

Installation, Operation, and Maintenance of Reduced-Wall, Resilient-Seated Gate Valves

SECTION 1: RECEIVING INSPECTION

Resilient-seated gate valves should be inspected at the time of receipt for damage during shipment. The initial inspection should verify compliance with specifications, direction of opening, size and shape of operating nut, number of turns to open or close, and type of end connections. A visual inspection of the seating surfaces should be performed to detect any damage during shipment or scoring of the seating surfaces. Inspection personnel should look for bent stems, broken handwheels, cracked parts, loose bolts, missing parts and accessories, and any other evidence of mishandling during shipment. Each valve should be operated through one complete opening-and-closing cycle in the position in which it is to be installed.

SECTION 2: STORAGE

Valves should be stored indoors. If outside storage is required, means should be provided to protect them from weather elements. During outside storage, valves should be protected from the weather, sunlight, ozone, and foreign materials. In colder climates where valves may be subject to freezing temperatures, it is absolutely essential to prevent water from collecting in the valves. Failure to do so may result in a cracked valve casting and/or deterioration of the resilient seat material.

SECTION 3: INSTALLATION

Installation instructions should be reviewed in detail before valves are installed. At the job site prior to installation, each valve should be visually inspected and any foreign material in the interior portion of the valve should be removed. A detailed inspection of the valve as outlined in Sec. 3 should be performed prior to installation.

Sec. 3.1 Bolts

All bolts should be checked for proper tightness and protected by the installer to prevent corrosion, either with a suitable paint or by polyethylene wrapping or other suitable means of corrosion protection.

Sec. 3.2 Underground Installation

Valves in water-distribution lines shall, where practical, be located in easily accessible areas.

3.2.1 During installation, there is the possibility of foreign materials inadvertently entering the valve. Foreign material can damage internal working parts during operation of the gate valve. For this reason, gate valves should be installed in the closed position. Each valve should be placed on firm footing in the trench to prevent settling and excessive strain on the connection to the pipe. Piping systems should be supported and aligned to avoid damage to the valve.

3.2.2 A valve box or vault should be provided for each valve used in a buried service application. The valve box should be installed so as not to transmit loads or stress to the valve, valve stem, or piping system. The valve box should be centered over the operating nut of the valve with the box cover flush with the surface of the finished area or such other level as directed by the owner. Valve boxes should be of such a design that a traffic load on the top of the box is not transmitted to the valve stem or piping system.

3.2.3 Valves buried in unusually deep trenches have special provisions for operating the valve. These are either a riser on the stem to permit a normal key to be used or a notation on valve records that a long key will be required.

Sec. 3.3 Aboveground Installations

Valves installed aboveground or in a plant piping system should be supported and aligned to avoid damage to the valve. Valves should not be used to correct misalignment of piping.

Sec. 3.4 Testing

To prevent time lost searching for leaks, it is recommended that valve excavations not be backfilled until pressure tests have been completed. After installation, it is desirable to test newly installed piping sections, including valves, at some pressure above the system design pressure. The test pressure should not exceed the rated working pressure of the valve. After the test, steps should be taken to relieve any trapped pressure in the body of the valve. The resilient-seated gate valve should not be operated in either the opening or closing direction at differential pressures above the rated working pressure.

Sec. 3.5 Application Hazards

Resilient-seated gate valves should not be installed in applications or for service other than those recommended by the manufacturer. The following list of precautions is not all inclusive but will help avoid some applications hazards.

3.5.1 Resilient-seated gate valves should not be installed in lines where service pressure will exceed the rated working pressure of the valve.

3.5.2 Resilient-seated gate valves should not be used for throttling service unless the design is specifically recommended for that purpose or accepted in advance by the manufacturer.

3.5.3 Resilient-seated gate valves should not be used in applications that are exposed to freezing temperatures unless sufficient flow is maintained through the valve or other protection is provided to prevent freezing.

3.5.4 Gate valves should not be installed at a dead end or near a bend in a pipeline without proper and adequate restraint to support the valve and prevent it from blowing off the end of the line. Thrust blocks, restrained joints, or other means of restraint are needed on or adjacent to valves on pipelines or where unusual conditions exist, such as high internal pressures, adjacent fittings, or unsuitable soils. Rigid piping systems incorporating flanged valves are not recommended for buried service.

3.5.5 To prevent damage, 4-in. (100-mm) NPS, resilient-seated gate valves should not be operated with input torques greater than 200 ft-lb (270 Nm). Gate valves 6-in. (150-mm) NPS to 16-in. (400-mm) NPS should not be operated with input torques greater than 300 ft-lb (406 Nm).

