

**Operation and Maintenance Manual**

**DOUBLE FLANGE BEND  
With the N foot  
FLANGE T-PIECE  
TT FLANGE X-PIECE**

**Cat. no.  
9202; 9203; 9218**

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.

**TABLE OF CONTENTS**

1 TECHNICAL DESCRIPTION ..... 3

    1.1 PRODUCT NAME AND FEATURES ..... 3

    1.2 INTENDED USE ..... 3

    1.3 TECHNICAL SPECIFICATION ..... 3

2 DESIGN ..... 3

    2.1 FITTING DESIGN DESCRIPTION ..... 3

    2.2 MATERIALS ..... 4

    2.3 DIMENSIONS ..... 4

    2.4 STANDARDISATION ..... 6

    2.5 ORDERING REGULATIONS ..... 7

    2.6 MANUFACTURE AND ACCEPTANCE ..... 7

    2.7 MARKINGS ..... 7

3 PROTECTION, STORAGE & TRANSPORT ..... 7

    3.1 PROTECTIVE COATINGS ..... 7

    3.2 PACKAGING ..... 7

    3.3 STORAGE ..... 7

    3.4 TRANSPORTATION ..... 8

4 ASSEMBLY AND INSTALLATION ..... 8

    4.1 INSTALLATION GUIDELINES ..... 8

    4.2 INSTALLATION INSTRUCTIONS ..... 8

    4.3 OPERATION ..... 10

    4.4 OH&S REGULATIONS ..... 10

5 GUARANTEE CONDITIONS ..... 10

## **1 TECHNICAL DESCRIPTION**

### **1.1 PRODUCT NAME AND FEATURES**

The subject of this O&MM are:

The double flange bend with the N foot of type 9202, intended for piping systems and used as an element to divert the direction of the medium flow from vertical to horizontal or the other way around.

The flange T-piece of type 9203, intended for piping systems and used as an element to divert the direction of the medium flow from vertical to horizontal or the other way around.

The flange X-piece of type 9218 TT, intended for piping systems and used as an element to divert the direction of the medium flow from vertical to horizontal or the other way around.

### **1.2 INTENDED USE**

The bend of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT are intended for mounting installations of any pipes terminated with flange connections.

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

### **1.3 TECHNICAL SPECIFICATION**

The bend of type 9202, T-pieces of type 9203, X-piece of type 9218 TT are used for transporting potable and industrial water and other liquids (to be determined with the manufacturer)

- temperature from -10°C to +70°C.
- scope of applied diameters of line pipes according to the table with dimensions  
for each type
- maximum medium flow rate:- liquid: max. 4 [m/s]  
- gas: max. 30 [m/s]

connections of bends and T-pieces 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 bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT. A bend is an iron casting supported by a foot with a flange, which allows connecting a supply pipe via a flange end on both sides. Bodies of T-pieces are T-shaped iron castings. Branch-offs are terminated with flanges, which allow connecting a supply pipe via a flange end, used for diverting the direction from vertical to horizontal and vice versa.

Note:

Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT are typical couplers.

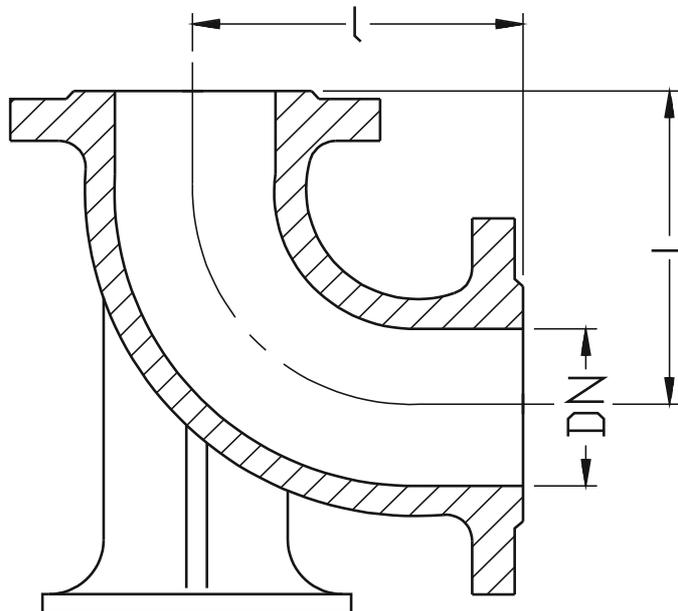
## 2.2 MATERIALS.

