

# AG1-VC BUTTERFLY VALVE



*"From 1970 close to our clients"*



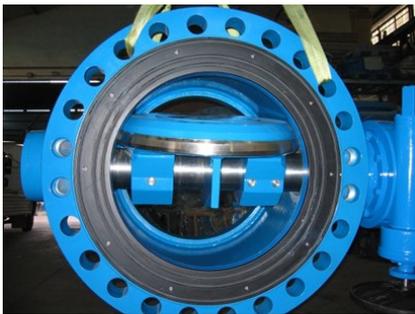
## ANGODOS

Since 1970 **ANGODOS** has been technological leader in valves industry, manufacturing everything in Madrid (Spain) and commercializing high performance valves internationally for different application fields.

**ANGODOS** Manufacturing range is pretty wide, covering a variety of application for different fields as waste water, drinking water, desalination, sanitation, irrigation system, mining, industry, gas and petroleum. from PN6 to PN100 and from DN40 to DN3000.

Since the creation of **ANGODOS**, the main objective has been providing Taylor-made solutions for the customers, developing a wide range of butterfly valves with different construction types and actuators, overspeed valves, check valves, air valves, and discharge valves solutions as howell-bunger valves.

Constant innovation and technological development allows **ANGODOS** to be the reference for the professionals interested in quality, safety, ease of use and installation and of course durability. **ANGODOS** has established a quality system for valves manufacturing, which has been approved by Lloyd's Register in accordance with the quality management system standard ISO 9001.



ANGODOS valve AG1 DN900 PN100



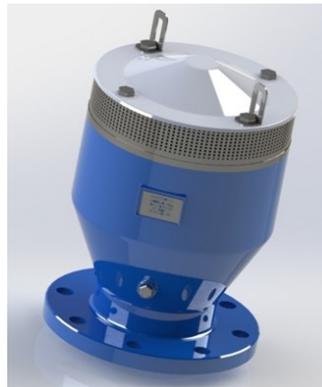
ANGODOS valve model AG1-CT with dismantling joint



Overspeed valve DN2000 PN25, double arm



Interior plant view – big diameter valves



DN150 PN25 air release valve



Check valves DN900 PN16 with hydraulic shock absorber

## Certificates



**CERTIFICATE OF APPROVAL**

This is to certify that the Quality Management System of:

**ANGODOS, S.L.**  
C/ San Juan, 21-23, Pol. Ind. El Palomo  
28946 Fuenlabrada, Madrid  
Spain

has been approved by Lloyd's Register Quality Assurance to the following Quality Management System Standard:

**ISO 9001:2008**

The Quality Management System is applicable to:

**Development, production, sale and service of valves, accessories and operation and control equipment.**

Approval Certificate No: SGI 2199125

Original Approval: 01 July 1999  
Current Certificate: 07 December 2016  
Certificate Expiry: 14 September 2018



Issued by: LRQA España, S.L.  
For and on behalf of: Lloyd's Register Quality Assurance Limited



C/ Princesa, 29 - 1<sup>o</sup> - 28008 Madrid, España  
For and on behalf of: Trinity Park, Riverside Lane, Birmingham B13 7JL, United Kingdom

**ISO 9001**



**EU CERTIFICATE OF CONFORMITY**

In accordance with the requirements of the Pressure Equipment Directive 2014/68/EU and the Pressure Equipment (Safety) Regulations 2016, UK Statutory Instrument 2016 No. 1105

This is to certify that the Quality Management System of:

**ANGODOS, S.L.**  
C/San Juan nº 21/23  
28946 – Fuenlabrada (Madrid)  
Spain

has been assessed against the requirements of Annex III, Module H of the Pressure Equipment Directive 2014/68/EU, and Schedule 4, Module H of the Pressure Equipment (Safety) Regulations 2016 and conforms to the requirements for the products shown below:

**Design and Manufacture of Industrial Valves (see attached schedule)**

Approval is subject to the continued maintenance of the quality system in accordance with the requirements of the above Directive and Regulations for the products listed on the attached schedule.

Authorisation is hereby given to use the LRV Notified Body Identification Number in accordance with the requirements of the specified Directive and Regulations in relation to the products as identified above.

