

**Operation and maintenance**  
**manual for**

**METAL SEATED**  
**GLAND PACKED**  
**FLANGED**  
**GATE VALVES**

**P/N**  
**2109**  
**2909**

Approved for use by

President of Factory, JAFAR S.A.

Failure to comply with the guidelines and instructions in this Operation and Maintenance Manual releases the manufacturer from all obligations, liability and guarantee.

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

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## 1 TECHNICAL DESCRIPTION

### 1.1 PRODUCT DESIGNATION AND IDENTIFICATION

The subject of this Operation and Maintenance Manual is:

TYPE 2109 and 2909 metal seated gland packed wedge gate valve

- bore with recess underneath the wedge
- wedge (closure) with metal sealing rings made of non-ferrous material or stainless steel
- non-rising spindle
- stem sealed with braided gland packing

### 1.2 USE

The TYPE 2109 and 2909 metal seated braced stem wedge gate valves are intended for industrial systems, heating systems, air systems for petroleum products and other chemically inert liquids. The valves are intended for overground and underground installations and must be installed horizontal pipelines in industrial systems.

### 1.3 TECHNICAL SPECIFICATION

The metal seated gland packed wedge gate valves with hard seals are intended for transporting of the specified media and other liquids as agreed with the manufacturer.

- Temperature: -10°C to +150°C
  - up to 120°C with bronze rings
  - up to 150°C with steel rings
- Nominal diameter (dimension) range: DN40 to DN600 [mm]
- Maximum medium flow rate:
  - liquid: max. 4 [m/s]
  - gas: max. 30 [m/s]

- The driving torque at opening start and closing end is as listed below:

DN [mm]	40	50	65	80	100	125	150	200	250	300	350	400	500	600
Mmax [Nm]	55			80			100		200		300		400	

- Valve control mode: the standard version of gate has the clockwise closing sense of rotation. The closing sense of rotation can be opposite on special order.

- The valve connection flange design is acc. to PN-EN 1092-2: 1999 with the sizes compliant with the nominal pressure values.
- the connection flanges are manufactured to PN-EN ISO 2285210:2011
- Valve drive coupling type: B3
- Installation length: PN-EN 558-1: 2012 Series 14.

- Nominal pressure PN values:
  - 1.0 MPa
  - 1.6 MPa

## 2 DESIGN

### 2.1 DESCRIPTION OF THE VALVE DESIGN

The TYPE 2109 and 2909 metal seated gland packed wedge gate valves manufactured by F.A. JAFAR S.A. feature a bore with a recess underneath the wedge, a non-rising stem, and an O-ring stem seal installed in the valve cover. The stem seal is made as a sealing assembly with five (5) braided gland packings. The gate valve closure is a metallic seals (with rings pressed into the wedge and the valve body seat) with the replaceable spindle

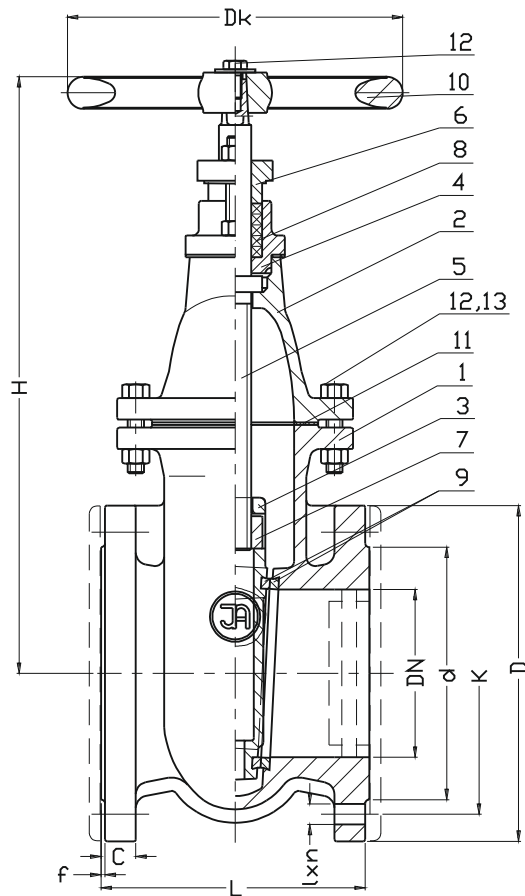
nut on the wedge lug. The top section of the valve cover is the gland packing unit which keeps the flow control head sealed. The gate valve stem is a cylindrical shaft tipped with a trapezoid thread at the bottom, which is the drive section, whereas the top tip is designed to match the control element. The valve cover is bolted tight to the valve body. The valve cover to body seal is an asbestos-free formed gasket. All inner and outer cast-iron surfaces of the valve are polyvinyl coated. The type 2109 spindle is driven with a hand wheel, and the type 2909 valve is switched with a drive actuator.

