SUPPLEMENTS

SUPPLEMENT 1

PRESSURE RELIEF VALVES ON THE LOW PRESSURE SIDE OF STEAM PRESSURE-REDUCING VALVES *(was Part 1 Supplement 2)*

S1.1 ~~S2.1~~ SCOPE

a) The subject of protection of vessels in steam service connected to the low-pressure side of a steam-pressure-reducing valve is of considerable importance to proper operation of auxiliary equipment such as pressure cookers, hot-water heating systems, etc., operating at pressures below that which the primary boiler generating unit is operating.
b) To automatically reduce the primary boiler pressure for such processing equipment, pressure-reducing valves are used. The manufacturers of such equipment have data available listing the volume of flow through reducing valves manufactured by them, but such data are not compiled in a form that the results can be deduced readily.
To protect the equipment operating on the low pressure side of a pressure-reducing valve, safety valves of a relieving capacity sufficient to prevent an unsafe pressure rise in case of failure of the pressure-reducing valve, should be installed.
c) The pressure-reducing valve is a throttling device, the design of which is based on certain diaphragm pressures opposed by spring pressure which, in turn, controls the opening through the valve. If the spring, the diaphragm, or any part of the pressure- reducing valve fails, steam will flow directly through the valve and the low pressure equipment will be subjected to the boiler pressure. To protect the equipment operating on the low pressure side of the pressure-reducing valve, safety valve(s) should be installed on the low pressure side of the pressure-reducing valve, which will provide a relieving capacity sufficient to prevent the pressure from rising above the system design pressure.
d) In most cases pressure-reducing valves used for the reduction of steam pressures have the same pipe size on the inlet and outlet. In case of failure of a pressure-reducing valve, the safety valve on the low-pressure side must have a capacity to take care of the volume of steam determined by the high pressure side and the area of the pipe.

S1.2 ~~S2.2~~ SAFETY VALVE CAPACITY

a) The capacity of the safety valve(s) on the low-pressure side of the pressure-reducing valve should be based on the capacity of the pressure-reducing valve when wide open or under maximum flow conditions or the flow capacity through the bypass valve.
b) By using the formula in S2.3 below, Inspectors may calculate the required relieving capacities of the safety valve(s) installed on the low-pressure side of the pressure reducing valve.
c) Usually a pressure-reducing valve has a bypass arrangement so that in case of failure of the pressure-reducing valve the boiler pressure may be short circuited into the low-pressure line without passing through the pressure-reducing valve. When determining the required relieving capacity of safety valves for the low-pressure side of the pressure-reducing valve, the steam flow through the bypass must be taken into consideration.

S1.3 ~~S2.3~~ CALCULATION OF SAFETY VALVE RELIEVING CAPACITY

a) When a pressure-reducing valve is installed, there are two possibilities of introducing boiler pressure into the low-pressure system:
1) the failure of the pressure-reducing valve so that it remains wide open; and
2) the possibility of the bypass valve being open.
b) It is necessary therefore, to determine the flow under both circumstances in paragraph a) above and check that the size of the safety valve under either condition will be adequate. The following formula should be used:
1) steam flow, W in lbs/hr (kg/hr) through the pressure-reducing valve
$W = AKC$
where,

A = internal area in sq. in. (sq. mm) of the inlet pipe size of the pressure reducing valve (see S2.5)
K = flow coefficient for the pressure reducing valve (see S2.4)
C = flow of saturated steam through a 1 sq. in. (1 sq. mm) pipe at various pressure differentials from Tables S2.3-a, S2.3-b, or S2.3-c.
(for U.S. Customary units) or Tables S2.3M-a, S2.3M-b, or S2.3M-c (for metric units).
2) steam flow, W in lbs/hr (kg/hr) through the by-pass valve
W = A1 K1 C1
where,
A1 = internal area in sq. in. (sq. mm) of the pipe size of the bypass around the pressure-reducing valve
K1 = flow coefficient for the bypass valves (see S2.4)
C1 = flow of saturated steam through a 1 sq. in. (1 aq. mm) pipe at various pressure differentials from Tables S2.3-a, S2.3-b, or S2.3-c.
(for U.S. Customary units) or Tables S2.3M-a, S2.3M-b, or S2.3M-c (for metric units).

S 1.4 ~~S2.4~~ STEAM FLOW WHEN FLOW COEFFICIENTS ARE NOT KNOWN

a) It is possible that the flow coefficients K and K1 may not be known and in such instances for approximating the flow, a factor of 1/3 may be substituted for K and 1/2 for K1.
The formulas in S2.3 then becomes:
W = 1/3 AC for the capacity through the pressure-reducing valve; and
W = 1/2 A1 C1 for the capacity through the bypass valve.
b) Caution should be exercised when substituting these factors for the actual coefficients since this method will provide approximate values only and the capacities so obtained may in fact be lower than actual. It is recommended that the actual flow coefficient be obtained from the pressure-reducing valve manufacturer and reference books be consulted for the flow coefficient of the bypass valve.

(Tables did not import correctly)

TABLE S2.3-a
Capacity of Saturated Steam, in lb./hr., per sq. in. of Pipe Area

	1500	1450	1400	1350	1300	1250	1200	1150	1100	1050	1000	950	900
1000	76560	72970	69170	64950	60540	55570	49930	43930	35230	25500	. . .	. . .	. . .
950	77430	74180	70760	67000	63100	58770	53920	48610	42380	34890	24910	. . .	. . .
900	77750	74810	71720	68340	64870	61040	56820	52260	47050	41050	33490	23960	. . .
850	77830	74950	72160	69130	66020	62610	58900	54930	50480	45470	39660	29080	23190
800	. . .	75070	72330	69490	66700	63680	60390	56910	53060	48800	43980	38340	31610
750	. . .	. . .	69610	66880	64270	61260	58200	54840	51170	47080	42420	37110	
700	. . .	. . .	66900	64270	61520	58820	55870	52670	49170	45230	40860		
650	. . .	. . .	. . .	61550	58860	56260	53480	50440	47070	43400			
600	. . .	. . .	. . .	58980	56270	53660	51020	48470	45010				
550	. . .	. . .	. . .	. . .	53810	51040	48470	45800					
500	. . .	. . .	. . .	. . .	. . .	45850							
450	. . .	. . .	. . .	. . .	. . .	45870							
400	. . .												
350	. . .												
300	. . .												
250	. . .												
200	. . .												
175	. . .												
150	. . .												
125	. . .												
110	. . .												
100	. . .												
85	. . .												
75	. . .												
60	. . .												
50	. . .												
40	. . .												
30	. . .												
25	. . .												

15 . . . . . .
10 . . . . . .
5 . . . . . .
Outlet pres., psi
Pressure-reducing valve inlet pressure, psi
Where capacities are not shown for inlet and outlet conditions, use the highest capacity shown under the applicable inlet pressure column.

