

Butterfly Valve

MAMMOUTH

Type Series Booklet



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Type Series Booklet MAMMOUTH

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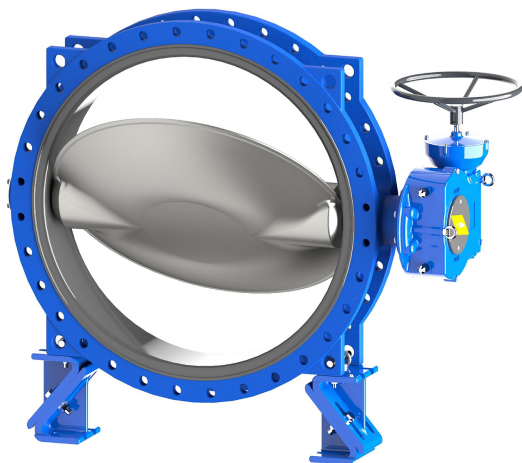
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Butterfly Valves

Centred-disc Butterfly Valves

MAMMOUTH



Main applications

- Water supply systems
- Water transport
- Cooling circuits
- Seawater desalination/reverse osmosis
- Flue gas desulphurisation
- General irrigation systems
- Shipbuilding
- Pipelines and tank farms
- Water treatment

Fluids handled

- Service water
- Seawater
- Cooling water
- Drinking water
- River water, lake water and groundwater
- Radioactive fluids
- Aggressive fluids

Operating data

Table 1: Operating properties

Characteristic	Value
Nominal pressure	6/10/16/20/25
Nominal size	DN 1050 - 4000
Min. permissible temperature [°C]	≥ 0
Max. permissible temperature [°C]	≤ +80
Vacuum operation	Contact the manufacturer.
Max. permissible flow velocity at operating pressure	Actuator rated for 2 m/s Higher velocities on request.

Design details

Design

- Flanged body with flat faces – T5: DN 1050-4000
- Installation with shaft in a horizontal or vertical position (actuator on top)
- Downstream dismantling possible
- Reduced face-to-face length: series 215, 254, 280, 400 or 520 mm, depending on DN.
- Dead-end service with counter flange possible
- Design to EN 593 and ISO 10631
- Top flange and square valve shaft end to ISO 5211
- Marking in accordance with EN 19
- Absolutely tight shut-off (no leakage visible to the naked eye) in either direction of flow in accordance with EN 12266-1, leakage rate A, ISO 5208, category A, and all standards which allow a leakage rate (e.g. ANSI/FCI 70-2 Class 6).
- Unless indicated otherwise, the normal mating dimensions of MAMMOUTH are suitable for the permissible pressure class (PS).
- Body with polyurethane coating, thickness 80 µm, colour: RAL 5002, blue
- Up to DN 4000 on request
- Valve discs: nodular cast iron, epoxy-coated as standard (thickness: 80 µm, colour: brown RAL 8012) or hard rubber coated (other materials on request)

Variants

- Anti-fluttering device (providing stabilisation in case of unsteady flow)
- Valve disc locking device
- Support feet
- Dismantling joints and expansion bellows
- Electric quarter-turn actuators
- Counterweight actuator
- AMTROBOX for open/closed position signalling
- Anti-static design for manually actuated valves

Valve body materials

Table 2: Overview of available materials

Material	Material number	Type	DN max.	KSB code
EN-GJS-400-15 (JS1030) ASTM A536 Gr. 60.40.18	JS 1030	T5	All	3g
1.0619 ASTM A216 Gr. WCC	Carbon steel	T5	All	1
Other standards on request				

Product benefits

- The spherical contact between valve disc and liner ensures durable and permanently tight shut-off.
- Keyed connection between shaft and valve disc
 - Dry shaft, no contact with fluid handled
- Sealing to atmosphere is ensured even when the actuator has been removed.
- Marking indicates position of valve disc
- Valve equipped with stainless steel plain bearing with reinforced PTFE coating depending on DN
- The elastomer liner provides tight sealing at the flanged line connections, eliminating the need for an extra gasket.
- Reduced pressure losses by optimised valve disc geometry
- Thrust insert for reduced friction
 - Absorbs the weight of the valve disc when the valve is installed with the shaft in the vertical position
- Valve certified to
 - WRAS for drinking water applications, with XC elastomer liner
- Valve actuation options
 - Manual
 - Electric
 - Pneumatic
 - Hydraulic

Product information as per Directive 2014/34/EU (ATEX)

The valves do not have a potential internal source of ignition and can be used in potentially explosive atmospheres, Group II, category 2 (zones 1+21) to ATEX 2014/34/EU.

Certifications

Table 3: Overview

Label	Effective in:	Comment
	Worldwide	-
	United Kingdom	Approved in accordance with the UK drinking water regulation
	France	Approved in accordance with the French drinking water regulation

Related documents

Table 4: Information/documents

Document	Reference number
Operating manual	8449.8

Product information

Product information as per Pressure Equipment Directive 2014/68/EU (PED)

The valves satisfy the safety requirements of Annex I of the European Pressure Equipment Directive 2014/68/EU (PED) for fluids in Groups 1 and 2.

Product information as per UK Pressure Equipment (Safety) Regulations 2016

The valves satisfy the safety requirements of the UK Pressure Equipment (Safety) Regulations 2016 (PER) for fluids in Groups 1 and 2.

EC Machinery Directive 2006/42/EC

Valves with actuators can meet the requirements of the 2006/42/EC Machinery Directive for partly completed machinery.

Product information as per Regulation No. 1907/2006 (REACH)

For information as per European chemicals regulation (EC) No. 1907/2006 (REACH) see <https://www.ksb.com/en-global/company/corporate-responsibility/reach>.

Purchase order specifications

- Type
- Nominal pressure
- Nominal size
- Fluid handled
- Flow rate / flow velocity
- Operating temperature
- Materials (body, valve disc, seat)
- Line connection, flange facing and flange surface quality
- Actuator / automation
- Reference number

Pressure/temperature ratings

Table 5: Test and operating pressures [bar]

Pressure class	Shell test	Leak test (seat)	Permissible operating pressures
	With water		
	PN	P10, P11	
6	9	6.6	6
10	15	11	10
16	24	17.6	16
20	30	22	20
25	37.5	27.5	25

Test to AWWA on request

Other standards on request

Technical data

Vacuum resistance

Valves with a face-to-face length of 280 mm and 400 mm, respectively, can be used for applications at 0 bar absolute.

DN 1050 to 1200 and nominal pressures of 6 and 10 bar: the liner must be glued in if pressures below 0.3 bar absolute are to be handled. With a glued-in liner, the valve can be used up to its maximum pressure.

Hydraulic characteristics of butterfly valves

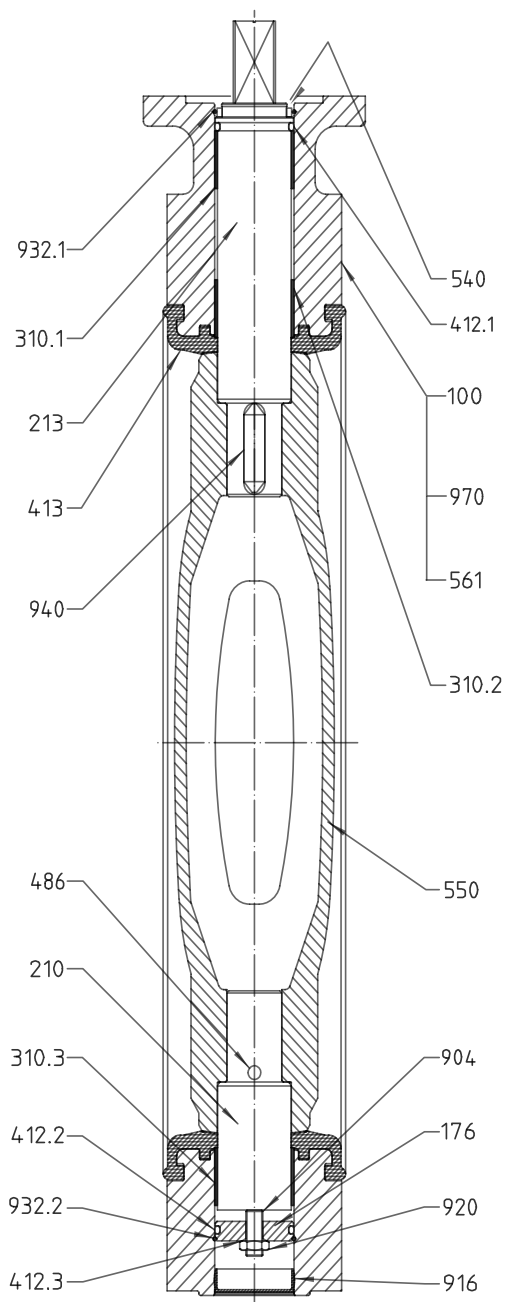
Table 6: Table Cv0 in GUS/min / psi^{0.5} [mm]

