

Chokes



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WORLDWIDE OILFIELD MACHINE

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Adjustable Choke

Utilizing a Worldwide Manufacturing and Engineering presence, WOM Chokes offer affordable and long term solutions for various choke applications.

WOM Chokes are engineered and manufactured in compliance with the standards:

- API 6A / ISO 10423
- PR1 AND PR2
- ANSI B16.5
- NACE Mr0175
- ISO 9001/2008
- EN 10204
- API 16C



Applications and Industries served

- Production
- Flowback
- Water Injection
- Gas Injection and Gas Lift
- Chemical Injection
- Fracturing Clean Up
- High Pressure Drop Application
- Multi-Phase Flow Application
- Cementing
- Drilling Manifolds
- Gas Processing



Positive Choke



WOM Positive Choke

The simplest configuration of the choke, which has a blanking plug assembly and flow bean in a standard choke body provides fixed flow conditions with respect to the various size of choke flow beans. Choke flow beans have tapered entrance to provide a smooth flow with minimized turbulence and beans retain their accuracy for a longer period of time. Sizes of choke flow beans of both integral and fractional 64th are available.

Product Specification & Features

- Wing nut style bonnet enables quick tear down of bonnet assembly.
- Interchangeable components which gives maximum flexibility of choice by utilizing one body and changing beans, seats and top-work (bonnet) assembly to convert positive chokes to adjustable chokes and vice versa.
- Meet or exceed the minimum requirement specified by API 6A latest Edition

Applications

Used in X-mas trees, production applications, choke and kill manifold, well testing and clean up operations.

Adjustable Choke



WOM Adjustable Choke

Needle and Seat is one of the simplest design of adjustable chokes available. It has a standard choke body with an adjustable choke bonnet assembly and Seat. The major parts of the assembly are conical tip rising needle, stainless steel seat and an indicator calibrated in 1/64" increments to enable effective orifice diameters. In highly erosive service a tungsten carbide tipped needle and tungsten carbide lined seat can be supplied.

Needle and seat design is suitable for standard erosive and corrosive services, and less severe service (non-high vibration applications i.e. high gas rates, high solids, etc.) that do not require tight shutoff.

Product Specification & Features

- Wing nut style bonnet enables quick tear down of bonnet assembly.
- Interchangeable components provides a maximum flexibility of choice.
- Meet or exceed the minimum requirement specified by API 6A latest Edition

Applications

Used in X-mas trees, production applications, choke and kill manifold, well testing and clean-up operations.



Features and Benefits

- Interchangeable components provide a maximum flexibility of choice.
- Available in both manual and automated operation.
- Meet or exceed API 6A requirements.

Adjustable and Positive Choke Sizes

Available Sizes and Pressure Ratings

2" Nominal Body (1" Max orifice)						
Size / Pressure	2 K	3K	5K	10K	15K	20K
2 1/16"		X	X	X	X	X
2 9/16"			X	X	X	X
3" Nominal Body (2" Max orifice)						
Size / Pressure	2 K	3K	5K	10K	15K	20K
2 9/16"			X	X	X	X
3 1/8"		X	X			
3 1/16"				X	X	X
4 1/16"			X	X	X	
4" Nominal Body (3" Max orifice)						
Size / Pressure	2 K	3K	5K	10K	15K	20K
4 1/16"		X	X	X	X	
5 1/18"			X	X		

Specifications
Nominal Size 2" to 4"
Working Pressure Up to 20,000 PSI *May vary according to size
Temperature: -20 °F to 350 °F
PSL: 1-3
Material Class BB to HH
PR-2

