

CAPPING VALVE, SERIES PZ

Metso capping valves provide for automatic opening and closing of batch digesters for chip fill. Complete accessories for computer control are furnished in the assembly. Over 2000 units are in use at pulp mills around the world.

DESIGN FEATURES

The unique design features of PZ valves offer benefits in installation, productivity and safety.

A preloading device assists the ball to the seat with the desired pressure for tight sealing. No adjustments are needed.

The preloading device is outside the body to prevent chips and liquor from causing hazards.

Fits straight onto digester flange

The lower body half can be modified in accordance with the digester flange dimensions and standards.

High reliability and endurance

PZ capping valves have metal to metal seating and a true STEMBALL®. In this design the ball and stem are made in a single piece for high reliability and endurance. Thanks to the single seat design, there is a spare seating surface available when the ball is turned 180°. The body joint accommodates a continuous gasket between the flanges.

No damage caused by occasional overfills

The Stemball® has a rear stem and a support to prevent sideways movement of the ball when closing against chips.

Added assurance, no supervision

Valves enable secure operation and full automation. To help prevent unintended operation when the digester is pressurized, an assembly of two independent interlocks including sensitive pressure switches is normally supplied.

Increased productivity

Quick opening and closing make the valve efficient. Chip filling is efficient because the valve has a full bore ball. The ball flow path is provided with a liner insert to allow smooth passage of the chips for fast filling.



Fast return on investment

An investment in capping valves soon pays off. Low maintenance and long service life can be expected.

Savings are achieved because filling time and labour costs are reduced. If we estimate that the cooking circulation cycle is reduced by 8 minutes and the time between fillings is 5 hours, then the increase in production at the average mill will be 2.5%. The daily increase for a mill producing 130,000 t/a would be 10 tons.

Nominal sizes and pressure ratings

Metso capping valves are manufactured in PN 16 and ASME CLASS 150 pressure ratings in the following sizes:

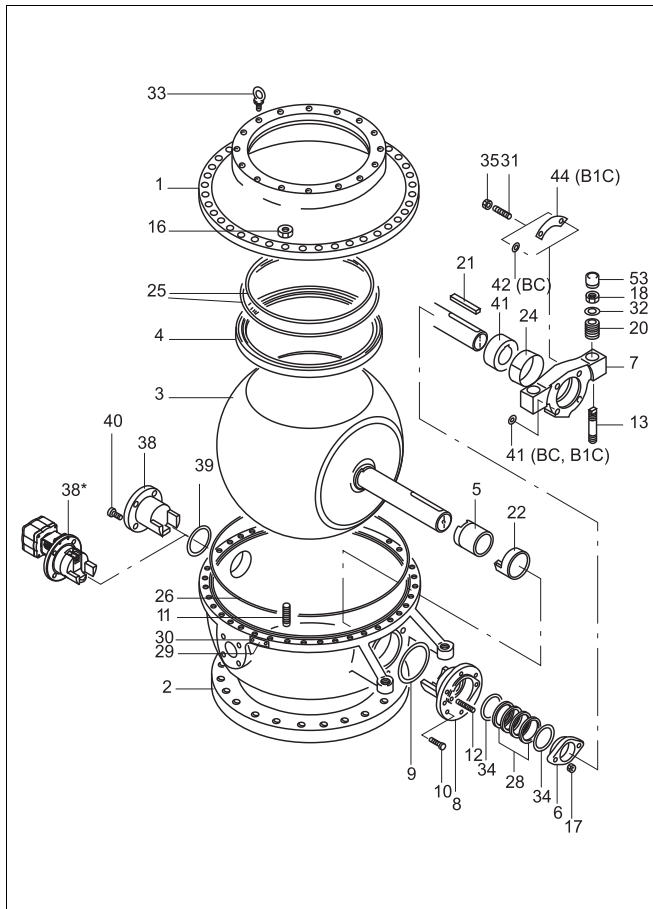
- DN 500 or 20 inch
- DN 600 or 24 inch
- DN 750 or 30 inch

The lower flange of the valve is custom-made to match the digester neck at the mill.

Operation

The capping valve is normally operated with a Metso pneumatic actuator. If required, a hydraulic or electric actuator can be used instead. A variety of limit switches can also be supplied.