DN	NPS	Flow coefficient with valve fully open Cv0				
	[inch]	PN 6	PN 10	PN 16	PN 20	PN 25
(1050)	42	-	142100	-	-	-
1100	44	-	165070	96050	96050	96050
1200	48	-	195000	129500	129500	129500
(1250)	50	199500	199500	-	-	-
1300	52	208800	196300	171250	171250	171250
(1350)	54	208800	196300	196300	196300	196300
1400	56	223800	221330	221350	221350	121150
1500	60	270300	275620	275650	154550	154550
1600		342450	342450	342450	196300	196300
(1650)	66	380050	380050	380050	221350	221350
1800	72	496950	496950	300700	300700	300700
(1950)	78	638950	638950	392550	392550	-
2000		689050	426000	426000	426000	-
(2100)	84	806000	505300	505300	-	-
2200		931250	931250	-	-	-
(2250)	90	630600	630600	-	-	-
2400	96	776750	776750	-	-	-
(2550)	102	1018950	-	-	-	-
2600		1018950	-	-	-	-
(2700)	108	1100000	-	-	-	-
(2850)	114	1390650	-	-	-	-
3000	120	1716350	-	-	-	-
3150 - 4000		Other diameters on request				

Table 7: Table Kvo in m³/h / bar^{0.5} [mm]

DN	NPS	Flow coefficient with valve fully open Kv0				
	[inch]	PN 6	PN 10	PN 16	PN 20	PN 25
(1050)	42	-	122500	-	-	-
1100	44	-	142300	82800	82800	82800
1200	48	-	168100	111600	111600	111600
(1250)	50	172000	172000	-	-	-
1300	52	180000	169200	147600	147600	147600
(1350)	54	180000	169200	169200	169200	169200
1400	56	193000	190800	190800	190800	104400
1500	60	233000	237600	237600	133200	133200
1600		295200	295200	295200	169200	169200
(1650)	66	327600	327600	327600	190800	190800
1800	72	428400	428400	259200	259200	259200
(1950)	78	550800	550800	338400	338400	-
2000		594000	367200	367200	367200	-
(2100)	84	694800	435600	435600	-	-
2200		802800	507600	-	-	-
(2250)	90	543600	543600	-	-	-
2400	96	669600	669600	-	-	-
(2550)	102	878400	-	-	-	-
2600		878400	-	-	-	-
(2700)	108	940000	-	-	-	-
(2850)	114	1198800	-	-	-	-
3000	120	1479600	-	-	-	-
3150 - 4000		Other diameters on request				

Materials



Series 216 / 254
DN 1050 - 1200 / PN 10 bar

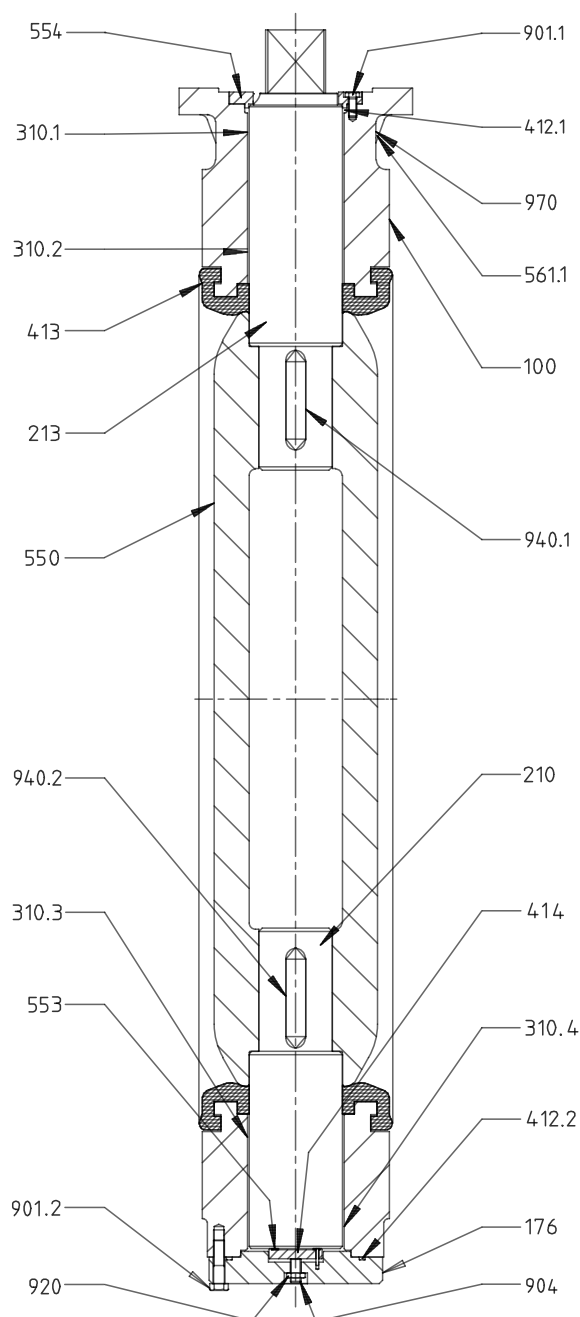
Fig. 1: Sectional drawing of MAMMOUTH for DN 1050 - 1200

Table 8: List of components, series 216 / 254

Part No.	Description	DN	Materials	KSB code
100	Body	1050 - 1200	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18	3g
100	Body	1050 - 1200	Cast steel	1 ¹⁾
176	Bottom	1050 - 1200	Carbon steel	
210 ²⁾	Shaft	1050 - 1200	Stainless steel 1.4028 (13 % Cr) ASTM A276 Gr. 420	6k
210 ²⁾	Shaft	1050 - 1200	Stainless steel (17 % Cr)	6e
210 ²⁾	Shaft	1050 - 1200	Stainless steel, Monel®	8 ¹⁾
213 ²⁾	Actuating shaft	1050 - 1200	Stainless steel 1.4028 (13 % Cr) ASTM A276 Gr. 420	6k
213 ²⁾	Actuating shaft	1050 - 1200	Stainless steel (17 % Cr)	6e
213 ²⁾	Actuating shaft	1050 - 1200	Stainless steel, Monel®	8 ¹⁾
310.1 ²⁾	Plain bearing	1050 - 1200	Steel with reinforced PTFE coating	
310.2 ²⁾	Plain bearing	1050 - 1200	Steel with reinforced PTFE coating	
310.3 ²⁾	Plain bearing	1050 - 1200	Steel with reinforced PTFE coating	
412.1	O-ring	1050 - 1200	Nitrile	
412.2 ²⁾³⁾⁴⁾	O-ring	1050 - 1200	Nitrile	
412.3 ²⁾³⁾⁴⁾	O-ring	1050 - 1200	Nitrile	
413 ⁴⁾	Liner	1050 - 1200	EPDM	XC
413 ⁴⁾	Liner	1050 - 1200	High-grade nitrile	K
486 ²⁾	Ball	1050 - 1200	Steel	
540 ²⁾³⁾⁴⁾	Bush	1050 - 1200	Acetal	
550 ³⁾	Valve disc	1050 - 1200	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18	3g
550 ³⁾	Valve disc	1050 - 1200	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Ebonite-coated	3p
550 ³⁾	Valve disc	1050 - 1200	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Halar-coated	3a
550 ³⁾	Valve disc	1050-1200	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Rilsan-coated	3r
550 ³⁾	Valve disc	1050 - 1200	Stainless steel 1.4408 / ASTM A351 Gr. CF8M	6
550 ³⁾	Valve disc	1050 - 1200	Cast steel	1
550 ³⁾	Valve disc	1050 - 1200	Aluminium bronze CC333G / ASTM B148 Gr. C95800	2
550 ³⁾	Valve disc	1050 - 1200	Stainless steel 1.4308 / ASTM A351 Gr. CF8	6g
561	Half round head grooved pin	1050 - 1200	Stainless steel	
904 ²⁾	Adjusting screw	1050 - 1200	Steel	
916 ²⁾³⁾⁴⁾	Plug	1050 - 1200	Polyethylene	
920 ²⁾	Nut	1050 - 1200	Steel	
932.1 ²⁾³⁾⁴⁾	Circlip	1050 - 1200	Steel	
932.2 ²⁾³⁾⁴⁾	Circlip	1050 - 1200	Steel	
940 ²⁾	Key	1050 - 1200	Steel	
970	Name plate	1050 - 1200	Stainless steel	