Certificate No: 0038/PED/MAD/0140  
Original Approval: 31 January 2014  
Current Certificate: 23 January 2017  
Certificate Expiry: 31 January 2020  
LRV Notified Body Number 0038



Teresa Souto on behalf of Lloyd's Register Verification

**PRESSURE EQUIPMENT 2014/68/EU**

**AENOR Product Certificate**  
Isolating valves for water supply



**B18/000006**

AENOR, Spanish Association for Standardization and Certification, certifies that the organization

**ANGODOS, S.L.**

registered office: C/ San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

supplies: Isolating valves for water supply

in compliance with: UNE-EN 1074-1:2001 [EN 1074-1:2000]  
UNE-EN 1074-1:2001 ERRATUM:2008  
UNE-EN 1074-2(A):2004 [EN 1074-2:2000(A):2004]  
UNE-EN 1074-2:2001 [EN 1074-2:2000]

References: Specified in Annex to the Certificate

Production site: C/ San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

Certification scheme: In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP B18.01

This certificate supersedes B18/000006, dated 2014-04-07

First issued on: 2014-04-07  
Modified on: 2014-07-23  
Validity date: 2018-04-07



Avelino BRITO  
Chief Executive Officer

**AENOR** Asociación Española de Normalización y Certificación | Girona 17, 28004 Madrid, España | Tel. 902 102 101 - www.aenor.es

**AG1 BC 1074-1/2 PRODUCT CERTIFICATE**

**AENOR Product Certificate**  
Isolating valves for water supply



**B18/000007**

AENOR, Spanish Association for Standardization and Certification, certifies that the organization

**ANGODOS, S.L.**

registered office: C/ San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

supplies: Isolating valves for water supply

in compliance with: UNE-EN 1074-1:2001 [EN 1074-1:2000]  
UNE-EN 1074-1:2001 ERRATUM:2008  
UNE-EN 1074-2(A):2004 [EN 1074-2:2000(A):2004]  
UNE-EN 1074-2:2001 [EN 1074-2:2000]

References: Specified in Annex to the Certificate

Production site: C/ San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

Certification scheme: In order to grant this Certificate, AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tasks periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP B18.01

First issued on: 2014-07-23  
Validity date: 2019-07-23



Avelino BRITO  
Chief Executive Officer

**AENOR** Asociación Española de Normalización y Certificación | Girona 17, 28004 Madrid, España | Tel. 902 102 101 - www.aenor.es

**AG1 VC 1074-1/2 PRODUCT CERTIFICATE**

## Certificates

**AENOR**

**AENOR Product Certificate**  
Air valves for water supply



**B18/000008**

AENOR certifies that the organization

**ANGODOS, S.L.**

registered office: Cl San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

supplies: Air valves for water supply

in compliance with: UNE-EN 1076-1:2001  
UNE-EN 1076-2:2001 ERRATUM 2008  
UNE-EN 1076-4:2001

References: Specified in Annex to the Certificate

Production site: Cl San Juan nº 21-23, Polígono Industrial El Palomo 28946 Fuenlabrada (Madrid - España)

Certification scheme: In order to grant this Certificate AENOR has tested the product and has verified the quality system implemented for its manufacture. AENOR performs these tests periodically while the Certificate has not been cancelled, in accordance with Specific Rules RP B18.02.

First issued on: 2017-03-21  
Validity date: 2022-03-21

  
**Avelino BRITO**  
General Manager

**VAIU 1074-1/4 PRODUCT CERTIFICATE**

**WRAS**  
Water Regulations Advisory Scheme

Our Ref: HLM130483  
Test Report: MAT/LAB 7110/2

22<sup>nd</sup> February 2013

Compounds AG,  
Baroldstrasse 1,  
CH-8330 Pfäfers 2H,  
Switzerland

**WATER REGULATIONS ADVISORY SCHEME (WRAS) - MATERIAL APPROVAL**

The material referred to in this letter is suitable for contact with wholesome water for domestic purposes having met the requirements of BS 6930-3:2000 'Suitability of plastic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water'.

The reference relates solely to its effect on the quality of the water with which it may come into contact and does not signify the approval of its mechanical or physical properties for any use.

**ETHYLENE PROPYLENE DIENE MONOMER (EPDM) - MATERIAL ONLY** **5365**

Sunaflex T 8165, Black coloured, compression moulded EPDM sheet material. Shore hardness 70A. Tested in-radius size 1.0mm. For use with water up to 65°C.

