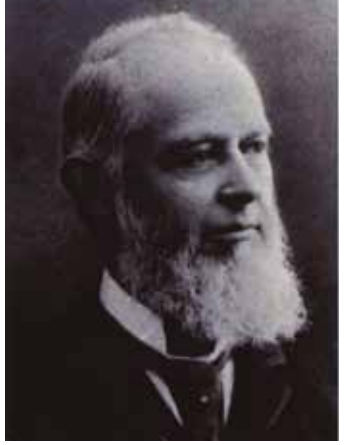
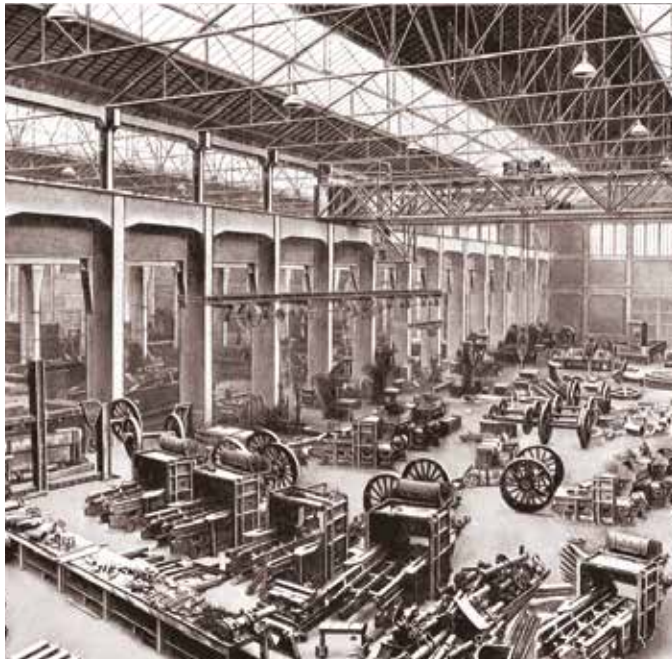
BABCOCK
VALVES

GENERALCATALOGUE

OF FORGED AND CAST VALVES


BABCOCK VALVES






SOCIEDAD ESPAÑOLA DE CONSTRUCCIONES
GALINDO
AÑO 1930
Nº 364
BILBAO
BABCOCK & WILCOX

Babcock Valves Heritage

In 1967, Babcock Wilcox Española -present in the Spanish market since 1918- implemented its diversification policy by setting up a valve manufacturing division, which soon became one of the leading players on the international market, thanks to its engineering efforts, developing new designs to improve product reliability in the power generation sector (nuclear and conventional), petrochemical industry, oil & gas sectors and water works.

Babcock Valves has the expertise, the know-how and the industrial experience of a company with almost half a century of history behind it, and a legacy of over 1.200.000 valves installed all around the world.

At Babcock Valves our commitment to our customers is underlined by a combination of tradition and continuous innovation.

Our name is recognised around the world as a benchmark for reliability and service excellence, with hundreds of customers expressing their satisfaction with our supplies, taking advantage of the right performances of our valves for years.

Know-how + Expertise = Babcock Valves

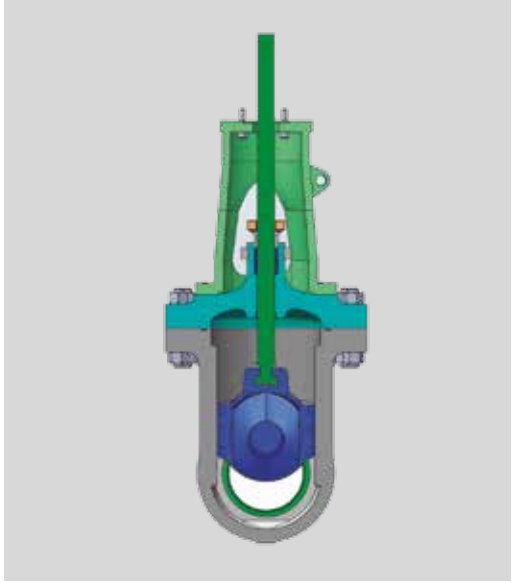
ENGINEERED TO THE LIMIT

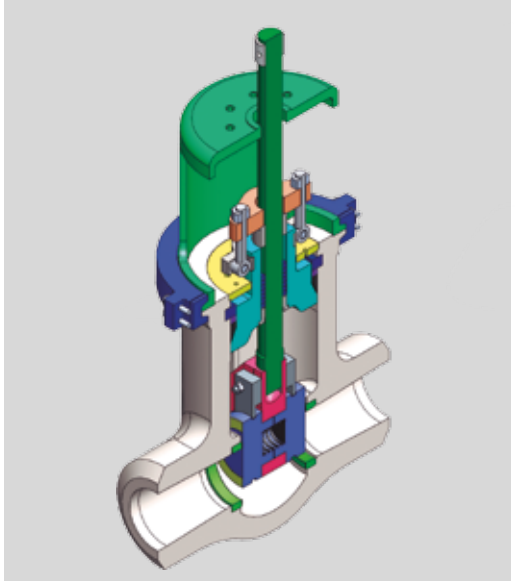
At Babcock Valves we use the latest software tools to develop and improve our own designs, to ensure the products we supply always comply and exceed the latest standards and international regulations.

