

Special Purpose Gear - Data Sheet

Standardization

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 - 11

Machines

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 08/2013) of PETROBRAS N-1921 REV. C 08/2013. 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 covers special purpose gear data sheet to be used in PETROBRAS designs.

1.2 This Standard shall be applied to supplies beginning from its issue date.

1.3 This Standard contains only 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 (including any amendments) applies.

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

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

API [STD 613](#) - Special Purpose Gear Units for Petroleum, Chemical, and Gas Industry Services.

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 Basic Considerations

3.1 The Annex A is the data sheet to be used to special purpose gear for SI units, according to API [STD 613](#).

3.2 The Annex B is the data sheet to be used to special purpose gear for Technical System units.

3.3 These data sheets shall be attached to a RM (Material Requisition), to be considered a purchasing document.

3.4 These data sheets shall be considered a lasting document of the equipment after they have been fulfilled (as built) by the Manufacturer or Engineering Company.

3.5 The heading and footnotes shall be filled in accordance with PETROBRAS [N-381](#).

3.6 The tag number of the equipment shall be written in an outstanding position as per PETROBRAS [N-1521](#).



DATA SHEET

No.

CLIENT:

SHEET

—

of

9

JOB:

AREA:

TITLE:

SPECIAL PURPOSE GEAR

INDEX OF REVISIONS

REV.

DESCRIPTION AND/OR REVISED SHEETS

	REV. 0	REV. A	REV. B	REV. C	REV. D	REV. E	REV. F	REV. G	REV. H
DATE									
DESIGN									
EXECUTION									
CHECK									
APPROVAL									

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THIS FORM IS PART OF PETROBRAS N-1921 REV. C ANNEX A - SHEET 01/06.

