Specification for Pumping Units

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Suggested revisions are invited and should be submitted to the Standards Department, API, 1220 L Street, NW, Washington, DC 20005, standards@api.org.

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Introduction

This specification under the jurisdiction of the API Executive Committee on Standardization and was developed with oversight from API Subcommittee 11 on Field Operating Equipment. This specification is intended to give requirements and information to both parties in the design, selection, and manufacture of beam pumping units. Furthermore, this specification addresses the minimum requirements with which the manufacturer is to comply so as to claim conformity with this specification.

Users of this specification should be aware that requirements above those outlined in this specification may be needed for individual applications. This specification is not intended to inhibit a manufacturer from offering, or the user/purchaser from accepting, alternative equipment or engineering solutions. This may be particularly applicable where there is innovative or developing technology. Where an alternative is offered, the manufacturer should identify any variations from this specification and provide details.

Annex A contains information on the application of the API Monogram for those organizations licensed to API Specification 11E. Forms are provided in Annex C for rating of crank counterbalance (Figure C.1) and for recording pumping unit stroke and torque factors (Figure C.2). Recommendations and examples for the calculation and application of torque factors are contained in Annex D to Annex G, and examples for calculating torque ratings for pumping unit reducers are contained in Annex H. Recommendations and considerations for conducting a system analysis are contained in Annex I. Annex J contains an illustration of a typical beam pumping unit and the nomenclature associated with it.

Specification for Pumping Units

1 Scope

This specification provides the requirements and guidelines for the design and rating of beam pumping units for use in the petroleum and natural gas industry. Included are all components between the carrier bar and the speed reducer input shaft. This includes the following:

a) beam pump structures,

b) pumping unit gear reducer, and

c) pumping unit chain reducer.

Only loads imposed on the structure and/or gear reducer by the polished rod load are considered in this specification.

Also included are the requirements for the design and rating of enclosed speed reducers wherein the involute gear tooth designs include helical and herringbone gearing. The rating methods and influences identified in this specification are limited to single and multiple stage designs applied to beam pumping units in which the pitch-line velocity of any stage does not exceed 5000 ft/min and the speed of any shaft does not exceed 3600 rpm.

This standard does not cover chemical properties of materials, installation and maintenance of the equipment, beam type counterbalance units, prime movers and power transmission devices outside the gear reducer, or control systems.

See Annex A for product is supplied bearing the API Monogram and manufactured at a facility licensed by API.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API Specification 11B, *Specification for Sucker Rods*

AGMA 908-B89 [1], *Geometry Factors for Determining the Pitting Resistance and Bending Strength of Spur, Helical and Herringbone Gear Teeth*

AGMA 2001-D04, *Fundamental Rating Factors and Calculation Methods for Involute Spur and Helical Gear Teeth*

ANSI [2]/AGMA 1012-G05, *Gear Nomenclature, Definitions of Terms with Symbols*

ASME B29.100 [3], *Precision Power Transmission, Double-Pitch Power Transmission, and Double-Pitch Conveyor Roller Chains, Attachments, and Sprockets*—Incorporating ASME B29.1, ASME B29.3, and ASME B29.4

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1 American Gear Manufacturers Association, 500 Montgomery Street, Suite 350, Alexandria, Virginia 22314, www.agma.org.

2 American National Standards Institute, 25 West 43rd Street, 4th floor, New York, New York 10036, www.ansi.org.