Choke Valves

SMART IN FLOW CONTROL

INTRODUCTION

Ringo Válvulas (RV) is located in the industrial city of Zaragoza, Spain. Since its establishment, RV has designed and manufactured its own cast and forged choke valves. Our experience of over 40 years in the upstream industry is the key to our international success and recognition. We export more than 75% of our production all over the world.

Contrary to other types of valves, the function of choke valves is to absorb a fraction of the inlet pressure to modulate the fluid pressure under control. During this process the kinetic energy generated by the pressure drop is translated into turbulence, heat, vibration and noise, which can cause significant wearing of several valve components.
Ringo Válvulas choke valve series includes single staged choke valve for non-critical process conditions to special multi-staged designs to work under the most severe services.

The company has extensive, modern facilities of over 12,000 m^2 (130,000 ft^2) with state-of-the-art installations and equipment for the assembly, testing and inspection of chokes according to API 6A, including bunker with test bench to perform High Pressure Gas tests.

RINGO CHOKES FEATURES

Ringo is API 6A certified for production and testing of chokes according to all Product Specification Levels: PSL1, PSL2, PSL3, PSL3G and PSL4 as well as for the two different Product Requirements: PR1 and PR2, depending on service and customer requirements. In addition, our chokes can be design and produce according to other different standards on request, such as ASME B16.34 or GOST.

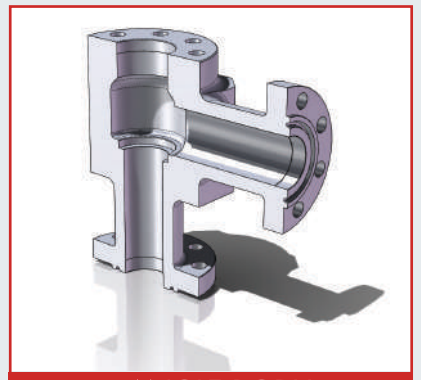
Pressure Rating	Temperature Rating	Characteristic	Shut-Off Class
ASME 150# - 4500# / API 2000 - 15000 PSI CWP	-59° to 560° (-74°F to 1040°F) API Temperature Classifications K,L,N,P,R,S,T,U,V,X,Y	Equal Percentage, Linear, On-Off	ANSI/ FCI Class IV (ANSI/ FCI Class V and VI as optional)

Material Class	Minimum Materials Requirements	
	Body, Bonnet, End & Outlet Connections	Pressure - Controlling Parts, Stems & Mandrel Hangers
AA - General Service	Carbon or Low-alloy Steel	Carbon or Low-alloy Steel
BB - General Service	Carbon or Low-alloy Steel	Stainless Steel
CC - General Service	Stainless Steel	Stainless Steel
DD - Sour Service[a]	Carbon or Low-alloy Steel[b]	Carbon or Low-alloy Steel[b]
EE - Sour Service[a]	Carbon or Low-alloy Steel[b]	Stainless Steel[b]
FF - Sour Service[a]	Stainless Steel	Stainless Steel[b]
HH - Sour Service[a]	CRAs[bcd]	CRAs[bcd]
ZZ - Sour Service	User Defined	User Defined

a As defined by NACE MR0175/ISO 15156 in compliance with NACE MR0175/ISO 15156.
b In compliance with NACE MR0175/ISO 15156.
c CRA required on retained fluid wetted surfaces only. CRA cladding of low alloy or stainless steel is permitted.
d CRA as defined in Clause 3 of this International Standard. NACE MR0175/ISO 15156 definition of CRA does not apply.

