

# Specification for Pumping Units

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## Contents

	Page
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative References</b> .....	<b>1</b>
<b>3 Terms, Definitions, Abbreviations, and Symbols</b> .....	<b>2</b>
<b>3.1 Terms and Definitions</b> .....	<b>2</b>
<b>3.2 Abbreviations and Symbols</b> .....	<b>4</b>
<b>4 Product Requirements</b> .....	<b>7</b>
<b>4.1 Functional Requirements</b> .....	<b>7</b>
<b>4.2 Technical Requirements</b> .....	<b>8</b>
<b>5 Beam Pump Structure Requirements</b> .....	<b>9</b>
<b>5.1 General</b> .....	<b>9</b>
<b>5.2 Design Loads for All Structural Members Except Walking Beams</b> .....	<b>9</b>
<b>5.3 Design Stresses for All Structural Members Except Walking Beams, Bearing Shafts, and Cranks</b> ....	<b>10</b>
<b>5.4 Design Loads for Walking Beam</b> .....	<b>10</b>
<b>5.5 Maximum Allowable Stress for Walking Beams</b> .....	<b>11</b>
<b>5.6 Other Structural Components</b> .....	<b>12</b>
<b>5.7 Structural Bearing Design</b> .....	<b>13</b>
<b>5.8 Brakes</b> .....	<b>13</b>
<b>6 Speed Reducer Requirements</b> .....	<b>14</b>
<b>6.1 General</b> .....	<b>14</b>
<b>6.2 Gear Reducers</b> .....	<b>14</b>
<b>6.3 Chain Reducers</b> .....	<b>36</b>
<b>6.4 Components</b> .....	<b>37</b>
<b>7 Product Identification</b> .....	<b>41</b>
<b>7.1 Beam Pump Structure Nameplate</b> .....	<b>41</b>
<b>7.2 Speed Reducer Nameplate</b> .....	<b>41</b>
<b>7.3 Installation Markings</b> .....	<b>41</b>
<b>7.4 Supplier/Manufacturing Requirements</b> .....	<b>42</b>
<b>8 Storage and Maintenance</b> .....	<b>42</b>
<b>8.1 Shipping and Handling</b> .....	<b>42</b>
<b>8.2 Lubrication</b> .....	<b>42</b>
<b>Annex A (informative) API Monogram</b> .....	<b>43</b>
<b>Annex B (normative) Beam Pumping Unit Designations</b> .....	<b>47</b>
<b>Annex C (informative) Recommended Data Forms</b> .....	<b>50</b>
<b>Annex D (informative) Torque Factor on Beam Pumping Units with Rear Mounted Geometry</b> <b>Class I Lever Systems with Crank Counterbalance</b> .....	<b>55</b>
<b>Annex E (informative) Torque Factor on Beam Pumping Units with Front Mounted Geometry</b> <b>Class III Lever Systems with Crank Counterbalance</b> .....	<b>67</b>
<b>Annex F (informative) Torque Factor on Beam Pumping Units with Front Mounted Geometry</b> <b>Class III Lever System with Air Counterbalance</b> .....	<b>76</b>