		DATA SHEET		No.	REV.
					SHEET 2 of 6
		TITLE: SPECIAL PURPOSE GEAR			
1	APPLICABLE TO:		☐ PROPOSAL	☐ PURCHASE	☐ AS BUILT
2	FOR: _____			UNIT: _____	
3	SITE: _____			SERVICE: _____	
4	No. REQ'D: _____			MANUFACTURER: _____	
5	MODEL: _____			VENDOR: _____	
6	SIZE / TYPE _____			DRIVER / DRIVEN - (TYPE): _____	
7	SERIAL No.: _____			MANUFACTURER No. _____	
8	UNITS OF MEASUREMENT		BASIC GEAR DATA		
9	☐ TECHNICAL SYSTEM UNITS		☐ SINGLE STAGE ☐ SINGLE HELICAL		
10	☒ SI UNITS		☐ DOUBLE STAGE ☐ DOUBLE HELICAL		
11	RATING REQUIREMENTS		☐ EPICYCLIC ☐ _____		
12	DRIVEN EQUIP. kW: NORM. _____ MAX. _____		MECHANICAL RATING kW _____ @ _____ rpm		
13	DRIVER kW: RATED _____ MAX. _____		GEAR SERVICE FACTOR _____ (ACTUAL)		
14	NORMAL TRANSMITTED POWER _____ kW		FULL LOAD GEAR UNIT POWER LOSS _____ kW		
15	GEAR UNIT RATED POWER _____ kW		GEAR UNIT MECHANICAL EFFICIENCY _____ %		
16	TORQUE @ MAX CONT SPEED _____ N.m		RATED SPEED, RPM PINION _____ GEAR _____		
17	MAX TORQUE _____ N.m @ _____ rpm		HARDNESS USED FOR		
18	☐ REDUCER ☐ INCREASER		RATING, (HB OR RC) PINION _____ GEAR _____		
19	RATED SPEED, rpm:		TOOTH PITTING INDEX, "K" MPa		
20	INPUT _____ ☐ SPECIFIED ☐ NOMINAL		ALLOWABLE _____ ACTUAL _____		
21	OUTPUT _____ ☐ SPECIFIED ☐ NOMINAL		MATERIAL INDEX NUMBER, MPa _____		
22	ALLOW. VAR IN GEAR RATIO (+) (-) _____ %		BENDING STRESS NUMBER, "St" MPa		
23	MAX CONTINUOUS SPEED _____ rpm		PINION: ALLOWABLE _____ ACTUAL _____		
24	TRIP SPEED _____ rpm		GEAR: ALLOWABLE _____ ACTUAL _____		
25	GEAR SERVICE FACTOR _____ (MIN)		PITCH LINE VELOCITY _____ m/s		
26	HARDNESS, PINION _____ GEAR _____		ANTICIPATED SPL _____ dBA @ _____ m		
27	SHAFT ASSEMBLY DESIGNATION _____		WR ² REFERRED TO LS SHAFT _____ N.mm ²		
28	HS SHAFT ROT FAC'G CPL'G ☐ CW ☐ CCW		BREAKAWAY TORQUE _____ N.m		
29	LS SHAFT ROT FAC'G CPL'G ☐ CW ☐ CCW		PINION TEETH HARDNESS RANGE _____		
30	EXTERNAL LOADS _____		PINION TEETH HARDENING METHOD: _____		
31	OTHER OPERATING CONDITIONS _____		☐ HS SHAFT SEPARATE / HARDNESS RANGE _____		
32			GEAR TEETH (RIM) HARDNESS RANGE _____		
33	INSTALLATION DATA		GEAR TEETH HARDENING METHOD: _____		
34	☐ INDOOR ☐ HEATED ☐ UNDER ROOF		GEAR HUB:		
35	☐ OUTDOOR ☐ UNHEATED ☐ PARTIAL SIDES		☐ FORGED CYLINDER ☐ FORGED & COPED ☐ FABRICATED		
36	☐ GRADE ☐ MEZZANINE ☐ _____		GEAR TO SHAFT FIT METHOD		
37	☐ WINTERIZATION REQ'D ☐ TROPICALIZATION REQUIRED		☐ INTEGRAL ☐ KEYED INTERFERENCE ☐ KEYLESS INTERFERENCE		
38	ELEC. AREA: ZONE _____ GRP _____ TEMP. _____		RIM ATTACHMENT _____		
39	ELEC. AREA: DIV. _____ CLASS/GRP _____ TEMP. _____		LS SHAFT HARDNESS RANGE		
40	MAX ALLOW SPL _____ dBA @ _____ m		JOURNAL STATIC WEIGHT LOADS		
41	ELEVATION _____ m BAROMETER _____ kPa		PINION _____ N GEAR _____ N		
42	RANGE OF AMBIENT TEMPERATURES:		TOTAL GEAR UNIT ASSEMBLED WEIGHT _____ N		
43	DRY BULB _____ °C WET BULB _____ °C				
44	NORMAL _____ °C _____ °C				
45	MAXIMUM _____ °C _____ °C				
46	MINIMUM _____ °C _____ °C				
47	RELATIVE HUMIDITY, %:				
48	UNUSUAL CONDITIONS ☐ DUST ☐ FUMES				
49	☐ SALTY ATMOSPHERE				
50	☐ OTHER _____				
51	REMARKS:				
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		DATA SHEET		No.	REV.
					SHEET 3 of 6
