Packers and Bridge Plugs

API SPECIFICATION 11D1
FOURTH EDITION, MARCH 2021

API MONOGRAM PROGRAM EFFECTIVE DATE: SEPTEMBER 1, 2022

ADDENDUM 1, APRIL 2022
(API MONOGRAM PROGRAM EFFECTIVE DATE: SEPTEMBER 1, 2022)

ERRATA 1, OCTOBER 2024



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

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Introduction

This specification has been developed by users/purchasers and suppliers/manufacturers of packers and bridge plugs and is intended for use in the petroleum and natural gas industry worldwide to give requirements and information to both parties in the selection, manufacture, testing, and use. Further, this specification addresses the minimum requirements to which the supplier/manufacturer is to conform.

This specification has been structured with grades of increased requirements in design validation and levels in quality control. These grades/levels allow the user/purchaser to select the grade/level required for a specific application.

There are three quality levels: Quality level QL3 is the minimum level of quality offered by this product standard. Quality level QL2 provides additional inspection and verification steps. Quality level QL1 is the highest level provided. Additional quality requirements may be specified by the user/purchaser as supplemental requirements.

There are 16 design validation grades to provide the user/purchaser the choice of requirements to meet a specific preference or application. Design validation grades V0-HR to V6-R are new 4th edition grades, and design validation grades V0 to V6 are for legacy products with design verification and validation requirements listed in Annex A. Design validation grade V6 is the minimum grade and represents equipment where the validation method has been defined by the supplier/manufacturer. V0-HR and V3-HR are for high pressure high temperature (HPHT) applications with specific requirements listed in Annex B and have replaced the legacy V0-H and V3-H validation grades. The complexity and severity of the validation testing increases as the grade number decreases.

This edition has been completely revised. Changes include moving requirements from the HPHT annex (Annex B) into the main body, consolidating common validation requirements, and organizing the validation tests into tables. New requirements for low temperature ratings validation and test report requirements have been added.

This edition now includes a new normative annex for legacy product requirements (Annex A) and three new informative annexes: optional requirements for validation of hydrostatically set products (Annex E), determining text fixture inside diameter (Annex F), and tubing-to-packer forces and rated performance envelopes (Annex G). Annex B has also been changed from informative to normative.

The International System of Units (SI) is used in this specification; however, US Customary (USC) or other units are also shown for reference.

It is necessary that users of this specification be aware that requirements beyond those outlined in this specification can be needed for individual applications. This specification is not intended to inhibit a supplier/manufacturer from offering, or the user/purchaser from accepting, alternative equipment or engineering solutions. This can be particularly applicable where there is innovative or developing technology.

Packers and Bridge Plugs

1 Scope

This specification provides requirements and guidelines for packers and bridge plugs as defined herein for use in the petroleum and natural gas industry. This specification provides requirements for the functional specification and technical specification, including design, design verification and validation, materials, documentation and data control, repair, shipment, and storage.

Products covered by this specification apply only to applications within casing or tubing. Products covered by other API specifications, such as API 19OH or API 19LH, are not covered by this specification. Installation and maintenance of these products are outside the scope of this specification.

Within this specification the term product is used to indicate both packers and bridge plugs.

This specification includes the following annexes:

— Annex A: Requirements for Legacy Products

— Annex B: Requirements for HPHT Environment Equipment;

— Annex C: Requirements for HPHT Operational Tools;

— Annex D: Requirements for External Flow Testing;

— Annex E: Validation of Maximum Initiation Pressure for Hydrostatically Set Products;

— Annex F: Determining Test Fixture Inside Diameter;

— Annex G: Tubing-to-Packer Forces and Rated Performance Envelopes.

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 20A, *Carbon Steel, Alloy Steel, Stainless Steel, and Nickel Base Alloy Castings for Use in the Petroleum and Natural Gas Industry,* 1st Edition

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

ANSI [1]/NACE MR0175 [2]/ISO 15156 [3], *Petroleum and natural gas industries—Materials for use in H2S-containing environments in oil and gas production*

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[1] American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, New York 10036, www.ansi.org.

[2] NACE International, 15835 Park Ten Place, Houston, Texas 77084, www.nace.org.

[3] International Organization for Standardization, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, www.iso.org.