

DESIGN AND ENGINEERING PRACTICE

STANDARD FORM

STANDARD FORMS (BINDER)

PTS 00.00.10.05
DECEMBER 2004



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/Divisions 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.

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

- 1) PETRONAS and its affiliates.
- 2) Other parties who are authorised to use PTS subject to appropriate contractual arrangements.
- 3) Contractors/subcontractors and Manufacturers/Suppliers under a contract with users referred to under 1) and 2) which requires that tenders for projects, materials supplied or - generally - work performed on behalf of the said users comply with the relevant standards.

Subject to any particular terms and conditions as may be set forth in specific agreements with users, PETRONAS disclaims any liability of whatsoever nature for any damage (including injury or death) suffered by any company or person whomsoever as a result of or in connection with the use, application or implementation of any PTS, combination of PTS or any part thereof. The benefit of this disclaimer shall inure in all respects to PETRONAS and/or any company affiliated to PETRONAS that may issue PTS or require the use of PTS.

Without prejudice to any specific terms in respect of confidentiality under relevant contractual arrangements, PTS shall not, without the prior written consent of PETRONAS, be disclosed by users to any company or person whomsoever and the PTS shall be used exclusively for the purpose they have been provided to the user. They shall be returned after use, including any copies which shall only be made by users with the express prior written consent of PETRONAS. The copyright of PTS vests in PETRONAS. Users shall arrange for PTS to be held in safe custody and PETRONAS may at any time require information satisfactory to PETRONAS in order to ascertain how users implement this requirement.

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1. INTRODUCTION

1.1 SCOPE

This PTS lists the standard forms applicable to electrical, mechanical and project engineering.

This is a revision of the PTS dated June 2004; a summary of changes is given in (1.4).

Prior to September 2002, editions of this PTS were in the form of a binder containing the standard forms themselves. This practice was discontinued because the forms are now available in electronic form. For PETRONAS users, the forms are available in electronic format.

For data sheets, requisition sheets and data/requisition sheets, refer to PTS 30.10.01.10

1.2 DISTRIBUTION, INTENDED USE AND REGULATORY CONSIDERATIONS

Unless otherwise stated by PETRONAS, the distribution of this document is restricted to companies forming part of or managed by PETRONAS and, where necessary, to Contractors and Manufacturers nominated by them.

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

When PTS are applied, a Management of Change (MOC) process should be implemented; this is of particular importance when existing facilities are to be modified.

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 the 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 typically specify the technical requirements. The Principal may also appoint 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 SUMMARY OF CHANGES SINCE PREVIOUS EDITION

The standard forms that have changed are marked with a vertical bar in the margin in [Section 2](#).

2. INDEX

2.1 DESIGN BOOKS

Number	Revision	Title
PTS 01.00.03.80	May 2004	Material balance sheet
PTS 01.00.03.81	Aug. 1998	General information sheet
PTS 01.00.03.84	Apr. 2002	Heat exchanger summary sheet
PTS 01.00.03.85	Aug. 1998	Pump summary sheet
PTS 01.00.03.86	Aug. 1998	Compressor and blower summary sheet
PTS 01.00.03.87	Aug. 1998	Mixing equipment summary sheet
PTS 01.00.03.88	Sep. 2004	Separating equipment summary sheet
PTS 01.00.03.89	Aug. 1998	Column summary sheet
PTS 01.00.03.90	Aug. 1998	Vessel summary sheet
PTS 01.00.03.91	Aug. 1998	Reactor summary sheet

2.2 ELECTRICAL EQUIPMENT

Number	Revision	Title
PTS 05.00.10.80	Mar. 2003	Utility data - electrical
PTS 05.00.54.84	Mar. 2002	Summary of electrical engineering
PTS 33.67.01.80	Aug. 2004	Schedule for LV switchboard
PTS 33.67.01.81	May 2002	Schedule for lighting distribution switchboard
PTS 33.67.01.82	Mar. 2002	Schedule for AC instrument distribution switchboard
PTS 33.67.20.80	Nov. 2002	Schedule for DC instrument distribution switchboard
PTS 33.67.34.80	May 2002	Schedule for remote control unit/safety switch
PTS 33.67.51.80	Mar. 2001	Schedule for high-voltage switchgear and control gear assemblies
PTS 33.68.30.80	Feb. 2001	Trace heating systems

2.3 MISCELLANEOUS

Number	Revision	Title
PTS 05.00.50.82	May 2002	Specification of design and engineering documents
PTS 05.00.51.81	Aug. 2000	List of data/requisitions and requisitions
PTS 05.00.51.82	May 2002	List of supplier's drawings
PTS 05.00.51.83	May 2002	List of design and engineering drawings
PTS 05.00.54.81	May 2002	Approval drawing specification (ADS)
PTS 05.00.54.82	May 2002	Final drawing specification (FDS)
PTS 05.00.55.83	Feb. 2000	Minutes of meeting
PTS 30.00.00.80	May 2002	Equipment record card - General
PTS 31.21.01.80	May 2002	Equipment record card - Heat exchanger shell
PTS 31.21.01.81	May 2002	Equipment record card - Tube bundle
PTS 31.21.01.82	May 2002	Equipment record card - Barometric condenser vacuum equipment
PTS 31.21.70.80	May 2002	Equipment record card - Air-cooled heat exchanger
PTS 31.22.00.80	May 2002	Equipment record card - Columns
PTS 31.22.00.81	May 2002	Equipment record card - Pressure vessel

