

Heat Recovery Steam Generator - Data Sheet

Procedure

This Standard replaces and cancels its previous revision.

The CONTEC - Authoring Subcommittee provides guidance on the interpretation of this Standard when questions arise regarding its contents. The Department of PETROBRAS that uses this Standard is responsible for adopting and applying the sections, subsections and enumerates thereof.

Technical Requirement: A provision established as the most adequate and which shall be used strictly in accordance with this Standard. If a decision is taken not to follow the requirement ("non-conformity" to this Standard) it shall be based on well-founded economic and management reasons, and be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by imperative nature.

Recommended Practice: A provision that may be adopted under the conditions of this Standard, but which admits (and draws attention to) the possibility of there being a more adequate alternative (not written in this Standard) to the particular application. The alternative adopted shall be approved and registered by the Department of PETROBRAS that uses this Standard. It is characterized by verbs of a nonmandatory nature. It is indicated by the expression: **[Recommended Practice]**.

Copies of the registered "non-conformities" to this Standard that may contribute to the improvement thereof shall be submitted to the CONTEC - Authoring Subcommittee.

Proposed revisions to this Standard shall be submitted to the CONTEC - Authoring Subcommittee, indicating the alphanumeric identification and revision of the Standard, the section, subsection and enumerate to be revised, the proposed text, and technical/economic justification for revision. The proposals are evaluated during the work for alteration of this Standard.

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CONTEC

Comissão de Normalização
Técnica

SC - 22

Utility Equipment

Introduction

PETROBRAS Technical Standards are prepared by Working Groups - WG (consisting specialized of Technical Collaborators from Company and its Subsidiaries), are commented by Company Units and its Subsidiaries, are approved by the Authoring Subcommittees - SCs (consisting of technicians from the same specialty, representing the various Company Units and its Subsidiaries), and ratified by the Executive Nucleus (consisting of representatives of the Company Units and its Subsidiaries). A PETROBRAS Technical Standard is subject to revision at any time by its Authoring Subcommittee and shall be reviewed every 5 years to be revalidated, revised or cancelled. PETROBRAS Technical Standards are prepared in accordance with PETROBRAS Technical Standard [N-1](#). For complete information about PETROBRAS Technical Standards see PETROBRAS Technical Standards Catalog.

Foreword

This Standard is the English version (issued in 04/2012) of PETROBRAS N-2728 REV. A 07/2011. In case of doubt, the Portuguese version, which is the valid document for all intents and purposes, shall be used.

1 Scope

1.1 This Standard standardizes Data Sheet form for Heat Recovery Steam Generator to be used in projects for PETROBRAS.

1.2 This Standard applies to projects started from the date of its issuance.

1.3 This Standard only contains Technical Requirements.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document applies.

PETROBRAS [N-381](#) - Execution of Drawings and Other Technical Documents in General;

PETROBRAS [N-1521](#) - Identification of Industrial Equipment.

ABNT [NBR 11096](#) - Stationary Steam Water-Tube and Fire-Tube Boilers;

ASME [PTC 4.4](#) - Gas Turbine Heat Recovery Steam Generators.

NOTE For documents referred in this Standard and for which only the Portuguese version is available, the PETROBRAS department that uses this Standard should be consulted for any information required for the specific application.

3 General Conditions

3.1 The Data Sheet is intended to record the purchaser's requirements and supplier's design details, and once completed, it shall be part of permanent document of the equipment.

3.2 The Data Sheet form is standardized in A4 format in accordance with Annex A.

3.3 To fill the footer and header of Data Sheet comply with PETROBRAS [N-381](#).

3.4 The ANNEX applicable to PETROBRAS [N-381](#) shall be used for continuation of any item exceeding Annex A of this Standard.

3.5 Identification of the steam generator shall comply with PETROBRAS [N-1521](#), and written in the header field for the name of the equipment (Heat Recovery Steam Generator), on the right side.

3.6 ABNT [NBR 11096](#) shall be followed in order to fill the Data Sheet.




3.7 Upon completing the Data Sheet, the following requirements shall be met:

- a) complete only the applicable fields, eliminating, with a horizontal line, the fields that are not applicable to the specific project;
- b) in the white lines, add any further data on the specific project.

