



EXPLANATION SHEET

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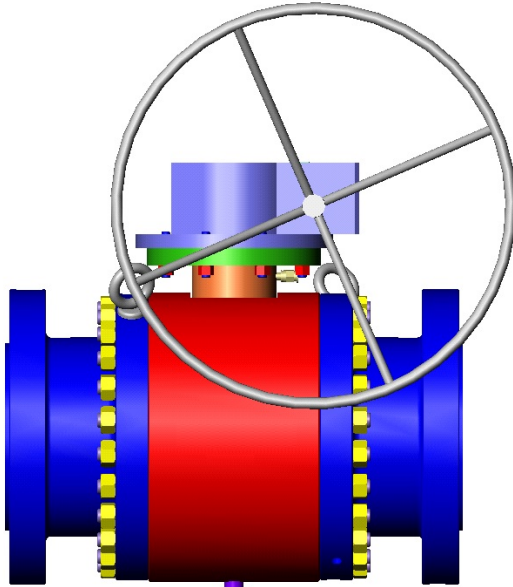
Dear Sirs,
please note that we have revised the manual in order to update the paragraph 6 relevant to nameplate

Paolo Malchiodi
Date: January 21st, 2020

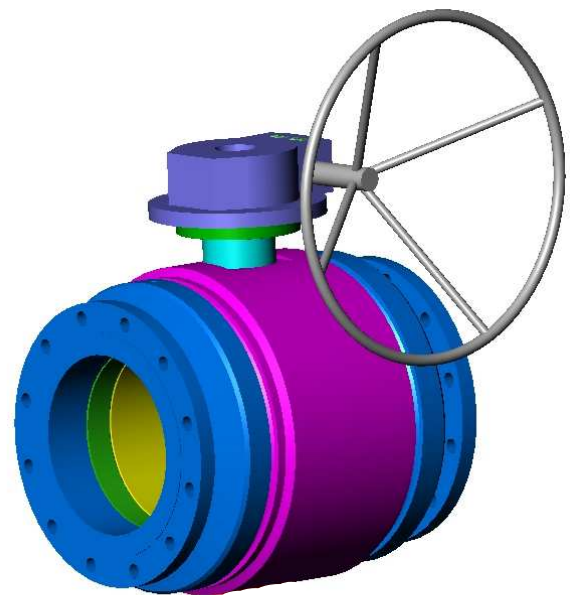


**USE AND MAINTENANCE STANDARD
MANUAL BALL VALVE "SIDE ENTRY"
TYPE 54 – 55 – 58- 59**

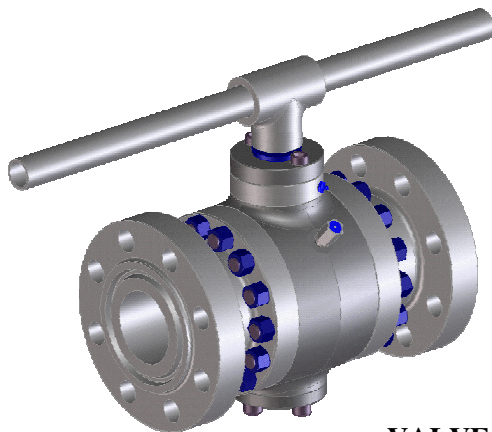
Doc. no. MMBE2 rev.7



**VALVE
TYPE 55**



**VALVE
TYPE 58**



**VALVE
TYPE 54**

Rev.	Date	Prepared	Verified	Approved
1	26-10-04	A. Covini	S. Schifano	P. Donini
2	04-10-12	C.Rado	S. Medicina	S. Berutti
3	03-11-13	P.Malchiodi	S. Medicina	P. Donini
4	28-01-15	F. Delvago	S. Medicina	P. Donini
5	21-05-18	P.Malchiodi	S. Medicina	P. Donini
6	27-08-19	I.Clarizio	S. Medicina	P. Donini
7	16-10-19	P. Malchiodi	S. Medicina	P. Donini



**USE AND MAINTENANCE STANDARD
MANUAL BALL VALVE "SIDE ENTRY"
TYPE 54 – 55 – 58- 59**

Doc. no. MMBE2 rev.7

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1 SCOPE

- 1.1 The purpose of this manual is to furnish the right indications for the installation, use and maintenance of Side Entry ball valves, with bolted or welded body.

