Allied Valve Pressure Relief Valve Presentation

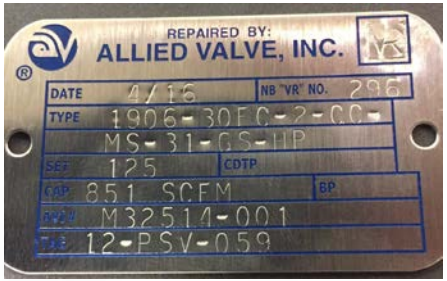
For the State of Minnesota Boiler Inspectors

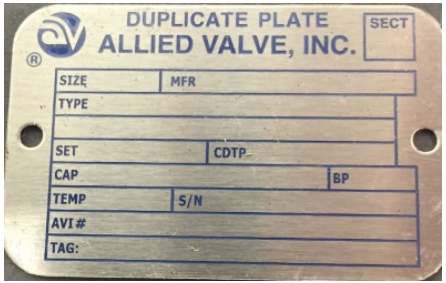
Discussion Topics

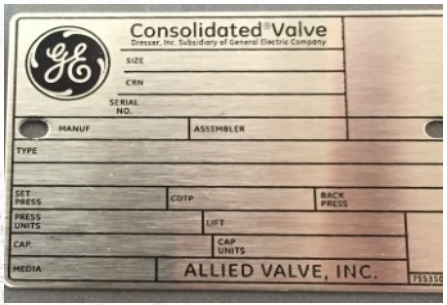
1. Tagging
2. Codes-Standards-Testing Options
3. Replacement Options
4. Documentation, OSHA 1910.119
5. Common Concerns

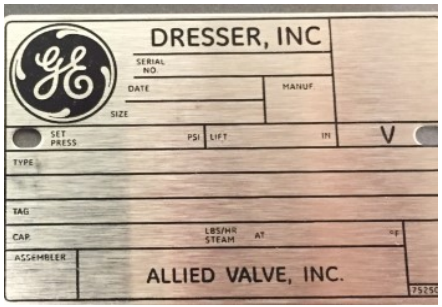
Tags Used

- Hand Lift
- Functionality Test Only
- VR Repair
- New Sec 1 (V) or Sec 8 (UV)
- Duplicate Tag
- Tested By Tag









ASME CODE

Single Valve Application - Set at or below MAWP

OVERPRESSURE

- **Section 1** - The pressure cannot rise more than 6% above MAWP (ASME Sec 1 PG-67.2 1998)
- **Section 8** – The pressure cannot rise more than 10% or 3 psi, whichever is greater above MAWP (ASME Sec 8 UG-125 (c) 1998)

Multiple Valve Application - First valve set at or below MAWP

OVERPRESSURE

- **Section 1** - Pressure cannot rise more than 6% above MAWP (ASME Sec 1 PG-67.2 1998)
- **Section 8** - Pressure cannot rise more than 16% or 4 psi, whichever is greater above the MAWP (ASME Sec 8 UG-125 (c) 1998)

whichever is

Coded Valves

Section I (V) Stamped

1. Used in all boiler applications (LB/HR)
2. Can be used off a boiler if capacity is carried

Section VIII (UV) Stamped

1. Off boiler application for steam, air/gas, liquid applications (LB/HR, SCFM, GPM)
2. Valves on liquid over 140F must have a lifting lever*
3. Cannot be used on a boiler

