Alloy and Carbon Steel Bolting for Use in the Petroleum and Natural Gas Industries

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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.

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Introduction

This Third Edition is the result of updating requirements from the Second Edition of API Specification 20E. API Specification 20E, Third Edition was developed based on input from the API 20E task group of technical experts. The technical revisions have been made to accommodate the needs of industry to move this specification to a higher level of service to the petroleum and natural gas industry.

Highlights of some of the significant changes between the Second and Third Editions include:

— metric equivalencies for thread descriptions have been added;

— essential variables were identified and added;

— labs performing qualification lot testing for all bolting specification levels (BSLs) and final acceptance testing of BSL-2 and BSL-3 product are now required to be ISO 17025 accredited;

— grade 2H and 2HM nuts have been limited to BSL-1 applications;

— grade 43 nuts have been added;

— grade B22 and B23 bolting has been restricted to classes 3, 4, and 5;

— grade B21 classes 3, 4, & 5 bolting has been added for BSL-1 and BSL-2;

— grade B16 bolting has been added for BSL-1 and BSL-2;

— allowable outsourced activities have been defined;

— bolting requalification requirements have been added;

— supplier audit frequencies have been defined;

— a specific process for verification of incoming raw material using defined testing criteria is now required;

— bolting grade, raw material casting method, raw material forming method, and quench method have been added as required MPS process control parameters;

— API 20H and 20N have been added as acceptable furnace qualification methodologies;

— ASTM A1100 has been added as the acceptable induction heating process qualification methodology;

— AMS-H-6875 was removed from the acceptable furnace qualification methodologies;

— a maximum furnace to quench tank transfer time of 90 seconds has been added;

— coating and plating processes have been identified as critical and will require validation per API Q1;

— removed zinc electroplating prohibition in splash zone or subsea service;

— ASTM F519 testing has been replaced with ASTM F606/F606M-21 Section 7 testing, as the method to verify that a plating process does not cause internal hydrogen embrittlement;

— top pouring of ingots has been prohibited in all cases other than the vacuum induction melting (VIM) process;

— vanadium and niobium are limited to .05 % for BSL-3 product;

— ASTM A962/A962M-22 S53 is now required for all continuous cast BSL-2 product;

— a maximum yield strength limit of 135 ksi (930 MPa) has been imposed for BSL-2 and BSL-3;

— nondestructive examination (NDE) process qualification shall now conform with API 20D;

— guidance for the allowance of oversizing of internal threads has been added;

— oversized nuts are required to be stamped with an “O” for purposes of identification;

— final documentation to include copies of the original bolting manufacturer’s test reports, product marking, and production lot quantity;

— use of the heat number as the manufacturing lot number has been prohibited;

— technical mill audit requirements were added as Annex A.

Alloy and Carbon Steel Bolting for Use in the Petroleum and Natural Gas Industries

1 Scope

1.1 Purpose

This standard specifies requirements for the qualification, production, and documentation of alloy and carbon steel bolting used in the petroleum and natural gas industries.

1.2 Applicability

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

1.3 Bolting Specification Levels

This standard establishes requirements for three bolting specification levels (BSLs). These three BSL designations define different levels of technical, quality, and qualification requirements: BSL-1, BSL-2, and BSL-3. The BSLs are numbered in increasing levels of requirements to reflect increasing technical, quality, and qualification criteria.

2 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any addenda) applies.

API Specification Q1, *Specification for Quality Management System Requirements for Manufacturing Organizations for the Petroleum and Natural Gas Industry*

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

API 6HT, *Heat Treatment and Testing of Carbon and Low Alloy Steel Large Cross Section and Critical Section Components*

API Specification 20B, *Open Die Shaped Forgings for Use in the Petroleum and Natural Gas Industry*

API 20D, *Qualification of Nondestructive Examination Services for Equipment Used in the Petroleum and Natural Gas Industry*

API 20H, *Heat Treatment Services - Batch Type for Equipment Used in the Petroleum and Natural Gas Industry*

API 20J, *Qualification of Distributors of Metallic Materials for Use in the Petroleum and Natural Gas Industries*

API 20N, *Heat Treatment Services—Continuous Furnace for Equipment Used in the Petroleum and Natural Gas Industry*

ASNT SNT-TC-1A,[1] *Personnel Qualification and Certification in Nondestructive Testing*

[1] ASNT American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, Ohio 43228, www.asnt.org.