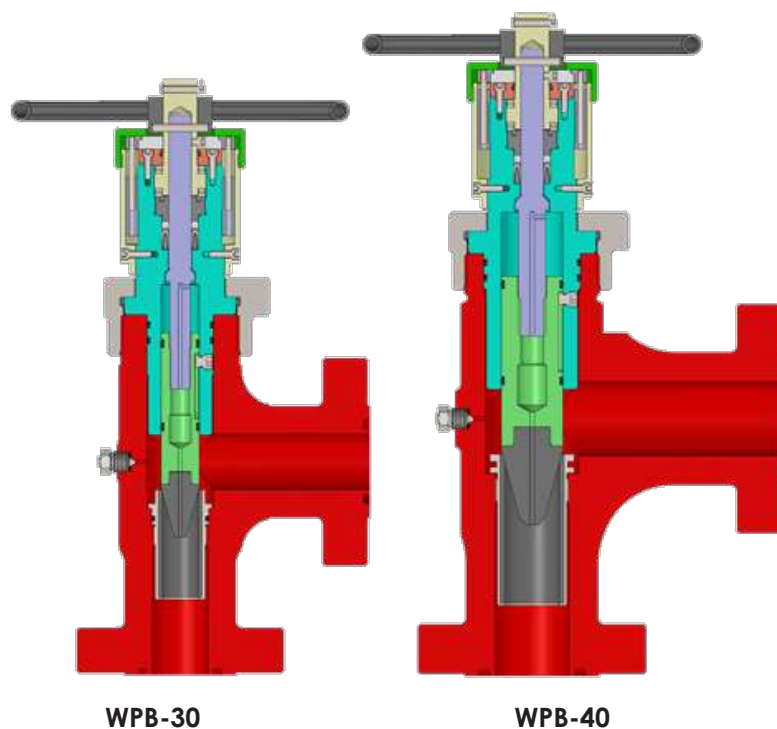


Pressure Balanced Adjustable Chokes

Model WPB-30 & -40

These are the improved version of standard needle & seat type chokes, where the operating torque is significantly reduced by balancing the pressure across the gate.

- Lower torque eliminates the requirement of gear box thus considerably reducing the number of turns to operate the choke.
- Elimination of gear box makes field maintenance easy. It also eliminates the possibility of over-torquing the stem, thus prevents the possible damage to the trim components.
- The indicator is designed to show the exact bean size in the window.
- Available in high pressure with larger trims i.e. 2" and 3" orifice.



Available Sizes and Pressure Ratings

Model	Available Orifice	Available Orifice (in fractions)	Working Pressure	Flange Size
WPB-30	2"	128/64"	API 10000 to 15000 psi	API 2-1/16" to 4-1/16"
WPB-40	3"	192/64"	API 5000 to 10000 psi	API 3-1/16" to 5-1/8"

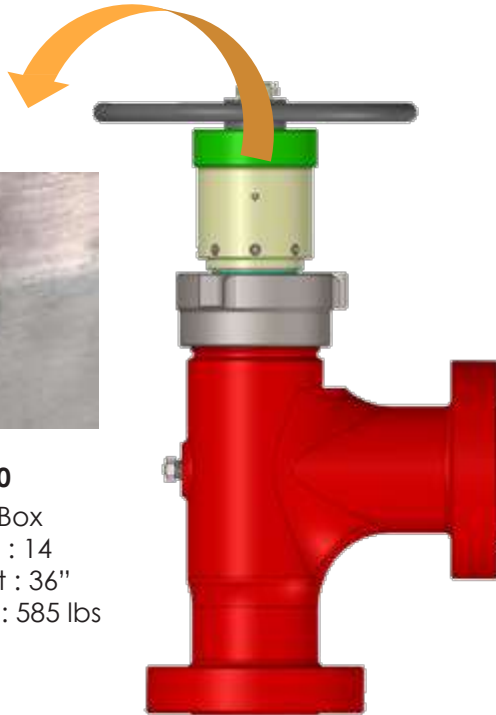


Pressure Balanced Adjustable Chokes Comparison



MODEL WPB-40

- W/O Gear Box
- No. of turns : 14
- Total Height : 36"
- Est. Weight : 585 lbs



Std. Adjustable Choke

- Comes with Gear Box
- No. of turns : 132
- Total Height : 51"
- Est. Weight : 700 lbs



WFB, WOM Flowback Chokes

The WOM Flowback choke, Model WFB is designed with Hammer Union connections and is well suited for fracking, flow back, and well service applications.

Available in both a 2" body with a 1" maximum orifice and a 3" nominal body with a maximum orifice size of 2".

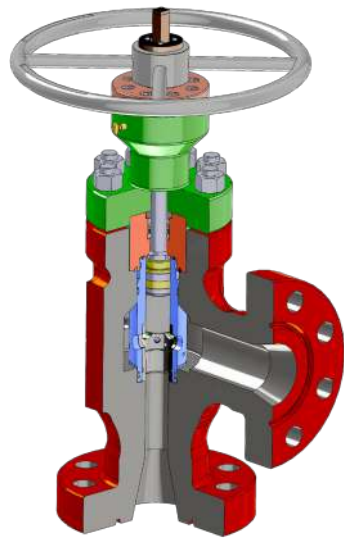


Adjustable Choke Specifications

End Type	Style	Connection Type	Temp	Service Type	Dim. A {in / mm}	Dim. B {in / mm}
Model : WFB-20 2" 1502F x 2" 1502M	0.75 Seat	Hammer Union	Low	Std.	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502F x 2" 1502M	0.75 Seat	Hammer Union	Low	H2S	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502M x 2" 1502F	0.75 Seat	Hammer Union	Low	Std.	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502F x 2" 1502F	0.75 Seat	Hammer Union	Low	Std.	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502F x 2" 1502M	1.00 Seat	Hammer Union	Low	H2S	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502M x 2" 1502M	1.00 Seat	Hammer Union	Low	Std.	9.91 / 251.7	6.06 / 153.9
Model : WFB-20 2" 1502M x 2" 1502F	1.00 Seat	Hammer Union	Low	Std.	9.91 / 251.7	6.06 / 153.9
Model : WFB-30 3" 1502F x 3" 1502M	2.00 Seat	Hammer Union	Low	Std.	11.88 / 301.8	8.38 / 212.9
Model : WFB-30 3" 1502F x 3" 1502M	2.00 Seat	Hammer Union	Low	H2S	11.88 / 301.8	8.38 / 212.9

