

INSTALLATION AND OPERATING MANUAL ICP BALL VALVES

INSTALLATION INSTRUCTIONS

GENERAL GUIDELINES :

- Ensure that the valves to be used are appropriate for the conditions of the installation (type of fluid, pressure and temperature).
- Be sure to have enough valves to be able to isolate the sections of piping as well as the appropriate equipment for maintenance and repair.
- Ensure that the valves to be installed are of correct strength to be able to support the capacity of their usage.
- **Installation of all circuits should ensure that their function can be automatically tested on a regular basis (at least two times a year).**

INSTALLATION INSTRUCTIONS :

- **Before installing the valves, clean and remove any objects from the pipes** (in particular bits of sealing and metal) which could obstruct and block the valves.
- **Ensure that both connecting pipes either side of the valve (upstream and downstream) are aligned (if they're not, the valves may not work correctly).**
- **Make sure that the two sections of the pipe (upstream and downstream) match, the valve unit will not absorb any gaps. Any distortions in the pipes may affect the tightness of the connection, the working of the valve and can even cause a rupture.** To be sure, place the kit in position to ensure the assembling will work.
- **If sections of piping do not have their final support in place, they should be temporarily fixed. This is to avoid unnecessary strain on the valve.**
- Tighten the bolts in cross.
- Pressure tests should be done with cleaned pipes
- Pressure tests have to be done with partial opening. Pressure should not exceed valve specifications according to EN 12266-1 or API 598.
- Pressurizing should be done gradually to avoid water hammer.
- It's recommended to operate the valve (open and close) 1 to 2 times per year



For an installation in ATEX area, check the conductivity between the valve, the upstream pipe and the downstream pipe and make sure the pipe is connected to the earth.

