Diaval®

Diaphragm Valves

www.diaval.com

CONTENTS

Legal Terms on Trade Marks

All trade marks used in this catalogue are registered by our company or third parties we are associated with and are proprietors of these trade marks. It is to be noticed that the wrong or unauthorised use of these registered trade marks and patents might result into legal action by our Company or the proprietors.

Our Company is authorised by the registered proprietors to use their trade marks in this web site as part of our Company business activity. In the event of some trade marks owned by third parties and whose permission of use had not been asked for, we are mentioning the property of the said trade mark (in example VITON® - is a Registered Mark of Dupont). The symbol ® or ™ is used along with the mark or product brand to identify a registration property.

Our Company turns down any responsibility on which third parties might incur by any wrong or unauthorised use of the third party proprietors marks and would highly recommend to apply authorisation to use these marks to avoid unwanted legal problems. Please refer to Manufacturing Brands and Distribution Brands to identify allregistered trade marks.

Main List of Trade Marks Proprietors used in this Data Sheets Manual.
The scope of media includes documents, data sheets, catalogues and Price Lists. This is not limited, should some Marks are not hereunder listed, they would be added up on request of the proprietor who is kindly welcome to e-mail our web-master advising so at webmaster@comeval.es Not mentioning any Trade Mark being used in this web site can only be attributed to a lack of knowledge by our side and will be mentioned on request.

VITON® TEFLON® HYPALON® TEFZEL®
Are registered Marks of DuPont Co.

LINATEX®
Is a registered Mark of LINATEX MALAYSIA

SANTOPRENE®
Is a registered Mark of ADVANCED ELASTOMER SYSTEMS LP

HASTELLOY®
Are registered Marks of HAYNES INTERNATIONAL.

INCONEL® MONEL®
Are registered Marks of INCO ALLOYS INTL.

STELLITE®
Is a registered Mark of STOODY CO.

Diaval® is a registered Trade Mark of COMEVAL VALVE SYSTEMS
Les Rotes 15, 46540 - El Puig (Valencia) Spain.

www.comeval.es

Registration Nº: 003567831

Introduction

Diaphragm Valves proved to be the answer to many process engineers' greatest desire of reliability at an acceptable cost of ownership. Of simple and reliable design, diaphragm valves offer secure operation with full leaktight at the plant. The maintenance, when required, is limited to the replacement of the diaphragm, the bolted bonnet design permits to dismantle the valve without removing the valve body from the pipe work.

The body seatless design eases the internal lining, which opens a broad range to inexpensive options to process engineers when selecting materials resistant to corrosion and abrasion duties. Conventional isolating valves would demand expensive exotic materials to resist the effects of severe corrosion whereas a duly lined iron based material can do the job.

DIAVAL portfolio clearly meets the requirements of modern industrial processes and the needs of all engineers. Through constant product development and own polymer research technology, **DIAVAL®** Diaphragm Valves are a reliable alternative to existing costly and expensive to maintain conventional valves.

DIAVAL INTERNATIONAL manufacture one of the largest Diaphragm Valves portfolio comprehensive of body linings, diaphragm grades and actuation currently available in the international market. Your **DIAVAL®** Team is available to guide you along a great cost saving experience.

DIAVAL® range of superior design and major cost saving benefits, for secure and full leaktight operation under the most severe circumstances.
The **DIAVAL®** range is totally interchangeable with other diaphragm valves in the market thus easing the plant choice.
 # Valve stroke Indicator; a yellow position indicator gives clear and positive valve position from any angle.

 # Greased for life valve spindle; spindle chamber incorporates a grease reservoir that lubricates the spindle along operations thus avoiding valve spindle jamming. Sealed bonnet arrangements available for toxic and hazardous fluids.

 # Valve stroke stopper; the bonnet design prevents over closure of the valve thus avoiding early diaphragm rupture.

 # Ergonomically Design Hand wheel; great comfort and ease of operation. Other operation options such as actuators, padlocks, interlocking, extended spindle and others are available from **DIAVAL®**.

 # Self draining; Weir valves are self draining when installed at an angle of 20º above horizontal. ST and Full Flow valves are self cleaning with an unobstructed bore.

 # Diaphragms; wide range of diaphragm materials to meet the needs of today's industrial processes and standards. Resilient diaphragms provides 100% leak-tight shut off and isolates all bonnet parts from the line fluid.

 # Safety; Optional Sealed bonnet arrangements available for toxic and hazardous fluids, Interlocking arrangement, padlocking and flange sealing coating.

 # Linings; porous free chemically resistant linings designed to eliminate the need of expensive metals. Wide range of polymers and fluoropolymers available to match all industrial needs. Full face rubber lining removes the need for gaskets unlike spigot face lining.

 # Body end connections; flanged and screwed ends to meet all European, Imperial and American standards. Other end styles available for the aseptic range.

Industry Applications

The DIAVAL range of Valves is encountered in many market sectors and process media applications.
The process engineer should observe the material of valve bodies, Diaphragm grades, seals and other selection criteria to ensure that and matches to the actual plant duties.

When deciding to use any valve of the wide DIAVAL portfolio in a process plant, the following parameters should be observed: *Fluid Temperature *Fluid properties and Concentration *Line pressure ; if checked parameters allow for the use of Diaphragm Valves, Plug Valves or Butterfly Valves, then a second check list should be considered to select the most appropriate Valve: *Clean or dirty media, pressure drop and intended valve purpose to define the Valve style *Corrosion or abrasion duties will lead to the proper choice of materials, linings and diaphragms or gaskets *Finally process end connections will define the body end style.

DIAVAL products are encountered in many applications of today's industry, this catalogue section describes the main fields where our products have been largely sold.

Valves for Desalination Plants

What is desalination?
Desalination is the process of removing dissolved salts from water to make it drinkable or for human use.
The two leading desalination technologies are thermal and membrane technologies. A major advantage of desalination of ocean water is that water is always available even in the most severe droughts.
A thermal process or distillation involves the heating of saline water to produce water vapour that is, in turn, condensed to form fresh water or low salt water concentration.
Membrane processes rely on permeable membranes to separate salts from water. Membrane processes can either be pressure-driven (reverse osmosis) which is now the most common method, or it could be voltage-driven (electro-dialysis).




Reverse Osmosis (RO). A process of desalination where pressure is applied continuously to the feed water, forcing water molecules through a semi permeable membrane. Water that passes through the membrane leaves the unit as product water; most of the dissolved impurities remain behind and are discharged in a waste stream.

Electro-dialysis. Most of the impurities in water are present in an ionized (electrically-charged) state. When an electric current is applied, the impurities migrate towards the positive and negative electrodes. The intermediate area becomes depleted of impurities and discharges a purified stream of product water. This technology is used for brackish waters but is not currently available for desalting seawater on a commercial scale.

Corrosion Control
The major problem in the efficient functioning of a Multi Stage Flash Desalination Plant is the lost downtime due to the ravages of corrosion. Whereas pipes and fittings are relatively inexpensive to repair or replace, the cost of a pump or valve can be very high. It is for this reason that the valves and pumps used must fall under the following criteria:
1.The valve must be corrosion resistant to the aggressive media and chemicals found on a Multi Stage Desalination Plant.
2.The Valve must be easy to maintain.
3.The valve must be highly reliable under the most arduous conditions.
4.The valve must be cost effective.

DIAVAL® valves offer a wide portfolio capable to meet all the above requirements in the desalination industry either with Diaphragm, Plug, Butterfly and Check Valves. Corrosion is effectively managed with alloy materials such as Super Duplex Stainless Steel for unlined valves and in requirement of working pressures beyond the reach of elastomer lined valves. Should working parameters allow so, the use of Diaphragm Valves would reduce the ownership cost tremendously as can be observed from the following table:

Service	Valve Type	Body Material	Body Lining	Diaphragm	Size Range
Sea Water	Diaval Diaphragm Valve	Ductile Iron	Natural Rubber	Natural Rubber	150 mm to 350 mm
Condensate	Diaval Diaphragm Valve	Ductile Iron	Butyl Rubber	Butyl Rubber	100mm to 250mm
Brine Discharge	Diaval Diaphragm Valve	Ductile Iron	Unlined	Butyl Rubber	200mm to 300mm
Caustic Addition	Diaval Diaphragm Valve	Ductile Iron	Butyl Lined	Butyl Lined	25mm to 50mm
Chlorine Injection	Diaval Diaphragm Valve	Ductile Iron	ETFE or PFA Lined	PTFE/Viton	25mm to 50mm

Valves must be reliable and not to be affected by the water impurities and suspended solids, hence the choice of plug valves or Straight Through Diaphragm Valves takes an important role for the proper plant functioning.

The DIAVAL portfolio offers the right product for each process conditions at Desalination Plants over the World.

Valves for Hydrochloric Acid

Although not manufactured in as greater quantities as sulphuric acid, Hydrochloric acid is nevertheless an important raw material used in the chemical. petroleum and metal industries.

Hydrogen Chloride is a gas at room temperature and normal pressure and when dissolved in water is known as hydrochloric acid.

One of the major uses of hydrochloric is in the metal preparation industry where it is used to pickle steel plate to remove scale. In order to handle and control hydrochloric acid the choice of materials must be carefully chosen.

In the valve and pump applications, the use of rubber linings and 'plastic' materials are widely used.
Should all metal valves or pumps be required then the cost rises dramatically due to need to use expensive nickel alloys.

The use of Diaval Diaphragm Valves has become widely accepted as the most economic way of handling
Hydrochloric acid due to the fact that the body can easily be lined with suitable 'rubbers' which resist the attack of the acid.

The diaphragm isolates the acid from the operating mechanism thus reducing the need, and cost of employing an expensive all metal bonnet assembly.

On the surface the choice of lining seems a simple choice, however consideration must be given to the impurities in the acid which are 'picked up' by virtue of its method of manufacture. It is these impurities that can attack and destroy linings that theoretically should be resistant to the acid.

Hydrochloric acid can be manufactured in a number of ways each method containing different impurities:

* In the production of organic chemicals hydrochloric acid can be produced as a by-product containing aromatics.
The choice of Fluorocarbon linings and TFM (PTFE) diaphragms are required in this application.

* The Process of reacting sulphuric acid with sodium sulphate to produce hydrogen chloride gas and subsequently hydrochloric acid can introduce fluorides as the impurity which are best controlled by the use of EPDM or butyl materials. The fluorides attack glass linings.

* The manufacture of chlorinated hydrocarbons can produce hydrochloric acid containing chlorine gas. The use of natural rubber (because of the formation of the resistance layer of 'rubber hydrochloride on the natural rubber) and fluorocarbon materials are required.

Should the use of Plug Valves was the choice, it would be strongly recommended to look for Fluoropolymer coated valves in combination with the PTFE Sleeve plug.

Valves for Sulphuric Acid

Sulphuric acid is perhaps the most widely used and most important technical products. Sulphuric acid is used in numerous industrial processes including fertiliser manufacture, metal plate, the dye stuffs industry, pharmaceuticals and countless others.

First discovered in 1831 by an Englishman whose patent for its manufacture has little changed over the years and is called the Contact Process. The Contact Process features the passing of a mixture of sulphur dioxide over a catalyst and passing the resultant sulphur trioxide into concentrated sulphuric acid. Sulphuric acid is a strong dibasic acid, with properties of an oxidising and dehydrating agent. Its dehydrating properties are important in absorbing water formed in such chemical processes as in nitration, etherification processes and saponification in the soap and detergent manufacture.
Sulphuric acid is sold in varying strengths or percentage of SO3 (sulphur trioxide) in H2SO4.The latter known as Oleums.

The commercially available strengths of sulphuric acid are as follows:

Strengths of Sulphuric Acid	Specific Gravity	% Sulphuric Acid
Battery Acid	1.250	33.3%
Fertiliser acid	1.525	62.2%
Oil of Vitriol	1.835	93.0%
Concentrated Oil Of Vitriol	1.841	98.0%
100% Sulphuric acid	1.835	100.0%
20% Oleum	1.915	105.0%
60% Oleum	1.992	114.7%

With its wide range of chemical properties the controlling of the various forms of sulphuric acid makes it extremely important that the correct material of construction for valve / pump is used.

In higher concentrations valves and pumps are often manufactured in plain cast iron or ductile iron, the chemical resistance of these materials is basically due to the fact that they contain a high content of combined carbon and a low content of free graphite. The acceptable corrosion rates must be determined by the Corrosion Engineer since these vary with increase velocity of the acid.

Temperature	% H2S04	mm per year
Ambient	65-98	<0.2
80 deg C	70-98	0.2 - 1.5
100 deg C	96-98	0.5 - 1.5

Temperature	% H2S04	mm per year
Ambient	85%	0.40
50 deg C	85%	1.03
100 deg C	98%	0.28

It can clearly be seen that above a percentage of approximately 85% the corrosion rates start to fall which allows the use of cast irons as a favourable material for the construction of valves and pumps.

The one factor NOT taken into account in the above example is the effect of velocity which is considerable when considering the choice of materials to handle sulphuric acid.

This adverse effect is known as erosion - corrosion .

In its more dilute forms there are many polymers and inert linings that will offer the engineer a economical choice in the controlling of sulphuric acid.

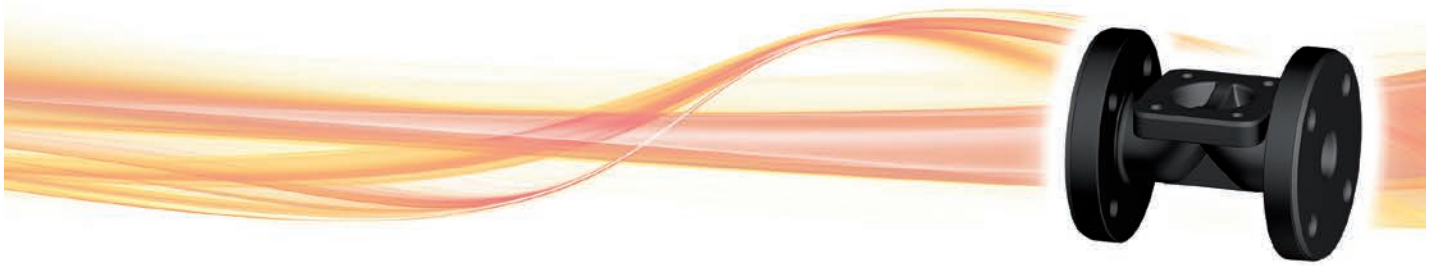
Diaval Diaphragm valves, with its many linings and smooth flow characteristics has been the Corrosion Engineers and Plant Managers first choice for handling and controlling sulphuric acid on the grounds of economics, safety, easy of maintenance and availability.

Application Guide - Diaphragms

GRADE	POLYMER TYPE	GENERAL APPLICATION
D10 **Natural Rubber**	**Natural Rubber Polyisoprene/SBR** Sulphur cured and carbon black reinforced	Inorganic salt solutions, dilute mineral acids, alkalies and salts. Abrasive services such as slurries.Not resistant to oxidizing media, oils or most organic solvents will attack it.
D15 **White Natural Rubber**	**Natural Rubber Polyisoprene/SBR** Sulphur cured and white reinforced	Food and pharmaceuticals, toothpaste, brewing, dairy
D20 **EPDM**	**Ethylene Propylene Diene (EPDM)** Organic peroxide cured, carbon black reinforced	Salts in water, acids and alkalies, ozone, hot water (HVAC), intermittent low pressure steam.Sterilisation
D30 **Butyl Rubber**	**Isobutylene Isoprene (IIR)** Sulphur cured and carbon black reinforced	Dilute mineral acids and alkalies, gases, acidic slurries, chlorine free hydrochloric acid, resistance to concentrated acids is good with some important exceptions as nitric or sulphuric acids
D40 **Nitrile**	**Butadiene Acrylonitrile**	Oily air, lubricating oil, cutting oils, fuel oils, animal and vegetable oils, aviation kerosen, LPG, paraffin. Generally resistant to oils and solvents.
D50 **Neoprene ®**	**Polychloroprene** Non sulphur cured carbon black reinforced	Abrasive slurries containing hydrocarbons, oily air, natural gas. Resistant to attack by ozone, sunlight, oils, gasoline, and aromatic or halogenated solvents but easily permeated by water
D60 **Hypalon ®**	**Chlorosuphonated polyethylene** Non sulphur cured carbon black reinforced	Outstanding resistance to ozone and oxidizing agents except fuming nitric and sulfuric acids. Oil resistance is good. Dilute / Medium acids, sodium hypochlorite, chlorine gas
D70 **Viton ®**	**Vinylidenefluoride-hexafluoro propyleneco-polymer** Carbon black reinforced	Strong sulphuric acid, chlorine gas, oils, certain aromatic solvents. Limited mechanical properties
D92 **PTFE/EPDM**	**Virgin PTFE + Ethylene Propylene Diene** Two piece Bayonet fitting	Strong acids, alkalies and salts in water at high temperature, biopharmaceuticals
D93 **PTFE/BUTYL**	**Virgin PTFE + IIR** Two piece Bayonet fitting	Strong acids at low-medium temperature
D97 **PTFE/Viton ®**	**Virgin PTFE + Vinylidenefluoride-hexafluoro propylene copolymer** Two piece Bayonet fitting	Strong acids, solvents, chlorine, bromine at higher temperature

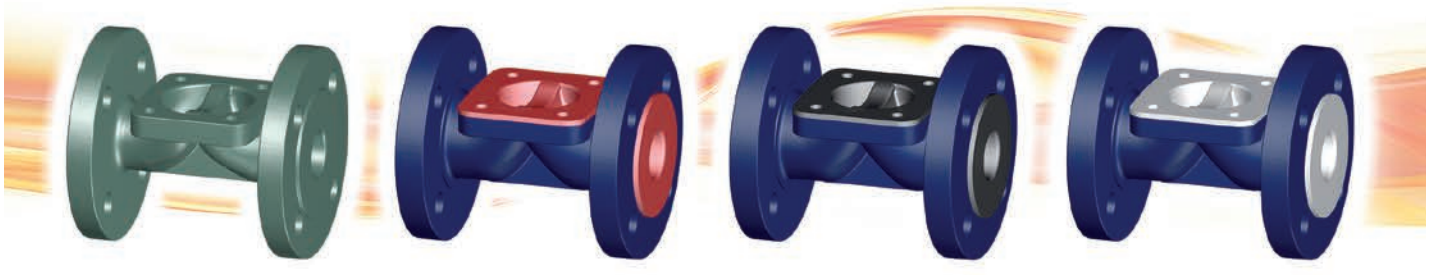
Vacuum reinforced diaphragms are available and will contain a steel stud and be designated by additional code letter (V) e.. D10V Because of the steel stud these diaphragms can be used on services where conventional bronze studs are prohibited e.g. use of D40V on acetylene.

*Other speciality customised diaphragm material available to suit individual requirement made out of various polymers



Application Guide - Lining
Rubber Lining

Lining material	Applications
Hard Rubber - HR (Ebonite), sulphur cured, carbon black reinforced Designated by a 'Sky Blue Spot' on end flange.	Used for inorganic salt solutions, dilute mineral acids, chlorine water, oxidizing agents, deionised and potable water
Soft Natural Rubber-SR Polyisoprene, sulphur cured, carbon black reinforced. Designated by a 'white spot' on end flange.	Excellent abrasion resistance for powders, slurries such as clays, fly ash and cement products.
Soft Butyl Rubber-BR Isobutylene isoprene (IIR), sulphur cured carbon black reinforced. Designated by a 'Dark Blue Spot' on end flange.	Good for corrosive and abrasive slurries, dilute mineral acids and acidic slurries, salts in water and lime. Avoid chlorine and chorine solutions
Soft Polychloroprene (Neoprene) Rubber Non-Sulphur cured carbon black reinforced. Designated by a 'Red Spot' on end flange. Hardness 65- +/- 5° Shore 'A'	Used on abrasives and minerals processing where small percentages of hydrocarbons are present, see water and sludge oils. Better resistance than SR to heat, oil, ozone and sunlight
Soft Hypalon® Rubber - (Chloro sulphonated polyethylene) Non-Sulphur cured carbon black reinforced Designated by a 'Green Spot' on the end flange.	Chemical resistance to dilute / medium strength acids and chlorinated brine solutions and sodium hypochlorite
Linatex® Specially compounded "RED" coloured soft lining Hardness 45 +/- 5º Shore 'A'	Used for "wet" slurry applications



Application Guide - Lining

Fluoropolymer Lining

	Lining material	Applications
Partly fluorinated	**ECTFE-Halar®** Co-polymer of ethylene and chlorotrifluoroethylene. Electrostatically applied coating.	Used for concentrated acids and salts containing hydrocarbons. Excellent chemical resistance against hydrogen fluoride and ozone. Suitable for most of organic and inorganic compounds and for a wide range of chemical solvents. Not suitable for dilute acids and inorganic salt solutions near to their boiling point. Some fluorinated solvents attack it. Very smooth surface with no porosity (good for pharma). Extremely low permeability. Outstanding adhesion. Very hard surface. Outstanding abrasion, cut-through & tear resistance. High ignition resistance. It has replaced other polymers and glass as valve lining.
	Ethylene tetrafluoroethylene-ETFE® Natural colour (red).	Most suitable for concentrated mineral acids, aromatic and aliphatic and chlorinated solvents at medium temperature, salts in water. Outstanding abrasion, cut-through, tear resistance and stress-crack resistance. Low permeability. No known solvents attack it under ordinary conditions. Outstanding weatherability. It has replaced other polymers and glass as valve lining.
	PVDF Polyvinylidene fluoride Natural colour (black)	Great resistance to mineral and organic acids, aliphatic and aromatic hydrocarbons, alcohols and halogenated solvents, salts in water, de-ionised water and effluent treatment chemicals. Excellent for wet chlorine gas or chlorine in water. Good mechanical properties. Low permeability. Resistant to UV and highly corrosive agents.
Fully fluorinated	**Polytetrafluoro alkoxy-PFA®** **Fluorinated ethylene propylene FEP** Natural colour.(transparent white)	PFA similar properties to PTFE but can be processed using conventional thermoplastic techniques (injection moulding, extrusion, electrostatic powder coating…). Most suitable for concentrated mineral acids at high temperature, aromatic and aliphatic and chlorinated solvents. No known solvents attack it.Virtually all chemicals except fluorine & related compounds and violent reducing agents like metallic sodium and molten alkali metals. High mechanical properties. Outstanding weatherability. FEP has nearly similar chemical resistance, lower temperature resistance and toughness than PFA. Cheaper alternative to PFA.
Other thermoplastics	Polypropylene PP	Similar behavior than HDPE but with lower density and higher temperature resistance. It is recommended for dilute acids, organic solvents degreasing agents, dilute alkalis and alcohols., salts in water, water and effluent treatment chemicals. Not recommended for aliphatic, aromatic or halogenated hydrocarbons. Tough, good abrasion resistance, with no stress-cracking problems. Poor UV resistance

Selecting the right fluoropolymer material for hazardous or hard to handle fluids is the most essential element in the process industry. Certain special conditions may affect the performance or service life of the fluoropolymer. For the proper selection of plastic lined products, the following information should be considered.

Application

*Primary Chemical and Concentration
*Secondary chemicals and concentration
*Trace chemicals or impurities present
*Presence of solids
*Flow rates
*Fluid purity requirements [metal ions, pigments]

Operating Condition

*Normal operating Temperature and range
*Peak temperatures during start ups & shut downs or upset conditions
*Mixing areas [exothermic or heat of mixing temp. condition]
*Normal operating Pressure and range
*Peak pressure during start ups, shut downs and upset conditions
*Vacuum conditions and range
*Vacuum conditions during start up, shut downs and upset conditions
*Cyclic conditions from batch operations, start ups or shut down conditions
*Line cleaning methods [chemical, steam, high pressure water, pigging]
Selection of the fluoropolymer with above guideline is essential to avoid certain phenomenal problems in the plastic lined products like Permeation & Environmental Stress Cracking. Normal operating Temperature and range

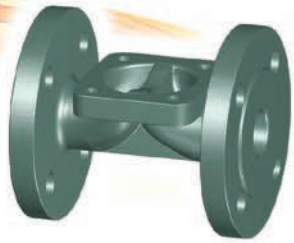
Permeation

Permeation is the transport of small molecules through the plastic liner. Permeation is a combination of absorption, solution, diffusion & desorption mechanisms. It is a function of several variables including the properties of the permeating species (i.e., molecular size, solubility parameters, concentration), properties of the plastic (i.e., crystallinity, density, thickness, thermal history), and operating parameters (i.e., temperature-pressure gradients and cycling). Permeation data published in most literature refers to thin coatings or films and should not be applied to plastic-lined products.
All products lined with fluoropolymers, such as PTFE, PFA, FEP, ETFE and ECTFE are subject to some permeation for certain fluids. Normally PTFE lined products in conjunction with the fluids having permeation in PTFE are substituted by PVDF to avoid permeation phenomenon.

Environmental Stress Cracking

Environmental Stress Cracking (ESC) is a well known but not always understood phenomenon with plastics. ESC occurs in plastic lined parts when the plastic liner is exposed to a chemical liquid while under mechanical or thermal stress. ESC can lead to failures at stresses below the tensile strength of the material. In some instances, the presence of a contaminant may act as a accelerator. For example, iron or copper contamination in concentrated sulphuric or hydrochloric acid can result in stress cracking of PP (Polypropylene) liners. All plastics, including PTFE, are known to be susceptible to ESC.
The occurrence of ESC is hard to predict. It is dependent on the process chemistry, operating conditions, physical system layout and quality of field fabrication. If the chosen fluoropolymer may be susceptible to ESC with a specific chemical, that does not mean the particular fluoropolymer will not work, but additional data must be gathered to insure that the liner is compatible with the chemical.

