



Consolidated

Best Under Pressure

NUCLEAR SERVICE VALVE CONDENSED CATALOG



Pressure Relief Valves for the Nuclear Industry



Alexandria Facility Features State-of-the-Art Technology and Equipment to Meet Stringent Customer Requirements

Equipped with advanced tools, equipment and technology, the facility in Alexandria, Louisiana is designed and certified to produce nuclear valves that deliver the reliability and trusted performance customers expect from Dresser Consolidated. The factory consists of 247,000 square feet with 56,000 additional square feet of office space spanning a total of 92 acres.

In addition to full manufacturing capabilities, this impressive ISO 9001 certified facility supports research and development testing as well as production testing. It is one of the few sites in the United States that holds National Board certification for air, water and steam valve testing. Plus, the Alexandria facility features a nuclear “clean room” that ensures integrity and precision crucial to the nuclear valve design and manufacture process.

Manufacturing

From Computer Numerically Controlled (CNC) machining and turning centers to paint booths and air compressors, the Alexandria facility incorporates some of the best machinery and practices to produce nuclear valves that will stand up in critical and demanding applications.

Our state-of-the-art facility is outfitted with both electronic and manual manufacturing equipment to give our experienced employees the tools they need to craft exceptional products. We have the tools on-site to take a valve from its early production phases to final cleaning and painting processes.

- CNC Machining Centers
- CNC Turning Centers
- Teach Lathes
- Manual Machines
- Material Moving Equipment and Hoists



Testing

The Alexandria facility is equipped to handle aggressive product testing to ensure the durability and quality of Dresser Consolidated nuclear valves. The site includes a Research and Development test facility as well as a Production test facility. In fact, the plant is one of only four facilities in the United States with National Board Certification for air and water applications and one of only three certified for steam.

R&D Test Facility

- Steam Test Facility
Capacity: 10,000 lbs/hr
Pressure: 250 psig
- Air Test Facility
Capacity: 3500 scfm
Pressure: 1000 psig
- Water Test Stand
Capacity: 500 gpm
Pressure: 10,000 psig

Production Test Facility

- Steam Test Facility
Pressure: 2,000 psig
- Air Test Facility
Pressure: 5,500 psig
- Water Test Facility
Pressure: 10,000 psig

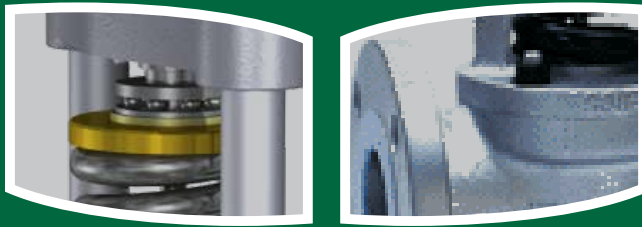


Clean Room

Large enough to meet projected requirements as well as current customer needs, the “clean room” complex at the Alexandria facility has been built and equipped to meet stringent customer specifications.

The atmosphere is strictly controlled to prevent undesirable elements from entering the complex and potentially compromising the integrity of the valves. Certain chemical elements are permanently prohibited from the clean room area. These include: free halogens; heavy metals such as mercury, lead, or their compounds; hydrocarbons, including oil, grease, and cellulose; and materials of unknown composition. Solvents are neutral and non-reactive, or in accordance with customer specifications. Additionally, clean room personnel wear approved safety gear at all times to prevent contamination.

- Valve body/parts are lowered into the cleaning tank for a wash and rinse.
- Oven for dry cleaning valve parts has a maximum heat generating capability of 500°F. An oven is available for drying completed valves as well.
- After cleaning and drying, valve assembly is completed on stainless steel tables prior to test.
- Completely assembled and cleaned, this Dresser Consolidated safety valve will be moved by overhead monorail system in the clean room.
- The valves are sealed to prevent recontamination.
- Nuclear parts are inspected, cleaned and packaged per the required nuclear packaging spec in the clean room.
- After nuclear valves have been set and tested in the test room, they are returned to the cleanroom for cleaning, final painting and packaging as required.

