



Valves for Process



MOGAS[®]
SEVERE SERVICE BALL VALVES

The MOGAS Solution



Initially installed over 10 years ago, this valve remains in service today providing reliable performance despite high temperature and pressures.



The MOGAS proprietary mate-lapping process of the ball and seats ensures 100% contact over entire sealing surface.



This 8" 2500# MOGAS valve was inspected after 12 years of service. Despite the viscous polymer in the line, this valve was able to operate without mishap and was returned to service.

Best Performance—Best Service—Best Value

Since 1973, MOGAS Industries, Inc. has been supplying severe service metal seated ball valves for the most severe applications, primarily in the refining, chemical/petrochemical, power and mining industries.

MOGAS introduced its advanced technology to the refining and petrochemical industries with the development of the C-Series line, utilized to ensure the operational integrity of a process and handle the plant's most severe applications. MOGAS has continued to provide progressive solutions for the process industries with improved metallurgical coatings, leak-free sealing and timely deliveries.

MOGAS Provides Solutions for Process

Today's refining complexes demand products that are reliable and consistently:

- Provide emergency isolation
- Perform under extreme conditions such as high temperature with heavy solids and coking, packing-in, and abrasive, corrosive or erosive media
- Reduce unexpected downtime and maintenance costs

MOGAS Valves for Process

REFINING

FCCU
Visbreaking & Coking
Heavy Oils
Gasification / Liquefaction
Catalyst Slurry, Injection
Debutanized Bottoms
Waste Heat Recovery
Emergency Shutdowns
UOP
S-Zorb
Continuous Platforming
Process
Hydrocracking

PETROCHEMICAL / CHEMICAL

Acetic Acid, Acetic Anhydride
Aluminum Catalyst
Caustice Sodamite
Ethylene Di-Chloride
K-Resins, Molten Lead
Phosgene Gas
Polyethylene, Polypropylene
VCM, TPA, PTA

SPECIALTY APPLICATIONS

Supercritical CO2 Extraction
Hot Gases
Rapid Open/Close Operation
Aerospace, Food Processing

MOGAS Quality Control

Quality

Full employee acceptance of quality is paramount to a successful Quality Assurance Program. MOGAS has established a culture of quality throughout the company, from the first customer inquiry to the final product shipment.

The MOGAS Quality Assurance Program

MOGAS severe service ball valves can be certified PED compliant for the European Union. The MOGAS Quality Assurance Program encompasses a complete quality management system to ensure conformance with national reference standards including ASME Code requirements.

When used as Power Operated Relief Valves, MOGAS PORV valves may be stamped with the ASME "V" Stamp, to ensure they have been designed, manufactured, inspected and tested to meet the requirements of ASME Code Sections I, II and IX.

Testing

- Leakage Rates per MSS SP-61
- Shell Tests performed at 1.5 x Max Cold Working Pressure
- Seat Closure Tests performed at 1.1 x Max Cold Working Pressure
- All valves meet API 607, API 6FA, BS 6755
- API 598 (upon request)

Engineering Services

At MOGAS, there is over 30 years of valve knowledge, applications engineering, and industry innovation. When there are special requirements, MOGAS engineers find the right solution. MOGAS is involved *exclusively* in the engineering and manufacturing of metal seated ball valves for the most severe services. Essentially, MOGAS is an engineering company which manufactures valves specific to customer application needs. MOGAS engineering specialists are available to analyze tough applications, design valves which meet punishing criteria and solve isolation, drain and vent problems.

Customer Service

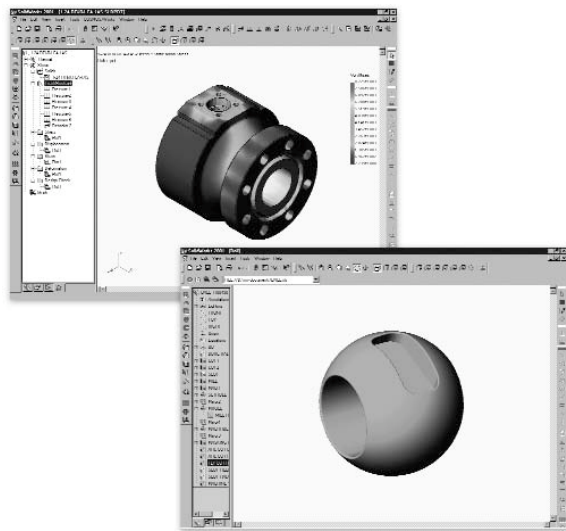
From commercial flexibility to outstanding service, the MOGAS goal is complete customer satisfaction. MOGAS field service representatives are available 24 hours a day, 365 days a year. MOGAS technical advisors will assist with installation or training. On-site coverage extends anywhere, bringing technical support to the harshest environments and the most remote locations. MOGAS goes wherever a solution is needed.

Warranty

MOGAS Industries, Inc. is pleased to offer MOGAS ball valves with a product warranty that is superior to other ball valve manufacturers. More detailed information is available in the standard terms and conditions of sale which accompanies a valve order.

Most Technologically Advanced

MOGAS engineers are equipped with the latest and most sophisticated tools, such as finite element analysis (FEA) software enabling engineers to analyze a valve down to the most minute detail and SolidWorks—a parametric-driven modeling software.



With SolidWorks, real-time information is provided. Drawings and spreadsheets can be linked within SolidWorks, so if the Bill of Material is changed in any way, the changes are reflected on the drawings as well, which eliminates errors.

MOGAS can provide 3-D viewing of valves, which can be put into the piping schematics of specific plants. This enables clients to see whether or not the valve will fit within their schematics. The valve is viewable from all angles, 360 degrees around. Another benefit is that any changes needed to be made on the valve can be done instantly through e-mail, which means no waiting for faxed documents.

Over 30 years of focused design and material research, specific to severe valve applications, has increased many clients' plant run-time and safety.

MOGAS METAL SEATED BALL VALVES

Manufactured according to international and industry codes and standards

ASME – American Society of Mechanical Engineers

B16.5	Steel pipe flanges & flanged fittings
B16.10	Face to Face & End to End dimensions of valves
B16.11	Forged fittings socket welding & threaded
B16.25	Butt-welding ends
B16.34	Valves – Flanged, threaded & welded end

FCI – Fluid Control Institute

FCI 70-2	Control valve seat leakage
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API – American Petroleum Institute

598	Valve inspection & test
607	Fire Test for Quarter Turn Valves

MSS – Manufacturer’s Standardization Society

SP-25	Standard marking system for valves, fittings flanges & unions
SP-55	Quality standard for steel castings for valves, flanges & fittings
SP-61	Pressure testing of steel valves

NACE – National Association of Corrosion Engineers

MR-0103	Materials resistant to Sulfide stress cracking in corrosive petroleum refining environments
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APPROVALS, ACCEPTANCES AND LISTINGS

ATEX Directive 94/9/EC Category 2 Classification - Gas Zone 1 Certification
(Ball valves with manual operators are categorized as non-electrical equipment.)

European Union: PED/CE Compliance

Dutch: Stoomwezen

SIL (Safety Integrity Level): Classified as a Type A device according to IEC61508. A full FMEDA report is available from MOGAS upon request.