TABLE S2.3M-a
Capacity of Saturated Steam, in kg/hr., per sq. mm of Pipe Area

10.25	**10.00**	**9.75**	**9.50**	**9.25**	**9.00**	**8.75**	**8.50**	**8.25**	**8.00**	**7.75**	**7.50**	**7.25**	**7.00**	**6.75**	**6.50**	**6.25**
6.75	53.44	51.68	49.82	47.85	45.77	43.63	41.28	38.73	36.01	33.09	29.47	25.37	20.89	. . . . .		
6.50	53.87	52.23	50.52	48.69	46.79	44.83	42.69	40.40	37.95	35.30	32.33	29.02	25.31	20.46	. . . . .	
6.25	54.07	52.55	50.96	49.27	47.51	45.71	43.75	41.67	39.46	37.08	34.46	31.59	28.43	24.45	19.36	. . . . .
6.00	54.15	52.67	51.19	49.62	47.99	46.33	44.53	42.63	40.62	38.74	36.12	33.59	30.83	27.53	23.13	17.64
5.75	54.19	52.74	51.32	49.85	48.33	45.80	45.14	43.40	41.56	39.62	37.51	35.25	32.82	30.04	26.20	21.90
18.76																
5.50	54.20	52.78	51.40	49.97	48.53	47.11	45.60	44.00	42.32	40.55	38.56	36.63	34.48	32.05	29.37	26.41
23.01																
5.25	. . . . .	50.00	48.60	47.20	45.82	44.35	42.78	41.17	39.44	37.62	35.68	33.52	31.16	28.59		
25.72																
5.00	. . . . .	50.01	48.62	47.23	45.89	44.49	43.02	41.55	39.98	38.33	36.57	34.64	32.56	30.01		
27.84																
4.75	. . . . .	47.24	. . . . .	44.52	43.13	41.75	40.31	38.81	37.22	35.50	33.64	31.66				
29.51																
4.50	. . . . .	44.53	43.14	41.77	40.43	39.08	37.63	36.07	34.41	32.65						
30.76																
4.25	. . . . .	43.15	41.82	40.46	39.10	37.74	36.33	34.90	33.39							
31.60																
4.00	. . . . .	41.84	40.48	39.12	37.82	36.45	35.12	33.76								
32.15																
3.75	. . . . .	39.14	37.88	36.48	35.13	33.81										
32.45																
3.50	. . . . .															
32.47																
3.25	. . . . .															
32.48																
3.00	. . . . .															

Outlet pres., MPa
Pressure-reducing valve inlet pressure, MPa
Where capacities are not shown for inlet and outlet conditions, use the highest capacity shown under the applicable inlet pressure column.

SUPPLEMENT 2

PRESSURE DIFFERENTIAL BETWEEN SAFETY OR SAFETY RELIEF VALVE SETTING AND BOILER OR PRESSURE VESSEL OPERATING PRESSURE (Was Part 2, Supplement 8)

S 2.1 ~~S8.1~~ SCOPE

If a safety valve or safety relief valve is subjected to pressure at or near its set pressure, it will tend to weep or simmer, and deposits may accumulate in the seat and disk area. Eventually, this can cause the valve to freeze closed and thereafter the valve could fail to open at the set pressure. Unless the source of pressure to the boiler or pressure vessel is interrupted, the pressure could exceed the rupture pressure of the vessel. It is important that the pressure differential between the valve set pressure and the boiler or pressure vessel operating pressure is sufficiently large to prevent the valve from weeping or simmering.

S2.2 ~~S8.2~~ HOT WATER HEATING BOILERS

For hot-water heating boilers, the recommended pressure differential between the pressure relief valve set pressure and the boiler operating pressure should be at least 10 psi (70 kPa), or 25% of the boiler operating pressure, whichever is greater. Two examples follow:
a) If the safety relief valve of a hot-water heating boiler is set to open at 30 psi (200 kPa), the boiler operating pressure should not exceed 20 psi (140 kPa).
b) If the safety relief valve of a hot water heating boiler is set to open at 100 psi (700 kPa), the boiler operating pressure should not exceed 75 psi (520 kPa). Section IV of the ASME Code does not require that safety relief valves used on hot water heating boilers have a specified blowdown. Therefore, to help ensure that the safety relief valve will close tightly after opening and when the boiler pressure is reduced to the normal operating pressure, the pressure at which the valve closes should be well above the operating pressure of the boiler.

S2.3 ~~S8.3~~ STEAM HEATING BOILERS

For steam heating boilers, the recommended pressure differential between the safety valve set pressure and boiler operating pressure should be at least 5 psi (35 kPa), i.e., the boiler operating pressure should not exceed 10 psi (70 kPa).
Since some absorption-type refrigeration systems use the steam heating boiler for their operation, the boiler operating pressure may exceed 10 psi (70 kPa). If the boiler operating pressure is greater than 10 psi (70 kPa), it should not exceed 15 psi (100 kPa), minus the blowdown pressure of the safety valve. This recommendation can be verified by increasing the steam pressure in the boiler until the safety valve pops, then slowly reducing the pressure until it closes, to ensure that this closing pressure is above the operating pressure.

S2.4 ~~S8.4~~ POWER BOILERS

For power boilers (steam), the recommended pressure differentials between the safety valve set pressure and the boiler operating pressure are as follows:

(following to be prepared in table format)

MINIMUM PRESSURE DIFFERENTIAL AS PERCENTAGE OF BOILER DESIGN PRESSURE

over 15 psi to 300 psi (100 KPa to 2.10 MPa): 10% but not less than 7 psi (50 KPa)
over 300 psi to 1000 psi (2.14 MPa to 6.89 MPa): 7% but not less than 30 psi (200 KPa)
over 1000 psi to 2000 psi (6.89 MPa to 13.8 MPa): 5% but not less than 70 psi (480 KPa)
over 2000 psi (13.8 MPa): per designer's judgment

Notes:
1. Above 2000 psi (13.8 MPa) the pressure differential between operating pressure and the maximum allowable working pressure is a matter for the designer's judgment , taking into consideration such factors as satisfactory operating experience and the intended service conditions.
2. Safety relief valves in hot water service are more susceptible to damage and subsequent leakage, than safety valves relieving steam. It is recommended that the maximum allowable working pressure of

the boiler and safety relief valve setting for high-temperature hot -water boilers be selected substantially higher than the desired operating pressure, so as to minimize the time the safety relief valve must lift.
3. For organic fluid vaporizers a pressure differential of 40 psi (280 kPa) is recommended.

S2.5 ~~S8.5~~ PRESSURE VESSELS

Due to the variety of service conditions and the various designs of pressure relief valves, only general guidelines can be given regarding differentials between the set pressure of the valve and the operating pressure of the vessel. Operating difficulty will be minimized by providing an adequate differential for the application. The following is general advisory information on the characteristics of the intended service and of the pressure relief valves that may bear on the proper pressure differential selection for a given application. These considerations should be reviewed early in the system design since they may dictate the maximum allowable working pressure of the system. To minimize operational problems it is imperative that the user consider not only normal operating conditions of the fluids (liquids or gases), pressures, and temperatures, but also start-up and shutdown conditions, process upsets, anticipated ambient conditions, instrument response time, and pressure surges due to quick-closing valves, etc. When such conditions are not considered, the pressure relief devices may become, in effect, a pressure controller, a duty for which it was not designed. Additional consideration should be given to the hazard and pollution associated with the release of the fluid. Larger differentials may be appropriate for fluids which are toxic, corrosive, or exceptionally valuable. The blowdown characteristics and capabilities are the first consideration in selecting a compatible valve and operating margin. After a self-actuated release of pressure, the valve must be capable of reclosing above the normal operating pressure. For example: if the valve is set at 100 psi (700 kPa) with a 7% blowdown, it will close at 93 psi (640 kPa). The operating pressure must be maintained below 93 psi (640 kPa) in order to prevent leakage or flow from a partially open valve.

Users should exercise caution regarding the blowdown adjustment of large, spring-loaded valves. Test facilities, whether owned by the manufacturer, repair house, or user, may not have sufficient capacity to accurately verify the blowdown setting. The setting cannot be considered accurate unless made in the field on an actual installation.

Pilot operated valves represent a special case from the standpoint of both blowdown and tightness. The pilot portion of some pilot operated valves can be set at blowdowns as short as 2%. This characteristic is not, however, reflected in the operation of the main valve in all cases. The main valve can vary considerably from the pilot depending on the location of the two components in the system. If the pilot is installed remotely from the main valve, significant time and pressure lags can occur, but reseating of the pilot ensures reseating of the main valve. The pressure drop in connecting piping between the pilot and the main valve must not be excessive, otherwise the operation of the main valve will be adversely affected.