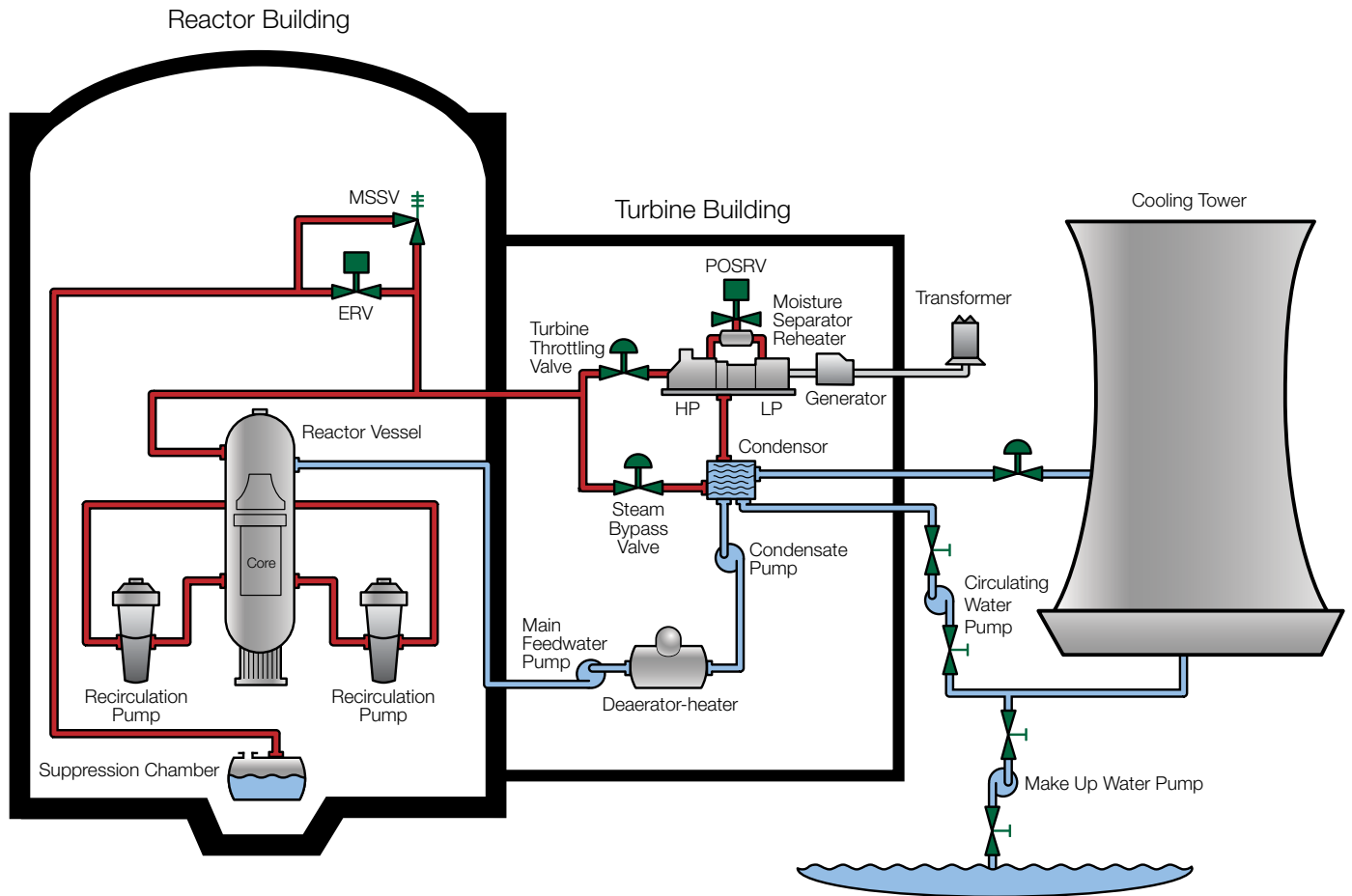


Boiling Water Reactor

This reactor may have many spring-loaded safety valves, pilot operated valves and/or spring-loaded mechanical assist valves, depending on plant design and steam capacity. These valves protect against over pressure of the reactor system in accordance with ASME Code requirements, as well as serving as operating valves. The actual percentage of total generating capacity represented by installed safety valves is determined by the reactor manufacturer and the Atomic Energy Commission by a detailed analysis of possible pressure transients in the system.