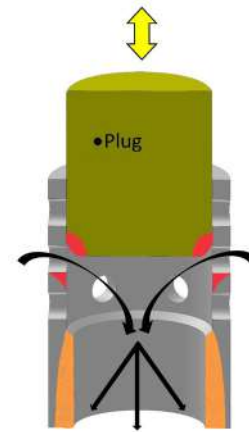


Plug and Cage Choke - WPC Series



Plug & Cage Trim

Plug moves up/down to vary hole opening area



■ Primary Wear
■ Secondary Wear

Plug and cage chokes are designed to provide accurate flow control throughout its operating range. The internal internally guided plug controls the opening and rate of flow. It is a robust design with its maximum flow capacity, making it ideal for oil production water injection and chemical injection services.

Product Specification & Features

- The WOM Plug and Cage style choke features a tungsten carbide cage as the throttling mechanism with a protective steel carrier around it.
- Outer Steel carrier is for protection against impacts from debris in the production fluid.
- The trim characteristics is equal percentage that provides superior flow control, however, WOM can provide the linear trim as well on demand.
- Pressure balanced trim considerably reduces the torque required to operate the choke.
- Plug is fully guided at the ID of sleeve and is rigidly attached to the stem to resist any induced vibration damage.
- Meet or exceed the minimum requirement specified by API 6A latest Edition

Applications

Plug and cage chokes are used for high capacity/Medium pressure drop application, Used in X-mas tree, process platforms, FPSOs.

