

# PETRONAS TECHNICAL STANDARDS

## DESIGN AND ENGINEERING PRACTICE

### TECHNICAL SPECIFICATION

#### CARBON AND LOW ALLOY STEEL PIPELINE FLANGES FOR USE IN OIL AND GAS OPERATIONS (AMENDMENTS/SUPPLEMENTS TO MSS SP-44)

PTS 31.40.21.34

FEBRUARY 2008



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## PTS Circular (2008) – 1

Subject: DESIGN AND ENGINEERING PRACTICE

PTS No.: PTS 31.40.21.34

PTS Title: Carbon and Low Allow Steel Pipeline Flanges for Use in Oil and Gas Operations  
(Amendments/Supplements to MSS SP-44)

Issue: July 1998

Please be informed that the referred PTS has been revised.

The relevant content as per the stated above shall be removed from PTS binder and replaced by **PTS 31.40.21.34 (Revision 1 – February 2008)** herein onwards.

| Verification :                                                                                                             | Endorsement :                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <br>.....<br>Signature<br>Pau Kiew Huai | <br>.....<br>Signature<br>Pramod Kumar Karunakaran |
| Position: General Manager, Engineering - PGTS                                                                              | Position: Senior General Manager, PGTS                                                                                                |
| Date: 27. 3. 08                                                                                                            | Date: 28-3-08                                                                                                                         |

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They are based on the experience acquired during the involvement with the design, construction, operation and maintenance of processing units and facilities. Where appropriate they are based on, or reference is made to, national and international standards and codes of practice.

The objective is to set the recommended standard for good technical practice to be applied by PETRONAS' OPU in oil and gas production facilities, refineries, gas processing plants, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardisation.

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|                    |                                                                                                                     |                                                                                               |                                                                                                                      |
|--------------------|---------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|
| PTS No:            | PTS 31.40.21.34                                                                                                     |            |                                                                                                                      |
| Publication Title: | Carbon and Low Allow Steel Pipeline Flanges for Use in Oil and Gas Operations (Amendments/Supplements to MSS SP-44) | Revision (Date):                                                                              | Rev 1(February 2008)                                                                                                 |
|                    |                                                                                                                     | Reviewed:                                                                                     | Shaikh Abdullah<br>Shaikh Othman  |
|                    |                                                                                                                     | Approved:  | Hashim Zainal Abidin                                                                                                 |
|                    |                                                                                                                     | Base PTS Version:                                                                             | Release 13                                                                                                           |

## 1. INTRODUCTION

The custodian of this PTS has assessed/reviewed/evaluated the stated PTS and offered the following exceptions/amendments. This PTS also includes PETRONAS Lessons Learnt and PETRONAS Best Practice for the subject matter as stated above.

All updates to the PTS has been incorporated into the main body of the PTS and highlighted as *italic* font.

## 2. EXCEPTIONS/AMMENDMENTS

The changes herein refer to PART II AMENDMENTS/SUPPLEMENTS TO MSS SP-44

2.1 Renumber (1.3) – QUALITY SYSTEM to (1.4)

2.2 Add the following statement at the end of (3.1.2)

Manufacturer shall provide proof of weldability whenever requested by Principal.

2.3 (3.1.5) in MSS SP-44(2006) is deleted. The similar test has been specified in (3.1.4.2) and (3.1.4.3)

2.4 Add (3.1.4.4) and (3.1.4.5) after (3.1.4.3)

3.1.4.4 Test frequency shall be conducted at a frequency of one test per order or heat number.

3.1.4.5 Where any results fail to conform to the specified requirement, the Manufacturer may retest the material using a procedure accepted by writing by Principal.

2.5 Add the following statement at the end of (6.1)

Flanges shall be given coating of standard shop primer approved by Principal. A purchaser approved rust inhibiting compound shall also be applied to the raised faces and bevels to protect these surfaces from corrosion in transit.

2.6 Add new (Section 13 – Preparation for Shipment)

2.7 Add new statement

(13.1) Flanges shall be appropriately packed for shipment, including protection of the beveled ends and mating faces. Packing methods and material shall be approved by Principal.

### 3. PETRONAS LESSON LEARNT

3.1 Nil

### 4. PETRONAS BEST PRACTICE

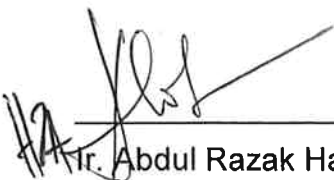
4.1 Nil

### 5. REFERENCE

5.1 PTS 31.40.21.34 - Carbon and Low Alloy Steel Pipeline Flanges for Use in Oil and Gas Operations (Amendments/Supplements to MSS SP-44) - (Release no. 13 – July 1998).

5.2 MSS SP-44, (Reaffirmed 2001) Steel Pipeline Flanges - 1996

5.3 MSS SP-44, Steel Pipeline Flanges - 2006

  
Ir. Abdul Razak Hassan

Head of Plant Engineering

Date: 26/03/08.

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## PART I INTRODUCTION

### 1.1 SCOPE

This new PTS specifies requirements and gives recommendations for the manufacture and supply of carbon steel and low alloy pipeline flanges.

Part II of this PTS gives amendments and supplements to clauses of MSS SP-44 which are considered necessary to ensure pipeline integrity.

This PTS is applicable to flanges for use in both sour and non-sour service.

NOTE: Sour service is defined in PTS 31.22.20.31

In addition to the flange types included in MSS SP-44, swivel ring flanges and anchor flanges are also covered by this PTS.

Bolting and gaskets are excluded from the scope of this PTS.