Other materials on request

-
- ¹ On request
² Part from shaft spare parts kit
³ Part from valve disc spare parts kit
⁴ Part from liner spare parts kit
-



Series 280 / 400 / 520
DN 1250 - 4000 / PN 6 bar
DN 1250 - 4000 / PN 10 bar
DN 1100 - 4000 / PN 16 bar
DN 1100 - 4000 / PN 20 bar
DN 1100 - 4000 / PN 25 bar

Fig. 2: Sectional drawing of MAMMOUTH for DN 1250 - 4000

Table 9: List of components, series 280 / 400 / 520

Part No.	Description	DN	Materials	KSB code
100	Body	1100 (1250) - 4000	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18	3g
100	Body	1100 (1250) - 4000	Carbon steel A216 Gr. WCC/1.0619	1 ¹⁾
176	Bottom	1100 (1250) - 4000	Carbon steel	
210 ²⁾	Shaft	1100 (1250) - 4000	Stainless steel 1.4028 (13 % Cr) ASTM A276 Gr. 420	6k
210 ²⁾	Shaft	1100 (1250) - 4000	Stainless steel (17 % Cr)	6e
210 ²⁾	Shaft	1100 (1250) - 4000	Stainless steel, Monel®	8 ¹⁾
213 ²⁾	Actuating shaft	1100 (1250) - 4000	Stainless steel 1.4028 (13 % Cr) ASTM A276 Gr. 420	6k
213 ²⁾	Actuating shaft	1100 (1250) - 4000	Stainless steel (17 % Cr)	6e
213 ²⁾	Actuating shaft	1100 (1250) - 4000	Stainless steel, Monel®	8 ¹⁾
310.1 ²⁾	Plain bearing	1100 (1250) - 4000	Steel with reinforced PTFE coating	
310.2 ²⁾	Plain bearing	1100 (1250) - 4000	Steel with reinforced PTFE coating	
310.3 ²⁾	Plain bearing	1100 (1250) - 4000	Steel with reinforced PTFE coating	
310.4 ²⁾	Plain bearing	1100 (1250) - 4000	Steel with reinforced PTFE coating	
412.1 ²⁾³⁾⁴⁾	O-ring	1100 (1250) - 4000	Nitrile	
412.2 ²⁾³⁾⁴⁾	O-ring	1100 (1250) - 4000	Nitrile	
413 ⁴⁾	Liner	1100 (1250) - 4000	EPDM	XC
413 ⁴⁾	Liner	1100 (1250) - 4000	High-grade nitrile	K
414 ²⁾	Thrust plate	1100 (1250) - 4000	Steel	
550 ³⁾	Valve disc	1100 (1250) - 4000	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18	3g
550 ³⁾	Valve disc	1100 (1250) - 4000	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Ebonite-coated	3p
550 ³⁾	Valve disc	1050 (1250) - 1400	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Halar-coated	3a
550 ³⁾	Valve disc	1050 (1250) - 1400	Nodular cast iron EN-GJS-400-15 (JS 1030) ASTM A536 Gr. 60.40.18, Rilsan-coated	3r
550 ³⁾	Valve disc	1100 (1250) - 4000	Stainless steel 1.4408 / ASTM A351 Gr. CF8M	6
550 ³⁾	Valve disc	1100 (1250) - 4000	Cast steel	1 ¹⁾
550 ³⁾	Valve disc	1100 (1250) - 4000	Aluminium bronze CC333G / ASTM B148 Gr. C95800	2
550 ³⁾	Valve disc	1100 (1250) - 4000	Stainless steel 1.4308 / ASTM A351 Gr. CF8	6g
553 ²⁾	Thrust insert	1100 (1250) - 4000	Steel with reinforced PTFE coating	
554	Washer	1100 (1250) - 4000	Steel	
561	Half round head grooved pin	1100 (1250) - 4000	Stainless steel	
901.1	Bolt	1100 (1250) - 4000	Steel	
901.2	Bolt	1100 (1250) - 4000	Steel	
904	Adjusting screw	1100 (1250) - 4000	Steel	
920	Nut	1100 (1250) - 4000	Galvanised steel	
940.1 ²⁾	Key	1100 (1250) - 4000	Steel	
940.2 ²⁾	Key	1100 (1250) - 4000	Steel	
970	Name plate	1100 (1250) - 4000	Stainless steel	

Other materials on request

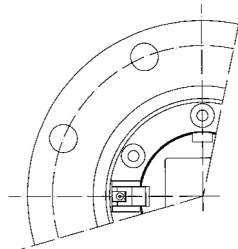
Variants

Valve variants

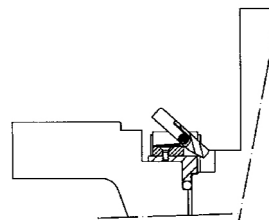
Valve disc locking device

In 0° or 90° position after actuator has been disengaged

Not available for DN 1050 to 1200 PN 10 (series 216 and 254)



Front view



Sectional drawing

Valve handling unsteady flow

On valves handling unsteady flow, an anti-fluttering device (flexible stops) located on the lower shaft prevents any play between the actuator and the valve disc.

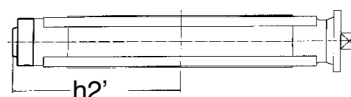
Any valve equipped with an anti-fluttering device must be fitted with a valve disc locking device.

Not available for DN 1050 to 1200 PN 10 (series 216 and 254).

Valve of face-to-face length l1 280: $h2' : h2 + 72$

Valve of face-to-face length l1 400: $h2' : h2 + 65.5$

$h2$: see Dimensions table



Dimension $h2'$

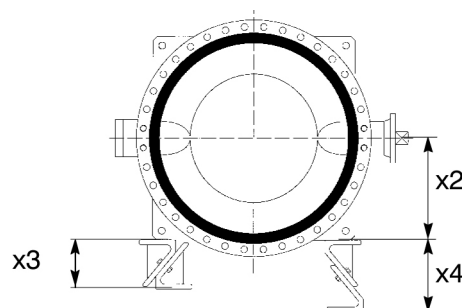
Support feet

Note: the support feet must not be fastened to the floor.

They must remain free to move.

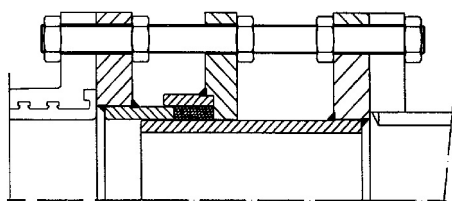
Valve of face-to-face length l1 216 and 254: $x3 = 330$
 $x4 = 450$

Valve of face-to-face length l1 280 and 400: $x2$: see Dimensions table
 $x3 = 350$
 $x4 = 510$