2.3 MISCELLANEOUS (continued)

Number	Revision	Title
PTS 31.22.10.41	May 2002	Full manufacturing report
PTS 31.22.10.42	May 2002	Abridged manufacturing report
PTS 31.24.00.80	Nov. 2002	Equipment record card - Fired steam boiler
PTS 31.24.00.81	May 2002	Equipment record card - Furnace
PTS 31.24.48.80	May 2002	Equipment record card - Air preheater
PTS 31.27.00.80	May 2002	Equipment record card - Conveyor/elevator
PTS 31.27.04.80	May 2002	Equipment record card - Weighing equipment
PTS 31.27.10.80	May 2002	Equipment record card - Mixing equipment
PTS 31.29.00.80	May 2002	Equipment record card - Gear box
PTS 31.29.02.80	May 2002	Equipment record card - Centrifugal pump
PTS 31.29.12.80	May 2002	Equipment record card - Reciprocating pump
PTS 31.29.22.80	May 2002	Equipment record card - Rotary displacement pump
PTS 31.29.32.80	May 2002	Equipment record card - Axial pump
PTS 31.29.40.80	May 2002	Equipment record card - Centrifugal compressor-blower
PTS 31.29.43.80	May 2002	Equipment record card - Reciprocating compressor
PTS 31.29.47.80	May 2002	Equipment record card - Fan
PTS 31.29.53.80	May 2002	Equipment record card - Reciprocating vacuum pump
PTS 31.29.56.80	May 2002	Equipment record card - Rotary vacuum pump
PTS 31.29.60.80	May 2002	Equipment record card - Steam turbine
PTS 31.29.70.80	May 2002	Equipment record card - Gas turbine
PTS 31.29.80.80	May 2002	Equipment record card - Internal combustion engine
PTS 31.29.85.80	May 2002	Equipment record card - Steam engine
PTS 31.36.90.50	May 2002	Equipment record card - Safety relief valves
PTS 31.38.00.80	May 2002	Equipment record card - Pipelines
PTS 32.31.00.80	May 2001	Equipment record card - Instruments
PTS 33.66.05.80	May 2001	Equipment record card - Electric motor
PTS 34.51.00.80	Nov. 2003	Equipment record card - Fixed roof tank
PTS 34.51.00.81	Nov. 2003	Equipment record card - Floating roof tank
PTS 34.51.00.82	Nov. 2003	Equipment record card - Spherical pressure tank
PTS 34.51.00.83	Nov. 2003	Equipment record card - RLG tank

2.4 PIPING SYSTEMS

Number	Revision	Title
PTS 31.38.00.81	Dec. 2004	Calculation sheet for pipe support loads
PTS 31.38.01.40	Feb. 2001	Specification for piping systems - Cover sheet
PTS 31.38.01.41	Feb. 2001	Specification for piping systems - Index and issue sheet
PTS 31.38.01.42	Feb. 2001	Specification for piping systems - Design and engineering requirements
PTS 31.38.01.43	Feb. 2001	Specification for piping systems - Selection of piping classes for process utility lines
PTS 31.38.01.44	Feb. 2001	Specification for piping systems - General-purpose sheet
PTS 31.38.01.52	Feb. 2001	Specification for piping systems - Description of piping classes deviating from PTS 31.38.01.12/15
PTS 31.38.01.80	Feb. 2001	Bill of material
PTS 31.38.01.81	Feb. 2001	Index sheet
PTS 31.38.01.82	Feb. 2001	Issue sheet

2.5 PUMPS

Number	Revision	Title
PTS 31.29.01.85	Sep. 2002	Calculation sheet for pumping data

3. REFERENCES

In this PTS, reference is made to the following publications:

NOTES: 1. Unless specifically designated by date, the latest edition of each publication shall be used, together with any amendments/supplements/revisions thereto.

PETRONAS STANDARDS

Requisitioning

[PTS 30.10.01.10](#)