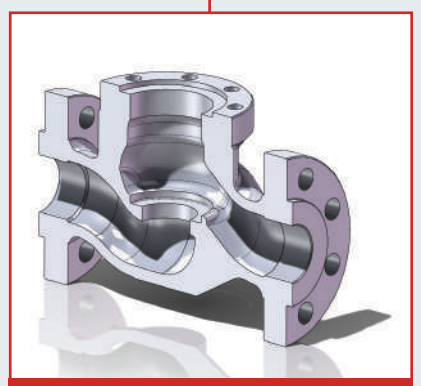
Body materials	Carbon Steel: A216-WCB/A105/4140/4130 Cr-Mo Alloy Steel: A217-WC6, A217-WC9/A182-F27/A182-F11 Cr-Mo-V Alloy Steel: A217-C12A, A182-F91 Stainless steel 18% Cr: A351-CF8M, A351-CF8C/A182-316/A182-347 Cr + Ni Stainless steels: Alloy 20, A351-CK3MCuN, A182-F44 Duplex: A890 Gr 4A, A182 F51 Super Duplex: A890 Gr 6A, A182 F53, A182 F55 Nickel based alloys, Hastelloy, Inconel: Monel Titanium
Cladding and Overlays	Stellite: Hardness HRC 45 RC & Maximum working temperature 500°C Tungsten carbide: Hardness HRC 74 RC & Maximum working temperature 550°C Chromium carbide: Hardness HRC 68 RC & Maximum working temperature 870°C Inconel: Hardness HRC 23 RC & Maximum working temperature 700°C
Trim materials	Martensitic: A276-410, A276-420 Austenitic: A276-316 Cr+Ni Stainless steels: Alloy 20, A182-F44 Duplex A182-F51, Super Duplex A182-F55 Nicket based alloys, Hastelloy, Inconel, Monel Titanium
Full tungsten carbide trims	Where high hardness is required (dirty fluids with particles). Produced by sinterization.

Other materials are available on request

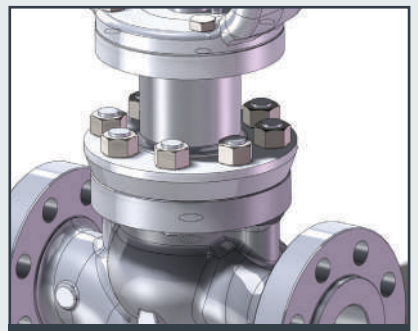


ANGLE BODY

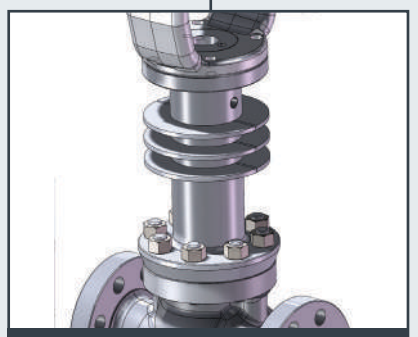
AXIAL BODY



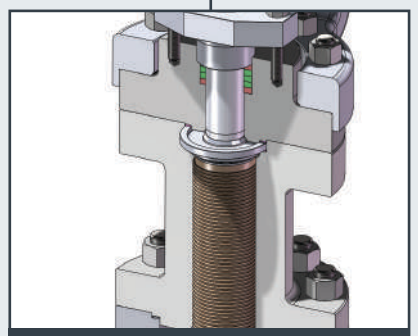
GLOBE BODY



BOLTED BONNET

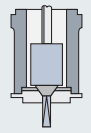
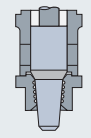
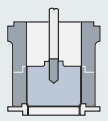
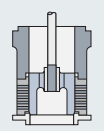
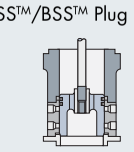
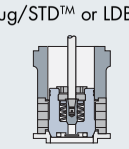
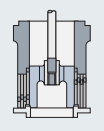


EXTENDED BONNET



BELLOW SEAL

	GENERAL SERVICE TRIM			
	TRIM CHARACTERISTIC	ANSI B16.104-76 RATED SEAT LEAKAGE	TEMPERATURE LIMIT	APPLICATIONS
POSITIVE			550°C (1022°F)	Fixed pressure drop
ADJUSTABLE	• Equal percentage • Modif. Equal percentage	Class IV STD Class V STD	550°C (1022°F)	Variable pressure regulation