The index of materials used for the production of foot bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT is to be found in the table.

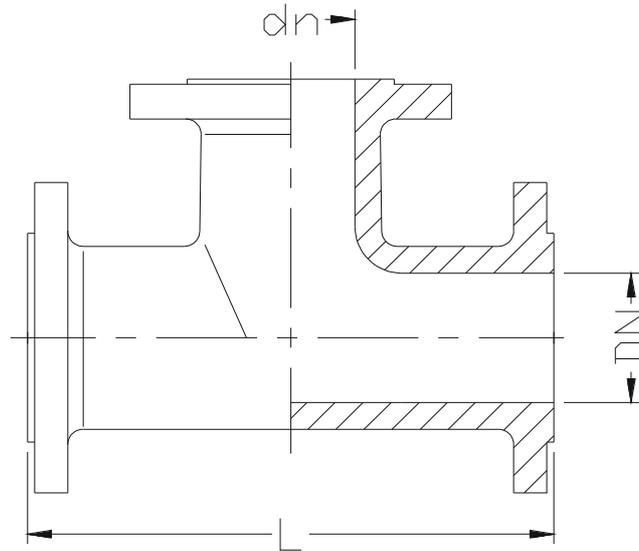
Pos.	Part name	Material	Standard
1	Bend, T-piece body	Ductile cast iron EN-GJS500-7	PN-EN 1563:2012

## 2.3 DIMENSIONS

Double flange bend with the N foot of type 9202.



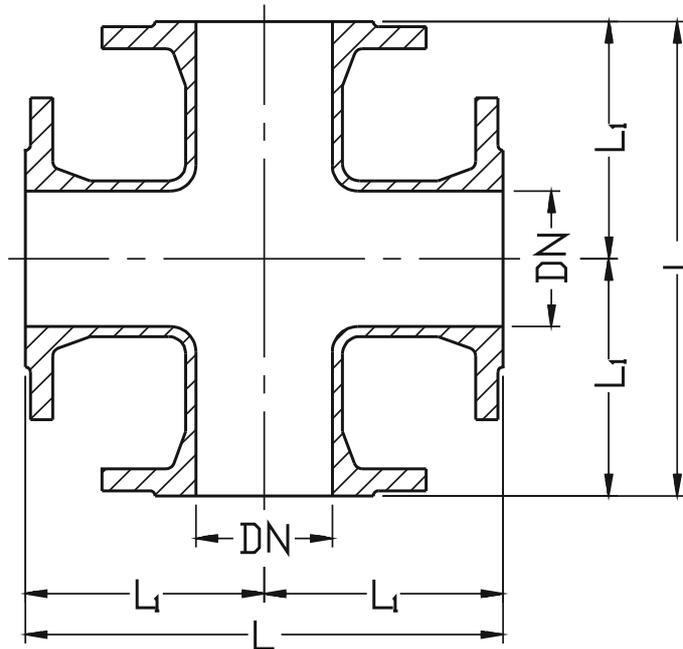
DN	l	Weight
	[mm]	[kg]
80	165	13,0
100	180	17,0
150	220	29,0
200	260	46,0
250	350	73,0
300	400	104,0
400	500	177,0
500	600	281,0
600	700	425,0
800	900	860,0