MATERIAL AND HEAT BALANCE					Design book No:			Page:	
Constituent		Stream number							
		1	2	3	4	5	6	7	
		Stream description							
		Mole fraction							
1									
2									
3									
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10									
11									
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18									
19									
20									
21	TOTAL	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
22	Temperature	° C							
23	Pressure	kPa (abs)							
24									
25	Total Stream:								
26	Molar Flow	kg.mole/h							
27	Mass Flow	kg/h							
28	Molecular Weight	kg/kg.mole							
29	Mass Enthalpy	kJ/kg							
30	Mole Vapour Fraction								
31									
32	Vapour Phase:								
33	Molar Flow	kg.mole/h							
34	Mass Flow	kg/h							
35	Std. Gas Flow	STD m³/h							
36	Std. Gas Flow	MMscfd							
37	Molecular Weight								
38	Mass Density	kg/m³							
39	Cp/Cv								
40	Mass Heat Capacity	kJ/kg °C							
41	Viscosity	cP							
42	Thermal Conductivity	W/m-k							
43	Z-Factor								
44									
45	Liquid Phase:								
46	Molar Flow	kg.mole/h							
47	Mass Flow	kg/h							
48	Actual Volume Flow	m³/h							
49	Molecular Weight								
50	Mass Density	kg/m³							
51	Mass Heat Capacity	kJ/kg °C							
52	Viscosity	mPa.s (cP)							
53	Thermal Conductivity	W/m.K							
54	Surface Tension	dyne/cm							
55									
56	Aqueous Phase:								
57	Molar Flow	kg.mole/h							
58	Mass Flow	kg/h							
59	Actual Volume Flow	m³/h							
60	Mass Density	kg/m³							
61	Viscosity	mPa.s (cP)							
62	Thermal Conductivity	W/m.K							
63	Mass Heat Capacity	kJ/kg.K							
	REMARKS	Made by:	Date:		Rev. Letter:				
					Date:				
		Checked by:	Date:	PLANT:	Signature:				
					Sheet No.	Continued on sheet No.			
		Approved by:	Date:	CONSIGNEE:					

		Design book No.:		page	
Principal:		Revision letter			
		Date			
		Signature			



AVA
surface

PUMP SUMMARY

Design book No.:

page

Project:

Location:[illegible]

Principal :

Revision letter

Date _____

Signature



Documents

Document Sharing Hub

COMPRESSOR AND BLOWER SUMMARY

Design book No.:

page

Project:

Location

[illegible]

Principal :

Revision letter				
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Date				
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Signature				Docu
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Documents

Document Sharing Hub

MIXING EQUIPMENT SUMMARY							Design book No.: _____ page _____					
Project:		Location:										
Equipment Number M	Service	Type	Speed impeller r/min	Working volume m ³	Required power in liquid kW	Power of installed motor kW	Vessel			Materials of construction	Remarks	
							Design temp. °C	Design pressure bar ga	Size dia x length mm			
Principal :									Revision letter			Documents Document Sharing Hub
									Date			
									Signature			

COLUMN SUMMARY						Design book No.: _____ page _____					
Project:		Location:									
Column Number C	Service	Design temperature °C	Design pressure bar ga	Size dia. x length mm	Type of trays	Number of trays	Materials of construction		Remarks		
							Shell	Internals			
Principal :							Revision letter			Documents	Document Sharing Hub
							Date				
							Signature				

VESSEL SUMMARY					Design book No.:		Page			
Project: Location:										
Vessel Number V	Service	Design temperature °C	Design pressure bar ga	Size dia. x length mm	Total volume m ³	Type of internals	Materials of construction		Remarks	
							Shell	Internals		
Principal :							Revision letter			Documents Document Sharing Hub
							Date			
							Signature			

REACTOR SUMMARY							Design book No.: _____ page _____				
Project:		Location:									
Reactor Number R	Service	Type	Design temperature °C	Design pressure bar ga	Size dia. x length mm	Type of internals	Materials of construction		Remarks		
							Shell	Internals			
Principal :							Revision letter			Documents	Document Sharing Hub
							Date				
							Signature				

EQUIPMENT						MOTOR RATING	LOAD FACTOR = A/B	EFFICIENCY at load factor C	POWER FACTOR at load factor C	kW = A/D	CONSUMED LOAD				REMARKS						
Equipment No.	Description	Vital	Essential	Non essential	Re- starting						ABSORBED LOAD	in decimals	at load factor C	cos φ		Continuous		Intermittent		Stand-by	
											A kW					B kW	C in decimals	D in decimals	E kW	F kVAr	G kW
1																					
2																					
3																					
4																					
5																					
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29																					

Maximum of normal running plant load:	kW;	kVAr;	$\sqrt{kW^2 + kVAr^2} =$	kVA	TOTAL												Power factor without compensation (cos φ): 0.
(Est. x%E + y%F)																	
Peak load																	
(Est. x%E + y%F + z%G)	kW;	kVAr;	$\sqrt{kW^2 + kVAr^2} =$	kVA	$kVA (= \sqrt{kW^2 + kVAr^2})$												Power factor with compensation (cos φ ₁): 0.
Coincidence factors x, y and z shall be defined for each separate case, subject to Principal's approval.																	Required capacitor rating [= kW (tgφ - tgφ ₁): kvar

NOTES																	
a) Load classification/restarting:						b) Absorbed loads:						c) Consumed loads:					
For definitions of "Vital", "Essential" and "Non-Essential" services and application "Restarting", see PTS 33.64.10.10						- for pumps, shaft load on duty point;						E - "Continuous"; all loads that may continuously be required for normal operation, including lighting and workshops					
						- for instrumentation, computers, communication, air conditioning, the required load during full operation of plant;						F - "Intermittent"; the loads required for intermediate pumping, storage, loading, etc.					
						- for lighting during dark hours;						G - "Stand-by"; loads required in emergencies only, such as fire-water pumps or those of normally not running electrically driven units stand-by for normally running steam-driven ones (e.g charge pumps, boiler feed pumps).					
						- for workshops, the average total load in normal full operation											

