

Corrosion Resistant Bolting for Use in the Petroleum and Natural Gas Industries

API SPECIFICATION 20F
FIRST EDITION, JUNE 2015



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.

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, 1220 L Street, NW, Washington, DC 20005.

Copyright © 2015 American Petroleum Institute

Foreword

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.

Shall: As used in a standard, “shall” denotes a minimum requirement in order to conform to the specification.

Should: As used in a standard, “should” denotes a recommendation or that which is advised but not required in order to conform to the specification.

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, 1220 L Street, NW, Washington, DC 20005. 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, 1220 L Street, NW, Washington, DC 20005.

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

Currently in preview, click buy full version

Contents

	Page
1 Scope	1
1.1 Purpose	1
1.2 Applicability	1
1.3 Bolting Specification Levels (BSL)	1
1.4 Bolting Types	1
1.5 Application of the API Monogram	1
2 Normative References	2
3 Terms, Definitions, Acronyms, and Abbreviations	2
3.1 Terms and Definitions	2
3.2 Acronyms and Abbreviations	4
4 Qualification Bolting	4
4.1 General	4
4.2 Qualification Testing	4
4.3 Materials and Dimensions	5
4.4 Acceptance of Qualification Bolting	5
4.5 Records of qualification	5
4.6 Limits of Bolting Qualification	6
5 Production of Qualified Bolting	6
5.1 Qualification of Procurement Sources for Raw Material	6
5.2 Material Specifications	7
5.3 Manufacturing Process Specification (MPS)	8
5.4 Heat Treatment Requirements	8
5.5 Raw Material	9
5.6 Chemical Analysis	9
5.7 Mechanical Properties	9
5.8 Metallurgical Requirements	10
5.9 Examination and Test Requirements	10
5.10 Nondestructive Examination (NDE) Requirements	10
5.11 Dimensional Inspection and Visual Inspection	10
5.12 Final Positive Material Identification	11
6 Calibration Systems	11
7 Test Report	11
8 Marking Requirements	12
8.1 Product Marking	12
8.2 Additional Marking Required by this Standard	12
9 Record Retention	12
10 Storage and Shipping	12
Annex A (informative) API Monogram Program	13
Bibliography	16
Tables	
1 Bolting Test Requirements	5
2 Sampling for Dimensional and Visual Inspection	11

Currently in preview, click buy full version

Corrosion Resistant Bolting for Use in the Petroleum and Natural Gas Industries

1 Scope

1.1 Purpose

This specification specifies requirements for the qualification, production and documentation of corrosion resistant bolting used in the petroleum and natural gas industries.

1.2 Applicability

This standard applies when referenced by an applicable API equipment standard or otherwise specified as a requirement for compliance.

1.3 Bolting Specification Levels (BSL)

This specification establishes requirements for two bolting specification levels (BSL). These two BSL designations define different levels of technical, quality and qualification requirements. The levels are designated as BSL-2 and BSL-3. BSL-2 includes requirements in addition to those stated in the ASTM A453 and API 6A718. BSL-3 adds technical, quality and qualification criteria to BSL-2. BSL-2 and BSL-3 are intended to be comparable to BSL-2 and BSL-3 as found in API 20E. BSL-1 is omitted from this standard.

1.4 Bolting Types

This specification covers the following product forms, processes, and sizes:

- a) machined studs;
- b) machined bolts, screws and nuts;
- c) cold headed bolts, screws and nuts;
- d) hot formed bolts and screws <1.5 in. (38.1 mm) nominal diameter;
- e) hot formed bolts and screws ≥1.5 in. (38.1 mm) nominal diameter;
- f) roll threaded studs, bolts, and screws <1.5 in. (38.1 mm) diameter;
- g) roll threaded studs, bolts, and screws ≥1.5 in. (38.1 mm) diameter;
- h) hot formed nuts <1.5 in. (38.1 mm) nominal diameter;
- i) hot formed nuts ≥1.5 in. (38.1 mm) nominal diameter.

1.5 Application of the API Monogram

If product is manufactured at a facility licensed by API and it is intended to be supplied bearing the API Monogram, the requirements of Annex A apply.

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, except that new editions may be used on issue and become mandatory 6 months from the date of publication.

API Specification 6A, *Specification for Wellhead and Christmas Tree Equipment*

API Standard 6A718, *Nickel Base Alloy 718 (UNS N07718) for Oil and Gas Drilling and Production Equipment*

ANSI/NCSL Z540.3 ¹, *Requirements for the Calibration of Measuring and Test Equipment*

ASTM A370-14 ², *Standard Test Methods and Definitions for Mechanical Testing of Steel Products*

ASTM A453, *Standard Specification for High-Temperature Bolting, with Expansion Coefficients Comparable to Austenitic Stainless Steels*

ASTM A751, *Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products*

ASTM A962-14a, *Standard Specification for Common Requirements for Bolting Intended for Use at Any Temperature from Cryogenic to the Creep Range*

ASTM E10, *Standard Test Method for Brinell Hardness of Metallic Materials*

ASTM E18, *Standard Test Methods for Rockwell Hardness of Metallic Materials*

ASTM E1476, *Standard Guide for Metals Identification, Grade Verification, and Sorting*

ASTM F788, *Standard Specification for Surface Discontinuities of Bolts, Screws, and Studs, Inch and Metric Series*

ASTM F812, *Standard Specification for Surface Discontinuities of Nuts, Inch and Metric Series*

SAE AMS 2750, *Pyrometry*

SAE AMS H-6875, *Heat Treatment of Steel Flow Materials*

3 Terms, Definitions, Acronyms, and Abbreviations

3.1 Terms and Definitions

For the purposes of this document, the following definitions apply.

3.1.1

bolting

All-thread studs, lap-end studs, double-ended studs, headed bolts, cap screws, screws, and nuts.

3.1.2

cold formed bolts, screws, and nuts

Parts formed through the mechanical cold upsetting of wire, rod or bar in order to generate the bolt or screw head (cold heading) or the configuration of the nut.

¹ NCSL International, 2995 Wilderness Place, Suite 107, Boulder, Colorado 80301-5404, www.ncsli.org.

² ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, www.astm.org.