2 REFERENCE DOCUMENTS

- 2.1 Use and maintenance manual for valves conformed to the follow specifications:
API 6D

3 SUITABILITY


- 3.1 This document is only for Side Entry ball valves with bolted or welded body, installed on pipeline with operating conditions described on chapter 4.

4 USE

- 4.1 The VALVITALIA's Side Entry ball valves are designed for services of flow control in the pipeline where the valves are in fully open or fully close position. The valves must not be used to regulate the flow. Improper uses for flow control may invalidate the guarantee.
- 4.2 The valve's open and close operations shall be done using the instruments furnished and selected for the valve (wrench, gear, actuator). VALVITALIA refuses any responsibility for manoeuvre done with different operators.

5 SAFETY PRECAUTIONS

- 5.1 Protective clothing and equipment normally required when working with the fluid involved is recommended.
- 5.2 Depressurize the line and cycle the valve as follows:
place the valve in the open position and drain the line, cycle the valve to relieve residual pressure in the body cavity before removal from the line; should the valve be seized in the open or closed position, use the vent/drain plug to completely depressurize body cavity. Drain vent plug shall be used with extreme care and never turned open more than 1/1.5 turns until drain/bleeding occurs through the plug hole. Vent drain plug if completely unscrewed with valve under pressure may be projected against the operator with danger of injuries.
- 5.3 After removal and before any disassembly, cycle the valve again several times.
- 5.4 It is important to refer to the tag fastened on each valve for maximum pressure ratings and material description.

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6 NAME PLATE

6.1 The name plate is exposed on VALVITALIA’s valves in accordance to the European directive certificate, where applicable.

Here below you can find an explanation table of what you will find on the name plates applied on the valves.

<i>SIZE DN</i>	Nominal Diameter	<i>CLASS</i>	Pressure Class
<i>M.O.P./Tmin</i>	Maximum operating pressure at minimum operating temp.	<i>M.O.P./Tmax</i>	Maximum operating pressure at maximum operating temp.
<i>TAG</i>	TAG Number	<i>SERIAL NUMBER</i>	Serial number
<i>TYPE</i>	Type of the valve	<i>BODY</i>	Valve body material
<i>VALVE ENDS</i>	Valve ends material	<i>STEM</i>	Valve stem material
<i>OBTURATOR</i>	Valve ball material	<i>SEAT</i>	Valve seat material
<i>MONTH/YEAR</i>	Month and year of production	<i>FLUID</i>	Fluid type
<i>FACE TO FACE / END TO END</i>		Face to face / end to end dimension	

Table 1


6.2 The name plate also shows:

-Company logo and address:



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- API logo and license: for the applicable API specification and if monogram is applicable;
- CE logo: for European community only. The applicable directive is 2014/68/UE;
- ATEX logo: for European community only. The applicable directive is 2014/34/UE;
- In case the monogram is applicable the nameplate, will also show QSL level, and seat design (DBB, DIB-1, DIB-2)

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7 INSTALLATION

- 7.1 Before the valve's SET-UP, it should be carefully checked in order to verify that there are not evident damage due to the shipping and handling. It very important verifying that the inside bore of the valve is free from any foreign particles that might damage the seats and ball.
- 7.2 Use the appropriate lifting hooks to lift the valve; if these are not available, use a sling rope around the lateral closures or around the body valve; never use the gear or the lever for valve handling. During handling of the valve, lateral ports must be always close with wood or plastic covers to avoid entry of foreign materials and damage to the flange faces.
- 7.3 The valve can be installed in both flow directions and in vertical or horizontal position. If the valve is operated by pneumatic, hydraulic or gas over oil actuator the valve shall be installed with the stem in vertical position only. The mounting with stem in horizontal position is possible only if special requirements, such as drain positioning & lifting lugs layout are agreed between customer and VALVITALIA and taken care during engineering phase.
- 7.4 During the SET-UP in the pipeline of the flanged valves, ball shall be in close position.
- 7.5 Remove the end flange's cover, clean the surfaces treated with antirust.
- 7.6 Before jointing the bolts between valve and pipeline flanges, insert the suitable gasket among the contact faces. Bolting screwing up shall be carried out on diametrically opposite bolts. For bolting torque, see section 2 in this manual.
- 7.7 Ball valve with WE ends, welding connection to pipeline should be carefully carried out with ball in open position and avoid an overheating of the body that can damage seals, gasket and seat ring (concerning to the Interpuss temperature, refer to the WPS/PQR supplied for each job)
- 7.8 After valve set-up, proceed to clear the pipeline to remove any foreign materials. Close and open the valve at least three times and verify the correct operations.
- 7.9 Lever operated valve is open when lever is in line with the pipeline. Valve is close when the lever is perpendicular to the flow line.
- 7.10 The gear box is arranged such as the handwheel is rotated clockwise to close the valve and anti-clockwise to open. The gearbox has adjustable stops and these are already set-up and must not be adjusted. To close the valve, rotate the handwheel until the position indicator on the gearbox shows close and the gearbox hits the close stop. To open, rotate the

