

TECHNICAL SPECIFICATION FOR WORKSHOP EQUIPMENT

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SECTION 1 TECHNICAL SPECIFICATION

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SECTION 1 **TECHNICAL SPECIFICATION**

1.1 **SCOPE OF WORK**

The work shall comprise of the following:-

- a) To supply, deliver, install, test and commission to successful operating conditions
 - (i) The complete compressed air systems.
- b) Officially hand over the completed work to the client.
- c) Maintain and service monthly the installed equipment and work for a period of 12 months from the date of handing over to the client.

1.2 **MAIN ITEMS**

The main items are as listed below:-

- a) One (1) Set portable air compressor
- b) Other associated works including such minor works as are necessary for the proper carrying out of the installation and operation of the system, whether or not such works are specifically called for in the specification and drawings.

1.3 COMPRESSED AIR SYSTEM

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1.3.1 GENERAL REQUIREMENT

a) Scope of Work

The scope of this work shall include the supply, delivery, installation, testing, commissioning, completion, handing over, operational maintenance and servicing during the guarantee period of the entire installation as described in this specification.

All works shall be carried out strictly in accordance with this specification, the relevant rules and regulation of the TNB, the Jabatan Bomba Malaysia, Factories and Machinery Department, Department of Occupational Safety and Health and current IEE Regulation. Where requirements of the different rules and regulations or codes differ, the most stringent requirements shall prevail. All materials shall be manufactured in accordance with the appropriate British Standards or such other National Standards as may be approved by the Engineer. The works to be performed under this contract comprises but not limited to supply and install compressed air system comprising air compressors, air receiver, refrigerated air dryer, interconnecting pipeworks, gauges, control panels, couplings, regulator, lubricators, hoses and all accessories as required.

b) Standards

The specification shall be read in conjunction with the following standards and Code of Practice which are deemed to form part of this Specifications.

In the event of this Specification being at variance with any provisions of these standards, the requirement of this specification shall have precedence over the provisions of the standards. Reference to any standards, any Code of Practice shall include the latest amendments thereto.

i) List of Applicable British Standards

B.S. 10	-	Flanges and bolting for pipes, valve and fittings.
B.S. 1387	-	Specification for screwed and socketed steel tubes and tubular and for plain tubes suitable for welding or for screwing to B.S. 21 pipe threads.
B.S. 1500	-	Fusion welded pressure vessels for general purposes.

B.S. 1501	-	Steel for fired and unfired pressure vessels plates.
B.S. 1571	-	Part 1 & part 2 : Testing of positive displacement compressors and exhausters.
B.S. 2600	-	General recommendation for the radiographic examination of fusion-welded butt joints in steel.
B.S. 2633	-	Weld in steel pipes.
B.S. 2645	-	Test for use in the approval of welders.
B.S. 3456	-	Constructional and water requirement of the thermal storage heater.
B.S. 3974	-	Pipe Supports.
B.S. 3961	-	Cast iron screw-down stop valves and stop and check valves for general purposes.
B.S. 4514	-	Specification for UPVC pipes.
B.S. 4999	-	Specification for general requirement for rotating electrical machines.
B.S. 5000	-	Type N electric motors.
B.S. 5154	-	Copper alloy globe, stop, check and gates valves for general purposes.
B.S. 4275	-	Respiratory protective equipment.

ii) List of Applicable Other Standards

In addition to foregoing B.S. and Code of Practices, the following relevant rules and regulations shall form part of this Specification.

- Factories and Machinery (Steam Boiler and Unfired Pressure Vessels) Regulations 1970 of the Government of Malaysia.
- A.S.M.E. Code
- ISO 1217

1.3.2 PORTABLE COMPRESSED AIR SYSTEM

1.0 Overview

The portable compressed air system shall consist of one (1) portable lubricated reciprocating air compressor complete with electric motor, belt driven assembly, air receiver tank, pressure switch, pressure regulator, safety relief valve, pressure gauges, wheels and all necessary accessories for a complete operating system.

The compressor shall be suitable for workshop application and capable of continuous intermittent operation at the specified capacity and pressure.

Other items required under this system are :-

- a) Portable reciprocating air compressor complete with air receiver tank
- b) Auto retractable air hose reel complete with hose and quick couplers
- c) Associated piping, fittings, regulators and accessories
- d) Electrical starter and control accessories

Air quality at compressor outlet shall be suitable for general workshop pneumatic tools and applications.

2.0 Detailed Specification of Individual Components

2.1 Portable Air Compressor

1. GENERAL DESCRIPTION

The compressor shall be of the portable lubricated reciprocating piston type, air cooled, belt driven and mounted on wheels suitable for workshop use.

The compressor package shall include :-

- Electric motor
- Belt and pulley drive assembly complete with belt guard
- Air receiver tank
- Pressure switch
- Safety relief valve
- Pressure regulator
- Pressure gauges
- Wheels and handle assembly
- Flexible connection and accessories

The compressor shall be factory assembled, tested and ready for operation upon installation.

The unit shall operate on 415V, 3 phase, 50Hz electrical supply unless otherwise specified. All equipment shall be new and manufactured under recognised quality standards.

DETAILED SPECIFICATION

1. COMPRESSOR PUMP

The compressor pump shall be heavy duty lubricated reciprocating piston type suitable for workshop duty.

The compressor shall be capable of delivering not less than :-

- Motor Rating : 5 HP
- Free Air Delivery (FAD) : 20 SCFM @ 7 bar
- Operating Pressure : 7 – 8 bar

The compressor pump shall be complete with finned cylinders and aftercooling arrangement for efficient heat dissipation.