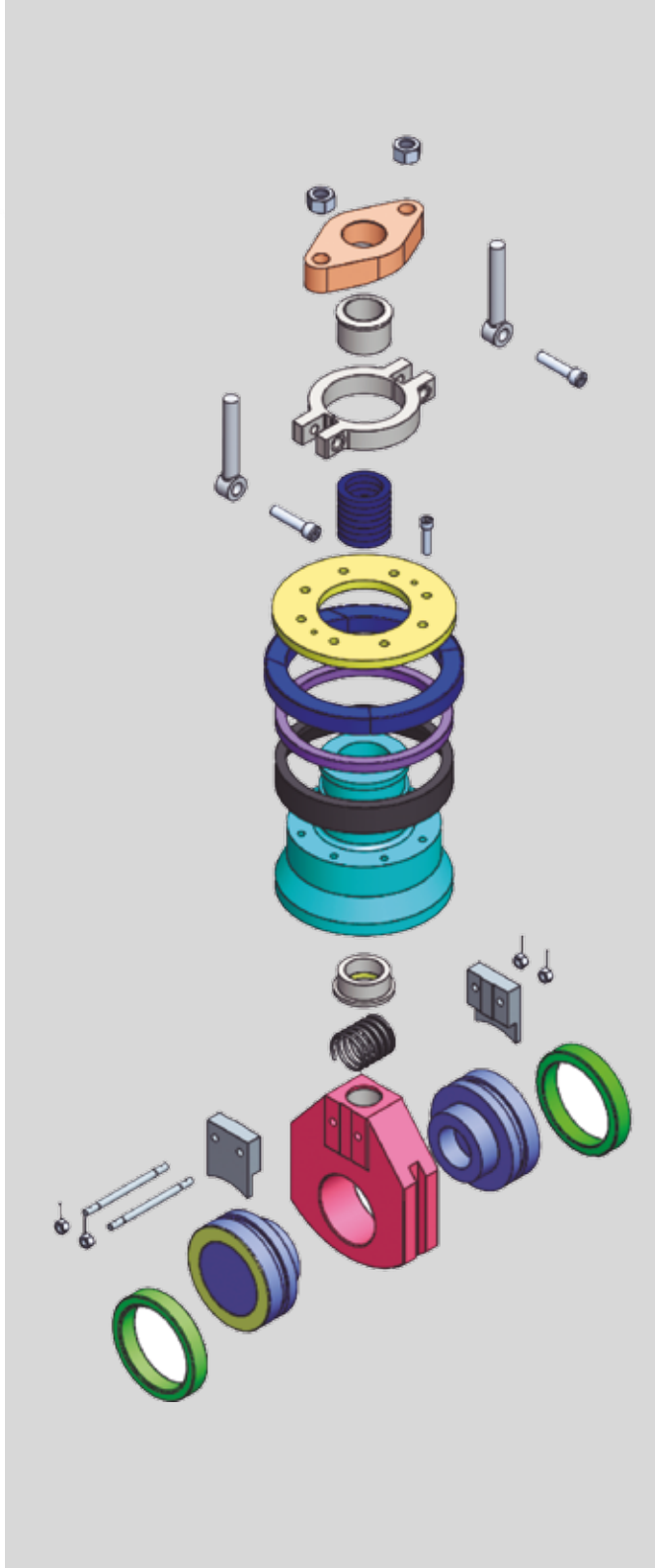
Our engineering team can guarantee the quickest possible response to meet our customers' requirements, anywhere in the world.