DN	dn	L	Weight	DN	dn	L	Weight	DN	dn	L	Weight
	[mm]		[kg]		[mm]		[kg]		[mm]		[kg]
50	50	300	11,5	250	80	700	65,0	450	100	950	190,0
60	60	320	12,5		100	700	69,0		150*	570*	195*
80	50	310	14,2		150	700	70,0		200	950	205,0
	60	310	14,6		200	700	80,0		250*	690*	211,0*
100	80	330	15,6	300	250	700	89,0	300*	745*	218,0*	
	40	320	17,8		80	800	93,0	450	950	240,0	
	50	320	18,5		100	800	97,0	80	1000	212,0	
	60	320	18,4		150	800	98,0	100	1000	215,0	
	65	320	20,0		200	800	101,0	150	1000	255,0	
	80	360	18,4		250	800	106,0	200	1000	262,0	
125	100	360	19,3	350	300	800	125,0	250	1000	270,0	
	60*	330*	22,8*		150*	530*	123,0*	300	1000	274,0	
	80	400	23,1		200	850	129,0	400	1000	285,0	
	100	400	23,5		250*	645*	135,0*	500	1000	300,0	
150	125	400	25,5	400	300	850	141,0	80	580	304,0	
	50*	340*	29,5*		350	850	167,0	200	1100	307,0	
	60*	340*	27,8*		80*	900	159,0*	400	1100	323,0	
	80	440	28,5		100*	900	161,0*	600	1100	350,0	
	100	440	29,5		150*	900	163,0*	200	690	350,0	
	150	440	32,5		200	900	169,0	800	400	910	430,0
200	50	520	43,2	400	250*	900	175,0*	800	800	1350	630,0
	60	520	41,5		300*	900	179,0*	1000	400	990	650,0
	80	520	43,5		350*	900	185,0*	600	1650	990,0	
	100	520	44,5		400	900	198,0	-	-	-	-
	125	520	45,0								
	150	520	45,5								
	200	520	49,0								

\* - on request

Flange X-piece of type 9218 TT.



DN	L	L <sub>1</sub>	Weight
	[mm]		[kg]
80	330	165	22,0
100	360	180	27,0
150	440	220	50,0
200	520	260	80,0
250	600	300	104,0
300	680	340	145,0
400	900	450	215,0
500	900	450	305,0
600	1100	550	420,0

## 2.4 STANDARDISATION

PN-EN 1074-1: 2002

Pipeline fittings. Functional requirements and verification tests.  
General requirements.

PN-EN 12266-1: 2007

Industrial fittings. Fitting testing.

PN-EN 19:2005

Industrial fittings. Metal fitting marking.

PN-89/H-02650

Fittings and pipelines. Pressures and temperatures.

PN-EN ISO 6708: 1998

Definition and selection of DN (nominal dimension).

PN-ISO 1629: 2005

Rubber and latex. Nomenclature.

---

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 1561: 2012	Founding. Grey cast iron.
PN-EN 1563: 2012	Founding. Ductile cast iron.
PN-EN ISO 12944-5: 2001	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

The double flange bend with the N foot of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT are accepted and produced in accordance with PN-EN 1074-1:2002 (Water supply system fittings. Functional requirements and verification tests. General requirements) and PN-EN 12266-1:2007 (Industrial valves. Testing of metallic valves). All fittings are tested for tightness (100%). Such tests include external unit tightness while delivered.

## 2.7 MARKINGS

The marking of bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT is governed by the following standards: PN-EN-19: 2005 and PN-EN-1074-1: 2002.

Bodies of bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT feature markings on labels, stuck on walls of body necks. The markings contain the following data:

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

and identification mark: (e.g. series no.)

## 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 12944-5:2001.

### 3.2 PACKAGING

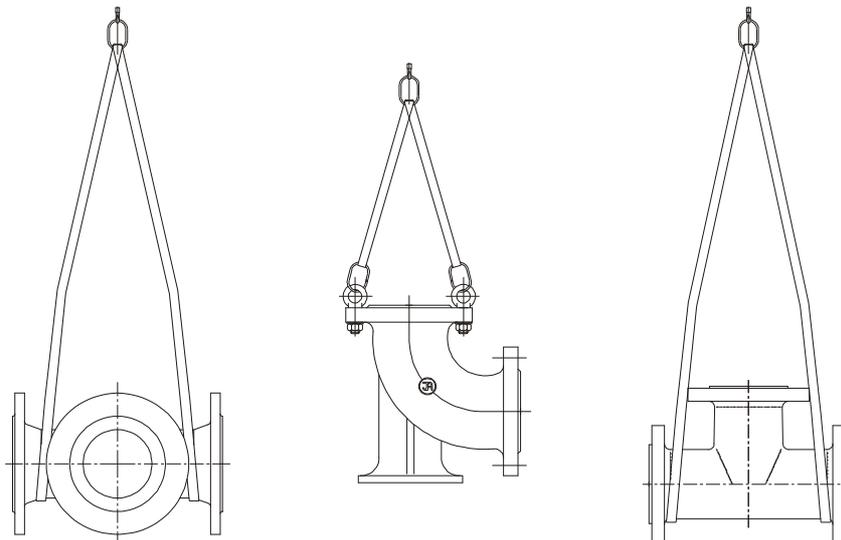
Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT are packaged on EURO pallets (1200x800) and secured with stretch foil.

