

INFRASTRUCTURE ENGINEERING

ELECTRICAL DEPARTMENT SPECIFICATION

Specification For A Hydraulic Compression Tool And Dies For Fitting For Overhead Track Equipment

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Transnet Freight Rail - Infrastructure

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1. General Requirements

- 1.1 This specification outlines the requirements of a hydraulic compression tools for the crimping of compression type fittings of the overhead track equipment.
- 1.2 The hydraulic compression tools shall be ergonomically designed for maximum operator productivity and safety.

2. Operating Conditions

- 2.1 The hydraulic compression tools will be operated in all weather conditions at altitudes varying from sea level to 1850m above sea level, relative humidity 10% to 90% and atmospheric conditions which vary from heavily saline to dry and dusty.
- 2.2 Ambient air temperatures ranging from -10° C to 50° C.

3. Qualifications

- 3.1 The design of the hydraulic compression tools is to be that of the manufacturer, but must be of robust construction in order to meet sustained heavy duty demands, yet it must be light and easy handled manoeuvred by one operator.
- 3.2 Unit will be acceptable in standard factory production finish and colour. Details to be furnished.

4. Performance

- 4.1 The actual design and service life of the hydraulic compression tools is to be stated.
- 4.2 The unit is to be easily and economically maintained for with standard workshop tools and equipment. Details of gas suppliers available locally are to be supplied at the time of tendering.

5. Technical Requirements

5.1 General Description

- 5.1.1 Heavy duty, portable electro-hydraulic compression tools, consisting of a compression head with dies, electrical motor, hydraulic compressor and hoses for crimping of compression type fittings on aluminium, copper and ACSR conductors.
- 5.1.2 The equipment shall comfortably meet the requirements of this specification taking clause 5.2 into account.
- 5.1.3 The unit shall be supplied complete with all the accessories including but not limited to a compact carrying case for dies etc.

5.2 Operational requirements

- 5.2.1 The compression head shall be connected to the hydraulic compressor by means of a detachable flexible hoses, so that the compression head may be used on an erected conductor while the compressor is on the ground.
- 5.2.2 The unit shall have the capacity to perform crimping for at least 30 continuous crimping operations.

5.2.3 The tool is required for the compression of fittings onto wire sizes as per below:

- Clamping/splicing 130 mm² - (7/4,90mm) A.A.C
- Clamping/splicing 160 mm² - (19/3,25mm) A.A.C
- Clamping/splicing 250 mm² - (19/4,25mm) A.A.C
- Clamping/splicing 323 mm² - (19/4,65mm) A.A.C
- Clamping/splicing 500 mm² - (37/4,25mm) A.A.C
- Clamping/splicing 800 mm² - (37/5,30mm) A.A.C
- Splicing 65 mm²/11 - (6/1/3,66mm) A.C.S.R
- Splicing 65 mm²/37 - (12/7/2,59mm) A.C.S.R
- Splicing 130 mm²/30 - (30/7/2,36mm) A.C.S.R
- Splicing 160 mm²/37 - (30/7/2,59mm) A.C.S.R
- Bi-metallic lugs onto 160mm² - (61/1,18mm) copper conductor.
- Copper spade terminal onto 500mm² - (91/2.65mm) copper conductor.

5.2.4 The minimum oil delivery required for compression 2.45lpm at 7 bar and 0.295 at 700 bar.

5.3 Compression head and dies

5.3.1 The compression head and dies shall consist essentially of a base plate, cylinder plunger assembly and the body to accommodate the dies as drawings on annexure A attached to this specification. (Drawings are Transnet Freight Rail drawing CEE TW-632 sheet 1 – 9).

5.3.2 The body is to be in two portions to permit placing over and removal from an erected conductor and positively locked or keyed together during the compression operation.

5.3.3 The head must accommodate dies having configurations and dimensions as per drawings on annexure A and must have means for:

- locating the dies in both the central and rotational planes in the head
- retaining both halves in the head during placing over or removal from the conductor as well as to permit easy changing of the dies of different sizes.

5.3.4 The body, cylinder and plunger assembly must be adequately proportioned for the duty required in compressing fittings for the maximum size as per clause 5.2 of this specification.

5.3.4 The fluid inlet to the compression head is to consist of a connector identical to that provided on the hydraulic compressor.

5.4 Hydraulic compressor and hoses

5.4.1 Hydraulic compressor shall be driven from a 12V DC or 220 AC supply and shall be supplied with a remote control kit having a six meter cord.

5.4.2 The compressor must contain an integral hydraulic fluid reservoir or capacity approximately twice that necessary to fill both the hose and perform one complete compression operation.