**APPROVAL NUMBER: 130524**  
**APPROVAL HOLDER: COMPOUNDS AG**

The Scheme reserves the right to review approval. This approval is valid between February 2013 and February 2015.

An entry, as above, will not be made if included in the Water Fittings Directory on-line under the section headed 'Materials which have passed full tests of effect on water quality'.

The Directory can be found at [www.wrass.co.uk/directory](http://www.wrass.co.uk/directory)

Yours faithfully,

  
**Jason Luggall**  
Approval & Enquiries Manager  
Water Regulations Advisory Scheme

11.10.2016

**Compounds AG**  
Baroldstrasse 1  
CH-8330 Pfäfers 2H

Water Regulations Advisory Scheme Ltd, The Water Regulations Advisory Scheme, 2000, Queen's Road, London SW6 2LN, UK. Tel: +44 (0) 20 7496 1000. Email: [enquiries@wrass.co.uk](mailto:enquiries@wrass.co.uk). Website: [www.wrass.co.uk](http://www.wrass.co.uk)

**EPDM certificate**



**Product certificate**  
K11557/14

Issued: 2018-03-01  
Reference: K11557/13  
Page: 1 of 3

**Coating systems for potable water applications**

STATEMENT BY KIWA  
With this product certificate, issued in accordance with the Kiwa Regulations for Product Certification, Kiwa declares that legitimate confidence exists that the products supplied by

**Akzo Nobel Powder Coatings GmbH**

as specified in this product certificate and marked with the Kiwa®-mark in the manner as indicated in this product certificate may, on delivery, be relied upon to comply with Kiwa evaluation guideline BRL-K759 'Coating systems for drinking-water applications' dated 2012-02-01.

  
**Luc Leroy**  
Kiwa

Publication of the certificate is allowed.  
Advice: consult [www.kiwa.nl](http://www.kiwa.nl) in order to ensure that this certificate is still valid.

**Kiwa Nederland B.V.**  
De Weiler 1  
3917 AA Driebergen-Zeewijk  
The Netherlands  
Tel: +31 (0) 358 44 00  
Fax: +31 (0) 358 44 00  
[www.kiwa.nl](http://www.kiwa.nl)

**Supplier**  
Akzo Nobel Powder Coatings GmbH  
Markenstrasse 50  
72770 NEUTLINGEN  
Germany  
Tel: +49 7121 / 519130  
Fax: +49 7121 / 5191 99  
[info@rescoat.com](mailto:info@rescoat.com)  
[www.akzonobel.de](http://www.akzonobel.de)

Certification process consists of initial and regular assessment of:

- quality system
- product

**Epoxy certificate**

**CERTIFICADO DE CALIBRACIÓN**  
Certificate of Calibration



Numero **8852-3667**

Página 1 de 3 páginas  
Page of pages

**CALTEX SISTEMAS, S.L.**  
LABORATORIO DE CALIBRACIÓN  
Av. Juan de La Cierva, nº 10 - 46980 Paterna (VALENCIA)  
Tel: 96 182 99 02 - Fax: 96 143 92 72  
[www.caltext.com](http://www.caltext.com)



OBJETO	MANÓMETRO DE PRESIÓN RELATIVA
Rem	DIGITAL
MARCA	SIKA
Model	E2 400 bar
IDENTIFICACION	CÓDIGO: NO CONSTA
Identificación	Nº SERIE: 1189RB2
SOLICITANTE	<b>Angodos S.L.</b>
Applicant	P. del El Palomo - CS San Juan, 21-23 28946 Fuenlabrada MADRID
FECHA/S DE CALIBRACIÓN	22/10/2013
Dates of calibration	
Signatarios autorizados	Fecha de emisión
Authorized signatories	Date of issue
 <b>Rafaela Jiménez Villar</b> Firmado digitalmente por Rafaela Jiménez Villar Motivo: He revisado este documento Fecha: 2013.10.22 16:56:42:00	<b>marfes, 22 de octubre de 2013</b>
<b>Responsable del centro</b>	
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<p>✓ CALTEX SISTEMAS con el medio ambiente. IMPRESIÓN A DOBLE CARA. LP-DEC-03-01 Ver. 34</p>	

## Epoxy coating system

Epoxy Powder is the standard coating material for **ANGODOS** valves. This coating guarantees high corrosion and abrasion resistance while shows outstanding impact resistance. Also excellent bonding with ductile iron is ensured for long service life without servicing the valves.

