounded by the scavengers who burn the waste.

The assessment of environmental performance suggests i) that the impact of activity related to power plant operations at TELP on the local physical and human environment is well within the limits allowed by NEQS/SEQS and WB Guidelines, and ii) that the impact of an illegal activity viz. open burning of garbage dumped at the unhygienic Govind Pass landfill site has adversely impacted the physical and living environment as well as the microenvironment of the power plant.

**ENVIRONMENTAL PERFORMANCE MONITORING OF OPERATION
OF TAPAL ENERGY LIMITED POWERPLANT
DECEMBER 2017 – MAY 2018**

TABLE OF CONTENTS

	Page #
Executive Summary	2
General	4
Methodology	4
Environmental Issues of the Microenvironment of TELP	4
Safety and Security	4
Health and Safety Issues	5
Environmental Performance Monitoring	6
Power Production and Furnace Oil Consumption	6
Stack Emission	6
Summary of Stack Emission Data	8
Discharge of Emission from TELP Operations	8
Ambient Air Quality	9
Lubricating Oil, Sludge and Oily Wastes	11
Groundwater and Soil Pollution	12
Solid Waste	14
Luminance Levels	14
Noise Emission	16
Environmental Issues of Macroenvironment of TELP	18
Annexures	20-29
Ambient Air Quality Analysis at TELP & Meteorological Parameters	21-23
Noise Emission & Light Intensity Level	24-25
Stack Emission Monitoring	26
Water & Wastewater Analysis	27
National Environmental Quality Standards	27-29

**ENVIRONMENTAL PERFORMANCE MONITORING OF OPERATION OF TAPAL
ENERGY LIMITED POWEPLANT
DECEMBER 2017 – MAY 2018**

GENERAL

Environmental Performance Monitoring Report for Tapal Energy Power Plant (TELP) at Hub Chowki, prepared for Tapal Energy Limited (TEL) for the December 2017 – May 2018 period by Research and Development Consultants (R&DC), is being submitted in continuing compliance with Pakistan Environmental Protection Act (1997), Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000, Sindh Environmental Protection Agency Review 2014 and World Bank Guidelines for Engine Driven Power plants 1998. The PEPA 1997 and SEPA as well as relevant Regulations and Guidelines require proponents of projects to follow monitoring and reporting plans to keep the concerned agencies informed of current status of environment.

METHODOLOGY

Standard methodology prescribed by Pakistan Environmental Protection Agency Review of IEE and EIA Regulations, 2000, Sindh Environmental Protection Act 2014 and Sindh Environmental Protection Agency Review 2014 have been followed by R&DC for preparing the report. Provisions for Environmental Performance Monitoring in World Bank Guidelines have been kept in view for assessment of impact of operation and performance of TELP on microenvironment and macro environment, as well as socio-economic condition of the neighborhood, and biodiversity of flora and fauna. Performance was evaluated on the basis of adequacy of systems adopted for discharge of emissions, disposal of solid wastes, liquid effluent, and oily sludge and for reducing their impact on health and safety of personnel and environment of workplace.

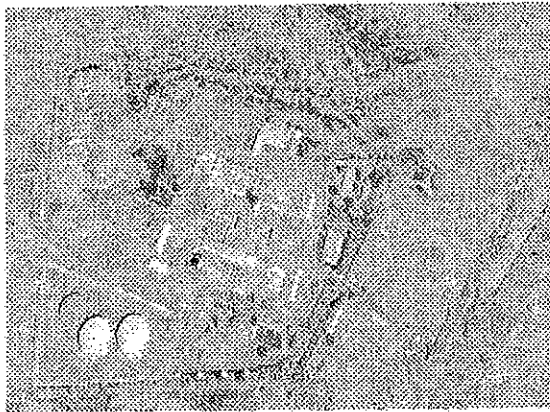
Data and information on operation and performance of power plant recorded in the text were provided by TELP officials. The data and information provided by TELP included fuel usage; fuel and water quality; quantity of lubricants and water used; wastewater, wastes including solid waste, and sludge generated and disposed of, in addition to occupational health and safety issues. Air quality, noise level and light intensity measurements were carried out by SEPA approved EverGreen Environmental Laboratory, EGEL officials, while R&DC recorded observations on general environmental conditions; performance of mitigation measures, land use changes and community issues.

ENVIRONMENTAL ISSUES OF MICROENVIRONMENT OF TELP

The power plant was operating at 67.98 percent capacity utilization showing that the operations at TELP were at above average during the period due mainly to optimal demand from the K-Electric. The physical environment immediately outside the TELP boundary wall continued to have the look shown by the following imagery. The wild growth of mesquite bushes was adequately controlled while the bougainvillea along the inside of boundary wall, as well as shrubs, seasonal flowers and maintenance of the large lawn at the back of administration building, were continuing to present a pleasant look. The neem, chikoo and coconut trees planted between the engine hall and boundary wall at the southeastern corner were, besides bearing fruits in good yield, effective in reducing the noise emission level at and beyond the TELP boundary wall.

Safety and Security: Safety and security measures together with good housekeeping practices adopted at TELP were found effective in minimizing the environmental risks during the reporting period. Safety and security measures at TELP include posting of guards at the five watchtowers along the perimeter of boundary wall and at the post at the top of Allu Pahar escarpment right in front and the lighting arrangement along the boundary wall. The TELP systems during the period were found in readiness during the surveys by R&DC for handling the convoys of 24-ton tanker trucks to meet the day to day demand of Heavy Fuel Oil (HFO), and for washing the drips and leakages into the channels that drain into

the API oil/water separator. The 2 X 10,000 m³ and 1 X 5,000 m³ vertical tanks for storage of HFO, and the containment system of dykes were under strict vigilance by the security staff that includes one posted at the watchtower constructed just at the tank yard site. No spillage of oil was reported or noticed at the sites during the visits for monitoring.



June - November 2017



December 2017 – May 2018

Health and Safety Issues: Plant Manager and Plant Safety and Environment Officer looked after Logistics, Safety and health issues at TELP.

Logistics

- i) Number of convoys of 20 to 38-ton tanker trucks handled: **1531 Tankers**
- ii) Number of incidents of oil drips, leakages and spills and measures adopted to dispose of into designated channels draining into the API oil/water separator, **NONE**
- iii) Incidence of oil leakage and mode of disposal (into system of dykes surrounding the vertical HFO and LFO tanks in the primary and secondary storage areas) **NONE**
- iv) Adequacy of Lighting: **Adequate indoor and outdoor lighting being maintained.**

Incidents

- i) Incidence of unforeseen events: **02**
- ii) Total Number of Incident/ Accident: **01 Personal Incident**
- iii) Major Accidents: Nature & Man Hour Lost: **None**
- iv) Minor Accidents: Nature & Man Hour Lost: **Metal plate fell on worker's foot, resulting in swelling of right foot.**

Hot Work Permits

- Live Permits: **1489 live permits** issued during above mentioned tenure
- Welding Permits: **256 hot work permits** issued during above mentioned tenure
- Internal Training Hours: **130 hours** internal training
- Technical Discussion Hours: **35 hours** of technical discussion
- Total Internal Training Hours: **165 hours** internal training
- External Training Hours: **104 hours** external training
- Total Training Hours: **269 hours**

Number of hours of Fire and accident free format: 1152 Hours

- Operation and maintenance of wastewater treatment plant: **Smooth operation and preventive maintenance carried out as when required.**
- Updating of First aid box available at the designated places: **Monthly Basis**

ENVIRONMENTAL PERFORMANCE MONITORING

Operations at the TELP Plant were 35635.7 engine hours, at 67.98 percent capacity utilization to meet the optimum demand from K-Electric during the June – November 2017 period. Environmental monitoring at TELP included evaluation of data generated on fuel oil usage during of operation of the 12 diesel generating (DG) sets; stack emissions from the 40 m high stacks, and noise emission from the DG sets in terms of impact on the microenvironment and macroenvironment measured by recording the level of primary pollutants in the engine hall as well as at different points inside and outside the boundary wall of TELP, besides quality and quantity of wastewater, oily sludge and solid waste disposal.

Power Production and Furnace Oil Consumption: The DG sets, according to Table I, operated for a total of 35635.7 engine hours, with 67.98 capacity utilization during the December 2017 –May 2018 period; consuming a total of 78198.13 tons HFO at an average rate of 429.66 tons per day thereby producing 366460.5 MWh energy @ 0.2133 ton/MWh.

Table I: Power Production, Furnace Oil Consumption & SO₂ Emission

Period	Operation: No. of Hrs Cumulative for 12 DG	Power Generated MWh	Consumption of Furnace Oil			SO ₂ Emission	
			Tons/ Month	Average Tons/Day	Ton/ MWh	Tons/ Month	Tons/ Day
Total: June – November 2016	35751.3 Hrs; Capacity Utilization = 67.83%	362831.4	78039.75	426.446	0.2150	Total = 4166.53 694.62/month	22.767
Total: December-2016- May 2017	35559.8 Hrs; Capacity Utilization = 67.84%	372947.3	79534.84	437.00	0.2132	Total = 4337.03 1445.67/month	23.829
Total: June – November 2017	38501 Hrs; Capacity Utilization = 73.05%	399097.8	85763.52	468.653	0.2148	Total = 4888.52 814.75/month	26.713
December 2017	3011.31	30675.7	6531.32	210.68	0.2129	356.152	11.488
January 2018	4508.18	45343.40	9722.41	313.62	0.2144	530.163	17.102
February 2018	5542.65	57115.4	12102.42	403.104	0.2118	615.948	21.998
March 2018	6940.56	71092.80	15141.87	488.44	0.2129	825.686	26.635
April 2018	7261.4	75531.90	16155.34	538.51	0.2138	880.950	29.365
May 2018	8371.6	86701.3	18544.77	598.21	0.2138	1011.24	32.620
Total: December 2017 – May 2018	35635.7 Hrs; Capacity Utilization = 67.98%	366460.5	78198.13	429.66	0.2133	Total = 4264.14 710.67/month	23.429

Stack Emission: Sulphur dioxide (SO₂), the emitted pollutant of major concern in the performance of Engine driven power plants, was discharged from the 40 m high stack into the atmosphere. The emission resulting from 2.87% sulphur in HFO, was 4264.14 tons during the period @ 23.429 tons/day and 11.635 kg/MW during the period compared with 11.629 kg/MW, 11.57 kg/MW, 11.45kg/MWh, 11.189 kg/MWh, 11.91kg/MWh, 12.19 kg/MWh and 12.42 kg/MWh during the preceding and earlier reporting periods respectively. The SEQs of Pakistan allows a maximum SO₂ emission of 500 tons/day while the WB Guidelines allow 100 tons/day @ 13.0 kg/MWh. SO₂ emissions from TELP are thus comfortably below the levels prescribed by the SEQs and recommended by the WB Guidelines.

Table II indicates that Stack emission of SO₂ from unit #9 representing the set of stacks that discharge emissions into the atmosphere through the heat recovery system, was at a rate of 1175.9 mg/Nm³, at velocity of 13.6 m/sec, and stack temperatures 274°C. Emission of SO₂ from the three such stacks is estimated at 3.929 tons/day. Emission of SO₂ from Stack unit #11, representing the set of stacks that discharges the emissions directly into the atmosphere, was at a rate of 1284.5 mg/Nm³, at velocity 14.0 m/s and stack flue gas temperature 280°C. Emission from this set is estimated at 13.25 tons SO₂/day. Accordingly the total emission of SO₂ from the 12-stack cluster was an average 17.185 tons/day, which is close to 17.102, the level calculated from fuel usage in January 2018. With the average rate of 17.185 tons/day the estimated production of SO₂ for January 2018 would be 532.764 tons which is almost the same as 530.163 calculated from fuel usage in January 2018. The rate calculated for this quantity of fuel is 11.74 Kg/MWh, which is

almost the same as 11.635 kg/MWh, the value estimated from Fuel consumption, and is within World Bank Guidelines 13.0 kg/MWh level.

TABLE II: ANALYTICAL DATA ON STACK EMISSION

Sr. No.	Parameters	Units	Gen Set # 9	Gen Set # 11	SEQS Limits
1	Fuel	-	Heavy-Oil		
2	Sampling Date	-	12-05-2018		-
3	Ambient Temperature	°C	38.0	38.0	-
4	Flue Gas Temperature		274	280	-
5	Carbon Monoxide (CO)	mg/Nm ³	128	132	800
6	Sulfur Dioxide (SO ₂)		1175.9	1284.5	1,700
7	Nitrogen Oxide (NO)		1118	1095	-
8	Nitrogen Oxide (NO ₂)		20.1	25.3	-
9	Oxides of Nitrogen (NO _x)		1138.1	1120.3	Oil 600
10	Oxygen (O ₂)	%	10.9	11.3	-
11	Carbon Dioxide (CO ₂)		2.63	2.84	-
12	Hydrogen (H ₂)	ppm	1.5	1.3	-
13	Efficiency Net	%	79.6	78.2	-
14	Efficiency Gross		73.4	71.8	-
16	Velocity	m/s	13.6 to 18.4		-

❖ SEQs= Sindh Environmental Quality Standards (The Gazette of Pakistan) Registered No. EPA/TECH/739/2014

NO_x Emission: NO_x emission for Dec 17 – May 18

The rate of emission of nitrogen oxides NO_x the other major pollutant in the flue gases of diesel driven engines at TELP, as measured by EGEL, ranged between 1138.1 mg/Nm³ and 1120.3 mg/Nm³ respectively for the above two sets of DG stacks. With a corresponding flow rate of 13.6 and 14.0 m/sec, total NO_x emissions are estimated at 15.365 tons/day or 476.316 tons per month. This is the production equivalent of the month of December 2017, when 30675.7 MW was produced. The rate arrived at from these calculations is: 15.527 kg/MW which is low but within 17.0 kg/MW, the limit recommended by World Bank Guidelines 1998 for engine driven power plants set up before the year 2000.

Emission of Particulate Matter: Since the status of power production as well as quality of HFO used during the period under review and also the quantity per MWh has not changed as detailed above and since continuous monitoring of particulate matter in gaseous emissions is even otherwise difficult for engine driven power plants, particularly those using furnace oil, surrogate performance monitoring results, as allowed by WB Guidelines effective 1998, are being submitted in this report as estimates of the discharge of particulate matter of size 10 micron, PM₁₀ emission. The rate of emission of particulate matter, PM₁₀ suggested by Wartsila and also reported earlier was @ 1.24g/sec/stack. This suggests an emission of 1.28 ton/day of PM₁₀/12 stacks (operational). According to estimates the PM₁₀ emission from TELP would be 0.8701 ton/day for an average 67.98 percent capacity utilization during the review period.

Summary of Stack Emission Data: Total emission from the 12-stack cluster was SO₂ @ 23.429 tons/day and @11.635 kg/MW by calculation based on fuel consumption, and an average 23.429 tons/day, and 11.635 kg/MWh by measurement. NO_x emission was @14.231 tons/day from the corresponding sets of the TELP stack cluster, which is well within the 17.0 g/kWh level recommended by World Bank Guidelines 1998. Particulate matter has been estimated at 0.8701 ton/day for an average 67.98 percent capacity utilization. The emissions and estimates from HFO quantities are in reasonable agreement, while the values are at acceptable levels of NEQS/SEQs, and meet the WB/IFC Guidelines. It may be pointed out that the NEQS/SEQs limits set for NO_x and PM₁₀ do not apply to Diesel power generators. The emission limits for particulate matter have not been set by NEQS/SEQs for diesel power generation. Emission levels of the primary pollutants are nevertheless well within suggested Guidelines.

Discharge of Emissions from TELP Operations

Gaseous emissions resulting from power generation activities were ported into the exhaust system, while noise emission was largely contained into the TEL Powerhouse, as noted from the Noise emission level measurements in the immediate outside (25 m) of the powerhouse. The Reporting period: mid-May 2018 for air quality monitoring coincided with the onset of high intensity summer that marks the pre-Monsoon period. Table III records the weather data during mid-May 2018 when the wind was calm and directionless, with temperatures recorded above 40°C.

The wind carried away the plume containing the gaseous emissions ported from the DG sets into the 40 m high chimney as may be observed from the wind rose, and imageries. The plume generally travels away from TELP at high and low speed during the summer and winter seasons respectively. The Imagery is self-explanatory.

Table III: Range of Climatic Parameter Variation at TELP (12-13/05/2018)

Range	Wind Speed (m/s)	Pressure (mbar)	Wind Direction (degree)	Air Temperature (°C)	Humidity (% Rh)
Average	0.4	1002.0	8.0	39.5	28.9
Maximum	2.1	1003.8	8.5	40.7	36.7
Minimum	0.0	1000.0	7.9	38.2	19.9

Table IIIa: Range of Climatic Parameter Variation at TELP (17-18/11/2017)

Range	Wind Speed (m/s)	Pressure (mbar)	Wind Direction (degree)	Air Temperature (°C)	Humidity (% Rh)
Average	1.0	1008.0	169.7	22.8	80.1
Maximum	4.1	1009.8	336.1	27.7	91.4
Minimum	0.0	1006.1	39.7	17.6	60.3

Table IIIb: Range of Climatic Parameter Variation at TELP (May 25-26, 2017)

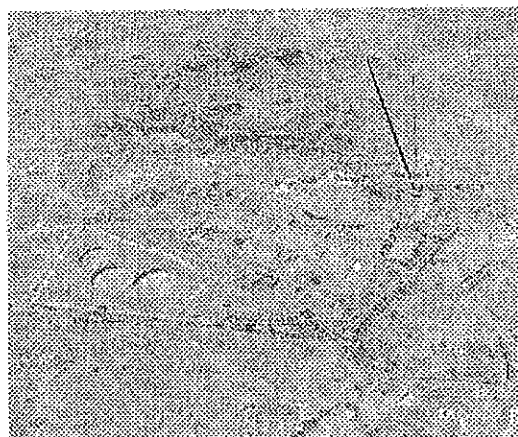
Range	Wind Speed (m/s)	Pressure (mbar)	Wind Direction (degree)	Air Temperature (°C)	Humidity (% Rh)
Average	2.1	994.0	220.9	34.7	74.5
Maximum	5.8	996.5	264.9	36.6	80.6
Minimum	0.0	991.9	189.1	33.7	66.0

Table IIIc: Range of Climatic Parameter Variation at TELP (December 17-18/ 2015)

Range	Wind Speed (m/s)	Pressure (mbar)	Wind Direction (degree)	Air Temperature (°C)	Humidity (% rh)
Maximum	3.6	1022	45	27.0	46
Average	2.3	1018	27	19.0	25
Minimum	1.1	1015	10	11.0	04



Wind Rose: June – November 2017



December 17 – May 2018

Ambient Air Quality: Dispersion of emissions is generally towards the Govind Pass garbage dump site about 2 km on the ENE of TELP. Rapid dispersal by the wind lowers the level of all emissions, including CO whose average level was, in the present report, found at ~2.3 ppm i.e. the same range as recorded earlier. Level of SO₂ was found to remain at ~33.5 ppb and NO_x at an average of 38.4 ppb.

Ambient air quality measurements and meteorological data recorded in the Annexure and briefly presented in Tables IV – IV.a – IV.e suggest that the average range of level of SO₂ has decreased from 35.3 to 33.3 ppb. The level of NO_x was found to have decreased from an average 42.1 ppb to 38.1 ppb. The level of carbon monoxide (CO) was found to have increased from 1.4 ppm to 2.3 ppm. The pattern of increase in level of all primary pollutants of concern is unrelated to emissions from TELP; which indicates that the increase in level is related to point sources outside of the TELP microenvironment.

Table IV: Range of Variation of Ambient Air Quality & Noise Level (12-13/05/2018)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
SEQS (2014)	42.5	69.8	61.5	4.05	NA	150	75
Minimum	29	30	10	1.9	348	128	48
Maximum	39	45	45	2.9	428	170	66
Average	33.6	38.2	25.3	2.3	400.1	149.3	56.3

Table IV.a: Range of Variation of Ambient Air Quality & Noise Level (17-18/11/2017)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
SEQS (2014)	42.5	69.8	61.5	4.05	NA	150	75
Minimum	27	32	8	1.6	336	128	47
Maximum	39	45	39	2.6	452	163	66
Average	33.7	38.4	19.8	2.2	399.3	147.3	56.3

Table IV.b: Range of Variation of Ambient Air Quality & Noise Level (25-26/5/2017)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
SEQS (2014)	42.5	69.8	61.5	4.05	NA	150	75
Minimum	30	30	10	1.7	356	138	45
Maximum	39	48	46	2.8	436	157	58
Average	33.3	38.1	25.3	2.2	404.3	147.5	50.9

Table IV.c: Range of Variation of Ambient Air Quality & Noise Level (10-11/6/2016)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
SEQS (2014)	42.5	69.8	61.5	4.05	NA		75
Minimum	29	37	10	2.1	368	138	48.7
Maximum	44	49	48	2.9	455	159	66.8
Average	35.3	42.1	27.2	2.7	407.2	148.2	58.5

Table IVd: Range of Variation of Ambient Air Quality & Noise Level (May 2015)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
Minimum	29	35	9	1.2	345	132	47.6
Maximum	41	47	45	2.9	432	174	71.3
Average	34.4	41.3	24.3	2.1	384.7	149.5	56.6

NEQS for SO₂: 45ppb (24 hours average), for NO_x: 20 ppb (24 hours average)

Table IV.e: Range of Variation of Ambient Air Quality & Noise Level (17-18/12/2015)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
Maximum	36	39	38	2.5	432	156	68.4
Average	30.5	34.5	23	1.9	388	140.5	60.0
Minimum	25	30	8	1.4	345	125	51.6

Concentration of the three pollutants viz. SO₂, NO_x and CO as well as particulate matter has, increased during the years from the baseline of 0.0 to 0.1 ppm noted at the inception of power production activity at TELP, but has increased conspicuously from the level noted in the June – November 2009 Report and observed from a comparison of the pollutant level in Tables IV.f to IV.i:

Table IV.f: Range of Variation of Ambient Air Quality & Noise Level (June 2014)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	Dust (µg/m ³)	Noise (dB)
Minimum	24.3	31.2	9.4	1.9	398	115	51.8
Maximum	38.5	47.2	49.5	3.2	432	171	65.4
Average	29.1	39.2	25.1	2.4	413.4	144.5	58.1

Table IV.g: Range of Variation of Ambient Air Quality & Noise Level (November 2013)

Range	SO ₂ (ppb)	NO _x (ppb)	O ₃ (ppb)	CO (ppm)	CO ₂ (ppm)	PM ₁₀ µg/m ³	Noise (dB)
Minimum	23.6	32.4	10.2	2	354	128	42.6
Maximum	36.2	46.1	35.9	3.2	399	168	68.4
Average	30.4	40.4	19.4	2.4	384.0	149.8	55.0

Table IV.h: Range of Variation of Ambient Air Quality & Noise Level (June – November 2010)

Range	SO ₂	NO _x	CO	CO ₂	Noise	O ₃	SPM
Maximum	26.5	38	3.9	398	65	39.1	210
Average	22.6	33	3.1	367	58	26.3	201
Minimum	15.2	31	2.1	335	52	11.2	178

Table IV.i: Range of Variation of Ambient Air Quality & Noise Level (June – November 2009)

	SO ₂	NO _x	CO	CO ₂	Noise	O ₃	PM ₁₀
Average	14.7	23.9	2.6	327	65.5	24.6	206

Maximum	19.1	26.5	3.6	341	69.5	35.3	216
Minimum	11.0	21.0	1.5	320	61.8	14.6	184

The characteristic pattern of variation in concentration of pollutants and consistent rise in the level of all pollutants including CO, CO₂ and SPM/ PM₁₀ observed during the current as well as earlier period, has been attributed in earlier reports to rising share of emissions emanating from point sources outside TELP, e.g. indiscriminate burning of municipal solid waste dumped by Solid Waste Management Directorate of the City District Government of Karachi in the unhygienic Govind Pass Land fill site in the Hub River Valley, stretching from only 1 km to the east of TELP to the Hub River bank. Impact of emissions from this degraded site is so much as to mask the effect of fallout from emissions from TELP. The present report has accordingly attributed the increase in level of primary pollutants of concern, to point sources outside the TELP microenvironment. The rampant urban sprawl all around the west and southwest of the power plant, revival of construction related industries and operation of increasing number of transportation fleets on the Hub River Road leading to Coastal Highway comprise the main components of the point sources. What used to be agricultural land at the current site of TELP and its surrounding is now converted into housing schemes. Cumulative impact of some such activities is observed in the gradual rise from year to year in the concentration of primary pollutants in the macroenvironment including the landfill site.

Lubricating Oil, Sludge and Oily Wastes: Table V shows that TELP used a total quantity of 307.452 tons lubricating oil at a rate of 0.8389 g/kWh during the December 2017 – May 2018 period. The variations in quantity of lubricating oil used depends on the requirements of operation and maintenance at TELP. As such this rate is comparable with (0.8861 g/kWh during December-2015 – May 2016; 0.862 g/kWh during June- November 2014, and 0.996 g/kWh during the December 2012 – May 2013 period when power production was of similar order.

Table V: Power Production, Lubricating Oil Consumption & Oily Waste Generation

Month	Gross Energy Generation kWh	Lube Oil Consumption Tons	Lube Oil Consumption g/kWh	Oily Sludge Tons	Used LO Ltrs
December 2017	30675.7	32.568	1.061	Nil	1000
January 2018	45343.40	36.968	0.8152	Nil	10400
February 2018	57115.4	37.778	0.6614	24.210	11670
March 2018	71092.80	65.743	0.9247	29.360	8513
April 2018	75531.90	62.450	0.8268	29.470	13037
May 2018	86701.3	71.945	0.8298	21.550	7419
Total	366460.5	307.452	0.8389	104.590	52039

Table V also shows that 104.590 tons oily sludge and 52039 liters oily water was produced within the fuel oil and lubricating oil systems during the December 2017 – May 2018 period. The oily wastes were lifted as per past practice by a SEPA approved contractor to dispose of oily wastes through recognized channel. Leakage of transformer oil was not reported or noticed at the site of the 132-KV switchyard. TELP has its electrical equipment guaranteed free of PCB additives in the transformer oil.

Groundwater and Soil Pollution: The requirement of 40 to 100 m³/day water to make up for the losses during cooling and boiler use, for the cooling circuits of the engines and auxiliaries, domestic use in canteen, offices, workshops, control room buildings and also for watering the landscaped area at TELP, is met by supplies by tanker truck operators.

Table VIa: Analysis of Wastewater December 2017 – May 2018 Period

Test	Duck Pond		Brine		Soak – Pit	
	Min	Max	Min	Max	Min	Max
pH	7.6	8.1	7.5	8.2	7.9	8.2
TDS in ppm	435	723	575	960	996	1225
TH in ppm	159	266	196	375	268	446
Chloride in ppm	101	188	140	275	175	350
Oil in ppm	...	...	...	...	Traces	Traces

*Data provided by TELP Analytical Laboratory

Approximately 8 m³ of water having the analysis shown in Table Via and VIb with total dissolved solid (TDS) content of 430 to 960 ppm was discharged daily by the Reverse Osmosis unit, installed to produce process water. Another 9 m³ of brackish water containing about 575 to 960 ppm TDS, besides less than 1.0 ppm oil (oil & grease), conforming to the NEQS, was discharged daily from API oil separator, and fuel unloading and treatment facilities. The two sources of brackish water are used for horticulture purposes. Approximately 15 to 20 m³ of wastewater, comprising domestic wastewater with the analysis shown in Table VIa, and VIb is discharged into soak pits located on TELP premises. The wastewater discharged in this manner has not surfaced up at any location and hence continues to be absorbed by the all silty soil.

Table VI.b: Analysis of Wastewater December 2017 – May 2018 Period*

Sample ID	pH	TDS ppm	Cl ppm	Oil & Grease ppm	Total Hardness ppm
Raw Water	6.9	425	98	ND	235
Wastewater (RO Effluent)	8.7	963	145	ND	328

Data generated by EverGreen Environmental Laboratory (EGEL)

Table VI.c: Analysis of Drinking Water Sample at TELP*

S.No.	Parameter	Unit	Tapal Sample #	WHO Limits
1	Temperature	°C	25	----
2	pH	--	8.1	6.5-8.5
3	Total Dissolved Solids (TDS)	mg/l	253	1000
4	Conductivity	uS/cm	590	--
5	Total Suspended Solids (TSS)	mg/l	02	---
6	Chloride	mg/l	34	250
7	Fluoride	mg/l	0.52	1.5
8	Taste	Object./unobj.	Unobject.	Unobject
9	Odour	Object./unobj.	Unobject.	Unobject
10	Colour	TCU	0	15
11	Iron	mg/l	0.2	0.3
12	Sodium	mg/l	26	200
13	Nitrate (as NO ₃ ⁻)	mg/l	02	50
14	Nitrite (as NO ₂ ⁻)	mg/l	0.3	3
15	Chromium	mg/l	0.02	0.050
16	Potassium	mg/l	1.4	--
17	Sulphate	mg/l	48	250

18	Free Chlorine	mg/l	BDL	--
19	Total Hardness as CaCO ₃	mg/l	60	500
20	Ca Hardness	mg/l	22	--
21	Turbidity	NTU	0	5
22	Total Coliform	Number/100ml	0	0/100 ml
23	E.Coli	Number/100ml	0	0/100 ml

Analysis of drinking water and wastewater at TELP was also carried out by EGEL. The former was found fit for drinking purposes; the latter has key parameters viz. Total Dissolved Solids, Total Suspended Solids, BOD₅, COD and oil & Grease, all within acceptable limits.

Solid Waste

As mentioned in earlier reports, an estimated 20 to 25 kg solid waste is generated per day at TELP. It comprises different proportions of oily rags and cotton waste used for wiping or cleaning the parts, accessories and floor; wastes from the offices and packing material, including bottles and small size plastic drums besides about 20 kg of kitchen waste from the canteen. The major share in the total solid waste was that of soiled oily rags followed by canteen and office wastes. The solid waste from the power plant and the small volume of canteen waste was picked up by KMC personnel from a designated place and carried in their trucks to the Govind pass landfill site in Hub River Valley where trucks of CDGK dispose of their garbage. Lubricant oil steel drums are stored separately for being recycled.

Luminance Level

Luminance Level was measured at the activity centres, inside and outside the Engine Hall. The daytime and night time light intensity measured by EGEL using Standardized Luxmeter is listed in Table VII.

Luminance in the macroenvironment was, as per the results of measurements, at lower yet acceptable level during the night time. During day time it varied from 6909 to 40,000 lux in the open and was at 37 to 80 Lux in closed door setting including the DGsets. During night time the luminance leveled from 47 to 71 Lux around the DG sets and 35 to 132 Lux (with 2 exceptions) in the open yard of TELP.

Luminance level listed in Table VII suggests that the day time light intensity outside the covered areas was reasonable. The illumination level of the uncovered area was reduced during night time but was at acceptable levels for Movement / Rough Intermittent tasks as per the Australian/New Zealand Standards:

Table VII: Luminance Level (12-13/05/2018)

No.	Location	Light (LUX) Night Time Range (/20,000)	Light (LUX) Day Time Range (X 100/200000)
1	Check post 5	100	36800
2	Workshop back side	106	13060
3	Behind power grid	75	40800
4	Check post 4	120	22500
5	Rear boundary wall corner	132	21900
6	Rear end boundary wall gate	20	21400
7	Soak pit	35	12560
8	Storage tank	48	12560
9	Unloading station # 4	125	13380
10	Unloading station # 1	98	6909
11	Main Office gate	84	12480
12	Radiator	105	19680
13	Vent stack	101	10540
14	Control room	62	70
15	Switch yard front	74	12320

16	Ware house	64	69
17	Workshop	59	67
18	Control room corridor	39	37
19	DG-1	67	80
20	DG-2	61	65
21	DG-3	62	67
22	DG-4	65	61
23	DG-5	71	70
24	DG-6	58	55
25	DG-7	60	61
26	DG-8	58	56
27	DG-9	61	63
28	DG-10	52	54
29	DG-11	47	45
30	DG-12	51	50

The Australia/New Zealand Standard 1680.1:2006 suggests the following Lux Level to be followed:

Movement and orientation only	40 Lux
Rough intermittent	80 Lux
Simple tasks	160 Lux
Ordinary tasks	240 Lux
Moderately difficult tasks	320 – 400 Lux
Difficult	600 Lux
Very difficult	800 Lux
Extremely difficult	1200 Lux
Exceptionally difficult	1600 Lux

Noise Emission

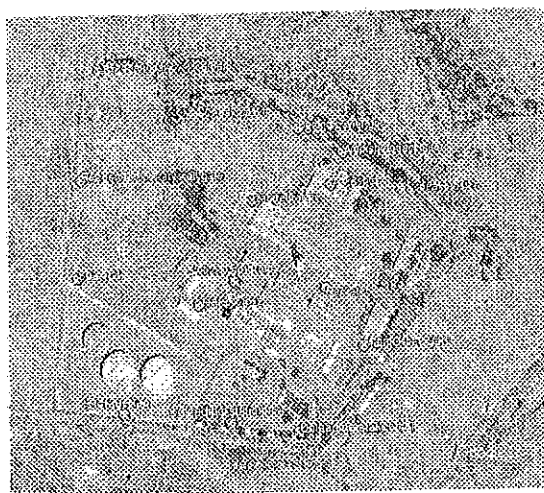
TELP operated at 67.98 percent capacity utilization during the reporting period. Being of major environmental concern in operation of engine driven power plants, Noise emission level has been reported at pertinent activity centres: inside as well as outside the powerhouse and at the macroenvironment of TELP, all marked on the accompanying Images. The noise levels were recorded on 12th May 2018, when the DG sets were running at full capacity during the day and night. The noise levels inside the engine Hall; at its 25 m periphery and beyond have been recorded for the day and night time and tabulated separately in Tables VIII.a, and VIII.b. Ambient noise level was recorded at a representative site near the boundary wall and has been recorded in Table VIII.c.

The ambient Noise level inside the Powerhouse ranged between average 105.2 dB and 111.4 dB during the day and between 105.6 and 111.5 dB during the night. As such the ambient noise level remained at high level during the day as well as night.

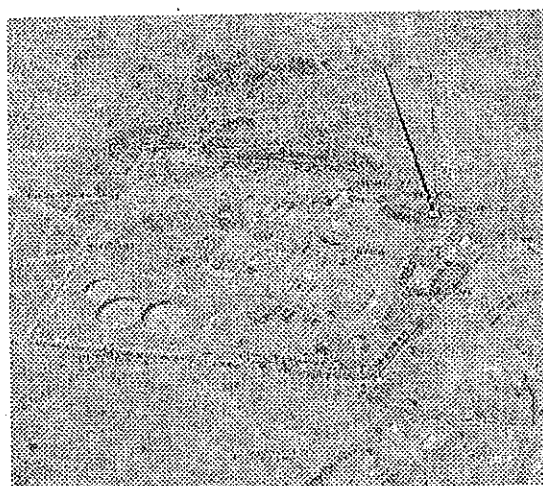
Table VIII.a: Day & Night Time Noise Level inside Powerhouse (12-13/05/2018)

	Location	Day Time			Night Time		
		Max	Min	Avg	Max	Min	Avg
1	Control room corridor	84.3	86.3	85.3	79.6	79.9	79.8
2	DG-1	104.6	105.8	105.2	106.1	106.7	106.4
3	DG-2	107.3	109.3	108.3	107.1	107.6	107.4
4	DG-3	104.9	106.7	105.8	105.8	106.4	106.1

5	DG-4	108.7	109.5	109.1	111.2	111.7	111.5
6	DG-5	107.6	108.4	108.0	108.5	108.9	108.7
7	DG-6	107.5	108.3	107.9	106.9	107.5	107.2
8	DG-7	105.7	106.8	106.3	107.5	107.8	107.7
9	DG-8	107.8	108.9	108.4	105.3	105.9	105.6
10	DG-9	107.6	108.6	108.1	108.7	109.2	109.0
11	DG-10	109.7	110.9	110.3	110.4	110.9	110.7
12	DG-11	110.9	111.8	111.4	106.8	107.3	107.1
13	DG-12	109.3	111.8	110.6	110.3	111	110.7



Noise Level & Luminance June – November 2017



Noise Level & Luminance December 2017 – May 2018

The high level noise emission inside the Powerhouse was considerably reduced at increasing distances from the Engine Hall. On the 25 meter periphery at the outside of the Gates it ranged from 70.5 to 86.2 during the day and 79.5 dB(A) to 82.9 during the night. The noise level on the outside of the 25 meter periphery ranged from an average 51.1 dB(A) to 68.5 at the boundary wall during the day and 49.2 to 68.4 at the boundary wall during the night; the level at the boundary wall being much within the limit: 75 dB(A), set by SEPA guidelines for continuous exposure for 8 hours, above which it is mandatory on the workers at TELP to wear ear plugs/mufflers. The extreme as well as average levels resulting from the overall impact of operations at TELP are well within the 75 dB level recommended by SEQS and 70 dB by the World Bank/IFC Guidelines for noise emissions during day and night.

Table VIII.b: Day & Night Time Noise Level At 25m Periphery of Powerhouse & Activity Centres At TELP (12-13/05/2018)

No	Location	Noise Level Day Time (dB)			Noise Level Night Time (dB)		
		Max	Min	Avg	Max	Min	Avg
1	Check post 5	67.9	69.0	68.5	67.9	68.8	68.4
2	Workshop back side	64.7	66.1	65.4	65.3	65.7	65.5
3	Behind power grid	66.1	67.4	66.8	66.7	67.1	66.9
4	Check post 4	52.9	55.3	54.1	55.5	55.8	55.7
5	Rear boundary wall corner	54.6	56.4	55.5	48.9	49.4	49.2
6	Rear end boundary wall gate	50.3	51.9	51.1	50.8	51	50.9
7	Soak pit	60.8	61.6	61.2	61.5	61.9	61.7
8	Storage tank	53.1	54.4	53.8	50.9	51.2	51.1
9	Unloading station # 4	54.7	56.9	55.8	49.1	49.5	49.3
10	Unloading station # 1	64.2	64.9	64.6	50.8	51.2	51.0

11	Main Office gate	69.7	71.2	70.5	66.3	66.9	66.6
12	Radiator	86.4	87.9	87.2	79.4	79.5	79.5
13	Switch yard front	84.9	86.2	85.6	79.5	80.2	79.9
14	Ware house	62.1	64.9	63.5	60.9	61.6	61.3
15	Workshop	77.6	79.6	78.6	70.8	71.2	71.0
16	Vent stack	70.5	72.4	71.5	80.9	84.9	82.9
17	Workshop	64.3	63.1	63.7	59.8	59.0	59.4

Table VIII.e shows the ambient noise emission level during 24 hours of monitoring at a site representing operational areas inside and outside the TELP boundary wall. The ambient noise level ranged between 48.0 and 66.0 with the average at 56.3 compared with 51.6 dB(A) and 68.4 dB(A) with the average at 60.0 dB(A) in the past. The extreme as well as average levels resulting from the overall impact of operations at 67.98% capacity utilization at TELP are well within the 75 dB(A) level recommended by SEQs and 70 dB(A) by the World Bank/IFC Guidelines for noise emissions during day and night time.

Table VIII.e: Ambient Noise Level dB(A) at TELP

	12-13/11/2017	12-13/05/2018
SEQS Limits	75.0	75.0
Maximum	66.0	66.0
Minimum	47.0	48.0
Average	56.3	56.3

Noise emission level for locations outside the boundary wall recorded earlier and noted during the present monitoring period does not suggest major variations from that noted during the last several years. The area outside TELP boundary wall is generally calm and so it was during the monitoring in May 12, 2018. The calm was broken many times due to frequent gust of wind, disturbances due to peak noise from operation of heavy vehicles carrying garbage; airplanes over flying the area, and occasional shrieks from crows and sparrows which raise the level by 2dB(A) and at times by 30 dB(A).

The impact of noise generated by the operation of vehicular traffic on RCD Highway was noticed on the access road near RCD Highway but not inside TELP working area, except occasional peak noise from the blowing of horn by heavy vehicles. Movement of vehicular traffic including tanker trucks carrying fuel oil and garbage trucks and dumpers was found to raise the noise level at the boundary wall of Abdul Rahim Goth from an average of 39-41 to 51 and 60 dB(A), depending on the size of the tankers, trucks and dumpers as well as size of the convoy passing by the Goth.

The frequency of movement of vehicles, including garbage trucks was around 6 to 10 per hour in the morning hours and only 2 to 3 in the afternoon. This number as well as rise in noise level was not high and the infrequent operation was not an annoyance to the resident population, since it has by now got accustomed to it, additionally the dense canopy of the trees and construction of boundary wall along the access road is intercepting the noise emission effectively.

ENVIRONMENTAL ISSUES OF MACROENVIRONMENT OF TELP

The immediately noticeable scenario at the TELP premises includes:

- ❖ Security and safety measures all around the perimeter of the boundary wall, including security check post at Allu Pahar escarpment and lighting arrangement to respond to the security issues
- ❖ Urban sprawl by at least three housing schemes set up in the past 10 years on the west, southwest and east of TELP
 - Raisabad Housing Society located about 1 km across RCD Highway on the west of TELP ahead of Hub Chowki and at end of Northern Bypass has grown as a commercial centre
 - Construction activity has picked up at the other two schemes.

- Khayabane Jinnah Cooperative Housing Society' (KJCHS) has, after construction of the boundary wall around its designated area, allowed construction activity but the same has yet to pick up steam.
 - Abbasi Poultry Farm and cattle shed that are adjacent to the KJCHS site office, and just near the dirt road along the TELP boundary wall are not in sight perhaps because of water shortage.
 - Scavengers have acquired possession of land and built semi-permanent structures at two kilometers from the boundary wall. Some such structures appear as permanent buildings; the site has the look of a *kachchi abadi* from a distance.
 - The adverse impact on the microenvironment of TELP is immediately noticeable by the perpetual haze due to incinerating garbage and rise of carbon monoxide to ~2.8 ppm level.
 - Activity at Abdul Rahim Goth, adjacent to TELP has slowed down; construction at the mosque and a few structures adjacent to and near Abdul Rahim Goth have also slowed down. No new or temporary abode has appeared during the last seven years. The canopy of trees planted along the access road and the raised boundary wall lining the Goth and TELP continues to ensure privacy to the residents of Abdul Rahim Goth
- ❖ Poultry farming activity in Sheikh Chillie poultry farm did not resume even on a limited scale. Similar was the case at other poultry farms e.g. New Asad Poultry, Shafiq Poultry, and Asad Poultry farms. The poultry farming activity seems abandoned in all such farms.
 - ❖ The city garbage dumping site at Govind Pass site was about 2.5 km to the northeast from TELP at its commencement some 20 years back; it is now within 1 km distance from the TELP boundary wall on the east. This activity has slowed down during recent years due to reasons best known to the local government.
 - ❖ Movement of scavengers, who burn the garbage to recover scrap as a commercial activity, seems to have leveled off. Those who moved in and settled near the unhygienic Govind Pass Landfill site, and acquired possession of land and built semi-permanent structures at only two kilometers from TELP boundary wall, are indebted to the Rais of the area, who is promoting property value all around; emergence of *kachchi abadi* is a major indicator of such desire.
 - ❖ Burning of garbage at the landfill site despite being restrained by orders of the Solid Waste Management Department of the CDGK, continues to emit smoke that hangs over the current dumping sites. Adverse impact of garbage burning on the microenvironment of TELP is immediately noticeable by the perpetual haze due to incinerating garbage and rise of carbon monoxide level from 1.5 ppm to nearly 2.8 ppm level
 - ❖ During the period of monitoring, the haze was being blown by the wind away from TELP site
 - ❖ Uncovered garbage trucks and dumpers of SITE, Baldia, Lyari, and Orangi clusters of District Government Karachi, continuously transport garbage from the respective towns to the landfill site in the Hub River valley beyond the escarpment of Allu Pahar
 - ❖ Huge mounds of burnt and unburnt garbage now line up the paved/unpaved road from only one kilometer of the TELP boundary wall
 - ❖ An almost 25 km² land area of the fertile Hub River valley is under serious stress due to indiscriminate disposal of garbage that has degraded the ecosystem of this part of Karachi City
 - ❖ The overgrowth of the thorny *muskit* in the macroenvironment in the north, south and west of TELP and outside its boundary wall is frequently cleared, but it keeps growing with the same rate
 - ❖ The cross drainage systems provided for the roadway in the macroenvironment of TELP, the erosion-resistant fill, and scraping of slopes of Allu Pahar allowing for mud slide or silt erosion, were well maintained to keep them functional .
 - ❖ The settlements of scavengers and hanging smoke from burning garbage appear to have caused loss of biodiversity at the landfill site but it was reported by the security personnel patrolling the area that the area on the outside of TELP boundary wall has rarified biodiversity

- ❖ Kites have abandoned their nests since the poultry farms are no longer functional but crows do abound and have their nests inside the TELP premises, while hares, porcupine, rats, rodents; mongoose and reptiles, including snakes make their presence felt in the area only occasionally. Similarly only few nocturnal animals are being attracted to the area

Company-Community interaction has slowed down due to reduced activity in Abdul Rahim Goth during the last few years, and it is now limited to (i) supplying one tanker of water once a week to the residents of Abdul Rahim Goth, and another tanker to the school, and (ii) offering jobs on contract basis to residents of Goths in the neighbourhood.

Residents of the Goths and of the settlements in the surrounding were found engrossed in their chores; they were not found noticing the impact of activities in their surrounding particularly that due to slowed down operation of the power plant, transportation by garbage trucks, dumping the solid waste in their neighbourhood and the hanging smoke resulting from the burning of solid waste.

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Appendix – E Summary of Historical Modification Records

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- **PLANT DE-RATION DUE TO RADIATORS HOT AIR RECYCLING BACK IN CHARGE AIR FILTERS OF ENGINES**

A canopy of fiber sheets constructed from DG # 7-12 to stop recycling of hot air from radiators, increasing temp. of induction air into the Engines, thus, causing de-ration of Engines.

- **GOVERNOR ACTUATOR REPLACEMENT DUE TO GOVERNOR DRIVE FAILURE.**

- Wartsila 38 A had manufacturer fault of actuator "Drive Failures".
- At Tapal 22nos. Governor Drives failures recorded and one of the failures on DG#07 caused us loss of complete Alternator due to over speed.
- Governor actuators and drives removed from all Engines and replaced by Electrical actuators (Pro-acts) on the recommendation of Wartsila.
- After around one and half year of service those Pro-acts started developing various faults and became unable to govern fuel control system.
- All the Pro-acts once again replaced with more power full and robust version Governor Actuator "EM-80".

- **HFO FIRED AUXILIARY BOILER**

- In zero/low dispatch condition we were using Diesel oil fired Aux. Boilers to generate steam for plant heating system.
- HFO fire Boiler was installed and commissioned to replace use of high cost Diesel oil with low cost HFO in zero/low dispatch condition of Plant.

- **ENGINE -ALTERNATOR FLEXIBLE COUPLING GUARDS**

- Modified fly wheel safety guards collapsible doors on all Engines installed for personnel safety, ease of operation and better housekeeping.

- **11 KV OUTGOING FEEDERS COOLING FAN TRIPPING ALARM**

- Tripping alarm for cooling fans of 11Kv outgoing feeders TR₁, TR₂ & TR₃ hooked up with PLC and activated for early warning of temperature rise in outgoing feeders.

- **ENGINE EMERGENCY STOP BACKUP SYSTEM(DEC. 2009 AND JUNE 2010)**

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- Engine Emergency stop backup system installed and commissioned on all DG sets to avoid over speed of Engines due to load rejection on KESC system.
- **ENGINE FUEL CONTROL GOVERNOR ACTUATOR(“EM-80”)**
 - EM 80 Driver failure and intermediate gears tripping circuit’s modification work completed on all Engines.
 - EM 80 panel breakers “tripping Circuit alarm” added & tested on all DG sets for early warning.
- **INTERMEDIATE GEARS**
 - Intermediate gears tripping circuit modification work completed on all Engines.
- **DRINKING WATER PLANT**
 - Drinking water plant installed and commissioned to provide clean drinking
 - Water to all employees.
- **GENERATOR RESIN**
 - Resin treatment on Stators carried out to protect them against short circuit due to vibration.
- **SPIRO-VENTS AND WATER PRESSURE**
 - Spiro-vents installed on all Engines and HT cooling water pressure rose to 4.2 bars to prevent cavitation in the cylinder block cooling water spaces.
 - Parallel Compressed air 30 bar line installed with isolating valves to increase system reliability and ease of maintenance.
 - Parallel steam line installed from Engine No. 4 to 9 with isolating valves to increase system reliability and ease of maintenance.

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- New compressors 2 nos. and an additional air vessel installed to maintain air pressure during frequent start/stop of Engines due to variation in KESC demand.
- Parallel Lube oil system for using Shell Argina XL-40 installed for Engine No.1 to 4 which includes storage tank, piping and pumps.
- Engines common leaky drain channel
- RE-routing of common leaky drain channel on all Engines to reduce leakage on fly wheel side due to high vibration and facilitate sample collection for early detection of any abnormal leakage.
- Engines fuel leaky drain channel
- Separate lines for A & B Banks fabricated and fitted to reduce leakage on fly wheel side due to high vibration and facilitate sample collection for early detection of any abnormal leakage.
- Engine driven pump and line installed and commissioned for pumping out storm water outside the Plant.
- All bolts of Engine Charge air receiver replaced with modified fastening studs to reduce force outages due to frequent failure of bolts.
- Crank shaft Split Gear “bolts” replaced with new modified ones on all Engines as per Wartsila recommendation.
- Fly wheel segments coating introduced and applied to all DG sets flexible couplings, to protect rubber part and increase service life of coupling.
- Parallel bus installed for Engine Hall cranes to increase reliability and availability of cranes.

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- All Engines Fly wheels crack detection test carried out and 11 Nos. Defective Fly wheels of Engines replaced with new ones.
- **132 KV LINE PROTECTIVE NETTING.**
 - Protective netting plat farms (2 nos.) constructed under 132 KV line, passing over the plant machines to prevent conductor falling directly on auxiliary machines.

FIRE AND SAFETY

- **FIRE FIGHTING LINE MODIFICATION**
 - Under ground high pressure Firefighting line replaced with over head one due to frequent leakages, for more reliable fire protection system.
 - Firefighting monitors re-located from switchyard corner to the point near to transformer for better approach.
- **INSTALLATION OF FIRE DETECTORS**
 - Fire detection system installed and commissioned in cable trench, ware house, Office building, Time office and project office (PCC) building.

CIVIL CONSTRUCTION

- **STAFF CANTEEN**
 - Staff canteen Constructed to shift temporary canteen from containers.
- **STAFF EMERGENCY STAY ACCOMMODATION**
 - Dormitory building constructed to accommodate over staying staff, in case of disturbances in the city, for plant operations.
- **Acquired 6.3 acres of land outside plant to construct oil tankers parking**

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- Company was facing law & order problem with villagers due parking of fuel tanker on the road near village. New land 6.3 acres acquired for fuel tankers parking.
- Boundary wall and road constructed to accommodate fuel Tankers.
- **GUARDS ACCOMMODATION AND NEW GUARD ROOM**
 - Guard room and residence building constructed for guards in new acquired land (Guards previously living in the tents)
- **RADIATOR YARD FLOORING**
 - Radiators area concrete flooring carried out to collect radiator washing water for gardening and avoid ingress of water into the structure foundation.
- **NEW PARKING AREA / SHED CONSTRUCTED TO ACCOMMODATE CONTRACT TRANSPORTS VEHICLES AND VISITOR CARS.**
- **FLOOD LIGHTS TOWERS INSTALLED AND COMMISSIONED NEAR BOUNDARY WALLS TO INCREASE VISIBILITY AT FOR SECURITY OF PLANT.**
- **ROOM CONSTRUCTED FOR TANK FARM.**
- **ENGINE SPARE PARTS (SWING SET) STORAGE BUILDING.**
 - Engine Swing set parts building constructed to shift and store all heavy parts.
- **NEW OFFICE BUILDING**
 - New office building constructed to accommodate Laboratory, Training Room and Offices, which were previously located in old temporary project building.
 - Storm water drain channel constructed to divert water outside the Plant.

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SUMMARY OF MODIFICATIONS/ IMPROVEMENTS

- RELOCATION OF MAIN GATE TO AVOID RAIN WATER INGRESS IN PLANT.