Tightness capability is another factor affecting valve selection, whether spring-loaded or pilot operated. Tightness varies somewhat depending on whether metal or resilient seats are specified and also on such factors as corrosion and temperature. The required tightness and test method should be specified to comply at a pressure not lower than the normal operating pressure of the process. It should be remembered that any degree of tightness obtained should not be considered permanent. Service operation of a valve almost invariably reduces the degree of tightness.

The following minimum pressure differentials are recommended unless the safety or safety relief valve has been designed or tested in a specific or similar service and a smaller differential has been recommended by the manufacturer:

(following to be prepared in table format)

a) for set pressures up to 70 psi (480 kPa), the recommended pressure differential is 5 psi (35 kPa);
b) for set pressure between 70 and 1000 psi (480 kPa and 6.89 MPa), the recommended pressure differential is 10% of set pressure; and
c) for set pressures above 1000 psi (6.89MPa), the recommended pressure differential is 7% of set pressure.

SUPPLEMENT 3

GUIDE TO JURISDICTIONS FOR AUTHORIZATION OF OWNERS-USERS TO MAKE ADJUSTMENTS TO PRESSURE RELIEF VALVES (WAS PART 3 S7.10)

S3.1 ~~S7.10.1~~ GENERAL

The Jurisdiction may authorize properly trained and qualified employees of boiler and pressure owners-users or their designees to restore set pressure and/or performance of pressure relief valves. All external adjustments shall be resealed with a seal identifying the responsible organization and a metal tag that identifies the organization and the date the adjustment shall be installed.

S3.2 ~~S7.10.2~~ TRAINING

a) The user shall establish a documented in house training program. This program shall establish training objectives and provide a method of evaluating the training effectiveness. As a minimum, training objectives for knowledge level shall include:
1) Applicable ASME Code and NBIC requirements;
2) Responsibilities within the organization's quality system;
3) Knowledge of the technical aspects and mechanical skills for making set pressure and/or blowdown adjustments to pressure relief valves;
4) Knowledge of the technical aspects and mechanical skills for marking of pressure relief valve adjustments.
b) If the user established a designee, the designee shall establish a training program and make their documentation available to the user and the jurisdictional authority.

S3.3 ~~S7.10.3~~ DOCUMENTATION

Each user shall document the evaluation and acceptance of an employee's or designee's qualifications.

S3.4 ~~S7.10.4~~ QUALITY SYSTEM

a) A written quality system shall be established by either the user or the designee with a written description available to the jurisdictional authority.
b) The written description shall include at a minimum:
1) Calibration of Test Equipment: This shall describe a system for the calibration of measuring and test equipment. Documentation of these calibrations shall include the standard used and the results. Calibration standards shall be calibrated against the equipment having valid relationships to nationally recognized standards.
2) Valve Testing, Setting, and Sealing: This system shall include provisions that each valve shall be tested, set, and all external adjustments sealed according to the requirements of the applicable ASME Code Section and S7.10.1(a).
3) Valve Marking: An effective marking system shall be established to ensure proper marking of the metal tag required by S7.10.1(a). The written quality system shall include a description or drawing of the metal tag.

S3.5 ~~S7.10.5~~ EXTERNAL ADJUSTMENTS

Only external adjustments to restore the required set pressure and/or performance of a pressure relief valve shall be made under the provisions of S3.1 ~~S7.10.1~~.

S3.6 ~~S7.10.6~~ REPAIRS

If disassembly, change of set pressure, or additional repairs are necessary, the valve shall be repaired by an organization that meets the requirements of the NBIC.

SUPPLEMENT 4

RECOMMENDED PROCEDURES FOR REPAIRING PRESSURE RELIEF VALVES (Was supplement S7.14)

S4.1 ~~S7.14.1~~ INTRODUCTION

a) It is essential that the repair organization establish basic, specific procedures for the repair of pressure relief valves. The purpose of these recommended procedures is to provide the repair organization with guidelines for this important aspect of valve repair. It is realized that there are many types of valves and conditions under which they are repaired and, for this reason, the specific items in these recommended procedures may not apply, or they may be inadequate for each of those types or to the detailed repairs that may be required for each valve.
b) S4.2 ~~S7.14.2~~ contains recommended procedures for the repair of spring-loaded pressure relief valves, and S4.3 ~~S7.14.3~~ contains recommended procedures for the repair of pilot operated types of safety relief valves. *Information on Packaging, Shipping and Transportation is included as S4.5.*

S4.2 ~~S7.14.2~~ SPRING-LOADED PRESSURE RELIEF VALVES

Prior to removal of a valve from a system for a repair or any disassembly, ensure that all sources of pressure have been removed from the valve.
a) Visual Inspection as Received
1) This information is to be recorded:
a. Record user (customer) identification number.
b. Complete nameplate data, plus any important information received from customer.
c. Check external adjustment seals for warranty repair.
d. Check bonnet for venting on bellows type valves.
e. Check appearance for any unusual damage, missing, or misapplied parts.
2) If sufficient damage or other unusual conditions are detected that may pose a safety risk during preliminary testing, then proceed directly to S7.14.2 c).
3) Valves that are to be repaired in place proceed to S7.14.2 c), unless preliminary testing has been authorized by the owner.
b) Preliminary Test as Received
1) Information from the recommended preliminary performance test and subsequent disassembly and inspections will provide a basis for any repair interval change that should be necessary to ensure that the valve will function as intended.
2) Determine set pressure or Cold Differential Test Pressure (CDTP) in accordance with manufacturer's recommendations and appropriate ASME Code Section. Do not allow test pressure to exceed 116% of set pressure unless otherwise specified by the owner. A minimum of three tests is usually required to obtain consistent results.
3) If results do not correlate with field performance, then steps to duplicate field conditions (fluid and temperature) may be necessary.
4) Record preliminary test results and test bench identification data.
c) Disassembly
1) Remove cap and lever assembly, if applicable.
2) Remove release nut assembly, if applicable.
3) Loosen jam nut on adjusting (compression) screw.
4) Record measurement and remove adjusting (compression) screw.
5) Remove bonnet or yoke.
6) Remove spring and washers, and tag (identify) including upper and lower washers, as appropriate.
7) Remove spindle and disk assembly.
8) Remove ring pins.
9) Record measurement and remove adjusting rings, nozzle, and guide, as applicable.
d) Cleaning
1) Wire all small parts together and clean by means of an abrasive. (Caution: do not use a cleaning method that will damage the parts.)
2) Do not clean in a chemical solution except under acceptable circumstances.
3) Protect seating surfaces and nameplates prior to cleaning.
e) Inspection

1) Check spring for damage such as erosion, corrosion, cracking, breakage, or compression below free height.
2) Check nozzle for cracks (NDE as applicable) or unusual wear.
3) Check disk assembly for cracks (NDE as applicable) or unusual wear.
4) Check spindle for trueness, bearing areas, and thread condition.
5) Check guide for wear and galling.
6) Check adjusting ring(s) for worn threads and wear.
7) Check ring pins for bent or broken pin and thread condition.
8) Check bellows, if provided, for pinholes and corrosion.
9) Check flange gasket facings for wear and cuts.
f) Machining
Machine nozzle and disk as necessary to the manufacturer's critical dimension charts.
g) Lapping
1) Machine or hand lap disk and nozzle to be sure of flatness.
2) Lap bevel seats to a grey finish; then re-machine disk or plug to the manufacturer's critical dimension.
h) Adjusting Rings
Install lower ring and guide ring to the same position they were when removed, or to manufacturer's specifications.
i) Bearing Points
Grind all bearing areas with grinding compound to make sure they are round and true.
j) Testing
Test data shall be recorded. Testing will be done in accordance with manufacturer's recommendations and appropriate ASME Code section. To preclude unsafe and unstable valve operations or erroneous performance test results, it is recommended that low volume testing equipment (e.g., gas cylinders without a test vessel, hand pumps, tubing) should be avoided.
k) Sealing
After final adjusting and acceptance by quality control inspection, all external adjustments will be sealed with a safety seal providing a means of identification of the organization performing the repair.
l) Nameplate
The repairer will place a repair nameplate on each repaired valve. The nameplate shall, as a minimum, meet the requirements of 5.9.1 **(CHECK X-REF).**