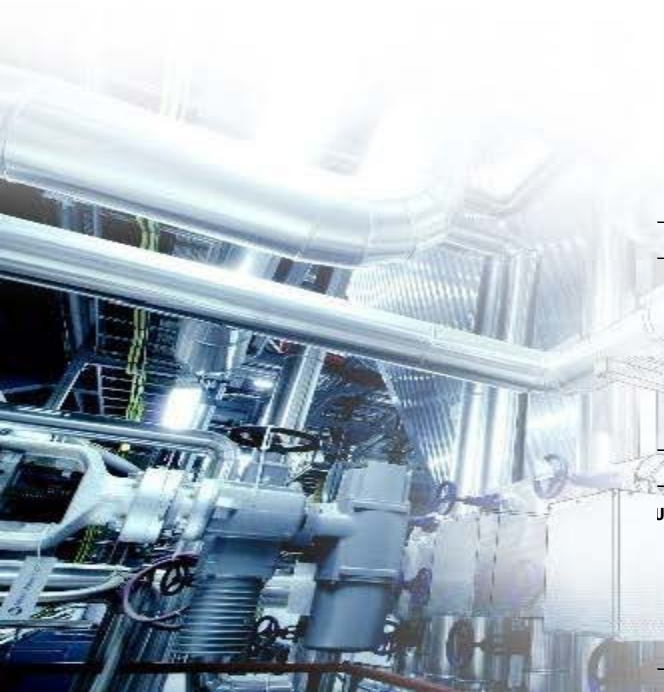
Section IV (HV) Stamped

1. Low pressure steam and hot water boilers (expressed in LB/HR or BTU/h)
2. Can hand lift with 75% of set pressure under valve

Non-Code Stamped

1. Used for overpressure protection on tanks, pump lines and hydraulic systems in a non-coded application

Set Pressure Tolerances



ASME CODE TOLERANCES

CODE SECTION	SET PRESSURE (PSIG)	SET PRESSURE TOLERANCE	MAXIMUM BLOWDOWN	OVERPRESSURE
POWER BOILER SECTION I CODE STAMP {V}	15 – 70	+/- 2 PSIG	(UP TO 67 PSIG) = 4 PSI	2 PSIG
	71 – 100	+/- 3%	(67 PSIG TO/AND 250 PSIG) = 6% OF SET	3%
	101 – 300	+/- 3%	(OVER 250 UP TO 375) = 15 PSI	3%
	301 – 1000	+/- 10 PSIG	(375 AND ABOVE) = 4%	3%
	1001 AND ABOVE	+/- 1%	4% ** Minimum Blowdown: 2% or 2 PSI, whichever is greater*	3%
HEATING BOILER SECTION IV CODE STAMP {HV}	**15 PSIG STEAM**			
	15	+/- 2 PSIG	2 – 4 PSIG	UP TO 20 PSIG
	HOT WATER			
	15 – 60	+/- 3 PSIG	N / A	10%
	61 – 160	+/- 5%	N / A	10%
UNFIRED PRESSURE VESSEL SECTION VIII CODE STAMP {UV}	15 – 30	+/- 2 PSIG	N / A	3 PSIG
	31 – 70	+/- 2 PSIG	N / A	10%
	71 - 3000	+/-3%	N / A	10%

Testing Frequencies

to

NBIC Recommendations - Periodic inspection and maintenance of these important safety devices is critical to ensure their continued functioning and to provide assurance they will be available when called upon to operate.

API 510 – **Pressure relief valves shall be tested at intervals necessary to verify their reliable performance.**

OSHA 1910.119 – The frequencies of inspections and tests of process equipment shall be consistent with applicable manufacturers' recommendations and good engineering practices, and more frequently if determined to be necessary by prior operating experiences.

(51%) – What does this mean?

NBIC Guidelines for Testing

Steam

Testing: Boiler, Pressure Vessels and Piping…Annually
Inspection/VR Repair: Not noted

Air and Clean Dry Gases

Testing: Pressure Vessels and Piping…3 years
Inspection/VR Repair: Not noted

Valve with Rupture Disk

Testing: 5 years

Propane, Refrigerant

Testing: 5 years
Inspection/Repair: Not noted

All others

Per inspection history

Gauge Calibration

Per NBIC Parts 2, 2.2.10.4 & 2.4.8.1

The owner is required to inspect their PMD’s (gauges). No specific guideline is given; this may be controlled by local jurisdiction.

We strongly suggest using the valve testing frequencies in the NBIC Part 2, 2.5.8 of 1 to 3 years as a guideline for PMD calibration.

NBIC Testing Electronic Valve Testing Requirements

Allied Valve Inc.™

Gauge Calibration

ALLIED VALVE, INC.

To: Allied Valve, Inc Pressure Relief Device Customer

RE: Verification or Calibration of customer gauges. Revision 0

The National Board Inspection Code "VR" program requires any gauge being used for testing to fall into the scope of calibration requirements of our Quality Control program. This includes the use of customer gauges.

To maintain a valve's ASME & or NBIC VR status, when a valve is tested on site, the pressure reading device must be verified or calibrated to be in calibration and documented.