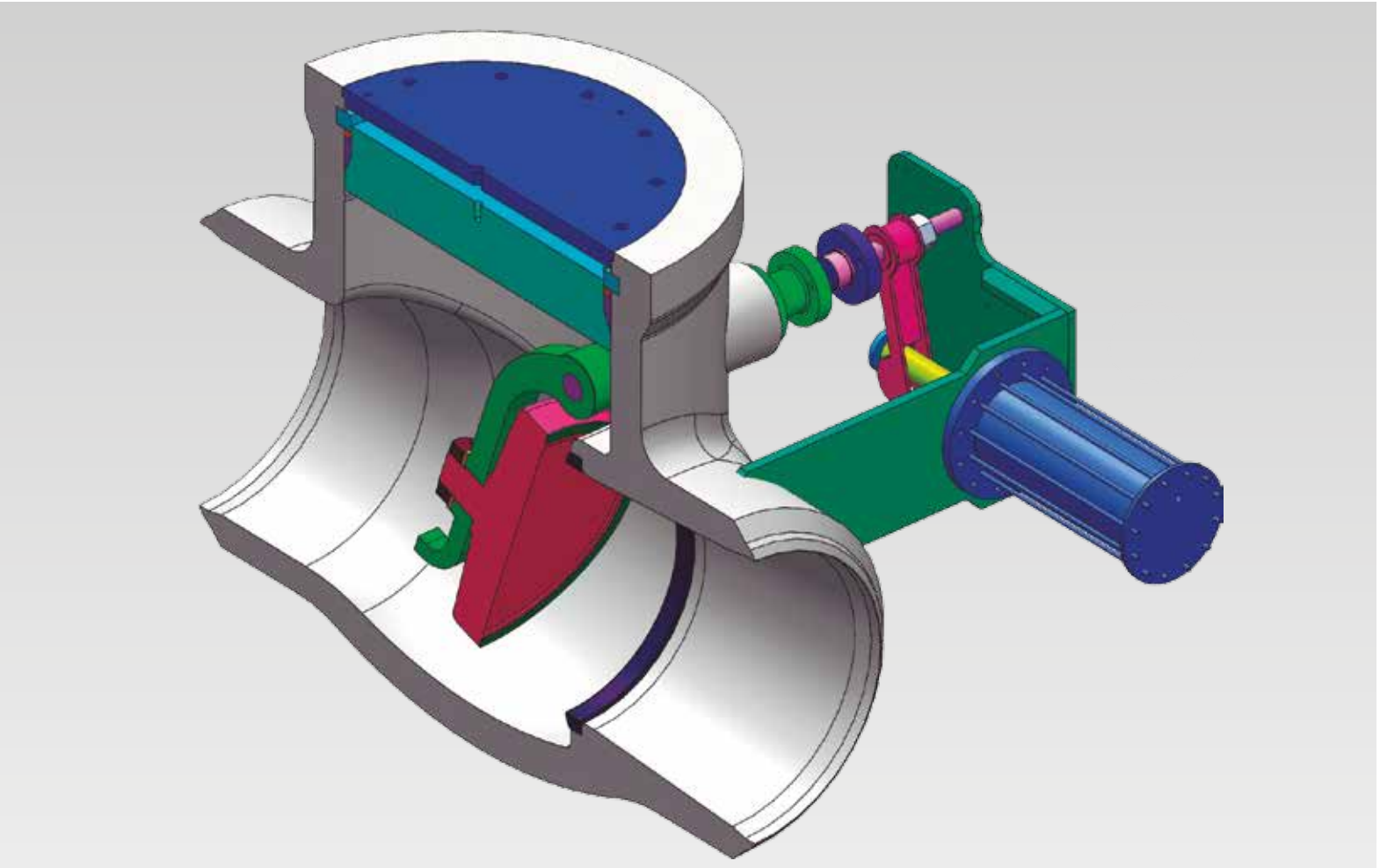
TECHNOLOGICAL BACKGROUND

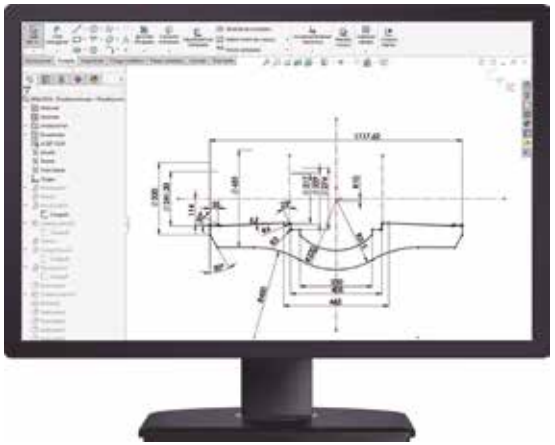
Babcock has developed its own solid, high value-added, valve-manufacturing technology over a period of 40 years. Initial agreements with technology leaders were followed by the development of our own in-house engineering facilities, in compliance with the main regulations and standards, and by studying customer specifications and applying advanced design tools.

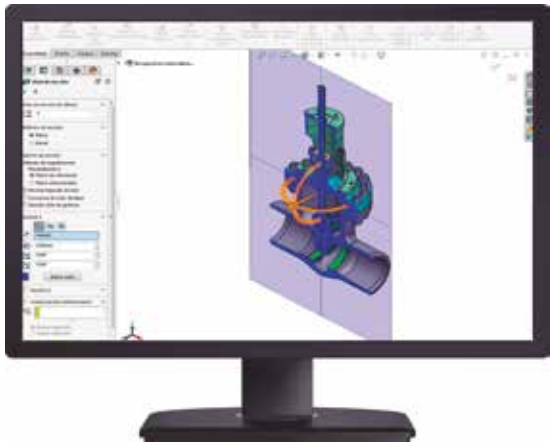


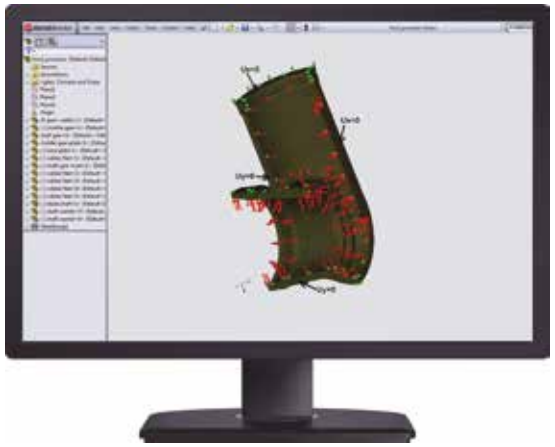












Research, Development and Innovation

R+D+I TO THE LIMIT

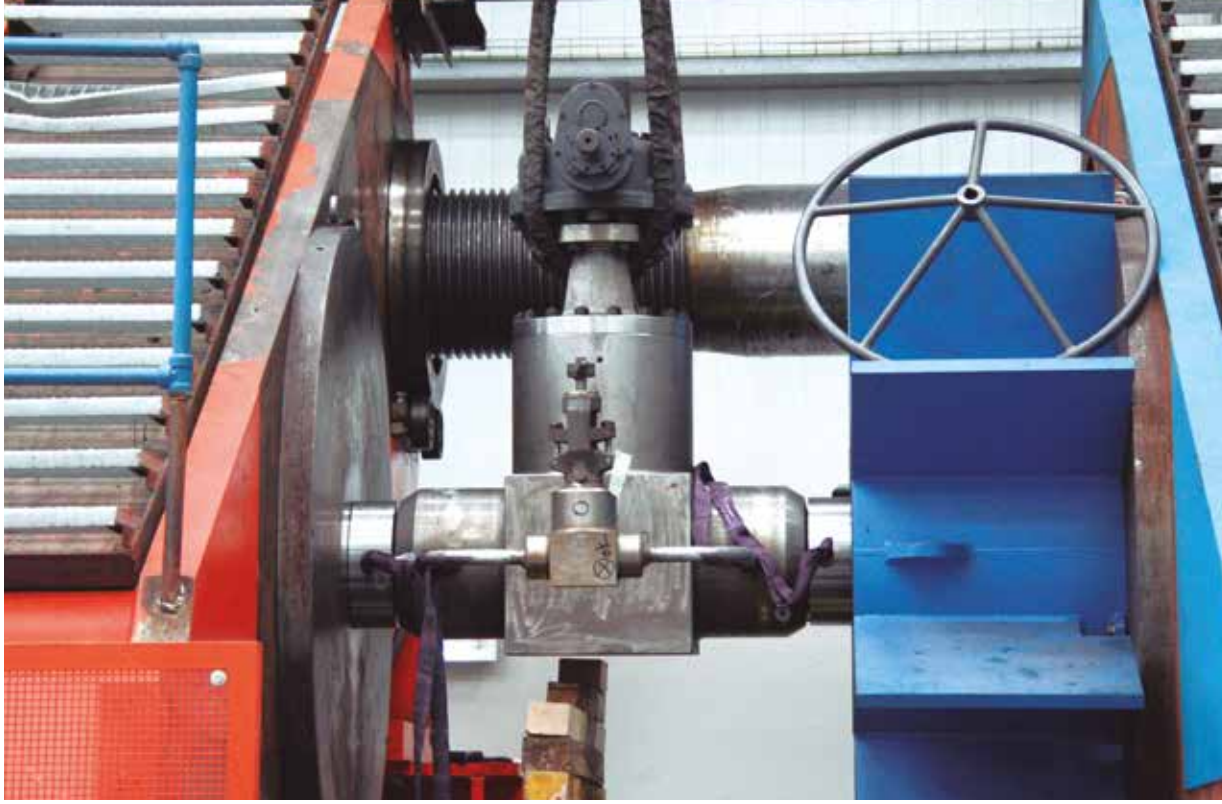
Babcock Valves has its own Research + Development + innovation Department (R+D+i) that works each and every day towards the same goal: how to improve our valves.

In doing so we use the latest software tools and technology to improve our own designs and develop new products, providing our customers with the best technical solutions and obtaining significant advantages over the competitors.

Babcock Valves' designs are based on advanced computer simulations, which minimize the possibility of design shortcomings and deficiencies affecting our valves, thereby ensuring our products always meet the latest applicable standards and customer requirements.

We design our own range of products with special emphasis on safety, low maintenance, long service life and the highest quality, optimizing the entire production process to offer competitive prices.