~~m) Packaging, Shipping and Transportation~~ (moved to the end of this section and combined with Part 2 info)
~~1) Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces.~~
~~2) Threaded and socket-weld valves up to 2 in. (50 mm) may be securely packaged and cushioned during transport.~~
~~3) Valve inlet and outlet connection, drain connections and bonnet vents should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation.~~
~~4) Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored.~~
~~5) Valves for special services, including but not limited to oxygen, chlorine, and hydrogen peroxide, should be packaged in accordance with appropriate standards and/or owner procurement requirements.~~

S4.3 ~~S7.14.3~~ PILOT OPERATED SAFETY RELIEF VALVES
a) Visual Inspection as Received
1) This information is to be recorded:
a. Complete nameplate data, plus any other important information received from the customer.
b. User identification number, if applicable.
c. Seals on external adjustments (~~yes/no~~, *are seals intact?*).
d. Identification on seal.
e. Obvious damage and external condition including missing or misapplied parts.
b) Disassembly
1) Remove pilot and disassemble per manufacturer's maintenance instruction.
2) Disassemble main valve. Where lift adjustments are provided, do not remove the locking device or change the lift unless it is required as part of conversion.
3) Remove the nozzle if recommended by the manufacturer's maintenance instructions and/or when required as part of conversion.

c) Cleaning
1) Pilot — Components of pilot are small and must be handled carefully to prevent damage or loss. Clean parts and nameplates with solvents that will not affect the parent metal and/or polish with 500 grit paper.
2) Main Valve — Clean by appropriate means such as abrasive blast. Finishes of machined surfaces must not be affected.
(Caution: Do not use a cleaning method that will damage the parts or nameplates.)
d) Inspection
1) Pilot
a. Check spring for damage such as corrosion, cracks, out of square ends, etc.
b. Inspect all parts for damage. Small burrs or scratches may be removed by polishing. Severely damaged parts should be replaced. (Internal components or pilots should not be repaired by machining as the functions of the pilot could easily be impaired.)
c. Check strainers *and filters* on inlet and outlet lines.
d. Replace all soft goods per manufacturer's recommendation.
2) Main Valve
a. Check nozzle seating surface for nicks. These can be removed by machining or lapping as required.
b. Check the piston and liner (or other moving member) for galling or excessive wear. The piston should move freely in the liner.
c. Replace soft goods or re-lap disk as required.
d. Where lift adjustments are provided, measure the lift per the manufacturer's specifications.
e) Testing
Test data shall be recorded. Testing will be done in accordance with the manufacturer's recommendation and in accordance with the applicable ASME Code section. To preclude unsafe and unstable valve operations or erroneous performance test results, it is recommended that low volume testing equipment (e.g., gas cylinders without a test vessel, hand pumps, tubing) should be avoided.
f) Sealing
After final adjustment and acceptance by quality control, all external adjustments will be sealed by means assuring positive identification of the organization performing the repair.
g) Nameplate
The repairer will place a repair nameplate on each repaired valve. The nameplate, as a minimum, shall meet the requirements of 5.9.1 **(NEED NEW X-REF)**.

S4.5 ~~2.5.6~~ Packaging, Shipping and Transportation of Pressure Relief Devices
(moved from in-service inspection and combined with similar information from spring loaded and pilot operated repair)

a) The improper packaging, shipment, and transport of pressure relief devices can have detrimental effects on device operation. Pressure relief devices should be treated with the same precautions as instrumentation, with care taken to avoid rough handling or contamination prior to installation.
b) The following practices are recommended:
1) Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces except threaded and socket-weld valves up to 2 in. (DN 50 ~~50mm~~) may be securely packaged and cushioned during transport.
2) Valve inlet and outlet connection, drain connections, and bonnet vents should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation.
3) The valve should not be picked up or carried using the lifting lever. Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or stored. These wires shall be removed before the valve is placed in service.
4) Pilot valve tubing should be protected during shipment and storage to avoid damage and/or breakage.

~~h) Packaging, Shipping and Transportation~~
~~1) Valves should be securely fastened to pallets in the vertical position to avoid side loads on guiding surfaces.~~
~~2) Threaded and socket-weld valves up to 2 in. (50 mm) may be securely packaged and cushioned during transport.~~
~~3) Valve inlet and outlet connection and drain connections should be protected during shipment and storage to avoid internal contamination of the valve. Ensure all covers and/or plugs are removed prior to installation.~~
~~4) Lifting levers should be wired or secured so they cannot be moved while the valve is being shipped or~~

~~stored.~~
~~5) Tubing should be protected during shipment and storage to avoid damage and/or breakage.~~
~~6)~~ 5)Valves for special services, including but not limited to oxygen, chlorine, and hydrogen peroxide, should be packaged in accordance with appropriate standards and/or owner procurement requirements.

SUPPLEMENT 5

RECOMMENDED GUIDE FOR THE DESIGN OF A TEST SYSTEM FOR PRESSURE RELIEF DEVICES IN COMPRESSIBLE FLUID SERVICE (Was Part 3, Supplement 8)

S5.1 ~~S8.1~~ INTRODUCTION

This supplement provides guidance for the design of a test system using compressible fluids (e.g., steam or air/gas) and permits the determination of pressure relief valve set pressure and valve operating characteristics such as blowdown. The size of the test vessel needed depends on the size of the valve, its set pressure, the design of the test system, and whether blowdown must be demonstrated. A repair organization may use the information provided in this supplement to determine the minimum size test vessel needed so that the measured performance is characteristic of the valve and not the test system.

S5.2 ~~S8.2~~ GENERAL

a) The National Board administrative rules and procedures for the "VR" *Certificate of Authorization* and symbol stamp require that pressure relief valves, after repair, be tested in accordance with the manufacturer's recommendations and the applicable ASME Code. The purpose of this testing is to provide reasonable assurance that valves will perform according to design when they are returned to service.
b) It is recognized that a full evaluation of the performance of some pressure relief valve designs requires testing at maximum allowable overpressure. However, it is beyond the scope of this supplement to define test equipment or facilities for such testing.
c) Section 9 of this part provides a glossary, S8.3 describes typical test equipment, and S8.4 provides data for estimating the size of test vessels required.

S5.3 ~~S8.3~~ TEST SYSTEM DESCRIPTION

a) An optimum configuration, particularly when the test medium source is of small capacity, is shown in Figure S8.3-a. The test medium flows from the pressure source, usually a compressor or boiler, to an accumulator. It then flows through a pressure-controlling valve into the test vessel, from which it is discharged, through the pressure relief valve installed ~~mounted~~ on the test vessel. The pressure-controlling valve is usually a globe valve, although any throttling valve is acceptable. If the pressure-controlling valve
is of adequate size and can open quickly, large transient flows can be generated, increasing the pressure above the pressure relief valve set pressure, causing it to lift, and be sustained in its lifted condition.
b) Figure S8.3-b shows a simpler test system in which the test vessel is pressurized directly from the pressure source without the use of an accumulator. In this configuration, flow-rates through the pressure relief valve and any consequent over-pressure are dependent on the flow generating capacity of the pressure source.
c) In a test facility, the pressure relief valve is usually installed ~~mounted~~ on an isolating valve that should be of sufficient size that it will not choke flow to the pressure relief valve. There should be no intervening piping between the two valves to avoid any significant pressure drop between the test vessel and the pressure relief valve.
d) The isolating valve and any adapter flanges or valve test nozzles must be designed to sustain pressure relief valve discharge forces, and so secured that these forces are not transmitted to the test vessel. This is especially important for larger valves set at pressures greater than 100 psig (700 kPa).