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handwheel until the position indicator on the gearbox shows open and the gearbox hits open stop.

- 7.11 Ball valve can be fitted with pneumatic, hydraulic or electric actuators. Specific instructions should be followed, as provided by actuator manufacturer.
- 7.12 No specific routine maintenance is necessary except operating the valve periodically, even if only partially, to verify that the valve operation is satisfactory. Gear operators are grease filled and require no maintenance.


8 OPERATING CHECKS OR REQUIREMENTS

- 8.1 Check there is no visible leak from the valve body, closure or other parts before the valve opening or closing. If any leak is detected, further inspection shall be done to identify the reason of the leak, before removing the valve from service.
- 8.2 Check there is no visible leak from the actuator, before the valve opening or closing. If any leak is detected, further inspection shall be done to identify the reason of the leak, before removing the valve from service.
- 8.3 Check that the valve line and the body cavity are not under pressure before proceed with any dismounting procedures.
- 8.4 Grease fitting maybe carried out also when the valve line is under pressure, due to the presence of security check valves.
- 8.5 In case of double piston effect design check that the valve is periodically vented in order to depressurize the valve body cavity. The pressure maybe relieved by the special vent and drain bleeder or valves provided.
- 8.6 It's required to have sealant and Sealant injection devices always available for maintenance or operational purposes;
- 8.7 A batch of standard spare parts are always required for "routine" maintenance. If those particulars are not included in the original scope of supply have to be requested to VALVITALIA through a service order.

9 VALVE DISASSEMBLY FOR MAINTENANCE

Valve type 58 has body and closures welded, so the only parts can be changed are the gland plate and stem's o-rings.

- 9.1 Valve removing from the pipeline
 - 9.1.A Isolate the pipeline and make sure itself that the valve is not under pressure, rotate the ball in open position. Unscrew the drain plug (40b) and drain the fluid thought the drain hole in the bottom of the valve.

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9.1.B 9.1.2 Rotate the ball in close position, remove the valve from the pipeline and put the valve in a position simple to disassembly the top part.

9.2 Adaptor plate disassembling

9.2.A Unscrew the key's capscrew if it is present and remove the key (21) from the stem (4).

9.2.B Unscrew the adaptor plate's (20) bolt(10) and pull up the adaptor plate (20) from its position.

9.3 Gland plate disassembling

9.3.A Unscrew the grease fitting (30) from the gland plate (5) and unscrew the gland plate's capscrews (9), and remove from its housing. Pull up the gland plate (5) helping with two opposite screwdrivers to lever, pay attention to score the stem (4) during the pull out of the gland plate, and do not loose the centering pins (36c).

9.3.B Remove the gland plate (5), remove the stem's fire safe seal (19), stem's o-rings (12) and clean it with a degreasing fluid and verify the integrity of the o-rings. Make the same operation for the gland plate o-ring/graphite (15 & 18). In case of o-ring's damages, it should be substituted.

9.4 Stem disassembling

9.4.A Screw on the top of the stem a lifting hook and pull up the stem (4).

9.4.B Remove the upper thrust washer (22) and degrease, verify the integrity and in case of damages, it should be substituted.


9.5 Closure disassembling (applicable only for valves type 54 & 55)

9.5.A Put the valve in vertical position with a closure (2) turned to the ground.