Our R+D+i team guarantees the quickest response to meet our customer requirements with personalized service.



Manufacturing Process Plan (MPP)

The manufacturing process at Babcock Valves is carefully controlled by our Q.A. staff, from receipt of purchase order to dispatch of the goods.

Each stage of the production process is conducted at own facilities or in cooperation with recognised and approved suppliers.

Casting quality, particularly in the case of alloys, special alloys and exotic materials, is guaranteed by working with foundries equipped with the most advanced production systems plus the Non-Destructive Tests required for each piece.

Precision machining, including processes such as valve seat and disc lapping, welding or surface hardfacing, are fully controlled by our experienced staff, ensuring that all valve components reach the assembly stage in perfect working condition.

All valves manufactured by Babcock Valves are fully tested at our wide range of testing benches.

Where required, any painting system can be applied at our facilities.

Our goal is to produce zero defects and long-life valves.

After Sales Service

With more than 1.200.000 valves installed all around the world, our commitment is to provide our customers the very best after sales service.

Therefore, we are ready at Babcock Valves to supply a full range of guaranteed spare parts for our entire product range, covering all of our products, both old and new designs.

Our specialized technical staff is available for on-site maintenance and/or technical support such us plant´s shutdown maintenance.

In addition to this, we provide analysis & trouble-shooting solutions to establish the causes of valve failures, valve accessories, related technical equipment, customized maintenance proposals, valve type selection, design alternatives advice, assessment of pipeline and fluid influence over valves and technical advice to improve valve operation.

Finally, training on Product Use & Maintenance for professionals is also into our abilities.


R5
R15
R14
R4
R5
R14

SELLO CE
PED 97/23/CE

API 6D-1464

REGISTER No.
TC No. RU-ES.AB45.B.14161

Quality & Certifications

To guarantee high levels of quality for all of our products, our Quality Assurance Department implements a rigorous control and testing system throughout the manufacturing process. Moreover, Babcock Valves keeps an operational quality control and assurance manual that enables us to maintain optimum quality levels.

All of our products are tested during the design phase and after assembly, prior to shipment. Testing includes cryogenic tests, hot cycle tests, multi-axis vibration tests, aging tests, flow and pressure tests, seismic resistance tests, valve hammer-impact tests, actuator tests and others.

Our valves are designed, manufactured and inspected, in accordance with the most relevant international standards, such as:

API	(American Petroleum Institute)
ANSI	(American National Standards Institute)
AWWA	(American Water Works Association)
DIN	(Deutsche Norm)
JIS	(Japanese Industrial Standards)
BS	(British Standards)
AFNOR	(Association Française de Normalisation)
MSS	(Manufacturers Standardization Society)
ISO	(International Standards Organization)
UNE	(Spanish Standard)
EAC	Eurasian Conformity


8"-1500

Product Range

Babcock's Valves

Gate Valves

Wedge Gate
Double Disc Gate
Parallel Slide Disc
Through-Conduit Gate

Globe Valves

Angle Globe
Y-Pattern Globe
Y-Angle Globe

Check Valves

Swing Check
Tilting Disc Check
Lift Check
Dual Plate Check

Butterfly Valves

Concentric Butterfly
Double Excentric Butterfly
Triple Excentric Butterfly

Ball Valves

Floating Ball
Trunnion-Mounted
Split Body
Fully Welded

Stop-check Valves

Globe
Angle
Y-Globe
Y-Angle

Special Valves

Hydrotest
Quick Closing Check
Double Disc Gate
Parallel Slide Gate
Bellow Sealed
Nuclear Certified
Stop-Check Globe y Pattern

Gate Valves :: Product Range

Code: **22**

Type: Wedge Gate
Bonnet: Bolted
Sizes: 1/2″ - 72″
ANSI Class: 150-2500

Code: **25**

Type: Wedge Gate
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **82**

Type: Double disc
Bonnet: Bolted
Sizes: 2″ - 72″
ANSI Class: 150-900

Code: **87**

Type: Parallel Slide
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **89**

Type: Parallel Slide
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **88**

Type: Parallel Slide with follower eye
Bonnet: Bolted
Sizes: 2″ - 60″
ANSI Class: 150-900

Code: **00**

Type: Through-conduit
Bonnet: Bolted
Sizes: 2″ - 60″
ANSI Class: 150-900

Code: **10**

Type: Through-conduit
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **84**

Type: Wedge Gate Cryogenic
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **85**

Type: Double Disc
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

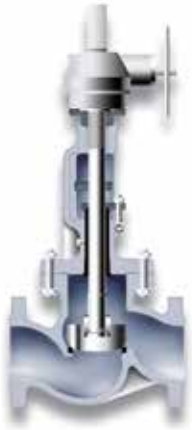
Code: **86**

Type: Parallel Slide with follower eye
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **83**

Type: Double Disc Cryogenic
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Globe Valves :: Product Range



Codes: **12 Globe**
32 Needle

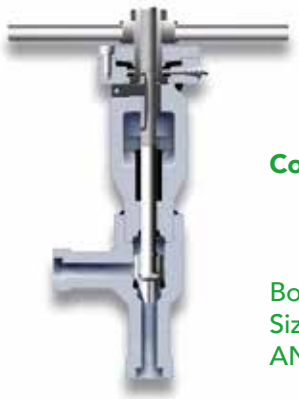
Bonnet: Bolted
Sizes: 1/2″ - 48″
ANSI Class: 150-2500

Codes: **15 Globe**
35 Needle

Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Codes: **11 Globe**
38 Needle

Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500



Codes: **91 Angle**
93 Angle Needle
Intermitent/Continuous
Blow Down Valve

Bonnet: Threaded and Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500

Code: **72 Y-Globe**

Type:
Bonnet: Bolted
Sizes: 1/2″ - 24″
ANSI Class: 150-900

Codes: **75 Y-Globe**
16 Y-Needle

Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **77 Bellows Seal Y-Globe**

Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-600

Code: **78 Belows Seal Globe**

Bonnet: Bolted Bonnet
Sizes: 1/2″ - 24″
ANSI Class: 150-600

Code: **13 Cryogenic**

Bonnet: Bolted Bonnet
Sizes: 1/2″ - 48″
ANSI Class: 150-900

Codes: **92 Angle**
98 Needle

Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Codes: **95 Angle**
96 Needle

Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Codes: **71 Y-Globe**
31 Y-Needle
34 Option Ø Lekeage

Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500

Codes: **17 Bellows Seal Globe**
37 Bellows Seal Needle

Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-600

Code: **14 Y-Angle**

Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Our Glove Valves can be supplyed mounting four different Kinds of discs, as can be seen below.