3.8 This Data Sheet shall be reproduced for its routine use.


[illegible]


	DATA SHEET		NO.		REV.	
					SHEET	
	TITLE:				of	
HEAT RECOVERY STEAM GENERATOR						


01	ITEM NO.:					
02	LOCATION:					
03	UNIT:					
04	SERVICE:					
05	MANUFACTURER:			MODEL:		
06	QUANTITY:					
07						
08	GENERAL DATA					
09	MAIN SOURCE OF HEAT					
10	APPLICATION OF SUPERHEATED STEAM					
11	CYCLIC STRESSES			<input type="checkbox"/> YES <input type="checkbox"/> NO		
12	SUPPLEMENTARY BURNING			<input type="checkbox"/> YES <input type="checkbox"/> NO		
13	SUPPLEMENTARY FUEL					
14	TYPE OF BURNER					
15	TYPE OF FURNACE					
16	DIRECTION OF FLOW OF FLUE GAS			<input type="checkbox"/> HORIZONTAL <input type="checkbox"/> VERTICAL		
17	BYPASS OF FLUE GAS			<input type="checkbox"/> YES <input type="checkbox"/> NO		
18	WATER VOLUME (m ³)					
19	TYPE OF BYPASS DAMPER					
20	OUTER DIMENSIONS (mm) (H x W x L)					
21	WATER CIRCULATION					
22	PRESSURE LEVELS OF PRODUCED VAPOR					
23	DRAFT SYSTEM					
24	TYPE OF BOILER SUPPORT					
25	CONDITION OF INSTALLATION			<input type="checkbox"/> OUTDOOR <input type="checkbox"/> INDOOR		
26	ASSEMBLY / MANUFACTURING			<input type="checkbox"/> FIELD <input type="checkbox"/> MODULAR		
27	CONDITIONS OF STEAM AND FEED WATER					
28			STEAM		FEED WATER	
29	PRESSURE (kgf/cm ² g)					
30	TEMPERATURE (°C)					
31	FLOW RATE (t/h)					
32						
33	PERFORMANCE DATA					
34	CASE OF OPERATION	1	2	3	4	5
35	DESCRIPTION	NORMAL				
36	CONDITIONS OF RECOVERABLE GAS					
37	FLOW RATE (t/h)					
38	TEMPERATURE (°C)					
39	MAX. PRESSURE (mm H ₂ O g)					
40	COMPOSITION OF RECOVERABLE GAS (VOL. %)					
41	CO ₂					
42	N ₂					
43	O ₂					
44	SO ₂					
45	SO ₃					
46	NO ₂					
47	H ₂ O					
48						
49	MOLECULAR WEIGHT	kg/kmol				
50	PARTICULATE LOAD (kg/h)					
51	PARTICLE SIZE (WEIGHT%)					
52	DEW POINT OF H ₂ SO ₄ (°C)					
53	DEW POINT OF H ₂ O (°C)					

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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 02/09.


	DATA SHEET		NO.		REV.	
					SHEET	
	TITLE:				of	
HEAT RECOVERY STEAM GENERATOR						
01	PERFORMANCE DATA (CONTINUED) (SEE NOTES 1 AND 2)					
02	CASE OF OPERATION	1	2	3	4	5
03	CONDITIONS OF WATER/STEAM PROCESS					
04	FEED WATER					
05	PRESSURE (kgf/cm ² g)					
06	TEMPERATURE (°C)					
07						
08						
09	PRESSURE CONTROL AT OUTLET OF ECONOMIZER TO AVOID STEAMING	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
10	OUTLET ECONOMIZER PRESSURE UPSTREAM OF CONTROL VALVE (kgf/ cm ² g)					
11						
12	RECIRCULATION OF FEED WATER IN ECONOMIZER	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
13						
14						
15	BYPASS OF ECONOMIZER FEED WATER	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
16						
17						
18	OUTPUT TEMPERATURE OF ECONOMIZER (°C)					
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29	CONDITIONS OF FLUE GAS					
30						
31	PRESSURE (mm H ₂ O)					
32	TEMPERATURE (°C)					
33	SUPPLEMENTARY BURNING	<input type="checkbox"/> YES <input type="checkbox"/> NO				
34	FUEL					
35	FLOW RATE (t/h)					
36	GUARANTEED EMISSIONS IN STACK - (kg/h)					
37	NO _x					
38	SO _x					
39	CO					
40	MP10					
41	TOTAL UNBURNED HYDROCARBONS					
42						
43						
44						
45						
46						
47						
48						
49						
50	PINCH POINT (°C) - (by pressure level)					
51	APPROACH POINT (°C) - (by pressure level)					
52	EFFICIENCY (METHOD ON LOSSES)- ASME PTC 4.4					
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 03/09.						