Halar Coating

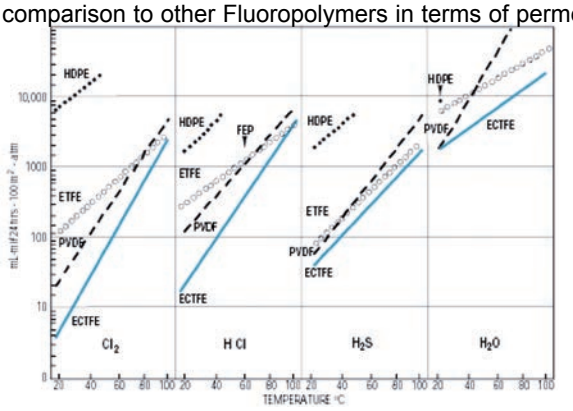


Halar® ECTFE; a versatile Fluoropolymer
Manufactured from ECTFE, is a melt processable Fluoropolymer. Halar® ECTFE is a partially fluorinated semi-crystalline polymer offering a unique combination of mechanical properties, thermal and chemical resistance with an outstanding ease of processability. It is a copolymer of ethylene and chlorotrifluoroethylene that brings advantages to valve application when compared to other Fluoropolymers. It is a very versatile polymer, available in all forms to meet processing needs. It offers excellent resistance to abrasion, harsh chemicals, and permeation. These characteristics have made of Halar® ECTFE a material of choice for several applications in the field of corrosion protection in the chemical industry. Halar® ECTFE is a high purity Fluoropolymer with a very smooth surface, which accounts for its extensive use in the semiconductor industry. Halar® meets the demands for fire-safe, non-fire propagating plastics. Halar® ECTFE powder coatings offer the greatest ease of processing, with the ability to be applied in high thickness when required.

Properties of Halar® ECTFE
Halar® offers a unique combination of properties especially as a coating and a liner. Halar Fluoropolymer coatings provide outstanding chemical resistance, good electrical properties, a broad-use temperature range from cryogenic to 150 ° C, and meet the requirements of UL-94 V-O vertical flame test in thicknesses as low as .007 (7mils). Halar® is resistant to strong mineral and oxidizing acids, alkalis, metal etchants, liquid oxygen, and essentially all organic solvents except hot amines.

Halar® ECTFE the DIAVAL® choice of Fluoropolymers
It is the preferable DIAVAL® choice over other Fluoropolymers such as PVDF, PFA or PTFE in example. For those applications exceeding the capabilities of other Fluoropolymers, Halar® can be evaluated before resorting to a fully fluorinated polymer, offering a compromise between the mechanical properties of a partially fluorinated plastic (like PVDF in example) and the chemical and thermal resistance which is typical of totally fluorinated polymers.
Halar® presents many other advantages over other Fluoropolymers as in example:
-Much better permeability properties.
-Smoother surface that precludes shedding of particles whilst avoid trapping.
-Environmental resistance properties.
-Thermal Properties and Chemical resistance properties.
-Electrical properties
-Mechanical Properties.

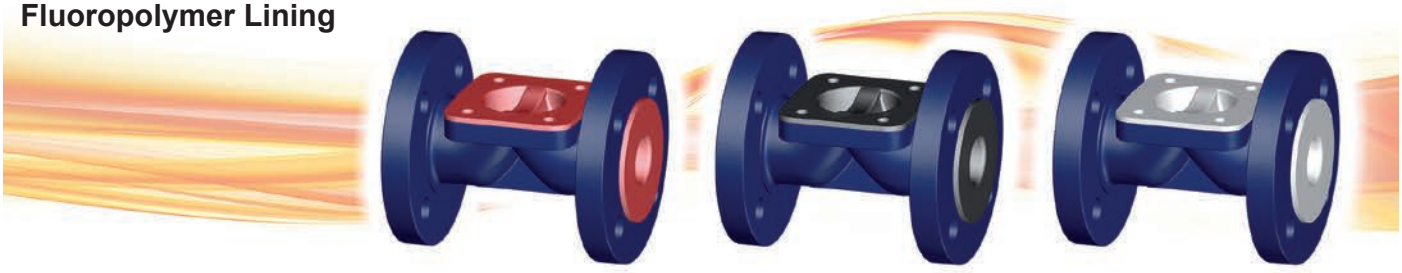
The graph shows how Halar® is rated in comparison to other Fluoropolymers in terms of permeation resistance to corrosive media at different temperatures.



The electrostatic powder coated Halar® shows superior performance than conventional Fluoropolymers that can be shown with more information available in our Data Base on request.

Tefzel® ECTFE;Tough for Abrasive Service Tefzel® fluoropolymer resin is a proven performer in the chemical and petrochemical processing industries. It has gained notable recognition for its unique properties and design versatility which are helping to solve some of the industry's toughest materials problems in process equipment and components. Like DuPont's family of Teflon® fluoropolymer resins, Tefzel® provides excellent resistance to attack by chemicals and solvents which can cause rapid deterioration of other plastics and all but the most costly metal alloys. Tefzel® is inert to strong mineral acids, inorganic bases, halogens and metal salt solutions. Even carboxylic acids, anhydrides, aromatic and aliphatichydrocarbons, alcohols, aldehydes, ketones, ethers,esters, chlorocarbons and classic polymer solvents have little effect on Tefzel®. Very strong oxidizing acids near their boiling points, such as nitric at high concentration, will however affect Tefzel® in varying degrees. So will strong organic bases such as amines and sulfonic acids. In addition to its chemical resistance, Tefzel® has excellent mechanical strength, stiffness and abrasion resistance. This may be an important consideration for process applications where abrasive slurries often accelerate wear and degradation of alternative materials. Tefzel® can also be reinforced with glass fibers to increase the flexural modulus to 950,000psi/6,550 MPa. Tefzel® has a broad continuous use temperature range from –150° to 300°F (–100° to 150°C).Specific temperature ratings vary with equipment design, thus it is important to consult with component manufacturers for in-use service recommendations.

Fluoropolymer Lining



Design Advantages
*Superior Corrosion Resistance over a wide spectrum of pH & temperatures from cryogenics to +200°C i.e multi component mixture applications.
*Economical compared to costly & highly specialized metals or Alloy Valves.
*Optimum Product Life-Cycle & Assured Performance means low maintenance.
*Economical Valve Actuation due to low torque requirements.
*No Contamination off low media i.e. High Purity Applications.
*Very low risk of failure because of Internationally recognized Designs means Higher Safety.

High Quality Lining Materials
The virgin fluorocarbon resins used by Diaval® stand out for Excellent Corrosion Resistant Performance. These resins are sufficient to satisfy nearly all applications of CPI and related Industries. The Valve Lining Process is the result of an intense technical guidance from resin supplier i.e. E.I-DuPont® Inc., U.S.A. which reflects in consistent and maintenance free performance of our thousands of lined products supplied in India and abroad since many years. As a member of DuPont's® Preferred Processor Network, Diaval® provides Genuine DuPont® resins in Lined Products which gives Total Confidence to customers for Assured Performance, Reliability and Safety.

Wide Variety of Lining Material
In the process of manufacturing plastic lined products, the choice, the quality of lining materials and the method of lining are of critical considerations. Since metallic parts of valve should never get in contact with corrosive media. The following virgin plastic resins are selected by Diaval® for respective max. temperature ratings.

PFA	200ºC
FEP	160ºC
ETFE[1]	150ºC
PVDF[1]	130ºC
ECTFE[1]	150ºC
PP	100ºC
HDPE	70ºC

[1]Before use please check chemical compatibility & temperature ratings.

Material Selection - General - For preliminary guidance only

Information contained in the Material Selection Chart is a combination of theoretical and application data, and should be taken as a guide only. Pressure-temperature rating, material compatibility and other parameters also to be considered for rubber selection. Please consult our Technical Department for a particular application.
With constant material / process changes, Diaval® cannot accept responsibility for diaphragm and/or body material performance resulting from such changes.

Fluid	Body Material		Diaphragm		Recomendations
Abrasive slurry - non acidic	Soft rubber lined	Ductile iron	D10		
Abrasive slurry - acidic	Butyl lined		D20 or D30		
Acetic acid up to 50%	Halar® lined	FEP lined	D20 or D30		
Acetic acid over 50%	Halar® lined	FEP lined	D20 or D30		
Acetic acid (glacial)	Halar® lined	FEP lined	D20 or D30		Sealed bonnet
Acetoacetic ester	Halar® lined	Stainless steel	D90		
Acetone	Ductile iron		D20 or D30		
Acetylene	Ductile iron	Cast steel	D20 or D30		No copper
Alum	Hard rubber lined	Soft rubber lined	D10	D20 or D30	
Alumina	Ductile iron	Soft rubber lined	D20 or D30	D10	
Aluminium sulphate	Hard rubber lined	Butyl rubber lined	D10	D20 or D30	
Ammonia, aqueous	Ductile iron	Stainless steel	D10	D20 or D30	Sealed bonnet
Ammonia gaseous	Ductile iron	Stainless steel	D10	D20 or D30	Sealed bonnet
Ammonium nitrate	Butyl rubber lined	FEP lined	D20 or D30	D50	
Ammonium phosphate	Butyl rubber lined		D10	D20 or D30	
Ammonium sulphate	Butyl rubber lined		D20 or D30		
Aniline	FEP lined	Stainless steel	D92		
Antifreeze	Ductile iron	Butyl rubber lined	D20 or D30		
Apple juice	Stainless steel		D15		
Asbestos cement	Soft rubber lined	Ductile iron	D10		
Ash handling	Soft rubber lined	Ductile iron	D10		
Asphalt	Ductile iron	Cast steel	D20 or D30		
Avcat	Stainless steel	Cast steel	D70	D20 or D30	
Avgas	Stainless steel	Cast steel	D70		
Avtag	Stainless steel	Cast steel	D70	D20 or D30	
Avtur	Stainless steel	Cast steel	D70	Butyl	
Barium carbonate	Hard rubber lined	Stainless steel	D20 or D30	D50	
Barium sulphate	Soft rubber lined	Hard rubber lined	D20 or D30		
Barytes	Soft rubber lined	Hard rubber lined	D10		
Basic slag	Soft rubber lined	Ductile iron	D10		
Battery acid	Hard rubber lined	Butyl rubber lined	D20 or D30		
Bauxite	Soft rubber lined		D10		
Beet juice	Ductile iron	Hard rubber lined	D20 or D30		
Benzene	Butyl rubber lined	Halar® lined	D92		
Benzyl alcohol	FEP lined	Halar® lined	D92		Sealed bonnet
Bilge (ships)	Ductile iron	Cast steel	D40		
Blast furnace gas	Ductile iron	Ductile iron	D20 or D30		
Bleaching powder	Hard rubber lined	Hypalon lined	D60		
Borax	Hard rubber lined		D10		
Brine	Hard rubber lined	Stainless steel	D10	D92	
Brine, chlorinated	Hard rubber lined	Hypalon lined	D60		
Bromine	FEP lined		D92		Sealed bonnet
Bcf	Ductile iron		D92		
Butane	Ductile iron	Cast steel	D40	D50	Sealed bonnet
Butanol	Ductile iron	Cast steel	D20 or D30		
Calcium carbonate	Ductile iron	Soft rubber lined	D10	D20 or D30	
Calcium chloride	Hard rubber lined		D10	D20 or D30	
Calcium hydroxide	Ductile iron	Soft rubber lined	D10	D20 or D30	

Material Selection

Fluid	Body Material		Diaphragm		Recomendations
Calcium hypochlorie	Hard rubber lined	Ductile iron	D60	D10	
Calcium phosphate	Butyl rubber lined	Hard rubber lined	D10	D20 or D30	
Calcium sulphate	Soft rubber lined	Ductile iron	D10	D20 or D30	
Calor gas	Ductile iron		D40		
Cane juice	Ductile iron	Soft rubber lined	D20 or D30		
Carbon black	Soft rubber lined	Ductile iron	D10		
Carbon dioxide	Ductile iron	Fductile iron	D20 or D30		
Carbon monoxide	Ductile iron		D20 or D30		Sealed bonnet
Carbon tetrachloride	Ductile iron	Ductile iron	D92		
Castor oil	Ductile iron		D20 or D30		
Caustic potash	Ductile iron	Butyl rubber lined	D10	D20 or D30	Sealed bonnet
Caustic soda	Ductile iron	Butyl rubber lined	D10	D20 or D30	Sealed bonnet
Cement (dry and slurry)	Soft rubber lined	Ductile iron	D10		
Chalk	Ductile iron	Soft rubber lined	D10		
China clay	Ductile iron	Soft rubber lined	D10		
Chlorinated brine	FEP lined	Hard rubber lined	D60	D10	
Chlorine gas dry	Ductile iron	Halar® lined	D97		
Chlorine gas moist	FEP lined	Halar® lined	D97		
Chlorine gas wet	FEP lined	Halar® lined	D97		
Chlorine water	Hard rubber lined	Halar® lined	D10		
Chloroform	FEP lined	Stainless steel	D92		
Chrome alum	Butyl rubber lined	Halar® lined	D20 or D30		
Chrome plating solns	Butyl rubber lined	Halar® lined	D20 or D30		
Chrome tanning solns	Butyl rubber lined	Halar® lined	D20 or D30	D92	
Clays and slips	Soft rubber lined	Ductile iron	D10		
Coal dust	Soft rubber lined	Ductile iron	D10		
Coal gas	Ductile iron	Ductile iron	D20 or D30	D40	
Coal slurry	Soft rubber lined	Ductile iron	D10		
Coke oven gas	Ductile iron	Ductile iron	D20 or D30	D40	
Compressed air (oil free)	Ductile iron	Cast steel	D40	D20 or D30	
Compressed air (oily)	Ductile iron	Cast steel	D40	D70	
Concrete	Soft rubber lined	Ductile iron	D10		
Copper plating solutions	Butyl rubber lined	Halar® lined	D20 or D30		
Copper sulphate	Butyl rubber lined	Halar® lined	D20 or D30		
Creosote	Hard rubber lined	Halar® lined	D70		
Creosote	Ductile iron	Halar® lined	D70		
Crude oil	Cast steel	Ductile iron	D70	D92	
Cutting oil	Hard rubber lined		D40		
Demineralised water	Hard rubber lined	Stainless steel	D20 or D30	D92	
Detergents	Hard rubber lined	Halar® lined	D20 or D30	D10	
Dibutyl phthalate	Halar® lined	Ductile iron	D92		
Dichlorodiluoromethane	Ductile iron	Cast steel	D92		
Diesel oil	Ductile iron	Cast steel	D70		
Diethyl ether	Stainless steel	Ductile iron	D92		Sealed bonnet
Diethylene glycol	Ductile iron	Stainless steel	D20 or D30		
Disinfectant (general)	Ductile iron	Halar® lined	D50		
Dye liquors	FEP lined	Butyl rubber lined	EPDM	D20 or D30	
Electrolytic tinplating solutions	Butyl rubber lined	FEP lined	D20 or D30		
Ethane	Ductile iron	Cast steel	D40	D50	
Ethanol	Ductile iron	Stainless steel	D20 or D30	D20 or D30	
Ether	Ductile iron	Stainless steel	D92		Sealed bonnet
Ethyl acetate	Stainless steel	Halar® lined	D20 or D30		
Ethyl alcohol	Ductile iron	Stainless steel	D20 or D30		
Ethylene	Ductile iron	Stainless stee	D20 or D30		

Material Selection

Fluid	Body Material		Diaphragm		Recomendations
Ethylene glycol	Ductile iron	Stainless steel	D20 or D30		
Ferric sulphate	Butyl rubber lined	Halar® lined	D10		
Fetilizers (dry powders)	Soft rubber lined	Ductile iron	D10		
Fertilizer slurries (wet process)	Butyl rubber lined	Ductile iron	D20 or D30	D20 or D30	
Fire foam	Ductile iron	Cast steel	D40		
Flue gas	Ductile iron	Cast steel	D40	D20 or D30	
Fly ash	Ductile iron	Soft rubber lined	D10	Butyl	
Freon	Ductile iron	Ductile iron	D92	D50	
Fuel oil	Ductile iron	Cast steel	D40		
Gas (coal)	Ductile iron	Cast steel	D40		
Gas (natural	Ductile iron	Cast steel	D40		
Gasoline	Cast steel	Ductile iron	D70		
Glucose	Stainless steel	Stainless steel	D20 or D30		
Glycerine	Stainless steel	Hard rubber lined	D20 or D30		
Gravel	Soft rubber lined	Ductile iron	D10		
Grease	Ductile iron	Cast steel	D40		
Gypsum	Soft rubber lined	Ductile iron	D10		
Hydraulic oils (vegetable based)	Ductile iron	Ductile iron	D20 or D30		
Hydraulic oils (mineral based)	Ductile iron	Ductile iron	D40		
Hydrobromic acid	FEP lined	Halar® lined	D92		
Hydrochloric acid	Hard rubber lined	Halar® lined	D10	D92	
Hydroluoric acid	Butyl rubber lined	Halar® lined	D20 or D30		
Hydrogen	Ductile iron	Cast steel	D20 or D30	D10	Sealed bonnet
Hydrogen peroxide	Hard rubber lined	Stainless steel	PTFE/D70	D20 or D30	
Hypo	Hard rubber lined	Halar® lined	D10	D60	
Inert gases	Ductile iron	Ductile iron	D20 or D30		
Inks	Stainless steel	Halar® lined	D92	D20 or D30	
Insecticide solutions	Ductile iron	Ductile iron	D40	D20 or D30	
Instrument air	Ductile iron	Stainless steel	D20 or D30	D40	
Iron oxide slurry	Soft rubber lined	Ductile iron	D20 or D30		
Isopropanol	Ductile iron	Hard rubber lined	D10	D20 or D30	
Kaolin	Soft rubber lined	Ductile iron	D10		
Kerosene	Ductile iron	Stainless steel	D70	D92	
Laundry bleach	Hard rubber lined	Halar® lined	D60	D10	
Lime	Ductile iron	Soft rubber line	D10		
Liquid parafin	Ductile iron	Ductile iron	D40	D70	
Liquid petroleum gases (I.P.G.)	Ductile iron	Cast steel	D40	D20 or D30	Sealed bonnet
Lubricating oils	Hard rubber lined	Cast steel	D40	D70	
Magnesium chloride	Ductile iron	Butyl rubber lined	D10	D20 or D30	
Magnesium oxide	Butyl rubber lined	Hard rubber line	D10	D20 or D30	
Magnesium sulphate	Soft rubber lined	Ductile iron	D10	D20 or D30	
Magnetite	Hard rubber lined	Ductile iron	D10		
Methane	Ductile iron	Ductile iron	D20 or D30	D40	
Methanol	Ductile iron	Stainless steel	D20 or D30		
Methanol/water mixture	Ductile iron	Hard rubber lined	D20 or D30	D10	
Methylated spirits	Ductile iron	Stainless steel	D20 or D30		
Methyl ethyl ketone (mek)	Stainless steel	FEP lined	D92		
Methyl isobutyl ketone	Stainless steel	FEP lined	D92	D20 or D30	
Milk	Stainless steel		D15		
Mineral oil	Ductile iron	Cast steel	D70	D40	
Molasses	Ductile iron	Stainless steel	D20 or D30		
Monosodium glutamate	Hard rubber lined	Stainless steel	D10		

Material Selection

Fluid	Body Material		Diaphragm		Recomendations
Mortar and cement	Soft rubber lined	Ductile iron	D10	D20 or D30	
Naphtha	Ductile iron	Cast steel	D70		
Napthalene	Ductile iron	Cast steel	D70		
Natural gas	Ductile iron	Stainless steel	D40	D50	
Nickel plating solutions	Butyl rubber lined	Halar® lined	D20 or D30	D60	
Nickel plating sludge	Butyl rubber lined	Halar® lined	D20 or D30	D60	
Nitric acid	FEP lined	Stainless steel	D92	D70	Check grade of S.S.
Nitric acid / hydroluoric acid mix	FEP lined	Halar® lined	D92		
Nitrogen	Ductile iron	Stainless steel	D20 or D30		
Nitrous oxide (dry)	Stainless steel	FEP lined	D20 or D30		
Oils, animal	Ductile iron	Stainless steel	D40	D92	
Oils, cutting	Ductile iron	Stainless steel	D70	D40	
Oil fuel	Ductile iron	Stainless steel	D70	D40	
Oils, lubricating	Ductile iron	Stainless steel	D70	D40	
Oils, mineral	Ductile iron	Cast steel	D70	D40	
Oil, rolling	Ductile iron	Cast steel	D70	D40	
Oil, transformer	Ductile iron	Stainless steel	D70	D40	
Oils, vegetable	Stainless steel	Ductile iron	D40	D70	
Oleum	FEP lined	Halar® lined	D92		
Olive oil	Stainless steel	Ductile iron	D40	D92	
Oxygen	Ductile iron	Stainless steel	D50	D20 or D30	Degreased for oxygen
Paint (oil based)	Ductile iron	Stainless steel	D40	D20 or D30	
Paint (water based)	Ductile iron	Stainless steel	D20 or D30	D92	
Paper pulp	Hard rubber lined	Butyl rubber lined	D10	D20 or D30	
Paper stock	Hard rubber lined	Butyl rubber lined	D10	D20 or D30	
Parafin	Ductile iron	Stainless steel	D70	D40	
Parafin wax	Ductile iron	Cast steel	D40	D70	
Paraquet	Ductile iron	Halar® lined	D40		Sealed bonnet
Pentane	Ductile iron	Cast steel	D70	D92	
Perchloroethylene	Ductile iron	Cast steel	D70	D92	
Petrol	Ductile iron	Cast steel	D70		Sealed bonnet
Petroleum jelly	Ductile iron	Halar® lined	D70	D40	
Phosphoric acid	Butyl rubber lined	Halar® lined	D20 or D30		
Photographic developers	Halar® lined	FEP lined	D20 or D30	D92	
Plating solutions	Butyl rubber lined	Halar® lined	D20 or D30		
Polyethylene glycol	Ductile iron	Stainless steel	D10	D20 or D30	
Potassium chloride	Hard rubber lined	Halar® lined	D10	D20 or D30	
Potassium cyanide	Hard rubber lined	Halar® lined	D10	D20 or D30	Sealed bonnet
Potassium ferricyanide	Hard rubber lined	Halar® lined	D20 or D30	D10	
Potassium hydroxide	Ductile iron	Hard rubber lined	D20 or D30	D10	Sealed bonnet
Potassium hypochlorite	Hard rubber lined	Halar® lined	D60	D10	
Potassium phosphate	Hard rubber lined	Butyl rubber lined	D20 or D30	D10	
Pottery slip	Soft rubber lined	Ductile iron	D10		
Producer gas	Ductile iron	Cast steel	D20 or D30	D40	
Propane (gas or liquid)	Ductile iron	Cast steel	D40	D50	
Radioactive efluents	Butyl rubber lined	Stainless steel	D20 or D30		No copper parts.
Rock salt	Soft rubber lined	Hard rubber lined	D10	D20 or D30	
Rolling oil	Ductile iron	Cast steel	D70	D10	
Salt	Soft rubber lined	Hard rubber lined	D10	D20 or D30	
Sand	Soft rubber lined	Ductile iron	D10	D20 or D30	
Sea water	Stainless steel	Hard rubber lined	D10	D20 or D30	
Sewage	Ductile iron	Hard rubber lined	D10	D50	
Silver plating solutions	Butyl rubber lined	Halar® lined	D20 or D30		

