

## **Operation and Maintenance Manual**

### **PIPE COUPLERS**

**Cat. no.**

**9101; 9102; 9103; 9104;  
9122; 9123;  
9144; 9151; 9152**

Approved for use by

JAFAR S.A. Factory President

Failure to comply with the guidelines and instructions in this Operation and Maintenance Manual exempts the manufacturer from all obligations, liabilities and guarantees.

Due to the continuous development of our business, we reserve the right to introduce modifications and structural changes to the product presented herein.

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**TABLE OF CONTENTS**

1 TECHNICAL DESCRIPTION .....	3
<b>1.1 PRODUCT NAME AND FEATURES</b> .....	3
<b>1.2 INTENDED USE</b> .....	3
<b>1.3 TECHNICAL SPECIFICATION</b> .....	3
2 DESIGN .....	3
<b>2.1 FITTING DESIGN DESCRIPTION</b> .....	3
<b>2.2 MATERIALS AND DIMENSIONS OF COUPLERS.</b> .....	4
<b>2.2.1 TYPE 9101</b> .....	4
<b>2.2.2 TYPE 9102</b> .....	5
<b>2.2.3 TYPE 9103</b> .....	6
<b>2.2.4 TYPE 9104</b> .....	7
<b>2.2.5 TYPE 9122</b> .....	8
<b>2.2.6 TYPE 9123</b> .....	9
<b>2.2.7 TYPE 9144</b> .....	10
<b>2.2.8 TYPE 9151</b> .....	11
<b>2.2.9 TYPE 9152</b> .....	12
<b>2.4 STANDARDISATION</b> .....	13
<b>2.5 ORDERING REGULATIONS</b> .....	13
<b>2.6 MANUFACTURE AND ACCEPTANCE</b> .....	14
<b>2.7 MARKINGS</b> .....	14
3 PROTECTION, STORAGE & TRANSPORT .....	14
<b>3.1 PROTECTIVE COATINGS</b> .....	14
<b>3.2 PACKAGING</b> .....	14
<b>3.3 STORAGE</b> .....	14
<b>3.4 TRANSPORT</b> .....	14
4 ASSEMBLY AND INSTALLATION .....	17
<b>4.1 INSTALLATION GUIDELINES</b> .....	17
<b>4.2 ASSEMBLY INSTRUCTIONS</b> .....	17
<b>4.3 OPERATION</b> .....	19
<b>4.4 OH&amp;S REGULATIONS</b> .....	19
5 GUARANTEE CONDITIONS .....	19

## 1 TECHNICAL DESCRIPTION

### 1.1 PRODUCT NAME AND FEATURES

The subject of this O&MM are:

Couplers for iron pipes, flangeless ones (for spigot pipes) of Type 9101; 9102; 9122; 9151 and flange ones of Type 9103; 9104; 9144; 9152. Such couplers are used in piping systems made of (hard) steel, iron, asbestos-cement or plastic (PE or PVC) pipes.

### 1.2 INTENDED USE

Iron bell-and-spigot joint clamps of Type 9101 are intended for mounting installations of hard bell-and-spigot pipes through the connection of their spigot ends with bell ends.

Flangeless couplers for iron pipes of Type 9102; 9122; 9151 are intended for mounting installations of hard pipes through the connection of their spigot ends.

Couplers for iron flange pipes of Type 9104; 9144; 9152 are intended for mounting installations through the connection of spigot ends of the pipes with flange fitting connections.

Couplers for PE and PVC pipes of Type 9103; 9123 are intended for mounting installations through the connection of their spigot ends with flange fitting connections.

They can be operated both in underground and overground installations as installed in vertical or horizontal pipelines.

### 1.3 TECHNICAL SPECIFICATION

Couplers for iron, PE or PVC pipes are intended for the transport of potable and industrial water and other liquids (to be determined with the manufacturer)

- temperature between  $-10^{\circ}\text{C}$  and  $+70^{\circ}\text{C}$ .
- scope of applied diameters of line pipes DN [mm] – according to the table with dimensions accordingly for each type
- maximum medium flow rate: - liquid: max. 4 [m/s]  
- gas: max. 30 [m/s]

connections of flange couplers are prepared for mounting flange pipes as big as required by the adopted nominal pressure according to PN-EN 1092-2: 1999.

## 2 DESIGN

### 2.1 FITTING DESIGN DESCRIPTION

"JAFAR" S.A. Fitting Factory provides couplers for iron pipes of different sorts. Such pipe couplers are built of ductile or grey cast iron. Coupler bodies are usually bushings for inserting ends of connected pipes, or flange bushings in the case of flange couplers. Inside the coupler body is a tight sealing intended for pipes of specific outer diameters, or a conical seal clamped by use of a ring with bolts, in the case of pipes with a specific scope of outer diameters.

Use of flange couplers for soft pipes of type 9103 combined with the fittings such as centric butterfly valves necessitates the application of a reduction flange in order to avoid the collision between the flow control element and the coupler body.

Flange couplers allow connecting the line pipe via the flange connection.

Bell-and-spigot joint clamps have a ring structure consisting of segments which clamp the pipe bell. Two rings on both sides of a bell-and-spigot connection of a pipe are pressed by a seal using nuts and bolts.

Clamping flanges have a similar structure, where the pipe end is sealed through clamping a conical seal by use of bolts, whereas the seal also serves as sealing between connected flanges.