FIGURE S8.3-a
Schematic of Test Equipment with Accumulator

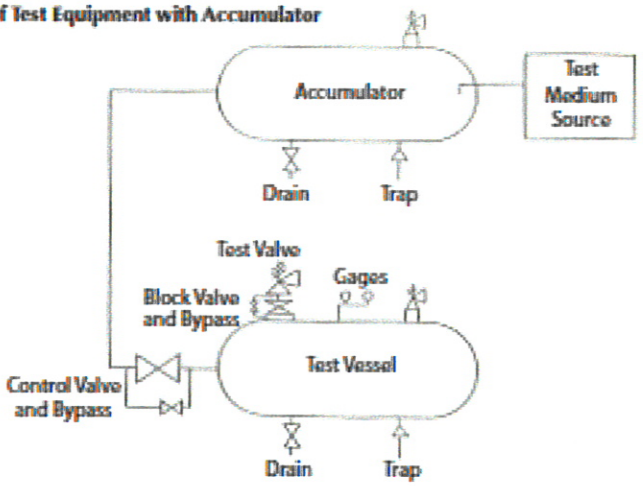
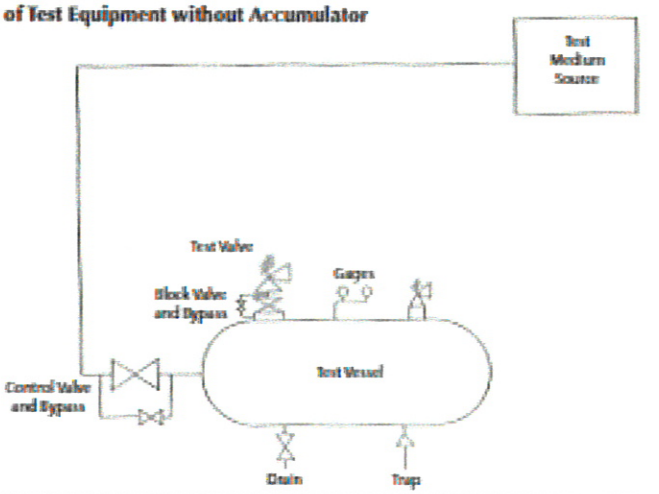


FIGURE S8.3-b
Schematic of Test Equipment without Accumulator



e) The vessel should have a length-to-diameter ratio as low as is practical, and should be suitably anchored.
f) Pressure sensing lines should be connected to the test vessel well away from any inlet or outlet connections where pressure distortions due to transient changes in flow velocity during testing could cause erroneous pressure readings. When testing with steam, any water head that develops in the gage line must be taken into consideration.
g) Any intervening piping between the test vessel and the pressure relief valve should be as short and as straight as possible and be of adequate size to minimize inlet pressure drop.
h) In the case of steam, the equipment should be insulated and steam traps should be installed, as appropriate, to ensure that the test steam is dry, saturated steam with a minimum quality of 98%.
i) Safety valves shall be used to protect the test vessel and the accumulator.

S 5.4 ~~S8.4~~ TEST VESSEL SIZING DATA

a) Recommended test vessel sizes are given in Figures S8.4-a and S8.4-b for a configuration using one vessel fed directly from the source of the test medium. Figure S8.4-a gives the test vessel size in cu. ft. vs. the valve orifice area in sq. in. for dry, saturated steam. Curves are shown for set pressures up to 500 psig (3.45MPa) for three different blowdowns: 4%, 7%, and 10%. The source is assumed to be capable of feeding the test vessel at 2500 lbs/hr. (1135 kg/hr). Figure S8.4-b gives similar curves for air with a source capable of feeding the test vessel at 200 SCFM (5.66 cu. m./minute).
b) For valves, with effective orifices less than 1.28 sq. in. (826 sq. mm), the size of the test vessel needed becomes less dependent on the flow capacity of the source. For these valves, a 15 cu. ft. (.425 cu. m.) minimum size test vessel is recommended. This should allow the accurate measurement and setting of

blowdown for small valves. This minimum size should also be adequate for determining set pressures of larger valves; however, larger test vessels must be used if blowdown is to be set accurately. It is recognized that there are practical limits on the size and maximum pressure of a test vessel used to demonstrate pressure relief valve operational characteristics. In such cases, determination of valve set pressure remains the only viable production and repair test option. The recommended minimum size test vessel (15 cu. ft. [0.425 cu. m]) is normally adequate for this purpose.

S8.5 TABLES, CHARTS, AND FIGURES

FIGURE S8.4-a
Recommended Test Vessel Size, Test Medium: Steam

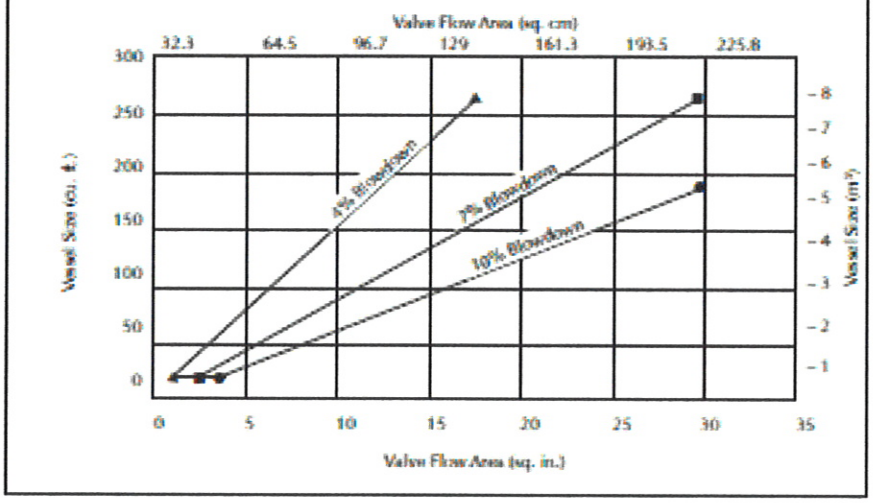
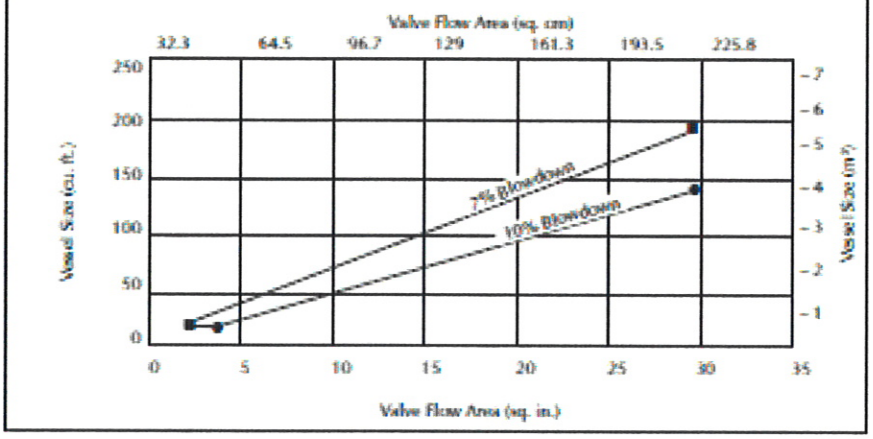


FIGURE S8.4-b
Recommended Test Vessel Size, Test Medium: Air or Gas



SUPPLEMENT 6

PROCEDURES TO EXTEND THE "VR" CERTIFICATE OF AUTHORIZATION AND STAMP TO ASME "NV" STAMPED PRESSURE RELIEF DEVICES (Was part 3, suppl. 9)

S6.1 ~~S9.1~~ INTRODUCTION

Approval to extend the scope of the National Board "VR" *Certificate of Authorization* to the Certificate Holder to use the "VR" stamp on ASME Code "NV" Class 1, 2, or 3 stamped pressure relief devices, which have been capacity certified by the National Board, may be given subject to the provisions that follow.