Material Selection

Fluid	Body Material		Diaphragm		Recomendations
Slaked lime	Ductile iron	Soft rubber lined	D10	D20 or D30	
Slip (pottery)	Soft rubber lined	Ductile iron	D10		
Soap lye	Ductile iron	Butyl rubber lined	D10	D20 or D30	
Soap solutions	Ductile iron	Butyl rubber lined	D10	D20 or D30	
Sodium bicarbonate	Ductile iron	Halar® lined	D20 or D30	D92	
Sodium chloride	Soft rubber lined	Hard rubber lined	D10	D20 or D30	
Sodium hydroxide	Ductile iron	Hard rubber lined	D20 or D30	D10	Sealed bonnet
Sodium hydroxide (oily)	Ductile iron	Stainless steel	D50	D40	
Sodium hypochlorite	Hard rubber lined	Halar® lined	D10	D70	
Solvent naphtha	Ductile iron	Cast steel	D70	D40	
Stannic chloride	Halar® lined	FEP lined	D20 or D30	D92	
Starch solutions	Ductile iron	Halar® lined	D20 or D30	D60	
Stearic acid	Stainless steel	Halar® lined	D92		
Sugar	Ductile iron	Stainless steel	D20 or D30	D15	
Sulphur dioxide	Butyl rubber lined	Hard rubber lined	D20 or D30		
Sulphuric acid below 75%	Butyl rubber lined	Halar® lined	D20 or D30	D70	
Sulphuric acid 75-95%	Halar® lined	FEP lined	D92	D70	
Sulphuric acid 95-99%	Ductile iron	Halar® lined	D92	D70	Sealed bonnet
Sulphuric acid over 99%	FEP lined	Halar® lined	D92		
Syrups (sugar)	Ductile iron	Stainless steel	D20 or D30	D15	
Tetrachloroethane	Ductile iron	Stainless steel	D92	D70	Sealed bonnet
Textile dyes	Halar® lined	Butyl rubber lined	D20 or D30	D92	
Tin plating solutions	Halar® lined	Butyl rubber lined	D92	D20 or D30	
Titanium dioxide	Butyl rubber lined	Hard rubber lined	D20 or D30	D10	
Toluene	Ductile iron	Cast steel	D92		
Transformer oil	Stainless steel	Ductile iron	D70		
Trichloroethylene	Ductile iron	Stainless steel	D92	D70	Sealed bonnet
Turpentine	Ductile iron	FEP lined	D40	D70	Sealed bonnet
Vegetable oils	Ductile iron	Stainless steel	D70	D92	
Vinegar	Stainless steel		D92		
Water cold	Ductile iron	Stainless steel	D10	D20 or D30	
Water de-mineralised	Hard rubber lined	FEP lined	D10	D92	
Water drinking	Stainless steel	Stainless steel	D20 or D30		
Water oily	Ductile iron	Gunmetal	D40	D50	
Water (salt and brackish)	Stainless steel	Hard rubber lined	D10	D20 or D30	
Wood pulp	Ductile iron	Soft rubber lined	D10	D20 or D30	
Wort	Ductile iron	Stainless steel	D20 or D30		
Xylene	Ductile iron	Cast steel	D92	D70	
Zinc chloride	Soft rubber lined	Stainless steel	D10	D20 or D30	
Zinc oxide	Stainless steel	Butyl rubber lined	D20 or D30	D92	
Zinc plating solutions	Butyl rubber lined	Hard rubber lined	D20 or D30		

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
1,1,2-Trichloroethane	NR	NR	150	65	450	230	-	-
1,2-Dibromo propane	--	--	200	95	450	230	-	-
1,2-Dibromopropane	-	-	-	-	-	-	200	95
1,4-Dioxane	75	25	NR	NR	450	230	-	-
1-Chloro(100%) nitropropane	--	--	--	--	450	230	-	-
2 0,4 ,5-T richlorophenol	75	25	150	65	450	230	-	-
2,3,4,6,-Tetrachlorophenol	75	25	150	65	450	230	-	-
2,3,4,6-Tetrachlorophenol	-	-	-	-	-	-	212	100
2,4,5-Trichlorophenol	-	-	-	-	-	-	212	100
2-Aminoisobutyric acid	125	50	--	-	450	230	-	-
2-Chloro-4-phenylphenol	--	--	--	--	450	230	-	-
Acetaldehyde	75	25	NR	NR	450	230	-	-
Acetamide	150	65	75	25	450	230	250	120
Acetic acid (10%)	200	95	225	110	450	230	-	-
Acetic acid (5%)	200	95	225	110	450	230	-	-
Acetic acid (50%)	200	95	200	95	450	230	250	120
Acetic acid (80%)	125	50	175	80	450	230	-	-
Acetic Acid (Glacial)	-	-	-	-	-	-	230	110
Acetic anhydride	75	25	NR	NR	450	230	300	150
Acetone	-	-	-	-	-	-	150	65
Acetone (10%)	125	50	125	50	450	230	-	-
Acetone (100%)	125	50	NR	NR	450	230	-	-
Acetone (50% H2O)	-	-	-	-	-	-	150	65
Acetonitrile	75	25	125	50	450	230	150	65
Acetophenone	75	25	NR	NR	450	230	300	150
Acetyl chloride	NR	NR	125	50	450	230	-	-
Acetylchloride	-	-	-	-	-	-	150	65
Acetylene	NR	NR	250	120	450	230	250	120
Acetylene tetrabromide	NR	NR	250	120	450	230	300	150
Acetylene tetrachloride	NR	NR	250	120	450	230	300	150
Acrylonitrile	125	50	75	25	450	230	150	65
Adipic acid	150	65	150	65	450	230	275	135
Air	225	110	275	135	450	230	300	150
Allyl alcohol	150	65	125	50	450	230	212	100
Allyl chloride	75	25	175	80	450	230	212	100
Alum	225	110	275	135	450	230	-	-
Alum, ammonium	225	110	275	135	450	230	-	-
Alum, chrome	175	80	200	95	450	230	-	-
Alum, potassium	225	110	275	135	450	230	-	-
Aluminum Ammonium Sulfate	-	-	-	-	-	-	300	150
Aluminum Chloride	-	-	-	-	-	-	300	150
Aluminum chloride (aqueous)	225	110	275	135	450	230	-	-
Aluminum fluoride	225	110	275	135	450	230	300	150
Aluminum hydroxide	200	95	275	135	450	230	300	150
Aluminum nitrate	200	95	275	135	450	230	300	150
Aluminum oxychloride	125	50	275	135	450	230	300	150
Aluminum Potassium Sulfate	-	-	-	-	-	-	300	150
Aluminum sulfate	225	110	275	135	450	230	-	-
Amino Acids (H2O)	-	-	-	-	-	-	212	100
Ammonia (anhydrous gas)	150	65	NR	NR	450	230	-	-
Ammonia (anhydrous liquid)	225	110	NR	NR	450	230	-	-
Ammonia (Anhydrous)	-	-	-	-	-	-	300	150
Ammonia (Aqueous 30%)	-	-	-	-	-	-	230	110
Ammonium acetate (saturated)	125	50	175	80	450	230	-	-
Ammonium beryllium fluoride	--	-	--	-	450	230	-	-
Ammonium bifluoride	200	95	150	65	450	230	300	150
Ammonium bromide (50%)	-	--	250	120	450	230	275	135
Ammonium Carbonate	-	-	-	-	-	-	300	150
Ammonium carbonate (saturated)	225	110	275	135	450	230	-	-
Ammonium Chloride	-	-	-	-	-	-	300	150

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Ammonium chloride (saturated)	225	110	275	135	450	230	-	-
Ammonium dichromate	125	50	250	120	450	230	275	135
Ammonium Fluoride	-	-	-	-	-	-	300	150
Ammonium fluoride (10%)	200	95	275	135	450	230	-	-
Ammonium fluoride (25%)	200	95	275	135	450	230	-	-
Ammonium fluoride (saturated)	175	80	275	135	450	230	-	-
Ammonium Hydroxide	-	-	-	-	-	-	300	150
Ammonium hydroxide (1%)	225	110	225	110	450	230	-	-
Ammonium hydroxide (10%)	225	110	225	110	450	230	-	-
Ammonium hydroxide (cone.)	225	110	225	110	450	230	-	-
Ammonium metaphosphate	150	65	275	135	450	230	-	-
Ammonium Nitrate (Conc.)	-	-	-	-	-	-	230	110
Ammonium nitrate (saturated)	150	65	275	135	450	230	-	-
Ammonium Perchlorate	-	-	-	-	-	-	275	135
Ammonium persulfate	150	65	75	25	450	230	150	65
Ammonium persulfate	150	65	75	25	450	230	150	65
Ammonium phosphate	225	110	275	135	450	230	300	150
Ammonium Sulfate	-	-	-	-	-	-	300	150
Ammonium sulfate (saturated)	225	110	275	135	450	230	-	-
Ammonium sulfide	150	65	125	50	450	230	300	150
Ammonium thiocyanate	150	65	275	135	450	230	300	150
Amyl acetate	75	25	125	50	450	230	250	120
Amyl alcohol	75	25	275	135	450	230	300	150
Amyl chloride	NR	NR	275	135	450	230	300	150
Aniline	125	50	125	50	450	230	230	110
Aniline Hydrochloride (10%)	-	-	-	-	-	-	150	65
Anthraquinone	-	-	-	-	-	-	275	135
Anthraquinone-Sulfonic Acid	-	-	-	-	-	-	275	135
Antimony trichloride	150	65	75	25	450	230	212	100
Aqua regia	75	25	75	25	450	230	212	100
Arsenic acid	200	95	275	135	450	230	300	150
ar-Tribromoethylbenzene	..	..	..	..	450	230	-	-
Aryl sulfonic acids	150	65	..	..	450	230	-	-
Barium carbonate	200	95	275	135	450	230	300	150
Barium chloride	200	95	275	135	450	230	300	150
Barium hydroxide	200	95	275	135	450	230	300	150
Barium sulfate	200	95	275	135	450	230	300	150
Barium sulfide	200	95	275	135	450	230	300	150
Battery Acid	-	-	-	-	-	-	250	120
bdine (10%)	75	25	150	65	450	230	-	-
bdine (gas)	--	--	150	65	450	230	-	-
Beer	175	80	225	110	450	230	-	-
Beet sugar liquors	150	65	225	110	450	230	-	-
Benzaldehyde	75	25	75	25	450	230	212	100
Benzalkonium chloride	..	..	..	..	450	230	-	-
Benzene	NR	NR	150	65	450	230	212	100
Benzene sulfonic acid	75	25	125	50	450	230	212	100
Benzoic acid	150	65	225	110	450	230	275	135
Benzoyl chloride	--	--	150	65	450	230	150	65
Benzyl alcohol	125	50	250	120	450	230	300	150
Benzyl amine	150	65	75	25	450	230	-	-
Benzyl chloride	75	25	275	135	450	230	300	150
Bis (2-Butoxyethyl) phthalate	..	..	..	..	450	230	-	-
Bismuth carbonate	225	110	275	135	450	230	300	150
Black liquor	..	..	175	80	450	230	300	150
Bleach (12.5% Cl2)	-	-	-	-	-	-	212	100
Borax	175	80	275	135	450	230	300	150
Boric acid	225	110	275	135	450	230	300	150
Brass	-	-	-	-	-	-	275	135
Brine	-	-	-	-	-	-	300	150

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Brine (acid)	200	95	275	135	450	230	-	-
Brine (basic)	175	80	275	135	450	230	-	-
Brine (chlorinated acid)	125	50	200	95	450	230	-	-
Bromic Acid	-	-	-	-	-	-	250	120
Bromine (dry gas)	NR	NR	150	65	450	230	-	-
Bromine (Dry)	-	-	-	-	-	-	150	65
Bromine (liquid)	NR	NR	150	65	450	230	-	-
Bromine (water-3% saturated)	75	25	200	95	450	230	-	-
Bromine chloride (dry gas)	NR	NR	150	120	0	135	-	-
Bromine chloride (liquid)	--	--	200	95	450	230	-	-
Bromine chloride water (8%)	75	25	200	95	450	230	-	-
Bromine Water (10%)	-	-	-	-	-	-	230	110
Bromoform	NR	NR	150	65	450	230	212	100
Butadiene	NR	NR	250	120	450	230	250	120
Butane	NR	NR	250	120	450	230	300	150
Butanediol	175	80	250	120	450	230	275	135
Butanol (Butyl alcohol)	200	95	250	120	450	230	-	-
Butyl acetate	NR	NR	75	25	450	230	230	110
Butyl acrylate	NR	NR	120	50	450	230	230	110
Butyl bromide	NR	NR	275	135	450	230	300	150
Butyl chloride	NR	NR	275	135	450	230	300	150
Butyl mercaptan	--	--	275	135	450	230	-	-
Butyl phenol	NR	NR	225	110	450	230	230	110
Butyl phthalate	125	50	NR	NR	450	230	150	65
Butylene	-	-	-	-	-	-	300	150
Butylene (butadiene)	NR	--	250	120	450	230	-	-
Butyraldehyde	--	--	150	65	450	230	212	100
Butyric acid	175	80	225	110	450	230	250	120
Cadmium	-	-	-	-	-	-	275	135
Calcium Bisulfate	-	-	-	-	-	-	300	150
Calcium bisulfide	200	95	275	135	450	230	300	150
Calcium bisulfite	200	95	275	135	450	230	-	-
Calcium bisulfite bleach liquor (6% total S02 5% free)	175	80	200	95	450	230	-	-
Calcium carbonate	225	110	275	135	450	230	300	150
Calcium chlorate	200	95	275	135	450	230	300	150
Calcium Chloride	-	-	-	-	-	-	300	150
Calcium chloride (saturated)	225	110	275	135	450	230	-	-
Calcium chlorite	150	65	200	95	450	230	-	-
Calcium Hydroxide	-	-	-	-	-	-	300	150
Calcium hydroxide (saturated)	225	110	275	135	450	230	-	-
Calcium hypochlorite	175	80	200	95	450	230	300	150
Calcium nitrate	200	95	275	135	450	230	300	150
Calcium oxide	225	110	250	120	450	230	275	135
Calcium oxide-sulfur	--	--	250	120	450	230	-	-
Calcium sulfate	225	110	275	135	450	230	300	150
Calcium sulfide	--	--	225	110	450	230	250	120
Cane sugar liquors	75	25	275	135	450	230	-	-
Caprylic acid	125	50	175	80	450	230	212	100
CARBITOL ethylene glycol ethers	125	50	275	135	450	230	-	-
Carbolic acid (see Phenol)	--	--	--	--	450	230	-	-
Carbon bisulfide	NR	NR	75	25	450	230	-	-
Carbon Dioxide (Dry)	-	-	-	-	-	-	300	150
Carbon dioxide (gas)	225	110	275	135	450	230	-	-
Carbon Dioxide (Wet)	-	-	-	-	-	-	300	150
Carbon Disulfide	-	-	-	-	-	-	150	65
Carbon disulfide (liquid)	NR	NR	75	25	450	230	-	-
Carbon monoxide	225	110	275	135	450	230	300	150
Carbon tetrachloride	NR	NR	275	135	450	230	150	65
Carbon Tetrachloride (wet gases)	NR	NR	275	135	450	230	-	-
Carbonic acid	225	110	275	135	450	230	300	150

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Castor oil	125	50	175	80	450	230	300	150
Caustic Potash (10 and 50%)	-	-	-	-	-	-	212	100
Caustic Soda (10 and 50%)	-	-	-	-	-	-	212	100
Cellosolve®	-	-	-	-	-	-	300	150
Chloral (10%)	NR	NR	125	50	450	230	-	-
Chloral hydrate	NR	NR	75	25	450	230	212	100
Chlorinated Brine	-	-	-	-	-	-	250	120
Chlorinated phenol	--	--	150	65	450	230	212	100
Chlorine (5% in CCL4)	NR	NR	200	95	450	230	-	-
Chlorine (Dry)	-	-	-	-	-	-	212	100
Chlorine (Wet)	-	-	-	-	-	-	250	120
Chlorine dioxide	NR	NR	150	65	450	230	250	120
Chlorine gas (dry)	NR	NR	200	95	300	150	-	-
Chlorine gas (wet)	NR	NR	200	95	300	150	-	-
Chlorine liquid (pressurized)	NR	NR	200	95	300	150	-	-
Chlorine water (saturated)	1150	65	225	110	450	230	-	-
Chloroacetic acid	125	50	NR	NR	450	230	-	-
Chloroacetic Acid (50% H2O)	-	-	-	-	-	-	230	110
Chloroacetyt chloride	NR	NR	125	50	450	230	-	-
Chlorobenzene	NR	NR	175	80	450	230	212	100
Chlorobenzyl Chloride	-	-	-	-	-	-	150	65
Chloroform	NR	NR	125	50	450	230	212	100
Chlorohydrin (liquid)	NR	NR	125	50	450	230	150	65
Chloropicrin	NR	NR	150	65	450	230	-	-
Chlorosulfonic Acid	-	-	-	-	-	-	75	25
Chlorosulfonic acid (100%)	NR	NR	NR	NR	450	230	-	-
Chrome	-	-	-	-	-	-	275	135
Chromic acid (50%)	125	50	125	50	450	230	150	65
Chromic Chloride	-	-	-	-	-	-	212	100
Chromium plating solution	125	50	175	80	450	230	-	-
Chromium trioxide (30%)	125	50	175	80	450	230	-	-
Chromyl chloride	125	50	125	50	450	230	212	100
Citric acid	225	110	275	135	450	230	-	-
Clorox Bleach Solution (5-1/2% Cl2)	-	-	-	-	-	-	212	100
CLOROX2 bleach solution (5.5% naoci)	1150	65	275	135	450	230	-	-
Coal gas	150	65	225	110	450	230	212	100
Coconut oil	125	50	275	135	450	230	-	-
Com oil	175	80	275	135	450	230	-	-
Copper	-	-	-	-	-	-	275	135
Copper carbonate, basic	200	95	275	135	450	230	-	-
Copper Chloride	-	-	-	-	-	-	300	150
Copper chloride (saturated)	200	95	275	135	450	230	-	-
Copper Cyanide	-	-	-	-	-	-	300	150
Copper cyanide (10%)	200	95	275	135	450	230	-	-
Copper fluoride	200	95	275	135	450	230	300	150
Copper nitrate	200	95	275	135	450	230	300	150
Copper Sulfate	-	-	-	-	-	-	300	150
Copper sulfate (saturated)	200	95	275	135	450	230	-	-
Cottonseed oil	150	65	275	135	450	230	-	-
Cresol	NR	NR	150	65	450	230	275	135
Cresylic Acid	-	-	-	-	-	-	275	135
Cresylic acid (50%)	NR	NR	150	65	450	230	-	-
Crotonaldehyde	-	-	-	-	-	-	212	100
Crude oil	150	65	275	135	450	230	300	150
Cupric Chloride (saturated)	200	95	275	135	450	230	-	-
Cyanoacetic acid	--	--	--	--	450	230	-	-
Cyclohexane	NR	NR	275	135	450	230	300	150
Cyclohexanol	75	25	150	65	450	230	250	120
Cyclohexanone	NR	NR	75	25	450	230	300	150
DDT	-	-	-	-	-	-	212	100

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Decalin	-	-	-	-	-	-	250	120
Decane	-	-	-	-	-	-	300	150
Desoxyephedrine hydrochloride	--	--	--	--	450	230	-	-
Dextrin	-	-	-	-	-	-	300	150
Dextrose	225	110	275	135	450	230	-	-
Diacetone alcohol	125	50	75	25	450	230	212	100
Diazo salts	225	110	275	135	450	230	-	-
Di-B (3,4-dihydroxyphenol aniline)	--	--	--	--	450	230	-	-
Dibutoxy ethyt phthalate	--	--	--	--	450	230	-	-
Dibutyl Phthalate	-	-	-	-	-	-	150	65
Dibutyt phthalate	125	50	NR	NR	450	230	-	-
Dibutyt sebacate	--	--	NR	NR	450	230	-	-
Dichloroacetic acid	125	50	125	50	450	230	150	65
Dichloroethane	75	25	175	80	450	230	-	-
Dichloroethylene	125	50	225	110	450	230	150	65
Dichloropropionic acid	--	--	125	50	450	230	150	65
Diesel fuels	75	25	275	135	450	230	300	150
Diethanol amine	150	65	NR	NR	450	230	-	-
Diethyl amine (aqueous)	75	25	75	25	450	230	-	-
Diethyl Benzene	-	-	-	-	-	-	275	135
Diethyl Cellosolve	-	-	-	-	-	-	300	150
Diethyl ether	NR	NR	125	50	450	230	212	100
Diethyl malonate	--	--	NR	NR	450	230	-	-
Diethylamine	-	-	-	-	-	-	230	110
Diethylene glycol ethers	150	65	200	95	450	230	-	-
Diethylene triamine	125	50	125	50	450	230	212	100
Diglycolic acid	75	25	75	25	450	230	212	100
Di-isobutylene	125	50	275	135	450	230	230	110
Di-isobutytketone	75	25	125	50	450	230	275	135
Dimethanolamine	150	65	NR	NR	450	230	-	-
Dimethyl acetamide	125	50	NR	NR	450	230	-	-
Dimethyl amine (aqueous)	75	25	75	25	450	230	-	-
Dimethyl aniline	NR	NR	75	25	450	230	-	-
Dimethyl formamide	125	50	NR	NR	450	230	250	120
Dimethyl phthalate	75	25	75	25	450	230	212	100
Dimethyl sulfate	--	--	75	25	450	230	150	65
Dimethyl sulfoxide	--	--	NR	NR	450	230	212	100
Dimethylamine	-	-	-	-	-	-	120	50
Dimethylaniline	-	-	-	-	-	-	275	135
di-n-Butyl Amine	-	-	-	-	-	-	230	110
Dioctyl phthalate	NR	NR	75	25	450	230	150	65
Diphenyl	0	0	125	50	450	230	-	-
Diphenyl Ether	-	-	-	-	-	-	175	80
Dipropylene glycol methyl ether	150	65	75	25	450	230	-	-
Disodium phospate	200	95	200	95	450	230	-	-
Distilled water	212	100	212	100	212	100	-	-
Divinyl benzene	--	--	125	50	450	230	175	80
DOWANOL1 glycol ethers	150	65	200	95	450	230	-	-
Epichlorohydrin	125	50	NR	NR	450	230	150	65
Ethyl acetate	125	50	NR	NR	450	230	150	65
Ethyl acetoacetate	NR	NR	75	25	450	230	150	65
Ethyl acrylate	75	25	75	25	450	230	212	100
Ethyl alcohol	175	80	275	135	450	230	300	150
Ethyl benzene (acidic)	NR	NR	125	50	450	230	-	-
Ethyl chloride	NR	NR	275	135	450	230	300	150
Ethyl chloroacetate	125	50	75	25	450	230	212	100
Ethyl cyanoacetate	125	50	75	25	450	230	212	100
Ethyl ether	NR	NR	125	50	450	230	-	-
Ethylamine	-	-	-	-	-	-	100	40
Ethylene bromide	NR	NR	275	135	450	230	300	150

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Ethylene chloride	NR	NR	275	135	450	230	300	150
Ethylene chlorohydrin	125	50	75	25	450	230	150	65
Ethylene diamine	150	65	75	25	450	230	120	50
Ethylene dibromide	75	25	225	110	450	230	-	-
Ethylene dichloride	75	25	275	135	450	230	-	-
Ethylene glycol	125	50	275	135	450	230	300	150
Ethylene Oxide	-	-	-	-	-	-	230	110
Ethylene oxide (5% aqueous)	NR	NR	200	95	450	230	-	-
Ethylene trichloride	NR	NR	275	135	450	230	-	-
Fatty acids	150	65	275	135	450	230	300	150
Ferric chloride	200	95	275	135	450	230	-	-
Ferric Chloride (50% in H2O)	-	-	-	-	-	-	300	150
Ferric chloride + HCL	175	80	275	135	450	230	-	-
Ferric Hydroxide	-	-	-	-	-	-	300	150
Ferric nitrate	200	95	275	135	450	230	300	150
Ferric sulfate	200	95	275	135	450	230	300	150
Ferrous chloride	200	95	275	135	450	230	300	150
Ferrous chloride + HCL	175	80	275	135	450	230	-	-
Ferrous Hydroxide	-	-	-	-	-	-	300	150
Ferrous nitrate	200	95	275	135	450	230	300	150
Ferrous sulfate	200	95	275	135	450	230	300	150
Fish solubles	75	25	150	65	450	230	-	-
Fluorine (gaseous)	NR	NR	75	25	NR	NR	100	40
Fluoroboric acid	150	65	275	135	450	230	275	135
Fluorosilicic acid	150	65	275	135	450	230	-	-
Fluosilicic Acid	-	-	-	-	-	-	275	135
Formaldehyde (37% in H2O)	-	-	-	-	-	-	230	110
Formaldehyde (37%)	175	80	125	50	450	230	-	-
Formaldehyde (50%)	175	80	125	50	450	230	-	-
Formic acid	125	50	250	120	450	230	275	135
FREON® 11	-	-	-	-	-	-	230	110
FREON® 12	-	-	-	-	-	-	230	110
FREON® 22	-	-	-	-	-	-	230	110
FREON® Fluorocarbons	NR	NR	200	95	450	230	-	-
Fructose	225	110	275	135	450	230	-	-
Fruit juices, pulp	225	110	200	95	450	230	-	-
Fuel oil	75	25	275	135	450	230	300	150
Fumaric Acid	-	-	-	-	-	-	200	95
Furane	-	-	-	-	-	-	150	65
Furfural	NR	NR	75	25	450	230	212	100
Gallic acid	175	80	75	25	450	230	212	100
Gas (manufactured)	150	65	275	135	450	230	300	150
Gas (natural)	150	65	275	135	450	230	300	150
Gasoline (leaded)	75	25	275	135	450	230	300	150
Gasoline (Sour)	-	-	-	-	-	-	300	150
Gasoline (unleaded)	75	25	275	135	450	230	300	150
Gelatin	175	80	250	120	450	230	-	-
Gin	200	95	200	95	450	230	-	-
Glucose	225	110	275	135	450	230	-	-
Glycerin	225	110	275	135	450	230	-	-
Glycerol	-	-	-	-	-	-	300	150
Glycerol triacetate	--	--	--	-	450	230	-	-
Glycine (saturated)	--	--	75	25	450	230	-	-
Glycol	-	-	-	-	-	-	275	135
Glycolic acid	150	65	75	25	450	230	250	120
Gold	-	-	-	-	-	-	275	135
Groton aldehyde	NR	NR	125	50	450	230	-	-
Heptane	NR	NR	275	135	450	230	300	150
Hexane	75	25	275	135	450	230	300	150
Hydrazine	-	-	-	-	-	-	100	40