Project title		Revision letter															UTILITY DATA - ELECTRICAL
Principal		Date															Cont. Job No.
Consignee		Signature															Project No.:
Eng. by:																	Drawing No.:

PTS 05.00.10.80, Sheet 1 of 2, 03/2003

EQUIPMENT						MOTOR RATING	LOAD FACTOR = A/B	EFFICIENCY at load factor C	POWER FACTOR at load factor C cos φ	kW = A/D	CONSUMED LOAD				kVAr = kW.tg φ	REMARKS				
Equipment No.	Description	Vital	Essential	Non essential	Re- starting						ABSORBED	Continuous		Intermittent			Stand-by			
											LOAD									
											A	B	C	D						
						kW	kW	in decimals	in decimals		kW	kVAr	kW	kVAr	kW	kVAr				
30																				
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Project title							Revision letter							UTILITY DATA - ELECTRICAL						
Principal							Date							Cont. Job No.						
Consignee							Signature							Project No.:						
Eng. by:														Drawing No.:						

SUMMARY OF ELECTRICAL ENGINEERING

Project title:	Consignee:
Project No.:	Contr. Job No.:
Principal:	Eng. Contractor

CONTENTS

Title	Section	Number of sheets issued	Revision letter of sheet													
			1	2	3	4	5	6	7	8	9	10	11	12	13	14
Table of contents	1	1														
List of engineering drawings	2															
List of manufacturer's drawings	3															
List of cables	4															
Generators, Electric motors, Transformers, Reactors, Rectifiers, Static inverters	5															
Switch gear	6															
Cables and accessories	7															
Lighting material	8															
Earthing material	9															
Miscellaneous material	10															
First issue	Rev. letter												TABLE OF CONTENTS			
	Date															
	Signature															
													Drawing No.: T -		Section: 1	
															Sheet: 1	

	Principal's drawing				Engineering/drawing office drawing						Released for construction		Title	Remarks		
	No. T -	Revision			Name	Number	Revision			Rev.	Date					
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Project title:					Principlal:						Consignee:				Eng. by:	
First issue	Rev. letter											Project No.:	LIST OF ENGINEERING DRAWINGS			
	Date												Drawing No.:	Section 2		
	Sign.												T -	Sheet 2		

	Principal's drawing					Supplier						Title	Requisition	Item	Remarks				
	No. T -	Revision				Name	Address	Drawing No.	Revision										
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3																			
4																			
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Project title:					Principal:					Consignee:					Eng. by:				
First issue	Rev. letter											Project No.	LIST OF ENGINEERING DRAWINGS						
	Date												Drawing No.:	Section: 3					
	Sign.												T -	Sheet					

	Description of cable						Description of run		Remarks	
	Cable no.	Type	Length, mm	Size, mm ²		Volt. grade	From	To		
1										
2										
3										
4										
5										
6										
7										
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Project title:		Principal:				Consignee:			Eng. by:	
First issue	Rev. letter								Project No.: LIST OF CABLES	
	Date									
	Sign.									
									Drawing No.: T -	Section 4 Sheet

* For use by consignee only

	Requisition			Item	Quant.	Unit	Description	Date of		Name of supplier	Remarks	* Promised delivery	* Ex works	* At site
								Requisition	Order					
1														
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Project title:			Principal:			Consignee:			Eng. by:			
First issue	Rev. letter								Project No.:	LIST OF REQUISITIONS		
	Date									Drawing No.:	Section:	
	Sign.									T -	Sheet	

[illegible]

Equipment item No.	CONNECTED CABLES												SPACE FOR DIAGRAMS DEVIATING FROM STANDARD DRAWING S 67.019												
	MAIN			CONTROL				PILOT			PILOT														
	No. of cores and size	Diameter		Length	No. of cores and size	Diameter		No. of cores and size	Diameter		No. of cores and size	Diameter													
		Over lead	Over all			Over lead	Over all		Over lead	Over all		Over lead	Over all												
		mm ²	mm			mm	m		mm ²	mm		mm	mm ²												
1																									
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21																									
22																									
NOTES						TECHNICAL DATA																			
1 Only for Ex'e motors						Supply System: V; 3-phase; 3/4-wire; 50/60Hz earthed																			
2 Only for motors in inching or reversing rotating service						Bus-bar current rating: A																			
3 For details see PTS 33.67.01.31						Bus-bar short-circuit strength: kA rms, 1 s																			
						REFERENCES																			
MANUFACTURER'S DRAWINGS						PTS 33.67.01.31																			
						S 67.019 Single-line diagrams for LV switchboard panels																			
						S 67.004 Schematic diagrams of control circuits for LV motors																			
						S 67.021 LV switchboard panel identification																			
						T - Summary of electrical engineering																			
						Contractor Job No.																			
						Make: Type:																			
						Location:																			
Plan :						SCHEDULE FOR LV SWITCHBOARD						Drawing No.													
Designed by :												T -													
Eng. By :												Contr. Job No.:													
Principal :												Sub-group No. 67													

