

API Specification

# 14A

Eleventh Edition, July 2005  
Specification for Subsurface Safety Valve  
Equipment

National Adoption of ISO 10432:2004—Petroleum and  
natural gas industries—Downhole equipment—  
Subsurface safety valve equipment

**Sections 5, 6.1, 6.2, Annex D**

API Monogram<sup>®</sup> Required

☐ Yes ☐ No

## 5 Functional Specification

### 5.1 General

#### 5.1.1 Functional Requirements

The user/purchaser shall prepare a functional specification for ordering products which conform with this International Standard and specify the following requirements and operating conditions, as appropriate, and/or identify the supplier's/manufacture's specific product. These requirements and operating conditions may be conveyed by means of a dimensional drawing, data sheet or other suitable documentation.

#### 5.1.2 Classes of Service

SSSV equipment manufactured in accordance with this International Standard shall conform to one or more of the following classes of service. The user/purchaser shall specify the class(s), as applicable.

- **Class 1: standard service.** This class of SSSV equipment is intended for use in wells which are not expected to exhibit the detrimental effects defined by Classes 2, 3, or 4.
- **Class 2: sandy service.** This class of SSSV equipment is intended for use in wells where particulates such as sand could be expected to cause SSSV equipment failure.
- **Class 3: stress cracking service.** This class of SSSV equipment is intended for use in wells where water containing corrosive agents can cause stress cracking. Class 3 equipment shall meet the requirements for Class 1 or Class 2 service and be manufactured from metallic materials that are demonstrated as resistant to sulfide stress cracking and stress corrosion cracking.

The supplier/manufacture shall ensure that the metallic materials used in Class 3 equipment meet the metallurgical requirements of ISO 15156 (all parts) for sour service and/or shall be suitable for service in non-sour-containing environments where stress corrosion cracking can occur.

The user/purchaser shall ensure that the specific metallic materials contained within Class 3 equipment are suitable for the intended application.

Within Class 3, there are two sub-classes, as follows:

- 1) 3S for sulfide stress cracking service and stress corrosion cracking service in which chlorides are present in a sour environment. Metallic materials suitable for a 3S environment shall be in accordance with ISO 15156 (all parts).
- 2) 3C for stress corrosion cracking service in a non-sour environment. Metallic materials suitable for Class 3C non-sour service are dependent on specific well conditions; no national or international standards exist for the application of metallic materials for this class of service.

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NOTE For the purposes of these provisions, NACE MR0175/ISO 15156-1-2-3, is equivalent to ISO 15156 (all parts).

- **Class 4: mass loss corrosion service** (see 3.16). This class of SSSV equipment is intended for use in wells where corrosive agents could be expected to cause mass loss corrosion. Class 4 equipment shall meet the requirements for Class 1 or Class 2 and be manufactured from materials which are resistant to mass loss corrosion. Metallic materials suitable for Class 4 service are dependent on specific well conditions; no national or international standards exist for the application of metallic materials for this class of service.

## 5.2 SSSV Functional Characteristics

The SSSV functional characteristics should include but are not limited to the following:

- a) type of SSSV control (surface-controlled, subsurface-controlled);
- b) type of SSSV retrieval (tubing-retrievable, WL-retrievable, coil-tubing-retrievable, TFL-retrievable, etc.);
- c) type of SSSV closing mechanism (ball, flapper, etc.);
- d) requirement for internal self-equalizing capability;
- e) requirement, if any, for holding the SCSSV open without the use of the primary operating source (temporary or permanent lock-open system);
- f) requirement, if any, for providing control fluid communication from the SCSSV to any other subsurface device (e.g. a through-tubing retrievable secondary valve);
- g) requirement, if any, for providing pump-through capability;
- h) requirement, if any, for a redundant/independent back-up operating system;
- i) requirements, if any, for minimal leakage (in accordance with 6.7.2) during functional testing.

