


# **BALUCHISTAN ENERGY COMPANY LIMITED**

## **DEVELOPMENT OF LPG TESTING LABORATORY AT TAFTAN**

### **Scope & Specification for Supply of Pipes & Piping Items**



	<p><b>Office Address:</b> Baluchistan Energy Company Limited 67-A, Main Jinnah Town Quetta, Baluchistan, Pakistan</p>	<p><b>Phone:</b> 9281-2863711, 2863712 <b>E-mail:</b> <a href="mailto:cfo@becl.com.pk">cfo@becl.com.pk</a> <a href="mailto:shayan.ali.siddiqui@gmail.com">shayan.ali.siddiqui@gmail.com</a> <b>Web:</b> <a href="http://www.becl.com.pk">www.becl.com.pk</a></p>
-------------------------------------------------------------------------------------	-----------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------



# **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

## **TABLE OF CONTENTS**

<b>1.0</b>	<b>SCOPE .....</b>	<b>3</b>
<b>2.0</b>	<b>CODES, STANDARDS AND REGULATIONS .....</b>	<b>3</b>
<b>4.0</b>	<b>MATERIAL.....</b>	<b>7</b>
<b>5.0</b>	<b>MARKING .....</b>	<b>7</b>
<b>6.0</b>	<b>COLOR CODING .....</b>	<b>8</b>
<b>7.0</b>	<b>INSPECTION REQUIREMENTS.....</b>	<b>9</b>
<b>8.0</b>	<b>PREPARATION FOR SHIPMENT .....</b>	<b>9</b>



# **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

## **1.0 SCOPE**

This specification contains minimum requirements for the supply/procurement of Pipes, Pipe fittings, Flanges, Gaskets and Stud bolts to be used in all process and utility piping.

## **2.0 CODES, STANDARDS AND REGULATIONS**

2.1 Codes, standards, and practices in effect as of to date shall form a part of this specification to the extent specified herein.

2.2 The codes that apply are as follows:

### **American Society of Mechanical Engineers**

ASME B1.1	Unified Inch Screw Threads
ASME B1.20.1	Pipe threads general purpose (inch)
ASME B16.1	Cast Iron Pipe Flanges and Flanged Fittings
ASME B16.5	Pipe flanges and flanged fittings
ASME B16.9	Wrought Iron butt welding fittings
ASME B16.11	Forged fittings, socket welding and threaded
ASME B16.20	Metallic gaskets for pipe flanges, ring joint, spiral wound and jacketed.
ASME B16.21	Non metallic flat gaskets for pipe flanges
ASME B16.25	Butt welding ends
ASME B16.47	Large diameter steel flanges
ASME B16.48	Steel line blanks
ASME B18.2	Square and Hexagon Bolts and Nuts
ASME B31.3	Process piping
ASME B36.10M	Welded and seamless wrought steel pipe
ASME B36.19M	Stainless steel pipe
ASME B46.1	Surface Texture (Surface Roughness, Waviness & Lay)

### **ASME Boiler & Pressure Vessel Code**

Section IX      Welding Qualifications

### **American Petroleum Institute**



## **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

API 590 Steel line blanks

API 5L Specification for line Pipe

### **American Society for Testing and Materials**

ASTM A53 Specification for pipe, steel, black and hot-dipped, zinc-coated, welded and seamless

ASTM A105 CS forgings for piping applications

ASTM A106 Seamless CS pipe for high temperature service

ASTM A123 Specification for Zinc (Hot Dip Galvanized) Coating on Iron & Steel Products

ASTM A182 Forged or rolled alloy steel pipe flanges, forged fittings and valves and parts of high temperature service.

ASTM A193 Alloy steel and SS bolting for high temperature service.

ASTM A194 CS and alloy steel nuts for bolts for high pressure or high temperature.

ASTM A216 Steel castings, CS suitable for fusion welding for high temperature service.

ASTM A234 Pipe fitting or wrought CS and alloy steel for moderate and high temperature service.

ASTM A320 Alloy / steel bolting material for low temperature service

ASTM A333 Seamless and welded steel pipe for low temperature service.

ASTM A350 CS and low alloy steel forgings, notch toughness testing is required for pipe components.

ASTM A403 Wrought Austenitic stainless steel piping fittings.

ASTM A420 Pipe fittings of wrought carbon steel and alloy steel for low temperature service.

ASTM A516 Pressure vessel plates, CS, for moderate and low temperature service.