2. MOTOR

The motor shall be Totally Enclosed Fan Cooled (TEFC) induction motor suitable for compressor duty.

The motor shall comply with the following requirements :-

- Power Supply : 415V / 3 Phase / 50Hz
- Enclosure Protection : Minimum IP54
- Insulation Class : Class F
- Service Factor : Minimum 1.15

Motor and compressor shall be mounted on anti-vibration pads.

3. DRIVE ASSEMBLY

The compressor shall be belt driven type complete with pulleys and fully enclosed metal belt guard.

The drive system shall be properly aligned and designed for quiet and reliable operation.

4. CONTROLS

The compressor shall be complete with automatic pressure switch control for start and stop operation.

The control system shall include :-

- ON/OFF control
- Automatic cut-in and cut-out operation
- Motor overload protection
- Pressure indication
- Safety shutdown protection

The compressor shall also include pressure regulator for outlet pressure adjustment.

5. AIR RECEIVER TANK

The air receiver tank shall be factory mounted with the compressor assembly and suitable for the compressor operating pressure.

The receiver tank shall be complete with :-

- Safety relief valve
- Pressure gauge
- Drain valve

- Necessary fittings and accessories

The receiver tank shall be designed for minimum working pressure of 10 bar.

Where applicable, the tank shall comply with relevant JKKP requirements.

6. SAFETY RELIEF VALVE

The compressor shall be complete with spring-loaded safety relief valve sized for full compressor capacity.

The relief valve shall be factory preset and tamper proof.

7. PRESSURE GAUGES

Pressure gauges shall be provided for receiver pressure and regulated outlet pressure.

Pressure gauges shall be minimum 63mm diameter and suitable for compressor operating pressure.

8. WHEELS AND FRAME

The compressor shall be mounted on heavy duty wheels complete with rigid steel frame and handle for portability.

The frame shall be powder coated for corrosion protection.

2.2 Auto Retractable Air Hose Reel

1. GENERAL DESCRIPTION

The hose reel shall be industrial grade automatic retractable type suitable for compressed air application.

The hose reel shall be complete with :-

- Mounting brackets
- Flexible high pressure air hose
- Industrial quick coupler set
- Hose stopper
- Swivel inlet connection
- All necessary accessories and fittings

2. DETAILED SPECIFICATION

The hose reel shall comply with the following minimum requirements :-

- Hose Length : 30 metres
- Working Pressure : 10 bar minimum

The hose shall be abrasion resistant and suitable for workshop operating conditions.

The reel mechanism shall include automatic hose locking and controlled retraction system.

2.3 JKKP Documentation Assistance

The Contractor shall assist the Client in the preparation of documents required for JKKP application for the portable air compressor system.

The Contractor's scope shall include :-

- a) Preparation of technical drawings and documentation
- b) Preparation of relevant forms and technical information
- c) Attendance during JKKP inspection when requested

Submission to JKKP, official correspondence with JKKP and payment of statutory fees shall be by the Client.

Certificate of Fitness (CF), where applicable, shall be obtained by the Client.

2.4 PIPING, VALVES & FITTINGS

i) Type of Pipework

The types and quality of all pipework used shall comply with the following unless otherwise shown in the drawings or specified elsewhere.

Service	Location	Pipe Type
Portable Compressed Air System	Above ground	Galvanised Iron Heavy Grade C to BS 1387

ii) Valves and Accessories

All valves, fittings, hose connectors and accessories shall be suitable for compressed air service at minimum working pressure of 10 bar.

Quick couplers shall be industrial type and compatible with workshop pneumatic tools.

iii) Pressure Gauges

Pressure gauges shall be brass cased Bourdon tube type calibrated in bar.

Gauges shall be selected such that the normal operating pressure is approximately at mid-scale.

2.5 Control Panel

The portable air compressor shall be supplied complete with factory mounted starter and motor protection devices.

The control arrangement shall include :-

- ON/OFF switch
- Motor overload protection
- Auto start/stop control by pressure switch
- Run indication
- Pressure control system

2.6 Electrical Power Requirements

a) Electric Motors and Starters

The compressor motor shall be suitable for 415V, 3 phase, 50Hz power supply and shall comply with relevant Malaysian electrical requirements.

Motor starters shall include :-

- Thermal overload protection
- Short circuit protection
- Under voltage protection

Starter type shall be suitable for the motor rating provided.

3.0 SCHEDULE OF RATES FOR SERVICE AND MAINTENANCE OF THE COMPLETE WORKSHOP EQUIPMENT AND ANCILLARY EQUIPMENT

The tenderer is to note that the prices quoted will be binding in the event that the Government decides to accept either of them immediately after the guarantee period.

These rates should not be subjected to variation for the period of 3 (three) years after the guarantee period.

For Service and Maintenance of the complete Workshop Equipment and Ancillary Equipment at the above premises in strict accordance with the Tender Specifications and for supply of all consumable materials as and whenever required and to provide emergency repair service during normal working hours and overtime hours as required.	<u>Charge Per Year</u> RM
For Service and Maintenance of the complete Workshop Equipment and Ancillary Equipment at the above premises in strict accordance with the Tender Specifications but <u>excluding</u> the supply of consumable materials and to provide emergency repair service during normal working hours and overtime hours as required. (N.B. All cotton waste, soap detergent and other cleaning cotton materials required for the cleaning purposes will be supplied by the Sub-Contractor without extra charges) .	RM

Tandatangan Pentender: _____

Nama dan Alamat:
(Dengan Cop) _____

Tarikh: _____

Tandatangan Saksi: _____

Nama dan Alamat:
(Dengan Cop) _____

Tarikh: