

Purchase Specification no. BBH7661

Technical specification for the Upgrade of DTF's hydraulic control system

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1. INTRODUCTION

1.1 This specification outlines general requirements for the supply, delivery, and installation of a hydraulic control system to be utilized in Transnet Freight Rail's (TFR), Rolling Stock Technology, Dynamic Testing Facility (DTF).

1.1 The hydraulic control system shall be able to control 9 hydraulic actuators (servo-valves) with forces ranging from 0kN to 5MN and strokes ranging from 0mm to 250mm. The hydraulic control system should be integrated with the existing hydraulic actuators.

1.2 All requirements as per the clauses of this specification are mandatory. TFR, Technology Management, Rolling Stock Technology will consider and evaluate any proposals from bidders deemed to be better than the requirements in this specification.

2. SCOPE

This document outlines Transnet Freight Rail (TFR), Rolling Stock Technology requirements for purchasing a hydraulic control system for testing rolling stock components in tension, compression, twist, fatigue, and bending for the DTF.

2.1 All offers shall be complete, including installation, connection to an electrical feed.

2.1 The contract shall cover the supply, testing, commissioning and training of the hydraulic control system for the DTF facility.

3. GENERAL TENDERING REQUIREMENTS

3.1 Bidders must specifically and separately acknowledge and indicate compliance with each individual clause and sub-clause of this specification and all specifications listed hereunder.

- 3.2 Bidders must furnish with at the time of their offer, completed and detailed information, comment, data, drawings as called for in this specification and its allied specification, to enable clear and satisfactory evaluation, comparison, and adjudication of their offers.
- 3.3 All offers shall include delivery, installation, commissioning and training.
- 3.4 Bidders must draw specific attention to instances of which the equipment offered by them differ from the requirements of the specification and supply complete detailed information on all such differences.
- 3.5 Any such deviations from the specification shall not be allowed without written consent from TFR, Technology Management, Rolling Stock Technology.
- 3.6 Any innovative design that deviates from this specification but will benefit TFR will be considered, provided that the tenderer clearly communicates such deviations beforehand. All deviations will have to be approved by TFR, Rolling Stock Technology.
- 3.7 Failure to comply fully with any of the requirements may result in an offer not being considered.

4. TECHNICAL REQUIREMENTS

Listed below are the general technical requirements that the hydraulic control system must meet:

4.1 Performance requirements

- 4.1.1 The hydraulic control system must be user-friendly.
- 4.1.2 The hydraulic control system should provide real-time closed-loop control to drive multiple servo-actuators.
- 4.1.3 The hydraulic control system must accommodate various configurations, including both axial and multiaxial testing.

4.1.4 The hydraulic control system must be designed for effortless reconfiguration, enabling adjustments without the need to rearrange components within the chassis.

4.1.5 The hydraulic control system shall have the following capabilities:

- Accommodate a wide range of transducers (AC and DC)
- Utilize excitation sensing for accurate voltage supplied to transducers
- Detection of excitation loss

4.2 Master and 2 x slave computers

The hydraulic control system shall be accompanied by the computers shown in Table 1:

Table 1: Computer requirements

Description	Quantity
Master computer – Controlling or commanding the hydraulic control system	1
Slave computer – Storing data, processing data, and visualizing test data	2

4.2.1 The supplier shall configure and test the master and slave computers required to operate with the hydraulic control system.

4.2.2 The master computer shall host the control software and any related applications.

4.2.3 The master and slave computers shall be exclusively designed for activities related to the hydraulic control system and shall be compatible with the current hydraulic actuators.

4.2.4 The following are the required minimum properties of the computers for the hydraulic control system (master and slave computers):

- 16GB of RAM and an optional slot to expand the memory
- Total storage: 500 - 1000GB (HDD / SSD)
- CPU: Intel or AMD (10th generation or newer) with 4 cores or more and 8 hardware threads
- Processor base frequency: 3.60 GHz
- Operating system: 64-bit, Windows 10 or newer

- Outputs: 3 or more USB 3.0 slots, 3 x VGA or 3 x HDMI

4.3 Dimensions of the hydraulic control system

The dimensions of the hydraulic control system shall meet the requirements shown in Table 2.

Table 2: Dimensions of the hydraulic control system

Dimensions of the chassis	
Height	400 – 800 mm
Width	200 – 600 mm
Depth	300 – 800 mm

4.4 Software requirements

- 4.4.1 The software shall be able to create, edit, and run tests.
- 4.4.2 The software shall feature a user-friendly interface and allow users to modify calculations as needed.
- 4.4.3 The software should be able to create and edit report templates using offline Microsoft Excel 2016 or newer version
- 4.4.4 The following functions are required to operate the hydraulic control system with the software:
 - Graphical drag-and-drop test flow design
 - Ability to create test templates
 - Data acquisition
 - Function generation at frequencies up to 100 Hz
 - Data export to ASCII
 - Report generation while the test is running.

5. ACCESSORIES

The following accessories shall accompany the hydraulic control system:

- 5.1 Remote E-stop with cable.
- 5.2 Remote controller to set up and initiate tests.

5.3 Uninterrupted power supply (UPS) to supply power to the hydraulic control system PC and Monitor shall meet the following:

- Double-conversion topology for constant power conditioning and up to 80 or 90 percent efficiency
- Graphical LCD for status updates
- Power rating: 2.5 – 4 KVA
- Voltage: 210 – 230 V
- Frequency: 50 / 60 Hz

6. Manuals and Drawings

6.1 Maintenance manuals

6.2 Operator's manual

6.3 Training manual

6.4 Parts catalogue and full detailed drawings of the components

6.5 Equipment specifications and drawings

7. INSTALLATION, COMMISSIONING, TRAINING AND CALIBRATION

7.1 Successful bidders shall carry out the installation and commissioning of the hydraulic control system at the purchaser's facility.

7.2 The successful bidder shall submit a detailed commission program which includes an inspection protocol/procedure.

7.3 The successful bidder shall provide a detailed test report certifying that the hydraulic control system was successfully commissioned to the necessary standards and safety requirements.

7.4 The successful bidder shall submit a complete and detailed test and inspection protocol for the commissioning of the hydraulic control system, before the anticipated date of commission.

7.5 Successful bidders shall provide a demonstration of the hydraulic control system at the supplier's facility during pre-dispatch inspection and at the purchaser's facility after delivery. The hydraulic control system shall be accepted only after satisfactory operation during the demonstration.

7.6 The system equipment shall be calibrated in accordance with the necessary standards.

7.7 The bidder shall ensure that the necessary training is provided for the safe operation of the hydraulic control system.

8. DELIVERY ADDRESS

The hydraulic control system shall be delivered to the following address:

Dynamic Test Facility (DTF)

Transnet Freight Rail

10 Cornelius Road

Koedoespoort 456-jr

Pretoria, South Africa, 0186

Co-ordinates: 25°43'24.9"S 28°16'07.7"E

9. WARRANTY AND GUARANTEE

9.1 The successful bidder shall give a minimum warranty of twelve (12) months after commissioning, against any defect imputable to manufacture and not revealed during acceptance at the works. In such instances the supplier's liability shall be the replacement of the defective system.

10. POST SALE SUPPORT

10.1 Assistance during equipment breakdowns

10.2 The supplier should be able to provide after-sales support, maintenance, and supply required spares as and when required.