

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE (CORE)

TECHNICAL SPECIFICATION

PIPELINE ISOLATING JOINTS (AMENDMENTS/ SUPPLEMENTS TO MSS SP-75)

PTS 31.40.21.31

DECEMBER 1999



PREFACE

PETRONAS Technical Standards (PTS) publications reflect the views, at the time of publication, of PETRONAS OPU/Divisions.

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/Divisions 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.

The information set forth in these publications is provided to users for their consideration and decision to implement. This is of particular importance where PTS may not cover every requirement or diversity of condition at each locality. The system of PTS is expected to be sufficiently flexible to allow individual operating units to adapt the information set forth in PTS to their own environment and requirements.

When Contractors or Manufacturers/Suppliers use PTS they shall be solely responsible for the quality of work and the attainment of the required design and engineering standards. In particular, for those requirements not specifically covered, the Principal will expect them to follow those design and engineering practices which will achieve the same level of integrity as reflected in the PTS. If in doubt, the Contractor or Manufacturer/Supplier shall, without detracting from his own responsibility, consult the Principal or its technical advisor.

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- 2) Other parties who are authorised to use PTS subject to appropriate contractual arrangements.
- 3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) and 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

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PART I INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and give recommendations for the design, fabrication, inspection and testing of monolithic isolating joints, for electrical isolation of pipelines from plants and/or other pipelines.

This PTS is a revision of the PTS of the same number dated April 1993; a summary of the main changes is given in (1.7).

Part III of this PTS provides amendments and supplements to MSS SP-75, 1998 Edition. The section numbering in Part III follows that of MSS SP-75. Where clauses of MSS SP-75 are not amended or supplemented by this PTS, they shall apply as written.

Part IV provides the requirements for isolating joints not covered by MSS SP-75.

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 Group and to Contractors and Manufacturers/Suppliers nominated by them.

This PTS is intended for use in the design, material procurement, construction and operation of pipelines.

If national and/or local regulations exist in which some of the requirements may be more stringent than 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

Data sheet	The data/requisition sheet PTS 31.40.21.93, to be used by the Principal and completed by the Manufacturer/Supplier.
Fitting	Term used in MSS SP-75 which has the same meaning as isolating joint.
Purchaser	Term used in MSS SP-75 which has the same meaning as Principal.

1.4 ABBREVIATIONS

DN	nominal diameter, in mm
HIC	hydrogen-induced cracking
NDE	non-destructive examination

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 by this PTS are listed in [\(Part V\)](#).

1.6 ACTION ITEMS

Items requiring selection or a decision by the Principal are identified by the use of a (P) in the margin. The required selection shall be indicated on the data/requisition sheet PTS 31.40.21.93

1.7 SUMMARY OF MAIN CHANGES SINCE LAST EDITION

This PTS is a revision of the PTS of the same number dated April 1993; other than editorial changes, the main changes have been as follows:

Old section	New section	Change
2.1	II-2.1	- added function of separation from structures; - removed details of application (not relevant to specification) - added requirement for operational suitability.
2.2	II-2.2	- clarified flange type; - added note about surge diverter; - added requirement for internal coating.
2.3	II-2.3	- tighter tolerance for large diameter fittings; - added requirement for taper; - removed requirement for default minimum length (now refers to PTS 30.10.73.31); - clarified requirements with regard to PWHT.
2.3	II-2.3	- removed note (not relevant to specification).
	III-1.1	- requires approval for substitution.
3-1.4	III-1.4	- removed preference for certain materials; - addresses approach when pipe pups are free-issued by the Principal.
3-2.5	III-2.5	- added requirement for submittal of calculations and test results.
3-5	III-5	- added requirement for fatigue test.
	III-6 III-7 III-8	- new sections on materials.
	III-9	- revised requirements on heat treatment.
	III-11	- new section on toughness and hardness testing.
3-13	III-13	- requirements extended.
3-14	III-14	- completely revised.
	III-15	- new section on NDE (referring to PTS 31.40.21.30).
3-16	III-16	- requirement for 5.1.C (3.1.C) certificates removed.
3-17	III-17	- requirements modified and extended.
3-18		- deleted.
4	III-App X1	- completely revised.
5.3	IV-1.3	- blast cleaning and coating requirements modified
5.5	IV-2	- Individual strapping now required.
	IV-3	- ISO 9001/2 introduced.
5.6	IV-4	- completely revised.