All inner and outer iron surfaces of couplers are coated with powder epoxy paint.

Couplers for pipes are divided into multidiametral – Type 9102; 9104

and universal ones – Type 9122, 9144, 9151, 9152

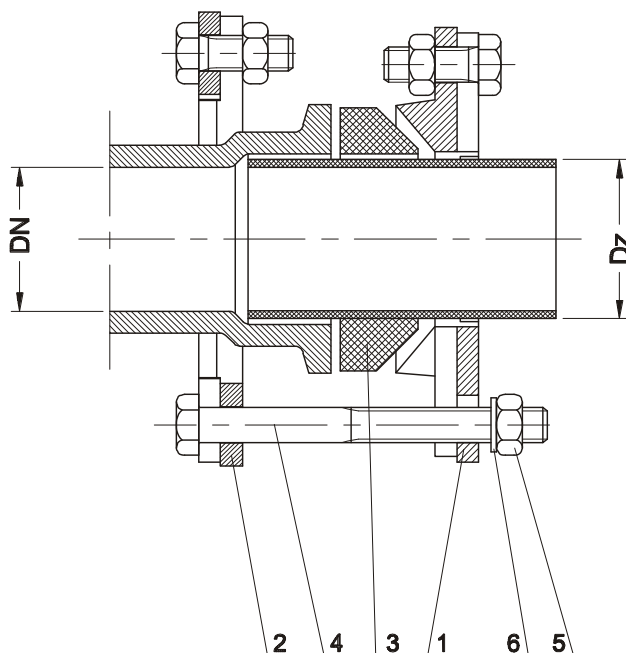
for PE or PCV pipes – Type 9103;

## 2.2 MATERIALS AND DIMENSIONS OF COUPLERS.

The index of materials used for the production of couplers is contained in the tables below

### 2.2.1 TYPE 9101

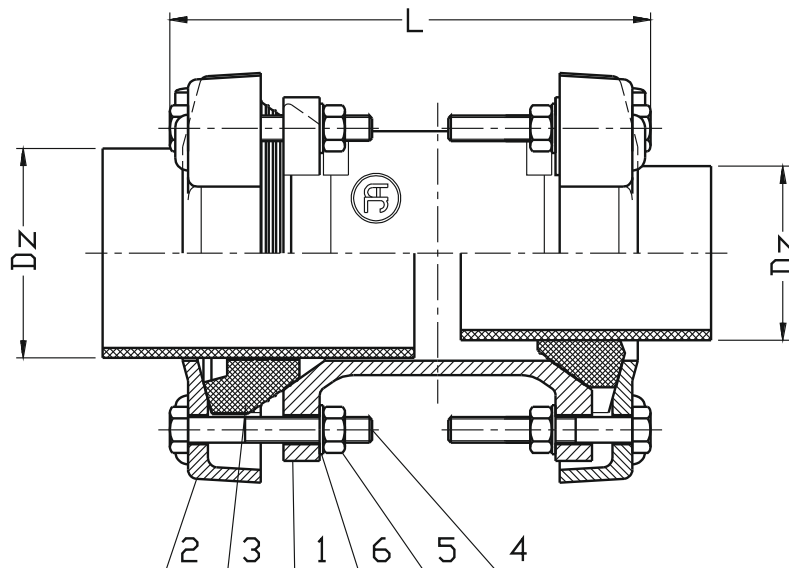
Pos.	Part name	Material	Standard
1	Sealing clamp	Iron: EN-GJS 500-7	PN-EN 1563: 2012
2	Body clamp	Iron: EN-GJS 500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM (or NBR)	PN-EN 1629: 2005
4	Bolt	Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Nuts	Steel: Fe/Zn5	PN-EN ISO 4032: 2013
6	Washer	Steel: Fe/Zn5	PN-EN ISO 7091: 2003



DN	Elements	Weight	DN	Elements	Weight
[mm]	[szt]	[kg]	[mm]	[szt]	[kg]
50	2x2	4,8	350	2x4	32,9
80	2x3	7,56	400	2x4	36,75
100	2x3	8,65	500	2x5	49,6
125	2x3	10,25	600	2x6	63,45
150	2x3	11,5	800	2x8	86,6
200	2x4	14,15	1000	2x9	112,7
250	2x4	19,85	1200	2x12	148,8
300	2x4	29,05	-	-	-

### 2.2.2 TYPE 9102

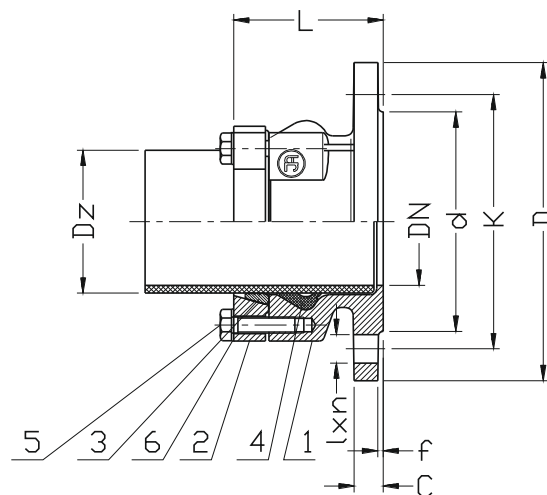
Pos.	Part name	Material	Standard
1	Body	Ductile cast iron: EN-GJS-500-7	PN-EN 1563: 2012
2	Pressure ring	Ductile cast iron: EN-GJS-500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM	PN-EN 1629: 2005
4	Bolt	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Nuts	Steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013
6	Washer	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003



