

	Specification	Kusile Power Station
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1. Introduction

Kusile Power Station Management has decided to outsource the total Milling and PF Piping Mechanical and C&I Maintenance service function to a suitably qualified, experienced, and well-established Contractor. This document describes the detail of the applicable plant areas, scope of work, standards, quality, requirements, specifications, terms & conditions as well as the criteria to be met to qualify for the tender.

2. Supporting Clauses

2.1 Scope

2.1.1 Purpose

The purpose of this document is to define the specified Milling and PF Piping System Mechanical Maintenance, scope of work activity requirements for Kusile Power Station.

The station is expected to perform at 85% EAF, 10% PCLF and 5% UCLF, and the specified Milling and PF Piping System maintenance activities and management strategy must support this requirement, so that the milling plant contributing to less than 1%UCLF. It is therefore imperative that the successful and suitably qualified Contractor aligns his/her organization fully to these specified scope activities and processes laid down in this document.

2.1.2 Applicability

This document shall apply throughout Eskom Kusile Power Station.

2.1.3 Effective date

The effective date of this document will be the date of authorization.

2.2 Normative/Informative References

The following documents contain provisions that, through reference in the text, constitute requirements of this document. At the time of publication, the editions indicated were valid. These documents are subject to revision and users are responsible to ensure that the most recent editions of the documents listed below are used.

2.2.1 Normative

- [1] 237 - 0016 Rev 0: Integrated Business improvement – Prevention and Improvement Standard
- [2] 240-86851633: Foreign Material Exclusion
- [3] 32 - 726 Rev 0: Mandatory S.H.E. Requirements for the Eskom Procurement and Supply Chain Management Process

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Note: See Annexure C: S.H.E. Requirements for Tender Enquiries
Annexure D: S.H.E. Tender Evaluation and Scoring Card
Annexure E: Supplier Suspension Process

- [4] 36 - 505 Rev 1: Personnel and Entities Performing Welding Related Special Processes on Eskom Plant
- [5] 36 - 942 Rev 0: Arc Flash Protection Specification
- [6] Act No 107 of 1998: National Environmental Management Act, 1998
- [7] Act No 14 of 2009: The National Environmental Laws Amendment Act, 2009
- [8] Act No 73 of 1989: The Environment Conservation Act, 1989
- [9] Act No 102 of 1980: National Key Points Act, 1980
- [10] Act No 36 of 1998: National Water Act, 1998
- [11] Act No 85 of 1993: Occupational Health and Safety Act & Regulations, 1993
- [12] GGR 0992: Plant Safety Regulations
- [13] 32-846 Rev 0 Operating Regulations for High Voltage Systems
- [14] NMP47-7 Rev 0: Application of KKS Plant Coding
- [15] 36 -702 Rev 1: Remnant Life Monitoring

2.2.2 Informative

- [16] 240-85498379 Kusile Power Station Milling Plant Maintenance Strategy

2.3 Definitions

2.3.1 Contractor:	Service provider contracted for supplying specific service to Eskom, Kusile Power Station.
2.3.2 Employer:	Eskom, or Eskom Kusile Power Station

2.4 Abbreviations

Abbreviation	Explanation
BOM	Bill of Material
ISO	International Standards Organisation
KKS	Kraftwerk Kennzeichen System
NEC	New Engineering Contract
OEM	Original Equipment Manufacturer
PCLF	Planned Capability Loss Factor
SAP	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.
SOW	Scope of Work

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Abbreviation	Explanation
UCF	Unit Capability Factor
UCLF	Unplanned Capability Loss Factor
QA	Quality assurance
QC	Quality control
QCP	Quality control plan
SANS	South African National Standards
SAP PM	SAP Plant Maintenance
SAP	Systems, Applications, Products (Plant Maintenance, Procurement, Finance and Materials Management) integrated maintenance management system.
SHE	Safety, Health, Environment
PW	Permit to work
ORHVS	Operating Regulations for High Voltage Systems
FFFR	Fossil fuel firing regulations

2.5 Process for Monitoring

In case of any additions, subtractions and/or amendments to the contents of the scope of work or any part of this document, prior the revision date, the Mechanical Maintenance Manager shall appoint a technician or senior technician to effect the necessary changes and to use the most current approved template for new revision.

