













Industry Leading Innovation

# 4000 SERIES

*vs. Gate, Plug, and Butterfly Valves*



## ADVANTAGES

### ADVANTAGES OF 4000 SERIES VS. GATE VALVES

- ▼ Quarter turn provides instant shutoff.
- ▼ Full unobstructed opening provides superior flow rate.
- ▼ Easy to open and close, no cheater bar required.
- ▼ Positive shutoff- Exceeds Class VI.
- ▼ No bronze seat rings, bronze disc rings or bronze stems to wear out.
- ▼ Lighter than gate valves, making installation and handling easier.
- ▼ Handle shows whether open or closed.
- ▼ Ball wipes clean during opening and closing.
- ▼ No bronze parts enables use in all-iron gate valve applications.
- ▼ Compact design fits into areas of limited space.
- ▼ Throttling is permitted. Open and shut are not the only working positions
- ▼ Low profile design enables easier storage and shipping.
- ▼ Can be locked in either open or closed position.
- ▼ Teflon® fused ball resists FRUURVLRQ,QD wider range of applications
- ▼ Zero wear rate in the open position.
- ▼ Unique packaging prevents damage during shipping and facilities storage.
- ▼ Easy and inexpensive to rebuild/repair

### ADVANTAGES OF 4000 SERIES VS. BUTTERFLY VALVES

- ▲ No disc in waterway to create turbulence.
- ▲ Same ANSI flanged dimensions as gate valves for easier retrofit.
- ▲ Teflon® seats, not Buna N or EPDM.
- ▲ More suitable for steam, petroleum, and corrosive applications.
- ▲ Main seating surface does not face upstream pressure in open position.
- ▲ Full opening provides superior flow characteristics.
- ▲ Teflon® packing instead of O-ring stem seals.
- ▲ Positive shutoff- exceeds Class VI.
- ▲ Blow out proof stainless steel stem.

### ADVANTAGES OF 4000 SERIES VS. PLUG VALVES

- ▲ Full unobstructed flow.
- ▲ No exposed internal components to catch and retain debris.
- ▲ No lubrication required to ensure smooth operation and maintain seals.
- ▲ Lower torque for more efficient and cost effective automation.
- ▲ Positive shutoff- exceeds Class VI.

# MORE THAN JUST A VALVE



**American Valve** offers a complete package of pneumatic, hydraulic and electric actuators, gear operators and operating nuts for the 4000 series. Our unique Teflon® fused ball and lower operating torques make the 4000 series an effective alternative to cast iron gates, carbon steel ball valves, carbon steel gate valves, and plug valves. Our in-house automation program provides a fast, cost-effective, and turn-key solution for your automation needs.

Pneumatic, hydraulic and electric actuators made for the 4000 series have an unmatched cycle life and are the industry-wide preference for even the most severe applications. These actuators offer adaptability to a variety of process conditions to accommodate your application.

The flexible, modular design of the patented 4000 series can be used to combine actuators, solenoid valves, limit switches and other accessories in a variety of applications. American Valve delivers the 4000 series fully automated and factory tested under a single manufacturer's warranty.

Standard 2" square operating nuts are available to effectively satisfy underground requirements.

## A SPECIAL PACKAGE FOR WHOLESALE

American Valve has also created unique, sturdy boxes for the patented family of 4000 ball valves. This exclusive packaging eliminates potential shipping damage and offers unparalleled storage capabilities to wholesalers.





AMERICAN VALVE

®

Industry Leading Innovation



## Patented Teflon® Fused Ball



Our patented Teflon® fused ball is more corrosion-resistant than balls made with unprotected metal surfaces. Refer to any manufacturer's chemical resistance guide for further information.

