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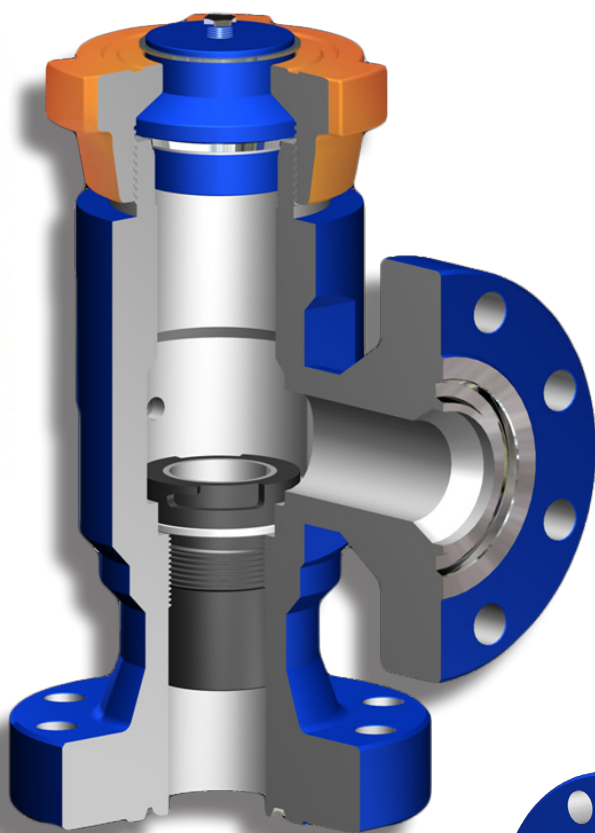
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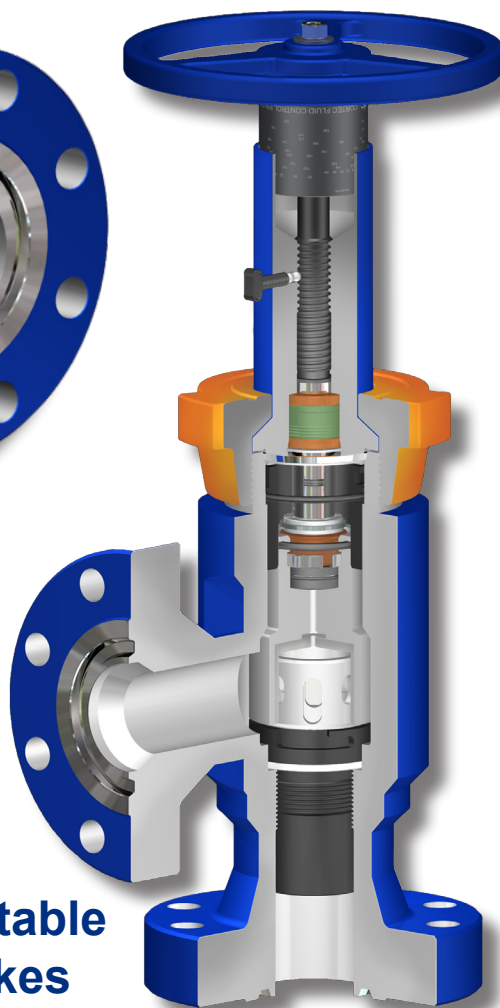
CORTEC

F L U I D C O N T R O L

Flow Control Equipment



**Positive
Chokes**



**Adjustable
Chokes**

CORTEC Fluid Control (985).223.1966 Fax: (985).223.1936
Email: sales@uscortec.com or Visit us at www.uscortec.com



1507-9001-0000

6A-0700

**CORTEC IS A DESIGN,
MANUFACTURING, SALES
AND SERVICE ORGANIZATION
SPECIALIZING IN
FLOW CONTROL APPLICATIONS
INTENDED FOR HIGH-PRESSURE
CRITICAL SERVICE
APPLICATIONS.**



The CORTEC manufacturing facility has in-house design, drafting, engineering, machining, welding, painting and testing. Equipment manufactured by CORTEC meets or exceeds API 6A quality standards. CORTEC maintains an extensive inventory in order to meet customer demands and avoid costly delays.



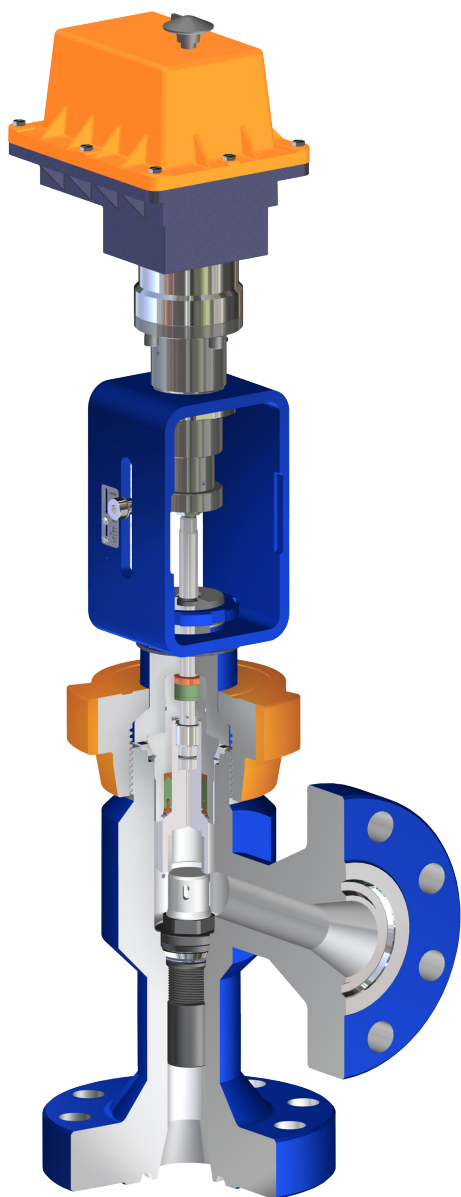
ISO-9001:2008



6A-0700

WHAT SHOULD I CONSIDER BEFORE ORDERING A CHOKE?

- Working pressure.
- Inlet and outlet connections, i.e., size, type, style.
- Nominal body size and maximum orifice size.
- Seat/ bean size to meet desired conditions and service expectations.
- Trim style, i.e., tapered needle, cage, rotating disc, etc.
- Means of operation, i.e., manual hand wheel or remotely actuated.
- Service conditions, i.e., standard or H2S service.
- Flow media & specifications, i.e., Oil, gas, water, temperature, gravity, etc.
- Flow volumes, i.e., BPD, GPM, GPD, MMSCFD, M3PD, M3PH etc.
- Materials of construction to assure compatibility with flow media.
- Body configuration, i.e., angle or inline.
- Design and quality requirements, i.e., API, ANSI, etc.
- Special requirements for the job, i.e., coatings, inlays, NDE testing, documentation, etc.



Choke Configuration Options				Page 4
Choke Model Nomenclature				Page 4
Trim Options				Page 5
Choke Bolting Dimensions				Page 5
Cage Trim High Performance Adjustable Control Chokes				
CC1/CC1M	1" max orifice	20,000 max PSI CWP		Page 6
CE1M	1" max orifice	15,000 max PSI CWP		Page 6
CC1.5M	1.5" max orifice	10,000 max PSI CWP		Page 6
CC2M	2" max orifice	20,000 max PSI CWP		Page 7
CC3M	3" max orifice	15,000 max PSI CWP		Page 7
CC4M	4" max orifice	5,000 max PSI CWP		Page 7
CC5M	5" max orifice	5,000 max PSI CWP		Page 7
Tapered Needle & Seat Adjustable / Positive Bean Chokes				
NH1/PH1	1" max orifice	10,000 max PSI CWP		Page 8
NH2/PH2	2" max orifice	15,000 max PSI CWP		Page 8
NH1M/PH1M	1" max orifice	15,000 max PSI CWP		Page 9
NH2M/PH2M	2" max orifice	15,000 max PSI CWP		Page 9
NCH1M/PCH1M	1" max orifice	15,000 max PSI CWP		Page 10
NC3M/PC3M	3" max orifice	10,000 max PSI CWP		Page 10
NG8746/PG8746	1" max orifice	10,000 max PSI CWP		Page 11
NJWA/PPC	1" max orifice	15,000 max PSI CWP		Page 11
Rotary Disc Adjustable Chokes				
RM2	(2) 1" max orifice	10,000 max PSI CWP		Page 12
RM3	(2) 1.19" max orifice	10,000 max PSI CWP		Page 12
OEM Replacement Trim				Page 12
API Temperature Rating & Material Recommendations				Page 12
Choke Actuation				Page 13
Other Product Offerings				Page 14
Piping Accessories				
(Flanges, Tees, Crosses, Ells, Double Studded Adaptors...)				Page 14
Other Products Offerings				
(Skid Assemblies, Manifolds, Sand Traps & Ball Catchers)				Page 15

Orifice sizing and selection

Probably the most misunderstood aspect of buying a choke is proper orifice sizing and trim style selection. It is critical to the proper performance, function, service life and operator satisfaction that the choke and it's associated components are properly selected based on the intended application of the choke. A choke that is provided with the optimal trim size and style will benefit greatly from maximum service life, flowing performance, and satisfactory choke function.

CORTEC utilizes an in house custom made choke sizing program that is based on years of experience and field confirmation. During the inquiry and sales process, we encourage the buyer to provide flow data and allow us to perform flow calculations. These calculations will aid us in selection of the correct orifice size and style and will allow us to make informed product recommendations. Please provide the CORTEC sales agent with all the known flow data and service conditions. Having a range of known and anticipated conditions for the life of the well will allow proper choke sizing and assist with future trim changes.

WE UNDERSTAND THE IMPORTANCE OF PROPER ORIFICE SIZING AND IT'S IMPACT ON YOUR PRODUCTION.

LET US HELP YOU MAKE THE RIGHT CHOICE.

CHOKE CONFIGURATION OPTIONS

CORTEC, a leader in choke technology, is setting the industry standards with its field-adaptable choke designs.