S6.2 ~~S9.2~~ ADMINISTRATIVE PROCEDURES

a) The repair organization shall hold a valid "VR" Certificate of Authorization.
b) The repair organization shall obtain a National Board "NR" Certificate of Authorization and stamp. The requirements for said certificate and stamp include, but are not limited to, the following. The repair organization shall:
1) Maintain a documented quality assurance program that meets the applicable requirements of 1.8 (**CHECK X-REF**) . This program shall also include all the applicable requirements for the use of the "VR" stamp;
2) Have a contract or agreement with an Inspection Agency to provide inspection of repaired "NV"-stamped pressure relief devices by Inspectors who have been qualified in accordance with the requirements of ASME QAI-1, *Qualifications for Authorized Inspection*;
3) Successfully complete a survey of the quality assurance program and its implementation. This survey shall be conducted by representatives of the National Board, the Jurisdiction wherein the applicant's repair facilities are located, and the applicant's Authorized Inspection Agency. Further verification of such implementation by the survey team may not be necessary if the applicant holds a valid ASME "NV" certificate and can verify by documentation the capability of implementing the quality assurance program for repair of "NV"-stamped pressure relief devices, covered by the applicant's ASME "NV" certificate.
c) The application of the "NR" *Certificate of Authorization* and stamp shall clearly define the scope of intended activities with respect to the repair of Section III, "NV"- stamped pressure relief devices.
d) Revisions to the quality assurance program shall be acceptable to the Authorized Nuclear Inspector Supervisor and the National Board before being implemented.
e) The scope of the "VR" Certificate of Authorization shall include repair of "NV"-stamped pressure relief devices.
f) Verification testing of valves repaired by the applicant shall not be required provided such testing has been successfully completed under the applicant's "VR" certification program.
g) A survey of the applicant for the "VR" Certificate
of Authorization and endorsement of the repair of "NV"-stamped pressure relief devices may be made concurrently.

S6.2 ~~S9.3~~ GENERAL RULES

a) ASME Code Section III, "NV"-stamped pressure relief devices, which have been repaired in accordance with these rules, shall be stamped with both the "VR" and "NR" stamps.
b) The "VR" and "NR" stamps shall be applied only to "NV" stamped (Class 1, 2, or 3) National Board capacity certified pressure relief devices that have been disassembled, inspected, and repaired as necessary, such that the valves' condition and performance are equivalent to the standards for new valves.
c) All measuring and test equipment used in the repair of pressure relief devices shall be calibrated against certified equipment having known valid relationships to nationally recognized standards.
d) Documentation of the repair of "NV" stamped pressure relief devices shall be recorded on the National Board Form NVR-1, *Report of Repair/ Replacement Activities for Nuclear Pressure Relief Devices*, in accordance with the requirements of 1.8 of Part 3 ~~this part~~.
e) When an ASME "NV"-stamped pressure relief device requires a duplicate nameplate because the original nameplate is illegible or missing, it may be applied using the procedures of 5.9.5 provided concurrence is obtained from the Authorized Nuclear Inspector and Jurisdiction. In this case the nameplate shall be marked "SEC. III" to indicate the original ASME Code stamping.

PART 4, SECTION 7

PART 4, SECTION 7
INSTALLATION — NBIC POLICY FOR METRICATION

7.1 GENERAL
This policy provides guidance for the use of US customary units and metric units. Throughout the NBIC, metric units are identified and placed in parentheses after the US customary units referenced in the text and associated tables. In Supplement 6, Continued Service and Inspection of DOT Transport Tanks the metric units are shown first with U.S. Customary units shown in parentheses. For each repair or alteration performed, selection of units shall be based on the units used in the original code of construction. For example, items constructed using US customary units shall be repaired or altered using US customary units. The same example applies to items constructed using metric units. Whichever units are selected, those units are to be used consistently throughout each repair or alteration. Consistent use of units includes all aspects of work required for repairs or alterations (i.e. materials, design, procedures, testing, documentation, and stamping, etc.).

7.2 EQUIVALENT RATIONALE
The rationale taken to convert metric units and US customary units involves knowing the difference between a *soft* conversion and a *hard* conversion. A soft conversion is an exact conversion. A hard conversion is simply performing a soft conversion and then rounding off within a range of intended precision. When values specified in the NBIC are intended to be approximate values, a hard conversion is provided. If an exact value is needed to maintain safety or required based on using good engineering judgment, then a soft conversion will be used. In general, approximate accuracy is acceptable for most repairs or alterations performed using the requirements of the NBIC. Therefore, within the NBIC, metric equivalent units are primarily hard conversions. The following examples are provided for further clarification and understanding of soft conversions versus hard conversions:
Example 1: Using 1 in. = 25.4 mm;
12 in. = 304.8 mm (soft conversion)
Example 2: Using the above conversion, a hard conversion may be 300 mm or 305 mm depending on the degree of precision needed.

7.3 PROCEDURE FOR CONVERSION
The following guidelines shall be used to convert between US customary units and metric units within the text of the NBIC:
a) All US customary units will be converted using a soft conversion;
b) Soft conversion calculations will be reviewed for accuracy;
c) Based on specified value in the NBIC, an appropriate degree of precision shall be identified;
d) Once the degree of precision is decided, rounding up or down may be applied to each soft conversion in order to obtain a hard conversion; and
e) Use of hard conversion units shall be used consistently throughout the NBIC wherever soft conversions are not required.
Note: Care shall be taken to minimize percentage difference between units.

7.4 REFERENCING TABLES
The following tables are provided for guidance and convenience when converting between US customary units and metric units. See NBIC Part 1, Tables 7.4-1 through 7.4-8.
Temperature shall be converted to within 1°C as shown in NBIC Part 1, Table 7.4-2.
Fractions of an inch shall be converted according to NBIC Part 1, Table 7.4-3. Even increments of inches are in even multiples of 25 mm. For example, 40 inches is equivalent to 1000 mm. Intermediate values may be interpolated rather than converting and rounding to the nearest mm.
For nominal pipe sizes, the following relationships were used as shown in NBIC Parts 1, 2 or 3, Table 7.4-4.
Areas in square inches (in^2) were converted to square mm (mm^2) and areas in square feet (ft^2) were converted

to square meters (m^2). See examples in NBIC Parts 1, 2 or 3 Tables 7.4-5a and 7.4-5b.
Volumes in cubic inches ($in.^3$) were converted to cubic mm (mm^3) and volumes in cubic feet (ft^3) were converted to cubic meters (m^3). See examples in NBIC Parts 1, 2 or 3, Tables 7.4-6a and 7.4-6b.
Although the pressure should always be in MPa for calculations, there are cases where other units are used in the text. For example, kPa is used for small pressures. Also, rounding was to two significant figures. See examples in Table 7.4-7. (Note that 14.7 psi converts to 101 kPa, while 15 psi converts to 100 kPa. While this may seem at first glance to be an anomaly, it is consistent with the rounding philosophy.)
Material properties that are expressed in psi or ksi (e.g., allowable stress, yield and tensile strength, elastic modulus) were generally converted to MPa to three significant figures. See example in NBIC Parts 1, 2 or 3, Table 7.4-8.
An often seen metric pressure rating is the expression BAR, one BAR equals 14.5 psi — to convert psi rating to a BAR rating, multiply by 0.069.