ASSEMBLY DRAWING



PARTS LIST

ITEM	QTY	PART DESCRIPTION	MATERIAL
001	1	BODY UPPER PART	ASTM A351 gr. CF8M
002	1	BODY LOWER PART	ASTM A351 gr. CF8M
003	1	BALL	ASTM A351 gr. CF8M + HCr
004	1	BALL SEAT	AISI 316 + ALLOY 50 Nb
005	1	BEARING BUSHING	AISI 316 + HCr+PTFE
006	1	GLAND	ASTM A351 gr. CF8M
007	1	CONSOLE	EN 10025-S355J2G3 + ENP
008	1	BONNET	ASTM A351 gr. CF8M
009	1	SPIRAL GASKET	AISI 316 + PTFE
010	6	HEXAGON SCREW	ISO 3506 A4-80
011	(40)	STUD	ASTM A193 gr. B8M
012	2	STUD	ASTM A193 gr. B8M
013	2	STUD	AISI 316
016	(40)	HEXAGON NUT HEAVY	ASTM A194 gr. 8M
017	2	HEXAGON NUT	ISO 3506 A4-70/80
018	2	HEXAGON NUT HEAVY	ISO 3506 A4-70/80
020	(24)	DISC SPRING	EN 10083-1.8159
021	1	KEY	UNS S31803
022	1	BEARING BUSHING	UNS S21800
024	1	BEARING STRIP	PTFE + C25
025	2	SEALING CORD	PTFE
026	1	SEAL STRIP	PTFE
028	4	PACKING RING	PTFE
029	1	IDENTIFICATION PLATE	AISI 304
031	(8)	STUD	TYPE AISI 329
032	2	ADJUSTING PLATE KIT	AISI 316
033	4	LIFTING EYE BOLT	ASTM A576 gr. 1015
034	2	SUPPORT RING	PTFE + C25
035	(8)	HEXAGON NUT	CARBON STEEL + ZINC + PASS.
038	1	SUPPORTER	ASTM A351 gr. CF8M
038*	1	REAR TILTING DEVICE	ASTM A351 gr. CF8M
039	1	SPIRAL GASKET	AISI 316 + PTFE
040	4	HEXAGON SCREW	ISO 3506 A4-80
041	1	BEARING RING	TYPE AISI 329
042	(6)	WASHER	CARBON STEEL + ZINC + PASS.
044	1	RETAINER PLATE	AISI 316
053	2	PROTECTION COVER	AISI 304

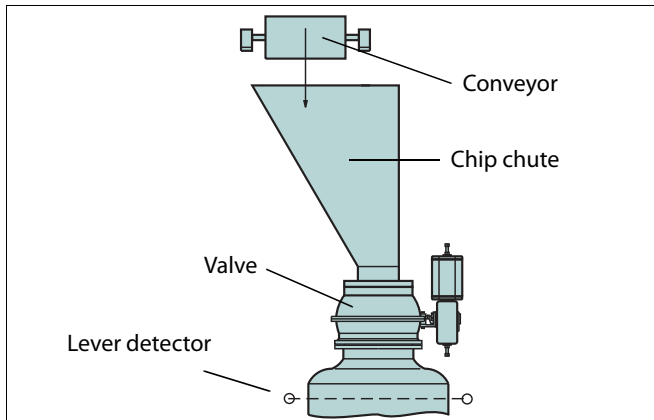
() Quantities are related to valve size above numbers are for DN 600/24"

TECHNICAL SPECIFICATIONS

<p>Product type</p> <p>Full-bore ball valve Ball and stem integrally cast Split-body design Single metal-seat design Customer-fit lower flange</p> <p>Pressure ratings</p> <p>PN 16 and ANSI 150 for the body</p> <p>Size range</p> <p>DN 500, 600 (750) / 20", 24" (30") Indication of the nominal size for the lower flange given in the second part of the size code, for example, 500/600.</p> <p>Temperature range</p> <p>... +200 °C / 390 °F</p> <p>Design standards</p> <p>Valve body: ANSI B 16.34 Body joint: ASME VIII Valve flanges: Upper flange acc. to dimensional drawings, page 3 Lower flange as ordered by customer</p> <p>Standard materials</p> <p>Body halves: ASTM A 351 gr. CF8M Ball: ASTM A 351 gr. CF8M + hard-chrome Bearings: Hard-chromed PTFE + UNS S21800 Seat: AISI 316 + Cobalt based alloy</p>	<p>Standard delivery includes</p> <p>Factory-adjusted preloading device. Linear insert in the flow opening of the ball. Piston-type actuator (pneumatic).</p> <p>Options</p> <p>Pressure switches for safety interlocks. Water flushing for ball surface. Rear tilting device.</p> <p>Certification</p> <p>EN 10204 3.1 material certificates for body halves, ball and bonnet. Tightness test certificate.</p> <p>Valve testing</p> <p>Each valve is tested for body and seat tightness. The test pressure for the body is 30 bar (1.5 x PN). The seat tightness testing is carried out with both air and water. Test pressures are: with air 0.7 and 5.6 bar / 10 and 82 psi with inhibited water 6 and 20.6 bar. / 87 and 299 psi.</p>
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CHIP FEEDING ARRANGEMENT

The figure depicts the chip flow from a belt conveyor. A 15 degree angle prior to the valve achieves the best filling behaviour in cases where excessive air has to escape through the valve (upwards).



