

Supplementary Specification to API Standard 677 General-Purpose Gear Units for Petroleum, Chemical and Gas Industry Services

Public Review Draft

Revision history

VERSION	DATE	PURPOSE
0.1	October 2019	Issued for Public Review

Acknowledgements

This IOGP Specification was prepared by a Joint Industry Project 33 Standardization of Equipment Specifications for Procurement organized by IOGP with support by the World Economic Forum (WEF).

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Foreword

This specification was prepared under Joint Industry Programme 33 (JIP33) "Standardization of Equipment Specifications for Procurement" organized by the International Oil & Gas Producers Association (IOGP) with the support from the World Economic Forum (WEF). Companies from the IOGP membership participated in developing this specification to leverage and improve industry level standardization for projects globally in the oil and gas sector. The work has developed a minimized set of supplementary requirements for procurement, with life cycle cost in mind, resulting in a common and jointly approved specification, building on recognized industry and/or international standards.

Recent trends in oil and gas projects have demonstrated substantial budget and schedule overruns. The Oil and Gas Community within the World Economic Forum (WEF) has implemented a Capital Project Complexity (CPC) initiative which seeks to drive a structural reduction in upstream project costs with a focus on industry-wide, non-competitive collaboration and standardization. The CPC vision is to standardize specifications for global procurement for equipment and packages, facilitating improved standardization of major projects across the globe. JIP33 provides the oil and gas sector with the opportunity to move from internally to externally focused standardization initiatives and provide step change benefits in the sector's capital projects performance.

This specification has been developed in consultation with a broad user and supplier base to realize benefits from standardization and achieve significant project and schedule cost reductions.

The JIP33 work groups performed their activities in accordance with IOGP's Competition Law Guidelines (November 2014).

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Introduction

The purpose of this specification is to define a minimum common set of specification requirements for the procurement of general purpose gear units in accordance with API Standard 677, Third Edition, April 2006, for application in the petroleum and natural gas industries.

This JIP33 standardized procurement specification follows a common document structure comprising the four documents as shown below, which together with the purchase order define the overall technical specification for procurement.



JIP33 Specification for Procurement Documents Supplementary Technical Specification

It is required to use all of these documents in conjunction with each other when applying this specification, as follows.

S-712: Specification for General Purpose Gear Units

This specification is written as an overlay to API Standard 677, following the clause structure of the parent standard, to assist in cross-referencing the requirements. Where clauses from the parent standard API Standard 677 are not covered in this specification, there are no supplementary requirements or modifications to the respective clause. The terminology used within this specification follows that of the parent standard and otherwise is in accordance with ISO/IEC Directives, Part 2.

Modifications to the parent standard defined in this specification are identified as Add (add to clause or add new clause), Replace (part of or entire clause) or Delete.

S-712D: Data Sheet for General Purpose Gear Units

This document provides project specific requirements where this specification requires the purchaser to define an application specific requirement. It also includes information required by the purchaser for technical evaluation. Additional purchaser supplied documents are also listed in the data sheet, to define scope and technical requirements for enquiry and purchase of the equipment.

S-712L: Information Requirements for General Purpose Gear Units

This document defines the information requirements, including format, timing and purpose, for information to be provided by the vendor. It also defines the specific conditions which must be met for conditional information requirements to become mandatory. The information requirements listed in the IRS have references to the source of the requirement.

S-712Q: Quality Requirements for General Purpose Gear Units

This document includes a conformity assessment system (CAS) which specifies standardized user interventions against quality management activities at four different levels. The applicable CAS level is specified by the purchaser in the data sheet.

The data sheet and the IRS are published as editable documents for the purchaser to specify application specific requirements. The supplementary specification and QRS are fixed documents.

Unless defined otherwise in the purchase order, the order of precedence (highest authority listed first) of the documents shall be:

- a) regulatory requirements;
- b) contract documentation (e.g. purchase order);
- c) purchaser defined requirements (data sheet, IRS, QRS);
- d) this specification;
- e) the parent standard.

1 General

1.2 ALTERNATIVE DESIGN

Add to section

Alternative proposals shall have equal or greater operating reliability based on proven experience. Acceptance of alternative proposals shall be subject to the purchaser's approval.