## 2.2 MATERIALS

The table below lists the structural materials of the metal seated gland packed wedge gate valves with soft seals.

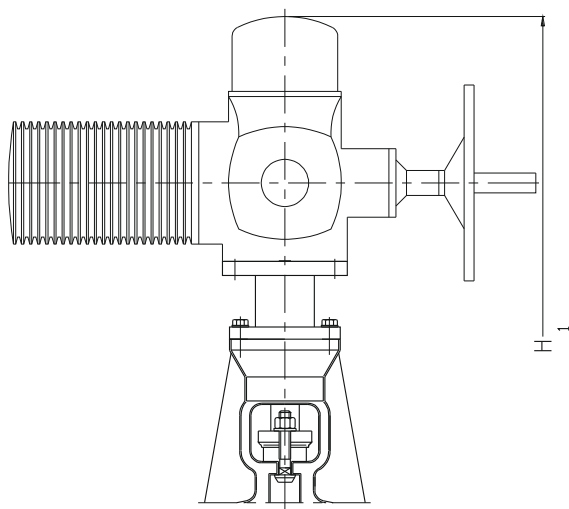
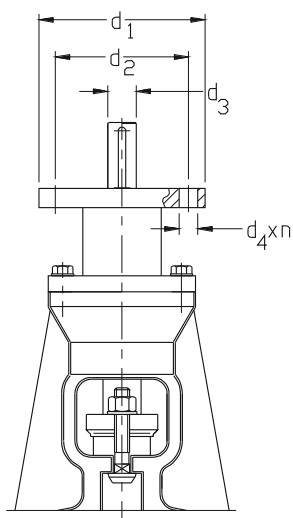
Item	Part designation	Material	Reference standard
1	Body	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
2	Cover	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
3	Wedge	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
4	Packing gland	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
5	Spindle	Steel grade 1.4021	PN-EN 10088-1: 2014
6	Gland	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
7	Spindle nut	Spheroidal cast-iron, EN-GJS 400-15, EN-GJS 500-7	PN-EN 1563: 2012
8	Seal	Carbon seal, DN40-DN300: PTFE + carbon; DN350-DN600	acc. to manufacturer's Technical Guidelines
9	O-ring seal	Steel grade 1.4021	PN-EN 10088-1: 2014
10	Handwheel	Grey cast iron, EN-GJS 250	PN-EN 1561: 2012
11	Valve cover gasket	Asbestos-free carbon gasket, DN40-DN300; AF300 – DN350-DN600	acc. to manufacturer's Technical Guidelines
12	Bolt	Steel, 1.0038 – DN40-DN300: Fe/Zn5 – DN350-DN600	PN-EN ISO 4017:2011
13	Nut	Steel, 1.0038 – DN40-DN300: Fe/Zn5 – DN350-DN600	PN-EN ISO 4032:2013

## 2.3 DIMENSIONS



Drive-ready: 2109

With electric drive actuator: 2909



DN	PN	L	H	H1	d	PN16	D	K	C	f	I	n	d1	d2	d3	d4	Dk	LH thread	Drive	No. of
[mm]	[bar]					(PN10)	PN16 (PN10)	PN16 (PN10)			PN16 (PN10)									
40		140	245		84		150	110	19	3	19	4					160	Tr12X3		15
50		150	255		99		165	125	19	3	19	4					160	Tr12X3		18
65		170	277		118		185	145	19	3	19	4					160	Tr16X4		20
80		180	303		132		200	160	19	3	19	8					160	Tr16X4		26
100		190	340		156		220	180	19	3	19	8					200	Tr20X4		30
125		200	387	none	184		250	210	19	3	19	8					200	Tr20X4	none	29
150		210	454		211		285	240	19	3	23	8					200	Tr22X5		36
200		230	538		266		340	295	20	3	23	12					250	Tr22X5		46
250		250	629		319		405 (395)	355 (350)	22	3	28 (23)	12					250	Tr26X5		48
300		270	730		370		460 (445)	410 (400)	25	4	28 (23)	12					320	Tr28X5		57
350		290	860	1033	429		520 (505)	470 (460)	27	4	28 (23)	16					320	Tr32X6	SA 14.2 F14	65
400		310	935	1370	480		580 (565)	525 (515)	28	4	31 (28)	16	175	140	30	18x4	320	Tr32X6	SA 14.6 F14	74
500		350	1135	1555	609 (582)		715 (670)	650 (620)	32	4	34 (28)	20					630	Tr40X6		91
600		390	1305	1650	720 (682)		840 (780)	770 (725)	36	5	37 (31)	20					630	Tr40X6		108