9.5.B Unscrew and remove the body's nuts (8) and the bolts (7). Pull up the closure (2) in order to avoid sudden movements and follow the vertical axes.


9.5.C Remove body-closure's o-ring and graphite (11-16) from the closure (2).

9.5.D Verify the o-rings' integrity after cleaning and degreasing and if they are damaged, they should be substituted.

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9.6 Seat ring disassembling (applicable only for valves type 54 & 55)

- 9.6.A Remove the seat rings (25& 26 for valve type 55 and 25b for valve type 54) from the closures by using two opposite screwdrivers to lever.
- 9.6.B After cleaning and degreasing them, verify that seat rings (25&26 or 25b) are not scored. If there are some damages, they may be removed by using rubbing paper.
- 9.6.C For valve type 55, in case of damages of the seat's seal o-ring (13), it must be replaced. For valve type 54, control the insert and, if it is damaged, substitute the seat ring with insert (25b).
- 9.6.D Extract the inner seat ring (25), remove the grease seal o-ring (only for valve type 55 position 48) and seat seal o-ring (14) and execute the cleaning operation, with a wet cloth. Verify by flexion that the radial surface have no laceration that requires the complete replacement of the rings.
- 9.6.E Clean the seat seal housing and the closure seal housing before replacing the seal in their housing.
- 9.6.F Extract the seat's spring (27) from their housing and then clean well. Moreover verify that they are not flattened or compressed, in this case they need to be replaced.

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9.7 Ball disassembling (applicable only for valves type 54 & 55)


- 9.7.A For the valve type 55, extract the ball (3) with the relating supports (32), for this operation use a non metallic rope through the ball bore and the side of the ball. For the valve type 54, screw the capscrews (52) and remove the lower trunnion; (51) pay attention to the bearing on the lower trunnion (58), at this point you can pull up the ball.
- 9.7.B Remove the centering pins (46) and rest the ball and the support to a clean place, in order to clean the ball’s surface and remove the supports from the ball’s hubs; pay attention to the two bearings (33) and to the lower trust washer (23). Clean and control the bearing (33) and the lower trust washer (23); if they are damaged they should be substituted.
- 9.7.C Disassemble the closure still bolted on the body, that is the one where the valve was resting.

9.8 Body and closure control (applicable only for valves type 54 & 55).

- 9.8.A Clean the body in every part with an appropriate solution.
- 9.8.B If the valve has been extracted from the line, it will be possible to check it accurately. Particularly, it will be possible to check the closures in the seal areas in order to verify the existence of corrossions or frictional pick-up.

10 MAINTENANCE

- 10.1 The ball valves don’t require periodic lubrications.
- 10.2 The ball valve’s maintenance should be made only with the valve removed from the pipeline. For the valve type 58/59, the maintenance is related only the top extremity of the valve, stem and gland plate.
- 10.3 Clean accurately the metallic parts using an oil wet cloth. Do not clean elastomers with solvents. In case of damage of soft parts, replace them.
- 10.4 Check accurately the external surface of the ball and the seats to find damages, if any. If the ball and the seats are slightly scratched, it is possible to remove the damages by wiping them lightly with sand paper roughness maximum 1200. This operation should be executed from technical staff. In doubt and for better results, we suggest to substitute the damaged parts with new ones.

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10.5 Verify the functionality of the valve making one manoeuvre cycle per year.

11 LUBRICATION

- 11.1 Every metallic surface in contact with the ball during the ball movement, should be lubricated with MACON GREASE C2 or equivalent grease.
- 11.2 The thrust washer (22&23) and bearing (33) are auto-lubricated, so them not require any lubrication.
- 11.3 Lubricate the screw thread with anti - frictional pick up
- 11.4 The emergency seal should be made using grease NORDSTROM 555.

12 ASSEMBLING

Before starting to reassemble the valve, control that every parts are accurately cleaned and free from any external materials. Ensure that the assembly will be made in a clean area and also that every packaged parts are kept as cleanest as possible. Substitute all the fire safe gaskets since they can not be utilized after the disassembling. The assembling instructions are opposite to the disassembling instructions. For a correct screwing of the bolting, see the table 2 closing torque.