Where ever possible, a ***gauge tap, see note***, near the valve to be tested is preferable. With this Allied technicians can use Allied certified gauges or transducers to get pressure readings. This will save time, assure NBIC compliance and guaranty accuracy of tests.

Where there is no gauge tap available, the pressure reading must be supplied by the customer. We must have ***evidence of calibration*** supplied to the technician of either a verification or calibration sticker on the gauge or pressure readout which indicates regular verification or calibration or a copy of a recent shown to the technician. Pressure reading instruments must be of an accuracy of at least .25% as stated in ASME PTC19.2. Timeline of performing a verification check or calibration should be at least as good as the customer required testing of the pressure relief device or The National Board recommendations listed in NBIC 2.5.8., whichever is shorter. Best if done before valve testing is performed to eliminate problems stemming from non conforming instruments. The Allied technician will record the gauge ID and verification or calibration date on his test report.
Tests performed without qualified pressure reading cannot be certified as accurate or warranted as such.

Account Managers and technicians will be glad to assist customer personnel to set up a way to accomplish this. It is strongly suggested that the customer should confirm qualified pressure reading before our technicians arrive on-site to eliminate delays before the testing.

The technicians will get together with your contact at the plant prior to testing to set up the proper method to acquire the data required.

Note: Gauge tap would be of ¼" npt min., ½" npt preferred size with double shutoff and ***a bleed valve*** between the 2 shutoff valves. If possible a siphon capable of pressure and temperature can also be installed. Must be accessible for technician to install his gauge.

Steve Hamby
Allied Valve, Inc.
QC Manager

Offices in:			
Chicago, IL	1019 W. Grand Ave. 6062	800-827-1197	Fax: 312-226-1197
Appleton, WI	3301 E Evergreen Dr.	920-832-9778	Fax: 920-832-9798
Riverdale, IA	4419 State Street 52722	563-359-8100	Fax: 563-359-0857
Cannon Falls, MN	6291 318th St. Way 55009	507-263-2251	Fax: 866-929-3719
Portage, IN	6575 Daniel Burnham Dr. 46368	219-764-3010	Fax: 219-764-3084
Bismarck, ND	1751 93rd St. NB 58501	701-214-5502	Fax: 701-557-7856

Valve Testing Options

Shop - Valves will be live tested on media they will see in the field (steam - lb/hr, air – scfm, liquid - gpm) on a certified shop test stand. Super heat correction factor will be used for higher temp super heated steam valves.

Field - Electronic Testing Device (50% -85% operating pressure required) can be used, per National Board, on larger flanged valves on Stm/Air

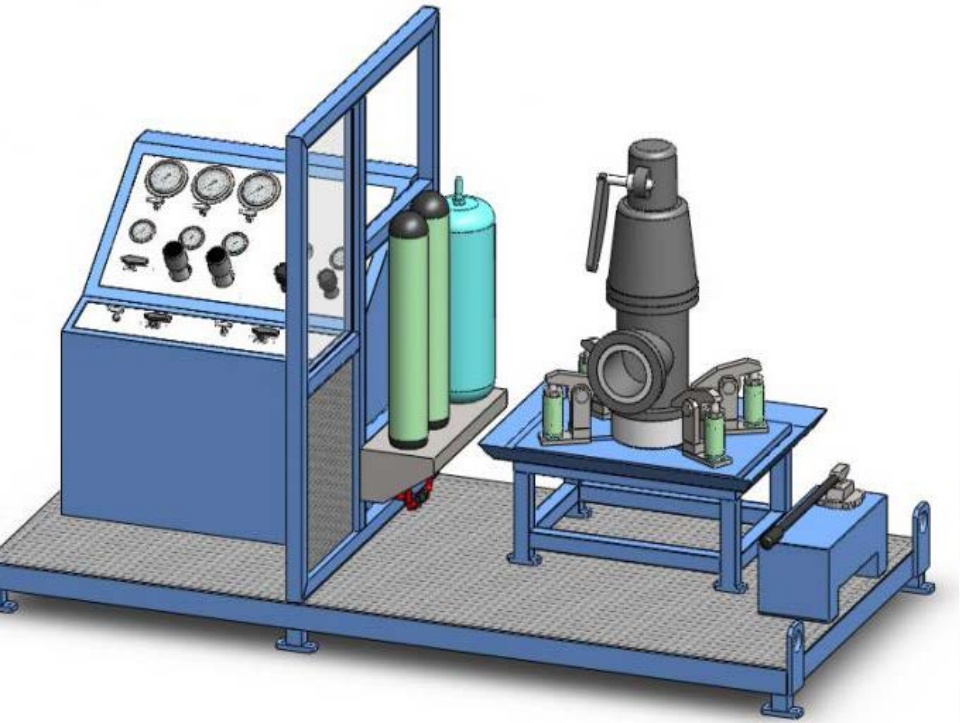
1. Gauge verification
2. Confirmed operating pressure
3. Tested to within allowed code tolerances
4. Test only tag secured to cap of PRV