American National Standards Institute (ANSI)

American Society of Mechanical Engineers (ASME)

American Society for Testing and Materials (ASTM)

CRN: Canadian Registration Numbers

National Association of Corrosion Engineers (NACE)

Manufacturer’s Standardization Society (MSS)

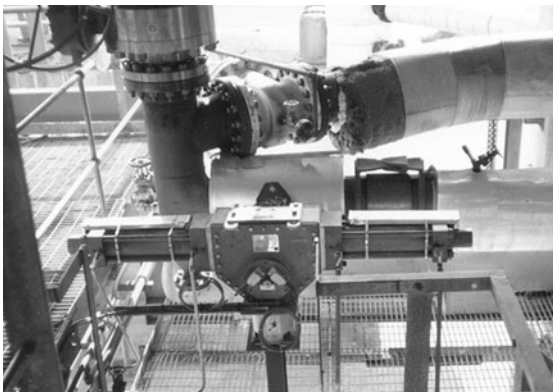
Process Applications

MOGAS valves are available for a standard 10-12 week delivery with an expedited delivery available upon request

Many valves are IN STOCK
Available for immediate delivery



Coke particles suspended in gas travel through this 16" 300# VCM Furnace Isolation Valve at high speed, making this a very abrasive service.



Twelve (12) years of continuous operation have been recorded for this 12" 3rd stage Cyclone Separator Valve.

Partial Applications List	
FCCU	Frac Bottoms Pump, Strainer & Heat Exchanger Isolation Best Practice List for Chevron/Texaco
	Regeneration Spent Catalyst Dump Valve Best Practice List for Shell Installation at Exxon-Baytown
	3rd or 4th Stage Cyclone Separator Installation at Total/Fina/Elf-Milford Haven
Delayed Cokers	Overhead Vapor Isolation Installation at Frontier-El Dorado
	Coker Drum Isolation Installation at Frontier-Cheyenne
	Heat Exchanger Isolation Installation at Shell-Martinez
	Drain & Vent Valves Installation at Premcor-Port Arthur
CCR Units	Lockhopper Isolation
	Vent Valves
	Platforming Reactor Isolation
	Catalyst Addition Valves to the Lockhopper MOGAS is 1 of the 2 approved vendors by UOP
Atmospheric or Vacuum Crude	Furnace Isolation
	Filter Isolation Installation at Conoco/Phillips-Borger
High Pressure Ebulating Bed Hydrocrackers	High Pressure Letdown Control Valve Isolation
	Catalyst Handling Valves
	ESD Valves
	Hot Oil & H2 Furnace Isolation Valves
	Heavy Coking Applications Preferred Vendor for Lummus & Axxens
VCM Units	Furnace Isolation
	Preferred Vendor for Dow Chemical
LDPE	Product Take-Off Valves
	Inlet Feed Valves
	Pump Isolation Valves
	Installation at Dupont-Victoria
HDPE	Product Take-Off Valves
	Inlet Feed Valves
	Pump Isolation Valves
	Installation at Chevron-Cedar Bayou
Polypropylene	Product Take-Off Valves
	Inlet Feed Valves
	Pump Isolation Valves
	Installation at Dow Chemical-Freeport
TPA, IPA, PTA	Isolation b/t 1st & 2nd Crystalizers
	Installation at BP/Amoco-Indonesia, Charleston
Pulp & Paper	Digester Blowdown Valves
	Green Liquor Valves
	Black Liquor Valves
	Steam Drain & Vent Valves
	PORV's Installation at Georgia Pacific & Smurfit-Stone

Valve Selection Guide

MOGAS Valve Selection Guide for Process Application						
MODEL	CA-1AS	CA-DRI	CA-HO1	S-Series **	ISOLATOR	RSVP
Size	1" - 24"	1" - 24"	1/2" - 3"	1/2" - 30+"	2" - 8"	1/2" - 2-1/2"
Class	150# to 4500#	150# - 4500#	1500# - 4500#	150# - 4500#	150# - 300#	150# - 4500#
End Connections	RF, BW, RTJ, Clamp, *Custom Connectors	RF, BW, RTJ, Clamp, *Custom Connectors	SW, BW, RTJ, Clamp, RF, *Custom Connectors	Per Customer Requirements	RF, BW	SW, BW
Body Materials	A105, F5, F9,347SS Hastalloy, Ti, All Materials Available	A105, F5, F9,347SS Hastalloy, Ti, All Materials Available	A105, F5, F9,347SS Hastalloy, Ti, All Materials Available	CUSTOM Per Customer Requirements	CF8M (316SS)	A105, F22, 316SS, Other Materials Available
Trims	410SS, 316SS, Inconel, Ti, All Materials Available	410SS, 316SS, Inconel, Ti, All Materials Available	410SS, 316SS, Inconel, Ti, All Materials Available	CUSTOM Per Customer Requirements	316SS or 410SS Ball & Stellite#3 Seats	410SS or Inconel 718 Ball & Seat
Coatings	HVOF Chrome Carbide & Tungsten Carbide, Spray & Fuse, Ceramic Coatings, Diffused Coatings	HVOF Chrome Carbide & Tungsten Carbide, Spray & Fuse, Ceramic Coatings, Diffused Coatings	HVOF Chrome Carbide & Tungsten Carbide, Spray & Fuse, Ceramic Coatings, Diffused Coatings	CUSTOM Per Customer Requirements	HVOF Chrome Carbide	HVOF Chrome Carbide or Spray & Fused Chrome Carbide
Directional Sealing / Solids Capability	Bi-Directional Sealing / Solids Resistant	Unidirectional Sealing / Solids Tolerant	Uni- or Bi- Directional / Solids Resistant	CUSTOM Per Customer Requirements	Bi-Directional Valve / Solids Resistant	Uni-directional Sealing / Solids Resistant
Application or Process	CCR Units	CCR Units	High Press Catalyst Handling Valves	* Custom Built with Heavy Engineering Involvement	Catalyst Handling Slurry	Drains & Vents for Any Process
	Delayed Coker	Delayed Coker				
	Fluid Coker	Fluid Coker		* Site visits by Engineering or Service Staff Recommended	Hydrogen Sulfur Reduction	
	FCC Units	FCC Units			SZORB Gas Handling	
	Atmospheric or Vacuum Crude Units	Atmospheric or Vacuum Crude Units			Pulp & Paper	
	High Press Ebulating Bed Hydrocrackers	High Press Ebulating Bed Hydrocrackers	High Press Ebulating Bed Units	Iron Carbide Units	10,000 Cycles or Less	
	Fixed Bed Hydrocrackers	Fixed bed Hydrocrackers		Direct Reduction of Iron ORE		
	Szorb Units	Szorb Units				
	Desulfurization Units	Desulfurization Units		Lethal Gases or Liquids	CCR Units	
	Gas to Liquid Units	Gas to Liquid Units		Direct Smelt Applications		
	Gasification Units	Gasification Units		Jet Engine Test Equipment	Lethal Gas	
	High Press/Temp O ₂ , H ₂ or Flue Gas	High Press/Temp O ₂ , H ₂ or Flue Gas	High Press/Temp O ₂ , H ₂ or Flue Gas	Extreme Temperatures and/or Pressures	EDC Slurries	
	Coal Liquefaction Units	Coal Liquefaction Units	Coal Liquefaction Units	Extreme Cycling Services	Dowtherm Handling	
	Polypropylene	Polypropylene				
	HDPE	High Density Polyethylene		Extreme Temp Shock Applications		
	LDPE	Low Density Polyethylene	LDPE	Tungsten HexaFluoride	Solids Handling	
	Acetic Acid	Acetic Acid		Autoclaves Ni, Au, Cu		
	VCM Units	VCM Units			Fuel Gas Applications	
TPA	TPA					
IPA	IPA		Supercritical Fluids			
Factory Stock	✓				✓	✓
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*Custom connectors available upon request