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Equipment Item No.	LABEL INSCRIPTION	LIGHTING DISTRIBUTION SWITCHBOARD DATA					DIAGRAMS	LAY-OUT		CONNECTED CABLES			
		Switch device Rating A	FUSE RATING		E.L.C.B		Standard arrangement in accordance with S 67.022	FINAL PANEL IDENTIFICATION		No. of cores and size mm ²	DIAMETER		No.
			Base A	Fuse A	Rating A	Sensitivity (mA)		Panel No.	Circuit No.		Over lead mm	Over all mm	
1													
2													
3													
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NOTES										TECHNICAL DATA									
										Supply system: ; 3- ϕ phase: wire: 50/60 Hz; earthed									
										Bus-bar current rating : A									
										Bus-bar short-circuit strength: kA rms, 1s									
										REFERENCES									
										PTS 33.67.01.31									
										S 67.021 LV switchboard panel identification									
MANUFACTURER'S DRAWINGS										S 67.022 Single-line diagrams and control circuits									
										for lighting distribution switchboards									
										T- Summary of electrical engineering									
										Contractor Job No. :									
										Make: Type:									
										Location:									
Project title:										Principal									
Consignee:										Eng. By:									
Switchboard No.:										Section: Left hand/centre/right hand/emergency									
Project No.:					Sub group No. 67					SCHEDULE FOR LIGHTING DISTRIBUTION SWITCHBOARD									
Requisition No.:										Drawing No.									
										T -									
First issue	Rev. letter																		
	Date																		
	Sign.																		

1	2	3	4	5	6	7	8	9	10	11	12	13
Equipment Item No.	LABEL INSCRIPTION	AC INSTRUMENT DISTRIBUTION SWITCHBOARD DATA					DIAGRAMS	LAY-OUT		CONNECTED CABLES		
		Switch device Rating A	FUSE RATING		CONTRACTOR		Standard arrangement in accordance with S 67.024	FINAL PANEL IDENTIFICATION		No. of cores and size mm ²	DIAMETER	
			Base A	Fuse A	Type	Rating A		Panel No.	Circuit No.		Over lead mm	Over all mm
1												
2												
3												
4												
5												
6												
7												
8												
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11												
12												
13												
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NOTES				TECHNICAL DATA								
				Supply system: V; phase: wire: 50/60 Hz; earthed								
				Bus-bar current rating : A								
				Transformers								
				Rating : kVA								
				Voltage ratio : / V;50/60 Hz								
				Phases : Single/three								
MANUFACTURER'S DRAWINGS				REFERENCES								
				PTS 33.67.01.31								
				S 67.024 Single-line diagram and control circuit								
				T- Summary of electrical engineering								
				Contractor Job No. :								
				Make: Type:								
				Location:								
Project title:				Principal								
Consignee:				Eng. By:								
Switchboard No.:				Location								
Project No.:				Sub group No. 67				SCHEDULE FOR DC INSTRUMENT DISTRIBUTION SWITCHBOARD				
Requisition No.:				Drawing No.								
				T -								
First issue	Rev. letter											
	Date											
	Sign.											

1	2	3	4	5	6	7	8	9	10
Equipment Item No.	LABEL INSCRIPTION	DC INSTRUMENT DISTRIBUTION CIRCUIT DATA			LAY-OUT		CONNECTED CABLES		
		Switch device Rating A	FUSE RATING		FINAL PANEL IDENTIFICATION		No. of cores and size mm ²	DIAMETER	
			Base A	Fuse A	Panel No.	Circuit No.		Over lead mm	Over all mm
1									
2									
3									
4									
5									
6									
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Documents

SPACE FOR DIAGRAMS DEVIATING FROM STANDARD DRAWING S 67.025/S 67.026 AND REMARKS

NOTES				TECHNICAL DATA								
				Supply system: V DC								
				Bus-bar current rating : A								
				Number of incoming feeder circuits: 2/3/4								
MANUFACTURER'S DRAWINGS				REFERENCES								
				PTS 33.67.01.31								
				S 67.025 Schematic diagram								
				S 67.026 Typical arrangement								
				T- Summary of electrical engineering								
				Contractor Job No. :								
				Make: Type:								
Project title:				Principal								
Consignee:				Eng. By:								
Switchboard No.:				Location								
Project No.:		Sub group No. 67		SCHEDULE FOR DC INSTRUMENT DISTRIBUTION SWITCHBOARD								
Requisition No.:				Drawing No. T -								
First issue	Rev. letter											
	Date											
	Sign.											

PTS 33.67.20.80, sheet 2/2, 11/2002



Documents

Document Sharing Hub

[illegible]