### 3.3 STORAGE

Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT should be stored indoors.

### 3.4 TRANSPORTATION

Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT should be transported by sheltered vehicles.



Schematic drawing of how the X-piece of type 9218 TT from DN100 – DN600, double flange bend with the N foot of type 9202 from DN80 – DN800 and flange T-piece of type 9203 from DN50 – DN1000 should be mounted for transport by use of slings. Use slings to transport the items mentioned above.

## 4 ASSEMBLY AND INSTALLATION

### 4.1 INSTALLATION GUIDELINES

The double flange bend with the N foot of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT are tailored to being mounted at a line pipe of a pipeline with the application of additional flange-to-flange seals. Before mounting the bend, 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. Insert the bend or T-piece into the prepared section of the pipeline, connect one of its flanges with the line pipe, while the other flange to the vertical pipe connection. Connect the flanges by using a flange-to-flange seal. Centre both pipe ends. Following the assembly, check if the T-piece or bend is installed correctly.

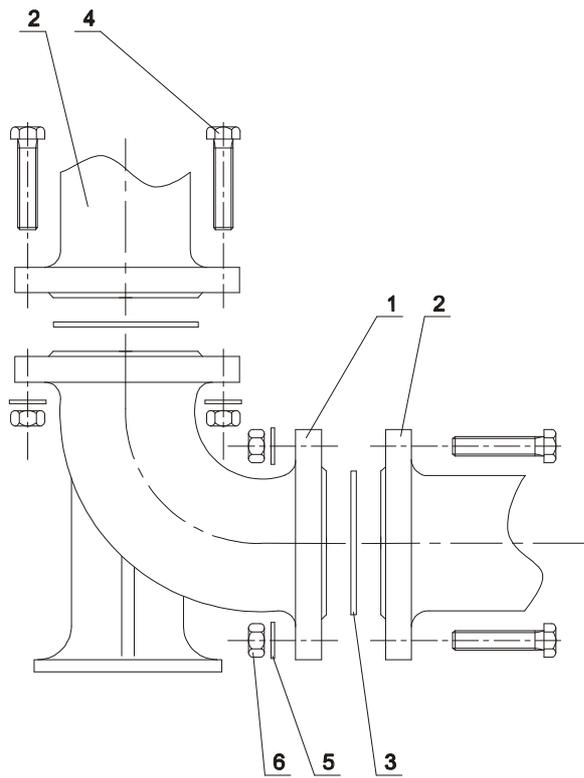
Bends and T-pieces delivered by the manufacturer are ready to be assembled at the installation. Any works related to the disassembly of sealing elements can lead to the loss of tightness.

### 4.2 INSTALLATION INSTRUCTIONS

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. Before the assembly works, 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.