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Hydrazine dihydrochloride	--	--	75	25	450	230	125	50
Hydriodic acid	200	95	275	135	450	230	300	150
Hydrobromic acid (10%)	225	110	275	135	450	230	-	-
Hydrobromic acid (50%)	175	80	275	135	450	230	300	150
Hydrochloric acid (10%)	200	95	275	135	450	230	-	-
Hydrochloric acid (20%)	200	95	275	135	450	230	300	150
Hydrochloric acid (35%)	200	95	275	135	450	230	-	-
Hydrochloric Acid (Conc.)	-	-	-	-	-	-	300	150
Hydrochloric Acid (Gas)	-	-	-	-	-	-	300	150
Hydrocyanic acid	150	65	275	135	450	230	300	150
Hydrofluoric acid (100%)	NR	NR	200	95	450	230	230	110
Hydrofluoric acid (20%)	200	95	250	120	450	230	-	-
Hydrofluoric acid (30%)	200	95	250	120	450	230	-	-
Hydrofluoric Acid (35%)	-	-	-	-	-	-	275	135
Hydrofluoric acid (37%)	200	95	250	120	450	230	-	-
Hydrofluoric acid (48%)	200	95	225	110	450	230	-	-
Hydrofluoric acid (60%)	200	95	200	95	450	230	-	-
Hydrofluoric Acid (70%)	-	-	-	-	-	-	250	120
Hydrofluorosilicic acid	150	65	275	135	450	230	300	150
Hydrogen	225	110	275	135	450	230	300	150
Hydrogen chloride (dry gas)	225	110	275	135	450	230	-	-
Hydrogen cyanide	NR	NR	NR	NR	450	230	300	150
Hydrogen fluoride gas	75	25	200	95	450	230	-	-
Hydrogen peroxide (30%)	NR	NR	200	95	450	230	250	120
Hydrogen peroxide (3-8%)	NR	NR	200	95	450	230	-	-
Hydrogen peroxide (90%)	NR	NR	70	20	450	230	150	65
Hydrogen Phosphide	-	-	-	-	-	-	150	65
Hydrogen sulfide (dry)	175	80	275	135	450	230	300	150
Hydrogen sulfide (water sol.)	175	80	225	110	450	230	-	-
Hydrogen sulfide (wet)	175	80	225	110	450	230	300	150
Hydroquinone	150	65	250	120	450	230	250	120
Hypo (sodium thiosulfate)	150	65	275	135	450	230	-	-
Hypochlorous acid	150	65	75	25	450	230	300	150
idoform	75	25	200	95	450	230	-	-
Inert Gases	-	-	-	-	-	-	300	150
Iodine (Dry)	-	-	-	-	-	-	230	110
Iodine (Wet)	-	-	-	-	-	-	230	110
Iodoform	-	-	-	-	-	-	230	110
Isobutyl Alcohol	-	-	-	-	-	-	275	135
Isopropylamine	-	-	-	-	-	-	120	50
Jet fuel (JP4, JP5)	75	25	200	95	450	230	230	110
Kerosene	75	25	275	135	450	230	-	-
Lactic Acid	-	-	-	-	-	-	250	120
Lactic acid (80%)	150	65	125	50	450	230	-	-
Lard oil	125	50	275	135	450	230	300	150
Lauric Acid	-	-	-	-	-	-	250	120
Laurie acid	175	80	225	110	450	230	-	-
Lauryl chloride	175	80	250	120	450	230	275	135
Lauryl Sulfate	-	-	-	-	-	-	250	120
Lauryl sulfate (saturated)	175	80	250	120	450	230	-	-
Lead acetate	175	80	275	135	450	230	300	150
Lemon oil	75	25	250	120	450	230	-	-
Lime sulfur solution	150	65	200	95	450	230	-	-
Linoleic acid	125	50	250	120	450	230	275	135
Linseed oil	150	65	275	135	450	230	300	150
Lithium bromide (saturated)	--	--	225	110	450	230	250	120
Lithium Hydroxide	-	-	-	-	-	-	300	150
Isopropyl alcohol	200	95	150	65	450	230	-	-
Isopropyl ether	NR	NR	125	50	450	230	-	-
Isopropylamine	150	65	125	50	450	230	-	-

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Lubricating oil	125	50	275	135	450	230	300	150
Magnesium carbonate	225	110	275	135	450	230	300	150
Magnesium chloride	225	110	275	135	450	230	300	150
Magnesium hydroxide	225	110	275	135	450	230	300	150
Magnesium nitrate	225	110	275	135	450	230	300	150
Magnesium Sulfate	-	-	-	-	-	-	300	150
Magnesium sulfate (10%-saturated)	225	110	275	135	450	230	-	-
Maleic Acid	-	-	-	-	-	-	275	135
Maleic acid (10%)	150	65	250	120	450	230	-	-
Maleic anhydride	75	25	75	25	450	230	200	95
Malic acid	125	50	250	120	450	230	275	135
Manganese sulfate (10% to saturated)	75	25	250	120	450	230	-	-
Manganese sulfate (saturated)	75	25	--	--	450	230	-	-
m-Bromotoluene	NR	NR	175	80	450	230	212	100
Mercuric chloride	175	80	250	120	450	230	275	135
Mercuric cyanide	150	65	250	120	450	230	275	135
Mercuric nitrate	175	80	275	135	450	230	275	135
Mercury	150	65	275	135	450	230	275	135
Methacrylic acid	--	--	125	50	450	230	200	95
Methane	75	25	275	135	450	230	250	120
Methane sulfonic acid	125	50	200	95	450	230	-	-
Methane Sulfonic Acid (50%)	-	-	-	-	-	-	230	110
Methoxy ethyl oleate	--	--	--	-	450	230	-	-
Methyl alcohol	200	95	275	135	450	230	300	150
Methyl Benzoate	-	-	-	-	-	-	250	120
Methyl bromide	NR	NR	275	135	450	230	300	150
Methyl CELLOSOLVE ethers	75	25	200	95	450	230	-	-
Methyl Cellosolve®	-	-	-	-	-	-	300	150
Methyl chloride	NR	NR	275	135	450	230	200	95
Methyl chloroform	NR	NR	125	50	450	230	150	65
Methyl chloromethyl ether	--	--	75	25	450	230	175	80
Methyl cyanoacetate	125	50	--	-	450	230	175	80
Methyl ethyl ketone	125	50	NR	NR	450	230	230	110
Methyl isobutyl ketone	75	25	NR	NR	450	230	230	110
Methyl methacrylate	225	110	125	50	450	230	175	80
Methyl salicylate	125	50	150	65	450	230	200	95
Methyl sulfuric acid	125	50	125	50	450	230	212	100
methyl trichlorosilane	--	--	150	65	450	230	200	95
Methylene bromide	--	--	175	80	450	230	212	100
Methylene chloride	NR	NR	125	50	450	230	212	100
Methylene iodide	--	--	200	95	450	230	212	100
Milk	225	110	250	120	450	230	-	-
Mineral oil	125	50	275	135	450	230	300	150
Molasses	225	110	150	65	450	230	-	-
mono-Bromobenzene	NR	NR	150	65	450	230	212	100
Monochlorobenzene	-	-	-	-	-	-	230	110
Monoethanolamine	175	80	NR	NR	450	230	150	65
Morpholine	150	65	75	25	450	230	150	65
Naphtha	125	50	275	135	450	230	300	150
Naphthalene	225	110	200	95	450	230	300	150
n-Butyl Alcohol	-	-	-	-	-	-	300	150
n-Butyl Mercaptan	-	-	-	-	-	-	300	150
n-Butylamine	-	-	-	-	-	-	120	50
Nickel chloride	200	95	275	135	450	230	300	150
Nickel nitrate	225	110	275	135	450	230	300	150
Nickel sulfate	200	95	275	135	450	230	300	150
Nicotine	-	-	-	-	-	-	212	100
Nicotinic acid	125	50	250	120	450	230	250	120
Nitric Acid - Sulfuric Acid (50/50)	-	-	-	-	-	-	212	100
Nitric acid (5-10%)	175	80	175	80	450	230	-	-

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Nitric acid (30%)	150	65	125	50	450	230	-	-
Nitric acid (50%)	75	25	125	50	450	230	221	105
Nitric acid (70%-fuming)	NR	NR	NR	NR	450	230	-	-
Nitric Acid (Conc. 70%)	-	-	-	-	-	-	248	120
Nitrobenzene	125	50	75	25	450	230	300	150
Nitrogen	225	110	275	135	450	230	-	-
Nitrogen dioxide	--	--	175	80	450	230	212	100
Nitrogen Gas	-	-	-	-	-	-	300	150
Nitroglycerine	--	--	125	50	450	230	-	-
Nitromethane	125	50	125	50	450	230	212	100
Nitrous Acid	-	-	-	-	-	-	212	100
Nitrous acid (10%)	NR	NR	200	95	450	230	-	-
Nitrous oxide	75	25	NR	NR	450	230	-	-
n-Methylaniline	-	-	-	-	-	-	250	120
Nonyl isophenyl sulfide	--	--	--	-	450	230	-	-
Octane	75	25	275	135	450	230	300	150
Octene	-	-	-	-	-	-	300	150
o-Dichlorobenzene	NR	NR	150	65	450	230	150	65
Oils and fats	175	80	250	120	450	230	-	-
Oleic acid	150	65	250	120	450	230	275	135
Oleum	NR	NR	NR	NR	450	230	120	50
o-Phenylphenol	--	--	175	80	450	230	212	100
Oxalic acid	125	50	125	50	450	230	230	110
Oxygen	125	50	275	135	450	230	300	150
Ozone	NR	NR	225	110	450	230	-	-
Ozone (<1% in Air)	-	-	-	-	-	-	212	100
Palmitic acid	175	80	250	120	450	230	275	135
p-Dioxane	-	-	-	-	-	-	150	65
Perchlorethylene	-	-	-	-	-	-	275	135
Perchloric acid (10%)	150	65	200	95	450	230	230	110
Perchloric acid (70%)	75	25	125	50	450	230	-	-
Perchloric Acid (72%)	-	-	-	-	-	-	150	65
Perchloroethylene	NR	NR	275	135	450	230	-	-
Petrolatum	175	80	275	135	450	230	300	150
Petroleum	-	-	-	-	-	-	300	150
Petroleum ether	NR	NR	150	65	450	230	212	100
Petroleum oils	125	50	250	120	450	230	-	-
Phenol (10%)	-	-	-	-	-	-	230	110
Phenol (100%)	-	-	-	-	-	-	212	100
Phenol (5%)	200	95	175	80	450	230	-	-
Phenol (90-100%)	150	65	125	50	450	230	-	-
Phenolsulfonic Acid	-	-	-	-	-	-	212	100
Phenolsulfonic acid (65%)	--	--	125	50	450	230	-	-
Phenyl glycine potassium salt	--	--	--	--	450	230	-	-
Phenylhydrazine	NR	NR	125	50	450	230	212	100
Phenylhydrazine hydrochloride	--	--	125	50	450	230	212	100
Phosgene	-	-	-	-	-	-	212	100
Phosgene (wet or dry)	NR	NR	175	80	450	230	-	-
Phosphoric acid (10-50%)	225	110	275	135	450	230	-	-
Phosphoric Acid (30%)	-	-	-	-	-	-	300	150
Phosphoric acid (50-85%)	225	110	225	110	450	230	-	-
Phosphoric Acid (85%)	-	-	-	-	-	-	275	135
Phosphorus oxychloride	NR	NR	NR	NR	450	230	221	100
Phosphorus pentachloride	125	50	200	95	450	230	212	100
Phosphorus pentoxide	175	80	200	95	450	230	230	110
Phosphorus trichloride	NR	NR	200	95	450	230	250	120
Phosphorus-red	75	25	75	25	450	230	-	-
Phosphorus-yellow	75	25	--	--	450	230	-	-
Photographic solutions	150	65	275	135	450	230	-	-
Phthalic acid	75	25	200	95	450	230	212	100

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Phthalic Anhydride	-	-	-	-	-	-	212	100
Picric acid	75	25	75	25	450	230	125	50
Plating solutions (Brass)	150	65	200	95	450	230	-	-
Plating solutions (Cadmium)	150	65	200	95	450	230	-	-
Plating solutions (Chrome)	125	50	200	95	450	230	-	-
Plating solutions (Copper)	150	65	200	95	450	230	-	-
Plating solutions (Gold)	150	65	200	95	450	230	-	-
Plating solutions (Iron)	150	65	200	95	450	230	-	-
Plating solutions (Lead)	150	65	200	95	450	230	-	-
Plating solutions (Nickel)	150	65	200	95	450	230	-	-
Plating solutions (Rhodium)	150	65	200	95	450	230	-	-
Plating solutions (Silver)	150	65	200	95	450	230	-	-
Plating solutions (Speculum)	150	65	200	95	450	230	-	-
Plating solutions (Tin)	150	65	200	95	450	230	-	-
Plating solutions (Zinc)	150	65	200	95	450	230	-	-
Polyglycol	175	80	200	95	450	230	-	-
Polyvinyl acetate	75	25	275	135	450	230	300	150
Polyvinyl alcohol	125	50	275	135	450	230	300	150
Potassium acetate	125	50	275	135	--	--	-	-
Potassium aluminum chloride	225	110	275	135	450	230	300	150
Potassium aluminum sulfate (50%)	225	110	275	135	450	230	300	150
Potassium bicarbonate	225	110	200	95	450	230	300	150
Potassium borate	200	95	275	135	450	230	300	150
Potassium bromate	225	110	275	135	450	230	300	150
Potassium bromide	225	110	275	135	450	230	300	150
Potassium carbonate	225	110	275	135	450	230	300	150
Potassium Chlorate	-	-	-	-	-	-	300	150
Potassium chlorate (aqueous)	225	110	200	95	450	230	-	-
Potassium chloride	200	95	275	135	450	230	300	150
Potassium chromate	225	110	275	135	450	230	300	150
Potassium cyanide	225	110	275	135	450	230	300	150
Potassium dichromate	225	110	275	135	450	230	300	150
Potassium ferricyanide (saturated)	225	110	275	135	450	230	-	-
Potassium ferrocyanide	225	110	275	135	450	230	300	150
Potassium fluoride	175	80	275	135	450	230	300	150
Potassium hydroxide (10%)	225	110	NR	NR	450	230	-	-
Potassium hydroxide (50%)	175	80	NR	NR	450	230	212	100
Potassium hydroxide (60-90%)	150	65	NR	NR	450	230	-	-
Potassium hypochlorite	175	80	200	95	450	230	275	135
Potassium iodide	125	50	225	110	450	230	-	-
Potassium nitrate	175	80	275	135	450	230	300	150
Potassium perborate	225	110	275	135	450	230	275	135
Potassium perchlorate	150	65	200	95	450	230	212	100
Potassium Permanganate	-	-	-	-	-	-	300	150
Potassium permanganate (saturated)	150	65	250	120	450	230	-	-
Potassium persulfate	--	--	125	50	450	230	150	65
Potassium sulfate	225	110	275	135	450	230	300	150
Potassium sulfide	175	80	275	135	450	230	300	150
Propane	75	25	275	135	450	230	275	135
Propionic Acid	-	-	-	-	-	-	212	100
Propyl alcohol	175	80	150	65	450	230	300	150
Propylene chlorohydrin	175	80	NR	NR	450	230	-	-
Propylene dibromide	75	25	200	95	450	230	212	100
Propylene dichloride	75	25	200	95	450	230	212	100
Propylene glycol	125	50	150	65	450	230	-	-
Propylene Glycol Methyl Ether	-	-	-	-	-	-	212	100
Propylene oxide	125	50	NR	NR	450	230	150	65
Pyridine	150	65	NR	NR	450	230	150	65
Pyrogallol	-	-	-	-	-	-	150	65
Salicylaldehyde	75	25	125	50	450	230	212	100

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Salicylic acid	125	50	200	95	450	230	250	120
Salt Brine	-	-	-	-	-	-	300	150
Sea water	212	100	212	100	212	100	300	150
sec-Butyl Alcohol	-	-	-	-	-	-	300	150
sec-Butylamine	-	-	-	-	-	-	120	50
Selenic acid (aqueous)	75	25	150	65	450	230	-	-
Silicon Tetrachloride	-	-	-	-	-	-	250	120
Silicone oil	150	65	250	120	450	230	-	-
Silver Chloride	-	-	-	-	-	-	300	150
Silver cyanide	200	95	275	135	450	230	300	150
Silver nitrate	225	110	275	135	450	230	300	150
Soap solution (saturated)	175	80	125	50	450	230	-	-
Sodium acetate	200	95	275	135	450	230	300	150
Sodium Benzene-Sulfonate	-	-	-	-	-	-	300	150
Sodium benzoate	200	95	275	135	450	230	300	150
Sodium bicarbonate	225	110	275	135	450	230	300	150
Sodium bisulfate	225	110	275	135	450	230	300	150
Sodium bisulfite	225	110	275	135	450	230	300	150
Sodium Borate	-	-	-	-	-	-	212	100
Sodium borate (borax)	175	80	275	135	450	230	-	-
Sodium bromide	225	110	275	135	450	230	300	150
Sodium carbonate	225	110	275	135	450	230	300	150
Sodium chlorate	200	95	250	120	450	230	300	150
Sodium chloride	225	110	275	135	450	230	300	150
Sodium chlorite solutions	175	80	250	120	450	230	-	-
Sodium Chromate	-	-	-	-	-	-	300	150
Sodium Cyanide	-	-	-	-	-	-	300	150
Sodium cyanide (saturated)	175	80	275	135	450	230	-	-
Sodium dichromate	225	110	200	95	450	230	-	-
Sodium Dichromate (Alkaline)	-	-	-	-	-	-	212	100
Sodium dodecyl benzene (30%)	--	--	250	120	450	230	-	-
Sodium ferricyanide	150	65	275	135	450	230	300	150
Sodium ferrocyanide	150	65	275	135	450	230	300	150
Sodium Fluoride	-	-	-	-	-	-	300	150
Sodium fluoride (saturated)	175	80	275	135	450	230	-	-
Sodium Glutamate	-	-	-	-	-	-	275	135
Sodium hydroxide (<10%)	200	95	100	40	450	230	-	-
Sodium hydroxide (>50%)	150	65	NR	NR	450	230	-	-
Sodium Hydroxide (10%)	-	-	-	-	-	-	230	110
Sodium hydroxide (10-50%)	200	95	NR	NR	450	230	-	-
Sodium hydroxide (50%)	200	95	NR	NR	450	230	230	110
Sodium Hypochlorite	-	-	-	-	-	-	300	150
Sodium hypochlorite (>15%)	125	50	125	50	450	230	-	-
Sodium hypochlorite (5%)	125	50	250	120	450	230	-	-
Sodium hypochlorite (5-15%)	125	50	175	80	450	230	-	-
Sodium Hyposulfite	-	-	-	-	-	-	300	150
Sodium iodide	175	80	275	135	450	230	300	150
Sodium Lignosulfonate	-	-	-	-	-	-	300	150
Sodium Metasilicate	-	-	-	-	-	-	300	150
Sodium nitrate	175	80	275	135	450	230	300	150
Sodium nitrite	175	80	275	135	450	230	300	150
Sodium Perborate	-	-	-	-	-	-	212	100
Sodium Perchlorate	-	-	-	-	-	-	150	65
Sodium peroxide	125	50	200	95	450	230	300	150
Sodium Persulfate	-	-	-	-	-	-	175	80
Sodium phosphate	175	80	275	135	450	230	300	150
Sodium silicate	225	110	275	135	450	230	300	150
Sodium Silicofluoride	-	-	-	-	-	-	300	150
Sodium sulfate	225	110	275	135	450	230	300	150
Sodium sulfide	150	65	275	135	450	230	300	150

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Sodium sulfite	150	65	275	135	450	230	300	150
Sodium Thiosulfate	-	-	-	-	-	-	300	150
Sodium thiosulfate (Hypo)	150	65	275	135	450	230	-	-
Sorbic Acid	-	-	-	-	-	-	275	135
Sour crude oil	150	65	275	135	450	230	300	150
Stannic chloride	225	110	275	135	450	230	300	150
Stannous Chloride	-	-	-	-	-	-	300	150
Stannous chloride (50%)	175	80	275	135	450	230	-	-
Stannous Fluoride	-	-	-	-	-	-	250	120
Steam	NR	NR	275	135	450	230	-	-
Stearic acid	175	80	275	135	450	230	300	150
Stoddard solvent	125	50	250	120	450	230	275	135
Styrene monomer	--	--	175	80	450	230	212	100
Succinic acid	150	65	150	65	450	230	275	135
Sugar syrup	200	95	275	135	450	230	-	-
Sulfamic acid	175	80	125	50	450	230	212	100
Sulfur	150	65	250	120	450	230	-	-
Sulfur (Molten)	-	-	-	-	-	-	250	120
Sulfur chloride	75	25	75	25	450	230	-	-
Sulfur dichloride	75	25	75	25	450	230	-	-
Sulfur Dioxide	-	-	-	-	-	-	230	110
Sulfur dioxide (dry or wet gas)	125	50	175	80	450	230	-	-
Sulfur dioxide (liquid)	--	--	175	80	450	230	-	-
Sulfur trioxide (liquid or gas)	NR	NR	NR	NR	450	230	-	-
Sulfur Trioxide (Liquid)	-	-	-	-	-	-		25
Sulfuric acid (>98%-fuming)	NR	NR	NR	NR	450	230	-	-
Sulfuric acid (10%)	225	110	250	120	450	230	-	-
Sulfuric acid (16%)	200	95	250	120	450	230	-	-
Sulfuric acid (30%)	200	95	250	120	450	230	-	-
Sulfuric acid (60%)	200	95	250	120	450	230	300	150
Sulfuric acid (60%)-sat. With CL2	75	25	200	95	450	230	-	-
Sulfuric acid (85%)	175	80	200	95	450	230	-	-
Sulfuric acid (93%)	NR	NR	200	95	450	230	-	-
Sulfuric acid (96%)	NR	NR	175	80	450	230	-	-
Sulfuric acid (98%)	NR	NR	150	65	450	230	-	-
Sulfuric Acid (Conc.)	-	-	-	-	-	-	300	150
Sulfuric Acid (Fuming - Oleum)	-	-	-	-	-	-	120	50
Sulfurous acid	175	80	200	95	450	230	230	110
Sulfuryl fluoride	NR	NR	75	25	450	230	-	-
Tall oil	175	80	275	135	450	230	300	150
Tallow	150	65	275	135	450	230	-	-
Tannic acid	150	65	225	110	450	230	275	135
Tartaric acid	150	65	250	120	450	230	275	135
tert-Butyl Alcohol	-	-	-	-	-	-	300	150
tert-Butylamine	-	-	-	-	-	-	120	50
Tetraethyl lead	75	25	275	135	450	230	300	150
Tetrahydrofuran	NR	NR	NR	NR	450	230	212	100
Tetramethyl Ammonium Hydroxide (50%)	-	-	-	-	-	-	212	100
Thionyl chloride	NR	NR	NR	NR	450	230	212	100
Thread cutting oils	125	50	200	95	450	230	-	-
Tin Tetrachloride	-	-	-	-	-	-	230	110
Titanium Dioxide	-	-	-	-	-	-	300	150
Titanium tetrachloride	NR	NR	150	65	450	230	212	100
Toluene	NR	NR	175	80	450	230	250	120
Toluene (25%) + kerosene	NR	NR	175	80	450	230	-	-
Tomato juice 225	225	110	200	95	450	230	-	-
Toxaphene (90%) + xylene	NR	NR	--	--	450	230	-	-
Tributyl citrate	--	--	--	--	450	230	-	-
Tributyl phosphate	125	50	75	25	450	230	150	65
Trichloracetic Acid	-	-	-	-	-	-	212	100

**Information related to DuPont*

Material Selection - Fluoropolymer linings - For preliminary guidance only

Corrosive Stream	PP		PVDF		PTFE/PFA		ETFE*	
	ºF	ºC	ºF	ºC	ºF	ºC	ºF	ºC
Trichloroacetic acid (10%)	150	65	200	95	450	230	-	-
Trichloroacetic acid (100%)	125	50	125	50	450	230	-	-
Trichloroethylene	NR	NR	275	135	450	230	275	135
Trichloromenthane (chloroform)	NR	NR	125	50	450	230	-	-
Trichloromethane	-	-	-	-	-	-	212	100
Tricresyl phosphate	125	50	NR	NR	450	230	-	-
Triethanolamine	150	65	125	50	450	230	-	-
Triethylamine	75	25	125	50	450	230	230	110
Trimethyl propane	75	25	200	95	450	230	-	-
Trimethylamine	--	--	150	65	450	230	-	-
tri-n-Butyl Amine	-	-	-	-	-	-	230	110
Tripropylene glycol methyl ether	150	65	--	--	450	230	-	-
Trisodium phosphate	175	80	275	135	450	230	275	135
Turpentine	NR	NR	275	135	450	230	275	135
UDMH-Hydrazine (50/50)	-	-	-	-	-	-	120	50
Urea	225	110	250	120	450	230	-	-
Urea (50% H2O)	-	-	-	-	-	-	275	135
Urine	200	95	275	135	450	230	-	-
Varsol	-	-	-	-	-	-	275	135
Vegetable oil	125	50	275	135	450	230	-	-
Vinegar	200	95	225	110	450	230	-	-
Vinyl acetate	75	25	250	120	450	230	275	135
Vinyl Chloride (Monomer)	-	-	-	-	-	-	150	65
Vinyl chloride monomer (liquid)	NR	NR	200	95	450	230	-	-
Vinylidene chloride (monomer)	NR	NR	200	95	450	230	-	-
Water	-	-	-	-	-	-	300	150
Water Sewage	-	-	-	-	-	-	275	135
Water-acid mine	212	100	212	100	212	100	-	-
Water-deionized	212	100	212	100	212	100	-	-
Water-demineralized	212	100	212	100	212	100	-	-
Water-distilled	212	100	212	100	212	100	-	-
Water-fresh	212	100	212	100	212	100	-	-
Water-salt	212	100	212	100	212	100	-	-
Water-sewage	212	100	212	100	212	100	-	-
Wax	-	-	-	-	-	-	300	150
Whiskey	225	110	225	110	450	230	-	-
Wine	200	95	225	110	450	230	-	-
Xylene	NR	NR	200	95	450	230	250	120
Zinc Acetate	-	-	-	-	-	-	250	120
Zinc chloride	175	80	275	135	450	230	300	150
Zinc hydrosulfite (10%)	--	--	200	95	450	230	250	120
Zinc nitrate	200	95	275	135	450	230	300	150
Zinc sulfate	200	95	275	135	450	230	300	150
Zinc Sulfide	-	-	-	-	-	-	300	150

**Information related to DuPont*

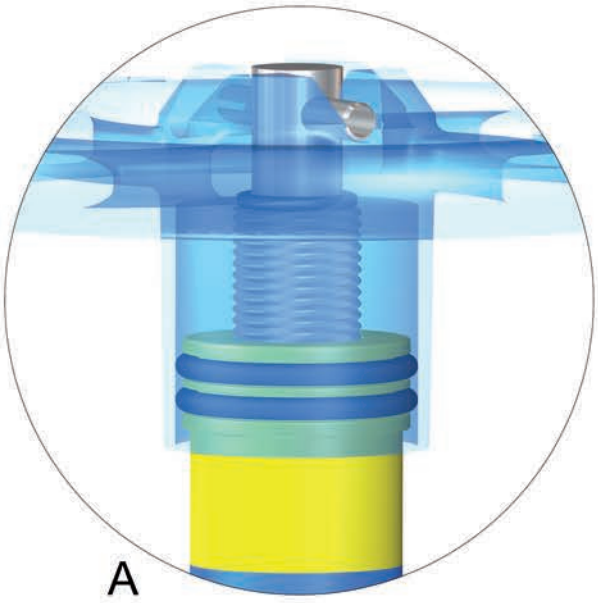
Special Arrangements

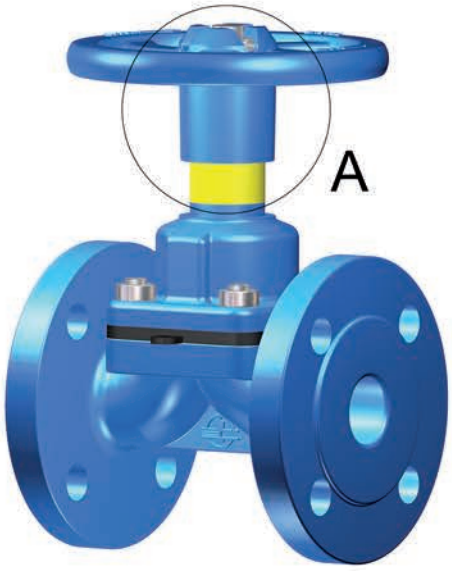
Sealed bonnet

Sealed bonnets mean an essential safety requirement when handling toxic or hazardous fluids. This design prevents fluid emissions in case of diaphragm rupture and, consequently, avoiding harmful risks to plant personnel.

