Installation, Maintenance, and Repair of Safety Valves (SSV, USV and BSDV)

API STANDARD 6AV2
SECOND EDITION, XXXXX 2020
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(SSV, USV and BSDV)

1 Scope

This standard provides requirements for installing and maintaining safety valves. Included are requirements for receiving inspection, installation and maintenance, field and off-site repair, testing procedures with acceptance criteria, failure reporting, and documentation. Power and control systems for safety valves are not included.

NOTE 1 The safety valve in this document is the Surface Safety Valve (SSV), Underwater Safety Valve (USV), or the Boarding Shutdown Valve (BSDV) as defined in API 6A. "Safety valve" as used in this standard denotes a surface safety valve (SSV) or an underwater safety valve (USV) or a boarding shutdown valve (BSDV).

NOTE 2 Safety valves are the final element of a safety shutdown instrumented system. Testing the safety shut down system and test frequency are outside the scope of this Standard.

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 6A, Specification for Wellhead and Tree Equipment

API Standard 6AR, Repair and Remanufacture of Wellhead and Tree Equipment


3 Terms, Definitions, Acronyms, and Abbreviations

3.1 Terms and Definitions

For the purposes of this standard, the terms and definitions given in API 6A and the following shall apply.

3.1.1 choked flow
Flow condition in which the fluid flow velocity and mass-flow rate are insensitive to the pressure differential across the flow restriction and occurs when the pressure drop across the flow restriction is higher than the critical pressure differential.

Flow condition in which the fluid velocity and mass-flow rate are insensitive to the pressure drop across the flow restriction and no phase change occurs.

NOTE: Choked flow occurs when the ratio of downstream pressure to upstream pressure is lower than the critical pressure ratio.
3.1.2 critical pressure differential
Pressure drop resulting from a pressure ratio below the critical pressure ratio.

3.1.2 critical pressure ratio
Ratio of pressure downstream of the flow restriction to pressure upstream of the flow restriction below which choked flow occurs.

3.1.3 direct measurement device
Instrument/equipment whose output is the measurement of flow rate (leakage) across the pressure-controlling components of the safety valves.

3.1.4 indirect measurement method
Use of equipment whose output is the measurement of one or more thermodynamic properties of the fluid moving across the safety valves, and the methodology used to convert the measured quantities into the equivalent flow rate (leakage) across the pressure-controlling components of the safety valves.

3.1.5 non-choked flow
Fluid flow which does not meet the definition of choked flow.
Fluid flow resulting when the pressure drop across the flow restriction is lower than the critical pressure differential.

3.1.6 operating manual
The publication issued by the manufacturer containing detailed data and instructions related to the design, installation, operation, and maintenance of safety valve equipment.
Documentation provided by the manufacturer containing data and instructions necessary for the correct installation, operation, and maintenance of the safety valve and associated equipment.

NOTE The content of operating manual for a safety valve is specified in API 6A.

3.1.7 operator
The user of a safety valve who is in conformance with the requirements of this standard.
The user of a safety valve.

3.1.8 periodic testing
Seal and functional test of safety valves according to a pre-determined schedule.

3.1.9 qualified personnel
Individual with characteristics or abilities gained through training, experience, or both, as measured against the established requirements of the manufacturer/purchaser/this document.

3.1.10 remanufacture
Activity where machining, welding or heat treating have been performed on used or reused parts. [see API 6AR]

NOTE Remanufacture does not include the replacement of bodies.
3.1.11 field repair
Activity involving disassembly, reassembly, and testing of a safety valve, with or without the replacement of parts, performed in accordance with this standard at the equipment installation site.

NOTE Field repair does not include replacement of the bodies.

3.1.12 off-site repair
Repair that occurs at a location other than the equipment installation site.

3.1.13 service provider
Organization and its designated qualified personnel contracted to perform installation, field maintenance, and/or repair.

3.1.14 sustained leak rate
Leak rate representative of current field performance of the safety valve valve-bore sealing mechanism.

3.2 Acronyms and Abbreviations
For the purposes of this specification, the following abbreviations shall apply.

- BSDV boarding shutdown valve
- NORM naturally occurring radioactive material
- PPB parts per billion
- PPM parts per million
- PSL product specification level
- ROV remotely operate vehicle
- RSL repair and remanufacture level
- SITP shut-in tubing pressure
- SSV surface safety valve
- USV underwater safety valve

4 Receiving Inspection
Prior to installation of the safety valve, the valve documentation shall be checked to verify the following:

- the serial numbers on the safety valve correspond to those recorded on the accompanying shipping report,
- the safety valve and safety valve actuator are marked with the proper required size, pressure rating, temperature rating, material class, and PSL or RSL for the intended service, and
- the safety valve is marked with the required service class (e.g. API 6A Class I, II or III for Sandy Service),
- the documentation supplied with the safety valve are in agreement with the markings listed above.

The safety valve shall be visually inspected by qualified personnel for damage that might impair its proper operation.
The operator shall verify the rated working pressure, the maximum gate differential pressure of the BSDVs and the actuator pressure to be sure they are according to the purchasing agreement and rig control system.

The operator shall verify the actuator’s rated working pressure, the BSDV’s maximum differential pressure and the required actuator pressure and volume against the purchasing agreement and the control system capabilities.

NOTE 1 USV operations can be affected by installation depth and control fluid densities.

NOTE 2 The BSDV can be designed to open at a valve bore sealing mechanism differential pressure that is lower than valve rated working pressure, as agreed between manufacturer and operator.

If disassembly is required as part of the visual inspection of the safety valve, it shall be performed by qualified personnel and shall be in accordance with the manufacturer’s operating manual and the requirements set in Section 6 of this document.

Tools and operational equipment (e.g. SSV lock-open device) associated with the safety valve should be identified and inspected for proper operation/condition, according to operator’s, user’s and manufacturer’s written procedures.