PART II ISOLATING JOINT FUNCTIONAL REQUIREMENTS

2.1 GENERAL

The purpose of isolating joints is to provide electrical separation between pipeline sections and adjoining and neighbouring structures and pipelines, and other sections of the same pipeline system, thereby preventing detrimental electrochemical interaction and improving the effectiveness of the cathodic protection system. Isolating joints are used also to ensure effective current distribution for cathodic protection systems.

Wherever practicable, the isolating joint is intended to be installed above ground, or in an inspection pit in dry conditions, in order to limit the possibility of electrical bridging across the joint. It is intended to be girth welded between two pipeline sections.

- (P) The design of the isolating joint shall be compatible with the design code adopted for the pipeline in which it is installed. The isolating joint shall be suitable for operation under the environmental and operating conditions specified by the Principal.

NOTE: ASME B31.4 and ASME B31.8 are commonly adopted codes used for pipeline design. In some situations, e.g. within plant fences, the pipeline sections connected to the isolating joint may be designed to a plant piping code, e.g. ASME B31.3.

The isolating joint shall be suitable for pigging operations.

2.2 ISOLATING JOINT COMPONENTS

The isolating joint shall consist of the following components (see Figure 1):

- Two spools, each consisting of a pipe segment with a bevelled end for welding to the pipeline, and with a welded-on boltless flange at the other end for encapsulation into insulating and filler material. Slip-on flanges shall not be used. The material used for the pipe segments shall be compatible with the pipeline material, as specified by the Principal in the data sheet.
- A rigid casing (retaining ring) for strength connection of the two spools.
- Insulating and filler materials for electrical isolation between the two spools.
- (P) • One set of ring seals for pipeline internal pressure containment. If specified by the Principal, there shall be a second set of ring seals.

NOTE: A double sealing arrangement should be specified for design pressures in excess of 50 bar (ga), or if the conveyed fluid is classified by the Principal as toxic.

- Two terminal connecting lugs on the outer surface of each spool. Each lug shall be suitable for M10 bolted cable connection. The lugs shall be welded on double plates on the spools. One set of lugs is intended for electrical measurements. The other set is intended for a surge diverter installation (by the Principal). The distance between the lugs intended for the surge diverter should not exceed 300 mm.

NOTE: This maximum lug separation distance of 300 mm is governed by the configuration of a standard surge diverter. If the Manufacturer/Supplier cannot meet this requirement, the Principal shall be informed so that a non-standard diverter can be purchased.

- An internal coating to limit the possibility of electrically bridging the spools due to deposits of a conductive medium.

2.3 DIMENSIONAL REQUIREMENTS

The internal diameter of the isolating joint shall not deviate by more than $\pm 2\%$ of the nominal internal diameter of the pipeline for nominal diameters not exceeding DN 500 and $\pm 1.5\%$ for nominal diameters above DN 500. Any transition shall be tapered at an angle not exceeding 14 degrees measured from the axis of the pipe (i.e. a taper of 1:4).

- (P) The minimum overall length of the joint shall be as specified by the Principal.

NOTE: The derivation of the isolation joint length is given in PTS 30.10.73.31

- (P) If the Principal specifies that post-weld heat treatment will be used for field welding, the Manufacturer/Supplier shall demonstrate that the length of the joint is suitable, i.e. the heat generated by the heat treatment is not detrimental to the insulating and filler materials and the internal coating. If this is not the case, the length of the joint shall be increased accordingly.

2.4 LOADING REQUIREMENTS

- (P) The isolating joint shall be able to resist the design pressure and the design temperature, in combination with the anticipated external loads as specified by the Principal.