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Appendix – F Plant Critical Spares Records

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
Engine Spares				
1	CTT-003-0048	Magnetic contactor DC, Single Pole On/Off, Current rating at 100% : 150A, Coil Volt: 24VDC, SW-180	Model : SW 180	1.00
2	CTT-024-0001	Dual LCD Hour Meter, Display Reading: 99999.9 Hours meter, Automatic recycle to zero, Model: T39AA	T39AA	13.00
3	DEN-001	Split gear 1111DT102 (New Part # 1111DT152)	1100-002	1.00
4	DEN-001A	Cylindrical Pin Rnd. for Split Gear, Wartsial DT# 616100 195	1100-013	24.00
5	DEN-001B	Socket Head Screw M20*90 for Split Gear, 616100251 982	1100-012	16.00
6	DEN-003	Hexagon bolt M20x230	1111DT108	28.00
7	DEN-004	V-ring v500A 1111DT109	1100-007	2.00
8	DEN-005	Strip 1111DT129 (For Lip Seal)	1100-008	11.00
9	DEN-006	Clamp 1111DT130 (For Lip Seal)	1100-011	17.00
10	DEN-007	Slide Strap 1111DT112 (For Lip Seal)	1100-009	60.00
11	DEN-008	Pin cylinder RND 16x40	0490 195	4.00
12	DEN-009B	Activator 7471 Loctite	DEN-009B	12.00
13	DEN-011	Sealing ring for camshaft door (small)	1212DT121	85.00
14	DEN-013	Sealing ring	1212DT123	22.00
15	DEN-015	Sealant loctite tpye 515	4496 130	63.00
16	DEN-016	Main bearing upper shell 1102DT101	1000001	6.00
17	DEN-017	Main bearing lower shell 1102DT102	1000002	6.00
18	DEN-018	Thrust bearing upper shell 1102DT103	1000-003	4.00
19	DEN-019	Thrust bearing lower shell 1102DT104	1000-004	4.00
20	DEN-020	Thrust bearing ring 1102DT105	1000-005	8.00
21	DEN-022	Nut for cylinder head stud	1501DT119	31.00
22	DEN-024	O-ring for cyl. liner 1302DT107	1050-003	134.00
23	DEN-026	Gas sealing ring 1302DT117	1050-006	69.00
24	DEN-026-M	Gas Sealing Ring with 2.5mm Thickness, Original Old Part # 2mm GSR: 1302DT117 Supplied by WNSD	1302DT117	27.00
25	DEN-026-W	Gas Sealing Ring 2mm New Part No. 1302DT139, Old Part No. 1302DT117	1302DT139	43.00
26	DEN-027	Anti-polishing ring 1302DT115	1050-007	16.00
27	DEN-031	Gudgeon pin (Piston Pin)	1421DT101	39.00
28	DEN-032	Piston ring 1421DT126	1130-003	19.00
29	DEN-033	Piston ring 1421DT105	1130-004	2.00
30	DEN-034	Piston ring 1421DT106	1130-005	2.00
31	DEN-034-S	Piston Ring Set (1130-003) (1130-004) (1130-005) (1130-0006)	1130-800	24.00
32	DEN-035	Piston ring 1421DT107 (New # 1421DT159)	1130-006	2.00
33	DEN-038	Nut for piston palm, 1401DT107	1110-007	17.00
34	DEN-039	Stud (1401DT120) for bigend bearing	1110-008	228.00
35	DEN-040	Stud (1401DT121) for piston palm	1110-009	208.00
36	DEN-041	Locating pin (Dowel Pin for connecting Rod)	1401DT112	19.00
37	DEN-042	Intermediate plate, New Part No.1110011 (Thickness 5.00mm), Old Part No. 1401DT126	1110-011	5.00
38	DEN-043	Gudgeon pin bush (1401DT144) 1401DT150	1110-005	8.00
39	DEN-044	O-ring D1:68 D2:5 (2166 520) (injector nozzle)	1670-005	238.00
40	DEN-045	O-ring D1:85 D2:5 (2166 540) (injector nozzle)	1670-006	442.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
41	DEN-046	Injector nozzle # VVO-U965g/E 1501DT178	1670-003	131.00
42	DEN-048	Main Bearing (Upper & Lower) 1102DT101 & 1102DT102	1000-001	5.00
43	DEN-050	Vibration pad M.T.B, VT-Uper, Type Novibra, Art No.69526, Make-Trelleborg (old # 8203DT218)	69526	7.00
44	DEN-051	O ring for cyl. head 1501DT181	1201-017	31.00
45	DEN-052	Valve spring	1501DT120	183.00
46	DEN-053	Turnomat old 1501DT121	1211-007	13.00
47	DEN-054	Supporting ring	1501DT148	21.00
48	DEN-055	Connecting Piece	1501DT127	1.00
49	DEN-058	Cylinder non return valve	1503DT902	114.00
50	DEN-059	Exhaust valve 1504DT113	1211-008	16.00
51	DEN-060	Inlet valve 1504DT102	1210-005	62.00
52	DEN-061	Hydraulic tensioning jack o ring kit	9612DT972	1.00
53	DEN-063	Starting air valve air assembly	1501DT903	6.00
54	DEN-064	Repair set-overhaul kit for lifting jack main bearing	1101DT001	3.00
55	DEN-065	Rotocap kk30	1501DT122	254.00
56	DEN-068	Mounting kit for cylinder head 1501DT014	1200-800	74.00
57	DEN-068-M	Mounting kit for Cylinder head with 2.5mm GSR Original Kit Artical # 1501DT008	1200-800	15.00
58	DEN-069	Ring lock 37x21x4 ST295-350HV	0351 852	108.00
59	DEN-071	Copper washer 33x39	2150 773	148.00
60	DEN-072	Exhaust Gas Temperature Sensor after Turbine MD1UDG-K-200-3/4-5.5-FR, CMR Code1018180	5130-036	7.00
61	DEN-073	Pump element	2106DT136	12.00
62	DEN-074	Indicator cock 1260-003	1506 R103	5.00
63	DEN-075	Copper washer ID 20 mm x OD 30 mm x Thickness 4 mm	1506 R109	20.00
64	DEN-085	Valve seat-exhaust 1501DT151	1201-012	8.00
65	DEN-086	Valve seat-Inlet 1501DT106	1201-006	313.00
66	DEN-087	Valve guide-exhaust 1501DT150	1201-011	104.00
67	DEN-088	Valve guide-inlet 1501DT149	1201-010	193.00
68	DEN-090	Connection block 2A,3B	8203DT306	3.00
69	DEN-091	Valve tempreature sensor	8203DT688	3.00
70	DEN-092	Sleeve for cylinder head, Old # 1501DT116	1201009	60.00
71	DEN-093	Retaining ring round 48X1,75	0370 048	216.00
72	DEN-095	O ring for inlet & exhaust 1501DT113	1210-006	56.00
73	DEN-097	Exhaust valve seat o rings upper 1501DT115	1201-008	271.00
74	DEN-099	Cover plate for connecting rod	9612DT294	8.00
75	DEN-100	Seals for Single Jack Palm Nut	9622DT224	16.00
76	DEN-1000	Cord inductive sensor 10/s90, Type: WWAKE4-10/S90, Make; Truck - Germany	KE4-10/S90	5.00
77	DEN-1001	Hexagon nut M20 for receiver	1560-134	49.00
78	DEN-1002	Washer for receiver	1560133	54.00
79	DEN-1003	Stud for receiver	1560132	54.00
80	DEN-1004	Hexagon bolt M6X16 (for OMD)	DEN1004L	91.00
81	DEN-1005	Hexagon bolt M6X12 10mm	DEN1005L	68.00
82	DEN-1006	Hexagon bolt M10X60 H17mm	DEN1006L	18.00
83	DEN-1007	Allen bolt M10X25mm H31mm turning gear	DEN1007L	39.00
84	DEN-1008	Air releasing plug 3/2 soleniod valve	DEN1008	22.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
85	DEN-1009	Allen Bolt 33x8mm pitch 1.5mm (proact motor)	DEN1009L	93.00
86	DEN-1010	Filter element for air control unit	359A027-4A	1.00
87	DEN-1011	Filter repair kit for air control unit	359A027-4A	28.00
88	DEN-1012	Hexagon head bolt M12 x 65	2240-010	180.00
89	DEN-1013	Allen bolt M12x90, L 35mmx10mm (yoke guide)	DEN1013L	21.00
90	DEN-1014	M.S Stud M16x2, L16mmx35mmx20mm	DEN1014L	32.00
91	DEN-1017	Disc spring (item 810)	D41/21	88.00
92	DEN-1022	Stopping air pipe for Bank A	3530-007	5.00
93	DEN-1023	Stopping air pipe for BANK B	3530-008	5.00
94	DEN-1024	Bulkhead Elbow 12 M18 x1,5 (Emergency main line) Part # WSV12L-CF, Material Carbon Steel, Make:Parker	3530-005	11.00
95	DEN-1025	Reducing coupling 12/8 Emergency main line	3530-006	13.00
96	DEN-1026	Allen bolt M6x71.45mm	DEN1026L	28.00
97	DEN-1029	Spring plate (fuel pump) 2106DT110 L' orange type PEO G053CN	1650-009	85.00
98	DEN-1031	Pipe	3531-012	12.00
99	DEN-1032	Stopping air pipe Bank A to B	3531-077	12.00
100	DEN-1034	Analogue opacity indicator	10752	2.00
101	DEN-1035	Joint washer for crankcase door	1070-028	9.00
102	DEN-1036	Joint washer for camshaft door	1070-029	92.00
103	DEN-1037	Joint washer for vibration dumper	1070-030	21.00
104	DEN-1038	Joint washer for non driven side	1070-031	28.00
105	DEN-1043	Hexagon nut M20 x 2.5 (8.8)	DEN1043L	4,245.00
106	DEN-1044	Spring washer for M20 bolt	DEN1044L	153.00
107	DEN-1045	Proximity switch bero M12, Inductive, 300 mA, NC, 0,2A - sn1=2 mm,20 ...265V AC/DC,Intermediate gear	3RG4012-0KA00	1.00
108	DEN-105	Male stud coupling 8-M12X1.5 (old # 2305 446) (for HP pipe)	3530-004	23.00
109	DEN-1055	Self locking nut M16	2240061	22.00
110	DEN-1057	Repair Kit for 3/2 Pneumatic Valve, Type: 343/41 F.NO:0109, DN:10,P:0....40 bar,Medium: Luft.	122 048 00	4.00
111	DEN-1058	Inner clamping ring, Part Number:- 3G51B5010M. Part 07, Type:- FM 827 * 564 * 74, Material:- C45N	3G51B5010M	2.00
112	DEN-1059	Plug G1/4" for air control unit	3532-025	17.00
113	DEN-106	Support	1530DT107	6.00
114	DEN-1060	Washer 13x8 for drain plug control air unit	3532-026	24.00
115	DEN-1061	Plug for PT100 & Solenoid 3 Pole with earth 250VAC Color Black Part:- GDM3011Black Make:Hirshhmann	GDM3011	34.00
116	DEN-1062	Plug for PT100 and Solenoid 3 Pole with Earth, 250VAC Clour: Black, P #-: GDM3009Black,Hirshhmann	615-341	4.00
117	DEN-1063	Hexagonal head plug thickness 1/4" (For generator)	DEN1063L	24.00
118	DEN-1064	1 set connenting bolts, (Vulkan flexible couplin(Consisting of P #: 16,19,22,28,32,35,39, and 41.	DEN1064	2.00
119	DEN-1065	Hexagon bolt M10x15	DEN1065L	26.00
120	DEN-1066	Diaphragm for pressure switch	DEN1066L	29.00
121	DEN-1068	Lever pin with knob+spring	DEN1068L	5.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
122	DEN-1069	Bush (2nd Over Size) Intermediate Shaft, Inside Diameter = Standard, Out side Diameter > 141 mm	PAAE117080	8.00
123	DEN-107	Rocker arm inlet	1530DT911	6.00
124	DEN-1071	Snap action switch (furl rack) Type: Z-15GQ21-B, Make: Omron.	Z-15GQ21-B	3.00
125	DEN-1072	Side Stud (Main Bearing)	1301DT121	3.00
126	DEN-1073	Nut (Main Bearing Side Stud) 1301DT109	1301DT216	2.00
127	DEN-1074	Stud (Main bearing)	636301301DT120	2.00
128	DEN-1075	Nut (Main Bearing Stud)	1301DT108	8.00
129	DEN-1076	Allen bolt M12 x 155, Thread length 35 mm, Head Dia 18 mm, Head height 12 mm, Allen key size 10 mm	DEN-1076-L	47.00
130	DEN-1078	Spring Plate	1650-011	6.00
131	DEN-1079	Nut Main bearing	636301301DT108	6.00
132	DEN-108	Rocker arm outlet	1530DT912	6.00
133	DEN-1086	Rod for Control Device (Governor to Common Shaft)	2240-172	4.00
134	DEN-109	Shaft rocker arms	1530DT111	9.00
135	DEN-1092	Head gurb screw M8x16mm Pitch 1.25mm (Fuel Pump Block)	DEN-1092-L	527.00
136	DEN-1093	Lock washer , inner dia = 26mm (for turning gear)	DEN-1093-L	30.00
137	DEN-1094	Lever for EM 80 Actuator	DEN-1094-L	2.00
138	DEN-1095	Round Coupling for EM80 Actuator	DEN-1095-L	3.00
139	DEN-1096	Copper washer ID=21mm x OD=26mm x Thickness 1.5mm	DEN-1096-L	95.00
140	DEN-1097	Allen bolt M12 x 160 thread length 40 mm (leaky chennal)	DEN-1097-L	94.00
141	DEN-1098	M.S Washer ID=13mm, OD=20mm, Thickness 2.5mm (Leaky chennal)	DEN-1098-L	185.00
142	DEN-110	Pivot	1530DT102	65.00
143	DEN-1101	Dosing Unit PAAE054625	2237-000	1.00
144	DEN-1101-A	Cleaning Device (PAAE087118)	PAAE087118	1.00
145	DEN-1104	EM0 Filter for Driver Fitler 380 Volt -3 Phase line filter Part No. 1755-179 Make: Woodward	1755-179	1.00
146	DEN-1105	EM-80 Cable for Driver to Actuator cable-EM-80 length; 30 Mtrs. Part Number 1745-373 Make Woodward	1745-373	2.00
147	DEN-1106	EM-80 EMI Male Female Adapter 15 pin Part Number 1755-183 Make: Woodward	1755-183	4.00
148	DEN-1107	EM-80 EMI Male Female Adapter 25 PIN Part Number 1755-185 Make: Woodward	1755-185	4.00
149	DEN-1108	Overhauling kit for main bearing jack, Part # 9612DT357 & 9612DT004	9612DT360	5.00
150	DEN-111	Pivot	1530DT108	65.00
151	DEN-1113	Hexagonal bolt M14 x 130 Grade 8.8	DEN-1113-L	43.00
152	DEN-1117	O Ring NIT60 M152 ID x 5 (Seal for Crank Case Relief valve)	204-752-4460	25.00
153	DEN-1118	Gauze & clip Assembly 150mm/6" A4 / M/ 8928 for Crank Case Relief valve P# 804721	A4/M/8928	2.00
154	DEN-1119	Hydraulic pipe for cylinder head jack	DEN-1119-L	16.00
155	DEN-112	Valve rocker bush	1530DT109	98.00
156	DEN-1120	Hexagonal bolt M20 x 198 mm	DEN-1120	20.00
157	DEN-1124	Hexagonal bolt M6x30mm with spring & plain washer	DEN-1124-L	100.00
158	DEN-1125	Hexagonal Bolt M30 x 130 mm (Part No 7000130130) ZERBST X5 LR (H.T 10.9) Make: Vulkan	7000130130	33.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
159	DEN-1126	Knobs for fuel rack covers	DEN-1126-L	10.00
160	DEN-1128	Lock Washer Round for Tapit Cover	616100381007	714.00
161	DEN-1129	Oil seal Ring(Fuel Pump Drain line leaky Channel)	3580-005	162.00
162	DEN-1131	Hexagonal bolt 8 x 20 mm Grade 8.8 imported Black	DEN-1131-L	378.00
163	DEN-1132	Sanding Belt (AA # 80) Size: 20 *520mm Grit # 80, Puma, Code: TP-7005	TP-7005	699.00
164	DEN-1133-M	S.S. flexible pipe with M.S. flange	DEN-1133-M	2.00
165	DEN-1134	Brass washer thck 0.4 mm, (fly wheel) (Outer dia 65mm x Inner dia 36 mm x Thickness 0.4mm	DEN-1134-L	154.00
166	DEN-1135	Three way valve (SS) size 1/2"	DEN-1135	18.00
167	DEN-113-A	Fuel Pump Body Part no 1650-001	DEN-113-A	6.00
168	DEN-114	Lube oil pump	SIZE 40X 62 X 1	1.00
169	DEN-1145	MS Locking strip Length 100mm, Width 30mm	DEN-1145	50.00
170	DEN-115	O-ring for Push Rod Part No. 1501DT114	1411-001	260.00
171	DEN-1154	Flow Gauge 1" 4 to 50 L/Min, P,Max: 10 Bar, P: 779425, Make: parker	DEN-1154	3.00
172	DEN-116	Push rod assem rocker arm 1531DT104	1411-002	24.00
173	DEN-1162	Tee 1" (SS 316)	DEN-1162	9.00
174	DEN-1163	Reducer bush 1-1/4" (SS-316)	DEN-1163	20.00
175	DEN-1168	Sealing (Silicon) tube dia 9 mm, (01 Roll = 23 Feet) leaky channel	DEN-1168-L	2.00
176	DEN-1169	Link Lever for Stopping Device, Old Part # 636302301DT113	2130-001	2.00
177	DEN-117	Gasket for HT / LT pump, Outer Dld. =210mm, thickness = 0.5mm, Width = 5.00mm	5405DT117	7.00
178	DEN-1170	Lever for Stopping Device, Old Part # 636302301DT114	2130-003	4.00
179	DEN-1171	Lever for Stopping Device, Old Part # 636302301DT116	2130-005	2.00
180	DEN-1172	Shaft for Stopping Device Old part # 636302301DT119	2130-007	2.00
181	DEN-1173	Bush for Stopping Device, Old Part # 63630301DT122	2130-009	4.00
182	DEN-1174	Tap Bolt M20*5	2130-012	11.00
183	DEN-1175	Lock Pin 8*50 for Stopping Device, Old part # 616100414 104	2130-019	14.00
184	DEN-1176	Tap Bolt M16*50 for Gear Segment Stopping Device, Old Part # 616100141 256	2130-031	14.00
185	DEN-1177	Grease nipple button type Size 14mm x Pitch 1.5mm	DEN-1177	39.00
186	DEN-1178	S.S. flexible pipe, Total length = 400 mm , Both ends berral nipple 1/2" thread BSP, Temperature 100	Leaky channel	28.00
187	DEN-1179	Bowl Metal with Manual drain Part No.320A466, Make: cube-3 Filters	320A466	3.00
188	DEN-118	Gasket for HT / LT Pump, Outed Dia. = 118mm, Thickness = 0.5mm, Width = 4.5mm	5405DT119	21.00
189	DEN-1180-B	O ring Part No. 532B107, Make: Cube 3 Filter	5328B107	12.00
190	DEN-1181	M.S. Washer size OD=65 x ID=31 x Thickness 6 mm	DEN-1181-L	37.00
191	DEN-1182	M.S. Washer size OD=55 x ID=33 x Thickness 6 mm	DEN-1182-L	83.00
192	DEN-1183	M.S. Washer size OD=50 x ID=30 x Thickness 6 mm for fly wheel	DEN-1183-L	29.00
193	DEN-1184	M.S. Spring Washer OD=45 x ID=31 x Thickness 6 mm	DEN-1184-L	727.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
194	DEN-1185	Scavenging Air Set for OMD, Part No. 10678, Make Schaller Automation	10678	2.00
195	DEN-1185A	Mounting screw for scavenging air set.	DEN-1185A	22.00
196	DEN-1186	Overhualing Kit for long stroke jack	9612DT361	6.00
197	DEN-1187	Hoisting Tool Piston	DEN-1187	2.00
198	DEN-119	Bush	5405DT116	20.00
199	DEN-1193	Inductive Proximity Sensor, Flush Mountable in Metal, Type: XS7-C40PC449, PNP NO + N12-48 Vdc,	DEN-1193	6.00
200	DEN-1194	Limit Switch Rotary Snap Action Type XCK-P118 Make: Telemecanique	XCK-P118	1.00
201	DEN-1195	Backup Ring (Teflon Ring) for Pneumatic Cylinder, for Option-1	DEN-1195-L	27.00
202	DEN-1197	Insert for M12 x 1.75 mm	DEN-1197-L	46.00
203	DEN-1198	Insert for M12 x 1.75 mm	DEN-1198-L	22.00
204	DEN-1199	Carbon Steel Base Plate for EM80 Actuator	DEN-1199	1.00
205	DEN-120	Shaft seal for HT/LT pump, Type: MG 12/40-G60, Material AQ1EGG Ident no 024221003, Make: Burgmann	5405DT118	9.00
206	DEN-1200	Plate Pos. # 38.2 L O Nr PEO-T324	DEN-1200	54.00
207	DEN-1201	Adapter Pos.# 56, L O Nr. PFO-T128	DEN-1201	18.00
208	DEN-1202	Allen bolt M10 x 55 mm Grade 8.8	DEN-1202-L	21.00
209	DEN-1204	S.S. Split pin 5mm dia, Length 50 mm	DEN-1204-L	18.00
210	DEN-1205	Dowel pin Dia 4mm, Length 50 mm	DEN-1205-L	2.00
211	DEN-1206	Dowel pin Dia 5mm, Length 50 mm	DEN-1206-L	11.00
212	DEN-1207	Dowel pin Dia 6mm, Length 50 mm	DEN-1207-L	3.00
213	DEN-121	O-ring ID 69,44W 3.53 (protecting pipe flange) P # 2178 151	1411-007	276.00
214	DEN-1211	Allen bolt M8 x 50 Half Thread 30mm (10.9 HT)	DEN-1211-L	20.00
215	DEN-1212	Circlip inside 10 mm for fuel pump	DEN-1212-L	39.00
216	DEN-1214	Welsh plug outer dia 76 mm	DEN-1214-L	14.00
217	DEN-1215	Non return valve -Tube end., Type RHD 12L PARRER	DEN-1215-L	4.00
218	DEN-1217	Hexagonal Bolt M6x130 Grade 8.8	DEN-1217-L	20.00
219	DEN-1232	Cap Stud Lateral	DEN-1232-L	8.00
220	DEN-1235	Shim for Cylinder Block Liner landing surface, 636301302DT131	1302DT131	30.00
221	DEN-1236	Repair Ring 9513DT333	636309513DT333	19.00
222	DEN-1237	Repair Ring 9513DT334	636309513DT334	7.00
223	DEN-1238	Nut for Main Bearing Side Stud	DEN-1238	6.00
224	DEN-124	Bolt M16X55 (0141 252) Intermediate gear	1310-011	2.00
225	DEN-1240	O-ring 240.67 * 5.33 for LO Engine Driven Pump of Diesel Engine	3521-068	24.00
226	DEN-1243	Sight glass kit for centrifugal filter, Part # 262605611ZT008, Centrifugal filter FM200DS	262605611ZT008,	12.00
227	DEN-1244	High R/F Pressure Combination, Order Number:- 370R5224W, Make: Cubear	370R5224W	1.00
228	DEN-1245	Resolver RE21-1-A05 for EM-80	DEN-1245	1.00
229	DEN-1246	Lip Seal for fuel booster pump	DEN-1246	6.00
230	DEN-1247	Helical Spring for EM80, Article Number: PAAE110369 and DAAE057275	PAAE110369	13.00
231	DEN-1248	O Ring for HP Pipe gland, OD, 40mm, ID 35.5mm, Thickness 2.5mm, Temperature 150 C	DEN-1248	187.00
232	DEN-1249	Locking Assembly for fuel rack cover	DEN-1249	33.00
233	DEN-125	Bolt M16X110 (intermediate gear)	0142 153	69.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
234	DEN-1250	Slide Ring Part # 1650 034 for injector pump	1650-034	54.00
235	DEN-1251	Interface Adaptor 010108213 R352	010108213 R352	10.00
236	DEN-1252	Pressure sensor switch 8.0 Bar, MBC 2431-1CB04 Make: Danfoss	061B100866	1.00
237	DEN-1253	Solenoid Valve Part # 2601DT219, Art No. 118 156 024N. Type 2 E 27, VDC 24 W11, F:No0803 IPS	2601DT219	8.00
238	DEN-1256	Fuel Injector complete without nozzle Lorange part Number without nozzle WO-U058A	1670-700	17.00
239	DEN-1257	Terminal plate (Cerimic) for EM-80 Motor	DEN-1257	10.00
240	DEN-1258	O ring size: ID=96,OD=105 Thickness 4.5mm	DEN-1258	50.00
241	DEN-1259	Supper"300" form-a-gasket Sealant ,Parmatex., Part #.83H, Item#.80057, Net 4 Fl.Oz.(1PT), (118 ml)	80057	9.00
242	DEN-126	O-ring ID 31,34 (2178 137)	1310-014	37.00
243	DEN-1260	Cleaner Loctite 7063 400ml	DEN-1260	8.00
244	DEN-1261	Alarm System for Con Rod Bearing	DEN-1261	1.00
245	DEN-1265	O Ring for Fuel Pump Pos 19, Pump Type: PEO GO53 CN, L'orange Part Number: FOF 9*48\FOS-39,	1650-012	432.00
246	DEN-1265-M	Modified O Ring for Fuel Pump Pos 19, Size: 104 * 4.4mm	DEN-1265-M	300.00
247	DEN-1266	Allen bolt M16x90 (12.9 HT) Thread length 65mm	DEN-1266	82.00
248	DEN-1267	Allen bolt M6 x 45 (12.9 HT) Half thread	DEN-1267	18.00
249	DEN-1268	Male stud coupling M12 with nut ferruel	DEN-1268	50.00
250	DEN-1269	Allen Bolt M12x45 Grade 8.8 full thread	M12X45-(8.8)	1,571.00
251	DEN-127	O-ring ID 127,77 (2178 170)	1310-017	34.00
252	DEN-1270	Hexagon bolt M16X100. 8.8	DEN-1270	527.00
253	DEN-1271	Hexagon bolt M20 X50 GRADE 8.8	DEN-1271	4,275.00
254	DEN-1272	Hexagon bolt M20X60 Grade 8.8	DEN-1272	145.00
255	DEN-1273	Hexagon bolt M20X70 Grade 8.8	DEN-1273	4,578.00
256	DEN-1275	Hexagon bolt M20X120 Grade 8.8	DEN-1275	133.00
257	DEN-1276	Hexagon bolt M20X140 Grade 8.8	DEN-1276	242.00
258	DEN-1277	Hexagon bolt M20X180	DEN-1277	30.00
259	DEN-1278	Hexagon Nut M30 4.6	DEN-1278	20.00
260	DEN-1279	Spirotop Air Release Valve 1/2", Spirotherm VTP050, Material: brass, Max. pressure:150 psi	DEN-1279	2.00
261	DEN-128	O-ring (2178 183) for intermedaite gear	1310-013	33.00
262	DEN-1280	Crankcase Breather, WNSD P # 3780-027 Article # 6303DT901A	3780-027	2.00
263	DEN-1281	Allen bolt M16x65 Grade 12.9 Imported black	M16X65-12.9	594.00
264	DEN-1282	Allen bolt M14x60 Grade 12.9 Imported black	DEN1282	189.00
265	DEN-1283	CYLINDER LINER TEMPERATURE SENSOR MTCH384 CK 98 M8X1 200FR PART NO 1078119	1078119	6.00
266	DEN-1284	VALVES T SENSOR EXTENSION CABLE CL 2PBDKX FR 4F1AECR2 PART NO 1399211	1399211	8.00
267	DEN-1285	BEARNG TEMPERATURE SENSOR Part # MP39.2 - CK - 139 - M10 - 1,75 - M18 - 2- FR PART NO 1348686	1348686	4.00
268	DEN-1286	Dowel pin 12X32, Part code: 616100490 142	616100490 142	50.00
269	DEN-1287	Set of torsional vibration damper Plugs	DEN-1287	23.00
270	DEN-1287A	Sample kit for Vibration Damper, Silicone Fluid, Damper Model # HA-1200-180-00-03,	HA-1200-180-00-03	1.00
271	DEN-1289	Filter Element (For Crank Case Breather)	PAAG159851	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
272	DEN-1290	O Ring for Banjo bolt	DEN-1290	28.00
273	DEN-1291	Seal for banjo bolt	DEN-1291	10.00
274	DEN-1292	Tapbolt M16*50 for Charge Air Receiver Part no 1570-0037 8.8 Ful Thread	1570-0037	10.00
275	DEN-1293	Tapbolt M16*90 For Charge Air Cooler 8.8 Ful Thread	616100141269	60.00
276	DEN-1295	Sealing Strip Material Number PAAE190374	PAAE190374	11.00
277	DEN-1296	Lower Strip Material Number PAAE190375	PAAE190375	12.00
278	DEN-1297	Top Strip Material Number PAAE190376	PAAE190376	12.00
279	DEN-1298	Support bar right Material Number PAAE190373	PAAE190373	16.00
280	DEN-1299	Support bar left Material Number PAAE190372	PAAE190372	11.00
281	DEN-1300	Bolt (M10x40) Material Number 000000141 132	000000141 132	68.00
282	DEN-1301	Locking Plate Material Number 000000361 003	000000361 003	83.00
283	DEN-1302	Bolt (M8 x 25) Material Number 000000141 086	000000141 086	185.00
284	DEN-1303	Locking Plate Material Number 000000361 002	000000361 002	231.00
285	DEN-1304	Lever lock For Engine Turning gear system	DEN-1304	10.00
286	Den-1305	Engage\Disengage lever for Turning Gear	Den-1305	3.00
287	DEN-1308	Oil Sump Sealing Ring 636301101 DT133	1001-005	4.00
288	DEN-1309	Glue IS495, Part # 1001-024	1001-024	2.00
289	DEN-1311	Stud for Fuel Block\Fuel Pump	1000-020	75.00
290	DEN-1312	Nut for Fuel Block\Fuel Pump	1000-024	17.00
291	DEN-1313	Stud for Fuel Block\Fuel Pump	1000-014	19.00
292	DEN-1314	Nut for Fuel Block\Fuel Pump	1000-023	28.00
293	DEN-1315	S.S Hex. Bolt with nut 16x100mm Grade 8.8	DEN-1315	58.00
294	DEN-1316	Gasket	DEN-1316	1.00
295	DEN-1317	O-RING, VITON, BLACK FOR AIR DISTRIBUTOR	DEN-1317	2.00
296	DEN-1318	O-RING FOR BYPASS FILTER	DEN-1318	4.00
297	DEN-1319	O-RING FOR BYPASS FILTER	DEN-1319	4.00
298	DEN-132	Hexagon Bolt for Intermediate Gear M20X100 1620DT110	1310-003	48.00
299	DEN-1320	gasket	DEN-1320	16.00
300	DEN-1321	columniform element	DEN-1321	9.00
301	DEN-1322	seal ring (engine)	DEN-1322	36.00
302	DEN-1323	seal ring (engine)	DEN-1323	72.00
303	DEN-1325	washer	DEN-1325	20.00
304	DEN-1326	Copper Ring 33*39	DEN-1326	36.00
305	DEN-1327	joint washer	DEN-1327	36.00
306	DEN-1328	Gasket	DEN-1328	36.00
307	DEN-1329	Valve Bush Set	DEN-1329	1.00
308	DEN-132A	Allen Bolt Intermediate Gear M20X80 (1620DT132) Grade 12.9 Order # 0040321617	1620DT132	104.00
309	DEN-1330	Nut 0242-066	DEN-1330	4.00
310	DEN-1331	O Ring	DEN-1331	2.00
311	DEN-1332	Shaft Sealing	DEN-1332	36.00
312	DEN-1333	Spare Parts Bag	DEN-1333	1.00
313	DEN-1335	Gasket 262X220X1.5ND6	DEN-1335	24.00
314	DEN-1337	Speed Detector of cam Shaft Bearing WKV4.4T	DEN-1337	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
315	DEN-1338	M12 Nut	DEN-1338	12.00
316	DEN-1339	DT144 Spherule Bearing	DEN-1339	4.00
317	DEN-1340	Rod Head For Fuel Control Shaft	DEN-1340	3.00
318	DEN-1341	nozzle pin	DEN-1341	30.00
319	DEN-1343	Flexible Rubber Hose Pipe (HT Vent), with MRS32-35-Hose Clamps and TW-TG 25 MG Hose Nipples ,	TW-TG 25	4.00
320	DEN-1344	Hex cap Screw M6x70: M6x70 0000002515 213	DEN-1344	50.00
321	DEN-1345	Pressure Test Block Module # MBV5000-1111	DEN-1345	4.00
322	DEN-1349	Bush for Intermediate Pin Part # 1000010	1620DT180	3.00
323	DEN-135	O-ring 66.27x 3.53	9612DT190	24.00
324	DEN-1350	Bolt for Sump Bank A&B Part # 1001017, PAAC000525 M16X70	1001017	116.00
325	DEN-1351	Bolt for Drive End A Cover Part # 1001016, PAAC000524, M16x65 (Hex)	1001016	20.00
326	DEN-1353	Gasket for cover end Part # 1071011	1071011	10.00
327	DEN-1355	Hexagon bolt vibration damper and Gear Wheel Part # 1142004	1142004	12.00
328	DEN-1358	Bolt for Intermediate Gear Part # 1310012, PAAC000529 M16x110 (HEX)	1310012	3.00
329	DEN-1359	Washer for Bolt of Charge Air pipe, Part # 1560009, PAAC000794	1560009	136.00
330	DEN-136	Gear wheel pump derive	1620DT107	1.00
331	DEN-1360	Pressure spring for Fuel Pump Block, Part # 1610004 (2102DT126)	1610004	7.00
332	DEN-1361	Set for lube oil attached pump, Part # 1811800	1811800	2.00
333	DEN-1362	Mounting set Ht Cooling Water Pump Part # 1910800	1910800	1.00
334	DEN-1363	Mounting set for LT Cooling Water Pump, Part # 1911800	1911800	1.00
335	DEN-1366	O ring for Starting Air Distributor, Part # 2111005	2111005	11.00
336	DEN-1367	Packing for HT Outlet of Head, part # 3551004	3551004	36.00
337	DEN-137	Packing	6120DT108	1.00
338	DEN-1370	COUNTER WEIGHT, Part # 1100016	1100016	2.00
339	DEN-1371	Repair set Injector, Indicating Cock, Safety Valve, Part # 1200801	1200801	18.00
340	DEN-1372	Repair kit Cooling water Pump LT, Part # 1913800	1913800	2.00
341	DEN-1373	HEXAGON HEAD SCREW M16x50 Part # PAAC000143	PAAC000143	6.00
342	DEN-1374	WASHER Part # PAAC000873	PAAC000873	38.00
343	DEN-1375	Intermediate Shaft for Rear Gear Wheel, Article Number: 636301620DT108, Part Number 1142-002	1142-002	2.00
344	DEN-1376	Gear Case Flange, Article Number: 636301620DT115	1071-008	4.00
345	DEN-1377	Flange, Article Number: 636301620DT122	1071-009	8.00
346	DEN-1378	Gasket for Gear Wheel, Article Number: 636301620DT123	1620DT123	16.00
347	DEN-1379	Tap Bolt M 12 X 30, Article Number: 616100141 168	1000-017	160.00
348	DEN-138	B-U ring 73x 67.2 x 2	9612DT191	24.00
349	DEN-1380	Bolt M16 X 100, Article Number: 616100142 151	3780-029	88.00
350	DEN-1381	Trek Washer For M16, Article Number 616100353 016	1071-013	44.00
351	DEN-1382	Bearing Bush, Part No. 2130-002 for (Gear segment 2301DT118)	2130-002	9.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
352	DEN-1383	Cover (Door for Split Gear Inspection)	DEN-1383	1.00
353	DEN-1384	Spring Pin 6* 40 for Stopping Device, Partt # 2130-018	2130-018	23.00
354	DEN-1385	Nipple Fat for Stopping Device, Part # 2130-022	2130-022	12.00
355	DEN-1386	Ball Bearing for Stopping Device, 6206- 2RS1	2130-023	24.00
356	DEN-1389	Lifting Jack for Main Bearing Part #1002700 (Material Number1101DT922)	1002-700	1.00
357	DEN-139	Hexagon head bolt M42X360	0151 449	64.00
358	DEN-1390	Locking Pin 8X50 Part No.2240-045	2240-045	50.00
359	DEN-1391	Temperature Switch Range 49-71 C, Model:4140DK1E00CE2-AET, Set 60 C Degree, Make:Amot, Con	4140DK1E00CE2-AET	3.00
360	DEN-1393	Pump Body HT, Wartsila Part No. 1912-003	1912-003	2.00
361	DEN-1395	FUEL LINE PROTECTING COVER B1	DEN-1395	7.00
362	DEN-1396	FUEL LINE PROTECTING COVER R1	DEN-1396	7.00
363	DEN-1397	FUEL LINE PROTECTING COVER R2	DEN-1397	7.00
364	DEN-1398	FUEL LINE PROTECTING COVER A	DEN-1398	17.00
365	DEN-1399	FUEL LINE PROTECTING COVER B	DEN-1399	17.00
366	DEN-140	Socket head cap screws	0251 964	4.00
367	DEN-1400	FUEL LINE PROTECTING COVER C	DEN-1400	18.00
368	DEN-1401	FUEL LINE PROTECTING COVER D	DEN-1401	18.00
369	DEN-1402	FUEL LINE PROTECTING COVER B9	DEN-1402	2.00
370	DEN-1403	EM-80 Driver, Part # 3522-1042, Make: Woodward	3522-1042	1.00
371	DEN-1405	Water Resistant PT-100, Part # TSAGL-2RD.T8.4(MI).60.10GL.Q4.M1.A.3, Make: COMECO	TSAGL-2RD.T8.4	22.00
372	DEN-1405-A	Thermowell for Water Resistant PT-100, YPTDB7*-4.60.Q4.U4.M9, Make: COMECO	YPTDB7*-4.60.Q4.U4.M9	22.00
373	DEN-1406	Starting air line Tee: Part # 3571-042, Old No. 6105DT123	3571-042	1.00
374	DEN-1407	Starting air line Tee: Part # 3571-043, Old No. 6105DT124	3571-043	2.00
375	DEN-1409	Tube, 1105 mm Long Part No. PAAF151235	PAAF151235	1.00
376	DEN-141	O-ring	2168 380	14.00
377	DEN-1410	Valve, PAAF151234	PAAF151234	2.00
378	DEN-1411	Reducer, 006240151	006240151	2.00
379	DEN-1412	Bearing 71816 TN W03 02 INA 45 Slovakia	DEN-1412	7.00
380	DEN-1413	Bearing HK 1010-B, INA Roller Berg Needle, Drawn Cup, Open End Plain, Desc: 94-f, Hs Code: 8492-4000	HK1010-B	11.00
381	DEN-1414	Oil Seal BAB SL 80* 100*7	DEN-1414	12.00
382	DEN-1416	Distance piece for Piston Bolt, Part No. 1130-012	1130-012	96.00
383	DEN-1418	Male Stud Coupling 10-M	DEN-1418	25.00
384	DEN-1419	O Ring for OMD Base Plate	DEN-1419	100.00
385	DEN-1421	Coupling Bush, for Starting Air Pipe WNSD Old Part No. 6105DT108	3570-006	6.00
386	DEN-1422	Thread Repair Insert M16 x 2	DEN-1422	11.00
387	DEN-1423	Allen Bolt M12 X35, Length: 35mm, Head width: 8mm, Allen key size: 10mm, Grade: 8.8	DEN-1423	260.00
388	DEN-1424	Stud M16 x 75 Part No.636301503DT102	1503DT102	20.00
389	DEN-1425	Flange Part No.636306104DT108	1201-018	4.00
390	DEN-1426	Guid Bush Part No. 1671-012	1671-012	72.00
391	DEN-143	Roller holder 2102DT139	2102DT170	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
392	DEN-1431	Roller Bearing P# KT121812 for EM-80 Motor, L= 11.5 mm, Out Side dia = 17.5 mm, Inside dia = 12.5 mm	KT121812	6.00
393	DEN-1432	Bulkhead Tube Connector Straight M12	DEN-1432	49.00
394	DEN-1433	Male Stud Coupling 1/2" x 3/8"	DEN-1433	50.00
395	DEN-1434	Main Bearing for Cylinder Bore Oversize 1mm, and crankshaft Journal std 380Material # PAAS005497,	PAAS005497	4.00
396	DEN-1435	Main Bearing with Axial Bearing Ring Oversize 1mm, and crankshaft Journal Std 380, Uper Shell	1102DT110	2.00
397	DEN-1436	Main Bearing with Axial Bearing Ring and crankshaft Journal Standard 380, Lower Shell	1102DT111	2.00
398	DEN-1437	Hexagon Seocket Screw M4x10 (Gurb Screw), Wartsila Part No. 1912-021 for HT/LT pump	1912-021	10.00
399	DEN-1438	Rotor Cover for HT Pump Wartsila Part No. 1912-007	1912-007	2.00
400	DEN-1439	Gas Sealing Ring 3mm Thickness	DEN-1439	44.00
401	DEN-144	Roller fuel pump 2102DT140 & Modified No. 2102DT172	1610-007	75.00
402	DEN-1441	Gas Sealing Ring 3mm Thickness, Version; 0503 Material # PAAE058995,with Ext.Rubber Ring P# F581000	F581000	18.00
403	DEN-1442	Gas Sealing Ring 4mm Thickness Version; 0503 Material # PAAE058995,with Ext.Rubber Ring P# F580805	F580805	18.00
404	DEN-1443	Fuel Line , Old Part No. 6201DT141, News Part No. 3500-019	3500-019	6.00
405	DEN-1444	Complete Filter Part No. 471-3700	471-3700	1.00
406	DEN-145	Shaft fuel pump roller	2102DT136	42.00
407	DEN-146	Push rod for fuel pump breaket 2102DT107	1610-010	14.00
408	DEN-147	Locking nut	9502DT231	3.00
409	DEN-148	Compression spring 2102DT115	2102DT115	49.00
410	DEN-149	O-ring (support fuel pump block) 2102DT118	1610-003	179.00
411	DEN-150	Throttle plug	2102DT119	163.00
412	DEN-151	Block pin	2102DT120	15.00
413	DEN-152	Distance bush	2102DT121	15.00
414	DEN-153	Socket Head cap screw M8x70 mm (Allen bolt)	0251 915	24.00
415	DEN-155	Locking pin 2102DT127	1410-011	46.00
416	DEN-156	Cylinder pin RND 14X32 Dowel pin for Cam Segment (Piece)	0490 173	7.00
417	DEN-157	Pressure spring 2102DT126	1410-013	65.00
418	DEN-158	Copper washer Copper washer ID=20 mm, OD=24 mm, Thickness 1.5 mm for fuel pump block	2150 557	174.00
419	DEN-159	O-ring D1 116D2 4 (2166 450)	1650-023	147.00
420	DEN-160	O-ring for fuel pump block & tapit roller (1410-012 & 1610-016)	1410-012	89.00
421	DEN-161	O-ring for fuel pump block 2178 235	1610-017	993.00
422	DEN-161-INS	O-ring for fuel pump block 2178 235	1610-017	9.00
423	DEN-162	Distance bush	2102DT144	12.00
424	DEN-163	Socket head cap screws M8X30	0251 907	20.00
425	DEN-164	Plunger spring	2106DT111	102.00
426	DEN-165	Casing in/outlet	2102DT109	5.00
427	DEN-166	Roller holder	2102DT147	7.00
428	DEN-167	Shaft in/outlet roller, 2102DT145	1410-004	73.00
429	DEN-168	Bearing bush, 2102DT112	1410-005	105.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
430	DEN-169	Roller inlet/exhaust 2102DT146	1410-006	66.00
431	DEN-170	Socket head cap screw M16X80	0251 332	45.00
432	DEN-171	Socket head cap screw M16X150	0251 341	122.00
433	DEN-172	Spring washer M16	0353 066	7.00
434	DEN-173	Measuring head VN115/87 EMCP/N 10601, Oil Mist Detector VN EMC Housing+Module Visatrn,	10601	1.00
435	DEN-176	O-ring 2103DT115 for Thrust ring cover	1480-001	24.00
436	DEN-177	Hex. Socket Head Screw Vibration Damper M20x90	1480-002	436.00
437	DEN-178	Screw M20 X 65 for camshaft 2103DT117	1480-003	415.00
438	DEN-179	Shaft with Gear Wheel for Camshaft, Wartsila Part No. 2103DT130	1480-004	2.00
439	DEN-180	Camshaft piece (A-side) Old Part No.2103DT161	1480-005	6.00
440	DEN-182	Cover piece	2103DT200	1.00
441	DEN-184	Sealing wahser piston skirt (o-ring)	1421DT122	45.00
442	DEN-186	Rod for Control Device	2240-172	2.00
443	DEN-188	Intermediate Flange	2103DT205	4.00
444	DEN-189	Pipe	2103DT182	4.00
445	DEN-190	Pipe	2103DT183	2.00
446	DEN-191	Pipe	2103DT184	2.00
447	DEN-192	Reducing Nipple	9503DT176	7.00
448	DEN-193	Hexagonal Bolt M16X90 half thread 0142 149	1480-017	143.00
449	DEN-194	Hexagon socket head cap screw M16X200	0251 495	61.00
450	DEN-195	Cylinder pin round 10x90 9smnb28k	0489 036	7.00
451	DEN-197	Repair set 2/3-way air way, Type: 2435 F.NO:9609, DN:38,P:0....30 bar,Medium: Luft.	122 760 00	7.00
452	DEN-198	Male stud coupling 12-M16,1.5	2305 451	33.00
453	DEN-199	Male stud coupling M33X2	2305 469	7.00
454	DEN-200	Male stud elbow M16,1.5	2308 713	6.00
455	DEN-201	Swivel banjo coupling 25-M33X22	2332 781	10.00
456	DEN-202	Axial bearing cam shaft 2103DT202	1480-015	9.00
457	DEN-203	Cylindrical pin for Cam Thrust Cover	2103DT204	30.00
458	DEN-204	Lube oil pump	5101DT918 &919	1.00
459	DEN-206	Hexagon bolt M12X175 V-Clamp	6104DT135	118.00
460	DEN-207	Fastening strip	6104DT166	117.00
461	DEN-208	Starting cam	2107DT215	1.00
462	DEN-210	Starting air distributor	2107DT933	1.00
463	DEN-212	Retaining RND 65X2.5	0370 065	3.00
464	DEN-216	Hexagon socket & head (for V-Clamp)	0149 019	29.00
465	DEN-217	Metal coupling flexible ((HT Out let cooler)	6404DT158	7.00
466	DEN-218	Magnetic Speed Pickup Sensor Fly Wheel P# . 2237-000, P. # DSE EH10.12 ATZ, Jaquet Tech Switzerland	DSE EH10.12 ATZ	1.00
467	DEN-218-A	Connector with Cable, 4-pole Teflon Cable, Length = 6.5m, Part # 820A-36656, Jaquet Technology Switz	820A-36656	2.00
468	DEN-219	Impeller Part No.5405DT112	1912-005	4.00
469	DEN-220	O-ring	2178 245	9.00
470	DEN-221	Pump shaft, Old Part No. 5405DT123, New Part No. 1912-014,for Colling Water Pump HT, Make: WNSD	1912-014	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
471	DEN-222	Oil seal ring for HT/LT pump, Viton oil seal 40 x 62 x 7mm, F1135 TC, Make: TTD	2234 173	6.00
472	DEN-223	V-clamp built on, New part Number : 2003-002, Old Part Number:- 6104DT917	2003-002	1.00
473	DEN-224	Flexible coupling (T/C out)	6404SW415	29.00
474	DEN-226	Cylinder bearing round, NJ310 EC1/C3 Part No. 3428 681	1912-027	26.00
475	DEN-227	Ball bearing round 6310/C3, Part No.3431 530	1912-028	3.00
476	DEN-230	Welsh plug cover	1501SW112	181.00
477	DEN-231	O ring ID 66.04 W5.33 (for fuel line) 3500-012	2167 526	218.00
478	DEN-234	Allen bolt Socket head screw M5X10	0251 427	42.00
479	DEN-237	Cooling water pump LT	5405DT922	1.00
480	DEN-239	Metal coupling pipe pressure 16 bar 139.7mm, YN-pipe coupling , Multiflex type round standard	MF-RS 125A	66.00
481	DEN-240	Starting air line	6105DT104	4.00
482	DEN-241	O ring (for Main starting air line of cylinder head) 6105DT107	3570-005	103.00
483	DEN-242	Pipe for starting air line	6105DT133	5.00
484	DEN-243	Fuse round 45	0370 045	197.00
485	DEN-244	O-ring ID 56.74W3.53 injector flange outside, Part # 2178 147	3570-030	53.00
486	DEN-245	Male Stud Coupling 42L X 35mm (1-3/8")	2305 461	18.00
487	DEN-248	Metal Flexible coupling for engine outlet pipe HTwater cooling	6404DT223	7.00
488	DEN-249-A	Exhaust Compensator Bellows Old Part No. 636306120DT121, Wartsila Part No.1580-003	1580-003	3.00
489	DEN-250	Tapbolt M12X35	0141 170	164.00
490	DEN-251	Bolt M30X150	0142 478	49.00
491	DEN-253	Guide ring 6201DT113	6201DT113	180.00
492	DEN-254	Back up ring 6201DT114	6201DT114	210.00
493	DEN-255	Flange for fuel line	6201DT118	17.00
494	DEN-256	Fuel line	6201DT142	4.00
495	DEN-257	Fuel line, Old Part No. 6201DT147, New Part No. 3500-017	3500-017	7.00
496	DEN-260	Hexagon head bolt M16X120	0142 155	72.00
497	DEN-261	Allen bolt M12 X 35 Grade 12.9 Imported black	0251 279	1,351.00
498	DEN-262	Allen Bolt M12 X 50 Grade 12.9 for fuel line	0251 282	241.00
499	DEN-263	O-ring ID 78.97W 3.53 for fuel line 2167 335	3500-011	463.00
500	DEN-264	Fuel pressure line (for cylinder head) 6202 DT116)	3510-001	9.00
501	DEN-265	Connecting piece 3510-002 (Straight HP Pipe)	6203DT111	130.00
502	DEN-266	Flange	6203DT106	18.00
503	DEN-269	M.S. Washer ID:17 OD:30 Thick 3mm (EGB Manifold)	0350 007	778.00
504	DEN-271	O-ring 40.87W 3.53 injector flange	2167 323	243.00
505	DEN-272	O-ring 59.92W 3.53 for starting air line	2167 329	119.00
506	DEN-273	O-ring 69.5X3 for main bearing jack 1101DT126	1001-008	5.00
507	DEN-274	Gasket for Lube Oil line Driven End Cover	6303DT168	23.00
508	DEN-275	O-ring ID 98.02 W 3.53 for running filter	2178 160	46.00
509	DEN-277	O-ring ID 148.59 W 5.33	2178 239	108.00
510	DEN-278	O-ring for lube oil pipe	2178 067	294.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
511	DEN-279	O-ring ID 23.16 W 5.33 for lube oil Leaky Chaneel 2178 625	3522-021	552.00
512	DEN-280	Metal coupling for cyl.head, GR - S 50A, Body: SUS304. Bolt/Nut: SUS304, OD=60.3mm, Length: 80 mm,	GR-5 50A	35.00
513	DEN-284	Collar Bearing Bush (Also available in DEN-133) Part # 1620DT146	1310-004	10.00
514	DEN-286	Indicator lamp yellow	8201DT112	1.00
515	DEN-287	Impulse switch CPL black	8201DT113	1.00
516	DEN-288	Impulse switch CPL red	8201DT114	1.00
517	DEN-289	Hour counter	8201DT115	2.00
518	DEN-290	Pressure indicator	8203DT168	1.00
519	DEN-291	Pressure indicator	8203DT169	2.00
520	DEN-292	Pressure indicator	8203DT170	2.00
521	DEN-293	Indicator for pressure	8203DT173	2.00
522	DEN-294	Speed indicator for blower	8203DT184	2.00
523	DEN-295	Speed indicator engine RPM 0-700 Blackstart Engine	8203DT185	1.00
524	DEN-296	Speed measuring system 16.18 SW	9503DT105	1.00
525	DEN-297	Temperature sensor for cylinder liner Type MTCH38 CK 98 M8X1 600FIM CMR Code 1078098 (8203DT297)	5133-033	7.00
526	DEN-299	Temperature Sensor Before Turbine (small) Old # 8203DT110, CMR Code: 1018167, Make, CMR	5130-045	9.00
527	DEN-300	Pickup T/C dantec 9072C0181, 6x2mm Metric Thread., Special High Temperature Version upto 135 Deg	8203DT285	3.00
528	DEN-301	Magnet 9072C0213, 8mm Metric 4 pole	8203DT286	8.00
529	DEN-302	Temp. switch amot 99-123 C, Model: 4144ODK1E00CE5-AET, Range: 99-123 C, Set 110 C Degree R, Amot	8213 R371	2.00
530	DEN-303	PT 100 tempreature sensor (Plug type) Old Nos is 010108203 R741, Supplier: Wartsila	636308203DT650	1.00
531	DEN-304	Temperature switch 66-87 C, Basic Model : 4140, Part # : 4140 DK 1E 00 CE3-AET, Make: AMOT CONTROLS	8203DT318	4.00
532	DEN-305	Temp. sensor main bearing 8203DT294	5131002	4.00
533	DEN-306	Temp. sensor for main brg. no.1 8203DT295	5131-003	3.00
534	DEN-307	Magnatic speed pick up	3003DT102	9.00
535	DEN-308	Camshaft bearing bush 2101DT102	1000-013	10.00
536	DEN-309	Camshaft Bearing without Groove for Position0-9 WND5 Article # 2101DT101, Extended P # 38100000A,	1000-035	32.00
537	DEN-311	cylindrical pin round 12x32	3005DT114	8.00
538	DEN-312	Main bearing Cap jack (built In) Overhual kit	H205552/01	12.00
539	DEN-313	Hexagon head bolts M16X75 H.T 8.8	0134 075	136.00
540	DEN-315	Tightening ring for tapit cover small (lower)	1216DT109	197.00
541	DEN-315-M	Sealing tube for Crank Case door, Temperature 150 C, Out side dia 12 mm, In side Bore 05 mm	DEN-315-M	522.00
542	DEN-319	Fresh air filter H206135/02 OMD	10042	113.00
543	DEN-325	Cover for Cylinder block	1212DT161	2.00
544	DEN-326	Cover for Cylinder block	1212DT162	2.00
545	DEN-329	Packing ring 107x61x1.5	2171 727	41.00
546	DEN-330	Packing ring -gasket	2171 730	166.00
547	DEN-331	Cavitation plug PEO-U087 2106DT130	1650-038	41.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
548	DEN-333	Spring plat item 18	2106DT112	3.00
549	DEN-334	Push rod fuel pump (2106DT114)	1650-015	13.00
550	DEN-335	Snap ring from B35 item 20 (0355 218)	1650-013	35.00
551	DEN-336	Retaining ring circlip 90x1	0371 090	197.00
552	DEN-337	Locking plate item 29-large tab washer	2106DT135	12.00
553	DEN-338	Retaining sleeve item 14	2106DT109	52.00
554	DEN-339	Stud pin OLD 1501DT125 " for Injector Holding"	1670-009	234.00
555	DEN-340	Dowel item 726x14	0490 101	98.00
556	DEN-341	Dowel item 73	0490 100	100.00
557	DEN-342	Fuel Pump Seal Ring Set, 2106DT001	2106DT001	30.00
558	DEN-343	Constant pressure valve	2106DT117	2.00
559	DEN-344	Delivery valve item 33	2106DT116	41.00
560	DEN-345	Valve spring 2106DT118	1650-023	81.00
561	DEN-346	Sealing ring item 4314x18x1.5	2155 658	266.00
562	DEN-347	Cover for Cylinder block	1212DT163	2.00
563	DEN-351	Yoke guide pin	1501DT102	22.00
564	DEN-352	Yoke cup	1504DT103	142.00
565	DEN-353	Yoke pivot	1504DT105	22.00
566	DEN-354	Yoke guide	1501DT107	10.00
567	DEN-355	Yoke cup support plate	1504DT107	104.00
568	DEN-356	Yoke adjustment screw	1504DT109	20.00
569	DEN-357	Welsh plugs cover	1501DT111	409.00
570	DEN-358	Valve collets	1501DT112	167.00
571	DEN-359	Hexagonal bolts M16x80	0142 147	195.00
572	DEN-360	Welsh plugs cover	1501SW111	230.00
573	DEN-361	Turbocharger gasket set	DEN361	1.00
574	DEN-363	Injector pivot item 6	1501DT139	52.00
575	DEN-364	Injector compression spring item 8	1501DT141	171.00
576	DEN-365	Injector o-rings	1501DT144	219.00
577	DEN-367	Gear wheel	5402SW178	2.00
578	DEN-368	Adjusting screw item 9	1501DT142	69.00
579	DEN-369	Spring housing	1501DT140	18.00
580	DEN-370-M	Exhaust Expansion Bellows, Size: 252 mm, Flange size 375 mm, 07 grove, 12 Holes, 3 Ply, Thicknes	6104DT130	34.00
581	DEN-371	Tension element (attached lub oil pump)	5402SW177	38.00
582	DEN-372	Air starting valve piston	1520DT103	14.00
583	DEN-373	Air starting valve 1520DT102	1230-003	42.00
584	DEN-374	Air starting valve spring 1520DT106	1230-005	118.00
585	DEN-375	Copper wahser ID 42 mm x OD 50 mm x Thickness 2 mm for Air starting valve washer	2150 790	15.00
586	DEN-376	Air starting valve o-ring (Old # 2167 233)	1230-009	50.00
587	DEN-377	Air starting valve self locking nut M10	0164 184	85.00
588	DEN-380	Hydr. nipple (unmount camshaft)	9612DT968	2.00
589	DEN-381	Lower push rod support	1531DT103	10.00
590	DEN-382	Hexagon socket head screw 10x45	251 259	12.00
591	DEN-383	Push rod protecting pipe	1531DT105	10.00
592	DEN-384	Push rod protecting sleeve 1531DT106	1411-005	173.00
593	DEN-385	O-ring (for cyl. head stud)	2166 512	232.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
594	DEN-387	Level switch, Heinrich Kulber AGCH 6341 Baar Type SM 40 VA 250 VAC/DC 1 A. Art. # 003 EA4 68005300	8203DT212	3.00
595	DEN-389	Joint wahser 10x18x1	2150 505	16.00
596	DEN-391	Pressure Regulator(reducer) for OMD, S/N: 1103-81444 & 81460 & 81464,	10001	1.00
597	DEN-393	Flexible mounts top	10018	15.00
598	DEN-394	Flexible mounts down	10019	17.00
599	DEN-395	Flexible bellows	10023	22.00
600	DEN-396	Gasket for measuring head OMD	10022	33.00
601	DEN-397	Rod Head M18 x 1.5 mm 18A RH Female KI 18-DNIRO (Part no.101487) (Old # 0834 510)	101487	8.00