PLUG

NEEDLE

BALL

PARABOLIC

Check Valves :: Product Range

Code: **42**

Type: Swing Check
Bonnet: Bolted
Sizes: 1/2″ - 48″
ANSI Class: 150-2500

Code: **45**

Type: Swing Check
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **02**

Type: Tilting Disc
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **04**

Type: Horizontal Lift Check
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **09**

Type: Horizontal Lift Check
Bonnet: Threaded and Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500

Code: **52**

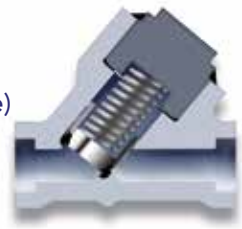
Type: Y-Lift Check
Bonnet: Bolted
Sizes: 1/2″ - 24″
ANSI Class: 150-2500

Code: **06**

Type: Angle Lift Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **54**

Type: Y-Piston Check (0 Leakage)
Bonnet: Threaded and Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500



Code: **51**

Type: Y-Piston Check
Bonnet: Threaded and Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500

Code: **05**

Type: Tilting Disc
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **07**

Type: Horizontal Lift Check
Bonnet: Bolted
Sizes: 1/2″ - 24″
ANSI Class: 150-900

Code: **55**

Type: Y-Lift Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **01**

Type: Angle Lift Check
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **44**

Type: Hydrotest Check
Bonnet: Bolted Bonnet
Handling: OS&Y
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **08**

Type: Hydrotest Check
Bonnet: Pressure Seal
Handling: OS&Y
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **43**

Type: Dual Plate Wafer Check
Sizes: 2″ - 48″
ANSI Class: 150-600

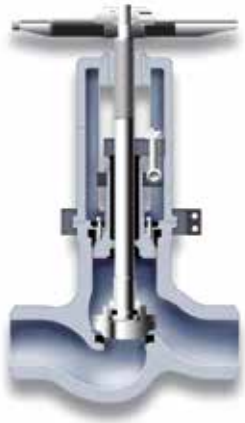
Stop-Check Valves :: Product Range

Code: **62**

Type: Globe Stop-Check
Bonnet: Bolted
Sizes: 1/2″ - 24″
ANSI Class: 150-2500

Code: **61**

Type: Globe Stop-Check
Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500



Code: **65**

Type: Globe Stop-Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **97**

Type: Angle Stop-Check
Bonnet: Bolted
Sizes: 2″ - 24″
ANSI Class: 150-900

Code: **94**

Type: Angle Stop-Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-900

Code: **73**

Type: Y-Globe Stop-Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **90**

Type: Y-Angle Stop-Check
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **76**

Type: Y-Globe Stop-Check
Bonnet: Threaded and Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-4500

Butterfly Valves :: Product Range

Code: **99**

Type: Concentric
Sizes: Up to 200"
ANSI Class: 150-600

Code: **100**

Type: Double Eccentric
Sizes: Up to 200"
ANSI Class: 150-2500

Code: **101**

Type: Triple Eccentric
Sizes: Up to 200"
ANSI Class: 150-2500

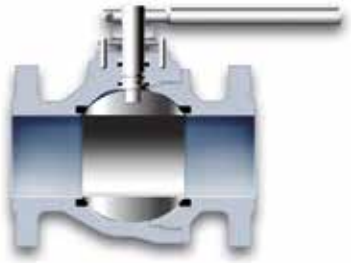
Ball Valves :: Product Range

Code: **BFI**

Type: Floating-Ball
Side Entry
One Piece Body

Sizes: 1/2″ - 3″

ANSI Class: 150-900

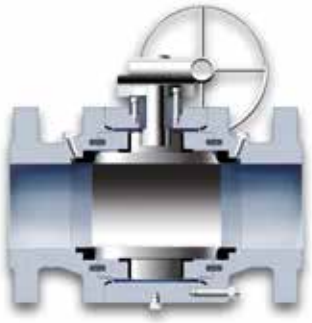


Code: **BFR**

Type: Floating Ball
Side Entry
Threaded & Sealed

Sizes: 1/2″ - 12″

ANSI Class: 150-900



Code: **BGA**

Type: Trunnion-Mounted
Side Entry
Bolted Body

Sizes: 2″ - 60″

ANSI Class: 150-1500

Code: **BGS**

Type: Trunnion-Mounted
Welded Body

Sizes: 2″ - 60″

ANSI Class: 150-900

Code: **BGT**

Type: Trunnion-Mounted
Top Entry

Sizes: 2″ - 60″

ANSI Class: 150-1500

Special Valves :: Product Range

Code: **08**

Type: Hydrotest Check
Bonnet: Pressure Seal
Sizes: 2″ - 36″
ANSI Class: 600-1500

Code: **44**

Type: Hydrotest Check
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **42**
45

Type: Steam Extraction Quick Closing No Return
Bonnet: Bolted/Pressure Seal
Sizes: Up to 64″
ANSI Class: 150-2500

Code: **89**

Type: Parallel Slide Gate
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **87**

Type: Parallel Slide Gate
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **86**

Type: Parallel Slide Gate with follower eye
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **37**

Type: Bellows Seal Needle
Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-600

Code: **95 Angle**
96 Needle

Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **98**

Type: Angle Needle
Bonnet: Bolted
Sizes: 2″ - 48″
ANSI Class: 150-900

Code: **85**

Type: Double Disc Gate
Bonnet: Pressure Seal
Sizes: 2″ - 48″
ANSI Class: 600-4500

Code: **82**

Type: Double Disc Gate
Bonnet: Bolted
Sizes: 2″ - 72″
ANSI Class: 150-900

Code: **88**

Type: Parallel Slide Gate with follower eye
Bonnet: Bolted
Sizes: 2″ - 60″
ANSI Class: 150-900

Code: **78**

Type: Bellows Seal Globe
Bonnet: Bolted Bonnet
Sizes: 2″ - 24″
ANSI Class: 150-600

Code: **77**

Type: Bellows Seal Y-Globe
Bonnet: Threaded & Welded
Sizes: 1/2″ - 3″
ANSI Class: 150-600