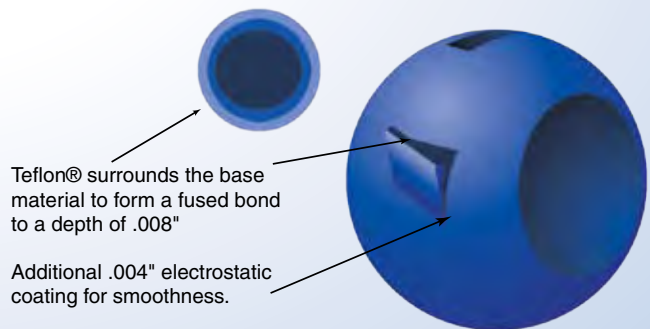
Our patented Teflon® fused ball inhibits the buildup of lime, calcium, sludge, etc. that accumulates on ball surfaces and thus prevents premature failure of the valve seats. Series 4000 valves with Teflon® fused balls can last up to ten times longer than valves made with unprotected ball surfaces.

The lubricity of our patented Teflon® fused ball allows for lower torque ratings in any application.

This feature eliminates ball pitting, prevents build-up, lowers torque, and stops premature valve failure.

Since the Teflon® is actually impregnated .008" into the solid metal, it can't wear, chip, or flake off.

## A Look Inside Our Ball...



Teflon® surrounds the base material to form a fused bond to a depth of .008"

Additional .004" electrostatic coating for smoothness.

Together they produce the strength of steel with the corrosion resistance of Teflon®. Our patented process has gained the best of both worlds...Strength, Lubricity, and Bonding.



	Minimum Tensile Strength	Minimum Yield Point	Minimum Elongation
Grey Iron A126 Class B	31,000 psi	---	0.1%
Ductile Iron A536 Grade 65-45-12	65,000 psi	45,000 psi	12%
Carbon Steel A216 WCB	70,000 psi	30,000 psi	22%
304 Stainless Steel A-351 CF8	70,000 psi	28,000 psi	35%
316 Stainless Steel A-351 CF8M	70,000 psi	30,000 psi	30%

## METALLURGY and Technical Info for 4000 Series

Model 4000 is made of cast iron (ASTM A126 Class B, standard grey iron). Model 4000D is made of ductile iron (ASTM 536, grade 65-45-12). Model 4001 is made of stainless steel (ASTM A351 CF8M).

It is useful to understand basic information about ferrous metals (cast irons, steels) and their relationships.

100% pure iron is never used as a cast metal because it is too soft and weak. When carbon is added, hardness and strength appear. When approximately 0.3% carbon is added, the resulting alloy is steel. Steel is a strong but difficult ferrous metal to manufacture from a production standpoint. Adding more carbon (up to about 2%) creates even more production problems. These "semi-steels" are seldom used.

When more carbon is added (between 2% and 3%), white iron is formed. White iron is true cast iron and is easy to produce. The problem with white iron is that it is very brittle because the carbon exists as iron carbide instead of pure carbon. Iron carbide (Fe<sub>3</sub>C) is a hard and brittle compound sometimes referred to as cementite. If white iron is subjected to a lengthy heat treatment, the Fe<sub>3</sub>C decomposes into iron and nodules of graphite. The end product is malleable iron.

When approximately 3.5% carbon is added, Fe<sub>3</sub>C exceeds its solubility in solid iron (the Fe<sub>3</sub>C is fully absorbed in the iron until there is no room left. The excess Fe<sub>3</sub>C is dispersed as graphite flakes). The result is grey iron. Grey iron (standard cast iron) delivers only moderate strength with almost no elongation because the excess Fe<sub>3</sub>C flakes act as stress raisers (they make cast iron easy to crack). Since grey iron is so economical to produce, its use has been widespread for centuries.

Cast Iron with spheroidal graphite (ductile iron) was first produced in 1948. Its chemical composition and percent of carbon is about the same as grey iron. The transformation to ductile iron occurs when molten grey iron is treated with magnesium. The insertion of magnesium into the pouring ladle (the process is called inoculation) transforms the Fe<sub>3</sub>C flakes into spheroids. These spheroids strengthen the metal by acting as crack arresters instead of crack facilitators. Ductile iron is sometimes referred to as spheroidal or nodular iron.

65-45-12 ductile iron is named for its physical properties (65,000 psi tensile strength, 45,000 psi yield, 12% elongation). Ductile iron chemically can be manufactured as Ferritic or Pearlitic. In Ferritic mixes, the graphite spheroids are in a matrix of pure iron. In Pearlitic mixes, the graphite spheroids are in a matrix of pure iron and cementite (Fe<sub>3</sub>C). The most common grade of ductile is Pearlitic-Ferritic, a combination of the two. American Valve's 4000D uses a predominately Ferritic mix (9:1) to take advantage of its high impact resistance and added tensile strength (80,000 psi).