PART III AMENDMENTS/SUPPLEMENTS TO MSS SP-75, 1998 EDITION

1. SCOPE

1.1 Add to this subsection:

Higher grade materials shall not be substituted for materials ordered to a lower grade without the approval of the Principal, irrespective of strength level.

1.4 Add to this subsection:

Wrought materials other than those covered by this standard, which may be used in the fabrication of the isolating joint, shall comply with PTS 30.10.02.11 In addition, the tensile, hardness and notch toughness properties, and the properties for sour service conditions (when specified), shall be in accordance with the requirements of this standard for all materials.

- (P) If the Principal supplies any material to be incorporated in the isolating, the Principal shall specify the required scope for the inspection and testing of such material.

2. PRESSURE RATING

2.2 Add to this subsection:

The values of specified minimum yield strength S , wall thickness t and diameter D shall be those of the pipeline section into which the isolating joint is to be welded.

2.5 Add to this subsection:

The isolating joint shall be designed following the methodology described in ASME VIII Division 1 Appendix 2, unless agreed otherwise by the Principal, using the design pressure, design temperature and design factor of the pipeline, and the anticipated external loads acting on the isolating joint.

The design calculations and/or results of relevant proof testing shall be submitted to the Principal for approval before fabrication is commenced, if specified in the approved quality plan ([Part IV, Section 4.2](#)).

5. HYDROSTATIC TESTING

Replace this section by:

Each isolating joint shall be hydrostatically strength tested at the pressure P calculated as specified in subsection 2.2, with the fitting in an unrestrained condition. The pressure shall be held for a minimum of four hours.

A hydrostatic fatigue test shall be carried out after the strength test has been successfully completed. The test shall comprise five cycles from atmosphere to 80 per cent of the strength test pressure. During the test the isolating joint shall be in an unrestrained condition.

There shall be no leakage, loss in pressure or inelastic deformation during the above tests.

6. MATERIALS

6.1 Replace this subsection by:

The steel shall be made in a basic oxygen or electric arc furnace. It shall be fully killed with a grain size of 7 or finer, as defined in ASTM E 112.

For quenched and tempered isolating joints, this grain size requirement shall not apply.

Add new subsection 6.5:

- (P) If the Principal specifies that the isolating joint shall be suitable for sour service and the joint is made from plate or pipe, the Manufacturer/Supplier shall perform HIC sensitivity tests in accordance with PTS 31.40.21.30, with the exception that the qualification of the HIC testing procedure as specified in Section 3.2 of PTS 31.40.21.30 is not required.

Each metallographic section shall be ground and polished to a 1 µm finish using automated equipment. The procedure shall be in accordance with ASTM E 3. The polished sections shall be lightly etched and dried prior to examination. The examination shall be performed at both x30 and x100 magnifications. Photomicrographs of all reportable cracks shall be included with the test report.

7. CHEMICAL COMPOSITION

Replace this section by:

Chemical composition shall be in accordance with PTS 31.40.21.30

8. TENSILE PROPERTIES

8.3 Add to this subsection:

A tensile test shall be carried out on a sample for each heat of steel used in the fabrication of the isolating joint.

- (P) If the Principal specifies that stress relieving of the isolating joint will be performed as part of the installation, e.g. after field welding, additional tensile testing of the parent metal and weldments shall be performed on stress-relieved specimens. The thermal cycle for the post-weld heat treatment shall be as specified by Principal. The tensile properties shall be the same as for non-heat-treated specimens.

8.6 *Replace this subsection by:*

If the isolating joint contains a longitudinal weld, an additional transverse weld tensile test shall be performed. For arc-welded isolating joints, an all-weld metal tensile test should also be performed in accordance with EN 876. Tests shall be performed at the same frequency as for the base material except that a change in welding procedure shall require an additional test. The tensile strength shall meet the requirements of Table 2.

The weld reinforcements shall be removed before tensile testing.

9. HEAT TREATMENT

9.1 Replace this subsection by:

If the isolating joint consists of several components assembled together by welding, without further cold or hot forming, the individual components shall be heat treated separately, i.e. prior to assembly.