**For specialized applications – contact MOGAS

C-Series Valve Line

Applications

Chemical / Petrochemical

- Acetic Acid Handling
- Catalyst Handling
- Dowtherm Handling
- Gas Furnace Isolation
- Lethal Services
- Polyethylene Isolation
- Polypropylene Isolation
- Solids Handling

Refining

- Catalyst Slurry Handling
- Coal Slurry Handling / Ash Removal
- Heavy Oil Units
- Hydrogen Isolation
- Hydrotreating Units
- Isolation in Coker Units
- Isolation in FCCU Applications
- Isolation in UOP Applications
- LC Finings Units

Available Sizes

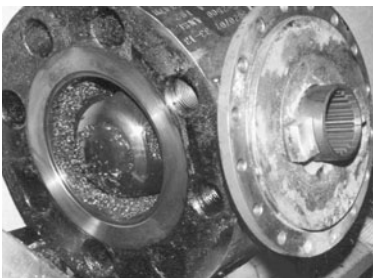
- 1/2" to 30"
- larger sizes upon request

Available Classes

- 150# to 4500#

Available End Connections

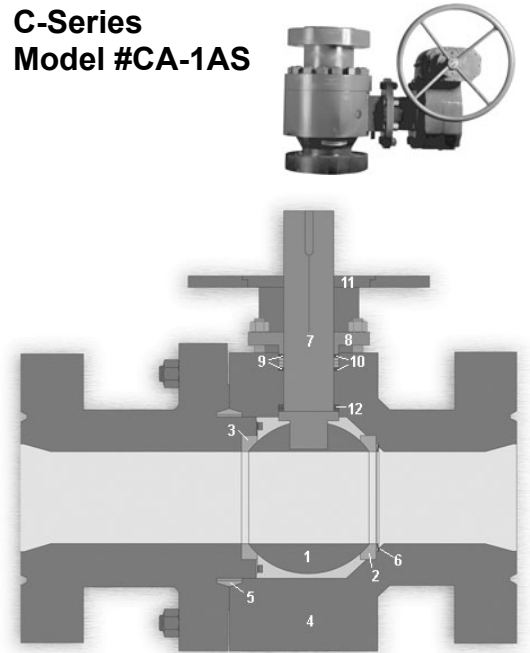
- Flanged
- Butt weld
- Socket weld
- High Pressure Clamp Connectors



Catalyst particulate and harsh solids are easily handled with MOGAS valves.

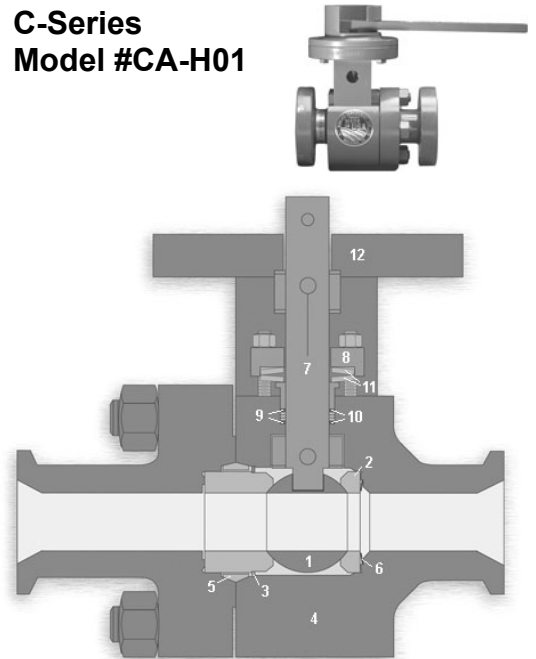
Valve Components	
Item NO.	Description
1	Ball
2	Seat
3	Locked-In-Seat
4	Body
5	Body Gasket
6	Seat Spring
7	Stem
8	Gland Flange
9	Packing
10	Anti-Extrusion Rings
11	Stem Bushing
12	Inner Stem Seals

C-Series Model #CA-1AS



Valve Components	
Item NO.	Description
1	Ball
2	Seat
3	Locked-In-Seat
4	Body
5	Body Gasket
6	Seat Spring
7	Stem
8	Gland Flange
9	Packing
10	Anti-Extrusion Rings
11	Live Loading
12	Stem Bushing

C-Series Model #CA-H01



"Shown with High Pressure Clamp Connectors"

If your smaller bore applications (1/2" - 3") require metal seated ball valve technology that withstands the most severe temperature and high pressures as well as pressure shocks, the CA-H01 is the best value for that application.

C-Series Valve Line

Applications

- High Temperature
- Catalyst
- Hydrogen
- Fuel Gas
- Steam Isolation
- Vent and Drain
- Bypass Applications
- Slurry
- Pulp and Paper
- 10,000 cycles or less
- CCR Units
- EDC Slurries
- Dowtherm Handling
- Solids Handling

In STOCK Features

- Standard MOGAS metal seated ball valve features
- Designed to meet industrial needs for reliability and economy
- Cast body in CF8M (316SS) provides tight shut-off for temperatures up to 1100°F (593°C)
- Full Bore, RF Flanged
- Fire Tested to API-607
- Bi-Directional sealing capability
- ASME B16.34, B16.10



C-Series

Model #ISOLATOR

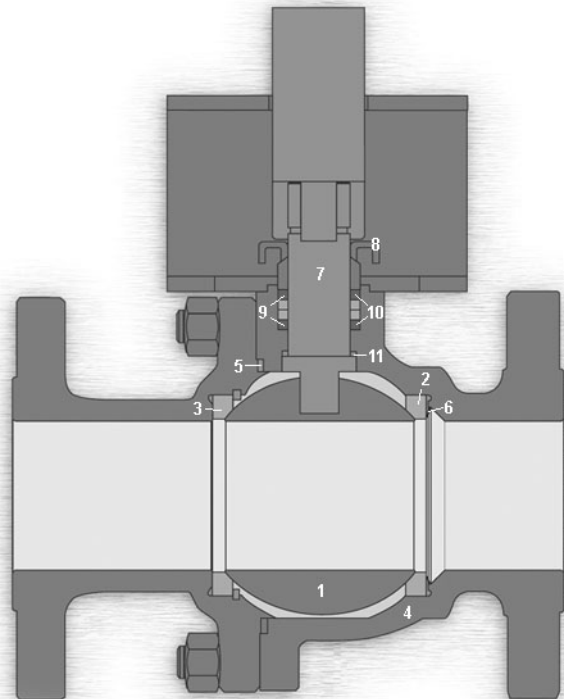
- The C-Series ball valve, Model #ISOLATOR, class 150# and 300#, is the best valve for your low pressure applications.
- If your low pressure applications require reliable metal seated ball valve technology that ensures absolute shut-off and a long service life, the ISOLATOR is the best value for that application.

Valve Components

Item NO.	Description
1	Ball
2	Seat
3	Locked-In-Seat
4	Body
5	Body Gasket
6	Seat Spring
7	Stem
8	Gland Flange
9	Packing
10	Anti-Extrusion Rings
11	Inner Stem Seals

ISOLATORS, ASME class 150# and 300#, sizes 2" - 8", CF8M (316SS) body material

IN STOCK FOR IMMEDIATE DELIVERY



C-Series Valve Components

Ball

Standard:

410SS/Chromium Carbide
Coated - HVOF applied

Optional:

17-4PH, 329SS, 316SS,
Inconels, Ferralium 255,
Hastelloys, Monel, Alloy
20, Titanium, Zirconium

Optional coating:

Spray & Fused applied
Chromium Carbide



The MOGAS mate-lapping process eliminates leaks through the ball and seat.