As shown in the figure, these valves discharge directly into the dry well, water pool or suppression chamber of the containment vessel. The main steam header has spring, pilot operated or spring-loaded mechanical assist valves, set at about 1,125 psig. Their main use is to keep the safety valves from opening. Since the steam in the single cycle boiling water reactor is radioactive, any discharge from these relief valves is fed to the reactor suppression chamber and discharged under water. Water is subsequently treated, and every trace of radioactivity removed before disposal. Capacity of each valve may be as high as 800,000 lbs./hour of steam.

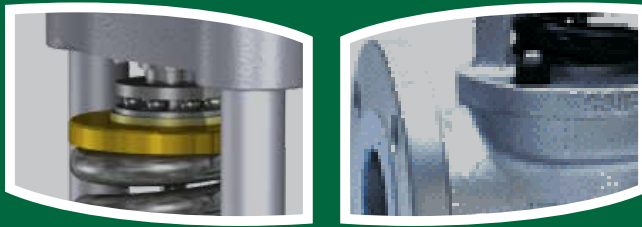
Conventional safety relief valves throughout the plant pumping system are comparable to existing fossil fuel power plants. Forged steel valves of the required pressure class are manufactured to quality levels, including non-destructive testing and third party inspection, in accordance with the Pump and Valve Code requirements for Nuclear Classes 1, 2 and 3 as designated by the design specifications.



MSSV – Main Steam Safety Valve
(3700 Series)

ERV – Electromatic Relief Valve
(1525 VX Series)

POSRV – Pilot Operated Safety Relief Valve
(13900 Series)