DN	D <sub>z</sub>	L	Weight
[mm]			[kg]
50	40-75	280	8,5
60 / 65	60-95	300	8,0
80	80-115		11,5
100	105-135		13,8
125	130-165		15,5
150	155-195	340	16,8
175	190-230		21,0
200	215-258		23,0
225	240-280		27,0
250	235-275 / 270-310	360	26,0 / 29,0
300	310-350 / 350-390	370	33,0 / 36,0
350	350-390 / 395-435		39
400	395-435 / 435-470 / 470-505		43,0 / 45,0
500	505-540 / 540-575 / 575-610		50,0 / 70,0 / 74,0
600	610-645 / 645-680 / 680-715		58,0 / 81,0 / 82,0
700	710-745		86,0
800	810-845		95,0

### 2.2.3 TYPE 9103

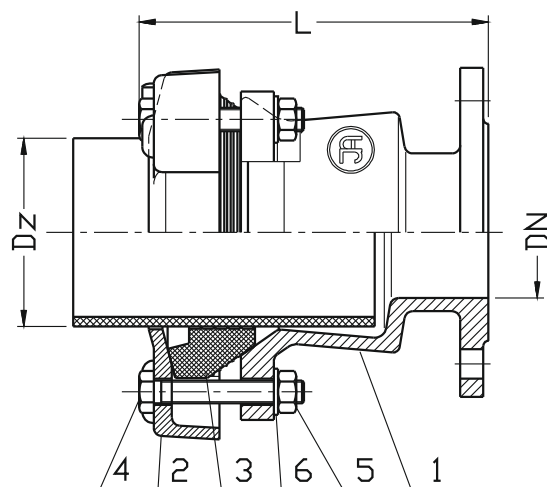
Pos.	Part name	Material	Standard
1	Body	Ductile cast iron: EN-GJS500-7	PN-EN 1563: 2012
2	Flange	Ductile cast iron: EN-GJS500-7	PN-EN 1563: 2012
3	Ring	Brass: CuZn39Pb1Al-B	PN-EN 1982: 2010
4	Forsheda ring	Rubber: EPDM	PN ISO 1629: 2005
5	Bolt	Steel: A2	PN-EN ISO 4017: 2011
6	Washer	Steel: A2	PN-EN ISO 7091: 2003
7	Pipe	PE	PN-EN ISO 1872: 2000



DN	D <sub>z</sub>	D PN16 (PN10)	K PN16 (PN10)	d	l x n PN16 (PN10)	f	C	L	Weight
[mm]									[kg]
50	63	165	125	102	19x4	3	19	90	3,8
80	90	200	160	138	19x8(4)	3	19	95	5,5
100	110	220	180	156	19x8	3	19	95	6,5
100	125	220	180	156	19x8	3	19	102	7,2
125	125	250	210	188	19x8	3	19	100	8,3
150	160	285	240	215	23x8	3	19	115	11,6
200	225	340	295	268	23x12(8)	3	20	138	15,8
250	280	400	355 (350)	320	28(23)x12	3	22	155	23
300	315	455	410 (400)	378	28(23)x12	4	25	175	33
300	355	455	410 (400)	378	28(23)x12	4	25	280	55
400	400	580	525(515)	480	31(28)x16	4	25	240	53
400	450	580	525(515)	480	31(28)x16	4	25	310	71
500	500	715(670)	650(620)	582	34(28)x20	4	26	336	90
500	560	715(670)	650(620)	582	34(28)x20	4	26	406	105
600	630	840(760)	770(725)	720	37(31)x20	5	30	473	145

#### 2.2.4 TYPE 9104

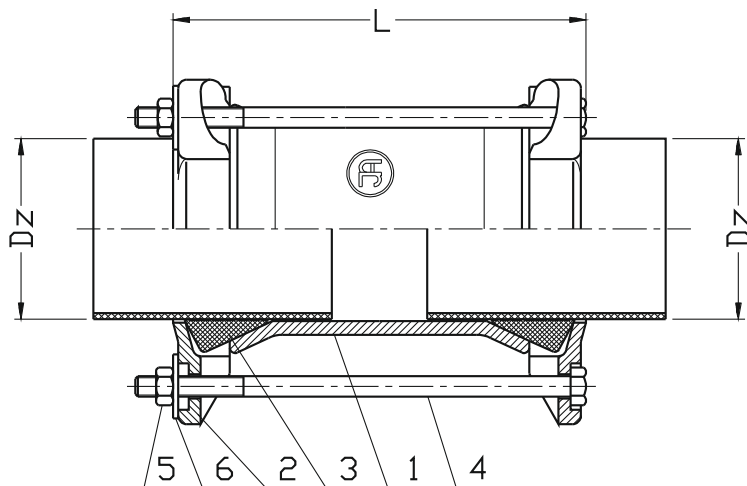
Pos.	Part name	Material	Standard
1	Body	Ductile cast iron: EN-GJS500-7	PN-EN 1563: 2012
2	Flange	Ductile cast iron: EN-GJS500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM	PN-ISO 1629: 2005
4	Bolt	Stainless steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Nuts	Stainless steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013
6	Washer	Stainless steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003