1	Panel label reading	(Note 1)									
2	Panel identification number										
3	Final panel identification number	(Note 2)									
4	Type of switching device										
5	Rated current switching device	A									
6	Rated current HV fuses	A									
7	Rating of generator	kVa									
8	Rating of transformer	kVa									
9	ELECTRIC MOTOR DATA										
10	Rated output	kW									
11	Full-load current	A									
12	LRC in % of FLC (at 100% U _n)	%									
13	Running-up time (at 80% U _n)	s									
14	Allowable running-up time	s									
15	E time (at 100% U _n)	(Note 3) s									
16	Restarting relay required	yes/no									
17	VOLTAGE TRANSFORMERS										
18	Secondary	V									
19	Rating	VA									
20	Class										
21	Secondary	V									
22	Rating	VA									
23	Class										
24	CURRENT TRANSFORMERS FOR PROTECTION										
25	Ratio	V									
26	Rating	VA									
27	Class										
28	Ratio	V									
29	Rating	VA									
30	Class										
31	Ratio	V									
32	Rating	VA									
33	Class										
34											
35	RELAYS										
36	Differential	Type/pcs									
37	Overcurrent	"									
38	Overvoltage	"									
39	Undervoltage	"									
40	Earth fault	"									
41	Rotor earth fault	"									
42	Stator earth fault	"									
43	Neutral overcurrent	"									
44	Reverse power	"									
45	Negative phase-sequence	"									
46											
47											
48	MEASURING, INDICATING AND INTEGRATING INSTR.										
49	Voltmeter	AC	Type/pcs								
50	Ammeter	AC	"								
51	Frequency meter	"									
52	Power-factor meter	"									
53	Ammeter	DC	"								
54	Wattmeter	"									
55	Reactive volt-ampere meter	"									
56	Watt-hour meter	"									
57	Maximum-demand indicator	"									
58	Recording (graphic) wattmeter	"									
59											
60											
61											
First Issue		Rev. letter									
		Date									
		Sign.									
Plant :			SCHEDULE FOR HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR							Drawing No.	
Consignee :			ASSEMBLIES							T -	
Eng. by :			Contr. Job No.:				Sheet No. 1, continued on sheet No. 2				
Principal :			Project No.:								

1	Panel label reading								
2	MAIN CABLES								
3	Type								
4	Cores x mm ²								
5	Diameter, overall	mm							
6	Diameter, overlead	mm							
7	Cable No.								
8	Type								
9	Cores x mm ²								
10	Diameter, overall	mm							
11	Diameter, overlead	mm							
12	Cable No.								
13	CONTROL CABLES								
14	Type								
15	Cores x mm ²								
16	Diameter, overall	mm							
17	Diameter, overlead	mm							
18	Cable No.								
19	Type								
20	Cores x mm ²								
21	Diameter, overall	mm							
22	Diameter, overlead	mm							
23	Cable No.								
24	Type								
25	Cores x mm ²								
26	Diameter, overall	mm							
27	Diameter, overlead	mm							
28	Cable No.								
29	MISCELLANEOUS CABLES								
30	Type								
31	Cores x mm ²								
32	Diameter, overall	mm							
33	Diameter, overlead	mm							
34	Cable No.								
35	Type								
36	Cores x mm ²								
37	Diameter, overall	mm							
38	Diameter, overlead	mm							
39	Cable No.								
40	Type								
41	Cores x mm ²								
42	Diameter, overall	mm							
43	Diameter, overlead	mm							
44	Cable No.								
45	Type								
46	Cores x mm ²								
47	Diameter, overall	mm							
48	Diameter, overlead	mm							
49	Cable No.								
50	Type								
51	Cores x mm ²								
52	Diameter, overall	mm							
53	Diameter, overlead	mm							
54	Cable No.								
55	Type								
56	Cores x mm ²								
57	Diameter, overall	mm							
58	Diameter, overlead	mm							
59	Cable No.								
60									
61									

First Issue	Rev. letter									
	Date									
	Sign.									
Plant :	SCHEDULE FOR HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR								Drawing No.	
Consignee :	ASSEMBLIES								T -	
Eng. by :					Contr. Job No.:				Sheet No. 2, continued on sheet No. 3	
Principal :					Project No.:					

1	TECHNICAL DATA				STANDARD DRAWINGS			
2	System voltage and frequency	:	kV, 3-phase, 50/60 Hz		S 67.027 - Identification of sections and panels			
3	Rated normal current	:	A		S 67.028 - Schematic diagrams of control circuits for HV motors (contractor starters)			
4	Short-time withstand current	:	kA rms, 1/3 s					
5	Peak withstand current	:	kA		Summary of electrical eng. T -			
6	System neutral	:	isolated/solidly earthed/earthed through		Ω			
7	Section	:	left hand/centre/right hand		MANUFACTURER'S DRAWINGS			
8								
9	Control voltage - Closing	:	- V AC/DC					
10	- Tripping	:	- V DC					
11	- Contactors	:	220/240/255-V AC					
12	Make and type	:						
13	Requisition No.	:						
14	Location	:						
15								
16	NOTES							
17	1. Schedule to be completed by supplier, where applicable							
18	2. Final panel identification number to be stated by supplier							
19	3. Only applicable to Ex (e) protected motors if located in Zone 1							
20								
21	SPACE FOR DIAGRAMS							
22								
23								
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First Issue	Rev. letter										
	Date										
	Sign.										
Plant	:	SCHEDULE FOR HIGH-VOLTAGE SWITCHGEAR AND CONTROLGEAR								Drawing No.	
Consignee	:	ASSEMBLIES								T -	
Eng. by	:							Contr. Job No.:		Sheet No. 3, continued on sheet No.	
Principal	:							Sub-group No. 67			

[illegible]

Project title:			Principal:							Consignee:					Eng. By:	
Rev letter cont'd															TRACE HEATING SUMMARY	
Date												Project:			Sub-group No:	
Signature												Requisition No.:			Drawing No.: Sheet No.: T- Cont'd on sheet:	