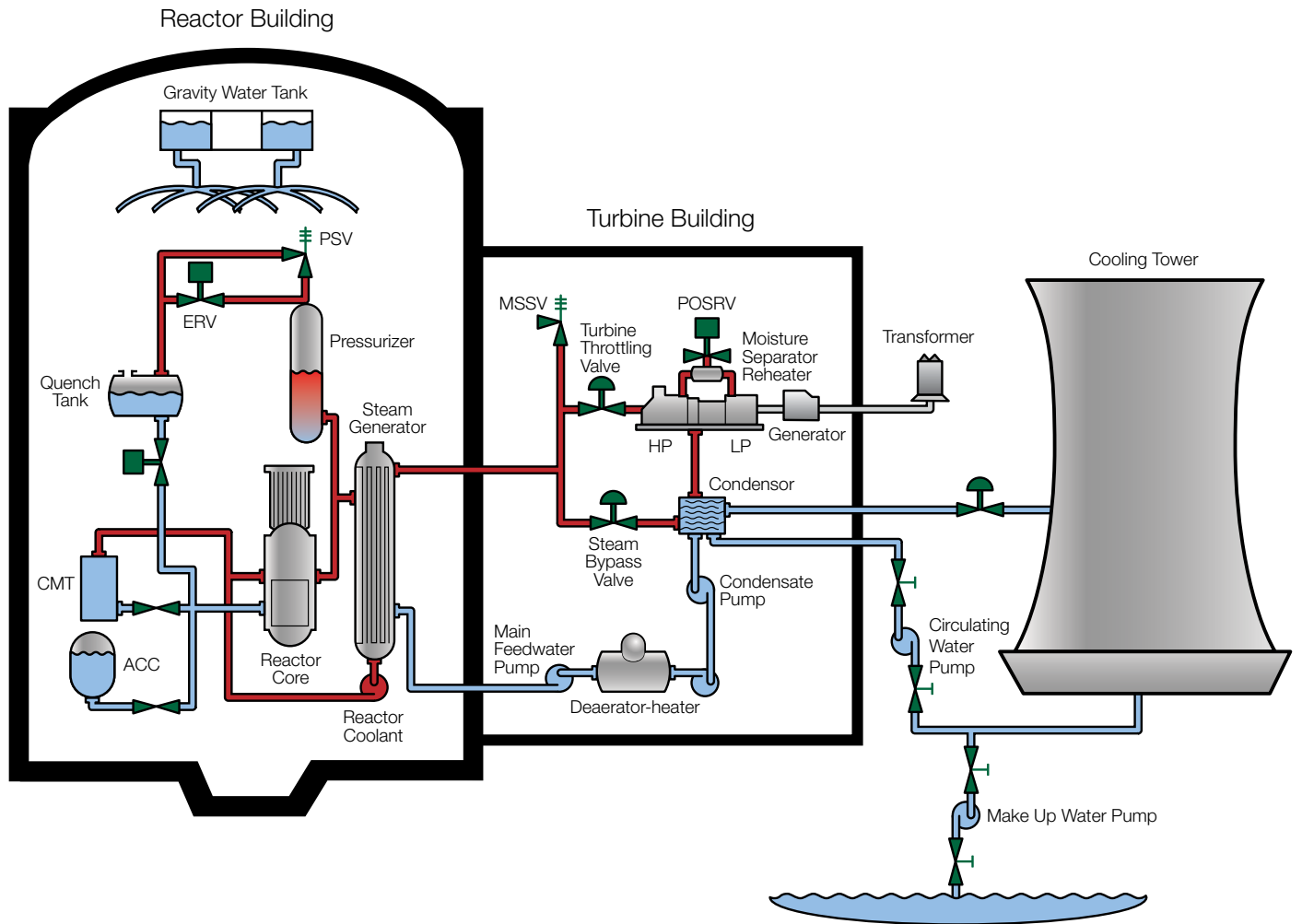
Pressurized Water Reactor

A primary loop is located inside the containment vessel, and a secondary loop sends steam to the turbine. Water in the primary loop is radioactive; steam in the secondary loop is not. The pressurizer in the primary system is equipped with several power actuated relief valves set above operating pressure, in addition to the spring-loaded safety valves required by the ASME Code. The released steam is discharged under water in a quench tank. This water must also be treated for disposal to remove every trace of radioactivity.

The actual percentage of total generating capacity represented by installed safety valves on the Pressurized Water Reactor is determined by the reactor manufacturer and the Atomic Energy Commission by a detailed analysis of possible pressure transients in the system.

Secondary steam valves are selected for full generating capacity of the heat exchangers. A current problem confronting pressurizer relief valves is that the primary loop contains some boric acid and releases a certain amount of hydrogen. It is extremely difficult to keep a safety relieve valve tight against hydrogen infiltration, as acid has a way of creeping into tiny openings and fouling the seat. Remedies include the thermodisc and low spindle bearing points standard on Consolidated valves. Other remedies include anti-simmer devices and water seals ahead of the valves.

Forged steel valves of the required pressure class are manufactured to quality levels, including non-destructive testing and third party inspection, in accordance with the Pump and Valve Code requirements for Nuclear Classes 1, 2, and 3 as designated by the design specifications.



MSSV – Main Steam Safety Valve
(3700 Series)

PSV – Pressurizer Safety Valve
(31700 Series)

ERV – Electromatic Relief Valve
(1525 VX Series)

POSRV – Pilot Operated Safety Relief Valve
(13900 Series)



Pressure Relief Valves for Nuclear Service

*Designed for ASME Section III, Class 1, 2 and 3 Valve Specifications
as well as ASME Section VIII Safety Related and Section I for
commercial applications.*

For more than 100 years, Dresser Consolidated has been a leader in dependable, reliable, high performance pressure relief valves. As one of the first companies to adapt valves to the nuclear industry's demands and requirements in the 1960s, Dresser Consolidated delivers a trusted name proven for decades to offer exceptionally dependable products in nuclear applications. Our customers can depend on Dresser Consolidated nuclear service valves for the safety of their communities and their facilities.