DN	D <sub>2</sub>	L	Weight
[mm]			[kg]
50	40-75	205	7,7
60 / 65	60-95		9,3
80	80-115	245	12,0
100	105-135		14,0
125	130-165	275	19,0
150	155-195		26,0
175	190-230		28,0
200	215-258	290	33,0
225	240-280		38,0
250	235-275 / 270-310		39,0 / 42,0
300	310-350 / 350-390	290 / 320	50,0 / 55,0
350	350-390 / 395-435	290 / 320	58,0 / 65,0
400	400-435 / 435-470 / 470-505	300 / 330 / 340	70,0 / 76,0 / 81,0
450	455-490 / 490-525	300	80,0 / 83,0
500	505-540 / 540-575 / 575-610	250 / 325 / 325	82,0 / 90,0 / 94,0
600	610-645 / 645-680 / 680-715	250 / 330 / 330	102,0 / 114,0 / 117,0
700	710-745	250	85,0
800	810-845	250	93,0

## 2.2.5 TYPE 9122

Pos.	Part name	Material	Standard
1	Body	Iron EN-GJS 500-7	PN-EN 1563: 2012
2	Flange	Iron EN-GJS 500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM	PN-ISO 1629: 2005
4	Bolt	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Nuts	Steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013
6	Washer	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003

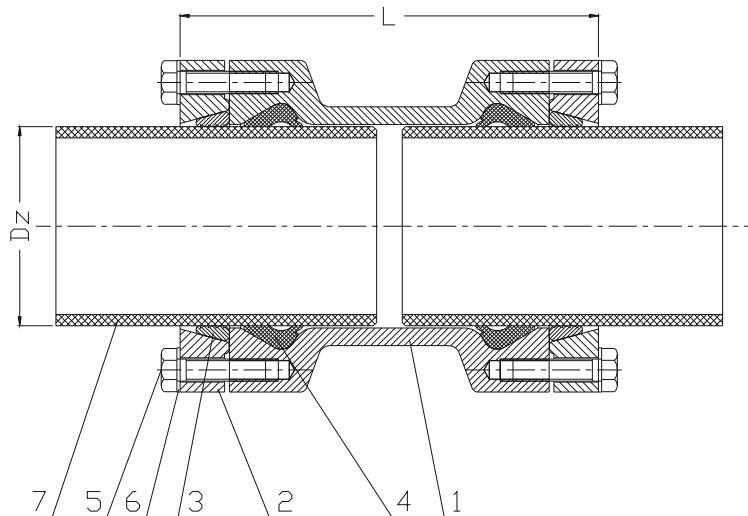




DN	D <sub>z</sub>	L	Weight
	[mm]		[kg]
40 / 50	47-60	190	2,2
50 / 65	57-72	210	4,0
50 / 65 / 80	68-85		4,5
80 / 100	84-106		5,0
100 / 125	103-116 / 108-130	210	7,5
		230	7,0
125 / 150	128-146 / 134-155	210	7,2
		230	7,7
150 / 175 / 200	153-175 / 165-185	210	8,6
		230	8,0
175 / 200	184-207	260	11,5
200	208-225 / 218-236 / 222-250		12,0
			14,0 / 14,5
250	246-270 / 264-284 / 282-306	300 / 260	17,0
		300	20,0
300	305-326 / 315-335 / 335-355 / 360-386	260 / 300	21,0 / 23,0
		300	24,0
350	386-410	300	28,0
400	408-435 / 425-458 / 465-500	260 / 300	29,0 / 34,0
		330	40

## 2.2.6 TYPE 9123

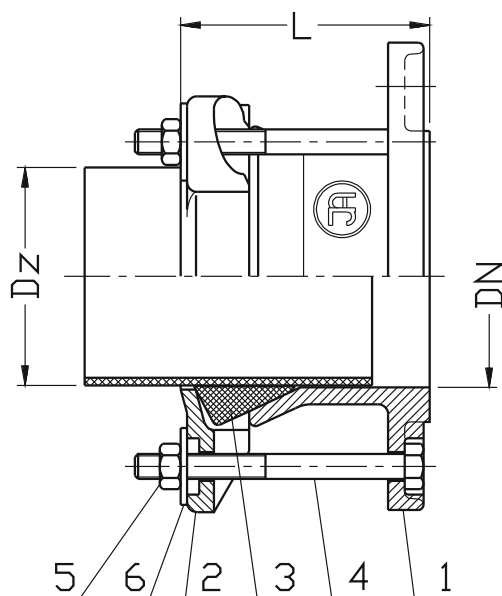
Pos.	Part name	Material	Standard
1	Body	Iron EN-GJS 500-7	PN-EN 1563: 2012
2	Flange	Iron EN-GJS 500-7	PN-EN 1563: 2012
3	Ring	Brass: CuZn39PbAl1-B	PN-EN 1982: 2010
4	FORSHEDA ring 575	Rubber: EPDM	PN-ISO 1629: 2005
5	Bolt	Steel: A2	PN-EN ISO 4017: 2011
6	Washer	Steel: A2	PN-EN ISO 7091: 2003
7	Pipe	PE	PN-EN ISO 1872-1:2000



DN	D <sub>z</sub>	L	Weight
[mm]			[kg]
50	63	180	4,7
80	90	190	5,8
100	110	190	6,7
150	160	230	13,0
200	225	276	20,0
250	280	310	23,2
300	315	368	32,0