Features:

- Machined and lapped to as perfect a sphere as possible
- Every ball and seat are "blued" to assure that 100% contact is achieved across the entire seat face
- Coated to at least a hardness of 62 Rc
- Oversized which allows 5 - 7% over travel which reduces wear and eliminates an unexpected opening due to actuator stops being out of adjustment
- Edges of the bore are rounded to prevent coating fracture
- Double Arcuate Cut - available for high pressure or severely abrasive applications

Double Arcuate Cut

MOGAS developed the Double Arcuate Cut in response to abrasive, high velocity services that were damaging to the ball and seat during the first few degrees of operation. The initial opening and final closing area normally create an ellipse where flow is concentrated and velocity is high. The Double Arcuate Cut increases that opening by a factor of three (3) and consequently reduces the velocity by actually spreading out the flow. A reduction in velocity will obviously decrease damage. Velocity is reduced both on the upstream and downstream sides.



The Double Arcuate Cut notch provides a blunt, leading edge against flow. The coating is thickest at this point and the elimination of a sharp edge minimizes coating fracture.

Seats

Standard:

410SS/Chromium Carbide
Coated-HVOF applied

Optional:

17-4PH, 329SS, 316SS,
Stellite 6, Inconels,
Hastelloys, Monel, Alloy
20, Titanium, Zirconium,
Ferralium

Optional coating:

Spray & Fused applied
Chromium Carbide

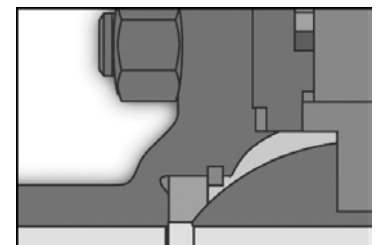


Seat Technology

MOGAS uses two different methods of trapping the downstream seat in place. Both methods of locking-in the seat provide sealed seat protection and easy seat removal for repair. By trapping the seat in its proper place, debris cannot get behind the seat and cause leakage.



High Pressure - Locked in Seat



Low Pressure - Locked in Seat

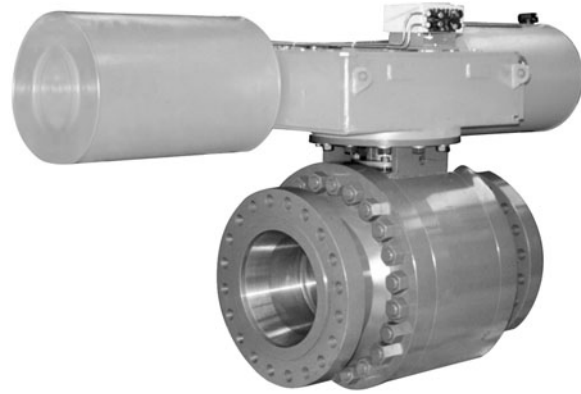
Features:

- Sharp leading edges of the seat ring wipe the sealing surface clean each time the valve is operated
- A wide sealing surface on each seat ring minimizes the possibility of nicks and scratches which cause leakage
- Each seat is mate-lapped front and back to ball and body to ensure the integrity of the seals
- All metal to metal seals - no Grafoil or Teflon behind the seats

C-Series Valve Components

Stem Seal Bearings

MOGAS utilizes coated, metal rings between the stem shoulder and the blow out proof pocket in the body. This creates a pressure energized stem seal internal to the valve. The surfaces secure a tight seal that is enhanced by line pressure exerting additional vertical force. This seal saves the packing box from thermal shocks and particle migration. The rings also serve as a thrust bearing which eliminates radial movement that can cause packing wear.



Packing Chamber

MOGAS utilizes an industry preferred system of two or three sandwiched rings of die-formed Grafoil ribbon between upper and lower braided carbon fiber anti-extrusion rings.

This is an optimum system which has enough Grafoil to effect a seal without having redundant rings for show.

A heavy stainless steel gland follower secured by a minimum of four studs compresses the system. This insures proper load strength and minimizes the possibility of cocking.

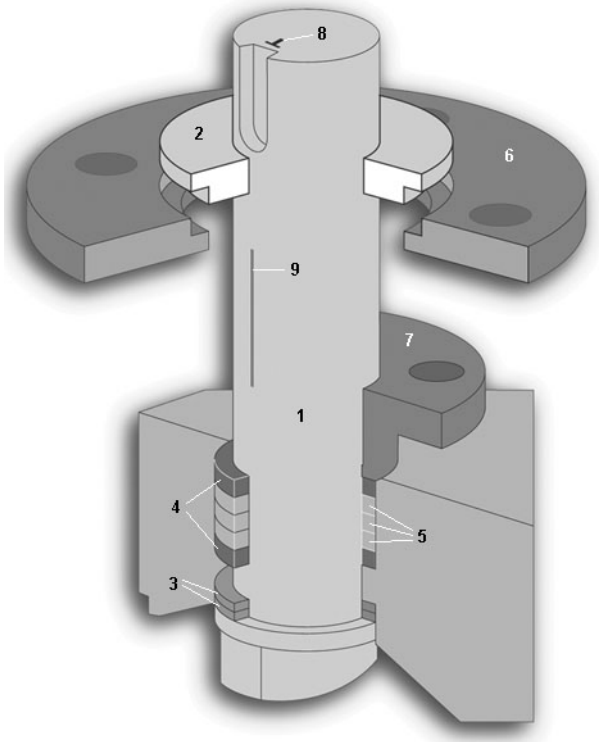
Actuator Mounting Flanges

MOGAS utilizes a rigidly secured mounting bracket for actuators, wormgears and levers. The bracket, constructed of heavy plate steel, is welded or bolted to the valve body.

The mounting plate is parallel to the bore, and perpendicular to the stem, so there is no misalignment of the operator. MOGAS places a heavy metal bushing in the bracket of the valve to guide the stem and ensure that the stem does not side load during operation. If side loading occurs, it is absorbed outside the packing chamber and does not deform packing.

Deformation of packing caused by side loading is a major cause of stem leakage in rotary valves. All of these components work together to provide the most reliable stem seal in the industry.

Valve Components	
Item NO.	Description
1	Stem
2	Stem Bushing
3	Stem Seal Bearings
4	Braided Anti-Extrusion Rings
5	Formed Grafoil Packing Rings
6	Actuator Mounting Flange
7	Gland Follower
8	"T" Mark on Stem
9	Scribe Line



C-Series Valve Components

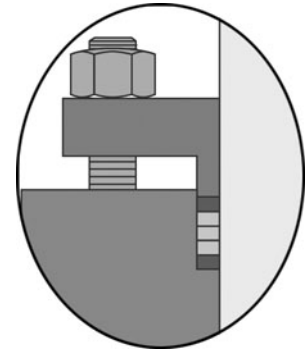
Stem Packing

Standard Packing

- Up to 456°C (850°F) - Oxygen Present
- Up to 654°C (1200°F) - Reducing Atmospheres

Special Features:

- Stainless steel studs and nuts are torqued to meet pressure requirements
- Heavy duty gland flange
- Braided carbon fiber anti-extrusion rings surround two to three die-formed Grafoil packing rings
- Double 410 stainless (typical) rings with chrome carbide coating or single PEEK filled Teflon® make up the inner stem seal bearings