TABLE 7.4-3
US Fractions/Metric Equivalents

Inches	Millimeters
1/32	0.8
3/64	1.2
1/16	1.5
3/32	2.5
1/8	3
5/32	4
3/16	5
7/32	5.5
1/4	6
5/16	8
3/8	10
7/16	11
1/2	13
9/16	14
5/8	16
11/16	17
3/4	19
7/8	22
1	25

TABLE 7.4-1
Soft Conversion Factors
(US x Factor = Metric)

US Customary	Metric	Factor
in.	mm	25.4
ft.	m	0.3048
$in.^2$	mm^2	645.16
$ft.^2$	m^2	0.09290304
$in.^3$	mm^3	16,387.064
$ft.^3$	m^3	0.02831685
US gal.	m^3	0.003785412
US gal.	liters	3.785412
psi	MPa	0.0068948
psi	kPa	6.894757
ft-lb	J	1.355818
°F	°C	5/9 x (°F–32)
R	K	5/9
lbm	kg	0.4535924
lbf	N	4.448222
in.-lb	N-mm	112.98484
ft.-lb	N-m	1.3558181
$ksi\sqrt{in}$	$MPa\sqrt{m}$	1.0988434
Btu/hr	W	0.2930711
lb/ft^3	kg/m^3	16.018463
in.-wc	kPa	0.249089

Note: The actual pressure corresponding to the height of a vertical column of fluid depends on the local gravitational field and the density of the fluid, which in turn depends upon the temperature. This conversion factor is the conventional value adopted by ISO. The conversion assumes a standard gravitational field (g_n – 9.80665 N/kg) and a density of water equal to 1,000 kg/m^3.

TABLE 7.4-2
Temperature Equivalents

Temperature °F	Temperature °C
60	16
70	21
100	38
120	49
350	177
400	204
450	232
800	427
1150	621

TABLE 7.4-4
Pipe Sizes/Equivalents

US CustomaryPractice	Metric Practice
NPS 1/8	DN 6
NPS 1/4	DN 8
NPS 3/8	DN 10
NPS 1/2	DN 15
NPS 3/4	DN 20
NPS 1	DN 25
NPS 1-1/4	DN 32
NPS 1-1/2	DN 40
NPS 2	DN 50
NPS 2-1/2	DN 65
NPS 3	DN 80
NPS 3-1/2	DN 90
NPS 4	DN 100
NPS 5	DN 125
NPS 6	DN 150
NPS 8	DN 200
NPS 10	DN 250
NPS 12	DN 300
NPS 14	DN 350
NPS 16	DN 400
NPS 18	DN 450
NPS 20	DN 500
NPS 22	DN 550
NPS 24	DN 600
NPS 26	DN 650
NPS 28	DN 700
NPS 30	DN 750
NPS 32	DN 800
NPS 34	DN 850
NPS 36	DN 900
NPS 38	DN 950
NPS 40	DN 1000
NPS 42	DN 1050
NPS 44	DN 1100
NPS 46	DN 1150
NPS 48	DN 1200
NPS 50	DN 1250
NPS 52	DN 1300
NPS 54	DN 1350
NPS 56	DN 1400
NPS 58	DN 1450
NPS 60	DN 1500

Table 7.4-5a

Area (US Customary)	Area (Metric)
3 in^2	650 mm^2
6 in^2	3,900 mm^2
10 in^2	6,500 mm^2

Table 7.4-5b

Area (US Customary) Area (Metric)
5 ft^2 0.46 mm^2

Table 7.4-6a
Area (US Customary) Area (Metric)
1 in^3 16,000 mm^3
6 in^3 96,000 mm^3
10 in^3 160,000 mm^3

Table 7.4-6b
Area (US Customary) Area (Metric)
5 ft^3 0.14 m^3

TABLE 7.4-7
Pressure/Equivalents
Pressure (US Customary) Pressure (Metric)
0.5 psi 3 kPa
2 psi 15 kPa
3 psi 20 kPa
10 psi 70 kPa
15 psi 100 kPa
30 psi 200 kPa
50 psi 350 kPa
100 psi 700 kPa
150 psi 1.03 MPa
200 psi 1.38 MPa
250 psi 1.72 MPa
300 psi 2.10 MPa
350 psi 2.40 MPa
400 psi 2.76 MPa
500 psi 3.45 MPa
600 psi 4.14 MPa
1,200 psi 8.27 MPa
1,500 psi 10.34 MPa

Table 7.4-8
Strength (US Customary) Strength (Metric)
95,000 psi 655 MPa

PRESSURE RELIEF DEVICES – PREPARATION OF TECHNICAL INQUIRIES TO THE NATIONAL BOARD INSPECTION CODE COMMITTEE

PART 4, SECTION 8

PART 4, SECTION 8
PRESSURE RELIEF DEVICES — PREPARATION OF TECHNICAL INQUIRIES TO THE NATIONAL BOARD INSPECTION CODE COMMITTEE

8.1 INTRODUCTION
The NBIC Committee meets regularly to consider written requests for interpretations and revisions to the Code rules. This section provides guidance to Code users for submitting technical inquiries to the Committee.
Technical inquires include requests for additions to the Code rules and requests for Code Interpretations, as described below.
a) Code Revisions
Code revisions are considered to accommodate technological developments, address administrative requirements, or to clarify Code intent.
b) Code Interpretations

Code Interpretations provide clarification of the meaning of existing rules in the Code, and are also presented in question and reply format. Interpretations do not introduce new requirements. In cases where existing Code text does not fully convey the meaning that was intended, and revision of the rules is required to support an Interpretation, an intent Interpretation will be issued and the Code will be revised. As a matter of published policy, the National Board does not approve, certify, or endorse any item, construction, propriety device or activity and, accordingly, inquiries requiring such consideration will be returned. Moreover, the National Board does not act as a consultant on specific engineering problems or on the general application or understanding of the Code rules.

Inquiries that do not comply with the provisions of this Section or that do not provide sufficient information for the Committee's full understanding may result in the request being returned to the inquirer with no action.

8.2 INQUIRY FORMAT

Inquiries submitted to the Committee shall include:

a) Purpose

Specify one of the following:

1) revision of present Code rules;

2) new or additional Code rules; or

3) Code Interpretation.

b) Background

Provide concisely the information needed for the Committee's understanding of the inquiry, being sure to include reference to the applicable Code Edition, Addenda, paragraphs, figures, and tables. Provide a copy of the specific referenced portions of the Code.

c) Presentations

The inquirer may attend a meeting of the Committee to make a formal presentation or to answer questions from the Committee members with regard to the inquiry. Attendance at a Committee meeting shall be at the expense of the inquirer. The inquirer's attendance or lack of attendance at a meeting shall not be a basis for acceptance or rejection of the inquiry by the Committee.

8.3 CODE REVISIONS OR ADDITIONS

Request for Code revisions or additions shall provide the following:

a) Proposed Revisions or Additions

For revisions, identify the rules of the Code that require revision and submit a copy of the appropriate rules as they appear in the Code, marked up with the proposed revision. For additions, provide the recommended wording referenced to the existing Code rules.

b) Statement of Need

Provide a brief explanation of the need for the revision or addition.

c) Background Information

Provide background information to support the revision or addition, including any data or changes in technology that form the basis for the request that will allow the Committee to adequately evaluate the proposed revision or addition. Sketches, tables, figures, and graphs should be submitted as appropriate.

When applicable, identify any pertinent paragraph in the Code that would be affected by the revision or addition and identify paragraphs in the Code that reference the paragraphs that are to be revised or added.