## 2.2.7 TYPE 9144

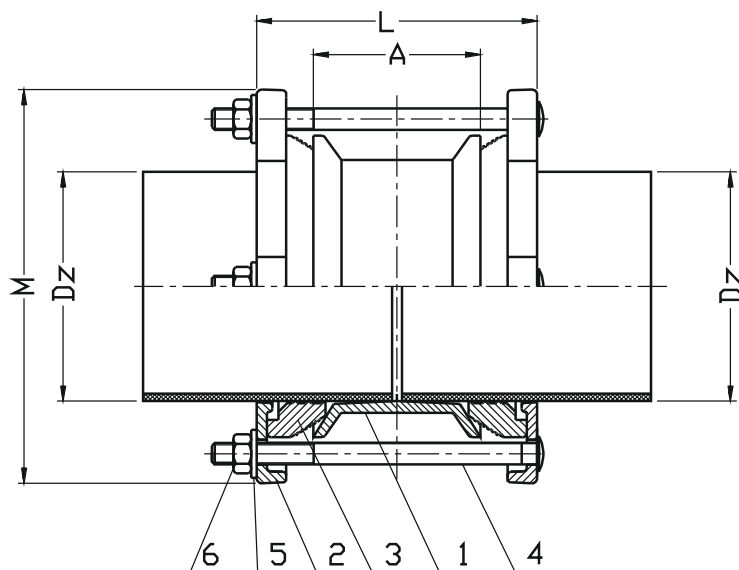
Pos.	Part name	Material	Standard
1	Body	Iron: EN-GJS 500-7	PN-EN 1563: 2012
2	Flange	Iron EN-GJS 500-7	PN-EN 1563: 2012
4	Gasket	Rubber: EPDM	PN-ISO 1629: 2005
4	Bolt	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Nuts	Steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013
6	Washer	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003



DN	D <sub>2</sub>	L	Weight
	[mm]		[kg]
50 / 65	57-72	120	5,0
50 / 65 / 80	68-85		6,0
80 / 100	84-106		6,0
100 / 125	103-116 / 108-130		7,0 / 7,8
125 / 150	128-146 / 134-154		9,0 / 9,6
150 / 175 / 200	153-175 / 165-185		11,0
175 / 200	184-207		13,6
200	208-225 / 218-236 / 222-250	150	14,5
250	246-270 / 264-284 / 282-306		18,5 / 18,5 / 22,0
300	305-326 / 315-335 / 334-355 / 360-386		23,0 / 27,0 / 28,0 / 36,0
350	386-410		25,0 / 28,0
400	408-435 / 425-458 / 465-500	180	28,0 / 30,0 / 44,0

### 2.2.8 TYPE 9151

Pos.	Part name	Material	Standard
1	Body	Iron EN-GJS 500-7	PN-EN 1563: 2012
2	Flange	Iron EN-GJS 500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM	PN-ISO 1629: 2005
4	Bolt	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Washer	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003
6	Nuts	Steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013

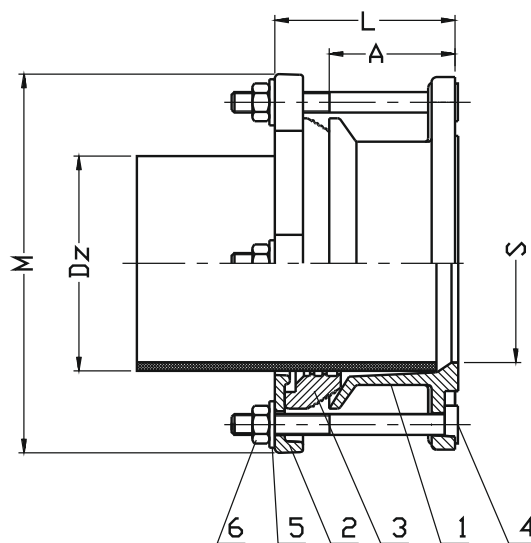


DN	D <sub>2</sub>	L	A	M	Weight
[mm]					[kg]
40	47-60	190	100	149,5	3,1
50	57-74		95	154,5	3,0
65	63-85			173,5	3,6
80	84-107			195,5	4,1
100	106-132			224,5	4,8
125	132-158			254,5	6,0
150	157-185	230	130	280,5	6,9
200	189-212			306,5	9,4
200	218-244			342,5	10,9
250	264-295			399,5	14,6
300	315-349			462,5	19,4

\* Sizes from DN 350 to DN2000 on request - order.

## 2.2.9 TYPE 9152

Pos.	Part name	Material	Standard
1	Body	Iron EN-GJS 500-7	PN-EN 1563: 2012
2	Pressure ring	Iron EN-GJS 500-7	PN-EN 1563: 2012
3	Gasket	Rubber: EPDM	PN-ISO 1629: 2005
4	Bolt	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 4017: 2011
5	Washer	Steel: A2, Steel: Fe/Zn5	PN-EN ISO 7091: 2003
6	Nuts	Steel: A4, Steel: Fe/Zn5	PN-EN ISO 4032: 2013



DN <sup>1</sup>	S	D <sub>2</sub>	L	A	M	Weight
[mm]						[kg]
50	59	57-74	124	75	164	2,7
65	75	63-85			197	3,5
80	101	84-107			203	3,7
100	121	106-132	134		228	4,4
125	150	132-158			282	5,6
150	173	157-185			283	6,0
200	202	189-212			337	8,3
200	225	218-244			338	8,3
250	277	264-295	146	85	402	11,4
300	329	315-349	155	100	458	14,8

\* Sizes from DN 350 to DN600 on request - order.