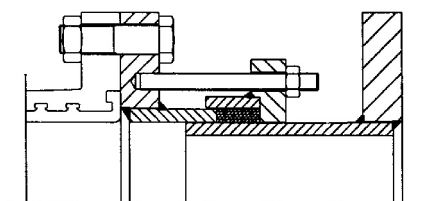


Support feet

Dismantling joint and expansion bellows

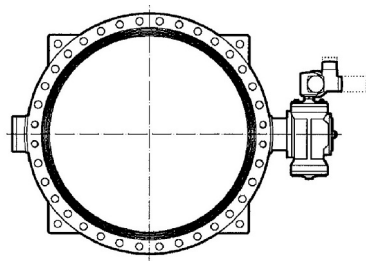


Dismantling joint

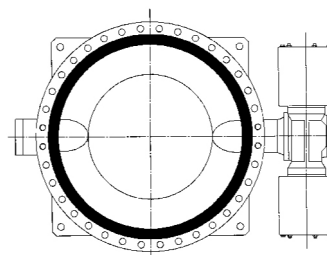


Expansion bellows

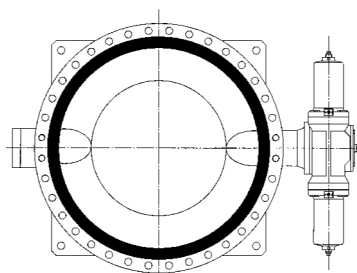
Actuator variants



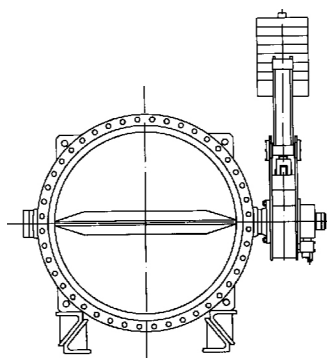
Electric actuator



ACTAIR EVO / DYNACTAIR EVO pneumatic actuator



HQ EVO Hydraulic actuator



Counterweight actuator

Dimensions and weights

Dimensions and weights of MAMMOUTH

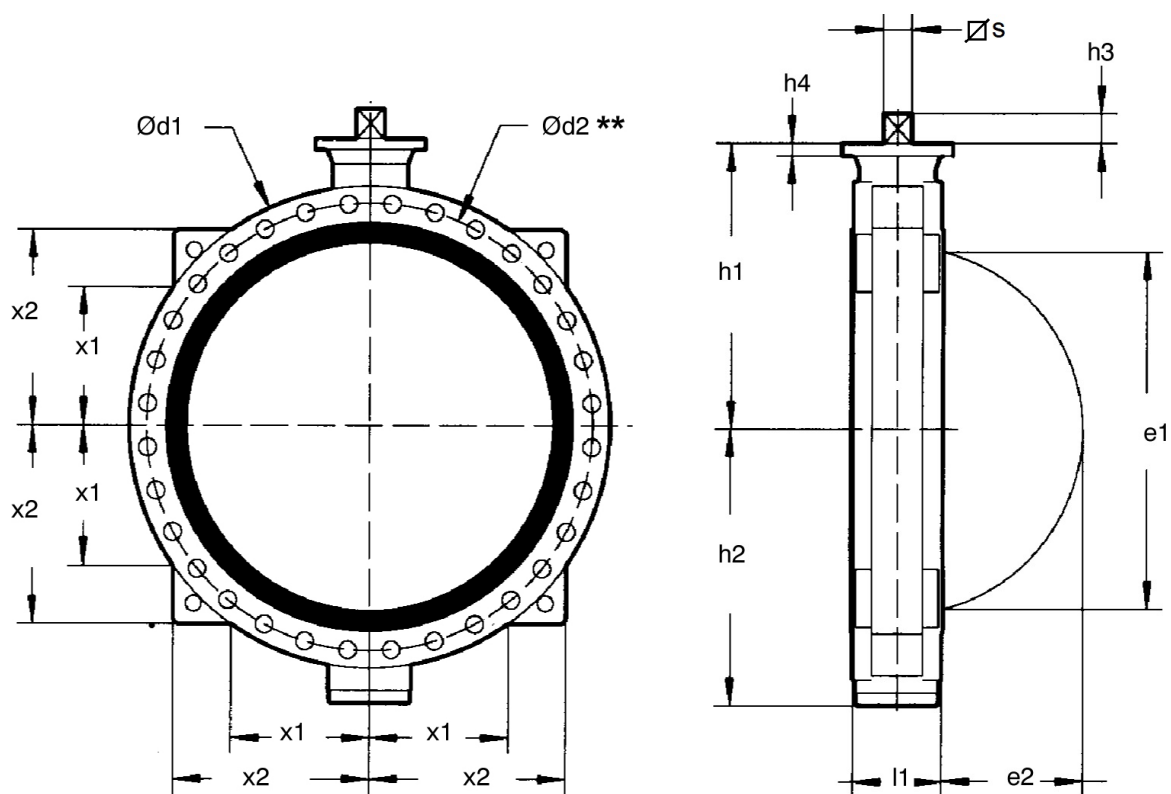


Fig. 3: Drawing of MAMMOUTH front view and side view

** See Bolting table

Table 10: Dimensions of MAMMOUTH 6 [mm]

DN ⁵⁾	NPS	Connections	Ød1	Face-to-face length h	h1	h2	Top flange to ISO 5211		Square shaft end		Valve disc open		x1	x2	kg
	[inch]			l1			No.	h4	Øs	h3	e1	e2			
(1250)	50	AWWA C207 Cl. B	1568	280	900	790	F30	40	90	90	1186	480	455	638	1600
1300		EN 1092 PN 6	1520	280	967	943	F30	40	90	90	1259	497	470	680	1620
	52	AWWA C207 Cl. B	1625	280	967	943	F30	40	90	90	1259	497	470	680	1650
(1350)	54	AWWA C207 Cl. B	1683	280	992	968	F30	40	90	90	1311	522	480	700	1680
1400		EN 1092 PN6	1630	280	⁶⁾	⁶⁾	F30	40	90	90	⁶⁾	⁶⁾	⁶⁾	⁶⁾	⁶⁾
1500		ISO 2084 PN6	1730	280	⁶⁾	⁶⁾	F30	40	90	90	⁶⁾	⁶⁾	⁶⁾	⁶⁾	⁶⁾
	60	AWWA C207 Cl. B	1854	280	⁶⁾	⁶⁾	F30	40	90	90	⁶⁾	⁶⁾	⁶⁾	⁶⁾	⁶⁾
1600		EN 1092 PN 6	1830	280	1115	1093	F30	40	90	90	1560	644	560	790	2160
(1650)	66	AWWA C207 Cl. B	2032	280	1147	1123	F30	40	90	90	1626	677	580	835	2251
1800		EN 1092 PN 6	2045	280	1217	1193	F30	40	90	90	1768	747	620	860	2281
	72	AWWA C207 Cl. B	2197	280	1217	1193	F30	40	90	90	1768	747	650	890	2698
(1950)	78	AWWA C207 Cl. B	2362	280	1297	1273	F35	40	90	90	1930	826	720	950	2795
2000		EN 1092 PN 6	2265	280	1319	1295	F35	40	90	90	1975	847	690	940	2885
(2100)	84	AWWA C207 Cl. B	2534	280	1372	1348	F35	40	90	90	2082	900	770	1010	3064
2200		EN 1092 PN 6	2475	280	1419	1395	F35	40	90	90	2177	948	750	980	3245
(2250)	90	AWWA C207 Cl. B	2705	400	1505	1468	F40	45	110	110	2245	931	830	1020	3835
2400		EN 1092 PN 6	2685	400	1560	1523	F40	45	110	110	2357	986	830	1070	4140
	96	AWWA C207 Cl. B	2877	400	1560	1523	F40	45	110	110	2357	986	830	1090	4910
(2550)	102	AWWA C207 Cl. B	3048	400	1660	1623	F40	45	110	110	2550	1078	950	1190	5110
2600		EN 1092 PN 6	2905	400	1660	1623	F40	45	110	110	2550	1078	900	1140	4980
(2700)	108	AWWA C207 Cl. B	3220	400	1735	1698	F48	45	140	140	2691	1136	1020	1250	5710
2800		EN 1092 PN 6	3115	400	1760	1723	F48	45	140	140	2762	1184	980	1210	5826
(2850)	114	AWWA C207 Cl. B	3391	400	1810	1773	F48	45	140	140	2853	1236	1080	1310	6720
3000		EN 1092 PN 6	3315	400	1860	1823	F48	45	140	140	2945	1286	1050	1280	6670
	120	AWWA C207 Cl. B	3562	400	1865	1828	F48	45	140	140	2945	1291	1130	1370	7698

⁵⁾ Other diameters on request

⁶⁾ On request

Table 11: Dimensions of MAMMOUTH 10 [mm]