Except where API 800° F fire safe standards are required for petrochemical refineries, **ductile iron is generally preferable to a carbon steel** because WCB has a tendency to flake, whereas ductile iron powders when subjected to liquid erosion. Ductile iron also possesses 50% higher yield strength properties and is more cost effective. Ductile iron castings have a maximum temperature rating of 650 degrees F. Traditional glass reinforced PTFE seats begin to deform at 360 degrees F.

ASTM A536-70 (MIL SPEC D-4512) requires each casting to be marked by its foundry heat number. Each heat is chemically tested prior to magnesium inoculation and also afterwards. Chemical certification by heat number is available upon request.

	GREY IRON	65-45-12 DUCTILE IRON	WCB	CF8	CF8M
Carbon % (max)	3.5	3.5	0.3	0.08	0.08
Manganese %	0.5	0.1	1.0	1.5	1.5
Phosphorous %	0.1	0.03	0.04	0.04	0.04
Sulfur %	0.1	0.005	0.05	0.04	0.04
Nickel %	0.02	0	0.5	8.0	9.0
Chromium %	0.05	0.025	0.04	18-21	18-21
Molybdenum %	0.05	0.002	0.25	-	2-3
Silicon %	2.1	3.2	0.3	2	2
Magnesium %	0.005	0.025	-	-	-

Standard cast steel (carbon steel) uses the symbol WCB and is defined under ASTM A-216. It contains a maximum of 0.3% carbon.

Stainless steel (ASTM A-351) has carbon levels even lower than WCB (0.08% maximum) making its production more costly. 304 Stainless Steel (CF8) adds 8% nickel, about 20% chromium, and a little more silicon. 316 stainless steel (CF8M) adds 2-3% molybdenum to the above. The addition of chromium, nickel and molybdenum enhances corrosion resistance, allowing CF8M to be utilized in a wide variety of chemical, petrochemical, and corrosive environments.

Size	Torque (ft. lbs)
½"	10
¾"	10
1"	10
1 ½"	20
2"	35
2 ½"	48
3"	62
4"	130
6"	260
8"	360
10"	535

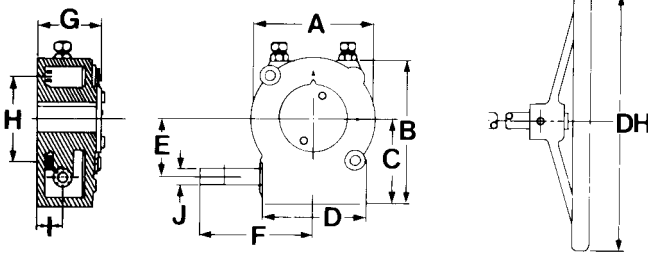
The actual amount of torque required to operate a valve is dependent upon many variables, such as line pressure, temperature, type of fluid, and frequency of operation. This table is based on average breakaway torque requirements for a valve handling a clean, particle-free liquid such as water. The following chart includes a safety allowance for service conditions. The torque figures listed should be further adjusted for dry or special service conditions. For fluids with high solids or abrasive content, consult factory for recommendations.

## OPERATING TORQUES for 4000 Series Ball Valves

### GEAR OPERATOR DIMENSIONS:

Size	A	B	C	D	E	F	G	H	I	J	DH	Ratio	TOFP*	WT
1 ½"- 2"	3 5/8	4 3/16	2 13/16	3	1 11/16	4 ½	1 ½	1 17/16	.67	.47	5	40:1	92	2
2 ½"- 4"	5 5/16	6 5/8	3 ¾	5 ¼	2 3/8	7 1/16	3	2 ¾	1.44	.59	7 ¾	45:1	367	6
6"-8"	7 3/8	8 ½	5 ¼	6 3/8	3 1/8	6 9/16	3 3/8	3 ½	1.57	.79	12 ¼	40:1	733	15
10"	7 3/8	8 ½	5 ¼	6 3/8	3 1/8	6 9/16	3 3/8	3 ½	1.57	.79	15 ½	40:1	733	15