12.1 Closure assembling

- 12.1.A Position the closure (2) which is situated downwards with the area of seat lodging facing upwards.
- 12.1.B Insert the seat's springs (27) in the spring seats' hole in the closure, helped by a grease if necessary.
- 12.1.C Put the seat seal in the right position, grease o-ring (48 only for valve 55) and seat gasket o-ring (14). During this operation pay attention to pinch the o-rings.
- 12.1.D Put the body-closures o-ring and graphite (11-16) in the closure using a grease if necessary.

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12.2 Ball assembling

- 12.2.A Put the upper and lower bearings (33) on the ball hubs.
- 12.2.B Put the lower thrust washer (23) on the lower ball hub.
- 12.2.C Put the supports (32) on the ball hubs.
- 12.2.D Put the centering pins (46) in the hole on the supports lateral surfaces
- 12.2.E Insert the assembly compound of ball and two supports on the closure pay attention that the pins on the support must be centered with the closure pins holes.
- 12.2.F Put the ball in close position.

12.3 Body assembling


- 12.3.A Put the body (1) vertically on the closure so that the bolts (7) enter through their hole in the closure.
- 12.3.B Verify that the gland plate's hole in the body is aligned with the upper ball trunnion.
- 12.3.C Assembly with the body the other closure completed with the seat ring, following the procedure described in the precedent points.
- 12.3.D Screws the nuts (8) on the bolt (7) stating with the bolts positioned in the lower part of the valve.
- 12.3.E Screw the drain plug (40b) on the body.

12.4 Stem assembling

- 12.4.A Position the stem (4) on the ball (4) with the key (21) in axes with the flow axe.
- 12.4.B Add the upper thrust washer (22) on the stem.

12.5 Gland plate assembling

- 12.5.A Place the gland plate's o-ring/graphite (15&18) in their housing at the end of the gland plate, at the top of the body hole.
- 12.5.B Place the stem o-rings (12), in their housing inside the gland plate (5).

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12.5.C Screw the grease fittings (30) at the gland plate (5).

12.5.D Place the gland plate (5) on the body (1), using a pin hole between the body and the gland plate, center the gland plate in the correct position; pay attention to scratch the stem during this operation.

12.5.E Fix the gland plate to body screwing well the capscrews (9) to have correct seal.

12.5.F Put the pin (36c) in their hole in the gland plate.

12.6 Adaptor flange assembling

12.6.A Insert the graphite (19), place the gland bushing (6) in its housing on the top of the gland plate.

12.6.B Place the adaptor flange (20) on the gland plate, centering the adaptor flange pin's hole position (20) with the gland plate pin's hole position (5).

12.6.C Place the capscrews (10) in their hole on the adaptor flange, screwing them.

10.6.1 Place the key (21) on its stem housing and fix it screwing the capscrew (21a)

13 FINAL RECOMMENDATION

13.1 After assembling the valve, move the valve from close position to open position twice in order to assets the parts.

13.2 With the valve in open position, verify that the key position is in axes with the flow, and when the valve is in close position, the key position should be perpendicular to the flow axe.

13.3 For a correct screwing of the bolts, refer to Table 2 – torque wrench settings.



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Table 2a – TORQUE WRENCH SETTINGS [Nm ± 5%]