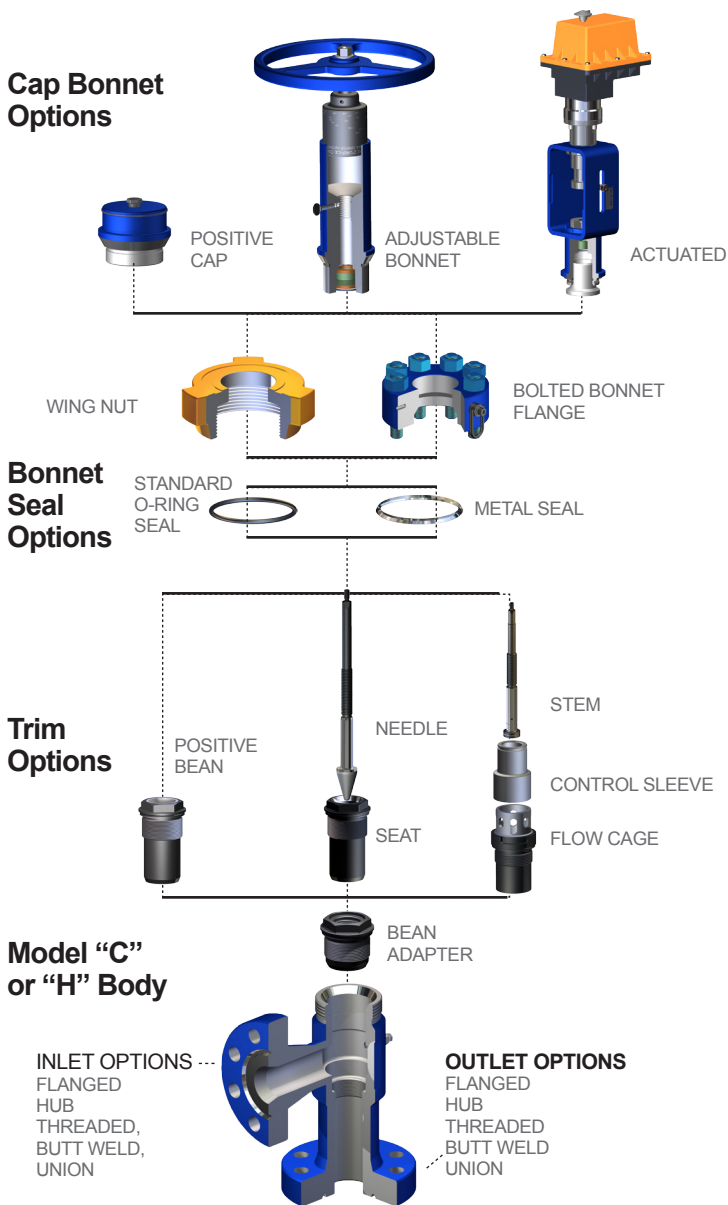
No other choke manufacturer offers greater design versatility than CORTEC. Each choke can be configured in one of three unique ways: as a positive choke, adjustable choke or actuated choke in either needle and seat, cage or multi-stage trim configurations. This allows the user to adapt to the changing well flow conditions over the life in the field. CORTEC uses only the highest quality materials to manufacture some of the most innovative yet easy to use choke designs known today.

- **Positive Bean Configuration**
- **Needle & Seat Configuration**
- **Cage Trim Configuration**
- **Multi-stage Trim Configuration**
- **Orifice sizes ranging from 1/4" to 5"**
- **API 2,000—20,000 PSI CWP**
- **ANSI Class 600—2,500**
- **Severe Service Applications**
- **PSL 1, 2, 3, & 3G**
- **API Specification Q1**
- **ISO 9001**
- **Built to meet or exceed API 6A specifications**
- **Customer Specified Preferences**

CHOKE MODEL NOMENCLATURE

Trim Type	C	Cage
	M	Multistage
	N	Needle & Seat
	P	Positive Bean
	R	Rotary Dice
Body Style	C	CORTEC Model
	E	CORTEC Model
	H	Cameron® Model H
	CH	Cameron® Model H2 15k
	G8746	Gray® Model 8746
	JWA	FMC® Model JWA
	PC	FMC® Model PC
M	Willis® Model M	
Max Orifice	1-5	1" - 5"
Bonnet Seal	M	Metal Ring Seal
	blank	Standard O-Ring Seal

*Cameron and Willis are registered trademarks of Cameron Corporation
 Gray is a Registered trademark of GE Oil & Gas
 FMC is a Registered trademark of FMC Corporation*



Trim Type (1 character)	Body Style (1-5 Characters)	Max Orifice (1-3 characters)	Bonnet Seal (0-1 Characters)
----------------------------	--------------------------------	---------------------------------	---------------------------------

Examples:

C	C	2	M
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Model "C" with Cage Trim, 2" Max Orifice with Metal Bonnet Seal Ring

N	CH	1	M
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Model "CH" with Needle Trim, 1" Max Orifice with Metal Bonnet Seal Ring

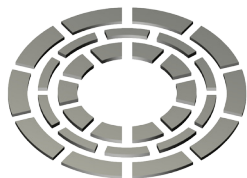
C	C	1.5	M
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Model "C" with Cage Trim, 1.5" Max Orifice with Metal Bonnet Seal Ring

P	H	2	
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Model "H" with Positive Trim, 2" Max Orifice with Standard O-Ring Bonnet Seal Ring

Multi-Stage Trim



Greatest Pressure Recovery Coefficient Ratio—resulting in lower cavitation and aerodynamic noise • More suitable for gas or high viscosity fluids.

CORTEC MODEL—MC

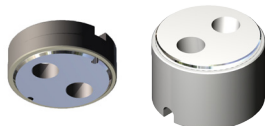
External Sleeve Cage Trim



High Pressure Recovery Coefficient Ratio • Erosion resistant prolonging Trim life • Pressure balanced to offset high actuation force requirements and allow for high differential pressures • Most efficient flow design in the industry • Highest seal integrity for positive shut off • For the most severe service that may include high pressure drops, cavitation, and abrasive service.

CORTEC MODEL—CC, CE

Rotary Disk Trim



High range ability requirements in severe erosive applications.

CORTEC MODEL—RM

CHOKE TRIM OPTIONS

Trim selection is key when calculating critical flow and cavitation values.

Selecting Trim with the highest Pressure Recovery Coefficient values for specific flow conditions is key. The selection process involves orifice and capacity sizing, critical flow information, and noise emissions.

Needle and Seat Trim



Wide Range of adjustments as flow rates and pressures fluctuate • Easy to replace in the field • Parts are interchangeable with popular models • Suitable for low to medium pressure drops, less severe service, and applications that do not require positive shutoff .

CORTEC MODELS—NH, NC, NCH, NG8746, & NJWA

Positive Choke Bean



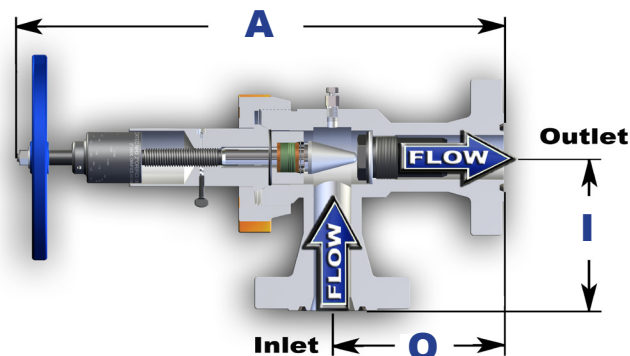
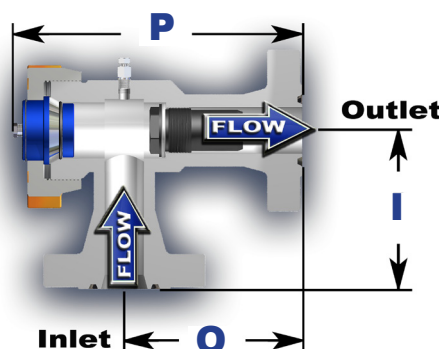
The simplest most inexpensive configuration • Engineered for heavy duty, maintenance free performance • Parts are interchangeable with popular models • Installation, parts replacement, and other field work are simple.

CORTEC MODELS—PH, PC, PHC, PG8746 & PPC

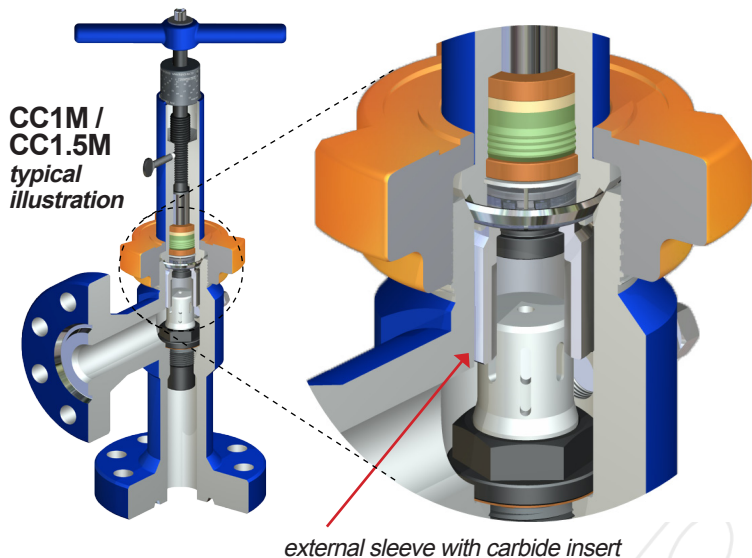
CHOKE BOLTING DIMENSIONS

CORTEC chokes can be manufactured to custom inlet and outlet dimensions. Our manufacturing process allows us the versatility to supply chokes to custom inlet and outlet dimensions with a wide variety of common and custom connections. This allows you to replace your existing choke without costly piping changes in the field.

Type	Dimension Description
I	Inlet dimensions are from the centerline of the choke to the face of the Inlet Flange.
O	Outlet dimensions are from the centerline of the choke to the face of the Outlet Flange.
P	Overall length of the Positive model of the choke.
A	Overall length of the Adjustable model of the choke in the fully closed position.



CONTROL CHOKES CORTEC MODEL "CC"/ "CE" HIGH PERFORMANCE CONTROL CHOKES



CORTEC Model "CC"/ "CE" adjustable external sleeve chokes are available in pressure balanced trim designs to offset high actuation force requirements and allow for high differential pressures.

CORTEC's unique slotted sleeve design allows for a smooth flow-to-lift transition while improving noise attenuation and maintaining low pressure recovery characteristics to offset the effects of potential cavitations and flashing.