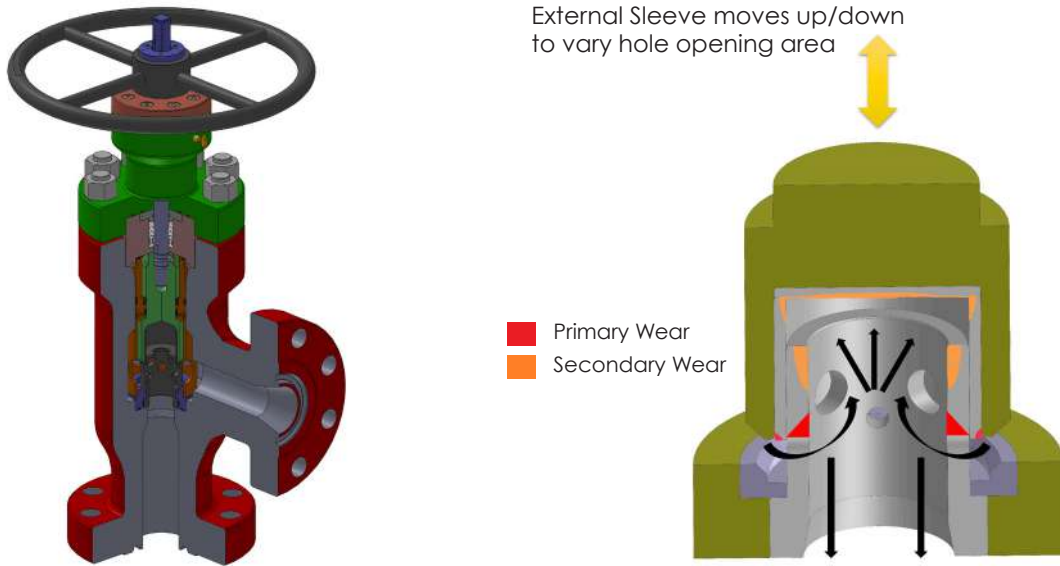
Plug and Cage Choke - WPC Series

Available Sizes and Pressure Ratings

CHOKE MODEL	NOMINAL SIZE	AVAILABLE TRIMS SIZES	AVAILABLE TRIMS SIZES FRACTIONS	WORKING PRESSURE	FLANGE SIZE
WPC20	2''	0.50''	32/64	API 5000 to 10000 PSI API 15000 to 20000 PSI ANSI 900# to 2500#	API 1-13/16'' to 3-1/16'' API 1-13/16'' to 2-1/16'' ANSI 2'' to 3''
		0.75''	48/64		
		1.0''	64/64		
WPC30	3''	0.50''	32/64	API 5000 to 10000 PSI API 15000 to 20000 PSI ANSI 900# to 2500#	API 2-9/16'' to 5-1/8'' API 2-9/16'' to 3-1/16'' ANSI 2'' to 4''
		0.75''	48/64		
		1.0''	64/64		
		1.5''	96/64		
		2.0''	128/64		
WPC40	4''	1.0''	64/64	API 5000 to 10000 PSI ANSI 900# to 2500#	API 3-1/16'' to 5-1/8'' ANSI 3'' to 5''
		1.5''	96/64		
		2.0''	128/64		
		2.5''	160/64		
		3.0''	192/64		
WPC60	6''	3.0''	192/64	API 5000 ANSI 900# to 1500#	4-1/16 to 7-1/16'' ANSI 4'' to 8''
		4.0''	256/64		
		5.0''	320/64		
		6.0''	384/64		



External Sleeve Choke - WES Series



External Sleeve Choke

External Sleeve chokes are designed to provide accurate flow control throughout its operating range. The externally guided sleeve controls the opening and rate of flow. The flow is directed upward away from the outlet, impinges on itself in the center of the flow cage which in turn isolates the body bore from incoming turbulent flow hence eliminating the body wear, making it ideal for low capacity/high pressure drop applications.

Product Specification & Features

- The seating is achieved through an isolated sealing element contact on a seat outside the flow cage.
- Pressure balanced trim considerably reduces the torque required to operate the choke.
- The trim characteristics is equal percentage that provides superior flow control, however, WOM can provide the linear trim as well on demand.
- Keeping the seat surface away from the high velocity flow protects the seat from throttling wear and the seat integrity is maintained.
- Meet or exceed the minimum requirement specified by API 6A latest Edition

Applications

External sleeve chokes are used in X-mas trees, gas lift applications, choke manifolds, well test applications, process platforms and FPSOs.

External Sleeve Choke - WES Series

Available Sizes and Pressure Ratings

CHOKE MODEL	NOMINAL SIZE	AVAILABLE TRIMS SIZES	AVAILABLE TRIMS SIZE FRACTIONS	WORKING PRESSURE	FLANGE SIZE
WES20	2''	0.50''	32/64	API 5000 to 10000 PSI API 15000 to 20000 PSI ANSI 900# to 2500#	API 1-13/16'' to 3-1/16'' API 1-13/16'' to 2-1/16'' ANSI 2'' to 3''
		0.75''	48/64		
		1.0''	64/64		
WES30	3''	0.50''	32/64	API 5000 to 10000 PSI API 15000 to 20000 PSI ANSI 900# to 2500#	API 2-9/16'' to 5-1/8'' API 2-9/16'' to 3-1/16'' ANSI 2'' to 4''
		0.75''	48/64		
		1.0''	64/64		
		1.5''	96/64		
		2.0''	128/64		
WES40	4''	1.0''	64/64	API 5000 to 10000 PSI ANSI 900# to 2500#	API 3-1/16'' to 5-1/8'' ANSI 3'' to 5''
		1.5''	96/64		
		2.0''	128/64		
		2.5''	160/64		
		3.0''	192/64		
WES60	6''	3.0''	192/64	API 5000 ANSI 900# to 1500#	4-1/16 to 7-1/16'' ANSI 4'' to 8''
		4.0''	256/64		
		5.0''	320/64		
		6.0''	384/64		

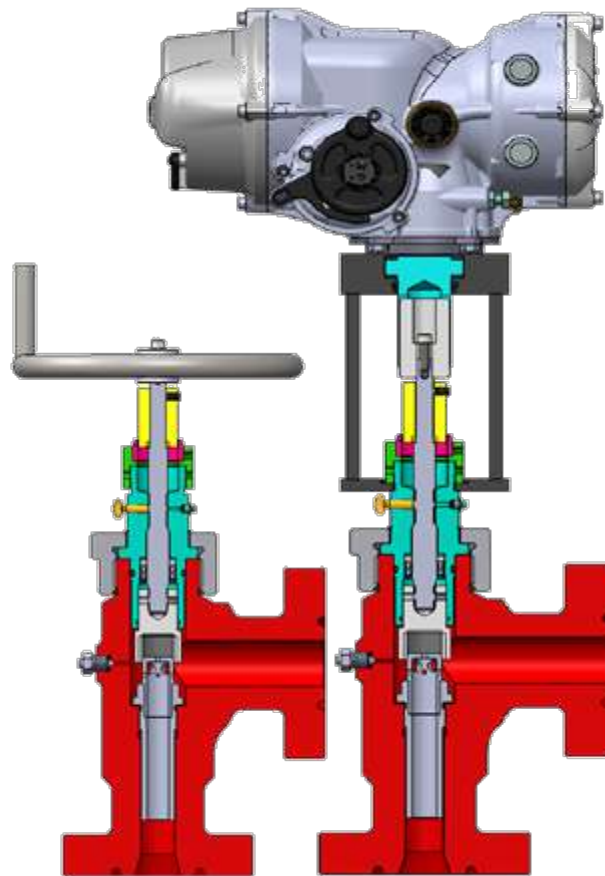


Model WES(H2)-20 & -30

WES(H2) series is an innovative modular design interconvertible between external sleeve, needle & seat and fixed bean choke design. It can also be easily converted from manual to actuator operated and vice-versa.

