



**DESIGN, SUPPLY, DELIVERY,
INSTALLATION, TESTING, CALIBRATION
AND COMMISSIONING OF TWO OFF
HEAVY DUTY CNC CONTROLLED PORTAL
TYPE MILLING MACHINES AT THE
DURBAN MAIN CENTRE, 311 SOLOMON
MAHLANGU DRIVE, ROSSBURGH.**

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Revision 0

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DOCUMENT AUTHORITIES

Departments	Facilities and Infrastructure
Effective Date	July 2026

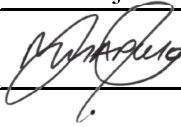
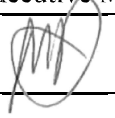
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1. INTRODUCTION

This scope of work is for the:

No.	TASK	REQUIRED
1	Design	✓
2	Manufacture	✓
3	Assess foundation	✓
4	Survey	✓
5	Supply	✓
6	Delivery	✓
7	Installation	✓
8	Documentation	✓
9	Testing	✓
10	Calibration	✓
11	Training	✓
12	Commissioning	✓

Of the specified:

No.	ITEM
1	Design, manufacture, supply, delivery, installation, testing, calibration and commissioning of two off 3 Axis heavy duty CNC controlled portal type milling machines
2	Training for 10 Transnet Engineering personnel on how to use the supplied equipment.
3	Submission of project completion documents.

2. TECHICAL REQUIREMENTS

2.1 The Contractor shall comply with the latest editions of all applicable South African legislation, regulations, standards, codes of practice, and recognised international standards relevant to the Design, manufacture, supply, delivery, installation of 3 axis heavy duty CNC controlled milling machine Portal type CNC milling machines (moving table):

- Occupational Health and Safety Act, Act 85 of 1993, and all applicable Regulations.

3. SPECIFIC REQUIREMENTS

3.1 Machine Specification

The following covers the minimum requirements for the required machinery.

Item no.	Requirements This specification covers the minimum requirements.
3.1.1	Design, supply, delivery, installation of 2 off 3 axis heavy duty CNC controlled milling machine Portal type CNC milling machines (moving table with T-Groove)
3.1.2	The minimum table length: 8000mm
3.1.3	The minimum table width:2000mm
3.1.4	Minimum longitudinal travel (X-axis): 8500mm
3.1.5	Minimum Cross travel of ram on bridge (Y-axis): 3700mm
3.1.6	Minimum Vertical travel of ram (Z-axis): 1250mm
3.1.7	The minimum distance from table to spindle nose: 1500mm
3.1.8	Minimum Column passage: 3200 mm
3.1.9	Minimum Rapid feed (X/Y/Z): 12/15/12 m/min
3.1.10	Maximum Working feed (X/Y/Z): 10 m/min
3.1.11	The machine shall have the capability of through hole coolant through the tools
3.1.12	The spindle motor performance shall be capable of having enough power to machine at the speeds and feed rates required with the tools listed below
3.1.13	CNC system: The machine control system preference will be Fanuc, or a compatible programming syntax CNC system or similar CNC system which must be of the latest available model. Transnet shall be given full access to the parameters and programs and they shall be protected with a password that shall be supplied to Transnet. The system shall be compatible with the transfer of programs via USB The PLC program shall be able to be viewed on the control panel to assist with troubleshooting on the machine.