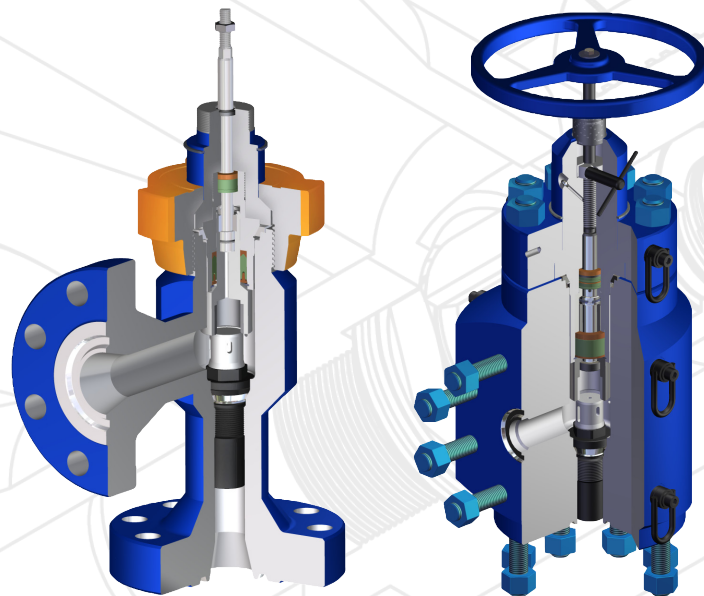
The CORTEC "CC"/ "CE" series adjustable choke assembly is a high performance Control Choke, designed to offer the oilfield operator specific performance advantages over the conventional needle trim options.

This high performance External Sleeve Cage trim design offers 'real-world' advantages to noise reduction, reduced cavitations in liquid service, reduced icing in gas service, extended service in abrasive environments, and positive shut-off.

MODEL	FLANGE SIZE AND TYPE				*DIMENSIONS inch (mm)		
	Nominal Connections 2"- 4"		Maximum Orifice - 1"		1"	0"	A"
CC1 CC1M *CE1M	Maximum Cv = 19						
	1-13/16"	10,000	API RTJ	7.69 (195)	8.81 (224)	24.35 (618)	
	1-13/16"	15,000	API RTJ	8.47 (215)	9.62 (244)	25.06 (637)	
	2-1/16"	5,000	API RTJ	6.88 (175)	8.00 (203)	23.54 (598)	
	2-1/16"	10,000	API RTJ	7.69 (195)	8.81 (224)	24.35 (618)	
	2-1/16"	15,000	API RTJ	8.88 (226)	10.31(262)	25.76 (654)	
	2-9/16"	5,000	API RTJ	6.94 (176)	8.25 (210)	20.79 (528)	
	2-9/16"	10,000	API RTJ	8.19 (208)	9.31 (236)	24.85 (631)	
	2-9/16"	15,000	API RTJ	10.50 (267)	11.75 (298)	27.29 (693)	
	3-1/16"	10,000	API RTJ	7.50 (191)	10.12 (257)	25.66 (652)	
	3-1/16"	15,000	API RTJ	10.34 (263)	11.62 (295)	27.16 (690)	
	3-1/8"	3,000	API RTJ	7.81 (198)	8.94 (227)	24.48 (622)	
3-1/8"	5,000	API RTJ	9.69 (246)	9.56 (243)	25.10 (638)		
CC1.5M	Nominal Connections 2"- 6"				Maximum Orifice - 1.5"		
	Maximum Cv = 42						
	1-13/16"	10,000	API RTJ	7.69 (195)	8.81 (224)	24.12 (613)	
	2-1/16"	5,000	API RTJ	6.88 (175)	8.00 (203)	23.31 (592)	
	2-1/16"	10,000	API RTJ	7.69 (195)	8.81 (224)	24.12 (613)	
	2-9/16"	5,000	API RTJ	8.00 (203)	10.00 (254)	25.31 (643)	
	2-9/16"	10,000	API RTJ	8.00 (203)	10.00 (254)	25.31 (643)	
	3-1/16"	10,000	API RTJ	9.00 (229)	11.00 (279)	26.31 (668)	
	3-1/8"	3,000	API RTJ	8.00 (203)	10.00 (254)	25.31 (643)	
	4-1/16"	5,000	API RTJ	9.50 (241)	11.50 (292)	26.81 (681)	

*Only available in 10,000 & 15,000 CWP. Consult Factory for Adjustable Dimensions.

The influencing feature of the **External Sleeve Cage** trim is a slotted cage which directs the flow media into opposing flow streams which collide or "impinge" upon themselves within the confines of the heavy section tungsten carbide cage. The "fluid impingement" process dissipates the destructive energy result-

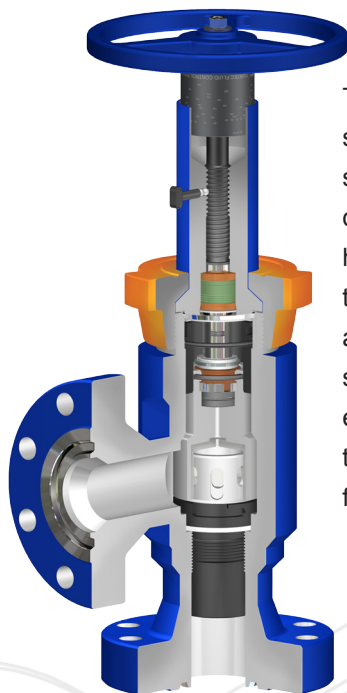


CE1M 15K

CC1M 20K

ing in a more passive or "laminar" flow that dramatically minimizes erosive damage to the choke body. Noise reduction is also a direct result of dissipating the energy within the cage.

ALL "CC"/ "CE" MODEL CHOKES CAN BE SUPPLIED WITH ACTUATORS. SEE CHOKE ACTUATION ON PAGE 13 FOR MORE INFORMATION.

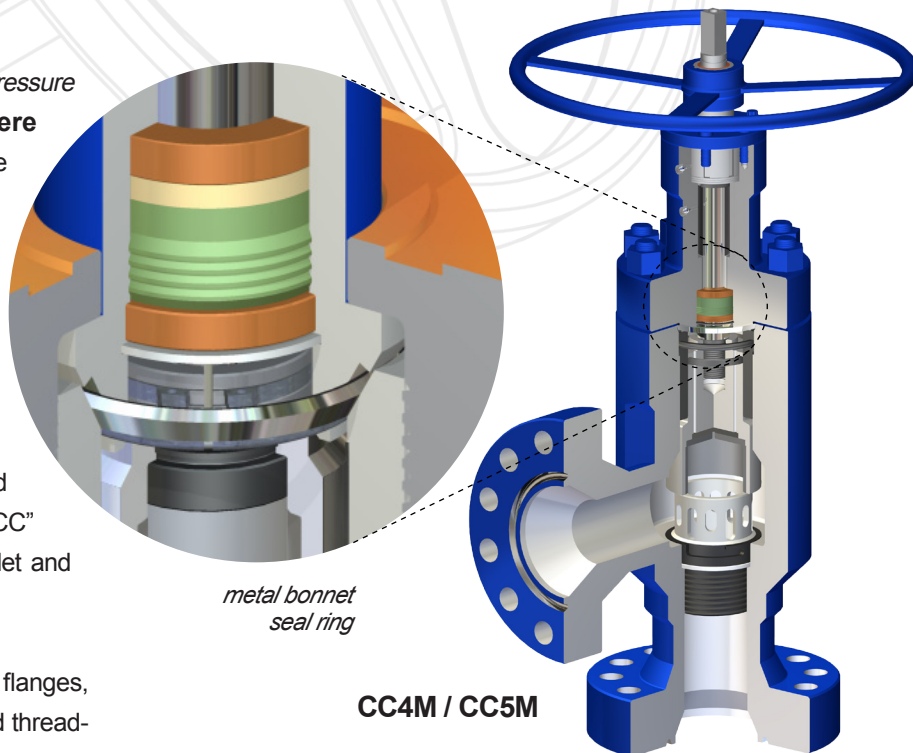


CC2M / CC3M
typical illustration

The **External Sleeve Cage** seat and control sleeve have sealing surfaces that are not directly exposed to the high velocity flow. When the control sleeve is closed against the cage seat, these surfaces provide a highly effective shut-off that meets the practical demands of oil-field applications.

MODEL	FLANGE SIZE AND TYPE			*DIMENSIONS inch (mm)			
				I"	O"	A"	
	Nominal Connections 2.5" - 8"				Maximum Orifice - 2"		
Maximum Cv = 78							
CC2M	2-9/16"	5,000	API RTJ	8.88 (225.6)	11.38 (289.1)	32.49 (825.2)	
	2-9/16"	10,000	API RTJ	10.38 (263.7)	11.75 (298.5)	32.86 (834.6)	
	2-9/16"	15,000	API RTJ	10.38 (263.7)	11.75 (298.5)	32.86 (834.6)	
	3-1/16"	10,000	API RTJ	10.38 (263.7)	11.75 (298.5)	32.86 (834.6)	
	3-1/16"	15,000	API RTJ	10.38 (263.7)	11.75 (298.5)	32.49 (825.2)	
	3-1/8"	5,000	API RTJ	8.88 (225.6)	11.38 (289.1)	32.49 (825.2)	
	4-1/16"	5,000	API RTJ	10.12 (257.0)	12.62 (320.5)	33.73 (856.7)	
	4-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	32.61 (828.3)	
CC3M	Nominal Connections 4" - 12"				Maximum Orifice - 3"		
	Maximum Cv = 173						
	3-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	36.00 (914.4)	
	3-1/8"	3,000	API RTJ	9.88 (251.0)	11.38 (289.1)	35.88 (911.4)	
	3-1/8"	5,000	API RTJ	9.88 (251.0)	11.38 (289.1)	35.88 (911.4)	
	4-1/16"	3,000	API RTJ	9.88 (251.0)	11.38 (289.1)	35.88 (911.4)	
	4-1/16"	5,000	API RTJ	9.88 (251.0)	11.38 (289.1)	35.88 (911.4)	
	4-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	36.00 (914.4)	
	5-1/8"	3,000	API RTJ	10.88 (276.4)	14.12 (358.6)	38.62 (980.9)	
	5-1/8"	5,000	API RTJ	10.88 (276.4)	14.12 (358.6)	38.62 (980.9)	
7-1/16"	5,000	API RTJ	12.38 (314.5)	14.12 (358.6)	38.62 (980.9)		

"CC"/"CE" series chokes (excluding Model "CC1"-pressure balanced) are fitted with a **heavy duty severe service metal bonnet seal ring** that eliminates the typical compression set, gas permeation, and temperature limitations associated with elastomeric seals. For pressure ratings up to 15,000 PSI CWP, "CC"/"CE" series chokes are manufactured from various grades of high strength steels suitable to meet a wide range of applications. "CC" series chokes rated for 20,000 PSI CWP are machined from a solid steel forged block and typically supplied with studded connections. The modular construction enables the "CC" series chokes to be adaptable to a wide range of inlet and outlet connections and dimensions.



metal bonnet seal ring

CC4M / CC5M

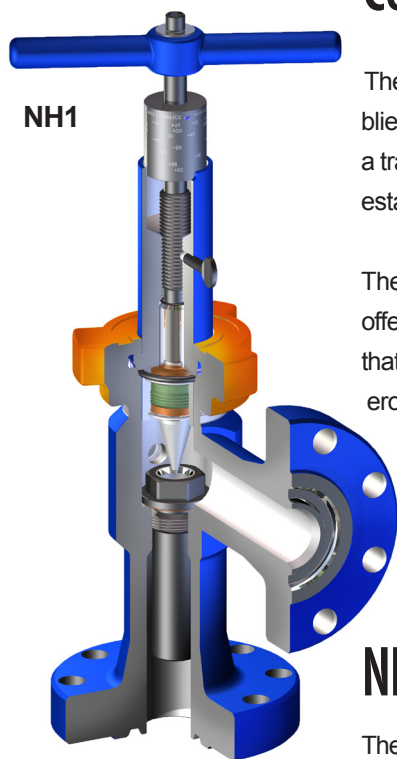
CORTEC chokes are typically fitted with API RTJ flanges, ANSI RF and RTJ flanges, hub, union, butt-weld, and threaded connections.