We are committed to developing products that meet our customers' needs while upholding the highest industry standards. We carefully listen to our customers and stay informed of the challenges you face. As a result, we are able to design, engineer, and manufacture valves that help address real-world issues. Simultaneously, we work closely with regulatory organizations to ensure our products meet the requirements specified in important codes such as ASME.

Dresser Consolidated nuclear pressure relief valves are in compliance with several ASME sections making them a good choice for a range of applications. Our nuclear service valves meet ASME Section III, Class 1, 2 and 3 valve specifications as well as ASME Section VIII safety related and Section I commercial applications.



Certified Quality

We uphold the strictest standards for product manufacturing and testing through an ASME-approved Quality Assurance Program. We are also certified with an ISO 9001 Quality System Certification, and we go even further by setting internal standards that exceed those of regulatory organizations. The Dresser Consolidated Quality Management System and Design Control procedures outline exacting design criteria and testing parameters. Only after a valve has gone through our rigorous quality program do we stamp it with the Dresser Consolidated Green Tag® symbol to show it meets or exceeds compliance mandates.

Expert Technical Support Throughout the Whole Product Life Cycle

Dresser Consolidated's service organization stands behind each nuclear service valve with expertise, technical skill and application knowledge. Our company's longevity in the industry means we have a history of best practices to build upon. Our sales force is qualified to help you select the right valve for your facility, application and specifications. They can also offer guidance on solving difficult challenges and issues. Dresser Consolidated's support services team also has the in-depth industry knowledge, product familiarity and implementation skills to help maintain continuous operations and cost effective performance.

With a range of styles, models, options and configurations, Dresser Consolidated nuclear safety valves and safety relief valves work in many different process and steam service applications.

- Primary, secondary and auxiliary systems
- Main steam systems for BWR and PWR reactors
- Reactor coolant system for PWR reactors
- Primary plant pressure vessels main steam generators
- Primary vessel service closed loop systems
- Moisture separator reheater systems
- Safety injection systems
- Chemical and volume control systems
- Ventilating systems
- Nitrogen Blanketing System



Dresser Consolidated Nuclear Service Valve Products



Type 3700
Main Steam Safety Valve

The Consolidated **Type 3700** is designed specifically to meet the stringent requirements of ASME Section III, Class 1 and 2. This valve is utilized as the primary pressure relief on main steam systems in BWR and PWR reactors.

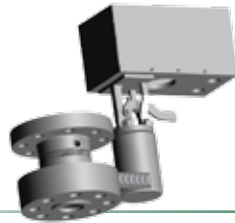
Inlet Sizes:	2 ½" through 10"
Outlet Sizes:	6" through 12"
Orifice Sizes:	3, 4, 6, 7, Q, 8, R, RR, S and T
Set Pressure Range:	50 to 1500 psig
Temperature Range:	Up to 600°F
Materials:	Carbon Steel / Alloy Steel
Reactor Service:	Boiling Water, Pressurized Water
Typical Application:	Primary plant pressure vessels and main steam generators
Certification:	ASME Section III, Class I for BWR and Class 2 for PWR, NV-Stamped



Type 31700
Pressurizer Safety Valve

The Consolidated **Type 31700** is designed to meet ASME Nuclear Code, Section III. This valve provides primary overpressure protection in reactor coolant systems in PWR reactors.

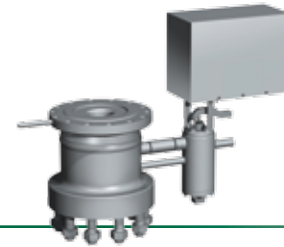
Inlet Sizes:	1 ½" through 6"
Outlet Sizes:	8"
Orifice Sizes:	1, 3, 5, 6, K, L, M, N, and P
Set Pressure Range:	100 to 3000 psig
Temperature Range:	Up to 700°F
Materials:	Stainless Steel
Reactor Service:	Pressurized Water
Typical Application:	Primary vessel service and closed loop systems
Certification:	ASME Section III, Class I, NV-Stamped



Type 31533VX Power Operated Relief Valve

The Consolidated **Type 31533VX** power operated relief valve (PORV) is designed to meet ASME Nuclear Code, Section III, Class 1 in PWR reactors.