Hand Lift – Smaller portable valves

1. Must have 75% of operating pressure versus nameplate set pressure

Functionality Test Only – EVT or hand lift only because of lack of gauge port or calibration records by customer. Functionality test stamped on valve sheet.

In-Shop Testing



- Test vessels and gauges are certified by the National Board
- Gauges are calibrated every three months
- Valves are tested in accordance with ASME guidelines
- Gauges used are Grade 3A or 4A +/- .25% accuracy as stated in ASME PTC19.2

Electronic Valve Testing (EVT)

Used for testing safety valves while boiler is running to verify set pressure.

<u>Needed to insure proper set:</u>

- ***<u>Accurate</u> inlet pressure***
- ***Optimum operating pressure***
  50% - 85% of nameplate set pressure of valve
  When possible use our calibrated gauges

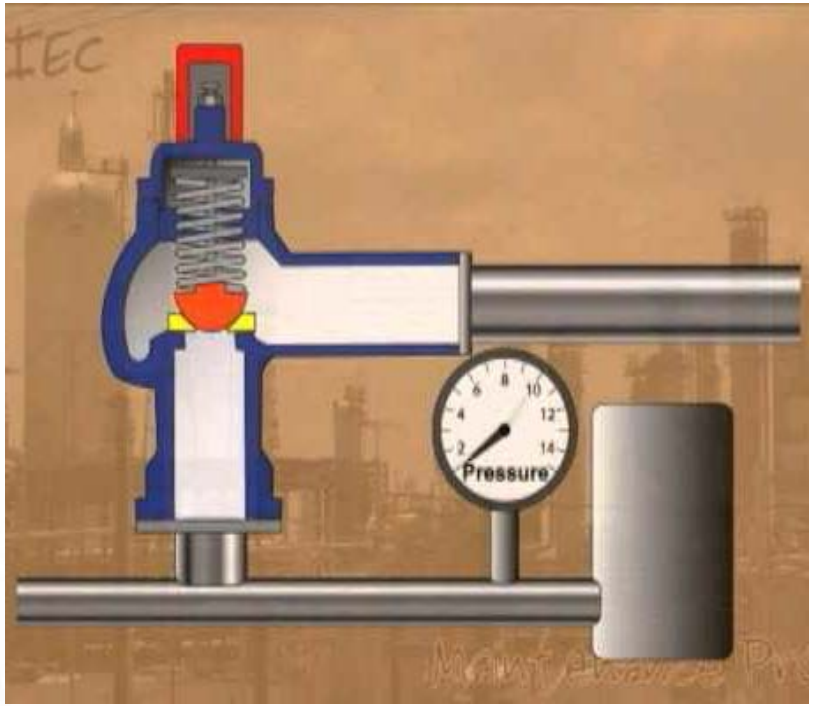
Calibrated DSC System – Technician will radio control room for operating pressure

Allied Valve Inc.™

What is Needed for Accurate Results

Gauge on pipe near valve

- Pressure drop concerns



ENTER COMPANY

Allied Valve Inc.
6291 318th Street Way
Cannon Falls, MN 55009

EVT TEST REPORT

Company name		Job No.	M162649-001
Location		Test date	31-03-2015

Valve data

Type	Size	Serial no.	Service
1737WE-2-104-S	2.5	BY25399	STEAM
Customer Tag	**Unit location**	**Manufacturer**	
SUPERHEAT	UNIT1	CONSOLIDATED	

Test data

Expected set pressure	Process pressure	Norm	Back pressure
1380.0 psi	1100.0 psi	ASME sec. 1	0.0 psi