The bonnet is sealed off by two VITON O-rings across the bonnet neck.

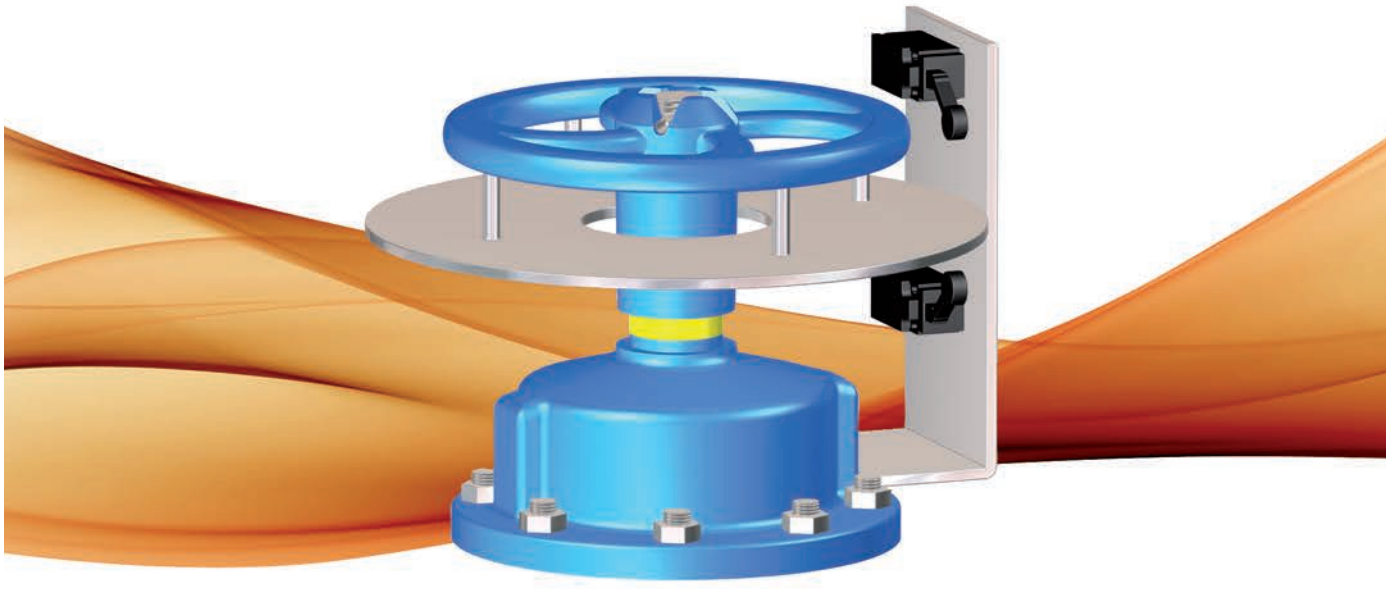
These rings are retaining the eventual leakage until a new diaphragm is mounted and thus service integrity restored.





Limit switches

Limit switches are often used to provide remote signal on the valve status. Electro mechanical limit switches or proximity switches can be provided on a special assembly consisting of a protruding rod angle plate (fix unit) where the switches are bolted and a round plate (moving unit) which moves up and down along with the hand wheel to activate the switches for open and closed position. If just a single signal is required, a single switch for open or closed signal should be mounted.



Bonnet options apply for manual operation. DIAVAL® can engineer and provide further tailor made options on request.

Special Arrangements

Padlocking device

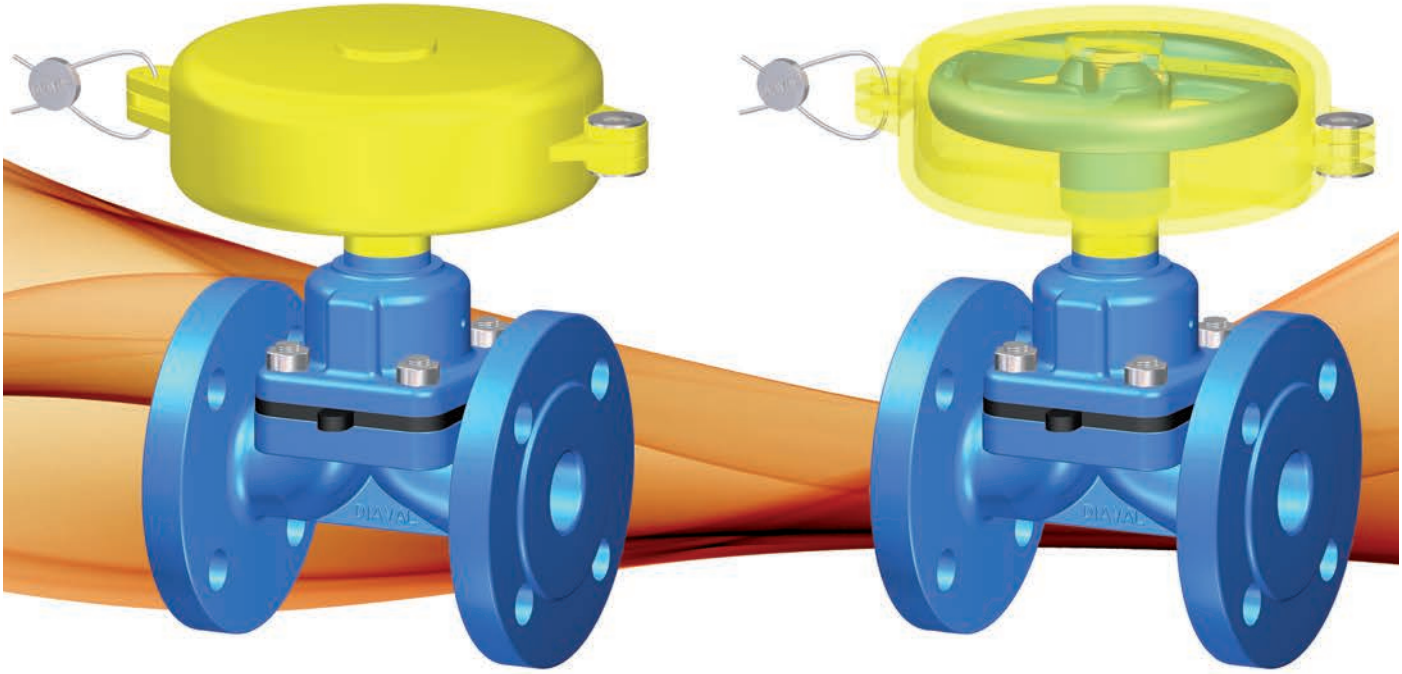
Conventional padlocking device that prevents unauthorized valve operation; the complete set consists in two empty steel rolls interconnected by a rod where the padlock is held.

The lower roll is fitted onto one of the bonnet union bolts whilst the upper one blocks the hand wheel free turn. A chain links both rolls thus making the integral set.

The device is provided with padlock and keys which are replaceable by the plant operator. No duplicate of padlock keys are kept at DIAVAL, therefore is plant owner responsibility to create their own set of keys and keeping procedure.

This system maybe provided as an option with new valves or, alternatively, can also be assembled in field on existing DIAVAL® valves.

Hand wheel protecting hood



Two halves plastic hood conveniently sealed to avoid valve operation by unauthorized personnel.

There are several hoods in accordance with the hand wheel diameter. This hoods can be provided as an option with new valves or, alternatively, can also be assembled in field on existing DIAVAL® valves.

Bonnet options apply for manual operation. DIAVAL® can engineer and provide further tailor made options on request..

Weir Type Diaphragm Valves

Codification

W	D	0	0	D	I	1	0	D	1	0	0	5	0

BODY DESIGN	
W	Weir
S	Straight Through
F	Full Flow

BODY/BONNET MATERIAL	
C	Cast iron
D	Ductile iron
A	Carbon steel
S	St. steel 316
I	Chr. iron 24%
J	Chr. iron 30%
B	Bronze
K	St. steel 316L
E	St. steel 304
M	Monel
H	Hastelloy
X	St. steel 1.4435
Y	St. steel 1.4435 BN2

BODY BASE MATERIAL	
00	Unlined
HR	Hard rubber
SR	Soft rubber
BR	Butyl rubber
ER	EPDM rubber
NL	Neoprene rubber
HY	Hypalon® rubber
PF	PFA
FE	FEP
ET	ETFE
HL	Halar®
LN	Linatex

FACE TO FACE/DRILLING		
	DI10	DIN3202F1 PN10
	AS15	BS5156 ASA 150
	BS10	BS5156 PN10
0B	SP00	Threaded BSPP
0B	ST00	Threaded BSPT
0N	PT00	Threaded NPT

DIAPHRAGM/SEALING	
D10	Natural rubber
D15	White natural rubber
D20	EPDM
D2V	EPDM vacuum service
D30	Butyl
D40	NBR
D4V	NBR vacuum service
D50	Neoprene
D60	Hypalon
D70	Viton
D92	PTFE/EPDM
D93	PTFE/Butyl
D97	PTFE/Viton
DLN	Linatex
D9E	Laminated PTFE with EPDM back

SIZE	
015	DN15
050	DN50
100	DN100

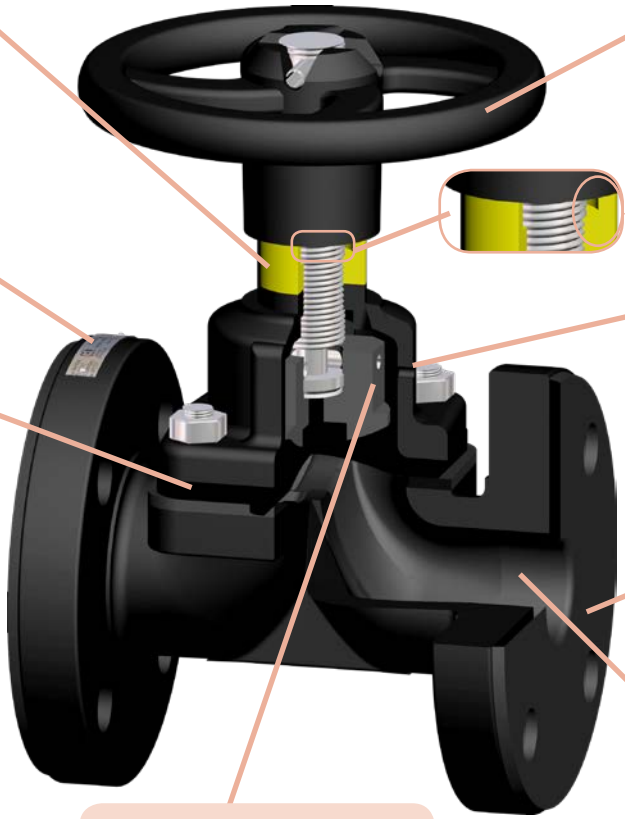
Design Attributes

Weir Type Diaphragm Valves are linear motion valves, bidirectional, for stopping or regulating the flow of the service fluid when necessary. Valves close by turning the handwheel clockwise. Valves are bolted bonnet, seatless design, with a diaphragm as closure element, with rising handwheel. Valves are offered with a broad range of diaphragms and linings materials to resist to abrasion and corrosion duties. The valves are inexpensive and easy to maintain, being the optimal solution for a large number of applications.

Yellow position indicator, for clear and positive valve position from any angle

Nameplate incl. batch no. for full traceability

Closure Diaphragms; manufactured from elastomeric and fluorocarbon materials; provide 100% seating tightness in both directions while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application



Ergonomic and rugged rising handwheel

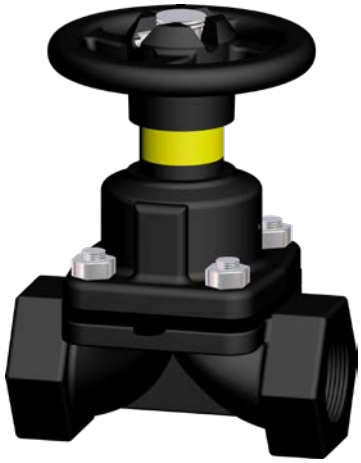
Grease reservoir integrated in the spindle chamber that lubricates the spindle along operations thus avoiding valve spindle jamming

Witness hole to detect leakage at diaphragm failure

Full rubber flange face in all rubber lined valves as standard

Porousless linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials

Precise compressor plate; guide and operates the diaphragm up and down



Threaded version

Main Features

Valve design: EN 13397, EN 12516
Face to face length: EN 558 Series 1 (DIN 3202F1) or EN 558 Series 7 (BS 5156)
Valve end connections: - Flanged to EN 1092-2 type 21/B, PN10/16 (DN15-150)*; PN10 (DN200-300)
*(*valves DN65 with 4 holes as accepted variant in standard*)
option drilling to ASA150#
- Female threaded ends to ISO 228-1 (DIN 259-BSPP) / ISO 7-1 (DIN 2999-BSPT) / ASME B1.20.1 (NPT)
Marking: EN 19
Pressure Tests: EN 12266-1
Seat leakage rate: Rate A (full seat tightness in both directions)
Inside and outside primer paint layer black color for protection during storage and transport
Product compliant with Directive 2014/68/EU on Pressure Equipment (PED) and Machinery Directive 2006/42/EC

Options

Other materials, other ratings and connexions, pneumatic or electric atuator, limit switches, sealed bonnet, interlocking arrangement, padlocking or handwheel hood to avoid non-authorized operation. Please consult us

Main Duties / Limits of use

Liquids compatible with materials of construction, acc. to Directive 2014/68/EU Annex II tables 8 (group 1*) & 9 (group 2*) up to category I

Rubber Diaph.

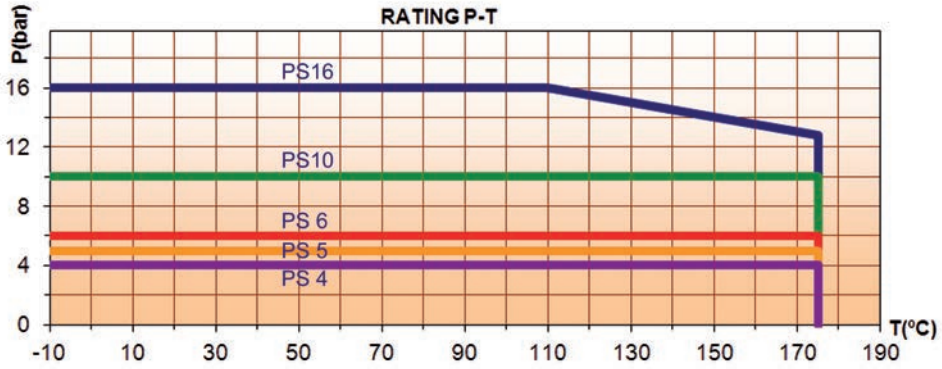
PS:16 bar DN10-50 (Art.4-Parr.3)
PS:10 bar DN65-150 (Art.4-Parr.3)
PS:6 bar DN200 (Art.4-Parr.3)
PS:5 bar DN250 (Art.4-Parr.3)
PS:4 bar DN300 (Art.4-Parr.3)

PTFE Diaph.

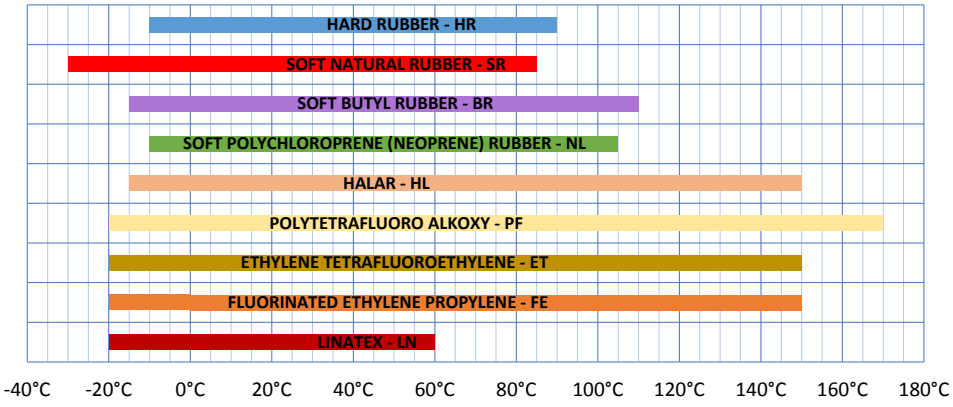
PS:10 bar DN10-125 (Art.4-Parr.3)
PS:6 bar DN150 (Art.4-Parr.3)

Combination of Body + Lining + Diaphragm determines the P-T limit of use of the valve
Questions referring to chemical resistance, please consult us
Observe also pressure/temperature limits on diagrams under
**Classification of fluids (group 1 or 2) acc. to Directive 2014/68/EU, Article 13*

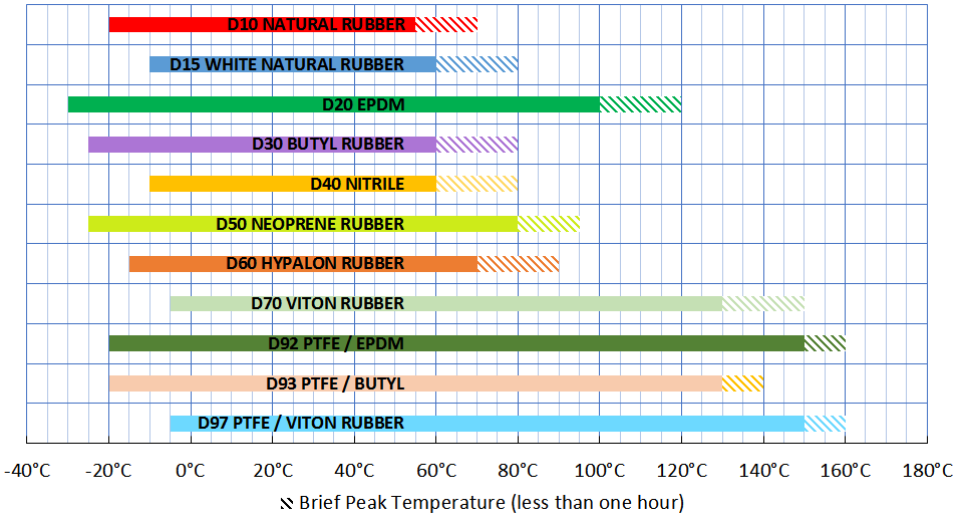
Bodies (Ductile iron)



Linings



Diaphragms



Temperature Values are for neutral fluids and not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship.Temperature values also depends on medium through the valve.

Valves Flow Data

A valve flow coefficient represents the standard flow rate which flows through the valve at a given opening, referred to pre-established conditions:

* Kv value is the volume of water at 20ºC, in cubic meters per hour (m3/h), that will flow through the valve at a static pressure drop of 1 bar across the valve

* Cv value is the volume of water at 60ºF, in gallons per minute (gpm), that will flow through the valve at a static pressure drop of 1 psi across the valve

Conversion from Kv to Cv can be roughly calculated by means of the following expression:
Cv = Kv x 1,17

Flow rate through the valve with other liquids can be calculated with the following expressions

Kv = q (SG / dp)1/2
where
q = water flow (cubic meter per hour)
SG = specific gravity (1 for water)
dp = pressure drop (bar)

Cv = q (SG / dp)1/2
where
q = water flow (US gallons per minute)
SG = specific gravity (1 for water)
dp = pressure drop (psi)

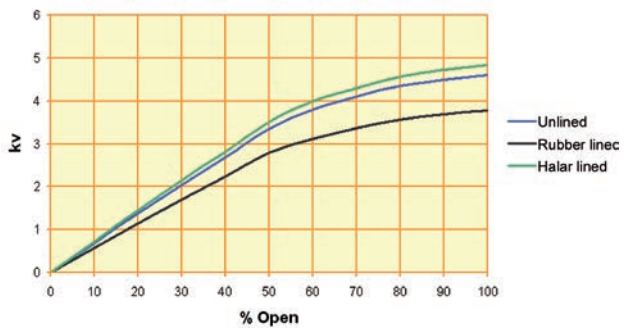
How to use the graphs:

The flow graphs in the following sheets provide the valve flow rate across the valve body at a determine opening degree.

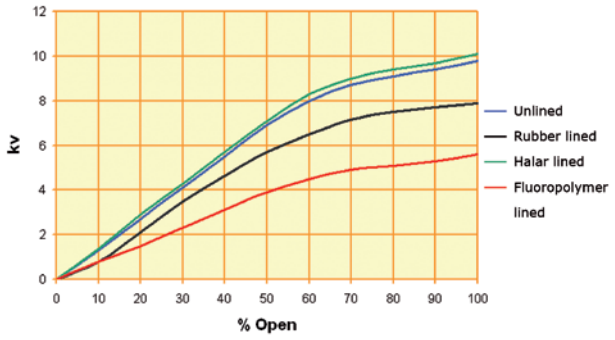
Choose the graph heading the valve Nominal Diameter which is being looked for; consider the valve inner lining features from a choice of unlined, rubber lined, ECTFE (Halar) lined or Fluoropolymer coated valve bodies and plot an intersection line upwards from the opening degree (in case of throttling) or full open to the colour representing the lining. The vertical axis will give the Kv value expressed in M^3/h.