All CORTEC Chokes are field convertible from positive to adjustable by changing out the bonnet assembly or cap assembly. They are available in a variety of material specifications, flange to centerline bolting dimensions, and a wide variety of connections.

*SEE CHOKE BOLTING DIMENSIONS ON PAGE 5.

MODEL	FLANGE SIZE AND TYPE		*DIMENSIONS inch (mm)		
			I"	O"	A"
CC4M	Nominal Connections 5" - 12"		Maximum Orifice - 4"		
	Maximum Cv = 275				
All CC4M Chokes are Built to Order					
CC5M	Nominal Connections 6" - 14"		Maximum Orifice - 5"		
	Maximum Cv = 448				
All CC5M Chokes are Built to Order					

POSITIVE AND ADJUSTABLE CHOKES CORTEC MODEL "H" CHOKES



NH1

The CORTEC Model "NH" adjustable and "PH" positive choke assemblies provide oilfield customers the reliability and interchangeability of a traditional angle body O-Ring bonnet and blanking cap seal in a well-established design that has been in service worldwide for decades.

The Model NH is a conventional **tapered needle trim** design that offers economy of operation and versatile utility in a traditional design that is familiar to oilfield personnel. It is based on the typical Cameron® H2 design that is widely available and offers field interchangeability with common components. Optional "Spring Loaded Pressure Energized TFE" stem packing reduces operation torque, offers superior sealing characteristics, and is compatible with a wide range of chemicals associated with drilling and production.

NH1 / PH1 – NH2 / PH2

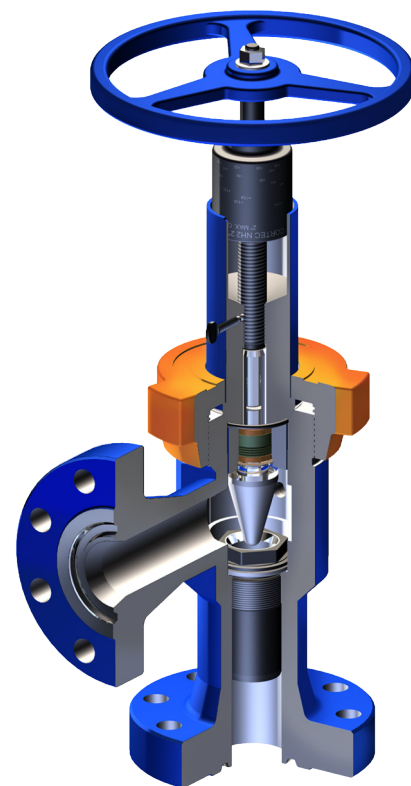
The "NH1" adjustable choke is a 2" nominal body design that accommodates stem and seat sizes up to 1" maximum orifice. Typical flange sizes are 1-13/16" to 3-1/16" and working pressures up to 15,000 PSI CWP.

The "NH2" adjustable choke is a 3" nominal body design that accommodates stem and seat sizes up to 2" maximum orifice. Typical flange sizes are 2-9/16" to 7-1/16" and working pressures up to 15,000 PSI CWP.

The "NH2" adjustable choke is a 2" max orifice design, and is typically supplied with 1" reduced orifice trim for high pressure well applications. The choke may then be field converted to 2" trim when well pressures decline and there is demand for a greater flow capacity.

The "PH1" positive choke is a 2" nominal design body, fitted with a blanking cap, and accommodates positive choke beans up to 64/64".

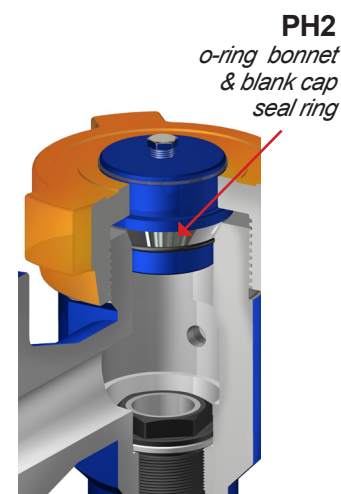
The "PH2" positive choke is a 3" nominal design body, fitted with a blanking cap, and accommodates positive choke beans up to 128/64". When orifice sizes of 64/64" and smaller are required, a bean adaptor with the same exterior profile as the 2" seat, is installed in the choke body. The bean adaptor is internally threaded for the smaller 1" max orifice beans, allowing the operator to combine cost savings and versatility with the existing choke body.



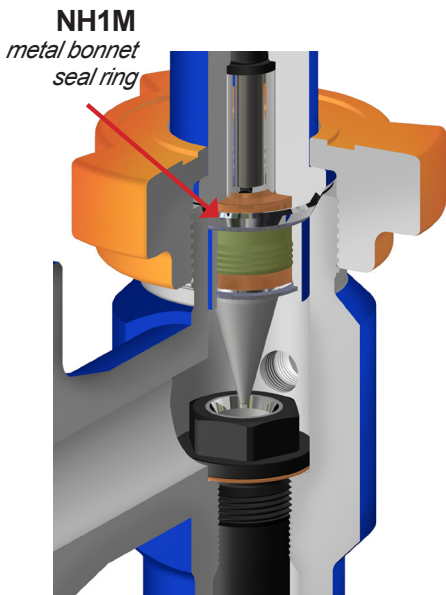
NH2



PH1



PH2
o-ring bonnet
& blank cap
seal ring



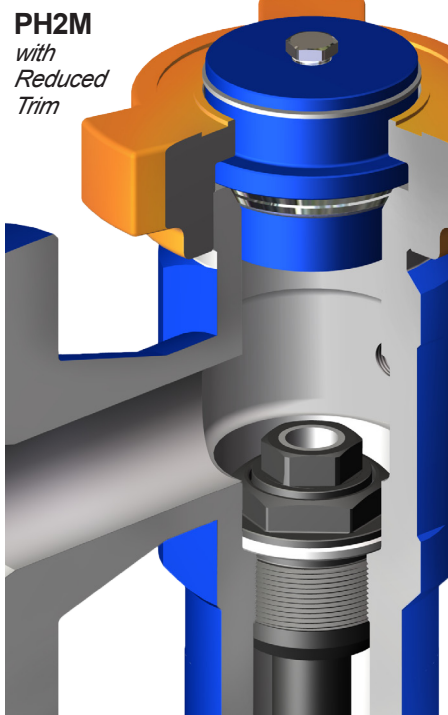
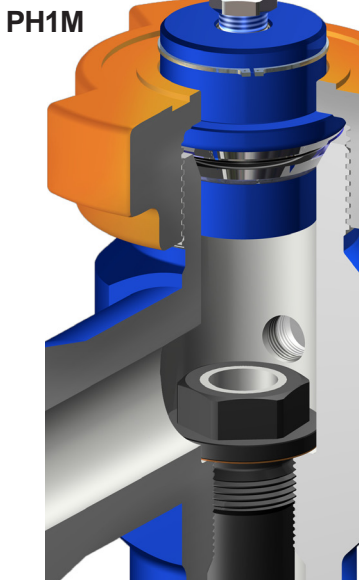
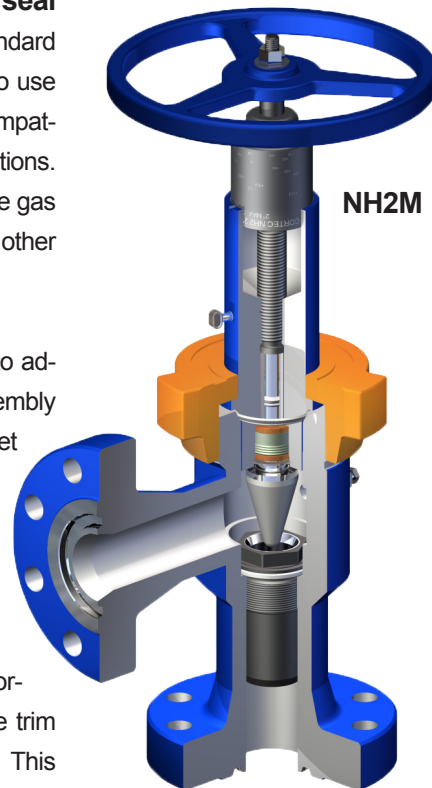
NH1M / PH1M - NH2M / PH2M (Metal Seals)

These models have the same characteristics as the “NH1”, “PH1”, “NH2”, “PH2” but feature a **metal bonnet seal** option that may be used in conjunction with the standard o-ring seal body. This allows field operators the option to use their existing body with the heavy duty metal seal that is compatible for severe service and low or high temperature applications. The metal seal is also advantageous in applications where gas permeation, compression set, chemical compatibility and other elastomer related issues are a concern.

All “H” models are readily field convertible from positive to adjustable by changing out the bonnet or blanking cap assembly as desired and can be built with a wide combination of inlet and outlet connections and dimensions to accommodate most replacement or special need requirements. They are available in a variety of material specifications for a wide range of field and service applications.

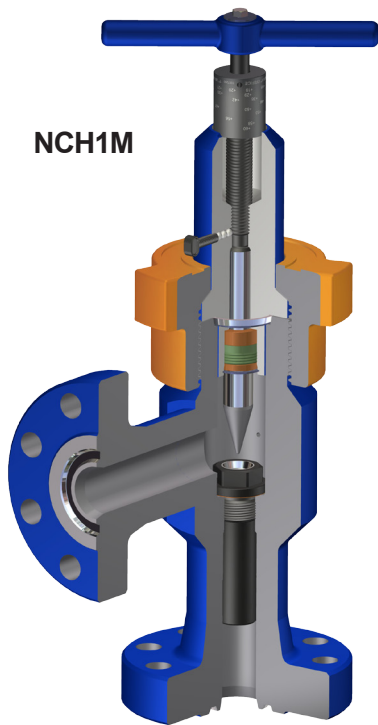
Additionally, CORTEC offers the “CC” series high performance control chokes utilizing the External Sleeve Cage trim that fits into the same choke bodies as the “NH” and “PH”. This allows field operators the versatility to convert existing chokes to a modern high performance control choke.