DN ⁵⁾	NPS	Connections	Ød1	Face-to-face length h	h1	h2	Top flange to ISO 5211		Square shaft end		Valve disc open		x1	x2	kg
	[inch]			l1			No.	h4	Øs	h3	e1	e2			
(1050)	42	AWWA C207 Cl. D	1332	216	765	674	F25	30	60	80	1018	405	383	545	850
1100		EN 1092 PN 10	1340	216	790	703	F25	30	60	80	1069	430	386	548	900
	44	AWWA C207 Cl. D	1389	216	790	703	F25	30	60	80	1069	430	403	566	960
1200		EN 1092 PN 10	1455	254	840	756	F25	30	60	80	1163	461	428	588	1090
	48	AWWA C207 Cl. D	1516	254	840	756	F25	30	60	80	1163	461	444	602	1150
(1250)	50	AWWA C207 Cl. D	1568	280	900	790	F30	40	90	90	1229	480	455	638	1600
1300		EN 1092 PN 10	1575	280	967	943	F30	40	90	90	1260	497	470	680	1620
	52	AWWA C207 Cl. D	1625	280	967	943	F30	40	90	90	1260	497	470	680	1650
(1350)	54	AWWA C207 Cl. D	1683	280	992	968	F30	40	90	90	1311	522	480	700	1680
1400		EN 1092 PN 10	1675	280	1017	993	F30	40	90	90	1362	547	480	725	1600
1500		EN 1092 PN 10	1854	280	1067	1043	F30	40	90	90	1464	600	530	765	1800
	60	AWWA C207 Cl. D	1785	280	1067	1043	F30	40	90	90	1464	600	530	765	1800
1600		EN 1092 PN 10	1915	280	1115	1093	F30	40	90	90	1561	644	560	790	2440
(1650)	66	AWWA C207 Cl. D	2032	280	1147	1123	F30	40	90	90	1627	677	580	835	2531
1800		EN 1092 PN 10	2115	280	1217	1193	F35	40	90	90	1769	747	620	860	2716
	72	AWWA C207 Cl. D	2197	280	1217	1193	F35	40	90	90	1769	747	650	890	2956
(1950)	78	AWWA C207 Cl. D	2362	280	1297	1273	F35	40	90	90	1931	826	720	950	3073
2000		EN 1092 PN 10	2325	400	1355	1318	F40	45	110	110	1940	780	710	940	3956
(2100)	84	AWWA C207 Cl. D	2534	400	1410	1373	F40	45	110	110	2052	836	770	1010	4831
2200		EN 1092 PN 10	2550	400	1460	1423	F40	45	110	110	2154	885	770	1020	4220
(2250)	90	AWWA C207 Cl. D	2705	400	1505	1468	F40	45	110	110	2246	931	830	1070	4447
2400		EN 1092 PN 10	2760	400	1560	1523	F40	45	110	110	2357	986	830	1090	5025
	96	AWWA C207 Cl. D	2877	400	1560	1523	F40	45	110	110	2357	986	830	1130	5320

Table 12: Dimensions of MAMMOUTH 16 [mm]

DN ⁵⁾	NPS	Connections	Ød1	Face-to-face length h	h1	h2	Top flange to ISO 5211		Square shaft end		Valve disc open		x1	x2	kg
	[inch]			l1			No.	h4	Øs	h3	e1	e2			
1100		EN 1092 PN 16	1355	280	867	843	F30	40	90	90	1054	396	333	590	1400
	44	AWWA C207 Cl. E	1405	280	867	843	F30	40	90	90	1054	396	333	590	1600
1200		EN 1092 PN 16	1485	280	917	893	F30	40	90	90	1153	447	450	625	1538
	48	AWWA C207 Cl. E	1511	280	917	893	F30	40	90	90	1153	447	450	625	1538
1300		EN 1092 PN 16	1585	280	967	943	F30	40	90	90	1260	497	470	680	1620
	52	AWWA C207 Cl. E	1626	280	967	943	F30	40	90	90	1260	497	470	680	1620
(1350)	54	AWWA C207 Cl. E	1683	280	992	968	F30	40	90	90	1312	522	480	700	1680
1400		EN 1092 PN 16	1685	280	1017	993	F30	40	90	90	1363	547	480	725	1744
1500		EN 1092 PN 16	1820	280	1067	1043	F30	40	90	90	1465	600	530	765	1950
	60	AWWA C207 Cl. E	1854	280	1067	1043	F30	40	90	90	1465	600	530	765	1950
1600		EN 1092 PN 16	1930	280	1115	1093	F35	40	90	90	1561	644	560	790	2658
(1650)	66	AWWA C207 Cl. E	2032	280	1147	1123	F30	40	90	90	1627	677	580	835	3048
1800		EN 1092 PN 16	2130	400	1255	1218	F35	40	90	90	1736	682	650	690	3295
	72	AWWA C207 Cl. E	2197	400	1255	1218	F35	40	90	90	1736	682	650	690	3753
(1950)	78	AWWA C207 Cl. E	2362	400	1335	1298	F40	45	110	110	1901	762	720	950	4880
2000		EN 1092 PN 16	2345	400	1355	1318	F40	45	110	110	1941	780	710	940	5304
(2100)	84	AWWA C207 Cl. E	2534	400	1410	1373	F40	45	110	110	2053	836	770	1010	4831

Table 13: Dimensions of MAMMOUTH 20 [mm]

DN ⁵⁾	NPS	Connections	Ød1	Face-to-face length h	h1	h2	Top flange to ISO 5211		Square shaft end		Valve disc open		x1	x2	kg
	[inch]			l1			No.	h4	Øs	h3	e1	e2			
1100		ISO 7005 PN 20	1405	280	867	843	F30	40	90	90	1055	396	382	590	1600
	44	ASME B16.47 Cl. 150	1405	280	867	843	F30	40	90	90	1055	396	333	590	1600
	44	AWWA C207 Cl. E		280	On request										
1200		ISO 7005 PN 20	1515	280	917	893	F30	40	90	90	1154	447	450	625	1761
	48	ASME B16.47 Cl. 150	1510	280	917	893	F30	40	90	90	1154	447	450	625	1761
	48	AWWA C207 Cl. E		280	On request										
1300		ISO 7005 PN 20	1625	280	967	943	F30	40	90	90	1261	497	470	680	1915
	52	ASME B16.47 Cl. 150	1625	280	967	943	F30	40	90	90	1261	497	470	680	1915
	52	AWWA C207 Cl. E		280	On request										
1400		ISO 7005 PN 20	1745	280	1017	993	F35	40	90	90	1363	547	480	725	2068
	56	ASME B16.47 Cl. 150	1745	280	1017	993	F35	40	90	90	1363	547	480	725	2068
1500		ISO 7005 PN 20	1855	400	1105	1068	F35	40	90	90	1426	531	520	775	3085
	60	ASME B16.47 Cl. 150	1855	400	1105	1068	F35	40	90	90	1426	531	520	775	3085
	60	AWWA C207 Cl. E		400	On request										

DN 1600 to 2000: dimensions not defined

Table 14: Dimensions of MAMMOUTH 25 [mm]

DN ⁵⁾	NPS	Connections	Ød1	Face-to-face length h	h1	h2	Top flange to ISO 5211		Square shaft end		Valve disc open		x1	x2	kg
	[inch]			l1			No.	h4	Øs	h3	e1	e2			
1100		EN 1092 PN 25	1420	280	867	843	F30	40	90	90	1055	396	395	590	1878
1200		EN 1092 PN 25	1530	280	917	893	F30	40	90	90	1155	447	450	625	2031
1300		ISO 2084 PN 25	1645	280	967	943	F35	40	90	90	1261	497	470	680	2185
1400		EN 1092 PN 25	1755	400	1055	1018	F35	40	90	90	1324	481	485	735	2622
1500		EN 1092 PN 25	1865	400	1105	1068	F35	40	90	90	1428	531	520	775	3210
1600		EN 1092 PN 25	1975	400	1155	1118	F40	45	110	110	1531	582	565	810	3320
1800		EN 1092 PN 25	2195	400	1255	1218	F40	45	110	110	1738	682	650	890	3895

Dimensions and weights of MAMMOUTH with manual gearbox

The torque for this type of large-diameter valve depends on the hydraulic characteristics of the system.

The selection of actuators given below for lubricating fluids typically applies to maximum flow velocities of 2 m/s.

Higher flow velocities and further actuator/valve combinations are possible, depending on the operating conditions and hydraulic characteristics of the system. Please contact us.