# Contents

	Page
<b>Annex G (informative) Torque Factor on Beam Pumping Units with Rear Mounted Geometry Class I Lever Systems with Phased Crank Counterbalance</b> .....	80
<b>Annex H (informative) Examples for Calculating Torque Ratings for Pumping Unit Reducers</b> .....	90
<b>Annex I (informative) System Analysis</b> .....	101
<b>Annex J (informative) Product Nomenclature</b> .....	102
<b>Bibliography</b> .....	103
<b>Figures</b>	
<b>1 Walking Beam Elements</b> .....	11
<b>2 Helical Gear Load Distribution Factor, <math>C_m</math>, for Helical and Herringbone Gears and Well-controlled Heat-treating Processes</b> .....	18
<b>3 Allowable Contact Fatigue Stress for Through Hardened and Tempered Steel Gears <math>S_{ac}</math> for Helical and Herringbone Gears</b> .....	20
<b>4 Allowable Bending Fatigue Stress for Through Hardened and Tempered Steel Gears <math>S_{at}</math></b> .....	21
<b>5 Helical Gear Load Distribution Factor, <math>K_m</math>, for Helical and Herringbone Gears</b> .....	26
<b>6 Allowable Yield Strength Number for Steel and Nodular Iron, <math>S_y</math></b> .....	30
<b>7 Minimum Effective Case Depth for Flame or Induction Hardened Gears, <math>h_e</math></b> .....	32
<b>8 Acceptable Flame and Induction Hardening Patterns</b> .....	33
<b>9 Effective Case Depth for Carburized Gears, <math>h_e</math></b> .....	34
<b>10 Minimum Total Case Depth for Nitrided Gears, <math>h_c</math></b> .....	35
<b>11 Allowable Stress—Shafting</b> .....	38
<b>12 Beam Pump Structure Nameplate</b> .....	41
<b>13 Pumping Unit Reducer Nameplate</b> .....	41
<b>C.1 Rating Form for Crank Counterbalance</b> .....	51
<b>C.2 Pumping Unit Stroke and Torque Factor Form</b> .....	52
<b>C.3 Manufacturer's Gear Reducer Data Sheet</b> .....	53
<b>D.1 Pumping Unit Geometry</b> .....	56
<b>D.2 Division of Dynamometer Card by Crank Angle Using Polished Rod Position Data</b> .....	61
<b>D.3 Torque Curves Using Torque Factors</b> .....	64
<b>D.4 Calculation Sheet—Clockwise Rotation</b> .....	65
<b>D.5 Calculation Sheet—Counterclockwise Rotation</b> .....	66
<b>E.1 Front Mounted Geometry, Class III Lever System</b> .....	68
<b>E.2 Division of Dynamometer Card by Crank Angle Using Polished Rod Position Data</b> .....	72
<b>E.3 Torque Curves Using Torque Factors</b> .....	75
<b>F.1 Pumping Unit Geometry</b> .....	77
<b>F.2 Division of Dynamometer Card by Crank Angle Using Polished Rod Position Data</b> .....	81
<b>F.3 Torque Curves Using Torque Factors</b> .....	82
<b>G.1 Rear Mounted Geometry, Class I Lever System with Phased Crank Counterbalance</b> .....	84
<b>G.2 Division of Dynamometer Card by Crank Angle Using Polished Rod Position Data</b> .....	88
<b>G.3 Torque Curves Using Torque Factors</b> .....	91
<b>G.4 Net Reducer Torque Calculation Sheet</b> .....	92
<b>J.1 Beam Pumping Unit Nomenclature</b> .....	102

## Contents

	Page	
<b>Tables</b>		
<b>1</b>	<b>Maximum Allowable Stresses in Pumping Unit Walking Beams of Structural Steel. . . . .</b>	<b>1</b>
<b>2</b>	<b>Pumping Unit Reducer Sizes and Ratings . . . . .</b>	<b>7</b>
<b>3</b>	<b>Speeds for Peak Torque Rating for Gear Reducers . . . . .</b>	<b>15</b>
<b>4</b>	<b>Maximum Allowable Contact Stress Number <math>S_{ac}</math> for Other Than Through Hardened and Tempered Steel Gears. . . . .</b>	<b>19</b>
<b>5</b>	<b>Elastic Coefficient <math>C_p</math> for Gear/Pinion Material Combinations. . . . .</b>	<b>19</b>
<b>6</b>	<b>Minimum Gear and Pinion Brinell Hardness Combinations for Through Hardened and Tempered Steel Gears. . . . .</b>	<b>20</b>
<b>7</b>	<b>Allowable Bending Fatigue Stress, <math>S_{at}</math> (for Other Than Through Hardened and Tempered Steel Gears) . . . . .</b>	<b>24</b>
<b>8</b>	<b>Yield Strength Factor, <math>K_y</math>. . . . .</b>	<b>29</b>
<b>9</b>	<b>Allowable Key Stresses . . . . .</b>	<b>39</b>
<b>10</b>	<b>Maximum Allowable Tensile Stress, Fasteners . . . . .</b>	<b>40</b>
<b>B.1</b>	<b>Pumping Unit Designation . . . . .</b>	<b>48</b>

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## Introduction

This specification is 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.

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# 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<sup>1</sup>, *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<sup>2</sup>/AGMA 1012-G05, *Gear Nomenclature, Definitions of Terms with Symbols*

ASME B29.100<sup>3</sup>, *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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<sup>1</sup> American Gear Manufacturers Association, 500 Montgomery Street, Suite 350, Alexandria, Virginia 22314, [www.agma.org](http://www.agma.org).

<sup>2</sup> American National Standards Institute, 25 West 43rd Street, 4th floor, New York, New York 10036, [www.ansi.org](http://www.ansi.org).