ALL “NH” MODEL CHOKES CAN BE SUPPLIED WITH ACTUATORS. SEE CHOKE ACTUATION ON PAGE 13 FOR MORE INFORMATION.



MODEL	FLANGE SIZE AND TYPE				*DIMENSIONS inch (mm)				
	Nominal Connections 2" - 4"		I"	O"	P"	A"	Maximum Orifice - 1"		
	Maximum Cv - Adjustable = 25 / Positive = 27.5								
NH1 NH1M PH1 PH1M	1-13/16"	10,000	API RTJ	7.69 (195.3)	8.81 (223.8)	14.42 (366.3)	22.12 (561.8)		
	2-1/16"	5,000	API RTJ	6.88 (174.8)	8.00 (203.2)	13.61 (345.7)	21.31 (541.3)		
	2-1/16"	10,000	API RTJ	7.69 (195.3)	8.81 (233.8)	14.42 (366.3)	22.12 (561.8)		
	2-9/16"	5,000	API RTJ	6.94 (176.3)	8.25 (209.6)	13.86 (352.0)	21.56 (547.6)		
	2-9/16"	10,000	API RTJ	8.19 (208.0)	9.31 (236.5)	14.92 (379.0)	22.62 (574.5)		
	3-1/16"	10,000	API RTJ	7.50 (190.5)	10.12 (257.0)	15.73 (399.5)	23.43 (595.1)		
NH2 NH2M PH2 PH2M	3-1/8"	3,000	API RTJ	7.81 (198.4)	8.94 (227.1)	14.55 (369.6)	22.25 (565.2)		
	3-1/8"	5,000	API RTJ	9.69 (246.1)	9.56 (242.8)	15.17 (385.3)	22.87 (580.9)		
	Nominal Connections 2.5" - 8"				Maximum Orifice - 2"				
	Maximum Cv - Adjustable = 86 / Positive = 110								
	NH2 NH2M PH2 PH2M	2-9/16"	5,000	API RTJ	8.88 (225.6)	11.38 (298.1)	18.23 (463.0)	30.00 (762.0)	
		2-9/16"	10,000	API RTJ	10.38 (263.7)	11.75 (298.5)	17.23 (437.6)	30.37 (771.4)	
2-9/16"		15,000	API RTJ	10.38 (263.7)	11.75 (298.5)	17.23 (437.6)	30.37 (771.4)		
3-1/16"		10,000	API RTJ	10.38 (263.7)	11.75 (298.5)	17.23 (437.6)	30.37 (771.4)		
3-1/16"		15,000	API RTJ	10.38 (263.7)	11.75 (298.5)	17.23 (437.6)	30.37 (771.4)		
3-1/8"		5,000	API RTJ	8.88 (225.6)	11.38 (289.1)	18.23 (463.0)	30.00 (762.0)		
PH2M	4-1/16"	5,000	API RTJ	10.12 (257.0)	12.62 (320.5)	19.47 (494.5)	31.24 (793.5)		
	4-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	18.35 (466.1)	30.12 (765.0)		
	4-1/16"	15,000	API RTJ	11.50 (292.1)	13.00 (330.2)	18.48 (469.4)	31.62 (803.1)		

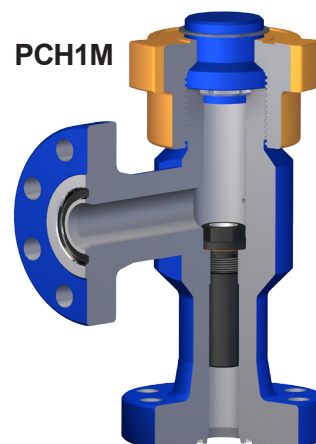
*Cameron is a Registered Trademark of the Cameron Corporation



NCH1M

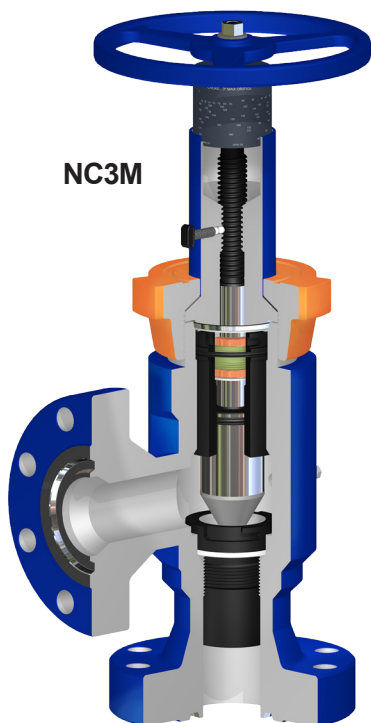
NCH1M / PCH1M

The NCH1M / PCH1M chokes are designed to replace similar models of the 15,000 PSI Cameron® model "H2" 1" maximum orifice body. Normal replacement items as well as flange to body centerline dimensions are interchangeable. Field convertible from positive to adjustable by changing out the bonnet assembly or cap assembly. This choke offers a rugged metal bonnet/cap seal that eliminates the temperature, gas permeation, compression set and chemical compatibility concerns normally associated with elastomeric seals. The stem packing is a high performance PTFE pressure energized seal that offers reduced operating torque, superior sealing capabilities, and compatibility with a wide range of chemicals associated with drilling and production.



PCH1M

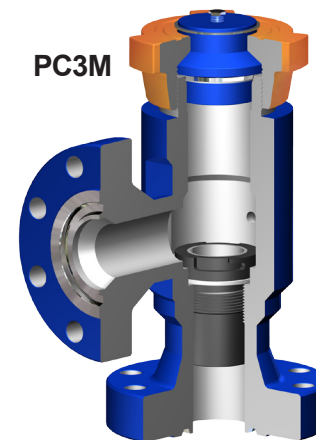
MODEL	FLANGE SIZE AND TYPE			*DIMENSIONS inch (mm)			
				I"	O"	P"	A"
	Nominal Connections 2"- 4"			Maximum Orifice - 1"			
	Maximum Cv - Adjustable = 25 / Positive = 27.5						
NCH1M	1-13/16"	15,000	API RTJ	8.47 (215.1)	9.62 (244.3)	17.79 (451.9)	24.34 (618.2)
	2-1/16"	15,000	API RTJ	8.88 (225.6)	10.31 (261.9)	18.48 (469.4)	25.03 (635.8)
PCH1M	2-9/16"	15,000	API RTJ	10.50 (266.7)	11.75 (298.5)	19.92 (506.0)	26.47 (672.3)
	3-1/16"	15,000	API RTJ	10.34 (262.6)	11.62 (295.1)	19.79 (502.7)	26.34 (669.0)



NC3M

NC3M / PC3M

The large bore NC3M / PC3M chokes are designed to offer high flow capacity in a pressure balanced traditional tapered needle stem and seat design. Field convertible from positive to adjustable by changing out the bonnet assembly or cap assembly. This choke offers a rugged metal bonnet/cap seal that eliminates the temperature, gas permeation, compression set, and chemical compatibility concerns normally associated with elastomeric seals. The stem packing is a high performance PTFE pressure energized seal that offers reduced operating torque, superior sealing capabilities, and compatibility with a wide range of chemicals associated with drilling and production. Readily converted to cage trim. See Model CC3M.



PC3M

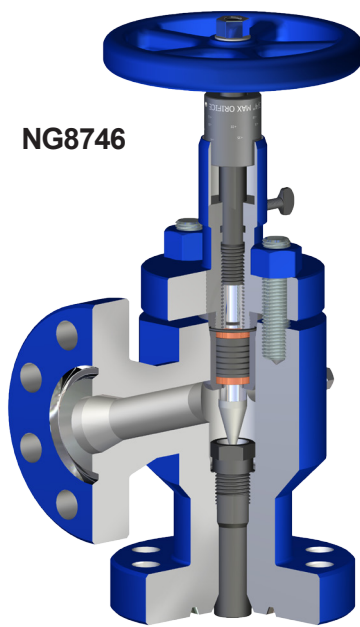
MODEL	FLANGE SIZE AND TYPE			*DIMENSIONS inch (mm)			
				I"	O"	P"	A"
	Nominal Connections 2"- 4"			Maximum Orifice - 3"			
	Maximum Cv - Adjustable = 211 / Positive = 247						
NC3M PC3M	3-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	23.52 (597.4)	34.53 (877.1)
	3-1/8"	3,000	API RTJ	9.88 (251.0)	11.38 (289.1)	23.40 (594.4)	34.41 (874.0)
	3-1/8"	5,000	API RTJ	9.88 (251.0)	11.38 (289.1)	23.40 (594.4)	34.41 (874.0)
	4-1/16"	3,000	API RTJ	9.88 (251.0)	11.38 (289.1)	23.40 (594.4)	34.41 (874.0)
	4-1/16"	5,000	API RTJ	9.88 (251.0)	11.38 (289.1)	23.40 (594.4)	34.41 (874.0)
	4-1/16"	10,000	API RTJ	9.94 (252.5)	11.50 (292.1)	23.52 (597.4)	34.53 (877.1)
	5-1/8"	3,000	API RTJ	10.88 (276.4)	14.12 (358.6)	26.14 (664.0)	37.15 (943.6)
	5-1/8"	5,000	API RTJ	10.88 (276.4)	14.12 (358.6)	26.14 (664.0)	37.15 (943.6)
	7-1/16"	5,000	API RTJ	12.38 (314.5)	14.12 (358.6)	26.14 (664.0)	37.15 (943.6)

ALL CORTEC CHOKES ARE AVAILABLE IN A VARIETY OF MATERIAL SPECIFICATIONS, FLANGE TO CENTERLINE BOLTING DIMENSIONS AND A WIDE VARIETY OF CONNECTIONS.

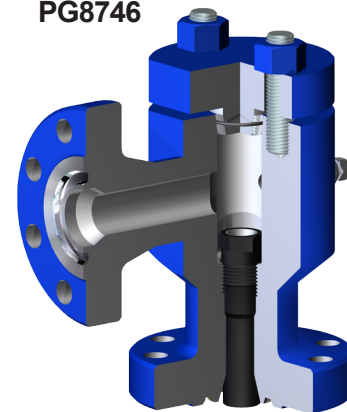
NG8746 / PG8746

PG8746

NG8746



The NG8746 / PG8746 chokes are a well established and recognized design. They are designed to be interchangeable with the Gray® Model "8746". Featuring the traditional two bolt bonnet and cap connection, 3/4" maximum orifice 90 degree angle body and conventional chevron style packing and o-ring bonnet and cap seal. Normal replacement items as well as flange to body centerline dimensions are interchangeable with existing similar models.