Inlet Sizes:	2 ½"
Outlet Sizes:	4"
Orifice Sizes:	13/16 through 1 5/8"
Set Pressure Range:	300 to 2500 psig
Temperature Range:	Up to 1050°F
Materials:	Stainless Steel
Reactor Service:	Pressurized Water
Typical Application:	Primary vessel service and closed loop systems
Certification:	ASME Section III, Class I, NV-Stamped



Type 1525VX Electromatic Relief Valve

The Consolidated **Type 1525VX** Electromatic relief valve is designed to meet ASME Nuclear Code, Section III, Class 1 for BWR reactors.

Inlet Sizes:	6"
Outlet Sizes:	8"
Orifice Sizes:	3.860"
Set Pressure Range:	100 to 1500 psig
Temperature Range:	Up to 700°F
Materials:	Carbon Steel
Reactor Service:	Boiling Water
Typical Application:	Primary vessel service and closed loop systems
Certification:	ASME Section III, Class I, NV-Stamped



Dresser Consolidated Nuclear Service Valve Products



Type 1541-3, 1543-3
Safety Valve

The Consolidated **Type 1541-3 and 1543-3** are designed to meet ASME Nuclear Code, Section III, Class 3, Section VIII safety related and Section I commercial. This spring-loaded safety valve product line is certified for air system protection service within Nuclear power plant processes.

Inlet Sizes:	1/2" through 2 1/2"
Outlet Sizes:	3/4" through 2 1/2"
Orifice Sizes:	D, E, F, G, H and J
Set Pressure Range:	15 to 300 psig
Temperature Range:	Up to 420°F
Materials:	Stainless Steel
Reactor Service:	Air System Protection
Typical Application:	Auxiliary Safety Systems
Certification:	ASME Section III, Class 3, NV-Stamped ASME Section VIII, Safety Related ASME Section I, Commercial



Type 1900
Safety Relief Valve

The Consolidated **Type 1900** is designed to meet ASME Nuclear Code, Section III, Class 3 and Section VIII Safety Related and Commercial. This valve meets numerous application requirements and is an excellent solution for the demanding requirements of nuclear applications.

Inlet Sizes:	1" through 12"
Outlet Sizes:	2" through 16"
Orifice Sizes:	D, E, F, G, H, J, K, L, M, N, P, Q, R, T, U, V and W
Set Pressure Range:	15 to 3000 psig
Temperature Range:	Up to 700°F
Materials:	Carbon Steel, Stainless Steel or Monel
Typical Application:	Various Nuclear and Balance of Plant Applications
Certification:	ASME Section III, Class 3 ASME Section VIII, Safety Related and Commercial



Type 19000 Safety Relief Valve

The Consolidated **Type 19000** is designed to meet ASME Nuclear Code, Section III and Section VIII. This valve meets numerous application requirements and is an excellent solution for the demanding requirements of nuclear applications. It is the best choice for thermal relief services due to the short fixed blowdown.

Inlet Sizes:	½" to 2"
Outlet Sizes:	1"
Orifice Sizes:	.096 through .567"
Set Pressure Range:	15 to 3000 psig
Temperature Range:	Up to 700°F
Materials:	Carbon Steel, Stainless Steel or Monel
Typical Application:	Various Nuclear and Balance of Plant Applications
Certification:	ASME Section III, Class 1, 2 or 3, NV-Stamped ASME Section VIII, Safety Related



Type 13900 Pilot Operated Safety Relief Valve

The Consolidated **Type 13900** pilot operated safety relief valve has been designed for high capacity steam over pressure protection for moisture separator reheater systems.