602	DEN-398	Rod head ends M18 x1.5V (Part no. 101444) KA 18-D (Old # 0834 038)	101444	20.00
603	DEN-398-A	Rod head ends M18x1.5mm (Part no 101448), KA 18-DNIRO	101448	10.00
604	DEN-398-B	Rod head ends M18x1.5mm (Part no 101452) KA 18-D2RS	101452	14.00
605	DEN-399	Allen bolt M10x40 Grade 12.9, Cylinder screw cyl. head flange	6104DT123	266.00
606	DEN-400	Male stud coupling 8-M16X1.5 (for HP pipe)	2305 467	38.00
607	DEN-401	Disassem T. nozzle holder	9612DT950	2.00
608	DEN-402	O-ring ID:175 2D:3.55 (for Charge Air Pipe from cyl head side) 2169 430	1560-010	50.00
609	DEN-404	Swivel nut intection valve	1501DT138	66.00
610	DEN-406	Constant pressure v/v 2106DT137	1650-022	24.00
611	DEN-406-OH	Constant Pressure Valve	DEN-406-OH	2.00
612	DEN-407	Filter for air control unit (2601DT140)	3532-007	4.00
613	DEN-408	Tank control air 2601DT141	3532-008	1.00
614	DEN-409	Ball valve 2601DT166 for controll air unit	3532-010	1.00
615	DEN-410	Thermocouple exh. gas head sensor, Type: MTS381-DCK-123-M1, CMR Code 1078060, Wartsila Code:5132-002	8203DT665	33.00
616	DEN-411	Starting air valve	6105DT137	1.00
617	DEN-412	Blocking valve 4005DT231	9900613	3.00
618	DEN-413	Stopping cylinder	2106DT123	1.00
619	DEN-415	Fastening strip for V-Clamp 6104DT309	2003-004	66.00
620	DEN-416	Connection block 1A, 2B, Wencor Pipe, Type CPW F K 1A/2B 3,8 FR,CMR#1498605, Wartsila # 8203DT305,	8203DT305	3.00
621	DEN-417	Connection block 3A, 4B, Type CPW F K 3A/4B 5,6 FR, Wartsila old code 8203DT307, CMR code 1498607	8203DT307	3.00
622	DEN-418	Connection block 4A, 5B WNSD Code # 8203DT308, Type: CPW F k 4A/5B 6,5 FR, CMR Code # 1498608	5160-017	2.00
623	DEN-419	Connection block 6A, 7B Type CPW F K 6A/7B 8,3 FR CMR Code 1498644 WNSD # 8203DT310	5160-019	2.00
624	DEN-420	Connection block 7A, 8B, Type CPW F K 7A/8B 9,2 FR, Wartsila old code 8203DT311, CMR code 1498645	8203DT311	1.00
625	DEN-421	Connection block 8A, 9B Type CPW F K 8A/9B 10,1 FR, CMR code 1498646, WNSD Old # 8203DT312	5160-021	1.00
626	DEN-422	Connection block 9A, Type: CPW F K Pa 11 FR, WNSD Code # 8203DT313, CMR Code 1498647	8203DT313	4.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
627	DEN-423	Connection block 1B, Extension Cable, Type CL 2P KX 4F1A 4F1A ECR1,5,Wartsila Old code 8203DT124,	8203DT314	2.00
628	DEN-424	Clamp (Holding block for liner)	1302DT102	54.00
629	DEN-426	Control rod	2106DT107	23.00
630	DEN-427	Allen Bolt M6x15 Grade 8.8	0251 202	100.00
631	DEN-429	Microswitch turning gear	9901972	10.00
632	DEN-432	Connecting cable (Old # 8203DT124) CMR code 1398240, Type CL 2P KX 4F1A 4F1A ECR1,5	5133-001	4.00
633	DEN-435	Allen bolt M6 x 30mm Grade 12.9 full thread	0251 900	66.00
634	DEN-436	Hexagon nut M16 for Exh. gas pipe	0185 114	4,554.00
635	DEN-437	Exhaust bends	6104DT138	2.00
636	DEN-438	Exhaust bends	6104DT139	2.00
637	DEN-439	Plunger & barrel GCO U809	9904066	2.00
638	DEN-440	Delivery valve GCO U001	9904068	1.00
639	DEN-441	Spring GCO - T011	9904069	4.00
640	DEN-442	Valve spring KZO-T005	9904070	3.00
641	DEN-443	Steel ball D5401-3/8Z	9904072	4.00
642	DEN-444	Delivery valve cone GCO-T098	9904074	2.00
643	DEN-445	Delivery valve spring PEO-T152	9904076	2.00
644	DEN-446	O ring FOF-35x2.5A	9904077	4.00
645	DEN-447	Connection piece GXO-T007	9904078	1.00
646	DEN-448	Joint washer D7603-A14x18	9904079	6.00
647	DEN-449	O ring FON-4,3x2.4A	9904080	2.00
648	DEN-450	Joint washer D7603-A7x18x2	9904081	2.00
649	DEN-451	Tube FPS-7x2x900	9904083	1.00
650	DEN-452	Connector P/N 10033	9904092	5.00
651	DEN-453	Protection cover P/N 10084	9904096	1.00
652	DEN-455	Protecting cover P/N 10015	9904098	1.00
653	DEN-456	Typhoon filter P/N 10632	9904099	1.00
654	DEN-457	Base plate P/N 10032 for OMD Circuit Board	9904100	1.00
655	DEN-458	Cover measuring head	9904102	1.00
656	DEN-459	Syphon block VN 115/87 OMD	10013	1.00
657	DEN-461	Set hydraulic hoses	9612DT961	1.00
658	DEN-462	Pressure guage 0-600 bar	9903722	1.00
659	DEN-463	Pressure guage 0-1000 bar	9903724	1.00
660	DEN-464	Hexagon Bolt M12 X 40 HT 8.8 (Imported)	0141 172	680.00
661	DEN-465	Allen Bolt M6X25 Grade 12.9	0251 205	110.00
662	DEN-466	Rod head round 12type	0834 004	6.00
663	DEN-467	Safety valve cyl. block	1212DT135	6.00
664	DEN-468	Cover for Cylinder block	1212DT165	2.00
665	DEN-469	Locking nut injection valve	1501DT143	50.00
666	DEN-470	Cutter spindle (locking pin)	1501DT146	191.00
667	DEN-471	Camshaft piece (B-side) Old Part NO. 2103DT162/C	1480-038	5.00
668	DEN-472	Joint washer 21x27	2150 515	66.00
669	DEN-473	O ring 3.53 x 183.74	2167 363	8.00
670	DEN-474	O ring 132.72 W:5.33	2167 547	38.00
671	DEN-478	Sealing washer 262x220x1.5	2171 817	34.00
672	DEN-480	O ring 5.33 x 42.52 (2178 694)	1000-030	62.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
673	DEN-481	Packing for centrifugal filter	2280 014	69.00
674	DEN-484	Helical spring	2301DT105	74.00
675	DEN-485	Helical spring	2301DT106	74.00
676	DEN-486	Sleeve for injection pump, Old Part # 2301DT108	2240-008	39.00
677	DEN-487	Shaft (for fuel stop lever)	2301DT119	6.00
678	DEN-488	Shaft for Fuel Stop Mechanism 2301DT120	2130-008	5.00
679	DEN-489	Shaft complete	3005DT115	1.00
680	DEN-490	Clamping element	3005DT121	21.00
681	DEN-491	Pressure plate	3005DT122	1.00
682	DEN-492	Gearwheel	3005DT131	9.00
683	DEN-493	Gearwheel	3005DT132	6.00
684	DEN-494	Drive shaft governor	3005DT133	3.00
685	DEN-495	Ball bearing 6010 SKF	3431 450	13.00
686	DEN-496	Ball bearing 6210 SKF	3431 490	14.00
687	DEN-497	Ball bearing 6307 SKF 80x35x21	3431 527	10.00
688	DEN-498	Ball bearing 6405 SKF S564 80x25x21	3431 552	14.00
689	DEN-499	Bearing for fuel shaft (Part No. 2240-048) RAE45-NPP-FA106 X 08.14 INA 45 Slovakia	2240-048	64.00
690	DEN-501	Gasket for leaky channel	6107DT255	2.00
691	DEN-502	Needle valve (T/C wahsing valve)	6130DT130	2.00
692	DEN-503	Ball valve for centrifugal filter (bearing DN20)	6303DT128	13.00
693	DEN-504	Supporting ring	6303DT203	60.00
694	DEN-505	O ring	8203DT361	76.00
695	DEN-506	O ring	8203DT363	168.00
696	DEN-508	Pressure transmitter 0-10 bar, Type: 8202, Nr: 409673, P: 0--10 Bar, Max. 32 Ba, 10--- 36 V DC/ 4--2	4011 303	3.00
697	DEN-509	Pressure transmitter 0-4 bar	4011 306	2.00
698	DEN-510	Pressure transmitter 0-6 bar, 0-70C, Type: 8202.77.2210. Type: NVITRAG, Make: Trafag, Switzerland	8230DT260	4.00
699	DEN-511	Pressure transmitter 0-40 bar	8213R730	3.00
700	DEN-512	Pressure switch range 0.28 - 3.72(Pressostatic switch), Modle: 4140CK1E11AA0-AET,Make: Amot Control	8203R408	4.00
701	DEN-513	Pressure switch 3.45-8.34 bar, Pressostatic switch, Modle: 4140CK1E12AA0-AET, Make: Amot Controls	8203R415	3.00
702	DEN-514	Bush	9503DT366	2.00
703	DEN-517	Exhaust valve seat (over size 127mm dia)	1501DT191	6.00
704	DEN-518	Exhaust Valve Seat 1 mm (Over Size), Wartsila Part No. 1501DT186	1501DT186	10.00
705	DEN-527	Pressure plate (attached lub oil pump)	5402SW179	7.00
706	DEN-528	Fuel oil leaky transfer pump	9905995	1.00
707	DEN-529	Pre heating pump motor	9905995	1.00
708	DEN-530	Adjusting sleeve	3005DT130	8.00
709	DEN-532	Torsional vibration monitor EM-30 Old Part No. 9701DT241	9905202	3.00
710	DEN-533	Magn. ventil valve	9905203	6.00
711	DEN-534	Speed Pickup with pole wheel for ABB TC, FTG 104, M36*2, SH2, Pole Wheel, Type Series FTP 511,	9905403	6.00
712	DEN-535	Cylinder head stud (old P # 636301501DT185)	1000-008	100.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
713	DEN-540	Temp. transmitter PT-100 0-100°C, Type 8100, 10...34 VDC/4...20mA ta 0...70 C, TRAFAGE Switzerland	8203DT415	3.00
714	DEN-541	Temp. transmitter PT-100 0-150°C, Type 8100, 14...3 VDC/4...20mA ta 0...70 C, TRAFAGE Switzerland	8203DT416	3.00
715	DEN-542	Temp. transmitter PT-100 0-250°C, Type 8100, 10...34 VDC/4...20mA ta 25...85 C, TRAFAGE Switzerland	8203DT417	3.00
716	DEN-543	Safety relief valve new type (Cylinder Head)	1503DT904	5.00
717	DEN-544	Bush for Intermediate Shaft (New No. 9503DT555)	1000-010	8.00
718	DEN-545	Pin for control lever, Part # 2301DT109	2240-009	61.00
719	DEN-546	Plain bearing spherical Ball joint GEH 15, Make: SKF	GEH-15	76.00
720	DEN-547	Lever for control shaft 5103-016, Old Part No. 2301DT107	5103-016	20.00
721	DEN-548	Locking pin (spindle pin) Part # 0414 028	2240-043	6.00
722	DEN-549	Transducer (vibration sensor for fly wheel)	5103-016	2.00
723	DEN-550	Cover for intermediate gear, New P.No. 1310-009 Old P. No. 636301620DT112,	1310-009	8.00
724	DEN-552	Intermediate shaft	1620DT125	1.00
725	DEN-553	Intermediate shaft, New Part No. 1310-010 Old Part No. 636301620DT125	1310-010	3.00
726	DEN-554	Double gearwheel (for Intermediate Gear), Wartsila Oil Part Number: 1620DT904	1620DT904	4.00
727	DEN-555	Driving gearwheel (attached lub oil pump)	5101SW199	2.00
728	DEN-556	Hex. socket screw M10x45 (attached lub oil pump)	0251 923	85.00
729	DEN-557	Safety valve (attached lub oil pump)	9907859	1.00
730	DEN-558	Pressure control valve (attached lub oil pump)	5101DT944	1.00
731	DEN-559	Sealing rings for air receiver 1301DT132	1560-021	134.00
732	DEN-560	Bolt hex. head M20X230 split gear 1111DT154	1111DT158	44.00
733	DEN-561	Cable CC4 9907437	8202DT128	6.00
734	DEN-562	Cable CP1 9907438	8202DT129	6.00
735	DEN-563	Cable CP2 9907439	8202DT130	2.00
736	DEN-565	Hexagonal bolt M20x130	0142 217	9.00
737	DEN-566	Washer	0350 008	147.00
738	DEN-567	Resilient elements (vib. pad) damper 8706DT181	4640-041	43.00
739	DEN-568	O ring for charge air pipe (Intake bellow)	6102DT104	43.00
740	DEN-569	Charge air pipe 6102DT107	1560-027	116.00
741	DEN-570	Gearwheel	3005DT120	2.00
742	DEN-571	Hexagon twin nuts	3005DT113	4.00
743	DEN-572	Hexagon Socket Head Screw M10x45, Grade 12.9 (Allen Bolt)	0251 259	108.00
744	DEN-573	Spare part rotocap KK30 1501DT180	1210-003	60.00
745	DEN-574	Connecting casing	10202	4.00
746	DEN-575	Quick connecting for U tube	10053	2.00
747	DEN-576	U tube manometre	10046	1.00
748	DEN-577	Distance bush	3005DT103	5.00
749	DEN-578	Distance ring	3005DT105	5.00
750	DEN-579	Disc key 8 x 9	0503 039	6.00
751	DEN-580	Cable Ties (Metallic) Material Stainless Steel 304, L= 362mm, W= 4.6mm Thickness: 0.25mm P # MTL4S-CP	8203DT450	24.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
752	DEN-582	Coil for Solenoid valve 3/2" , P/No. F171930	F171930	6.00
753	DEN-582-A	Solenoid valve 3/2", Art. # 114.423.00, Type: 1557 / 41, 0 - 32 Bar P/No. F500490	F500490	1.00
754	DEN-583	Pneumatic valve 2/3 for stop (Old # 2601DT103) , Air Valve Details:- A. # 122 04800 Type 343/41	3532-003	8.00
755	DEN-584	Gland	6102DT108	10.00
756	DEN-585	Damper for exhaust manifold	6107DT349	115.00
757	DEN-586	Water outlet valve 2601DT922 s/ valve drain	3533-700	2.00
758	DEN-587	Adj.equal TEE RND 12	2308 983	1.00
759	DEN-590	Non return valve 12 serial L 2579 103	3532-041	6.00
760	DEN-591	O ring 124.5x3	1101DT125	14.00
761	DEN-592	Hex. sock hd cap screw M14x90 (0251 954)	1650-024	42.00
762	DEN-593	Hexagon Socket Head Cap Screw M12x25 (Allen Bolt)	0251 838	10.00
763	DEN-594	Hex. sock hd cap screw M10x90 (0251 931)	1650-003	56.00
764	DEN-601	Rod head Round POS 18A RH Male	616100834053	7.00
765	DEN-605	Fitted bolt Old # 0101 189	2240-028	95.00
766	DEN-609	Hexagonal bolt M12x80	0142 079	79.00
767	DEN-619	Male stud coupling 12x1/2	2305 433	2.00
768	DEN-633	Screw IN-T coupling Rnd	2309 342	3.00
769	DEN-635	Plate PEO T324 (2106DT133)	1650-041	36.00
770	DEN-636	Hexagonal bolts M16x45mm for T/C casing	2002-026	113.00
771	DEN-638-A	Adapter for Rubber Element , Part Number: PAAS002294	PAAS002294	8.00
772	DEN-638-M	Foundation Rubber Element (New Modified), Flexible element, Part #: PAAE049535 New P # 4640072	4640-072	76.00
773	DEN-639	Flange	8706DT108	282.00
774	DEN-640A	Shim 2mm Engine Foundation OD: 160mm ID: 62mm	DEN-640A	42.00
775	DEN-641	Bush	8706DT188	1,329.00
776	DEN-642	Flange	8706DT153	92.00
777	DEN-643	Element	8706DT178	75.00
778	DEN-651	Flat bar (bright)	8706DT194	200.00
779	DEN-652	Hexagonal bolt M12x20	0141 164	147.00
780	DEN-653	Hexagonal bolt M6x20	0141 054	114.00
781	DEN-654	Hexagonal bolt M16x80	0142 143	570.00
782	DEN-655	Hexagonal nut M24	0185 016	4.00
783	DEN-661	Resilient element vibration pad	8706DT277	12.00
784	DEN-663	Hexagonal bolt M16x90	0141 259	5.00
785	DEN-664	Hexagonal nut M16 (0185 014)	1670-010	82.00
786	DEN-665	Male stud coupling 12 M18x1.5	2305 452	5.00
787	DEN-666	Joint Washer 16x20	2150 554	39.00
788	DEN-667	Sampling funnel (right)	270683	6.00
789	DEN-668	Sampling funnel (left)	270681	2.00
790	DEN-669	Sampling funnel (straight), Part # 10503	10503	2.00
791	DEN-670	Connection Unit for Syphon Block, Par No. 10089, Make: Schaller Automation	10089	3.00
792	DEN-672	Joint washer	1912-006	6.00
793	DEN-673	Impeller nut	1912-012	13.00
794	DEN-678	Male stud coupling 6 M10x1	3532-029	11.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
795	DEN-679	Instrument Cable 5x1.5mm, Type: RTFRO 5 x 1.5 mm, Make: HABIA CABLE.	5130-041	231.00
796	DEN-680	Instrument Cable 2 x 0.75mm, Type: RTFRO, Make: HABIA CABLE	5130-009	263.00
797	DEN-681	Instrument Cable 3 x 0.75mm, Type RTFRO Make Habia Cable	5130-010	206.00
798	DEN-682	Instrument cable 5x.75mm	5130-042	200.00
799	DEN-683	Instrument Cable 2 x1.5mm, Type: RTFRO, Make: HABIA CABLE	5130-043	206.00
800	DEN-684	Instrument Cable 3x1.5mm, Type: RTFRO 3 * 1.50 mm, Make: HABIA CABLE	5130-044	322.00
801	DEN-685	Instrument Cable 7x.75mm, Type: RTFRO 7 * 0.75 mm, Make: HABIA CABLE.	5130-011	285.00
802	DEN-686	Box mounting receptacle 32CON	5011-070	8.00
803	DEN-687	Box mounting receptacle 41CON	5011-071	8.00
804	DEN-688	Box mounting receptacle 19CON	5011-072	2.00
805	DEN-692	Cable driver unit act 5417-647 15m	9915730	3.00
806	DEN-694	PT/100 3 wire head type 200-600C	C212	9.00
807	DEN-695	Spring	3533-002	9.00
808	DEN-696	Piston for water outlet valve	3533-001	3.00
809	DEN-697	Limit switch ZEN2G OMRON, Type: ZE-N22-2G. 15 Amps 125,250 Or 480VAC, Make Omron Made in Japan	ZE-N22-2G	6.00
810	DEN-699	Cylindrical pin	1501DT152	19.00
811	DEN-700	Thermocouple Temperature Sensor for Main Bearing Zero Possition. 8203DT421, Type MP39.2CK 139 M10,	1348254	6.00
812	DEN-705	Cover A21392 (Turning gear cover casing)	9915543	6.00
813	DEN-706	Cover 31501	9915544	1.00
814	DEN-707	Bushing A43934 for turning gear	9915545	5.00
815	DEN-708	Compression spring A42570	9915546	2.00
816	DEN-709	Worm A34706	9915547	1.00
817	DEN-710	Shaft Oil Seal Size:80 x 110 x 12 Make: Noke	9915551	8.00
818	DEN-711	Shaft seal 40506510 BASL	9915552	5.00
819	DEN-713	Studs for air cooler	DEN713	74.00
820	DEN-714	Strip for air cooler (5302DT157)	4760-005	7.00
821	DEN-715	Strip for air cooler	4760041	6.00
822	DEN-717	Instrument cable 2x1.5 30000mm	5130043	106.00
823	DEN-718	Male jack for speed pickup	9916332	6.00
824	DEN-720	Temperature Transmitter(C201) TC-PT100 -50 to +50, Analog PC-Programmable, Model: Inor, Sweden	C201	5.00
825	DEN-722	Bolt for piston crown DT140	1421DT142	59.00
826	DEN-723	Tip for temp switch 99-123 degreeC, Amot part Number 41055, 2959 7C 351, Make: AMOT	41055	7.00
827	DEN-724	Tip for temp switch 63-87 degreeC, 41053, Amot Part Number 41053, 3482 74N 047, Make: Amot	41053	8.00
828	DEN-726	Connecting flange (fuel pump)	1650 025	2.00
829	DEN-727	Plate (fuel pump)	1650 041	19.00
830	DEN-728	Sealing washer	1650 017	41.00
831	DEN-729	Sealing washer	1650 039	27.00
832	DEN-730	Shaft seal	1650 040	28.00
833	DEN-731	Dip stick spring steel 40" 0.55x10mm	DEN731L	11.00
834	DEN-732	Chassis mount sg plug 32 62GB12E18-32P	450-247	5.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
835	DEN-733	Chassis mount sg sock 32 62GB56T18-32S	450-405	6.00
836	DEN-734	Thermowell for Temperature Switch, Outer dia :18 mm, Inner dia : 15 mm, Hex size :25 mm,	DEN734L	8.00
837	DEN-735	Disc spring for air cooler	1570 044	507.00
838	DEN-736	Studs for crank 8.8 x 66x20mm	DEN736L	1,531.00
839	DEN-737	Block for charge air cooler	DEN737L	23.00
840	DEN-738	Bearing Journal for Camshaft, Wartsila Part No. 2103DT188	1480-011	2.00
841	DEN-739	Bearing journal for camshaft	2103DT192	2.00
842	DEN-740	Bearing journal for camshaft	2103DT193	1.00
843	DEN-741	Bearing journal for camshaft	2103DT194	1.00
844	DEN-742	Bearing journal for camshaft	2103DT198	1.00
845	DEN-743	Printed circuit card C1, C1 DC/DC CARD 24 V 0V7370035-96, Make: Finlandia Interface	636309530DT106	3.00
846	DEN-745	Circuit board C4 SPEMOS	9530DT114	1.00
847	DEN-746	Speed convetor/switching card C3/C5	9530DT108	4.00
848	DEN-747	Mother board	9530DT112	2.00
849	DEN-748	Sump Float Level Switch Part # LS-800-3BRG-BN-SPDT-020-GR4-2, Brass Stem, HS Code:90261021	LS-800-3BRG-BN-SPDT-020-GR4-	3.00
850	DEN-751	Compensation cable 2x2 Type K, Item Number 9474078, CMR	5130 060	190.00
851	DEN-752	Clip	5132 009	200.00
852	DEN-755	Repari kit Pressure Reglating Valve, Part # 11068, Make: Schaller Automation Germany Old P# 10977	11068	4.00
853	DEN-757	Seal for OMD	10206	29.00
854	DEN-758	Valve box seal for OMD, Part No. 10049, Size : 14cm * 9cm, Make: Schaller Automation	10049	21.00
855	DEN-762-F	Termination A 6 pin socket, Part # 0383 551 06 (Female), Make: JAEGER, Made in France	038355-106	6.00
856	DEN-764	Allen bolt M10 x 35mm (for cyl. head flange)	DEN764L	200.00
857	DEN-766	Connecting rod bearing set, Upper: 636301401DT157, Lower: 636301401DT158, Set Number: 636301401DT159	1110-702	10.00
858	DEN-766-S	2mm Undersize Connecting Rod Bearing SetM PAAE063143 Standard Shaft Size:360mm,WNSD P #: 1401DT131	PAAE063143	6.00
859	DEN-766-S2	10mm Undersize Connecting Rod Bearing Set Part No. 1391DT135 & 140	PAAE065877	2.00
860	DEN-767	Thermal expn. plate air cooler A	DEN767L	4.00
861	DEN-768	Thermal expn. plate air cooler B	DEN768L	4.00
862	DEN-772	Ribs for charge air cooler, Type 84/34/10+12/2 ESVS99-20N162	S99 20N162	107.00
863	DEN-774	Micro Switch, Type BZ-2R24-A2N81, 15A/380V, Make: Honeywell	BZ-2R24-A2N81	20.00
864	DEN-775	Tip for temp switch 49-71	41052	7.00
865	DEN-776	Seals kit hyd cylinder RSM500K, Enerpac	DEN776L	1.00
866	DEN-778	Seals kit hyd cylinder RCH202K, Enerpac	DEN778L	3.00
867	DEN-779	Seals kit hyd cylinder RCH121, Enerpac	RCH121	6.00
868	DEN-781	Seals kit hyd cylinder RC102, Enerpac	RC102	4.00
869	DEN-782	Seals kit hyd cylinder RC53K, Enerpac	RC53K	2.00
870	DEN-783	Seals kit hyd cylinder P391K2, Enerpac	P391K2	2.00
871	DEN-784	Stud for counter weight 1111DT117	1100-004	74.00
872	DEN-785	Nut	1100-001	17.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
873	DEN-787	Piston	2111008	10.00
874	DEN-788	Spring	2111009	16.00
875	DEN-789	Cylinder liner	2111010	19.00
876	DEN-790	Taper pin	2111013	2.00
877	DEN-791	Plug	3533-003	2.00
878	DEN-792	Copper ring 22 x 27	3533-004	3.00
879	DEN-793	O ring ID 8.74 x 1.78 for Air unit	3533-005	10.00
880	DEN-794	O ring ID 13.11 x 2.62 Air unit	3533-006	109.00
881	DEN-795	S.S. allen bolt M6 X 50mm	DEN795L	49.00
882	DEN-796	Allen Bolt for Air Cooler M12x100 Grade 12.9	DEN796L	245.00
883	DEN-797	Washer spring air cooler 13x18.5x3mm	DEN797L	189.00
884	DEN-799	Allen bolt for air cooler M12x60mm	DEN799L	311.00
885	DEN-801	Cylinder pin 8 x 16	490 102	48.00
886	DEN-802	Stud M20 x 200 (for fuel pump block holding)	1000 020	33.00
887	DEN-803	Bearing bracket 2301DT156	2240 056	6.00
888	DEN-804	Bearing bracket	2240 059	1.00
889	DEN-805	Bearing bracket	2240 060	2.00
890	DEN-806	Bearing bracket 2301DT156	2240 180	2.00
891	DEN-807	Spring plate 2106DT110	1650 009	30.00
892	DEN-808	Bearing bracket	2240 049	3.00
893	DEN-809	Axial bearing bracket	2240 050	2.00
894	DEN-810	Bracket	2240 182	4.00
895	DEN-811	Distance Bush for Injector 1501DT123	1670 007	6.00
896	DEN-814	Thermocouple team A 3 pin plug, Made in Farance - JAEGER	0429 531 66	10.00
897	DEN-814A	Thermocouple Team A 3 Pin Scket, Made in Farance - JAEGER	042953-166	8.00
898	DEN-815	Thermocouple team A 4pin plug, Made in Farance - JAEGER	043082-106	6.00
899	DEN-815A	Thermocouple team A 4pin Female Plug , Made in Farance - JAEGER	043085-106	5.00
900	DEN-816	Thermocouple team A 6pin plug	0383 551 06	14.00
901	DEN-816A	Thermocouple team A 6 Pin Socket	0429 541 56	6.00
902	DEN-818	Distence piece for OMD syphon block	DEN-818L	16.00
903	DEN-819	Top Bush with O ring for OMD syphon	DEN-819L	12.00
904	DEN-820	Bottom Bush with O ring for OMD syphon	DEN-820L	2.00
905	DEN-821	Vibration damper (For cam shaft), Material G410015, D 41/21 Vibration damper, Wartsila # 1481-005	1481-005	2.00
906	DEN-824	Copper washer for fuel P/P	DEN824L	22.00
907	DEN-825	Circlip for OMD filter	DEN825L	23.00
908	DEN-826	Allen Bolt & nut 6x35mm	DEN826L	70.00
909	DEN-828	Safety valve 30 bar for starting air vessels	9922699	1.00
910	DEN-829	Filling valve for starting air vessels	9922700	1.00
911	DEN-830	Discharge valve for starting air vessels	9922701	1.00
912	DEN-831	Pressure relief valve R9511DB	182180-0-E	1.00
913	DEN-832	Driving gear shaft R95/1250	168132-9	1.00
914	DEN-833	Gear shaft R95/1250	167886-1	1.00
915	DEN-834	Chese head screw M20x60-8.8 (Allen bolt)	250649-1	8.00
916	DEN-835	Parallel pin 7-10M6x40-ST	253129-1	4.00
917	DEN-836	O ring 3771A-183 74x3,53 FPM75 attached LO pump	258442-3	35.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
918	DEN-837	Bearing bush D60xD65x50	173083-7	24.00
919	DEN-838	Piston R95 D110x235	176112-1	4.00
920	DEN-839	Grub screw 8-1053-3x12x2	251620-1	2.00
921	DEN-840	Compression spring 7x80x200x7.5	256239-5	8.00
922	DEN-841	Chese head screw (Allen Bolt) M8x25 8.8	250519-6	62.00
923	DEN-842	Screwed Plug 910-G1/4A	251697-9	4.00
924	DEN-843	Sealing ring 7603-A 14x18,Part No. 1811-801	258493-6	9.00
925	DEN-844	O ring 3771A 27x2, 62-PPM75	258409-2	18.00
926	DEN-845	Maintenance set for Hyd. jack	9612DT005	2.00
927	DEN-846	Rod head LH female	PHS 18LA	8.00
928	DEN-847	Fuel Common Control Shaft.	2240 054	5.00
929	DEN-850	Rubber Pipe Hydraulic 2 ft for OMD	DEN850L	6.00
930	DEN-853	M.S. elbow S18 with nuts for OMD	DEN853L	8.00
931	DEN-854	Syphone block rubber for OMD 115/87	DEN854L	21.00
932	DEN-855	Mechanical seal for UV pump	DEN855L	5.00
933	DEN-857	Allen bolt M10 X 35 12.9 temp=600C	DE857L	39.00
934	DEN-859	O ring for OMD air regulator	DEN859L	90.00
935	DEN-861	O ring, for water outlet valve	DEN861L	52.00
936	DEN-862	Connecting nipple male	9653DT107	2.00
937	DEN-863	Main set pump 9612DT212to99	9654DT107	2.00
938	DEN-864	Cycling valve	1002260	1.00
939	DEN-865	Connecting nipple female (Available in PHS-001-0046)	9653DT106	1.00
940	DEN-866	Low range pressure Tranm.Type: PR-41/20mbar/8885, OUTPUT: 4-20mA 2 Wire, RANGE:0-20mbar, SN15534	PR-41/20mbar/8885	1.00
941	DEN-867	Hexagon bolt M8x50 half threaded hot box cover	DEN867L	170.00
942	DEN-868	S.S. stopper screw 23.7x12.1x6	DEN868L	28.00
943	DEN-869	Distance piece 12mmx2" needle valve	DEN869L	97.00
944	DEN-870	G.I. hex bolt 12x35mm 8.8 main starting air v/v	DEN870L	70.00
945	DEN-871	Allen bolt M10x25mm chrome plated main start air v/v	DEN871L	77.00
946	DEN-872	Lip seal	1360 011	14.00
947	DEN-873	Copper washer 1.5x6x11mm	DEN873L	174.00
948	DEN-877	M.S. U channel 4x895x54x40mm	DEN877L	4.00
949	DEN-878	S.S. bolt with nuts M12X100mm full thread	DEN878L	100.00
950	DEN-879	Thermowell stainless steel for after & before	DEN879L	24.00
951	DEN-880	Exhaust expansion joint UT.2FA for After T/C bellow, UT-2FA 800.3.001,SWD Drawing # 00.274.227.C0051	274.227.C0051	4.00
952	DEN-881	Screw on socket S030-1/4-1/4	5150131	5.00
953	DEN-882	Inertia disk	3265 051	3.00
954	DEN-883	Heat exchanger	1682 857	4.00
955	DEN-884	Coil / stator	5408 015	2.00
956	DEN-885	Return spring	3014 571	12.00
957	DEN-886	Sealed bearing	1411 323	13.00
958	DEN-887	Sealed bearing	1411 321	6.00
959	DEN-888	Rotor assembly	3594 103	1.00
960	DEN-889	Pin connector 6 pin male & female	1630 379	6.00
961	DEN-891	Sensor feed back	1680 519	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
962	DEN-893	O ring 20.3 X 2.62 (NBR) for lube oil line	3522-019	686.00
963	DEN-894	Pipe complete, For Cylinder head Cooling Water Pipe	3551-020	6.00
964	DEN-896	Stud cyl.head cover 165x16x40x22	DEN896L	20.00
965	DEN-898	Allen bolt M12x120mm 39mm 8.8	DEN898L	48.00
966	DEN-899	Master slave card 9905-460F	3211064	6.00
967	DEN-902	Chassis mount socket 2+3way proact	MS3102R20-8P	26.00
968	DEN-904	Safety valve engine main air starting line	3570-032	3.00
969	DEN-905	Extinguisher, Old Part No. 636306105DT102, New Part No. 3570001	3570-001	13.00
970	DEN-906	Bend, For Cylinder head Cooling Water Pipe"	3551-019	6.00
971	DEN-907	Non return valve DN150	3550024	2.00
972	DEN-908	Rubber sheet 60x136x2mm for OMD	DEN908L	24.00
973	DEN-909	Steel lever for fuel controll	DEN909L	5.00
974	DEN-910	O ring for LO attached Pump 15bar 100C	15B-100C	18.00
975	DEN-911	Allen bolt M12 x 70mm	DEN911L	142.00
976	DEN-912	Actuator lever P/N 5397-211	9929597	3.00
977	DEN-914	Teeth Gear for Turning Gear Motor 2"x1.5", Outer Dia: 2 inch, Height : 1.5 Inch. With Lock pin	DEN914L	1.00
978	DEN-916	Plain washer 12.5mmx25x3mm (leaky chennai)	DEN916L	29.00
979	DEN-917	Hexagonal bolt M12x130x40mm	DEN917L	63.00
980	DEN-924	Distance bush (for intermediate gear)	1310020	24.00
981	DEN-928	Piston for Hydraulic Jack Single Pam Nut	9612DT907	8.00
982	DEN-929	Hexagon bolt M20x340	1430 014	648.00
983	DEN-930	Washer 37x21x4 ST 295-350HV	1430 015	649.00
984	DEN-931	Liquid sealing medium Loctite 638 Packing 50ml	DEN-931	3.00
985	DEN-935	Hexagonal bolt M10x25mm 8.8	DEN935L	31.00
986	DEN-936	Guide Ring (Teflon Bush) for Fuel Injector Connection	3510-005	17.00
987	DEN-937	Flange	1230004	4.00
988	DEN-938	Flange	1231001	1.00
989	DEN-939	Hexagonal bolt M12x110 (thread length 30mm (8.8) for head starting air & dummy flange	1230008	26.00
990	DEN-940	Fuel rack cover AB & B1 Upper 915 x 190mm, Part No. 1620-003	1620-003	1.00
991	DEN-941	Fuel rack cover B1&A9 centre 36x12"	DEN941	9.00
992	DEN-942	Fuel rack cover B1&A9 bottom 36x14"	DEN942	8.00
993	DEN-943	Fuel rack cover A1&B9 top 36x7.5"	DEN943	6.00
994	DEN-944	Fuel rack cover A1&B9 centre 30.25x12"	DEN944	19.00
995	DEN-946	Fuel rack cover top 27½x7-5/8"	DEN946	25.00
996	DEN-947	Fuel rack cover centre 27½x14½"	DEN947	25.00
997	DEN-948	Fuel rack cover bottom 27½x12-3/16"	DEN948	20.00
998	DEN-949	Set of seals for cly.liner,, 1302DT107	1050-700	78.00
999	DEN-950	Gear segment 2301DT118	2240-012	3.00
1000	DEN-951	Gear segment 2301DT117	2130-006	5.00
1001	DEN-952	Program transmitter PT100 3 wire	TRBG12S2S3SN	1.00
1002	DEN-953	Program transmitter PT100 3 wire 4-20	TRBG12BS2	1.00
1003	DEN-954	M.S. fixing holder for temp. switch	1.25" X 1.25"	15.00
1004	DEN-955	Polymide pipe clamp 8mm	108A-PA	16.00
1005	DEN-956	Polymide pipe clamp 10mm , Order code 110 A - PA Make: Stauff	110A-PA	87.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1006	DEN-957	Polymide pipe clamp 12mm	112A-PA	87.00
1007	DEN-958	Polymide pipe clamp 12mm 3S	3012-PA	59.00
1008	DEN-959	Polymide pipe clamp 15mm 3S	3015-PA	1.00
1009	DEN-960	Polymide pipe clamp 22mm 3S	4022-PA	43.00
1010	DEN-961	Metal pipe clamp 20mm	3567 A-027	64.00
1011	DEN-962	Metal pipe clamp 25mm	3567 A-034	160.00
1012	DEN-963	Metal pipe clamp 32mm	3567 A-043	45.00
1013	DEN-964	Metal pipe clamp 40mm	3567 A-049	32.00
1014	DEN-965	Metal pipe clamp 50mm	3567 A-061	165.00
1015	DEN-966	Metal pipe clamp 65mm	3567 A-077	27.00
1016	DEN-967	Metal pipe clamp 80mm	3567 A-089	24.00
1017	DEN-968	Metal pipe clamp 100mm	3567 A-115	10.00
1018	DEN-969	Metal pipe clamp 150mm	3567 A-169	38.00
1019	DEN-970	Adopter male-female needle valve	DEN970L	41.00
1020	DEN-971	O ring 45mm x 3.5mm viton	3532-003A	24.00
1021	DEN-972	O ring 26mm x 3.5mm viton	3532-003B	24.00
1022	DEN-973	O ring 34mm x 3.5mm viton	3532-003C	24.00
1023	DEN-974	O ring 16mm x 2mm viton	3532-003E	35.00
1024	DEN-976	Temp Gauge 0-120 Deg C Glycerine fill Range:0-120 Deg C. Model: TB 8 1 9 E S9 100 0/120 F02 R10,	TB8 1 9ES9	16.00
1025	DEN-977	M.S bracket plate 3mm,90mm	DEN977L	5.00
1026	DEN-978	Chassis mount plug for proact driver	CA3106F20-8SF80,20-8	24.00
1027	DEN-979	Polymide pipe double tube clamps 8mm	LN 108 PA	31.00
1028	DEN-980	Polymide pipe double tube clamps 10mm	LN 210 PA	36.00
1029	DEN-981	Polymide pipe double tube clamps 12 mm	LN 212 PA	44.00
1030	DEN-982	Polymide pipe double tube clamps 16mm	LN 316 PA	24.00
1031	DEN-986	Joint Part	2240014	3.00
1032	DEN-987	Joint Part	2240015	6.00
1033	DEN-988	Friction ring pair	2240016	6.00
1034	DEN-989	Self locking nut m12	2240035	46.00
1035	DEN-990	Pin rnd 8x40, spring pin	2240044	4.00
1036	DEN-991	Tightening bush round 8x50	2240045	48.00
1037	DEN-992	Fuel Control Shaft small for both Bank.	2240051	6.00
1038	DEN-993	Fuel Control Shaft for Bank B.	2240052	4.00
1039	DEN-994	Fuel Control Shaft for Bank A.	2240053	3.00
1040	DEN-995	Lever for control shaft	2240003	6.00
1041	DEN-996	Lever	2240004	6.00
1042	DEN-997	Nut M20 x 1.5MM, Part # 1431-005	1431-005	82.00
1043	DEN-998	Hexagonal thin nut M30x2MM, Part # 1430-010	1430-010	90.00
1044	FOC-TCH-165	Exhaust Gas Turbocharger complete	FOC-TCH-165	1.00
1045	FOC-TCH-167	Sealing cover compressor side 517.197	517.197	14.00
1046	FOC-TCH-168	Thrust Ring 520.028	520.028	13.00
1047	FOC-TCH-169	Thrust Bearing 517.153	517.153	10.00
1048	FOC-TCH-170	Counter trusht bearing 517.154	517.154	2.00
1049	FOC-TCH-171	Pressure Transmitter Cat. No. 590.651	590.651	2.00
1050	FOC-TCH-172	Current out put relay	FOC-TCH-172	2.00
1051	FOC-TCH-173	Bearing bush 517.161	517.161	47.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1052	FOC-TCH-174	Bearing disc 517.075	517.075	20.00
1053	FOC-TCH-175	Ring nut turbine side 0520.021	520.021	7.00
1054	FOC-TCH-177	Librinth Ring Compressor Side 520.035 CS	520.035	9.00
1055	FOC-TCH-178	Librinth Ring Turbine Side 520.018 TS	520.018	2.00
1056	FOC-TCH-179	Cleaning device for compressor 579.03	579.03	18.00
1057	FOC-TCH-180	Speed pickup sensor 562.040	562.040	2.00
1058	FOC-TCH-181	Cover 517.159	517.159	2.00
1059	FOC-TCH-182	Clamping nut 520.068	520.068	4.00
1060	FOC-TCH-183	Terminal box 562.083	562.083	1.00
1061	FOC-TCH-184	Cleaning device for turbine 578.300	578.300	1.00
1062	FOC-TCH-185	Set of lameller ring 517.166	517.166	5.00
1063	FOC-TCH-187	Clamping Claw 513.010	513.010	113.00
1064	FOC-TCH-188	Clamping Claw 0513.021	513.021	55.00
1065	FOC-TCH-189	Gasket turbine side 517.070	517.070	8.00
1066	FOC-TCH-190	Round ring seal 540.015	540.015	10.00
1067	FOC-TCH-192	Round ring seal 517.063	517.063	34.00
1068	FOC-TCH-193	Hexagonal bolt 517.157	517.157	60.00
1069	FOC-TCH-194	Hexagonal bolt 517.093	517.093	21.00
1070	FOC-TCH-195	hexagonal bolt 517.013	517.013	12.00
1071	FOC-TCH-196	Lock Nut 517.094	517.094	10.00
1072	FOC-TCH-197	Cylinder screw 562.019	562.019	6.00
1073	FOC-TCH-199	Screw connection 546.048	546.048	12.00
1074	FOC-TCH-200	Brass nipple	FOC-TCH-200	16.00
1075	FOC-TCH-201	Sleeve	FOC-TCH-201	5.00
1076	FOC-TCH-202	Ball Cock Cat, No.578.2031	578.2031	7.00
1077	FOC-TCH-203	Cylinder screw	FOC-TCH-203	6.00
1078	FOC-TCH-205	Nozzle Ring 513.001	513.001	14.00
1079	FOC-TCH-206	Insulation (Compensator)	FOC-TCH-206	18.00
1080	FOC-TCH-207	Diffuser 509.001	509.001	3.00
1081	FOC-TCH-208	Turbine Blade Cat. No.: 520.008	520.008	135.00
1082	FOC-TCH-209	Retaining Ring Cat No.520.006	520.006	3.00
1083	FOC-TCH-213	Lock Washer Pair Cat No. 506.107	506.107	569.00
1084	FOC-TCH-214	Hexagon Bolt Cat No. 513.013	513.013	252.00
1085	FOC-TCH-215	Lock Washer Pair Cat No. 513.014	513.014	274.00
1086	FOC-TCH-216	Hexagon Bolt Cat No. 506.106	506.106	612.00
1087	FOC-TCH-217	Stud Screw Cat.: 517.100	517.100	17.00
1088	FOC-TCH-218	Pressure Reducing Valve Cat. No.: 590.411	590.411	1.00
1089	FOC-TCH-219	Hose Line (Pipe)	FOC-TCH-219	3.00
1090	FOC-TCH-220	Guide Plate	FOC-TCH-220	5.00
1091	FOC-TCH-221	End Cover Tubine Side 517.064	517.064	2.00
1092	FOC-TCH-231	Screw connecton (Elbow) PH-25	FOC-TCH-231	3.00
1093	FOC-TCH-234	Twist Drill	FOC-TCH-234	2.00
1094	FOC-TCH-235	Round Seal Ring	FOC-TCH-235	10.00
1095	FOC-TCH-238	Undercut Bolt 520.066	520.066	5.00
1096	FOC-TCH-239	Gas Admission Casing complete Cat. No.: 501.000	501.000	4.00
1097	FOC-TCH-241	Hexagon nut Cat No.:517.102	:517.102	2.00
1098	FOC-TCH-242	Lock Washer Pair Cat.517.095	.517.095	12.00
1099	FOC-TCH-243	Set of Gaskets	FOC-TCH-243	8.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1100	FOC-TCH-244	Labyrinth Disc, Compressor Side Cat. No. 517.089	517.089	2.00
1101	FOC-TCH-245	S.S L-pipe Long 1	FOC-TCH-245	20.00
1102	FOC-TCH-246	S.S L-pipe Small 1	FOC-TCH-246	87.00
1103	FOC-TCH-247	S.S Pipe 1	FOC-TCH-247	12.00
1104	FOC-TCH-248	Lube Oil pipe T/C Inlet Bank - A	FOC-TCH-248	2.00
1105	FOC-TCH-249	Lube Oil Outlet pipe T/C	FOC-TCH-249	3.00
1106	FOC-TCH-250	M.S Plate for Sensor	FOC-TCH-250	20.00
1107	FOC-TCH-251	Rubber Hose	FOC-TCH-251	3.00
1108	FOC-TCH-252	Dry washing Pipe Insulation	FOC-TCH-252	1.00
1109	FOC-TCH-253	Square Pipe 1-1/2", 10 ft	FOC-TCH-253	3.00
1110	FOC-TCH-254	M.S Pipe 2 (10ft)	FOC-TCH-254	24.00
1111	FOC-TCH-255	Oil Discharge Pipe	FOC-TCH-255	4.00
1112	FOC-TCH-256	S.S Bend 2"	FOC-TCH-256	1.00
1113	FOC-TCH-257	Lube Oil Inlet Line pipe (Straight) with flange	FOC-TCH-257	1.00
1114	FOC-TCH-258	Compensator Cat. No. 590.422	590.422	2.00
1115	FOC-TCH-261	Hose Clamp Cat. No.: 590.759	590.759	14.00
1116	FOC-TCH-262	Hose, Cat. No.590.757	590.757	2.00
1117	FOC-TCH-263	Hose, Cat. No.590.758	590.758	1.00
1118	FOC-TCH-265	Screw Connection S16 (Straight Connector)	FOC-TCH-265	144.00
1119	FOC-TCH-266	Ring Covering Complete Cat. No. 591.3000	591.3000	8.00
1120	FOC-TCH-267	Sound insulation. Complete Cat. No.: 591.6000	591.6000	12.00
1121	FOC-TCH-272	S.S Pipe 16mm	FOC-TCH-272	4.00
1122	FOC-TCH-273	Screw Connection S30 (Straight Connector)	FOC-TCH-273	96.00
1123	FOC-TCH-274	S.S Nut S30	FOC-TCH-274	23.00
1124	FOC-TCH-275	Screw Connection S25 single nut	FOC-TCH-275	18.00
1125	FOC-TCH-276	M.S Pipe Clamp 2"	FOC-TCH-276	21.00
1126	FOC-TCH-277	M.S Pipe Clamp 2-1/4"	FOC-TCH-277	4.00
1127	FOC-TCH-278	M.S Flange 1-1/2	FOC-TCH-278	10.00
1128	FOC-TCH-279	Barrel Nipple S30 without nut	FOC-TCH-279	36.00
1129	FOC-TCH-280	MS Clamp Support plate	FOC-TCH-280	35.00
1130	FOC-TCH-281	M.S Hexagon Bolt for consul foundation M30x120	FOC-TCH-281	8.00
1131	FOC-TCH-282	M.S Sleeve for consul foundation	FOC-TCH-282	9.00
1132	FOC-TCH-283	M.S Hexagon Bolt for T/C foundation M20x110	FOC-TCH-283	26.00
1133	FOC-TCH-284	M.S Sleeve 55mm for T/C Foundation	FOC-TCH-284	16.00
1134	FOC-TCH-285	M.S Sleeve 65mm for T/C Foundation	FOC-TCH-285	17.00
1135	FOC-TCH-286	S.S Elbow 2" welding type	FOC-TCH-286	20.00
1136	FOC-TCH-287	M.S Flange two pcs for Air Intake duck	FOC-TCH-287	1.00
1137	FOC-TCH-288	S.S Pipe S25 for water washing pipe	FOC-TCH-288	13.00
1138	FOC-TCH-289	S.S Pipe S16 for water washing pipe	FOC-TCH-289	20.00
1139	FOC-TCH-290	M.S Pipe S30 for Gravity Tank line	FOC-TCH-290	19.00
1140	FOC-TCH-291	Lube inlet line (T-Type)	FOC-TCH-291	2.00
1141	FOC-TCH-292	M.S Plug 21mm	FOC-TCH-292	7.00
1142	FOC-TCH-293	M.S Plug 20 mm	FOC-TCH-293	3.00
1143	FOC-TCH-294	M.S Plug 18 mm	FOC-TCH-294	2.00
1144	FOC-TCH-295	M.S U Channel for Gravity Tank foundation base	FOC-TCH-295	4.00
1145	FOC-TCH-296	M.S Hexagonal Bolt M16x50	FOC-TCH-296	5.00
1146	FOC-TCH-297	Bracket for Lube Oil inlet line	FOC-TCH-297	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1147	FOC-TCH-305	Undercut bolt 506.099	506.099	48.00
1148	FOC-TCH-306	Hexagon Nut 506.104	506.104	20.00
1149	FOC-TCH-307	Hexagon Bolt 546.073	546.073	64.00
1150	FOC-TCH-308	Lock washer Pair 546.074	546.074	64.00
1151	FOC-TCH-313	Pressure Transmitter Cat. No.590.652	590.652	2.00
1152	FOC-TCH-314	Shim Cat. No.: 562.016	562.016	2.00
1153	FOC-TCH-315	Lock Washer Cat. No.: 562.020	562.020	2.00
1154	FOC-TCH-318	Volute Casing 546.001	546.001	4.00
1155	FOC-TCH-319	Screw Plug 546.023	546.023	4.00
1156	FOC-TCH-320	Sealing Ring 546.024	546.024	4.00
1157	FOC-TCH-321	Screw Plug 546.025	546.025	12.00
1158	FOC-TCH-322	Sealing Ring 546.026	546.026	12.00
1159	FOC-TCH-323	Hexagon Bolt 546.045	546.045	4.00
1160	FOC-TCH-324	Lock Washer Pair 546.046	546.046	4.00
1161	FOC-TCH-325	Turbine outflow housing 506.001	506.001	4.00
1162	FOC-TCH-326	hexagon Bolt 506.102	506.102	96.00
1163	FOC-TCH-327	Hexagon nut 506.105	506.105	96.00
1164	FOC-TCH-328	Hexagon bolt 506.108	506.108	12.00
1165	FOC-TCH-329	Hexagon nut 506.109	506.109	44.00
1166	FOC-TCH-330	Insert Piece without jet assist/ IRC 540.001	540.001	4.00
1167	FOC-TCH-331	Spacer Ring 540.030	540.030	10.00
1168	FOC-TCH-332	Diffuser 542.001	542.001	4.00
1169	FOC-TCH-333	Hexagon bolt 545.425	545.425	96.00
1170	FOC-TCH-334	Hexagon nut 545.427	545.427	96.00
1171	FOC-TCH-335	Lock Washer Pair 545.428	545.428	192.00
1172	FOC-TCH-336	Fabric Compensator Cat. No.590.605	590.605	1.00
1173	SPT-127	Stud Remover M72*4 (For Main Bearing)	9612dt977	2.00
1174	SPT-128	Puller bar + Bridge Side Studs 9622DT956A (for cylinder Head Jack 4 legs)	9622DT913	2.00
1175	SPT-130	HYdraulic Jack M48*3 Side Stud, 9612DT903A	9612DT903A	1.00
1176	SPT-130A	Repair Kit for Hydraulic Jack M48*3 Side Studs	9612DT002	4.00
1177	TCH-002	Hexagon headed screw	51032	4.00
1178	TCH-004	Dividing rib	51031	3.00
1179	TCH-005	Screw	51048	23.00
1180	TCH-007	Gaskets	52102	35.00
1181	TCH-011	Ring nut	32151	3.00
1182	TCH-012	Locking plate	32153	57.00
1183	TCH-014	Sealing bush TE	51014	13.00
1184	TCH-016	Locking plate	51016	93.00
1185	TCH-018	S.S. flexible pipe T/C ID12mm P10bar, Hexagon size 27mm, Pipe size L= 46 Cms,OD=22 mm,ID=12 mm,	6404DT282	4.00
1186	TCH-019	Turbocharger TA04 bearing T/S 34000	34100	2.00
1187	TCH-021	Partition wall cover plate	23001	6.00
1188	TCH-022	Oil pump CE	36000	2.00
1189	TCH-023	Cap nut	39001	8.00
1190	TCH-024	Oil pump TE	39000	1.00
1191	TCH-027	Gland strip caulking wire	21002	5.00
1192	TCH-028	Hex headed screw 23002	23002	22.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1193	TCH-029	Locking plate (51012)	23003	20.00
1194	TCH-030	Hex headed screw 23004	23004	32.00
1195	TCH-031	Locking plate (62107)	23005	6.00
1196	TCH-033	Turbine blades	29000	55.00
1197	TCH-034	Damping wire set	21007/8	4.00
1198	TCH-037	Guide bush	23008	2.00
1199	TCH-039	Hexagonal bolt M24x70	141424	47.00
1200	TCH-040	Hexagonal bolt M30x150	142478	43.00
1201	TCH-041	Holding spring	32162	23.00
1202	TCH-042	Holding spring	34162	25.00
1203	TCH-043	Centrifuge CE	32150	2.00
1204	TCH-044	Centrifuge TE	34150	4.00
1205	TCH-045	Gland strips	21003	16.00
1206	TCH-047	Damping wire VTR454P11	21008	2.00
1207	TCH-052	Locking plate VTR 454	32114	12.00
1208	TCH-053	Ring nut VTR 454	34151	10.00
1209	TCH-055	Nozzle ring VTR454P11	56001	3.00
1210	TCH-056	Hex-headed screw VTR 454P11 74004	76018	19.00
1211	TCH-061	Gasket for T/C gas outlet 500°C	TCH061L	17.00
1212	TCH-062	Gasket copper for T/C gas inlet 600°C	TCH062L	13.00
1213	TCH-063	Caulking wire	21004	8.00
1214	TCH-071	Tube nipple for T/C blower washing	TCH71L	25.00
1215	TCH-072	Nipple for T/C blower washing	TCH72L	19.00
1216	TCH-075	Copper washer T/C oil filling plugs	TCH75L	11.00
1217	TCH-076	Hex headed screw M16 X 40	74002	60.00
1218	TCH-077	Locking washer	74003	222.00
1219	TCH-078	Bolts with reduced shank	74041	18.00
1220	TCH-079	Locking washer (61007)	74007	45.00
1221	TCH-080	Count shank allen bolt M16x60mm	TCH80L	97.00
1222	TCH-082	Pump holder complete TE	34160	3.00
1223	TCH-083	Pump holder complete CE	32160	2.00
1224	TCH-084	Hexgonal headed screw	32152	11.00
1225	TCH-085	Hexgonal headed screw	76021	29.00
1226	TCH-086	Locking washer	76022	29.00
1227	TCH-088	Gasket 1mm 305x355x230x275	KRL-232	20.00
1228	TCH-090	Plain washer 14x24 2mm	TCH90L	98.00
1229	TCH-093	Plug cast Iron M36x2MM, L=16mm	TCH93L	5.00
1230	TCH-094	Copper washer 46MMx36MM, Thick1MM	TCH94L	65.00
1231	TCH-095	Gasket Thick 1MM	TCH95L	9.00
1232	TCH-097	Copper washer ID=17mm,OD=23mm	TCH97L	76.00
1233	TCH-098	M.S stud 16mm x 2mm	TCH98L	6.00
1234	TCH-099	M.S nut M16	TCH99L	16.00
1235	TCH-100	Gasket 1 mm thickness	KLR-232	9.00
1236	TCH-102	Rope	90370	3.00
1237	TCH-104	Verbus Disc VTR454 TPSS7/61 TPL73/77/80/85 (51003)	51016	24.00
1238	TCH-105	Nozzle for Turbine Washing, WNSD part Number:- 9513DT163-HR	TCH-105-L	44.00
1239	TCH-108	MS Lock 24 mm	TCH-108-L	50.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1240	TCH-109	SS Tee 1" (SS 316)	TCH-109-L	10.00
1241	TCH-112	Oil Flow Monitoring System ED 0189/A (Consist of Transmitter, Cap Nut, Internal Cable, Locking Wire,	TCH-112	2.00
1242	TCH-113	Drain valve seat for T/C	TCH-113-L	4.00
1243	TCH-114	Hexagonal bolt M20x110 (2 pitch)Half thread HT8.8	TCH-114	43.00
1244	TCH-115	Hexagonal bolt M20x105 (2 pitch)Half thread HT8.8	TCH-115	27.00
1245	TCH-116	WallNuts Pellets Grennules Size :1.5 --2.0 mm	TCH-116	2,400.00
1246	TCH-117	Pressure Transmitter, Range: 0 - 4 bar, Output: 4 - 20 mA, Mech: Block Adapter, Order #: 060G5684	060G5684	4.00
1247	TCH-118	Pressure Switch, Regulating Range: -0.2 to 4 bar, Differential MIN Range: 0.3 bar, : Danfoss	061B000466	2.00
1248	TCH-121	Speed Pick up 562.040	562.040	3.00
1249	TCH-122	Support 562.016	562.016	1.00
1250	TCH-124	Lock washer 562.020	562.020	6.00
1251	TCH-125	Terminal Box, Order # 562.083, Make: MAN DIESEL	562.083	1.00
1252	TCH-129	Hexagon bolts Part # 506.106	506.106	48.00
1253	TCH-130	Lock washer pair Part # 506.107	506.107	54.00
1254	TCH-131	Hexagon bolts Part # 513.013	513.013	12.00
1255	TCH-132	Sealing cover compressor side Part # 517.197	517.197	4.00
1256	TCH-133	Sealing cover turbine side Part # 517.072	517.072	13.00
1257	TCH-134	Seal, turbine side Part # 517.070	517.070	4.00
1258	TCH-135	O-ring seal Part # 517.085	517.085	11.00
1259	TCH-137	Labyrinth ring, turbine side Part # 521.018	520.018	4.00
1260	TCH-138	Labyrinth ring, compressor side Part # 521.035	520.035	2.00
1261	TCH-139	O-ring seal Part # 540.015	540.015	5.00
1262	TCH-140	Nozzle Ring 513.001	513.001	1.00
1263	TCH-141	Clamping Claw 513.010	513.010	4.00
1264	TCH-143	Clamping Claw 513.021	513.021	2.00
1265	TCH-145	Retaining Ring 520.006	520.006	1.00
1266	TCH-146	Lock Washer pair 513.014	513.014	12.00
1267	TCH-149	Suction Pipe BS for Man Turbo charger	TCH-149	1.00
1268	TCH-155	MAN turbine water washing valve, Type:BK3 DN20, Connection: 30S/25S/16S, PN10 10/11M, Make: Pister	Type:BK3 DN20	2.00
1269	TCH-156	Handle for Dry / water washing valve	TCH-156	46.00
1270	TCH-157	Seat for Valve 24*41*8 mm Material: Teflon	TCH-157	6.00
1271	TCH-158	Seat for Valve 19*36*8 mm Material: Teflon	TCH-158	31.00
1272	TCH-159	O-Ring 40* 2.5 mm Material: Viton	TCH-159	29.00
1273	TCH-160	O-Ring 19* 2.5 mm Material: Viton	TCH-160	96.00
1274	TCH-161	Locking Ring 38mm * 15 *15 mm As per sample	TCH-161	21.00
1275	TCH-162	Spindle for Valve	TCH-162	4.00
1276	TCH-163	Nipple for 3 way Valves L:38mm Dia: 34mm	TCH-163	12.00
1277	TCH-164	Nipple for Valves L:41mm Dia: 42mm\35mm	TCH-164	8.00
1278	TCH-168	Thrust Ring 520.028	TCH-168	1.00
1279	TCH-174	Bearing disc 517.075	TCH-174	1.00
1280	TCH-177	Librinth ring compressor side 520.035	TCH-177	1.00
1281	TCH-193	Hexagonal Bolt 517.157	517.157	48.00