### **Manufacturer's Standardization Society of Valves and Fittings Industry**

MSS SP25 Standard marking system for valves, fittings, flanges, and unions.

MSS SP 44 Steel Pipe Line Flanges

MSS SP 97 Integrally Reinforced Forged Branch Outlet Fittings, Socket Weld, Threaded And Butt Welding Ends.

### **British Standards**

BS 3799 Steel Pipe fittings screwed and socket welding



# **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

## **National Association of Corrosion Engineers/International Organization for Standardization**

NACE MR-0175/ Sulfide Stress Cracking Resistant Metallic Materials  
ISO 15156

### **3.0 SPECIFIC REQUIREMENTS**

#### **3.1 PIPES**

- 3.1.1 Pipe dimensions shall be in accordance with ASME B36.10 for wrought steel and wrought iron pipe and ASME B36.19 for stainless steel pipe, except where otherwise stated.
- 3.1.2 All pipe threads shall conform to American Standard taper as per ASME B2.1.
- 3.1.3 Pipe made by Acid-Bessemer process shall not be acceptable. Steel pipe shall be made by open hearth, electric furnace or basic-oxygen processes.
- 3.1.4 Butt weld end preparation shall be in accordance with ASME B16.25.

#### **3.2 PIPE FITTINGS**

- 3.2.1 Threaded joints shall conform to American Standard taper as per ASME B2.1.
- 3.2.2 Forged steel screwed and socket weld fittings shall conform to ASME B16.11.
- 3.2.3 Malleable Iron Threaded fittings shall conform to ASME B16.3. Threaded plugs shall not be made of malleable iron but shall be forged steel round head plugs, Vogt. No. 2130 or equal. Pipe plugs for use with socket welding shall consist of a nipple with one end plain, other end threaded.
- 3.2.4 Butt weld fittings shall be in accordance with ASME B16.9 to the extent of sizes covered.
- 3.2.5 All fittings shall be marked in accordance with MSS-SP-25.
- 3.2.6 Butt weld end preparations shall be in accordance with ASME 16.25.

#### **3.3 FLANGES**

- 3.3.1 Class 125 and Class 250 flanges shall be in accordance with ASME B16.1.



## **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

- 3.3.2 Class 150 to Class 2500 flanges in sizes upto 24" shall be in accordance with ASME B16.5.
- 3.3.3 Class 150 to Class 900 flanges in sizes from 26" to 60" shall be in accordance with ASME B16.47 Series A.
- 3.3.4 Flange Face Finishing - the finish of contact faces of pipe flanges, orifice flanges, stub-ends and connecting end flanges of valves and fittings shall adhere to requirements as set forth in B16.5.
- 3.3.5 The surface finish for raised face shall have a roughness of 125 to 200 AARH, unless specifically noted otherwise.
- 3.3.6 Threads for screwed flanges shall conform to American Standard taper as per ASME B2.1.
- 3.3.7 AARH Surfaces are to be compared by sight and feel with "standard roughness comparison specimen" and shall not be subjected to rejection by tracer type instruments using stylus tracers or electrical amplification.
- 3.3.8 Orifice flanges and orifice fittings shall conform to American Gas Association recommendations. Pipe plugs shall be of same material as flanges
- 3.3.9 The bore of welding neck flanges shall correspond to the inside diameter of the connecting pipe or fitting, permitting a thickness difference up to 1/16". When the difference in wall thickness between the two components being joined exceeds 1/16", taper boring shall be performed on the component having the heavier wall per ASME B31.3 (327.3.1c).
- 3.3.10 All flanges shall be marked in accordance with MSS-SP-25.

### **3.4 GASKETS**

- 3.4.1 Non-metallic gaskets for flanged pipe joints shall conform to ASME B16.21.
- 3.4.2 Limiting dimensions for other gaskets suitable for ASME flanges shall be in accordance with ASME B16.5, Appendix E.



## **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

- 3.4.3 Gasket dimensions for flanges larger than 24" shall be in accordance with the flange standard specified in the individual spec. class.

### **3.5 STUD BOLTS**

- 3.5.1 Flange bolts and nuts shall conform to ASME B18.2.1 & B18.2.2 respectively. Threads shall be of Coarse Thread Series, ASME B1.1. Tolerance shall be Class 2A and 2B for bolts and nuts, respectively. Nuts for bolts and studs shall be of American Heavy Hexagon Series.
- 3.5.2 Where stud bolts are specified to be A193 Gr.B7, they shall be in the liquid quenched and tempered condition.