2.6 Related/Supporting Documents

The following additional documents are attached and form an integral part of this scope of work. Copies of the relevant Employer performance standards can be made available on request.

[1] B114103-35-99-GM03-00001 Technical Documentation Pulverizer Plant MPS® Mill

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3. Roles and responsibilities

Note: Further roles and responsibilities can be obtained from the NEC3 TSC book.

Activity	Responsible	Accountable	Consult	Inform
Compilation	<ul style="list-style-type: none">• Senior Technician	<ul style="list-style-type: none">• Mechanical Maintenance Manager	<ul style="list-style-type: none">• Maintenance Manager	<ul style="list-style-type: none">• All
Revision and Template update	<ul style="list-style-type: none">• Senior Technician• System Engineer	<ul style="list-style-type: none">• Mechanical Maintenance Manager	<ul style="list-style-type: none">• Maintenance Manager• Documentation Officer	<ul style="list-style-type: none">• All
Implementation	<ul style="list-style-type: none">• Contractor• Technician• Senior Technician• Mechanical Maintenance Manager	<ul style="list-style-type: none">• Contractor• Technician• Senior Technician• Mech. Maintenance Manager	<ul style="list-style-type: none">• Maintenance Manager• System Engineer	<ul style="list-style-type: none">• All

3.1 Requirements

3.1.1 The Employer

- a) Performance is measured by the Employer against those areas which contribute to the Employer's business and the Contractor shall be compensated accordingly. (e.g. Reliability, Availability and Safety).
- b) Areas of measurement include the Employer's key business indicators and will be redefined from time to time.
- c) Employer shall provide training for PSR, ORHVS, FFFR and any other training as deemed necessary by the Employer.
- d) Employer to provide special tools where applicable.
- e) The Employer and Contractor in this SOW is committed towards the following;
 - i. Retention of critical skills
 - ii. Continuous cost reduction
 - iii. Health & Environment Safety
 - iv. Transfer of maintenance experience and skills
 - v. The employer shall supply the contract with lubrication for the Milling Plant system
 - vi. The employer shall be responsible for mechanical and hot splicing of the feeder belt

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3.1.2 The contractor

- a) The Contractor shall implement a program of continuous improvement to optimize component performance, achieve cost reductions and reduce system and equipment failures. The employer will review and achieve such programs
- b) The Contractor shall be responsible for all mechanical maintenance as per Employer's instructions, processes and systems.
- c) The Contractor shall be responsible for the inspection, maintenance, repair, bench testing and replacement of all types of valves associated with this SOW.
- d) The Contractor shall be responsible to provide a competent person for the maintenance of all hydraulic related equipment in regards to this scope SOW.
- e) The Contractor shall be responsible for all equipment alignment requirements within this scope of work.
- f) The following complementary services to improve Plant and labour performance can be defined as follows;
 - 1. Procedure and documentation writing
 - 2. Compile and improve task lists
 - 3. Implement approved design and modification
 - 4. Spares management
 - 5. Technical advice
 - 6. Component failure analysis reporting
- g) The Employer may request the Contractor to ensure that an accurate description of spare parts is maintained in the Employer's stores and the Contractor informs the Employer as to any recommended changes.
- h) The Contractor is to ensure that any service rendered does not interfere with the Employer's scheduled work and should align himself with the Employer's work control management process.
- i) Should the Employer become aware of any changes to the activity schedule (programme of notifications), the Employer may issue the Contractor with a revised programme.
- j) The contract entered into with the Contractor is non-exclusive and work

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against this contract can only be performed upon receipt of a task order.

