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TITLE
PURCHASE SPECIFICATION FOR FLANGES

PURPOSE
This specification is a supplement to the Purchase Order, defining the technical requirements for the manufacture, examination, testing, identification, protection and documentation for flanges.

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PURCHASE SPECIFICATION FOR FLANGES

1. PURPOSE AND SCOPE

This specification together with the “item description” in the Request for quotation or Purchase Order covers the purchase requirements for flanges.

2. OBJECTIVE

The requirements outlined herein are supplementary to the Purchase Order. Together, they define the technical requirements for the manufacture, examination, testing, identification, protection and documentation for flanges.

3. DEFINITIONS

3.1 **Approval** - Approval or approved by Purchaser, Owner/User and Authorised Inspection Authority (A.I.A) shall mean written agreement or authorization by Purchaser, Owner/User and A.I.A. All requests for approval shall be submitted in writing and any proposed deviation from specified requirements shall be fully motivated & **subject to prior written approval by the Owner/User.**

3.2 **Purchaser** - may be the **Owner/User** or his designated representative e.g. Engineering Contractor.

3.3 **Manufacturer** - shall be the Vendor of equipment, a fabricator, assembler or contractor. They shall be **approved** in accordance with a recognized quality system such as ISO 9001 or the ASME “U” stamp and be **subject to the prior written approval of the Owner/User**.

3.4 **Owner/User** - PetroSA (SOC) Limited.

3.5 **Authorised Inspection Authority** - An Inspection Authority approved by the Department of Minerals and Energy of the Government of the R.S.A. for the certification of "Vessels under Pressure". **The A.I.A. shall be appointed by the Owner/User.**

3.6 **Shall** - The word "shall" is to be understood as **mandatory** to comply with the requirements of this Specification.

3.7 P.M.I

Positive Material Identification by such methods as alloy analyser, metal scope or re-check of chemical analysis.

3.8 RFQ

Request For Quotation

3.9 PO

Purchase Order

3.10 ITEM PURCHASE DESCRIPTION

The Item Purchase Description is the individual detailed description for each flange on the RFQ or PO. Each Item Purchase Description has a PetroSA Material Number and a PO or RFQ item number. The Item Purchase Description specifies flange type, size, rating, material, as follows:

Flange Type	Weld neck, Slip on, Blind, etc.
Size (nominal bore)	25mm, 32mm, 40mm, etc.
Rating	Class 150 # , 300 # , 600 # , etc.
Material	Stainless Steel, Carbon Steel, etc.

4. REFERENCES

Where reference is made to a Code, Specification or Standard, the reference shall be taken to mean the latest edition of the Code, Specification or Standard, including addenda, supplements and revisions thereto unless specified otherwise in the Contract.

Deviations from requirements set forth in this specification shall only be permitted with the prior written approval of the Owner/User.

4.1 Statutory Regulations (As applicable)

NO.	DOC NO.	TITLE
1	Act 26 of 1996	Mine, Health and Safety Act and Regulations
2	Act 85 of 1993	Occupational Health and Safety Act and Regulations
3	Act 50 of 1991	Minerals Act and Regulations

4.2 EN 10204: Metallic materials: Types of inspection documents

4.3 American National Standards Institute (ANSI) Standards

NO.	DOC NO.	TITLE
1	ASME/ANSI B1.1	Unified Inch Screw Threads (UN and UNR Thread Form).
2	ASME/ANSI B2.1	Pipe Threads (except Dry-seal).
3	ASME/ANSI B16.5	Pipe Flanges and Flanged Fittings.
4	ASME/ANSI B16.9	Factory-Made Wrought Steel Butt-welding Fittings.
5	ASME/ANSI B16.11	Forged Steel Fittings, Socket-Welding & Threaded.
6	ASME/ANSI B16.20	Metallic Gaskets for Pipe Flanges - Ring-Joint, Spiral Wound and Jacketed.
7	ASME/ANSI B16.21	Non-metallic Flat Gaskets for Pipe Flanges.
8	ASME/ANSI B16.25	Butt welding Ends.
9	ASME/ANSI B16.36	Steel Orifice Flanges, class 300, 600, 900, 1500 and 2500
10	ASME/ANSI B16.47	Large Diameter Steel Flanges.
11	ASME/ANSI B36.10	Welded and Seamless Wrought Steel Pipe
12	ASME/ANSI B36.19	Stainless Steel Pipe
13	ANSI/AWWA-C207	American Water Works Association, Standard for Steel Pipe Flanges for Waterworks service- Sizes 4 inches thru 144 inches
	ASME SA-388	Standard Practice for Ultrasonic Examination of Heavy Steel Forgings

4.4 American Petroleum Institute (API) Standards

NO.	DOC NO.	TITLE
1	API 601	Metallic Gaskets for Raised-Face Pipe Flanges and Flanged Connections (Double-Jacketed Corrugated and Spiral-Wound)

