

Changes shown by ↗

THE FOLLOWING PARAGRAPH NUMBERS REFER TO API-677,  
SECOND EDITION, JULY 1997, WHICH IS A PART OF THIS PRACTICE.

### SECTION 1 - GENERAL

- I 1.1 SCOPE
- (Exception) This practice covers general-purpose, horizontal, enclosed-single and multistage gear units incorporating parallel shaft helical and right angle spiral bevel gears.
  - All requirements specified in this practice are additions to those of **API-677** unless specifically noted as exceptions. Paragraph numbers in this practice which do not appear in **API-677** are new paragraphs.
  - An asterisk (\*)** indicates that a decision by the Purchaser is required, or that additional information is furnished by the Purchaser.  
**Note:** A Bullet (•) is shown in **API-677** indicating that a Purchaser's decision is required.
  - Vendor Qualification.** General-purpose gear units shall be supplied by vendors qualified by experience to manufacture the units proposed. To qualify, the vendor must have manufactured, at the proposed point of manufacture, at least two gear units of comparable power and speed rating, pinion speed, speed ratio, and pitch line velocity. These gear units must have been in service for at least one year and be performing satisfactorily.
- I 1.5 REFERENCED PUBLICATIONS
- Table 1** lists the practices and standard which shall be used with this practice.
  - Table 2** lists the standards which shall be used with this practice **as specified** by the Purchaser.

**TABLE 1**

| PRACTICES                  |                                                                               |
|----------------------------|-------------------------------------------------------------------------------|
| IP 2-1-1                   | Plant Noise Design Criteria                                                   |
| IP 20-1-1                  | Inspection of Equipment and Materials                                         |
| STANDARD                   |                                                                               |
| <b>API Standard</b><br>677 | General-Purpose Gear Units for Petroleum, Chemical, and Gas Industry Services |

**TABLE 2**

| STANDARDS                  |                                                                                   |
|----------------------------|-----------------------------------------------------------------------------------|
| <b>ASTM Standards</b>      |                                                                                   |
| B 111 / B 111M             | Copper and Copper-Alloy Seamless Condenser Tubes and Ferrule Stock                |
| B 169 / B 169M             | Aluminum Bronze Plate, Sheet, Strip and Rolled Bar                                |
| B 171 / B 171M             | Copper-Alloy Plate and Sheet for Pressure Vessels, Condensers and Heat Exchangers |
| B584                       | Copper Alloy Sand Castings for General Applications                               |
| <b>API Standard</b><br>671 | Special Purpose Couplings for Refinery Services                                   |

## SECTION 2 - BASIC DESIGN

- 2.1 GENERAL
- E 2.1.5 (Exception) **Noise.** Vendors shall furnish noise emission data for the quoted equipment with their proposal per **IP 2-1-1**.
- O,R \* 2.1.14 **Gear units and auxiliaries** shall be suitable for **outdoor installation** in the climatic zone specified.
- R \* 2.1.19 When specified, **spare rotors** shall be furnished for and delivered with each gear unit. If the rotors of two or more proposed gear units are duplicates, a single spare set will suffice.
- R \* 2.1.20 When specified, a spare bearing set including thrust and radial bearings shall be furnished with each gear unit. If two or more proposed gear units are duplicates, a single spare bearing set will suffice.
- 2.4 RATING
- O,R \* 2.4.1.1 **For electric motor drivers** the gear unit shall also be rated to withstand momentary high torque overloads equal to or exceeding four times gear power rating to provide for peak torque resulting from reapplication of voltage after a power interruption. The suitability of this rating shall be confirmed by the Purchaser after final system characteristics are defined.
- In addition, for synchronous motor drives and variable frequency induction motor drives,** the gear unit including the gear teeth and bearing metal shall also be rated to withstand the peak oscillatory torque values predicted by the system transient torsional analysis of the motor starting without incurring fatigue damage or failure.
- 2.9 BEARINGS
- 2.9.3 THRUST BEARINGS
- R 2.9.3.1.4 Proposed **system arrangement for gear units without thrust bearings** must be approved by the Owner's Engineer.
- 2.10 LUBRICATION
- R 2.10.10 d. **Materials of construction** for coolers in **fresh water cooling service** shall be **carbon steel** with **admiralty metal tubes** and brass tubesheets. **Materials for salt water cooling service shall be as follows:**

| SHELL        | CHANNELS AND COVERS                            |                                                                          | TUBESHEETS  |                                  | TUBES               |                                                          |
|--------------|------------------------------------------------|--------------------------------------------------------------------------|-------------|----------------------------------|---------------------|----------------------------------------------------------|
|              | Materials                                      | Specification                                                            | Material    | Specification                    | Material            | Specification                                            |
| Carbon Steel | Acid Resisting Bronze<br>or<br>Aluminum Bronze | <b>ASTM B584</b><br>Alloy C92200<br><br><b>ASTM B169</b><br>Alloy C61400 | Naval brass | <b>ASTM B171</b><br>Alloy C46400 | Inhibited Admiralty | <b>ASTM B111</b><br>Alloy C44300<br>C44400, or<br>C44500 |

The oil side operating pressure shall be higher than the water side operating pressure.

## SECTION 3 - ACCESSORIES

- 3.2 COUPLINGS AND GUARDS
- R 3.2.4 The **coupling to shaft juncture** shall be capable of transmitting the **peak torques due to acceleration and re-acceleration** referenced in **Par. 2.4.1.1** above.

## SECTION 4 - INSPECTION, TESTING, AND PREPARATION FOR SHIPMENT

- 4.3 TESTING
- 4.3.4 OPTIONAL TESTS
- R \* 4.3.4.1 FULL-SPEED/FULL OR PART LOAD TEST
- Unless otherwise specified, vibration limits shall not exceed those specified in **Par. 2.9.3**.
- 4.4 PREPARATION FOR SHIPMENT
- M \* 4.4.3.1 (Exception) Painting of unmachined exterior surfaces for corrosive or marine atmospheres will be specified.