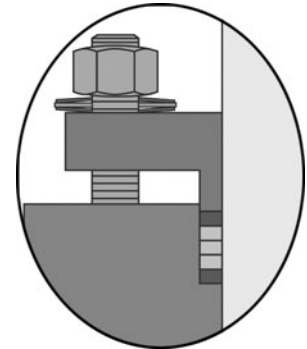
Standard Packing

Standard Packing with Live Loading

- Up to 456°C (850°F) - Oxygen Present
- Up to 654°C (1200°F) - Reducing Atmospheres

Special Features:

- Includes all of the features of the standard stem packing with stainless steel Belleville spring washers and the stainless steel guide spacer



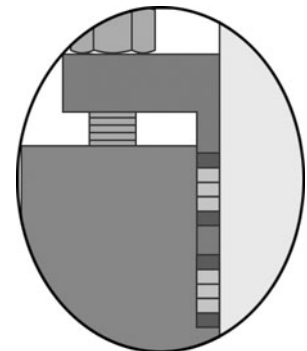
Standard Packing with Live Loading

Dual Stem Packing

- Up to 456°C (850°F) - Oxygen Present
- Up to 654°C (1200°F) - Reducing Atmospheres

Special Features:

- Includes all of the features of the standard stem packing
- Two sets of braided carbon fiber anti-extrusion rings surround two to three die-formed Grafoil packing rings
- Double 410 stainless (typical) rings with chrome carbide coating or single PEEK filled Teflon® make up the inner stem seal bearings
- 316 stainless steel molycoated lantern ring situated between the two packing sets



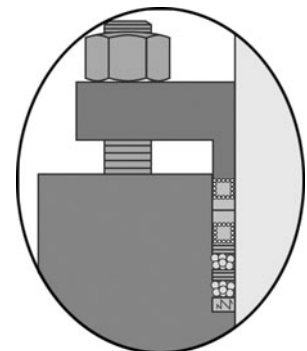
Dual Stem Packing

High Temperature Packing

- 456°C-710°C (850°F-1300°F) - Oxygen Present
- 456°C-907°C (850°F-1652°F) - Reducing Atmospheres

Special Features:

- Top - two reinforced composite fiber braided ropes surround two oxygen resistant, corrosion inhibited, die-formed Grafoil packing rings
- Center - two ceramic fiber gasket insulators and two ceramic fiber braided rope insulators split up to form an oxygen and heat barrier
- Bottom - Grafoil impregnated, Inconel 718 anti-extrusion and sealing ring, also includes inner stem seal bearings

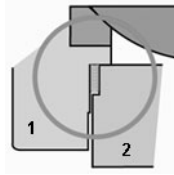


High Temperature Packing

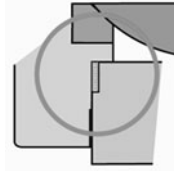
C-Series Valve Components

**Before
Tightening**

1. End Connect
2. Valve Body

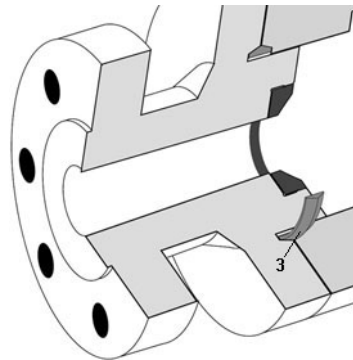


**After
Tightening**



Bolting

The coefficients of thermal expansion of body and bolting materials are important criteria in the selection and design of the bolting on the valve. The bolting is sized in accordance with ASME Section VIII Appendix II. On both high and low pressure valves, a body bolting make-up torque is specified which provides a preload between the body and end connection. This bolting torque is sufficient to insure there will be no relative movement during pressure or thermal cycling of the valve in service.



3. Delta Ring Gasket

Gaskets

- Spiral wound for 150# to 1500# ANSI Class, Inconel with Grafoil for all temperatures
- Pressure energized gold plated delta ring gasket for 2500# to 4500# ANSI Class
 - Inconel 718 for Carbon Steel, F-22 and Nickel Alloy body materials
 - A638 Gr. 660 for stainless steel body materials



End Connections

MOGAS manufactures many valves with almost any style of end connection. All end configurations are machined integral with the body and end connections of the valve, instead of multiple piece construction. The choice of end connection configurations is usually left to the discretion of the customer.

RSVP Valve Line

Features

- Ball and seats are mate-lapped for 100% sealing area contact which ensures absolute shutoff
- Sharp leading edges of the seat wipe the ball clean each time the ball is operated, eliminating particle buildup
- The ball protects the seats from flow when the valve is open or closed which reduces wear on sealing surfaces
- Extensive stuffing box with dual anti-extrusion rings keep packing in place
- Quarter turn non-rising stem does not deteriorate packing
- Live loading ensures zero emissions even in severe temperature shocks
- Precision machined "rigid" mounting bracket designed to support the actuator in any position

Applications

- Drain and Vent Isolation
- Steam
- Hot Gas
- Clean Gas
- Hydrogen
- Dowtherm Handling

Available Sizes

- 1/2" - 2 1/2"

Available ASME Classes

- 150# - 4500#

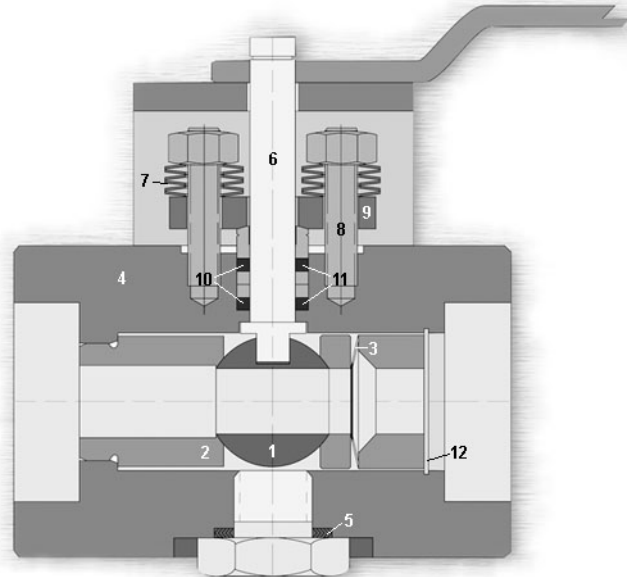
Available End Connections

- Flanged
- Buttweld
- Socketweld
- High Pressure Clamp Connectors



Bill of Material		
Item NO.	Description	Material
1	Ball	410SS/HVOF-CCC or Inconel 718/MSF09 Ctd.
2	Seat	410SS/HVOF-CCC or Inconel 718/MSF09 Ctd.
3	Spring	Inconel 718
4	Body	A182-F22, A105, F91
5	Gasket	316/Grafoil
6	Stem	A276 GR431 Nitrided
7	Live Loading	Inconel 718
8	Gland Thruster	316 Nitrided
9	Gland Flange	410SS
10	Stem Packing	Expanded Graphite
11	Anti-Extrusion Rings	Braided Graphite w/Inconel Wires
12	Retainer Ring	A638-660

The MOGAS RSVP valve line is used in the Power and Process Industries for isolation of high pressure/high temperature drain and vent applications. If your drain or vent application requires a valve that can withstand severe pressures and extreme temperatures, the RSVP is your best choice for that application.



C-Series Coatings and Materials

These are general guidelines and are subject to review by the MOGAS Engineering Department based on specific details of a given application.