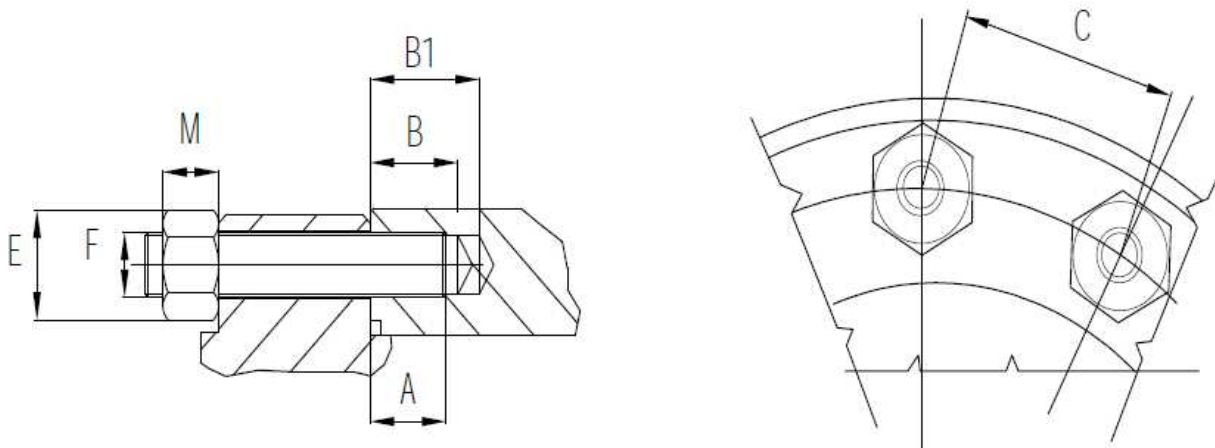
BOLT SIZE	A 193 B7 A 320 L7	A 193 B7M A 320 L7M A 453 Gr.660B	A 193 B8
M 8	26	20	25
M 10	51	39	49
M 12	90	68	86
M 14	126	96	121
M 16	197	151	189
M 18	270	206	259
M 20	386	295	295
M 22	532	406	406
M 24	666	509	509
M 27	988	755	617
M 30	1334	1019	834
M 33	1568	1198	951
M 36	2168	1656	1039
M 39	2807	2144	1345
M 42	3547	2710	
M 45	4428	3383	
M 48	5429	4147	
M 52	6989	5338	
M 56	8431	6440	
M 60	10487	8011	
M 64	12878	9838	
M 68	15631	11940	
M 72	18718	14299	
M 76	22158	16926	
M 80	26027	19882	
M 85	31462	24033	
M 90	37609	28729	
M 95	44442	33949	
M 100	52142	37296	



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Table 2b – BOLT DIMENSIONS AND TIGHTENING TORQUE



Bolt Diameter	Pitch mm	Area - mm ²		tightening Torque - Nm (±5%)				tightening Thrust - Ton (±5%)				Chord mm	F mm	M mm	E mm
		Root	S.R.UNI	Mat. (1)	Mat. (2)	Mat. (3)	% Sn	Mat. (1)	Mat. (2)	Mat. (3)	% Cp				
1/2"	13,00	83,3	92,8	81	106	102	80	3,74				26,0	16	13	25,1
5/8"	11,00	133,5	147,7	140	183	175	70	5,24				36,5	19	16	31,2
3/4"	10,00	199,4	218,1	249	325	312	70	7,83				41,0	22	19	36,9
7/8"	9,00	276,8	301,3	399	522	500	70	10,86				45,5	25,5	22	41,6
1"	8,00	363,2	394,8	594	778	746	70	14,25	18,66	17,88	20	49,5	28,5	25	47,3
1 1/8"	8,00	478,0	514,8	907	1188	1138	70	18,76	24,56	23,53	20	56,5	32	29	53,1
1 1/4"	8,00	609,0	650,3	1275	1670	1275	70	23,90	31,29	23,90	20	62,0	35	32	57,7
1 3/8"	8,00	756,0	801,3	1484	1943	1484	60	25,43	33,29	25,43	20	73,5	38	35	63,5
1 1/2"	8,00	919,0	969,0	1959	2565	1959	60	30,91	40,47	30,91	20	79,5	41	38	69,3
1 5/8"	8,00	1097,0	1154,8	2523	3303	2064	60	36,90	48,31	30,19	20	85,0	44	41	75,0
1 3/4"	8,00	1290,0	1348,4	3257	4263	2664	60	43,39	56,81	35,50	20	94,5	48	45	80,8
1 7/8"	8,00	1503,0	1567,7	4047	5298	2539	60	50,56	66,19	31,71	20	96,5	51	48	85,5
2	8,00	1729,0	1793,5	4850	6349	3042	60	58,16	76,14	36,48	20	100,5	54	50	91,2
2 1/4"	8,00	2226,0	2303,2	7118	9318	4465	60	74,88	98,03	46,97	20	116,5	60	57	100,0
2 1/2"	8,00	2787,0	2877,4	9850	12895	6179	60	93,75	122,73	58,81	20	122,5	66,5	63	116,0
2 3/4"	8,00	3419,0	3509,7	13426	17576		60	115,01	150,56		20	134,5	73	70	125,0
3"	8,00	4103,0	4212,9	17494	22901		60	138,02	180,68		20	157,5	79	76	136,0