Flow Coefficients Kv (m³/h)

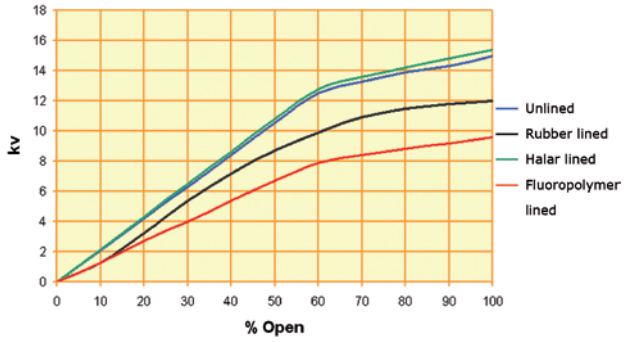
Weir Type DN15



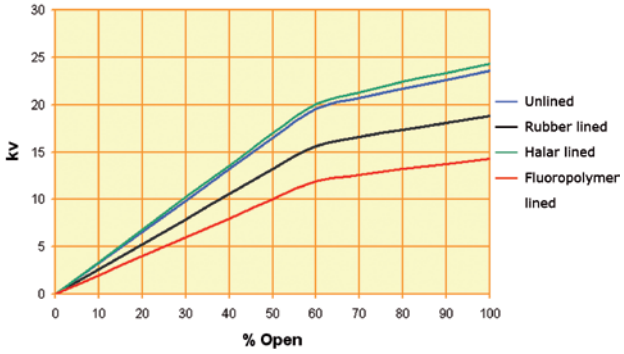
Weir Type DN20



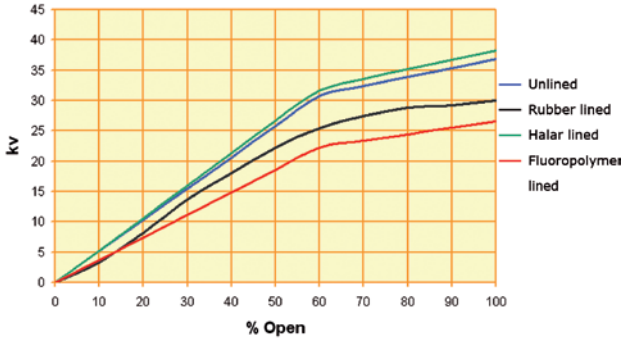
Weir Type DN25



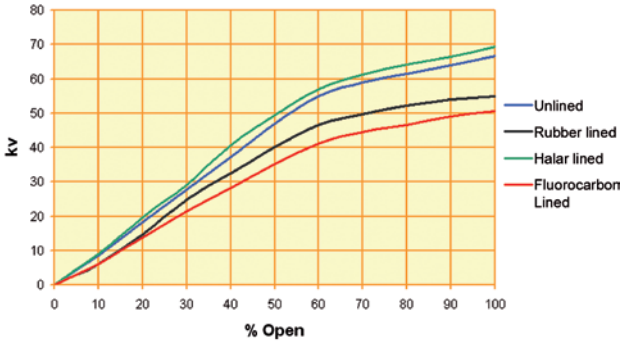
Weir Type DN32



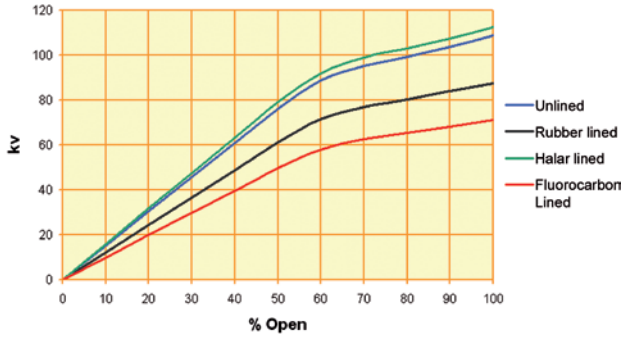
Weir Type DN40



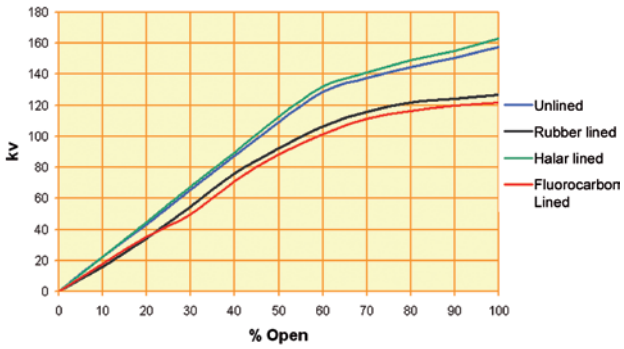
Weir Type DN50



Weir Type DN65

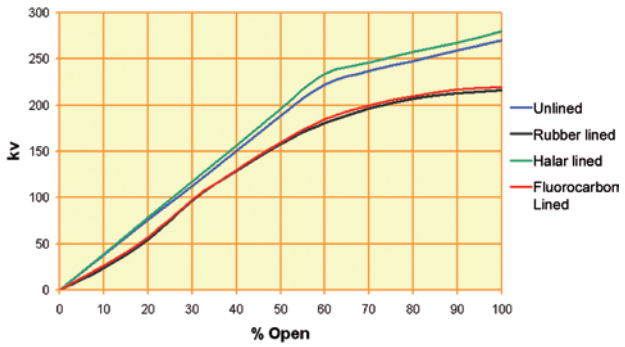


Weir Type DN80

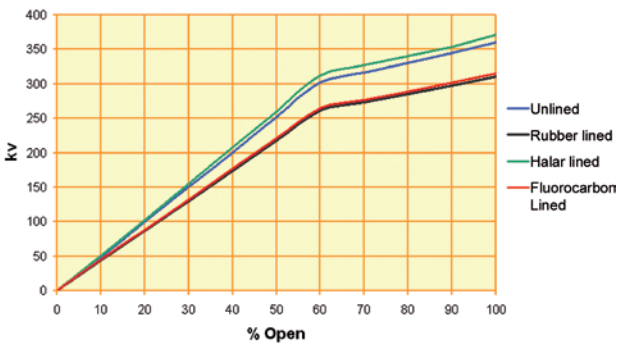


Flow Coefficients Kv (m³/h)

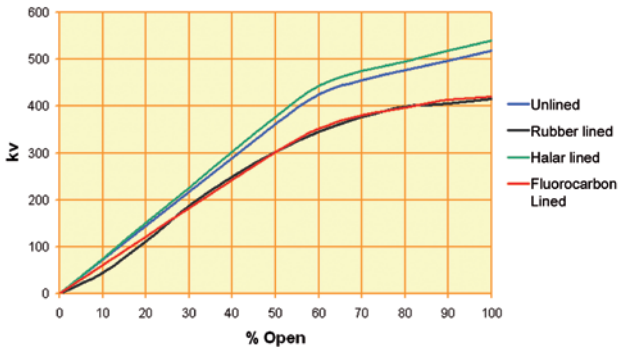
Weir Type DN100



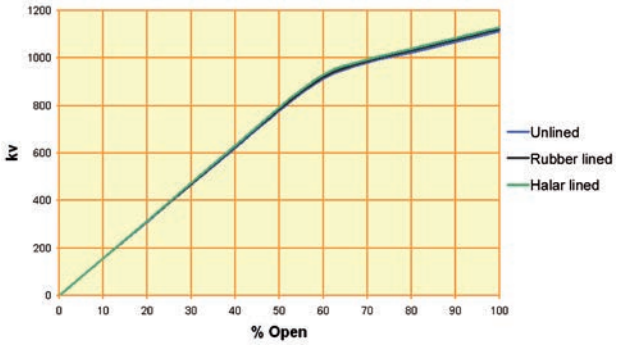
Weir Type DN125



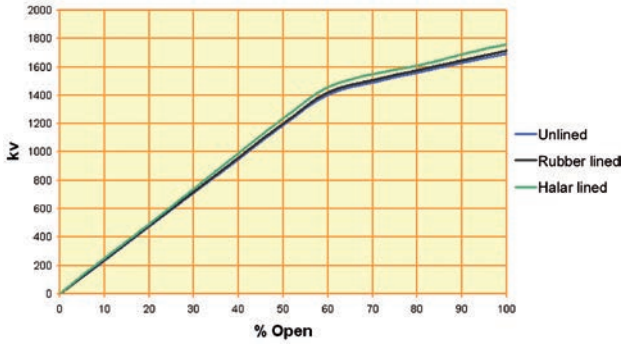
Weir Type DN150



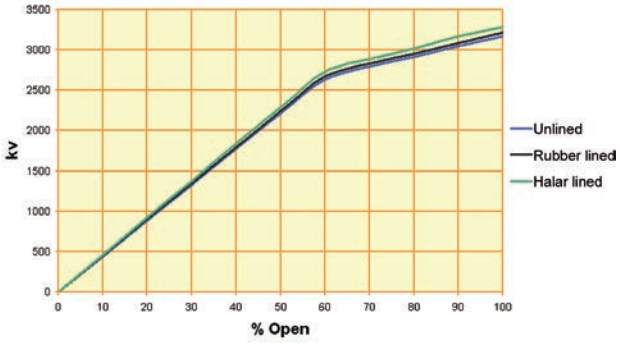
Weir Type DN200



Weir Type DN250

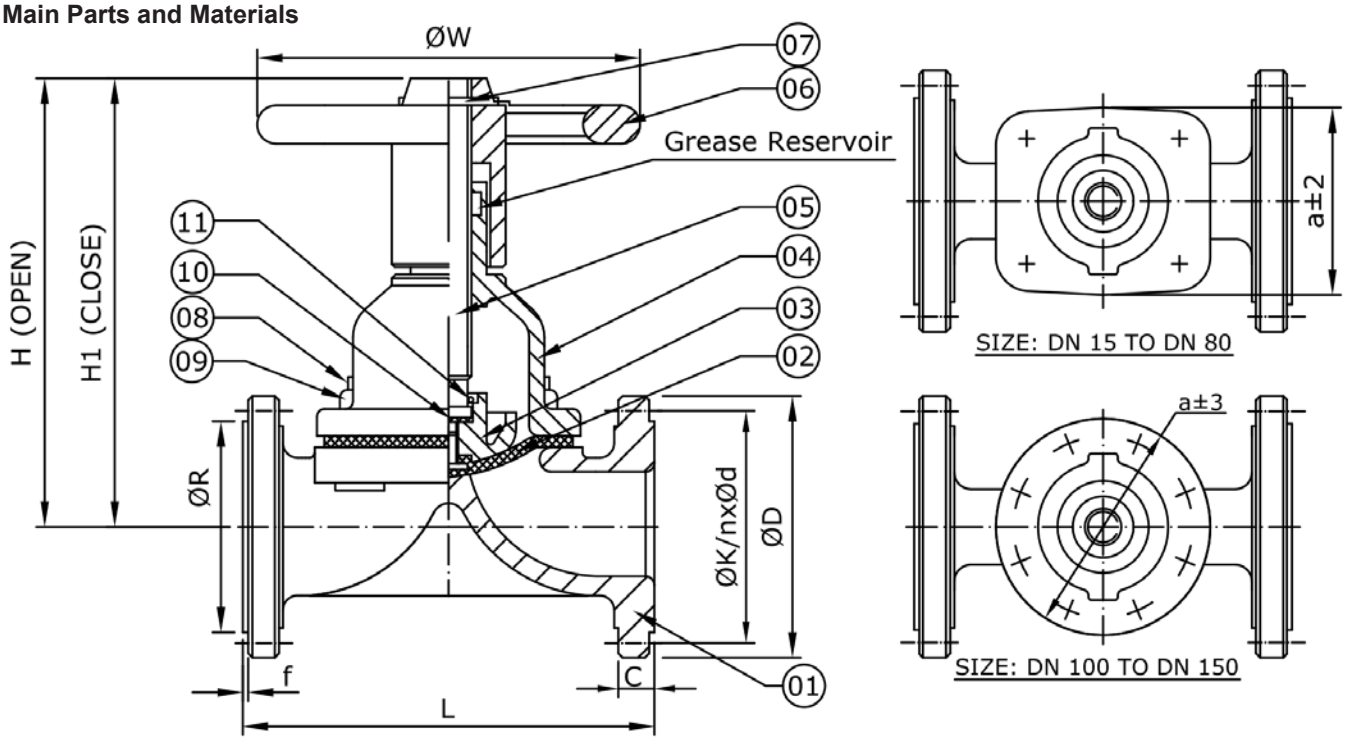


Weir Type DN300



Unlined valves with flanged ends

Main Parts and Materials



NO.	PART		MATERIAL
1	BODY	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)
2	DIAPHRAGM	RUBBER	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
			PTFE + EPDM (D92) / PTFE + Butyl (D93) / PTFE + Viton (D97)
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)

NO.	PART	MATERIAL
5	SPINDLE	Steel
6	HANDWHEEL	Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN	Steel (EN42)
8	BODY STUDS	Steel
9	BODY NUTS	Steel
10	THRUST WASHER	Nylon
11	COMP. PIN	Steel (EN42)

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	108	114	127	146	159	190	216
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	109	117	140	143	172	190	230
	H1 (close)	103	109	130	131	152	166	195
	a	52	67	75	88	110	127	146
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	ØR	45	58	68	78	88	102	122
	f	2	2	2	2	3	3	3
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13	14,5	16	17,5
	ØR	35	43	51	64	73	92	105
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	2,3	3,2	4,2	6,4	7,5	12	18
	EN 558 S1 (DIN 3202 F1)	2,7	3,5	4,4	6,6	8,5	12,5	19

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Unlined valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	254	305	356	406	521	635	749
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	242	326	391	468	680	802	971
	H1 (close)	202	275	326	390	560	657	796
	a	190	Ø230	Ø265	Ø320	Ø420	Ø502	Ø569
	ØW	240	270	270	360	460	600	700
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	ØR	138	158	188	212	268	320	370
	f	3	3	3	3	3	3	4
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#*	ØD	191	229	254	279	343	406	483
	C	19,5	24	24	25,5	29	30,5	32
	ØR	127	157	186	216	270	324	381
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x19	8x19	8x22	8x22	8x22	12x22	12x22
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	23	34	50	69	150	220	300
	EN 558 S1 (DIN 3202 F1)	25	36	52	75	160	235	315

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

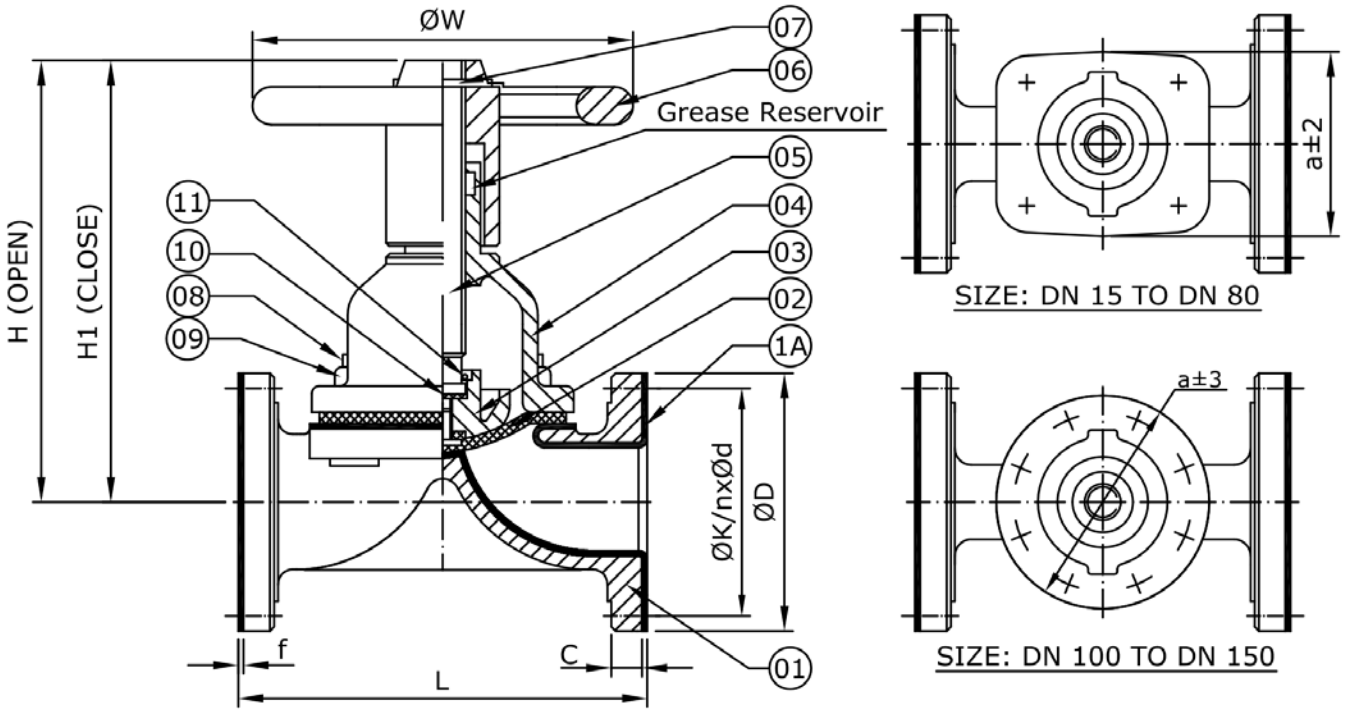
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Rubber lined valves with flanged ends

Main Parts and Materials



NO.	PART		MATERIAL
1	BODY	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)
1A	LINING	_HR_	Hard rubber
		_SR_	Soft rubber
		_BR_	Butyl rubber
		_ER_	EPDM rubber
		_NL_	Neoprene rubber
2	DIAPHRAGM + BACKING	RUBBER	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
			PTFE + EPDM (D92) / PTFE + Butyl (D93) / PTFE + Viton (D97)

NO.	PART		MATERIAL
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)
5	SPINDLE		Steel
6	HANDWHEEL		Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN		Steel (EN42)
8	BODY STUDS		Steel
9	BODY NUTS		Steel
10	THRUST WASHER		Nylon
11	COMP. PIN		Steel (EN42)

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	114	123	133	152	165	196	222
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	112	120	143	145	175	193	233
	H1 (close)	106	112	133	134	155	169	198
	f	3	3	3	3	3	3	3
	a	52	67	75	88	110	127	146
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13	14,5	16	17,5
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	3,2	3,4	4,7	7	8,5	12	22
	EN 558 S1 (DIN 3202 F1)	3,5	3,7	5	8,2	9,5	13,3	22,5

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Rubber lined valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	260	313	364	414	529	643	757
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	245	330	395	472	684	806	975
	H1 (close)	205	279	330	394	564	661	800
	f	3	4	4	4	4	4	4
	a	190	Ø230	Ø265	Ø320	Ø420	Ø502	Ø569
	ØW	240	270	270	360	460	600	700
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#*	ØD	191	229	254	279	343	406	483
	C	19,5	24	24	25,5	29	30,5	32
	nxØd	4x19	8x19	8x22	8x22	8x22	12x26	12x26
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	26	38	54	76	155	227	307
	EN 558 S1 (DIN 3202 F1)	28,5	40	57	81	165	242	322

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

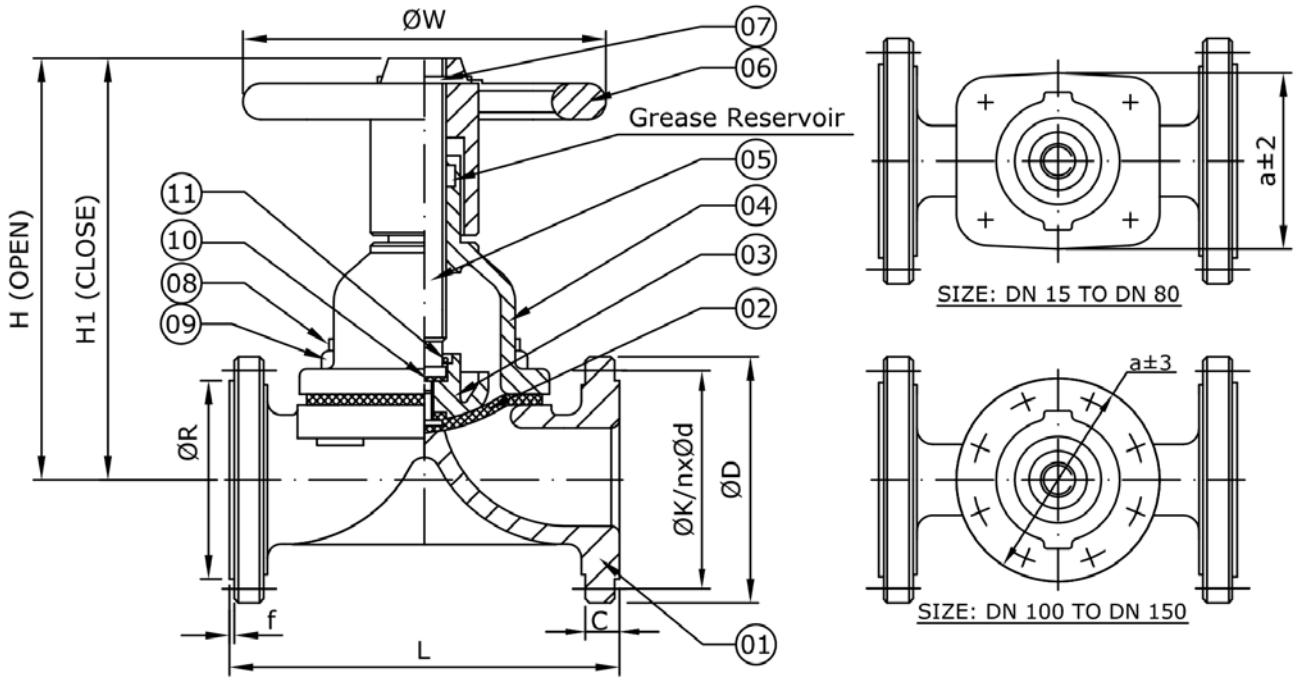
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Halar® coated valves with flanged ends

Main Parts and Materials



NO.	PART	MATERIAL		
1	BODY	WCHL_	Cast iron EN-JL1040 (GG25)	Halar® lined
		WDHL_	Ductile iron EN-JS1030 (GGG40)	
2	DIAPHRAGM	RUBBER	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)	
			PTFE + EPDM (D92) / PTFE + Butyl (D93) / PTFE + Viton (D97)	
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)	
4	BONNET	WCHL_	Cast iron EN-JL1040 (GG25)	
		WDHL_	Ductile iron EN-JS1030 (GGG40)	

NO.	PART	MATERIAL
5	SPINDLE	Steel
6	HANDWHEEL	Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN	Steel (EN42)
8	BODY STUDS	St. steel SS304
9	BODY NUTS	St. steel SS304
10	THRUST WASHER	Nylon
11	COMP. PIN	Steel (EN42)

Main Valve Parameters

	DN	15	20	25	32	40
L	EN 558 S7 (BS 5156)	108	114	127	146	159
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200
	H (open)	109	117	140	143	172
	H1 (close)	103	109	130	131	152
	a	52	67	75	88	110
	ØW	100	100	120	120	120
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150
	C	14	16	16	18	18
	ØR	45	58	68	78	88
	f	2	2	2	2	3
	nxØd	4x14	4x14	4x14	4x18	4x18
	ØK	65	75	85	100	110
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127
	C	11,5	11,5	11,5	13	14,5
	ØR	35	43	51	64	73
	f	1,6	1,6	1,6	1,6	1,6
	nxØd	4x16	4x16	4x16	4x16	4x16
	ØK	60,3	69,8	79,4	88,9	98,4
Approx. Weight	EN 558 S7 (BS 5156)	2,3	3,2	4,2	6,4	7,5
	EN 558 S1 (DIN 3202 F1)	2,7	3,5	4,4	6,6	8,5

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Information / restriction of technical rules need to be observed!

Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

Dimensions in mm subject to manufacturing tolerance / Weights in kg

The engineer, designing a system or a plant, is responsable for the selection of the correct valve

Product suitability must be verified, contact manufacturer for information

Halar® coated valves with flanged ends

Main Valve Parameters

	DN	50	65	80	100	125	150
L	EN 558 S7 (BS 5156)	190	216	254	305	356	406
	EN 558 S1 (DIN 3202 F1)	230	290	310	350	400	480
	H (open)	190	230	242	326	391	468
	H1 (close)	166	195	202	275	326	390
	a	127	146	190	Ø230	Ø265	Ø320
	ØW	164	220	240	270	270	360
FLANGED ENDS TO EN PN10	ØD	165	185	200	220	250	285
	C	20	20	22	24	26	26
	ØR	102	122	138	158	188	212
	f	3	3	3	3	3	3
	nxØd	4x18	4x18	8x18	8x18	8x18	8x22
	ØK	125	145	160	180	210	240
FLANGED ENDS TO ASA150#*	ØD	152	178	191	229	254	279
	C	16	17,5	19,5	24	24	25,5
	ØR	92	105	127	157	186	216
	f	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x19	4x19	4x19	8x19	8x22	8x22
	ØK	120,6	139,7	152,4	190,5	215,9	241,3
Approx. Weight	EN 558 S7 (BS 5156)	12	18	23	34	50	69
	EN 558 S1 (DIN 3202 F1)	12,5	19	25	36	52	75

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

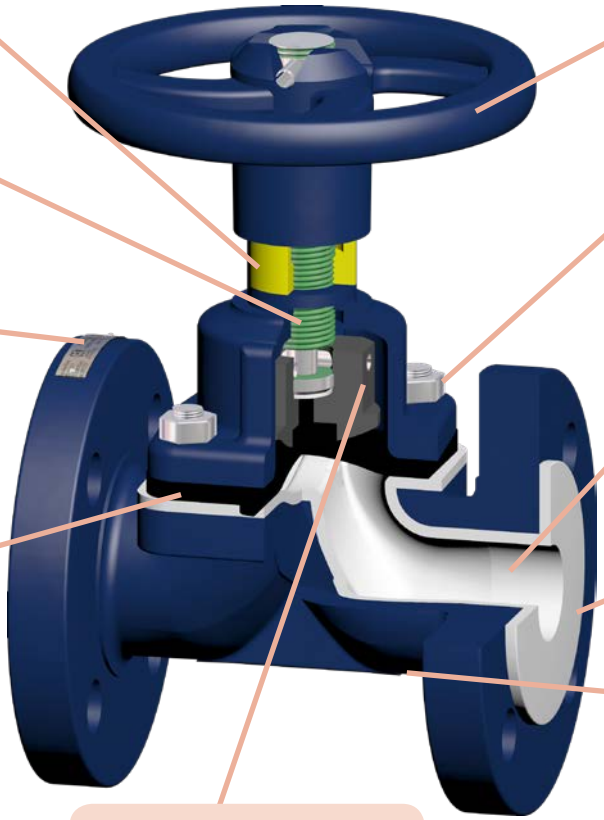
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Fluoropolymer Lined valves Design Attributes

Weir Type Diaphragm Valves are linear motion valves, bidirectional, for stopping or regulating the flow of the service fluid when necessary. Valves close by turning the handwheel clockwise. Valves are bolted bonnet, seatless design, with a diaphragm as closure element, with rising handwheel. Valves are offered with a broad range of diaphragms and linings materials to resist to abrasion and corrosion duties. The valves are inexpensive and easy to maintain, being the optimal solution for a large number of applications.