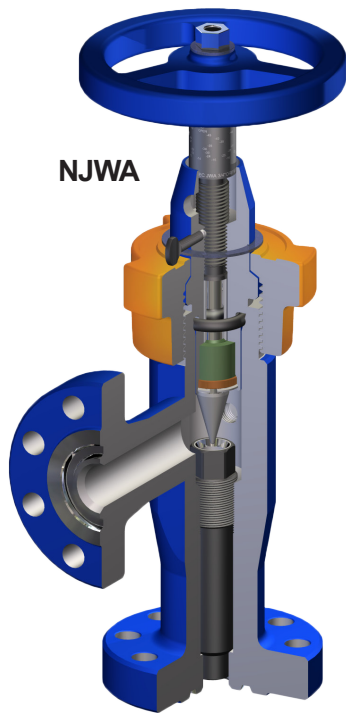


MODEL	FLANGE SIZE AND TYPE			*DIMENSIONS inch (mm)			
	Nominal Connections 2" - 4"			I"	O"	P"	A"
	Maximum Cv - Adjustable = 13.7 / Positive = 15.5						
NG8746	1-13/16"	10,000	API RTJ	7.12 (180.8)	7.50 (190.5)	13.44 (341.4)	19.70 (500.4)
	2-1/16"	5,000	API RTJ	7.00 (177.8)	7.50 (190.5)	13.44 (341.4)	19.70 (500.4)
PG8746	2-1/16"	10,000	API RTJ	7.12 (180.8)	7.50 (190.5)	13.44 (341.4)	19.70 (500.4)
	2-9/16"	5,000	API RTJ	7.00 (177.8)	8.25 (209.6)	14.19 (360.4)	19.70 (500.4)

*Gray is a Registered Trademark of the GE Oil & Gas

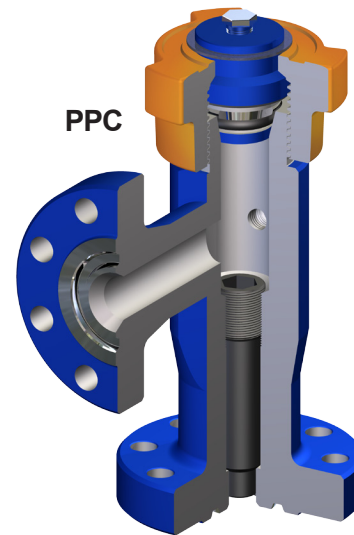
NJWA / PPC

NJWA



The NJWA / PPC chokes are another well established and recognized design. They are designed to be interchangeable with the familiar FMC® Models "JWA" and "PC". Featuring the conventional hammer nut bonnet and cap connection, 1" maximum orifice 90 degree angle body and conventional chevron style packing and o-ring bonnet and cap seal. Normal replacement items as well as flange to body centerline dimensions are interchangeable with existing similar models. Available with a high performance PTFE pressure energized seal that offers reduced operating torque, superior sealing capabilities, and compatibility with a wide range of chemicals associated with drilling and production.

PPC



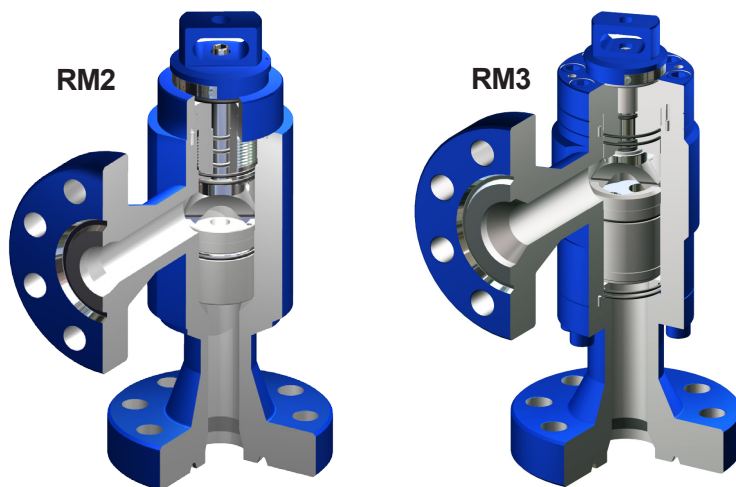
ALL CORTEC CHOKES ARE FIELD CONVERTIBLE FROM POSITIVE TO ADJUSTABLE BY CHANGING OUT THE BONNET ASSEMBLY OR CAP ASSEMBLY.

MODEL	FLANGE SIZE AND TYPE			*DIMENSIONS inch (mm)			
	Nominal Connections 2" - 4"			I"	O"	P"	A"
	Maximum Cv - Adjustable = 19 / Positive = 27.5						
NJWA PPC	1-13/16"	10,000	API RTJ	7.50 (190.5)	9.38 (238.3)	16.64 (422.7)	21.56 (547.6)
	1-13/16"	15,000	API RTJ	7.38 (187.5)	10.13 (257.3)	18.58 (471.9)	26.14 (664.0)
	2-1/16"	5,000	API RTJ	7.50 (190.5)	9.38 (238.3)	15.51 (394.0)	22.01 (559.1)
	2-1/16"	10,000	API RTJ	7.50 (190.5)	9.38 (238.3)	16.64 (422.7)	21.56 (547.6)
	2-1/16"	15,000	API RTJ	7.38 (187.5)	10.13 (257.3)	18.58 (471.9)	26.14 (664.0)
	2-9/16"	5,000	API RTJ	8.56 (217.4)	9.50 (241.3)	15.63 (397.0)	22.13 (562.1)
	2-9/16"	10,000	API RTJ	9.38 (238.3)	9.38 (238.3)	16.64 (422.7)	21.56 (547.6)
	2-9/16"	15,000	API RTJ	10.50 (266.7)	11.75 (298.5)	20.20 (513.1)	27.76 (705.1)

*FMC is a Registered Trademark of the FMC Corporation

ROTARY DISC CHOKES RM2 / RM3

CORTEC model RM2 & RM3 are direct replacements for Willis® Models “M2” & “M3”. This model is a MOV (Multiple Orifice Valve) that utilizes a rotating disc positioned over a stationary disc and is known for its positive shut-off capability. Discs are made of tungsten carbide and are available with one or two holes with 64th-inch equivalents.



HOLE SIZE	#OF HOLES	64th EQUIV	HOLE SIZE	#OF HOLES	64th EQUIV
1/4"	1	16.00	1/2"	1	32.00
1/4"	2	23.00	1/2"	2	45.00
3/8"	1	24.00	3/4"	2	68.00
3/8"	2	34.00	1"	2	91.00
			1.19"	2	108.00

MODEL	FLANGE SIZE AND TYPE				*DIMENSIONS inch (mm)		
	Nominal Connections 2" - 3"				1"	0"	A"
	Maximum Orifice (2) - 1"						
RM2	Maximum Cv = 49						
	1-13/16"	10,000	API	RTJ	8.20 (208.3)	10.39 (263.9)	17.80 (452.1)
	2-1/16"	5,000	API	RTJ	8.28 (210.3)	10.47 (265.9)	17.88 (454.2)
	2-1/16"	10,000	API	RTJ	8.82 (224.0)	10.75 (273.1)	18.16 (461.3)
	2-9/16"	5,000	API	RTJ	8.39 (213.1)	10.58 (268.7)	17.99 (456.9)
	2-9/16"	10,000	API	RTJ	9.05 (229.9)	10.99 (279.1)	18.40 (467.4)
RM3	Nominal Connections 3" - 6"				Maximum Orifice - (2) - 1.19"		
	Maximum Cv = 68						
	3-1/16"	10,000	API	RTJ	11.18 (284.0)	15.41 (391.4)	22.63 (574.8)
	3-1/8"	3,000	API	RTJ	9.22 (234.2)	13.41 (340.6)	20.63 (524.0)
	3-1/8"	5,000	API	RTJ	9.82 (249.4)	14.01 (355.9)	21.23 (539.2)

*Willis is a Registered Trademark of the Cooper Cameron Corporation

OEM REPLACEMENT TRIM

CORTEC is pleased to offer replacement Trim for other Original Equipment Manufacturers.

Common models that are offered:

Cameron® / Willis®

Model H2

Model M2

Model M3

FMC®

Model JWA

Model PC

Varco Best®

Model BH2

Model BJWA

GE—ABB Vetco Gray®

Model 8746

API TEMPERATURE RATING & MATERIAL RECOMMENDATIONS

API6A Temperature Ratings										
	-100	-50	0	50	100	150	200	250	300	350
K		-75				180				
L			-50			180				
P				-20		180				
R	Room Temperature									
S			0			150				
T				0			180			
U								250		
X										350

Operating Range, Degrees Fahrenheit (°F)

Material Recommendations		
API Material Class	Body / Bonnet	Choke Trim (Stem, Seat, Bean)
AA & BB General Service	Alloy Steel	Stainless Steel or Stainless Steel & Tungsten Carbide
CC Non-Sour, CO2	Stainless Steel	Stainless Steel or Stainless Steel & Tungsten Carbide
DD & EE Sour, Low CO2*	Alloy Steel	Stainless Steel & Tungsten Carbide
FF H2S, CO2*	Stainless Steel	Stainless Steel & Tungsten Carbide
HH High H2S, High CO2*	Corrosion Resistant Alloy	Corrosion Resistant Alloy & Tungsten Carbide

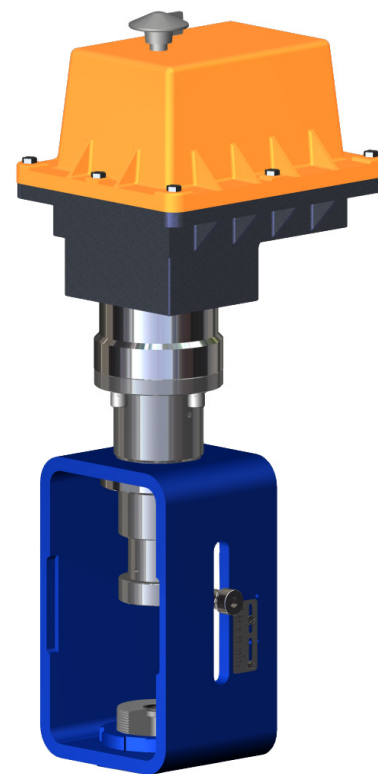
*NACE Standard MR0175 Compliance

CHOKE ACTUATION

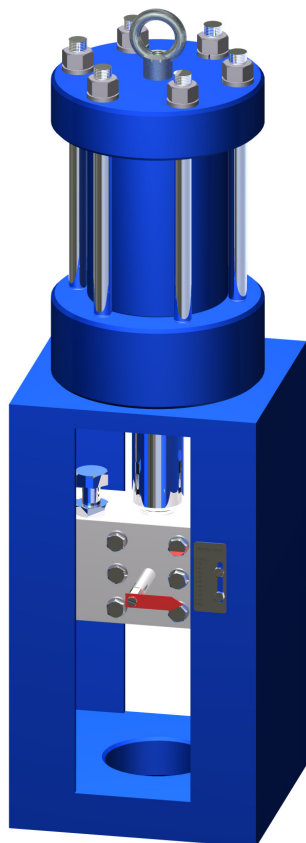
Advanced actuators and instruments for a complete flow control solution. CORTEC, LLC supplies various proprietary actuators and associated instrumentation to complement its comprehensive range of chokes.