Note : - Column Mat.(1) it is valid for the following material : A193 B7M, A320 L7M, A453 Gr.660B, A193 B7 (> M 100)
 - Column Mat.(2) it is valid for the following material : A320 L7, A320 L43, A193 B7 (<= M 100)
 - Column Mat.(3) it is valid for the following material : A193 B8 Classe 2 (<= M 39)

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RECOMMENDED SPARE PARTS

FOR STARTUP / COMMISSIONING					
ASSEMBLY POSITION	DESCRIPTION	TYPE “54” (Q.ty)	TYPE “55” (Q.ty)	TYPE “58” (Q.ty)	TYPE “59” (Q.ty)
12	STEM O-RING	1	2	2	1
15	GLAND PLATE O-RING	1	1	1	1
18	GLAND PLATE F.S. GASKET	1	1	1	1
19	STEM F.S. GASKET	1	1	1	1

One kit of all spare parts indicated in the above table is valid for 5 valves of same type.

FOR 2 (TWO) YEARS OF OPERATION					
ASSEMBLY POSITION	DESCRIPTION	TYPE “54” (Q.ty)	TYPE “55” (Q.ty)	TYPE “58” (Q.ty)	TYPE “59” (Q.ty)
3	BALL	1	1	-	-
11	CLOSURE O-RING	2	2	-	-
12	STEM O-RING	1	2	2	1
13	SEAL O-RING	-	2	-	-
14	SEAT GASKET O-RING	2	2	-	-
15	GLAND PLATE O-RING	1	1	1	1
16	CLOSURE F.S. GASKET	1	1	-	-
18	GLAND PLATE F.S. GASKET	1	1	1	1
19	STEM F.S. GASKET	1	1	1	1
25b	SEAT WITH INSERT	2	2 ⁽¹⁾	-	-
39	BODY O-RING	1	1	-	-
48	“U” CUP O-RING	-	2 ⁽²⁾	-	-
59	LOWER TRUNNION O-RING	1	-	-	-


Note:

⁽¹⁾ For valves supplied with “SEAT WITH INSERT” only.

⁽²⁾ For valves supplied with lubricated seats only.

One kit of all spare parts indicated in the above table is valid for 5 valves of same type.

The above mentioned spare kits are only for reference as a minimum set of spare parts for valve maintenance. They do not necessarily match and replace the spare kit defined in the order phase.

	<p>USE AND MAINTENANCE STANDARD MANUAL BALL VALVE "SIDE ENTRY" TYPE 54 – 55 – 58- 59</p>	<p>Doc. no. MMBE2 rev.7</p>
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14 STORAGE

- 14.1 The valves are furnished with wood or plastic cover applied at the end, and they shall be removed before the installation in the pipeline
- 14.2 For the storage, the ball shall be in open position.
- 14.3 The valve shall remain in their original package for more than 18 months, in a clean, dry and cover place or in a controlled environment warehouse.
- 14.4 If the storage is in external ambient for a period more than 12 months, advise VALVITALIA before the order.

15 ASSEMBLY DRAWING

20	ADAPTOR FLANGE	149	DRAIN PLUG
19	STEM FIRE SAFE GASKET	48	"U" CUP RING
18	GLAND PLATE F.S. GASKET	46	SUPPORT PIN
16	CLOSURE F.S. GASKET	44	CHECK VALVE
15	GLAND PLATE O-RING	41	GREASE FITTING
14	SEAT GASKET O-RING	40b	DRAIN CONNECTION
13	SEAL O-RING	36c	STOP PIN
12	STEM O-RING	35	LIFTING LUG
11	CLOSURE O-RING	33	SUPPORT BEARING
10	ADAPTOR FLANGE CAPSCREW	34	LEG
9	GLAND PLATE CAPSCREW	32	SUPPORT
8	NUT	30	STEM GRASE FITTING
7	BODY BOLT	27	SEAT SPRING
6	GLAND BUSHING	26	SEAT ESTERNAL RING
5	GLAND PLATE	25b	SEAT INNER RING
4	STEM	23	LOWER THRUST WASHER
3	BALL	22	UPPER THRUST WASHER
2	CLOSURE	21a	KEY CAPSCREW
1	BODY	21	STEM KEY
Pos.	Description	Pos.	Description