The heat treating process shall be performed in accordance with a documented procedure. The Manufacturer/Supplier shall also establish and follow procedures for maintaining heat and/or lot identity. Details of heat treatment shall be agreed with the Principal prior to the start of production. A record shall be maintained of each heat treatment and shall be included in the Manufacturer/Supplier's data report.

9.1.1 *Replace this subsection by:*

Stress relieving shall be performed at a temperature between 560 °C and 600 °C unless otherwise agreed with the Principal. Isolating joints shall be held at the stress-relieving temperature for at least one hour per 25 mm of maximum section thickness, but never less than one half hour. Cooling shall be in the furnace or in still air.

11. NOTCH TOUGHNESS TESTING

Replace this section by:

11. NOTCH TOUGHNESS AND HARDNESS TESTING

11.1 NOTCH TOUGHNESS TESTING

Notch toughness testing shall be in accordance with PTS 31.40.21.30

11.2 HARDNESS TESTING

11.2.1 Location

A series of Vickers hardness tests (HV10) shall be carried out on a cross-section removed from a test isolating joint. The test method shall comply with EN 1043-1. The series of readings shall extend from unaffected base metal on one side across the weld to unaffected base metal on the other side. Three traverses shall be made, one 2 mm from the outer edge, the second across the centre and the third 2 mm from the inner edge. The spacing between the hardness impressions shall be 0.75 mm. The hardness impressions within the HAZ shall be as shown in EN 1043-1.

11.2.2 Acceptance criteria

Hardness measurements shall not exceed the following:

- for sour service 248 HV10
- for non-sour service 325 HV10

13. TOLERANCES OF WELDING FITTINGS

13.3 Add to this subsection:

For a distance of 100 mm from the welding ends, the internal diameter shall not deviate by more than ± 1.5 mm from the nominal internal diameter of the pipeline or that permitted by ASME B16.9, whichever is the more stringent.

The entire end bevel shall be machined and root faces shall not be brought into tolerance by filing or grinding.

14. MANUFACTURE

14.1 Replace this subsection by:

Isolating joints shall be made by forging, pressing, piercing, rolling, extruding, welding, or a combination of these processes. The forming procedure shall be applied so that it will not produce injurious defects in the isolating joint.

The Manufacturer/Supplier shall prepare detailed manufacturing procedures including welding and inspection. Any requirement for qualification testing of these procedures, and of welders/welding operators (14.4.1) shall be agreed with the Principal and documented as part of the quality plan ([see Part IV Section 4.2](#)).

14.4.1 Replace this subsection by:

Welding, including repair welding, shall be performed in accordance with procedures qualified to ASME Section IX. Welders and welding operators shall be qualified in accordance with ASME Section IX.

In addition to the mechanical tests specified in ASME IX, notch toughness tests and hardness tests shall be performed on the qualification test welds in accordance with (11 and 11A). Acceptance criteria for all tests shall be as stated in (8, 11 and 11A).

The results of all qualification tests shall be documented in a Procedure Qualification Record (PQR).

14.4.5 Add to this subsection:

Repair welding shall be executed using procedures qualified in accordance with the requirements of (14.4.1).

The repaired area shall be non-destructively tested by radiographic testing, ultrasonic testing and magnetic particle testing.

14.5.2 Add to this subsection:

Imperfections of the following types exceeding the specified criteria shall be considered injurious defects:

a. Cold formed dents

All cold formed dents with a sharp bottom gouge and all sharp gouges (without dents) deeper than 1.0 mm.

b. Offset of plate edges

For isolating joints having a nominal wall thickness of 12 mm or less, the radial offset of plate edges (misalignment) shall not exceed 2 mm. For nominal wall thicknesses greater than 12 mm, the radial offset shall not exceed 3 mm or 12.5% of the wall thickness, whichever is smaller.

c. Height of weld reinforcement

The height of the weld bead shall not extend above the prolongation of the original surface of the fitting by more than 3 mm. The surface of the weld bead shall never be below a prolongation of the surface of the isolating joint.

d. Arc strikes

Arc strikes may be removed by grinding provided the remaining wall thickness is within the specified tolerances. The ground area shall be merged smoothly into the original contour of the isolating joint by grinding.

e. Undercuts

An undercut shall be repaired when it exceeds any of the following criteria:

- Maximum depth of 1 mm and not exceeding 12.5% of the wall thickness with a maximum length of half the wall thickness, and not more than two such undercuts in any 300 mm of weld length.
- Maximum depth of 0.5 mm, any length.