## 2.4 STANDARDISATION

PN-EN 1074-1: 2002	Pipeline fittings. Functional requirements and verification tests. General requirements
PN-89/H-02650	Fittings and pipelines. Pressures and temperatures
PN-EN 1092-2: 1999	Flanges and their connections. Circular flanges for pipes, fittings, couplers and accessories with PN designation. Cast iron flanges.
PN-EN 19:2005	Industrial fittings. Metal fitting marking.
PN-EN 12266-1: 2012	Industrial fittings. Fitting testing. Pressure testing, testing procedures and acceptance criteria.
PN-EN 558:2012	Mandatory requirements.
PN-EN ISO 6708: 1998	Industrial fittings. Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems. PN-designated fittings and classes.
PN-EN 1559-1: 2011	Definition and selection of DN (nominal dimension).
PN-EN 1561: 2012	Founding. Technical conditions of delivery. General provisions.
PN-EN 1563: 2012	Founding. Grey cast iron.
PN-EN 1370: 2012	Founding. Ductile cast iron.
PN-ISO 965-1: 2001	Founding. Examination of surface condition by visual-tactile comparators.
PN-ISO 1629: 2005	ISO general purpose metric screw threads Tolerances. Principles and basic data.
PN-EN 10088-1: 2014	Rubber and latex. Nomenclature.
PN-EN ISO 4032: 2013	Corrosion-resistant steel. Grades of stainless steel.
PN-EN ISO 7091: 2003	Hexagon regular nuts, style 1. Product grades A and B.
PN-EN ISO 1872-1:2000	Round washers. Normal series. Product grade C.
PN-EN ISO 1873-1:2000	Plastics. Polyethylene (PE) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 1874-1:2010	Plastics. Polypropylene (PP) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 12944-5: 2009	Plastics. Polyamide (PA) forming and extrusion moulding materials. Designation system and basis for specification.
	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Protective paint systems.

## 2.5 ORDERING REGULATIONS

Water supply system fittings are specific purpose industrial fittings, therefore orders must include:

- catalogue number,
- intended use, e.g. for water supply systems,
- furthermore:
- nominal diameter – acc. to PN-EN ISO 6708: 1998

- nominal pressure – acc. to PN-89/H – 02650
- body material type – acc. to PN-EN 1563: 2012
- max. operating temperature – acc. to PN-89/H – 02650.

## **2.6 MANUFACTURE AND ACCEPTANCE**

Couplers for iron, steel and asbestos-cement pipes of Type 9101; 9102; 9104; 9111; 9122; 9144, 9151, 9152 and couplers of Type 9103, 9123 for PE or PVC pipes are accepted and manufactured acc. to PN-EN 1074-1: 2002 (Pipeline fittings. Functional requirements and verification tests. General requirements) and PN-EN 12266-1:2012 (Industrial valves. Testing of metallic valves). All stub pipes are leak tested (100%). Such tests include tightness after clamping on a pipe.

## **2.7 MARKINGS**

Pipe couplers are marked acc. to PN-EN-19: 2005 and PN-EN-1074-1: 2002.

Bodies of pipe couplers feature markings on the front and back walls of the body neck. The marking contains the following data:

- coupler type (acc. to the product catalogue number /TYPE/)
- nominal diameter
- nominal pressure
- body material type
- manufacturer trade mark.

and a protrusion containing the identification marking (e.g. a batch number).

## **3 PROTECTION, STORAGE & TRANSPORT**

### **3.1 PROTECTIVE COATINGS**

All internal and external cast iron surfaces are secured with epoxy paint applied electrostatically. The paint is approved for contact with food products.

The anti-corrosion coat layer thickness is min. 250 µm.

The casting surface is pre-treated for epoxy coating in accordance with the relevant technical documentation and PN-EN ISO 12944-5:2009.

Bolts connecting the body with the cover are characterised by grade 1.4301 (stainless steel), or Fe/Zn5 (galvanised steel)

### **3.2 PACKAGING**

Pipe couplers are packaged on EURO pallets (1200x800) and secured with stretch foil.

### **3.3 STORAGE**

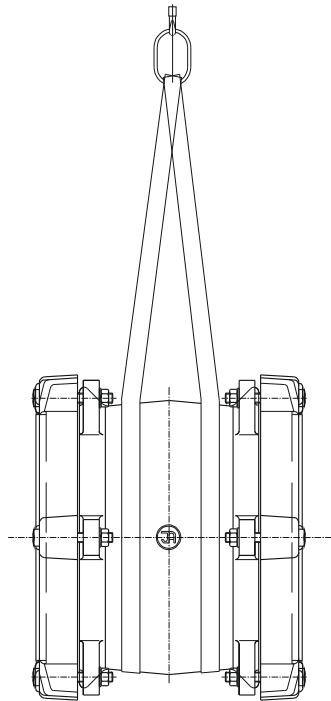
Pipe couplers should be stored indoors.

