

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE (CORE)

TECHNICAL SPECIFICATIONS

DESIGN OF CATHODIC PROTECTION SYSTEMS FOR NEW FIXED OFFSHORE STEEL STRUCTURES (AMENDMENTS/SUPPLEMENTS TO DNV RP B401)

PTS 37.19.30.30

OCTOBER 2009



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This revision of PTS **37.19.30.30 Design of Cathodic Protection Systems for New Fixed Offshore Steel Structures (Amendments/Supplements to DNV RP B401)** has been exclusively updated incorporating the latest DNV RP B401 2005 edition

The previous version of this PTS (**December 1995**) will be removed from PTS binder/ e-repository from herein onwards.

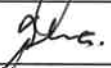
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Revision History

Date	Version	Description of Updates	Author
28/09/2009	0	Updating, aligning and incorporating latest edition of DNV RP B401 2005	M Zul Alwi Mat Adam

Summary of Amendments

- 1) The previous version of this PTS refers to DNV RP B401 1993 edition. Since then, DNV RP B401 has been updated in 2005 and has since amended until April 2008. This PTS is revised based on the latest DNV RP B401 2005 version (amended April 2008)
- 2) The DNV RP B401 2005 has major changes in its structure, alignment and new information. This PTS has been re-aligned based on that.
- 3) Main changes in DNV RP B401 2005;
 - a. Impressed current cathodic protection is removed from the scope. In this PTS scope also does not include impressed current. Thus, all parts in the PTS regarding impressed current have been removed.
 - b. The coating category has been changed from 4 to 3 and made wider to include commonly applied system. This PTS has been updated according to the changes.
 - c. Anode Manufacture Section (Sect 8) has been made more comprehensive.
- 4) The scope of this PTS does not include CP for pipelines. The DNV RP B401 2005 also removes pipelines. Thus any part concerning pipelines from previous PTS has been removed.

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, 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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PART I INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and gives recommendations for the number, mass, dimensions, type, and distribution of anodes for the cathodic protection (CP) of new fixed offshore steel structures. It may also serve as a guideline if in situ replacement of a CP system is required.

This PTS is a revision of the previous publication PTS 37.19.30.30., dated December 1995.

This PTS shall only be used for seawater salinities in the range of 3.3 to 3.8%, and for temperatures in the range of 4 to 30 °C.

This PTS is based on DNV Recommended Practice RP B401, 2005 edition. Part III of this PTS gives amendments and supplements to this document.

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 nominated by them.

This PTS is intended for use in offshore 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 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

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, authorised 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 in this PTS are listed in (Part IV).

PART II DESIGN PHILOSOPHY

1.1 GENERAL

The CP system shall be designed to maintain the subsea metal surfaces within an electrochemical potential range which prevents subsea corrosion and material damage. This shall be achieved by supplying cathodic protection current from a distributed sacrificial anode system.

As a minimum, the CP system shall be designed for the full design life of the structure. However, the possibility of a prolonged field life requiring an extended structure life should be given due consideration.

Impressed current systems shall not be used for new installations.

An impressed current system may be considered for an offshore structure which is to serve beyond its original design life and of which the sacrificial anodes are depleted. The design of such impressed current systems is not covered in this PTS.

The CP system shall be designed to maintain the submerged steel surfaces within the electrochemical potential range of -0.800 to -1.000 volts versus Ag/AgCl/seawater.

Traditionally the PETRONAS Group has relied solely on sacrificial anodes to prevent subsea corrosion of its offshore structures. Nevertheless, under some circumstances which result in very high current demand or anode weights, the use of sacrificial anodes alone is not considered effective or feasible; the application of a coating in conjunction with sacrificial anodes should then be adopted.

1.2 DESIGN TEMPLATE, COMPUTER SPREADSHEET

A design sheet which may be helpful to designers with the design and calculation sequence is presented in (Appendix 1). An example of its use is presented in (Appendix 2). A related computer spreadsheet is available from SIPM-EPD/63.

PART III AMENDMENTS/SUPPLEMENTS TO DNV RP B401, 2005 EDITION

This part contains "section by section" amendments/supplements to RP B401. To simplify interpretation, the section numbering herein corresponds with that in RP B401. Unamended sections in RP B401 remain valid as written.

1. General

1.2 Scope

Delete this section and refer to Section (1.1) of this PTS.

2. References