Repair shall be by grinding provided that the remaining wall thickness remains within the specified tolerances.

14.5.3 Replace this subsection by:

Surface defects having a depth less than 6.5% of the nominal wall thickness may be repaired by grinding.

Whenever grinding repairs are made as a result of imperfections being disclosed by NDE, the part of the isolating joint containing such repair shall be subjected to additional NDE using the same technique, and magnetic particle testing after the grinding operation.

Repair of base material by welding is not permitted.

15. NON-DESTRUCTIVE EXAMINATION (NDE)

Replace this section by:

NDE shall be in accordance with PTS 31.40.21.30

16. INSPECTION

16.2 Replace this subsection by:

The Manufacturer/Supplier shall provide the Principal with an inspection certificate containing the results of all inspection and testing, including the requirements of Sections 7, 8, 9, 11 and 15. The certificate shall comply with ISO 10474 Type 3.1.B.

17. MARKING

Add to this section:

- f. Purchase order and item number
- g. Serial number of the isolating joint
- h. PTS 31.40.21.31

If sour service conditions are specified, the isolating joint shall be stamped "SOUR".

APPENDIX X1 SUPPLEMENTARY REQUIREMENTS

The following supplementary requirements shall apply:

SR-2, SR-6, SR-13 and SR-14.

PART IV OTHER REQUIREMENTS

1. COMPONENTS NOT COVERED BY MSS SP-75

1.1 RING SEALS

Elastomeric materials for ring seals shall resist explosive decompression, and shall be suitable for long-term exposure to the transported fluid at the design pressure and temperature conditions. The cross-section of the seals shall not exceed 7 mm diameter for design pressures of 150 bar and above.

NOTE: Compatibility of ring seal materials with the transported fluid may be checked with PTS 30.10.02.13 Polybutadiene acrylonitrile (NBR) and vinylidene fluoride-hexafluoropropylene are commonly used materials.

1.2 INSULATING AND FILLER MATERIALS

The insulating materials and filler materials shall be suitable for long-term exposure to the transported fluid at the design pressure and temperature conditions.

NOTE: Compatibility with the transported fluid may be checked with PTS 30.10.02.13 Fabric reinforced phenolics for insulating materials, and epoxies or silicones for filler materials are commonly used.

1.3 COATING

The isolating joint shall be coated internally to prevent electrical bridging of the two spools through the transported fluid. The isolating joint shall be coated externally. The internal and external coatings shall terminate 50 mm from the isolating joint ends.

- (P) All surfaces to be coated shall be blast cleaned to ISO 8501-1 grade Sa 2½ or Sa 3 as specified by the Principal, using non-metallic abrasive certified as being in accordance with the appropriate part of ISO 11126. The internal and external coatings shall consist of an amine-cured epoxy, to a minimum dry film thickness of 300 µm applied in two coats. The application shall be in strict accordance with the coating Supplier's specification. The coating application and inspection procedures shall be submitted to the Principal for approval.

NOTE: Epoxy internal coatings may not be suitable for some chemical products, refer to PTS 30.10.02.13 If other coatings need to be specified, advice from a materials specialist should be taken. Metallic pigmented coatings shall not be used.

Each coated isolating joint shall be visually inspected. The coating shall be continuous, uniform and free of runs, sags, pinholes and other imperfections indicative of incorrect coating application. Coating thickness tests, using a magnetic electronic type thickness gauge, shall be carried out on each isolating joint, by taking four spot measurements at 90 degree intervals around the diameter. Each spot measurement shall meet the minimum thickness specified.