4.5 Manufacturer's Standardisation Society (MSS) Standards

NO.	DOC NO.	TITLE
1	MSS-SP-6	Standard Finishes for Contact Faces, Pipe Flanges and Connecting-End Flanges of Valves and Fittings
2	MSS SP-25	Standard Marking System for Valves, Fittings, Flanges and Unions
3	MSS-SP-44	Steel Pipe Line Flanges

4.6 International Standardization Organization (ISO)

NO.	DOC NO.	TITLE
1	ISO 468	Surface roughness - parameters, their values and general rules for specifying requirements

5. GENERAL REQUIREMENTS

5.1. Precedence

5.1.1. In the event of any conflict between the various relevant documents, the order of precedence shall be:

a) The Purchase Order (PO), including terms, conditions and legal requirements 'THE CONTRACT'.
b) Purchaser's data sheets, and/or drawings.
c) This Specification including all references therein.
d) Other relevant documents, i.e. Authorised deviations and exclusions.

5.1.2. It shall be the responsibility of the Vessel Manufacturer to call attention to any conflicts between Specifications, the ASME Code, the Purchase Order, or Purchaser's drawings, and request a written interpretation from the Owner/User. The Manufacturer is not at liberty to assume which instructions shall govern.

5.2. Deviations

No substitution or deviation from the requirements of this Specification shall be permitted without approval by Principal. All approved deviations and/or substitutions shall be stated in the Purchase Order.

5.3. QA/QC Program

Every Supplier/Sub-supplier/manufacturer/vendor shall be accredited in accordance with a recognized quality system such as SANS/ ISO 9000. Any exception to this requirement shall be clearly addressed in the RFQ.

6. MATERIALS

6.1. Special Requirements for Austenitic Stainless Steel

6.1.1. All austenitic stainless steel flanges shall be furnished in the solution annealed condition.

6.1.2. The heat treatment temperature for the "straight" grades (all grades other than "L" grades and "H" grades) and "L" grades of austenitic stainless steel shall be within the following ranges:

a) Type 304, 304L, 316 and 316L: 1050° C to 1100°C.
b) Types 321, 347 and 348: 1030 °C to 1070 °C.

6.2. Components specified to ASTM A352 shall meet the impact resistance requirements at the minimum temperature shown in Table 1 of ASTM A352 for the grade specified in the item purchase description.

6.3. Special Requirement for Class 2500 Flanges

The following additional requirements shall apply only to Class 2500; grade 316L austenitic stainless steel flanges (blind flanges excluded):

6.3.1. The chemical composition of austenitic stainless steel shall conform to the requirements prescribed in Table 1 of ASTM Al 82 for Grade F316L, with the following exceptions:

a)	Carbon	0,03% maximum.
b)	Molybdenum	2,50% minimum.
c)	Ferrite	FN 4 - FN 12

6.3.2. A chemical analysis shall be made of each heat of steel preferably taken during pouring of the heat.

6.3.3. A copper-copper sulphate-sulphuric acid test for detecting susceptibility to intergranular attack shall be made on each heat by the Supplier in accordance with Practice E of ASTM A262.

7. DESIGN AND DIMENSIONS

7.1. Thicknesses

7.1.1. Flanges specified as Schedule 10, 20, 30, 40, 60, 80, 100, 120, 140, 160, standard weight, extra strong, or double extra strong shall be in accordance with ASME/ANSI B36.10.

7.1.2. Flanges specified as Schedule 5S, 10S, 40S and 80S shall be in accordance with ASME/ANSI B36.19.

7.1.3. Austenitic stainless steel and non-ferrous flanges specified as Schedule 10, 40 or 80 (without the suffix "S") shall be in accordance with ASME/ANSI B36.10, not ASME/ANSI B36.19.

7.1.4. Flanges larger than NPS 48 specified with beveled end as "standard weight" or "extra strong" shall be in accordance with the following:

Standard Weight	9,53mm
Extra Strong	12,7mm

7.1.5. When the beveled ends of weld neck flanges are required to be internally tapered to the specified wall thickness (weight or schedule) the standard end-to-end dimensions shall not be infringed upon.

7.2. Flame cut weld bevels are not permitted.

7.3. The dimension shown in the size column of the RFQ or PO for reducing flanges indicates the nominal pipe size, not the outside diameter of the flange.

7.4. When a "raised face special finish" facing is specified in the item description, the gasket contact surface roughness shall be 3.2 to 6.4 um RA in accordance with ISO 468.

7.5. Except as specified in Paragraph 7.4 of this Specification, the surface finish of raised face, gasket contact surface shall be 3,2um to 12,5um Ra in accordance with ISO 468.

8. ORIFICE FLANGES

8.1. Orifice Flanges shall be in accordance with ANSI B16.36.

8.2. Orifice Flanges shall be furnished in pairs (PER SET).

8.3. Orifice Flanges shall be furnished with ANSI B16.11 solid forged plugs (one plug per tap). Plugs shall be of the same material (ASTM and Grade) as specified for the Orifice Flange.

9. EXAMINATION, INSPECTION AND TESTING

9.1. Examinations and/or tests may be reviewed and/or witnessed by the Principal or Principal's authorized agent at the suppliers and or manufacturer's facility. The extent of reviewing and/or witnessing will be defined in the PO.

