

	Special Purpose Gear Units (This practice is appropriate for attachment to Inquiry or Purchase Document)	IP 10-10-1 Page 1 of 3 Rev. 1 March 1998
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**THE FOLLOWING PARAGRAPH NUMBERS REFER TO API-613, FOURTH EDITION,
JUNE 1995 WHICH IS A PART OF THIS PRACTICE**

SECTION 1 - GENERAL

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| I | 1.1 | <p>SCOPE</p> <ul style="list-style-type: none"> a. The use of double helical planetary type gears must be approved by the Owner's Engineer. b. All requirements specified in this practice are additions to those of API-613 unless specifically noted as exceptions. Paragraph numbers in this practice which do not appear in API-613 are new paragraphs. c. An asterisk (*) indicates that a decision by the Purchaser is required, or that additional information is furnished by the Purchaser. d. Vendor Qualifications. Special 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 rating, pinion speed, speed ratio, and pitch line velocity. These gears must have been in service for at least one year and be performing satisfactorily. <p>Alternatively, the vendor may satisfy this experience requirement on an individual component and service condition basis. Experience need not be concentrated in a single gear unit, but may be spread through several operating gear units. To qualify, however, each of these gear units must have been in service for at least one year and be performing satisfactorily. Also see Par. 1.1f.</p> <p>The critical areas which must be demonstrated to the satisfaction of the Owner's Engineer include, but are not limited to, the following:</p> <p>Service Conditions:</p> <ul style="list-style-type: none"> 1. Power and torque rating 2. Pinion speed and speed ratio 3. Prime mover and driven machine load classification (gear service factor) <p>Mechanical Design:</p> <ul style="list-style-type: none"> 4. Type of unit and rotor arrangement 5. Pitch line velocity 6. Gearing material selection and surface hardness 7. Gear tooth surface loading and beam loading 8. Manufacturing process for teeth, gear rotors and housing 9. Journal and thrust bearing design and loading 10. Lubrication system design <ul style="list-style-type: none"> e. In the area of component mechanical design, the vendor must show that each component has operated under similar conditions to those of the proposed gear unit. f. Where the vendor qualification requirement of Par. 1.1d prevents the application of the latest technology, the vendor shall submit to the Purchaser a second alternative proposal incorporating such features for review and approval by the Owner's Engineer. The proposal shall specifically identify the undemonstrated features and state their advantages. |
| I | 1.5 | <p>REFERENCED PUBLICATIONS</p> <ul style="list-style-type: none"> a. Table 1 lists the practices and standard which shall be used with this practice. |

TABLE 1

PRACTICES	
IP 2-1-1	Plant Noise Design Criteria
IP 10-12-1	Vibration, Axial-Position, and Bearing-Temperature Monitoring Systems for Compressors and Drivers
IP 10-14-1	Lube and Seal Oil Systems for Machinery
IP 20-1-1	Inspection of Equipment and Materials
STANDARD	
API Standard 613	Special-Purpose Gear Units for Refinery Service

SECTION 2 - BASIC DESIGN

	2.1	GENERAL
E	2.1.4	Noise. Gear vendors shall supply noise emission data for the quoted gear with their proposals per IP 2-1-1 .
R,M	2.1.11	a. Gears shall be suitable for outdoor installation.
	*	b. Gears and auxiliaries shall be winterized for the climatic zone specified.
R	2.1.18	The following spare parts shall be furnished for and delivered with each gear unit:
		a. Rotors
		b. A fully instrumented set of bearings (including radial and thrust).
		c. Oil seals
		If two or more gear units are duplicates, a single set of spares will suffice.
	2.2	RATING
	2.2.1	GEAR RATED POWER
R	*	c. For electric motor drivers the gear 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 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 characteristic.
	2.6	DYNAMICS
O,R	* 2.6.1.6	a. For constant speed applications, the vendor shall submit a damped unbalance response. The bearing stiffness and damping characteristics shall be provided for 10, 50, and 100% of rated gear output at the operating speed, unless otherwise specified. Bearing characteristics shall be provided for the range of expected bearing clearances.
	*	b. For variable speed applications, the vendor shall submit a damped unbalance response showing rotor vibration level versus speed from zero to maximum continuous speed unless otherwise specified. The bearing stiffness and damping characteristics shall be provided for the speed range zero to maximum continuous for power levels of 10, 50, and 100% of gear rated output. Bearing characteristics shall be provided for the range of expected bearing clearances.
	2.7	BEARINGS AND BEARING HOUSINGS
	2.7.1	GENERAL
I	2.7.1.3	(Exception) Thrust and radial bearings shall be fitted with bearing metal temperature sensors per IP 10-12-1 .
	2.7.3	THRUST BEARINGS
R	2.7.3.1	(Exception Figure C-1) Proposed system arrangement for gears without thrust bearings must be approved by the Owner's Engineer.