	Specification	Medupi Power Station
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Title: **Medupi Power Station MPS265 Mill Grinding Roller Refurbishment Scope of Work**

Document Identifier:

Alternative Reference Number: **241-2022234**

Area of Applicability: **Medupi Power Station**



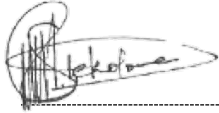

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1. Introduction

Medupi Power Station has a requirement for **20** MPS265 Mill Grinding Rollers to be refurbished for all Mills that will be overhauled for a period of 60 months. This will improve the reliability of the milling plant and hence Medupi UCLF. This document describes the details of the scope of work, standards, quality requirements, specifications, terms & conditions as well as the criteria 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 Medupi Power Station MPS265 Mill Grinding Roller Refurbishment Scope of Work activity requirements for Medupi Power Station.

The station is expected to perform at 92% UCF, 6% PCLF and 2% UCLF, and the specified Milling Plant Maintenance activities and Management strategy must support this requirement.

It is therefore imperative that the successful and suitably qualified Contractor aligns his/her organisation fully to these specified scope activities and processes set out in this document.

2.1.2 Applicability

This specification shall apply to all maintenance employees as well as contracting employees that are required to perform maintenance work and/or activities in support of the Medupi Maintenance Department on the Milling Plant at Medupi Power Station.

2.1.3 Effective date

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

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] 240-97020108 v5.5: Medupi Power Station Maintenance Contract User Requirement Specification
- [2] 237 - 0016 Rev 0: Integrated Business improvement – Prevention and Improvement Standard
- [3] 240-86851633: Foreign Material Exclusion
- [4] 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

- [5] 36 - 505 Rev 1: Personnel and Entities Performing Welding Related Special Processes on Eskom Plant
- [6] 36 - 942 Rev 0: Arc Flash Protection Specification
- [7] Act No 107 of 1998: National Environmental Management Act, 1998
- [8] Act No 14 of 2009: The National Environmental Laws Amendment Act, 2009
- [9] Act No 73 of 1989: The Environment Conservation Act, 1989
- [10] Act No 102 of 1980: National Key Points Act, 1980
- [11] Act No 36 of 1998: National Water Act, 1998
- [12] Act No 85 of 1993: Occupational Health and Safety Act & Regulations, 1993
- [13] GGR 0992: Plant Safety Regulations
- [14] 32-846 Rev 0: Operating Regulations for High Voltage Systems
- [15] NMP47-7 Rev 0: Application of KKS Plant Coding
- [16] 36 -702 Rev 1: Remnant Life Monitoring

2.2.2 Informative

- [17] 240-85498379 Medupi Power Station Milling Plant Maintenance Strategy

2.3 Definitions

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

2.5 Roles and Responsibilities

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

2.6 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.

2.7 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. Scope of Work

3.1 Requirements

3.1.1 Contract Roles and Responsibilities

- a) The Contractor shall be required to perform refurbishment of at least 3 Grinding Rollers at a time within at most a period of **31 Calendar Days** inclusive of collection and delivery to Medupi site; to a total of 20 rollers by the end of the contract.
- b) The contract entered into with the Contractor is non-exclusive and work against this contract can only be performed upon receipt of a Task Order.
- c) The Contractor shall ensure that he/she has all the necessary tools, equipment as well as lifting equipment (including a pick and carry crane, 27 ton or above) required to load, transport and off load the grinding rollers.
- **Note:** All lifting equipment utilised by the Contractor must have the appropriate load test certification which is valid during the period of use on Medupi site. Copies of such documentation shall be made available for review by the Employer at any time both on Medupi site and at the Contractor's workshop.
- d) The Contractor is required to repair and/or fabricate to the best standard and conditions or replace those parts that are damaged and for which spares are not readily available, such as protection plates. Such fabrications or repairs must be according to drawings tolerances and quality standards. The client must do quality checks and accept such fabricated or repaired parts before they can be installed on grinding rollers.

3.1.2 Continuous Improvement

- The Contractor shall implement a program of continuous improvement to optimise component performance and reduce system and equipment failures.
- The Contractor shall participate in improvement programs as stipulated by the employer.

3.1.3 Management and Reporting

- Liaison meetings shall be held with the Employer's Representative or his/her delegate on an ad hoc basis to discuss progress, technical details, or any concerns relating to the contract or scope.
- The Contractor shall provide full detailed failure reports, tests, analysis reports and any other report necessary to the Employer.

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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.
- f) The following documentation, inspection and tests are required when re-manufacturing, refurbishing, or repairing a Roller.
 - Roller History and design.
 - If no Drawing/s exists for the Roller and its components, the supplier shall include the cost of the drawings separately in his quotation. The relevant drawing numbers must be reflected on the quality control plans.
 - Material certificates for new shafts and keys.
 - Stamp identification on shaft ends.
 - Bearing numbers, bearing clearance and brand name for all replaced Bearings.
 - An addition new nameplate fitted indicating the date of manufacture, order number, lubricant specification and other relevant technical details shall be fitted to the Hub. All original nameplates shall not be removed.
- g) The supplier shall submit details of corrosion protection measures to protect the Roller Internals from deterioration during storage. If a Roller is to be stored dry for a long period, the use of vapor phase inhibitors (VPI's) or vapour corrosion inhibitors (VCI's) is recommended.