## 2.4 REFERENCE STANDARDS

PN-EN 1074-1: 2002	Valves for water supply. Fitness for purpose requirements and appropriate verification tests. General requirements
PN-EN 1074-2: 2002	Valves for water supply. Fitness for purpose requirements and appropriate verification tests. Isolating valves.
PN-EN 1171: 2007	Industrial valves. Cast iron gate valves.
PN-89/H-02650	Valves and pipelines. Pressure and temperature ratings.
PN-EN 1092-2: 1999	Flanges and their joints. Circular flanges for pipes, valves, fittings and accessories, PN designated. Cast iron flanges.
PN-EN19: 2005	Industrial valves. Marking of metallic valves
PN-EN 12266-1: 2012	Industrial valves. Testing of metallic valves. Pressure tests, test procedures and acceptance criteria. Mandatory requirements.
PN-EN 558: 2012	Industrial valves. Face-to-face and centre-to-face dimensions of metal valves for use in flanged pipe systems. PN-designated valves.
PN-EN ISO 6708: 1998	Pipework components. Definition and selection of DN (nominal size).
PN-EN 1559-1: 2011	Founding. Technical conditions of delivery. General.
PN-EN 1561: 2012	Founding. Grey cast irons.
PN-EN 1563: 2012	Founding. Spheroidal graphite cast irons.
PN-EN 1370: 2012	Founding. Surface roughness inspection by visual tactile comparators.
PN-EN 10088-1: 2014	Stainless steels. List of stainless steels.
PN-74/H-84032	Spring steel. Grades.
PN-EN 1982: 2010	Copper and copper alloys. Ingots and castings.
PN-EN 12420: 2002	Copper and copper alloys. Forgings.
PN-ISO 965-1: 2001	General purpose ISO metric threads. Tolerances. Principles and basic data.
PN-ISO 2903: 1996	Trapezoid ISO metric threads. Tolerances.
PN-EN ISO 4762: 2006	Hexagon socket head cap screws.
PN-EN 10204: 2006	Metallic products. Types of inspection documents.
PN-ISO 1629: 2005	Rubbers and latices. Nomenclature.
PN-EN ISO 1872-1: 2000	Plastics. Polyethylene (PE) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 1873-1: 2000	Plastics. Polypropylene (PP) moulding and extrusion materials. Designation system and basis for specifications.
PN-EN ISO 1874-1: 2010	Plastics. Polyamide (PA) moulding and extrusion materials. Designation system and basis for specification.
PN-EN ISO 12944-5: 2009	Paints and varnishes. Corrosion protection of steel structures by protective paint systems. Protective painting systems.

## **2.5 ORDERING INFORMATION**

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

- part number (P/N, equal to the product type);
- intended use, e.g. for water supply systems,
- and:
- nominal diameter, acc. to PN-EN ISO 6708: 1998
- nominal pressure, acc. to PN-89/H-02650;
- type of body material — acc. to PN-EN 1561: 2012 or PN-EN 1563: 2012
- maximum operating temperature, acc. to PN-89/H-02650.

## **2.6 PRODUCTION AND ACCEPTANCE**

TYPE 2109 and TYPE 2909 metal seated gland packed gate valves are accepted and produced in accordance with: PN-EN 1074-2: 2002 (Valves for water supply. Fitness for purpose requirements and appropriate verification tests. Isolating valves) and PN-EN 12266-1: 2012 (Industrial valves. Testing of valves). All gate valves are leak tested (100%). The tests include external body tightness and closing tightness.

## **2.7 MARKINGS**

The gate valve marking meets the following standards: PN-EN-19: 2005, PN-EN-1171: 2007.

The gate valve bodies feature markings on the front and back walls of the body chamber. The marking contains the following data:

- valve type (defined by the product reference standard number)
- nominal diameter
- nominal pressure
- body material type
- manufacturer trademark

The location on the valve specified in the documentation features the nameplate which contains the following data:

- manufacturer's company name and logo
- serial number
- sealing temperature rating
- construction mark "B" and/or mark "CE" (as applicable)
- product type.

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

### **3.1 PROTECTIVE COATINGS**

All inner and outer cast-iron surfaces are protected with grey polyvinyl coat.

The anti-corrosion coating layer minimum thickness is 100µm.

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

The screws connecting the body and the cover are manufactured as stainless, grade 1.4301 or Fe/Zn5 (galvanised steel).