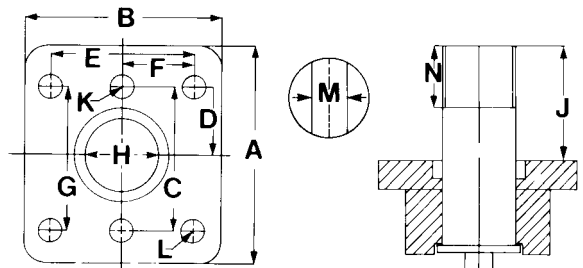
\* Torque Output Foot-Pounds



### MOUNTING PAD DIMENSIONS:

Size	A	B	C	D	E	F	G	H	J	K	L	M	N
½	2.370	1.750	1.565	.570	1.140	.570	1.140	.500	1.500	2pl M8	4pl 1/4unc	.310	1.100
¾	2.370	1.750	1.565	.570	1.140	.570	1.140	.500	1.500	2pl M8	4pl 1/4unc	.310	1.100
1	2.370	1.750	1.565	.570	1.140	.570	1.140	.500	1.500	2pl M8	4pl 1/4unc	.310	1.100
1 ½	3.620	2.745	2.310	.985	1.970	.985	1.970	.825	2.100	2pl M12	4pl M8	.470	1.495
2	3.620	2.745	2.310	.985	1.970	.985	1.970	.825	2.100	2pl M12	4pl M8	.470	1.495
2 ½	4.725	3.740	2.935	1.415	2.835	1.40	2.835	1.100	2.400	2pl 1/2unc	4pl 7/16unc	.665	1.810
3	4.725	3.740	2.935	1.415	2.835	1.40	2.835	1.100	2.400	2pl 1/2unc	4pl 7/16unc	.665	1.810
4	4.725	3.740	2.935	1.415	2.835	1.40	2.835	1.100	2.400	2pl 1/2unc	4pl 7/16unc	.665	1.810
6	5.160	4.725	3.465	1.730	3.465	1.730	3.465	1.775	2.750	6pl 1/2unc	6pl 1/2unc	1.060	2.205
8	5.160	4.725	3.465	1.730	3.465	1.730	3.465	1.775	2.700	6pl 1/2unc	6pl 1/2unc	1.060	2.205
10	5.160	4.725	3.465	1.730	3.465	1.730	3.465	1.775	2.650	6pl 1/2unc	6pl 1/2unc	1.060	2.205

Dimensions and weights are given as approximates; consult factory for details.





**Certificate  
of  
Registration**



by  
*Global Registrars, Inc.  
Pittsburgh, Pennsylvania*

*This is to certify that the Quality Management System utilized at:*

**American Valve, Inc.  
4321 Piedmont Parkway  
Greensboro, NC 27410**

*has been audited by qualified Global  
Registrars, Inc. Auditors and found to comply  
with the requirements of*