Yellow position indicator, for clear and positive valve position from any angle

Stem PTFE coat protection

Nameplate incl. batch no. for full traceability

Closure Diaphragms; manufactured from elastomeric and fluorocarbon materials; provide 100% seating tightness in both directions while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application

Ergonomic and rugged rising handwheel

Bolting in stainless steel

High quality fluoropolymer linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials

Raised face flange face in all fluoropolymer lined valves as standard

Precise compressor plate; guide and operates the diaphragm up and down

Witness hole for lining in DN150 and upper sizes

Main Features

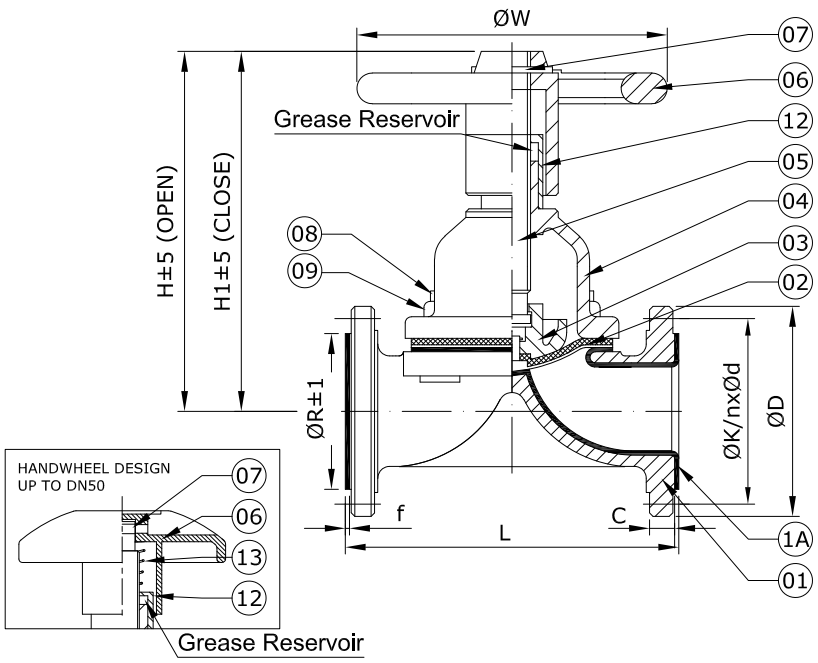
Valve design: EN 13397, EN 12516
Face to face length: EN 558 Series 1 (DIN 3202F1) or EN 558 Series 7 (BS 5156)
Valve end connections: - Flanged to EN 1092-2 type 21/B, PN10/16 (DN15-150)*; PN10 (DN200-300)
*(*valves DN65 with 4 holes as accepted variant in standard*)
option drilling to ASA150#
Marking: EN 19
Pressure Tests: EN 12266-1
Seat leakage rate: Rate A (full seat tightness in both directions)
Outside epoxy coating protection blue color similar to RAL5814 for Fluoropolymer lined. Min. average thickness 60µm
Product compliant with Directive 2014/68/EU on Pressure Equipment (PED) and Machinery Directive 2006/42/EC

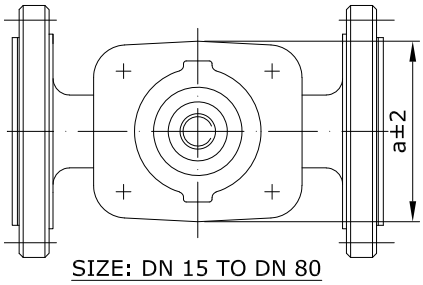
Options

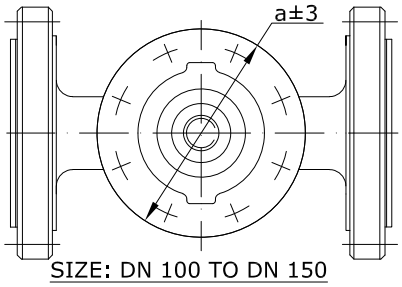
Other materials, other ratings and connexions, pneumatic or electric atuator, limit switches, sealed bonnet, interlocking arrangement, padlocking or handwheel hood to avoid non-authorized operation. Please consult us

Fluoropolymer lined valves with flanged ends

Main Parts and Materials







NO.	PART	MATERIAL	
1	BODY	Nodular Iron (GGG40.3)	
1A	LINING	PF	PFA
		ET	ETFE
		FE	FEP
2	DIAPHRAGM + BACKING	RUBBER	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
		PTFE + EPDM (D92) / PTFE + Butyl (D93) / PTFE + Viton (D97)	
3	COMPRESSOR	Cast Steel A216 Gr.WCB	

NO.	PART	MATERIAL
4	BONNET	Cast Steel A216 Gr.WCB
5	SPINDLE	Steel PTFE coated
6	HANDWHEEL	Cast Steel A216 Gr.WCB
7	H/W DOWEL PIN	Spring steel
8	BODY STUDS	St. Steel A2
9	BODY NUTS	St. Steel A2
12	POSITION INDICATOR SLEEVE	HDPE
13*	COMPRESOR SPRING	St. Steel

**For valves up to DN50*

Main Valve Parameters

	DN	15	20	25	32	40
L	EN 558 S7 (BS 5156)	114	123	133	152	165
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200
	H (open)	109	120	149	162	175
	H1 (close)	103	112	139	151	155
	f	3	3	3	3	3
	a	52	67	75	88	110
	ØW	100	100	120	120	120
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150
	C	14	16	16	18	18
	ØR	45	58	68	78	88
	nxØd	4x14	4x14	4x14	4x18	4x18
	ØK	65	75	85	100	110
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127
	C	11,5	11,5	11,5	13	14,5
	ØR	35	43	51	64	73
	nxØd	4x16	4x16	4x16	4x16	4x16
	ØK	60,3	69,8	79,4	88,9	98,4
Approx. Weight	EN 558 S7 (BS 5156)	3,2	3,4	4,7	7	8,5
	EN 558 S1 (DIN 3202 F1)	3,5	3,7	5	8,2	9,5

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Fluoropolymer lined valves with flanged ends

Main Valve Parameters

	DN	50	65	80	100	125	150
L	EN 558 S7 (BS 5156)	196	222	260	313	364	414
	EN 558 S1 (DIN 3202 F1)	230	290	310	350	400	480
	H (open)	190	253	243	327	392	462
	H1 (close)	166	218	203	276	328	384
	f	3	3	3	4	4	4
	a	127	146	190	Ø230	Ø265	Ø320
	ØW	164	220	240	270	270	360
FLANGED ENDS TO EN PN10	ØD	165	185	200	220	250	285
	C	20	20	22	24	26	26
	ØR	102	122	138	158	188	212
	nxØd	4x18	4x18	8x18	8x18	8x18	8x22
	ØK	125	145	160	180	210	240
FLANGED ENDS TO ASA150#*	ØD	152	178	191	229	254	279
	C	16	17,5	19,5	24	24	25,5
	ØR	92	105	127	157	186	216
	nxØd	4x19	4x19	4x19	8x19	8x22	8x22
	ØK	120,6	139,7	152,4	190,5	215,9	241,3
Approx. Weight	EN 558 S7 (BS 5156)	12	22	26	38	54	76
	EN 558 S1 (DIN 3202 F1)	13,3	22,5	28,5	40	57	81

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

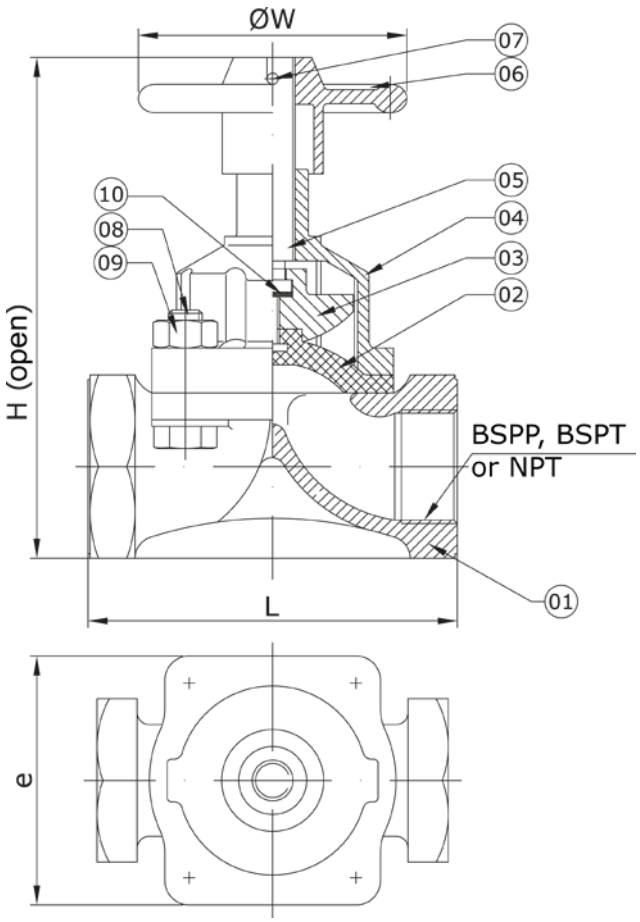
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Unlined threaded valves

Main Parts and Materials



NO.	PART		MATERIAL
1	BODY	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)
		WS_	St. steel
2	DIAPHRAGM	RUBBER	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
			PTFE + EPDM (D92) / PTFE + Butyl (D93) / PTFE + Viton (D97)
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	WC_	Cast iron EN-JL1040 (GG25)
		WD_	Ductile iron EN-JS1030 (GGG40)
		WS_	St. steel
5	SPINDLE		Steel
6	HANDWHEEL		Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN		Steel (EN42)
8	BODY STUDS		Steel
9	BODY NUTS		Steel
10	THRUST WASHER		Nylon

Main Valve Parameters

DN		10	15	20	25	32	40	50	65	80
L	(1)	50	66	85	110	124	140	165	203	254
	(2)	-	108	117	127	146	159	190	-	-
H (open)	(1)	70	70	105	122	148	155	183	212	256
	(2)	-	106	117	141	152	176	196	-	-
ØW	(1)	45	75	75	85	120	120	120	165	230
	(2)	-	100	100	120	120	120	164	-	-
e		42	52	67	75	88	110	127	146	190
Approx. Weight		1,2	1,5	2	3,2	4	6	8	11	18

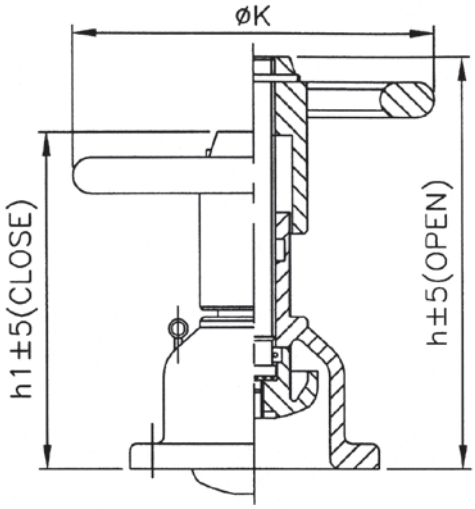
(1) Standard dimensions for cast and ductile iron valves
(2) Standard dimensions for st. steel valves

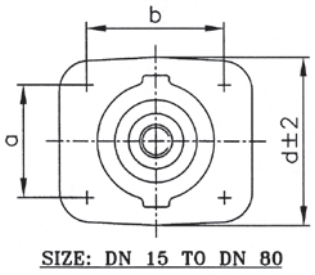
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

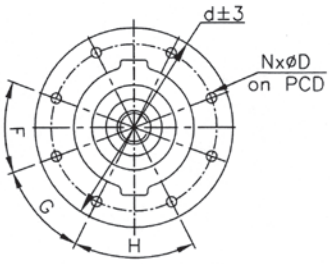
The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Main Bonnet Dimensions

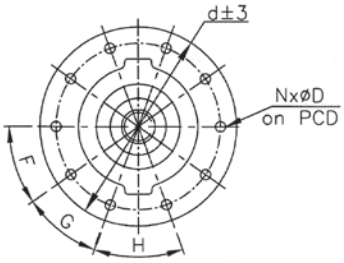




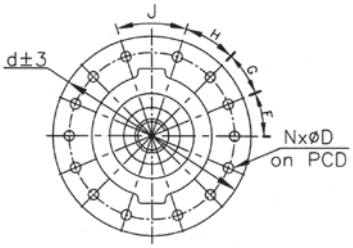
SIZE: DN 15 TO DN 80



SIZE: DN 100&125



SIZE: DN 150

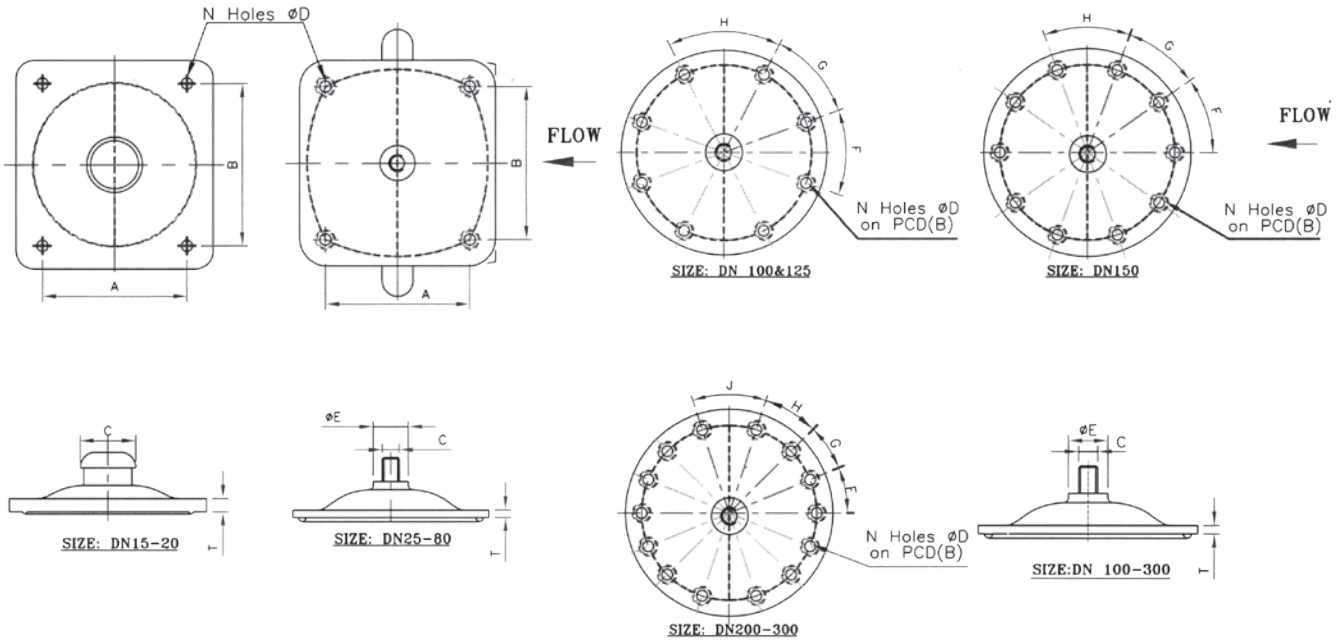


SIZE: DN 200 TO DN 300

DN	a	b ØPCD	d	h	h1	ØK	NxØD	Weight	ANGLES BETWEEN THE HOLES F	G	H	J
15	33	37	52	84	78	100	4x6,5	0,9	---	---	---	---
20	40	44	67	90	82	100	4x7	1,1	---	---	---	---
25	46	54	75	115	105	120	4x9	2,0	---	---	---	---
32	60	67	88	117	106	120	4x9	2,0	---	---	---	---
40	65	70	110	133	113	120	4x11	2,5	---	---	---	---
50	78	83	127	155	131	164	4x11	4,5	---	---	---	---
65	95	102	146	194	159	220	4x13	8,5	---	---	---	---
80	114	127	190	201	161	240	4x16,5	9,5	---	---	---	---
100		Ø194	Ø230	258	207	270	8x13	14,5	40º	42º	56º	---
125		Ø222	Ø265	307	243	270	8x16,5	18,5	43º20’	43º20’	50º	---
150		Ø273	Ø320	358	280	360	10x16	27,0	35º	35º	40º	---
200		Ø381	Ø420	549	429	460	14x16	63,0	22º30’	22º30’	27º	36º
250		Ø438	Ø502	697	552	600	14x21	90,0	22º30’	22º30’	22º30’	45º
300		Ø508	Ø569	804	629	700	14x21	147,0	24º	24º	24º	36º

Dimensions in mm subject to manufacturing tolerance / Weights in kg

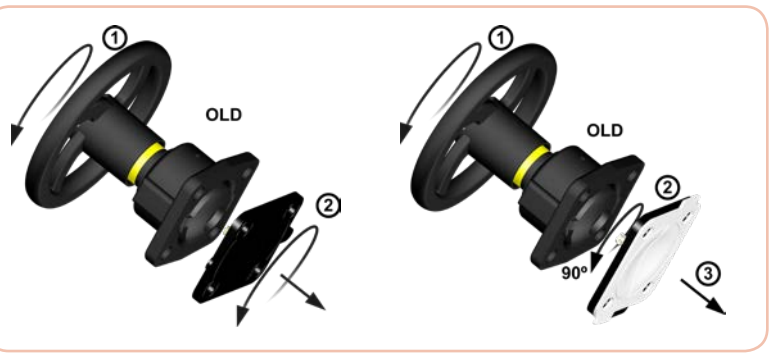
Main Spare Diaphragms Dimensions



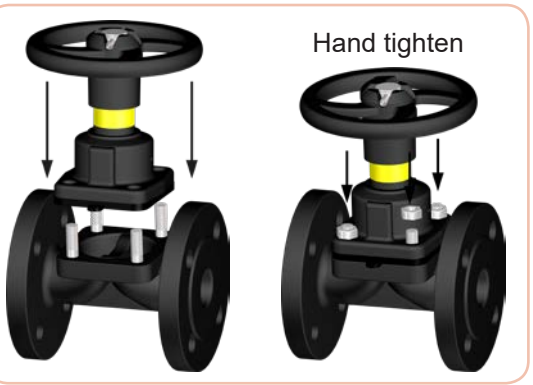
			DIMENSIONS OF DIAPHRAGM					ANGLES BETWEEN THE HOLES			
DN	**A**	**B**	**C**	**ØE**	**ØD**	**Nº HOLES**	**T**	**F**	**G**	**H**	**J**
15	33	37	Ø12.7	---	7.0	4	6.0	---	---	---	---
20	40	44	Ø12.7	---	8.5	4	6.5	---	---	---	---
25	46	54	1/4" BSW	18.0	9.5	4	6.15	---	---	---	---
32	60	67	1/4" BSW	18.0	10.0	4	7.5	---	---	---	---
40	65	70	1/4" BSW	22.2	11.5	4	7.5	---	---	---	---
50	78	83	1/4" BSW	25.6	11.5	4	7.5	---	---	---	---
65	95	102	5/16" BSW	29.0	14.0	4	7.5	---	---	---	---
80	114	127	5/16" BSW	32.0	18.0	4	8.0	---	---	---	---
100		Ø194	5/16" BSW	37.0	16.0	8	10.0	40º	42º	56º	---
125		Ø222	3/8" BSW	44.5	17.3	8	11.5	43º20'	43º20'	50º	---
150		Ø273	3/8" BSW	50.0	18.5	10	11.5	35º	35º	40º	---
200		Ø381	7/8" BSW	63.0	20.0	14	10.0	22º30'	22º30'	27º	36º
250		Ø438	7/8" BSW	76.0	22.0	14	14.0	22º30'	22º30'	22º30'	45º
300		Ø508	7/8" BSW	89.0	25.0	14	15.5	24º	24º	24º	36º

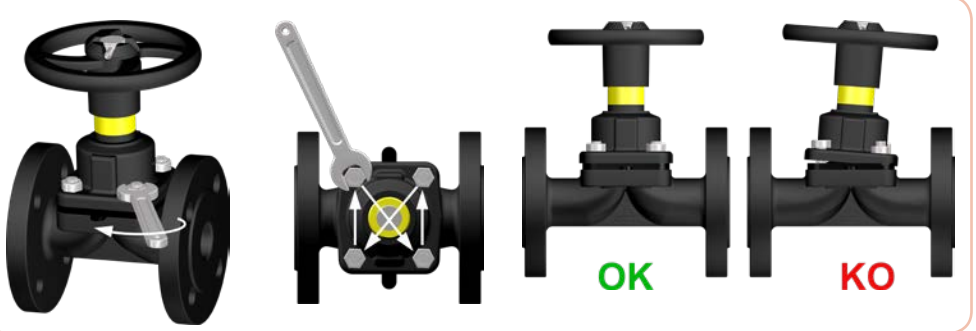
Dimensions in mm subject to manufacturing tolerance

Brief Guide of Instructions: Replacing an old diaphragm



Do not overtighten. Turn back some degrees to match holes





Weir Type Diaphragm Valves with Pneumatic Actuator

Main Features

- For DIAVAL manufactured valves in weir and straight through type, with rubber diaphragms and PTFE / rubber backed diaphragms.
- Rugged & compact design, long life span at the plant. Favourable size / performance ratio.
- Rolling diaphragm design, allowing long cycle operations.
- Single acting (Direct and reverse actions).
- High quality spring, large thrust.
- Visual position indicator for open / close.
- Burnished stem protected by bellow.
- Maintenance-free O-ring sealing with flexible guiding.
- Possibility of assembly of additional devices / accessories.
- Operating ambient temperatures -40ºC to +100ºC.
- Fully traceable at the manufacture facility, identified by aluminum riveted plates.
- Optional top mounted emergency hand wheels for manual operation.
- Compliant with Machinery Directive 2006/42/EC

DP Direct Acting

DP Reverse Acting

Working Principle

Direct Acting actuator is designed to operate from a normally open position. Air pressure on the top side of actuator diaphragm closes the valve and the spring opens the valve when the air is released from the actuator.

Reverse Acting actuator is designed to operate from a normally closed position. Air pressure on the bottom side of the actuator diaphragm opens the valve. When air is released spring closes the valve.

Control Accesories

There is a number of control accessories available to be assembled on to the ARI actuators. These accessories are comprehensive of limit switches (mechanical or inductive type), proximity sensors, solenoid valves, air speed regulators, positioners, air gauge sets… and many other customized solutions.
Control accessories may be specified and provided by the customer or by DIAVAL, however, only those accessories installed and tested at any DIAVAL facilities are covered by a performance guarantee.

Tests - After Market

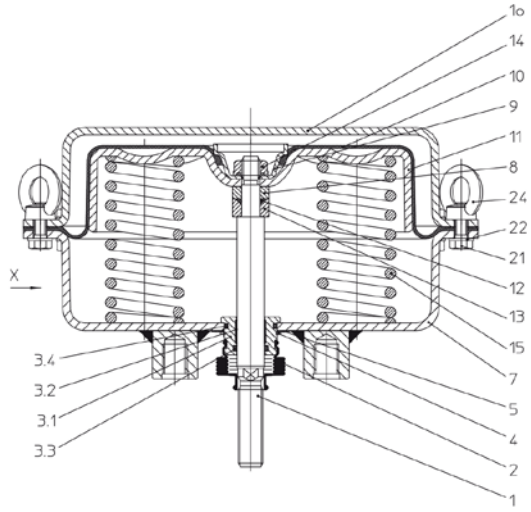
All actuators are tested after assembly and before dispatch. Tests are comprehensive of visual and functional tests as per EN-12266-1/DIN 3230 P.3 - EN.10.204/2.2
Actuators can be serviced at DIAVAL facilities where a stock of common spares is permanently available. Off site service engineers are available on demand and against usual service rates.