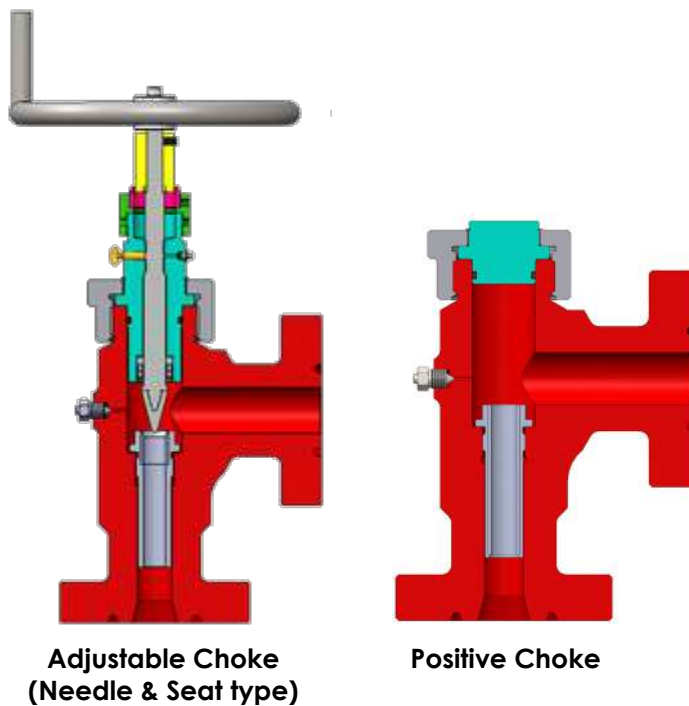
Model WES(H2) can be converted to needle and seat choke by replacing the stem and seat.

For WES(H2) chokes, conversion from a manual to an actuated choke does not require the choke to be dis-assembled thereby decreasing downtime.