### **3.4 TRANSPORT**

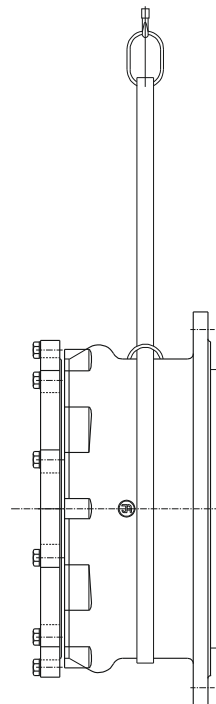
Pipe couplers should be transported by sheltered vehicles.

While transporting and mounting heavy couplers, use tape slings (example shown in the schematic drawing below), securing fittings against turning. For the coupler of type 9101 from DN50-DN1200, coupler of type 9102 from DN125-DN800, coupler of type 9103 from DN200-DN600, coupler of type 9104 from DN100-DN800, coupler of type 9122 from DN250-DN400, coupler of type 9123 from DN160-DN315, coupler of type 9144 from DN250-DN400, coupler of type 9151 DN200-DN300, coupler 9152 DN200-DN300.

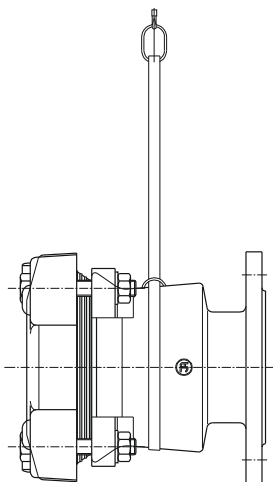
**9102**



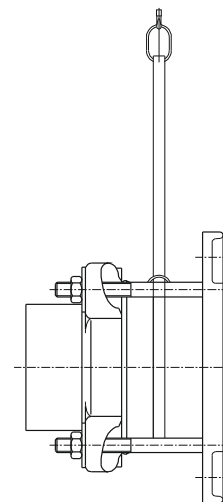
**9103**



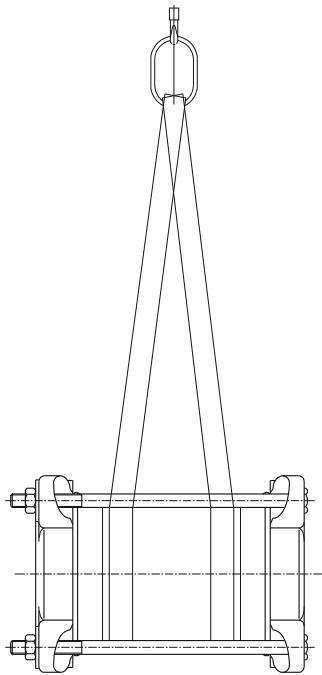
**9104**



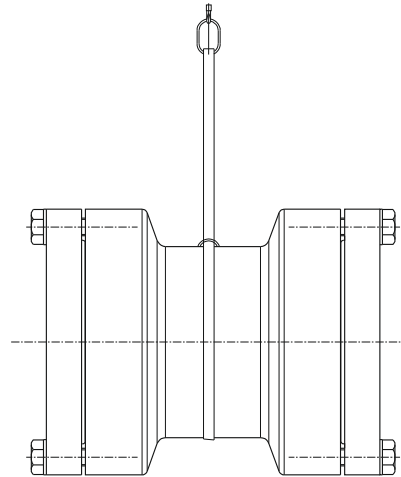
**9144**



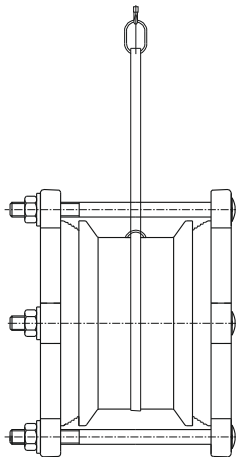
**9122**



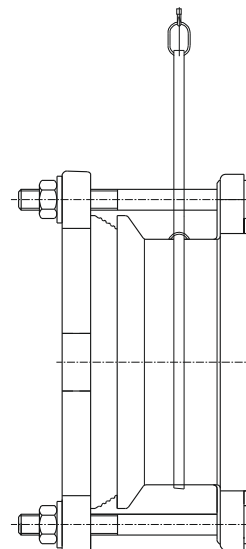
**9123**



**9151**



**9152**





## 4 ASSEMBLY AND INSTALLATION

### 4.1 INSTALLATION GUIDELINES

Before installing the fittings, check the technical and commercial documentation, i.e. application of media and operation parameters of the pipeline in which they are to be installed. Any change in the operating conditions must be consulted with the fitting's manufacturer.

Before the assembly, remove the sealing of the main pass, if any; check the condition of the inner surfaces of the coupler and, if necessary, carefully wash them with water. During the assembly works make sure that the installation does not expose the fittings to bending or tensile stresses due to their burdening with the weight of the unsupported pipeline. It is recommended performing installation works with the consideration of the pipeline compensation due to the temperature and pressure.

### 4.2 ASSEMBLY INSTRUCTIONS

Pipe couplers of Type 9101; 9102; 9103; 9104; 9111; 9122; 9144; 9151; 9152 and Type 9123 for (PE or PVC) tailored to mounting line pipes of a pipeline without having to use additional seals. Before mounting the coupler, it is recommended lubricating the surface of the sealing system with technical vaseline, which will prevent rubber elements from adhering and being damaged in the course of disassembly works. Pipe ends, as long as they are not terminated (bevelled), should have burrs and sharp edges blunted. After inserting the pipe end into the coupler bell, centre it and uniformly tighten the assembly bolts. Following the assembly, check if the unit is installed correctly. While mounting the coupler of Type 9123. Cut the pipe perpendicularly to its axis and bevel it at the angle of approx. 30°. Loosen the bolts fixing the body with the flange, lubricate the pipe end and slide the coupler on. Cross-tighten the bolts for the flange to closely adhere to the body around the entire perimeter.