### Application process

**ANGODOS** Just applies the best epoxy powder, and always following the procedures carefully to ensure the quality and maintain the properties of the coating.

The process comprises four steps:

- Pre-Blasting cleaning of the element.
- Blasting grade SA 2 1/2 according to UNE-EN-ISO 8503 "Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates".
- Heating elements to 180°C.
- Electrostatic spray is applied assuring 300 microns thick creating a polymerized, continue, and airtight film all over the valve.

### Coating performance

- Perfect airtight, zero porosity.
- Minimum coated thickness 300 microns.
- High adhesion to metal (min. 12 N/mm<sup>2</sup> ).
- High resilience never cracking.
- Smooth surface (makes incrustation more difficult).
- Suitable for drinking water and food use. WRAS certificate.



Manual blasting cabin 4.5x4.5 meters



Polymerization ovens, 3x3x5 meters



Manual powder coating, cabin 4x4 meters

## Polyurethane coating system

Polyurethane (PU) coating is an optional coating material for all **ANGODOS** valves. This coating guarantees high corrosion and abrasion resistance while having more flexibility than epoxy coating higher impact resistance. Also excellent bonding with ductile iron is ensured for long service life without servicing the valves. Polyurethane coating shows outstanding wear resistance and the advantage of being U.V stable, this means that it won't yellow like epoxy does when exposed to small amounts of sunlight over a period of time

### Application process

**ANGODOS** Just applies the best polyurethane and always following the procedures carefully to ensure the quality and maintain the properties of the coating.

The process comprises three steps:

- Pre-Blasting cleaning of the element.
- Blasting grade SA 2 1/2 according to UNE-EN-ISO 8503 "Preparation of steel substrates before application of paints and related products - Surface roughness characteristics of blast-cleaned steel substrates".
- Polyurethane is applied assuring minimum 300 microns thick creating a polymerized, continue, and airtight film all over the valve, but the thickness could be up to 1000 microns.

### Coating performance

- Perfect airtight, zero porosity.
- Minimum coated thickness 300 microns but can reach 1000 microns as desired.
- Very good adhesion to metal (min. 10 N/mm<sup>2</sup> ).
- High resilience never cracking, very flexible, tolerates large temperatures swing.
- High scratch resistance.
- Smooth surface (makes incrustation more difficult).
- Suitable for drinking water and food use. WRAS certificate.



Manual blasting cabin 4.5x4.5 meters



Equipment for corrosion protection with polyurethane coating



Manual powder coating, cabin 4x4 meters



## Butterfly valve

**ANGODOS AG1-VC** is a full bore butterfly valve with flanged body. The valve is manufactured from a single cast iron body internally vulcanized with EPDM elastomer.

The internal vulcanized elastomer gasket offers flat sealing and is the key for reliable performance. The disc is attached to the eccentric (simple or double) shaft bearing assuring an uniform seat and avoiding critical leaking by pressure discontinuities at the sealing area. In this way **ANGODOS AG1-VC** sealing system assures perfect sealing under the most demanding conditions.

Full bore and hydrodynamic internal design provides outstanding hydrodynamic features minimizing the head loss.



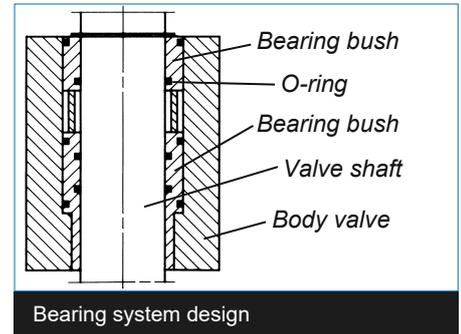
### Product features

- UNE-EN 1074-1 / UNE-EN 1074-2 Product certificate.
- Full bore.
- Minimum head loss.
- Low maintenance due to robust, simple and compact design.
- Made with top quality materials, certified for drinking water and highly corrosion resistant.
- Sealing gaskets and lateral sealing vulcanized to the body, maintenance free.
- Flange connection according to UNE-EN 1092.
- Face to face dimensions series 14 according to UNE-EN 558.
- Simple or double eccentricity.
- Low friction and maintenance free bearing system.
- Gearbox: smooth drive, IP67rating, standard motor connection, self-locking, adjustable stop, position indicator.
- Hand-wheel or square drive with ratchet (without gearbox) available ( DN100, DN150, DN200).
- Easy installation due to the lifting attachments, lateral flat gaskets and compact size.
- Manufacture range, DN100-DN300 / PN10, PN16, PN25.
- Optimum performance in clean water and reused water systems up to 60°C.
- Special materials available upon request.
- Other dimensions available upon request.