### **3.2 PACKAGING**

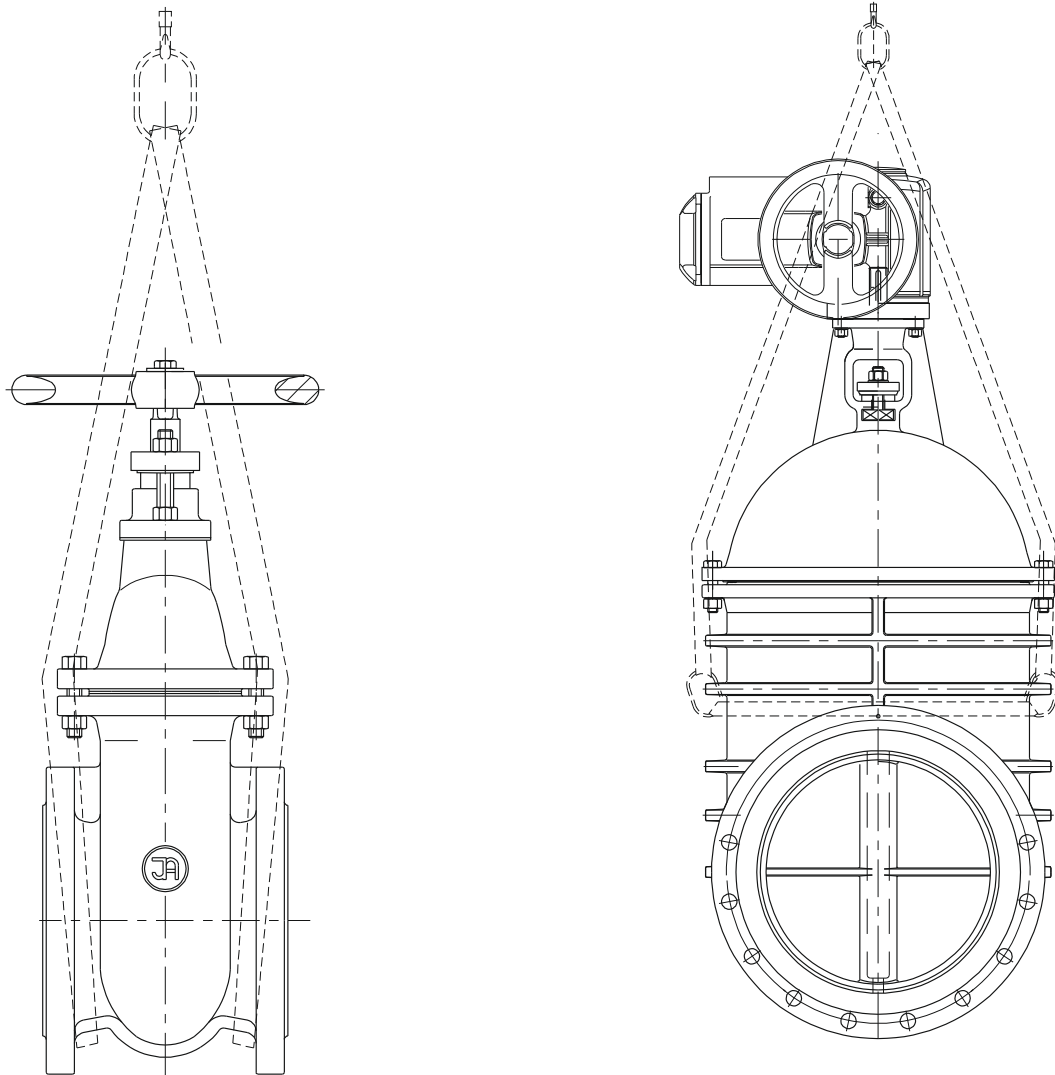
The gate valves are packed on EURO pallets (1200x800) and protected with heat-shrunk film.

### 3.3 STORAGE

Store the gate valves in sheltered rooms.

### 3.4 TRANSPORT

Transport the gate valves on sheltered vehicles.  
Never suspend the valve by its drive actuator when handling.



It is recommended use belt slings as shown in the diagram above  
for handling and installation of the gate valves from DN50 to DN200.

## 4 ASSEMBLY AND INSTALLATION

### 4.1 ASSEMBLY GUIDELINES

The Type 2109 and 2909 metal seated gland packed wedge gate valves can be installed in underground or overground pipelines both in horizontal or vertical orientation. The listed products are suitable for joining with the flanged ends of pipelines with the size equal to that of the valve flanges. Note that the system must not expose the (gate) valve to bending or tensile stress from loading with the weight of unsupported pipeline sections. Assemble with consideration to pressure and temperature compensation of the pipeline. The valve assembled and



adjusted by the manufacturer is ready for installation. Any dismantling of the valve components may result in loss of seal.