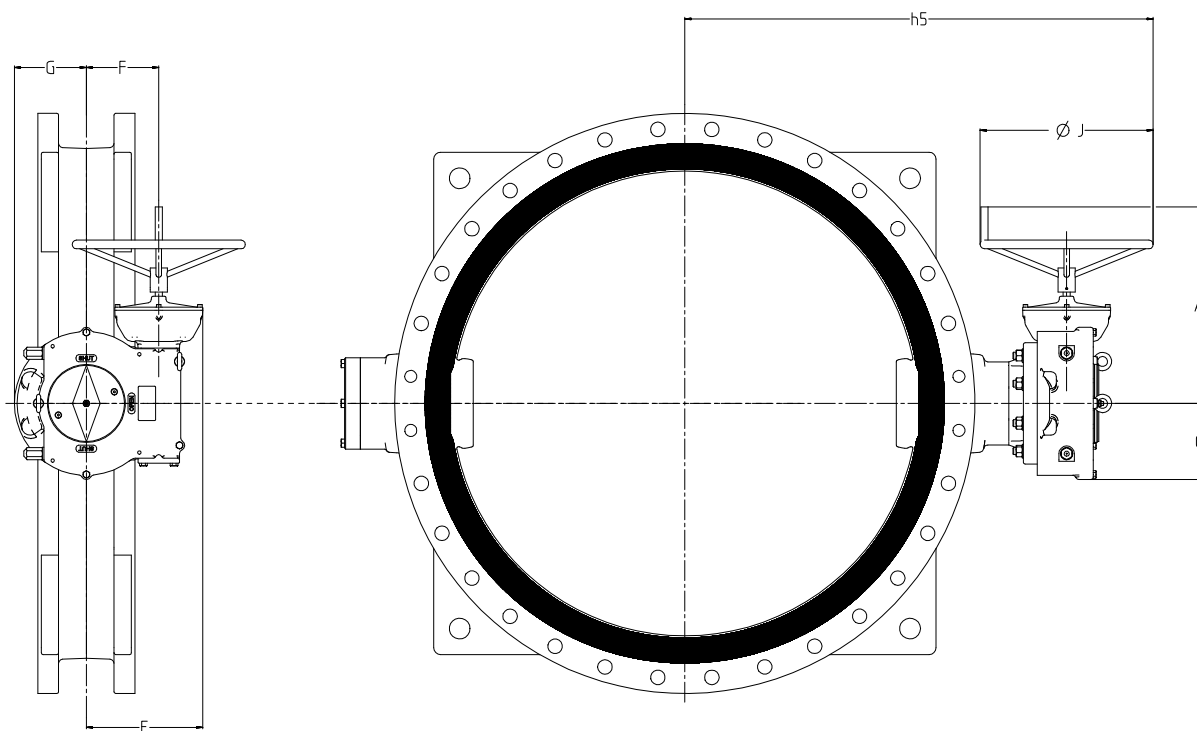


Fig. 4: Mammouth + MC manual gearbox

Table 15: Dimensions of MAMMOUTH 6 + actuator [mm]

DN ⁷⁾	NPS [inch]	Actuator	A	C	E	F	G	ØJ	h5	[kg]
(1250)	50	MC2600	491	220	336	209	207,5	500	1235	1736
1300	52	MC2600	491	220	336	209	207,5	500	1302	1756
(1350)	54	MC2600	491	220	336	209	207,5	500	1327	1816
1400	56	MC2600	491	220	336	209	207,5	500	1352	1736
1500	60	MC2600	491	220	336	209	207,5	500	2189	1936
1600		MC2600	491	220	336	209	207,5	500	1450	2296
(1650)	66	MC2600	491	220	336	209	207,5	500	1482	2387
1800	72	MC2600	491	220	336	209	207,5	500	1552	2417
(1950)	78	MC2600	491	220	336	209	207,5	500	1632	2931
2000		MC2600	491	220	336	209	207,5	500	1654	3021
(2100)	84	MC3200	531	255	383	256	235	500	1707	3285
2200		MC3200	531	255	383	256	235	500	1754	3466
(2250)	90	MC6300	816	297	529	279	298	600	1904	4148
2400	96	MC6300	816	297	529	279	298	600	1959	4453
(2550)	102	MC6300	816	297	529	279	298	600	2059	5423
2600		MC6300	816	297	529	279	298	600	2059	5293
(2700)	108	-	-	-	-	-	-	-	-	-
2800		-	-	-	-	-	-	-	-	-
(2850)	114	-	-	-	-	-	-	-	-	-
3000		-	-	-	-	-	-	-	-	-
	120	-	-	-	-	-	-	-	-	-

⁷⁾ Other diameters on request

Table 16: Dimensions of MAMMOUTH 10 + actuator [mm]

DN ⁷⁾	NPS [inch]	Actuator	A	C	E	F	G	ØJ	h5	[kg]
(1050)	42	MC2600	491	220	336	209	207,5	500	1100	986
1100	44	MC2600	491	220	336	209	207,5	500	1125	1036
1200	48	MC2600	491	220	336	209	207,5	500	1175	1226
(1250)	50	MC2600	491	220	336	209	207,5	500	1235	1736
(1350)	54	MC2600	491	220	336	209	207,5	500	1327	1816
1400		MC2600	491	220	336	209	207,5	500	1352	1736
1500	60	MC2600	491	220	336	209	207,5	500	1402	1936
1600		MC2600	491	220	336	209	207,5	500	1450	2576
(1650)	66	MC2600	491	220	336	209	207,5	500	1482	2667
1800	72	MC3200	531	255	383	256	235	500	1552	1937
(1950)	78	MC3200	531	255	383	256	235	500	1632	3294
2000		MC3200	531	255	383	256	235	500	1690	4177
(2100)	84	MC3200	531	255	383	256	235	500	1745	5052
2200		MC6300	816	297	529	279	298	600	1859	4533
(2250)	90	MC6300	816	297	529	279	298	600	1904	4760
2400	96	-	-	-	-	-	-	-	-	-

Table 17: Dimensions of MAMMOUTH 16 + actuator [mm]

DN ⁷⁾	NPS [inch]	Actuator	A	C	E	F	G	ØJ	h5	[kg]
1100	44	MC2600	491	220	336	209	207,5	500	1202	1536
1200	48	MC2600	491	220	336	209	207,5	500	1252	1674
1300	52	MC2600	491	220	336	209	207,5	500	1302	1756
(1350)	54	MC2600	491	220	336	209	207,5	500	1327	1816
1400	56	MC2600	491	220	336	209	207,5	500	1352	1880
1500	60	MC2600	491	220	336	209	207,5	500	1402	2086
1600		MC3200	531	255	383	256	235	500	1450	2879
(1650)	66	MC3200	531	255	383	256	235	500	1482	3269
1800	72	MC3200	531	255	383	256	235	500	1590	3974
(1950)	78	MC6300	816	297	529	279	298	600	1734	5193
2000		MC6300	816	297	529	279	298	600	1754	5617
(2100)	84	MC6300	816	297	529	279	298	600	1809	5144

Table 18: Dimensions of MAMMOUTH 20 + actuator [mm]

DN ⁷⁾	NPS [inch]	Actuator	A	C	E	F	G	ØJ	h5	[kg]
1100	44	MC2600	491	220	336	209	207,5	500	1202	1736
1200	48	MC2600	491	220	336	209	207,5	500	1252	1897
1300	52	MC2600	491	220	336	209	207,5	500	1302	2051
1400	56	MC3200	531	255	383	256	235	500	1352	2289
1500	60	MC3200	531	255	383	256	235	500	1440	3306

Table 19: Dimensions of MAMMOUTH 25 + actuator [mm]

DN ⁷⁾	NPS [inch]	Actuator	A	C	E	F	G	ØJ	h5	[kg]
1100		MC2600	491	220	336	209	207,5	500	1202	2014
1200		MC2600	491	220	336	209	207,5	500	1252	2167
1300		MC3200	531	255	383	256	235	500	1302	2406
1400		MC3200	531	255	383	256	235	500	1390	2843
1500		MC3200	531	255	383	256	235	500	1440	3431
1600		MC6300	816	297	529	279	298	600	1554	3633
1800		MC6300	816	297	529	279	298	600	1654	4208

Line connections

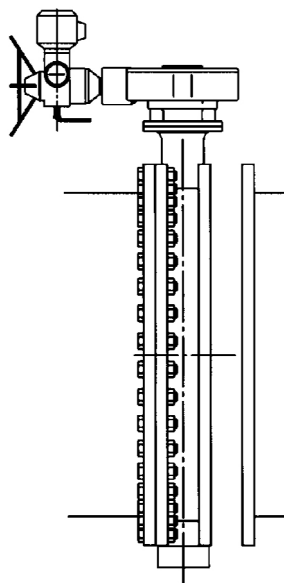
Unless indicated otherwise, the normal mating dimensions of MAMMOUTH are suitable for the permissible pressure class (PS).