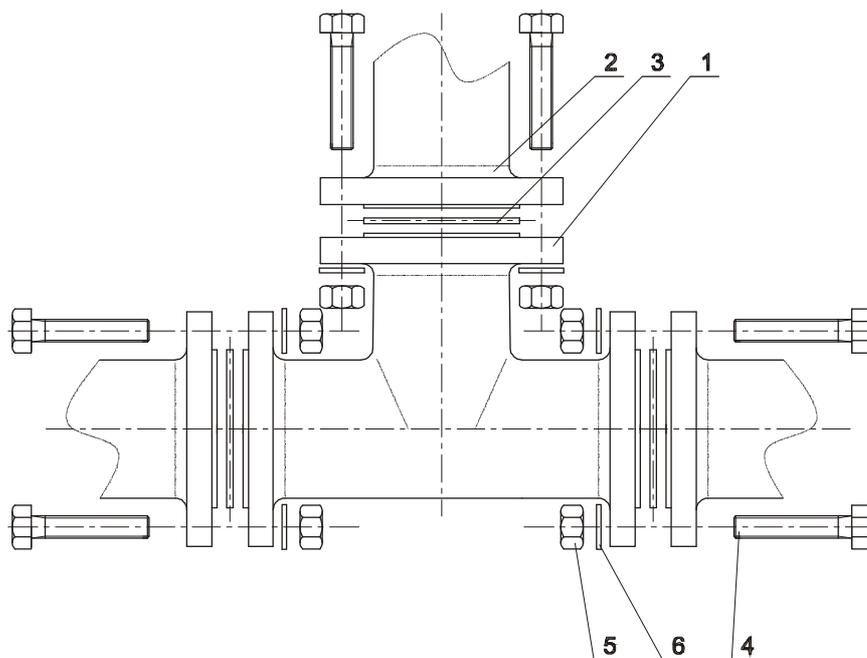
Any change in the operating conditions must be consulted with the fitting's manufacturer.

Method for the installation of a double flange foot bend of type 9202 is presented in the diagram below:



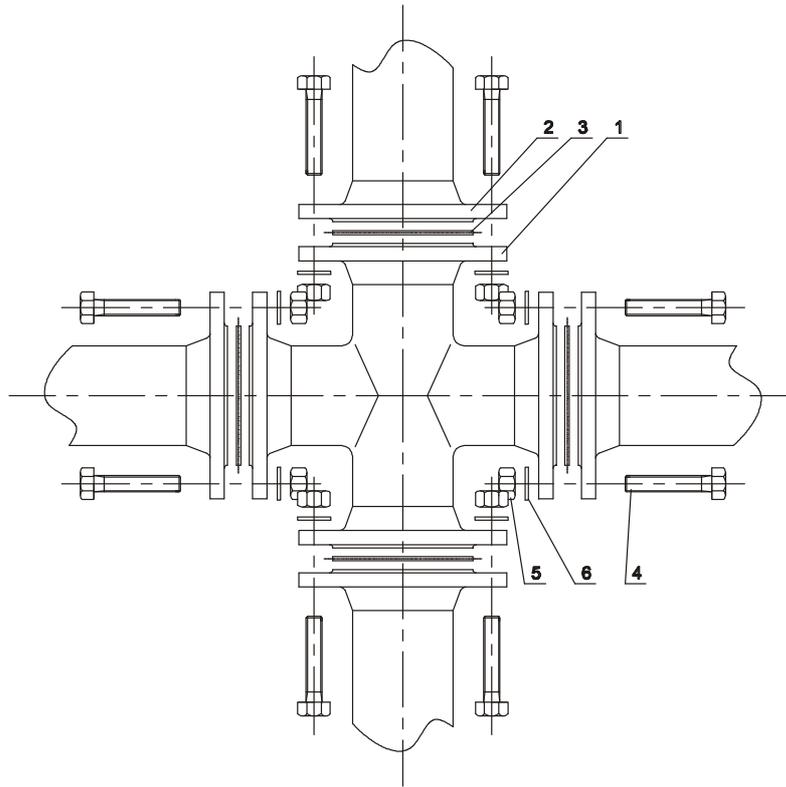
1.- bend pipe, 2.- pipeline flanges 3.- flange seal, 4- mounting bolt, 5.- washer, 6.- nut.

Method for the installation of a flange T-piece of type 9203 is presented in the diagram below:



1.- T-piece, 2.- pipeline flanges 3.- flange seal, 4- mounting bolt, 5.- nut, 6.- washer.

Method for the installation of a flange X-piece of type 9218 TT is presented in the diagram below:



1.- X-piece, 2.- pipeline flange, 3.- flange seal, 4.- mounting bolt, 5.- nut, 6.- washer.

#### 4.3 OPERATION

Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT should be operated according to requirements pertaining to connection fittings.

#### 4.4 OH&S REGULATIONS

Bends of type 9202, T-pieces of type 9203 and X-pieces of type 9218 TT 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.

#### 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.