### **4.0 MATERIAL**

- 4.1 The individual class of the materials specified shall be strictly adhered to in the purchasing, fabrication and testing of the pipes.
- 4.2 Deviations of the material from class specifications may occur. These deviations are only permissible if they are equal or better than the individual requirements specified.
- 4.3 All materials specified to NACE requirements shall be manufactured, tested and inspected in accordance with NACE MR0175.

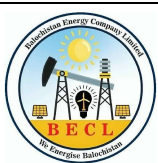
### **5.0 MARKING**

- 5.1 In addition to the marking requirements of the relevant product standard and MSS SP-25, the following information shall be marked on each component.

Specification and grade of material

Nominal diameter and wall thickness

- 5.2 Marking shall be carried out on all individual components from size 2" NPS and larger and corrosion resistant metal tags for components sizes less than 2"NPS, the tags shall be securely attached to each item/package.
- 5.3 Marking of components 2"NPS and larger shall be carried out by stenciling with indelible paint, with pipe being marked 100mm from each end. The paint shall not contain any harmful metals such as zinc, or metallic salts which would adversely affect



## SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS

the metal on heating or welding, with particular attention being paid to austenitic and duplex stainless steel.

- 5.4 All components shall additionally be hard stamped or vibro etched with the heat number. For components manufactured from austenitic and duplex stainless steel, marking shall be by vibro etching. Carbon steel and impact tested carbon steel shall be marked by round nosed low stress stamps.

### 6.0 COLOR CODING

- 6.1 To enable identification of materials on site, supplier is required to mark all items (pipes, elbows, tees, reducers, flanges etc.), excluding bolting with color coding in accordance with the color coding schedule shown in Table below.

#### Color Coding Schedule (excluding gaskets)

MATERIAL	COLOR	RAL No.	BS 4800 REF.
Carbon Steel (NACE)	Light Brown	8002	08C37
Carbon Steel (non-NACE)	Light Green	6032	14E51

Note: No color coding is required for galvanized components

The paint shall not contain any harmful metals such as zinc, or metallic salts which would adversely affect the metal on heating or welding, with particular attention being paid to austenitic stainless steel.

Color coding location shall be as follows, noting marking shall not encroach upon surfaces prepared for welding or gasket contact surfaces:

Pipe - 1-1/2"NPS and smaller – broad rings painted 1.5 meters apart.

2"NPS and larger – broad line painted down the entire length of the pipe.

Fittings - Socket weld and threaded ends – broad circumferential band painted at one end of the fitting.

Butt weld – broad line painted down entire longitudinal length of fitting.





## **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

Flanges - Welding neck flanges – broad circumferential band painted on the hub remote from the butt weld end. Blinds shall have bulls eye painted on the back

Spectacle blinds – circumferential band painted on the edge of the spacer section

Separate blind and spacer - circumferential band painted on the edge of each item

Gaskets - Spiral wound type – outer edge of the outer ring as per ASME B16.20.

Ring Type Joint – entire outer edge of the ring ensuring marking does not encroach upon seating surfaces.

### **7.0 INSPECTION REQUIREMENTS**

7.1 All inspection requirements shall be as per applicable codes / standards.

7.2 Mill test reports shall be furnished.

7.3 Reports of other tests as carried out as per the applicable code shall also be furnished.

### **8.0 PREPARATION FOR SHIPMENT**

8.1 After inspection and test, all items shall be completely free of water, dried and prepared for shipment. Adequate protection shall be provided against mechanical damage and atmospheric corrosion in transit.

8.2 Exposed, finished and machined surfaces shall be given a heavy coating of rust inhibition compound, Mobil Kote No. 302 or equivalent. Application of rust prevention is generally not required for alloy and non-corrosive materials. Special treatment will be required for items of stainless steel to prevent corrosion due to exposure to salty atmosphere.

8.3 Openings of pipe shall be covered or plugged with substantial wood, metal or plastic closures/end caps, securely fitted and suitable for prolonged exposure prior to final installation



## **SPECIFICATION FOR SUPPLY OF PIPES & PIPING ITEMS**

- 8.4 All fittings after necessary preparation shall be packed in the sea worthy crates. Crates shall be constructed of well-seasoned sound lumber that has no splits or rotted sections. All items shall be secured to the base of the container and braced or blocked within the container. The supplier shall consider that the material can be involved in several loading and unloading operations; that the shipment may involve truck, rail, ship, and barge or air transportation; and that there may be prolonged periods of storage or idleness before these items are put into service.