## Design principles

### Bearing system

The stainless steel shafts are completely enclosed by using O-ring sealing embedded inside and outside the bronze bearing bush internally and externally. Bronze material has self-lubricating properties, additionally while mounting the system bearings are lubricated using silicone grease, getting low friction in the system, allowing smooth operation and long and safe service life.

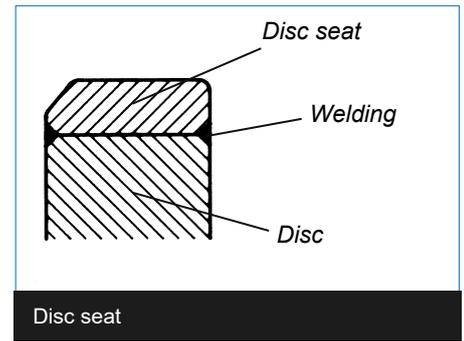


### Sealing system

The disc is a single piece of Stainless Steel up to DN200. For DN>200 the disc is made of S275JR Steel with sealing seat made of stainless steel for better sealing and longer life of the elastomer.

The elastomer is made of one piece of EPDM certified for drinking water vulcanized to the body. It also includes the flat side gaskets for easy installation.

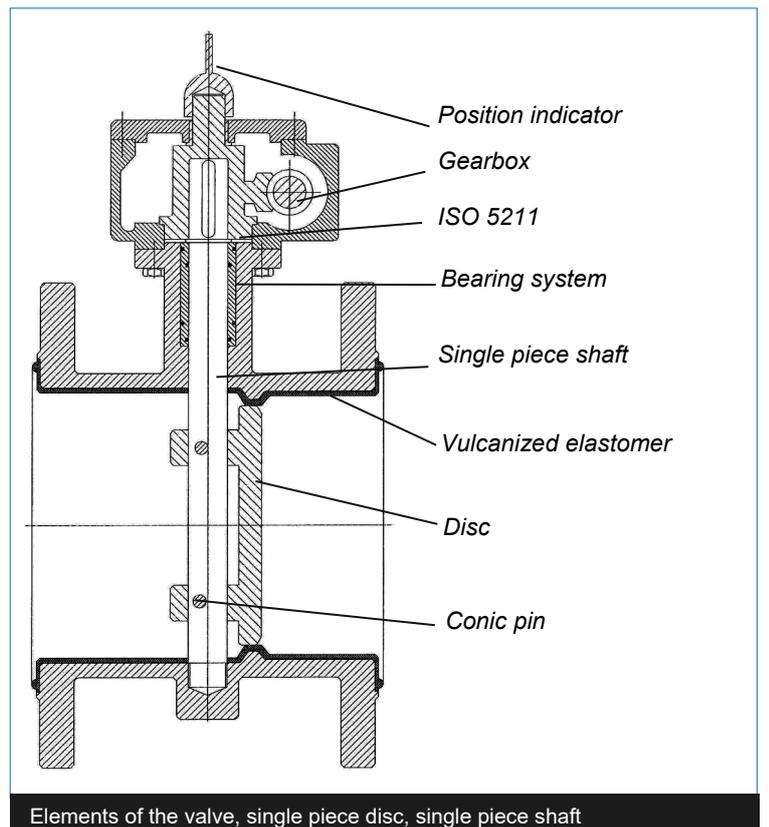
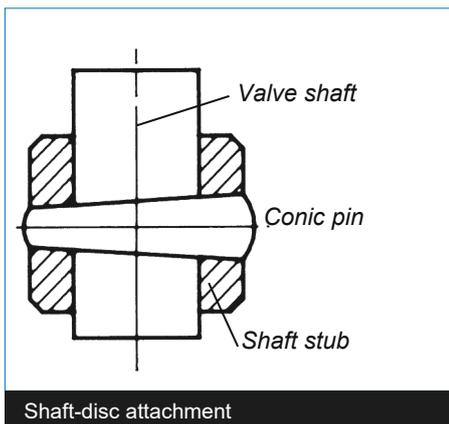
The cylindrical shape of the sealing system makes **ANGODOS AG1-VC** valve suitable for working pressures up to PN25.