9.2. The Supplier shall, on request, submit examinations and test reports to the Principal to determine compliance with requirements. When random examination results in rejection, additional flanges shall be examined on the basis of two additional tests for each failure to assure compliance with the PO.

9.3. Upon receipt, Principal will apply a PMI program on all materials furnished by mill/vendor/supplier. Any and all non-conforming materials shall be returned to mill/vendor/supplier for replacement at no cost to Principal.

10. IDENTIFICATION AND PROTECTION

10.1. Marking

10.1.1. All flanges shall be marked in strict accordance with the specification referenced for manufacture in the item purchase description (i.e. ASTM).

10.1.2. All permanent marking shall be applied by the manufacturer. Application of marking by supplier (local or foreign) is not allowed.

10.1.3. Marking by painting on the flange or marking on metal or plastic tags attached to the flange is not allowed.

10.1.4. Any exceptions to these requirements shall be clearly stated with bid. Any Principal approved exceptions will be clearly noted in resultant purchase order. Any and all flanges not marked in accordance with these requirements, except as specifically allowed by Purchase Order, will be rejected.

10.2. Colour Coding

The following requirements for colour coding are applicable only when specified in the P.O. Application of colour coding shall be by manufacturer. Flanges furnished from a supply house (local or foreign) shall not be colour coded by supplier.

10.2.1. Flanges shall be colour coded as per the colour code specified in Paragraph 10.2.6 of this Specification.

10.2.2. Colour coding is intended to supplement, not replace, normal identification marking required by ANSI, ASTM, MSS or other specifications

10.2.3. The paint shall be resistant to salt water atmosphere, tropical or freezing climates or similar attack. If shall not cause corrosion of the pipe to which it is applied. The manufacturer's trade name and a chemical analysis of the paint to be used for colour coding austenitic and/or ferritic stainless steel and non-ferrous alloys shall be submitted for the Principal's approval.

10.2.4. When specified to be colour coded, the colour coding shall be applied on the outer periphery of each flange. For flanges thicker than 25mm, the band may be limited to 25mm in width. When two or three colours are specified, adjacent bands shall be applied.

10.2.5. Paint shall not be applied to the following:

a) Bore of flanges.
b) Threads.
c) Weld bevels.
d) Symbols or markings which would obliterate identification.
e) Gasket seating surfaces

10.2.6. The colour code shall be as follows:

a.	RED	Carbon steel material specified to an ASME-SA material specification.
c.	YELLOW / RED	Low temperature carbon steel to ASTM A350 Grade LF2
d.	YELLOW / PURPLE	Low temperature 3,5% Ni to ASTM A-350 Grade LF3
e.	YELLOW / GREEN	1¼ Cr - ½Mo to ASTM A182 Grade F11.
f.	YELLOW / BLUE	5 Cr - ½ Mo alloy steel pipe to ASTM A182 Grade F5
g.	YELLOW / BROWN	Austenitic stainless steel Type 304.
h.	YELLOW / WHITE	Austenitic stainless steel Type 304L.
i.	YELLOW / BLACK	Austenitic stainless steel Type 316L.
j.	YELLOW / GREY	Austenitic stainless steel Type 321.
k.	YELLOW / PINK	Austenitic stainless steel Type 347.
l.	YELLOW / ORANGE	Monel (UNS N04400) to ASTM B564
m.	BLACK / GREEN	Alloy 20 to ASTM B462
n.	YELLOW / GREEN / RED	Carbon-½Moly to ASTM A182 Grade F1
o.	YELLOW / BLUE / RED	2¼ Chrome - ½Moly to ASTM A182 Grade F22

10.3. Protection during Handling and Shipping

Components shall be prepared for shipment in such a manner to prevent damage or atmospheric corrosion to inside or outside surface during storage or while in transit. When metal protectors are used, a non-metallic gasket shall be furnished between the flange and the protector.

11. CERTIFICATION AND RECORDS

11.1. Mill Certificates

Mill Certificates: The Supplier shall furnish mill certificates giving the chemical analysis and physical tests for all flanges except those specified to a SABS or BS specification. Material test certificates shall comply with the requirements of EN10204 type 3.1 unless specified otherwise in the PO.

11.2. Heat Treatment Reports

The solution annealing temperature for austenitic stainless steel (as per the requirements of Paragraph 6.1.1 of this Specification) shall be included on the mill certificate.

11.3. Supplementary Reports

11.3.1. The Supplier shall furnish a certified report giving the results of all tests and examinations specified in the item description and/or this Specification that are supplementary to the material specification referenced for manufacture.

11.3.2. These reports shall include, but are not limited to, supplementary requirements for radiographic examination, mechanical tests and heat treatment, but need not duplicate any other required reports.

11.4. Submission of Document

11.4.1. Unless otherwise specified in the PO, two copies of all documentation and material certifications shall accompany each delivery.

11.4.2. All documents shall include the PO number, the Principal item code number(s) and shall be signed as authentic by the supplier on his authorities

11.4.3. The PO shall state when reports, additional to those required by this Specification, are to be furnished.