Following the hydrostatic pressure test ([Part III, 5](#)) and electrical checks ([Part IV, 1.4](#)), the coatings shall be subject to holiday detection using a wet sponge tester set at 60V. The acceptance level shall be zero pinholes.

Applied coating that fails to meet the requirements of this PTS shall be removed completely and the isolating joint shall be re-prepared and the coating re-applied and inspected.

1.4 ELECTRICAL CHECKS

Electrical checks, to be done after the hydrostatic pressure test, shall be carried out in the following sequence:

- A voltage of 1500 V (AC) at 50 Hz shall be applied across the joint for 5 minutes. There shall be no breakdown, flash-over or reduction in electrical resistance during this period.
- A voltage of 1000 V (DC) shall be applied across the joint in a dried condition. The resistance shall be at least 1 MΩ.

2. TRANSPORTATION

The isolating joint shall be protected against damage in transit. The bevelled ends of the isolating joint shall be protected by plastic covers and care shall be taken to prevent damage to the external and internal coatings. Isolating joints shall be individually strapped on skid-mounted cradles and enclosed in crates.

3. QUALITY ASSURANCE SYSTEM

The Manufacturer/Supplier shall establish and maintain a quality system in accordance with ISO 9001 or ISO 9002, or with an alternative standard if agreed by the Principal.

4. DOCUMENTATION

4.1 LANGUAGE

Unless otherwise specified by the Principal, all documentation submissions required by this PTS shall be in the English language.

4.2 PRE-MANUFACTURING DOCUMENTATION

The Manufacturer/Supplier shall produce a quality plan, specific to the purchase order, covering the complete manufacturing and inspection process, including welding. The quality plan shall be submitted to the Principal for agreement within an agreed time period.

NOTE: Review of the draft quality plan at the enquiry stage of the order may assist the process.

4.2.1 Content of the quality plan

The format and issue of the quality plan shall be consistent with the document control requirements of the Manufacturer/Supplier's quality system.

The content of the quality plan should be based on ISO 10005 and shall include the following:

1. Identification of the product and purchase order to which the plan is to be applied.
2. Reference to MSS SP-75 and this PTS.
3. Location of the manufacture of the isolating joint.
4. Identification of the individuals responsible for controlling the activities defined in the plan.
5. Identification of the individuals with the authority to interface directly with the Principal.
6. Identification all sub-suppliers and sub-contractors.
7. The quality plans of all sub-suppliers and sub-contractors.
8. All sequenced activities for the purchase order and references to the quality system procedures and work instructions which will be applied to these activities.

9. Copies of all the quality system procedures and work instructions covering base material production, fabrication and welding, test and inspection, special processes (e.g. heat treatment), control of non-conforming product, handling, storage, packing and shipping, as requested by the Principal for agreement.
10. Test and inspection frequency and acceptance criteria, including the upper and lower process control limits where statistical process control is employed.
11. The location of each inspection and test point in the process sequence.
12. Points where the Principal has established witnessing or verification requirements.
13. Sub-supplier's data sheets and qualification test reports.

4.3 USER MANUAL

In addition to the certificate of compliance ([Part III, Section 16](#)), the Manufacturer/Supplier shall provide a user manual detailing the requirements for installation and inspection in service.

PART V REFERENCES

In this PTS, reference is made to the following publications:

NOTE: Unless specifically designated by date, the latest edition of each publication shall be used, together with any amendments/supplements/revisions thereto.