3.1.14	The Speed of the spindle shall be capable of up to minimum: 4500 rpm																
3.1.15	Positioning repeatability: 0.018mm or better on all axes																
3.1.16	Linear scales on all 3 axes for positioning accuracy: 0,006 / 8.000mm																
3.1.17	Allowed weight on the table: 25000kg																
3.1.18	Universal milling head with automatic loading onto ram from cradle with automatic indexing on two planes at 2.5-degree increments, with CTS through head and with automatic tool clamping. Milling head power transmission with a minimum of 22 kW, with minimum speed 2500 rpm.																
3.1.19	The machine shall be supplied with a wireless probe for the measuring and setup of the machine																
3.1.20	Complete enclosure, without roof and with side sliding door																
3.1.21	Dimensions: The supplier to indicate the overall dimensions of the equipment supplied. (Length, width and height)																
3.1.22	Tool changer: The machine to be equipped with a minimum of 24-position chain-type automatic tool changer, capable of changing tools vertically into ram and horizontally into universal milling head.																
3.1.23	Cutters/Tools/Jigs & Fixtures: Bider to supply BT type tools and holders, the Holder must be a BT50 please refer to this clarification below in this regard. The complete tooling set shall be made up of the table below Cutters/Tools <table><tr><th>CUTTERS</th><th>UDRILL</th><th>DRILLS</th><th>GUN TAP</th><th>RADIUS CUTTER</th><th>BEVEL CUTTER</th><th>Holders</th><th>Electro Permanent Magnetic Chuck</th></tr><tr><td>10MM x 1 20MM x 1 25MM x 1 32MM x 1 40MM x 1 50MM PINAPPLE x 1 63MM x 1 100MM x 1 125MM x 1</td><td>17MM x 1 17.5MM x 1 3D x 1 21MM X 3D x 1 22MM X5D x 1 25MM X 4D x 1 25MM X 5D x 1 50MM x 1</td><td>5MM x 1 6MM x 1 6.8MM x 1 6.5MM x 1 9MM x 1 9.5MM x 1 10.2MM x 1 10.5MM x 1 13MM x 1 13.5MM x 1 14MM x 1</td><td>8MM x 1 10MM x 1 12MM x 1 16MM x 1 20MM x 1 24MM x 1</td><td>5R ON 50MM x 1 20R ON 32MM x 1</td><td>15MM x 1 20MM x 1 25MM x 1 30MM x 1 40MM x 1 45MM x 1 50MM x 1 60MM x 1 65MM x 1</td><td>BT50 x 2</td><td>800MMX990MM X70MM</td></tr></table> Jigs & Fixtures: The bidder to supply one Jig as per attached drawing for both machines as per Annexure A: Jig drawing TWK23461. The jig shall be supplied with T-Groove bolts and nuts for mounting onto the working table	CUTTERS	UDRILL	DRILLS	GUN TAP	RADIUS CUTTER	BEVEL CUTTER	Holders	Electro Permanent Magnetic Chuck	10MM x 1 20MM x 1 25MM x 1 32MM x 1 40MM x 1 50MM PINAPPLE x 1 63MM x 1 100MM x 1 125MM x 1	17MM x 1 17.5MM x 1 3D x 1 21MM X 3D x 1 22MM X5D x 1 25MM X 4D x 1 25MM X 5D x 1 50MM x 1	5MM x 1 6MM x 1 6.8MM x 1 6.5MM x 1 9MM x 1 9.5MM x 1 10.2MM x 1 10.5MM x 1 13MM x 1 13.5MM x 1 14MM x 1	8MM x 1 10MM x 1 12MM x 1 16MM x 1 20MM x 1 24MM x 1	5R ON 50MM x 1 20R ON 32MM x 1	15MM x 1 20MM x 1 25MM x 1 30MM x 1 40MM x 1 45MM x 1 50MM x 1 60MM x 1 65MM x 1	BT50 x 2	800MMX990MM X70MM
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3.1.24	Speeds: The bidder to indicate all the different speeds for the equipment. (Spindle speed.)																
3.1.25	Safety Standards:																

	• The bidder to supply the design standards of the equipment/machine. • The bidder to supply all the safety features build into the equipment/machine.
3.1.26	Electrical: • Fixed control panel • Lockable inter — locking main isolator. • An emergency shut — off which must be easily accessible. • The bidder to indicate all electrical components used in the equipment. • The different types off drives used eg. Siemens, Fanuc, Commander, Yaskawa etc. • All wiring diagrams shall be supplied. The bidder to indicate the minimum power required for the equipment to operate fully. Power supply to machine. • Transnet will supply a supply point within 10 meters of the location of the machine, that the bidder shall connect to.
3.1.27	Programming Software: • The machine must be able to be programed manually on the CNC Control panel • The bidder shall confirm the Computer Assisted Machining (CAM) software is compatible with Fusion 360 software
3.1.28	Each machine shall be powered by 400V AC 50Hz power. Supply and install power cabling up to point supplied by Transnet Engineering within 10m of the position of the machine, cable trunking from the electrical distribution box to the new machine. Install the fused isolator (lockable). Each phase of 3 phases to be lockable. Test and issue an electrical certificate of compliance in accordance with SANS 10142-1. The machine shall have surge protection protecting against Type 1 + 2 surges and have a supply filter suitable to comply with EMC standards.
3.1.29	Testing, calibration and commissioning. SAT shall include, as a minimum: - Full operational testing of all machine functions. - Verification of CNC operation. Calibration shall include: - Linear scales. - Spindle positioning. - Wireless workpiece probe. - Tool measurement system. - CNC positioning system. - Axis compensation values. - Geometrical Calibration certificate. Electrical: Final electrical testing and commissioning and issuing of electrical COC certification