SERIES SFF & SFR



SFF / SFR
EN/ANSI/ASME/API/BS/NF

SFF
EN/DIN/BS/NF

CE

Ex II 2 G D



REVIEW CONTROL

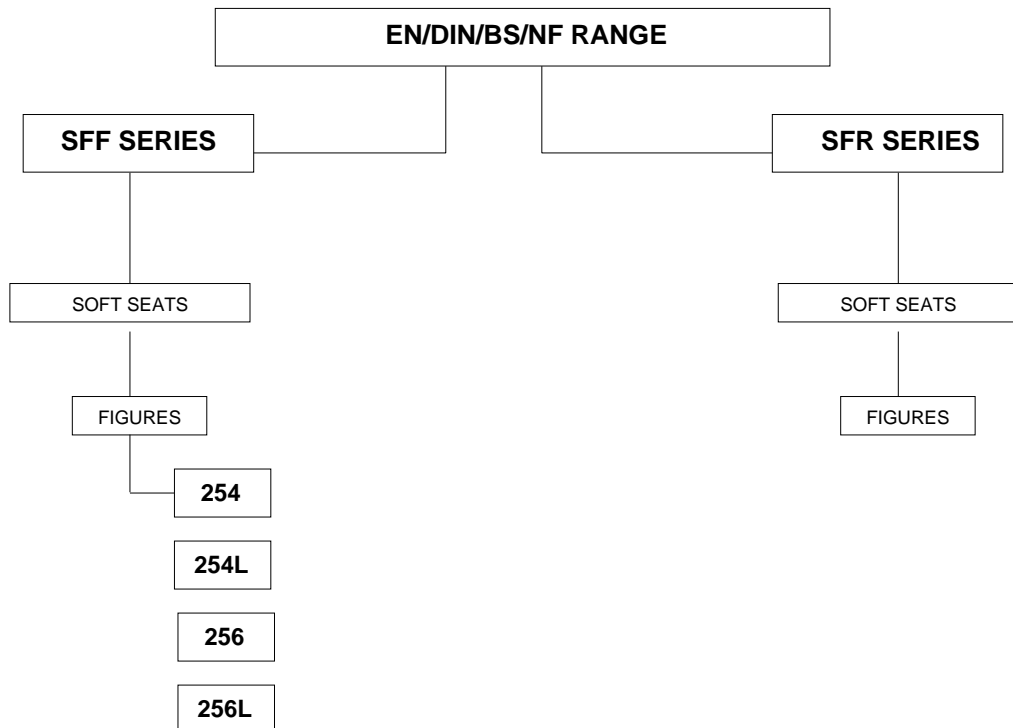
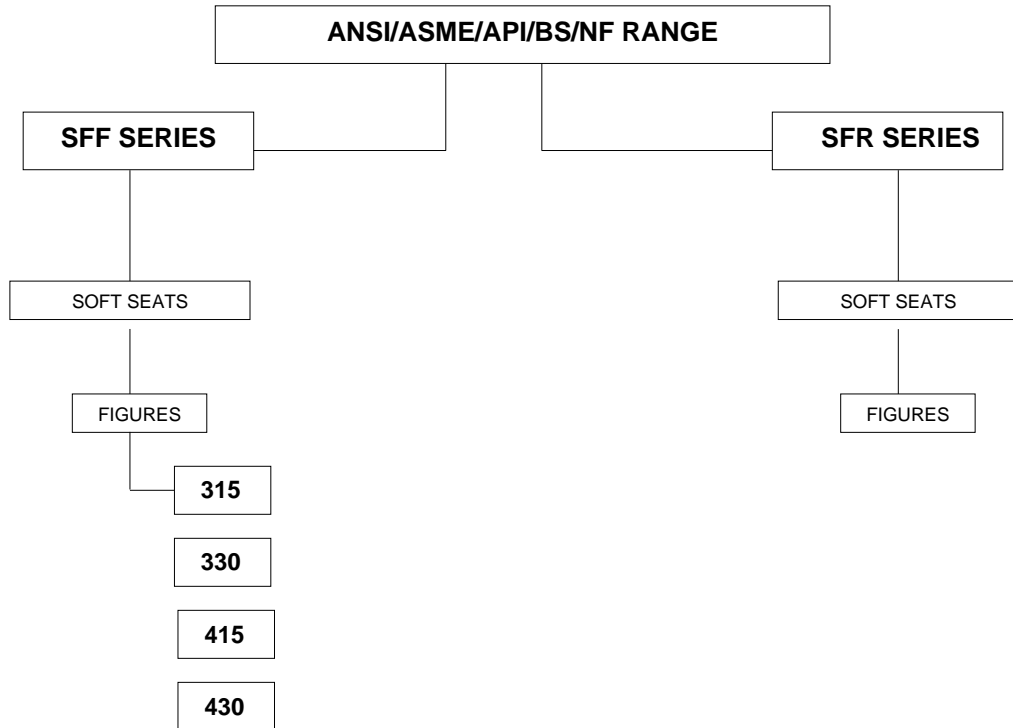
PROCEDURE REF.: DOC. MMM LCVE

REV.	DATE	CARRIED OUT BY	APPROVED BY	DESCRIPTION
0	19/07/2010	J. Rubio	J.Tejedor	1st Edition
1	19/07/2016	J. Rubio	J.Tejedor	Update of European Directives

