

PETRONAS TECHNICAL STANDARDS

MANUAL

Lightning Protection System (LPS) (Supplement to IEC 62305)

PTS 33.64.00.11

JULY 2011



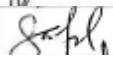
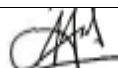
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This new PTS **33.64.00.11 – Lightning Protection System (July 2011)** has been reviewed and updated to incorporate PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry code and standards.

Document Approval

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PREFACE

Petronas Technical Standards (PTS) 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 applied by PETRONAS in oil and gas production facilities, oil refinery, gas processing, chemical plants, marketing facilities or any other such facility, and thereby to achieve maximum technical and economic benefit from standardization.

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.

The right to use PTS rests with three categories of users:

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1.0 INTRODUCTION

1.1 SCOPE

This PTS specify the minimum technical requirements for lightning protection system (LPS) for use in oil refineries, chemical plants, gas plants, exploration and production and supply/marketing.

LPS shall comply with IEC 62305, as relevant and as supplemented by this PTS to the following latest IEC publications:-

- IEC Publication 62305-1 2006 (Protection against lightning-General Principle)
- IEC Publication 62305-2 2006 (Protection against lightning-Risk Management)
- IEC Publication 62305-3 2006 (Protection against lightning-Physical damage to structures and life hazard)
- IEC Publication 62305-4 2006 (Protection against lightning-electrical and electronic system within structure)
- IEC Publication 62305-5 2006 (Services)

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 nominated by them.

This PTS is intended for use in oil refineries, chemical plants, gas plants, exploration and production facilities and supply/marketing 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 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

Lightning protection system LPS	Complete system used to reduce physical damage due to lightning flashes to a structure
External lightning protection system	Part of the LPS consisting of an air-termination system, a down-conductor system and an earth-termination system
Internal lightning protection system	Part of the LPS consisting of lightning equipotential bonding and/or electrical insulation of external LPS
Air-termination system	Part of an external LPS using metallic elements such as rods, mesh conductors or catenary wires intended to intercept lightning flashes

Down-conductor system	Part of an external LPS intended to conduct lightning current from the air-termination system to the earth-termination system
Earth-termination system	Part of an external LPS, which is intended to conduct and disperse lightning current into the earth
Earth electrode	Part or a group of parts of the earth-termination system, which provides direct electrical contact with the earth and disperses the lightning current into the earth
Earth Ring	Earthing electrode forming a closed loop around the structure below or on the surface of the earth
Natural component of LPS	Conductive component installed not specifically for lightning protection which can be used in addition to the LPS or in some cases, could provide the function of one or more parts of the LPS NOTE: Examples of the use of this term include: - natural air-termination; - natural down-conductor; - natural earthing electrode
Dangerous sparking	Electrical discharge due to lightning which causes physical damage in the structure to be protected
Separation distance	Distance between two conductive parts at which no dangerous sparking can occur
Surge protective device SPD	Device that is intended to limit transient overvoltages and divert surge currents. It contains at least one non-linear component
Test joint	Joint designed to facilitate electrical testing and measurement of LPS components
Lightning protection zone LPZ	Zone where the lightning electromagnetic environment is defined NOTE: The zone boundaries of an LPZ are not necessarily physical boundaries (e.g. walls, floor and ceiling).
Lightning equipotential bonding	Bonding to LPS of separated metallic parts, by direct conductive connections or via surge protective devices, to reduce potential differences caused by lightning current
Direct stroke lightning	The electric current and energy deposited by a lightning stroke can be sufficiently high to melt thin metallic components and destroy electronic components if they are not designed to propagate to ground or divert the energy.