- k) All works will be subject to anytime inspection from the Employer.
- l) Please note that equipment will only form part of the works once the respective area has been commissioned and handed over to Generation.
- m) The Contractor maintains all year round, agreed base crew at Kusile Power Station which is supervised by the Contractor with any changes to the crew being negotiated and agreed upon with the Employer.
- n) The Contractor will utilise the rotatable process for all refurbishable spares items. Employer to provide appropriate training.
- o) This contract is for preventative, predictive, corrective maintenance (breakdowns) and opportunity scheduled mill maintenance.
- p) Containment and clean-up of spillages is viewed to be very important for plant housekeeping and any spillage caused as a result of the Contractor shall be cleaned by the Contractor.
- q) The Contractor shall perform leak checks on all responsible plant areas and inform the Employer's representative accordingly. Defects must be raised on the system to address any plant deviations.
- r) The Contractor shall ensure the integrity of plant labelling and that deficiency with regards to KKS labelling is reported immediately.
- s) The Contractor must ensure that they have Responsible Persons (in terms of PSR and ORHVS) for any work performed on plant.
- t) All maintenance technically qualified (above semi-skilled) Contractors shall be trained and authorised (in terms of PSR and ORHVS) within 6 months of the contract start date.
- u)
- v)
- w) The Contractor must ensure that all personnel successfully complete a written examination for the relevant regulation based on the Eskom Fossil Fuel Firing Regulations.

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- x) The Contractor to provide relevant tools as required.
 - y) The Contractor shall assist in the implementation, recommendations and corrective actions which are identified by the Kusile Power Station Condition monitoring programme, including EtaPRO™ performance & condition monitoring programme.
 - z) The Contractor shall implement a program of continuous improvement to optimise plant performance and reduce system and equipment failures.
 - aa) The Contractor shall participate in improvement programs as stipulated by the employer.
 - bb) The contractor shall be responsible for total fluid management by ensuring that topping up of the oil and drainage is done within specified timeline
 - cc) The contract shall assist the employer with manpower, skill and tools during the splicing of the feeder belts
 - dd) The contractor shall be responsible for supplying competent manpower, skills and tools to tile the chutes, duct and piping
 - ee) The contractor shall keep minimum stock of spares listed and approved by the employer for maintenance purposes
 - ff)
- The Contractor shall participate in improvement programs as stipulated by the employer.

3.1.3 Management and Reporting

- f) The type of reports, level of detail and frequency of reporting will be mutually agreed by the Employer and the Contractor during the contract negotiation phase of this agreement. These may change from time to time on request by the Employer.
- g) The Contractor to be represented at all production and outage related meeting which may be daily, weekly or monthly.
- h) The Contractor to be represented at all Employer safety meetings.
- i) The Contractor to be represented at any ad-hoc meetings that may arise in order to address any production or safety related matters.
- j) Liaison meetings shall be held with the Employer's Representative or his/her delegate on a

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monthly basis to discuss any technical details, or concerns.

3.1.3.1 Contractor's management, meetings and key people

- a. Before work starts on site, an inaugural meeting is held with the Contractor and the Employer, to explain in detail all requirements of the Site Regulations.
- b. The Contractor is issued with a file of current Site Regulations on arrival. The file remains the property of the Employer and the Contractor is responsible for its maintenance and updating to include new or revised regulations as issued by the Employer.
- c. The Contractor must ensure that all personnel operating mobile equipment and vehicles are authorised where applicable, this includes but not limited to;
 - i. Forklifts
 - ii. Mobile Cranes
 - iii. Cherry Pickers
 - iv. Sky Jacks
- d. The Contractor shall be responsible for the regular inspections and daily equipment checks of the mobile equipment and vehicles including record keeping.
- e. The Contractor must ensure that all personnel performing work on the plant are authorised, this includes but not limited to;
 - i. Confined space locations
 - ii. Working at heights
 - iii. Heat stress areas
 - iv. Hazardous substances

3.1.3.2 Communication and Correspondence

- a. All correspondence includes;
 - i. Kusile Power Station
 - ii. Employer's Contract number
 - iii. Contract description
 - iv. Correspondence subject matter
 - v. Employer's name and contact details
 - vi. Contractor contact details
 - vii. Date
- b. Where appropriate the correspondence includes the Employer's reference and is delivered as a single package.
- c. All communications from the Contractor are numbered sequentially with a prefix as advised by the Employer. The Employer responds in like manner. The prefix and numbering system

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is decided upon at the Inaugural meeting.