PETRONAS STANDARDS

Index to PTS publications and standard specifications	PTS 00.00.05.05
Metallic materials - selected standards	PTS 30.10.02.11
Non-metallic materials – selection and application	PTS 30.10.02.13
Design of cathodic protection systems for onshore buried pipelines	PTS 30.10.73.31
Pipeline fittings (amendments/supplements to MSS SP-75)	PTS 31.40.21.30

DATA/REQUISITION SHEETS

Pipeline isolating joints	PTS 31.40.21.93
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Note: Data/requisition sheets are contained in binder PTS 31.10.01.10

AMERICAN STANDARDS

Boiler and pressure vessel code:	
Section VIII, Pressure vessels	ASME VIII
Section IX, Welding and brazing qualifications	ASME IX
Process piping	ASME B31.3
Liquid transportation systems for hydrocarbons, liquid petroleum gas, anhydrous ammonia, and alcohols	ASME B31.4
Gas transmission and distribution systems	ASME B31.8
Factory-made wrought steel butt welding fittings	ASME B16.9

Issued by:
American Society of Mechanical Engineers
345 East 47th Street
New York NY 10017
USA

Standard practice for preparation of metallographic specimens	ASTM E 3
Standard test method for determining average grain size	ASTM E 112

Issued by:
American Society for Testing and Materials
1916 Race Street,
Philadelphia Pa 19103
USA

Specification for high test wrought butt welding fittings

MSS SP-75
1998 edition

Issued by:
Manufacturers Standardisation Society
of the Valves and Fittings Industry
127 Park Street N.E
Vienna, Virginia 22180
USA

EUROPEAN STANDARDS

Destructive tests on welds in metallic materials - longitudinal tensile test on weld metal in fusion welded joints

EN 876

Destructive tests on welds in metallic materials - hardness testing

Part 1: Hardness test on arc-welded joints

EN 1043-1

Issued by:
CEN Secrétariat Central
Rue de Stassart 36
B-1050 Brussels
Belgium

Copies can also be obtained from national standards organizations

INTERNATIONAL STANDARDS

Preparation of steel substrates before application of paints and related products. Visual assessment of surface cleanliness

Part 1: Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coating

ISO 8501-1

Quality systems - model for quality assurance in design, development, production, installation and servicing

ISO 9001

Quality systems - model for quality assurance in production, installation and servicing

ISO 9002

Quality management - guidelines for quality plans

ISO 10005

Steel and steel products, inspection documents

ISO 10474

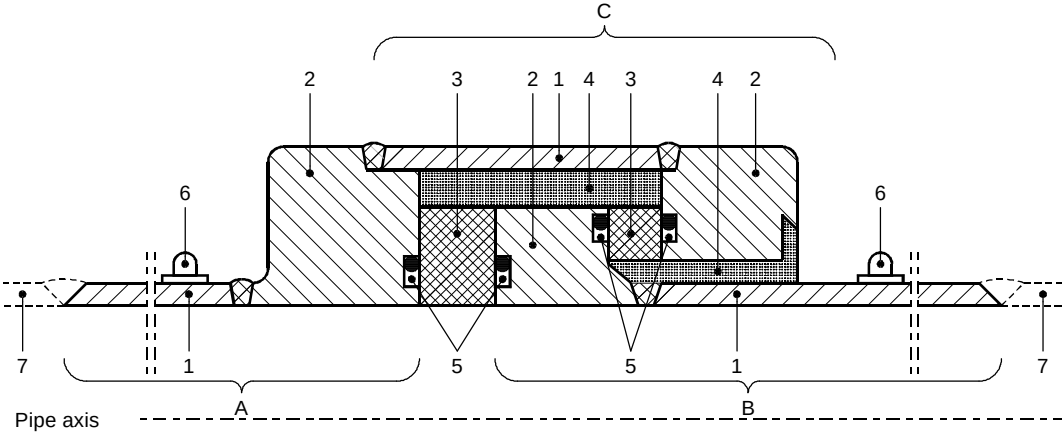
Specifications for non-metallic blast-cleaning abrasives

ISO 11126

Issued by:
International Organisation for Standardisation
1, Rue de Varembe
CH-1211 Geneva 20
Switzerland

Copies can also be obtained from national standards organizations.

FIGURE 1 Typical isolating joint



- | | |
|------------------------|-------------------|
| 1: Linepipe | A: Spool 1 |
| 2: Forgings | B: Spool 2 |
| 3: Insulating material | C: Retaining case |
| 4 : Dielectric filler | |
| 5 : Ring seals | |
| 6 : Connecting lugs | |
| 7: Pipeline | |