CONTENTS

1.-	APPLICABLE RANGE.....	Page 4
2.-	GENERAL INFORMATION	Pages 5-9
	<input type="checkbox"/> STATEMENT	
	<input type="checkbox"/> DESCRIPTION OF APPLICABLE EQUIPMENTS	
	<input type="checkbox"/> TECHNICAL STANDARDS	
	<input type="checkbox"/> SCOPE OF USE	
	<input type="checkbox"/> ENVIRONMENTAL CONSIDERATIONS	
	<input type="checkbox"/> DESIGN CONDITIONS	
3.-	INSPECTION AT RECEPTION AND STORAGE	Page 10
4.-	INSTALLATION	Pages 10-11
5.-	PREVENTIVE MAINTENANCE	Page 11
6.-	MAINTENANCE OPERATIONS	Page 12
	<input type="checkbox"/> PRECAUTIONS	
7.-	REASONS FOR PARTS REPAIR AND REPLACEMENT	Pages 12-14
	<input type="checkbox"/> LEAKAGE THROUGH THE PACKING	
	<input type="checkbox"/> LEAKAGE THROUGH THE BODY SEAL	
	<input type="checkbox"/> CHANGE OF PACKING	
	<input type="checkbox"/> CHANGE OF SEATS, PACKING AND SEALS	
8.-	MAXIMUM GLAND NUT TIGHTENING TORQUE	Page 14
9.-	NUTS AND BOLTS TIGHTENING TORQUE	Page 15
10.-	VALVE EXPLOSION VIEW	Page 16

1.- APPLICABLE RANGE



2.- GENERAL INFORMATION

2.1 STATEMENT

ICP SFF and **SFR** Series Ball Valves have been designed and manufactured for the use, circulation and control of fluids in those industrial processes in which conditions are suitable for the performance levels of the valves, according to the applicable standards.

Steel & Stainless Steel Valves DN greater than 25

ICP VALVES states that ICP valves covered by this certificate have been designed and manufactured according to the following European Directive requirements:

- European Pressure Equipment Directive 2014/68/EU: Evaluation Procedure of Conformity Mod H Cat III, certified by TÜV 01 202 E/Q-14 9501. Marking CE 0035 Cat III Mod H.
- Directive 2014/34/EU ATEX, classification Group II, Cat 2 for use in explosive atmospheres, areas 1,2 & 21,22. Evaluation of conformity according to Appendix VIII. Marking CE Ex II2GDc.

Applied harmonized and non-harmonized technical Standards:

- EN 10213, EN 10204, EN 12266-1, EN 15848-1 & (2)*, EN ISO 17292, EN 1983, EN 19:2002, others see ICP's Catalogue and Assembly & Maintenance Procedures.
- EN 13463-1:2001, EN 1127-1.

The electrical and mechanical extras are not covered by this statement and will have to carry their own in order to be assembled with ICP valves.

Steel & Stainless Steel Valves DN lower than 32

ICP states that ICP valves covered by this certificate have been designed and manufactured according to the following European Directive requirements:

- European Pressure Equipment Directive 2014/68/EU: classified according article 3, part 3, cat SEP, must not carry the CE label.
- Directive 2014/34/EU ATEX, classification Group II, Cat 2 for use in explosive atmospheres, areas 1,2 & 21,22. Evaluation of conformity according to Appendix VIII. Marking CE Ex II2GDc.

Applied harmonized and non-harmonized technical Standards:

- EN 10213, EN 10204, EN 12266-1, EN 15848-1 & (2)*, EN ISO 17292, EN 1983, EN 19:2002, others see ICP's Catalogue and Assembly & Maintenance Procedures.
- EN 13463-1:2001, EN 1127-1.

The electrical and mechanical extras are not covered by this statement and will have to carry their own in order to be assembled with ICP valves.

The suitability of the materials and the design of the type of valve in terms of their working conditions is the responsibility of the end user of the valve.

* on request

SFF & SFR SERIES FOR EN/ANSI/ASME/API/BS/NF DESIGN

DESCRIPTION OF APPLICABLE EQUIPMENTS

Category III Module H (ISO EN 9001)

Series	Body	Ball	Bore	Class/ISO PN	ICP Fig.	DN	FLANGES
SFF	Two pieces	Floating	Full	150 / ISO PN 20	315 415	1/2" - 8"	RF / STOCK FINISH
				300 / ISO PN 50	330 430	1/2" - 8"	

Applicable Technical Standards:

- EN 19: Marking of general purpose industrial valves.
- EN 558-2: Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems
Part 2: Class-designated valves.
- EN 1503-2: Valves - Materials for bodies, bonnets and covers - Part 2: Steels other than those specified in European Standards.