TAPAL ENERGY (PVT.) LIMITED.
CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1282	TCH-196	Lock Nut 517.094	517.094	88.00
1283	TCH-219	Hose Line (Pipe), Size: Length 4 Feet, Union Nut outside 50mm, Union Nut inside 40mm,	TCH-219	6.00
1284	TCH-262	S.S Flexible Pipe	TCH-262	6.00
1285	TCH-263	Hose, Cat. No.590.758 (Water Washing Line)	TCH-263	6.00
1286	TCH-310	Sealing Ring 517.026	517.026	36.00
1287	TCH-311	Sealing Disk 546.050	546.050	12.00
1288	VAL-153	Dog leg pipe teflon hose DN50 L=700mm W0036G012000	9902595	22.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
Electrical Spares				
1	ABB-003	Volt meter (RPM), 0-700, 0-30000 10V	ABB003	2.00
2	ABB-005	Pressure meter CELSA PQ 96s 0-10 bar	ABB005	3.00
3	ABB-008	Pressure Meter Type PQ96, Range 4-20mA, Scale 0-40 bar, Make : ZIEGLER	ABB008	3.00
4	ABB-009	Pressure meter 0-6 bar, Analogue, Input:4-20ma, Tropic Proof, Scale: 0-6 Bar, PQ 96 Make: Ziegler	0-6 Bar	1.00
5	ABB-010	Temperature meter 0-150 C	ABB010	1.00
6	ABB-011	Pressure Meter 0-4 Bars-20mA, Type PQ96, Range 4-20mA, Scale 0-4 bar, Make : Ziegler	ABB011	2.00
7	ABB-014	Push button squared D3C1R+DA20	ABB014	4.00
8	ABB-015	Control switch K1B006T+KBE1B	ABB015	8.00
9	ABB-017	Illuminated push button 1NO + INC	020PQAILRK	18.00
10	ABB-018	Light push button squ D1Y3W-DS2N11	ABB018	32.00
11	ABB-019	Signal horns HP 115 VDC	212 20316	2.00
12	ABB-021	Advant fieldbus 100 ABB 3BSE006188R2	ABB021	1.00
13	ABB-022	Cpu module ABB PM632	ABB022	1.00
14	ABB-023	Lithium Battery ABB SB 610	ABB023	4.00
15	ABB-024	Fan unit ABB RC 620	ABB024	2.00
16	ABB-025	AF 100 Interface Kit CI626K01 Ordering code 3BSE004006R1	CI626K01	1.00
17	ABB-026	Power supply ABB SA610K01	ABB026	2.00
18	ABB-027	I/O extension ABB RF620K02	ABB027	1.00
19	ABB-028	Analog input module ABB AI620, 16CH 12BIT 0-20mA, 4-20mA, +/-20mA, +/-10V, Make: ABB	AI620	1.00
20	ABB-029	Analog input module ABB AI630, 3BHT300011R1PR:E, Make: ABB	3BHT300011R1PR:E	1.00
21	ABB-030	Digital Input Module ABB DI 650, 32CH, 24 Vdc, Isolated 4 Groups, SOE 8.3mA	DI 650	3.00
22	ABB-031	Digital output module ABB DO610	ABB031	2.00
23	ABB-034	Synchro check relay module SPCU3D45	SPCU 3D45-AA B	1.00
24	ABB-039	Busextension ABB CI615K01, Including TC610, Make:ABB	CI615K01	7.00
25	ABB-042	Analog Input module ABB AI635, 14+2CH, 3BHT300032R1, 15BIT THERMOCOUPLES 2 CH CHANNELS, WITH PT 100.	3BHT300032R1	4.00
26	ABB-045	Generator ABB SPAG 332 C-CA	ABB045	1.00
27	ABB-046	Differential ABB SPAD 3GI J6-BA	ABB046	1.00
28	ABB-047	Under/ Over voltage ABB SPAU 130 C-CA	SPAU 130 C-CA	1.00
29	ABB-048	Phase sequence ABB SPAM 150C-CA, SPAM 150 C-CA, RS 641 014-CA, AUX. VOLT: 18-80 VDC, SER.NO. 13320	SPAM 150 C-CA	2.00
30	ABB-049	Under react SPAX IGI-J3-BA	ABB049	1.00
31	ABB-050	Mounting case ABB SPAX ZK-1	ABB050	1.00
32	ABB-051	A-meter C/R 1000/1 A, Input: 0-1 Ampere, CT Ratio:1000/1, Scale: 0 -1000 A, Size: 96 X 96,Crompton	ABB051	1.00
33	ABB-053	Active power meter CELSA DQ 96s/2	ABB053	1.00
34	ABB-054	Reactive power meter CELSA DQ 96s/2b	ABB054	1.00
35	ABB-055	Power factor meter CELSA DPQ 96s/2	ABB055	2.00
36	ABB-056	V-meter 132V, 130 KW (Control Room)	ABB056	2.00
37	ABB-057	Frequency meter FRER ZQ 96, INPUT: 3 X 11000/110v, Scale: 45...55Hz, Tropic Proof, Make: Ziegler.	ABB057	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
38	ABB-059	Power transducer 0 to 14 MW, Type: PQ400-0944, Measuring range: P:0...14 MW, Q:-3...0...12 MVar,	PQ400-0944	1.00
39	ABB-061	Position indicator CEWE NC301	ABB061	1.00
40	ABB-063	Selector switch squared K1d024M+KBE1B	ABB063	1.00
41	ABB-066	Contact for emergency push button	ZB5AZ103	1.00
42	ABB-069	Overcurrent prot, relay ABB SPAJ 141 C-CA	ABB069	2.00
43	ABB-070	A-meter MVR 3150/1A	ABB070	4.00
44	ABB-072	Position indicator CEWE NC 304	ABB072	6.00
45	ABB-073	Position indicator CEWE NC 301, Type CMHP2E, New Part #9AFP310061-CACY,110, VDC, AB Sweden	SK613050-3	7.00
46	ABB-075	Under/over voltg. prot relay ABB SPAJ 141C-CA	ABB075	1.00
47	ABB-076	Under/over frequency ABB SPAF 1G50 J3-BA	SPAF IG50 J3-BA	1.00
48	ABB-078	Autosynchronizer 3N , 110V, 50Hz	ABB078	2.00
49	ABB-079	A-meter 200 /1A (Radiator LVR)	ABB079	5.00
50	ABB-081	V-meter 11000/110V (Control Room) Generator	ABB081	3.00
51	ABB-082	Synchoronoscope DEIF CSQ 96 b	ABB082	1.00
52	ABB-083	Double V-meter 0-13 KV 11000/110 V	ABB083	2.00
53	ABB-084	Double frequency meter DEIF 2FTQ 96p	ABB084	1.00
54	ABB-085	Power transducer 0 to 2.5 KW	PQ400-0944	3.00
55	ABB-086	Voltage Transducer TILLQUIST U-800L-154, Input(1) (2), 0. 130 Volt, 45-65Hz, Output (-5) (+6)	U-800L	3.00
56	ABB-087	Frequency trand. TILLQUIST F-100L-154	ABB087	2.00
57	ABB-089	Selector Switch K1F 003UCH Make: Schneider	K1F 003UCH	3.00
58	ABB-090	Selector Switch K1C 003QCH, Make: Schneider	K1C 003QCH	5.00
59	ABB-094	Mini.circ.breaker ABB stotz S271-K1	ABB094	2.00
60	ABB-095	Mini.circ.breaker ABB stotz S271-K1	ABB095	1.00
61	ABB-097	Mini.circ.breaker ABB stotz S272-K2	ABB097	7.00
62	ABB-098	Miniature Circuit Breaker ABB S 202-K4, S 2C - S/H 6R Make: ABB STOTZ	202-K4	8.00
63	ABB-099	Mini.circ.breaker ABB stotz S272-K6	ABB099	4.00
64	ABB-100	Alarm contact ABB U304-S/H	ABB100	17.00
65	ABB-101	Auxiliary relay 110 VDC Part # 60.13.9.110.0040, Make: Finder	60.13.9.110.0040	5.00
66	ABB-102	11-pin Relay Base, Contact Rating: 10A ; 250V, Type: 90.27, Make: Finder	ABB102	13.00
67	ABB-103	Auxiliary relay 24 VDC, Type: 60.13.9.24.0040 Make: Finder	60.13.9.24.0040	5.00
68	ABB-107	Auxiliary relay module PHOENIX UMK-16 RM 24 DC	ABB107	4.00
69	ABB-108	Pluggable Miniature Relay 24/21-21HC, REL-MR-24 VDC, PHOENIX, CONTACT, Made In Germany	24/21-21HC	109.00
70	ABB-109	Limit switch AC15, 230V/6A, 400V/4A, IEC947-5-1, VDE 0660 IP 4kV, FANAL ETW11 (Elect. pannel door)	E161-15	3.00
71	ABB-110	Anti. cond. heater SOLENER SR50	ABB110	2.00
72	ABB-112	Bulb squared BA 9s , 110V, 1.2W	ABB112	69.00
73	ABB-113	Time delay unit RELECO CT3-E20/H	ABB113	2.00
74	ABB-114	Diodes plugs GHIEMMETTI GDS-621/20SZ rt	ABB114	50.00
75	ABB-115	Aux.relay unit PHOENIX UMK-16RM , 110DC/M	ABB115	1.00
76	ABB-116	Relays + PHOENIX REL/KSR-G	ABB116	11.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
77	ABB-121	MCCB ABB STOTZ 3 Pole, C2, 2Amps, Type: SH203-CZ, Make: ABB	ABB121	6.00
78	ABB-123	MCCB 3 Pole 25A, 6kA (B - Curve) Model S 253 B 25 Make: ABB	S 253 B 25	3.00
79	ABB-124	Auxiliary contact ABB Stotz S2-S/H	ABB124	9.00
80	ABB-125	Auxiliary contact ABB control OZSK1 1S+1A	ABB125	2.00
81	ABB-127	Thermal relay 2B80 60-80A	ABB127	6.00
82	ABB-128	Fuse-switch ABB control OESA 00-63A	ABB128	1.00
83	ABB-129	V-meter switch squared KIF 027M	ABB129	1.00
84	ABB-131	Cam switch squared K1C 56A/4568 K	ABB131	2.00
85	ABB-136	V-meter 400V (LVR), Type: EQ96P 0-500V, Make: ZIEGLER	T	3.00
86	ABB-142	MCCB ABB S263-C 16-A, C16, 400Volt, 6000/3, E 76126, 277/480 Vac, IEC 947-2,Icu 10KA, Ub Max 440,	S263-C 16-A,	8.00
87	ABB-143	MCCB ABB stotz S262-C 4-A	ABB143	12.00
88	ABB-145	MCCB ABB stotz S263-C 10-0A	ABB145	11.00
89	ABB-149	Impulse relay ESMI NR 8255 220 VAC	ABB149	1.00
90	ABB-150	Contacto ABB Control OK OW10, Model: AF12-30-10, 240 V AC, Contactor 5.5 KW, 1 NO, Make: ABB	AF12-30-10	11.00
91	ABB-151	A-meter 800/5A (LVR), Type: EQ96P 0-800V, Make: ZIEGLER	ABB151	4.00
92	ABB-162	MCCB stotz S261-C 6.0A	ABB162	3.00
93	ABB-171	Auxiliary contactor ABB control OESA ZX 1	ABB171	1.00
94	ABB-172	Thermal relay ABB control PATAM 2B63 45-63A	ABB172	1.00
95	ABB-173	Control switch squared K1A 001A	ABB173	1.00
96	ABB-176	Control switch K1C 56A/4767K	ABB176	3.00
97	ABB-177	Handle squared KCB 1B	ABB177	2.00
98	ABB-178	Motor protect unit ABB SACE MS235-2.5.1.6-2.5A 50k	ABB178	1.00
99	ABB-179	Motor protect unit ABB SACE MS325-6.3.4.0-6.3A 50k	ABB179	1.00
100	ABB-180	Alarm contact ABB SACE SK01 MS325	ABB180	5.00
101	ABB-183	Contacto ABB control OKYM 45W22 240 VAC	ABB183	1.00
102	ABB-184	A-meter 4000/5A (LVR)	ABB184	2.00
103	ABB-188	Miniature circuit breaker ABB stotz S262-C10 10A	ABB188	7.00
104	ABB-190	Miniature circuit breaker ABB stotz S261C-2 2A	ABB190	5.00
105	ABB-192	Miniature circuit breaker ABB stotz S263C-6 6A	ABB192	4.00
106	ABB-193	Miniature circuit breaker ABB stotz S263C-10 10A	ABB193	1.00
107	ABB-194	Aux. relay ABB KOJEET OK00 T31	ABB194	1.00
108	ABB-195	Aux. relay ABB KOJEET OK00 T40 OKZA2	AB195	1.00
109	ABB-196	Sync. check relay ABB Transmit SPAU 341 C1	ABB196	1.00
110	ABB-198	3 Phase direc. overcurr ABB transmit SPAs 348 C	ABB198	1.00
111	ABB-199	Stabilized diff. relay SPAD 346 C1	SPAD 346 C1	3.00
112	ABB-200	Tip circuit rev ABB trans 1B1 C4	ABB200	2.00
113	ABB-201	Alarm annunciator ABB transmit SACO 16D1	ABB201	1.00
114	ABB-202	Frequency relay ABB transmit SPAF 140C	SPAF 140 C-AA	1.00
115	ABB-203	Overcurr/earthfault relay ABB transmit SPAJ 140C	ABB203	1.00
116	ABB-204	Position indicator for CEWE NC304	AB204	3.00
117	ABB-205	Current meter 300/1A (LVR) Radiator	ABB205	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
118	ABB-206	Active pow meter CONST-PAQ 96s	ABB206	3.00
119	ABB-207	Current meter 8001A Gen. (C/Room)	ABB207	2.00
120	ABB-209	React pow met CONST-PAQ 96	ABB209	1.00
121	ABB-212	React pow met CONSTR-PAQ 96	ABB212	2.00
122	ABB-213	Selector switch JUHA-ELECTRO OY K1P 56A/4584K	ABB213	1.00
123	ABB-214	Selector switch volt OY K1P 56A/4584K	ABB214	1.00
124	ABB-218	Auxiliary relay 60 VAC finder	ABB218	2.00
125	ABB-219	Auxiliary relay 110 VAC finder	ABB219	1.00
126	ABB-224	Discrepancy control switch 10WA 0262EL SUOMEN SOLE	ABB224	1.00
127	ABB-225	Current trad. ELTE 1800L-154	ABB255	2.00
128	ABB-226	Voltage transd. TILLQUIST ELTEKNIK U800L-154	ABB266	1.00
129	ABB-227	Power transducer -200 to 200 MW	PQ400-0944	2.00
130	ABB-228	Frequency transd. scale 45-55	ABB228	1.00
131	ABB-229	Current trans.TILLQUIST ELTEKNIK 1800L-154	ABB229	1.00
132	ABB-230	Resistance trans.TILLQUIST ELTEKNIK VR120L-154	ABB230	2.00
133	ABB-231	Power transducer -2 to 60 MW	PQ400-0944	3.00
134	ABB-232	Set of spares parts for SF 6 drcuit breaker	ABB232	3.00
135	ABB-233	Main contact for disconnect 3-pole, 1600A	ABB233	1.00
136	ABB-234	Main contact for earthing switch1-pole, 145 kv	ABB234	2.00
137	ABB-235	Support insulator C4-650	ABB235	3.00
138	ABB-236	Aux. contacts 4 No. 4Nc	ABB236	3.00
139	ABB-237	Interlocking coil 110 vDC	ABB237	1.00
140	ABB-238	Hv-bushing, phase SUURMUUNTAJAT	ABB238	1.00
141	ABB-239	LV Bushing 11KV Main Trafo	NLTD 24 B 4500	1.00
142	ABB-240	Neutral Star Bushing Main Trafo	ABB240	1.00
143	ABB-241	Complete set of gaskets LTB1451D1, 5429038-AX	LBT 1451D1	9.00
144	ABB-242	Complete fan with motor	ABB242	1.00
145	ABB-243	Over pressure relief valve (Device) 208-007-04, MIT/with/avce/con, SWT-679-1, 0.70 Bar, S.#: 195300	208-007-04	2.00
146	ABB-243-A	PRD Direct Wiring DC (Code : SWT-679-1, Type: SPDT (Std), Action: latching (Std), Styles: Qualitrol,	ABB-243-A	2.00
147	ABB-244	Oil tempreture indicator	ABB244	1.00
148	ABB-245	Winding tempreture indicator	ABB245	2.00
149	ABB-246	Oil level guage	ABB246	1.00
150	ABB-247	Buchholtz relay	ABB247	1.00
151	ABB-256	Luminar GW 84805/400w ABB ASEA SKADIA NK 400	ABB256	2.00
152	ABB-260	Luminar GW 7440B/5-120 ABB ASEA SKADIA NK150F	ABB260	3.00
153	ABB-261	Luminar GW 84461/250HST SKADIA NK250	ABB261	1.00
154	ABB-262	Luminar GW 84805/400 W ABB ASEA SKADIA MZN 400	ABB262	1.00
155	ABB-263	Luminar GW 84461/250 HST ABB ASEA SKADIA MZN 400	ABB263	1.00
156	ABB-264	Luminar ABB ASEA SKANDIA GW 84805/400w	ABB264	1.00
157	ABB-266	Luminar ABB ASEA SKANDIA SLS 108/258 HE	ABB266	2.00
158	ABB-268	Luminar ABB ASEA SKANDIA 7440B/ 5-150	ABB268	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
159	ABB-272	Charging Motor with Gear Box, DC 110 - 125V, Order Code : GCE0940084P0105, Make ABB	804-30-002	3.00
160	ABB-273	Tripping /closing coil	ABB273	2.00
161	ABB-274	UV Tripping Coil, Under Voltage Release with Spring Mechanism, Order Code : GCE9371466R01 ABB	GCE9371466R01	6.00
162	ABB-275	Voltage transf. 11000:/3/110:3/110:3V	ABB275	4.00
163	ABB-276	Voltage transf. 11000/110 V	ABB276	3.00
164	ABB-276A	Current transf.-outgoin 3150/1/1A	ABB277A	4.00
165	ABB-276B	Current transf. 3150/1/1A	ABB276B	4.00
166	ABB-276C	Current transf. (1000/1/1A)	ABB276C	4.00
167	ABB-276D	Current transf.200/1/1A	ABB276D	4.00
168	ABB-276E	Current trans. 11000 : 3/110 : 3/110 :3V	ABB276E	1.00
169	ABB-279	Circuit breaker 2Pole S262 C6, IEC 947 - 2, U = 440, Icu 10kA, Make: ABB	ABB279	13.00
170	ABB-280	Aux. relay, set of RELAY FINDER 60.13.8.110.0040	ABB280	1.00
171	ABB-282	Thermostate TRAFAG M95-3531567-0	ABB282	1.00
172	ABB-283	Time Relay-set of TELE-HAASE R3V11	ABB283	1.00
173	ABB-284	Cubicle heater TEGO HG 45	ABB284	1.00
174	ABB-286	Terminal block diode	9905753	13.00
175	ABB-287	Selector switch KIC003N+KBE18	9905755	1.00
176	ABB-288	Descrrepancy control switch	9905780	1.00
177	ABB-289	Process cable TK630V030	9905577	10.00
178	ABB-290	Base backplane 10s RF615	9905578	1.00
179	ABB-291	Extension backplane RF620	9905579	3.00
180	ABB-293	Bus cable backplane TK615	9905582	1.00
181	ABB-294	Instrumentation Cable 2 x (2+1) 0.5 mm2 Jamak	9905572	1.00
182	ABB-295	Instrumentation Cable 4 x (2+1) 0.5mm2 Jamak	9905573	1.00
183	ABB-296	Instrumentation Cable 12 x (2+1) 0.5mm2 Jamak	9905576	1,001.00
184	ABB-302	Relays 3NO+3NC 230V	55.33.8.230.0050	33.00
185	ABB-303	Switch disc	9270603	1.00
186	ABB-304	Spring drum	9371370	1.00
187	ABB-305	Control shaft	7001933	1.00
188	ABB-306	Control disc	7001917	1.00
189	ABB-307	Shaft D16x110	94779935	2.00
190	ABB-308	Roller	7001914	1.00
191	ABB-309	Spring 1.5 mm	9478006	1.00
192	ABB-310	Torision spring	7177401	2.00
193	ABB-311	Compression spring	7001915	1.00
194	ABB-312	Cheese head bolt 6M	0303041	2.00
195	ABB-313	Hexagon nut M6	367309	2.00
196	ABB-314	Retaining washer	418316	2.00
197	ABB-315	Roller chain	0997168	2.00
198	ABB-317	Switch fuse	OESA800D3PL	1.00
199	ABB-318	Turn switch	OETL125OK3	1.00
200	ABB-321	Arcing chamber kit 3 P (LV CB, 4000,3200) For Air Breaker F5S 3 Pole	LV CIRCUIT BREAKER	3.00
201	ABB-322	Battery CD 9V, NI for 4000 or 3200	LV CIRCUIT BREAKER	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
202	ABB-323	Release PR1/P LSIG without CTF3/6, For Air Breaker F5S 3 Pole	UXAB269501010	2.00
203	ABB-324	Under Voltage Release. UVR 110VDC, Circuit Voltage: 110VDC, Part #: UXAB239290909, ABB	UXAB239290909	4.00
204	ABB-325	Auxiliary contacts switch left	ABB325	1.00
205	ABB-326	Arcing chamber kit 3P/4P	3 P/4 P	1.00
206	ABB-327	kit including cover & lever 3P	ABB327	1.00
207	ABB-334	LV circuit breaker rating 4000A	ABB334	1.00
208	ABB-335	LV circuit breaker rating 3000A	ABB335	1.00
209	ABB-336	LV circuit breaker rating 1250A	ABB336	1.00
210	ABB-337	Push button XB2-3361 green	XB2-3361	6.00
211	ABB-338	Push button XB2-3461 red	XB2-3461	5.00
212	ABB-339	MPCB range 0.63-1A Telemecanique	GV 2 - M05	3.00
213	ABB-340	MPCB range 1.6-2.5A Telemecanique	GV 2 - M07	3.00
214	ABB-341	Auxiliary contact Telemecanique	GV2 - AN11	3.00
215	ABB-342	Mag. contactor ABB 4 pole n.o. 24V DC	BC16-30-10	5.00
216	ABB-343	Auxiliary contact 2 n.o - 2 n.c	CA5-22E	3.00
217	ABB-344	Busextension kit CI615, TC 610	C1615K01	3.00
218	ABB-345	Converter DC/DC VTD24SD, Input 85-110 VDC, out put 24 VDC Series, switching power supply, Make:Japan	VTD-24SD	2.00
219	ABB-347	Terminal block WDU-16	WDU-16	5.00
220	ABB-348	Terminal block WDU-4	WDU-4	10.00
221	ABB-349	Railmounted DK PT 100 TS 35	9914490	10.00
222	ABB-350	Undervoltage relay RM3-UA102MW, A1-A2 : 24-240V 50-60 HZ, (New RM4UA32MW)	9949591	3.00
223	ABB-351	Bus extension kit C1615K01	C1615K01	1.00
224	ABB-352	Auxiliary relay unit 16RM24DC/M	16RM24DC/M	5.00
225	ABB-353	Heater	ABB353	1.00
226	ABB-354	Bus extender cable 2.5M AC110	TK610V025	2.00
227	ABB-355	Power supply board SPAX 1G1 J3-BA	SPA-ZU295/50/C	2.00
228	ABB-356	Interposing current transformer	064868-901	4.00
229	ABB-357	Sum transformer	064867-901	1.00
230	ABB-358	Mini circuit breaker 2 pole type STOTZ	S262C2S2S/H	2.00
231	ABB-359	MCCB 2 Pole C6, S262	S2-S/H	2.00
232	ABB-360	Aux.cont 4NC+4NO 110Vdc 10Amp	3TH42-44-0LF4	1.00
233	ABB-361	Switch disc. fuse 690V 3 pole125A	3KM5230-1EB01	1.00
234	ABB-362	Switch disc. fuse 690V 3 pole 250A	3KM5530-1EB01	2.00
235	ABB-364	Test block 515	515	1.00
236	ABB-365	Test jack (dual current injection)	ABB365L	1.00
237	ABB-367	Switch discon. 250A, 690V 3pole	3KL5530-1EB01	1.00
238	ABB-369	Terminal cover 3KL55	3KX3557-3DA01	2.00
239	ABB-373	Rectifier PSS 30/24-80CAN	PSS30/24	1.00
240	ABB-374	Diode MIU 82/35-100SI3	MIU82/35	3.00
241	ABB-375	Connector kit AF100k02 redundant	AF 100K02	4.00
242	ABB-376	Cable and connection 5m 1	TK630VO50	3.00
243	ABB-377	Disconnecting link size 6 for terminal	8WA 18227VH01	100.00
244	ABB-378	Test socket 4mm	8WA 1822 7PH00	100.00
245	ABB-379	Test socket 4mm	8WA 1822 7PH05	50.00
246	ABB-380	Terminal thermo screw conn 8mm,	8WA 1011 1MH15	50.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
247	ABB-381	Isolated terminal block 6mm 2 wire 400VAC	WT 6/I/STB	20.00
248	ABB-382	Top fixed contact kit 3200A 3 pole F5, For Air Breaker F5S 3 Pole	UXAB269799023	1.00
249	ABB-383	Top fixed contact kit 4000/5000A 3 pole F5, For Air Breaker F5S 3 Pole	UXAB269799025	1.00
250	ABB-384	Moving arcing contact kit 3 pole, For Air Breaker F5S 3 Pole	UXAB269799013	2.00
251	ABB-385	Jaw type isolation contact kit 3200A, For Air Breaker F5S 3 Pole	UXAB269799018	1.00
252	ABB-386	Jaw type isolation contact kit 4000/5000A, For Air Breaker F5S 3 Pole	UXAB269799020	1.00
253	ABB-387	Closing spring kit 30 pole F5-S-H, For Air Breaker F5S 3 Pole	UXAB269099001	2.00
254	ABB-388	Protection relay opening electromagnet PR1 relays, For Air Breaker F5S 3 Pole	UXAB269599061	1.00
255	ABB-389	Lever for megamax F3/F6, For Air Breaker F5S 3 Pole	UXAB156440801	4.00
256	ABB-390	Cam switch K1B-006 TLH (selector)	K1B-006TLH	2.00
257	ABB-391	Cam switch 3 pole 12amps	K1F-003ULP	2.00
258	ABB-408	Charging motor 110-125VDC	GCE0940084P0105	1.00
259	ABB-409	Charging motor 110-125VDC	GCE0940084P0135	1.00
260	ABB-410	Rectifier	GCE947683P0100	1.00
261	ABB-411	Auxiliary switch 2NO+3NC S1	GCE7002397R0122	1.00
262	ABB-412	Auxiliary switch 3NO+2NC S3	GCE7002397R0121	1.00
263	ABB-413	Auxiliary switch 2NO+3NC S4	GCE7002397R0122	1.00
264	ABB-414	Auxiliary switch 2NO+3NC S5	GCE7002397R0122	1.00
265	ABB-415	Micro switch S2	GCE0905024P0100	1.00
266	ABB-417	Under volt. release Y4 110VDC/AC, For Breaker Type VD4, 1212-40 same as serial #5640701/0552/96,	GCE9371466R00105	1.00
267	ABB-418	Shunt release OFF Y2 110-125VDC	GCE7004590P0115	2.00
268	ABB-419	Shunt release ON Y3 110-125VDC	GCE700490P0105	3.00
269	ABB-420	Magnet support complete for VCB	GCE7000880R0111	3.00
270	ABB-421	Rivolta BWR 210 special cleaner	GCE0007707P0100	1.00
271	ABB-422	Cold cleaner	GCE0007706P0100	5.00
272	ABB-423	Pole VD4 12Kv 3150A40kA (3poles)	GCE179616R0142	1.00
273	ABB-424	Under Voltage Release UVR 110VDC, Circuit Breaker Type: SACE F5, Control Voltage:110VDC,	UXAB239290909	2.00
274	ABB-426	Measuring transd. 4-20ma 0-130V	CP 4001	1.00
275	ABB-428	Power supply 18-80 V DC 941 004-BA	SPGU 48 B2	3.00
276	ABB-429	Power supply 18-80 V DC 941 023-BA	SPTU 48S1	1.00
277	ABB-431	Power supply 18-80 V DC	SPTU 48R1	1.00
278	ABB-432	Power supply Code: SPTU 240 R1, 80-265 V AC/DC 50Hz	SPTU 240 R1	2.00
279	ABB-433	Power Supply 80-265 V AC/DC 50Hz SPGU 240 A1, Make : ABB	SPGU 240A1	3.00
280	ABB-434	Cam switch 0-1 spring return 1 stage	K2A-001ALH	2.00
281	ABB-435	Cam switch 1-0-2 3 stage	K2F-003ULH	1.00
282	ABB-436	Cam switch 1-0-1 spring return 1 stage	K2B-004TLH	2.00
283	ABB-437	Cam switch 0-1-2-3 spring return 4 stage	K2I-023QLH	1.00
284	ABB-438	Cam switch 1-0-1 spring return 4 stage	K2H-004ULH	2.00
285	ABB-439	Cam switch L1,L2,L3,L4, L1N-L2N-L3N	K1F-027MLH	2.00
286	ABB-440	Cam switch for Volt 0-L1N-L2N-L3N	K1D-023MLH	1.00
287	ABB-441	Cam switch 0-L1-L2-L3 for Voltage	K1F-003MLH	2.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
288	ABB-442	Head cam switch multi fix KAG-3H	KAG-3H	12.00
289	ABB-444	Motor Protection relay module Thermal Overload Relay Module for SPAM 150C 18-80V Part # SPCJ 4D34 AA	SPCJ 4D34 AA	3.00
290	ABB-445	Over/under voltage relay module, SPCU ICI B AAA	SPCU ICI B AAA	1.00
291	ABB-446	Residual over voltage relay module	SPCU IC6 B AAA	1.00
292	ABB-447	FT test kit with accessories	9688A68G18	2.00
293	ABB-448	Magnetic cont 2pole 32A 24VDC	3TC4417-OAB4	3.00
294	ABB-449	Panel heater 110-250VAC 45W	224-509 HG048	8.00
295	ABB-450	Signal horns HPO 115 VDC	212 204 16	2.00
296	ABB-451	Contactor relay 6NO+2NC 110VDC	3TH4262	3.00
297	ABB-452	Fuse terminal M6-8-STP cap colour grey	8-STP	50.00
298	ABB-454	Terminal with test piont M4-6,2	ABB454	75.00
299	ABB-455	Instrument isolating terminal 8WA1	011-1MH15	40.00
300	ABB-456	Memory module 128MB PC100	DIMM CL2	6.00
301	ABB-457	Memory module 64 MB PC100	MT8LSDT864	6.00
302	ABB-459	Isolated terminal M6/8-STP (AVR)	M6/8-STP	61.00
303	ABB-460	UP Counter with Totalizer CROUZET,Counter Totalizer LCD 24X48, Votage input, 8-Dgit,	26 546 829	3.00
304	ABB-461	PCB term block 24A 1721731 3-5.08	304-1347	28.00
305	ABB-462	Terminal with test socket (Ins. isolating)	8WA1 011-1MH15	150.00
306	ABB-464	System adaptor MPK 318D/24V	OKO 8282	1.00
307	ABB-465	Fuse adaptor MPK 347/24V	OKO 847	1.00
308	ABB-466	Control unit RCU 24	OKO 8312	1.00
309	ABB-467	Contact block type UKK3	OKO 8281	98.00
310	ABB-468	System Adapter MPK 318D/110V	OKO 8281	1.00
311	ABB-469	Fuse adapter MPK 347/110V	OKO 8471	1.00
312	ABB-470	Control unit RCU 110	OKO 8311	1.00
313	ABB-471	Control relay AC-11:4A 230V 22E 2NO+2NC (K4)	3TH20 22-OFB4	5.00
314	ABB-472	Panel lock system	960702	1.00
315	ABB-473	Hinges for control panel	960702	88.00
316	ABB-474	Over voltage & reverse power module SPCP 3C2	SPCP 32 2-AA RS 442	2.00
317	ABB-475	Three Phase Over Current Relay Module SPCJ 3C3-AA RS 425 002-AA, Make: ABB Transmit OY	SPCJ 3C3-AA RS 425	4.00
318	ABB-476	Directional neutral over current relay module	SPCS 3C4 SPCS B-AA,RS 433	2.00
319	ABB-477	Out put relay module SPTR 7B1	RS 112 004-AA	3.00
320	ABB-478	Panel Lock (for J339 & J341) triangle type	ABB-478-L	23.00
321	ABB-479	Earthing switch OJWN	12/110 B 260	1.00
322	ABB-480	Control unit for cubical	ABB480	1.00
323	ABB-481	Earthing switch OJWN	12/110 B 210	1.00
324	ABB-482	Support isolator	NTGA 12D10	5.00
325	ABB-483	Screw plate K/A MHZ JB1	ABB483	6.00
326	ABB-484	Hex. bolt & washer M16x100/38Y	ABB484	6.00
327	ABB-485	Isoflex topas NB 52 kluber	ABB485	2.00
328	ABB-488	Bushing with tulip contact IN 2000 A, Type NLDX 12A1	NLDX 12A2	6.00
329	ABB-489	Bushing with Tulip Contact IN 2000 A, Type: NLDX 12A1., Make: ABB Finland	NLDX 12A1	6.00
330	ABB-490	Hex. bolt & washer M16x90 39A16X	ABB490	16.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
331	ABB-500	Print Mechanism 80mm for energy meter	MTP40140B	6.00
332	ABB-501	Terminal boxes	ABB501	4.00
333	ABB-503	Sluphur hexa flouride gas SF6	ABB503	80.00
334	ABB-504	Auxiliary contact block 1N.O+N.C	82-H	2.00
335	ABB-505	Gas tube set (incl 3 tube) BP+BG+BN	2511852	1.00
336	ABB-506	Valve block LTB 5439027-BL	5439027-BL	1.00
337	ABB-507	Set of contacts for SF6 breaker	5413080-BL	3.00
338	ABB-508	Density switch 1HSB495663-1	1HSB495663-1	1.00
339	ABB-509	Combined Over Current & Earth Fault Module SPCJ4D24, SPCJ-4D24-AA, RS 425 011-AA, Make ABB	SPCJ4D24	3.00
340	ABB-510	Combine Over & Under Voltage Relay , SPCU3C14	SPCU3C14	2.00
341	ABB-511	Differential relay module	SPCD3D53	2.00
342	ABB-512	Earth fuatl realy module	SPCD2D55	2.00
343	ABB-513	Directional over current relay	SPCS4D11	2.00
344	ABB-514	Directional over current relay	SPCS4D12	2.00
345	ABB-515	Directional earth fault relay	SPCS2D26	1.00
346	ABB-516	Comb.over current&earth fault	SPCJ4D29	2.00
347	ABB-517	Protection realy module	SPCF1D15	1.00
348	ABB-518	Digital hour counter 8 digit	XBK H18000033E	1.00
349	ABB-519	Connecting flag for LV bushing	LTDL 4500	5.00
350	ABB-520	Sealing gasket for NLTD bushing	LTDL 24 B	4.00
351	ABB-521	Outer terminal stud	244073	3.00
352	ABB-522	Locking pin for transformer bushing	244073	6.00
353	ABB-523	Gasket (6)	ABB523	3.00
354	ABB-524	Intermediat ring	ABB524	3.00
355	ABB-525	Potential equalising spring	ABB525	3.00
356	ABB-526	Compression spring	ABB526	3.00
357	ABB-527	Nut (12)	ABB527	3.00
358	ABB-528	Circular Duct Fan Motor, Model No. R2E225 - RA92-18, 230Volt~, 50Hz, 0.73A; 165WWatt, 2650U/min	R2E225 - RA92-18	3.00
359	ABB-530	Circular Duct Fan Motor with Capacitor, KV 250 L TW., Watt: 166 Watt, Voltag: 230 Vac, Amp:0.82 Hz:	1218	2.00
360	ABB-531	Hexagonal bolt L: 55mm Dia: 10mm	ABB531L	24.00
361	ABB-532	Bus bar 10mm 62x62mm	ABB532L	7.00
362	ABB-533	N-Type Outlet (Socket) 16A	ABB-533-L	2.00
363	ABB-534	Analog Ammeter 0-200 mA	ABB-534-L	3.00
364	ABB-541	Inverter Mass Sine 24/1500, Mass sine 24/1500 part # 24021500 I/P 24Vdc O/P 230 Vdc, 50 Hz	24021500	2.00
365	ABB-542	Filter Unit for PLC Pannel, Outlet filter unit old P# SK 3323 200, New P# SK 3239 200, Make: Rittal	SK3239 200	6.00
366	ABB-543	Voltage Monitoring Relay P # 3UG46 33 - 1AL30, Make: Siemens. (for EM80)	3UG46 33 - 1AL30	4.00
367	ABB-544	Spring Drum for Breaker VD4M 1212-40, P#GCE9371370P0101 Make: ABB	GCE9371370P0101	6.00
368	ABB-545	Spring 1.5 mm for Breaker VD4M 1212-40, P# GCE9478006P0101, Make: ABB	GCE9478006P0101	2.00
369	ABB-546	Rectifier MSR 24/40 Input:230 VAC, 50-60 Hz 9A, Output 20-33 Vdc 40A, Make:EFORE - ESTONIA	ABB-546	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
370	ABB-548	Torsion Spring VD4M 1212-40, P # GCE7177415P0102, Make: ABB	GCE7177415P0102	6.00
371	ABB-549	Torsion Spring VD4M 1212-40, P # GCE7177401P0101, Make: ABB	GCE7177401P0101	6.00
372	ABB-550	PG-100 Power Panel, G2, Sseries 8" color STN, Size 640 mm x 480mm, Made by UTICOR Technology LP USA	PG-100	1.00
373	ABB-551	Screw with G.I plain wahser	ABB-551-L	34.00
374	ABB-552	Front Connection Cable for PC to REL511	ABB-552	2.00
375	ABB-557	Cabinet Cooler® System with Thermostat Control	ABB-557	1.00
376	ABB-558	Fixing Screw of For Process Connector TK630	ABB-558	296.00
377	ABB-559	Module Fixing Screw for AC110 System	ABB-559	428.00
378	ABB-561	Hour meter 80 - 170 VDC (Round Type) Type 587.60.2, Make: BAUSER, Germany	Type 587.60.2	7.00
379	ABB-562	Optical Beacon Light	ABB-562	2.00
380	ABB-563	Screw for fixing Female Process Connector CI615	ABB-563	39.00
381	ABB-564	Fixing Screw of For Bus Extension TK610	ABB-564	54.00
382	ABB-565	Electronic Multi Function Voltage Relay	ABB-565	6.00
383	ABB-566	Protective Cover for Circular head push button and switches, Model: ZB6-YA001, Make: Telemechanique	ABB-566	41.00
384	ABB-568	Male Connector complete with fixing screws, Pole Count: 20, Cross Section (AWG)28-14, Part # 246-102	246-102	14.00
385	ABB-569	Female Connector complete with fixing screws	ABB-569	10.00
386	ABB-570	Temperature Controller 0-200 Degree C, SIZE: 48 X 48, MODEL: TZ45T-14R, MAKE: AUTONICS	TZ45T-14R	6.00
387	ABB-572	Digital Tachometer, T411 with display along with interface cable, JAQUET Technology RPM	T411	1.00
388	ABB-575	Electrical Interlock for LV fuse switch	ABB-575	1.00
389	ABB-579	DC Axial Compact Cooling Fan for EM-80	ABB-579	7.00
390	ABB-580	Interposing Transformer 3-Phase TRA	ABB-580	2.00
391	ABB-582	Monochrome Display Panel LJ64EU34	LJ64EU34	6.00
392	ABB-583	Monochrome Display Panel L J 640 U34, Dispaly Size 8.9 Inch, Make: Sharp USA	LJ640U34	6.00
393	ABB-587	Control Software Integration CLP:s 800xA 100 AC 80	ABB-587	1.00
394	ABB-598	Closing Coil XF-E	ABB-598	4.00
395	ABB-599	Low Volage Relase Loop MN-V	ABB-599	3.00
396	ABB-600	500V Voltmeter	ABB-600	1.00
397	ABB-601	Control Panel Light	ABB-601	2.00
398	ABB-602	Terminal Line	ABB-602	5.00
399	ABB-603	3A Alarm Assistant Switch	ABB-603	5.00
400	ABB-604	Generator Power Meter	ABB-604	2.00
401	ABB-605	Leap Change Over Switch	ABB-605	1.00
402	ABB-606	24DC Alarm Light	ABB-606	3.00
403	ABB-607	Synchronized Frequency Meter	ABB-607	2.00
404	ABB-608	Generator Current Meter	ABB-608	1.00
405	ABB-609	Control Element Module 140CPU11303	ABB-609	1.00
406	ABB-610	Synchronized Voltmeter (Voltage Meter)	ABB-610	1.00
407	ABB-611	Control and Protection Relay SPAD 346 C3 AA, RS 621 005-AA, ABB Transmit OY	SPAD 346 C3 AA	1.00
408	ABB-612	Generator Reactive Power Meter	ABB-612	1.00
409	ABB-613	11KV Outlet Current Meter	ABB-613	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
410	ABB-614	Ammeter Conversion Switch	ABB-614	11.00
411	ABB-615	Auto Synchro Meter	ABB-615	1.00
412	ABB-616	Voltage Control Unit	ABB-616	1.00
413	ABB-617	Circuit Board	ABB-617	1.00
414	ABB-618	Solenoid Valve SC320-184	ABB-618	1.00
415	ABB-619	Amperometer C-1500A	ABB-619	1.00
416	ABB-620	Heat Protection Reply	ABB-620	1.00
417	ABB-621	Alarm Contact MZ001	ABB-621	14.00
418	ABB-622	Engine RPM Meter	ABB-622	1.00
419	ABB-623	Pressure Relay	ABB-623	2.00
420	ABB-624	Heat Relay	ABB-624	1.00
421	ABB-625	Temperature Adjuster	ABB-625	2.00
422	ABB-626	Protection Control Switch 6.3A	ABB-626	2.00
423	ABB-627	Terminal of Contact Light	ABB-627	7.00
424	ABB-628	Terminal of Fuse	ABB-628	55.00
425	ABB-629	Terminal M160	ABB-629	3.00
426	ABB-630	Terminal M6/8	ABB-630	5.00
427	ABB-631	Terminal Seat RT78624	ABB-631	19.00
428	ABB-632	Emergency Stop Button	ABB-632	4.00
429	ABB-636	O Ring For Engine Stop Device	ABB-636	32.00
430	ABB-637	Element 100*200	ABB-637	23.00
431	ABB-639	Polymorphic Relay	ABB-639	6.00
432	ABB-640	IC Relay Bar	ABB-640	16.00
433	ABB-641	Engine Closing Button	ABB-641	5.00
434	ABB-643	Touch Panel	ABB-643	1.00
435	ABB-644	Transformer	ABB-644	1.00
436	ABB-645	Separator AC Contractor	ABB-645	2.00
437	ABB-646	Control Element Module 140DDZ	ABB-646	3.00
438	ABB-647	Control Element Module 140D	ABB-647	1.00
439	ABB-648	Control Element Module 140AR	ABB-648	1.00
440	ABB-649	Control Element Module 140AT	ABB-649	1.00
441	ABB-650	Control Element Module 140PS	ABB-650	1.00
442	ABB-651	Sintech Location Indicator	ABB-651	3.00
443	ABB-652	Generator Field Protective Relay 100/110V	ABB-652	1.00
444	ABB-653	Breakers/Fuse 63A/80A	ABB-653	8.00
445	ABB-654	800A Air Switch	ABB-654	1.00
446	ABB-655	Control Panel Heater	ABB-655	1.00
447	ABB-656	8 Needle Assistance Relay Pin and jack	ABB-656	1.00
448	ABB-657	11 Needle Assistance Relay Pin and jack	ABB-657	1.00
449	ABB-658	System Adapter MPK336	ABB-658	1.00
450	ABB-659	Current Mutual Inductor 5/1A	ABB-659	9.00
451	ABB-660	DC Axial fan, Model: 3610KL-05W-B50, V: 24VDC, Speed Min: 3200, Air Flow 54.7 CFM, Make: NMB-MAT	3610KL-05W-B50	7.00
452	ABB-661	Alarm Module for SACO 16D1 Annunciator, Part # SWPM 3A1B, Make: ABB Transmit Oy Finland	SWPM 3A1B	1.00
453	ABB-662	Connection module for SPAS 348C, Part # SPTK 8B20, Make: ABB Transmit Oy	SPTK 8B20	1.00
454	ABB-663	Manual Voltage Regulating Module, 9AFP300842-CACZ, Specification:, Part # SPCN 1D56-AB, Make: ABB OY	SPCN 1D56-AB	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
455	ABB-669	I/O terminal module extended XEA 5001	49015	1.00
456	ABB-670	SSI/TTL connection cable X120	49482	1.00
457	ABB-671	Control box, Control box Operating device	42225	1.00
458	ABB-674	On/Off Operating Mechanism, Code No. : 510507805, 021652091116L J, For ABB Vacuum Circuit Breaker	510507805, 0216520	1.00
459	ABB-678	Pluggable Miniature Relay 110VDC, Model : REL-MR-110DC/21HC, Make : PHOENIX CONTACT, Made in Austria	REL-MR-110DC/21HC	30.00
460	CNV-070	Valve Spindle DN200 PN10, For MOV-3-125-18, Make: Pleiger	MOV-3-125-18	1.00
461	CNV-071	Valve Seat DN200, Part Number: 9227510280, Make: Pleiger	9227510280	1.00
462	CNV-072	Seat Bushing DN200, Part Number: 9261802980, Make: Pleiger	9261802980	1.00
463	CNV-074	Valve Spindle DN150 PN16, For MOV-3-125-18, Make: Pleiger	MOV-3-125-18	3.00
464	CNV-075	Valve Seat DN150, Part Number: 9227420480, Make: Pleiger,	9227420480	2.00
465	CNV-076	Seat Bushing DN150, Part Number: 9261806280, Make: Pleiger	9261806280	2.00
466	CNV-077	Sliding Gear DN150 PN16, Part Number: 4787020520, Make: Pleiger	4787020520	1.00
467	EDS-014-0008	Voltage dependent resistor V 10 471 U	EDS-014-0008	12.00
468	HFF-013	Temperature Controller 40.. 100C 85490	HFF013L	4.00
469	SYD-001	Set of roller for electric gate	SYD001	4.00
470	SYD-002	Electric motor for electric gate	SYD002	1.00
471	SYD-003	Complete control pannel electronic circuits	SYD003	1.00
472	SYD-005	Support insulator C4-650	9902346	3.00
473	SYD-006	Slide bearing tube support (Item # 529)	9902347	6.00
474	SYD-007	Fixed tube AI 100/80 (Item # 540)	9902348	3.00
475	SYD-008	Expension tube AI 100/80 (Item # 541)	9902349	3.00
476	SYD-009	I-connector C/C=100mm (Item # 567)	9902350	14.00
477	SYD-010	T-connector C/C=100mm (Item # 570)	9902351	6.00
478	SYD-011	Parallel alderly 32.6mm (Item # 572)	9902352	4.00
479	SYD-012	T-connector C/C=100mm (Item # 573)	9902353	3.00
480	SYD-013	T-connector alderly 32.6mm (Item # 593)	9902354	19.00
481	SYD-014	T-connector C/C=100mm (Item # 594)	9902355	12.00
482	SYD-015	T-connector Copper Wire 12.5mm (Item # 595) for Transformer Earth	9902356	3.00
483	SYD-016	Conductor support 32.6mm (Item # 596)	9902357	6.00
484	SYD-017	I-connector 32.6mm (Item # 597)	9902358	21.00
485	SYD-018	T-connector AI 100/80 (Item # 598)	9902359	12.00
486	SYD-019	I-connector C/C=100mm (Item # 599)	9902360	12.00
487	SYD-020	I-connector 32.6mm (Item # 600)	9902361	3.00
488	SYD-021	T-connector 32.6mm (Item # 601)	9902363	13.00
489	SYD-022	End cap AI 100/80 (Item # 602)	9902364	6.00
490	SYD-023	Spacer C/C=100mm (Item # 603)	9902365	24.00
491	SYD-024A	Main Blade set for Disconnector Switch, Six Blades (3 Male 3 Female), Type:- SSBII-145-1600.	SSBII-145-1600	2.00
492	SYD-025	Central break disconn w earth	9902367	1.00
493	SYD-026	Metal oxide surge	9902369	1.00
494	SYD-027	Zinc oxide surge max145K	9902368	1.00
495	SYD-028	Oil minium current transf. 300/1/1/1/1A	IMB 145 300/1/1/1/1A	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
496	SYD-029	Capacitor voltage transf. 132 : 110 : V	9902371	3.00
497	SYD-030	Motor contactor	5351765-6	3.00
498	SYD-031	Motor protective switch	GJM25500	1.00
499	SYD-032	Set of contacts TAP changer	SYD032	1.00
500	SYD-033	Motor 3 PH 50Hz 415V	MK110017-S	1.00
501	SYD-034	Toothed belt, Timing Belt number of Teeth=72, Length=685mm, width=19.05mm, Model=270 L 075, Optibelt	2181710-1	5.00
502	SYD-035	Line protection terminal	REL 511	1.00
503	SYD-036	Bus bar protection relay card	SYD036	1.00
504	SYD-037	Detector oil temp (PT 100)	AKM44564-105	1.00
505	SYD-038	Detector winding temp indicator	AKM44666-105	1.00
506	SYD-041	Post insulator	SYD041	1.00
507	SYD-042	Disc insulator 16pcs U-70BL	U-70BL	1.00
508	SYD-043	HV clamps	SYD043	1.00
509	SYD-044	Current transformer 1600-800/1/1/1 Amp	IMB 145- 1600-800/1/1/1	3.00
510	SYD-045	Gas relay L01	OYO2 50 A 1	1.00
511	SYD-046	Supporting insulator CDE H21	NTWA 24A 4	3.00
512	SYD-047	Buchholz relay	OYOS 25	1.00
513	SYD-049	HV bushing Porcelain for Auxilary Transformer 10 Nf DIN42531 Pos. 1	10 Nf 250	6.00
514	SYD-050	De-hydrating breather	WJKHM3	3.00
515	SYD-051	LV bushing	NLRL 1M3150	1.00
516	SYD-052	Measuring amplifier	03	1.00
517	SYD-053	Starting contact	05	1.00
518	SYD-054	Maintaining contact	06	1.00
519	SYD-055	Limit switch	08	1.00
520	SYD-056	Position transmitter	14	1.00
521	SYD-057	Conical toothed wheel	102	1.00
522	SYD-058	Geneva wheel	125	1.00
523	SYD-059	Geneva wheel with arm	126	1.00
524	SYD-060	Shear pin	114	3.00
525	SYD-061	Geneva drive with shaft	108	1.00
526	SYD-062	Geneva drive with shaft	112	1.00
527	SYD-063	Cam disk	115	1.00
528	SYD-064	Brake	117	1.00
529	SYD-065	Brake disk	118	1.00
530	SYD-066	Operating counter	120	1.00
531	SYD-067	Cylindrical toothed wheel	124	1.00
532	SYD-068	Cam bar	128	1.00
533	SYD-069	Brake for maintaining contact	129	1.00
534	SYD-070	Cam disk for storing contact	130	1.00
535	SYD-071	Driging disc	131	1.00
536	SYD-072	Spring	158	2.00
537	SYD-073	Spring	156	2.00
538	SYD-074	Brake disk	157	1.00
539	SYD-075	Operating wire	161	1.00
540	SYD-076	Toothed wheel	150	3.00
541	SYD-077	Sleeve	159	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
542	SYD-078	Nava	160	1.00
543	SYD-079	Drive	151	1.00
544	SYD-080	Breaker pole 5452009-E	5452009E	1.00
545	SYD-081	Breaker chamber ins 1HSB422732-P	B422732-P	1.00
546	SYD-082	Post insulator 2732 2123-E	2732 2123-E	1.00
547	SYD-083	Density switch 5663 118-49	5663 118-49	1.00
548	SYD-084	Opening coil 1 Y1 LA 516 771-AL	LA 516 771-AL	2.00
549	SYD-085	Opening coil 2 Y2 LA 516 771-AL	LA 516 771-AL	2.00
550	SYD-086	Opening coil 1 Y3 LA 516 771-AL	LA 516 771-AL	2.00
551	SYD-087	Motor 4461 029-1	4461 029-1	2.00
552	SYD-088	Catch gear close 1HSB 535436	535436-B5	2.00
553	SYD-089	Catch gear close 1HSB 535436-B3	5354326-B3	2.00
554	SYD-090	Shock absorber 5256 716-K	5256 716-K	2.00
555	SYD-091	Contact set & o ring switch cover	SYD091	1.00
556	SYD-092	Spares for motor drive unit	SYD092	2.00
557	SYD-093	Dehydrating breather	WJKHM3-16A	1.00
558	SYD-094	Dehydrating breather	WJKHM1	1.00
559	SYD-096	Gasket 3mmx115mm for breather	SYD96L	4.00
560	SYD-097	Rotacting contact set silver plated	SYD97	6.00
561	SYD-101	Circlip 12mm	SYD101L	24.00
562	SYD-102	S.S. Bolt M10X50mm with nut & washer	SYD102L	46.00
563	SYD-103	S.S. Bolt M12 X 50mm with nut & washer	SYD103L	41.00
564	SYD-104	S.S. Bolt M12X 75mm with nut & washer	SYD104L	45.00
565	SYD-105	Termination Kit for 185mm Sq 3 core Armoured Cable	SYD-105-L	1.00
566	SYD-106	Termination Kit for 185mm Sq 3 core (Outdoor)	SYD-106	2.00
567	SYD-107	Brass Bolt Position 2 for HV Bushing 10 NF 250 DI	SYD-107	18.00
568	SYD-108	Brass Cap Position 3 for HV Bushing 10 NF 250 DI	SYD-108	18.00
569	SYD-109	Top Aarcing Horn for Auxillary Transformer "K2" DIN 42531 Pos. No. 4	42531	6.00
570	SYD-110	Sealing Ring Pos 5 fo	SYD-110	18.00
571	SYD-111	Internal Gasket Pos 6 for HV Bushing 10 NF 250 DI	SYD-111	18.00
572	SYD-112	flange Gasket Pos 7 for HV Bushing 10 NF 250 DI	SYD-112	18.00
573	SYD-122	Liquid Seal for dehydrating Breather, P# : WJ105, De-Hydrating Breather P.# WJKHM 1-3, OY Stromberg	WJ105	8.00
574	SYD-124	Male/Female contact for disconnecter 3-pole, 1600A, Type = SSB-II, For CENTER-BREAK DISCONNECTORS	SYD-124	5.00
575	SYD-125	Heat Shrinkable Wrapround Sleeve, Suitable for 30mm Cale Diameter, Length: 1.5 Meter, P. # CRSM 53/1	CRSM 53/13	85.00
576	SYD-126	S.S. Hexagon Bolt M8x50mm 316	SYD-126	120.00
577	SYD-127	S.S. Hexagon Bolt M8x20mm 316	SYD-127	189.00
578	SYD-128	S.S. Hexagon Bolt M8x25mm 316	SYD-128	278.00
579	SYD-129	High Grade Aluminum block Size: Length: 60mm, Width:50mm, Thickness 15mm	SYD-129	53.00
580	SYD-130	T-Connectors Model : MDCBT 2230	SYD-130	9.00
581	SYD-131	Three Pole Main Blade set, Drw no. A2-636039, Type: Main Blade for SSBII-AM-145.	A2-636039	1.00
582	SYD-132	Vertical Rod, Drw no. A4-260280-L, Type : Vertical rod for SSBII-AM-145.	A4-260280-L	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
583	SYD-133	Coupling Rod Complete, Drw no. A4-260000-L, Type : Coupling Rod SSBII-AM-145	A4-260000-L	1.00
584	SYD-134	Turn table Coupling Rod complete, Drw no. A4-260033-L, Type : Turn Table Coupling Rod SSBII-AM-14	A4-260033-L	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
Auxiliary Spares				
1	ALF-002	Wash water heater CBM26-20	176456081	1.00
2	ALF-006	Wash water control valve Type 241	20994169	1.00
3	ALF-007	Demulsifier filter EPE 2501	20994170	1.00
4	ALF-008	Level switch water tank mobility	61784	1.00
5	ALF-009	Strainer dieneit 08-180 .6 mm	290994171	6.00
6	ALF-010	Filter insert (2.10G60-AL0-0-V), Filter Element No. 357374/1	290994172	3.00
7	ALF-011	Set of filter gasket 5GV, EPE	290994173	2.00
8	ALF-012	Ball bearing PRG 6313 (fuel washing unit)	290994174	2.00
9	ALF-014	Mechanical seal PRG M3/60-R-DN washing unit, Material SBVGG, Ident # 000 319 001, Burgmann	290994176	2.00
10	ALF-015	Slide bearing PRG foot bearing	290994177	1.00
11	ALF-016	O ring PRG D=151,7 x 5,33 mm	290994178	2.00
12	ALF-018	Main switch P3-63/V/SVB	290994180	1.00
13	ALF-020	Motor protection switch PKZM 1-1,6	290994182	1.00
14	ALF-021	High power control switch NZMH4-63	290994183	1.00
15	ALF-022	Contactors controls DIL2M (230V)	290994184	1.00
16	ALF-024	Operation switch TO-1-15366/E	290994186	2.00
17	ALF-025	Control contactor DILR 22 (230V)	290994187	1.00
18	ALF-026	Control contactor DIL00M (230V)	290994188	1.00
19	ALF-027	Control lamp 130V	290994189	5.00
20	ALF-028	Water pump mechanical seal CN 3/3	290994190	1.00
21	ALF-029	Dieneit pressure guage 0-6 bar 1/2	290994191	1.00
22	ALF-030	Pressure guage -1 to 1.5 bar 1/2	290994192	1.00
23	ALF-031	Flow meter gasket cover 1804	290994193	1.00
24	ALF-032	Flow meter bearing unit 1824	290994194	1.00
25	ALF-033	Flow meter ball bearing 1830	290994195	1.00
26	ALF-034	Flow meter indicator 1828	290994196	1.00
27	ALF-035	Flow meter reed contact 1862	290994197	1.00
28	ALF-036	Thermometer dieneit 0-160° CTR63	290994198	1.00
29	ALF-037	Thermometer dieneit 0-60° CTR64	290994199	1.00
30	ALF-038	Safety valve 512; 1/4x3/8; 2-5 bar	290994200	1.00
31	ALF-039	Rotors set micro oval flow meter LS4051	290994201	1.00
32	ALF-042	Ball bearing 6903-2Z-C3	290994206	6.00
33	ALF-043	Kit containing fuses EPC-400	3183050211	6.00
34	ALF-044	Spare kit flow indicator, Recommended for 3 Years of Operation, ALFALAVAL	176219601	2.00
35	ALF-045	Spare kit pneumatic 3 way valve	74839305	11.00
36	ALF-046	Spare kit pneumatic 3 way valve actuator Diaphragm	176144804	12.00
37	ALF-048	Set of spares for solenoid valve MV10, Part # 1762691-01,	176269101	10.00
38	ALF-049	Set of spares for solenoid valve MV10A, ACSQ Solenoid valve 3/4", SCB210C035 Code 0302335, Holland	176270201	3.00
39	ALF-050	Solenoid valve 131M for 3 way valve HFO & LO	176388901	2.00
40	ALF-052	Spare set IMO ACE-38N LOPX feed Pump	176216431	2.00
41	ALF-055	Valve seat depa 25 sludge pump	14631251	11.00
42	ALF-057	Gasket depa 25 sludge pump	14651040	3.00
43	ALF-058	Shaft depa 25 sludge pump	14645250	4.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
44	ALF-059	Ring set depa 25 sludge pump	14665040	1.00
45	ALF-061	Paring disc finish machined	54924601	4.00
46	ALF-062	Inlet pipe	54924580	4.00
47	ALF-064	Spring LPOX	7118100	73.00
48	ALF-065	Screen	6189900	5.00
49	ALF-066	Glass disc	3868500	3.00
50	ALF-067	Worm wheel shaft for Lopx	52515684	2.00
51	ALF-068	Sealing washer FOPX613	52809801	3.00
52	ALF-069	Worm wheel LOPX	54947604	1.00
53	ALF-070	Stop ring FOPX 613	6517000	1.00
54	ALF-071	Taper pin FOPX 613	6472900	3.00
55	ALF-072	Friction Pad	52057684	5.00
56	ALF-074	Bottom sleeve	6517600	8.00
57	ALF-075	Height adjusting ring	3748100	10.00
58	ALF-076	Height adjusting ring	3748200	19.00
59	ALF-077	Height adjusting ring	37483	3.00
60	ALF-078	Washer	6518100	3.00
61	ALF-079	Bowl spindle	6764100	4.00
62	ALF-080	Worm LOPX 613	69828	1.00
63	ALF-081	Conveyor FOPX 613	6519000	2.00
64	ALF-082	Oil fan	6519400	10.00
65	ALF-083	Ball bearing housing	6519500	2.00
66	ALF-084	Buffer	6519600	36.00
67	ALF-085	Spring FOPX 613	66191	38.00
68	ALF-086	Protecting collar	52165902	2.00
69	ALF-087	Protecting plate	6891900	2.00
70	ALF-088	Screw	221260105	11.00
71	ALF-090	Torroidal transformer for EPC-400	490079518	1.00
72	ALF-091	Circuit breaker 3,0 with push button	490086026	2.00
73	ALF-092	Rubber key for push button	490100802	35.00
74	ALF-095	Flow indicator (176797480) Article No. 1763444-01, AC Solenoid Indicator	1763444-01	23.00
75	ALF-096	Pneumatic 3 way valve	74839382	2.00
76	ALF-097	Solenoid valve block water lopx	176345592	1.00
77	ALF-098	Flow valve 1,8 L/M,	176289481	2.00
78	ALF-099	Flow valve 18 L/M,	176289485	9.00
79	ALF-101	Solenoid valve top part for water assem. LOPX & FOPX	176282601	1.00
80	ALF-102	Strainer insert	176390701	23.00
81	ALF-103	Solenoid valve block-air fopx	176352480	2.00
82	ALF-104	Connecting hose complete (53411581 Replaces 53411580) for Alfa Laval Sweden FOPX 613	53411581	8.00
83	ALF-108	Connecting hose ¾-¾, ID=8.0mm, OD=12.0mm, Length: 2 meters,Working pressure:10 Bar	176390601	9.00
84	ALF-112	Steam heater CBM 26-40 H LOPX	176465082	2.00
85	ALF-113	Diaphragm Operated Pneumatic, Type DL 25 FA-E-E-T suction & discharge Connection 1 inch, air connect	14001112	2.00
86	ALF-114	Air valve depa 25 sludge pump (available in SWS-217) 14601040	2501053	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
87	ALF-115	Bearing depa 25 sludge pump	14664040	2.00
88	ALF-116	Air solenoid 48V depa 25	14664040	1.00
89	ALF-120	Lamp shade green ZB2-BV03	290993282	3.00
90	ALF-121	Magnetic contactor LC1-D2510E7, 48V, 50/60 Hz, 11 KW, 400 V, 15HP-460, Schneider	LC1-D2510E7	2.00
91	ALF-123	Control relay CA2-DN22E7	290993959	4.00
92	ALF-124	Auxiliary relay LA1-DN20	290993958	2.00
93	ALF-125	Main switch sirco 3x63A	290992658	3.00
94	ALF-127	Push button red ZB2-BA4	290993046	4.00
95	ALF-132	Circuit breaker 32A, D32, 3P, Tem Din, D 32, 400 Volt, Make: Terasaki - Spain	DH06D32A	2.00
96	ALF-134	Circuit breaker 2P 4A	290994124	2.00
97	ALF-136	Thermal relay 1.5-2.5A	29099320	1.00
98	ALF-138	Ampere meter 0-25A	290992739	2.00
99	ALF-139	Intermediate service kit for HFO	55786001	7.00
100	ALF-139-D	O ring P # 65133-00	65133-00	18.00
101	ALF-139-F	O ring P # 71686-00	71686-00	9.00
102	ALF-139-G	O ring P # 71866-00	71866-00	18.00
103	ALF-139-I	O ring P # 73212-00	73212-00	15.00
104	ALF-139-P	O ring P # 223406-86	223406-86	23.00
105	ALF-139-Q	Gasket P # 536775-05	536775-05	7.00
106	ALF-139-U	Nozzle P# 542037-03	542037-03	22.00
107	ALF-139-V	O ring P # 2234121-40	2234121-40	18.00
108	ALF-140	Major service kit for HFO	55785901	6.00
109	ALF-140-A	Ball Bearing 2309 M/VQ 335 SKF	ALF-140-A	2.00
110	ALF-141	Screw	19405068	12.00
111	ALF-143	Lifting tool	55573780	1.00
112	ALF-144	Lifting tool for LOPX & FOPX	55574680	1.00
113	ALF-145	Adaptor	54412101	1.00
114	ALF-146	Major service kit for LO	54815301	6.00
115	ALF-147	Friction pad	42084381	15.00
116	ALF-148	O ring for seperator	176390702	26.00
117	ALF-149	Disc bowl	54157981	170.00
118	ALF-152	Torroidal transformer	ALF152	1.00
119	ALF-153	Circuit breaker 3,0A c/w push button	ALF153	1.00
120	ALF-155	Universal control cable 5-pole for dosing pump	SICAH12017PVT1570VA3110C	1.00
121	ALF-156	I/P POSITIONER TYPE 3767, 1/4-18 NPT pneumatic connection electrical connection by coupling M20x1.5	ALF-156	1.00
122	ALF-159	Flow valve 5,5 1/m	176289483	5.00
123	ALF-165	Pneumatic actuator	176342882	2.00
124	ALF-179	Ace pump without motor	290994234	1.00
125	ALF-180	Two way ball valve c/w actuator+switches	290994214	1.00
126	ALF-186	Pressure transmitter AKS 33 1-6 bar danfos	290994231	1.00
127	ALF-188	Worm wheel shaft FOPX613	52515685	1.00
128	ALF-189	Intermediate service kit for LO	55461001	1.00
129	ALF-190	Worm wheel FOPX	54947609	1.00
130	ALF-193	Friction block FOPX613	21042281	7.00
131	ALF-194	Bottom sleeve FOPX 613	73526	5.00
132	ALF-195	Bowl spindle FOPX 613	10737903	2.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
133	ALF-198	Buffer FOPX 613	70708	3.00
134	ALF-199	Ball bearing housing FOPX 613	70711	1.00
135	ALF-200	Spring FOPX 613	7071400	70.00
136	ALF-201	Oil fan FOPX 613	7071700	2.00
137	ALF-202	Buffer FOPX 613	70346	24.00
138	ALF-204	Protecting collar FOPX 613	51978303	3.00
139	ALF-205	Distributing ring FOPX 613	53671702	2.00
140	ALF-206	Cover FOPX 613	53671702	3.00
141	ALF-207	Control paring disc FOPX 613	53671502	3.00
142	ALF-208	Screw FOPX 613	22170610	44.00
143	ALF-209	Screw FOPX 613	22171113	2.00
144	ALF-210	Paring disc FOPX 613	54501102	2.00
145	ALF-211	Paring disc upper FOPX 613	54599780	3.00
146	ALF-213	Sight glass FOPX 613	54457680	3.00
147	ALF-214	Glass tube FOPX 613	51767401	2.00
