Subsurface Safety Valve and Annular Safety Valve Equipment

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Introduction

This specification has been developed by users/purchasers and suppliers/manufacturers, of subsurface safety valves intended for use in the petroleum and natural gas industry worldwide. This specification is intended to give requirements and information to both parties in the selection, manufacture, testing, and use of subsurface safety valves. Furthermore, this specification addresses the minimum requirements to claim conformity to 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 supplier/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 supplier/ manufacturer should identify any variations from this specification and provide details.

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

The requirements for lock mandrels and landing nipples contained in prior editions of this specification are now included in API Specification 14L.

This specification has been structured with design validation grades of increased requirements allowing the user/ purchaser to select the validation grade required for a specific application.

There are eight design validation grades for SSSVs and two design validation grades for ASVs to provide the user/ purchaser the choice of requirements to meet a specific preference or application. New to the 13th edition are design validation grades V1-HR, V1-R, V2-R, and V3-R for SSSVs, and V4-A and V3-A for ASVs. Design validation grades V1-H, V1, V2, and V3 are for products with Test Agency Validation tests meeting requirements listed in Annex N. V1-HR and V1-H are for high-pressure high-temperature (HPHT) applications with specific requirements listed in Annex H. The complexity and severity of the validation testing increases as the grade number decreases. Quality requirements for the manufacture of prototypes and factory-produced SSSVs and ASVs are included, however the use of quality levels has not been deemed necessary due to the critical nature of the downhole safety valve.

Changes to this specification in 13th edition include but are not limited to:

1) New normative annex, Annex N for Test Agency Validation requirements performed prior to the 12th edition (previously Annex B in 11th edition);

2) New normative annex, Annex O for Annular Safety Valves, there are also some requirements for ASVs within the main body of the specification;

3) Validation grades V4-1 or V4-2 are no longer included as these were for products validated prior to the 12th edition;

4) For the additional validation grades V1-HR, V1-R, V2-R, V3-R, the suffix -R designates that the Test Agency Validation test meets the requirements of Annex B of this edition, and other required validation testing found in this specification. Validation grades without the suffix -R designates that the Test Agency Validation was performed prior to the 12th edition (previously Annex B in 11th edition) and meets the requirements of Annex N and other required validation testing found in this specification.

Changes in Addendum 1 include the following:

Addition of a new Annex P “Requirements for CCS Environments”, and associated definitions and minor updates in the main body to point to Annex P. Annex P includes references to the main body and modifies the requirements in the main body to meet the needs of CCS environments. This includes Functional Specifications, Technical Specifications, Manufacturing Requirements, Validation Grades, and Validation Testing.

Subsurface Safety Valve and Annular Safety Valve Equipment

1 Scope

This specification provides the requirements for subsurface safety valves (SSSVs), annular safety valves (ASVs) and the secondary tools as defined herein necessary to operate the features included within them, including all components that establish tolerances and/or clearances that may affect performance or interchangeability of the SSSV or ASV components. It includes repair operations and the interface connections to control conduits and/or other equipment but does not cover the connections to the primary well conduit.

NOTE The SSSV and ASV are emergency fail-safe devices. The products covered within this specification are installed and operated to the requirements of API Recommended Practice 14B.

This specification does not cover installation, maintenance, control systems for SSSV or ASV, computer systems, and control conduits not integral to the downhole SSSV or ASV. Also not included are products covered under API 6A, API 11D1, API 14L, API 17C, API 19G, API 19AC, API 19V, and other products with API specifications.

This specification only covers ASVs which are surface controlled.

Repair activities for SSSVs, ASVs, and secondary tools, conducted after final manufacturing is complete and product is shipped are covered by this specification. Redress activities for SSSVs, ASVs, and secondary tools are addressed in API Recommended Practice 14B and are outside the scope of this specification.

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.

ANSI/ASQ Z1.4, *Sampling Procedures and Tables for Inspection*

ANSI/NACE MR 0175/*ISO 15156* [1] *(all parts), Petroleum and natural gas industries — Materials for use in H2S-containing environments in oil and gas production*

API Manual of Petroleum Measurement Standards (*MPMS*), Chapter 10.4, *Determination of Water and/or Sediment in Crude Oil by the Centrifuge Method (Field Procedure)*

API Specification 5B, *Specification for Threading, Gauging, and Thread Inspection of Casing, Tubing, and Line Pipe Threads*

API Specification 11D1, *Packers and Bridge Plugs*, Fourth Edition

API Recommended Practice 13B-1, *Recommended Practice for Field Testing Water-based Drilling Fluids*

API Recommended Practice 14B, *Design, Installation, Repair and Operation of Subsurface Safety Valve Systems*

API Specification 14L, *Specification for Lock Mandrels and Landing Nipples,* Third Edition

API Standard 17F, *Specification for Subsea Production Control Systems,* Fourth Edition

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

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