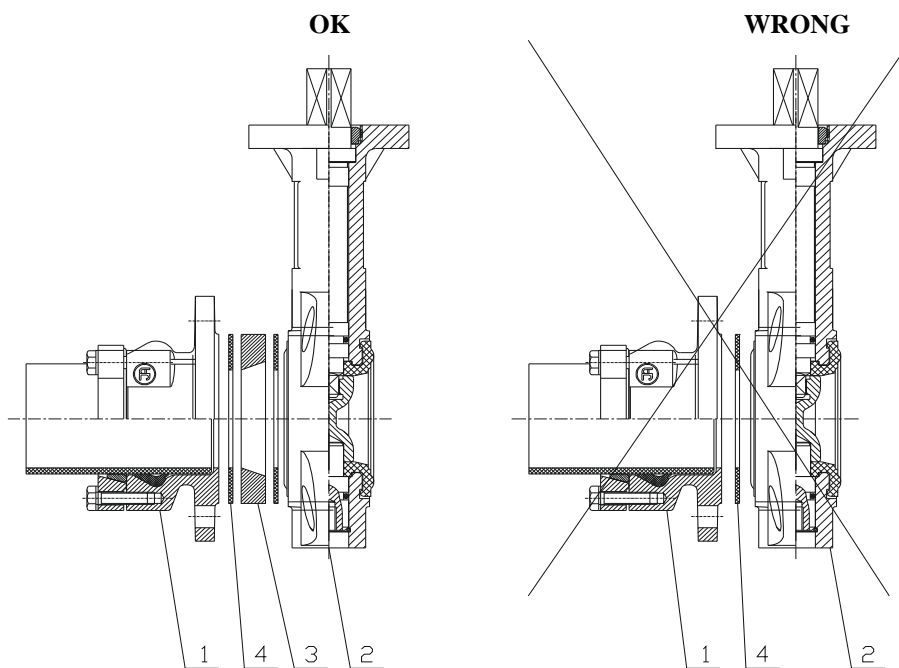
**While using thin-walled (up to 3 mm) pipes or ones operating at underpressure, use reinforcing bushings inside every such pipe.**

Couplers delivered by the manufacturer are ready to be assembled at the installation. Any works related to the disassembly of sealing elements can lead to the loss of tightness.

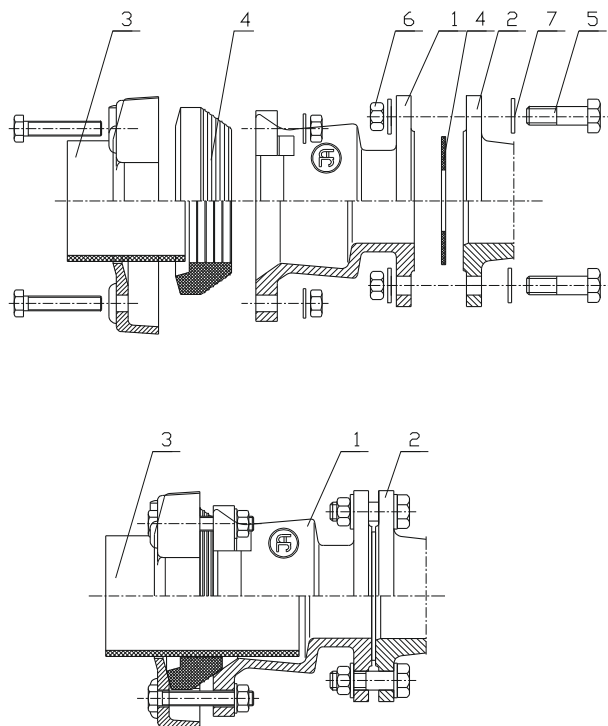
**Note! If the product is damaged mechanically, do not install it in the pipeline.**

The method for the assembly of a pipe-flange coupler is presented in the following schematic drawings.

Assembly with the centric butterfly valve:



1.- coupler of type 9103, 2.- centric butterfly valve, 3.- distance flange  
4.- flange seal.



1.- pipe-flange coupler, 2.- pipeline flange, 3.-pipeline,  
4.- flange seal (coupler seal),  
5.- mounting bolt, 6.- nut, 7.-washer.

#### **4.3 OPERATION**

Pipe couplers should be operated according to requirements pertaining to connection fittings and accessories.

Exceeding the operating limits of the fitting may result in damage that will not be covered by the suretyship granted by the manufacturer.

#### **4.4 OH&S REGULATIONS**

Pipe couplers are subject to guidelines and recommendations included in H&S regulations applicable to the installation of pipelines and equipment in: water supply stations, thermal power stations, sewage treatment plants, intermediate pumping stations and other structures, as well as general health and safety regulations (use of upper limb protection equipment, lower limb protection equipment, head protection equipment and protective clothing), in particular during works with low and high temperature exposure.

**Misuse of this product is prohibited.**

#### **5 GUARANTEE CONDITIONS**

The manufacturer grants guarantee for the product being installed and operated according to this O&MM. The conditions and period of the guarantee are specified in the guarantee sheet.