

PETRONAS TECHNICAL STANDARDS

FIREPROOFING OF STEEL STRUCTURES

PTS 34.19.20.11

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This revision of PTS **34.19.20.11 – FIREPROOFING OF STEEL STRUCTURES** has been updated to incorporate PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry code and standards. All updates in the document are highlighted in italic font.

The previous version of this PTS **34.19.20.11 (January, 2007)** will be removed from PTS binder/ e-repository from herein onwards.

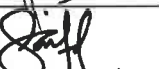
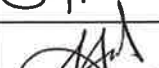
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Revision History

Date	Version	Description of Updates	Author

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 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, it is expected of 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 owner.

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1.1 INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and gives recommendations for the design and application/installation of passive fire protection (PFP or fireproofing) of steel. The extent of fireproofing and PFP requirements shall be established on the basis of the requirements of PTS 80.47.10.30 and a fire safety assessment executed for the particular plant or unit.

The zones where PFP are required are called Fire Protection Zones (FPZ). The extent of the fireproofing around equipment and structures shall be indicated on layout and construction drawings.

This PTS applies to steel supporting structures (and in some cases piping and equipment) in process areas and processing plants as well as to storage facilities, jetties and pipe bridges (including those outside the battery limits) in oil/gas/petrochemical installations.

This PTS is intended to ensure that the degree of fireproofing applied is effective and practical in terms of maintainability and reduction of risks. As there is a wide variation in the design of structures, the intent of this PTS shall be considered at all times when prescribing the fireproofing of structures not specifically mentioned in (3).

This PTS is not applicable to jet fires.

This is a revision of the PTS of the same number dated January 2007; see (1.5) regarding the changes.

1.2 DISTRIBUTION, APPLICABILITY AND REGULATORY CONSIDERATIONS

Unless otherwise authorised by Petronas, the distribution of this PTS is confined to Petronas companies and, where necessary, to Contractors and Manufacturers/Suppliers nominated by them.

This PTS is intended for use in oil refineries, chemical plants, gas plants, supply/distribution installations and onshore exploration and production facilities.

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.

NOTE: National and/or local regulations for fire protection are generally intended for structures erected in populated areas and may therefore be inappropriate for oil, gas and chemical plants, where the fire loadings and risks are different.

1.3 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 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 to act for, and on behalf of, the Principal.

The word **shall** indicates a requirement.

The word **should** indicates a recommendation.

1.4 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 (5).

1.5 SUMMARY OF CHANGES SINCE PREVIOUS EDITION

The previous edition of this PTS was dated January 2007. Listed below are the main changes.

Old section	New section	Change
2.2	-----	Removed old section – Fire Proofing Zone (FPZ). Added a new section – Fire Severity.
2.3	-----	Removed old section - Resistance Against Fire. Added new section – Fire Resistance Duration.
2.4	-----	Removed: Section regarding design considerations
3.1	-----	Reworded section.
3.1.1	-----	Deleted subheading.
3.2	-----	Reworded section
3.2.1	-----	Deleted subheading
3.3	-----	Reworded section.
-----	3.4	Added new section - Piping and Equipment
-----	3.5	Added new section - Process Unit Pipe Racks and Pipe Support Columns
-----	3.6	Added new section - Buildings
4.1	-----	Deleted text in general section
-----	4.1.1	Added new section – Basic Materials.
-----	4.1.2	Added new section - Corrosion Under Fireproofing
4.2	4.2	Changed: Title changed to Concrete Fireproofing
4.2.1	4.2.1	Removed: General fireproofing performance requirements Added: Design of concrete fireproofing
-----	4.2.1.1	Added new section – Environmental Controls
4.2.3	4.3	Moved: Section on proprietary fireproofing systems moved to 4.3 Changed: Title changed to Proprietary Material Fireproofing
-----	4.2.3	Added: Concrete Fireproofing Installation
-----	4.2.4	Added new section – Concrete Fireproofing Inspection and Testing During Application.
4.2.4	4.2.5	Moved: Brickwork Fireproofing section moved to 4.2.5

continued...

Old section	New section	Change
4.3	-----	Removed: Fireproofing Equipment Inside Buildings
-----	4.3.1	Added: General section on proprietary material fireproofing
-----	4.3.2	Added: Proprietary lightweight fireproofing systems
-----	4.3.3	Added: Proprietary intumescent and subliming fireproofing systems
-----	4.3.4	Added: Installation coordinator
-----	4.3.5	Added: Inspection
4.4	-----	Deleted Section
4.5	-----	Deleted Section
5	-----	Deleted Section
6	5	Moved: References moved to Section 5 Added to American Standards and Industry Practices: ACI 216.1/TMS-0216 ACI 318 ACI 506.2 ACI 506.3 ASTM A185 ASTM C33 ASTM C150 ASTM E119 API Publ 2218
Appendix 1	Appendix 2	Moved: Typical details of concrete fireproofing - solid encasement to Appendix 3
Appendix 2	Appendix 3	Moved: Typical details - cover plates for weather protection to Appendix 3 Changed: Title changed to Structural Column Details
-----	Appendix 1	Added: Inspection and maintenance after application of fireproofing
-----	Appendix 4	Added: Pipe Rack Details
-----	Appendix 5	Added: Concrete Fireproofing of Vessel Skirts
-----	Appendix 6	Added: Fireproofing of Vessel Structural Support Legs