SECTION 4: MAINTENANCE

Sec. 4.1 Valve Exercising

Each valve should be operated through a full cycle and returned to its normal position on a time schedule that is designed to prevent a buildup of tuberculation or other deposits that could render the valve inoperable or prevent a tight shutoff. The interval of time between operations of valves in critical locations, or valves subjected to severe operating conditions, should be shorter than for other less important installations, but it can be whatever time period is found to be satisfactory based on local experience. The number of turns required to complete the operation cycle should be recorded and compared with permanent installation records to ensure full gate travel.

When using portable, auxiliary power actuators with input torque capacities exceeding the maximum operating torques recommended in Sec. 3.5.5, extreme care should be taken to avoid applying excessive torque to the valve stem. If the actuator has a torque-limiting device, it should be set below the values in Sec. 3.5.5. If there is no torque-limiting device, the recommended practice is to stop the power actuator three or four turns before the valve is fully opened or fully closed and complete the operation manually.

Maintenance should be performed at the time a malfunction is discovered to avoid a return trip to the same valve or to prevent neglecting it altogether. A recording system should be adopted that provides a written record of valve location, condition, maintenance, and each subsequent inspection of the valve.

Sec. 4.2 Inspection

Each valve should be operated through one complete operating cycle. If the stem action is tight, the operation should be repeated several times until proper operation is achieved. With the gate in the partially open position, a visual inspection should be performed, where practical, to check for leakage at all joints, connections, and areas of packing or seals. If leakage is observed, all defective O-rings, seals, gaskets, or end-connection sealing members should be replaced. If the leakage cannot be corrected immediately, the nature of the leakage should be reported promptly to those who are responsible for repairs. If the valve is inoperable or irreparable, its location should be clearly established to prevent loss of time for repair crews. The condition of the valve and, if possible, the gate position should be reported to the personnel responsible for repairs. In addition, fire departments and other appropriate municipal departments should be informed that the valve is out of service.

Sec. 4.3 Record Keeping

To carry out a meaningful inspection and maintenance program, it is essential that the location, make, type, size, and date of installation of each valve be recorded. Depending on the type of record-keeping system used, other information may be entered in the permanent record. When a resilient-seated gate valve is inspected, an entry should be made in the permanent record indicating date of inspection and condition of the valve. If repair work is necessary, it should be indicated, and, on completion of the work, the nature of the repairs and date completed should be recorded.

SECTION 5: REPAIRS

Leakage, broken parts, hard operation, and other major defects should be corrected by a repair crew as soon as possible after the defect is reported. If repairs are to be performed in the field, the repair crew should take a full complement of spare parts to the jobsite. Provisions should be made to isolate the defective valve from water pressure and relieve internal trapped pressure prior to performing any corrective maintenance. Disassembly of the valve should be accomplished in accordance with the procedure supplied by the manufacturer.

After repair of the valve, the operating mechanism should be cycled through one complete operating cycle. With full line pressure applied to the valve in the open position, an inspection should be made to detect leakage in the areas around the seal plate, bonnet, packing gland, and body-end connections. A record should be made to indicate that the valve has been repaired and is in working condition. Any markings that the valve is inoperable should be deleted. In addition, fire departments and other appropriate municipal departments should be informed of the satisfactory repair of the valve.

Installation, Operation, and Maintenance Manual for SCI[®] Resilient-Seated Gate Valves



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Installation and Maintenance of Resilient-Seated Check Valves

SECTION 1: RECEIVING INSPECTION

Resilient-seated check valves should be inspected at the time of receipt for damage during shipment. The initial inspection should verify compliance with specifications, direction of opening and type of end connections. A visual inspection of the seating surfaces should be performed to detect any damage during shipment or scoring of the seating surfaces. Inspection personnel should look for cracked parts, loose bolts, missing parts and accessories, and any other evidence of mishandling during shipment. The disc assembly of each valve should be manually operated through one complete opening-and-closing cycle in the position in which it is to be installed.

SECTION 2: STORAGE

Valves should be stored indoors. If outside storage is required, means should be provided to protect them from weather elements. During outside storage, valves should be protected from the weather, sunlight, ozone, and foreign materials. In colder climates where valves may be subject to freezing temperatures, it is absolutely essential to prevent water from collecting in the valves. Failure to do so may result in a cracked valve casting and/or deterioration of the resilient seat material.