	DATA SHEET				NO.				REV.				
	TITLE: HEAT RECOVERY STEAM GENERATOR								SHEET				
									of				
01 MECHANICAL PROJECT CONDITIONS (SEE NOTE 2)													
02 PROJECT CODE/STANDARD (W/ DATE OF ISSUANCE):													
03 COMBUSTION CHAMBER:													
04 TYPE:		VOLUME (m ³):			HEATING AREA (m ²):			DIMENSIONS (m):					
05 STEAM-AND-WATER DRUM													
06 PROJECT PRESSURE (kgf/cm ²)				NOMINAL DIAMETER: (in):				TOTAL LENGTH (mm):					
07 THICKNESS (mm):				WEIGHT (tf):				NO. OF HANDHOLE.:					
08 DIAM. OF HANDHOLE: (in):				ASTM MATERIAL:				TYPE OF WELDING:					
09 WATER DRUM:													
10 PROJECT PRESSURE (kgf/cm ²)				NOMINAL DIAMETER: (in):				TOTAL LENGTH (mm):					
11 THICKNESS (mm):				WEIGHT (tf):				NO. OF HANDHOLE.:					
12 DIAM. OF HANDHOLE: (in):				ASTM MATERIAL:				TYPE OF WELDING:					
13 BOILER HEAT EXCHANGE SECTION													
14 LOCATION		PIPE		HEAD		PIPE		HEAD		PIPE		HEAD	
15		PIPE		HEAD		PIPE		HEAD		PIPE		HEAD	
16 PROJECT PRESSURE (kgf/cm ²)													
17 PROJECT TEMPERATURE (°C)													
18 MAX. OPER. TEMP. (°C)													
19 HYDROSTATIC TEST PRESSURE (kgf/cm ²):													
20 HEATING AREA (m ²)													
21 QUANTITY													
22 DIAMETER (mm)													
23 THICKNESS (mm)													
24 CORROSION ALLOWANCE (mm)													
25 ASTM MATERIAL													
26 METHOD OF CONNECTION													
27 HEAT TREAT. STRESS RELIEF													
28 % WELDING FULLY RADIOG.													
29 ARRANGEMENT													
30 TRANSV. PITCH (mm)													
31 LONG PITCH (mm)													
32 NO. OF PIPES													
33 N ^o OF PASSES													
34 NO. OF PIPES PER PASS													
35 TOTAL LENGTH (m)													
36 FIN, PIN OR FLAT													
37 TYPE OF FIN / PIN													
38 PITCH / DIST. FINS / PINS (mm)													
39 THICK. /DIAM. FINS / PINS (mm)													
40 DIMENS. FINS / PINS (mm)													
41 FINS / PINS MATERIAL													
42 FOULING FACTOR (m ² .h.°C / kcal)													
43 MAX SPEED OF GAS (m/s)													
44 PIPE SUPPORT													
45 ASTM MATERIAL													
46 PROJECT TEMPERATURE (°C)													
47													
48 DESUPERHEATER													
49 TYPE:		MANUFA:			ASTM MATERIAL:			DIAMETER (mm):					
50 LOCATION:		INLET TEMPER (°C):			MAX. OPER. FLOW RATE (t/h):			MIN. OPER. FLOW RATE (t/h):					
51													
52													
53													
54													
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 04/09.													