Material Reference Chart				
Material Designation	Material Type	Description	Approx. Temp. Limit	
			°C	°F
PEEK, Glass or Carbon Filled	Thermoplastic	Non Abrasive Services, Acetic Acid Services	260	500
A105	Carbon Steel	General Service, Catalyst, Coal Ash, Feedwater	427	800
A182 F6A (410SS)	Martensitic Steel	Standard Ball Material with Coating	649	1100
A182 F5, F9, F11, F22	Low Alloy Chrome Moly Steel	High Temp., Heavy Oils, Frac. Bottoms, Steam Service	649	1100
A182 F304, F316, F347	Austenitic Stainless Steel	General Corrosive Service, High Temperature	815	1500
Titanium, Zirconium	Reactive Metals	Lightweight, Highly Corrosion Resistant	371	600
Alloy 2205, Ferralium 255	Duplex Stainless Steel	Austenitic Ferritic Stainless, Chloride Service	260	500
Alloy 20	High Nickel Stainless Steel	'Super' Stainless, Sulfuric Acid Service	427	800
Monel 400, Monel K-500	Nickel Copper Alloy	Medium Strength, Hardenable	482	900
Inconel 718	Nickel Chromium Base Alloy	High Strength, Precipitation Hardenable	704	1300
Incoloy 825	Nickel Iron Base Alloy	Medium Strength	704	1300
Inconel 625	Nickel Chromium Base Alloy	Medium Strength	704	1300
Inconel X750	Nickel Base Alloy	High Temperature, Precipitation Hardenable	704	1300
Incoloy 800H or HT	Iron Nickel Base Superalloy, 40% Iron	High Temperature, Corrosion	899	1650
Hastelloy X	Nickel Base Superalloy	High Corrosive Services, Oxidation Resistant	982	1800
Stellite #3	Cobalt Base Superalloy	High Corrosive Services, Rc 55 w/o Coating	899	1650
Haynes 230	Nickel Base Superalloy	NOx, Nitric Acid, Extreme High Temperatures	982	1800

Approximate Material Equivalents						
	Material Trade (Common) Name	ASTM Specification	German Worknorme	DIN	GOST	UNS
BODY	A105 Carbon Steel	A105	1.0460	C 22.8		K03504
	F22 Low Alloy Steel	A182-F22	1.7380	10CrMo9-10	12Ch8	K21590
	F91 Low Alloy Steel	A182-F91				K90901
	F316 (Forged) Austenitic Stainless Steel	A182-F316	1.4401	X5CrNiMo-17-12-2		S31600
	F316 (Cast) Austenitic Stainless Steel	A-351-CF8M	1.4408	G-X6CrNiMo-18-10	07Ch18N10G2SM2L	J92900
	F347H Austenitic Stainless Steel	A182-F347H				F34709
	F5 Low Alloy Steel	A182-F5				K41545
	Spring, Seat and/or Stem	410 Martensitic Stainless Steel	A276 Type 410	1.4006	X10Cr13	12Ch13
17-4PH Precipitation Hardened Stainless Steel		A564 GR.630	1.4542	X5CrNiCuNb 16-4		S17400
Stellite #3 Cobalt Alloy		HOWMET, HOW 3 *				R30103
Inconel 718 Nickel Alloy		B637 (UNS N07718)	2.4668			N07718
Incoloy 800HT		B408 (UNS N08811)	1.4876			N08811
A286 Iron Base Superalloy		A638 GR.660				S66286
Bolting	B16 Chromoly Vanadium	A193-B16				K14072
	B7 Chromoly	A193-B7	1.1181			G41400
	B8M 316 Stainless Steel	A193-B8M		A4-80		S31600

This partial list of approximate material equivalents is for reference only. All materials provided will be per ASTM standards. Please contact MOGAS Sales for specific requirements.

*This is a trade name specification and not a ASTM specification.

C-Series Coatings and Materials

These are general guidelines and are subject to review by the MOGAS Engineering Department based on specific details of a given application.

Material and Coating Selection Chart				
Application	Temperature/Pressure	Body/End Material	Ball Material/Coating	Seat Material/Coating
Catalyst Slurry	Low Pressure - Up to 454° C / 850° F	A105, 304SS, 316SS	316SS, 410SS/CCC	Stellite #3
Catalyst Slurry w/ Hydrogen	High Pressure - Up to 454° C / 850° F	347SS, 316SS	410SS, Inconel 718/CCC	410SS, Inconel 718/CCC
Catalyst Handling	Low Pressure - Up to 649° C / 1200° F	F5, 316SS, 347SS	410SS, Inconel 718/CCC	Stellite #3, 410SS, Inconel 718/CCC
Coking	Up to 649° C / 1200° F	F5, F9	410SS/CCC	410SS/CCC
Catalyst Handling	Low Pressure - Up to 816° C / 1500° F	316H, 347H, Incoloy 800H	Incoloy 800H/Fused Carbide	Incoloy 800H/Fused Carbide
Sulphuric Acid	260° C / 500° F	Alloy 20, Incoloy 825, Titanium	Hastelloy C-22/Incoloy 825/ TCC of PSZ	Stellite #3, Incoloy 825/TCC or PSZ
Steam	Up to 649° C / 1200° F	F22	410SS, Inconel 718/CCC	410SS, Inconel 718/CCC
Acetic Acid	Up to 260° C / 500° F	Hastelloy, Titanium, Zirconium	Hastelloy, Titanium	PEEK, Hastelloy, Titanium
H2S, Sour Gas	Up to 204° C / 400° F	Titanium, Incoloy 825, Inconel 625	Incoloy 825/TCC	Incoloy 825/TCC
High Chloride Service, Dry	Up to 538° C / 1000° F	Hastelloy, Titanium	Hastelloy/TCC	Hastelloy/TCC
Polyethylene/Polymers	Up to 427° C / 800° F	A105, 316SS	410SS/CCC	410SS, 17-4PH/CCC or Stellite #3
Coal Ash Slurry	Up to 538° C / 1000° F	F22, 316SS	410SS/CCC	410SS, 17-4PH/CCC or Stellite #3
Supercritical CO2 Process	Low Temperature/High Pressure	316SS, 347SS	17-4PH/CCC	17-4 PH/CCC
Silica Catalyst	Up to 704° C / 1300° F	316H	Incoloy 800H, Fused Carbide	Incoloy 800H, Fused Carbide
Flue Gas	Up to 816° C / 1500° F	316H, Incoloy 800H	Incoloy 800H, Fused Carbide, Hastelloy X	Incoloy 800H, Fused carbide, Hastelloy X

Coatings

In critical services, the reliability of a valve is often dependent upon proper coating selection. In metal to metal sealing ball valves, the ball and seat coating must provide wear and anti-gall properties. In addition, coatings must be compatible with base materials for proper adhesion, corrosion resistance and thermal stability. Our coating development and improvement is a continuing process. MOGAS has more than 25 years of research and in-service experience that has led to our expertise in coating selection.

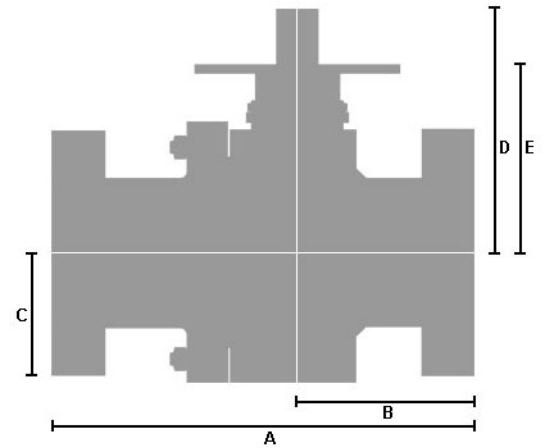
Once the coating is selected, it is imperative that the coating vendor apply the coating correctly. MOGAS approves coating vendors only after extensive metallurgical testing of their coating systems. Selected vendors apply coatings to exact specifications. In addition, random sampling and a vendor audit system ensure that only the highest quality coatings are applied to MOGAS valves.