**ANSI/ISO/ASQ Q9001:2000  
ISO 9001:2000**

*for the*

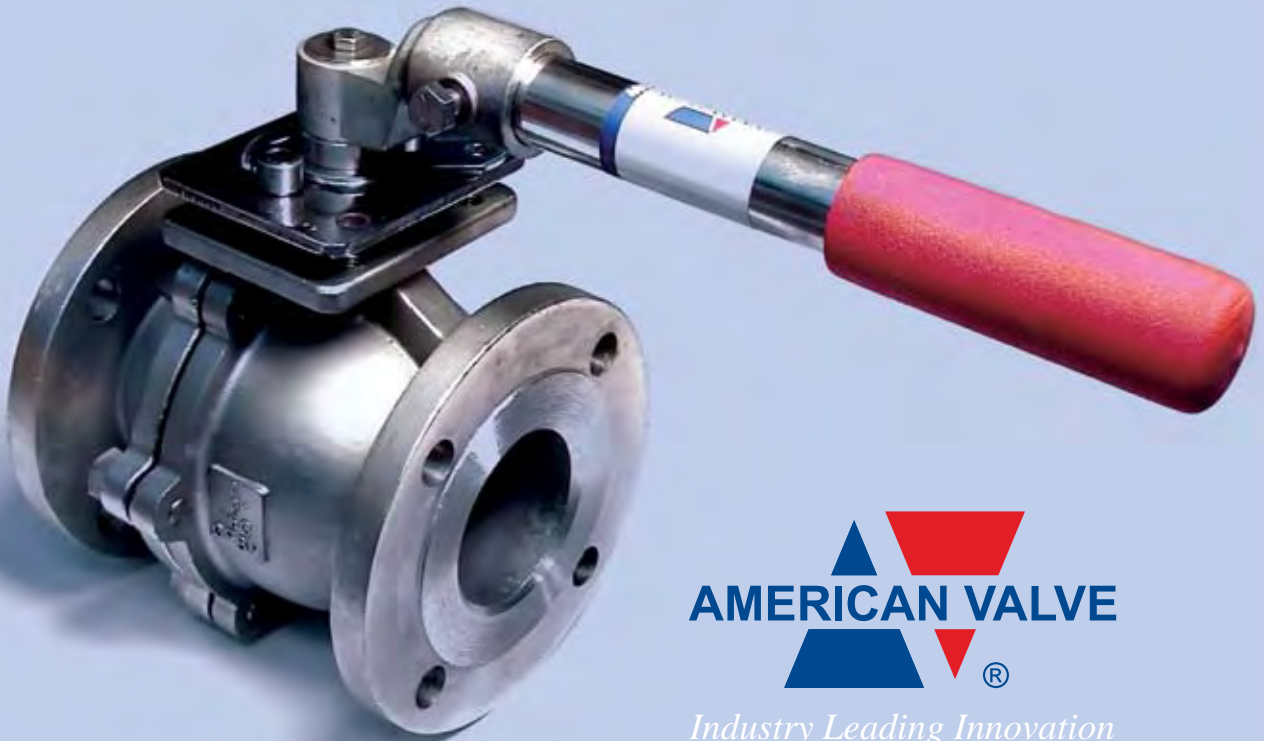
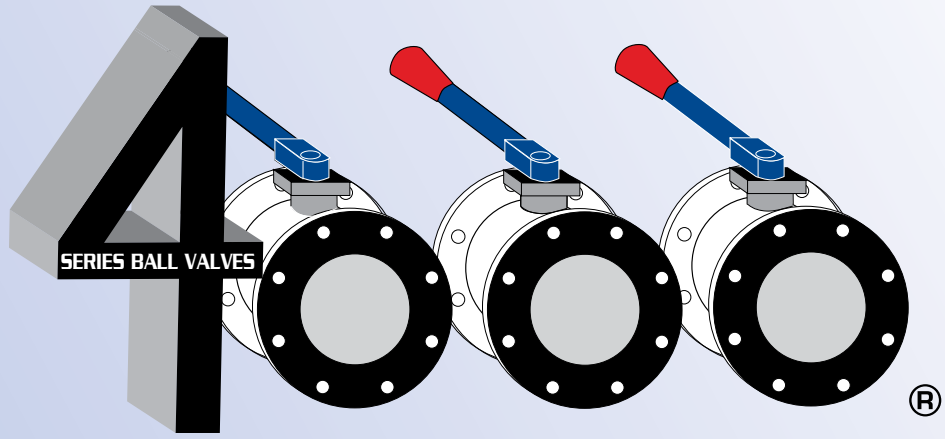
**Manufacture and Distribution of Industrial and Domestic  
Commercial Valves and Distribution of Imported Commercial  
Valves, Plumbing Fittings, and HVAC Registers and Grilles**

*This certification is granted subject to the system rules governing  
registration and the supplier hereby covenants with Global  
Registrars, Inc. duly to observe and comply with the said rules.*

*Certificate Number: 090*

*Date of Issuance: April 9, 1996*

*Joseph A. Fabian*  
on behalf of  
*Global Registrars, Inc.*



*Industry Leading Innovation*

*Member of the Valve Manufacturers Association of America*

**ISO 9001:2000 Certified**

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<http://www.americanvalve.com>