148	ALF-219	Circuit breaker 3+N16A	290994216	1.00
149	ALF-220	Circuit breaker 3P 20A	290994122	3.00
150	ALF-221	Circuit breaker 1+N4A	290994217	1.00
151	ALF-223	Pilot lamp trafo type	290994218	1.00
152	ALF-234	Auxiliary contact 2NO LAB-DN20	290994221	1.00
153	ALF-241	A meter 243-022G 0-40A	290994226	1.00
154	ALF-243	Set spare ACG 070 N5 pump	290994236	1.00
155	ALF-244	Friction pads FOPX Make: Alfa Laval	52885684	16.00
156	ALF-246	Digital controler SR63-2I1-90-0341C	526311632	1.00
157	ALF-247	Digital controler SR63-4I1-90-0341C	526311634	1.00
158	ALF-251	Cap nut	54502602	3.00
159	ALF-252	Lifting device	54502501	2.00
160	ALF-253	Elastic plate	6057100	2.00
161	ALF-254	Nave	7036300	1.00
162	ALF-255	Screw	834100	58.00
163	ALF-257	Washer	7398800	5.00
164	ALF-258	Nut	6747600	10.00
165	ALF-259	Nut	6747200	5.00
166	ALF-260	Nut	6747300	3.00
167	ALF-261	Spring casing	7398900	3.00
168	ALF-262	Gasket	6519200	12.00
169	ALF-262-MK	Gasket for Spring casing Vertical Drive	65192	1.00
170	ALF-263	Spring	7034000	52.00
171	ALF-264	Wear ring	7071000	6.00
172	ALF-265	Split pin	1643500	6.00
173	ALF-267	Sleeve	7071200	6.00
174	ALF-268	Holder	7071300	3.00
175	ALF-269	Ball bearing	54874703	1.00
176	ALF-270	Lock ring	7071600	1.00
177	ALF-271	Plug	7034700	18.00
178	ALF-272	Cover for FOPX Part # 7501500	7501500	2.00
179	ALF-273	O ring	6520100	4.00
180	ALF-273-Mk	O Ring Coller at Top Bearing Vertical Drive	6520100	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
181	ALF-274	Gear wheel	6921400	2.00
182	ALF-275	Pin	6922600	2.00
183	ALF-276	Pin	6921200	1.00
184	ALF-277	Spring	3909600	3.00
185	ALF-278	Friction pad (break)	31063784	12.00
186	ALF-279	Spring FOPX	26008355	34.00
187	ALF-280	Screw	22171613	40.00
188	ALF-281	Screw	22171613	17.00
189	ALF-282	Level ring	53733905	2.00
190	ALF-283	Inlet pipe	55424280	2.00
191	ALF-284	Rectangular ring	840100	18.00
192	ALF-284-MK	Rectangular Ring (Inlet Tube/Operating Water)	840100	4.00
193	ALF-285	Clamp washer	53018501	3.00
194	ALF-286	Washer	22310134	6.00
195	ALF-287	Nut	7294700	17.00
196	ALF-288	Distributing ring	53671802	2.00
197	ALF-289	Inlet pipe	52410687	5.00
198	ALF-290	Service kit 3-yrs FOPX	55787301	5.00
199	ALF-291	Puller tools	52851480	1.00
200	ALF-292	Screw	7248000	6.00
201	ALF-293	O ring	6756600	31.00
202	ALF-294	Adjusting ring	53020802	3.00
203	ALF-295	Inlet tube	55424281	8.00
204	ALF-296	Distributing cover	53633181	4.00
205	ALF-297	Ball valve	54833301	2.00
206	ALF-298	Valve plug	53786402	46.00
207	ALF-299	Nozzle	54233604	24.00
208	ALF-300	Gasket	3896700	12.00
209	ALF-301	Gasket	6521100	12.00
210	ALF-303	Adjusting washer	6325600	34.00
211	ALF-304	Ball	819000	8.00
212	ALF-305	Sleeve	6517800	3.00
213	ALF-306	Pin	6539100	4.00
214	ALF-307	Plug	6517900	3.00
215	ALF-308	Sleeve	6518800	1.00
216	ALF-309	Spring casing	6519100	3.00
217	ALF-310	Washer	6518900	3.00
218	ALF-311	Screw bolt for bearing housing LOPX	7293600	24.00
219	ALF-312	Washer	6209400	89.00
220	ALF-313	Screw	221172308	70.00
221	ALF-314	Bushing	7032100	1.00
222	ALF-316	Seal ring (Oil seal SC 16 x 30 x 7 x 3)	3871000	4.00
223	ALF-317	Brake shoe	53760285	1.00
224	ALF-318	Worm wheel for LOPX	54947605	1.00
225	ALF-319	Service kit frame feet (foundation pad)	54854201	6.00
226	ALF-320	Screw	834100	130.00
227	ALF-321	Flow valve 18 L/M	179289485	2.00
228	ALF-322	Set of spares for solenoid valve	176279201	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
229	ALF-323	Rectanular ring	6523200	4.00
230	ALF-324	Rectanular ring	6523500	4.00
231	ALF-325	Gasket	3749000	10.00
232	ALF-326A	HFO Heater U-Tubes for FOPX V22-2P L=1500, Connection PN 16 DN 80 Make: Bloksma	FOPX V22-2P	1.00
233	ALF-327	Flow control disc	545995-02	4.00
234	ALF-328	O ring	7435500	42.00
235	ALF-329	O ring	22341256	37.00
236	ALF-330	O ring, LOPX ID:36mm, OD: 44mm, Thickness:4mm, Temperature:150°C	42150	35.00
237	ALF-331	Guide lug	7187700	8.00
238	ALF-332	Solenoid valve block	176345486	1.00
239	ALF-333	Spring support	53674601	6.00
240	ALF-336	Constant flow valve 0.9L/M	1762894-80	3.00
241	ALF-337	Constant flow valve 0.4L/M	1762894-90	3.00
242	ALF-338	Non return valve G1/2	2545150-02	1.00
243	ALF-339	Non return valve G3/4	2545150-03	1.00
244	ALF-340	Pneumatic change over valve	1763414-02	1.00
245	ALF-341	Spare kit for pneumatic valve	1762237-01	2.00
246	ALF-342	Non return valve	1764506-01	1.00
247	ALF-343	Pressure switch	1764764-05	2.00
248	ALF-344	Shutt off valve	1764621-02	1.00
249	ALF-345	Motor Drive for Steam Valve LOPX Kvs=4.0, AVR32W32 F920, 24 V AC 50-60 Hz, IP55, Make: SAUTER	1763197-01	2.00
250	ALF-346	Low pressure switch KPS-33 Range 0..3.5 bar Diff:.02 bar, Switch SPDT, Danfoss	1764764-01	4.00
251	ALF-347	High pressure switch	1764764-02	1.00
252	ALF-349	Nipple with non return valve MV10	1764015-80	5.00
253	ALF-350	Filter Regulator Pressure guage 0-12 bar, Part No. P3LEA12EPSBNGP, PL3 Lite 1/4" Make: Parker	P3LEA12EPSBNGP	4.00
254	ALF-351	Locking ring W.par chamb	545996-02	4.00
255	ALF-352	Screw FOPX (Dosing ring Allen bolt)	221721-20	90.00
256	ALF-353	Hexagon nipple	526353-08	6.00
257	ALF-354	Screw	2212602-19	25.00
258	ALF-355	Nut	221893-10	30.00
259	ALF-356	Screw	72926	98.00
260	ALF-357	Worm Wheel FOPX 613TFD-20	549476-10	2.00
261	ALF-358	Screw	72933	22.00
262	ALF-359	Spring washer	40040	86.00
263	ALF-360	Nave	65152	1.00
264	ALF-361	Guard	65199	6.00
265	ALF-362	Screw (Dosing ring allen bolt)	221721-19	113.00
266	ALF-363	Guard	65199	2.00
267	ALF-365	Spare kit for Water Transducer WT-200, Includes, MT-50 Circuit board 31830-4547-4, Supply Board 3183	176521681	4.00
268	ALF-366	Needle valve wit control flange	176390301	4.00
269	ALF-367	Needle valve wit control flange	176390302	2.00
270	ALF-368	Control Module, EPC-400, Part No. 31830-5010-4, Make Alfa Laval	3183050104	2.00
271	ALF-370	Rubber diagh purifier MV-10 o rings	MV-10A	6.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
272	ALF-371	Air inlet pressure control station	4708 11	1.00
273	ALF-372	Frequency convetor driver 400Hz IP20 (VLT 2800)	VTL-2800	1.00
274	ALF-373	Airline filter regulator 1/4" .2-2.7bar, Auto Drain with Pressure gauge, Make COAP	5.40 PSI	1.00
275	ALF-375	Terminal block 04kw motor seperator feed p/p	ALF375L	5.00
276	ALF-377	Cover	557781-02	1.00
277	ALF-378	Lock pin 25 x 3mm	ALF378L	22.00
278	ALF-379	Rubber Oil Seal size = 22 x 12 x 7 mm for LOPX pump	ALF379L	8.00
279	ALF-380	Terminal board	37446-999	2.00
280	ALF-381	Relay For Electro pneumatic positioner 8013 Series, Make: Masoneilan France	88-60942010	1.00
281	ALF-382	Coil	400078977-888	2.00
282	ALF-383	Flexure strip	63225001000	2.00
283	ALF-384	Flexure strip	63225002000	2.00
284	ALF-385	Diaphragm S/A	18-50174-999	8.00
285	ALF-386	Bellofram S/A	18-50171-999	5.00
286	ALF-387	Gasket	601-88008000	9.00
287	ALF-388	Metering tube	60189015999	2.00
288	ALF-389	Case	403101032951	1.00
289	ALF-390	Magnet S/A, Dresser flow contol	400082882999	1.00
290	ALF-391	Positioner, Part # 060942010-999-0000, Model # 8013-257 Signal:4 to 20 Ma, Make: Masonellon	8013-257	3.00
291	ALF-392	Flow meter 0-8 Cubic M/Hr	1761974-80	1.00
292	ALF-393	Spare kit for flow meter	1762196-01	3.00
293	ALF-395	O ring 2.5mmx78 for flow meter	ALF395L	15.00
294	ALF-396	O ring 2mmx78 for flow meter	ALF396L	16.00
295	ALF-397	Frequency/current converter KFU-UFC	104657	1.00
296	ALF-398	Magnetic Contactor, 220VAC AC3 32A, 7.5KW / 400 Volt, 10HP / 480V, 220V, 50/60Hz, LC1D18M7,	LC1D18M7	3.00
297	ALF-399	Auxiliary cont block 3NO+1NC, Type: LA1 DN31, Make: Telemecanique	LAI DN31	2.00
298	ALF-401	Accessories for overload	LA7D03M	2.00
299	ALF-402	Magnetic coup gear 359749+359751 (HFO washing) New	1A-A/3A19/D	1.00
300	ALF-403	Service pack (HFO washing/demulsifire dosing p/p)	1-RS319-A-A	2.00
301	ALF-405	Relay 14pins 230VAC3A250VAC1	C9-A41	10.00
302	ALF-406	Rubber pipe 205x300mm 150C 1.5Bar	ALF406L	3.00
303	ALF-407	Mini Switch 611-E121-001, MRF PN E121SD1CGE, ON-(ON) DPDT PCB, C&K Pushbutton Switches	611-E121-001	25.00
304	ALF-408	Micro resistors 1K Ohms	ALF408L	24.00
305	ALF-409	Unit overhaul kit	176603980	1.00
306	ALF-410	Unbalance sensor kit SU400 LO seperator	56189581	1.00
307	ALF-413	Flow valve 1.6 L/M SU400 LO seperator	176603707	2.00
308	ALF-414	Flow valve 11.0 L/M SU400 LO seperator	176603702	2.00
309	ALF-415	Flow valve 2.8 L/M SU400 LO seperator	176603703	1.00
310	ALF-416	Water transducer SU400 LO seperator	176476084	1.00
311	ALF-417	Pressure transmitter 06-bar MBS 3000 060G1124	176589701	3.00
312	ALF-418	Temperature sensor	176443980	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
313	ALF-421	Screw for friction pad HFO/LO	ALF421L	31.00
314	ALF-422	Solenoid coil, 250volt 10watt, Size: 30 by 30 mm. height 40mm. Hole dia for Plunger: 13mm.	ALF422L	2.00
315	ALF-423	Flat belt	56346801	2.00
316	ALF-425	Overhaul kit SU 400	56491901	2.00
317	ALF-426	Inspection kit SU 400	56491701	1.00
318	ALF-427	Intermediate service kit MOPX 303	54666906	3.00
319	ALF-428	Eprom kit	3183063611	1.00
320	ALF-429	Eprom kit (3183062131)	318363601	1.00
321	ALF-432	Teflon washer 31x25x1mm	ALF432L	67.00
322	ALF-434	Gasket 1mm klinger	ALF434L	24.00
323	ALF-435	V-belt SPA-2650 for HFO washing unit	ALF435L	9.00
324	ALF-436	Locking (SU 400)	56187680	1.00
325	ALF-437	Nut (SU 400)	56189701	1.00
326	ALF-438	Spring Support	7070900	6.00
327	ALF-439	Lock Ring For FOPX	51868901	2.00
328	ALF-440	Top Disc	54515602	2.00
329	ALF-442	Lamp holder Z-BV7	Z-BV7	5.00
330	ALF-444	Soleniod Valve dia 3/4"	SCXE210D095.	1.00
331	ALF-445	Soleniod Valve dia 3/4" 10A	SCX 210C035	1.00
332	ALF-446	Trapper lock pully 150x42xH50mm	150-3SPA-2517	2.00
333	ALF-447	Tapper lock for 150	3SPA 2517	2.00
334	ALF-449	O-ring 3mmx78mm -flow meter	ALF449L	12.00
335	ALF-500	Paring chamber for LOPX	549248-02	2.00
336	ALF-504	Hexagon screw FOPX	55560402	1.00
337	ALF-505	Pin spanner FOPX	6538000	1.00
338	ALF-506	Pin spanner FOPX	51964603	1.00
339	ALF-507A	Connecting Rod	1036735	1.00
340	ALF-507B	Sleeve, Material code 1017948, for pump Code: Sigma 1 S1Ca 12017 PVT 1570UA31101, Make: Prominent	1017948	2.00
341	ALF-508	PVT liquid ends complete (Washing unit)	1010560	1.00
342	ALF-509	Valve complete	1002267	3.00
343	ALF-510	Diaphragm	1010279	3.00
344	ALF-511	Spare part kit or sigma dosing pump	1010541	2.00
345	ALF-512	Strainer model:YS12C M111	YS12C M111	2.00
346	ALF-514	Gasket ID=33mm,OD49mm	ALF514L	32.00
347	ALF-516	Steam packing rectangular	ALF516L	6.00
348	ALF-517	Rectangle ring LOPX	67575	10.00
349	ALF-518	Seal ring LOPX	71440	14.00
350	ALF-519	Rectangle ring FOPX	74722	18.00
351	ALF-520	Seal (rectangular) ring FOPX	74736	4.00
352	ALF-523	Temperature Guage with Electric Contact 0-120	ALF523L	1.00
353	ALF-524	S.S.Filter with handle (HFO)	ALF-524-L	3.00
354	ALF-525	O ring (LO inlet pipe FOPX & LOPX)	223406-31	63.00
355	ALF-526	Rectanglar ring (LO inlet pipe FOPX & LOPX)	190603	52.00
356	ALF-527	O ring (Water assembly FOPX & LOPX)	223404-18	5.00
357	ALF-528	O ring LOPX sliding bowl)	42154	39.00
358	ALF-529	Nut (Vertical Shaft) LOPX	549276-01	36.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
359	ALF-530	Spring sleeve Horizontal shaft (LOPX & FOPX)	38160	16.00
360	ALF-531	O ring for water inlet pipe tube	74067	33.00
361	ALF-531-MK	O ring for water Inlet tube	ALF-531-MK	3.00
362	ALF-532	Holding bracket (for friction pad)	70372	17.00
363	ALF-533	Screw (for friction pad LOPX & FOPX)	73801	58.00
364	ALF-535	Integral Action Controller, Type: 6DR 2004-1, AC 220V/240,Max. 21VA/13W, Make: Siemens	6DR 2004-1, DR 2801-8D	1.00
365	ALF-537	Digital Flow Meter, Type DC1010 CL -311000-E supply : 85-265V AC, Input 4-20 MA / 0.0---9999.	ALF-537-L	1.00
366	ALF-541	Glass for flow meter.	ALF-541-L	3.00
367	ALF-542	Angular Contact Bearing 7214 BEM1/VQ335 072D Make: SKF	54874501	9.00
368	ALF-543	Hexagonal bolt M12x30 Grade 8.8 (Imported)	ALF-543-L	250.00
369	ALF-544	Circuit Breaker 40A, D40, 3P, Tem Din, D 40, 400 Volt, Make: Terasaki - Spain	DHO6D40A	4.00
370	ALF-545	Bearing 6214 M4 / C3VQ335, Make: SKF, Made in France	54874703	3.00
371	ALF-546	Shaft seal G050, Type T038 UR4 BMV IMO Pump (Old # 190850)	192693	5.00
372	ALF-547	O-ring (for LOPX Major Kit)	ALF-547	28.00
373	ALF-549	Ball bearing 22 5147- M SKF (for LOPX Major Kit)	ALF-549	14.00
374	ALF-550	Ball bearing 2308M/VQ335 SKF	548746-03	3.00
375	ALF-550-MK	Ball bearing 2308M/VQ335 SKF	ALF-550-MK	7.00
376	ALF-551-MK	Ball bearing 6014 M/C350	ALF-551-MK	6.00
377	ALF-552-MK	Ball bearing 6015 M/C350	ALF-552-MK	5.00
378	ALF-553	Ball bearing 6213 M4/C 350 SKF	ALF-553	4.00
379	ALF-553-MK	Ball bearing 6213 M4/C 350 SKF	ALF-553-MK	1.00
380	ALF-554	O ring (for LOPX Major Kit)	ALF-554	1.00
381	ALF-554-Mk	O-ring (64104)	64104	1.00
382	ALF-555	Gasket (Friction Coupling)	38164	2.00
383	ALF-555-MK	Gasket (38164)	38164	5.00
384	ALF-556	Lock Washer (for LOPX Major Kit)	ALF-556	2.00
385	ALF-556-MK	Lock washer (38159)	38159	2.00
386	ALF-557	Ball Bearing 6305 SKF (for LOPC Major Kit)	ALF-557	6.00
387	ALF-557-MK	Ball bearing 6305 SKF	ALF-557-MK	7.00
388	ALF-558	Ball bearing 6206 SKF (7826)	7826	2.00
389	ALF-558-MK	Ball bearing 6206 11080/3 HSKF	ALF-558-MK	7.00
390	ALF-559	Lock Washer (for LOPX Major Kit)	ALF-559	4.00
391	ALF-560-MK	Ball bearing 6306 SKF	ALF-560-MK	6.00
392	ALF-561	Ball bearing 6211 SKF (for LOPX Major Kit)	ALF-561	10.00
393	ALF-563	O ring (for LOPX Major Kit)	ALF-563	2.00
394	ALF-563-MK	O-ring (260190 03)	260190 03	2.00
395	ALF-564-MK	Gasket (Gear Cover)	65220	11.00
396	ALF-566	Diaphragm Ref 40, for Camflex II valve series 35002 Make: Masonellan France:(00-035104040-7160000)	00-035104040-7160000	2.00
397	ALF-567	Piston Ref No. 43, for Camflex II valve series 35002 Make: Masonellan France: (00-035104020-7790000)	00-035104020-7790000	2.00
398	ALF-569	Coil for solenoid 48 Volt, AC	ALF-569	6.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
399	ALF-570	Non Return Valve Type: RK 41, Size DN15, Body: CW710R/Special Brass Value Disc 1.4571/S.S, 6-16 bar	ALF-570-L	2.00
400	ALF-571	Steam Regulating Valve 2", Type: 35-35202-8013-77-4G-HW, KV:50, Incl: Actuator, Make: MASOLEIN	35-35212	23.00
401	ALF-571A	PLUG, For valve, CAMFLEX VALVE 35-,35212, 2"PN 16, CV, Make: MASOLEIN	ALF-571A	1.00
402	ALF-572	Distributor for FOPX	544948-80	2.00
403	ALF-573	Flow Transmitter Model LSF41-L0-R1, Port Size 2-Rp1/8, Make: Oval, OVAL M-111 - Japan	LSF41-L0-R1	2.00
404	ALF-574	Flow Transmitter Model LSF45-L0-R1, Port Size 2-Rp1/4, Make: Oval, OVAL M-111 - Japan	LSF45-L0-R1	1.00
405	ALF-575	Globe Valve DN15 PN16	ALF-575	2.00
406	ALF-576	TubeTastic Tube Oil Skimmer	ALF-576	1.00
407	ALF-577	O ring Part # 564626-02 Replaced with 57946402 (Brass Type)	ALF-577	1.00
408	ALF-578	Coupling Disk LOPX Part # 65155	65155	2.00
409	ALF-579	Coupling Disk FOPX Part # 71460	71460	3.00
410	ALF-580	Height Adjusting Ring 1mm	ALF-580	9.00
411	ALF-582	Clamping Strrup for FOPX, Part No. 519463-02	519463-02	2.00
412	ALF-583	Support for FOPX, Part No. 524104-02	524104-02	3.00
413	ALF-584	Support for FOPX, Part No. 544119-02	544119-02	1.00
414	ALF-585	Connecting Hosting, for FOPX Part No. 546433-01	546433-01	2.00
415	ALF-586	Pairing Disk for FOPX, Part No. 545997-80	545997-80	2.00
416	ALF-587	Lock Ring with Pairing Champ Cover for FOPX Part 545996	545996	2.00
417	ALF-588	Flow Controll Disc for FOPX, Part No. 545995-02	545995-02	1.00
418	ALF-589	Position Switch with Angle Roller Lever	ALF-589	4.00
419	ALF-590	Wash Water Flowmeter BGN-S 7-70 L/H DN25 PN40	ALF-590	2.00
420	ALF-591	Distributing Cone Part No. 543046-80	42084381	1.00
421	ALF-592	Vibration Trip/Display Module	ALF-592	1.00
422	ALF-593	Vibration Sensors	ALF-593	1.00
423	ALF-594	Low Pressure Switch, 901.64 117L4, Adjustable range between 50 to 250mbar,Media: Fuel Oil, IMPRESS	901.64 117L4	1.00
424	ALF-595	Water Transducer WT-200, for FOPX 613 & LOPX 709, Artical No. 31830-1770-01, Make: Alfa Laval	31830-1770-01	1.00
425	ALF-597	Spare Kit Separator	ALF-597	2.00
426	ALF-598	Control Element Module 140XBP	ALF-598	1.00
427	ALF-599	Control Element Module 140XBP	ALF-599	1.00
428	ALF-600	Solenoid Operated Valve for Purifier	ALF-600	1.00
429	ALF-601	Screw for FOPX Part No. 536773-02	536773.02	14.00
430	ALF-602	Major service Kit FOPX-613, Part # 557859-01	557859-01	4.00
431	ALF-603	Major service Kit LOPX-709, Part # 548153-01	548153-01	6.00
432	BOL-001	Drain cock 1/4"	12588	9.00
433	BOL-002	Hydraulic oil (per ltr)	95423	10.00
434	BOL-004	Mech seal CR4 20/1-220 (Aux.boiler feed pump)	985202	2.00
435	BOL-005	Repair set mechanical seal	16308-034	1.00
436	BOL-006	Mechanical Seal for Boiler Circulating Pump, Pos # 43.3, Part # 43008622, BU h7N B 028 Q1AEGG-EN 127	16308-028	2.00
437	BOL-007	Gasket	16547	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
438	BOL-008	Spring valve discharge	UH18285	7.00
439	BOL-009	Disc check valve	UH25196	9.00
440	BOL-010	Spring valve inlate	UH18286	7.00
441	BOL-011	Seat check valve	UH25189	9.00
442	BOL-013	Diaphragm	UH15055	7.00
443	BOL-014	Insert rubber discharge snubber	UH17616	3.00
444	BOL-015	Insert rubber intake snubber	UH60077	1.00
445	BOL-016	Nozzle oil L.F.	200105	1.00
446	BOL-017	Nozzle oil H.F.	22520	3.00
447	BOL-018	Level switch clayton pump	190762	1.00
448	BOL-019	Relay 2NO + 2NC	99460	2.00
449	BOL-020	Fuse 4A	190410	16.00
450	BOL-021	Sensor temperature J exhaust gas	200680	1.00
451	BOL-022	Fuse 1A	190408	14.00
452	BOL-026	Blowdown valve accu	200608	2.00
453	BOL-027	Steam trap	200370	1.00
454	BOL-030	Limit Switch, Bistable Reed Contacts, Max. Switching Capacity: 20VA, 250VAC, 1.5A, Make: KROHNE	MS 15/RE	2.00
455	BOL-031	Level controller hotwell	241560-041	1.00
456	BOL-032	Sensor temp. J steam drum	190484	1.00
457	BOL-033	Fuse 12A water pump	190235	13.00
458	BOL-034	Fuse isolator 25A	190214	1.00
459	BOL-035	Time relay 10-180	190166	1.00
460	BOL-038	Switch oil level	18381	1.00
461	BOL-039	Electrode ignition	JL1567	13.00
462	BOL-042	UV cell	190185	5.00
463	BOL-043	Switch body 1NC+1NO	190299	5.00
464	BOL-045	Air pressure switch	190287	2.00
465	BOL-046	Switch main 3P 32A 11KW	190415	2.00
466	BOL-047	Solenoid water by pass	18160	2.00
467	BOL-048	Coil fuel valve 220/50 230/60 19W	190206	2.00
468	BOL-049	Solenoid air damper	17522	2.00
469	BOL-051	Insulation block 18x3x1"	B11559	96.00
470	BOL-054	Valve solenoid water ¾" 220V	190244	8.00
471	BOL-057	Lamp test 9 diode	190101	11.00
472	BOL-060	Switch Emergency Mushroom Type Push button, 1NO/1NC contact, Model : XB2 83642	XB2 83642	3.00
473	BOL-061	Netfilter 220V/6A	200850	1.00
474	BOL-062	Switch pressure G½	PR16308/019	1.00
475	BOL-063	Controller level	PR/16308/003	1.00
476	BOL-065	Seat puller	UH25257	1.00
477	BOL-066	Seat driver	UH18389	1.00
478	BOL-069	Cable set PLC XBTK	200231	1.00
479	BOL-071	Motor starter GV2ME20, TeSys-034319, Schneider	GV2ME20	2.00
480	BOL-072	Switch head push button	190305	2.00
481	BOL-073	Switch main 3P 125A 55KW	200150	1.00
482	BOL-075	Sensor pressure 0-25 bar	200728	1.00
483	BOL-076	Thermic integral LB1-LC03M22 32 16-25A	LB1-LC03M22	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
484	BOL-077	Protection module LB1LB03P06 integral 18 1-1.6A, TYPE : LB1LB03P06, Make: Telemecanique.	LB1-LB03P06	1.00
485	BOL-078	Thermal Protection Module LB1-LB03P17,10-16A, TYPE : LB1-LB03P17, Make: Telemecanique.	LB1-LB03P17	4.00
486	BOL-080	Digital in-output PLC	200137	1.00
487	BOL-081	Cable extension module PLC	201275	1.00
488	BOL-082	PLC TS x 17	200133	1.00
489	BOL-085	Battery lithium PLC, TSX17ACC1, (Inorganic Lithium Battery Size 1/2 AA, 3.6 Volts, SL-350 PVVC	200136	1.00
490	BOL-086	Input analog PLC 4-20MAx4	200229	1.00
491	BOL-088	Valve SOL F.1/4" 220V, Model 10600189, TPL: 24017, Size 1/4", Pressure,10 bar, Voltage 230VAC / 4 Watt	190175	2.00
492	BOL-089	Dolenoid 230V 50/60HZ WESCO	017520	2.00
493	BOL-090	Switch body 2NO	190297	1.00
494	BOL-091	Solenoid wesco 230V 50/60HZ	018158	4.00
495	BOL-092	Switch POS	190671	1.00
496	BOL-094	Valve steam MTR DN32PN40	200938	1.00
497	BOL-096	Switch head 2 POS	190306	4.00
498	BOL-097	M.S. PIPE SCH 40 with nut & ferrul both ends	201356	15.00
499	BOL-098	Impeller POS 23.00 for boiler circulating pump	007932	1.00
500	BOL-100	Bearing cover POS 36.00 boiler circulating pump	BOL100	2.00
501	BOL-101	Casing for mechanical seal boiler circulating pump	BOL101	2.00
502	BOL-102	Shaft sleeve POS 52.30 boiler circulating pump	20029875	1.00
503	BOL-103	Sleeve bearing POS 52.90 boiler circulating pump	43001409	2.00
504	BOL-104	Shaft POS 21.00 boiler circulating pump 65004657	65004657	2.00
505	BOL-105	Display PLC 2x21 CHAR	201255	1.00
506	BOL-106	Transformer 400-440V/230-24V	190087	1.00
507	BOL-108	Regeneration control valve 415 vai bsp	201504	3.00
508	BOL-110	2/2-way Plastic Diaphragm Valve, Nominal Size: DN 25, Type:667, Part # 667 25D 0 1142	667 25D 0 1142	3.00
509	BOL-112	Transformer 220V / 2x6500V	190520	1.00
510	BOL-113	Cable ignition L=800	190537	2.00
511	BOL-115	Nozzle 9.5 GPH 90°	33524	4.00
512	BOL-116	Nozzle 80° 4.5 GPH PLP	200105	8.00
513	BOL-117	Filter cuno 3/8 NPT E-100 REV A	0121 85	3.00
514	BOL-119	Bearing flange side	19118	4.00
515	BOL-120	Coil solenoid 230V50HZ	18160	4.00
516	BOL-121	Temperature switch	99504	1.00
517	BOL-122	Rotor and hub assembly E-100	UH 26015	1.00
518	BOL-124	Spring return damper	UH 14717	1.00
519	BOL-125	Coil solenoid	17522	1.00
520	BOL-126	Crank shaft	UH 60510	1.00
521	BOL-127	Gear 115T	UH 14103	1.00
522	BOL-128	Bearing roller tanker TS2578	19253	4.00
523	BOL-129	Spring return diaph	UH 12803	2.00
524	BOL-130	Seal oil CR # 9760	29211	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
525	BOL-131	Seal oil	17399	2.00
526	BOL-132	Retainer insert	UH 16371	2.00
527	BOL-133	Check valve assembly	UH 23304	1.00
528	BOL-136	Sleeve bearing 54.00 position	BOL136	1.00
529	BOL-137	Rod bypass upper	UH61246	2.00
530	BOL-138	CPLG rod bypass	UH12375	2.00
531	BOL-139	Pin rod bypass	UH15758	2.00
532	BOL-140	Rod bypass lower	UH61236	2.00
533	BOL-141	Seat	UH13660	2.00
534	BOL-142	Disc	UH13661	2.00
535	BOL-143	Protection module	LB1 LC03M22	2.00
536	BOL-144	Intrinsically safe control unit	KF02-PT2-EXI-5 & EX-0	1.00
537	BOL-147	Air pressure/flow switch	C6097A2210	1.00
538	BOL-149	Diaphragm for prs.v/v 41-73 4.5-10bar	5200943	8.00
539	BOL-150	Diaphragm for prs. v/v 41-73 8-16 bar	5200943	8.00
540	BOL-151	Diaphragm for prs.v/v 41-73 4.5-10 bar	5200868	7.00
541	BOL-152	Complete actuator 4.5-10 bar	2413-0011	1.00
542	BOL-153	Complete actuator 8-16 bar	2413-0012	1.00
543	BOL-154	Top distributor 415-VA 1BSP	BOL154	7.00
544	BOL-155	Bottom distributor 415-VA 1BSP	BOL155	3.00
545	BOL-157A	Poly Glass Vessel for Softner, Item No. 30507, Size 10x 44: 2.5" Top opening with Raiser Tube	30507	1.00
546	BOL-159	Temperature regulator Auxiliary Voltage: 100-240VAC, Model: 400-RR-1-000, 1/16 DIN 48 X 48, 4-Digit	101528	1.00
547	BOL-161	Heater 220V50WL=200	177129	3.00
548	BOL-162	Photoresistance landis QRB3(1)	139106	1.00
549	BOL-164	Base control box landis AGM41.049.05	111012	1.00
550	BOL-165	Ignition transformer D4 7326	191334	1.00
551	BOL-166	Coil elek 1930 1415-VL 230V, Fast Safety Solenoid Coil, 230 VAC; 50 Hz; Power= 45W Model: VML35L 46, 6L	112278	1.00
552	BOL-167	Heater 220V3.5KwLR340	177120	5.00
553	BOL-168	Ignition electrode	133246	2.00
554	BOL-169	Gr. servomotor MDL24+230V50:60Hz	053898	1.00
555	BOL-170	Fan TGT D380x130RD HUB	291071	1.00
556	BOL-171	Probe of temperature gefran	185853	1.00
557	BOL-172	Sleeve bearing	POS 54.00	5.00
558	BOL-173	Locking screw	POS 90.03	6.00
559	BOL-174	Oil Seal	POS 52.50	6.00
560	BOL-175	Nut	POS 92.20	2.00
561	BOL-177	Key	POS 94.00	2.00
562	BOL-178	Fan for motor 8.5"x40x35x50mm	BOL178L	1.00
563	BOL-179	Motor starter 3 pole cont breaker	LDI-LC030	3.00
564	BOL-180	Thermal magnetic mod. 16-25 Amps	LB1-LC03M22	2.00
565	BOL-181	Instantaneous auxiliary cont block	LA1-LC010	2.00
566	BOL-182	PRV actuator 2425 compatible	1102672	1.00
567	BOL-183	Industrial nozzle with pin, WR2-50 400 KG/H, Ref # 284325, Make: F.B.R.	284325	3.00
568	BOL-184	Group cross piece FGP450/M	052850	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
569	BOL-185	Spare kit for solenoid ¼ 220V/50HZ	L145R4	6.00
570	BOL-186	Thermostats mech. 40-300 deg C, Type H72120, MINISTAT 634.25.53.122.2.35.12160150.44, Make: Trafaq.	614-24-53	2.00
571	BOL-188	Lips seal, Size 35 x 42 x 3.5 mm	43006740	8.00
572	BOL-189	Gasket, Pos. 40.00 Part No. 43005373	43005373	3.00
573	BOL-190	Gasket Pos. 40.01 Part # 43034050	43034050	4.00
574	BOL-191	Gasket Pos. 40.02 Part # 43057942	43057942	4.00
575	BOL-192	O ring, ID:28mm, OD: 36mm, Thickness: 4mm, Pos. No. 41.20 Part # 43007014	43007014	17.00
576	BOL-193	O ring	43003052	6.00
577	BOL-195	Guage glass 170 C temp	BOL195L	2.00
578	BOL-196	Asbestos packing 45x4mm	BOL196L	91.00
579	BOL-197	Mounting feet motor frame 132M for boiler circulation pump motors	7017 045	1.00
580	BOL-199	LIP seal 64mm 45mm 5.5mm	BOL199L	9.00
581	BOL-200	Fiber glass rope 500c	BOL200L	25.00
582	BOL-201	Magnetic Cylindrical float	ZVSS-250	2.00
583	BOL-202	Lip seal 40 mm	BOL202L	5.00
584	BOL-206	Gasket steam packing klinger	BOL206L	51.00
585	BOL-207	Copper gasket 90mmx112mm	BOL207L	10.00
586	BOL-208	Motor operated valve for steam, Type: 421 555C/49ev/49(1 or F)22, Fb Nr. V201 4212, Make: KFM Regulat	421 555C/49	1.00
587	BOL-209	Actuator for Blow down Value EL-55	BOL209	1.00
588	BOL-211	Ball float steam trap 25 mm	BOL-211-L	2.00
589	BOL-213	Spring L=129.5mm, ID=49.3m, OD=57.28, Thick=4.5mm (Non return valve)	BOL-213-L	4.00
590	BOL-215	Temperature Guage 0-500 Centigrade, Dial size : 6 " with back mounted., Thread type :3/4" Fixed with	BOL-215-L	3.00
591	BOL-216	Aux.contact LA1 LB015, TYPE : LA1 LB015, Make: Telemecanique.	LA1 LB015	2.00
592	BOL-217	Spring for inspection door, For DDFC 5TPH fire tube boiler, Boiler # DDFC - 1077	Boiler # DDFC - 1077	20.00
593	BOL-218	S.S. flexible pipe, Working pressure 10 bar, Temperature 300 C, both end 1/2" thread	BOL-218-L	13.00
594	BOL-219	Jaw Coupling Hub SKU - 422611, Bore Dia. 24 (mm), Keyway 8.0 x 3.3 mm, Outside Dia. 64.516 mm, Overall	SKU - 422611	3.00
595	BOL-222	Spider Aluminum coupling Size: A24/32, Make: JOVEJOY	BOL-222-L	3.00
596	BOL-223	Insert for coupling size A24/32 Make: JOVEJOY, for Auxilary HFO Fired Boiler-C	BOL-223-L	2.00
597	BOL-224	Oil Pump T4A-105, OIL PUMP TYPE T4A-105, Serial Number 1001011 or 7001011, MAKE: Suntec	BOL-224-L	1.00
598	BOL-225	Pressure Regulating Valve., Type: TV10011, Make: Suntec	TV10011	1.00
599	BOL-228	High temprature Thermostate 100-160-0 Degree C, NT 6544, NOT-UK T150 19 02 L5	NT 6544, NOT-UK T150 19 02 L	2.00
600	BOL-231	Ball bearing 3204 ATN9 Make: SKF	BOL-231-L	2.00
601	BOL-234	Indication lamp (LED type) Green, APT, AD16-22D, 220VAC	BOL-234-L	9.00
602	BOL-235	Indication lamp (LED type) Red, APT, AD16-22D, 220VAC	BOL-235-L	2.00
603	BOL-237	Castable Refractory Packing 40 Kgs./Kgs.	BOL-237-L	75.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
604	BOL-238	Mechanical seal, Pump Type: SV 812F55T, Q 614 M3/H, H149 80 MH min M, M 2900 l/min, Make: Lowara	002231638	1.00
605	BOL-239	O- ring Vitone® Size 73 x 80 x 3.5mm for heater	BOL-239	55.00
606	BOL-240	Magnetic switch rating 230VAC/40VA/1A, Cable silicon 4x0.75mm ² , Length 1m, Make: KUBLER-France	BGU-1 Sil	2.00
607	BOL-241	Cartidge Heaters 30W, For Boiler Bur Part # 177127, Make: F.B.R. (Italy), Boiler model # FNDP 550/M TL		1.00
608	BOL-244	Solenoid driven diaphragm type dosing pump Model: CNPA0704PPE, Rate 3.9L/h P# 1022483 Make: Prominent	1022483	1.00
609	BOL-246	Level Controller, Main Supply Voltage: 198 - 264 VAC, Frequency: 50 Hz, Model: LC 1350, Make: Spirax	LC 1350	1.00
610	BOL-249	Fan Blower for HFO Oil Fired 5TPH steam Boiler;	BOL-249	1.00
611	BOS-001	Set minor kit pumps (for IMO pump ACG 045K5, ITBP Manuf. year 96 Sr. # 436013	179531	8.00
612	BOS-002	Set of ball bearings pump	BOS002	3.00
613	BOS-003	Candle element automatic filter	BOS003	3.00
614	BOS-004	Set of gasket for automatic filter	6.60 U.6.60 - 07 GR.05	5.00
615	BOS-005	By pass filter insert	BOS005	1.00
616	BOS-006	Set by pass filter gasket	BOS006	3.00
617	BOS-007	Safety valve, Type 85 1BGFK-1/2 EPDM DN 15, PN64 Pressure 10 bar Made in Germany	851BGFK-1/2	3.00
618	BOS-010	Contactora model 100-C12KF200, 2N.O. 2 NC 230V 50/60Hz, Made in Switzerland.	100-C12KF200	4.00
619	BOS-011	Contactora model 100-C09KF10, 1 NO Aux cont. 3 pole 230V 50/60Hz, Made in Switzerland.	100-C09KF10	3.00
620	BOS-016	Heat exchanger	BOS016	1.00
621	BOS-020	Booster pump monitor kit (incl. seal, o ring)	BOS020	1.00
622	BOS-021	Booster pump monitor kit (excl. seal, o ring)	BOS021	6.00
623	BOS-024	Sealing DN 150 PN 16	9900501	24.00
624	BOS-025	Sealing DN 200 PN 10	9900502	10.00
625	BOS-028	Filter element (candle Filter) for lube oil	1450600	143.00
626	BOS-029	O ring (lub oil duplex filters top cover)	3040151	24.00
627	BOS-030	Filter candle Boll & Krich Fiterbau GmbH Part # 1340079 (Fil-Tec P # 1020003073)	1020003073	107.00
628	BOS-031	O ring kit for lub oil 6.61.07 Gr.20	3649814	4.00
629	BOS-033	Safety valve	2660005	1.00
630	BOS-035	Main switch	4207515	1.00
631	BOS-036	Control element, Contacts for push button. LISTED 165C, 1NO, A600, IND. CONT. EQ. P600, Ue 660v ~ AC-1	4206215	13.00
632	BOS-037	Press button	4200953	1.00
633	BOS-038	Latching Relay for Auto B.F. filter, ES12-100-8..230 VUC, Make: ELTAKS	ES12-200-8..230 VUC	2.00
634	BOS-039	Auxiliary contactor	4204182	2.00
635	BOS-043	Lamp current transformer	4204912	3.00
636	BOS-045	Transformer	4200004	1.00
637	BOS-046	Control unit	4307733	1.00
638	BOS-047	Control valve DN15KE73, Actuator Specifications: Thrust : 2.0 kN, Speed : 0.50 mm/s, Power Input : 12VA	AEL52211JXA	2.00
639	BOS-048	Switch box SBB-80M22	9905492	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
640	BOS-049	Pneumatic actuator	9905490	1.00
641	BOS-051	Spare part kit DN15KE73	9905486	11.00
642	BOS-052	Spare part kit pneumatic actuator	9905488	2.00
643	BOS-053	Complete Motor with Gear for Viscotherm, Part # 0672-0029, Make: VAF	0672-0029	1.00
644	BOS-054	Spare part kit VZ2, 02 years Maintenance Kit, For Viscotherm Sensor Type: V9203201-12000, Make: VAF	03390-1116	7.00
645	BOS-056	Spare part kit VZ2	0390-1011	12.00
646	BOS-057	Spare part kit VZ5	0390-0975	1.00
647	BOS-058	Spare kit DP/1TR SMAR	0390-1005	12.00
648	BOS-060	Temperature controller 2208e Process controller Code 2208e/VC/VH/RU/RW/FL/FH/2XX/ENG/A/0.0/5 0.0/X	2208E#B01550	3.00
649	BOS-061	Spare part kit 5/2 valve for PPM-028, LOF-005 & BOS-098	9913972	1.00
650	BOS-063	Totaliser with key reset part no. 0654-0004, VAF Instrument BV	0654-0004	5.00
651	BOS-064	Air silencer bronze SBE-1/8"	BOS064	6.00
652	BOS-065	Angle ball cock	BOS-065	1.00
653	BOS-066	Disk	5007512	2.00
654	BOS-067	Cover	5006510	1.00
655	BOS-068	O ring Pos.no 34 (Size: 75.7 x 3.53) Viton	3038188	8.00
656	BOS-069	O ring Pos. No. 35 (Size: 53.57 x 3.53) Viton	3096894	43.00
657	BOS-070	O ring Pos. No. 36 (size: 37.4 x 5.33) viton	3096995	11.00
658	BOS-071	O ring Pos. 37 Size: 53.7 x 3.53 Viton (Type 6.60 Gr. 05, Boll & Kirch Filter BAU GMBH)	3030063	29.00
659	BOS-072	Doppel nutring Pos. No. 45	3437135	10.00
660	BOS-073	Piston Pos. No. 40	2785451	7.00
661	BOS-074	O ring Pos. No. 41, Size : 43.82 x 5.33 Viton	3038126	16.00
662	BOS-075	O ring	3098361	12.00
663	BOS-076	Gasket for booster pump	BOS076L	3.00
664	BOS-077	Spare kit viscotherm sensor 0390-0085, Make: VAF Instrument BV	0390-0085	3.00
665	BOS-078	Spare kit viscotherm sensor	0390-0538	7.00
666	BOS-079	Spare kit for diff. pres.transmitter	0390-1005	3.00
667	BOS-080	Spare kit for diff. pres.transmitter	0390-1006	8.00
668	BOS-081	O ring ID 12 x 1mm viton	0630-6013	3.00
669	BOS-082	Assembly damping capillary	0352-0015PH	6.00
670	BOS-083	Assy measuring capillary	0352-0026	3.00
671	BOS-084	Cap, magnet, aisi 316	0409-0091	3.00
672	BOS-085	Assy, inner magnet	0310-0010	2.00
673	BOS-086	Pump assy stainless steel	0671-0001	2.00
674	BOS-087	Main flange steel	0414-0016	1.00
675	BOS-088	Sensor Span 6.25-250 kpa, Model LDS30 XD, Part No. 204-0301-031 SO, Make: SMAR	229266	2.00
676	BOS-089	Exhaust control valve with muffler	SRB - 1/8	6.00
677	BOS-091	Outer magnet assembly	0313-0009	3.00
678	BOS-092	O ring ID 67.95 x 2.62mm	0630-3147	28.00
679	BOS-093	Nut ring M85x1.5xID58x12mm	0417-0001	3.00
680	BOS-094	Assembly inner magnet	0313-0010	1.00
681	BOS-095	Ring retaining 8 din-6799 spring	0740-0080	6.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
682	BOS-097	Pilot 5/2 valve kit	9933111	6.00
683	BOS-099	Spare kit 2 years JZ025/40VIT, Kit includes 2 x Vanes, 1 Pushrod, 2 O-Ring for covers, 1- O-ring	0390-0779	2.00
684	BOS-100	Assembly magnet JZ large inner	0313-0076	4.00
685	BOS-101	Vane JZ025/040	0405-0029	8.00
686	BOS-102	Rotor JZ025/40, For Midflow vane meter, Identical to type J5040B13C12-12000	0403-0138	4.00
687	BOS-103	Shaft JZ025/40 magnet right	0404-0090	2.00
688	BOS-104	Shaft JZ025/40 vane	0404-0126	2.00
689	BOS-105	Parallel pin hrd. 6m6x12	0705-0612	4.00
690	BOS-106	O ring ID 101.27x2.62mm	0630-3155	40.00
691	BOS-107	Temperature sensor 40-170 DegC	128	1.00
692	BOS-108	Control valve 15mm cast iron PN16	KA33	1.00
693	BOS-109	Valve & seat assembly 15m	KA33	3.00
694	BOS-110	Set of gasket 15mm	KA33	3.00
695	BOS-111	Rubber kit for sliding valve lube oil	BOS111L	1.00
696	BOS-113	Time delay block 0.3-30s (on-delay)	LAZ-DTZ	4.00
697	BOS-115	Lamp cover signal lamp white	3SB1001-6BG06	21.00
698	BOS-116	Lamp cover signal lamp green	3SB1001-6BE06	11.00
699	BOS-117	Lamp cover signal lamp red	3SB1001-6BR06	4.00
700	BOS-118	Lamp holder support	3SB1902-1AC	50.00
701	BOS-120	O ring 2 x 70 x 66mm for level switch	BOS120L	35.00
702	BOS-122	Power supply 230VAC 24VDC 22mA, Input:100-240VAC; 0.55A, Output: 24VDC; 1.0A, Model: MDR-20-24,	Model: MDR-20-24	4.00
703	BOS-124	Packing 11.6CMx9.2CMx2mm	BOS124L	24.00
704	BOS-125	Packing 82x57x1mm	BOS125L	23.00
705	BOS-126	Packing 92x66x1mm	BOS126L	24.00
706	BOS-127	Pilot light RM600	RM600	5.00
707	BOS-128	On off switch bodies 1P 0-1	LE2-12 1781	3.00
708	BOS-129	On off switch bodies 2P 0-1-2	LE2-12 4251	4.00
709	BOS-130	On off switch bodies 3P 1-0-2	LE2-12 3253	3.00
710	BOS-131	On off switch bodies 2P 1-0-2	LE2-12 3252	5.00
711	BOS-132	On off switch bodies 0-1, 2P	LE2-12 1784	1.00
712	BOS-133	Actuator on off switch 0-1	LFS2-A-4-178	6.00
713	BOS-134	Actuator on off switch	LFS2-A-4-001	6.00
714	BOS-135	Legends 0-1	LL 2-A-4-178	10.00
715	BOS-136	Legends 1-0-2	LL 2-A-4-325	10.00
716	BOS-137	3 way change over valve DN50L2/90	283 SGS/BW	1.00
717	BOS-138	Kit for 3 way change over valve	BOS138	6.00
718	BOS-139	Temperature meter with bulb	0396-214	6.00
719	BOS-140	O-ring (Viton) 270mm dia 05mm	BOS140L	9.00
720	BOS-141	O-ring with ceramin seal 38mmx03mm	BOS141L	11.00
721	BOS-144	Contact block N.O	800E3X10	20.00
722	BOS-145	PCB mounted relay 8 pin 24vdc	BOS145L	12.00
723	BOS-146	Contact block N.C	800E3X01	20.00
724	BOS-147	Mechanical seal M7N/25-00, Material: Q1Q1VGG, KOMM: 929057, Ident No.:003 1188 475, Burgmann Indust	003 188 475	6.00
725	BOS-150	Adaptor clip male threaded	BOS150L	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
726	BOS-151	Pulse Counter, Pulse Counter Part no 99 766 921 Prouct availability 5 digits Rating : 230/50Hz Make	99 766 921	2.00
727	BOS-156	Bearing Protecting Plate ID 52 mm OD 35mm	BOS-156-L	2.00
728	BOS-157	Steel Washer ID:20mm, OD: 28mm	BOS-157-L	21.00
729	BOS-158	Cirdlip OD:25mm	BOS-158-L	13.00
730	BOS-159	Cirdlip OD:56mm	BOS-159-L	4.00
731	BOS-161	O-Ring Pos: 38, Part Number 3094563, Filter type: 6.60 Gr.05, Boll and Kirch	3094563	2.00
732	BOS-163	Spring Ring Pos:97, Part Number 2209969, Filter type: 6.60 Gr.05, Boll and Kirch	2209969	5.00
733	BOS-164	Disc Pos: 106, Part Number 2200637, Filter type: 6.60 Gr.05, Boll and Kirch.	2200637	5.00
734	BOS-165	Locking Ring Pos 108 , Part Number 2203399, Filter type: 6.60 Gr.05, Boll and Kirch	2203399	10.00
735	BOS-166	Cover POS:09, Part Number 6530356, Filter type: 6.60 Gr.05, Boll and Kirch	6530356	3.00
736	BOS-167	Candle Support for HFO Booster Unit P# 5007847, Filter type 6.60 Gr.05, Boll & Krich	5007847	2.00
737	BOS-172	Ball Valves Weld End DN 50 PN40 Make: Star Line	BOS-172	4.00
738	BOS-179	Volumeter For HFO Measurment (for Digital booster meter booster), OMG 52.7010344, OMG52+UOD103+BEG44	OMG52.7010344	1.00
739	BOS-183	Pulse disc for HFO flow counter	BOS-183	7.00
740	BOS-184	Main Switch Ith 63 A 3 Pole AC 22A OETL 40D1 ABB	BOS-184	3.00
741	BOS-185	Plastic Cover for indication lamp (Yellow)	BOS-185	29.00
742	BOS-186	Plastic Cover for indication lamp (Green)	BOS-186	22.00
743	BOS-187	O-Ring Size 189.87 x 5.33 Viton	BOS-187	36.00
744	BOS-188	O-Ring Size 104.37 x 3.53 Viton	BOS-188	34.00
745	BOS-189	Midflow Meter Gear Unit, Type : J5040-B130C12-12, for HFO Booster Unit Make: VAF	J5040-B130C12-12	1.00
746	BOS-192	Seal for Steam Auto Valve, Material: PTFE, Outer dia: 15.8 mm, Inner dia: 10 mm, Thickness: 4mm	BOS-192	25.00
747	BSG-001-0002	Lube Filter LF 3000	LF-3000	2.00
748	BSG-001-0003	Air filter AF 928M	BSG003	6.00
749	BSG-001-0005	Fuel filter lucas 296	BSG005	2.00
750	BSG-001-0006	Fuel Filter FF105D	FF-105D	2.00
751	BSG-001-0007	Water pump repair kit	3803261	2.00
752	BSG-001-0008	Switch magnetic	3916302	1.00
753	BSG-001-0009	Turbo repair kit (Cummins Generator Set Model: LTA10-G2, Turbo charger HOLSET Type-H2D	3545653	1.00
754	BSG-001-0011	Actuator	3085218	1.00
755	BSG-001-0012	Harness wiring	213273	1.00
756	BSG-001-0013	Pickup magnetic	213272	1.00
757	BSG-001-0014	EFC cards (for Cummins Part No. 3062322) 3044196	3062322	2.00
758	BSG-001-0015	Spider coupling	3046200	1.00
759	BSG-001-0016	Automatic Voltage Regulator AVR Model MX 341, Type: E000-23410, Make: Newage International Ltd.	E000-23410	1.00
760	BSG-001-0017	Upper engine gasket	3804843	1.00
761	BSG-001-0018	Belt V - ribbed	3034942	3.00
762	BSG-001-0019	Thermostat	201737	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
763	BSG-001-0020	Lower engine gasket	3804749	1.00
764	BSG-001-0021	Injector	3076736	1.00
765	BSG-001-0022	Thermostat	3059408	1.00
766	BSG-001-0023	Belt V ribbed	3037425	4.00
767	BSG-001-0025	Rectifier kit HCKI	15812	1.00
768	BSG-001-0026	Exhaust bellows 4" L=13.5 for BSG	BSG126	1.00
769	BSG-001-0027	Water Filter WF-2075, Make Fleet Gaurd - France	WF-2075	2.00
770	BSG-001-0028	Ampere meter 0-400Amps 72x72mm	BSG128	2.00
771	BSG-001-0029	Ampere meter 0-300A 70x70mm	BSG129	2.00
772	BSG-001-0030	Change over switch 4pole 200Amps, Opass-Turkey.	BSG130	1.00
773	BSG-001-0031	KW meter 0-250KW 400:5A 3phase, Model:WQ96, PT380, Make: Ziegler	0-250	2.00
774	BSG-001-0093	Belt V Ribbed for Alternator Drive Nos. TW1355, for Cummins Engine No. 23551523, ModellTA10-G2	3288587	2.00
775	BSG-001-0094	Air Circuit Breaker, No. of Poles : 03, Rated Current In : 400 AMP, Model No. NSX400N Make:Schneider	LV432693	1.00
776	BSG-001-0095	AC Voltmeter, Range: 6 - 600V, Accuracy Class:1.5, Frequency:50 Hz, Bezel Size : 72 X 72 mm, Ziegler	EQ72	1.00
777	BSG-002-0001	Pressure switch/transmitter, Oil Pressure Sensor, Range : 0 - 10 Bar, Model : 30/138 ,Make:VDO	622-333	2.00
778	BSG-002-0002	Relay 8 pin rm 805 012 12vdc	BSG0202	3.00
779	BSG-003-0001	Air Filter Part No. AS-5628	AS-5628	2.00
780	BSG-003-0002	Air Filter # AF 409K Make: Fleetguard	AF409K	3.00
781	BSG-004-0001	Fuel Gauge for Rain Water Pump	BSG-004-0001	1.00
782	BSG-005-0016	Diesel Filter Part No. 2656117 Make: Perkins, or 1: FF 167 Fleetguard	2656117	3.00
783	BSG-005-0017	Lub oil filter Part No. 2654403 Make: Perkins, or LF 551A Fleetguard	2654403	2.00
784	BSG-005-0019	Hose Pipe upper	BSG-005-0019	1.00
785	BSG-005-0020	Hose Pipe lower	BSG-005-0020	1.00
786	BSG-005-0023	Injector (Nozzle Assy Part No. 093400-1310 DENSO) for fuel pump for fork Lifter series C240-ISUZU	BSG-005-0023	6.00
787	CAF-001	Drive motor	460102	1.00
788	CAF-002	Time relay clock pulse 24VAC/DC 0.05-100h, Type : 3RP 1555-1A-P30, with LED & 1 Change over contact,	3RP1555-1AP30	2.00
789	CAF-003	Reducer gear	911021	1.00
790	CAF-004	V belt SPZ 800 LW/LA Make: SKF OR OPTI	MF 1315 (785003)	19.00
791	CAF-005	Pawl spring	911018	19.00
792	CAF-006	Drive pawl	911026	17.00
793	CAF-007	Stop pawl	911024	1.00
794	CAF-008	Chain link, Part # 09110770	09110770	434.00
795	CAF-009	Junction chain link, Part No. 09110780	09110780	5.00
796	CAF-010	DD panels 6' RH Old Part No. 911113, New Part No. 10010778	10010778	218.00
797	CAF-011	DD panels 6' LH Old # 911112, New Part No. 10010782	10010782	310.00
798	CAF-013	Ratched wheel	10001941	2.00
799	CAF-014	Ratched wheel hub	9170310	1.00
800	CAF-015	Stop pawl axle	911016	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
801	CAF-016	Excentric on reducer	9110320	2.00
802	CAF-017	Reducer pulley	9110820	1.00
803	CAF-018	Drive pawl axle	9110170	1.00
804	CAF-019	Speed reducer	10011052	1.00
805	CAF-020	Console stiffening	10010819	1.00
806	CAF-021	Air cooler buffer plate	CAF021	3.00
807	CAF-022	Collar for lower sprocket (2 collar)	9112040	4.00
808	CAF-023	Lower sprocket	9110110	2.00
809	CAF-024	Coupling nut	9172100	1.00
810	CAF-025	Upper sprocket	9110370	2.00
811	CAF-026	Reducer pulley 19mm	9110860	1.00
812	CAF-027	Motor pulley, Material Aluminum Alloy	9110850	9.00
813	CAF-028	Chain link lever	86900051	2.00
814	CAF-029	Inclined Liquid Column Manometer, Range : 0 - 50 mmH ₂ O, Model # MG 50, Make:KIMO Instruments (France	MG 50	1.00
815	CAF-030	Differential pressure switch 0-10M bar, Type LGW-10 A2, Order Code 107-417, Make: Krom Sohroder	LGW - 10	3.00
816	CBR-007-0006	Auxiliary block 2NC + 3NO	LA1-LB015	3.00
817	CBW-006-0037	PVC Insulated 4 Core 2.5mm Square	CBW0060037	50.00
818	CMN-079	Control cabinet	80G01	1.00
819	CMN-081	Grinding motor	958	1.00
820	CMN-082	Limit switch	80G07	1.00
821	CMN-083	Motor board complete	80G14	1.00
822	CMN-085	Power board	80G05	1.00
823	CMN-086	Transformer machine BSP-3	BSP-3	1.00
824	CMN-091	Filter and oil mist lubricator C202-L00 & c202-F00, Make Camozzi	01/1503	1.00
825	CMN-092	Filter elements	01/A10	12.00
826	CNV-001	Linear actuator 230V, L-AUFN 28W	4.5 KN	3.00
827	CNV-002	Linear Actuator 230v, 50HZ, L-AUFN 60W, IP 65, STELIGESCHW 25mm/Min.	12KN	1.00
828	CNV-003	Potentiometer 0-200 Ohm	4270041070	8.00
829	CNV-004	Three point controller 362-MC, 230 VAC (+/- 10%), 50/60 Hz., (+/- 5%), Max. 1000 MA, LCD Display,	362-D	1.00
830	CNV-005	PT 100 type Wit-PT-16, pt 100 ohm 0 C DIN 200 0C, NO. 118837, MAKE: ROSSEL - PLEIGER.	CNV005	5.00
831	CNV-007	Stuffing box gland DN150	9265123800	38.00
832	CNV-008	Valve seat DN150	9227420480	6.00
833	CNV-009	Seat bushing DN150	9261806280	6.00
834	CNV-010	Valve seat	9227510280	3.00
835	CNV-011	Seat bushing	9261802980	3.00
836	CNV-013	Motor linear actuator 230V	9990160	1.00
837	CNV-014	Torque switch	83.106-1-W2V1NOX	6.00
838	CNV-015	Motor pinion	28H-160.040	6.00
839	CNV-016	Switch plate	28H-140.030	6.00
840	CNV-017	Distance washer	08-140.040	12.00
841	CNV-018	Switch rod complete	28H-140.010	4.00
842	CNV-019	Gear wheel complete	28H-120.040	1.00
843	CNV-020	Driving rod complete	28H-200.010-1A	2.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
844	CNV-021	Gear wheel complete	28-120.020	2.00
845	CNV-022	Operating rod	28H-400.080	5.00
846	CNV-023	Gear wheel complete	28-120.030	2.00
847	CNV-024	Motor 230V-50Hz 1350 U/Min, For Liner Actuator 4.5 KN, 230 V, Supplier: Pleiger Elektronik	EE 14/81 S	4.00
848	CNV-025	Torque switch	VCSJ-ML	5.00
849	CNV-026	Schmersal switch	M6800-11-2-8-V	6.00
850	CNV-027	Switch plate	1.2KN-140.030	2.00
851	CNV-028	Distance washer	1.2KN-140.040	12.00
852	CNV-029	Switch rod complete	1.2KN-140.010	5.00
853	CNV-030	Gear wheel complete	3.5KN-120.040	12.00
854	CNV-031	Driving rod complete	1.2KN-200.010-1A	6.00
855	CNV-032	Gear wheel complete	3.5KN-120.020	6.00
856	CNV-033	Operating rod	28H-400.080	5.00
857	CNV-034	PT/100 2 wire sensor 200-600C	CNV034	4.00
858	CNV-037	MOV 3-200-69/2 DN 200, PN10	MOV-3-81	1.00
859	CNV-039	Sleeve 3.5KN 120.070	120.070	2.00
860	CNV-040	Compression spring	08.12.080	6.00
861	CNV-041	Grease felt	08.12.090	2.00
862	CNV-042	Circlip A20x1.75SD	1.75SD	36.00
863	CNV-043	Wheel III complete 3.5KN -120.020	3.5KN 120-020	3.00
864	CNV-044	Bearing bushing 1.2KN -180.010	1.2KN 180-010	3.00
865	CNV-045	Compensation washer 20x28x0.5	20 X 28 X 0.5	12.00
866	CNV-046	Grease felt 08-120-110	08-120-110	12.00
867	CNV-047	Washer 08-120-120	08-120-120	12.00
868	CNV-048	Gear wheel 1.2KN -180-040	1.2KN 180-040	3.00
869	CNV-049	Felt washer 08-130-030	08-130-030	12.00
870	CNV-050	Fitting key A5x5x10	A5 X 5 X 10	4.00
871	CNV-051	Threaded bush 1.2KN 180-130-1	1.25KN 180-130-1	3.00
872	CNV-052	Wiper ring 14x22x7	14 X 22 X 7	8.00
873	CNV-053	Hand wheel complete 40-180-030/R	40-180-030/R	4.00
874	CNV-054	Hexagon nut self locking M6	M6	12.00
875	CNV-055	Sleeve 28H-110-.020 Pos. 4	28H-110.020	2.00
876	CNV-056	Nut 28H-110-.030 Pos. 5	28H-110.030	2.00
877	CNV-057	Disengaging lever 28H-180.120 Pos.77	28H-180.120	2.00
878	CNV-058	Fork shaped piece 28H-180.100	28H-180.100	2.00
879	CNV-059	Stay bolt 28H-180.130 Pos.80	28H-180.130	2.00
880	CNV-060	Shoulder screw 28H-180.110 Pos.83	28H-180.110	2.00
881	CNV-061	Hand wheel comp SA12-160.180	SA12-160.180	1.00
882	CNV-063	Operating level 28h-400.060	28H-400-.060	6.00
883	CNV-064	Kuppling / coupling Pos. 12	POS. 12	3.00
884	CNV-065	Spring washer	CNV65L	50.00
885	CNV-066	Oil seal SC 8 22 2 B-L	CNV66L	6.00
886	CNV-067	Capacitor 05 uf +/- 5%	CNV067L	4.00
887	CNV-078	Hexagon Nut M6	CNV-078-L	36.00
888	CNV-079	Hexagon Nut M10	CNV-079-L	10.00
889	COM-001	Valve kit sunction valves gasket	1503-5800-61	5.00
890	COM-002	Filter kit	1503-6129-60	2.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
891	COM-004	Pressure switch MDR 4/11	24981	1.00
892	COM-005	Pressure transmitter cover	24981	1.00
893	COM-006	Cylinder with piston and rings type FD-30	1503-5801-63	4.00
894	COM-007	Drain valve kit type TD 25	2901-0216-00	1.00
895	COM-008	Drain valve kit type LT-1230	2901-0216-00	4.00
896	COM-010	Filter kit	1503-6130-60	1.00
897	COM-012	Pressure transmitter MDR 5/35	922297	1.00
898	COM-013	High pressure cylinder piston rings LT-1230	1503-0377-80	4.00
899	COM-014	Low pressure cylinder piston rings LT-1230	1503-0376-80	4.00
900	COM-016	Fan bush for dryer motor	COM16L	12.00
901	COM-018	Check valve	1503-6177-60	1.00
902	COM-025	Gaskets	0653-9098-00	20.00
903	COM-026	Valve kit LT-1230	1503-6141-60	3.00
904	COM-027	Gaskets	1503-0170-00	7.00
905	COM-028	Damper	1503-1250-01	26.00
906	COM-029	O rings (for Bearing housing 1503-0004-00)	0366-6144-00	19.00
907	COM-030	Bearing shell complete	1503-6185-61	4.00
908	COM-031	Seal rings (for LT-1230)	0666-6565-00	6.00
909	COM-032	Cylinder LH	1503-5806-66	2.00
910	COM-033	Cylinder and Piston R/H, Part No. 1503-5806-67, Make: Atlas Capco	1503-5806-67	2.00
911	COM-034	Head	COM-034	9.00
912	COM-035	Gudgeon pin HP & LP	1503-3021-00	5.00
913	COM-036	Valve seat HP & LP	1503-2867-00	7.00
914	COM-037	Cirdip	335-2125-00	4.00
915	COM-038	Piston Kit (Scraper ring kit) HP & LP for LE-75	1503-5802-62	2.00
916	COM-039	Valve Kit LE75	1503-6132-60	6.00
917	COM-040	Cord LE75	1503-2977-00	4.00
918	COM-041	O rings	663-2106-86	6.00
919	COM-042	Gaskets	1503-2953-00	4.00
920	COM-043	Inlet silencer	1503-2857-00	2.00
921	COM-044	Unloading piston kit	1503-6161-60	1.00
922	COM-045	Air filter	1503-189-00	8.00
923	COM-046	Bearings 6207 LE75	502-2107-00	5.00
924	COM-047	Bearings 6308 LE75	502-3108-00	3.00
925	COM-048	Seal LE75	2807-1923-55	2.00