Fire Safe certification:	BS 6755 Part 2 / API 607 4 TH Edition / API 6FA / ISO 10497:2004
Valves design:	API 6D / ASME B 16.34 / EN 1983 / EN ISO 17292
Body design:	ASME VIII Div 1
Shell thickness:	ASME B 16.34 / BS 5351
Flanges:	ASME B 16.5
Face-to-face dimensions:	ASME B 16.10 / API 6D
Shell finishing quality:	MSS SP 55
Wetted parts materials & bolting:	NACE MR 01.75
Marking:	EN 19 / API 6D / EN ISO 17292
Pressure testing:	API 598 / ISO 5208 / EN 12266
Actuator mounting flange:	ISO - EN 5211
Fugitive emissions:	EN 15848-1 & (2)*

* on request

SFF SERIES FOR EN/DIN/BS/NF DESIGN

DESCRIPTION OF THE APPLICABLE EQUIPMENTS

Category III Module H (ISO EN 9001)

Series	Body	Ball	Bore	ISO PN	ICP Fig.	DN	FLANGES
SFF	Short (F18) Split body	Floating	Full	16	256	65 - 200	RF Form C
				40	254	15 - 150	
	Long (F1) Split body			16	256L	65 - 200	
				40	254L	15 - 200	

Applicable Technical Standards

- EN 19: Marking of general-purpose industrial valves.
- EN 558-1: Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems.
Part 1: PN-designated valves
- EN 1503-1: Valves - Materials for bodies, bonnets and covers - Part 1: Steels specified in European Standards.

- Fire Safe certification: BS 6755 Part 2 / ISO 10497:2004
- Valves design: EN 1983 / EN ISO 17292
- Body design: DIN 3840
- Shell thickness: BS 5351
- Flanges: EN 1902-1
- Face to face dimensions: EN 558-1
- Shell finishing quality: MSS SP 55
- Marking: EN 19 / ISO EN 17292
- Pressure testing: ISO 5208 / EN 12266
- Actuator mounting flange: DIN 3337 / ISO - EN 5211
- Fugitive emissions: EN 15848-1 & (2)*

* on request

SCOPE OF INSTALLATION ACCORDING TO THE TYPE OF FLUID (DANGEROUS FOR THE ENVIRONMENT OR HUMAN HEALTH)**GROUP 1 CLASSIFICATION**

.- The incorporation of additional safety elements “Double packing” is recommended for the range of products included in Group 1.

.- The use of valves without additional safety devices in Group 1 will be the responsibility of the user or the purchaser, as well as the advisability of installing leakage detection systems.

GROUP 2 CLASSIFICATION

.- Carbon Steel valves will not be used in corrosive fluids lines

Warning is given that when the use of fluids that could cause damages to human's health, environment or property is expected, then the necessary safety elements to prevent risks must also be used!

ENVIRONMENTAL CONSIDERATIONS:

According to the premises marked by the ISO 14000 Regulations and the environmental policy of ICP Valves.

The recyclability of the components that form part of ICP valves is the following:

Recyclable components:

Metal parts, PTFE (hard), plastic plug (low-density polyethylene).

Non-recyclable components:

PTFE mixed with other compounds (Glass-fiber, graphite, etc...), nylon, graphite and graphite mixed with metal.



**BALL VALVE ASSEMBLY AND MAINTENANCE PROCEDURE FOR
LCV BALL VALVES REF. DOC. MMM LCVE Rev.1 – July 2016**

DESIGN CONDITIONS

**SFF & SFR SERIES
FOR CLASS-DESIGNATED VALVES
API 6D / ANSI B 16.34 / BS 5351 / NF E 29-470**

**SFF & SFR SERIES
FOR PN-DESIGNATED VALVES
DIN 3357 / BS 5351 / NF E 29-470**

CLASS 150 - ISO PN 20

	Unit	A216 WCB	A351 CF8M
Class	psig	150	
Design Temp.	°C	-29 / 230 (see note 1)	
Design Pressure	psi/N/mm ²	285/1.965	275/1.896
Test Temp.		Ambient	
Test Pressure	Psi/N/mm ²	428/2.947	412/2.844
Castings Quality Factor		0.8	

