



Exploration & Production

GENERAL SPECIFICATION

PIPELINES - RISERS

GS EP PLR 222

Carbon steel flanges and branch outlet fittings and forged components for pipelines (sweet service)

06	01/2011	Revised position mechanical tests
05	10/2008	Revised § 5.2 / § 5.4.3 / § 5.4.7
04	10/2006	Updated for sweet service
03	10/2005	Addition of "EP" root to GS identification
00	02/2001	First issue
Rev.	Date	Notes

Owner: EP/TDO/TEC

Managing entity: EP/TDO/TEC/PLR



Contents

1. Scope	4
2. Reference documents.....	4
3. General.....	7
3.1 Definition.....	7
3.2 Approval of Supplier's procedures.....	7
3.3 Quality Assurance/Quality Control.....	8
3.4 Project Particular Specification (PPS)	8
4. Design	8
4.1 Design data.....	8
4.2 Flange design	9
5. Flange material.....	9
5.1 Specification	9
5.2 Manufacturing process	9
5.3 Chemical composition.....	10
5.4 Mechanical properties.....	11
6. Welding necks ends.....	13
7. Gaskets and bolting materials	13
7.1 Gaskets.....	13
7.2 Bolting.....	13
7.3 Electrical continuity	13
8. Pup pieces	13
9. Blind flanges.....	14
10. Inspection and non-destructive testing	14
10.1 General.....	14
10.2 Non-Destructive Testing (NDT)	14
11. Repair of defects	15
12. Dimensional requirements and inspection	15



13. Welding	16
13.1 General.....	16
13.2 Welding process	16
13.3 Welding Procedure Specification (WPS)	16
13.4 Welding procedure qualification tests	16
13.5 Qualification of welders.....	17
13.6 Inspection and testing.....	17
13.7 Weld acceptance criteria	17
14. Mill hydrostatic testing	18
15. Protection	18
16. Marking of flanges.....	18
17. Handling, storage and packing	18
18. Documentation	19
19. Other references	20
Appendix 1 Flanges characteristics	21
Appendix 2 Sampling of test specimens (all flanges)	22
Appendix 3 Sampling of tests specimens (swivel rings)	23

1. Scope

- This specification defines the Company's general technical requirements for the design, materials, manufacture, testing and inspection of forged carbon steel flanges of the welding neck type to be used in onshore and offshore pipeline systems.
- Within this specification the term "flanges" is used indifferently to designate anchor flanges, blind flanges, swivel rings, hang-off collar, buckle arrestors, master fittings and forged components (except tees and bends), when applicable.
- **It also applies to branch outlet fitting.**
- This specification applies to flanges with minimum specified yield strength ranging from 290 N/mm² (42,000 Psi) up to 482 N/mm² (70,000 Psi).
- This Specification shall be used in conjunction with a Project Particular Specification (PPS) detailing the additional tests and requirements or the possible modifications to the present specification, based on the particular design conditions of the pipeline Project.
- Within this specification the term "flanges" is indifferently used to designate all items stated in bullet 2 here-above
- This specification also covers ring joint gaskets, as well as stud bolts and nuts for these flanges.
- Flanges specified in this specification are to be used in Sweet Service as defined in **GS EP COR 170**.
- Flanges shall comply with the requirements of **MSS SP 44**, except where otherwise noted in this specification. Pressure-temperature ratings are defined in Appendix 1.
- For NPS 38 and larger sizes of the 300 and higher classes of welding neck flanges shall have 42 ksi minimum yield strength in the ring section (plateau); unless otherwise specified into the PPS.
- Flanges shall be forgings meeting the requirements of this specification and the requirements for forged flanges in **ASTM A 694**, unless otherwise indicated in this specification.
- Flanges may be supplied welded onto a piece of pipe at least 1000 mm in length, when so required in the PPS. This welded pipe piece is designated as "pup piece" in this specification.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

The order of precedence of the applicable documents shall be:

- The Project Particular Specification
- The present General Specification
- The Codes and Standards in reference.



Applicable Codes and Standards, which are to be used in conjunction with this specification, are stated hereafter.

Unless otherwise specifically indicated in writing, the Supplier shall work in accordance with the requirements specified herein and the applicable requirements of the latest editions of the referenced Codes and Standards at time of Contract award, whenever asked in the present specification.