	Machine Programming and Initial Production Support The Contractor shall develop, verify, and optimise the CNC machining programs required for the initial production run using the component drawings provided by Transnet Engineering as detailed in Annexure B – Component Drawings MAC_66A0200 & MAC_22A0100 The initial programming shall include the development of all CNC programs, tooling selection, machining strategies, workholding verification, machine setup, program simulation, prove-out, and optimisation to achieve the specified dimensional accuracy, surface finish, and production cycle times. During testing and commissioning, the Contractor shall execute and validate the machining programs by manufacturing the first production components on the supplied machine. Any program modifications required to achieve compliance with the specified quality and performance requirements shall be undertaken by the Contractor at no additional cost. Transnet Engineering shall provide the raw materials, workpieces, and any associated consumables required for the commissioning trials and first production run. The Contractor shall utilise these materials solely for the purpose of machine proving, program validation, operator training, and performance verification. Upon successful completion of commissioning, the Contractor shall hand over to Transnet Engineering all validated CNC programs, tooling data, setup sheets, work offsets, machine parameter records, and any supporting documentation necessary to enable independent future production and maintenance of the machining programs.
3.1.30	Documentation and items to be supplied with the machine Operation Operational Manual with detailed operation of the machine, 3 Hardcopy + 1 PDF Maintenance Maintenance Manual with procedures of detailed maintenance, 3 Hardcopy + 1 PDF Maintenance Schedule of when Maintenance will be required, 3 Hardcopy + 1 PDF List of all passwords to gain full access to the Machine, 3 Hardcopy + 1 PDF Recommended spare parts list, 3 Hardcopy + 1 PDF Lubrication Chart with list of Lubricants, Lubrication points and frequency, 3 Hardcopy + 1 PDF Error list with Causes and corrective procedures, 3 Hardcopy + 1 PDF Electrical Single Line Diagrams (SLD).

Electrical Schematics (Power and Control).
 Generator Wiring Diagrams.
 Automatic Transfer Switch (ATS) Wiring Diagrams.
 Distribution Board Schematics.
 Generator Synchronising Schematics (where applicable).
 Earthing and Bonding Drawings.
 Lightning Protection Drawings.
 Cable Schedules.
 Cable Routing Drawings.
 Cable Termination Schedules.
 Terminal Block Schedules.
 Panel Layout Drawings.
 Electrical Parts List with OEM Part Numbers.
 Protection Relay Settings.
 Protection Coordination Study.
 Short Circuit Study.
 Load Flow Calculations.
 Voltage Drop Calculations.
 Generator Sizing Calculations.
 Fuel System Control Wiring Diagrams.

Electrical

Electrical Schematics, 3 Hardcopy + 1 PDF
 Electrical Parts List (with OEM part numbers), 3 Hardcopy + 1 PDF
 Cable schedules, 3 Hardcopy + 1 PDF

Mechanical

Mechanical Assembly diagrams of all parts of the machine, 3 Hardcopy + 1 PDF
 Mechanical Parts list (with OEM part numbers), 3 Hardcopy + 1 PDF

CNC

OEM CNC Manuals, 1 Hardcopy + 1 PDF
 Backup of any CNC programs, Installable Backup + 1 PDF
 Backup of Parameters, Installable Backup + 3 Hardcopy + 1 PDF

PLC

PLC Program Installable Backup + 1 PDF Copy
 PLC Program project file for fault finding

Drives

Drive parameter backup, 3 Hardcopy + 1 PDF

Hydraulics

Hydraulic Schematics, 3 Hardcopy + 1 PDF
 Hydraulic Parts list (With OEM Part numbers), 3 Hardcopy + 1 PDF

Pneumatics

Pneumatic Schematic 3 Hardcopy + 1 PDF
 Pneumatic Parts list (With OEM part numbers), 3 Hardcopy + 1 PDF