	Loadcell range	Loadcell serial nr.	Loadcell calibration date
Load cell	0-1000 Kg	N67072	02-03-2015

Test results

	Inlet pressure	Set pressure
As found	1228.0 psi	1391.9 psi

	Inlet pressure	Set pressure
Test 1	1228.0 psi	1391.9 psi
Test 2	1228.0 psi	1381.5 psi
Test 3	1228.0 psi	1389.4 psi
Average	1228.0 psi	1387.6 psi

Acceptable range

From 1366.2 psi - 1.00 % to 1393.8 psi + 1.00 %

Pass / Fail

Comments

FUNCTIONAL TEST ONLY
CUSTOMERS UNQUALIFIED
PRESSURE READING USED
NOT CERTIFIED AS
ACCURATE OR WARRANTED

TECHNICIAN _____ CUSTOMER _____

Certified Valve Sheet

Required by
Local Jurisdictional Body
VR Rep must maintain records for 7 years

ValvKeep

ALLIED VALVE, INC
Relief Device Service Report

Owner Cargill
Plant Sioux City, IA

Location & Identification

Allied Shop (AVI) ID		Tag Number	RV-00-05	Unit / Vessel	2nd Level Canola Bleaching
Sales Order #	31217M-002	AV Tag Number	AVM-1-180		
Customer PO#	277712	Equip Location	F-014 Pulse Tube	Valve Asset ID	SAP #220019825
Description	Warehouse Column#2 Bin#6				

Valve Details

Manufacturer	Farris				
Model Number	27GA46-120			S/N	522024-1-KE
Pilot Model				S/N	
Valve Size	1.5 x 2.5	Inlet	150	Outlet	150
Set Pressure	80 PSIG	Service	Liquid -	Capacity	138 US G/MIN
Temperature	F	Back Pressure		Cap Type	Screwed
Spring Number	RF3101-SS	From / To	76 to 84	Soft Seat Mat'l	

Original Nameplate

Model Number	27GA46-120			Req'd Code	Sec VIII (UV)
Set Pressure	80 PSIG	Temperature	F	Capacity	138 US G/MIN

Last Repair Data

Model Number	27GA46-120			Set Pressure	80 PSIG
Temperature	F	Capacity	138 US G/MIN	BP	
Repair Co.	Dowco			VR #	
Last Repair Date	2011/06	VR Stamp	False	CDTP	
				I.D.#	1106100

Received Data

Date Received	2013/09/18	Nameplate	Original	Special Cleaning	False
Maintenance For	Standard Recondition	Seal	Intact	Set Press Changed	False
As Found Condition	Fair			Conversion	False

Pre-Test Data

Performed	False	Popped @	PSIG	Leaked / @	@
Pretest Results				Pretest By:	