SEVERE SERVICE TRIM				
TRIM TYPE	TRIM CHARACTERISTIC	ANSI B.16.104-76 RATED SEAT LEAKAGE	TEMPERATURE LIMIT	APPLICATIONS
MINIFLOW™ 	• Modf. Equal percentage	Class IV STD Class V OPT	550°C (1022°F)	• Very low flows • Tight shut-off • Modulating and on-off applications
MULTISTEP™ 	• Equal percentage • Modf. Equal percentage	Class IV STD Class V STD	550°C (1022°F)	• Most basic plug type • Low flows
USS/STD™ or LDB™ Cage 	• Linear • Equal percentage	Class IV STD Class V OPT Class VI OPT	550°C (1022°F)	• Most basic plug type • Low noise (with LDB™ Cage) • Modulating and on-off control • For flashing service
BSS/STD™ or LDB™ Cage 	• Linear • Equal percentage	Class IV STD Class V OPT Class VI OPT	250°C (482°F)	• Low and medium pressure drop • Tight shut-off • Low noise (with LDB™ Cage) • Modulating and on-off control • Small actuators • General purpose applications
		Class II STD Class III OTP	550°C (1022°F)	
CAVLESS™/BSS™ Plug 	• Linear	Class IV STD Class V STD Class VI OPT	250°C (482°F)	• Medium and large flows • Cavitating and flashing service • Feedwater systems • Condensed systems • 2 phase flows
		Class II	550°C (1022°F)	
PILOT Plug/STD™ or LDB™ Cage 	• Linear • Equal percentage	Class V STD	550°C (1022°F)	• High temperature service • Medium and large flows • Tight shut-off • Low noise (with LDB™ Cage) • Steam dump
MULTICYL™ /BSS™ Plug 	• Linear • Equal percentage	Class IV STD Class V STD Class VI OPT	250°C (482°F)	• High pressure drop • Large flows • Very critical pressure drop steam or gas application • Very high pressure drop liquid applications for proventing cavitation and trum erosion damage
		Class II	550°C (1022°F)	

PNEUMATIC

HYDRAULIC

ELECTRIC

ELECTRO-HYDRAULIC

STEPPING/MANUAL

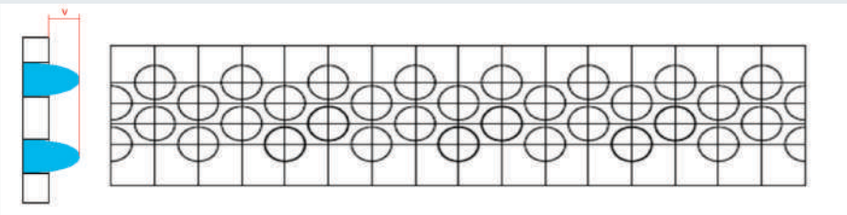
BODY

BONNET

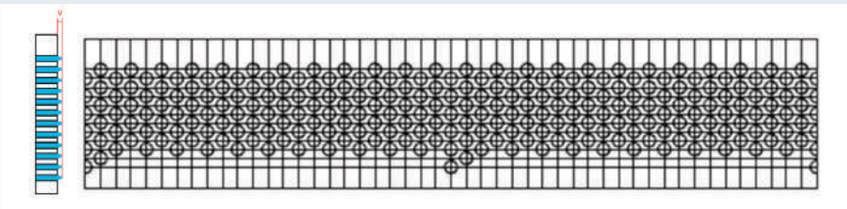
TRIM SERVICE

ACTUATORS

SEVERE SERVICE AJUSTABLE CHOKES



Hole distribution for STD cage and its related velocity jet stream



Hole distribution for LDB cage and its related velocity jet stream

STD ™ Cage:

Multi-hole cage for non-critical modulating service.