	DATA SHEET		NO.		REV.
					SHEET
	TITLE:				of
HEAT RECOVERY STEAM GENERATOR					
01	MECHANICAL PROJECT CONDITIONS (CONTINUED)				
02					
03	DUCTS AND HOUSING				
04	LOCATION	BOILER HOUSING	INLET DUCT	OUTLET DUCT	BYPASS DUCT
05	PROJECT PRESSURE (mm H ₂ O)				
06	PROJECT TEMPERATURE (°C)				
07	SIZE (m) OR FREE AREA (m ²)				
08	HOUSING MATERIAL				
09	HOUSING THICKNESS (mm)				
10	COATING: INTERNAL/EXTERNAL				
11	THICKNESS (mm)				
12	MATERIAL				
13	ANCHORAGE (MATERIAL AND TYPE)				
14	HOUSING TEMPERATURE (°C)				
15					
16	STACK				
17	HOUSING MATERIAL:	CORROSION ALLOWANCE (mm):		MIN. THICK. (mm):	
18	INNER DIAMETER: (m)	AT BASE:	ON TOP:	HEIGHT ABOVE THE FLOOR (m):	
19	COATING MATERIAL:	<input type="checkbox"/> INTERNAL	<input type="checkbox"/> EXTERNAL	THICKNESS (mm):	
20	COATING EXTENT:	ANCHORAGE (MATERIAL AND TYPE)			
21	SPEED OF FLUE GAS OF PROJECT (m/s):	FLUE GAS TEMP. (°C)		NORMAL:	MAX.:
22	STACK EFFECT (GUARANTEED OPERATING MODE) (mm H ₂ O):				
23					
24	DAMPER / GUILLOTINE DAMPER				
25	LOCATION	BOILER INLET		BOILER OUTLET	
26	TYPE				
27	MANUFACTURER				
28	DRIVE / ACTUATOR				
29	LEAKAGE (m ³ /h)				
30	TIME OF ACTION (s)				
31	BURNER				
32	TYPE NFPA 85:	QUANTITY:	FLARE DIRECTION:	DRAFT:	
33	TYPE OF FUEL				
34	BURNER TEMP. (°C)				
35	PRESSURE (kgf/cm ² g)				
36	VISCOS. REQ. (CSt)				
37	CAPACITY OF FLARE (10 ⁶ kcal/h)	MIN.			
38		NORMAL			
39		MAX.			
40	EXCESS AIR (%)				
41					
42					
43	TURN DOWN				
44	LOSS OF LOAD (mm H ₂ O)				
45	IGNITER - RELEASE RATE (10⁶ kcal/h):				
46	TYPE:	FUEL:	OPER. PRESS. (kgf/cm ² g):	AUTOMATIC:	
47	ATOMIZATION STEAM				
48	OPERATING PRESSURE (kgf/cm ² g):	TEMPERATURE (°C):		CONSUMPTION (kg STEAM / kg COMB.):	
49	BURNER MATERIALS				
50	AIR DAMPER:	OIL NOZZLE:	GAS NOZZLE:		
51	OIL BOOM:	GAS BOOM:	ATOMIZER:		
52	IGNITER NOZZLE:				
53					
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 05/09.					