C-Series Engineering Data

The MOGAS C-Series

Dimension Information

Dimensions for the MOGAS C-Series Valve Line are approximate. Additional dimension information, including information for valve sizes 14" - 24" is available from MOGAS or your local representative.



150# Full Opening Raised Face Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	108	4.25	54	2.13	64	2.50	64	2.50	51	2	9	20
20	3/4	117	4.63	60	2.38	64	2.50	64	2.50	51	2	11	25
25	1	127	5	68	2.69	64	2.50	140	5.50	127	5	13	28
40	1 1/2	165	6.50	70	2.75	80	3.13	137	5.38	124	4.88	18	40
50	2	179	7.06	79	3.10	92	3.63	182	7.17	155	6.10	23	51
80	3	204	8.06	99	3.88	118	4.63	230	9.07	189	7.45	45	99
100	4	230	9.06	93	3.65	133	5.25	252	9.93	211	8.31	61	134
150	6	394	15.50	189	7.44	194	7.63	340	13.38	279	11	203	447
200	8	457	18	233	9.19	238	9.38	407	16.01	335	13.20	306	674
250	10	533	21	272	10.72	298	11.75	519	20.42	422	16.63	573	1264
300	12	610	24	305	12	308	12.13	546	21.50	495	19.50	925	2040

C-Series Engineering Data

300# Full Opening Raised Face Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	140	5.50	70	2.75	64	2.50	64	2.50	51	2	15	33
20	3/4	152	6	60	2.38	64	2.50	64	2.50	51	2	18	40
25	1	165	6.50	68	2.69	64	2.50	140	5.50	127	5	25	55
40	1 1/2	190	7.50	70	2.75	80	3.13	137	5.38	124	4.88	36	80
50	2	216	8.50	97	3.80	92	3.63	182	7.17	155	6.10	29	64
80	3	282	11.12	125	4.93	118	4.63	230	9.07	189	7.45	54	118
100	4	305	12	146	5.75	133	5.25	252	9.93	211	8.31	80	176
150	6	403	15.88	189	7.44	194	7.63	340	13.38	279	11	219	483
200	8	502	19.75	233	9.18	238	9.38	407	16.01	335	13.20	378	834
250	10	568	22.38	277	10.91	298	11.75	519	20.42	422	16.63	659	1452
300	12	648	25.50	246	9.69	308	12.13	546	21.50	495	19.50	1034	2280

600# Full Opening Raised Face Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	165	6.50	68	2.69	64	2.50	64	2.50	51	2	20	45
20	3/4	190	7.50	86	3.38	64	2.50	64	2.50	51	2	23	50
25	1	216	8.50	108	4.25	64	2.50	76	3	64	2.50	28	62
40	1 1/2	241	9.50	121	4.75	80	3.13	114	4.50	102	4	32	70
50	2	292	11.50	124	4.88	92	3.63	182	7.17	155	6.10	37	82
80	3	356	14	152	6	118	4.63	230	9.07	189	7.45	69	152
100	4	432	17	197	7.75	138	5.44	243	9.55	218	8.57	116	256
150	6	559	22	226	8.88	203	8	273	10.75	222	8.75	327	720
200	8	660	26	305	12	240	9.44	308	12.13	257	10.13	517	1140
250	10	787	31	349	13.75	273	10.75	384	15.13	334	13.13	925	2040
300	12	838	33	400	15.75	308	12.13	432	17	381	15	1197	2640

C-Series Engineering Data

900# Full Opening Raised Face Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	229	9.00	114	4.50	76	3	121	4.75	108	4.25	20	45
20	3/4	229	9.00	114	4.50	76	3	121	4.75	108	4.25	18	40
25	1	254	10.00	127	5	76	3	121	4.75	108	4.25	29	63
40	1 1/2	305	12.00	152	6	114	4.50	121	4.75	108	4.25	44	98
50	2	368	14.50	152	6	109	4.31	211	8.30	170	6.70	72	158
80	3	381	15	165	6.50	124	4.88	234	9.22	194	7.65	89	196
100	4	457	18	184	7.25	168	6.63	222	8.75	197	7.75	240	530
150	6	610	24	245	9.63	222	8.75	283	11.13	232	9.13	522	1150
200	8	737	29	298	11.75	292	11.50	308	12.13	257	10.13	1009	2225
250	10	838	33	394	15.50	348	13.69	419	16.50	368	14.50	1746	3850
300	12	965	38	406	16	400	15.75	457	18	406	16	2223	4900

1500# Full Opening Raised Face Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	203	8	114	4.50	76	3	121	4.75	95	3.75	29	65
20	3/4	216	8.50	83	3.25	N/A	N/A	121	4.75	95	3.75	32	70
25	1	254	10	102	4	102	4	121	4.75	99	3.88	34	75
40	1 1/2	330	13	127	5	89	3.50	203	8	178	7	52	115
50	2	368	14.50	152	6	109	4.31	211	8.30	170	6.70	72	158
80	3	470	18.50	178	7	143	5.63	241	9.50	200	7.88	166	365
100	4	546	21.50	236	9.31	181	7.13	314	12.38	238	9.38	293	645
150	6	705	27.75	292	11.50	254	10	495	19.50	375	14.75	635	1400
200	8	832	32.75	375	14.75	318	12.50	508	20	419	16.50	1043	2300
250	10	991	39	429	16.88	394	15.50	610	24	533	21	1724	3800
300	12	1130	44.50	629	24.75	362	14.25	660	26	559	22	2041	4500

C-Series Engineering Data

2500# Full Opening RTJ Flanged Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	229	9	114	4.50	76	3	121	4.75	95	3.75	29	65
20	3/4	229	9	114	4.50	76	3	121	4.75	95	3.75	34	75
25	1	254	10	127	5	76	3	121	4.75	95	3.75	42	92
40	1 1/2	305	12	152	6	114	4.50	203	8	152	6	65	143
50	2	454	17.87	188	7.41	158	6.13	230	9.05	189	7.45	104	230
80	3	584	23	283	11.13	213	8.37	294	11.59	245	9.63	204	450
100	4	683	26.88	273	10.75	200	7.88	334	13.13	257	10.13	397	875
150	6	927	38.5	372	14.63	279	11	391	15.38	314	12.38	953	2100
200	8	1038	40.87	416	16.38	337	13.25	719	28.30	643	25.30	1588	3500
250	10	1292	50.88	518	20.38	337	13.25	716	28.19	614	24.19	2132	4700
300	12	1444	56.88	578	22.75	470	18.50	716	28.19	614	24.19	2359	5200

4500# Grayloc Ends													
Nominal Valve Size		End to End Dimensions A		Centerline to End B		Centerline to Bottom C		Centerline to Top D		Centerline to Top E		Approx. Weight	
DN	NPS	mm	In.	mm	In.	mm	In.	mm	In.	mm	In.	kg	lb.
15	1/2	264	10.38	132	5.19	76	3	121	4.75	95	3.75	36	80
20	3/4	273	10.75	137	5.38	76	3	121	4.75	95	3.75	45	100
25	1	254	10	127	5	76	3	210	8.25	184	7.25	68	150
40	1 1/2	305	12	152	6	114	4.50	216	8.50	191	7.50	113	250
50	2	451	17.75	226	8.88	143	5.63	216	8.50	165	6.50	168	370
80	3	584	23	241	9.50	238	9.38	394	15.50	289	11.38	202	445
100	4	673	26.50	337	13.25	292	11.50	546	21.50	470	18.50	544	1200
150	6	914	36	457	18	330	13	643	25.31	567	22.31	1270	2800
200	8	1022	40.25	511	20.13	337	13.25	716	28.19	640	25.19	1905	4200
250	10	1143	45	552	21.75	337	13.25	716	28.19	614	24.19	N/A	N/A
300	12	1257	49.50	524	20.63	470	18.50	716	28.19	614	24.19	N/A	N/A

C-Series Engineering Data

Cv Information

Cv information is approximate. Please contact MOGAS or your local representative for additional valve sizes.