926	COM-049	Seal LE75	2807-1924-05	6.00
927	COM-050	Retainer	2801-1486-00	7.00
928	COM-051	O ring	2801-1464-30	7.00
929	COM-054	Cirdip LT-1230	0335-2169-00	2.00
930	COM-055	Collector Oil	1503-0132-00	4.00
931	COM-057	Collar Rings LT-1230	1503-0151-00	3.00
932	COM-058	Bottom (Base frame)	1503-0009-00	2.00
933	COM-059	Cord (Seal) LT-1230	1503-0532-00	7.00
934	COM-060	Temperature reducer LT1230	1503-0324-00	9.00
935	COM-061	Couplings	0580-0213-00	2.00
936	COM-062	Ring lubricator	1503-0147-00	4.00
937	COM-063	Gudgeon	1503-0115-00	2.00
938	COM-064	Piston ring kit complete	1503-6167-60	6.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
939	COM-065	Connecting rod complete LT1230	1503-1126-81	3.00
940	COM-066	Lock nut	0291-1111-00	34.00
941	COM-067	Washer	0301-2344-00	24.00
942	COM-068	Circlip LT-1230	0335-2127-00	7.00
943	COM-069	Neddle Bearings for LT-1230	0516-3204-01	1.00
944	COM-070	Gudgeon pin LD	1503-0114-00	2.00
945	COM-071	Safety valve LT-1230	0830-1007-67	4.00
946	COM-073	Spacers	1503-0154-00	12.00
947	COM-074	Drain kit intercoller	8070-2261-08	4.00
948	COM-075	Solenoid valve 220/240 50 HZ	1089-0479-60	5.00
949	COM-076	Bearing Housing	1503-2913-00	5.00
950	COM-077	Crank case	1503-0008-00	1.00
951	COM-078	Slight glasses	1503-0202-00	2.00
952	COM-079	Bearing housing 1503-0004-00	1503-0004-00	2.00
953	COM-082	Gasket	0661-1000-27	11.00
954	COM-083	Seal	1503-0234-00	18.00
955	COM-085	Pipe	1503-1234-01	3.00
956	COM-086	Cover Oil	1503-0192-00	2.00
957	COM-087	Seal LT-1230	1619-7252-00	4.00
958	COM-088	Seal LT-1230	1619-5562-00	4.00
959	COM-089	Crank Shaft	1503-1125-80	1.00
960	COM-090	Housing LE-75	1503-0300-00	2.00
961	COM-091	Bolt M8x20	014-1325-03	1.00
962	COM-092	Washer OD=11, ID=8, Thickness 2.5 mm	0301-2335-00	18.00
963	COM-093	Support	1503-2615-00	4.00
964	COM-094	Lock washer	1503-2395-00	4.00
965	COM-095	Coupling	0580-0210-03	6.00
966	COM-096	Clamp	0346-1000-09	4.00
967	COM-097	Fan cowl LT-1230	1503-1150-00	2.00
968	COM-098	Connecting pipe LT-1230	1503-0002-00	4.00
969	COM-099	O-ring	0663-7135-00	16.00
970	COM-100	Connecting piece LT-1230	1503-0012-00	6.00
971	COM-101	O-ring	0663-3135-00	16.00
972	COM-102	Reducer	0605-8300-05	5.00
973	COM-104	Antivibration pad	1503-2960-00	14.00
974	COM-105	Cooler	1503-2864-00	4.00
975	COM-106	Pipe	1503-2951-00	2.00
976	COM-107	O ring cord	1503-2467-00	5.00
977	COM-110	Cover	1503-2461-00	3.00
978	COM-111	Cover	1503-0192-01	1.00
979	COM-112	Bolt	0147-1250-03	1.00
980	COM-113	Washer	0301-2321-00	10.00
981	COM-114	Lock nuts	0291-1108-00	6.00
982	COM-115	Plug	1503-2976-01	3.00
983	COM-116	Cover	1612-4067-00	3.00
984	COM-117	Air filter	1503-2555-80	1.00
985	COM-119	Bolts	2806-1378-30	10.00
986	COM-120	Dowel pin	2806-5912-11	14.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
987	COM-121	Nipple	2801-8544-00	6.00
988	COM-122	Sight glass	1503-2948-00	1.00
989	COM-123	Gasket	2801-1206-00	4.00
990	COM-124	Breather flange	1503-2950-00	1.00
991	COM-125	Bolts	2806-1365-20	6.00
992	COM-126	Woodruff key	2806-6000-15	1.00
993	COM-128	Cap	2801-1200-23	1.00
994	COM-129	Fan housing	1503-2892-00	2.00
995	COM-130	Fan	1503-2868-00	1.00
996	COM-131	Housing for LE-75	1503-2860-00	2.00
997	COM-132	Bolts	0147-1249-00	4.00
998	COM-133	Washer	0301-2321-00	6.00
999	COM-134	Bolts M10x30	0147-1363-03	1.00
1000	COM-135	Washer	1503-3033-00	1.00
1001	COM-136	Tapitite bolt M8x20	0226-0300-43	26.00
1002	COM-137	Lock nut	0291-1108-00	1.00
1003	COM-138	Screwed stud	0246-1956-21	4.00
1004	COM-140	Cooler	1503-2864-00	2.00
1005	COM-141	Valve seat	1503-0028-00	4.00
1006	COM-142	Guard LE75	1503-0075-00	2.00
1007	COM-143	Axial seal LE75	1503-1236-00	6.00
1008	COM-144	Cover	1503-0331-00	5.00
1009	COM-145	Axial seal LE75	1503-1237-00	3.00
1010	COM-146	Outlet cap	1503-0330-00	1.00
1011	COM-147	Pulsation damper LT-1230	1503-0332-00	3.00
1012	COM-148	Connection pipe	1503-2855-00	5.00
1013	COM-149	Delivery pipe	1503-2853-00	8.00
1014	COM-150	Bolt	0147-1341-03	4.00
1015	COM-151	Valve head LE75	1503-2874-00	4.00
1016	COM-153	O ring	0663-3135-00	1.00
1017	COM-154	O ring	0663-3132-00	1.00
1018	COM-155	Bolt	0147-1335-03	14.00
1019	COM-156	Coupling	0581-0000-75	4.00
1020	COM-157	Solenoid valve 220-240(50Hz)	1089-0621-32	5.00
1021	COM-158	Suction cap LT-1230	1503-0329-00	2.00
1022	COM-159	Gasket	0661-1000-27	10.00
1023	COM-160	Valve seat LT-1230	1503-0017-00	4.00
1024	COM-161	Guard LT-1230	1503-1231-00	4.00
1025	COM-162	Suction cap LT-1230	1503-1226-00	6.00
1026	COM-163	Crank case assembly	1503-5815-63	2.00
1027	COM-165	Oil plug ser LE	2801-9086-00	1.00
1028	COM-166	Hour meter size 48x48 (7 digit), 230V 50 Hz, Type BW40. X8 Make Muller or Legrand France	BW40X8	2.00
1029	COM-167	Valve plate LP	3118	9.00
1030	COM-168	Valve plate LP	3119	9.00
1031	COM-169	Valve plate HP	3120	8.00
1032	COM-170	Valve plate HP	3121	6.00
1033	COM-171	Valve spring LP	3275	8.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1034	COM-172	Valve spring LP	3276	7.00
1035	COM-174	Valve spring del HP	3278	8.00
1036	COM-175	Valve gasket HP	3914	1.00
1037	COM-176	Valve gasket HP	3915	8.00
1038	COM-177	Valve gasket HP	3916	6.00
1039	COM-178	Valve gasket LP	3917	6.00
1040	COM-179	Gasket set	4124	5.00
1041	COM-180	Fan switch by P/N 1089-9214-33	1089-9214-25	2.00
1042	COM-181	Pressure switch by P/N 1089-9214-37	1089-9214-22	2.00
1043	COM-183	Pressostat	1617-0060-00	2.00
1044	COM-184	Silencer LT-1230	1503-2465-00	2.00
1045	COM-185	Antivibration pads LT-1230, Part No. 1503-0204-00, Make: Atlas Capco	1503-0204-00	10.00
1046	COM-186	Coupling LT-1230	1503-0181-00	2.00
1047	COM-187	Bolts LT-1230	0147-1367-03	4.00
1048	COM-188	Preventive maintenance kit	2901-0568-00	1.00
1049	COM-189	Roto inject fluid GA-45	2901-0522-00	1.00
1050	COM-190	Piston rod	1426	2.00
1051	COM-192	Safety valve HP	4420	2.00
1052	COM-193	Safety valve LP	4421	3.00
1053	COM-194	Intermediate Cooler complete Part # 3661 Make: Sperre Compressor	3661	2.00
1054	COM-195	Alter cooler complete (Copper coil for sperre compressor)	3662	2.00
1055	COM-196	Cylinder HP, Part # 1141MK, with gaskets, stud bolts/unuts and fitting Make: Sperre Compressor	1141MK	2.00
1056	COM-197	Cylinder LP, Spare Kit Part # 1145MK, Model L, HL2/140, Contains: Stud bolt, Nut, Gasket	1145MK	2.00
1057	COM-198	Valve LP Complete, Part No. 3034, Model: HL-2/140, Sperre Compressor	3034	2.00
1058	COM-199	Valve HP complete	3035	2.00
1059	COM-200	Piston LP	3362	4.00
1060	COM-202	Compression ring stepped LP	3492	9.00
1061	COM-203	Compression ring plain HP	3502	8.00
1062	COM-204	Needle bearing	3879	1.00
1063	COM-205	Needle bearing Part # 3880, Make: Sperre Compressor	3880	4.00
1064	COM-206	Seeger ring	3808	6.00
1065	COM-207	Oil Level Switch Stop/Alarm, Type: VHS00M01171R31, Brass PVDF float, SP-3600, Screwed Plug 3/4" BSP	VHS 00 M	4.00
1066	COM-208	Vibration damper	4545S2	12.00
1067	COM-210	Refrigent condenser FD-30,50Hz	1617-0923-00	1.00
1068	COM-211	Water sep. for air dryer FD-30	1617-0784-00	2.00
1069	COM-212	Filter BP-20,TB-70	1202-8980-00	2.00
1070	COM-214	Oil ring 77/160	3529	6.00
1071	COM-215	Oil ring LL2/140	3541	7.00
1072	COM-216	Stud	0246-1246-02	32.00
1073	COM-217	Fan LT-1230	1503-2398-00	2.00
1074	COM-218	Guide ring HP 120-160	3299	4.00
1075	COM-219	Guide ring LP 140-160	3300	5.00
1076	COM-220	Filter cartridge insert 200	3718	3.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1077	COM-221	Ventilator 85-300 (Breather Valve or Oil Fill Cap) Part No. 3700	3700	3.00
1078	COM-222	Roller bearing 160 (Bearing # NJ 213 ECP Make SKF)	3873	2.00
1079	COM-223	Roller bearing 160 (22217 E GT. BRITAIN)	3874	3.00
1080	COM-225	Oil filter	1613-6105-00	1.00
1081	COM-226	Air filter	1613-8720-00	4.00
1082	COM-227	Gasket LP cyl. 120-160	4081	2.00
1083	COM-228	Gudgeon pin 77mm HP	3455	2.00
1084	COM-229	Pressure guage 0-60 bar	3773	2.00
1085	COM-231	Pressure switch KPS-39 10-35 bar, Adjustable Differential 2 to 6 Bar, Connection: G 3/8" A, DANFOSS	060-3102	2.00
1086	COM-232	Gasket 120-160	4097	4.00
1087	COM-233	Seal ring 200-219 Oil seal 63 x 90 x 10	3861	3.00
1088	COM-235	Coupling for LE-75 (Old Part No. 1503-2956-00)	1503-3180-00	5.00
1089	COM-236	Filter housing	1503-2464-00	4.00
1090	COM-237	High pressure pipe 300 BAR 1/4"	COM237L	3.00
1091	COM-238	Air filters GA45 G9909834	1613-7408-00	1.00
1092	COM-239	Coupling element (Ref 1030)-GA-45	1613-6885-00	1.00
1093	COM-240	Piston (Ref 2060) GA-45 G9909834	1613-6783-00	1.00
1094	COM-241	Stepping switch 3 step 3 pole 20A	K21-023NLH	1.00
1095	COM-243	Stepping switch 4 step 4 pole 20A	K2Q-034NL	1.00
1096	COM-244	S.S. flexible plpe 30bar-45bar 19x36mm	COM244L	4.00
1097	COM-246	Fan for motor dia=11"x1.5"	COM246L	7.00
1098	COM-248	Spare kil connect. rod	1426MK	2.00
1099	COM-250	Level Glass 200-300	3634	2.00
1100	COM-251	Crankcase 120-160	1020	1.00
1101	COM-252	Bearing Sheld 120-160	1054	1.00
1102	COM-254	Coupling Compressor side 120/160	1983	2.00
1103	COM-255	Fly wheel fender 120/160	3795	1.00
1104	COM-256	Spare part kit -cylinder LP	1145MK	1.00
1105	COM-257	Spare Kit Valve LP, 3034MK	3034MK	2.00
1106	COM-258	Spare kit piston LP, Part # 3362MK, gudgeon pin with Seeger-rings and Piston ring Make: Sperre Comp	3362MK	2.00
1107	COM-259	Spare kit piston HP, Part # 3423MK, gudgeon pin with seeger-ring and piston ring	3423MK	1.00
1108	COM-260	Spare kit crankshaft	1405MK	1.00
1109	COM-263	Air filter 120-160	3715	3.00
1110	COM-264	Unloading piston HV/120	3316	2.00
1111	COM-265	Valve opener complete	3245	1.00
1112	COM-268	Motor Terminal for 3phase motor	COM268L	2.00
1113	COM-269	Operating Head for Selector Switch, Type KAG - 3H, Make Telemecanique	Type KAG - 3H	3.00
1114	COM-270	Fan assembly for air dryer (condensor unit)	1617-0948-00	4.00
1115	COM-272	Housing LT 1230	1503-2466-00	2.00
1116	COM-273	Flexible Discharge Air Pipe Working pressure 30 Bars, Testing Pressure 40 Bar,Length 13", ID=1-1/4"	Sperre	5.00
1117	COM-281	Fly wheel nut 1330	1330	10.00
1118	COM-282	Drive coupling 1376	1376	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1119	COM-283	Drive coupling, compressor 1983	1983	2.00
1120	COM-284	Coupling housing 1987	1987	3.00
1121	COM-285	Bolt 3945	3945	12.00
1122	COM-286	Bolt 4405	4405	6.00
1123	COM-287	Bolt 4446	4446	12.00
1124	COM-288	Washer 4414	4414	12.00
1125	COM-291	Temperature switch 50-100 DC, Type: KPS 79, Differential: 4-16 Degree C. Make: Danfoss.	KPS 79	3.00
1126	COM-294	Refrigerant filter drier, DN 032 S No. 023U4001, Vol. in Litre: 0.10, Make: Danfoss Made in Denmark	023U4001	4.00
1127	COM-295	Pressure switch SK-R3/10/0A	911156	1.00
1128	COM-297	Control Transformer, Type: UTV 0.25, KVA: 0.25, Hz 50/60, Primary: 0-230-440, Secondary: 230/115 V	COM-297-L	1.00
1129	COM-299	Compressor for AC LR 90, Scroll Compressor Model No. ZR94KC-TF5/D, Make: Copeland, USA	LR90 ZR94KC-TF5/D	1.00
1130	COM-302	Heater for Refrigerant Compressor MT80 and 100	COM-302	1.00
1131	COM-303	Overhauling kit for Spere Routine B for HL2/140 Part # 7938, for 5000 Hrs. Maintenance: Make: Sperre	7938	2.00
1132	COM-304	Overhauling kit Routine C for HL2/140 Part # 7968 for 10000 Hrs. Maintenance, Make: sperre	7968	2.00
1133	COM-307	Crank shaft for HL2/140, Part # 1405MK, Make: Sperre Compressor Norway	1405MK	1.00
1134	COM-309	Bolt for LE-75	COM-309	31.00
1135	COM-310	2/2 - Way Solenoid Valve, Pressure 1-25Bar, Port Size: G 3/4, Model: 5404, Part # 134597 Make: Burkert	134597	1.00
1136	COM-311	Coil 5404, A 20.0, EB, G3/4, EN1-25bar, Murkert Contromatic, Germany	179765	4.00
1137	COM-312	Cooler, Part No. 1503-2864-00, Type: LE-75, Atlas Copco	1503-2864-00	3.00
1138	COM-314	Unloader valve kit, Part # 2901 0211 00, Make: Atlas Copco, for Air Compressor GA45	2901 0211 00	1.00
1139	COM-317	Solenoid Valve, Part No, 6236-3823-00, Make: Atlas Copco, for Air Compressor Model GA 45	6236-3823-00	1.00
1140	CON-009-0010	Fuse terminal 1.5 8WA1 011-1SF12	8WA1 011	36.00
1141	CON-009-0011	Single terminal 6, 41A800V 1DH11	8WA1 011	56.00
1142	CTT-001-0001	AC magnetic starter 1 HP FTB10	ABB064	1.00
1143	CTT-001-0005	Direct motor starter 20HP15KW3Ph	FTB - 35	1.00
1144	CTT-001-0006	Motor starter 2.2kW 3PH 3.7-5.5A	LE1M35Q712	1.00
1145	CTT-001-0007	Motor starter 1.5kW 3PH 2.6-3.7A Type: LE1M35Q710, Make: Schneider, Electric	LE1M35Q710	1.00
1146	CTT-001-0008	Motor starter 1.1 KW, 3PH 1.8-2.6A, Type LE 1 M35Q708, Make: Telemecanique	LE1M35Q708	3.00
1147	CTT-001-0009	Motor starter .55kW 3PH 1.2-1.8A	LE1M35Q707	6.00
1148	CTT-001-0010	Motor starter 5.5KW 3-AC3, Type LE 1 M35Q721 Make: Telemecanique	LE1M35Q721	3.00
1149	CTT-001-0011	Motor starter 7.5KW3-AC3, Type: LE1M35Q722 Make: Schneider	LE1M35Q722	3.00
1150	CTT-001-0013	Motor circuit breaker 2.5-4 Amps	GV2ME-08K1	6.00
1151	CTT-001-0014	Motor starter 0.25 KW3-AC3	LE 1 M35Q705	2.00
1152	CTT-003-0009	Contacto 110VAC 50hz 10A	DILOOM-10	12.00
1153	CTT-003-0011	Magnetic contactor 7.5 KW 24VDC	LCID18BD	4.00
1154	CTT-003-0014	MCCB ie-40-63A Ve690V50Hz Telemag	GV 3 - M63	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1155	CTT-003-0015	Auxiliary contact telemacanique	G V1-A03	1.00
1156	CTT-003-0016	Contact rating 16A 400VAC	CTT316	4.00
1157	CTT-003-0017	Control Relay 3RH1122-1BB40, 24V DC 2NO+2NC, for AVR AC: 4A 230V Make: Siemens	3RH1122-1BB40	7.00
1158	CTT-003-0018	Contact relay 6NO+2NC 1NO+1NC 24VDC, Overlapping Contacts, Type # 3TH4346 - OBB4, Make: Siemens	3TH4346-0BB4	5.00
1159	CTT-003-0019	Contactor 220V 50hz S-PKZ-2, (SEIA- PKZ2) Make: Moeller FD fan	S-PKZ 2	2.00
1160	CTT-003-0020	Contact AC-3,15kw 220VAC50Hz	A30-30-10	5.00
1161	CTT-003-0021	Magnetic contactor 4KW 240V 50Hz, Type: A9-30-10 Make: ABB	A9-30-10	4.00
1162	CTT-003-0023	Magnetic Contact 230V 50Hz Coil, Model: SE00-20-PKZO, Make: Moeller Germany	SE00-20-PKZO	5.00
1163	CTT-003-0024	Connecting strip 3.0/4	B3.0/4PKZO	3.00
1164	CTT-003-0027	Magnetic cont. 3NO 32A 15KW 24VAC 30A,Coil Voltage; 24VAC, Main Contact(N-O), 1N-C+1N-O, fuji Japan	CTT0327	4.00
1165	CTT-003-0028	Magnetic Contactor 45KW 240V 3P (Ring Man Pumps)	3RT1046-1AP04	2.00
1166	CTT-003-0032	Laterally aux. switch block for Ring Man pump	3RH 19 21-1EA11	5.00
1167	CTT-003-0033	Main contact for 3RT 1045	3RT 1945-6A	4.00
1168	CTT-003-0034	Contacts with fixing parts	3RT 1934-6A	3.00
1169	CTT-003-0035	Auxiliary switch block 2NO+1NC	3RH 19-21-1KA11	2.00
1170	CTT-003-0036	Auxiliary switch block 2NO	3RH 19-21 IEA20	4.00
1171	CTT-003-0037	Auxiliary switch block 2NO	3RH 19-21 IEA11	2.00
1172	CTT-003-0038	Auxiliary switch block 2NO	3RH 19-21 IEA02	5.00
1173	CTT-003-0039	Contact block EK10	CTT339	6.00
1174	CTT-003-0040	Contact block type EK01	CTT340	6.00
1175	CTT-003-0041	Remaking of magnetic cont. tips	CTT0341	1.00
1176	CTT-003-0044	Magnetic contact LC1D09E7 48VAC	LC1-D0901E7	5.00
1177	CTT-003-0045	Magnetic contact LC1D12E7 48VAC	LC1-D1201E7	5.00
1178	CTT-003-0049	Magnetic contactor, Coil Voltage: 230V ; 50Hz, Part # SE00-11-PKZO, Make: Klockner MOELLER	SE00-11PKZO	1.00
1179	CTT-004-0001	Magnetic contactor 3TF, 3TF4822-0XPO, AC-3 415 VAC, 37 KW, Siemens	3TF-4822-0XPO	4.00
1180	CTT-004-0002	Magnetic contactor 20-240VAC 7.5KW	SC-5-1(19)	5.00
1181	CTT-004-0003	Magnetic cont. 110VAC, 50Hz, 4 n.o.	A9-40-00	3.00
1182	CTT-004-0004	Magnetic contactor 55KW 230V (HFO unloading)	3TF5022-OAPO	2.00
1183	CTT-004-0005	Auxiliary contact block	3TY7561-1KA00	7.00
1184	CTT-004-0006	Main contact for 3TF47	3TY7470-0A	4.00
1185	CTT-004-0007	Main contact for 3RT1046	3RT1946-6A	3.00
1186	CTT-004-0008	Auxiliary contact block instantaneous for Ring Man pump	GV3-A03	3.00
1187	CTT-004-0009	Empty enclosuer XAL-D02	XAL-D02	3.00
1188	CTT-004-0010	Control stations	XAL-D211H29	4.00
1189	CTT-004-0011	Empty Enclosuer Pendant push button unit point 3	XALD363B	2.00
1190	CTT-004-0012	Panel enclosure KST32-12 with gland plates fitted	0699774	6.00
1191	CTT-004-0013	Panel Enclosure AV/123-125 for MCB, Size: 250 by 187.5 mm.Type: AV/123-125 Article# 036089,Moeller	036089	6.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1192	CTT-004-0014	Panel individual enclosure C123E-125RAL7032, Size 250 x 187.5mm Type 090152, Moller-Germany	090152	3.00
1193	CTT-004-0015	Panel individual enclosure C144E-125-RAL7032	090157	2.00
1194	CTT-004-0016	Main contact set LC1D6511	LC1D6511	7.00
1195	CTT-004-0017	Main contact set LC1D8011	LC1D8011	2.00
1196	CTT-004-0018	Top & bottom cover pannel 123-125	CTT418	12.00
1197	CTT-004-0019	Top covers pannel encl KST32-12	CTT419	4.00
1198	CTT-004-0020	Empty enclosure XAL D01	011473 X 1	9.00
1199	CTT-005-0001	Main switch N6-100+RH6+A	ABB071	1.00
1200	CTT-005-0004	Rotary switch 3 pole 20 Amps	TO - 2-1	3.00
1201	CTT-005-0005	Rotary switch 3 pole board mounting	IVS TO E-RT 20	6.00
1202	CTT-005-0006	Switch disconnecter 14A 600V AC	2-1/V/SVB	2.00
1203	CTT-006-0002	Over load relay 16-25A 3UA5200-2C	ABB080	3.00
1204	CTT-006-0003	Overload 1.6~2.5 TELEMECANIQUE	LR2D 1307	3.00
1205	CTT-006-0004	Thermal overload 0.25-0.4A	CTT064	5.00
1206	CTT-006-0005	Thermal delayed overload 50-63A, Type: 3UA58 40-2PA *, MAKE: SIEMENS Germany	3UA 5840-2P	3.00
1207	CTT-006-0006	Overload relay 24-34A	BMV9-75-9	9.00
1208	CTT-006-0007	Thermal Over Relay 17-25Amp LRD 22, Range: 16-24 A, Make: Schneider Electric	LR 2D 1322	1.00
1209	CTT-006-0008	Thermal over relay 0.25-0.4Amp	LR 2D 1303	3.00
1210	CTT-006-0009	Auxillary relay 14pin 60.13.8.380	60.13.8380.040	4.00
1211	CTT-006-0011	Relay 230VAC 40.52.8.230	40.52.8.230	14.00
1212	CTT-006-0012	Relay socket 95.85.1	95.85.1	2.00
1213	CTT-006-0014	Overload 29H6L MRA3771	MRA37715587	6.00
1214	CTT-006-0016	Thermal overload 16-22 amps fuji	CTT616	4.00
1215	CTT-006-0017	Thermal overload 1.7-2.6 amps fuji	CTT617	3.00
1216	CTT-006-0018	Overload relay 18..25A S2 CL10	3RU1136-4DB0	6.00
1217	CTT-007-0001	Thermal overload relay T135 65-90A	ABB040	1.00
1218	CTT-007-0002	Thermal overload 5-7.5A	CTT072	3.00
1219	CTT-009-0001	Time relay AC24,0.5-10mm 240V, Type: RE7 MY13MW Range: 0.05 Sec-300 Hrs Volt: 24-240 Vac & Vdc,	RE7-MY13MW	5.00
1220	CTT-009-0003	Power relay 110 VDC 10A 11 pin, Type 60.13.9.110.0040, Coil Votage 110 VDC, Finder	60.13.9.110.0040	12.00
1221	CTT-009-0007	Timer 24-240V AC & DC, Type: ETR4 -69 -A, 24 - 240 VAC / DC, Range: 0 to 100 Hrs.,Moller-Germany	ETR4 - 69A	9.00
1222	CTT-009-0008	Timer 24-240VAC & DC on relay, dial type 8 pin, Make Nais, Fuji and National Power, OMRON	ETR4 - 70A	4.00
1223	CTT-009-0011	Relay 240VAC, 11pin 10A, Type 60.13.8.230.0040, Coil Voltage 230 VAC 11pin, rating 10A, Make: Finder	60.13.8240.0040	21.00
1224	CTT-009-0013	Relay 11 pin 24VAC finder	CTT913	11.00
1225	CTT-009-0016	Relay timer base 8 pins Type 90.26, Make: Finder	90.26	22.00
1226	CTT-009-0017	Relay 5 pins PCB 10A/250VAC	V23057B006	24.00
1227	CTT-009-0018	Relay 24VDC, 8A/250VAC	KR510024	11.00
1228	CTT-009-0019	Relay 11 pins 110VAC 10A	601381100040	11.00
1229	CTT-009-0020	Relay 8 pin, coil voltage: 12Vdc	CTT0920	3.00
1230	CTT-009-0021	Relay 8 pin 5 A, 250Vac	CTT921	5.00
1231	CTT-009-0022	Relay 8 Pin coil voltage 48 VAC , Make: Finder	CTT-009-0022	7.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1232	CTT-009-0023	Solid State Timer, Multi functional Timer, 8-Pin, Coil Voltage: 24-240 VAC-VDC, Model: H3BA-8, Omron	H3BA-8	6.00
1233	CTT-010-0002	Bimetal relay 1NO+1NC 50-63A	CTT1038	1.00
1234	CTT-013-0001	Air break contactor 3TF2801	CTT1039	1.00
1235	CTT-014-0002	Motor connector for radiator	CTT1032	4.00
1236	CTT-014-0004	Terminal plate 3phase motor	CTT144	2.00
1237	CTT-017-0001	Contactors 230-240 VAC Coil Volt, Model LC-1D12M7, Make: Schneider	LC-1D12M7	3.00
1238	CTT-017-0002	Contactors 230-240VAC coil volt	FC-18	2.00
1239	CTT-017-0004	Magnetic cont FC20 220V AC, 3 Pole, 2a,2b, 2 NO, 2NC, Make: Green Power National	3P2A2B FC20	4.00
1240	CTT-017-0005	Magnetic cont FC30 220V AC	3P2A2B	2.00
1241	CTT-018-0002	Auxiliary block 1N/O+1N/C	LA1-DN11	3.00
1242	CTT-018-0005	Auxiliary contact A600-Q300 16A	CAL5-11VI	2.00
1243	CTT-018-0006	Magnetic Contactor 37KW 230V, Type LC1-D80M7, Make: Schneider	LC1-D80M7	2.00
1244	CTT-018-0009	Thermal overload relay 12-18 Amps, Type: LR2-D1321, Make: Telemecanique	LR2-D1321	4.00
1245	CTT-018-0010	OLR trip reset unit LAD 703M	LAD 703M	2.00
1246	CTT-018-0011	Magnetic contactor 30KW 220VAC LC1 D65M5	LC1 D6511	3.00
1247	CTT-018-0012	Overload relay 55 70A	LRD 3361	1.00
1248	CTT-018-0013	Auxiliary contact block 1NO+1NC	NHI 11/PKZO	2.00
1249	CTT-018-0014	Auxiliary contact block 1NO+1NC	NHI E-11-PKZO	2.00
1250	CTT-018-0023	Instantaneous auxiliary contact block DN20, Make: Telemecanique - France	LA1DN20	2.00
1251	CTT-019-0002	Thermal delay overload 48-65A, Type LR2 D3359, Make: Telemecanique	LR2 D3359	2.00
1252	CTT-020-0001	Auxiliary block PKZ-2 NH1-11, 10 A, 300VAC for FD fan	PKZ-2 NH1-11	1.00
1253	CTT-020-0002	Mechanical interlock block LA9D09978	LA 9 DO902	5.00
1254	CTT-021-0001	Stopper for DIN Rail Mount End Connector	CTT211	22.00
1255	CTT-023-0001	Digital counter 220V for LO unit	LC4H-R6	6.00
1256	EDS-002-0001	Simatic S5-95U compact unit	6ES5095-8MA05	1.00
1257	EDS-002-0002	Simatic S5 482 dig inp/out module	6ES5482-8MA13	1.00
1258	EDS-002-0004	Simatic S5 734-1 cable 3.2M 25 pin	6ES5734-1BD20	1.00
1259	EDS-003-0003	Front connet cable OPTO/9-POL	1MKC950001-1	1.00
1260	EDS-004-0002	Cable SPA-ZP 6A2	SPA ZP 6A2	1.00
1261	EDS-004-0003	Cable SPA-ZP 5A3	SPA ZP 5A3	1.00
1262	EDS-004-0004	Cable SPA-ZP 21A	SPA ZP 21A	1.00
1263	EDS-005-0001	Adva soft windows 1.3/2	EDS051	1.00
1264	EDS-005-0002	Interface AF 100	EDS052	1.00
1265	EDS-005-0003	Adva soft windows 1.3/2 command	EDS053	1.00
1266	EDS-005-0004	BNC terminator	EDS054	4.00
1267	EDS-005-0005	Drop cable TK516>AF100K02	EDS055	1.00
1268	EDS-005-0006	Coaxial cable for AF100	EDS056	360.00
1269	EDS-006-0001	Potentiometer PCB, 0-50 k	EDS61	12.00
1270	EDS-006-0002	Surface mount resistance 2K .75W	306-6241	11.00
1271	EDS-006-0003	Surface mount resistance(SMD) 1.82K 0.25W	EDS-006-0003	24.00
1272	EDS-007-0001	Eeprom AM 27 C256-150DC	EDS71	11.00
1273	EDS-007-0003	EPROM # M27 C512-15F6	M27C512	3.00
1274	EDS-007-0004	EPROM SXLK 27C256	27C256	11.00
1275	EDS-008-0001	Transistor BF-240	EDS81	23.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1276	EDS-008-0002	Transistor BC-212 B	EDS82	11.00
1277	EDS-008-0003	Transistor BD-159 / 139	EDS83	10.00
1278	EDS-008-0004	Transistor BCY 79VIII	EDS084	12.00
1279	EDS-008-0005	Transistor C 640	EDS085	10.00
1280	EDS-008-0006	Transistor BD 140	EDS86	10.00
1281	EDS-008-0007	Transistor CBC 182	EDS87	10.00
1282	EDS-008-0008	Transistor BC2128	EDS88	12.00
1283	EDS-008-0010	Transistors PH BUJ 26A (Fuse)	EDS810	8.00
1284	EDS-008-0011	Transistor 70L08A	GEL211	11.00
1285	EDS-008-0012	Transistor LM 336	GEL212	11.00
1286	EDS-008-0013	Transistor BS 170	GEL213	11.00
1287	EDS-008-0014	Transistor M2N5051	GEL214	11.00
1288	EDS-008-0015	Transistor BD679	GEL215	10.00
1289	EDS-008-0016	Transistor P2955	GEL216	11.00
1290	EDS-008-0017	Transistor IRFD 460	EDS817	12.00
1291	EDS-008-0018	Transistor BC-2378 M812	EDS818	12.00
1292	EDS-008-0019	Power transistor IRF 150 (proact)	IRF150	2.00
1293	EDS-008-0020	Power transistor BUZ24	BUZ24	15.00
1294	EDS-008-0021	Transistor BYV 42E150	42E150	12.00
1295	EDS-008-0022	Transistor\Thyristor	HI5NA50	12.00
1296	EDS-008-0023	Transistor C546 B	C546 B	12.00
1297	EDS-008-0024	Transistor TIP 31C	TIP 31C	11.00
1298	EDS-008-0026	Field effect transistor K2141 (PG100)	K2141	8.00
1299	EDS-008-0027	Optical transistor CNY-17-1 (PG100)	CNY17-1	8.00
1300	EDS-008-0028	Shunt transistor TL 431C	TL 431C	16.00
1301	EDS-008-0029	Transistor IRG4PC50W IYR	IRG4PC50W	17.00
1302	EDS-008-0030	Transistor SSS3N90A, 022	SSS3N90A	22.00
1303	EDS-008-0032	Transistor IRGBC20UD2	IRGBC20UD2	8.00
1304	EDS-008-0033	Regulator (IC) LM 2575 T	LM2575T	7.00
1305	EDS-008-0034	Transmitter LM 338K	EDS834	11.00
1306	EDS-008-0035	Transistor IRF 1540G	IRF 1540G	12.00
1307	EDS-008-0036	Transistor BC 327	EDS836	11.00
1308	EDS-008-0037	Transistor C3621	C3621	12.00
1309	EDS-008-0042	Transistor BC 548	EDS842	12.00
1310	EDS-008-0044	Transistor 4 N35	EDS844	10.00
1311	EDS-008-0045	Transistor PN2222(A)	EDS845	12.00
1312	EDS-008-0046	IGBT IR4BC30FD	IR4BC30FD	28.00
1313	EDS-008-0047	IGBT IRG4BC30UD 23IF	EDS847	8.00
1314	EDS-008-0051	Transistor 2N-3904 -320	EDS-008-0051	6.00
1315	EDS-008-0053	Transistor G4PC40UD	EDS-008-0053	8.00
1316	EDS-008-0054	Transistor BC-141-16	EDS-008-0054	6.00
1317	EDS-008-0055	Transistor J6810	EDS-008-0055	6.00
1318	EDS-008-0056	Transistor 2N5416	EDS-008-0056	6.00
1319	EDS-008-0057	Transistor IRF 640	EDS-008-0057	6.00
1320	EDS-008-0058	Transistor C547A	EDS-008-0058	6.00
1321	EDS-008-0059	Transistor 2N2219A	EDS-008-0059	6.00
1322	EDS-008-0060	Transistor BUZ80A	EDS-008-0060	6.00
1323	EDS-008-0061	Transistor IRF BE 30	EDS-008-0061	6.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1324	EDS-008-0062	Transistor 2N3439	EDS-008-0062	6.00
1325	EDS-008-0063	Transistor 2N3773	EDS-008-0063	16.00
1326	EDS-008-0064	Transistor D313	EDS-008-0064	24.00
1327	EDS-008-0065	Transistor BD x 53C	EDS-008-0065	12.00
1328	EDS-008-0066	Transistor 13005 A	EDS-008-0066	29.00
1329	EDS-009-0001	Capacitor 2200 micro 16V	EDS91	11.00
1330	EDS-009-0002	Capacitor 2200 micro 10V	EDS92	9.00
1331	EDS-009-0003	Capacitor 1000 micro 16V	EDS93	2.00
1332	EDS-009-0004	Capacitor 1000 micro 10V	EDS94	10.00
1333	EDS-009-0005	Capacitor 330 micro 15V	EDS95	8.00
1334	EDS-009-0006	Capacitor 2200 16V cylinder shape	EDS96	20.00
1335	EDS-009-0008	Capacitor 1000 10V cylinder shape	EDS98	16.00
1336	EDS-009-0009	Capacitor 1MICRO FD50V	EDS99	7.00
1337	EDS-009-0011	Capacitor 10MICRO FD 63V	EDS911	9.00
1338	EDS-009-0012	Capacitor 100MICRO FD 16V	EDS912	8.00
1339	EDS-009-0013	Capacitor 100MICRO FD 25V	EDS913	15.00
1340	EDS-009-0014	Capacitor 220 MICRO FD 25V	EDS914	64.00
1341	EDS-009-0015	Capacitor 1200 micro farad (M) 80V	566246	172.00
1342	EDS-009-0016	Capacitor 100 micro farad 20V	EDS916	18.00
1343	EDS-009-0018	Capacitor 10 100V micro frad	EDS918	11.00
1344	EDS-009-0019	Capacitor 1000 100V micro frad	EDS919	8.00
1345	EDS-009-0020	Capacitor 33 micro farad 25V	EDS920	5.00
1346	EDS-009-0021	Capacitor 39 micro farad 50V	EDS921	10.00
1347	EDS-009-0022	Capacitor 470 micro farad 6.3V	EDS922	12.00
1348	EDS-009-0023	Capacitor 2200 micro farad 40VDC	ESD823	6.00
1349	EDS-009-0024	Capacitor 470 micro M.40Vdc	EDS924	8.00
1350	EDS-009-0025	Capacitor 100 micro farad 35Vdc	EDS925	15.00
1351	EDS-009-0026	Capacitor 47 Micro Farad 160 VDC 100 MM 275 V-X2	EDS0090026	10.00
1352	EDS-009-0027	Capacitor 0.1 micro Farad 250 Vac	EDS0090027	11.00
1353	EDS-009-0028	Capacitor 100MM 275V-X2	EDS0090028	12.00
1354	EDS-009-0029	Capacitor 220 Micro farad 400 Vac	EDS-009-0029	10.00
1355	EDS-009-0030	Capacitor 1000 Micro farad 35 V (For PG100s)	EDS-009-0030	22.00
1356	EDS-009-0031	Capacitor 100 Micro farad 400 V (For PG100s)	EDS-009-0031	9.00
1357	EDS-009-0032	Capacitor 100 uf 200 Wv	EDS-009-0032	6.00
1358	EDS-009-0033	Capacitor 220 uf 35 V	EDS-009-0033	12.00
1359	EDS-009-0034	Capacitor 22 uf 63V	EDS-009-0034	3.00
1360	EDS-009-0035	Capacitor 470 uf 16V	EDS-009-0035	7.00
1361	EDS-009-0036	Capacitor 100 uf 25 V	EDS-009-0036	17.00
1362	EDS-009-0037	Capacitor 4.7 uf 350V	EDS-009-0037	22.00
1363	EDS-009-0038	Capacitor 22 uf 50V	EDS-009-0038	23.00
1364	EDS-010-0001	Zener diode XZ8,85C	EDS101	10.00
1365	EDS-010-0002	Diode IN4005	EDS102	20.00
1366	EDS-010-0003	Diode IN4148	IN4148	17.00
1367	EDS-010-0004	Zener diode D-16	EDS104	22.00
1368	EDS-010-0005	Zener diode D-06	EDS105	35.00
1369	EDS-010-0006	Diode DSE 130-06A	EDS106	12.00
1370	EDS-010-0007	Diode HFA15P B60	EDS107	12.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1371	EDS-010-0008	Diode IN 5406	EDS108	9.00
1372	EDS-010-0011	Diode IN 6292 A	IN6292A	35.00
1373	EDS-010-0012	Zener diods C 12 PH	EDS1012	23.00
1374	EDS-010-0015	Diode UF4004	UF4004	1.00
1375	EDS-010-0016	Zener Diode	6.8B2	24.00
1376	EDS-010-0017	Diode IN 5402	EDS1017	8.00
1377	EDS-010-0018	Dual diode FMB 26L	EDS1018	12.00
1378	EDS-010-0020	Diode BY 329 - 1200	EDS1020	12.00
1379	EDS-010-0021	Diode IN4448	IN4448	22.00
1380	EDS-010-0022	Zener diode 448	EDS1022	24.00
1381	EDS-010-0023	Zener diode blue strip	EDS1023	12.00
1382	EDS-010-0024	Zener diode 6.8B	EDS1024	9.00
1383	EDS-010-0026	Diod BYV 26C PH	EDS-010-0026	6.00
1384	EDS-010-0027	Diod BYV27-150	EDS-010-0027	6.00
1385	EDS-010-0028	Diod BYV 96E PH	EDS-010-0028	6.00
1386	EDS-010-0029	Diode IN 4007 6 Am	EDS-010-0029	24.00
1387	EDS-010-0030	Diode IN 4007 2 Am	EDS-010-0030	18.00
1388	EDS-011-0001	Resistor 220 ohms ¼ watt	EDS111	22.00
1389	EDS-011-0002	Resistor 2.5 k ¼ watt	EDS112	17.00
1390	EDS-011-0003	Resistor 220 ohms ½ watt	EDS113	19.00
1391	EDS-011-0004	Resistor 2.5 k ½ watt	EDS114	21.00
1392	EDS-011-0005	Resistor ¼ watt 4150 Ohms	EDS115	24.00
1393	EDS-011-0006	Resistor ¼ watt 322 Ohms	EDS116	24.00
1394	EDS-011-0007	Resistor ¼ watt 2550 Ohms	EDS117	20.00
1395	EDS-011-0008	Resistor ¼ watt 1.5 K Ohms	EDS118	2.00
1396	EDS-011-0009	Resistor ¼ watt 22 K Ohms	EDS119	18.00
1397	EDS-011-0010	Resistor ¼ watt 120 Ohms	EDS1110	10.00
1398	EDS-011-0011	Resistor ¼ watt 22 Ohms	EDS1111	23.00
1399	EDS-011-0012	Resistor ¼ watt 1 K Ohms	EDS1112	13.00
1400	EDS-011-0013	Resistor ¼ watt 14 K Ohms	EDS1113	24.00
1401	EDS-011-0014	Oscillator F 1100E-9515 14.745600	EDS1114	3.00
1402	EDS-011-0016	Resistance 560 Ohms 1 watt	EDS1116	3.00
1403	EDS-011-0017	Resistance 560 Ohms 2 watt	EDS1117	12.00
1404	EDS-011-0018	Potentio meter variable 100k ohms	EDS1118	3.00
1405	EDS-011-0019	Resistance 0.28 Ohms 2Watt	EDS1119	26.00
1406	EDS-011-0020	Resistance 33 Ohms ¼Watt	EDS1120	30.00
1407	EDS-011-0021	Resistance 1.2 K Ohms ¼Watt	EDS1121	23.00
1408	EDS-011-0022	Resistance 1.5 M Ohms ¼Watt	EDS1122	29.00
1409	EDS-011-0023	Resistance 30 K Ohms 3Watt	EDS1123	27.00
1410	EDS-011-0024	Resistance 47 Ohms 2Watt	EDS1124	30.00
1411	EDS-011-0025	Resistance 120 Ohms 0.2Watt	EDS1125	23.00
1412	EDS-011-0026	Resistance 27 K Ohms ¼Watt	EDS1126	28.00
1413	EDS-011-0027	Thermistor SCK 102 (PG100)	EDS1127	15.00
1414	EDS-011-0028	Resistor 1k Ohms 1Watt	EDS1128	46.00
1415	EDS-011-0030	Resistance 0.82M ohms ½ watt	EDS1130	36.00
1416	EDS-011-0031	Resistance 80ohms 1 watt	EDS1131	35.00
1417	EDS-011-0032	Resistance 3.9k ohms 5 watt	EDS1132	30.00
1418	EDS-011-0033	Resistance 100k ohms 2 watt	EDS1133	24.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1419	EDS-011-0036	Resistance 10k ohms 2 watt	EDS1136	36.00
1420	EDS-011-0037	Resistance 2.7k ohms ¼ watt	EDS1137	25.00
1421	EDS-011-0038	Resistance 10k ohms ¼ watt	EDS1138	26.00
1422	EDS-011-0039	Resistor 1-2 K ohms ¼Watt	EDS1139	21.00
1423	EDS-011-0040	Resistor 10 Ohms 1/2 Watt	EDS1140	19.00
1424	EDS-011-0041	Resistor 470K ½ Watt	EDS1141	17.00
1425	EDS-011-0042	Resistor 120K 2 Watt	EDS1142	19.00
1426	EDS-011-0044	Resistor 6.2 kilo ohms 2 Watt	6.2K - 2W	22.00
1427	EDS-011-0045	Resistor 6.2 kilo ohms 2 Watt	EDS1145	24.00
1428	EDS-011-0046	Resistance 620 ohms 1/4 watt	EDS1146	18.00
1429	EDS-011-0047	Resistance 620 ohms 1/2 watt	EDS1147	22.00
1430	EDS-011-0048	Chip resistance 10K Ohms 1/8Watt	EDS1148	12.00
1431	EDS-011-0049	Chip resistance 22K Ohms 1/8Watt	EDS1149	10.00
1432	EDS-011-0050	Chip resistance 1.8K Ohms 1/8Watt	EDS1150	10.00
1433	EDS-011-0052	Chip resistance 2.2K Ohms 1/8Watt	EDS1152	12.00
1434	EDS-011-0053	Chip resistance 100 Ohms 1Watt	EDS1153	11.00
1435	EDS-011-0054	Variable resistance 500 Ohms	EDS1154	12.00
1436	EDS-011-0055	Chip resistance 1K Ohms 1/8 Watt	EDS1155	12.00
1437	EDS-011-0056	Resistance 27 KJ 5 watt	27KJ 5	12.00
1438	EDS-011-0057	Resistance 680 Ohms 1 watt.	EDS-011-0057	11.00
1439	EDS-011-0058	Resistance 3.9 K Ohms 1 Watt	EDS-011-0058	7.00
1440	EDS-011-0063	Potentiometer Variable 0-20ohms	EDS0110063	9.00
1441	EDS-011-0064	Potentiometer variable 0-0050 ohms	EDS0110064	10.00
1442	EDS-011-0065	Resistance 150 K Ohm 1/2 W	EDS-011-0065	21.00
1443	EDS-011-0066	Resistance 2.2 K Ohm 1/2 W	EDS-011-0066	24.00
1444	EDS-011-0067	Resistance 2 K Ohm 1/2 W	EDS-011-0067	22.00
1445	EDS-011-0068	Resistance 1.8 K Ohm 1/2 W	EDS-011-0068	24.00
1446	EDS-011-0069	Resistance 1 K Ohm 1/2 W	EDS-011-0069	50.00
1447	EDS-011-0070	Resistance 2.2 Ohm 1/2 W	EDS-011-0070	44.00
1448	EDS-011-0071	Resistance 18 Ohm 1/2 W	EDS-011-0071	44.00
1449	EDS-011-0072	Resistor 6.2 kilo ohms 1/2 Watt	EDS-011-0072	24.00
1450	EDS-011-0073	SMD Resistance 2.74 KOhm, 1/4 W, Type 1206,	EDS-011-0073	80.00
1451	EDS-011-0075	Resistor 0.47 Ohms 5%, 1/2 Watt	EDS-011-0075	50.00
1452	EDS-011-0076	Resistor 1.0 Ohms 5%, 1/2 Watt	EDS-011-0076	25.00
1453	EDS-012-0001	IC LM 393 P (Proact)	EDS121	29.00
1454	EDS-012-0002	IC TDA 1060	EDS122	4.00
1455	EDS-012-0003	IC 8CA MT ME 555 P 8pins	EDS123	3.00
1456	EDS-012-0004	IC LM 358N	EDS124	22.00
1457	EDS-012-0005	IC UC 3844N	EDS125	8.00
1458	EDS-012-0007	IC LT 1019 (Proact)	EDS127	36.00
1459	EDS-012-0008	IC MP 14024BCp/CD4024BE (Proact)	EDS128	7.00
1460	EDS-012-0009	IC IR 2110 (Proact)	EDS129	28.00
1461	EDS-012-0010	IC LM 193 JGB	EDS1210	12.00
1462	EDS-012-0011	IC TLC 27M2A1 (Proact)	EDS1211	53.00
1463	EDS-012-0014	IC CD4069UBF	EDS1214	11.00
1464	EDS-012-0015	IC CD 4053BL	EDS1215	11.00
1465	EDS-012-0016	IC KA 3842 A	EDS1216	2.00
1466	EDS-012-0017	IC CA 3161 E	EDS1217	23.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1467	EDS-012-0018	IC X28HC64P1-12, CB543ES	EDS1218	3.00
1468	EDS-012-0019	IC CA 3162 E	EDS1219	23.00
1469	EDS-012-0020	IC LM 2904N	EDS1220	11.00
1470	EDS-012-0021	Chip IC HEF4041BT	4047	12.00
1471	EDS-012-0022	Chip IC HEF4013BT	EDS1222	12.00
1472	EDS-012-0024	Chip IC HEF4046BT	EDS1224	12.00
1473	EDS-012-0027	Chip IC TIL 111/TI9401	EDS1227	6.00
1474	EDS-012-0028	Chip IC MC 3403N	EDS1228	5.00
1475	EDS-012-0029	Chip IC M47ad/LM2917N-B	EDS1229	6.00
1476	EDS-012-0030	IC LM 358N	EDS1230	5.00
1477	EDS-012-0031	IC Regulator UAA18 WC3	EDS1231	6.00
1478	EDS-012-0032	IC LM 294CT-12 P+	EDS1232	12.00
1479	EDS-012-0035	IC UC2844N	EDS-012-0035	5.00
1480	EDS-012-0036	IC UC 2844N/SMD	EDS-012-0036	6.00
1481	EDS-012-0037	IC 79L12	EDS-012-0037	6.00
1482	EDS-012-0039	IC UC2844N	EDS-012-0039	3.00
1483	EDS-012-0040	Optocoupler AQV 210EH	AQV 210EH	240.00
1484	EDS-012-0041	IC TC 4011BP	EDS-012-0041	5.00
1485	EDS-012-0042	IC TC 4013BP	EDS-012-0042	5.00
1486	EDS-012-0043	IC 74 HC 08 AP	EDS-012-0043	5.00
1487	EDS-012-0045	IC LMC 662 AIN Pin Type	EDS-012-0045	4.00
1488	EDS-012-0046	IC LM2902 (SMD)	EDS-012-0046	15.00
1489	EDS-012-0047	IC PIJ 2902 (SMD)	EDS-012-0047	4.00
1490	EDS-012-0048	IC AD637 AQ	EDS-012-0048	4.00
1491	EDS-012-0049	IC OP177G Pin Type	EDS-012-0049	15.00
1492	EDS-012-0050	IC OP 27 G Pin Type	EDS-012-0050	12.00
1493	EDS-012-0051	IC 74 HC 4052N Pin Type	EDS-012-0051	6.00
1494	EDS-012-0052	IC LM 2904 N Pin Type	EDS-012-0052	6.00
1495	EDS-012-0053	IC LM 2902 N Pin Type	EDS-012-0053	12.00
1496	EDS-012-0057	IC TLC 3702 IP	EDS-012-0057	6.00
1497	EDS-012-0058	IC 4N 35	EDS-012-0058	8.00
1498	EDS-012-0059	IC IRGPF 50 F	EDS-012-0059	4.00
1499	EDS-012-0060	IC G 4 PSH71KD	EDS-012-0060	4.00
1500	EDS-012-0061	IC LM 2903	EDS-012-0061	4.00
1501	EDS-012-0062	IC 74 HC 74 N	EDS-012-0062	3.00
1502	EDS-012-0063	IC 74HC 4316N	EDS-012-0063	6.00
1503	EDS-012-0064	IC MC 1405 3B CP	EDS-012-0064	3.00
1504	EDS-012-0067	IC GAL 16 V 8 D	EDS-012-0067	7.00
1505	EDS-012-0068	IGBT Gate Drive Opto-coupler HCMW3120	HCMW3120	48.00
1506	EDS-014-0001	Voltage dependent resistor VDR275L20	VDR275L20	12.00
1507	EDS-014-0002	Voltage dependent resistor VE13 0461	VE13 0461	8.00
1508	EDS-014-0005	Voltage depdt resistor S14K275	RV9718	11.00
1509	EDS-014-0006	Voltage depdt resistor 20K275	20K275	9.00
1510	EDS-014-0009	Voltage dependent resistor 10V 471K	EDS-014-0009	11.00
1511	EDS-018-0001	Intelligent Power Module MIG20Q806H, Make: Toshiba	MIG20J806H	1.00
1512	EDS-018-0033	Transistor C327	EDS1833	12.00
1513	EDS-018-0034	IGBT Module BSM50GP120, 1200V 50 A, Make: Eupec\ Infineon	EDS-018-0034	17.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1514	EDS-019-0001	IC base 8 pin	EDS191	40.00
1515	EDS-019-0002	IC base 14 pins	EDS192	42.00
1516	EDS-019-0003	IC base 16 pins	EDS193	50.00
1517	EDS-020-0002	PCB mounted relay 5 pin.12VDC	AZ 696-1C-12DE	7.00
1518	EDS-021-0001	Filament	EDS0210001	6.00
1519	EDS-021-0002	IC LM 348N	EDS-021-0002	2.00
1520	EDS-021-0003	IC 084CN	EDS-021-0003	2.00
1521	EDS-021-0004	IC CPA 9611N	EDS-021-0004	1.00
1522	EDS-023-0001	Inductive Slot Sensor SJ2-N-Y12815, Part Number 106576, Make:Pepperl+Fuchs GmbH	106576	3.00
1523	EXB-001	Bellow US1FA.0800.1.006 800x410mm	EXB001	2.00
1524	EXB-002	Bellow US1FA.1100.1.003 1100x425mm	EXB002	2.00
1525	EXB-004	Bellow UT2FA.1100.3.002 1100x750mm	EXB004	2.00
1526	FFS-001	Transformer50 Hz	FFS001	1.00
1527	FFS-002	Loop connection board LEK22	FFS002	1.00
1528	FFS-003	Loop printed circuit board LEE 23	FFS003	1.00
1529	FFS-004	Diode board BUS01	FFS004	1.00
1530	FFS-005	Output board SOE24	FFS005	1.00
1531	FFS-006	Power supply board SVE05	FFS006	1.00
1532	FFS-007	Front board CAB32	FFS007	1.00
1533	FFS-008	KEY pad ABT 32	FFS008	1.00
1534	FFS-009	Processor board CPE16 CSM 17	FFS009	1.00
1535	FFS-010	Relay board RAK03	FFS010	1.00
1536	FFS-011	Relay board RAK16	FFS011	1.00
1537	FFS-012	Power supply SVE 54	FFS012	1.00
1538	FFS-013	Control override module LAB 01	FFS013	1.00
1539	FFS-014	Control board release system LAE 25	FFS014	1.00
1540	FFS-015	Output card release system LAK 20	FFS015	1.00
1541	FFS-017	Battery control board BLK 03	FFS017	1.00
1542	FFS-018	Battery control module BLE01	FFS018	1.00
1543	FFS-019	End of line board CAK 16	FFS019	1.00
1544	FFS-021	Add mod ADX156 KBL incl. housing	FFS021	1.00
1545	FFS-022	Indicator light-prism and base	FFS022	4.00
1546	FFS-024	Heat detector 160F	FFS024	5.00
1547	FFS-025	Manual Call Station, MUS3A-ROOOF-01, Manual Break Glass Station & Box KAC, UK	MUS3A-ROOOF-01	2.00
1548	FFS-026	CO2 break glass unit KY1/SY/C-English	FFS026	1.00
1549	FFS-027	Pack of 5 spare glasses	FSS027	1.00
1550	FFS-028	Ionisation detector ORM 531(ORM-130) D:5000509, CH:022, 202525, EN 54-7 NL:CE 232842, Hekatron GmbH	ORM-130	1.00
1551	FFS-029	Slow whoop MK4 (Hooter for control room, LV room and MV Room)	FFS029	2.00
1552	FFS-030	Smoke detector Model MK-II-OP Part#: 80-200, ENS4 Part 7 with Base MK-II DB/D P# 80-223 Make:Fyreye	MK-II-OP	4.00
1553	FFS-032	EPROM including software	FFS032	1.00
1554	FFS-033	Box assorted fuses	FFS033	10.00
1555	FFS-034	Cylinder valve K85-50	FFS034	3.00
1556	FFS-035	Lever for cylinder valve	FFS035	2.00
1557	FFS-036	Flexible hose HD 600	FFS036	3.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1558	FFS-037	Non-return valve 3/4"	FFS037	1.00
1559	FFS-038	Nitrogen cylinder 0.4 ltr	FFS038	1.00
1560	FFS-039	Nozzle 1/2" x5.2 mm	FFS039	3.00
1561	FFS-040	Pressure guage 0-160 Bar	FFS040	1.00
1562	FFS-041	Pressure switch HD	FFS041	1.00
1563	FFS-042	Electronic actuator 24V/2A	FFS042	1.00
1564	FFS-043	Relief valve	FFS043	1.00
1565	FFS-044	Pilot pipe L=370 mm	FFS044	2.00
1566	FFS-045	Pilot pipe L=600 mm	FFS045	1.00
1567	FFS-046	Gasket for flexible hose	FFS046	10.00
1568	FFS-047	Gasket for flexible hose	FFS047	10.00
1569	FFS-048	Gasket for pilot pipe	FFS048	19.00
1570	FFS-049	Gasket set for NW 100 alarm set	FFS049	1.00
1571	FFS-051	Angular Contact Ball Bearings 3309 ATN9 Make: SKF	3309 ATN	1.00
1572	FFS-052	Pump housing gaskets	FFS052	1.00
1573	FFS-053	Fuel Oil Filter Fleetguard FF-167	FF-167	2.00
1574	FFS-056	Ball valve V3000-1/2"	FFS056	1.00
1575	FFS-059	Level guage tube	FFS059	1.00
1576	FFS-060	Level guage valve	FFS060	1.00
1577	FFS-061	Level transmeter FL 3	FFS061	1.00
1578	FFS-062	Valve rubber for SOCLA 402-50 mm	FFS062	1.00
1579	FFS-063	KT module	FFS063	1.00
1580	FFS-064	Rectifier 24SGR5	FFS064	2.00
1581	FFS-065	Start relay 88 W82 120	FFS065	1.00
1582	FFS-066	A meter	FFS066	2.00
1583	FFS-067	Volt meter	FFS067	1.00
1584	FFS-068	Hour counter round	FFS068	1.00
1585	FFS-069	Oil pressure guage 0-10 bar for fire fighting eng.	FFS069	1.00
1586	FFS-070	Tempreture guage	FFS070	1.00
1587	FFS-072	Push button -back lit	FFS072	1.00
1588	FFS-073	Contact block	FFS073	4.00
1589	FFS-075	Signalling device yellow	FFS075	2.00
1590	FFS-076	Signalling device green	FFS076	1.00
1591	FFS-077	Signalling device blue	FFS077	1.00
1592	FFS-078	Relay BR 303 O24	FFS078	1.00
1593	FFS-079	Relay 2G 450 L24	FFS079	3.00
1594	FFS-080	Relay module HR 420	FFS080	1.00
1595	FFS-081	Mechanical seal	FFS081	1.00
1596	FFS-082	Set sealing rings for pump housing	FFS082	1.00
1597	FFS-083	Counter flanges with gaskets	FFS083	2.00
1598	FFS-084	Pressure switch 1-10 bar 0.3-1.3 bar	RT-116	2.00
1599	FFS-085	Lee 21 147928	147928	1.00
1600	FFS-087	Manual Call Point KAC 2001, Marking British Cataogue NO. MUS3A-ROOOF0G-01, Make: KAC UK	KAC 2001	3.00
1601	FFS-092	Exhaust expansion bellow	FFS092L	6.00
1602	FFS-094	V - belt A1 10x1150, (SP-RAF-2450 (9.5 X 1150 La), Maintenance free BANDO)	SP-RAF-2450	4.00
1603	FFS-095	Lube oil filter LF 3481	LF 3481	3.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1604	FFS-096	Air release socket 15-16bar 1"	FFS96L	1.00
1605	FFS-098	Automatic Heat Detector Model: MKII-HR, Part # 80-202, with base Model: MKII-DB-D, Part # 80-223 Zeta	MKII-HR	6.00
1606	FFS-100	Gasket 118.5x79mmx01mm	FFS100L	5.00
1607	FFS-102	Warning light, Revolving Light, 220volts, 50HZ, Color:RED, Model: TLB100-F-F-A11-R, Make:HANYOUN NUX	TLB100-F-F-A11-R	1.00
1608	FFS-106	Self startor pinion gear	FFS-106-L	1.00
1609	FFS-108	Rubber bellow Dia 6", No of Holes 8 Nos., PN-16, DN-150, Flange to Flange ,Distance 7" Temp 60 C	FFS-108-L	1.00
1610	FFS-109	Rubber bellow Dia 6" No of Holes 8 Nos., PN-16, DN-150, Flange to Flange , Distance 9" Temp 60 C	FFS-109-L	1.00
1611	FFS-110	Indication Lamp 28 Volt, 40 ma	FFS-110-L	5.00
1612	FFS-111	Smoke Detector Test Spray, Model: 25S, Net WT. 2.5 OZ(75G), UL Listed Made in USA	Model: 25S	5.00
1613	FFS-120	Relief Valve, Model # 228H-M01AMS, Size 4" Min press.60 psig, Max Press. 175 psig, MFGD: J19, KUNKLE	FFS-120	1.00
1614	FFS-121	Photo Electronic Smoke Detector Head Model: 2151 Make: System Sensor	2151	3.00
1615	FFS-122	Quick Release Valve,	FFS-122	3.00
1616	FFS-123	Lever for Quick Release Valve K85-50.0	FFS-123	3.00
1617	FFS-131	Electrical control head with emergency ,B6793-701 24VDC HA/EM	809-153951	1.00
1618	FFS-132	Pneumatic/hand operated pressure switch, 3 pole switch 1/2" "NPT 3,5 BAR"	809-154111	1.00
1619	FFS-133	CO2 Cylinder: Gas: 67.5 Liter or 45 Kgs. pressure 51.7 bar at 20 Degree Centigrade G. Weight 125 Kg	K85-50	1.00
1620	FFS-135	Valve type K85-50 for CO2 cylinder, Pneumatic en manual operated	809-233133	1.00
1621	FFS-136	Pilot Hose HDR2 for N2, L = 370 mm 3/8 BSP - 38 BSP (Squared) DN6	809-233139	1.00
1622	FFS-137	Adapter 3/8-24, UNF IN-G 3/8"	809-233142	1.00
1623	FFS-138	Adapter 3/8", BSP IN - 3/8" - 24 UNF OUT	809-233143	1.00
1624	FFS-139	Pilot Hose HDR1 for N2, L = 600 mm 1/4" 3/8" BSP - 3/8" BSP	809-233145	2.00
1625	FFS-140	Roomfilling Nozzle, 1/2" x 5.2	809-300314	1.00
1626	FFS-141	Pilot Vent, 3/8" x 24 TPI	809-730049	1.00
1627	FFS-142	Valve Globe Type Inlet 2" BSP female Thread,	FFS-142	1.00
1628	FFS-146	Valve operating wheel, Materials: MS, for 2" Valve	FFS-146	3.00
1629	FFS-167	Sprinkler 1/2 x 68 - MX 1 - MS	FFS-167	18.00
1630	FFS-168	Spider Rubber Pad. Spidex CJ55 Red, USA FIFI Pump Coupling	CJ55	5.00
1631	FFS-169	Impeller (FIFI pump), Type: Closed, Outer dia:330mm, Shaft bore:35mm	FFS-169	1.00
1632	FFS-170	Spectrex Triple Infrared IR3 Flame Detector	FFS-170	3.00
1633	FFS-171	Fire Hose Reel Assembly, Inner Hole= 5.5mm, Materials Aluminum	FFS-171	2.00
1634	FFS-172	Water Motorize Alarm, Model WMA-1, Hydraulically Operated Mechanical Sprinkler, Make: Tyco, USA	WMA-1	1.00
1635	FFS-173	Fire Hose Reel with out hose pipe, Suitable for 30 meters hose fitting 1"	FFS-173	4.00
1636	FFS-174	Cylindrical Roller Bearing NU 2210 ECP, Make: SKF	NU 2210 ECP	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1637	FFS-176	Fire Flush Light; Medium Size Flush Light, Catalogue No.SEW-NR Strob 24 Volts DC, Color white,	SEW-NR	1.00
1638	FFS-178	Sight glass tube outer dia. 12mm,inner dia.10mm, Thickness 2mm	FFS-178	1.00
1639	FFS-179	Fire hose Reel Nozzle	FFS-179	1.00
1640	FLS-001-0008	Filter HF6337 for Perkins Engine	HF6337	2.00
1641	GAS-001	Rectangular gasket 00274C0026	GAS001	2.00
1642	GAS-002	Gasket DN700 00274C0028	GAS002	2.00
1643	GAS-005	Gasket DN1200 00274.242C0028	GAS005	1.00
1644	GEL-002-0012	Distribution box 18x14x8" 30mm	GEL212	2.00
1645	GEL-012-0005	Illuminated push button 22mm	XB5AW3165	6.00
1646	GEL-012-0006	Push button 22mm operator	ZB5AW11	13.00
1647	GEL-012-0007	Contact Block 2NC, Model ZB5AZ104	ZB5AZ104	3.00
1648	GEL-012-0008	Contact block 2NO	ZB5AZ103	9.00
1649	GEL-012-0010	Contact block complete bodies with LED 120V~ White	ZB5ZWOG15	20.00
1650	GEL-012-0011	Contact block with LED 120V~ RED, XB4-BW34M5, Schneider	XB4-BW34M5	3.00
1651	GEL-012-0012	Contact block mounting collar	ZB5ZWOG63	14.00
1652	GEL-012-0013	Contact block mounting collar 110VDC	ZB5ZWOG65	15.00
1653	GEL-012-0014	Bulb BA9s 2.4W 110VDC	GEL1214	125.00
1654	GEL-015-0018	Cam switch K2A-001ALH/K2A001ALP	GEL1518	4.00
1655	GEL-015-0019	Cam switch K2F-003ULH/K2F-003ULP	GEL1519	2.00
1656	GEL-025-0004	Ventilation fan 150mm/6" 240V	15CM RD	1.00
1657	GEL-032-0001	Transformer 10Amps 220-240-480V	GEL321	1.00
1658	GEL-032-0005	PCB Mounted Transformer 5.5VA D2027, Trafo Type: SPK06015, Primary:220V, 0.04A Pin1-4,	SPK06015	6.00
1659	GEN-001	Labyrinth seal for bearings, Dia 315mm, IDNo. 200350027 Material: Therm P50, Insulating Garter	200350027	6.00
1660	GEN-002	Set bearing shell halves	GEN002	2.00
1661	GEN-003	Basler AVR	GEN003	1.00
1662	GEN-004	Diodes	9906820	26.00
1663	GEN-005	Electrostatic air filter 20x25x1, Electrostatic Air filters 20 * 25 * 1 CR, US Patent Nos. 2612966	2612966	84.00
1664	GEN-007	Pump for bearing oil cooling system	GEN007	3.00
1665	GEN-008	Heat exchanger (oil cooler)	CB 51 - 20H	4.00
1666	GEN-009	Lube oil filter # HF 7968, 08 bar, Make: Fleet Guard, France, or MAN - WD950	HF 7968	7.00
1667	GEN-010	Current transformer 1000/1A; 5P20;10VA	KOFA12A3	1.00
1668	GEN-011	Voltage transformer 3PU-180/63E-11000V	3818HC413	1.00
1669	GEN-013	Varistor SKVC 20A, 460C, 9648P, Semipack, Make: Semikron	9906819	5.00
1670	GEN-014	Level switch FLT 360	9907014	3.00
1671	GEN-015	Exciter diode monitor	EDM - 200	1.00
1672	GEN-018	Dump condensor motor 5.5KW RPM575	9908540	1.00
1673	GEN-020	Rectifier bridge SKD, Model: SKD 30/16 A1, Make: SEMIKRON	30/16A1	4.00
1674	GEN-021	Rectifier bridge SKB30/16A1	SKB30/16A1	5.00
1675	GEN-022	Resistor 1K J 100W	188-223	14.00
1676	GEN-023	Resistors 10R J 9809	188-122	5.00
1677	GEN-024	Printed circuit board (EDM)	9-1772-01-100	1.00
1678	GEN-025	Shunt 15A100mv CIO.5 radio control	6-6119-00-011	3.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1679	GEN-026	Component plate	6110320108F	1.00
1680	GEN-027	Autotransformer 50/60 Hz230-165-110V	6610100049	3.00
1681	GEN-028	Resistance .56ohms 10W RCH10	6610900051/0R56	9.00
1682	GEN-029	Resistance 3300ohms 10W RCH10	33868	12.00
1683	GEN-030	Resistance 47 ohms 10W RCH10	33869	12.00
1684	GEN-031	Resistance 330 ohms 50W WH50	33865	12.00
1685	GEN-032	Resistance 1 K ohms 10W	33845	24.00
1686	GEN-033	Resistance 330 ohms 10W RCH10	33846	24.00
1687	GEN-034	Resistance 680 ohms 10W RCH10	33844	24.00
1688	GEN-035	Electronic insert FEL-31	FEL-31	3.00
1689	GEN-036	Flow switch VHS 15M R 1/2"	3591JL101002	4.00
1690	GEN-037	PT 100 2 Wire Immersion Length 14" (Head Type) With Ferrul and Nut PYR PT100RG0/4	60129126	4.00