There must be efficient air removal when steam is used for packing the chips. Steam packing increases chip filling by 20-40% for each charge. Air evacuation requires screens inside the digester and a blower (fan) specially designed for this purpose.

INTERLOCKING

The primary devices of the system are two separate pressure switches. Their preset pressure can be low. Operation of the solenoid valves is virtually impossible when the digester is under pressure. The function of the packing steam valve can also be tied to this interlocking system.

DETERMINING PORT SIZE FOR BATCH DIGESTER CAPPING VALVES

The required port size for a Metso capping valve is determined by the digester volume and the desired filling time. The port area required for a ball capping valve using conveyor belt chip transport can be closely estimated when the required chip volume, filling time, and conveyor speed are known.

The following tables assist in selecting a capping valve.

Target filling time	Fill rate	Valve size
Digester volume 120 m ³ / 4200 ft ³		
25 minutes	4.8 m ³ /min / 169 ft ³ /min	DN 500/20"
Digester volume 160 m ³ / 5600 ft ³		
30 minutes	5.3 m ³ /min / 187 ft ³ /min	DN 600/24"
35 minutes	4 m ³ /min / 141 ft ³ /min	DN 500/20"
Digester volume 200 m ³ / 7000 ft ³		
30 minutes	6.7 m ³ /min / 236 ft ³ /min	DN 600/24"
40 minutes	5 m ³ /min / 176 ft ³ /min	DN 600/24"

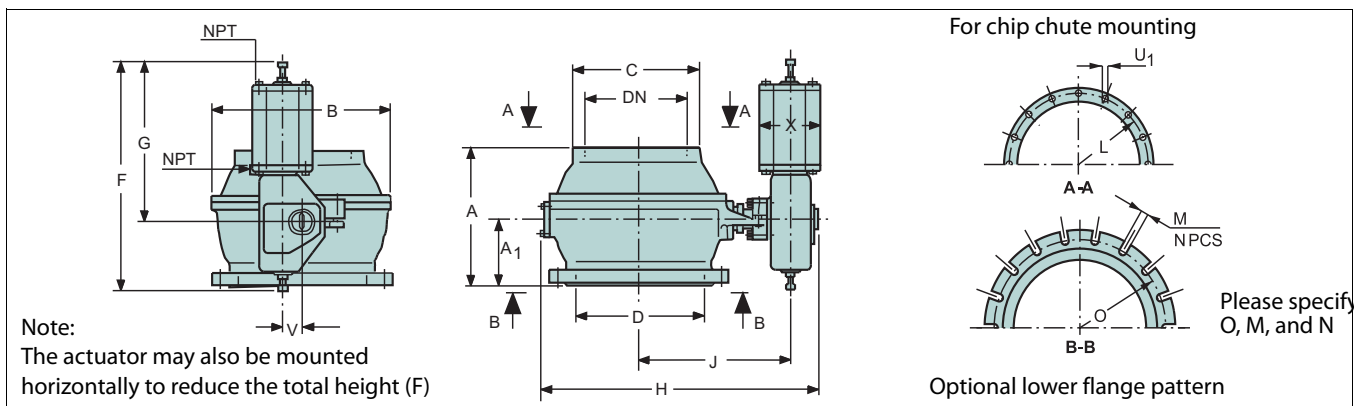
This table is conservative and valid for digesters where excessive air moves upwards through the valve.

A modern digester is equipped with a screw-type conveyor feed. High capacities of up to 16.7 m³/min / 600 ft³/min can be achieved. If the air evacuation is engineered correctly the filling time can be reduced considerably. Typically the following filling time has been achieved:

- Digester volume 200 m³ / 7000 ft³:
- valve size: 500/20"
- filling time: 20 min

In case the filling and chip packing cycle includes a periodical "vacuum pressure" inside the digester, a Rear Tilting Device (L option) is recommended to improve valve tightness and cycle life.

DIMENSIONS



VALVE		Dimensions in mm													Pneumatic actuator type	kg**
TYPE	DN	Lower flange* D		A	A1	B	C	L	U1		F	G	X	V		
PZ 500	500	490 ≤ D ≤ 520	730	400	920	625	590	M20	38	1330	910	395	153	840	B1C 32/95	1250
		640 ≤ D ≤ 680	630	300												
PZ 600	600	580 ≤ D ≤ 590	870	480	1070	740	700	M20	42	1330	910	395	153	970	B1C 32/105	1750
		720 ≤ D ≤ 740	770	380												
PZ 750	750	730 ≤ D ≤ 740	1080	600	1330	910	860	M24	42	1660	1150	505	194	1200	B1C 40/120	2600
		880 ≤ D ≤ 890	930	450												