Code: **93 IBD/CBD**

Type: Angle Needle
Bonnet: Threaded and Welded
Sizes: 1/2″ - 12″
ANSI Class: 150-4500

Code: **14**

Type: Y-Angle Globe/Stop-Check
Bonnet: Pressure Seal
Sizes: 2″ - 24″
ANSI Class: 600-4500

Code: **101**

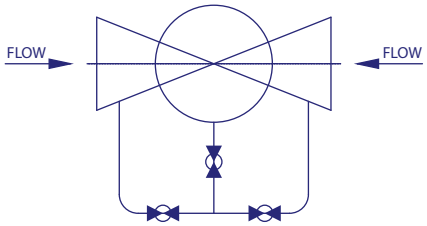
Type: Triple Eccentric High Performance Butterfly
Sizes: Up to 200″
ANSI Class: 150-2500

Accesories and Special Equipment

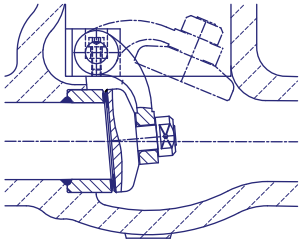
Babcock Valves can supply its products with any kind of actuator system:

- Impactor
- Pneumatic
- Gas over-oil
- Others
- Electric
- Hydraulic
- Manual with bevel or spur gear

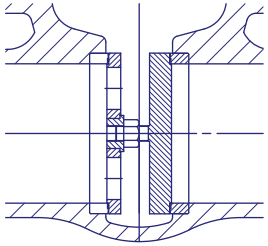
In addition to our own or third party products and technologies adapted to our own designs.
Moreover, we are also able to supply any type of accessory, from stem extensions and chain wheels to position indicators with dashpot and counterweight in check valves.
For further information contact our sales team at info@babcockvalves.com



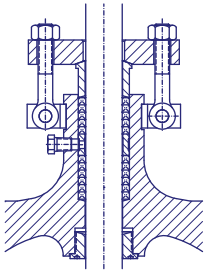
Bypass



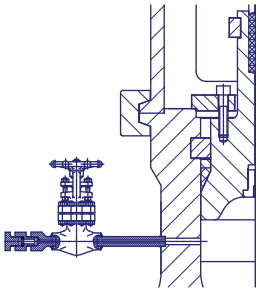
Internal shaft



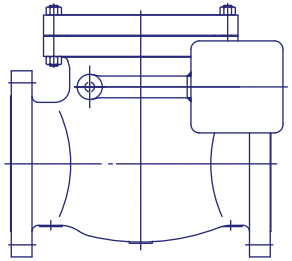
Blowing device



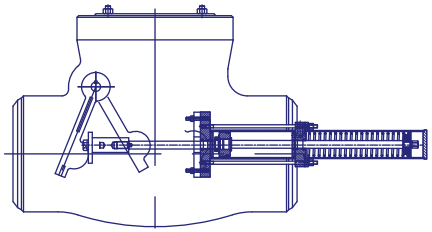
Lantern ring



Overpressure protection device

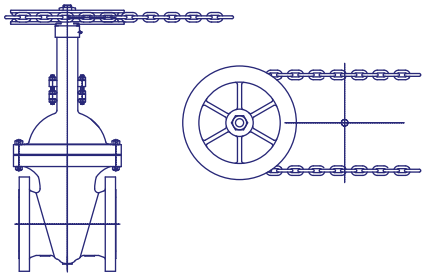


Check valve with external lever and counterweight

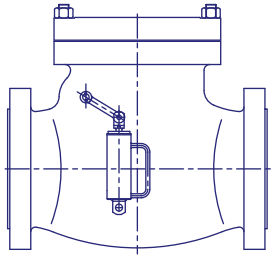


Quick closing non return valve

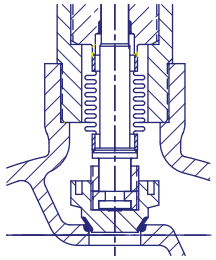
Stem extension with floor stand and universal joint