ISO PN 16

	Unit	1.0619	1.4408
PN	Bar	16	
Design Temp.	°C (see Note 1)	-10 / 230	-50 / 230
Design Pressure	Bar / N/mm ²	16 / 1,6	16 / 1,6
Test Temp.		Ambient	
Test Pressure	Bar / N/mm ²	24 / 2,4	24 / 2,4
Safety Factor (Casting)		PN (2), PE (1,5)	

CLASS 300 ISO PN 50

	Unit	A216 WCB	A351 CF8M
Class	psig	300	
Design Temp.	°C	-29 / 230 (see Note 1)	
Design Pressure	Psi/N/mm ²	740/5.102	720/4.964
Test Temp.		Ambient	
Test Pressure	Psi/N/mm ²	1110/7.653	1080/7.446
Castings quality factor		0.8	

ISO PN 40

	Unit	1.0619	1.4408
PN	Bar	40	
Design Temp.	°C (see Note 1)	-10 / 230	-50 / 230
Design Pressure	Bar / N/mm ²	40 / 4,6	40 / 4,6
Test Temp.		Ambient	
Test Pressure	Bar / N/mm ²	60 / 6,6	60 / 6,6
Safety Factor (Casting)		PN (2), PE (1,5)	

Note 1: Seats in PTFE. For other types of seats, consult the manufacturer's catalogue.

Note 2: On request in DIN/EN materials or AD-Merkblatt certificates.

3.- INSPECTION AT RECEPTION AND STORAGE

- 3.1 All valves will be examined on reception, to ensure that they have not suffered any damages during transport, and the supplier will immediately be informed of any damages observed.
- 3.2 The valves leave the factory in open position as a measure of protection and to ensure that no foreign body can damage the ball, except fail to close actuated valves (actuator normally in closed position).
- 3.3 **WARNING!**
The valves will be stored under cover and protected from inclement weather conditions and foreign bodies.
- 3.4 The valves will not be unpacked until they are to be definitively installed, except for purposes of inspection. After inspection they will be packed again.

4.- INSTALLATION

- 4.1 The handling and transporting of the valves must be carried out with extreme precaution and using the necessary and adequate means on the basis of their size and weight, in this way avoiding any risks to the persons that handle them.
- 4.2 **WARNING!**
Never use the wrench to hold the valve during handling, assembly or transport.

Check the condition of the valve, firstly to detect any possible damages caused during their transport and/or handling.

Likewise inspect the inside of the valve, as well as the interior of the pipe that connects up to the valve. It is of utmost importance that there are no foreign bodies that could damage the valve seats, insofar as these parts are fundamental to the correct operation of the valve.

WARNING!

*When it is known or assumed that the valve is to be installed at a collection point for waste, such as welding slag, rust or scale, **protective filters or screens must be placed, temporarily or definitively (depending on the installation), upstream, before connection with the valve.***

The valve must be installed in such a way that it is accessible for the necessary periodic inspection and maintenance required guaranteeing the performance levels for which it has been designed.

ICP Standard SFF & SFR series constructions up to –20°C have been designed without fluid direction preference – **“They are Bi-directional”**

When the construction of the valve, even being of the same SFF & SFR Series, is specified to work at temperatures below – 20 °C and down to – 46 °C (**LOW TEMPERATURE**), the valves will be **“Unidirectional”** and will have an arrow or identification plate indicating the flow direction.

The valve can be installed with the stem in any position, although it is recommended that this be done in a vertical position, with the stem upwards.

WARNING!

The valves must not support stress from the piping, the installation must be carried out ensuring correct alignment and parallelism in order to ensure that it is not subject to any unexpected stress.

