

# Positive Displacement Pumps— Controlled Volume for Petroleum, Chemical, and Gas Industry Services

API STANDARD 675  
THIRD EDITION, NOVEMBER 2012

ERRATA, JUNE 2014  
ERRATA 2, APRIL 2015

REAFFIRMED, JULY 2021



American  
Petroleum  
Institute

## Special Notes

API publications necessarily address problems of a general nature. With respect to particular circumstances, local, state, and federal laws and regulations should be reviewed. The use of API publications is voluntary. In some cases, third parties or authorities having jurisdiction may choose to incorporate API standards by reference and may mandate compliance.

Neither API nor any of API's employees, subcontractors, consultants, committees, or other assignees make any warranty or representation, either express or implied, with respect to the accuracy, completeness, or usefulness of the information contained herein, or assume any liability or responsibility for any use, or the results of such use, of any information or process disclosed in this publication. Neither API nor any of API's employees, subcontractors, consultants, or other assignees represent that use of this publication would not infringe upon privately owned rights.

API publications may be used by anyone desiring to do so. Every effort has been made by the Institute to assure the accuracy and reliability of the data contained in them; however, the Institute makes no representation, warranty, or guarantee in connection with this publication and hereby expressly disclaims any liability or responsibility for loss or damage resulting from its use or for the violation of any authorities having jurisdiction with which this publication may conflict.

API publications are published to facilitate the broad availability of proven, sound engineering and operating practices. These publications are not intended to obviate the need for applying sound engineering judgment regarding when and where these publications should be utilized. The formulation and publication of API publications is not intended in any way to inhibit anyone from using any other practices.

Any manufacturer marking equipment or materials in conformance with the marking requirements of an API standard is solely responsible for complying with all the applicable requirements of that standard. API does not represent, warrant, or guarantee that such products do in fact conform to the applicable API standard.

All rights reserved. No part of this work may be reproduced, translated, stored in a retrieval system, or transmitted by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. Contact the Publisher, API Publishing Services, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

## Foreword

This standard is based on the accumulated knowledge and experience of manufacturers and users of reciprocating, controlled volume pumps. The objective of this standard is to provide a purchase specification to facilitate the procurement and manufacturer of controlled volume pumps for use in petroleum, chemical, and gas industry services.

The primary purpose of this standard is to establish minimum requirements.

Energy conservation is of concern and has become increasingly important in all aspects of equipment design, application, and operation. Thus innovative energy conserving approaches should be aggressively pursued by the manufacturer and the user during these steps. Alternative approaches that may result in improving energy utilization should be thoroughly investigated and brought forth. This is especially true of new equipment proposals since the evaluation or purchase options will be based increasingly on total life costs as opposed to acquisition cost alone. Equipment manufacturers, in particular, are encouraged to suggest alternatives to those specified when such approaches achieve improved energy effectiveness and reduced total life costs without sacrificing safety or reliability.

This standard requires the Purchaser to specify certain details and features. Although it is recognized that the Purchaser may desire to modify, delete, or amplify sections of this standard, it is strongly recommended that such modifications, deletions, and amplifications be made by supplementing this standard rather than by rewriting or incorporating sections thereof into another standard.

Nothing contained in any API publication is to be construed as granting any right, by implication or otherwise, for the manufacture, sale, or use of any method, apparatus, or product covered by letters patent. Neither should anything contained in the publication be construed as insuring anyone against liability for infringement of letters patent.

This document was produced under API standardization procedures that ensure appropriate notification and participation in the developmental process and is designated as an API standard. Questions concerning the interpretation of the content of this publication or comments and questions concerning the procedures under which this publication was developed should be directed in writing to the Director of Standards, American Petroleum Institute, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001. Requests for permission to reproduce or translate all or any part of the material published herein should also be addressed to the director.

Generally, API standards are reviewed and revised, reaffirmed, or withdrawn at least every five years. A one-time extension of up to two years may be added to this review cycle. Status of the publication can be ascertained from the API Standards Department, telephone (202) 682-8000. A catalog of API publications and materials is published annually by API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001.

Suggested revisions are invited and should be submitted to the Standards Department, API, 200 Massachusetts Avenue, NW, Suite 1100, Washington, DC 20001, standards@api.org.