VALVE		Dimensions in inch													Pneumatic actuator type	lbs**
TYPE	SIZE	Lower flange* SIZE		A	A1	B	C	L	U1		F	G	X	V		
PZ 20	20	19.29 ≤ D ≤ 20.47	28.74	15.75	36.22	24.61	23.23	3/4	1.50	52.36	35.83	15.55	6.02	33.07	B1C 32/95	2750
		25.19 ≤ D ≤ 26.77	24.80	11.81												
PZ 24	24	22.83 ≤ D ≤ 23.23	34.25	18.90	42.13	29.13	27.56	7/8	1.65	52.36	35.83	15.55	6.02	38.19	B1C 32/105	3850
		28.34 ≤ D ≤ 29.13	30.31	14.96												
PZ 30	30	28.74 ≤ D ≤ 29.13	42.52	23.62	52.36	35.83	33.86	1	1.65	65.35	45.28	19.88	7.64	47.24	B1C 40/120	5720
		34.64 ≤ D ≤ 35.04	36.61	17.72												

*) The lower flange is made to correspond to the digester flange. The valve height A varies with the lower flange diameter.
 **) Weights are only approximative due different lower flange sizes.

HOW TO ORDER

PZ	K	S	*600/800	A	R	V	-	B1CU 32/105	-	QX	-	ACC
1.	2.	3.	4. & 5.	6.	7.	8.	-	9.	-	10.	-	11.

NOTE *Size marking, either in inches or in millimeters, defines also the upper end connection threads; unified threads when size expressed in inches and metric threads when size expressed in millimeters.

1.	PRODUCT SERIES / CONSTRUCTION / PRESSURE RATING
PZ	Ball valve, lower body half with flange to be specified in order. Upper body half with 16 pcs tapped holes with metric threads or unified threads starting from center line. Body pressure rating PN 16 / ASME class 150.

2.	CONNECTIONS / SPECIAL CONSTRUCTION
K	2 pcs PN16 / DN 80 connections in lower body half.
C	2 pcs ASME class 150 / NPS 3" connections in lower body half.
N	Lower body half without connections.
Y	Special connections, special location e.g. in upper body half or special quantity or some other speciality.

3.	END-TO-END LENGTH		
	DN 500 / 20"	DN 600 / 24"	DN 750 / 30"
L	730 mm / 28.74", when flow port of lower body half is 490 mm ≤ D ≤ 520 mm / 19.25" ≤ D ≤ 20.47"	870 mm / 34.25", when flow port of lower body half is 580 mm ≤ D ≤ 590 mm / 22.83" ≤ D ≤ 23.23"	1080 mm / 42.52", when flow port of lower body half is 730 mm ≤ D ≤ 740 mm / 28.74" ≤ D ≤ 29.13"
S	630 mm / 24.80", when flow port of lower body half is 640 mm ≤ D ≤ 680 mm / 25.19" ≤ D ≤ 26.77"	770 mm / 30.31", when flow port of lower body half is 720 mm ≤ D ≤ 740 mm / 28.38" ≤ D ≤ 29.13"	930 mm / 36.61", when flow port of lower body half is 880 mm ≤ D ≤ 890 mm / 34.64" ≤ D ≤ 35.04"
Y	Special, to be specified in order.	Special, to be specified in order.	Special, to be specified in order.

4.	SIZE	
mm	in	
500	20	
600	24	
750	30	

5.	NOMINAL SIZE OF LOWER BODY HALF (mm or in)
To be specified in order. Nominal size of lower body half shall be given in the same units as the valve size, see 4. sign separated with slash.	

6.	BODY	BALL	BALL SEAT	BEARINGS
A	CF8M	CF8M + Hard chrome	316 SS + Cobalt based hard facing	Coated hard chrome + UNS S21800
C	CG8M	CG8M + CA-chrome	317 SS + Cobalt based hard facing	PTFE/ 254 SMO

7.	BALL SEAT TYPE
R	Scraping, locked, seat seals in grooves.

8.	OPTIONS
-	Standard, without sign.
V	Water flushing for ball.
L	Rear tilting device
Y	Special option, to be specified in order.

9.	ACTUATOR SERIES
B1CU 32	Pneumatic actuator, double-acting, mounting face acc. to ISO 5211.
B1CPU 32	Pneumatic actuator, double-acting, mounting face acc. to ISO 5211 with Jammer locking device, see application report 2611/01/03.

10.	LIMIT SWITCH SERIES
QX4VB05 HDM	Microswitches, 4 pcs.

11.	SAFETY LOCKING
ACC	Interlocking system, see application report 2611/01/02
Jammer	Jammer system, see application report 2611/01/03

Subject to change without prior notice.

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