Disassembly / Assembly

Disassembled By CB Inspected By BH Assembled By BF

BER (Beyond Economical Repair) False

Test Data

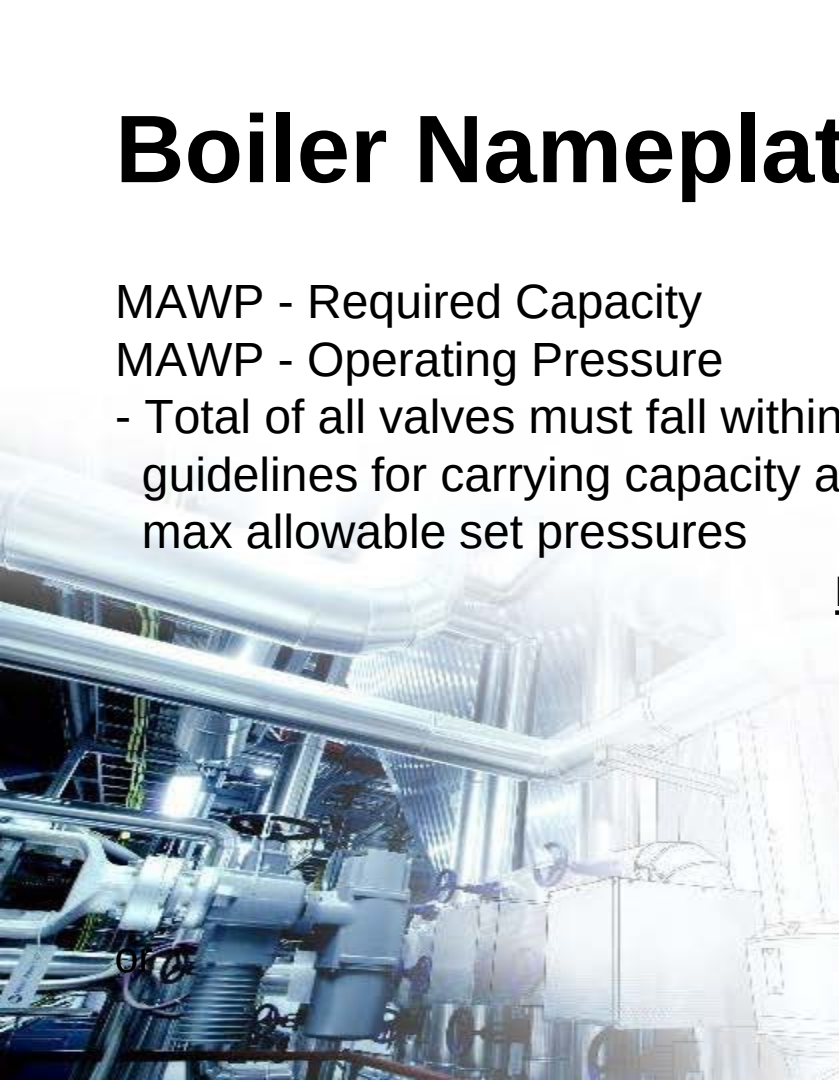
Date Tested 2013/09/27

Set Pressure	80 PSIG	Final Test Press	82.0 PSIG	Cold Diff Set (CDSP)	
Test Method	Bench	Test Media	Water	Leakage Rate	Passed BPM @ 74
Test Equip S/N		Gauge 1 S/N	CG-4	BP Test / @	@
Load Cell #		Tested By	DW	VR Stamp Applied	
Service Location	Allied Valve CF	QC / Final Inspection	DW	Passed Test	False

Comments

Boiler Nameplate

MAWP - Required Capacity
MAWP - Operating Pressure
- Total of all valves must fall within code guidelines for carrying capacity and max allowable set pressures



Possible Problems during Valve Replacement:

- When a customer replaces a valve with a different manufacturer's valve
- Section VIII valve is used in a Section I application (Not Allowed)
- Operating pressure not verified (90%)
- Outlet piping not properly supported
- Drip pan comes in contact with outlet piping

Different Capacities at 100 psi Section 1 (V) Steam

Consolidated1811N Orifice 23,091 lb/hr

Consolidated 1511N Orifice 23,071 lb/hr

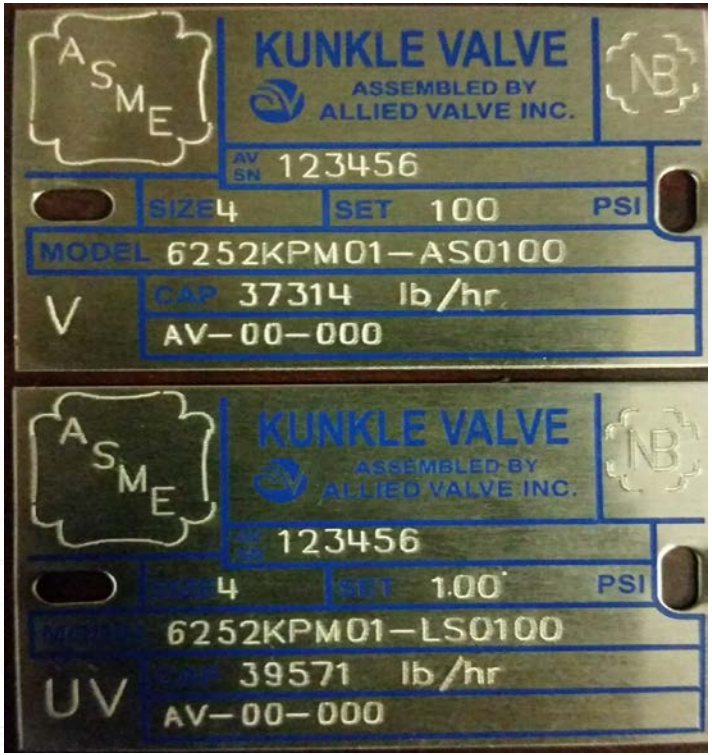
Kunkle 6252N Orifice 25,407 lb/hr

Apollo 119N Orifice 24,215 lb/hr

Farris 6400N Orifice 25,078 lb/hr

Nameplates

Section 1 Capacity Versus Section 8 (Same Valve)