8.4 CODE INTERPRETATIONS

Requests for Code Interpretations shall provide the following:

a) Inquiry

Provide a condensed and precise question, omitting superfluous background information and, when possible, composed in such a way that a "yes" or a "no" reply, with brief provisos if needed, is acceptable.
The question should be technically and editorially correct.
b) Reply
Provide a proposed reply that will clearly and concisely answer the inquiry question. Preferably the reply should be "yes" or "no" with brief provisos, if needed.
c) Background Information
Provide any background information that will assist the Committee in understanding the proposed Inquiry and Reply Requests for Code Interpretations must be limited to an interpretation of the particular requirement in the Code. The Committee cannot consider consulting type requests such as:
1) A review of calculations, design drawings, welding qualifications, or descriptions of equipment or Parts to determine compliance with Code requirements;
2) A request for assistance in performing any Code-prescribed functions relating to, but not limited to, material selection, designs, calculations, fabrication, inspection, pressure testing, or installation;
3) A request seeking the rationale for Code requirements.

8.5 SUBMITTALS
Submittals to and responses from the Committee shall meet the following criteria:
a) Submittal Inquiries from Code users shall be in English and preferably be submitted in typewritten form; however, legible handwritten inquiries will be considered. They shall include the name, address, telephone number, fax number, and email address, if available, of the inquirer and be mailed to the following address:
Secretary, NBIC Committee
The National Board of Boiler and
Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229
As an alternative, inquiries may be submitted via fax or email to:
Secretary NBIC Committee
Fax: 614.847.1828
Email: *NBICinquiry@nationalboard.org*
b) Response
The Secretary of the NBIC Committee shall acknowledge receipt of each properly prepared inquiry and shall provide a written response to the Inquirer upon completion of the requested action by the NBIC Committee.

PRESSURE RELIEF DEVICES- GLOSSARY OF TERMS
PART 4, SECTION 9

PART 4, SECTION 9
PRESSURE RELIEF DEVICES — GLOSSARY OF TERMS
9.1 DEFINITIONS
For the purpose of applying the rules of the NBIC, the following terms and definitions shall be used herein as applicable to each Part:
Additional terms and definitions specific to DOT Transport Tanks are defined in Part 2, Supplement 6.

Accumulator — A vessel in which the test medium is stored or accumulated prior to its use for testing.
Alteration — A change in the item described on the original Manufacturer's Data Report which affects the pressure containing capability of the pressure-retaining item. (See Subsection 3.4.3, EXAMPLES OF ALTERATION) Nonphysical changes such as an increase in the maximum allowable working pressure (internal or external), increase in design temperature, or a reduction in minimum temperature of a pressure-retaining item shall be considered an alteration.
ANSI — The American National Standards Institute
Appliance — A piece of equipment that includes all controls, safety devices, piping, fittings, and vessel(s) within a common frame or enclosure that is listed and labeled by a nationally recognized testing agency for its intended use.
ASME Code — The American Society of Mechanical Engineers' Boiler and Pressure Vessel Code published by that Society, including addenda and Code Cases, approved by the associated ASME Board.
Assembler — An organization that purchases or receives from a manufacturer the necessary component parts of valves and assembles, adjusts, tests, seals, and ships safety or safety relief valves at a geographical location, and using facilities other than those used by the manufacturer.
Authorized Inspection Agency — New Construction: An Authorized Inspection Agency is one that is accredited by the National Board meeting the qualification and duties of NB-360, *Criteria for Acceptance of Authorized Inspection Agencies for New Construction.*
Inservice: An Authorized Inspection Agency is either:
a) a jurisdictional authority as defined in the National Board Constitution; or
b) an entity that is accredited by the National Board satisfying the requirements of NB-369, *Qualifications and Duties for Authorized Inspection Agencies Performing Inservice Inspection Activities and Qualifications for Inspectors of Boilers and Pressure Vessels*; NB-371, *Accreditation of Owner-User Inspection Organizations (OUIO)* or NB-390, For *Federal Inspection Agencies (FIAs) Performing Inservice Inspection Activities.*
Capacity Certification — The verification by the National Board that a particular valve design or model has successfully completed all capacity testing as required by the ASME Code.
Chimney or Stack — A device or means for providing the venting or escape of combustion gases from the operating unit.
Confined Space — Work locations considered "confined" because their configurations hinder the activities of employees who must enter, work in and exit them. A confined space has limited or restricted means for entry or exit, and it is not designed for continuous employee occupancy. Confined spaces include, but are not limited to, underground vaults, tanks, storage bins, manholes, pits, silos, process vessels, and pipelines.
Regulatory Organizations often use the term "permit-required confined space" (permit space) to describe a confined space that has one or more of the following characteristics: contains or has the potential to contain a hazardous atmosphere; contains a material that has the potential to engulf an entrant; has walls that converge inward or floors that slope downward and taper into a smaller area which could trap or asphyxiate an entrant; or contains any other recognized safety or health hazard, such as unguarded machinery, exposed live wires, or heat stress. Confined space entry requirements may differ in many locations and the Inspector is cautioned of the need to comply with local or site- specific confined space entry requirements.
Conversion — Pressure Relief Devices: The change of a pressure relief valve from one capacity-certified configuration to another by use of manufacturer's instructions.
Units of Measure: Changing the numeric value of a parameter from one system of units to another.
Demonstration — Making evident by illustration, explanation, and completion of tasks documenting evaluation of an applicant's ability to perform Code activities, including the

adequacy of the applicant's quality program, and by a review of the implementation of that program at the address of record and/or work location.
Dutchman — Generally limited to tube or pipe cross-section replacement. The work necessary to remove a compromised section of material and replace the section with material meeting the service requirements and installation procedures acceptable to the Inspector. Also recognized as piecing.
Examination — In process work denoting the act of performing or completing a task of interrogation of compliance.
Visual observations, radiography, liquid penetrant, magnetic particle, and ultrasonic methods are recognized examples of examination techniques.
Exit — A doorway, hallway, or similar passage that will allow free, normally upright unencumbered egress from an area.
Field — A temporary location, under the control of the Certificate Holder, that is used for repairs and/or alterations to pressure-retaining items at an address different from that shown on the Certificate Holder's *Certificate of Authorization*.
Forced-Flow Steam Generator — A steam generator with no fixed steamline and waterline.
Hydrostatic Test — A liquid pressure test which is conducted using water as the test medium.
Inspection — A process of review to ensure engineering design, materials, assembly, examination and testing requirements have been met and are compliant with the Code.
Inspector — See National Board Commissioned Inspector and National Board Owner-User Commissioned Inspector.
Intervening — Coming between or inserted between, as between the test vessel and the valve being tested.
Jurisdiction — A governmental entity with the power, right, or authority to interpret and enforce law, rules, or ordinances pertaining to boilers, pressure vessels, or other pressure-retaining items. It includes National Board member jurisdictions defined as "jurisdictional authorities."
Jurisdictional Authority — A member of the National Board, as defined in the *National Board Constitution*.
Lift Assist Device — A device used to apply an auxiliary load to a pressure relief valve stem or spindle, used to determine the valve set pressure as an alternative to a full pressure test.
Liquid Pressure Test — A pressure test using water or other incompressible fluid as a test medium.
Manufacturer's Documentation — The documentation that includes technical information and certification required by the original code of construction.
Mechanical Assembly — The work necessary to establish or restore a pressure retaining boundary, under supplementary
materials, whereby pressure-retaining capability is established through a mechanical, chemical, or physical interface, as defined under the rules of the NBIC.
Mechanical Repair Method — A method of repair, that restores a pressure retaining boundary to a safe and satisfactory operating condition, where the pressure retaining boundary is established by a method other than welding or brazing, as defined under the rules of the NBIC
NBIC — The *National Board Inspection Code* published by The National Board of Boiler and Pressure Vessel Inspectors.
"NR" Certificate Holder — An organization in possession of a valid "NR" *Certificate of Authorization* issued
by the National Board.
National Board — The National Board of Boiler and Pressure Vessel Inspectors.
National Board Commissioned Inspector — An individual who holds a valid and current National Board Commission.