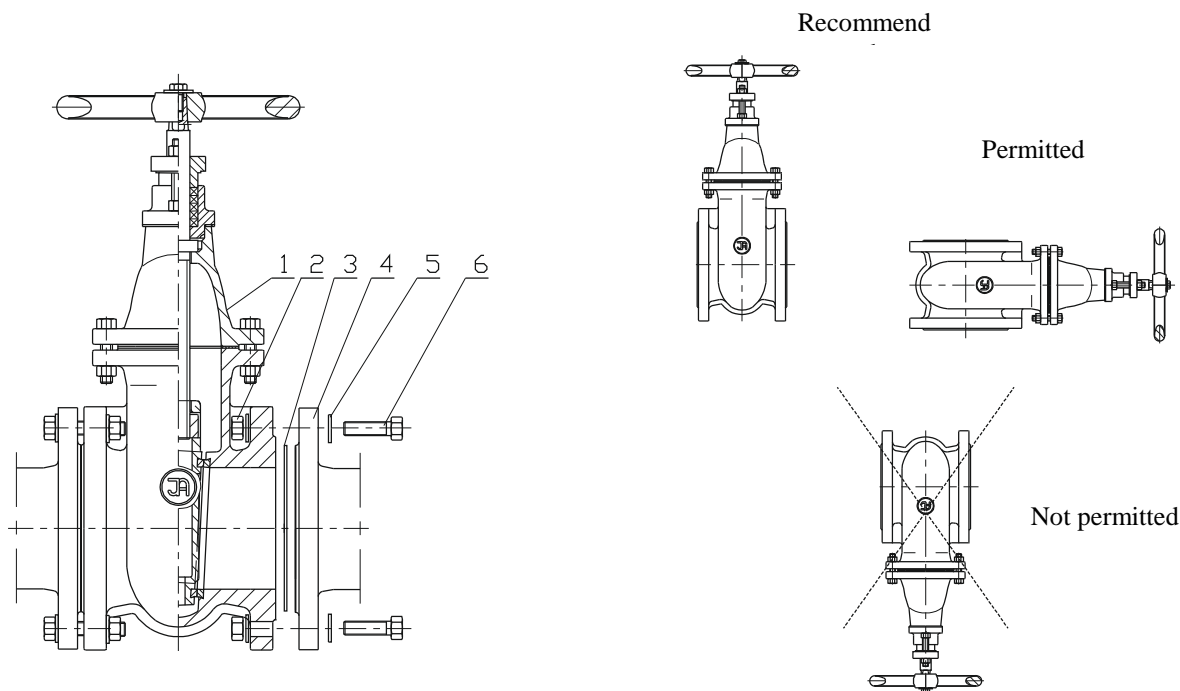
#### 4.2 ASSEMBLY INSTRUCTIONS

Before attempting to install the valve, check the technical and commercial documents delivered with the product to verify that the media and pipeline operating parameters comply with the manufacturer's declaration. Any change in the operating conditions must be consulted with the valve manufacturer beforehand.

Before attempting to assemble the valve, remove the main bore plugs, check the inner surfaces of the valve and thoroughly flush with water, if necessary.

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

The figure below shows the method for coupling the gate valve and the valve orientation diagrams:



1. Valve; 2. Nut; 3. Gasket; 4. Pipeline flange; 5. Washer; 6. Fastening bolt

#### 4.3 OPERATION

The gate valve shall be operated according to all relevant requirements for cut-off valves, i.e. either in fully open or fully closed positions. Leaving the gate valve partially opened (or closed) may result in seal failure. To ensure full performance, switch the knife gate valve periodically (once a year, from fully open to fully closed).

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

#### 4.4 OCCUPATIONAL HEALTH AND SAFETY

The metal seated gland packed flanged gate valves are eligible for the OHS guidelines and recommendation concerning installation of pipelines and devices for water supply stations, heat power plants, water treatment plants, sewage treatment plants, pumping stations and other facilities, and eligible for the Polish Regulation concerning general OHS laws (use of personal protective equipment for hands, legs and head, and safety garment), especially at work with low or high temperature hazard.

**Misuse of this product is prohibited.**

#### 5 WARRANTY TERMS AND CONDITIONS



The product assembled, installed and operated in compliance with this Manual is covered by a commercial warranty from the manufacturer. The conditions and period of the warranty is specified in the warranty sheet.