### 1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by PETRONAS, the distribution of this PTS is confined to companies forming part of PETRONAS or managed by a Group company, and to Contractors and Manufacturers/Suppliers nominated by them.

This PTS specifies the minimum technical requirements for flanges to be used in the construction or maintenance of oil and/or gas pipelines and related facilities. It is intended for use in exploration and production facilities, transmission pipelines and, where applicable, oil refineries, chemical plants and supply/marketing installations

If national and/or local regulations exist in which some of the requirements may be more stringent than in this PTS, the Contractor shall determine by careful scrutiny which of the requirements are the more stringent and which combination of requirements will be acceptable as regards safety, environmental, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this PTS which is considered to be necessary in order to comply with national and/or local regulations. The Principal may then negotiate with the Authorities concerned with the object of obtaining agreement to follow this PTS as closely as possible.

### 1.3 DEFINITIONS

#### 1.3.1 General definitions

The **Contractor** is the party which carries out all or part of the design, engineering, procurement, construction, commissioning or management of a project, or operation or maintenance of a facility. The Principal may undertake all or part of the duties of the Contractor.

The **Manufacturer/Supplier** is the party which manufactures or supplies equipment and services to perform the duties specified by the Contractor.

The **Principal** is the party which initiates the project and ultimately pays for its design and construction. The Principal will generally specify the technical requirements. The Principal may also include an agent or consultant, authorised to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

### 1.3.2 Specific definitions

|                                    |                                                                                                                                                                                                                                                             |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Bevel</b>                       | Replaces the term "welding end" as used in MSS SP-44                                                                                                                                                                                                        |
| <b>Defect (in NDT)</b>             | A discontinuity or group of discontinuities whose indication(s) do not meet specified acceptance criteria.                                                                                                                                                  |
| <b>Flaw/discontinuity (in NDT)</b> | An interruption, which may be either intentional or unintentional, in the physical structure or configuration of a pipe.                                                                                                                                    |
| <b>Indication (in NDT)</b>         | Evidence of a discontinuity that requires interpretation to determine its significance.                                                                                                                                                                     |
| <b>Minimum design temperature</b>  | The minimum temperature to which the pipeline or section of pipeline may be exposed during normal operational activities, including start-up and shut-down operations and controlled blowdown, but excluding abnormal situations such as pipeline ruptures. |
| <b>Sample product</b>              | Flange selected for inspection and/or testing                                                                                                                                                                                                               |
| <b>Test unit</b>                   | The number of flanges to be accepted or rejected together, on the basis of the tests carried out on sample products                                                                                                                                         |
| <b>Test welding ring</b>           | Sample of tubular material from the forging required for use in welding procedure and welder approval testing.                                                                                                                                              |
| <b>User</b>                        | Term used in MSS SP-44 which shall be taken to mean the Principal.                                                                                                                                                                                          |

### 1.4 ABBREVIATIONS

|             |                                   |
|-------------|-----------------------------------|
| <b>CE</b>   | Carbon equivalent                 |
| <b>ID</b>   | Nominal internal diameter         |
| <b>MT</b>   | Magnetic particle testing         |
| <b>NDT</b>  | Non-destructive testing           |
| <b>UT</b>   | Ultrasonic testing                |
| <b>WPAR</b> | Welding procedure approval record |
| <b>WPS</b>  | Welding procedure specification   |

### 1.5 CROSS-REFERENCES

Where cross-references to other parts of this PTS are made, the referenced section number is shown in brackets. Other documents referenced in this PTS are listed in (Part III).

### 1.6 GUIDANCE FOR USE

The amendments to MSS SP-44 given in Part II are directly related to equivalent sections in MSS SP-44. For clarity, the section and paragraph numbering of MSS SP-44 has been used as far as possible. Where clauses in MSS SP-44 are referenced within this PTS, it shall mean those clauses as amended by this PTS. Clauses in MSS SP-44 that are not amended by this PTS shall remain valid as written.

## 1.7

### INFORMATION TO BE SUPPLIED BY THE PRINCIPAL

The following information shall be supplied by the Principal to the Manufacturer at the enquiry stage:

- the type of flange;
- the type of flange face;
- ID of flange;
- class (pressure and temperature rating);
- the grade of flange material;
- service: sour or non-sour;
- minimum design temperature;
- pipeline hydrotest pressure if in excess of 1.5 times the pressure rating for the class specified;
- grade, ID and wall thickness of adjoining pipe;
- type of ISO 10474 inspection certificate, or inspection report, required.

The Principal shall also supply the following supplementary information, where applicable, to the Manufacturer at the enquiry stage of the order:

- number and dimensions of test welding rings required for test welding;
- grade of temporary preservation compound required;
- whether flange design calculations are subject to the agreement of the Principal prior to manufacture;
- whether previous test data can be considered for approving manufacture;
- whether testing is required in the simulated stress-relieved condition;
- the number of sample products to be tested per test unit;
- whether the Manufacturer is required to submit a quality plan for agreement by the Principal prior to manufacture;
- whether the Principal intends to witness any of the Manufacturer's production and quality control operations;
- whether the chemical composition of the Manufacturer's proposed flanges is subject to the agreement of the Principal prior to manufacture;
- whether specific quality assurance/control procedures of the Manufacturer shall be agreed by the Principal prior to manufacture;
- whether alternative bevel dimensions are required;
- the pipeline design, test and/or operating conditions, together with the load combinations e.g. internal pressure bearing loads plus bending moments, for which the flange design shall be verified by the Manufacturer;
- support details (for anchor flanges only).