Electric

Bettis® TorqPlus™ Model “EM-510” multi turn actuator. The low friction high torque CORTEC open yoke adaptor converts rotary motion of the actuator to a high thrust linear motion to provide the choke with superior thrust to meet the most demanding applications. Featuring a manual override, weatherproof aluminum housing, explosion proof electronics, local position indicator, precise repeatability, low power consumption, 4-20 ma control signal and position feedback, three limit switches and dual conduit entries. Upon loss of control signal this unit can be configured to fail in place, fail open or fail closed. Upon loss of the power source the unit will fail in the last position. Powered by optional 12 or 24 VDC or 115 or 230 VAC. The actuator and open yoke unit weight is only 55 lbs (24.95 kg).



**Bettis® Model EM
Electric Actuator**



**Hydraulic Piston
Actuator**

Hydraulic Piston

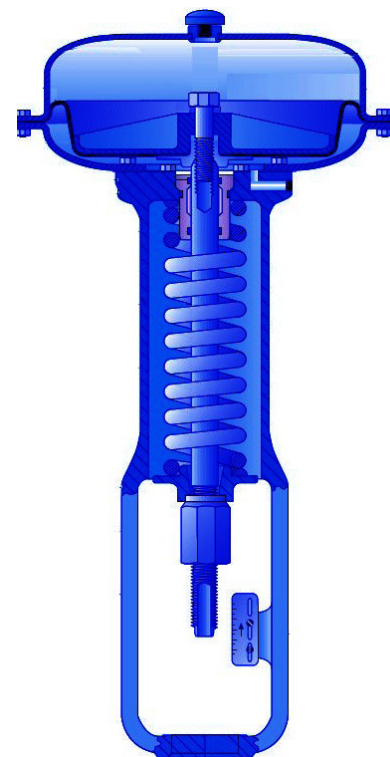
Hydraulic piston actuators are double acting with a linear motion. Hydraulic piston style is the preferred actuator of many oilfield applications and favored for their high thrust and rugged reliability. This design is typically supplied for high pressure manifold applications and where rugged environments and applications demand reliability.

Pneumatic Diaphragm

Pneumatic diaphragm actuators are supplied with fail open or fail close operation. Available with position and control instrumentation to meet your requirements. This model is typically supplied with pneumatic or electro-pneumatic positioners, filter regulator, and stainless steel tubing and fittings.

Pneumatic Linear Piston

Pneumatic piston actuators are available in double acting, fail open or fail close. For applications where pneumatic is the desired power source, linear piston actuators provide reliable high thrust in a simple and rugged design. Can be supplied with a variety of instrumentation and controls to suit customer requirements. *(not pictured)*



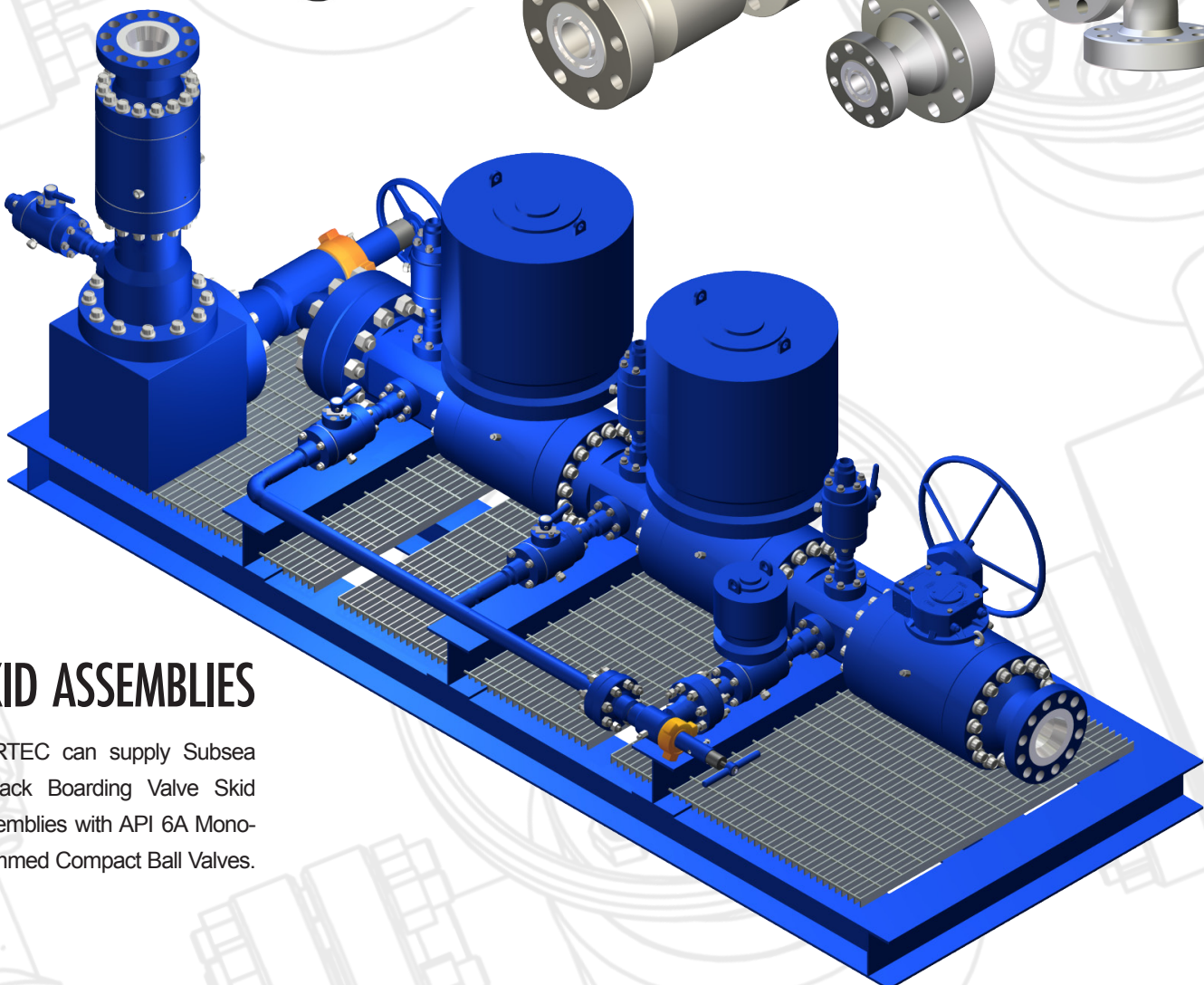
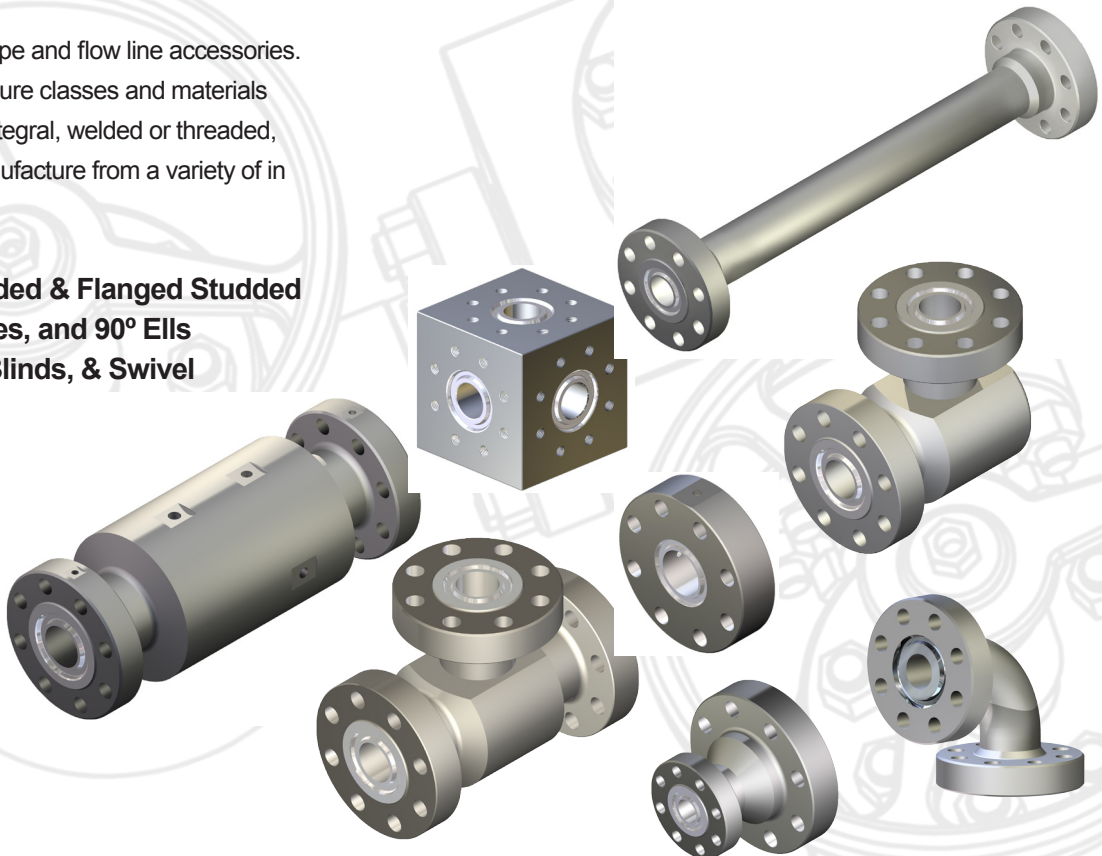
**Pneumatic Diaphragm
Actuator**

PIPING ACCESSORIES

API 6A PSL 1, 2 & 3

CORTEC can supply a variety of pipe and flow line accessories. We offer a full range of sizes, pressure classes and materials to suit most service applications. Integral, welded or threaded, CORTEC has the capability to manufacture from a variety of in stock materials.