	DATA SHEET		NO.	REV.
	TITLE: HEAT RECOVERY STEAM GENERATOR			SHEET
				of
01	GAS FUELS% VOL. DRY BASIS			
02	COMPONENT			
03	H ₂			
04	O ₂			
05	N ₂ + O ₂			
06	N ₂			
07	CO			
08	CO ₂			
09	CH ₄			
10	C ₂ H ₆			
11	C ₂ H ₄			
12	C ₃ H ₈			
13	C ₃ H ₆			
14	ISOBUTANE			
15	N BUTANE			
16	ISOBUTENE			
17	2TC4			
18	2CC4			
19	RSH ppm			
20	H ₂ O ppm			
21	N PENTANE			
22	H ₂ S			
23	C ₅₊			
24	SUPPLY PRESSURE (kgf/cm ² g)			
25	SUPPLY TEMPERATURE (°C)			
26	P.C.I. (kcal/kg)			
27				
28	LIQUID FUELS			
29	CHARACTERISTICS			
30	VISCOSITY (cSt @ 98.9 °C)			
31	VISCOSITY (cSt @ 135 °C)			
32	VISCOSITY (cSt @ 163 °C)			
33	VISCOSITY (cSt @ 190 °C)			
34	VISCOSITY (cSt @ 240 °C)			
35	RATIO C/H (WEIGHT)			
36	d 20/4			
37	SULFUR CONTENT (% WEIGHT)			
38	VANADIUM CONTENT (ppm WEIGHT)			
39	SODIUM CONTENT (ppm WEIGHT)			
40	ASH CONTENT (% WEIGHT)			
41	SUPPLY PRESSURE (kgf/cm ² g)			
42	SUPPLY TEMP (°C)			
43	BACK PRESSURE (kgf/cm ² g)			
44	P.C.I. (kcal/kg)			
45	NOTES:			
46				
47				
48				
49				
50				
51				
52				
53				
54				
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 06/09.				

	DATA SHEET		NO.		REV.
	TITLE: HEAT RECOVERY STEAM GENERATOR				SHEET
					of
01	FORCED DRAFT FANS				
02	TYPE:	MANUFACTURER:		CAPACITY (Nm ³ /h):	
03	HEIGHT OF PRESS GAUGE (mm H ₂ O):	POWER REQUIRED: (kW):		DRIVE:	
04	TURBINE OF V.T.F. (FORCED DRAFT FAN)				
05	TYPE:	MANUFACTURER:		ESTIMATED OUTPUT:	
06	STEAM SUPPLY:	STEAM OUTPUT:		STEAM FLOW RATE (t/h):	
07	ENGINE OF V.T.F.				
08	TYPE:	MANUFACTURER:		ESTIMATED OUTPUT:	
09					
10	INDUCED DRAFT FANS				
11	TYPE:	MANUFACTURER:		CAPACITY (Nm ³ /h):	
12	HEIGHT OF PRESS GAUGE (mm H ₂ O):	POWER REQUIRED: (kW):		DRIVE:	
13	TURBINE OF V.T.I. (INDUCED DRAFT FAN)				
14	TYPE:	MANUFACTURER:		ESTIMATED OUTPUT:	
15	STEAM SUPPLY:	STEAM OUTPUT:		STEAM FLOW RATE (t/h):	
16	ENGINE OF V.T.I.				
17	TYPE:	MANUFACTURER:		ESTIMATED OUTPUT:	
18					
19	SOOTBLOWER				
20	MANUFACTURER:				
21					
22	LOCATION	NUMBER	TYPE	BLOWING FLUID	ENGINE RATIO
23	SUPERHEATERS				
24	VAPORIZATION SECTION				
25	ECONOMIZER				
26	LOCATION OF CONTROL:				
27	CONTROL MODE:				
28					
29	SEALING AIR FAN				
30	QTY/TYPE:	MANUFACTURER:		CAPACITY (Nm ³ /h):	
31	HEIGHT OF PRESS GAUGE (mm H ₂ O):	POWER REQUIRED: (kW):		DRIVE:	
32					
33	CHEMICAL DOSE UNIT (FLUID):				
34	DOSING PUMP			CHEMICAL TANK	
35	NO. REQUIRED:	CAPACITY (m ³ /h):		NO. REQUIRED:	DIAMETER (mm):
36	MANUFACTURER:	DISC. PRESS. (kgf/cm ² g):		PROJECT PRESSURE (kgf/cm ² g):	HEIGHT (mm):
37	TYPE/MODEL:	ENGINE (kW):		PROJECT TEMP. (°C):	THICKNESS (mm):
38				CAPACITY (m ³):	MATERIALS:
39					
40	CONTINUOUS BLOW DOWN TANK			INTERMITTENT BLOW DOWN TANK	
41	PROJ. CODE/ STD.:	DIAMETER (mm):		PROJ. CODE/ STD.:	DIAMETER (mm):
42	PROJ. PRESS. (kgf/cm ² g):	HEIGHT (mm):		PROJECT PRESSURE (kgf/cm ² g):	HEIGHT (mm):
43	PROJECT TEMP. (°C):	THICKNESS (mm):		PROJECT TEMP. (°C):	THICKNESS (mm):
44	CAPACITY (m ³ /h):	MATERIALS:		CAPACITY (m ³ /h):	MATERIALS:
45					
46					
47					
48					
49					
50					
51					
52					
53					
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 07/09.					