1691	GEN-038	Basler Electrical AVR 200 1 L 24-48VDC	9360100101	2.00
1692	GEN-039	Loose oil ring EL 28 - 2	GEN-039	3.00
1693	GEN-041	Bearing shell in two halves	E.ZLQ28-300	4.00
1694	GEN-044	Bridge rectifier 35A 100V	KBPC3510W	23.00
1695	GEN-045	Shim 0.5mm	GEN045L	18.00
1696	GEN-046	Shim 01mm	GEN046L	5.00
1697	GEN-047	Shim 1.5mm	GEN047L	6.00
1698	GEN-048	Shim 2.0mm	GEN048L	5.00
1699	GEN-049	Sperical seating of insulated bearing	ERNLQ28-300	1.00
1700	GEN-053	Metal coupling for pump 13mm	GEN53L	5.00
1701	GEN-054	Kit for repairing generator Coil	GEN054	1.00
1702	GEN-056	Vibracon SM42-SS	SM42 SS	16.00
1703	GEN-057	Bolt for Generator Foundation, with washer and nut M42x230 Grade 8.8	GEN57	15.00
1704	GEN-058	Current Transformer 800/6.9A	7632SF003/12	3.00
1705	GEN-059	Current Transformer 800/1A	7632SF006	2.00
1706	GEN-060	Curved Jaw Coupling Spiders, Type: CJ 19, Make: LOVEJOY	CJ 19	8.00
1707	GEN-063	Bolt for generator foundation(long) M42x260mm	GEN063	14.00
1708	GEN-064	Hexagonal head bolt 10x38mm	GEN64L	28.00
1709	GEN-065	Washer OD:21mm,ID11mm	GEN65L	200.00
1710	GEN-066	Hydraulic bolt	50605507	12.00
1711	GEN-067	Hydraulic nut	50605504	12.00
1712	GEN-068	bush ring	50605523	12.00
1713	GEN-069	Tapper pin	9869819	7.00
1714	GEN-070	Hex nut	10206014	9.00
1715	GEN-071	Plate washer	99869673	9.00
1716	GEN-072	Tapper pin	29371218	8.00
1717	GEN-074	PT100 for stator winding temp.	GEN074L	3.00
1718	GEN-075	PT100 for stator winding temp.25mm	GEN075L	3.00
1719	GEN-076	Washer Galvanized OD:78 x ID 42 x Thickness 4 mm	GEN76L	31.00
1720	GEN-078	Pt100 stator winding 150 x 12	MS213026PE150K127X300F	6.00
1721	GEN-079	Pt100 stator winding 60" x 425	S8015PD60T425X120	6.00
1722	GEN-082	White Splrit	GEN-082-L	4.00
1723	GEN-087	Control relay 2NO+2NC 24VDC for AVR, AC-11: 4A 230V 22E 2NO+2NC, DC 24V / 1.2 W,3TH20 22-OFB4, Germ	TH20 22-OFB4	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1724	GEN-091	Flexible Pipe, length 820 mm, Outer Dia Flexible Pipe 29mm, Outer Dia matalic Pipe 19.5mm	GEN-091-L	5.00
1725	GEN-092	Flexible Pipe length 520mm, Outer Dia Flexible Pipe 21.5mm, Outer Dia matalic Pipe 14.5 mm	GEN-092-L	5.00
1726	GEN-095	Shaft End Seal (EPDM) Size: 15x30x7, Pump type: KF 8 RF 1 D 15, pump S.#: P.0129230004, Make: KRACH	0044170244	27.00
1727	GEN-097	Socket Head M30 Bolt M30x180, Grade 8.8, for Generator Pedastal Bearing	GEN-097	24.00
1728	GEN-098	Pole for Generator Rotor	GEN-098	2.00
1729	GEN-101	Over Voltage Sensing Relay, 3 Phase 3 wire, Measuring range 110VAC, Type RMV-112D, Make: DEIF, SA	RMV-112D	2.00
1730	GEN-102	Power Supply DC, Part # QUINT-PS/1AC124DC15, Make: Phoenix Contact	QUINT-PS/1AC124DC15	2.00
1731	GEN-103	Auxiliary Relay, Part # 46.52.9.024.0040 with 40 series socket, Make: Finder	46.52.9.024.0040	4.00
1732	GEN-104	Auxiliary Relay, Part # 55.34.9.024.0094 with 94 series socket, Make: Finder	55.34.9.024.0094	2.00
1733	GEN-105	Timer, Part # 85.02.0.024.0000 with socket, Make: Finder	85.02.0.024.0000	2.00
1734	GEN-106	Contactor size S0 with 1NO + 1NC, Part # 3RT2326-2BB40, Make: Siemens	3RT2326-2BB40	4.00
1735	GEN-107	Over Voltage Limit Bloc diode for contactor 3RT2, Part # 3RT29 26-1ER00, Make: Siemens	3RT29 26-1ER00	4.00
1736	GEN-108	Auxiliary Contact Module 1NO + 1NC, Side Mounting for size 'S0' contactor, Make: Siemens	GEN-108	4.00
1737	GEN-114	2 Pole Circuit Breaker, 4A "C" Curve, Model 1C60N Part # 25482, Make: Schneider	25482	2.00
1738	GEN-115	2 Pole Circuit Breaker, 2A "C" Curve, Model 1C60N, Part # 25419, Make: Schneider	25419	2.00
1739	GEN-116	3 Pole Circuit Breaker, 20A "D" Curve, Part # 24602, Make: Schneider	24602	1.00
1740	GEN-117	MX + OF Shunt Trip, 24VDC, Part # 27118, Make: Schneider	27118	2.00
1741	GEN-118	Auxiliary Contact for Circuit Breaker, Part # A9A26924, Make: Schneider	A9A26924	6.00
1742	GEN-119	Auxiliary Contact for Circuit Breaker, Part # A9A26927, Make: Schneider	A9A26927	5.00
1743	GEN-120	Conductive Electric Varnish Corona Shield 8003, Packing 1Kg./Can, Make: Von Roll Switzerland Ltd	8003	6.00
1744	GEN-121	Conductive Electric Varnish Corona Shield 8001, Packing 1Kg./Can, Make: Von Roll Switzerland Ltd	8001	6.00
1745	GEN-122	Conductive Electric Varnish Corona Shield 8002	GEN-122	6.00
1746	GNV-011-0001	Exhaust vlave with muffler SRB ¼"	GNV111	2.00
1747	GPM-001-0001	Coupling complete	339142	1.00
1748	GPM-001-0002	Shaft Pin	310192	4.00
1749	GPM-001-0004	Spacing pipe POS 64	331407	1.00
1750	GPM-001-0005	Spacing pipe POS 64a	331403	1.00
1751	GPM-001-0007	Spacing pipe POS 64d	331401	5.00
1752	GPM-001-0008	Spacing pipe POS 69	331406	2.00
1753	GPM-001-0013	Bearing (pos 47a)	330085	8.00
1754	GPM-001-0014	Service kits	425066	1.00
1755	GPM-001-0016	Shaft	426506	1.00
1756	GPM-001-0017	Impeller complete	425064	8.00
1757	GPM-001-0018	Service kits	425266	4.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1758	GPM-001-0019	Coupling complete POS 8	331928	1.00
1759	GPM-001-0020	Shaft complete POS 51	426610	2.00
1760	GPM-001-0021	Service kits, pump type CRN 8-50 (Exhaust Boiler)	425069	3.00
1761	GPM-001-0022	Shaft	426605	4.00
1762	GPM-001-0023	Service kits	415286	3.00
1763	GPM-001-0024	Shaft seal aux. boiler feed pump grundfos, CR+N2/4 BUBE A-B, C-D P1 9947, P#: 00405096, Make: Grundfo	405096	5.00
1764	GPM-001-0025	Shaft	416002	2.00
1765	GPM-001-0026	Shaft seal Exhaust boiler feed pump CR / CRN 8/16 AUUE/V A-B, Make: Denmark	985204	1.00
1766	GPM-001-0027	Gasket	330032	14.00
1767	GPM-001-0028	Suction interconnection	335005	2.00
1768	GPM-001-0029	Intermediate chamber with bearing	425004	1.00
1769	GPM-001-0030	Spacing pipe	331404	16.00
1770	GPM-001-0031	Spacing pipe	331402	11.00
1771	GPM-001-0032	Spacing pipe	320268	8.00
1772	GPM-001-0033	Washer	96409005	3.00
1773	GPM-001-0034	Spacing pipe	331405	5.00
1774	GPM-001-0035	Shaft seal for Auxiliary Boiler Booster pump (SH Seal CR CR+N2/4 BUBE C-D, P#00405096, Make: Grundfos	00405096	3.00
1775	GPM-001-0036	Intermediate chamber with bearing	415003	1.00
1776	GPM-001-0037	Impeller complete	415053	4.00
1777	GPM-001-0038	Spacing pipe	410142	4.00
1778	GPM-001-0039	Bearing ring	410121	3.00
1779	GPM-001-0040	Spacing pipe	400035	3.00
1780	GPM-001-0041	Washer	410026	2.00
1781	GPM-001-0042	Gasket	410034	4.00
1782	GPM-001-0043	Priming V/V	415090	1.00
1783	GPM-001-0044	Shaft	426608	1.00
1784	GPM-001-0045	Priming V/V	335239	2.00
1785	GPM-001-0046	Suction interconnection	425208	7.00
1786	GPM-001-0047	Impeller	425232	14.00
1787	GPM-001-0048	Intermediate chamber with bearing	425204	7.00
1788	GPM-001-0049	Gasket	331032	4.00
1789	GPM-001-0051	Intermediate chamber	335003	8.00
1790	GPM-001-0052	Seal driver	330001	2.00
1791	GPM-001-0055	Washer	330075	3.00
1792	GPM-001-0056	Nut	102323	1.00
1793	GPM-001-0057	Suction inlet connector	335005	1.00
1794	GPM-001-0058	Hexagon socket head screw	ID 0942	8.00
1795	GPM-001-0063	Intermediate chamber CRN-8-100	425202	10.00
1796	GPM-001-0064	Alr vent screw	405150	3.00
1797	GPM-001-0065	Shaft seal CR/I/N 10/15/20 HQQE (jockey)	96511844	1.00
1798	HDW-060-0006	Plysheet wooden 8'x4'	HDW6006	4.00
1799	HFF-001	Set viton gaskets	HFF001	4.00
1800	HFF-002	HFO fine filter 7803360, Disposable Cartridge For Heavy Fuel Oil, Repl part # C6360300, Micro Felt,	C6360300	22.00
1801	HFF-003	O rings for HFO Fine filter	3030073	25.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1802	HFF-005	Valve steam control DN50PV25 2437K	1138395	1.00
1803	HFF-006	Thermostat steam control 2430K	1071469	1.00
1804	HFF-007	Thermowell G3/4 PN40 220mm	1090 8465	1.00
1805	HFF-008	Adaptor clip male threaded, Article # 1790-8311, Required for Thermostat Part # 2430 K, Make: Samson	1790-8311	5.00
1806	HFF-009	Adaptor clip female threaded	HFF009L	1.00
1807	HFF-010	Thermowell length 170mm dia 12mm	HFF10L	4.00
1808	HFF-011	Spacer/Reducer 18mm, dia 14mm	HFF11L	6.00
1809	HFF-015	Spare Parts Kit for Hand Pump, Model:- 33795.00, Make: Abrox AG	33795.00	2.00
1810	HFF-016	High Pressure Hand pump 450 bar/400/500 ccm, with piston rod 1/8" BSP, Art # 3239111, Make: Abnox	3239111	1.00
1811	HFT-001	Heater complete	HFT001	1.00
1812	HFT-002	Bottom cover	HFT002	2.00
1813	HFU-001	Electric motor	HFU001	1.00
1814	HFU-003	SHAFT SEAL G050T100UOAUUV, For HFO unloading Pump Type IMO/LPQ 110 LI / IRYP	188530	2.00
1815	HFU-004	O ring kit for pump	HFU004	1.00
1816	HFU-005	Self sealing coupling Tank unit 119 MM/3", 3" BSP Female Thread Alum / Viton, 5531C-1107	5531C-1107	2.00
1817	HFU-006	Hose unit 119 MM/3" 3" BSP Female Threade Alum/Viton	5532C-1307	2.00
1818	HFU-008	Decanting hose couplings	HFU008	16.00
1819	HFU-009	Bolt with brass bush spring wash	HFU009L	4.00
1820	HFU-010	Rubber ring for hose unit	HFU010L	24.00
1821	HFU-016	Pulley for motor	HFU16L	2.00
1822	HFU-017	Elastic trasion ring	PIV 148-10	8.00
1823	HFU-018	Coupler (Aluminium) Size 3" 633-C, Make OPW KAMLOK	HFU-018	2.00
1824	HFU-019	Plug (Aluminium) Size 3" 634-A, Make OPW KAMLOK	HFU-019	2.00
1825	HFU-025	Coupling body (Aluminium)	5311A-1	4.00
1826	HFU-026	O-ring (Viton (FKM)	5516-07	12.00
1827	HFU-027	O-ring (Viton (FKM)	6132-07	12.00
1828	HFU-028	Protective ring (NBR/PVC)	5381B-10	14.00
1829	HFU-032	Handle (Aluminium)	5567-1	3.00
1830	HFU-033	Bushing (Stainless steel)	5427-4	24.00
1831	INS-001	Magnetic Level Switch Float Type, AA 01 041, IP 65, TRIMOD-BESTA, Switzerland	AA 01 041	2.00
1832	INS-002	Magnetic Level Switch Float Type, AA 01 04, IP 65, TRIMOD-BESTA, Switzerland	AA 01 04	2.00
1833	INS-004	Level Element for Tank 2500mm 2" BSP male, Transmitter XM-800E-TC2-C53-K6, LO=2500,A=2360mm, CI=165m	XM-800E-TC2-C53-K6	1.00
1834	INS-005	Level Element for tank 3000mm 2" BSP male	INS005	1.00
1835	INS-006	Level Element for tank 2900mm 2" BSP male, Part # XM-880E-2900, Transmitter XM-800E-TC2-C53-K6,	XM-880E-2900	1.00
1836	INS-007	Level Element for tank 2710mm 2" BSP male	XM-880E-2710	1.00
1837	INS-008	Level indicator transmltor- 0-100% 4-20mA Type HT-640, Type: HT 690.2BD3, 45140, In put, Spanning 4	HT 690.2BD3	3.00
1838	INS-010	Level switch for tank h=3000mm DN65	INS010	1.00
1839	INS-012	Level switch float nc 69x 72	INS012	1.00
1840	INS-013	Terminal box for LS-270-E	INS013	2.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1841	INS-014	Set of spares for flow qty.mtr and printer	INS014	1.00
1842	INS-015	Level Indicator guage+tranducer 1" BSP female	INS015	1.00
1843	INS-016	Pressure transmeter for level 4-20 mA DN32	INS016	1.00
1844	INS-023	Thermometer 100 C RX 691 lincert=400mm	INS023	1.00
1845	INS-025	Well (X 10CRNimoti 18-10)DIN 16179-lincert=87mm	INS025	1.00
1846	INS-026	Well (X 10CRNimoti 18-10)DIN 16179-lincert=147mm	INS026	16.00
1847	INS-028	Thermowell(X10CRNimoti18-10)DIN16179-lince rt=387mm	INS028	3.00
1848	INS-029	Hot well for temp/guage 10mm 1/2NPT	INS029	3.00
1849	INS-030	IC-SCL 4020 BE	INS030	2.00
1850	INS-031	Intigrated Circuit IC-LM 324N	IC-LM 324N	7.00
1851	INS-032	IC-7660 CPA	INS032	2.00
1852	INS-033	IC-PCB 80C 49P G025-0605-V2Y	INS033	2.00
1853	INS-034	IC-ICL 7650 SCPD	INS034	2.00
1854	INS-035	IC-ICL 7135 CPI	INS035	2.00
1855	INS-036	IC-HCF 4054 BE	INS036	2.00
1856	INS-039	Ampere meter 45-D 0.000-10.000A	DM96 P	1.00
1857	INS-043	Thermometer 160 C RX 691 lincert=400mm	INS-043-L	3.00
1858	INS-045A	Totalizer For VZO 50FL (Impluse Counter) Spec: 2108 Part # 87610340) Make: Crouzet	87610340)	1.00
1859	INS-047	Temperature Gauge 0-100 C, Order Code: BT392R, Bulb Dia: 8mm, Bulb Length: 500mm,	BT392R	2.00
1860	INS-048	Pressure gauge 0 - 1.2 Bar, Size: 163 mm (6 inch),Scale Interval: 0.01, Pres Medium: Diesel / Fuel	INS-048	2.00
1861	KCN-001	Rope guide spring	KCN001	2.00
1862	KCN-002	Wire rope	KCN002	76.00
1863	KCN-003	Rope guide complete	KCN003	1.00
1864	KCN-004	Limit switch XCK-A-121	XCK-A-121	2.00
1865	KCN-005	Overload switch	KCN005	1.00
1866	KCN-006	Safety catch	KCN006	1.00
1867	KCN-007	Hoisting Contactors LC1 D128E7, Schneider	LC1 D128E7	3.00
1868	KCN-008	Rectifier hoisting motor brake, REC12-690+DC 60010145	60010145	2.00
1869	KCN-009	Brake repair kit hoisting motor	KCN009	1.00
1870	KCN-010	Friction disk bridge travel motor	KCN010	1.00
1871	KCN-011	Rectifier bridge travel motor brake	KCN011	1.00
1872	KCN-012	Bridge travel limit switch	KCN012	1.00
1873	KCN-013	Hoisting motor, 3~ Motor NR 523344, INS.Cl.F, Type: MF11L-106N155110031T-IP55, 3.5/0.55 kw	2810/380 R/MIN	1.00
1874	KCN-014	Trolley motor, Type: MF07LB 104-131184019, IP 55, 4 min ON, 6 Off, ENCL TEFC 3Ph, 0.45/.11 KW S3	MF07LB 104-131184019	2.00
1875	KCN-015	Bridge travel motor, MF07ZC 104-133184012, IP 55 , NR 517085, 0.65/0.15 KW, S3-40 Ins. Cl-F, 2785/5	KCN015	2.00
1876	KCN-016	Brake hoisting motor	KCN016	1.00
1877	KCN-018	Brake bridge travel motor	KCN018	1.00
1878	KCN-019	Set maln contactors	KCN019	4.00
1879	KCN-021	Fuse base P/N 258655	9903418	1.00
1880	KCN-022	Contactor P/N 257539	9903419	2.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
1881	KCN-023	Contactor P/N 257529	9903480	2.00
1882	KCN-024	Main isolator P/N 256779	9903421	1.00
1883	KCN-025	Extension shaft P/N 261101	9903422	1.00
1884	KCN-026	Handle P/N 248761	9903423	1.00
1885	KCN-027	Transformer P/N 258705	9903424	1.00
1886	KCN-028	Plug female P/N 259222	9903425	1.00
1887	KCN-029	Plug female 15 pin	9903426	1.00
1888	KCN-031	Contactor P/N 257527	9903428	2.00
1889	KCN-032	Auxiliary contact block P/N 256622	9903429	1.00
1890	KCN-033	Terminal block M4/6	9903430	2.00
1891	KCN-034	Plug male 1EP1B (15 Pins), MENNEKES 391 (5 Poles)	9903431	3.00
1892	KCN-036	Control station comp P/N 58822	9903433	1.00
1893	KCN-038	Limit switch	P2B0035	1.00
1894	KCN-039	Limit switch	P2B0037	1.00
1895	KCN-041	Cable	A07BBF5G1.5	5.00
1896	KCN-042	Cable	S07BBD5F7G1.5	5.00
1897	KCN-045	Sliding hanger galvanised	BN7-Z	39.00
1898	KCN-046	Joint clamp galvanised	VN7-Z	4.00
1899	KCN-048	End feed box	AK7-28	1.00
1900	KCN-049	Insulating tape	T50	2.00
1901	KCN-052	Collector , Part Number:- NL7-4-35 Make: Kone Cranes, (CL7-4-35) 802734	NL7-5-35	1.00
1902	KCN-053	Translation box	OG35-7	3.00
1903	KCN-055	Brush phase K91P (141102)	802764	24.00
1904	KCN-056	Enclosure RN7G	802945	66.00
1905	KCN-057	Copper bar CU50	802946	200.00
1906	KCN-058	Carbon brushes	B91 SP	50.00
1907	KCN-060	Control cable A05VVD2-F20x1.5	254044	44.00
1908	KCN-061	Key housing (wedge housing)	P3K0007	1.00
1909	KCN-062	Key (rope wedge)	P3K0008	1.00
1910	KCN-063	Brake assembly (hoist brake)	NM317NR2	3.00
1911	KCN-064	Brake replacement set (brake repair)	60009674	1.00
1912	KCN-065	Brake spring and nut	HF910/NM317V	2.00
1913	KCN-066	Wear compensation set	60009945	1.00
1914	KCN-067	Rectifier	8930/1	3.00
1915	KCN-068	End shield (brake coil and flange)	8940/2	2.00
1916	KCN-069	Brake wheel	8950	3.00
1917	KCN-070	Armature disk	8960	3.00
1918	KCN-071	Fixing parts	8980	4.00
1919	KCN-072	Plugs	8990	4.00
1920	KCN-074	Line feed box LK21-7	1011710	1.00
1921	KCN-075	Feed clamp VKK CU50 RN7G	1012750	8.00
1922	KCN-076	Line feed housing LRNKHS7-V	1012210	1.00
1923	KCN-077	Real with core AS7	1039510	1.00
1924	KCN-078	Flexible rubber seal	AS7	140.00
1925	KCN-079	Cable carrier assembly	KCN79L	50.00
1926	KCN-080	End carriage gear GM456	543015	2.00
1927	KCN-081	Contact block for front mounting	XEN-G1191	5.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1928	KCN-082	Operating head (black) for pendent	XAC-A9412	3.00
1929	KCN-084	Operating head green for pendent	XAC-A9413	3.00
1930	KCN-085	Bearing for Lifting Hook Pos # 10, P3L0011 (BRG # 81110 TN SKF)	P3L0011	3.00
1931	KCN-086	Bearing for Lifting Hook Pos # 05, URB-E WUP209E (P3P0004) BRG # NUP209E.TVP2 FAG	P3P0004	2.00
1932	KCN-087	Rope pulley for Lifting Hook Pos # 03, Details:Crane Code: XL/050/17/222-0, Hoist,XL304H20ADA509ADEM	KCN-087	1.00
1933	KCN-088	Fan for Hoisting Motor H100, outer dia 180 mm 52269605, Inner dia 29 mm F025401	52269605	2.00
1934	KCN-089	Motor thermal protection device MSL-48C, 48 VAC, Rele 250 VAC. 7.5 A, SCANFIL OY, Finland	MSL-48C	2.00
1935	KCN-091	Break fixed plate Part # 531	KCN-091	1.00
1936	KCN-092	Brake Lining Part # 534	KCN-092	2.00
1937	KCN-093	Brake forcing plate Part # 535	KCN-093	1.00
1938	KCN-094	Brake spring Part # 537	KCN-094	1.00
1939	KCN-095	AC solenoid 539, for Electric chain Hoist, Model No. EC4, Make- NITCHI	KCN-095	1.00
1940	KCN-096	Grip pos. 8, Part No.P3K0013	KCN-096	2.00
1941	KLM-006	Monochromatic light unit	TYPE S	1.00
1942	KLM-007	Optical flat 1/4lb double boxed	KLM007	1.00
1943	KLM-008	Flatness guage L metric	KLM008	1.00
1944	KLM-009	Series 3 dispencer sub assy	KLM009	1.00
1945	LFX-011-0010	Industril plug 4 pole 16A 380-415V, Type 014, Weather Proof Plug, IECCEE	LFX1110	7.00
1946	LFX-011-0011	Industrial socket 4 pole 16A	LFX1111	5.00
1947	LOF-001	Perbunan gasket for lub oil filter type 6.61 Gr 20	3645349	4.00
1948	LOF-004	Piston Lube Oil Filter Unit, Part Number 2785551, Make: Fil Tec Rexin, Germany	2785551	7.00
1949	LOF-005	Valve 5/2 E341 L95 34, Model # 341L9534-B04A, Make: Parker Lucifer	E341L9534	3.00
1950	LOF-006	Spring type straight pin	2300007	4.00
1951	LOF-007	O ring Pos. no.40 (Size: 123.4 x 3.53) viton for HFO candle filter	3040268	33.00
1952	LOF-008	Stripper	3544103	11.00
1953	LOF-009	O ring	3040106	21.00
1954	LOF-010	Air valve bush	5006622	2.00
1955	LOF-011	Spring	2307527	8.00
1956	LOF-013	O Ring Pos. No. 39, Size: 81.92 x 5.33 Viton	LOF013L	14.00
1957	LOF-014	O Ring Pos. No. 36 Size: 78.74 x 5.33) Viton	3035793	16.00
1958	LOF-015	O ring Pos. no. 34 (Size: 135.89 x 5.33) viton for steam heater	3040163	36.00
1959	LOF-016	O ring Pos. no.40 (Size: 123.4 x 3.53) viton	3040268	10.00
1960	LOF-017	Non return valve	2608775	5.00
1961	LOF-018	Angle ball cock	2560356	6.00
1962	LOF-020	O Ring Pos. No.50, Size 53.3 x 5.33 Perbunan	3040118	13.00
1963	LOF-021	Air valve ram	5005622	2.00
1964	LOF-022	O ring 34, 135.8 x 5.33 x perbunan for LO candle filter	3040163	81.00
1965	LOF-023	Dichtung Pos. No. 35, Size: 91.5 x 3.5 Viton (Square type)	3532219	10.00
1966	LOF-024	O ring 36, 78.7 x 5.33 x viton	3035793	28.00
1967	LOF-025	O ring 39, 81.9 x 5.33 perbunan	3031277	7.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1968	LOF-027	Fitting T shape	LOF027L	2.00
1969	LOF-028	Reducer fitting	LOF028L	2.00
1970	LOF-029	O ring OD 38mm X 3mm air sliding valve	LOF29L	28.00
1971	LOF-030	O ring OD 38x3mm air sliding valve	LOF030L	8.00
1972	LOF-031	O ring for LO mud filter 150C	LOF031L	22.00
1973	LOF-032	O ring 30x25x2.5 100C for LO filter	LOF32L	32.00
1974	LOF-033	Temperature guage 0-100 C 1/2"BSP, Dial size: 4" Glycerine Filled, Imersion Length with Socket : 175mm	LOF33L	11.00
1975	LOF-034	Contact set contactor 3TF 470	3TF470-OA	6.00
1976	LOF-035	O ring with seal for fine filter (lube oil duplex filter gland)	LOF035L	14.00
1977	LOF-036	Temperature guage 0-100C 8x160mm, Bi Metal Thermometers all Stainless Steel Construction,	06TB899E41M	7.00
1978	LOF-038	Allen bolt M16x55mm, full thread	LOF38L	38.00
1979	LOF-039	Allen bolt M12x50mm, full thread (for Mud filter)	LOF39L	358.00
1980	LOF-040	Temperature gauge 0-160 Centigrade, Bottom Mounted, Glycerine Filled, Dial size 4". Total Length:13"	BH242	7.00
1981	LOF-041	Coupling for pre LO pump	LOF041L	36.00
1982	LOF-044	O-ring Pos.06 for LO Duplex Filter, Art. Nr: 458, Size:367.67 * 6.99, Type: 2.05.5.420.750 DN200,	458	24.00
1983	LOF-045	Gasket Pos.08 for LO Duplex Filter, Art. Nr: DIN 7603, Size:21*27*1.5, Type: 2.05.5.420.750 DN200, M	7603	6.00
1984	LOF-046	Gasket Pos.19 for LO Duplex Filter, Art. Nr: DIN 7603, Size:13*18*1.5, Type: 2.05.5.420.750 DN200, M	7603	6.00
1985	LOF-047	Gasket Pos.20 for LO Duplex Filter, Art. Nr: 3540024, Type: 2.05.5.420.750 DN200, Make: Boll and Kir	3540024	6.00
1986	LOF-048	O-Ring with seal Pos.24 for LO Duplex Filter, O-ring size: OD=43mm, ID=37mm, Thickness 3 mm	3420011	12.00
1987	LOF-049	O-ring Pos.25 for LO Duplex Filter, Art. Nr: 375, Size:240.67*5.33, Type: 2.05.5.420.750 DN200, Make	375	26.00
1988	LOF-050	Straight Grooved pin Pos.27 for LO Duplex Filter, Art. Nr: DIN 1481,Size:6*40, Type: 2.05.5.420.750	1481	3.00
1989	LOF-051	O-ring Pos.28 for LO Duplex Filter, Art. Nr:378, Size:266.07*5.33 Gear Oil	378	17.00
1990	LOF-052	Gasket Pos.34 for LO Duplex Filter, Art. Nr: DIN 7603, Size: 13*18*1.5	7603	6.00
1991	LOF-053	Gasket Pos.41 for LO Duplex Filter, Art. Nr: WN45.5, Type: 2.05.5.420.750 DN200, Make: Boll and Kir	WN45.5	4.00
1992	LOF-054	O-Ring size: ID=25mm OD 30mm Thick 2.6mm	LOF-054-L	16.00
1993	LOF-055	O-Ring size: ID=160mm OD 168.9mm Thick 3.45mm LO Candle Filter for Element Cage	LOF-055-L	14.00
1994	LOF-057	Temperature Controller	LOF-057	1.00
1995	LOF-058	O-Ring size: 189.87 x 5.33 Viton, for Lube Oil candle Filter dome cover	LOF-058	29.00
1996	LOF-059	O-Ring Size OD=175 x ID=168 x Thickness7mm Viton crank case door rellve valve new type	LOF-059	30.00
1997	LOF-060	Lube Oil Filter Pleated Element, Article Code: 1020017602, SBS-124750L50B#N,Commodity Code: 84219900	1020017602	51.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
1998	LOH-004	Gasket NBR Nitrile STD. Glued Gasket Type and year M-107/1996, Sr. 42318 Drg. 1836, 6592-2	17375016	300.00
1999	LOH-005	Liquid Gasket Brand 100 grams /Tube: Make Bosil Brand	00700258	10.00
2000	LOH-006	Degreasing Agent Tufkleen AT-803, Heavy Duty Multi Purpose Packing 05 Liters / Can	00780626	1.00
2001	LOH-008	Complete Plate Pack for Heat Exchanger	1836 6592-0	1.00
2002	LOH-009	Tie Bolts with out Nut and Spacer.	LOH-009	12.00
2003	LOH-010	Nut M36 for Lube Oil Cooler Tie Bolt.	LOH-010	7.00
2004	LOH-011	First Plate HEAD side(NBR Nitrile STD. with glued/clip on gaskets for Lube Oil Heat Exchanger	LOH-011	4.00
2005	LOH-012	Last Plate Follower Side. (NBR Nitrile STD. with glued/clip on gaskets for Lube Oil Heat Exchanger	LOH-012	4.00
2006	LOP-001	Mechanical seal for Pre Lube Oil Pump	LOP001	4.00
2007	LOP-002	Ball bearings 6212/C3	LOP002	4.00
2008	LOP-003	Flat seal	LOP003	1.00
2009	LOP-004	Safety valve	LOP004	2.00
2010	LOP-006	Mechanical seal pos62	9908911	4.00
2011	LOP-007	Set bearing bushes pos152	9908912	1.00
2012	PLC-001	Eskom rack kit	P7LA	1.00
2013	PLC-002	Eskom kit	P7LB	1.00
2014	PLC-003	Speisegeeraet 48VDC	B5LA	1.00
2015	PLC-004	TX filter 100-500 khz	E5LA	1.00
2016	PLC-005	Tunable RF hybrid	P3LB	1.00
2017	PLC-006	Neue austauschg R2	B4LA	1.00
2018	PLC-007	Teleoperation interface	O4LA	1.00
2019	PLC-008	Wire pax interface 2/4	O4LC	1.00
2020	PLC-009	Pilot/supervision prog	P4LA	1.00
2021	PLC-010	AF - converter	P4LB	1.00
2022	PLC-011	RX HF - converter	P4LD	1.00
2023	PLC-012	HF - umsetzer abgestimmt	P4LF	1.00
2024	PLC-013	Prints type	P4LG	1.00
2025	PLC-015	Schnittstelle 1	G4AC	1.00
2026	PLC-016	ZF - converter	P4LC	1.00
2027	PNB-001-0005	Push Buton Head (Actuator) ZB4-BA	PNB-001-0005	8.00
2028	PNB-001-0006	Push Buton Mounting Coller ZB4BZ00	PNB-001-0006	9.00
2029	PNB-005-0001	On-off switch	OS-059	2.00
2030	PPM-001	Minor pump kit incl. mech,seal,gaskets	PPM001	9.00
2031	PPM-002	Set of electrical spares	PPM002	4.00
2032	PPM-003	Set of ball bearing for electrical motor 6309-2Z	PPM003	4.00
2033	PPM-005	Pressure guage O-16 bar 2" NPT	PPM005	1.00
2034	PPM-007	Contactors	PPM007	4.00
2035	PPM-010	Set of gaskets for heater	PPM010	1.00
2036	PPM-011	Pressure Import differential Indicator for filter P= 0.8, Operating Temp: 150C Max, Type: 4.36.2	0550001	1.00
2037	PPM-013	Electric motor for LFO modules	PPM013	1.00
2038	PPM-017	Valve element for IMO pump	188808	3.00
2039	PPM-018	Pump element for IMO pump	188769	2.00
2040	PPM-020	Rotor set for IMO pump	187542	7.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
2041	PPM-021	Valve spring for IMO pump	74294	10.00
2042	PPM-022	Complete shaft coupling for IMO pump	173666	20.00
2043	PPM-025	Shaft seal for IMO pump (Ring Man)	105494	2.00
2044	PPM-026	Rotor set for IMO pump	105411	1.00
2045	PPM-027	Cyl. roller bearing 81110P auto back flush	2708948	6.00
2046	PPM-029	Coil 483510, 220/240V auto back flush L.O, 20-240V 50Hz. 9W, Part Number 483510S6 F, Make: LUCIFER	483510S6 F	4.00
2047	PPM-031	Sound abzerber BZ/MS R1/8" auto back flush	9902508	15.00
2048	PPM-033	High pressure regulator auto back flush L.O., Model # AR-2000, Make SMC Japan	2650017	3.00
2049	PPM-034	Safety valve auto back flush for L.O	2660085	3.00
2050	PPM-035	Angle ball cock auto back flush L.O	2560063	10.00
2051	PPM-036	Limit switch auto back flush L.O	420057	2.00
2052	PPM-037	Spring dest NR. D-313W auto back flush L.O	2307527	2.00
2053	PPM-038	Non return valve ST/viton auto back flush HFO	PPM-038	6.00
2054	PPM-039	Differential Pressure Contact Indicator 4.36.2 P=2.0 DDA 09322 20, Part # 0550004 Boll & Kirch	0550004	2.00
2055	PPM-041	Float auto back flush filter HFO	2610023	5.00
2056	PPM-042	Pin auto back flush filter HFO	2611123	7.00
2057	PPM-044	Mud drain valve seat auto back flush L.O	5032487	1.00
2058	PPM-050	Spring type straight pin auto back flush L.O	2300007	1.00
2059	PPM-051	Shaft Seal Preheating Pump Grundfos, Shaft Seal UMT/PRUUE/V 16MM B-C-D, Pump type 4804.50-120	00985844	8.00
2060	PPM-052	Impeller for H.T pre heating pump, Article Number: 546298, Pump Type: 4805-120-06, Make: Grundfos	546298	4.00
2061	PPM-053	Shaft for H.T preheating pump, Article Number: 96404742, Pump Type: 4805-120-03, Make: Grundfos	96404742	3.00
2062	PPM-054	Connector block for impeller H.T preheating pump, Article Number: 96404731, Pump Type: 4804.50-120,	96404731	1.00
2063	PPM-055	Air reservoir HFO bck flush filter	6533516	1.00
2064	PPM-059	Ram HFO back flush filter Z32087	5006512	1.00
2065	PPM-060	Spring HFO back flush filter	2300011	2.00
2066	PPM-061	Doopernut ring HFO back flush filter	3437135	5.00
2067	PPM-062	Limit switch HFO back flush filter	4200143	6.00
2068	PPM-063	Roller bearing HFO back flush filter	2708947	8.00
2069	PPM-064	Connection box HFO back flush filter	5950011	1.00
2070	PPM-065	Spring ring for HFO back flesh filter	2200235	6.00
2071	PPM-066	Spring for HFO back flesh filter	2307427	6.00
2072	PPM-067	Do.ko antrieb for HFO back flush filter	4500016	2.00
2073	PPM-068	Connection box for antrieb HFO back flush	4503345	1.00
2074	PPM-069	Gasket for HFO back flush filtetr	3098381	12.00
2075	PPM-070	Gasket for HFO back flush filter	3038361	12.00
2076	PPM-072	Cock valve for Lube Oil	5421473	3.00
2077	PPM-073	Gasket set 6.60 Gr.05 for Auto B.F filter	3635419	5.00
2078	PPM-074	Cock for auto B.F. filter	6335469	7.00
2079	PPM-075	Housing for auto B.F filter	5005609	1.00
2080	PPM-076	Housing for auto B.F filter	5229568	1.00
2081	PPM-077	Spring for auto B.F filter	2307427	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2082	PPM-078	Dichtring seal	3270001	6.00
2083	PPM-079	Hexagon head screw plug	2000186	6.00
2084	PPM-080	Screwing	2500029	6.00
2085	PPM-081	Bolt	2001578	6.00
2086	PPM-082	Housing lower part	6530355	1.00
2087	PPM-083	Rectangular tube	5701532	2.00
2088	PPM-084	Square bar steel	5701533	1.00
2089	PPM-085	Minor kit ACE 038N1 G053 pree LO feed pump	189194	4.00
2090	PPM-086	Rotor set	99820	2.00
2091	PPM-087	Valve spring ACE 038N2 D615	154104	2.00
2092	PPM-088	Minor kit ACG 070N6 G053 FOPX Feed pump	189202	1.00
2093	PPM-089	Rotor set ACG 070N6 G012	179523	1.00
2094	PPM-090	Valve spring ACG 060N4 D615A	157388	1.00
2095	PPM-091	Elastic Transition Ring for flexible coupling Nor-Mex 128- (HFO Ring Man pump)	Nor-Mex 128	16.00
2096	PPM-092	Elastic Transition Ring for flexible coupling Nor-Mex 82 (HFO booster pump)	Nor-Mex 82	8.00
2097	PPM-093	Elastic Transition Ring for flexible coupling Nor-Mex 67 (LO purifire feed pump)	Nor-Mex 67	10.00
2098	PPM-094	HT Cooling Water Circulation Pump, Type: 4804.-120/E1, Make: Grundfos	4804-120/E1	1.00
2099	PPM-095	Mechanical Seal for Drinking Water Pumps	PPM-095-L	2.00
2100	PPM-097	Elastic Transition Ring Nor-Mex 97	PPM-097	5.00
2101	PPM-098	GRUN Fos 495063	PPM-098	1.00
2102	PPM-099	Coupling for HFO Seperator Feed Pump, Pump Type:ACE 080 N4 IRBP, S # 438049, Coupling Size E 97	191704	2.00
2103	RAD-003	V belt sets SPB 4250, Model: SPB4250, DUN, Make: DUNLOP, UK	SPB-4250	2.00
2104	RAD-005	High temperature cooling section	RAD005	1.00
2105	RAD-006	Low temperature cooling section	RAD006	1.00
2106	RAD-008	Main control switch	3LD2814-OTK51	6.00
2107	RAD-009	Lock washer 68mm radiator motor	RAD9L	20.00
2108	RAD-010	Terminal block 36kw radiator motor	RAD10L	15.00
2109	RAD-011	Fan for motor 225M LPK11031509	ILA4223-4/6AC90	1.00
2110	RAD-012	Magnetic contactor 15kw/400V (low speed)	3RT1034-1AP	2.00
2111	RAD-013	Auxiliary switch block 2NO	3RH19 1EA20	1.00
2112	RAD-014	Auxiliary switch block 2NC	3RH19 1EA02	3.00
2113	RAD-015	Auxiliary switch block 1NO+1NC low speed, Type: 3RH1921 1EA11, Make Siemens	3RH1921 1EA11	3.00
2114	RAD-016	Overload relay 14-20A, 1NO+1NC Make: Siemens	3RU11 36-4BB0	6.00
2115	RAD-017	Rubber seal 75mm, (V Ring) Nitrile V0095S	V0095S	6.00
2116	RAD-018	Aluminum Hexagon Bolt with Nut M16 x19.5 x 2 mm	RAD18L	40.00
2117	RAD-019	Magnetic contactor 37KW 80A (high speed), AC3 Coil Voltage 230 Vac, 50 Hz. 3 Pole, Type 3RT10 45-1A	3RT1045	3.00
2118	RAD-020	Laterally mountable auxilary block NO+NC	3RH 19 21	9.00
2119	RAD-021	Thermal delay overload 45-63Amp, Type; 3RU11 46-4JBO, Make Siemens - Germany	3RU11-46-4JBO	3.00
2120	RAD-022	Terminal for 12/36KW motor	RAD	4.00
2121	RAD-023	Small clevis clamp	644	20.00
2122	RAD-024	Aluminium clevis 16MMx89MM	168	8.00
2123	RAD-025	Aluminium nut 16MM	169	16.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2124	RAD-026	Clamp stud	608	10.00
2125	RAD-027	Clevis	2252	10.00
2126	RAD-028	Small mount 1.435", Part No. 637, Fan Type : Class 5000, Make: Moore	637	10.00
2127	RAD-029	Resilient washer 5/8"	52	7.00
2128	RAD-030	Stud SS 10MM bush	1345	5.00
2129	RAD-031	Bushing type QDE	12	1.00
2130	RAD-032	Complete bushing hub QDE (Replacement Fan Hub / W / Bushing)	RAD032	1.00
2131	RAD-034	Panel meter 0-1200 AMPS 96x96mm	RAD034L	4.00
2132	RAD-035	Ball bearing 7218 BEP SKF or 7218 B-TVP Polyamide Cage FAG	7218 BEP	6.00
2133	RAD-036	Roller Bearing NU 2216 -E-TVP2- FAG	NU 2216	3.00
2134	RAD-038	Lock washer 90x2mm	RAD038L	5.00
2135	RAD-039	Traper lock pulley with bush-4030	0314B0434	5.00
2136	RAD-041	Axial shaft seal (Lip seal)	TBR000500-4N04	9.00
2137	RAD-042	Axial shaft seal (Lip seal)	TBR000450-4N04	9.00
2138	RAD-044	Repair Kit for Automatic Air Vent AE14SV, 3/4" PMA 16 bar, TMA 250 Degree C, Diff. PMX 14 bar, Spira	AE14SV	14.00
2139	RAD-045	Hexagonal bolt M6x 60 mm with nut & washer (G.I.)	RAD-045-L	250.00
2140	RAD-046	Fan Blade, For 5449/12B-m-11A-10, QDA FANS 5000 Manual, Make:MOORE FANS LIMITED	RAD-046	10.00
2141	RAD-047	Motor Starter, Model: ACS550-01-072A-4, Power 37KW, Current 72 Amps, Supp. Volt 400 VAC, 50 Hz	RAD-047	1.00
2142	RAD-048	S.S Stud M12x85mm, Size:M12,Threads pitch:1.75mm,Length: 65mm, Threads:One side30mm other side 25mm	RAD-048	47.00
2143	RAD-049	Lock Nut KM18 SKF M90x2 (For Radiator Shaft)	RAD-049	7.00
2144	RAD-050	Allen Bolt M12X90 Full Thread Grade 8.8	RAD-050	50.00
2145	SWS-001	Set elect. spare parts for all jotem modules	SWS001	1.00
2146	SWS-002	Variable height suction assembly for dosing pumps	SWS002	1.00
2147	SWS-003	Set of misc. electr. items/O-rings	SWS003	2.00
2148	SWS-007	P.P. Yarn cartridge filter 10"	SWS5MICRO	88.00
2149	SWS-009	Pressure switch	SWS009	1.00
2150	SWS-010	Conductivity cell-ews	SWS010	1.00
2151	SWS-011	Technoplast check valve 40 mm	SWS011	1.00
2152	SWS-014	Level switch	SWS014	1.00
2153	SWS-015	Level relay Electrode Relay, Elektrodenrelais, Type : ER-104/S, Voltage : 230V~, 50Hz, Make : E.L.B	ER-104/S	2.00
2154	SWS-016	Flow meter, Part # MS 005106, Type: MeiStream 50,Temp:30 C, Pressure :PN16, Qn : 15 m3/h, Metr. K.I.B	MS 005106,	1.00
2155	SWS-017	Conductivity measuring cell	SWS017	1.00
2156	SWS-018	Set elect.spare parts for P571	SWS018	1.00
2157	SWS-019	Set elect.spare parts for P572	SWS019	2.00
2158	SWS-020	Set elect.spare parts for U340	SWS020	1.00
2159	SWS-021	Set elect.spare parts for U343	SWS021	1.00
2160	SWS-022	Set elect.spare parts for U344	SWS022	1.00
2161	SWS-024	Movichrom pump G3/5-2R	SWS024	1.00
2162	SWS-028	Set gasket for movichrom pump	SWS028	3.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
2163	SWS-030	Set gasket for eataline pump	SWS030	11.00
2164	SWS-032	Mechanical Shaft Seal Condensate & HT PreHeat Pump, CR+N8/16 BUBE A-B, P1 0437 (PI 0908), P# 425062	425062	9.00
2165	SWS-036	Stator for helical rotor pump, anbp 12.2E12E12 Po1, Pump S.# 76.08046, Make: Allweiler.	76.08046	3.00
2166	SWS-037	Rotor for helical rotor pump	SWS037	2.00
2167	SWS-039	Set motor bearings for helical rotor pump	SWS039	1.00
2168	SWS-040	Motor cooling fan for helical rotor pump	SWS040	1.00
2169	SWS-041	Motor cooling fan coverfor helical rotor pump	SWS041	1.00
2170	SWS-042	Cover ring	SWS042	4.00
2171	SWS-043	Coalscing Insert	SWS043	2.00
2172	SWS-044	Pressure / vaccum guage -1-5 bar NPT dial 2.5"	SWS044	4.00
2173	SWS-046	Non-return valve 3/4"	SWS046	2.00
2174	SWS-047	Selonold Valve, Type 6014, Port Size : G 1/8 ; P max : 10 Bar, 24V ; 50Hz ; 8W, Recorder No. : 04229	6014	2.00
2175	SWS-048	2/2 piston valve 3/4"	SWS048	1.00
2176	SWS-049	Pressure spring	SWS049	2.00
2177	SWS-050	O-ring	SWS050	2.00
2178	SWS-051	Valve gasket	SWS051	2.00
2179	SWS-052	Groove ring	SWS052	2.00
2180	SWS-053	O-ring	SWS053	2.00
2181	SWS-054	O-ring	SWS054	2.00
2182	SWS-055	Actuator for piston valve	SWS055	2.00
2183	SWS-056	Sealing for piston valve	SWS056	2.00
2184	SWS-057	3/2 way piston valve 3/4"	SWS057	1.00
2185	SWS-058	Actuator for 3 way piston valve	SWS058	2.00
2186	SWS-059	O-ring	SWS059	2.00
2187	SWS-060	Pressure spring	SWS060	2.00
2188	SWS-061	O-ring	SWS061	2.00
2189	SWS-063	O-ring	SWS063	2.00
2190	SWS-064	O-ring	SWS064	2.00
2191	SWS-065	Safety valve	SWS065	4.00
2192	SWS-066	Sensing electrode	SWS066	1.00
2193	SWS-067	Set lamps -4 pieces	SWS067	1.00
2194	SWS-068	Set fuses-9pcs	SWS068	2.00
2195	SWS-071	Motor protection relay	SWS071	1.00
2196	SWS-072	Luminuos push button	SWS072	1.00
2197	SWS-073	Motor contactor	SWS073	1.00
2198	SWS-074	Auxiliary relay	SWS074	10.00
2199	SWS-075	Sensing relay	SWS075	1.00
2200	SWS-076	Transformer	SWS076	1.00
2201	SWS-077	Alarm relay	SWS077	2.00
2202	SWS-078	Set fuses	SWS078	2.00
2203	SWS-079	Dissicator assembly	SWS079	3.00
2204	SWS-080	Sample cell tube	SWS080	1.00
2205	SWS-081	O-ring set	SWS081	1.00
2206	SWS-083	P.P. Yarn cartridge filter 20"	SWS5MICRO	21.00
2207	SWS-089	Major service kit	546670-03	1.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
2208	SWS-090	Set of spare fuses	SWS090	1.00
2209	SWS-091	Circuit board	SWS091	1.00
2210	SWS-092	Circuit breaker	SWS092	1.00
2211	SWS-093	Push button	SWS093	1.00
2212	SWS-094	Gasket	SWS094	6.00
2213	SWS-095	Set of spares for 3 way valve	SWS095	1.00
2214	SWS-096	Washer	SWS096	2.00
2215	SWS-097	Washer	SWS097	2.00
2216	SWS-098	Washer	SWS098	2.00
2217	SWS-099	Gasket	SWS099	6.00
2218	SWS-100	Set of spares for valve block water	SWS100	1.00
2219	SWS-101	Kit for solenoid valve	SWS101	3.00
2220	SWS-103	Strainer insert	SWS103	1.00
2221	SWS-105	Indicator	SWS105	1.00
2222	SWS-106	Solenoid valve	SWS106	1.00
2223	SWS-107	Gasket	SWS107	6.00
2224	SWS-108	Gasket	SWS108	6.00
2225	SWS-109	Gasket	SWS109	6.00
2226	SWS-110	Set of spares for dual strainer	SWS110	1.00
2227	SWS-111	Filter insert	SWS111	1.00
2228	SWS-112	Pressure guage 0-2.5 bar NPT	SWS112	1.00
2229	SWS-113	Washer	SWS113	2.00
2230	SWS-114	Washer	SWS114	2.00
2231	SWS-115	Washer	SWS115	2.00
2232	SWS-116	Discharge cover	163	7.00
2233	SWS-120	Hexagon socket head cap screw	SWS120	5.00
2234	SWS-123	Flat belt	26016922	12.00
2235	SWS-125	O-ring	SWS125	6.00
2236	SWS-126	O-ring	SWS126	6.00
2237	SWS-127	Storage casing 37/116x31.5	SWS127	3.00
2238	SWS-129	Storage casing 21/116x31.5	SWS129	3.00
2239	SWS-130	Storage casing 19/116x44.8	SWS130	3.00
2240	SWS-131	Shaft	210	2.00
2241	SWS-133	Deep groove ball bearing 6308 2ZR C3	321	4.00
2242	SWS-135	Thrust ring	474	6.00
2243	SWS-136	Spacer sleeve 17/9x16	525.01	11.00
2244	SWS-139	Spacer sleeve 17/9x8.5	525.04	8.00
2245	SWS-140	Bearing sleeve	529	4.00
2246	SWS-141	Disc	550.04	12.00
2247	SWS-143	Coupling	840	5.00
2248	SWS-144	Hexagon head screw plug	903.03	4.00
2249	SWS-145	Tie bolt	905	6.00
2250	SWS-146	Shaft seal aux. boiler for feed pump grundfos	CR(N) 2/4 AUUE/V 985167	1.00
2251	SWS-148	S.S. flexible pipe, Size 1/2" X 3/8" (Length 30")	SWS148	8.00
2252	SWS-149	S.S. flexible pipe ID 1/2", L 30"	SWS149	9.00
2253	SWS-150	Service kit 3 years	555613-01	1.00
2254	SWS-151	Friction element	544060-01	4.00
2255	SWS-152	Purolite C-100 chemical	SWS152L	25.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2256	SWS-154	Hydraulic seals 25 bar	SWS154L	2.00
2257	SWS-155	Electric gear pump w/Motor 1hp .75kw,Type: CF-1HP, Cap:Upto 1.2m3/hr, Head:Up to 140 meters,	SWS155	1.00
2258	SWS-156	Motor stool	341	2.00
2259	SWS-157	Base plate	890	3.00
2260	SWS-158	Pneumatic Actuator 10bar 5/2 valve, Make:OMOL Automation, Type:DA15 F03, P.Max = 8.4 bar, T.Max=80C	DA015401S	2.00
2261	SWS-162	Liquid End Dosing Pump G4/B 0.2L/Hr 10Bar	SWS-162	2.00
2262	SWS-163	Spare parts Set for Dosing G4/B Pump 0.2L/Hr 10Bar	SWS163L	2.00
2263	SWS-166	End cap with o rings 25 bar	SWS166L	12.00
2264	SWS-167	Circlip for RO membrane	SWS167L	12.00
2265	SWS-168	Two stage float swith 100V 0.5A	792640.5	7.00
2266	SWS-169	O ring for R/O membrane type 01 large	SWS169L	452.00
2267	SWS-170	O ring for R/O membrane type 02 small	SWS170L	6.00
2268	SWS-171	Cartridge filter 5 micron, Lenght = 30", Dia = 60 mm, Make Aqua clear filter (F30-2), Gr	SWS171L	38.00
2269	SWS-172	Cartridge filter 01 micron, Lenght = 30", Dia = 60 mm, Make Aqua clear filter (F30-1),	SWS172L	52.00
2270	SWS-173	Pressure switch 6bar ¼ 20A AC-3	SWS173L	3.00
2271	SWS-174	Pressure transMBS3000 0-10bar 4-20mA	060G1125	3.00
2272	SWS-178	O ring for dosing pump non return	SWS178L	48.00
2273	SWS-179	S.S. ball valve 10 bar with solenoid	ND 25	4.00
2274	SWS-180	Non return valve for solenoid pump	SWS180L	12.00
2275	SWS-181	Non return valve ½" PVC	SWS181L	12.00
2276	SWS-182	Reducer for both ends and valves	SWS182L	24.00
2277	SWS-184A	Spare part Kit for Dosing Pump 0708	1001648	1.00
2278	SWS-184B	Liquid End Dosing Pump 0708 (for 7.1 Liter/Hrs)	1002061	1.00
2279	SWS-185A	Spare part Kit for Dosing Pump 1601	1001645	6.00
2280	SWS-185B	Liquid End Dosing Pump 1601 (for 1.1 Liter/Hrs)	1002058	1.00
2281	SWS-186	PVC adaptor for dosing pump	SWS186L	9.00
2282	SWS-187	Coupling for HT PreHeat Pump, CR+N8/16 BUBE A-B, P1 0437 (P1 0908)	SWS187L	7.00
2283	SWS-188	Diaphragm 31mm for dosing pump	SWS188L	10.00
2284	SWS-190	Air cell for WM235	WM-AC235	1.00
2285	SWS-191	Drain assembly 1¼"	SWS191L	1.00
2286	SWS-192	Cap valve stem	SWS192L	2.00
2287	SWS-193	Nut	SWS193L	2.00
2288	SWS-194	Washer	SWS194L	2.00
2289	SWS-195	Spacer	SWS195L	2.00
2290	SWS-196	Rubber gasket	SWS196L	2.00
2291	SWS-197	O ring	SWS197L	4.00
2292	SWS-198	Flow sensor 130C PN16 1¼"	QN 6 DN 25	1.00
2293	SWS-199	Flow sensor 130C PN16 2"	QN 10 DN 40	1.00
2294	SWS-202	Auxiliary relay 8 plns 24VAC 50HZ	RP 410824	7.00
2295	SWS-205	Aqua Timer Controller SIATA SFE-EV Pro Simplex SFVSPX5XX10 with Cam.5 ,Make: SATA	AT5 02/05	2.00
2296	SWS-207	Pneumatic valve 3/2 & 5/2, SC G55 1A001 MS (Solenoid), G55 1A00 1S3A8 230/50, Make: Asco	SC G55 1A001 MS	4.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
2297	SWS-208	Mechanical seal	4015653	4.00
2298	SWS-209	Impeller, 3phase 400V	4005238	2.00
2299	SWS-217	Air Valve Internal 25.01 (Part No.2501053)	2501053	9.00
2300	SWS-218	Central Block	250301	1.00
2301	SWS-219	Suction Manifold	251510-030	1.00
2302	SWS-220	Pump Chamber	251505-030	6.00
2303	SWS-221	Plug C.S.	905101-13	3.00
2304	SWS-222	Discharge Manifold	251512-30	1.00
2305	SWS-223	Ali Chamber	251501-05	5.00
2306	SWS-224	Clamp Bend Assembly	250401	5.00
2307	SWS-225	Diaphragm 25.30N(Part No.251801-4B)	251801-4B	16.00
2308	SWS-226	Valve Seat EPDM-Grey 25.31N(Part No.251805-41)	251805-41	25.00
2309	SWS-227	Valve Ball EPDM-grey, Type: DL 25-AA-NNN, Make: DEPA Pump (Crane)	251810-41	8.00
2310	SWS-228	Washer Shaft	902000405	8.00
2311	SWS-229	Piston, Inner Short stroke	250120830	3.00
2312	SWS-230	Shaft	251207-10	3.00
2313	SWS-231	Piston Inner	251208-30	6.00
2314	SWS-232	Piston Outer	251214-13	6.00
2315	SWS-233	Center Block	251201-30	1.00
2316	SWS-234	Gasket	921000173	24.00
2317	SWS-235	O - Ring	920202-79	43.00
2318	SWS-236	Shaft Bearing	251206-64	8.00
2319	SWS-237	Air Inlet	252001-05	5.00
2320	SWS-238	O Ring Air Filter	922010141	9.00
2321	SWS-239	Muffler	252020-48	2.00
2322	SWS-240	Multi Port Filter Valve 5 Way valve 1.5", Side Mount 1.5" Model: 18201-0200, Make: Sta-Rite	18201-0200	2.00
2323	SWS-245	Submersible Switch Box SK529, P#:122066497, EAN# 4016322123576, Ord#:-0010259748, WILO Pumpen Perfek	122066497	2.00
2324	SWS-245-A	Float Switch WA-95, P#:122066497, EAN# 4016322185291, Order#:-0010259748, WILO Pumpen Perfekto	501255297	7.00
2325	SWS-245-B	Signal Horn 220V, P#:122066497, EAN# 4016322188766, Order#:-0010259748, WILO Pumpen Perfekto	501459398	2.00
2326	SWS-246	Fuel oil filter 26561117	26561117	1.00
2327	SWS-247	Lube oil filter 2654408	2654408	1.00
2328	SWS-248	Suction air filter 3-2500	3-2500	2.00
2329	SWS-249	Diaphragm Operated Pneumatic Pump, Type DL 25 FA, suction & discharge Connection 1 Inch, air connect	2105615	1.00
2330	SWS-250	Suction Manifold for DL-25-FA-NN, OEM Reference 251510L30, For DEPA Pumps.	2104581	3.00
2331	SWS-251	Complete bare shaft pump Type KCB 83.3 (2CY - 5/3.3-2) , Make: Shanghai Aoli Co. Ltd.	KCB 83.3	1.00
2332	SWS-254	O-Ring ID= 18.39, OD= 23.78, Thick 3.10 mm	SWS-254-L	22.00
2333	SWS-255	O-Ring ID= 92.60, OD= 97.9, Thick 5.10 mm	SWS-255-L	15.00
2334	SWS-257	Solenoid Driven Dosing Pump 12.3 L/H 04 bar 230V	SWS-257	1.00
2335	SWS-257A	Spare part Kit for Dosing Pump 0413	1001649	1.00
2336	SWS-257B	Liquid End Dosing Pump 0413 (for 12.3 Liters/Hrs)	1002062	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2337	SWS-260-K	Fluid Section Service Kit for DB50-SAX-NHY Pump	SWS-260-K	1.00
2338	SWS-262	Diaphragm Operated Pneumatic Pump, Model 666270-G22-C, ARO Pump	666270-G22-C	1.00
2339	SWS-262-K	Fluid Section Service Kit for 6662-70-G22-C Pump 637432-22 make ARO	SWS-262-K	3.00
2340	SWS-263	Service kit for Air Section of Pump, Part # 63718-C, 666-120-362-C, Sum 13-407, 120PSI 8 Bar, ARO	63718-C	4.00
2341	SWS-264	Service kit for Fluid Section of Pump,P # 637119-62-C, 666-120-362-C, SUM 13-407, 120PSI, 8 Bar, ARO	637119-62-C	1.00
2342	SWS-266	Submersible Pump TS 32/12A, Item no. 6043945 Make: Wilo	6043945	1.00
2343	SWS-267	Submersible Pump TM 32/7, Item no. 4048412 Make: Wilo	4048412	1.00
2344	SWS-268	Multi Port Filter Valve 5 Way valve 2-1/2", Side Mount 2-1/2" Mode:18201-0200, Make: Sta-Rite	18201-0200	2.00
2345	SWS-269	Mechanical Seal Part No. 002231255, Pump Model SV418F30, Make: Lowara	002231255	2.00
2346	SWS-277	RO membrane Housing End Cap StainlessSteel	SWS-277	5.00
2347	SWS-284	Engine Driven Water Pump Model: RT30WT, Capacity Max, 1640 Ltrs/Min 26 m Rake: Rato	RT30WT	1.00
2348	SWS-286	5/2 Solenoid Valve Air pressure:10 bar, Temperature: -5 .. 80°C, Code :484.52.0.1.M58, Make:Pneumax,	SWS-286	2.00
2349	SWS-287	Water Filter System 3 Stage UVM-9322-20	UVM-9322-20	1.00
2350	SWS-289	Activated Carbon Cartridge Filter, Item No. 5	SWS-289	1.00
2351	SWS-291	Frequency Converter 400Hz IP20 (AC Drive), SAMCO-VM05, Input: 3 Phase, 440VAC, Output; 3 Phase 440V	SAMCO-VM05	1.00
2352	VAL-002	Automatic drain 5993 S DN25	VAL002	1.00
2353	VAL-006	3 way ball valve (L-port) 7760-L 1/2"	VAL006	3.00
2354	VAL-007	3 way ball valve (L-port) 7760-L 1"	VAL007	3.00
2355	VAL-008	3 way ball valve (L-port) 7307 DN 40	VAL008	1.00
2356	VAL-009	3 way ball valve (L-port) 7307 DN 50	VAL009	1.00
2357	VAL-010	Ball valve (full bore) 7343 DNS 15	VAL010	4.00
2358	VAL-011	Ball valve (full bore) 7343 DNS 20	VAL011	3.00
2359	VAL-012	Ball valve (full bore) 7343 DNS 25	VAL012	3.00
2360	VAL-013	Ball valve (full bore) 7343 DNS 40	VAL013	2.00
2361	VAL-014	Ball valve (full bore) 7343 DNS 50	VAL014	2.00
2362	VAL-015	Bayonet coupling 790 1"	VAL015	6.00
2363	VAL-019	Globe valve 3250 1 1/4"	VAL019	4.00
2364	VAL-022	3 way globe valve mixing 248 DN50	VAL022	2.00
2365	VAL-024	Globe valve 436 DN20	VAL024	1.00
2366	VAL-026	Globe valve 436 DN40, ARI-FABA, Seat JS1049, Make: ARI-ARMATUREN/GERMANY	230460040011	2.00
2367	VAL-027	Globe valve DN50 PN16(For Steam), Material:GGG40.3; Type:Bellow Seal ,Made of Cast Steel (ARI-FA)	GGG40.3	2.00
2368	VAL-030	Globe valve DN150, PN40, ARI-FABA, Seat JS1049, Make: Ari-armaturen/Germany	230460150011	1.00
2369	VAL-030-A	Sealed Bellow for globe Valve DN150 PN40, Make: ARI-ARMATUREN/GERMANY	0442003187	3.00
2370	VAL-030-B	Plug, For Globe valve, 10 ARI-FABA-LONG LIFE PN40 FIG# 35.046, Standard : DIN 2533 DN150mm Make: ARI	121 31 0187 4021	2.00
2371	VAL-032	Needle valve 226 S 1"	VAL032	5.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2372	VAL-033	Non Return Valve DN25, PN16, Figure 77NGY, Make: Econosto	FIG.77	4.00
2373	VAL-034	Non return valve 77 NO DN40	VAL034	3.00
2374	VAL-036	Non return valve DN100 PN16, Material: GGG 40.3, Make econ, Medium: Steam/Hot water Max. temp, 250	VAL036	2.00
2375	VAL-037	Non return valve 95 DN50	VAL037	2.00
2376	VAL-038	Non return valve 95 DN25	VAL038	1.00
2377	VAL-039	Pressure regulating valve 1536 DN80	VAL039	1.00
2378	VAL-040	Safety valve 1515 1"	VAL040	1.00
2379	VAL-041	Self closing valve 574 SP DN 20	VAL041	3.00
2380	VAL-042	Steam trap 1032 H 3/4"	VAL042	3.00
2381	VAL-043	Steam trap 1054 LA 1/2"	VAL043	6.00
2382	VAL-044	Steam trap 1054 LA 3/4"	VAL044	1.00
2383	VAL-045	Steam trap 1054 LA 1"	VAL045	3.00
2384	VAL-046	Steam trap 1145 DN50	VAL046	3.00
2385	VAL-050	Stop valve (with test connection) 1381 1/2"	VAL050	2.00
2386	VAL-051	Strainer y-type 1020 DN40	VAL051	1.00
2387	VAL-052	Strainer y-type 1020 DN50	VAL052	3.00
2388	VAL-053	Strainer y-type 1020 DN65	VAL053	1.00
2389	VAL-054	Strainer y-type 1020 DN100	VAL054	1.00
2390	VAL-055	Strainer y-type 1020 DN150	VAL055	1.00
2391	VAL-057	Suction filter 1190 DN50	VAL057	1.00
2392	VAL-060	Pressure pulsating damper 1389 1/2"	VAL060	2.00
2393	VAL-061	Gasket ring DIN 16285 (set 100 pcs)3003 1/2"	VAL061	1.00
2394	VAL-062	Level indicator guage 180+239+240 DN25	VAL062	3.00
2395	VAL-068	Thermostat (cap 4m, -40 +105 c) 92001 1"	VAL068	1.00
2396	VAL-070	Steam control valve 920 3/4"	VAL070	3.00
2397	VAL-071	Steam control valve 9433 DN40	VAL071	1.00
2398	VAL-072	Thermowell Insert 160 mm 5905	VAL072	1.00
2399	VAL-073	Temperature Control System Valve Type: 2 Port. Control System121, Thermostat Capillary: 4mm	121	2.00
2400	VAL-074	Steam control valve 5906 DN25	VAL074	1.00
2401	VAL-076	2 way stop valve pneumatic 2571 DN100	VAL076-FOC	2.00
2402	VAL-077	3 way stop valve pneumatic 2571 DN100	VAL077	1.00
2403	VAL-078	3 way solenoid valve 240V-50Hz 1/4" NPT female	VAL078	3.00
2404	VAL-079	2 way solenoid valve 240V-50Hz 1" BSP female	VAL079	2.00
2405	VAL-082	Rubber Expansion Bellows Type 49-Yellow DN50, Article #. 2549G05B0A, length 100mm, with Flange	2549G05B0A	10.00
2406	VAL-084	Bellows(PIN 16) M49- Red DN150 Water line	RED	9.00
2407	VAL-085	Bellows(PIN 16) M49-yellow DN-200	DN-200	8.00
2408	VAL-090	Flexible plpe 1/2" for LT vent line, Length = 460mm	VAL090	14.00
2409	VAL-091	Flexible (PN16) A -GP- 80 DN13 1/2"	VAL091	3.00
2410	VAL-092	Flexible (PN16) A -GP- 80 DN20 3/4"	VAL092	1.00
2411	VAL-094	Flexible (PN16) 211 M DN40	VAL094	1.00
2412	VAL-096	Flexible (PN16) -technopal 36 x 6 mm	VAL096	1.00
2413	VAL-097	Flexible (PN16) -gasoline 36 x 6 mm	VAL097	2.00
2414	VAL-098	Butterfly valve (PN16) 2094E -MP DN40	VAL098	4.00