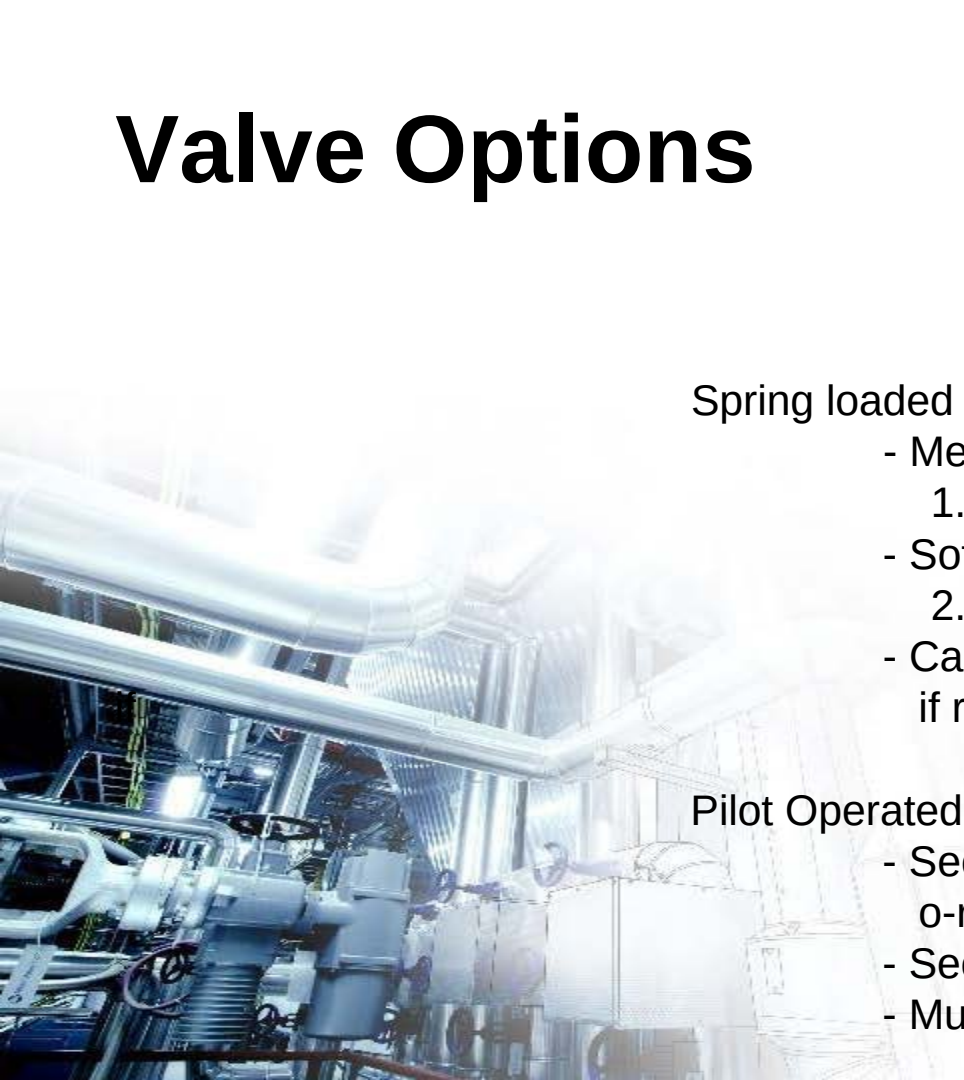


Drain Plugs - Section 1

Code requires Drain Plugs to be removed on Section 1 Applications

ASME PG 73.2.6

Valve Options



Spring loaded - Section 1 (V) or Section 8 (UV)

