



Document No.	GP 18-04
Applicability	Group
Date	29 August 2007

GP 18-04

Manufacture of Duplex Stainless Steel Fittings and Components

Group Practice

**BP GROUP
ENGINEERING TECHNICAL PRACTICES**

Foreword

This is the first issue of Engineering Technical Practice (ETP) BP GP 18-04.

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Introduction

This Group Practice (GP) covers selection of manufacturers and the QA and QC associated with the specification and manufacture of fittings and components in all grades of duplex stainless steel.

This GP draws attention to important issues that shall be addressed by BP when purchasing items in this range of alloys.

This GP has been written against a background in which many duplex stainless steel components of poor metallurgical quality have been certified and dispatched by manufacturers. These manufacturers have invariably been ISO 9001 certified and usually NORSOK M-650 qualified, but have, nevertheless, fallen short in terms of manufacturing controls.



1. Scope

- a. This GP specifies requirements for the selection and qualification of manufacturers and the associated manufacturing QA and QC measures for the purchase, manufacture, and production monitoring of fittings and components manufactured in all grades of duplex stainless steel.
- b. This GP covers the manufacture of cast, forged, and hot isostatically pressed fittings and components.

Manufacture of OCTG (see GIS 02-206), linepipe (see GIS 43-315) and small diameter tubing for use in subsea control umbilicals are not within the scope of this GP.

Fabrication of process pipework systems, linepipe materials, and new pressure vessels is not within the scope of this GP (see GIS 42-102, GIS 43-334, and GIS 46-010).

2. Normative references

The following normative documents contain requirements that, through reference in this text, constitute requirements of this technical practice. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this technical practice are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

BP

GIS 18-011	Welded Fabrication and Construction.
GIS 42-102	Fabrication, Assembly, Erection, and Inspection of Austenitic and Duplex Stainless Steel, Cupro-Nickel based Alloys, and Titanium and Zirconium Pipe work (ASME B31.3).
GN 36-016	Piping Materials Data Sheets.

American Petroleum Institute (API)

API Q1	Specification for Quality Programs for the Petroleum, Petrochemical and Natural gas Industry.
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American Society for Testing and Materials (ASTM)

ASTM E562	Standard Test Method for Determining Volume Fraction by Systematic Manual Point Counting.
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British Standards Institute (BSI)

BS EN 10204	Metallic products. Types of inspection documents.
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International Organization for Standardization (ISO)

ISO 3834-1	Quality requirements for the fusion welding of metallic materials. Part 1: Criteria for the selection of the appropriate level of quality requirements.
ISO 3834-2	Quality requirements for the fusion welding of metallic materials. Part 2: Comprehensive quality requirements.
ISO 9001	Quality management systems - Requirements.
ISO 10474	Steel and Steel Products - Inspection Documents.



ISO TS 29001 Petroleum, petrochemical and natural gas industries - Sector specific quality management systems requirements for product and service supply organizations.

Norsk Søkkel Konkuranseposisjon (NORSOK)

M-650 Qualification of manufacturers of special materials.

3. Terms and definitions

For the purposes of this GP, the following terms and definitions apply:

22% Cr duplex

Ferritic/austenitic stainless steel alloy with 22% Cr and PRE_w greater than or equal to 34.

25% Cr duplex

Ferritic/austenitic stainless steel alloy with 25% Cr and PRE_w greater than or equal to 38.

25% Cr super duplex

Ferritic/austenitic stainless steel alloy with 25% Cr and PRE_w greater than or equal to 40.

PRE_w

Pitting resistance equivalent number ($PRE_w = \% Cr + 3,3\% (Mo + 0,5\% W) + 16\% N$).

4. Symbols and abbreviations

For the purpose of this GP, the following symbols and abbreviations apply:

HAZ	Heat affected zone.
MPQT	Manufacturing procedure qualification test.
OCTG	Oil country tubular goods.
PRE_w	Pitting resistance equivalent number.
QA	Quality assurance.
QC	Quality control.
QMS	Quality management system

5. Background

Quality management standards (ISO TS 29001/ISO 9001) require manufacturers to validate any process used in production where the conformity of the resulting product can not be readily or economically verified by subsequent monitoring or measurement. Such processes are often termed special processes. The forming, fabrication and thermal processing of duplex stainless steels is considered to be a series of special processes. NORSOK M-650 establishes a set of qualification requirements to verify that manufacturers have sufficient competence, experience and the necessary facilities to manage such special processes. Therefore, it might be reasonably anticipated that manufacturers possessing both ISO 9001 and NORSOK M-650 qualifications would consistently produce duplex stainless steel