Full Bore C _v Information							
Valve Size	150#	300#	600#	900#	1500#	2500#	4500#
1/2	26	26	26	26	26	20	6
3/4	62	62	62	52	52	33	19
1	114	114	114	85	85	62	38
1 1/2	271	271	271	223	223	145	140
2	498	498	498	432	432	271	271
2 1/2	799	799	799	640	640	432	385
3	1176	1176	1176	1071	978	640	670
4	2159	2159	2159	2014	1749	1071	1305
6	5076	5076	5076	4641	4019	2603	3309
8	9300	9300	8985	8120	7023	4641	6634
10	14866	14866	14096	12966	11289	7561	10565
12	21800	21800	20857	18579	16045	10881	15262

* The CV information for the 4500# ASME class is based upon the inside diameter of the pipe schedule, while the remaining values are based upon ASME 16.34.

Reduced Bore C _v Information							
Valve Size	150#	300#	600#	900#	1500#	2500#	4500#
1 X 3/4	31	31	31	41	41	29	40
1 1/2 X 1	48	48	48	54	54	81	81
3 X 2	195	195	195	206	218	333	312
4 X 3	519	519	519	549	632	1071	968
6 X 3	353	353	353	361	377	457	406
6 X 4	788	788	788	830	917	1516	1095
8 X 6	2101	2101	2162	2376	7815	4641	3053
10 X 8	4250	4250	4502	4992	6247	7561	7018
12 X 8	3177	3177	3258	3511	3948	6623	4138
12 X 10	7349	7349	7778	9269	12411	10881	13955
14 X 10	5947	5947	6278	6983	8592	13347	9071
14 X 12	13794	13794	15502	19582	19466	13347	18818
16 X 12	9301	9301	10013	11487	14864	-	-
16 X 14	19917	19917	23041	30124	25787	-	-
18 X 12	7571	7725	8074	8735	10228	-	-
18 X 14	13591	14080	15242	17642	24039	-	-
20 X 14	11010	11242	12068	13151	15594	-	-
20 X 16	18879	19553	22079	25726	35175	-	-
24 X 20	32666	33793	39620	48754	70991	-	-

MOGAS doesn't just manufacture ball valves, MOGAS provides solutions to problems.

MOGAS Provides Solutions to Problems that Plague the Process Industry:



MOGAS valves

1. Perform under extreme conditions with no internal or external leakage
2. Operate safely and efficiently
3. Are easily automated
4. Reduce unexpected downtime and maintenance costs
5. All available for a standard 10-12 week delivery with an expedited delivery available upon request and some models are stocked for immediate delivery
6. Our C-Series valves can be quoted to DIN or International Flange Specifications
7. MOGAS will quote EU countries for PED/CE compliance

1. MOGAS valves perform under extreme

conditions with no internal or external leakage.

- Precision machined external stem bearings eliminate radial movement which causes packing wear
- Extensive packing box with dual anti-extrusion rings keeps packing in place and eliminates leak paths
- Quarter turn non-rising stem does not deteriorate packing
- The ball and seats are mate-lapped for 100% sealing area contact which ensure absolute shutoff
- Sharp leading edges of the seat wipe the ball clean each time the valve is operated
- The ball protects the seats from flow when the valve is open or closed which reduces wear on sealing surfaces
- The seat spring combined with line pressure provides a constant mechanical force while allowing for thermal expansion

2. MOGAS valves operate safely and efficiently.

- Strict quality control procedures ensure that each valve exceeds all engineering specifications
- All pressure containing components meet or exceed the ASME B16.34 and ASME Section VIII standards
- Fire safe to API 607, API 6FA, BS 6755
- Valves can be supplied to be NACE MRO175 compliant
- Tested to MSS-SP-61, API 598 (upon request) or Class V & VI shutoff
- CE Stamp
- Each valve is individually tested prior to leaving the factory

3. MOGAS valves are easily automated.

- Mounting flange and flange bushing allow for easy change from manual to automated operation and eliminate side thrusts of stem
- Precision machined "rigid" mounting bracket designed to support actuator in any position
- Oversized stem, sized to provide maximum torque, prevents misalignment between ball and actuator and retains 90% of strength at high temperatures

4. MOGAS valves reduce unexpected

downtime and maintenance costs.

- By eliminating the common leakage problems associated with other valves, MOGAS C-Series Valves provide DEPENDABLE ISOLATION and a LONG SERVICE LIFE

MOGAS valves are available for a standard 10-12 week delivery with an expedited delivery available upon request.

**Many valves are IN STOCK
Available for IMMEDIATE DELIVERY**

A partial list of satisfied MOGAS customers include:

• **Chemical/Petrochemical**

Air Products
Dow Chemical
E.I. Dupont
Eastman Chemical
GB Biosciences
Hanwha Chemical

• **Refining**

AGIP
BP/Amoco
Chevron
Exxon/Mobil
KNPC
Motiva

Nerefco
Pemex
PKN Orlean
Shell
Syncrude
Total / Fina

MOGAS engineers and manufactures severe service metal seated ball valves for a wide range of specific industries and applications including:

• **Power**

Boiler Drain Isolation
Control Valve Isolation
Feedwater Heater Isolation
Main Steam Isolation
Overpressure Relief of Boiler /
Superheater Header
Steam Drum Vent Isolation

• **Mining**

Autoclave Vent Isolation and Shutdown
Autoclave Discharge Isolation
Slurry Transport

• **Specialty Applications:**

MOGAS has extensive experience in serving the needs of miscellaneous specialty applications. If your application is severe, temperatures up to 1652°F (907°C), pressures up to 30,000 psig and has erosive/corrosive media, MOGAS can engineer a valve that will perform under harsh conditions with zero leakage.

- Hot Gases
- Supercritical CO2 Extraction
- Food Processing
- Coal Liquification/Gasification
- DRI
- Iron Carbide
- Pulp and Paper

The MOGAS definition of SEVERE SERVICE:

- High temperature—up to 907°C / 1,652°F
- High pressure—up to 2068 bar(g) / 30,000 psig
- Entrained or abrasive particulates
- Corrosive media
- Catalyst service
- Acidic media
- Lethal services
- Viscous sludge
- Heavy solids build-up

Sales and Service Centers

Europe

Marek Dobiesz, Sales and Service Manager
09-410 Plock 12, P.O. Box 100, Poland
Phone: +48.24.3666.998 • Mobile: +48.604.945124
Fax: +48.24.3666.998 • Email: mdobiesz@mogas.com

China

Unit A1, 4/F, Yidian Plaza, No. 746, Zhaojiabang Road
Xuhui District, Shanghai, 200030, China
Phone: +86.21.67642083 • Fax: +86.21.67642083
E-mail: mogas@mogas.com

MOGAS Industries, Inc. Headquarters

14330 East Hardy Street, Houston, TX, USA 77039-1405
Phone: +1.281.449.0291 • Fax: +1.281.590.3412 • E-mail: mogas@mogas.com • www.mogas.com