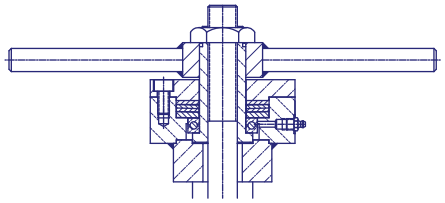
Handwheel with chain



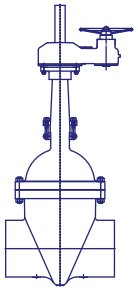
Dashpot



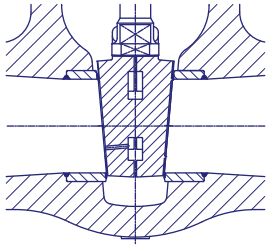
Belows seal



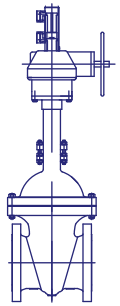
Dillatation compensating device



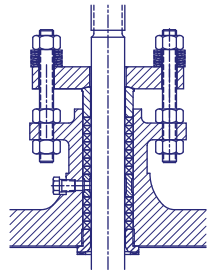
Horizontal spur gearing



Balance hole



Limit micro switches



Live loading packing

Materials

MATERIAL GROUP	COMMON NAME	MATERIAL TYPE	CASTING SPEC. EQUIVALENT	FORGING SPEC.	APPLICATION
Carbon Steel	CS	C-Mn-Fe	A 216-WCB / WCC	A105N	General non-corrosive service from -20°F (-29°C) to 800°F (427°C)
Low Temperature Carbon Steel	LTCS	C-Mn-Fe	A352-LC1 A352-LCB A352-LCC	A 350-LF2	General non-corrosive service from -50°F (-46°C) to 650°F (340°C), LF2 to 800°F (427°F)
Low Temperature Alloy Steel	Nickel Steel	3.1/2Ni	A352-LC3	A 350-LF3	-150°F (-101°C) to 650°F (340°C)
Alloy Steel	Moly Steel	C-1/2Mo	A217-WC1	A182-F1	Up to 875°F (468°C)
	Alloy Steel Chrome Moly	1.1/4Cr-1/2Mo	A217-WC6	A182-F11 cl2	Up to 1100°F (593°C)
		2.1/4Cr-1Mo	A217-WC9	A182-F22 cl3	Up to 1100°F (593°C), HP steam
		5Cr-1/2Mo	A217-C5	A182-F5a	High temp, refinery service
		9Cr-1Mo	A217-C12	A182-F9	High temp, erosive refinery service
		9Cr-1Mo-V	A217-C12A	A182-F91	High pressure steam
		9Cr-2w-V		A182-F92	High temp, erosive refinery service
Stainless Steel	Austenitic S.Steel 300 series S.Steel	304 : 18Cr-8Ni	A351-CF8	A182-F304	0.04% min. carbon for temp. >1000°F (538°C)
		304L : 18Cr-8Ni	A351-CF3	A182-F304L	Up to 800°F (427°C)
		304H :	A351-CF10	A182-F304H	
		316 : 16Cr-12Ni-2Mo	A351-CF8M	A182-F316	0.04% min. carbon for temp. >1000°F (538°C)
		316L : 16Cr-12Ni-2Mo	A351-CF3M	A182-F316L	Up to 800°F (427°C)
		316H :	A351-CF10M	A182-F316H	
		316Ti :		A182-F316 Ti	Special grade
		321 : 18Cr-10Ni-Ti		A182-F321	0.04% min. carbon (grade F321H) and heat treat at 2000°F (1100°C) for service temps. >1000°F (538°C)
		321H		A182-F321H	
		347 : 18Cr-10Ni-Cb(Nb)	A351-CF8C	A182-F347	0.04% min. carbon (grade F347H) and heat treat at 200°F (1100°C) for service temps. >1000°F (538°C)
		347H		A182-F347H	
		317L	A351-CG3M*	A182-F317L	
	Alloy 20	28Ni-19Cr-Cu-Mo	A351-CN7M	A182-F20*	Service to 600°F (316°C)*
	Duplex 2205	22Cr-5Ni-3Mo-N	A351-CD3MN (A995-4A)* J92205 (A995-4A)*	A182-F51	Service to 600°F (316°C) - The original S31803 UNS designation has been supplemented by S32205 which has higher minimum N, CR, and Mo
	Super Duplex 2507	25Cr-7Ni-4Mo-N	A351-CD4MCu* A995-5A*/CE3MN	A182-F53	Service to 600°F (316°C)*
	Super Duplex F55	25Cr-7Ni-3.5Mo-N-Cu-W	A995-CD3MWCuN (A995-6A)	A182-F55	Service to 600°F (316°C)
	Super Austenitic 6Mo	20Cr-18Ni-6Mo	A351-CK3MCuN	A182-F44	Service to 600°F (316°C)
Nickel-Iron Alloy	Incoloy 800	33Ni-42Fe-21Cr		B564-N08800	Service to 1000°F (538°C)
	Incoloy 825	42Ni-21.5Cr-3Mo-2.3Cu	A494-CU5MCuC*	B564-N08825*	Service to 600°F (316°C) for N02200, 1200°F (648°C) for N02201
Nickel	Nickel	99/95Ni	A494-CZ-100*	B160-N02200 (bar)	
Nickel-Copper	Monel 400	67Ni-30Cu	A494-M35-1	B564-N04400	
	Monel 500			B564-N05500*	
Nickel-Alloy	904L		n/a	904L*	
Nickel Superalloys	Inconel 600	72Ni-15Cr-8Fe	A494-CY40*	B564-N06600	
	Inconel 625	60Ni-22Cr-9Mo-3.5Cb	A494-CW-6MC*	B564-N06625	
	Hastelloy C-276	54Ni-15Cr-16Mo	A494-CW-2M*	B564-N10276	
Titanium	Titanium	98Ti	B367-C2*	B381-Gr2	Special grade

Nominal Seating Surface, Stem and Backseat Bushing or Weld-deposit Materials and Hardness

Trim Number	Nominal Trim	Seat Surface Hardness (HB) Mininum[a]	Seat Surface Material Type[b]	Seat Surface Typical Specifications Grade			Stem/Bushing		Stem Hardness (HB)	Backseat Bushing Hardness (HB)
				Cast	Forged	Welded[m]	Material Type[b]	Typical Specifications Type		
1	F6			TRIM NUMBER 1 IS OBSOLETE						
2	304			TRIM NUMBER 2 IS OBSOLETE						
3	F310	Note[d]	25Cr-20Ni	NA	ASTM A182 (F310)	AWS A5.9 ER310	25Cr-20Ni	ASTM A276-T310	Note[d]	Note[d]
4	Hard F6	750[e]	Hard 13Cr	NA	Note[f]	NA	13Cr	ASTM A276-T410 or T420	200 min. 275 max.	250 min.
5	Hardfaced	350[e]	Co-Cr A[g]	NA	NA	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
5A	Hardfaced	350[e]	Ni-Cr	NA	NA	Note[h]	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
6	F6 and Cu-Ni	250[i] 175[i]	13Cr Cu-Ni	ASTM A 217 (CA 15) NA	ASTM A182 (F6a) Note[k]	AWS A5.9 ER410 NA	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
7	F6 and Hard F6	250[i] 750[i]	13Cr Hard 13Cr	ASTM A 217 (CA 15) NA	ASTM A182 (F6a) Note[f]	AWS A5.9 ER410 NA	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
8	F6 and Hardfaced	250[i] 350[i]	13Cr Co-Cr A[g]	ASTM A 217 (CA 15) NA	ASTM A182 (F6a) NA	AWS A5.9 ER410 AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
8A	F6 and Hardfaced	250[i] 350[i]	13Cr Ni-Cr	ASTM A 217 (CA 15) NA	ASTM A182 (F6a) NA	AWS A5.9 ER410 Note[h]	13Cr	ASTM A276 T410 or T420	200 min. 275 max.	250 min.
9	Monel [TM *]	Note[d]	Ni-Cu Alloy	NA	MFG Standard	NA	Ni-Cu Alloy	MFG Standard	Note[d]	Note[d]
10	316	Note[d]	18Cr-8Ni	ASTM A351 (CF8M)	ASTM A182 (F316)	AWS A5.9 ER316	18Cr-8Ni-Mo	ASTM A276-T316	Note[d]	Note[d]
11	Monel [TM *] and Hardfaced	Note[d] 350[i]	Ni-Cu Alloy Trim 5 or 5A	NA NA	MFG Standard NA	NA See Trim 5 or 5A	Ni-Cu Alloy	MFG Standard	Note[d]	Note[d]
12	316 and Hardfaced	Note[d] 350[i]	18Cr-8Ni-Mo Trim 5 or 5A	ASTM A351 (CF8M) NA	ASTM A182 (F316) NA	AWS A5.9 ER316 See Trim 5 or 5A	18Cr-8Ni-Mo	ASTM A276-T316	Note[d]	Note[d]
13	Alloy 20	Note[d]	19Cr-29Ni	ASTM A351 (CN7M)	ASTM B473	AWS A5.9 ER320	19Cr-29Ni	ASTM B473	Note[d]	Note[d]
14	Alloy 20 and Hardfaced	Note[d] 350[i]	19Cr-29Ni Trim 5 or 5A	ASTM A351 (CN7M) NA	ASTM B473 NA	AWS A5.9 ER320 See Trim 5 or 5A	19Cr-29Ni	ASTM B473	Note[d]	Note[d]
15	Hardfaced	350[e]	Co-Cr A[g]	NA	NA	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	18Cr-8Ni	ASTM A276-T304	Note[d]	Note[n]
16	Hardfaced	350[e]	Co-Cr A[g]	NA	NA	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	18Cr-8Ni-Mo	ASTM A276-T316	Note[d]	Note[n]
17	Hardfaced	350[e]	Co-Cr A[g]	NA	NA	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	18Cr-10Ni-Cb	ASTM A276-T347	Note[d]	Note[n]
18	Hardfaced	350[e]	Co-Cr A[g]	NA	NA	AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A	19Cr-29Ni	ASTM B473	Note[d]	Note[n]