- **Adaptors—Double Studded & Flanged Studded**
- **Integral—Pup Joints, Tees, and 90° Ells**
- **Flanges—Weld Necks, Blinds, & Swivel**
- **Adaptor Spools & Cross**
- **API Blocks—Tees & 90°**
- **Instrument Flanges**
- **Blast Joints**
- **Crosses**
- **Spools**



SKID ASSEMBLIES

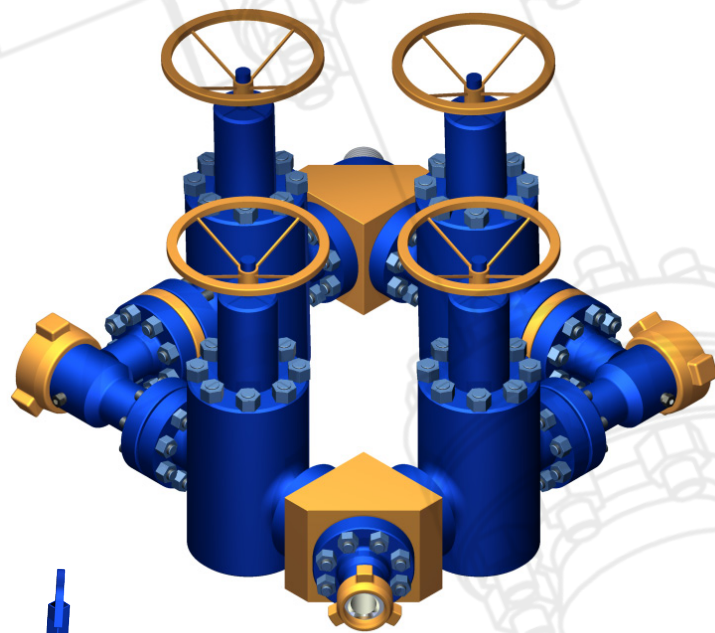
CORTEC can supply Subsea Tieback Boarding Valve Skid Assemblies with API 6A Monogrammed Compact Ball Valves.

MANIFOLD, SAND TRAPS & BALL/ PLUG CATCHERS

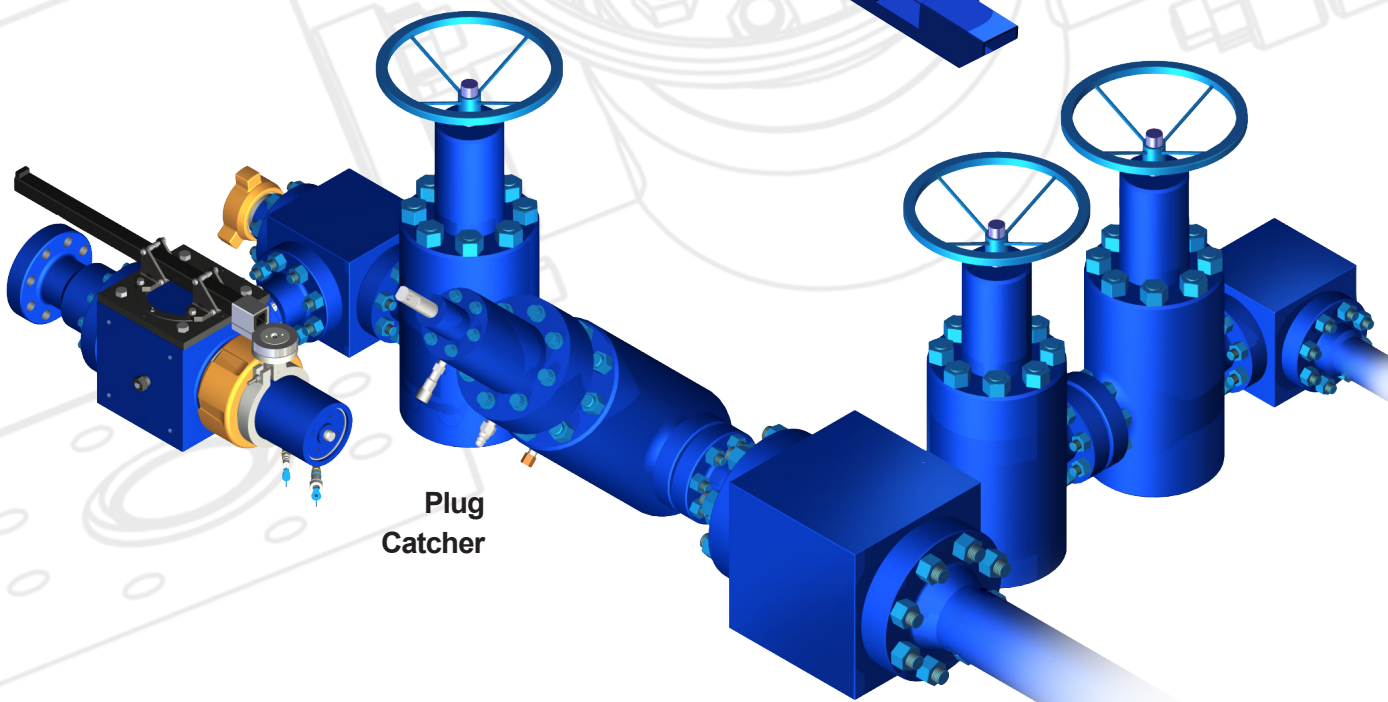
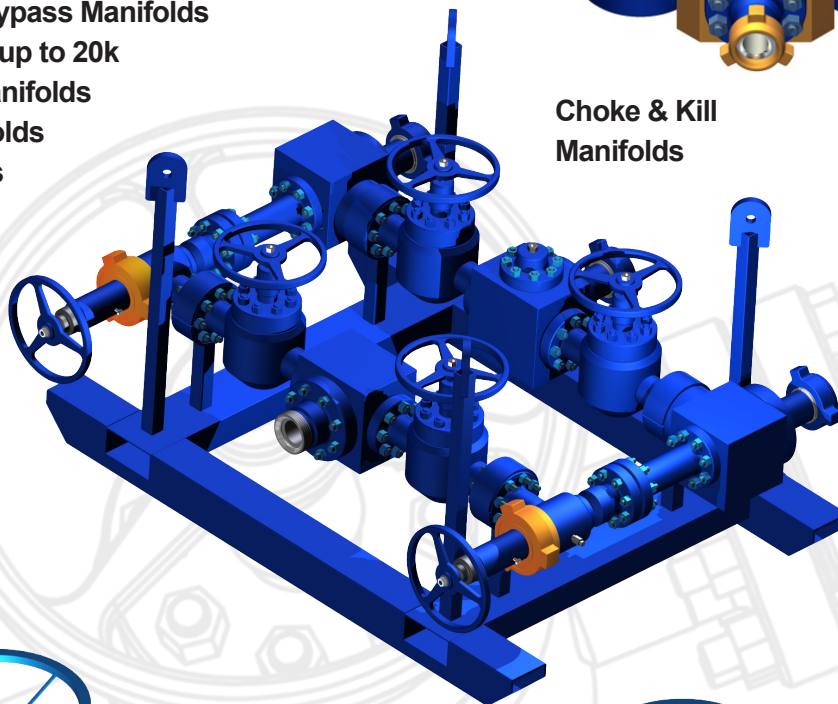
CORTEC has vast experience in the design and manufacture of various types of manifold systems. From land based drilling to offshore production, from well testing to portable choke and kill, CORTEC can design and build your manifold needs.

We utilize in-house engineering, design, machining and welding, which allows greater control over the quality, design, and manufacturing of the most complex manifolds.

- Under-balanced Drilling and Bypass Manifolds
- Diverter Manifolds 1" - 13-5/8" up to 20k
- Portable Well Test Squeeze Manifolds
- Portable Choke and Kill Manifolds
- Offshore Production Manifolds
- Ball / Plug Catchers
- Standpipe Manifolds
- Cement Manifolds
- Mud Manifolds
- Sand Traps



Choke & Kill
Manifolds



Plug
Catcher

CMS

CORTEC MANIFOLD SYSTEMS

CORTEC

FLUID CONTROL

TECHNOLOGY • EXPERIENCE • SERVICE

CORTEC has over 30 years experience in design & manufacturing of fluid control products while adapting to the changing oil & gas industry, & responding to its needs. CORTEC specializes in manufacturing high quality equipment for onshore, offshore & subsea applications.

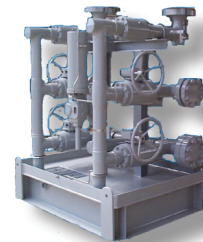
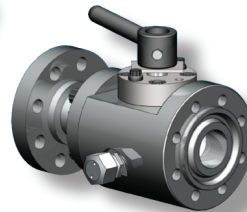
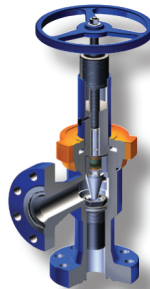


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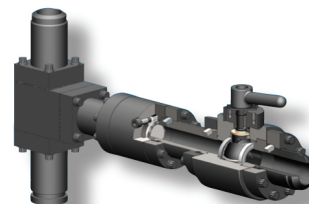
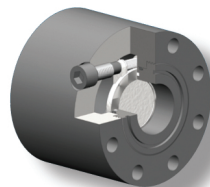
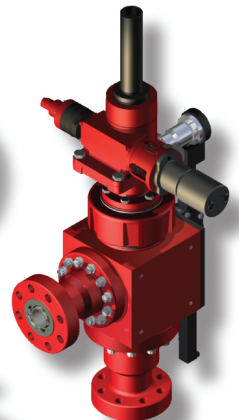
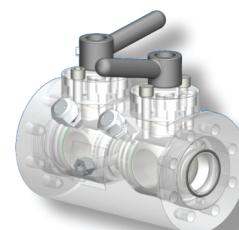
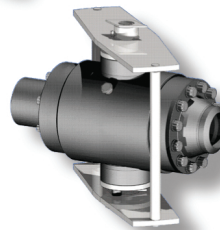
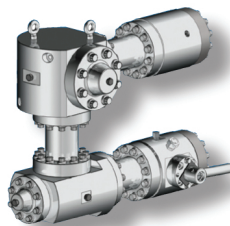
CORTEC
FLUID CONTROL



ISO-9001:2008



6A-0700



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