Legend for sheet 1

Column	Title	Description
1	Item number	This is a serial number. These numbers are fixed for the project, new items must be added at the bottom of the list.
2	Revision	Indicate the revision status per line. The revision numbers refers to the number in the bottom template.
3	Line No. / Equipment No./ Instrument No./	Item or object number to be traced.
4	Line size	The normal (pipe) diameter, DN.
5	Pipe length	The pipe length to be traced expressed in metres.
6	Pipe material	This column shows the pipe CS = Carbon Steel SS = Stainless Steel GRE = Plastic Etc.
7	Insulation material	Abbreviation showing insulation material: RW = Rockwool FG = Fiber Glass PI = Poly-isocyanurate CG = Cellular Glass FE = Foamed elastomer OTH = Other insulation material If "OTH" is filled in, the specific information on the applied material should be listed in the Remarks section. Note: Ageing factor to be applied
8	Insulation thickness	The insulation thickness in mm.
9	Operating temperature	The temperature of the medium during normal process operation. This temperature is taken as the continuous exposure temperature of the tracing.
10	Maximum medium temperature	The maximum temperature that the heat tracing is allowed to reach in the current design under limits imposed by any element in the system like: - medium - pipe material - insulation material
11	Maintain temperature	The temperature that needs to be kept by the tracing at the lowest ambient temperature.
12	Exposure temperature	The temperature of the medium during upset condition of the process. This temperature is used as the intermittent temperature, which the tracing cable must be able to withstand.
		TRACE HEATING SUMMARY
		Drawing No.
		Sheet No.: T- Cont'd on sheet:

PTS 33.68.30.80, sheet 2/3 02/2001

Legend for sheet 1 (continued)

Column	Title	Description																								
13	Steam out	The temperature of the steam used for pipe cleaning. The auto trace cables may be exposed to +190 °C intermittently. If steam out is not applicable, enter N.A. in this column.																								
14	Calculation temperatures	Calculation minimum: This is the minimum maintained temperature by the tracing at the lowest ambient temperature and 230 V power supply.																								
15	Thermostat	The setpoint of the thermostat if required. If no thermostat is required enter N.A. in this column.																								
16	Heat loss	The heat-loss of a given pipe at maintain temperature for the lowest ambient temperature. Including% heat-loss safety factor.																								
17	Type of heat tracing cable	Catalogue number of selected electrical trace cable.																								
18	Thermal output	The heat output of the tracing cable at maintain temperature with a supply voltage of 230 V.																								
19	Spiral ratio	The spiral ratio gives the number of tracing elements on the pipe. This is only applicable to straight tracing.																								
20	Cable length item	The length of tracing cable required to keep the item at maintain temperature.																								
21	Valves	No: The number of valves in the described item. Heater/valve length: The length of tracing cable to be installed per valve.																								
22	Stub-outs	Stub-outs are short pieces that are attached to the process pipe and need to be traced (e.g. drains, vents, instrument connections etc.) No: The number of stub-outs in the described item. Heater length/stub-out: The total of tracing cable to be installed per stub-out.																								
23	Supports	The standard support type is a No: The number of supports for the described item Heater length/support: The total of tracing cable to be installed around/on one support																								
24	Total length cable	This is the total length of tracing cable required to trace the item on the specific row.<table><tr><td>item length</td><td>x</td><td>Trace ratio</td><td>=</td></tr><tr><td>No. of valves</td><td>x</td><td>m length</td><td>=</td></tr><tr><td>No. of stub outs</td><td>x</td><td>m length</td><td>=</td></tr><tr><td>No. of supports</td><td>x</td><td>m length</td><td>=</td></tr><tr><td>Connection</td><td></td><td>1 m</td><td>=</td></tr><tr><td>Length</td><td></td><td></td><td></td></tr></table> Total length of cable	item length	x	Trace ratio	=	No. of valves	x	m length	=	No. of stub outs	x	m length	=	No. of supports	x	m length	=	Connection		1 m	=	Length			
item length	x	Trace ratio	=																							
No. of valves	x	m length	=																							
No. of stub outs	x	m length	=																							
No. of supports	x	m length	=																							
Connection		1 m	=																							
Length																										
25	Total heater current (amps)	The start-load of the heater at –5°C start-up temperature with 230 V power supply, 300 seconds after switching on the heat tracing circuit.																								
26	Total heater load (watts)	The output of the heat tracing cable at maintain temperature with power supply of 230 V.																								
27	Junction box	The identification of the junction box in the field.																								
28	Phase	This identifies which phase of the Main box the junction box is connected to (L1, L2 or L3).																								
		TRACE HEATING SUMMARY																								
		Drawing No.																								
		Sheet No.: T- Cont'd on sheet:																								

SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		PRINCIPAL OFFICE'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 1				
ORIGINAL to be sent to: (Principal's name and address)			Eng. Contractor's Job No.						
			Principal's project No.						
			Project title and applicable unit number(s)						
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:				
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4					
<u>Code to be used by principal only (see column 5)</u> <table border="0"> <tr> <td>1. Comments on document proper</td> <td>3. See additional remarks</td> </tr> <tr> <td>2. To be resubmitted for comments</td> <td>4. No comments</td> </tr> </table>						1. Comments on document proper	3. See additional remarks	2. To be resubmitted for comments	4. No comments
1. Comments on document proper	3. See additional remarks								
2. To be resubmitted for comments	4. No comments								
Additional remarks engineering contractor									
Additional remarks principal									
* Engineering contractor to indicate by X what is applicable									
Engineering contractors remain responsible for their documents under all circumstances, and shall never be entitled to allege express or tacit approval thereof by the principal.			Signature engineering contractor	For comments ☐ * Released ☐ *					

SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		PRINCIPAL OFFICE'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 2				
COPY to be sent to: (Principal's name and address)			Eng. Contractor's Job No.						
			Principal's project No.						
			Project title and applicable unit number(s)						
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:				
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4					
<u>Code to be used by principal only (see column 5)</u> <table border="0"> <tr> <td>1. Comments on document proper</td> <td>3. See additional remarks</td> </tr> <tr> <td>2. To be resubmitted for comments</td> <td>4. No comments</td> </tr> </table>						1. Comments on document proper	3. See additional remarks	2. To be resubmitted for comments	4. No comments
1. Comments on document proper	3. See additional remarks								
2. To be resubmitted for comments	4. No comments								
Additional remarks engineering contractor									
Additional remarks principal									
* Engineering contractor to indicate by X what is applicable									
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SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		PRINCIPAL OFFICE'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 3
COPY to be sent to: (Principal's name and address)			Eng. Contractor's Job No.		
			Principal's project No.		
			Project title and applicable unit number(s)		
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4	
<u>Code to be used by principal only (see column 5)</u> 1. Comments on document proper 2. To be resubmitted for comments 3. See additional remarks 4. No comments					
Additional remarks engineering contractor					
Additional remarks principal					
* Engineering contractor to indicate by X what is applicable					
Engineering contractors remain responsible for their documents under all circumstances, and shall never be entitled to allege express or tacit approval thereof by the principal.			Signature engineering contractor	For comments ☐ * Released ☐ *	

SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		PRINCIPAL OFFICE'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 4				
COPY to be sent to: (Principal's name and address)			Eng. Contractor's Job No.						
			Principal's project No.						
			Project title and applicable unit number(s)						
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:				
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4					
<u>Code to be used by principal only (see column 5)</u> <table border="0"> <tr> <td>1. Comments on document proper</td> <td>3. See additional remarks</td> </tr> <tr> <td>2. To be resubmitted for comments</td> <td>4. No comments</td> </tr> </table>						1. Comments on document proper	3. See additional remarks	2. To be resubmitted for comments	4. No comments
1. Comments on document proper	3. See additional remarks								
2. To be resubmitted for comments	4. No comments								
Additional remarks engineering contractor									
Additional remarks principal									
* Engineering contractor to indicate by X what is applicable									
Engineering contractors remain responsible for their documents under all circumstances, and shall never be entitled to allege express or tacit approval thereof by the principal.			Signature engineering contractor	For comments ☐ * Released ☐ *					

SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		PRINCIPAL OFFICE'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 5				
COPY to be sent to: (Principal's name and address)			Eng. Contractor's Job No.						
			Principal's project No.						
			Project title and applicable unit number(s)						
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:				
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4					
<u>Code to be used by principal only (see column 5)</u> <table border="0"> <tr> <td>1. Comments on document proper</td> <td>3. See additional remarks</td> </tr> <tr> <td>2. To be resubmitted for comments</td> <td>4. No comments</td> </tr> </table>						1. Comments on document proper	3. See additional remarks	2. To be resubmitted for comments	4. No comments
1. Comments on document proper	3. See additional remarks								
2. To be resubmitted for comments	4. No comments								
Additional remarks engineering contractor									
Additional remarks principal									
* Engineering contractor to indicate by X what is applicable									
Engineering contractors remain responsible for their documents under all circumstances, and shall never be entitled to allege express or tacit approval thereof by the principal.			Signature engineering contractor	For comments ☐ * Released ☐ *					

SPECIFICATION OF DESIGN AND ENGINEERING DOCUMENTS Sequential order No.		ENGINEERING CONTRACTOR'S COPY		All documents to be accompanied by one set of this specification. In this specification only the documents relating to one project sub-group number should be stated.	SHEET No. 6				
COPY to be sent to: (Principal's name and address)			Eng. Contractor's Job No.						
			Principal's project No.						
			Project title and applicable unit number(s)						
From:			Date of despatch from engineering contractor to principal:	Date of receipt by principal from engineering contractor:	Date of return from principal to engineering contractor:				
1. Registration No. of engineering contractor	2. Registration No. of principal	3. Number of transparencies and/or prints	4. Description of document or title	5 Code 1-4					
<u>Code to be used by principal only (see column 5)</u> <table border="0"> <tr> <td>1. Comments on document proper</td> <td>3. See additional remarks</td> </tr> <tr> <td>2. To be resubmitted for comments</td> <td>4. No comments</td> </tr> </table>						1. Comments on document proper	3. See additional remarks	2. To be resubmitted for comments	4. No comments
1. Comments on document proper	3. See additional remarks								
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