Make sure when installing the valve that the flange seal that connects up to the valve is correctly fitted, following the seal manufacturer's instructions, also ensuring that it is compatible with the circulating fluid.

IMPORTANT!

After installation run a final check on the valve, opening and closing it to make sure that it is working perfectly.

WARNING!

Make sure that the fluid used in cleaning operations and the way in which the cleaning is done are compatible with the installed valve.

Having finished the final cleaning operations prior to bringing the valve on-line, if filters have been installed they can be removed or, on the other hand if the user considers that rust or scale formations may be encountered, they must be left permanently in place.

IMPORTANT!

When ball valves are destined to end line, you should reduce the hydrostatic proof pressure of the line to 1,1 Rating pressure.

5.- PREVENTIVE MAINTENANCE

- 5.1 Preventive maintenance operations essentially consist of periodic inspections to ensure that the valve is working correctly.
- 5.2 The valves must be opened and closed at least once every 6 months and, should such be required on the basis of the fluid or the application of the valve and its importance, opening and closing check plans will have to be established for shorter periods.
- 5.3 *The user will be responsible for establishing opening and closing plans that are adequate for the work conditions and the fluids used!*
- 5.4 **WARNING!**
Never leave the valves open or closed for a long period of time.
- 5.5 A very high torque increase could be due to the inclusion of foreign bodies in the seats. It is important not to force the valve! Proceed with an inspection of the seats in order to avoid damaging the ball.
- 5.6 We advise replacement of the seals and the seats whenever an in-depth revision of the installation is made.

6.- MAINTENANCE OPERATIONS

PRECAUTIONS BEFORE DISASSEMBLY!!

Make sure that the line has been closed and depressurised.
Open and close the valve several times in order to release the pressure and drain the valve cavity.

WARNING!

Wear protective clothing adequate for the circulating fluid. (Comply with the safety guidelines laid down by the company!)

Remove the valve from the line in the closed position, and clean off any remaining fluid.

The replacement of parts must be done using original ICP spare parts!

The manufacturer will not be responsible for the malfunctioning of the valve if original ICP parts are not used!

7.- REASONS FOR PARTS REPAIR AND REPLACEMENT

7.1 LEAKAGE THROUGH THE PACKING

7.1.1 If leakage is detected through the packing (8), tighten the gland nut (12) by an 1/8 of a turn. Repeat this operation if leakage persists. If there is still leakage substitute the packing (8).

7.2 LEAKAGE THROUGH THE BODY SEAL

7.2.1 If leakage is detected through the body seal (17), then this seal must be changed. Follow the instructions point 7.4.

7.3.- CHANGE OF PACKING

We recommend that when the change of packing (8) is necessary, to substitute as well the seats (4), body seal (17) and stem thrust washers (6). However, if due to process needs it is not possible to disassembly the valve from the line, follow the sequence below:

DISASSEMBLY

7.3.1 Make sure that the installation is not under pressure.

7.3.2 Disassembly the handle (14) or actuator, open the rib of the locking washer (11), in order to remove the gland nut (12) and the disk springs (10).

7.3.3 Remove the thrust washer (13) and the gland ring (9). Remove the packing (8) without damaging the stem (5) and body (1) surfaces.

ASSEMBLY

- 7.3.4 Fit a new packing (8) in its body (1) housing.
- 7.3.5 Place the gland ring (9), the new thrust washer (13), the disk springs (10), the locking washer (11) and tighten the gland nut (12) to the torque specified in point 8.8.
- 7.3.6 Before refitting the handle (14) or actuator, check the valve under pressure to verify the tightness of the packing (8). If there is leakage see point 7.1.1.
- 7.3.7 Assembly the handle (14) or actuator.

