

PETRONAS TECHNICAL STANDARDS

DESIGN AND ENGINEERING PRACTICE

PACKAGED, INTEGRALLY GEARED, CENTRIFUGAL PLANT AND INSTRUMENT AIR COMPRESSORS (AMENDMENTS/SUPPLEMENTS TO API 672)

PTS 31.29.40.33

November 2010



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PTS Circular 2010 – 31.29.40.33



PTS No:	31.29.40.33
PTS Title:	Packaged, Integrally Geared, Centrifugal Plant and Instrument Air Compressors (Amendments/Supplements to API 672)

This revision of PTS 31.29.40.33– Packaged, Integrally Geared, Centrifugal Plant and Instrument Air Compressors (Amendments/Supplements to API 672) has been updated to incorporate PETRONAS Lessons Learnt, Best Practice and new information issued by relevant industry code and standards.

The previous version of this PTS 31.29.40.33 (September 2002) will be removed from PTS binder/ e-repository from herein onwards.

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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 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, 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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PART I INTRODUCTION

1.1 SCOPE

This PTS specifies requirements and gives recommendations for packaged, integrally geared, centrifugal plant and instrument air compressors. This PTS is based on API 672, Fourth Edition, March 2004; Part III of this PTS amends, supplements and deletes various clauses of API 672.

This is a revision of the PTS of the same number dated September 2002; see (1.5) regarding the changes.

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise authorized by PETRONAS, the distribution of this document is confined to companies forming part of PETRONAS Group, and to Contractors nominated by them.

This PTS is intended for use in oil refineries, chemical plants, gas plants, supply/marketing installations and, where applicable, in 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 combination of requirements will be acceptable as regards safety, economic and legal aspects. In all cases the Contractor shall inform the Principal of any deviation from the requirements of this document 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 document 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 or maintenance 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 by this PTS are listed in (Part IV).

1.5 SUMMARY OF CHANGES FROM PREVIOUS EDITION

The previous edition of this PTS was dated September 2002, and was based on API 672, Third Edition, September 1996. There have been numerous changes to reflect the new basis (API 672, Fourth Edition, March 2004) and it is impractical to summarise them here.

PART II GENERAL INFORMATION

This PTS gives amendments and supplements to API Std 672, Fourth Edition, March 2004.

Packaged, integrally geared, centrifugal plant and instrument air compressors shall conform to API Std 672 as amended/supplemented by this PTS.

For ease of reference, the clause (or paragraph) numbering of API Std 672 has been used throughout Part III of this specification. Clauses (paragraphs) in API Std 672 not mentioned shall remain valid as written.

A bullet (•) in the margin against certain clauses (paragraphs) in API Std 672 indicates that a decision by the Principal is required. These decisions shall be indicated on the data/requisition sheets, preferably under the heading "Additional Requirements" or stated in the purchase order.

NOTE: The data/requisition sheets for packaged, integrally geared, centrifugal plant and instrument air compressors are PTS 31.29.40.93.

PART III AMENDMENTS/SUPPLEMENTS TO API 672

1. GENERAL

1.0 Scope

Add to this clause:

Integrally geared compressors equipped with expander stages are not included in the scope.

NOTE: This API Standard and PTS refer to compressors handling only air or inert, non-toxic gases.

1.1 *In this clause, replace "Special Purpose " by "Vital Service"*

1.2 *In this clause, replace "non critical" by "essential or non-essential service"*

Add new clause:

1.2.1 Basic duty packages may be selected for spared essential and non-essential services with minimal requirements.

1.2.2 Special duty packages shall be selected for non-spared essential services and shall comply with the additional requirements specified in this PTS.

1.2.3

3.0 Definition of Terms

Add new clauses:

3.37 maximum continuous speed

for compressors driven by variable speed drivers:

speed at least equal to 105 % of the highest speed required by any of the specified operating conditions

for compressors driven by constant-speed drivers:

rated speed

3.38 when specified

where used in API 672, this term shall mean "if specified by the Principal"

3.39 vital, essential, and non-essential services

	Safety Equipment	Other Equipment		
	Vital Service	Essential Service		Non-Essential Service
		Non-Spared Equipment	Spared Equipment	
Definition	A service in which failure of equipment causes an unsafe condition of the plant or installation resulting in jeopardy to life and/or major damage (fire, explosion etc.).	A service in which failure of equipment renders a plant or process unit inoperable or reduces performance to a level unacceptable to the Principal.	A service in which failure of equipment renders a plant or process unit inoperable or reduces performance to a level unacceptable to the Principal.	All other services.
Selection criteria	Equipment shall be adequately spared to ensure 100 % availability of the service under all circumstances	<i>A decision not to install spare equipment is based upon economic considerations and proven equipment availability. Non-spared equipment availability may be upgraded by means of additional Capex to match required plant availability.</i>	<i>Installed spare equipment is normally selected where potential losses due to equipment outage greatly outweigh equipment Capex. Sparing philosophy shall be economically evaluated and is typically 2x100% or 3x50%.</i>	Economic evaluation required to justify spared equipment.
Driver selection criteria	Independent power sources shall be selected to ensure 100 % service availability		Independent power sources may be selected, for start-up and utility availability reasons	
Examples	- firewater pumps with diesel and motor drives - ESD systems - EIA compressor	- HCU feed pump; - HCU recycle compressor - FCCU main air compressor - FD and ID fans	- BFW pumps - fractionator bottom pumps - fresh gas compressors (HCU)	- drinking water pumps - sewage pumps