3.1.5 Re-commissioning

- a) The Contractor shall deliver the refurbished yoke assembly to Medupi site once the final quality checks has been concluded between the contractor and Eskom.
- b) The roller yoke assembly should be transported in such a manner as to prevent damage in the bearings or other components and to prevent the ingress of dirt or moisture during

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transportation. It is preferable that a suitable cradle with “G sensor” be installed for transportation and handling purposes to record any unsuitable handling conditions of the Roller that can lead to secondary damage or warranty claims.

- c) The contractor to ensure that they have their own baseline vibration analysis upon running of the grinding roller assembly.
- d) The Contractor shall be responsible or held liable for any defects arising from maintenance/operational faults seventy-two hours after refurbishment of grinding roller yoke assembly the Contractor worked on.

3.2 Applicable Scope of work

3.2.1 Applicable Component

Component	Boundaries of Plant Area
MPS265 Mill Grinding Roller	<p>This scope of work is applicable to the following component, within the Vertical Spindle MPS265 Mill.</p> <p>Grinding Roller</p> <p>This implies the following parts:</p> <ul style="list-style-type: none">- Axle- Yoke- Clamping Ring- Cover Ring- Protection Plates (Left, Bottom and Right)- Bearing Bush- Bearing System <p>This excludes the outer ring/tyre</p>

3.2.2 Strip and assess Roller

Upon stripping and assessing the Yoke assembly the contractor shall notify the client to be present to witness the damage. During the inspection and after the assessment is done on all components making up the Yoke assembly inclusive of the hub, a decision to repair, refurbish or re-manufacture will be made based on those findings.

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3.2.3 Inspections

The following information gathered by Eskom and the Contractor, and any specific Eskom requirement will determine the scope of work to repair, refurbish or re-manufacture the Yoke assembly or specific components thereof:

The following checks should form part of a Contractor receiving inspection and may be carried out by Eskom prior to shipping to the manufacturer's works:

- a) Clean and record the nameplate details and/or shaft end stampings.
- b) Check the delivery documents and Eskom's initial work requirements.
- c) Remove the top and bottom covers, and record.
 - The run out on shaft to Hub.
 - Shaft End Floats.
 - Any visual signs of damage wear.
 - The manufacturer will remove the shafts, bearings from the hub, by means of a 200 tons horizontal press using required fixtures: To avoid secondary damage to components.

The following check will be performed by the manufacturer on the Roller:

- a) A 100% MPI of all shaft journals. All indications must be recorded.
- b) The shaft and bore of the Hub should be checked for signs of fretting and corrosion.
- c) For dismantled shaft assemblies, MPI all keyways and measure and record the dimensions of all keys and keyways.
- d) Measure the dimensions of the Rollers and the shaft diameters to check and confirm fits and tolerances.

The following check will be performed by the manufacturer on the bearings:

Bearings should be removed, if possible, without damaging them. For refurbished and re-manufactured hubs, it is good practice to replace all bearings. In the case of repaired hub, if a bearing has completed less than 50% it's L₁₀ design running hours and the bearings are in good condition, as inspected and verified as suitable by the original bearing manufacturer's technical department, or a suitably qualified person, they may be re-installed for further service. If bearings, which have completed a significant portion of their L₁₀ design life, are re-used, the manufacturer may waive any guarantees on the repairs. Generally, the use of the old bearings is not recommended.

- a) Visually inspect the rolling elements and raceway for signs of wear and damage.
- b) Check the outer races for signs of movement in the bearing bores of the case and for signs of fretting and corrosion.
- c) Check the wear patterns of the bearing races for indications of misalignment.

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The following checks will be performed by the manufacturer on the shafts:

- a) MPI the shaft with attention to keyways, fillet radii and changes in section of the shaft.
- b) Check all bearing seats for signs of wear.
- c) Measure the bearing seats to check fits and tolerances and compare with the selected or specified bearing.
- d) Check oil seal tracks for signs of damage or wear.

The following checks will be performed by the manufacturer on the Hub.

- a) Inspect Hub joints for the presence of paper or other gasket materials.
- b) Check condition of all machined faces and bores for damage.
- c) MPI all bearing bores.
- d) Dye penetrant sets entire Hub after cleaning if required.
- e) Visually inspect all bores for signs of wear.
- f) Re-assemble case (with gasket if required) and tighten all bolts to the manufacturers specified torque.
- g) Measure all bearing bore diameters (3 x positions), top and bottom.

The following checks will be performed by the manufacturer on the lubrication systems:

- a) Check oil ways and supply ports cast into Hub for signs of blockage and sludge build up.

The following checks will be performed by the manufacturer on the other items:

- a) Record the details of all fastenings (nuts and bolts), dowels, washers, locking screws, seals and gaskets.
- b) Visually inspect all covers, oil catchers, loose bearing housings etc.

