

# General-Purpose Gear Units for Petroleum, Chemical and Gas Industry Services

API STANDARD 677  
THIRD EDITION, APRIL 2006

REAFFIRMED, NOVEMBER 2016



AMERICAN PETROLEUM INSTITUTE

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**Downstream Segment**

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# General-purpose Gear Units for Petroleum, Chemical and Gas Industry Services

## 1 General

### 1.1 SCOPE

**1.1.1** This standard covers the minimum requirements for general-purpose, enclosed single and multistage gear units incorporating parallel shaft helical and right angle spiral bevel gears for the petroleum, chemical, and gas industries. Gears manufactured according to this standard shall be limited to the following pitchline velocities. Helical gears shall not exceed 60 m/s (12,000 ft/min), and spiral bevels shall not exceed 40 m/s (8,000 ft/min). Spiral bevel gearsets shall be considered matched sets.

Note 1: This standard is not intended to apply to gears in special-purpose service, which are covered in API Std 613; to gears in contact with other equipment; to epicyclic gear assemblies; or gears with non-involute tooth forms.

Note 2: This standard requires the purchaser to specify certain details and features. A bullet (•) at the beginning of a paragraph indicates that either a decision by, or further information from, the purchaser is required. Further information should be shown on the data sheets or stated in the quotation request and purchase order.

**1.1.2** General-purpose gears are applied in equipment trains that are usually spared, or are in noncritical service.

Typical applications for which this standard is intended are cooling tower water pump systems, forced and induced draft fan systems, and other general-purpose equipment trains.

### 1.2 ALTERNATIVE DESIGNS

The vendor may offer alternative designs. Equivalent metric dimensions, fasteners, and flanges may be substituted as mutually agreed upon by the purchaser and the vendor.

### 1.3 CONFLICTING REQUIREMENTS

In case of conflict between this standard and the inquiry or order, the information included in the order shall govern.

### 1.4 DEFINITION OF TERMS

Terms used in this standard are defined in 1.4.1 through 1.4.26.

**1.4.1 axially (horizontally) split:** A joint that is parallel to the shaft centerline.

**1.4.2 bending stress number (S):** Defined in 2.4.4.2.

**1.4.3 critical speed:** A shaft rotational speed at which the rotor-bearing-support system is in a state of resonance.

**1.4.4 design:** Requirements normally defined by the equipment designer and the manufacturer.

Note: The use of the word design in a term (such as design power, design pressure, design temperature, or design speed) should be avoided in the purchaser's specifications.

**1.4.5 DN:** An alphanumeric designation of size for components of a pipework system, which is used for reference purposes. It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical size, in millimeters (mm), of the bore or outside diameter of the end connection.

Note 1: The number following the letters DN does not represent a measurable value (ISO 6708: 1995).

**1.4.6 gear:** Refers to either the pinion or gear wheel.

**1.4.7 gear-rated power:** The maximum power specified by the purchaser on the data sheets and stamped on the nameplate (see 2.4.1).

**1.4.8 gear service factor (SF):** The factor that is applied to the tooth pitting index and bending stress number, depending on the characteristics of the driver and the driven equipment, to account for differences in potential overload, shock load, and/or continuous oscillatory torque characteristics.

**1.4.9 hunting tooth combination:** Exists for mating gears when a tooth on the pinion does not repeat contact with a tooth on the gear until it has contacted all the other gear teeth.