

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE

WELDABLE STRUCTURAL STEELS FOR FIXED OFFSHORE STRUCTURES

PTS 37.19.10.30
APRIL 2011



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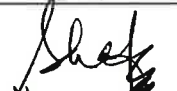
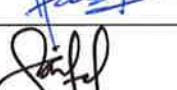
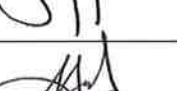
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PTS No:	PTS 37.19.10.30
PTS Title:	Weldable Structural Steels for Fixed Offshore Structures

This revision of PTS 37.19.10.30 – Weldable Structural Steels for Fixed Offshore Structures has been updated incorporating PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry codes and standards.

This PTS shall replace the existing PTS 37.19.10.30 (December 2008), release 13. The new title of this PTS shall be “Weldable Structural Steels for Fixed Offshore Structures”.

Document Approval

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Revision History

Date	Version	Description of Updates	Author
31/12/2008	Rev. 1	Amendment to EN 10225 and EN 10025	Ir M Nazri b Mustafa
25/03/2011	Rev. 2	To update requirements to suit Malaysia waters (Charpy Test) and to update steel grouping in Petronas	Ahmad Rizal A Rahman

PREFACE

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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.

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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.

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1. INTRODUCTION

This PTS specifies requirements and gives recommendations for the supply of weldable structural steel materials for use in fixed offshore structure. It applies to steel jacket substructures, foundation piles and decks.

The scope of this PTS includes the supply of plates, rolled sections, seamless hollow section and welded (HFW) hollow sections. The delivery requirements for tubular members fabricated from rolled plate are also specified. The PTS applies both to material supplied by the Manufacturer and the Contractor.

1.1 CONTENT SUMMARY

Three steel categories are covered:

Primary: All main structures

Secondary: Secondary structure, i.e. deck stringers, equipment supports and flooring

Tertiary: Stairs Handrails, access platforms

Section 2 of this PTS specifies the technical requirements for primary steel, presented in the form of amendments and supplements to EN 10225:2001 (plus Corr. 1, 2003).

Section 3 of this PTS specifies specific technical requirements for the supply of primary steel tubular members fabricated from plate.

Section 4 of this PTS specifies the technical requirements for secondary and tertiary steels, presented in the form of supplements to EN 10025:2004.

Section 5 of this PTS specifies the documentation and information requirements for primary steel.

Section 6 of this PTS specifies the requirements for storage and the maintenance of traceability.

This is a revision of the PTS of the same number dated December 2008; see (1.5) for the summary of changes.

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 Contractors nominated by them.

This PTS is intended for use in Exploration and Production companies that require the use of weldable structural steel for fixed offshore structures.

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 with regard to the 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, the objective being to obtain agreement to follow this PTS as closely as possible.

1.3 DEFINITIONS

1.3.1 General definitions

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

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

The **Principal** is the party that 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

The definitions in EN 10025:2004 and EN 10225:2001 shall apply.

1.4 ABBREVIATIONS

CEV	Carbon Equivalent Value
CTOD	Crack Tip Opening Displacement
EEMUA	Engineering Equipment & Materials Users' Association
HFW	High Frequency Welded
LAST	Lowest Anticipated Service Temperature
NDT	Non Destructive Testing
TTP	Through Thickness Property

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 (7).

1.6 SUMMARY OF CHANGES

This PTS is a revision of the PTS of the same number dated December 2008. The summary of changes are as below:

No	Section	Changes
1	PTS Title	Deletion of wording "Amendment/Supplements to EN 10225 and 10025".
2	1	2 nd paragraph : Add "...and the Contractor".
3	1.4	Abbreviations section created
4	2.1	Notes on delivery condition added
5	2.2	Classification for Primary Structural Steel added.
6	2.3 : 8.3.1	Charpy at -20°C for Malaysian waters and -40°C for temperate countries.
7	2.3.1	Clause 2.3.1 added
8	2.3.2	Clause 2.3.2 added
9	3.2	Dimensional tolerances for length added
10	4.2.1	Clause 4.2.1 added
11	4.3.1	Clause 4.3.1 added
12	4.4	Table for new steel grouping is added
13	7	Alternative specifications added
14	8	Legend added

2. TECHNICAL REQUIREMENTS – PRIMARY STEEL

2.1 SPECIFIED GRADES

Primary structural steel in plate, rolled section and hollow section [Seamless and high frequency welded (HFW)] shall be in accordance with EN 10225:2001 (plus Corr. 1, 2003), Groups 2 and 3, as listed below. EN 10225 Group 1 steel, shall not be used for primary applications.

The corresponding toughness classes, as defined in ISO 19902:2007, are given in this table. It should be noted that classes have been allocated to steel grades. This is not shown in ISO 19902:2007. Plates in Group 2 at thicknesses greater than 40 mm are required to be pre-qualified by CTOD testing (see clarification/modification to 8.4.3), equivalent to the "X" designation in ISO 19902:2007.

Form	Group	Grade	Toughness Class – ISO 19902:2007	Notes
Plate	2	S355G7 (+N and +M) S420G1 (+Q and +M) S460G1 (+Q and +M)	CV2 CV2 CV2	1
	3	S355G8 (+N and +M) S420G2 (+Q and +M) S460G2 (+Q and +M)	CV2Z/ZX CV2Z/ZX CV2Z/ZX	1
Sections (Open)	2	S355G11 (+N and +M) S420G3 (+M) S460G3 (+M)	CV2 CV2 CV2	2
	3	S355G12 (+N and +M) S420G4 (+M) S460G4 (+M)	CV2Z CV2Z CV2Z	2
Hollow Sections (Seamless)	2	S355G14 (+N and +Q) S420G6 (+Q) S460G6 (+Q)	CV2 CV2 CV2	3
	3	S355G15 (+N and +Q)	CV2Z	3
Hollow Section (HFW)	2	S355G13 (+N and + Q) S420G5 (+Q) S460G5 (+Q)	CV2 CV2 CV2	4
NOTES : 1. Grades S355 G9 and G10 are equivalent to grades S355 G7 and G8 respectively, and may be substituted for them. 2. (a) Limited to 36 mm flange thickness for primary applications. (b) Steels in the as-rolled condition are not permitted. 3. Limited to 30 mm wall thickness for primary applications. 4. Limited to 20 mm wall thickness by EN 10225.				