3.2.4 Repairs

If the decision is made to repair the Roller, the supplier shall provide the quote to the client and the repairs shall be carried out after the agreement between the two parties. For a Roller requiring repairs, the items requiring repair or replacement will depend on the nature of the failure and the extent or the resultant damage.

The following is just a basic guideline of the repair process:

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- i. Prepare and position the roller yoke assembly for refurbishment in the workshop using the crane.
Note: Handle with extreme care to avoid injuries and yoke assembly damage relating to falling to the ground due to improper rigging.
Note: Total weight of one roller assembly is 16.5 Tons. The assembly the Contractor will handle will be without the outer ring and should be almost half of the total assembly weight.
- ii. Place the assembly on the wear ring (yoke side) on suitable supports or wooden blocks and or rubber mat.
- i. Ensure effective collection and containment of oil from yoke during refurbishment by strategically placing oil drip trays and saw dust before work commences.
- ii. NB: The grinding roller ring should have been removed and left on site
- iii. Clean the grinding roller yoke assembly with an effective degreaser
 - o Clean clamping ring
 - o Clean bearing shaft
 - o Skim face of outer bearing/retainer cover
 - o Skim yoke/axle retainer plate
- iv. Assess the roller parts for damages; notify the client to be present to witness the damage
- v. Arrange all the necessary spares including but not limited to:
 - o Bolts and nuts
 - o Protective plates
 - o Tiles
 - o Etc.**Note:** See Appendix A.1 for a list of applicable spares. List to be used as reference, and not as complete list of spares and should be supplied by the Contractor.
- vi. Repair all items that are repairable and clean/repair all bolt bore holes and threads.
- vii. Inspect the bearing on the inner ring/outer ring of the rolling elements and their cage for:
 - o Wear
 - o Scoring
 - o Pitting
 - o Cracking
 - o Plastic deformation
 - o Dimensional stability
 - o Corrosion
- viii. Inspect wearing bush for radial sealing:
 - o Check surface quality of the running surfaces
 - o Check dimensional stability within the permitted tolerances, (see chapter 10.3. of B114103-35-99-GM03-00001-AB)**Note:** Replace the bearing in the event of out-of-roundness, damage or scoring.
- ix. Perform pressure test on grinding roller bearing chamber
- x. Ensure there are no foreign matter in the cavities before reassembling the roller. No grinding work will be done in the same workshop. Should that be necessary,

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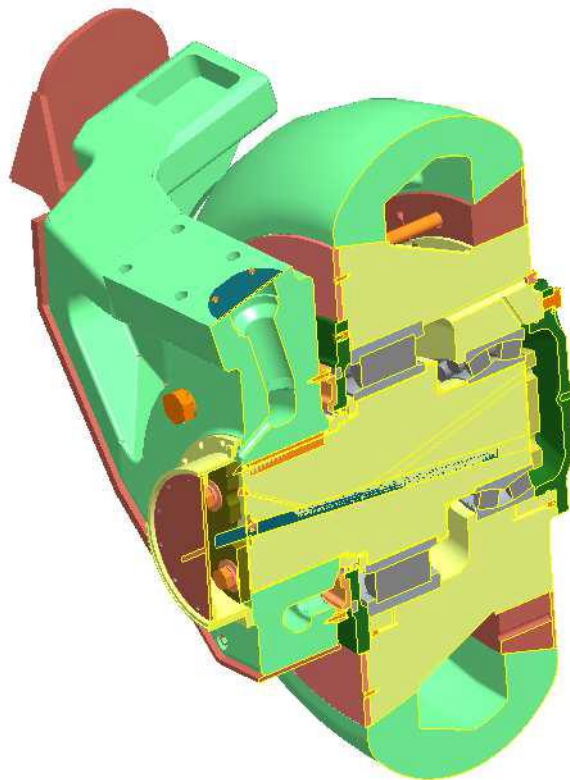
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complete cover the roller to ensure that no debris enter any cavities or holes of the roller assembly.

- xi. Do Quality check and Inspection on the roller yoke assembly

Note: Should there be a need to dismantle the grinding roller bearing system, please refer to B114103-35-99-GM03-00001-AB (Medupi Power Station Technical Documentation Pulverizer Plant MPS Mill). Please also refer this document for any technical data such as torque settings, component(s) weights, tolerances, etc.



3.3 Communication and Correspondence

- a) All correspondence includes
- i. Medupi 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

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- 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 are decided upon at the Inaugural meeting.

3.4 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.

4. Acceptance

This document has been seen and accepted by:

Name	Designation
Kenneth Ndumo	System Engineer Milling Plant
Bernard Matanda	Senior Advisor Engineering
Sithokozile Hlongwa	Manager Boiler Engineering
Joshua Lekoloane	Mechanical Boiler Maintenance Manager

5. Revisions

Date	Rev.	Compiler	Remarks
August 2022	1	PM Mashita	First Issue

6. Development Team

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

- Bernard Matanda
- Kenneth Ndumo

7. 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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