**WES(H2)-20
Manual & Actuated**

Model WES(H2)-20 & -30

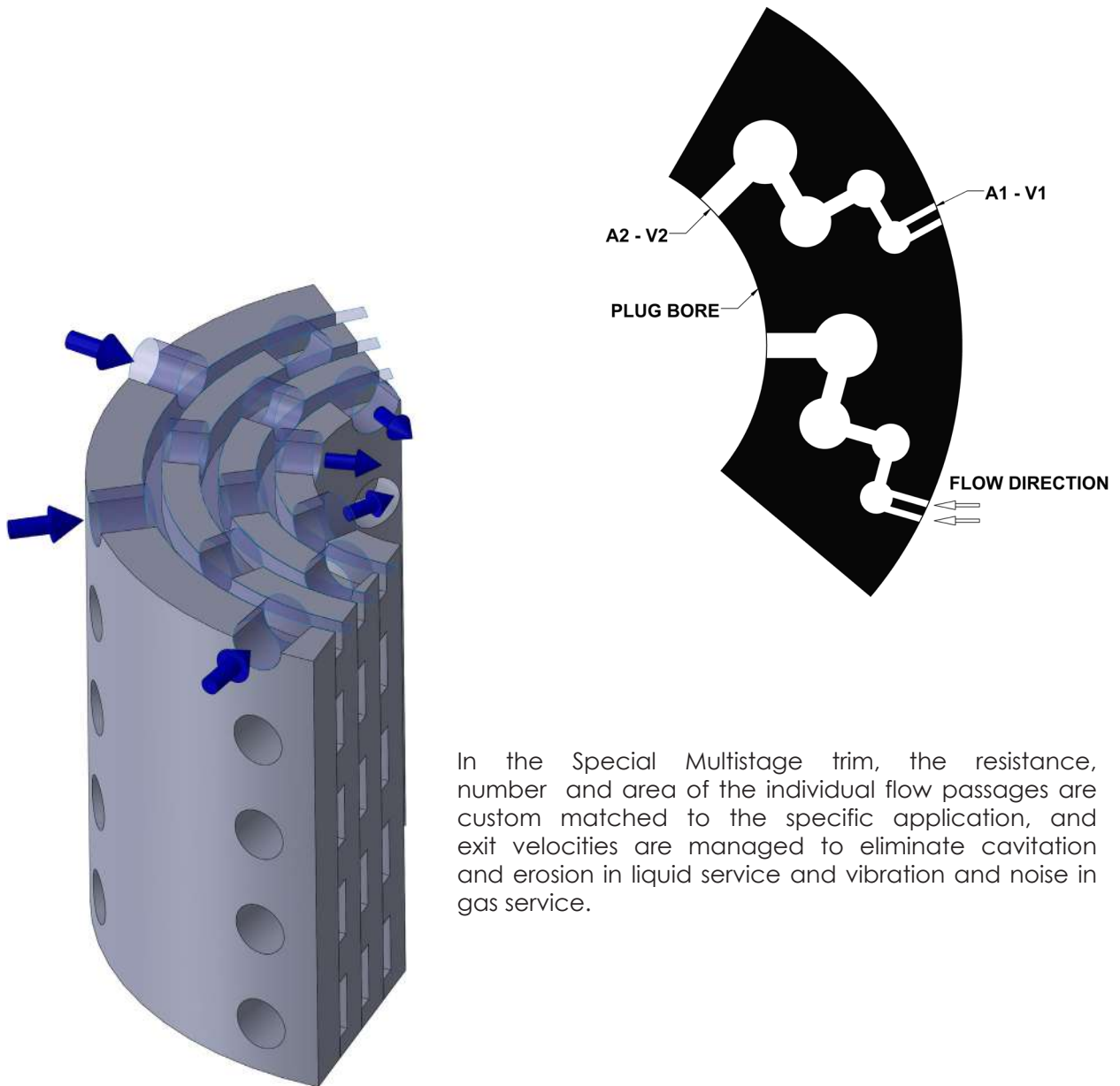


Available Sizes and Pressure Ratings

Model	Available Orifice	Available Orifice (in fractions)	Working Pressure	Flange Size
WES(H2)-20	.75"	48/64"	API 2000 to 15000 PSI	API 1-13/16" to 3-1/8"
	1"	64/64"		
WES(H2)-30	2"	128/64"	API 2000 to 10000 PSI	API 3-1/16" to 5-1/8"

Special Multistage Trim

Special energy dissipating, velocity controlled, disc stack trim can be provided as a solution to severe service applications. Including anti cavitation, high pressure drop, and low noise services.



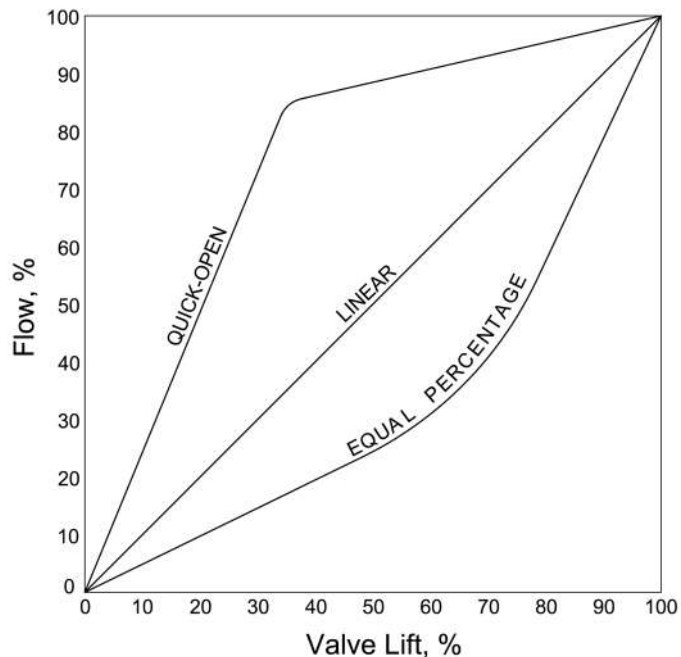
In the Special Multistage trim, the resistance, number and area of the individual flow passages are custom matched to the specific application, and exit velocities are managed to eliminate cavitation and erosion in liquid service and vibration and noise in gas service.