### Shaft system

The shaft is made of a single piece, reducing deflection, and it is attached to the using conic pins during the assembly operation, avoiding any kind of displacement. The actuator is attached to the shaft according to ISO 5211 standard.

**ANGODOS AG1-VC** is manufactured taking care of the operation conditions and client requirements, the design range includes simple or double eccentricity shaft, with bidirectional sealing.



## Hydraulic performance

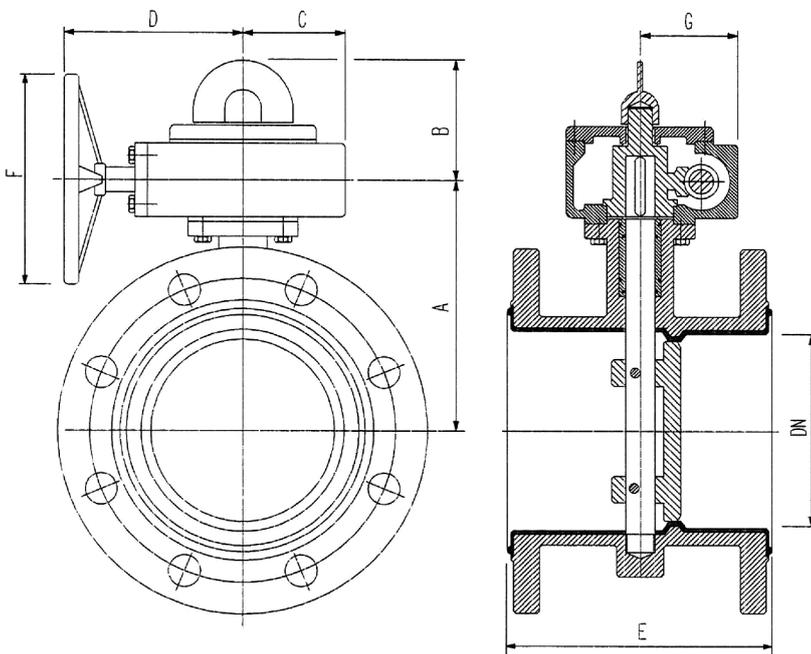
ANGODOS AG1-VC has been designed to maximize the hydraulic performance. To this end full bore has been ensured and the hydrodynamic design of the valve (interior shape of the body, shaft and disc) minimize head loss

A powerful tool (CFD) has been used to ensure the best valve design and to calculate the air performance (CFD).

Flow coefficient **Kv** is defined as the flow rate in cubic meters per hour [m<sup>3</sup>/h] of water with a pressure drop across the valve of 1 bar. Flow coefficient will drop as the degree of valve opening **Kv(α)**.

DN	Kv 100%	Kv 75%	Kv 50%	Kv 25%
100	353	277	130	36
150	810	608	349	155
200	1,555	641	533	209
250	2,790	1,767	794	254
300	3,850	2,592	1,152	360