The flange dimensions are in accordance with the following standards:

- ISO 7005 PN 20
- EN 1092
- AWWA C207 Cl. B, D and E, edition 94
- ASME B16-47 Series A Class 150
- ISO 2084
- Other connections on request

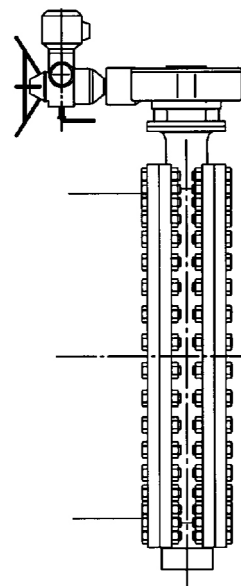
Installation information

Dead-end service and downstream dismantling



Downstream dismantling

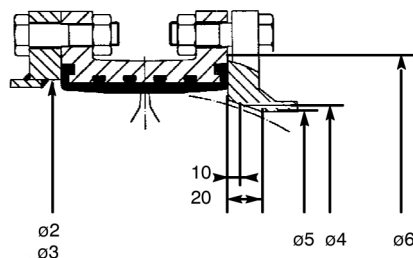
For downstream dismantling,
successively loosen diagonally opposed tie rods.



Dead-end service

Flange dimensions

The valves can be installed between all commercial mating flanges and line connections without requiring any flange gaskets. The elastomer liner alone provides a tight seal at the flange connections. Please verify that the connection meets the requirements given below.



Flange dimensions

Ø 2: max. permissible flange face diameter

Ø 3: min. permissible flange face diameter

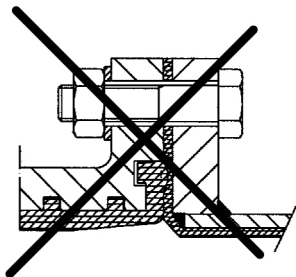
Table 20: Dimensions table of MAMMOUTH

DN ⁸⁾	NPS	Max. permissible diameter Ø2		Min. permissible Ø on flange face Ø3		Min. Ø at a distance of 10 mm from the flange face Ø4		Min. Ø at a distance of 20 mm from the flange face Ø5		Min. permissible raised face Ø of flanges with raised faces
		Face-to-face length l1 ⁹⁾								
	[inch]	216	254	216	254	216	254	216	254	
(1050)	42	1067	-	1010	-	1006	-	1001	-	1135
1100	44	1117	-	1063	-	1058	-	1053	-	1187
1200	48	-	1222	-	1158	-	1152	-	1147	1307
		Face-to-face length l1 ⁹⁾								Ø6
		280	400	280	400	280	400	280	400	
1100	44	1130	-	1053	-	1045	-	1039	-	1220
1200	48	1226	-	1152	-	1148	-	1143	-	1320
(1250)	50	1300	-	1226	-	1222	-	1217	-	1370
1300	52	1330	-	1259	-	1252	-	1247	-	1420
(1350)	54	1380	-	1310	-	1303	-	1298	-	1470
1400	56	1430	1430	1361	1320	1354	1312	1349	1305	1530
1500	60	1530	1530	1463	1424	1459	1416	1454	1410	1630
1600		1625	-	1560	-	1556	-	1552	-	1730
(1650)	66	1690	-	1626	-	1623	-	1619	-	1810
1800	72	1830	1830	1768	1734	1765	1730	1761	1722	1930
(1950)	78	1990	1990	1930	1898	1926	1894	1923	1889	2090
2000		2034	2034	1974	1943	1971	1935	1968	1931	2130
(2100)	84	2140	2140	2081	2051	2078	2047	2075	2043	2240
2200		2234	2234	2176	2147	2173	2149	2171	2145	2340
(2250)	90	-	2330	-	2244	2244	2240	2221	2235	2430
2400	96	-	2440	-	2356	-	2355	-	2351	2540
(2550)	102	-	2640	-	2564	-	2555	-	2552	2740
(2700)	108	-	2740	-	2665	-	2658	-	2654	2890
2800		-	2840	-	2766	-	2760	-	2756	2940
(2850)	114	-	2940	-	2867	-	2860	-	2856	3040
3000		-	3040	-	2968	-	2962	-	2959	3140
	120	-	3060	-	2988	-	2972	-	2967	3160

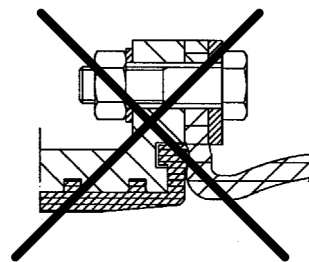
⁸⁾ Other diameters on request

⁹⁾ See Dimensions table

Coated flange



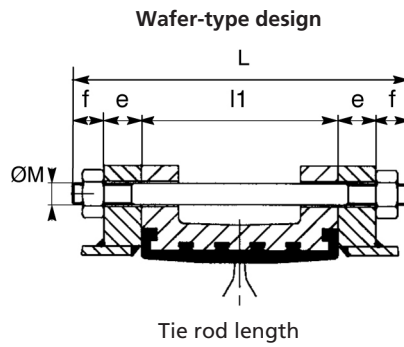
Flange with rubber coating



Expansion bellows

N.B.: direct installation between rubber-coated flanges or with expansion bellows is not permitted. Contact us.

Bolting



$$L = l1 + 2e + 2f$$

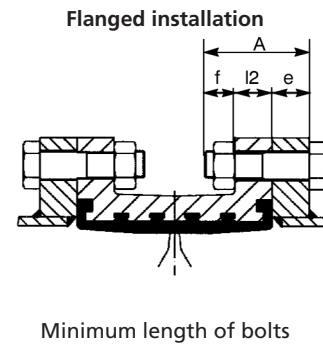
L: minimum length of tie rods

l1: face-to-face length of valve

e: flange thickness (customer-specific)

f: thickness of nut + standardised overhang of tie rod

Bolting is not included in our standard scope of supply.



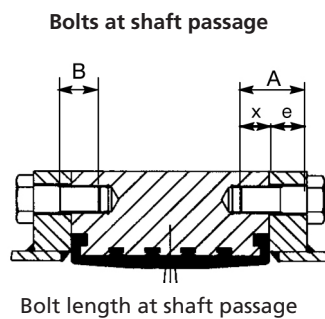
$$A = l2 + e + f$$

A: minimum length of bolts

l2: valve flange thickness

e: flange thickness (customer-specific)

f: thickness of nut + standardised overhang of bolt



$$A = e + X$$

A: max. length of bolts

X: max. thread engagement depth

e: flange thickness (customer-specific)

B: min. thread length > A-e

Table 21: Dimensions of [mm] MAMMOUTH 6

DN ¹⁰⁾	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at shaft passage	
	[inch]			Ø d2		Qty	Qty ¹¹⁾	l2	Qty ¹¹⁾	x
(1250)	50	AWWA C207 Cl. B	1.75 ¹²⁾	1479,5	500	36	36	52	8	45
1300		EN 1092 PN 6	M33	1450	45	28	28	60	4	45
	52	AWWA C207 Cl. B	1.75 ¹²⁾	1537	50	36	36	60	8	45
(1350)	54	AWWA C207 Cl. B	1.75 ¹²⁾	1594	50	36	36	60	8	45
1400		EN 1092 PN 6	M33	1560	45	32	32	60	4	45
1500		ISO 2084 PN 6	M33	1660	45	32	32	60	4	45
	60	AWWA C207 Cl. B	1.75 ¹²⁾	1759	50	44	44	60	8	45
1600		EN 1092 PN 6	M33	1760	40	36	36	60	4	45
(1650)	66	AWWA C207 Cl. B	1.75 ¹²⁾	1930,4	50	44	44	65	8	45
1800		EN 1092 PN 6	M36	1970	45	40	40	60	4	50
	72	AWWA C207 Cl. B	1.75 ¹²⁾	2095,4	50	52	52	66	8	48
(1950)	78	AWWA C207 Cl. B	2 ¹²⁾	2260,6	55	56	56	70	8	45
2000		EN 1092 PN 6	M39	2180	45	44	44	60	4	45
(2100)	84	AWWA C207 Cl. B	2 ¹²⁾	2425,7	55	56	56	60	8	45
2200		EN 1092 PN 6	M39	2390	45	48	48	70	4	45
(2250)	90	AWWA C207 Cl. B	2.25 ¹²⁾	2590,8	62	60	60	70	8	65
2400		EN 1092 PN 6	M39	2600	45	48	48	70	8	65
	96	AWWA C207 Cl. B	2.25 ¹²⁾	2755,9	62	60	60	70	8	65
(2550)	102	AWWA C207 Cl. B	2.5 ¹²⁾	2908,3	70	64	64	70	8	60
2600		EN 1092 PN 6	M45	2810	50	52	52	70	8	55
(2700)	108	AWWA C207 Cl. B	2.5 ¹²⁾	3067	70	64	64	70	8	55
2800		EN 1092 PN 6	M45	3020	50	56	56	70	8	55
(2850)	114	AWWA C207 Cl. B	2.75 ¹²⁾	3219,5	75	68	68	70	8	55
3000		EN 1092 PN 6	M45	3220	50	60	60	80	8	55
	120	AWWA C207 Cl. B	2.75 ¹²⁾	3317,9	75	68	68	80	8	55