	Computer - Backup image of the Computer - Install files for software on the computer - Installation instructions for software, 1 PDF - Operational manuals for the software 3 Hardcopy + 1 PDF - License keys for all software on computer - Passwords for all software on computer 3rd Party Documentation All Operational, maintenance manuals and Specifications for any third party equipment installed, 3 Hardcopy + 1 PDF Training - Training manuals 1 PDF copy - Register of personnel trained - Certificates of personnel Trained on the machine. 1 Hardcopy + 1 PDF Safety and Compliance - Warranty certificate and warranty terms - Compliance Declaration by OEM - Calibration certificates
3.1.31	The machine shall be supplied with its own air compressor - Compressors are classified as pressure vessel equipment and shall comply to Occupational Health and Safety Act – Act 85 of 1993, PER Regulations and SANS 347. - All Manufacturer’s/Importers documents pertaining to pressure equipment shall comply to the Occupational Health and Safety Act – Act 85 of 1993, PER Regulations & SANS 347. - Pre-commissioning inspection and dispensation/exemption to be carried out by an Approved Inspection Authority (AIA). Pre-commissioning inspection report, certificate of continuance, etc. to be issued by AIA (must be Transnet approved AIA). The following documentations must be submitted for review prior to the unit arriving on-site: 1. Manufacturing Certificates: Original certificates of manufacture. 2. Conformity: Importers’ certificates of conformity. 3. Safety Valves: Valid test certificates (1 or 3-year validity). 4. Pressure Gauges: Calibration certificates for all dial gauges (1 or 3-year validity). 5. AIA Reports: Pre-commissioning inspection reports and certificates of continuance (whether completed at the supplier’s premises or post-installation). Please also advise which Approved Inspection Authority (AIA) will be performing the inspections before site delivery. 6. Technical Drawings: All available schematic or design drawings. 7. Nameplates: Clear photographs of the original and additional compliant nameplates. For any technical queries regarding AIA requirements, please contact our Pressurised Equipment Specialist through the Transnet Engineering representative

3.1.32	Training: The following training for operators and maintenance staff must be supplied • Training of up to 10 operators • Training of up to 10 persons on the programming of the machine • Training of up to 10 Maintenance staff on the periodic maintenance and troubleshooting and repairs of the machine.
3.1.33	Warranty: The Contractor shall provide a comprehensive warranty for each CNC portal milling machine for a minimum period of twelve (12) months from the date of Final Acceptance by Transnet Engineering. The warranty shall cover the complete machine, including all mechanical, electrical, electronic, hydraulic, pneumatic, CNC control, software and ancillary systems supplied under this Contract. The warranty shall include, but not be limited to, the following: The Contractor shall warrant that the equipment supplied: • Is new, unused and of the latest proven design. • Is free from defects in design, materials and workmanship. • Complies fully with this Specification and the approved technical proposal. • Is suitable for continuous heavy-duty industrial operation under the specified environmental conditions. • Will achieve the guaranteed performance and machining accuracy specified in this document. Any defects identified during the warranty period shall be rectified by the Contractor at no additional cost to Transnet Engineering

4. OTHER INFORMATION RELATED TO THE SCOPE

- 4.1 Any matter relating to this work, which requires a decision from Transnet Engineering shall be presented to the Project Manager in charge.
- 4.2 All offers shall be completed in every respect with this specification. Only completed tenders shall be considered.

5. HEALTH AND SAFETY REQUIREMENTS

- 5.1 All equipment whether detailed in this specification or not shall comply with the requirements of the Occupational Health and Safety Act 85 of 1993 as amended and all other applicable legislation including specific set of regulations and local authority bylaws where applicable.
- 5.2 All the necessary safety equipment such as guards over rotating equipment shall be supplied and the equipment shall comply fully with all the requirements of the South African Occupational Health and Safety Act, Act 85 of 1993 and all other applicable legislation including specific set of regulations and local authority bylaws where applicable.

6. GENERAL

- 6.1 The successful tenderer will be subjected to a workshop inspection by Transnet Engineering to ensure that the facilities are to the satisfaction of the Transnet Engineering in terms of the quality control and equipment capabilities for manufacturing such type of equipment.
- 6.2 The tenderers shall guarantee that the rating and size etc. of the equipment offered, will be adequate to perform the duties required.
- 6.3 Operation will be in the following conditions:

Altitude	Sea level
Ambient temperature	0°C to 45°C
Relative humidity	50% to 100%
Atmosphere	Heavy saline

7. DEFINITIONS AND ABBREVIATIONS

- 7.1 CLIENT: Transnet Engineering Durban
- 7.2 TECHNICAL OFFICER: Project Manager, Transnet Engineering Durban
- 7.3 CONTRACTOR: Contractor appointed under this specification document