

PETRONAS TECHNICAL STANDARDS

ONLINE PROCESS STREAM ANALYSIS - ANALYSER HOUSES

PTS 32.31.50.13

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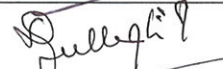
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The previous version of this PTS **December 2008** will be removed from PTS binder/ e-repository from herein onwards.

Document Approval

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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.

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1. INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and gives recommendations for the design, construction and climate conditioning of analyser houses.

The scope of this PTS is further defined in Section [2.2](#).

Excluded from the scope of this PTS is the design and construction of premises without an artificial means of maintaining a non-hazardous area, such as walk-in shelters for analyser systems. The design of such premises and their analyzer systems shall comply with PTS 80.00.10.10.

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 PETROANS or managed by a Group company, and to Contractors and Manufacturers nominated by them.

It is intended for use in oil refineries, chemical plants, gas plants and, where applicable, in onshore and offshore exploration and production facilities and supply/marketing installations.

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

1.3.1 General Definitions

The **Contractor** is the party which carries out all or part of the design, engineering, procurement, installation and commissioning or management of a project or operation of a facility. The Principal may sometimes 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 the Principal.

The word **shall** indicate a requirement.

The word **should** indicate a recommendation.

1.3.2 Specific Abbreviations and Definitions

Alarm	an audible and/or visible means of indication to panel operator an equipment malfunction, process deviation or abnormal condition requiring a response
Analyser house	Building with a specific closed room containing more than one analyser which may be connected to a process installation, together with associated electrical equipment and auxiliary devices NOTE: Laboratories are not included in this definition.
Artificial ventilation	Method of mechanical movement of air to reduce the potential concentration of flammable gases or vapors in the analyser house; such ventilation may also be used to maintain the pressure inside the analyser house above the external ambient pressure
CCR	Central Control Room
FAR	Field Auxiliary Room
FAT	Factory Acceptance Test
Instrumented Protective Function (IPF)	Function comprising the initiator, logic solver and final element function for the purpose of preventing or mitigating hazardous situations
Lower Flammable Limit (LFL)/Lower Explosive Limit (LEL)	Volume ratio of flammable gas or vapor in air below which an explosive gas mixture will not be formed
MCT	Multiple Cable Transit
PGC	Process Gas Chromatograph
Purging	Operation of passing a quantity of air or inert gas through a room and its associated ducts in order to reduce to a safe level, any concentration of flammable gas or vapor which may be present
STEL	Short Term Exposure Levels
Upper Flammable Limit (UFL)/Upper Explosive Limit (UEL)	The volume ratio of flammable gas or vapor in air above which an explosive gas mixture will not be formed
Ventilation failure	Situation where the required air flow and, if applicable, the required pressure cannot be maintained inside the analyser house
Ventilation system	Complete installation required to produce artificial ventilation

1.4 CROSS REFERENCES

Where cross references to other parts of this PTS are made, the referenced section is shown in brackets. Other documents referenced by this PTS are listed in ([13](#)).

2. GENERAL

2.1 PURPOSE OF ANALYSER HOUSES

The main purpose of an analyser house is to ensure continuity of operation of analyser systems with high reliability by providing an improved operating environment for them and protecting them from the weather.

The operating environment of analysers is affected by the:

- Area classification;
- Environmental conditions, mainly temperature, dust, saliferous ambient air and humidity;
- Sample handling, conditioning and recovery;
- Effective maintenance.

As analyser houses are complex and therefore expensive to construct and maintain, they contribute significantly to the Total Cost of Ownership. They shall therefore only be erected when strictly required and their size shall be optimized in accordance with this PTS.

The suitability of cheaper alternatives, e.g. a walk-in shelter, shall be checked. The selection is either a walk-in shelter, a site-erected analyser house or a pre-fabricated analyser house (with all analyser systems installed) shall be evaluated in terms of Total Cost of Ownership.

2.2 BASIS OF DESIGN

This PTS specifies the design and construction of analyser houses with respect to:

- Maintaining a non-hazardous area;
- Providing protection in the event that the means to maintain the non-hazardous area fail;
- Procedures for maintaining the installed electrical safety protection measures;
- Maximum and minimum limits for climatic conditioning, if required;
- Verification and testing of installed instrumented protective systems.

NOTE : Hazardous situations created by external toxic gas atmospheres shall be dealt with separately in each individual case.

Requirements and recommendations are given for the design, construction and operation of systems for artificial ventilation of analyser houses, their associated equipment such as air ducts, and the auxiliary devices necessary for providing and maintaining the required pressure above ambient.

NOTE : For the purpose of this PTS, analyser houses are assumed to have forced artificial ventilation systems. Induced ventilation systems shall not be used..

Hazardous situations arising from the toxicity of gases and vapors that have to be handled shall be the subject of a special study, on the basis of which the appropriate measures shall be decided on and submitted to the Principal for approval.

Hazardous situations arising from products in the process environment around the analyser house shall be addressed in the plant hazard study during the preliminary and final design study (see [2.4](#)).

2.3 BASIC DESIGN STANDARDS

The following standards shall apply in conjunction with this PTS:

- IP 15 for ventilation requirements of analyser houses and adjacent sample conditioning areas;
- IEC/TR 60079-16 for the procedures to achieve a safe area inside the analyser house that satisfies IP 15;
- IEC 61285 for maintaining the integrity of the analyser house and its surrounding.

2.4 HEALTH, SAFETY AND ENVIRONMENTAL (HSE) CONSIDERATIONS

The following HSE measures shall be taken to ensure that the interior of the analyser house can be classified as non-hazardous under normal operating conditions:

- The quantity of flammable materials entering the interior of the analyser house shall be kept to a minimum. This shall be achieved by applying PTS 32.31.50.11 section 3.3 with flow rate to analyser maximum no more than 20 NL/h.
- An efficient air ventilation system shall be provided to continuously dilute accidental internal release of flammable gases or vapors, if any, to below the levels recommended in IEC/TR 60079-16.

NOTE : To ensure that electrical equipment does not create a hazardous condition if the ventilation system fails, additional precautions shall be taken (see [5.1](#), [6.7](#) and [8.1](#)).

- Provision of systems for safe disposal of waste material. For example, if the vent gas from analyser houses is continuously contaminated with hydrocarbons, then an environmentally acceptable and safe means of disposal of this vent gas shall be provided ([8.3](#)).
- Provision of fire protection features as described in PTS 34.17.00.32.