7.4.- CHANGE OF SEATS, PACKING AND SEALS**DISASSEMBLY**

- 7.4.1 Verify that the installation is not under pressure.
- 7.4.2 Disassembly the valve from the line. If the circulating fluid is noxious or inflammable, precautions must be taken to avoid accidents.
- 7.4.3 Unfasten the nuts (16) of the body-body connector, bearing in mind that there may be fluid trapped in the body cavity (1). Separate the body connector (2) from the body (1).
- 7.4.4 Remove the seat (4) from the body connector and the seal (17) from the body-body connector.
- 7.4.5 Turn the ball (3) to the closed position and remove it from body (1). Clean the outside surfaces, the bore and slot, verifying that the pressure relief hole situated at the bottom is not blocked.
Check the exterior surface of the ball, particularly the area in contact with the seats and the radius of transition between the exterior surface and the bore. If the ball's surface or slot are damaged, replace the ball for a new one.
- 7.4.6 Remove the seat (4) from the body (1).
- 7.4.7 Disassembly the stem (5). For this operation follow steps 7.3.2 and 7.3.3. Remove the stem (5) through from the inside of the body (1). Remove the thrust washer in PTFE with glass fibre (6). The stem (5) incorporates an o-ring (7) that will have to be substituted.
- 7.4.8 Clean the inside surfaces of the body (1) and body connector (2), specially the housing areas of the seats, body seal, thrust washer and packing.
- 7.4.9 Clean and check the stem. Verify that the antistatic device works, pushing the balls inwards in their housing and checking that they return to their original position. If any of these balls is blocked or the surface of the stem damaged, substitute the stem by a new one.

ASSEMBLY

Make sure that the spare parts are ICP original, with the same materials and dimensions as the parts to be replaced.

WARNING!!

If the valve has to be degreased (Oxygen Service, Hydrogen Peroxide, etc.), consult the manufacturer.

- 7.4.10 Place the thrust washer (6) in the stem (5). Place the O-ring (7) in the stem's slot.
- 7.4.11 Insert the stem (5) in its housing through the inside of the body (1).
- 7.4.12 Assembly the packing (8) and rest of parts according points 7.3.4, 7.3.5 y 7.3.6
- 7.4.13 Place a new seat (4) in the body (1).
- 7.4.14 Turn the stem (5) to the closed position so that it can be introduced in the slot of the ball (3).
Assembly the ball (3) in closed position, making sure that there is no play between the slot and the stem.
- 7.4.15 Insert in the body connector (2) the other seat (4) and the seal (17) in the body's (1) housing.
- 7.4.16 Adjust the body connector (2) over the body (1). Verify that the holes of both flanges are in the same position with respect to the stem's symmetry of the valve.
- 7.4.17 Screw the nuts (16), following the adequate sequence.
- 7.4.18 Assembly the handle (14) or actuator.
- 7.4.19 Before re-assembling the valve in the line, test it in half-open position to verify the tightness of the packing (8) and body seal (17) and then close it and test the tightness of the seats (4).

8.- MAXIMUM GLAND NUT TIGHTNESS TORQUE IN m.Kp.

Nominal Diameter	Graphite Packing
15	2.2
20	2.2
25	2.2
32	2.5
40	4
50	4
65	7
80	8
100	8
125	9
150	9
200	23