		TITLE: SPECIAL PURPOSE GEAR			
1	GEAR DATA			COUPLING AND GUARDS	
2		PINION	GEAR		PINION SHAFT GEAR SHAFT
3	NUMBER OF TEETH	_____	_____	COUPLING FURNISHED BY	_____
4	GEAR RATIO	_____	_____	MOUNT COUPLING HALVES	_____
5	TANGENTIAL LOAD, "Wt", N	_____	_____	CPLG. GUARD ADAPTER BY	_____
6	AGMA GEOMETRY FACTOR "J"	_____	_____	CPLG. GUARD FURNISHED BY	_____
7	PITCH DIAMETER, mm	_____	_____	COUPLING VENDOR	_____
8	OUTSIDE DIAMETER, mm	_____	_____	VENDOR'S MODEL NUMBER	_____
9	ROOT DIAMETER, mm	_____	_____	CPLG WEIGHT ON SHAFT, N	_____
20	LENGTH LINE OF ACTION, mm	_____	_____	CG IN/OUTBOARD OF SHAFT END	_____
11	CENTER GROOVE DIAMETER, mm	_____	_____	HUB DRILL TEMPLATE PROVIDED	_____
12	NORM. PRESS. ANGLE, DEGREES	_____	_____	SHAFT END DETAIL	
13	NORMAL DIAMETRAL PITCH, mm	_____	_____	SHAFT END DETAIL SPECIFIED BY: ☐ PURCHASER ☐ GEAR VENDOR	
14	HELIX ANGLE, DEGREES	_____	_____	(INTEGRAL UNLESS OTHERWISE SPECIFIED)	
15	CENTER DISTANCE, mm	_____	_____	SHAFT END DETAIL IF "OTHERWISE" SPECIFIED: PINION GEAR	
16	BACKLASH, mm	_____	_____	TAPERED / KEYLESS	☐ ☐
17	NET FACE WIDTH, "FW", mm	_____	_____	TAPERED / 1-KEY	☐ ☐
18	PINION L/D	_____	_____	TAPERED / 2-KEYS	☐ ☐
19	FACE OVERLAP RATIO	_____	_____	CYLINDRICAL / 1-KEY	☐ ☐
20	TRANSVERSE CONTACT RATIO	_____	_____	CYLINDRICAL / 2-KEYS	☐ ☐
21	AGMA 6011 SERVICE FACTOR	_____	_____	OTHER _____	☐ ☐
22	RATINGS BASED ON ANSI/AGMA 6011 WITH SF=1.0	_____	_____	SHAFT DIAMETER, mm	_____
23	DURABILITY POWER	_____	_____	(IF INTEGRAL FLANGE USE DIAM. IMMEDIATELY ADJACENT TO FLANGE)	
24	STRENGTH POWER	_____	_____	RADIAL BEARING	
25	TOOTH SURFACE FINISH, μm RA	_____	_____		PINION GEAR
26	TOOTH GENERATION PROCESS	_____	_____	TYPE	_____
27	TOOTH FINISHING PROCESS	_____	_____	DIAMETER, mm	_____
28	LEAD MODIFICATION ☐ NOT REQ'D ☐ REQ'D	_____	_____	LENGTH, mm	_____
29	CALCULATED TOTAL LEAD MISMATCH _____ μm	_____	_____	JOURNAL VELOCITY, m/s	_____
30		_____	_____	LOADING, kPa	_____
31		_____	_____	CLEARANCE MIN/MAX, mm	_____
32		_____	_____	SPAN, mm	_____
33		_____	_____	POWER LOSS EA BRG., kW	_____
34	SCUFFING DATA			OIL FLOW EA BRG., m^3/h	_____
35	SCUFFING DATA PER ANSI/AGMA 925-A03			THRUST BEARING(S)	
36	SCUFFING RISK _____	CALCULATION METHOD _____		LOCATION	_____
37	COMPOSITE SURFACE ROUGHNESS σ_x _____ μm	_____	_____	MANUFACTURER	_____
38	SPECIFIC FILM THICKNESS, EHL λ_{min} _____ μm	_____	_____	TYPE	_____
39	TOOTH TEMPERATURE, θ_M _____ $^{\circ}\text{C}$	_____	_____	SIZE	_____
40	MAXIMUM CONTACT TEMPERATURE, $\theta_{B \text{ MAX}}$ _____ $^{\circ}\text{C}$	_____	_____	AREA, mm^2	_____
41				LOADING, kPa	_____
42	MATERIALS			RATING, kPa	_____
43	GEAR CASING _____	OIL SEALS _____		INT. THRUST LOAD, N (+)(-)	_____
44	PINION(S) _____			EXT. THRUST LOAD, N (+)(-)	_____
45	GEAR RIM(S) _____			POWER LOSS EACH, kW	_____
46	HS SHAFT _____	LS SHAFT _____		OIL FLOW EACH, m^3/h	_____
47	RADIAL BEARINGS _____	BACKING _____			
48	THRUST BEARING(S) _____	BACKING _____			
49					
50	SHAFT END DETAIL				
51	☐ GEAR SHAFT END FOR COUPLING INTEGRAL FLANGE				
52	☐ PINION SHAFT END FOR COUPLING INTEGRAL FLANGE				
53	☐ OTHER: _____				
54					
55	REMARKS:				
56					
57					
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