Currently in preview, click buy full version

## Contents

	Page
1 Scope .....	1
2 Normative References.....	1
3 Terms and Definitions.....	4
4 General .....	10
4.1 Unit Responsibility .....	10
4.2 Governing Requirements and Units of Measurement.....	11
4.3 Pump Designations.....	11
5 Statutory .....	12
5.1 Statutory Requirements .....	12
5.2 Requirements.....	12
6 Basic Design .....	13
6.1 General .....	13
6.2 Pressure Containing Parts .....	14
6.3 Liquid End Connections .....	15
6.4 Flanges .....	16
6.5 Pump Check Valves .....	16
6.6 Diaphragms .....	17
6.7 Packed Plungers .....	17
6.8 Relief Valve Application .....	17
6.9 Gears .....	17
6.10 Drive Train Enclosure .....	18
6.11 Drive Bearings .....	18
6.12 Lubrication .....	18
6.13 Capacity Adjustment .....	18
6.14 Materials .....	19
6.15 Nameplates and Rotation Arrows .....	25
7 Accessories .....	25
7.1 Drivers.....	25
7.2 Couplings and Guards .....	27
7.3 Baseplates .....	28
7.4 Pressure-limiting Valves (PLVs).....	30
7.5 Controls and Instrumentation .....	30
7.6 Auxiliary Piping .....	30
7.7 Special Tools .....	32
7.8 Pulsation Suppression Devices .....	32
8 Inspection, Testing, and Preparation for Shipment.....	32
8.1 General .....	32
8.2 Inspection Records .....	33
8.3 Testing .....	35
8.4 Preparation for Shipment.....	38
9 Vendor's Data .....	40
9.1 General .....	40
9.2 Proposals .....	41
9.3 Contract Data .....	42

## Contents

	Page
<b>Annex A (informative) Data Sheets</b> .....	<b>45</b>
<b>Annex B (informative) Materials</b> .....	<b>0</b>
<b>Annex C (informative) Inspector's Checklist</b> .....	<b>51</b>
<b>Annex D (normative) Controlled Volume Pump Vendor Drawing and Data Requirements</b> .....	<b>52</b>
<b>Annex E (informative) Net Positive Suction Head Versus Net Positive Inlet Pressure</b> .....	<b>60</b>
<b>Annex F (informative) Pulsation and Vibration Control Techniques</b> .....	<b>62</b>
<b>Figures</b>	
<b>1 Typical Liquid End Pumps</b> .....	<b>11</b>
<b>2 Typical Drive End Pumps</b> .....	<b>12</b>
<b>Tables</b>	
<b>1 Welding Requirements</b> .....	<b>23</b>
<b>2 Minimum Requirements for Piping Materials</b> .....	<b>31</b>
<b>3 Material Inspection Standards</b> .....	<b>35</b>
<b>4 Test Tolerances</b> .....	<b>38</b>
<b>B.1 Miscellaneous Material Specifications</b> .....	<b>50</b>

# Positive Displacement Pumps—Controlled Volume for Petroleum, Chemical, and Gas Industry Services

## 1 Scope

This standard covers the minimum requirements for reciprocating, controlled volume pumps and pump units for use in the petroleum, petrochemical, and gas industry services. These pumps are either hydraulic diaphragm or packed plunger design. Rotary positive displacement pumps are not included. Diaphragm pumps that use direct mechanical actuation are also excluded.

NOTE See API 674 for positive displacement reciprocating pumps and API 676 for positive displacement rotary pumps.

This standard requires the Purchaser to specify certain details and features. A bullet (●) at the beginning of a paragraph indicates that either a decision by, or further information from, the Purchaser is required. Further information should be shown on the data sheets (see example in Annex A) or stated in the quotation request and purchase order.

Alternate Designs and Conflicting Requirements are now located in Section 6.

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 Appendix A); otherwise, it should be stated in the quotation request or in the order.

## 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. The hierarchy of documents shall be specified.

NOTE Typical documents are user, industry, and API specifications, data sheets, meeting notes and supplemental agreements.

API Specification 5L, *Specification for Line Pipe*

API Recommended Practice 520, *Sizing, Selection, and Installation of Pressure-Relieving Devices in Refineries, Part I—Sizing and Selection*

API Recommended Practice 520, *Sizing, Selection and Installation of Pressure-Relieving Devices in Refineries, Part II—Installation*

API Standard 526:2002, *Flanged Steel Pressure Relief Valves*

API Standard 541:2002, *Form-wound and Squirrel Cage Induction Motors — 250 Horsepower and Larger*

API Standard 546:1997, *Brushless Synchronous Machines — 500 kVA and Larger*

API Standard 614, *Lubrication, Shaft-sealing, and Control-oil Systems and Auxiliaries for Petroleum, Chemical, and Gas Industry Services*

API Standard 671, *Special Purpose Couplings for Refinery Services*

API Recommended Practice 500, *Classification of Locations for Electrical Installations in Petroleum Refineries*

API Recommended Practice 686, *Machinery Installation and Installation Design*

AGMA 6013-A06: 2006<sup>1</sup>, *Standard for Industrial Enclosed Gear Drives*

AGMA 6022-C93: 1994 (R 2008), *Design Manual for Cylindrical Wormgearing*

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