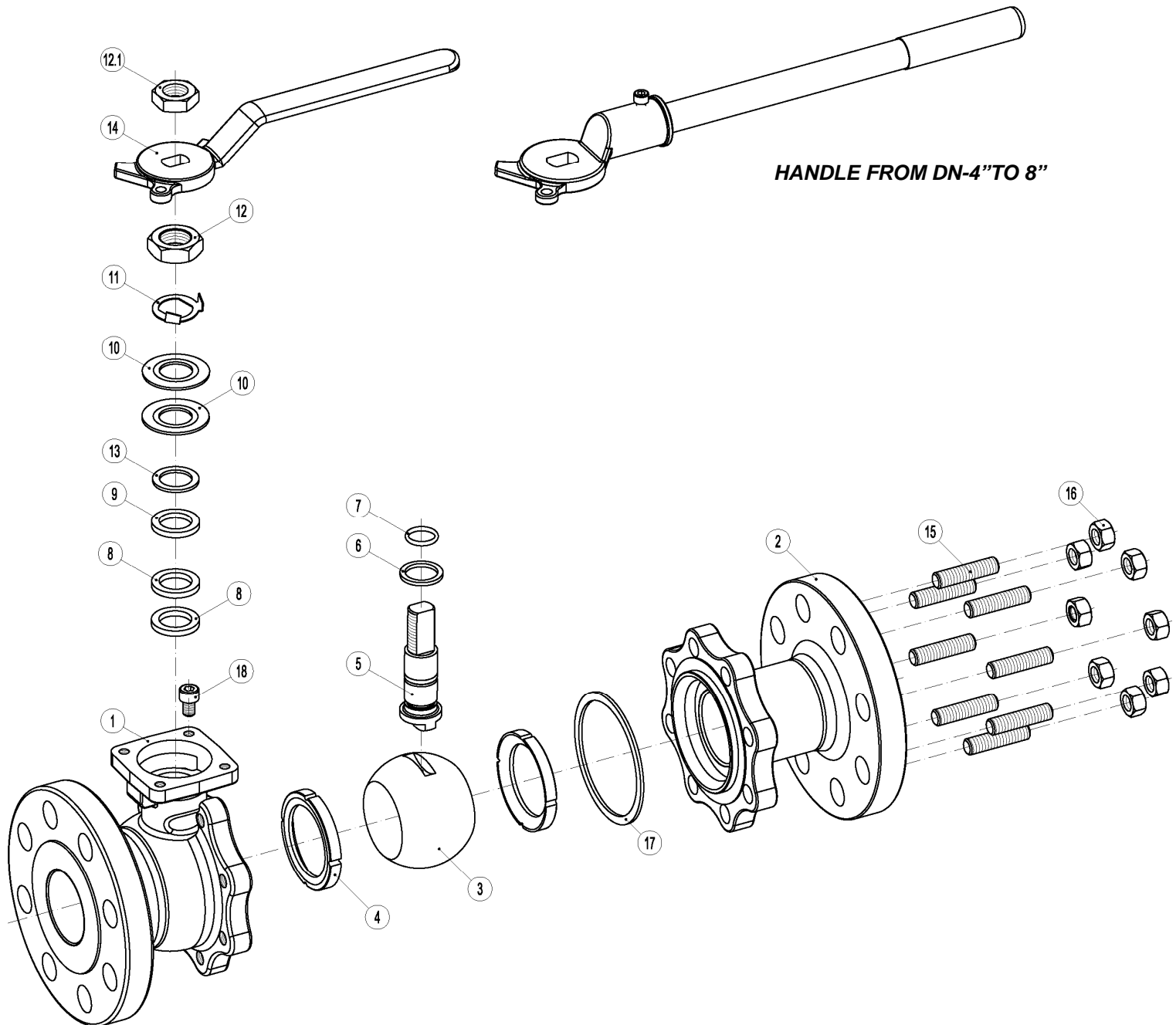
9.- TIGHTNESS TORQUE CHART OF THE BOLTS / NUTS OF THE BODY-BODY CONNECTOR. VALUES IN mKg.

UNC THREAD CLASS ASSEMBLY (*)

Elastic Limit 0.2%		
(Kg/mm ²)	21	55
Material	B8/B8M	B7M
ØBolt		
3/8"	1.57	4
7/16"	2	5.5
1/2"	2.6	7
9/16"	4.2	11
5/8"	6.3	16.5
3/4"	10	27
7/8"	16.8	43
1"	25	72

(*) Calculation with a friction coefficient of 0.12 and 75% of the elastic limit.

10.- VALVE EXPLOSION VIEW





**BALL VALVE ASSEMBLY AND MAINTENANCE PROCEDURE FOR
LCV BALL VALVES REF. DOC. MMM LCVE Rev.1 – July 2016**



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