5.4.3 The compressor unit must be protected by a pre-set relief valve against overload and this valve is to be such that it cannot conveniently be interfered with and preferably be of an audible type so that pumping can continue until relief pressure is heard. This relief pressure must be in excess of the necessary working pressure to ensure complete fulfilment of the compression operation.

5.4.4 The compressor is to be fitted with a suitable pressure gauge such that the relief valve setting is located at ¾ scale position. The gauge is positioned where damage will not easily occur under average service conditions.

5.4.5 The fluid outlet from the pump is to consist of an easily connected, self-closing connector for attachment of the hose. The type is to be such that no fluid will be lost during the connection and disconnection process. A dust cover attached to connection points is to be incorporated in the design of the connector.

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- 5.4.6 The compressor is to be fitted with a fluid filter which can be removed and cleaned.
- 5.4.7 The hose is to be rated a 2.5 times the set relief pressure and shall be of reinforced type and small bore of a continuous length 12 metres fitted with self closing connectors at each end. These connections must also be provided with attached dust covers and strainers. The hose shall be provided with spring wire guards at both ends.
- 5.4.8 For the hand operated type of compression tool, the lever operating the pump must be of suitable length to permit reasonably easy operation by one person.
- 5.4.9 The pump and lever arrangement is to be such that fixing the assembly to a rigid object is not necessary during pumping operation.
- 5.4.10 For the fuel engine driven type compression tool, a self contained engine and pump assembly without belting is required. A suitable carrying handle shall be provided for carrying the assembly.
- 5.4.11 The engine shall be easy to start, contain its fuel tank and be adequately rated to perform the compression duty without labouring or stalling.
- 5.4.12 The fuel engine type is to be provided with a main manual valve to control the supply of pumped fluid to the compression head to commence and cease the compression without the need to stop and start the engine.
- 5.4.13 The valve is to be clearly marked in English for open and closed.

5.5 Construction

- 5.5.1 The mass of the complete unit and for the dies shall be indicated.
- 5.5.2 The tool shall be of robust construction to sustain heavy duty demands alongside the railway track, under the service conditions as stated in clause 2 of this specification.
- 5.5.3 Where necessary the seals must be incorporated to prevent the ingress of grit to vital working parts of the tool.

5.6 Additional requirements

- 5.6.1 The following information shall be supplied:
- Relief valve pressure setting in bars
 - Max. compressive force on the die at relief valve setting
 - Mass of hydraulic compressor only
 - Mass of compression head only with a die
 - Mass of 12m hose and fitted couplers
 - Fuel tank capacity
- 5.6.2 An operator's handbook, additional information and spare parts list must be supplied with each machine in order to ensure that the machine is operated in accordance to the manufacturer's instructions.
- 5.6.3 Sufficient training must be given to all operators of these machines.
- 5.6.4 Hydraulic compression tools must be supplied complete with essential tools and consumable items as necessary. Details to be furnished for any tools required.

6. Data Plate

- 6.1.1 The unit must come with a data plate.
- 6.1.2 The brand and model number of the unit must clearly shown.
- 6.1.3 The actual mass in kilograms (Kg) of the unit must be shown on the machine
- 6.1.4 The actual dimensions of the unit must be indicated in millimetres (mm).
- 6.1.5 The relief valve settings in bars must be shown on the machine.

7. Quality Control

- 7.1 All units must be manufactured in an environment that complies to the latest ISO 9000 to ISO 9004 or similar quality control standards. Details must be furnished.
- 7.2 Units will be subject to a technical evaluation and the final decision will, amongst others, be based on these findings.

8. Legal and Operational

- 8.1 All equipment to comply with the requirements of the latest versions/issues SABS and other specification(s) applicable to fuel engines, hydraulic compression tools and safety.
- 8.2 The information as requested by the various clauses in this specification is to be supplied in form of technical data, pamphlets and/or drawings. If this is not complied to, offers may be overlooked.
- 8.3 Hydraulic compression tools not already in service with Transnet Freight Rail must be made available for testing/evaluation during the adjudication of the tender. Technical improvements on existing machines/equipment are to be substantiated by physical examples.
- 8.4 The hydraulic compression tools is to be guaranteed for a minimum period of 12 months against faulty material and workmanship - fair wear and tear of consumables excluded. Full details of guarantee are to be submitted.
- 8.5 Hydraulic compression tools spares/parts/consumables for this type of equipment shall be available locally. Full details of suppliers are to be submitted.

Annexure A

Refer to drawings attached.