3.1.4 Quality and Documentation Control

- a) The Contractor shall ensure that any witness, hold, and inspection points are strictly adhered to.
- b) The Contractor to ensure that all measuring and test equipment are calibrated at all times & proof thereof must be readily available.
- c) All Quality References and Standards as stipulated in this document will be adhered to.
- d) Work will only be conducted with an Employer approved Quality Management Programme.
- e) The Contractor shall submit to Eskom a method statement and detailed quality control plans for the remanufacture, refurbishment or repair of the roller. QCP's should include QCP's for the manufacture or repair of individual components. The supplier should also provide a time base production schedule to Eskom prior to starting work.

3.1.5 Project implementation plan

- a) The Contractor shall supply a project implementation plan including at least the following:
 - i. Site establishment
 - ii. Manpower plan
 - iii. Organogram
 - iv. SHE plan

3.1.6 Manpower requirements

- a) The number of maintenance staff required to execute the works is to be decided by the Contractor after his/her assessment of the scope of work and submitted to the Employer for approval.
- b) The successful Contractor shall utilise/provide skilled and suitably qualified staff with current experience in, but not limited to, the following disciplines;
 - i. Working knowledge of the SAP system
 - ii. Occupational Health and Safety Act 85 of 1993
 - iii. NEC contract management

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- iv. Quality Management Control and Assurance procedures
 - v. Spares optimisation
 - vi. Procedure writing
 - vii. BOM compilation
 - viii. Task list development/review
- c) Staff must meet minimum requirements of Eskom job descriptions, with additional requirements specified where applicable.
- d) All staff brought onto site in connection with this work scope should be able to fluently speak, understand, read and write in English.
- e) Proof of Contractor and staff qualifications is to be supplied on request by the Employer.
- f) The Contractor ensures that all staff being brought onto Kusile site have a valid fitness certificate based on the specified plant man-job specification.
- g) Provide daily supervision of all related plant through trained and competent personnel to ensure that inspections & work activities are conducted daily.

3.1.7 Re-commissioning

- a) All Plant equipment maintained shall be re-qualified as per site specific procedure after any maintenance intervention.
- b) The Contractor shall be responsible or held liable for any defects arising from maintenance/operational faults twenty-four hours after an intervention, provided that the equipment has been placed into service.

3.2 Works information

3.2.1 The milling plant

Applicable Plant Area	Boundaries of Plant Area

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Milling Plant	<p>The Milling Plant is defined as the plant and equipment interfacing with coal, that exists between the following points;</p> <ul style="list-style-type: none">- the coal bunker (excluding bunker inlet chute), and- outlet of the mill classifier including the gate valve (HHE 11-51 AA501). <p>It has the following plant within its boundary;</p> <p>Coal Bunker</p> <p>The plant and equipment interfacing with coal, that includes the following;</p> <ul style="list-style-type: none">- bunker walls and lining, and- bunker hopper and lining. <p>Feeder</p> <p>The plant and equipment interfacing with coal, that exists between the following points;</p> <ul style="list-style-type: none">- the bunker outlet shut-off gate valve, and- the raw coal pipe between conveyor and mill. <p>This implies the following plant and equipment;</p> <ul style="list-style-type: none">- bunker outlet shut-off gate valve
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- transition chute with compensator
- feeder belt conveyor system (including drive train)
- fuel bed controller
- coal weighing system
- raw coal piping with compensator
- purge air inlet damper
- feeder outlet chute
- clean out chain conveyor system (including drive train)
- feeder housing
- feeder outlet shut-off gate valve

Mill (Vertical Spindle)

The plant and equipment interfacing with coal, that exists between the following points;

- raw coal inlet chute to the mill, and
- outlet of the classifier including isolating gate valves

This implies the following plant and equipment;

- grinding elements (i.e. track & rollers)
- mill body
- static classifier
- loading frame and tension rods
- hydraulic system,
- discharge duct
- reject box including upper and lower hydraulic gate valves
- seal air fans (include. all sealing medium supply)
- all lubrication sets,
- drive unit (i.e. motor and gearbox)
- common mobile mill turning device
- mill air supply inlet (including control & isolating dampers, rotating throat)

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3.2.1.1 Applicable scope of work

- a) All Mechanical maintenance shall be executed according to the following maintenance strategies:
 - i. Kusile Power Station Maintenance Strategy for the Coal Milling Plant.
 - ii. Kusile Power Station Maintenance Strategy for PF Pipe and Burners.