Control Flow

Trim Characteristics

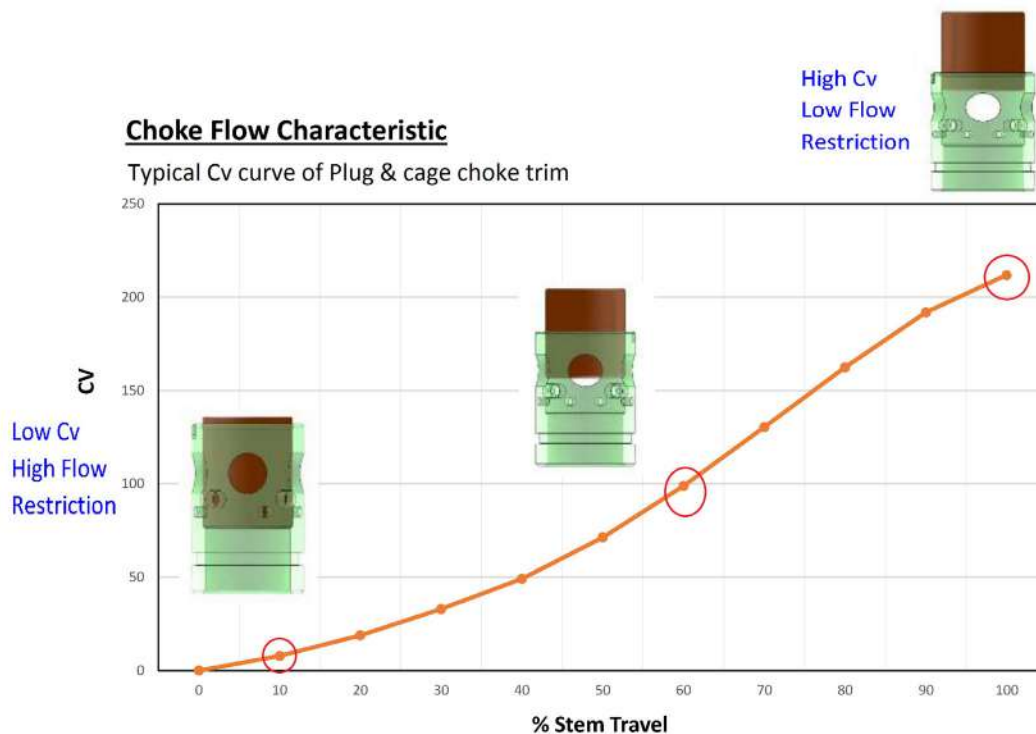
Choke flow control falls into three broad trim characteristics:

- Quick Opening
- Linear
- Equal percentage: Percentage of choke opening is equal to the percentage of change in the flow capacity. It is an exponential curve that has better flow controllability at low opening positions.



Choke Flow Characteristic

Typical Cv curve of Plug & cage choke trim



Drilling Chokes



WOM Manual Drilling Choke



WOM Hydraulic Drilling Choke

WOM drilling chokes offer the customer increased service life and cost savings in high pressure drilling operations especially where substantial amount of abrasive fluids are present. WOM Drilling chokes are designed to encounter large cuttings coming up with the drilling mud.

Product Specification & Features

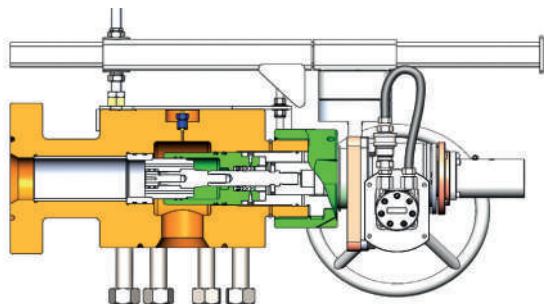
- Features cutting edge gate and seat design which reduces wear in extremely hostile flow conditions
- Reversible gate and seat design increases life of the choke.
- Pressure balanced trim considerably reduces the torque required to operate the choke.
- Large body cavity around trim components reduces the speed of the solids in the fluids, thus enhances the body life.
- Extended wear sleeve limits downstream erosion to the trim, protecting the body from damage.
- Meet or exceed the minimum requirement specified by API 16C latest Edition

Applications

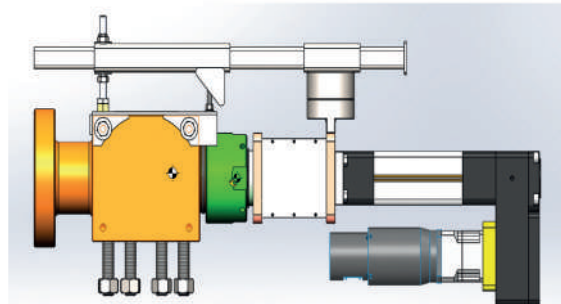
Their consistent performance has been proved in kick control, well testing, well clean-up and other harshest of conditions. Available in 1-3/4" orifice trim with 5,000, 10,000 and 15,000 PSI pressure ratings.



Magnum Choke



Hydraulic motor driven manual override



Linear Electric actuator driven (servo)

Magnum chokes offer the customer increased service life and cost savings in high pressure applications, extreme service conditions where the substantial amount of abrasives and debris are present. In extreme services/operations the magnum choke's robust design minimizes the operational downtime and equipment damages.