Nominal Seating Surface, Stem and Backseat Bushing or Weld-deposit Materials and Hardness

Trim Number	Nominal Trim	Seat Surface Hardness (HB) Mininum[a]	Seat Surface Material Type[b]	Seat Surface Typical Specifications Grade			Stem/Bushing		Stem Hardness (HB)	Backseat Bushing Hardness (HB)
				Cast	Forged	Welded[m]	Material Type[b]	Typical Specifications Type		
19	Nickel [1]	Note [d]	Ni Alloy	MFG Standard [1]	MFG Standard [1]	MFG Standard	Ni Alloy [1]	MFG Standard [1]	Note [d]	Note [n]
19A	Alloy 625	Note [d]	Alloy 625	ASTM A494 (CW6MC)	ASTM B564 UNS N06625	AWS A5.14 ERNiCrMo-3	Alloy 625	ASTM B564 UNS N06625	Note [d]	Note [n]
19B	Alloy C276	Note [d]	Alloy C276	ASTM A494 (CW2M)	ASTM B564 UNS N10276	AWS A5.14 ERNiCrMo-4	Alloy C276	ASTM B564 UNS N10276	Note [d]	Note [n]
19C	Alloy 825	Note [d]	Alloy 825	ASTM A494 (CU5MCuC)	ASTM B564 UNS N08825	AWS A5.14 ERNiCrMo-3	Alloy 825	ASTM B564 UNS N08825	Note [d]	Note [n]
20	Nickel [1] and Hardfaced	Note [d] 350 [i]	Ni Alloy CoCr-A [g]	MFG Standard [1] NA	MFG Standard [1] NA	AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A	Ni Alloy [1]	MFG Standard [1]	Note [d]	Note [n]
20A	Alloy 625 and Hardfaced	Note [d] 350 [i]	Alloy 625 CoCr-A [g]	ASTM A494 (CW6MC) NA	ASTM B564 UNS N06625 NA	AWS A5.14 ERNiCrMo-3 AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A	Alloy 625 Alloy 625	ASTM B564 UNS N06625	Note [d]	Note [n]
20B	Alloy C276 and Hardfaced	Note [d] 350 [i]	Alloy C276 CoCr-A [g]	ASTM A494 (CW2M) NA	ASTM B564 UNS N10276 NA	AWS A5.14 ERNiCrMo-4 AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A	Alloy C276	ASTM B564 UNS N10276	Note [d]	Note [n]
20C	Alloy 825 and Hardfaced	Note [d] 350 [i]	Alloy 825 CoCr-A [g]	ASTM A494 (CU5MCuC) NA	ASTM B564 UNS N08825 NA	AWS A5.14 ERNiCrMo-3 AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A	Alloy 825	ASTM B564 UNS N08825	Note d[d]	Note [n]
21	Hardfaced [1]	350 e	Co-Cr A [g]	NA	NA	AWS 5.13 ECoCr-A or AWS 5.21 ECoCr-A	Ni Alloy [1]	MFG Standard [1]	Note [d]	Note [n]

NOTE: Cr = Chromium; Ni = Nickel; Co = Cobalt; Cu = Copper; NA = Not Applicable.

1. Trim materials, including stem and base material for HF trim items, shall have a corrosion resistance and temperature limit at least equal to the valve body's corrosion resistance and pressure temperature rating.

a HB (formerly BHN) is the symbol for the Brinell hardness per ASTM E10.

b Free machining grades of 13Cr are prohibited.

c Body and disc seat surfaces should be 250 HB minimum with a 50 HB minimum differential between the body and disc seat surfaces.

d Manufacturer's standard hardness.

e Differential hardness between the body and disc seat surfaces is not required.

f Case hardness by nitriding to a thickness of 0.13 mm (0.005 in.) minimum.

g AWS A5.13 ECoCr-A or AWS A5.21 ERCoCr-A: This classification includes such trademark materials as Stellite 6™ *, Stoody 6™ * and Wallex 6™ *. For Plasma Transfer Arc Welding (PTAW) process powder with the metallurgy equivalent to UNS R30006 can also be used. CoCr-E (Stellite 21™ * or equal) may be used only with purchaser approval and typical CoCr-E alloys include AWS A5.13 ECoCr-E or AWS A5.21 ERCoCr-E.

h Manufacturer's standard hardfacing with a maximum iron content of 25 %.

i Hardness differential between the body and disc seat surfaces shall be the manufacturer's standard.

j Not used.

k Manufacturer's standard with 30 Ni minimum.

l Not used.

m Typical backseat weld deposit material.

n Per manufacturer's standard if not hardfaced, 250 HB minimum if hardfaced.

* This term is used as an example only, and does not constitute an endorsement of this product by API.

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JIS (Japanese Industrial Standards)
BS (British Standards)
AFNOR (Association Française de Normalisation)
MSS (Manufacturers Standardization Society)
ISO (International Standards Organization)
UNE (Una Normativa Española)

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