- b) Inspection, testing, maintenance and replacement of the following;
 - i. Drive unit coupling
 - ii. Mill motor bearings
 - iii. Gearbox
 - iv. Lubrication system maintenance (i.e. valves, pumps, filters/strainers, etc,)
 - v. Oil lubrication heat exchangers
 - vi. Mill housings and wear plates
 - vii. All internal components of the mill (i.e. nozzle rings, grinding rollers and tracks, loading frame, tension rods, pendulum joints and adjustments, reject scrapers etc)
 - viii. Hydraulic system including cylinders
 - ix. Seal air system
 - x. Scavenging air system
 - xi. Steam system used for purging
 - xii. Classifier
 - xiii. Classifier chute liners
 - xiv. Classifier vanes
 - xv. Reject box including upper and lower hydraulic gate valves
 - xvi. Feeder system
 - xvii. All valves, Pneumatic and hydraulic actuators,
 - xviii. Dampers and orifice.
 - xix. All manholes, doors and inspection hatches including all bolts, gaskets and rubber seals
- c) Inspect and maintain integrity of drive unit base and all holding down bolts.
- d) Maintain related compressed air distribution system.
- e) Mill motor mounting and dismounting
- f) Electrical actuator mounting/dismounting.
- g) Temperature, pressure, flow and level measuring equipment
- h) Feeder scale
- i) Limit switches
- j) Level switches

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- k) C&I Cabling
- l) Power supplies
- m) Relays and fuses
- n) Modules
- o) Solenoid coils
- p) Roller positioner
- q) AUMA actuator matics

3.2.2 PF Piping

Plant Area	Boundaries of Plant Area
PF Piping	<p>The PF Distribution system is defined as the plant and equipment interfacing with coal and primary air, that exists between the following points;</p> <ul style="list-style-type: none">- exit point of the PF from the mill classifier excluding the isolating valve, and- Inlet to the PF Burner (square flange). <p>This implies the following plant and equipment;</p> <p>PF Piping</p> <ul style="list-style-type: none">- PF pipe work & ducting- Expansion bellows- Supports

3.2.2.1 Applicable scope of work

- a) Inspection, testing, maintenance and replacement of the following:
 - i. PF piping and connections
 - ii. All ceramic lined bends and expansion joints
 - iii. Hangers and supports
 - iv. PF system dampers and 3-way valves including actuator mounting/dismounting.
 - v. Including all C&I components attached to the system

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3.3 Exclusions

- a. Scaffolding & Insulation
- b. Coal Bunker rope access inspections.
- c. Non Destructive Testing
- d. Unauthorised Modifications
- e. Civil Maintenance
- f. Electrical Maintenance
- g. Condition monitoring
- h. Refurbishment of Motors
- i. Re-metaling of Motor Bearings

4 Tender requirements

A proposal is to be submitted by the tenderers for the above-mentioned scope of work.

- Hereafter a contract shall be negotiated with the successful Contractor.
- The appointment of successful Contractor is at Eskom's (The Employer) sole discretion considering the factors which Eskom considers relevant.

5 Acceptance

This document has been seen and accepted by:

Name	Designation

6 Revisions

Date	Rev.	Compiler	Remarks

7 Development Team

The following people were involved in the development of this document:

Name	Surname	Designation

8 Acknowledgements

None

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Appendix A – Additional Information

