# Axial and Centrifugal Compressors and Expander-compressors for Petroleum, Chemical and Gas Industry Services

API STANDARD 617
SEVENTH EDITION, JULY 2002

REAFFIRMED: JANUARY 2009

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**Downstream Segment**

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# SECTION 1—GENERAL

## 1.1 SCOPE

This standard covers the minimum requirements for axial compressors, single-shaft and integrally geared process centrifugal compressors and expander-compressor for use in the petroleum, chemical, and gas industries services that handle air or gas.

This standard does not apply to fans (covered by API Std 673) or blowers that develop less than 34 kPa (5 psi) pressure rise above atmospheric pressure. This standard also does not apply to packaged, integrally-geared centrifugal plant and instrument air compressors, which are covered by API Std 672. Hot gas expanders over 300°C (570°F) are not covered in this standard.

**1.1.1** This chapter contains information pertinent to all equipment covered by this standard. It is to be used in conjunction with the following chapters as applicable to the specific equipment covered:

Chapter 2—Centrifugal and Axial Compressors
Chapter 3—Integrally Geared Compressors
Chapter 4—Expander-compressors

Note: A bullet (●) at the beginning of a paragraph indicates that either a decision is required or further information is to be provided by the purchaser. This information should be indicated on the data sheets (see Annex A of Chapters 2, 3 and 4); otherwise, it should be stated in the quotation request (inquiry) or in the order.

## 1.2 ALTERNATIVE DESIGNS

The vendor may offer alternative designs.

All designs should comply with this standard. Any exceptions to the standard including, alternate design differences from this standard, shall be clearly stated in the proposal.

## 1.3 CONFLICTING REQUIREMENTS

In case of conflict between this standard and the inquiry, the inquiry shall govern. At the time of the order, the order shall govern.

## 1.4 DIMENSIONS

The SI system of units and dimensions are used in this standard. Any data or drawings related to equipment supplied to this standard shall use the SI system.

Alternate systems such as the U.S. Customary system may be used if specified.

### 1.4.1 Unit Conversion

The units in this document are SI prime and U.S. Customary secondary.

Note: The factors in Chapter 15 of the API *Manual of Petroleum Measurement Standards* were used to convert from U.S. Customary to SI units. The resulting exact SI units were then rounded off.

## 1.5 DEFINITION OF TERMS

Terms used in all chapters of this standard are defined in 1.5.1 through 1.5.54. Annexes 2C, 3C, and 4C on nomenclature are located in each subsequent chapter of this specification.

**1.5.1 axially split:** A joint that is parallel to the shaft centerline.

**1.5.2 compressor or expander section:** A series of compression or expansion stages between which there is no intercooling or reheating, or loss or gain in flow (i.e., no side streams, bypassing or injection), and whose rotational speeds are in fixed relationship (ratio) to each other.

**1.5.3 compressor rated point:** The intersection on the 100% speed curve corresponding to the highest capacity of any specified operating point.

Note: This is generally a derived point rather than an actual operating point (see Figure 2.1-1a for a graphical representation).

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

**1.5.5 design:** A term that may be used by the equipment manufacturer to describe various parameters such as design power, design pressure, design temperature, or design speed.

Note: This terminology should be used only by the equipment designer and manufacturer and not in the purchaser's specifications.

**1.5.6 flammable fluid:** The definition of a flammable fluid is covered in detail in NFPA 30.

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

**1.5.8 gear wheel (bullgear):** The lowest speed rotor in a gearbox.

**1.5.9 gearing:** The pinion(s) and gear wheel combination(s). A gear mesh is a pinion and gear wheel that operates together. A gear wheel may mesh with more than one pinion, and therefore be part of more than one gear mesh.

**1.5.10 hold down bolts (mounting bolts):** Bolts holding the equipment to the mounting plate.

**1.5.11 hydrodynamic bearings:** Bearings that use the principles of hydrodynamic lubrication. The bearing surfaces