Product Specification & Features

- The magnum choke body can accommodate 3", 2" or 1.5" orifice with respect to change in process parameters. All sizes of trims are interchangeable within the same choke body.
- Optional manipulator system allows the operator to slide and swing the bonnet assembly for quick tear down for trim changes.
- Designed to provide tight shut off.
- Pressure balanced trim considerably reduces the torque required to operate the choke.
- Large body cavity around trim components reduces the velocity of the solids in the fluids, thus enhances the body life.
- Extended wear sleeve limits downstream erosion to the trim, protecting the body from damage.
- Gate is fully guided by the Bonnet Extension which can be rotated with respect to bonnet to shift the surface wear
- Meets or exceeds the requirement specified by API6A and API 16C.

Applications

Used for extreme applications like flow back, drilling, choke & kill, coil tubing, well control & snubbing.

Available Sizes and Pressure Ratings

Magnum Choke

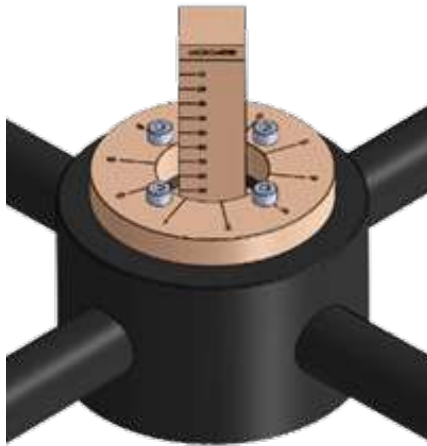
Nominal Size	API Pressure Range (Psi)	Max.orifice Size
2"	5000-20000	1.5" or 2"
3"	5000-15000	1.5" or 2" or 3"
4" to 7"	5000-15000	3"



Additional Features

Pressure Balancing Hole

Pressure balance hole is provided in all WOM choke valves so as to equalise the pressure around the Stem Seal which reduces the stem load & in turn the torque required to operate the valve.



Micrometer Indicator

Linear allowance in the Micrometer Indicator marking for easy calibration of the Indicator after assembly.

Large visual Dial Indicator for easy operation.

Stem Travel, % Open and Bean Size are shown on the Indicator Marking for easy & correct positioning of the valve.

Thumb Screw

Thumb Screw maintains set position of the Stem by resisting rotation of the drive nut.



Stem Packing & LIP Seals

Spring energized lip seals with scrapers used for dynamic seals enhance reliability of stem packing and pressure balance sealing.

Standard Materials of Construction

API 6A Material Class and Material						
Item	AA, BB	EE - 1.5	EE	CC, FF 1.5	FF	HH
Body Bonnet	AISI 4130	AISI 4130	AISI 4130	AISI 410 SS or Grade F6NM SS	AISI 410 SS or Grade F6NM SS	AISI 4130 w/ Alloy 625 Cladding
Stem	AISI 410 SS	AISI 410 SS	INC 718 or INC 725	AISI 410 SS or INC 718	INC 718 or INC 725	NC 718 or INC 725
Bolting	ASTM A320 L7	ASTM A320 L7	ASTM A320 L7	ASTM A320 L7	ASTM A320 L7	ASTM A320 L7
Seat, Cage, External Sleeve, Plug	AISI 410 SS and Tungsten Carbide	AISI 410 SS and Tungsten Carbide	AISI 410 SS and Tungsten Carbide	AISI 410 SS and Tungsten Carbide	AISI 410 SS and Tungsten Carbide	CRA 718 / 725 / 625 and Tungsten Carbide
Stem Packing	PTFE / Elastomeric	PTFE / Elastomeric	PTFE / Elastomeric	PTFE / Elastomeric	PTFE/ Elastomeric	PTFE/ Elastomeric

Notes:

- 1 - H₂S concentration as defined by ISO 15156 (NACE MRO175)
- 2 - H₂S no limit as defined by ISO 15156 (NACE MRO175)
- 3 - Material selection subject to change and review

API Classification	Operating Temperature			
	Min (C)	Max (C)	Max (F)	Min (F)
L	-46	82	-50	180
N	-46	60	-50	140
P	-29	82	-20	180
S	-18	60	0	140
T	-18	82	0	180
U	-18	121	0	250
X	-18	180	0	350



WORLDWIDE OILFIELD MACHINE



VALVES & CONTROLS
A WOM group company



Magnum Technology Center
A WOM Group Company

We are Worldwide Oilfield Machine (WOM) - a global company pioneering Flow Control Solutions for the Surface & Subsea sectors of the oil & gas industry. Headquartered in Houston, Texas, we have manufacturing facilities, engineering centers, sales offices and assembly/testing workshops all over the world.

Our strength is our robust infrastructure that allows us complete control over quality, costs and delivery. With more than 20 patents and noted accreditations, our very own R&D facilities and 24x7 service centers across the globe we have the required capabilities & resources to deliver all your manufacturing needs for the industry.

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