SECTION 3: INSTALLATION

Installation instructions should be reviewed in detail before valves are installed. At the job site prior to installation, each valve should be visually inspected and any foreign material in the interior portion of the valve should be removed. A detailed inspection of the valve as outlined below should be performed prior to installation.

Sec. 3.1 Bolts

All bolts should be checked for proper tightness and protected by the installer to prevent corrosion, either with a suitable paint or by polyethylene wrapping or other suitable means of corrosion protection.

Sec. 3.2 Underground Installation

Valves in water-distribution lines shall, where practical, be located in easily accessible areas.

3.2.1 During installation, there is the possibility of foreign materials inadvertently entering the valve. Foreign material can damage internal working parts during operation of the check valve. Each valve should be placed on firm footing in the trench to prevent settling and excessive strain on the connection to the pipe. Piping systems should be supported and aligned to avoid damage to the valve.

3.2.2 A valve box or vault should be provided for each valve used in a buried service application. The valve box should be installed so as not to transmit loads or stress to the valve or piping system. Valve boxes should be of such a design that a traffic load on the top of the box is not transmitted to the valve stem or piping system.

Sec. 3.3 Aboveground Installations

Valves installed aboveground or in a plant piping system should be supported and aligned to avoid damage to the valve. Valves should not be used to correct misalignment of piping.

Sec. 3.4 Testing

To prevent time lost searching for leaks, it is recommended that valve excavations not be backfilled until pressure tests have been completed. After installation, it is desirable to test

newly installed piping sections, including valves, at some pressure above the system design pressure. The test pressure should not exceed the rated working pressure of the valve. After the test, steps should be taken to relieve any trapped pressure in the body of the valve. The resilient-seated check valve should not be operated at differential pressures above the rated working pressure.

Sec. 3.5 Application Hazards

Resilient-seated check valves should not be installed in applications or for service other than those recommended by the manufacturer. The following list of precautions is not all inclusive but will help avoid some applications hazards.

3.5.1 Resilient-seated check valves should not be installed in lines where service pressure will exceed the rated working pressure of the valve.

3.5.2 Resilient-seated check valves should not be used in applications that are exposed to freezing temperatures unless sufficient flow is maintained through the valve or other protection is provided to prevent freezing.

3.5.3 Check valves should not be installed at a dead end or near a bend in a pipeline without proper and adequate restraint to support the valve and prevent it from blowing off the end of the line. Thrust blocks, restrained joints, or other means of restraint are needed on or adjacent to valves on pipelines or where unusual conditions exist, such as high internal pressures, adjacent fittings, or unsuitable soils. Rigid piping systems incorporating flanged valves are not recommended for buried service.

SECTION 4: MAINTENANCE

Sec. 4.2 Inspection

A visual inspection should be performed, where practical, to check for leakage at all joints and connections. If leakage is observed, all defective O-rings, seals, gaskets, or end-connection sealing members should be replaced. If the leakage cannot be corrected immediately, the nature of the leakage should be reported promptly to those who are responsible for repairs. If the valve is inoperable or irreparable, its location should be clearly established to prevent loss of time for repair crews. The condition of the valve should be reported to the personnel responsible for repairs. In addition, fire departments and other appropriate municipal departments should be informed that the valve is out of service.

Sec. 4.3 Record Keeping

To carry out a meaningful inspection and maintenance program, it is essential that the location, make, type, size, and date of installation of each valve be recorded. Depending on the type of record-keeping system used, other information may be entered in the permanent record. When a resilient-seated check valve is inspected, an entry should be made in the permanent record indicating date of inspection and condition of the valve. If repair work is necessary, it should be indicated, and, on completion of the work, the nature of the repairs and date completed should be recorded.

SECTION 5: REPAIRS

Leakage, broken parts, hard operation, and other major defects should be corrected by a repair crew as soon as possible after the defect is reported. If repairs are to be performed in the field, the repair crew should take a full complement of spare parts to the jobsite. Provisions should be made to isolate the defective valve from water pressure and relieve internal trapped pressure prior to performing any corrective maintenance. Disassembly of the valve should be accomplished in accordance with the procedure supplied by the manufacturer.

After repair of the valve, the disc should be cycled through one complete operating cycle. With full line pressure applied to the valve, an inspection should be made to detect leakage in the areas around the seal plate, bonnet and body-end connections. A record should be made to indicate that the valve has been repaired and is in working condition. Any markings that the valve is inoperable should be deleted. In addition, fire departments and other appropriate municipal departments should be informed of the satisfactory repair of the valve.

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