Inlet Sizes:	16" to 20" flanged
Outlet Sizes:	18" through 24" flanged
Orifice Sizes:	114, 143.1, 176.7 and 201 sq. in.
Set Pressure Range:	50 psig to 300 psig
Temperature Range:	250°F to 550°F
Materials:	Carbon Steel with Stainless Steel trim
Typical Application:	Moisture Separator Reheater Systems
Certification:	ASME Section VIII, PED and SQL



Dresser Consolidated Safety Relief Valve Products



Type 2478
Pressure Relief Valve

The Consolidated **Type 2478** pressure relief valve is a totally enclosed design for safety related applications.

Inlet Sizes:	1/2" through 2 1/2"
Outlet Sizes:	3/4" through 2 1/2"
Orifice Sizes:	D, E, F, G, H and J
Set Pressure Range:	15 to 300 psig
Temperature Range:	-325°F to 406°F
Materials:	Cast need space between bronze and bonnet, brass base and trim and PTFE soft seats
Certification:	Non-Coded



Type 2900
Pilot Operated Safety Relief Valve

The Consolidated **Type 2900** pilot operated safety relief valve combines the best of two products into one, the 1900 safety relief valve and the 3900 POSRV. The 2900 POSRV is designed to replace spring loaded relief valves without having to modify outlet piping.

Inlet Sizes:	1" through 12"
Outlet Sizes:	2" through 16"
Orifice Sizes:	Seventeen sizes – D through W
Set Pressure Range:	15 to 6250 psig
Temperature Range:	-40°F to 505°F
Materials:	Stainless steel pilot with carbon steel main valve and stainless steel trim
Certification:	ASME Section I Code Case 2446 and ASME Section VIII, PED and SQL



Type 3900 Pilot Operated Safety Relief Valve

The Consolidated **Type 3900** pilot operated safety relief valve is a non-flowing design available in a modulating or pop action pilot. The 3900 POSRV is suitable for the overpressure protection of many pressurized systems in the nuclear industry.

Inlet Sizes:	1" through 10"
Outlet Sizes:	2" through 10"
Orifice Sizes:	Fourteen sizes – D through T
Set Pressure Range:	15 to 6250 psig
Temperature Range:	-40°F to 505°F
Materials:	Stainless steel pilot with carbon steel main valve and stainless steel trim
Certification:	ASME Section VIII, PED and SQL

Type 4900 Pilot Operated Safety Relief Valve

The Consolidated **Type 4900** pilot operated safety relief valve is a tubeless valve designed for overpressure protection of many pressurized systems in the nuclear industry.

Inlet Sizes:	1" to 8" flanged
Outlet Sizes:	2" through 10" flanged
Orifice Sizes:	Fourteen sizes – D through T
Set Pressure Range:	15 psig to 7200 psig
Temperature Range:	-40°F to 505°F
Materials:	Stainless steel pilot with carbon steel main valve and stainless steel trim
Certification:	ASME Section VIII, PED and SQL

About Dresser Consolidated

Dresser Consolidated, headquartered in Houston, Texas, has been an international leader in dependable pressure relief valves and solutions for more than 100 years. A business segment of Dresser, Inc., the company delivers the trusted expertise to provide and service reliable flow safety systems in critical applications around the world. www.dresser.com

About Dresser, Inc.

Dresser Inc. is a global leader in providing highly-engineered infrastructure products for the global energy industry. Leading brand names within the Dresser portfolio include Dresser Wayne® retail fueling systems, Waukesha® natural gas-fired engines, Masoneilan® control valves, Consolidated® pressure relief valves, and ROOTS® blowers and rotary gas meters. The company has manufacturing and customer service facilities strategically located worldwide and a sales presence in more than 150 countries. www.dresser.com.

Dresser Consolidated Dresser, Inc., Flow Technologies

10343 Sam Houston Park Drive
Houston, Texas 77064 U.S.A
T. +1-281-671-1640
F. +1-281-671-1735



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