2 Basic Design

2.1 GENERAL

2.1.1

Replace "AGMA 6010" with

"AGMA 6013"

2.1.4

Add to section

The purchaser shall specify the driven equipment's operating envelope covering all operating points in addition to rated operating point, including minimum and maximum speed, and minimum and maximum torque.

2.1.7

Add to section

The purchaser shall specify cooling medium design requirements to gear unit vendor to design the heat exchangers.

2.5 CASINGS

2.5.1 Design Parameters

2.5.1.3

Add to section

Shimming between the housing and bearing is not permitted.

2.5.1.4

Add to section

The material of construction for internal piping shall be SS 316L minimum.

2.5.1.5

Add to section

Tubes and fittings of SS 316 grade shall be used for internal lube oil piping.

2.5.1.10

Add to section

Purge oil mist shall not be applied.

Add new section

2.5.1.14

Fasteners internal to the gearbox shall be positively locked or retained. The use of a thread-locking compound alone is not considered positive locking.

2.6 CASING CONNECTIONS

2.6.2 Lube-oil Connections

2.6.2.1

Add to section

Oil supply and drain connections shall be flanged.

2.6.2.2

Replace second sentence with

The material of construction for plugs shall be 316 stainless steel minimum.

2.7 GEAR ELEMENTS

2.7.2 Quality Assurance

2.7.2.3

Add to section

The gear tooth accuracy shall be verified in accordance with ISO 1328-1 and charts shall be provided.

2.7.3 Shafts

2.7.3.2

Replace first sentence with

The rotor shaft-sensing areas to be observed by radial-vibration probes shall be concentric with the bearing journals.

2.8 DYNAMICS

2.8.3 Balance

2.8.3.1

Replace definition of U_{max} with

U_{max} = residual unbalance, in g-mm (oz-in).

3 Accessories

3.3 MOUNTING PLATES

3.3.1 General

3.3.1.3

Add to section

The baseplate shall be designed for column mounting of the gear unit.

5 Vendor's Data

5.2 PROPOSALS

5.2.3 Technical Data

Add new list item n.

- n. The vendor shall furnish a list of the user's installations having gears similar to the proposed unit, operating under conditions of equal or more severe service. The list of installations shall include the following data:
1. Gear unit rated power.
 2. Single / double helical.
 3. Input speed.
 4. Gear ratio.
 5. Pitch line velocity.
 6. Bending stress number.
 7. Gear teeth hardening - through hardened/carburized/nitrided.
 8. Gear manufacturing location.

9. Operation - onshore/offshore.
10. Country of installation.
11. Year of supply.
12. Year of start operation.
13. Purchaser / end user.

5.3 CONTRACT DATA

5.3.6 Installation, Operation, Maintenance, and Technical Data Manuals

5.3.6.3 Operating and Maintenance and Technical Data Manual

Add to section

The manufacturing record book (MRB) shall be supplied by the vendor with the operating manual, maintenance manual and technical data manual.

APPENDIX A—GENERAL-PURPOSE GEAR DATA SHEETS

DATA SHEET GENERAL PURPOSE GEAR UNITS API 677 THIRD EDITION PARALLEL SHAFT DATA SHEET - SI UNITS

Replace data sheet with

The purchaser shall use IOGP S-712D.

DATA SHEET GENERAL PURPOSE GEAR UNITS API 677 THIRD EDITION PARALLEL SHAFT DATA SHEET - U.S. CUSTOMARY UNITS

Replace data sheet with

The purchaser shall use IOGP S-712D.

DATA SHEET GENERAL PURPOSE GEAR UNITS API 677 THIRD EDITION BEVEL MOUNTED DATA SHEET - SI UNITS

Replace data sheet with

The purchaser shall use IOGP S-712D.

DATA SHEET GENERAL PURPOSE GEAR UNITS API 677 THIRD EDITION BEVEL MOUNTED DATA SHEET - CUSTOMARY UNITS

Replace data sheet with

The purchaser shall use IOGP S-712D.

APPENDIX E—VENDOR DRAWING AND DATA REQUIREMENTS

Replace appendix with

The purchaser shall use IOGP S-712L.

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