A.1 Minimum Spares list

QTY per Mill roller	DESCRIPTION OF SPARES REQUIRED	Total QTY (per set of 3 Rollers)
GRINDING ROLLER YOKE ASSEMBLY		
1	Grinding roller yoke; 2234 x 1379 x 912, Material: EN-GJS-400-15U(GGG-40)	3
1	Wear protection plate; Plate 524 x 957 x25, Material: EN 1,0038	3
1	Wear protection plate; Plate 524 x 957 x25, Material: EN 1,0038	3
12	Hexagon socket head cap screw; M20 x 45, Material: 10,9 galvanized	36
12	Locking edge washer; VSKZ 20 , Material: Spring steel galvanized	36
1	Wear protection bottom; Plate 861 x 299 x 10, Material: EN 1,0038	3
1	Wear protection bottom ceramic liner; Ceramic liner 1/2", Material: 92% AL203	3
2	Hexagon socket head cap screw; M30 x 120, Material: 10,9 galvanized	6
1	Wear protection; 624 x 266 x25, Material: EN 1,0038	3
4	Hexagon socket head cap screw; M20 x 45, Material: 10,9 galvanized	12
4	Locking edge washer; VSKZ 20 , Material: Spring steel galvanized	12
4	Hexagon head screw; M56 x 50, Material: 5,6 galvanized	12
4	spring lock washer; A 56, Material: Spring steel galvanized	12
6	Hexagon head screw; M24 x 45, Material: 5,6 galvanized	18
6	spring lock washer; VSK 24, Material: Spring steel galvanized	18
1	Tube Protection box; 508 x 11, Material: EN 1,0305	3
12	Hexagon socket head cap screw; M12 x 35, Material: 10,9 galvanized	36
12	Locking edge washer; VSKZ 12, Material: Spring steel galvanized	36
1	Plate for protection box; Plate 10, Material: EN 1,0038	3
1	Round 16; Round 16, Material: EN 1,0038	3
1	Roller tyre; 2070 / 1440 x 700, Material: EN-GJN-HV600 (XCr23)	3
1	Clamping ring; 1531 / 1165 x 190, Material: EN 1,0038	3
12	Hexagon socket head cap screw; M42 x 535, Material: EN 1,7709	36
12	Washer ; 43 x 6, Material: EN 1,0159	36
1	Wear protecting ring; 1531 x 1531 x10, Material: EN 1,0038	3
12	Hexagon socket head cap screw; M12 x 30, Material: 10,9 galvanized	36
12	Locking edge washer; VSKZ 12, Material: Spring steel galvanized	36
3	Wear protecting ring back; 1319 x 506 x20, Material: EN 1,0038	9
12	Hexagon socket head cap screw; M12 x 35, Material: 10,9 galvanized	36
12	Locking edge washer; VSKZ 12, Material: Spring steel galvanized	36
QTY per Mill	DESCRIPTION OF SPARES REQUIRED	Total QTY (3 Mills)

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QTY per Mill roller	DESCRIPTION OF SPARES REQUIRED	Total QTY (per set of 3 Rollers)
GRINDING ROLLER BEARING		
1	Axle ; 1034 x 539; Material: EN 1,221	3
1	Hexagon head screw plug; G1 / 1/2A x16; Material: 5.8	3
1	Sealing ring; A48 x 55 x 2; Material: CU/ISOPLAN	3
1	Clamping disk plate; Plate 45; Material: EN 1,0038	3
3	Hexagon head screw; M 36 x 113; Material: EN 1,7709	9
3	Disk / Washer; 37; Material: EN 1,0401	9
1	Back of bearing plate Clamping ring; plate 533 x 533 x35; Material: EN 1,0038	3
12	Hexagon socket head cap screw; M12 x 45; Material: EN 10,9	36
12	Locking edge washer; VSKZ 12; Material: spring steel	36
1	Feather key; 90 x 45 x 272; Material: EN 1,0503	3
1	Venting filter; ANSELM-F1451 / G 1/8"; Material: EN 1,0401	3
1	Locking disk Axle; 441 x 41; Material: EN 1,0038	3
3	Hexagon head screw; M36 x 127; Material: EN 1,7709	9
3	Spring disk; 90 x 45 x 5; Material: EN 1,8159	9
3	Spring plate; 15; Material: EN 1,5415	9
1	Cylindrical roller bearing single row NU31/500; EMA / VE900; Material: Special steel	3
1	Self aligning roller bearing double row 24164; CC; Material: Special steel	3
1	Bearing Bush; 1527 / 486 x 719; Material: EN-GJS-400-15(GGG-40)	3
3	Safety plate plug; 42 x 145; Material: EN 1,0330	9
3	Safety bolt plug; 63; Material: EN 1,0037	9
3	Hexagon head screw; G1A x16; Material: 5.8	9
3	Sealing ring; A 33 x 39 x 2; Material: CU/ISOPLAN	9
4	Sealing plug; M18 x 24 x1,5; Material: EN 1,0038	12
4	Sealing ring; A 10 x 14 x 1; Material: CU/ISOPLAN	12

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