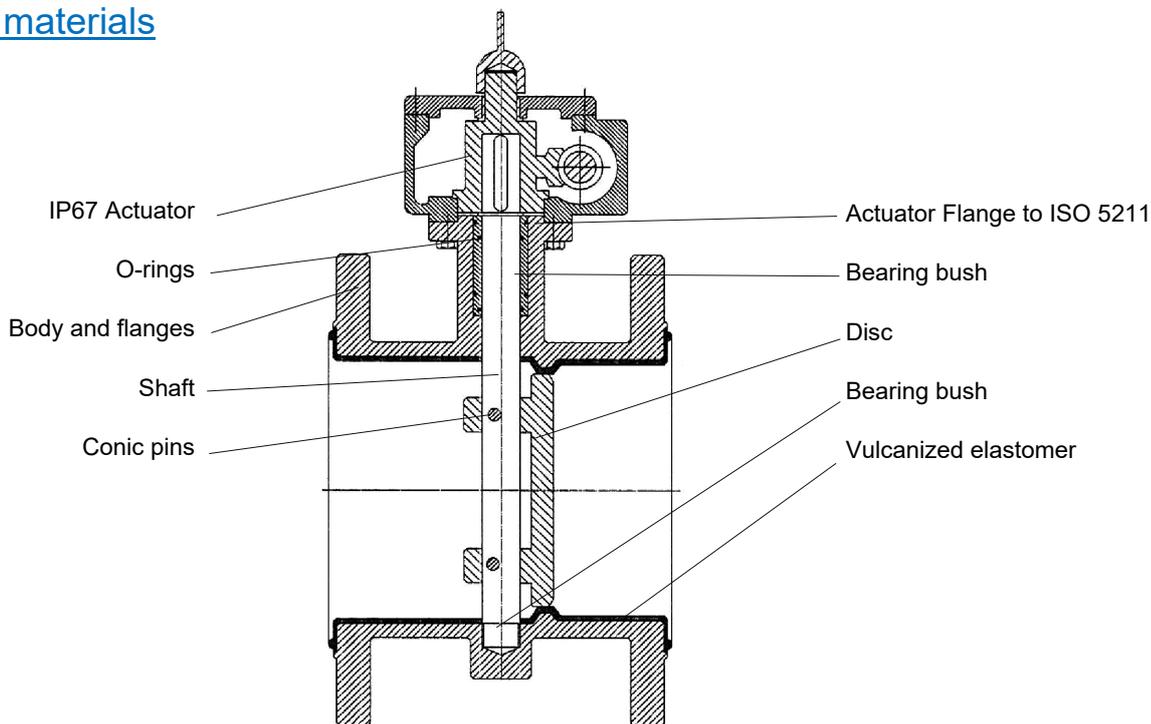
## Dimensional characteristics



- Flanges PN10, PN16, PN25 to UNE-EN 1092, ISO 2531
- Face to face length according to UNE-EN 558, ISO 5752.
- Hand wheel or square drive with ratchet without gearbox available ( DN100, DN150, DN200).
- Other dimensions available upon request.

DN	A (mm)	B (mm)	C (mm)	D (mm)	UNE-EN 558	F (mm)	G (mm)	Weight (Kg)
					S14 E1 (mm)			
100	168	125	70	150	190	150	80	32
150	210	125	70	150	210	150	80	49
200	265	125	70	150	230	150	80	64
250	310	125	70	150	250	150	80	83
300	335	125	70	200	270	150	95	107

## Parts list and materials



Componente		Material	
1	Body and flanges	Ductile cast iron GJS-400-15 according to UNE-EN 1563 (ASTM A536 GR.65-45-12) + 250µ Epoxy	
2	Disc	DN100-DN200	Stainless Steel 1.4301 according to UNE-EN 10088-1 (AISI 304)
		DN250-DN300	Steel S275JR according to UNE-EN 10025-2 (ASTM A36) + 250µ Epoxy+ Disc seat
3	Sealing system disc seat	DN250-DN300	Stainless Steel 1.4301 according to UNE-EN 10088-1 (AISI 304)
4	Shaft	Stainless Steel 1.4021 according to UNE-EN 10088-1 (AISI 420)	
5	Conical pins	Stainless Steel 1.4021 according to UNE-EN 10088-1 (AISI 420)	
6	Vulcanized Elastomer	Elastomer EPDM 70 Shore according to UNE-EN 681.1	
7	Bearing bush	DN100-DN200	Teflon covered Carbon Steel
		DN250-DN300	Bronze CC491K according to UNE-EN 1982 (ASTM B62 C83600)
8	O-rings	Elastomer EPDM 70 Shore according to UNE-EN 681.1:1996	
9	Shaft cover	DN250-DN300	Steel S275JR according to UNE-EN 10025-2 (ASTM A36) + 250µ Epoxy
10	External screws	DN250-DN300	Stainless Steel 1.4301 according to UNE-EN 10088-1 (AISI 304)

### Options:

- Disc: Stainless Steel (AISI 316)/ Duplex / Bronze.
- Coating: Protegol PU 32-45.
- Vulcanized elastomer: EPDM, NBR, Viton.
- Teflon covered Carbon Steel.
- Hand wheel or square drive with ratchet (without gearbox) ( DN100, DN150, DN200).