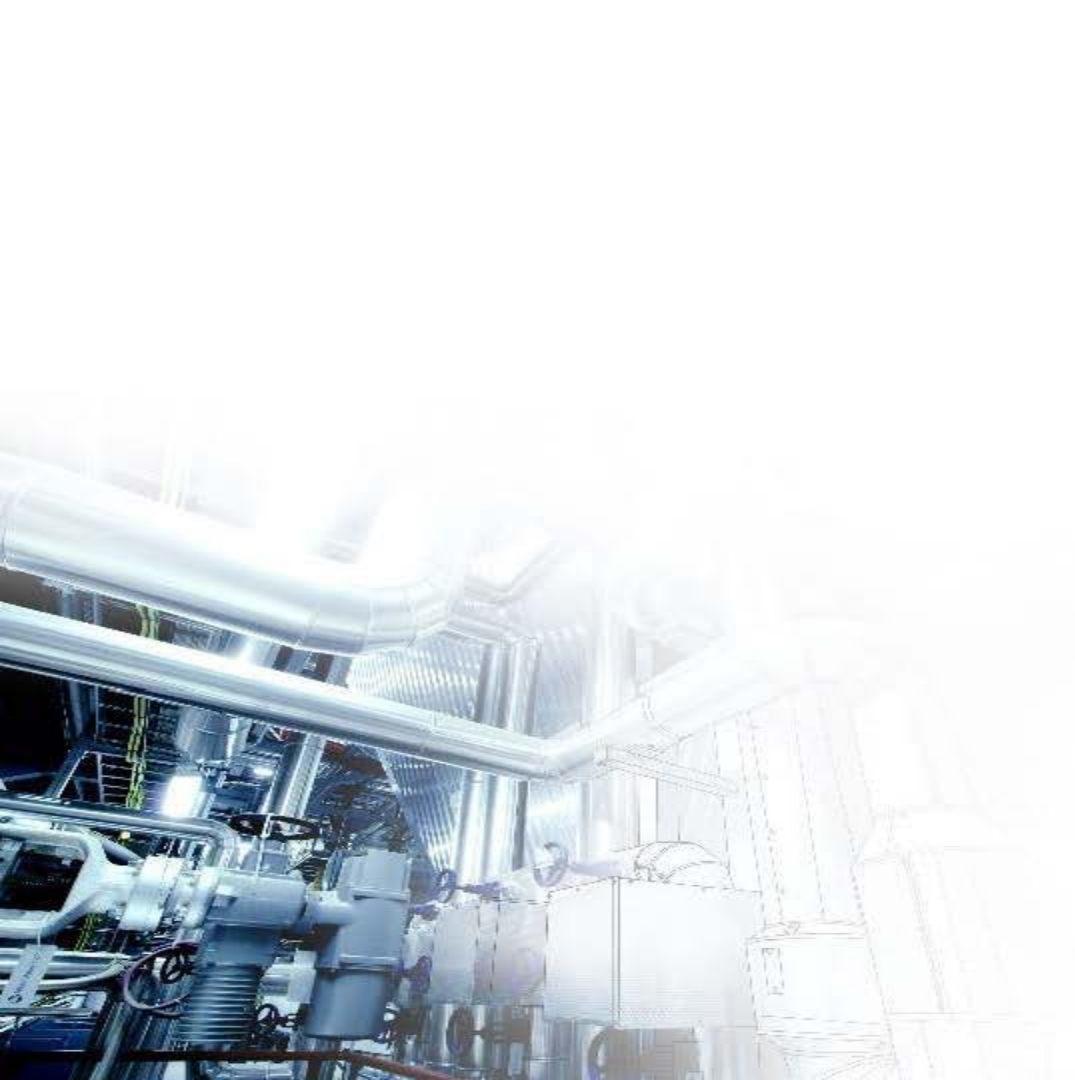
- Metal Seated
  1. Safe operating to 90% of set pressure
- Soft Seated over 101 psi off boiler
  2. Safe operating to 95% of set pressure
- Can use Section I valve on steam off the boiler if required capacity is carried

Pilot Operated – Section 1 (V) or Section 8 (UV)

- Section 1 (V), heat exchanger used because of o-ring seat
- Section 8 (UV) all other off boiler applications
- Must be on clean service

Common Failure Reasons

1. Operating too close to set point of valve
2. High vibration
3. Outlet piping stress
4. Improperly sized valve
5. Improper valve selection
6. Drip pan hits outlet piping
7. Improper storage or installation
8. Bolt torqueing



Thank You!
Questions?

"Go Twins!!!"

Allied Valve Inc.™