LDB ™ (LOW_{dB}):

Multi-hole cage with small hole pattern to reduce noise level by decreasing jet diameter and increasing f_p.

Contoured trim

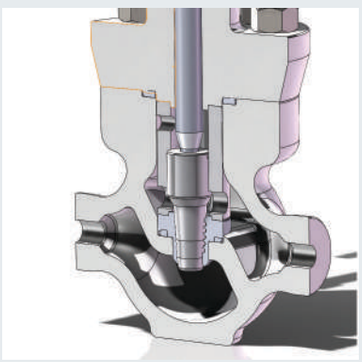
Single stage contoured trim utilizing top and seat guiding for maximum stability while also providing an open flow path to prevent solid particles, such as sand, from getting "trapped." Both seat and plug as well as optionally available downstream wearing sleeve are made using solid wear resistant materials, such as tungsten carbide, providing exceptional service life under the most extreme conditions.

Multi-stage Solutions

MULTISTEP ™

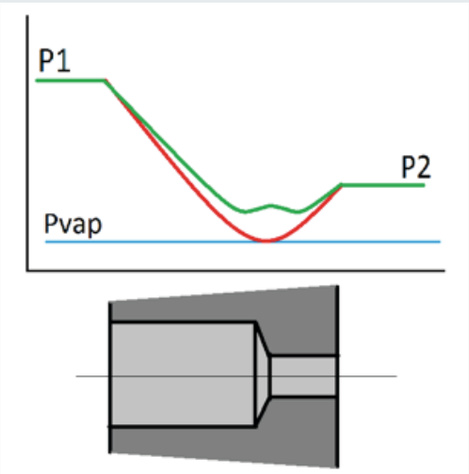
Multistaged trim for small Cv values, normally used for choke valves of small sizes. In addition can be added to other plug types to provide high rangeability (up to 1:200) and multi-stage effect for start up conditions at low stroke, where other common multi-stage system has no effect.

Available in *Flow Over the seat* and *Flow Under the seat* configuration.



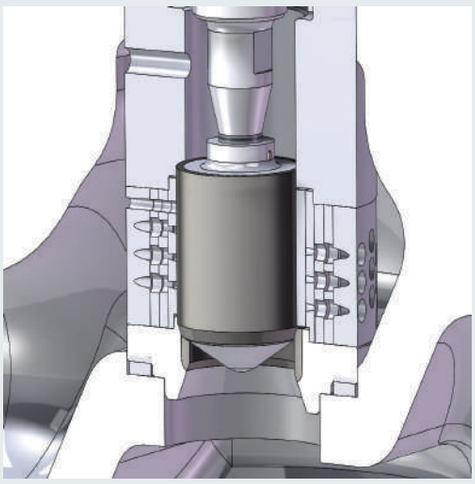
CAVLESS ™

CAVLESS ™ cage has a double drilled series of radial holes, which provides a nozzle effect. The design can control the location of the vena-contracta and therefore control the location where cavitation occurs. When the plug is throtling a number of nozzles will be uncovered and the resulting jet stream of cavitation liquid will be directed into the cage center. This diverts the harmful effects of cavitation away from the plug and cage. Only available in Flow Over the seat configuration.



MULTICYL ™

With our MULTICYL ™ cage the fluid goes through a staged pressure reduction process, utilizing as many stages as necessary to keep pressure drop under critical values.
We have the expertise to calculate, design and manufacture the MULTICYL ™ trim with the necessary number of stages to have xT and Fl as higher as required by process conditions.
Only available in *Flow Under the seat configuration*.



CROSSTEP ™

CROSSTEP ™ design behaves as a multistep pressure reducing cage with multidisc stack construction, the crossings being the equivalent of the restrictions-expansions with the advantage of a lower pressure recovery.
The cross-sectional area of the channels, the number of channels per disc, the impinging angle at every crossing and the number of crossings, are calculated to best suit every particular set of conditions.

SAMSON

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N NPT

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