	DATA SHEET		NO.		REV.
	TITLE: HEAT RECOVERY STEAM GENERATOR				SHEET
					of
01	FEED WATER PREHEATER				
02	TYPE SUBJECT:	TOTAL HEAT EXCHANGE. (10 ⁶ kcal/h):		EXCHANGE AREA (m ²):	
03	TOTAL COEFFICIENT OF HEAT EXCHANGE (kcal/m ² .h.°C):				
04	PERFORMANCE	SIDE OF PIPES		SIDE OF STEAM-AND-WATER DRUM	
05	FLUID NAME	BOILER FEED WATER		WATER/SATURATED STEAM	
06		INLET	OUTLET		
07	TEMPERATURE (°C)				
08	OPERATING PRESSURE (kgf/cm ² g)				
09	DENSITY (kg/m ³)				
10	VISCOSITY (cP)				
11	THERMAL CONDUCTIVITY (kcal/mh°C)				
12	SPEED (m/s)				
13	FOULING FACTOR (m ² .h.°C/kcal)				
14	CONSTRUCTION	SIDE OF PIPES		SIDE OF STEAM-AND-WATER DRUM	
15	PROJECT PRESSURE (kgf/cm ² g)				
16	PROJECT TEMPERATURE (°C):				
17	PITCH (mm)				
18	NO. OF PIPES				
19	NO. OF PASSES				
20	NO.. OF PIPES PER PASS				
21	TYPE OF PIPE				
22	OUTER DIAMETER (mm)				
23	THICKNESS (mm)				
24	CORROSION ALLOWANCE (mm)				
25	ARRANGEMENT/LENGTH (mm)				
26	ASTM MATERIAL				
27					
28	AIR PREHEATER				
29	TYPE SUBJECT:	TOTAL HEAT EXCHANGE. (10 ⁶ kcal/h):		EXCHANGE AREA (m ²):	
30	TOTAL COEFFICIENT OF HEAT EXCHANGE (kcal/m ² .h.°C):				
31	PERFORMANCE	SIDE OF PIPES		SIDE OF STEAM-AND-WATER DRUM	
32	FLUID NAME	BOILER FEED WATER		WATER/SATURATED STEAM	
33		INLET	OUTLET		
34	TEMPERATURE (°C)				
35	OPERATING PRESSURE (kgf/cm ² g)				
36	DENSITY (kg/m ³)				
37	VISCOSITY (cP)				
38	THERMAL CONDUCTIVITY (kcal/mh°C)				
39	SPEED (m/s)				
40	FOULING FACTOR (m ² .h.°C/kcal)				
41	CONSTRUCTION	SIDE OF PIPES		SIDE OF STEAM-AND-WATER DRUM	
42	PROJECT PRESSURE (kgf/cm ² g)				
43	PROJECT TEMPERATURE (°C):				
44	PITCH (mm)				
45	NO. OF PIPES				
46	NO. OF PASSES				
47	NO. OF PIPES PER PASS				
48	TYPE OF PIPE				
49	OUTER DIAMETER (mm)				
50	THICKNESS (mm)				
51	CORROSION ALLOWANCE (mm)				
52	ARRANGEMENT/LENGTH (mm)				
53	ASTM MATERIAL				
54					
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FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 08/09.					