TAPAL ENERGY (PVT.) LIMITED.**CLOSING STOCK****As of July, 2018**

S. No.	Tel Code	Description	Part Code	Closing Quantity
2415	VAL-100	Butterfly valve DN50, (PN16) 2094 EPDM, Flange Number of holes 4,	VAL100	2.00
2416	VAL-104	Butterfly valve (PN16) 2092E -MP DN200	VAL104	1.00
2417	VAL-109	Butterfly valve (PN16) 2094N -MP DN65, EPDM, KV3 Type Flange Number of Holes 4, Make:AYVAZ, Turkey	VAL109	2.00
2418	VAL-111	Butterfly valve (PN16) 2094N -MP DN150	VAL111	27.00
2419	VAL-112	Butterfly valve DN-200 PN16	VAL112	1.00
2420	VAL-114	Butterfly valve (PN16) 6433 DN200	VAL114	1.00
2421	VAL-115	Butterfly valve (PN10) 2092N -R2 DN40	VAL115	3.00
2422	VAL-121	Expansion Bellow Fuel Oil Temp 150, DN80, L230mm, PN16	VAL121	5.00
2423	VAL-123	Expansion Bellow Steam Condensate DN65, L180mm, PN16, Movement = 60 mm (Axial)	VAL123	6.00
2424	VAL-124	Expansion Bellow Steam Condensate DN10, L200mm, PN16, Movement = 60 mm (Axial)	VAL124	6.00
2425	VAL-125	Expansion Bellows for Steam L=225mm BD=170mm, Flange Dia 283 mm Thickness 25mm,	VAL125	4.00
2426	VAL-126	Expansion Bellow Steam Condensate DN200, L230mm, PN 16, Movement = 60 mm (Axial)	VAL126	3.00
2427	VAL-128	Ball valve (full bore) 2276 ZT DN32	VAL128	3.00
2428	VAL-133	Pressure control valve "IWKA" V220 DN65	28-016-065	1.00
2429	VAL-134	Globe valve DIN 3/8	VAL134	1.00
2430	VAL-136	Quick closing valve AW 334 DN50	VAL136	1.00
2431	VAL-137	Quick closing valve AW 334 DN65	VAL137	1.00
2432	VAL-139	Pressure transmitter (0-16 bar)820278221031k61/2"	VAL139	1.00
2433	VAL-140	Pressure transmitter (0-16 bar)820279221031k81/2"	VAL140	1.00
2434	VAL-143	Thermowell TW 1208 -U 400 1/2" BSP male	VAL143	1.00
2435	VAL-144	Temperature element pt-100 AS 5100 PD-Z 1/2	VAL144	1.00
2436	VAL-145	Adjustable orifice DN150-PN10	VAL145	1.00
2437	VAL-146	Oil mist coalescer DN 150-PN10	VAL146	1.00
2438	VAL-147	Hose coupling storz DN50 NA81	VAL147	1.00
2439	VAL-148	Hose coupling todo- GM DN50+cap	VAL148	1.00
2440	VAL-150	Rubber Expansion Bellow DN40 NA133 (for pre heating HT inlet outlet line)	NA133	3.00
2441	VAL-151	Rubber compensation bellow DN100 X RED	DN-100	8.00
2442	VAL-152	Rubber hose pipe 2-3/8"	VAL002	12.00
2443	VAL-154	Flexible Rubber Hose Pipe (HT Ven), HANSA-FLEX MULT125-4.5 EPDM HOSE, LENGTH: 420mm with T1025 m	MULT125-4.5 EPDM	4.00
2444	VAL-158	Rubber compensation DN150, YELLOW For Lube Oil	VAL158	1.00
2445	VAL-159	Exp. bellow Fuel oil DN200 L230mm	VAL159	2.00
2446	VAL-160	Filter regulator combined (for dum condensor)	CFDR 60-2	3.00
2447	VAL-161	Butterfly valve rubber DN150PN10	150PN-10-16	6.00
2448	VAL-162	Seat nitrile DN200, PN10 (MAT N 4), Old Model without Nerve, TTV, Spain	DN200 PN10	26.00
2449	VAL-163	Rubber flex. pipe for control air	0711063	14.00
2450	VAL-165	Metal flex pipe 70CM 100C 10-16bar De-suldge line SU-400	AR-1+VR	1.00
2451	VAL-166	Expansion Steam Bellow, Flange OD = 282mm, Flange ID = 170mm, No of Holes = 8	VAL166L	2.00
2452	VAL-167	Seat EPDM HT DN150 (MAT T 5) lining for butterfly	DN150PN10	9.00
2453	VAL-169	Handle for butterfly valve	VAL169L	3.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2454	VAL-170	Handle for butterfly valve small	VAL170L	5.00
2455	VAL-171	Rubber lining for butterfly valve	VAL171L	1.00
2456	VAL-172	Seat DN 50, PN10	VAL172	23.00
2457	VAL-173	Steam O-Ring (Viton DN40, PN40)	VAL173	2.00
2458	VAL-174	Steam O-Ring (Viton DN50, PN40)	VAL174	2.00
2459	VAL-175	Ball DN 15 PN40 F316	VAL175	1.00
2460	VAL-176	Ball DN 40 PN 40 F316	VAL176	1.00
2461	VAL-177	Ball DN 50 PN 40 F316	VAL177	4.00
2462	VAL-178	Steam DN 15 PN 40 F316	VAL178	1.00
2463	VAL-179	Steam DN 40 PN 40 F316	VAL179	1.00
2464	VAL-180	Steam DN 50 PN 40 F316	VAL180	2.00
2465	VAL-181	Seat PTFE DN 15 PN 40	VAL181	2.00
2466	VAL-182	Seat PTFE DN 40 PN 40	VAL182	2.00
2467	VAL-183	Seat RPTFE DN 50 PN 40	VAL183	4.00
2468	VAL-185	Non Return valve DN 80, PN 40, Flange DIN 2833, Material: GS-C25N, (Exhaust boiler)	2833	2.00
2469	VAL-188	Spring L=70mm Coil OD 37.5 mm Wire Thick 3mm	VAL-188-L	4.00
2470	VAL-190	Spindle Ring (Steam Valve)	VAL-190-L	9.00
2471	VAL-191	Screw Joint (Steam Valve)	VAL-191-L	11.00
2472	VAL-196	Non Return Valve, DN65 PN16 wafer type lift check valve type, Type: SR12.16 DN 65, PN16 Make: RITAG	DN 65	5.00
2473	VAL-197	S.S. Flexible pipe L=560 mm	VAL-197	3.00
2474	Val-198	Non Return Valve, DN50 PN16 wafer type lift check valve type, Type: SR12.16 DN 50, PN16 Make: RITAG	DN50	1.00
2475	VAL-200	Globe Valve for Steam DN40 PN40 GCG403	VAL-200	2.00
2476	VAL-201	Rubber Bellow Yellow for Lube Oil, DN-200 Without Flanges Type 49 NBR/Nyloncord-Quality, Mak	2149104220	15.00
2477	VAL-202	Rubber Bellow RED for HT CW, DN-150 Without Flanges Type 49 NBR/Nyloncord-Quality, Willbrandt	2149101215	5.00
2478	VAL-203	Rubber Bellow Red for HT CW, Without Flanges Type 49 Red NBR/Nyloncord-quality, DN-50, Willbrandt KG	DN-50	12.00
2479	VAL-205	Non Return Valve, DN40 PN16 wafer type lift check valve type, Type: SR12.16 DN 40, PN16 Make: RITAG	DN 40	4.00
2480	VAL-206	Rubber Bellow DIN2633, DN65, PN16, Type: AS, For Lube Oil, Rubber Lining NBR, OD = 185mm	DN65 Type AS	1.00
2481	VAL-207	Seal bellow (SS) Require for Valve: DN40,PN16, PartNo:X6CrNiMoTi17 122,1.4571	VAL-207	5.00
2482	VAL-208	Rubber Bellow/Compensator PN25 DN150, Type AR - 1+VR, MAKE: Stenflex	00018076-00	6.00
2483	VAL-210	Stop valve angle pattern DN-100 PN 16 with Flange	VAL-210	1.00
2484	VAL-211	Ball valve 1/2" M/M nickel-plated, Type: CW17n, PN: 30' 50, Manufacture: ITAP, Made: Italy.	VAL-211	18.00
2485	VAL-224	Flexible Pipe 3/4" both end fitting	VAL-224	4.00
2486	VAL-225	Rubber Bellow Yellow for Lube Oil, DN150 Without Flanges Type 49 Yellow NBR/Nyloncord-Quality,, Make	2149104215	12.00
2487	VAL-227	Non Return Valve DN150, PN40, Type: GSC 25N, Make: ARI, Body 1.0619+N, -60 deg. C to +450 deg.	35.003	1.00

TAPAL ENERGY (PVT.) LIMITED.

CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2488	VAL-228	Rubber Bellow/Compensator DN32 PN 16,BL-125, Type AS (Lube Oil) Make: Stenflex Germany	DN32 Type AS	2.00
2489	VAL-229	Globe Valve DN80, GS-25N, PN40 for Steam	VAL-229	1.00
2490	VAL-230	Tank Vent Check Valve Type RM PN10, Size: DN150 PN 10, Galvanized steel (Thickness according IACS	RM PN10	2.00
2491	VAL-231	Handle for Butterfly Valve for Fresh Lube Oil	VAL-231	12.00
2492	VEN-006	Complete Fan Hub, ACP-900/280-8 with 28mm shaft diameter constructed from GRP, Make:Climate Control	ACP-900/280-8	2.00
2493	VEN-008	Motor impeller 450D4	DVS450D4-B1	4.00
2494	VEN-009	Motor impeller 355D6	DVS355D6-A1	3.00
2495	VEN-010	Rubber with metalic sleeve bush 25mm	VEN10L	84.00
2496	VEN-015	Circuit Breakers with Phase Protection	VEN015	6.00
2497	VEN-018	3-Blade Hub Part # 898,5400 Series 19VT QDSF Hub, 3 Blades arrangement.	898	2.00
2498	VEN-019	Clevis Blade Bolt Part # 168	168	4.00
2499	VEN-020	Clevis Bolt Nut Part # 169	169	4.00
2500	VEN-021	Clevis Hub Bolt Part # 905	905	6.00
2501	VEN-022	Locking clip	VEN-022	6.00
2502	VEN-024	Clevis (2-1/4") Part # 901	901	6.00
2503	VEN-025	QDSF Type Bushing	VEN-025	6.00
2504	VEN-026	Bushing Bolt	VEN-026	5.00
2505	VEN-028	Centrifugal Fan: R4D 310-AR18-01, 3~ 400 Volt 50 hz, 1430 RPM 85W, Make: EBM papst, Made in Germany	R4D 310-AR18-01	1.00
2506	VEN-030	S.S Grill for Auxilary side Force Draft Fan	VEN-030-L	8.00
2507	WES-001	Overhual kit pneum hyd pump	9903611	1.00
2508	WES-002	Overhual kit hand oper hyd pump	9903613	6.00
2509	WES-004	Thermostat with sensor bulb	6685868	1.00
2510	WES-005	Synthetic rubber Strip 30 * 20 (Code: 07.010250,)	07.010250	15.00
2511	WES-006	Gasket 165 * 61*2 Tesnit BA (	07.070400	3.00
2512	WES-007	Gasket 140 * 46*2 Tesnit BA Code:07.070200	07.070200	3.00
2513	WES-008	Gasket 68 * 48*2 Tesnit BA, Code: 07.060500	07.060500	12.00
2514	WES-012	O ring (NITRIL) 70 SH .801	WES-012	6.00
2515	WES-013	O ring (NITRIL) 90SH 0.362 x .103	WES-013	6.00
2516	WES-014	Seal set (For Elfy Hand Pallet Truck)	WES-014	1.00
2517	WES-018	Oil Nozzle, HP Karcher Type=OD,Capacity=1.75 USgal/h,Capacity=6.55 kg/h ,Shape=Conical,Code#030H6930	WES-018	2.00
2518	WES-021	Washer (Set of 3) P # 51155220	51155220	1.00
2519	WES-022	Helical Spring (Set of 3) P # 53322810	53322810	1.00
2520	WES-023	O ring P # 63627960	63627960	1.00
2521	WES-024	Piston Housing P # 50603970	50603970	1.00
2522	WES-025	Oil Seal (Set of 3) P # 63650590	63650590	1.00
2523	WES-028	Brass Bush (Set of 3) P # 51124140	51124140	1.00
2524	WES-030	O Ring (Set of 3) P # 63620920	63620920	1.00
2525	WTP-001-0001	Indicator light for pannel	WTP001	1.00
2526	WTP-001-0002	Seal for pump (sterlizer cylce)	WTP002	2.00
2527	WTP-001-0003	Mechanical seal for WTP	WTP003	7.00
2528	WTP-001-0004	Quartz sleeve 33" long	WTP004	3.00

TAPAL ENERGY (PVT.) LIMITED.
CLOSING STOCK

As of July, 2018

S. No.	Tel Code	Description	Part Code	Closing Quantity
2529	WTP-001-0005	UV lamp 33" long	WTP005	2.00
2530	WTP-001-0006	O ring for UV lamp	WTP006	6.00
2531	WTP-001-0007	Differential pressure switch RT262A	WTP007	1.00
2532	WTP-001-0011	Filter linear for GAC	WTP111	1.00
2533	WTP-001-0017	V-Meter 0-500 V	WTP-001-0017	2.00
2534	WTP-001-0018	A-Meter 0-60 A	WTP-001-0018	4.00



OCTOBER 1, 2018

REMAINING USEFUL LIFE ASSESSMENT (RULA) STUDY REPORT

TAPAL ENERGY (PRIVATE) LTD, KARACHI, PAKISTAN

AUTHORED BY: CONTINENTAL MARINE ENERGY SDN BHD

KUALA LUMPUR, MALAYSIA

www.cm-energy.com.my

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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DOCUMENT CONTROL

Document No		PP-5031/RULA – Volume No. 2		
Revision	Dated	Prepared By	Approved By	Reason for Revision
0	19 th September 2018	YAH, MAs, UMS	Shoaib Arshad, Plant Manager	Draft Report
1	1 st October 2018	YAH, MAs	Tapal Energy (Pvt.) Ltd	Final

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CONTENTS

About this Report	3
Appendix – G1 Preventive Maintenance Records Mechanical.....	4
Appendix – G1A Inspection, Testing & PM Records	5
Appendix – G2 Preventive Maintenance Records Electrical.....	518
Appendix – G2A Generators In-house Test Reports	519
Appendix – G2B LEAP Test Reports.....	532
Appendix – G2C Transformers Oil Testing Records	804
Appendix – G2D DGA Test Reports, Transformers.....	872

	Remaining Useful Life Study Report Tapal Energy (Private) Ltd.	
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About this Report

This report is prepared by M/s Continental Marine Energy Sdn Bhd (CME), Malaysia. CME is appointed by the asset owners, Tapal Energy Pvt. Ltd. as independent Consultants. The role of CME is to conduct condition assessment study under agreed scope of equipment and provide conclusion on remaining useful life.

The report is structured in two Volumes (Volume No. 1 and Volume No. 2). The Volume No. 1 is the main report covering executive summary, definitions, approach, methodology, condition assessment results, conclusion and recommendations with cited Appendix (Appendix A to F). Whereas, the Volume No. 2 mainly covers Appendix (Appendix G1 and G2), citing historical O&M (Operations and Maintenance) records, OEM assessments, third party reports and other inspection records with physical verification data that is referred during the condition assessment analysis in this study and as stated in the Volume No 1 of this study report.

For technical enquiries about this report, the first point of contact are asset owners (Tapal Energy Pvt. Ltd.). However, CME Sdn. Bhd. Malaysia as Consultants can also be approached at info@cm-energy.com.my citing reference number of this report and specific enquiry.

Annexure F – KE Power Purchase Consent



BD/AH/TEL-0286/2018-1022
22 October 2018

Mr. Tabish Tapal
Chief Executive Officer
Tapal Energy (Private) Limited ("TEL")
F-25, Block 5 Rojhan Street, Kehkashan,
Clifton, Karachi

Subject: K-Electric Limited (KE) Consent for TEL's Generation License Application ("Consent") in relation to the Renewal of the Power Purchase Agreement ("PPA") for an Additional Term of Five (5) Years

Dear Sir,

This refers to your letter no. TEL/FIN/035/19 dated 11 September 2018, wherein TEL requested for KE's Consent in relation to the power offtake from TEL Complex for an additional period of five (5) years through a renewal of the existing PPA which is due to expire on 19 June 2019.

The continued availability of TEL's Complex is an integral part of our strategy to meet our future demand and its contribution to the system stability of the 132KV network due to its strategic location in Karachi's North-West zone. Given the present condition of the Complex, its historical performance and maintenance record, KE is pleased to provide TEL with its Consent.

This Consent is subject to TEL fulfilling all Regulatory obligations including applying for and obtaining generation license and tariff for the renewal period and the approval of revised and restated PPA by the NEPRA.

Thanking you.

Yours sincerely,

Adnan Rizvi
Director Commercial and Regulatory