¹⁰⁾ Other diameters on request

¹¹⁾ Quantity of bolts x 2

¹²⁾ In inches

Table 22: Dimensions of [mm] MAMMOUTH 10

DN ⁽¹⁰⁾	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at shaft passage	
	[inch]									
				Ø d2		Qty	Qty ⁽¹¹⁾	l2	Qty ⁽¹¹⁾	x
(1050)	42	AWWA C207 Cl. D	1.5 ⁽¹²⁾	1257	45	32	32	42	4	33
1100		EN 1092 PN 10	M33	1270	45	28	28	43	4	40
	44	AWWA C207 Cl. D	1.5 ⁽¹²⁾	1314	45	36	36	43	4	38
1200		EN 1092 PN 10	M36	1380	45	28	28	60	4	54
(1250)	48	AWWA C207 Cl. D	1.75 ⁽¹²⁾	1479,5	50	36	36	52	8	45
	50	AWWA C207 Cl. D	1.5 ⁽¹²⁾	1422	45	40	40	45	4	48
1300		EN 1092 PN10	M39	1490	45	28	28	60	4	45
	52	AWWA C207 Cl. D	1.75 ⁽¹²⁾	1537	50	36	36	60	9	45
(1350)	54	AWWA C207 Cl. D	1.75 ⁽¹²⁾	1593,8	50	36	36	60	8	45
1500		EN 1092 PN 10	M39	1700	50	32	32	60	4	45
	60	AWWA C207 Cl. D	1.75 ⁽¹²⁾	1759	50	44	44	80	8	45
1600		EN 1092 PN 10	M45	1820	50	36	36	60	4	45
(1650)	66	AWWA C207 Cl. D	1.75 ⁽¹²⁾	1930,4	50	44	44	65	8	45
1800		EN 1092 PN 10	M45	2020	50	40	40	66	4	50
	72	AWWA C207 Cl. D	1.75 ⁽¹²⁾	2095,5	50	52	52	66	8	48
(1950)	78	AWWA C207 Cl. D	2 ⁽¹²⁾	2260,6	55	56	56	70	8	45
2000		EN 1092 PN 10	M45	2230	50	40	40	70	8	50
(2100)	84	AWWA C207 Cl. D	2 ⁽¹²⁾	2425,7	55	56	56	75	8	65
2200		EN 1092 PN 10	M52	2440	60	44	44	70	8	65
(2250)	90	AWWA C207 Cl. D	2.25 ⁽¹²⁾	2590,8	62	60	60	80	8	65
2400		EN 1092 PN 10	M52	2650	60	48	48	70	8	65
	96	AWWA C207 Cl. D	2.25 ⁽¹²⁾	2755,9	62	60	60	82,5	8	65

Table 23: Dimensions of [mm] MAMMOUTH 16

DN ⁽¹⁰⁾	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at shaft passage	
	[inch]									
				Ø d2		Qty	Qty ⁽¹¹⁾	l2	Qty ⁽¹¹⁾	x
1100		EN 1092 PN 16	M39	1270	45	24	24	60	8	45
	44	AWWA C207 Cl. E	1.5 ⁽¹²⁾	1314	45	32	32	69	8	45
1200		EN 1092 PN 16	M45	1390	45	28	28	60	4	45
	48	AWWA C207 Cl. E	1.5 ⁽¹²⁾	1422	45	36	36	69	8	45
1300		EN 1092 PN 16	M45	1490	50	28	28	60	4	45
	52	AWWA C207 Cl. E	1.75 ⁽¹²⁾	1537	50	36	36	74	8	45
(1350)	54	AWWA C207 Cl. E	1.75 ⁽¹²⁾	1593,8	50	36	36	74	8	45
1400		EN 1092 PN 16	M45	1590	50	32	32	60	4	45
1500		EN 1092 PN 16	M52	1710	65	32	32	63	4	45
	60	AWWA C207 Cl. E	1.75 ⁽¹²⁾	1759	50	44	44	80	8	45
1600		EN 1092 PN 16	M52	1820	65	36	36	65	4	45
(1650)	66	AWWA C207 Cl. E	1.75 ⁽¹²⁾	1930,4	50	44	44	85	8	45
1800		EN 1092 PN 16	M52	2020	60	36	36	70	8	65
	72	AWWA C207 Cl. E	1.75 ⁽¹²⁾	2095,5	50	52	52	89	8	65
(1950)	78	AWWA C207 Cl. E	2 ⁽¹²⁾	2260,6	55	56	56	98	8	65
2000		EN 1092 PN 16	M56	2230	60	40	40	75	8	65
(2100)	84	AWWA C207 Cl. E	2 ⁽¹²⁾	2425,7	55	56	56	98	8	65

Table 24: Dimensions of [mm] MAMMOUTH 20

DN ¹⁰⁾	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at shaft passage	
	[inch]			Ø d2			Qty ¹¹⁾	l2	Qty ¹¹⁾	x
1100		ISO 7005 PN 20	M39	1314	45	32	32	69	8	45
	44	ASME B16.47 Cl.150	1.5 ¹²⁾	1314	45	32	32	69	8	45
	44	AWWA C207 Cl. E	1.5 ¹²⁾	1314	45	32	32	69	8	45
1200		ISO 7005 PN 20	M39	1422	45	36	36	69	8	45
	48	ASME B16.47 Cl.150	1.5 ¹²⁾	1422	45	36	36	69	8	45
	48	AWWA C2307 Cl. E	1.5 ¹²⁾	1422	45	36	36	69	8	45
1300		ISO 7005 PN 20	M45	1537	50	36	36	74	8	45
	52	ASME B16.47 Cl.150	1.75 ¹²⁾	1537	50	36	36	74	8	45
	52	AWWA C207 Cl. E	1.75 ¹²⁾	1537	50	36	36	74	8	45
1400		ISO 7005 PN 20	M45	1651	50	40	40	78	8	45
	56	ASME B16.47 Cl.150	1.75 ¹²⁾	1651	50	40	40	78	8	45
1500		ISO 7005 PN20	M45	1759	50	44	44	80	8	55
	60	ASME B16.47 Cl.150	1.75 ¹²⁾	1759	50	44	44	80	8	55
	60	AWWA C207 Cl. E	1.75 ¹²⁾	1759	50	44	44	80	8	55

Table 25: Dimensions of [mm] MAMMOUTH 25

DN ¹⁰⁾	NPS	Connection	Bolt Ø	Bolt hole circle	f	Wafer-type design	Flanged installation		Bolts at shaft passage	
	[inch]			Ø d2			Qty ¹¹⁾	l2	Qty ¹¹⁾	x
1100		EN 1092 PN 25	M52	1310	65	24	24	69	8	45
1200		EN 1092 PN 25	M52	1420	65	28	28	69	4	45
1300		ISO 2084 PN 25	M56	1530	60	28	28	74	4	45
1400		EN 1092 PN 25	M56	1640	60	28	28	74	8	65
1500		EN 1092 PN 25	M56	1750	60	32	32	80	8	56
1600		EN 1092 PN 25	M56	1860	60	32	32	81	8	65
1800		EN 1092 PN 25	M64	2070	70	36	36	89	8	65



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