		DATA SHEET				NO.				REV.		
		TITLE: HEAT RECOVERY STEAM GENERATOR								SHEET		of
01	SITE CONDITIONS											
02	ROOM TEMPERATURE (°C)			MAX.:		NORMAL/MILD:			MIN.:			
03												
04	ELEVATION (m):					BAROMETRIC PRESSURE (kgf/cm ² a):						
05	WIND SPEED (km/h):					PREVAIL. WIND DIRECTION:						
06	AREA CLASSIFICATION:											
07												
08	UTILITIES											
09	B. VAPOR PRESSURE		MIN.	NORMAL	MAX.	M. VAPOR PRESSURE		MIN.	NORMAL	MAX.		
10	PRESSURE (kgf/cm ² g)					PRESSURE (kgf/cm ² g)						
11	TEMPERATURE (°C)					TEMPERATURE (°C)						
12	TOTAL CONSUMPTION (kg/h)					TOTAL CONSUMPTION (kg/h)						
13												
14	INSTRUMENT AIR		NORMAL	MAX.	PROJECT	SERVICE AIR		NORMAL	MAX.	PROJECT		
15	PRESSURE (kgf/cm ² g)					PRESSURE (kgf/cm ² g)						
16	TEMPERATURE (°C)					TEMPERATURE (°C)						
17	TOTAL CONSUMPTION (Nm ³ /h)					TOTAL CONSUMPTION (Nm ³ /h)						
18	DEW POINT (°C)					DEW POINT (°C)						
19	OIL-FREE: <input type="checkbox"/> YES <input type="checkbox"/> NO					OIL-FREE: <input type="checkbox"/> YES <input type="checkbox"/> NO						
20												
21	COOLING WATER											
22	CIRCUIT: <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED		TYPE WATER		OF		FOULING (m ² .h.°C/kcal):		FACTOR			
23	INLET		NORMAL	PROJECT	CUT	OUTLET		NORMAL	PROJECT	MAX. (*)		
24	PRESSURE (kgf/cm ² g)					PRESSURE (kgf/cm ² g)						
25	TEMPERATURE (°C)					TEMPERATURE (°C)						
26	TOTAL CONSUMPTION (Nm ³ /h) NORMAL:					MAX.:			(*) MAX. ALLOWABLE			
27												
28	MACHINES WATER COOLING											
29	CIRCUIT: <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED		TYPE WATER		OF		FOULING (m ² .h.°C/kcal):		FACTOR			
30	INLET		NORMAL	PROJECT	CUT	OUTLET		NORMAL	PROJECT	MAX. (*)		
31	PRESSURE (kgf/cm ² g)					PRESSURE (kgf/cm ² g)						
32	TEMPERATURE (°C)					TEMPERATURE (°C)						
33	TOTAL CONSUMPTION (Nm ³ /h) NORMAL:					MAX.:			(*) MAX. ALLOWABLE			
34												
35	ENGINE POWER		UP TO 200 HP			FROM 201 HP TO 2000 HP			ABOVE 2000 HP			
36	VOLTAGE (V)											
37	FREQUENCY (Hz):											
38	NUMBER OF PHASES:											
39			NORMAL	MAX		NORMAL	MAX		NORMAL	MAX		
40	TOTAL CONSUMPTION (kW)											
41												
42	BOILER FEED WATER											
43	ALKALINITY (ppm):			CHLORINE (ppm):			HARDNESS (ppm CaCO ₃):					
44	pH:			SILICA (ppm):			DISSOLVED OXYGEN:					
45	HYDRAZINE (ppm):			CONDUCTIVITY (μS/cm):			POTASSIUM + SODIUM (ppm):					
46	IRON (ppm):			COPPER (ppm):			SULFATE (ppm):					
47	NOTE 1 THE PERFORMANCE DATA SHALL BE REPORTED FOLLOWING THE STEAM FLOW.											
48	NOTE 2 PAGES 03/09 AND 04/09 MAY BE DUPLICATED, IF NECESSARY.											
49												
50												
51												
52												
INFORMATION HEREIN IS PROPERTY OF PETROBRAS; ITS UTILIZATION FOR OTHER PURPOSES IS NOT ALLOWED.												
FORM BELONGING TO PETROBRAS N-2728 REV. A ANNEX A- SHEET 09/09.												

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