Where this specification states no overriding requirements, the referenced Codes and Standards shall apply in full.

Standards equivalent to those referred to herein shall not be substituted without written approval from the Company.

The Supplier shall equip himself with copies of all the reference specifications referred to in this specification and shall make them readily available to all fabrication, testing and inspection personnel involved on the work.

Standards

Reference	Title
ASME B16.5	Pipe Flanges and Flanged Fittings
ASME B16.47	Large Diameter Steel Flanges NPS 26 Through NPS 60 Metric/Inch Standard
ASME B31.4	Pipeline Transportation Systems for Liquid Hydrocarbons and other Liquids
ASME B31.8	Gas Transmission and Distribution Piping Systems
ASTM A 194/A 194M	Carbon and Alloy Steel Nuts for High-Pressure and High Temperature Service
ASTM A 320/A 320M	Specification for Alloy Steel - Bolting Materials for Low Temperature Service
ASTM A 370	Test Methods and Definitions for Mechanical testing of Steel Products
ASTM A 388/A 388M	Practice for Ultrasonic Examination of Heavy Steel Forgings
ASTM A 694/A 694M	Specification for Forgings, Carbon and Alloy Steel for Pipe, Flanges, Fittings, Valves and Parts for High - Pressure Transmission Services
ASTM E 10	Test method for Brinell Hardness of Metallic Materials
ASTM E 23	Method for Notched Bar Impact Testing of Metallic Materials
ASTM E 709	Guide for Practice of Magnetic Particle Examination
BS EN 473	Qualification and certification of non-destructive testing personnel
BS 4515	Welding of Steel Pipelines on Land and Offshore (Q)
EN 10204	Types of inspection documents
ISO 148	Charpy impact test (V-notch)



Reference	Title
ISO TS 29001	Quality systems: Model for quality assurance in production, installation and servicing
MSS SP 44	Steel pipe line flanges

Professional Documents

Reference	Title
API 5L	Specification for Line pipe
COFREND	Comité Français des essais non-destructifs (French Committee of non-destructive testing). Qualification and certification of non-destructive personnel
MSS SP 97	Integrally reinforced forged branch outlet fittings

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
ANSI B 16.5	Pipe flanges and flanged fittings
ANSI B 16.20	Ring-Joint Gaskets and Grooves for Steel Pipe Flanges
ASME section V	Boiler and Pressure Vessel Code. Non-destructive Examination
ASME section VIII	Boiler and Pressure Vessel code - Section VIII: Pressure Vessels

Other documents

Reference	Title
Not applicable	



Total General Specifications

Reference	Title
GS EP COR 170	Materials for Sour Service (Upstream Applications) - Specification for design
GS EP COR 350	External protection of offshore and coastal structures and equipment by painting
GS EP PLR 420	Site welding of carbon steel pipelines to API 1104 (sweet service)

3. General

3.1 Definition

Throughout this specification, the following definitions apply:

Purchaser	Means the Company or the Supplier (as applicable), which have placed the Purchase Order to the Manufacturer.
Inspector	Means the Company's representative(s) of member(s) from an Inspection Agency duly appointed by the Company or the Supplier (as applicable) to act as its representative(s) for the purpose of the Contract.
Approval	Means the authorisation in writing given by the Company to the Supplier to proceed with the performance of a specific part of the work without releasing in any way the Supplier from any of its obligations or liabilities under the Contract or at law; Approve, Approved and Approval shall be construed accordingly.
PPS	Designates the Project Particular Specification.

3.2 Approval of Supplier's procedures

The Supplier shall submit the following documentation for review and approval one month prior to commencement of fabrication.

- Design calculations and fabrication drawing of flanges.
- Design calculation of gaskets and bolts
- Manufacturing Procedure Specification, describing all proposed forging operations, heat treatment, inspection and non-destructive testing in their correct sequence. This document will also mention the characteristics of equipment used to carry out above mentioned operations

Sketch showing rough forging piece before machining and, when applicable, the test blank with exact location and orientation of test specimens

- Heat treatment and recording procedures, including number and location of thermocouples
- Dimensional inspection procedures
- Non-destructive inspection procedures