## 5.3 Well Parameters

The following characteristics shall be specified as applicable:

- a) well location (land, platform, subsea);
- b) size, mass, grade and material of the casing and tubing;
- c) setting depth (maximum required for application) and control system parameters (control fluid type/properties, supply pressure, supply line(s) and connection rating(s), etc.);
- d) casing and/or tubing architecture, trajectory, deviations, maximum dog leg severity;
- e) restrictions through which the SSSV shall pass and restrictions/profiles through which the SSSV service tools/accessories shall pass;

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- f) requirement, if any, for passage of additional lines (electrical, hydraulic), between the valve OD and the
- g) casing ID, if applicable.

## **5.4 Operational Parameters**

### **5.4.1 SSSVs**

The following operational parameters, as applicable, shall be specified for the SSSV:

- a) rated working pressure;
- b) rated temperature range;
- c) if applicable, maximum allowable pressure drop at maximum flow rate through SSSV;
- d) loading conditions, including combined loading (pressures, tension/compression, torque, bending) and the corresponding temperature extremes anticipated to be applied to the valve;
- e) well stimulation operations, including its parameters, such as acidizing (give the composition of the acid), the pressure, the temperature, the acid flow rate and the exposure time, as well as any other chemicals used during the stimulation;
- f) sand consolidation and fracturing operations, including sand/proppant description, fluid flow rate, proppant/fluid ratio or sand/fluid ratio, chemical composition, pressure and temperature;
- g) well-servicing activities through the safety valve: size, type and configuration of other devices to be run through the valve, if applicable.

### **5.4.2 SSCSVs**

The conditions under which the SSCSV will operate (flow conditions) and the conditions under which the valve should close (see ISO 10417) shall be specified, such as:

- a) at valve setting depth, the minimum, maximum and normal values of the production/injection pressures and temperatures at the anticipated flow rates;
- b) composition of the production fluid (gas/oil/water) and density of each component.

## **5.5 Environmental Compatibility**

The following shall be identified for the SSSV to ensure environmental compatibility:

- a) production/injection/annulus fluid chemical and physical composition, including solids (sand production, scale, etc.), to which the SSSV is exposed during its full life cycle;
- b) in cases where the user/purchaser has access to corrosion-property historical data and/or research which is applicable to the functional specification, the user/purchaser should state to the manufacturer which material(s) has the ability to perform as required within a similar corrosion environment.

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## **5.6 Compatibility with Related Well Equipment**

The following information, as applicable, shall additionally be specified to ensure the compatibility of the SSSV with the related well equipment:

- a) SSSV size, type, material, the configuration of the interface connections (these connections are not included in the evaluation of combined loading);
- b) internal receptacle profile(s), sealing bore dimension(s), outside diameter, inside diameter and their respective locations;
- c) requirement(s) for passage of conduits (electrical/hydraulic) between valve OD and casing ID.

## **6 Technical Specification**

### **6.1 Technical Requirements**

The supplier/manufacturer shall prepare and provide to the user/purchaser the technical specification that responds to the requirements defined in the functional specification.

### **6.2 Technical Characteristics of SSSV**

The following criteria shall be met:

- a) the SSSV shall be located and/or seal at the specified location and remain so until intentional intervention defines otherwise;
- b) while installed, the SSSV shall perform in accordance with the functional specification;
- c) where applicable, the SSSV shall not compromise well-intervention operations as specified in 5.4;
- d) while in service, the SSSV shall meet the requirements of the functional specification.

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## Annex D (informative)

### Optional Requirement for Closure Mechanism Minimal Leakage

#### D.1 General

Minimal leakage rate applies only to the functional test. If a minimal leakage requirement is specifically requested by user/purchaser, the supplier shall adhere to D.2 and D.3.

NOTE These test requirements are optional and do not mandate minimal leakage requirements for all SSSVs.

#### D.2 Gas Leakage Test Requirements

If the leakage rate exceeds 14,2 dm<sup>3</sup>/min (0,5 scfm), the SSSV fails the functional test.

#### D.3 Liquid Leakage Test Requirements

If the leakage rate exceeds 1 cm<sup>3</sup>/min (0,034 fl oz/min), the SSSV fails the functional test.