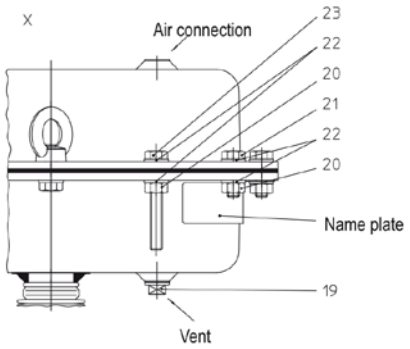
Operating and Maintenance Instructions

Please ensure that the DIAVAL Operating and Maintenance Instructions are provided by your supplier along with the valves. Do not try to start maintenance without having read and understood the Essential Safety Guidelines. Please consult us for further information.

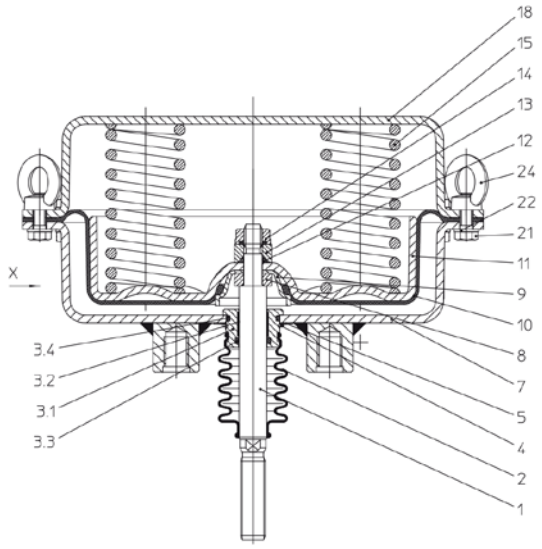
Standard Materials

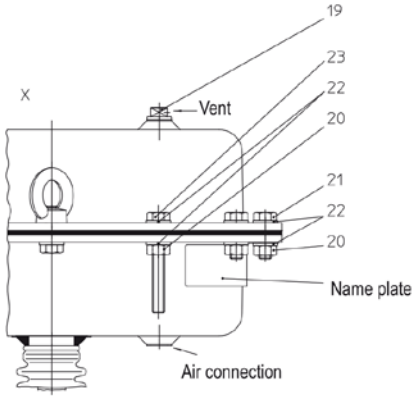
Only the best quality materials are incorporated to the DIAVAL manufacturing process and are subject to a strict quality control by our DIAVAL engineers at the assembly plant.





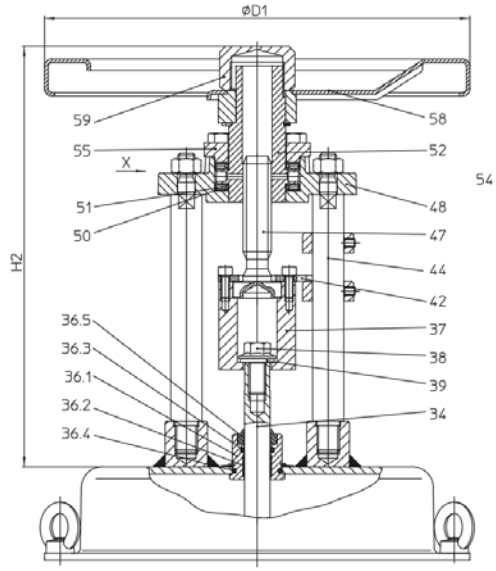
DP Direct Acting

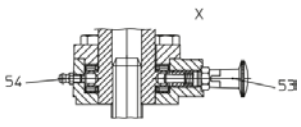




DP Reverse Acting

DP reverse & direct	DP30	DP32	DP33	DP34
Actuator weight (kg)	5	9	15	45





Dimensions and weights	DP30	DP32	DP33	DP34
ØD1	225	225	300	397
H2	284	284	297	458
Weight (with actuator)	10	14	20	62

Dimensions in mm subject to manufacturing tolerance / Weight in kg

Top Handwheel (Optional)

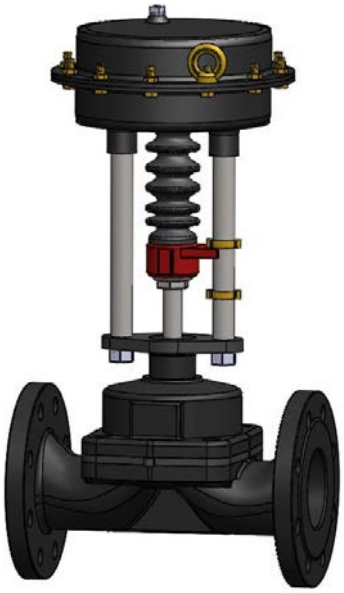
Standard Materials

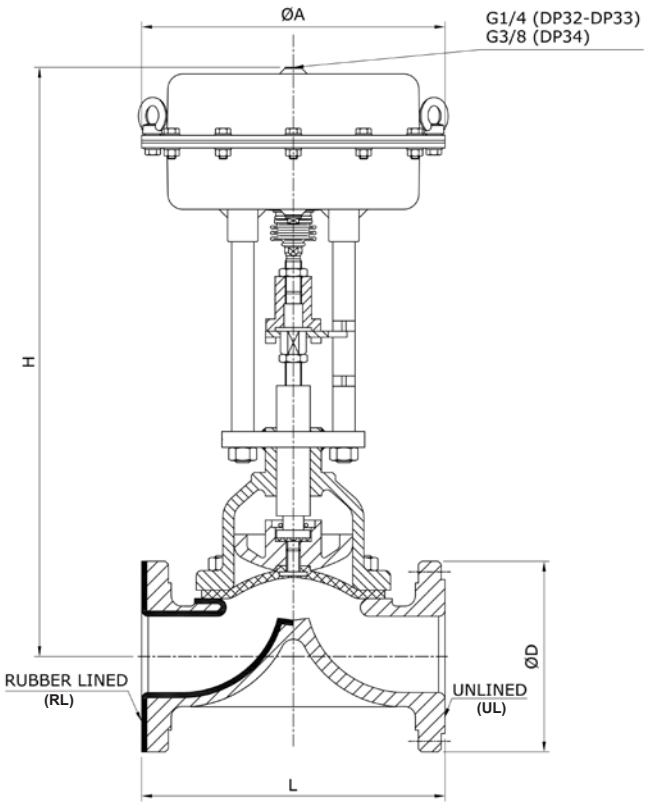
Pos.	Description	Material
1	Stem	X20Cr13+QT, 1.4021+QT
2	Bellow seal	EPDM50 or 42CR
3	Stem guiding *	X20Cr13+QT, 1.4021+QT
3.1	Stem guiding *	X20Cr13+QT, 1.4021+QT
3.2	Guiding band *	PTFE + 25%C
3.3	O-ring (stem) *	NBR
3.4	O-ring (guiding) *	NBR
3.5	Scraper *	NBR
4	Retaining ring	FSt - A3B
5	Spring plate	FSt (Fe/Zn12B)
6 / 7	Lower diaphragm casing (DP32-34Tri)	DD13+QT, 1.0335+QT (powder coated)
7	Lower diaphragm casing (DP35)	P265GH, 1.0425 / S235JR, 1.0037
8	Bushing	X20Cr13+QT, 1.4021+QT
9	Diaphragm lange	DD13+QT, 1.0335+QT (Fe/Zn12B) or X20Cr13+QT,
10	Rolling diaphragm *	NBR + webbing
11	Diaphragm plate (DP32-34Tri)	1.4021+QT
11	Diaphragm plate (DP35) *	DD13+QT, 1.0335+QT (Fe/Zn12B)
12	O-ring	St 52-3 G 03 g, 1.0570 G 03 g
13	Bushing	NBR
14	Flange nut	X20Cr13+QT, 1.4021+QT
15	Compression spring *	8 - A4G
16	Spring centring	FDSiCr
17	Spring centring	DC01, 1.0330 (Fe/Zn12B)
18	Upper diaphragm casing (DP32-34Tri)	St 52-3 G 03 g, 1.0570 G 03 g
18	Upper diaphragm casing (DP35)	DD13+QT, 1.0335+QT (powder coated)
19	Screwed cap	P265GH, 1.0425 / S235JR, 1.0037
20	Hexagon nut (DP32-34Tri) 1)	Polyäthylen
20	Hexagon nut (DP35) 1)	8 - A4G

Pos.	Description	Material
21	Hexagon screw (DP32-34Tri) 1)	C35E, 1.1181
21	Hexagon screw (DP35) 1)	8.8 - A4G
22	Washer	8.8 - A4G
23	Hexagon screw (DP32-34Tri) 1)	St - A4G
23	Hexagon screw (DP35) 1)	8.8 - A4G
24	Eye nut 1)	10.9 - A2G
34	Stem extension	8-A4G
36.1	Bellow seal *	X20Cr13+QT, 1.4021+QT
36.2	Guiding band *	X14CrMoS17+QT, 1.4104+QT
36.3	O-ring *	PTFE +25%C
36.4	O-ring *	NBR
36.5	Scraper *	NBR
37	Bushing	NBR
38	Hexagon screw	X20Cr13+QT, 1.4021+QT
39	Washer	8.8 - A4G
42	Torsion lock	X20Cr13+QT, 1.4021+QT
44 1	Distance column	8.8 - A4G
47	Stem	1SMn30+C, 1.0715+C (Fe/Zn12B)
48	Traverse	X20Cr13+QT, 1.4021+QT
50	Axial-washer	EN-JS1049, EN-GJS-400-18U-LT (Fe/Zn12B)
51	Axial-dial ring	St
52	Threaded bush	St
53	Catch pin	CuZn35Ni3Mn2Al-Pb-R490, CW710RR490
54	Lubricating nipple	St, Cu
55	Covering for traverse	5.8 - A4G
58	Handwheel	S235JR, 1.0037 (Fe/Zn12B)
59	Safety cap	Fe P01, 1.0330 (epoxy coating)

Weir Type Diaphragm Valves with Direct Acting Pneumatic Actuator- Rubber Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	415	95	250
20	150	117	123	427	105	250
25	160	127	133	434	115	250
32	180	146	152	444	140	250
40	200	159	165	476	150	250
50	230	190	196	471	165	250
65	290	216	222	503	185	250
80	310	254	260	520	200	250
100	350	305	313	736	220	405
125	400	356	364	786	250	405
150	480	406	414	856	285	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Direct Acting (actuator opens at air failure, springs to open/air to close).

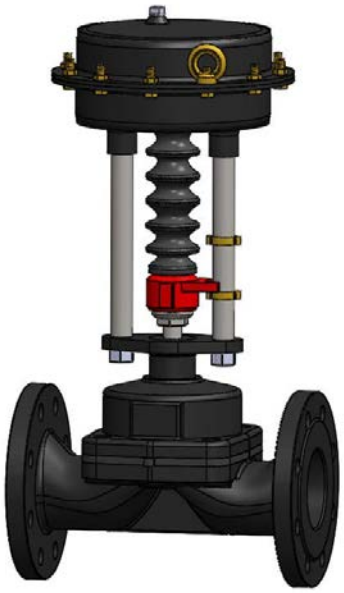
Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Close (bar)
DN15	DP32021020NA	10	10	1,5-2,0
DN20	DP32021020NA	10	10	1,5-2,0
DN25	DP32021020NA	10	10	2,0-2,5
DN32	DP32021020NA	10	10	2,0-2,5
DN40	DP32021020NA	10	10	2,0-2,5
DN50	DP32021020NA	10	10	2,0-2,5
DN65	DP32021020NA	8	8	3,0-3,5
DN80	DP32021030NA	8	8	3,5-4,0
DN100	DP34021050NA	8	8	2,5-3,5
DN125	DP34021050NA	8	8	3,5-4,5
DN150	DP34021065NA	6	6	4,0-5,0

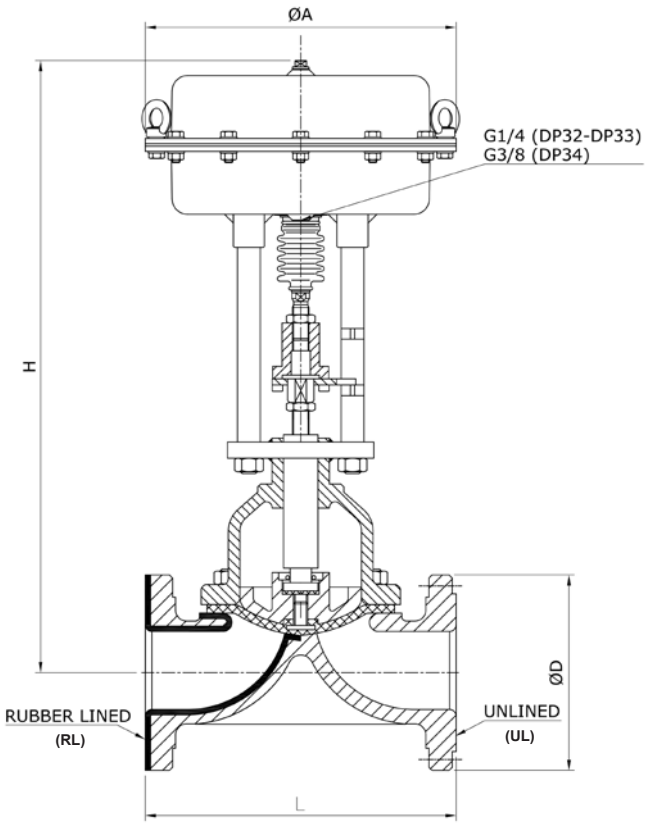
Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Weir Type Diaphragm Valves with Reverse Acting Pneumatic Actuator- Rubber Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	415	95	250
20	150	117	123	427	105	250
25	160	127	133	434	115	250
32	180	146	152	444	140	250
40	200	159	165	476	150	250
50	230	190	196	471	165	250
65	290	216	222	503	185	250
80	310	254	260	520	200	250
100	350	305	313	736	220	405
125	400	356	364	786	250	405
150	480	406	414	856	285	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Reverse Acting (actuator closes at air failure, air to open/spring to close).

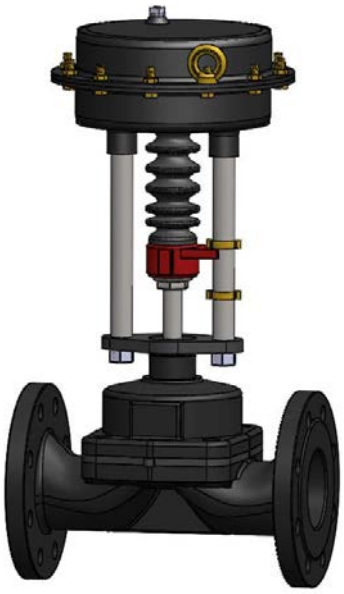
Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Open (bar)
DN15	DP32041220NC	10	9	2,0-2,5
DN20	DP32041220NC	10	9	2,0-2,5
DN25	DP32082420NC	10	9	3,0-3,5
DN32	DP32082420NC	10	9	3,0-3,5
DN40	DP32082420NC	9	7	3,0-3,5
DN50	DP32082420NC	8	6	3,0-3,5
DN65	DP32152520NC	8	6	3,0-3,5
DN80	DP33153030NC	8	6	4,0-4,5
DN100	DP34153050NC	8	6	4,0-4,5
DN125	DP34204050NC	7	4	5,0-5,5
DN150	DP34204065NC	6	3	5,0-5,5

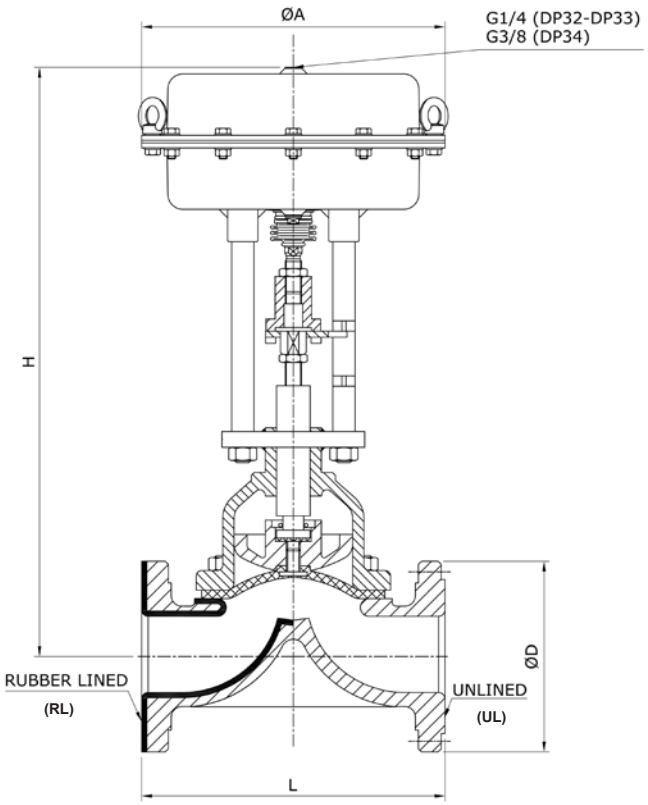
Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Weir Type Diaphragm Valves with Direct Acting Pneumatic Actuator- PTFE Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	415	95	250
20	150	117	123	427	105	250
25	160	127	133	434	115	250
32	180	146	152	444	140	250
40	200	159	165	476	150	250
50	230	190	196	471	165	250
65	290	216	222	503	185	250
80	310	254	260	520	200	250
100	350	305	313	736	220	405
125	400	356	364	786	250	405
150	480	406	414	856	285	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Direct Acting (actuator opens at air failure, springs to open/air to close).

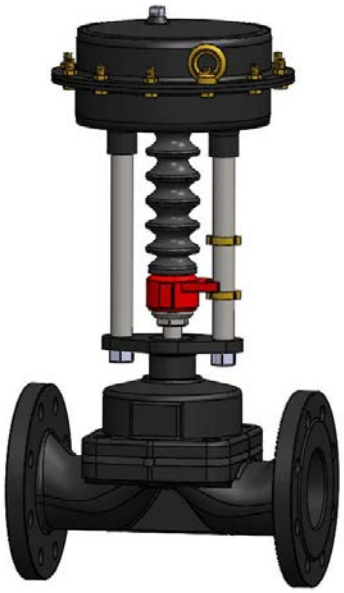
Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Close (bar)
DN15	DP32021020NA	6	6	2,0-2,5
DN20	DP32021020NA	6	6	2,0-2,5
DN25	DP32021020NA	6	6	2,5-3,0
DN32	DP32021020NA	6	6	2,5-3,0
DN40	DP32021020NA	6	6	3,0-3,5
DN50	DP32021020NA	6	6	3,5-4,0
DN65	DP32021020NA	6	5	4,5-5,0
DN80	DP32021030NA	6	4	5,0-5,5
DN100	DP34021050NA	6	4	4,5-5,0
DN125	DP34021065NA	6	4	4,5-5,0
DN150	DP34021065NA	5	3	5,0-5,5

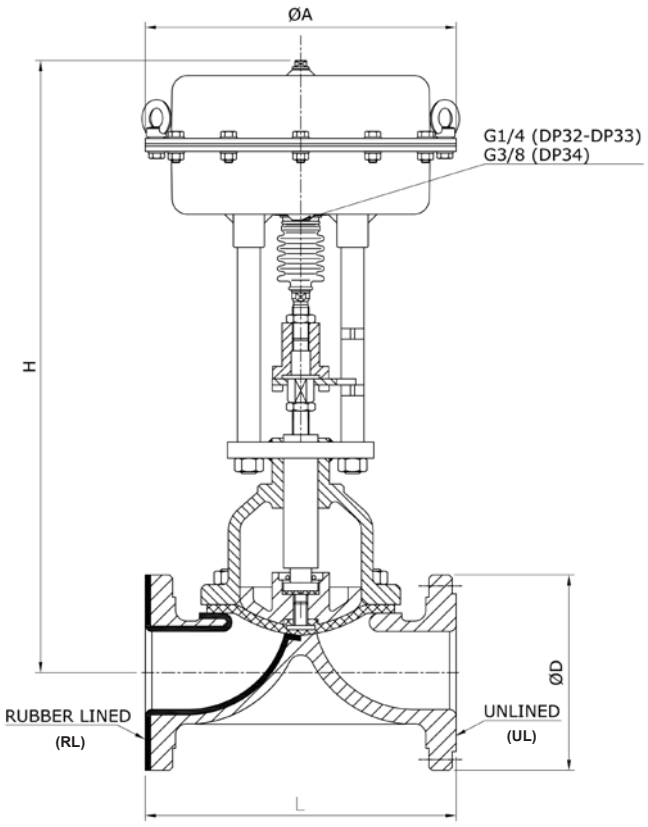
Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Weir Type Diaphragm Valves with Reverse Acting Pneumatic Actuator- PTFE Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	415	95	250
20	150	117	123	427	105	250
25	160	127	133	434	115	250
32	180	146	152	444	140	250
40	200	159	165	476	150	250
50	230	190	196	471	165	250
65	290	216	222	503	185	250
80	310	254	260	520	200	250
100	350	305	313	736	220	405
125	400	356	364	786	250	405
150	480	406	414	856	285	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Reverse Acting (actuator closes at air failure, air to open/spring to close).

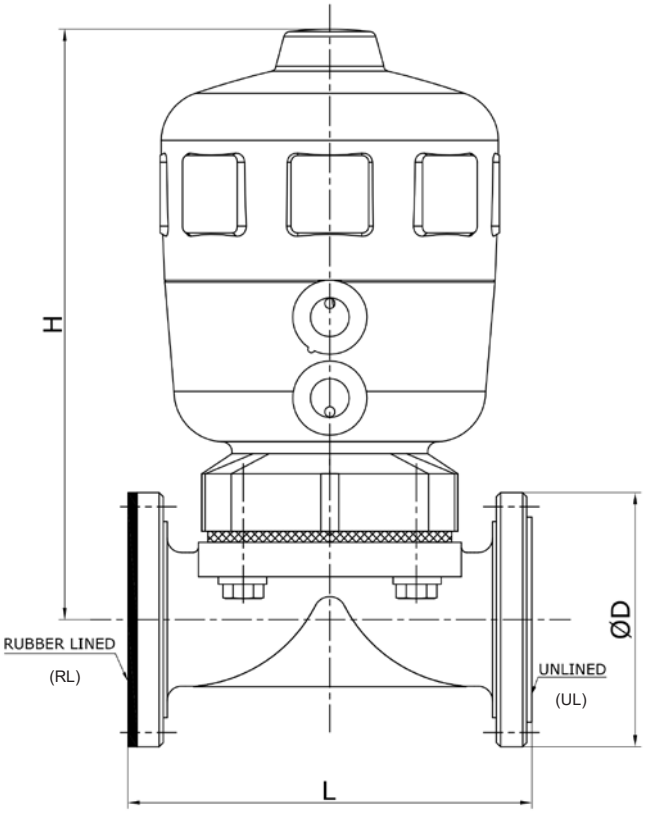
Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Open (bar)
DN15	DP32041220NC	6	6	2,0-2,5
DN20	DP32041220NC	6	6	2,0-2,5
DN25	DP32082420NC	6	6	3,0-3,5
DN32	DP32082420NC	6	6	3,0-3,5
DN40	DP32152920NC	6	4	3,0-3,5
DN50	DP32152920NC	6	4	3,5-4,0
DN65	DP33153030NC	6	4	4,0-4,5
DN80	DP33204030NC	6	4	4,5-5,0
DN100	DP34204050NC	6	4	5,0-5,5
DN125	DP34204065NC	6	4	5,0-5,5
DN150	DP34204065NC	5	3	5,0-5,5

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Piston Pneumatic Actuator

Main Dimensions



Actuator shell material:
PA Polyamide
Temperature: -10ºC to 60ºC*

*For higher temperature also available PPS Polyphenylene sulfide version

DN	L			H (rubber diapfragm)	H (ptfe diaphragm)	Port connection	ØD
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)					
	UL/RL	UL	RL				
15	130	108	114	127	132	1/8" BSPP	95
20	150	117	123	148	153	1/4" BSPP	105
25	160	127	133	169	174	1/4" BSPP	115
32	180	146	152	224	229	1/4" BSPP	140
40	200	159	165	225	270	1/4" BSPP	150
50	230	190	196	230	275	1/4" BSPP	165
65	290	216	222	274	381	1/4" BSPP	185

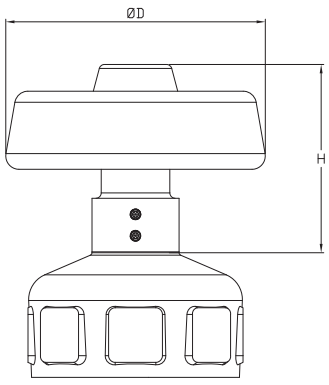
Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Accesories

Manual Override



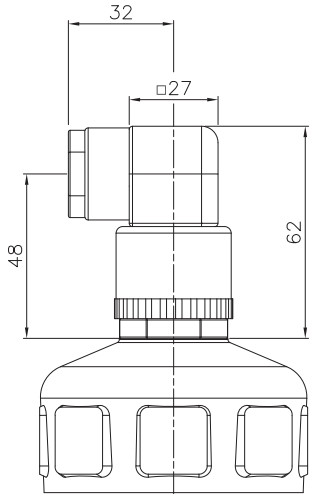
VALVE SIZE	Code	ØD	H
DN 15-25	B636822	80	68
DN 32-65	B636823	150	82

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

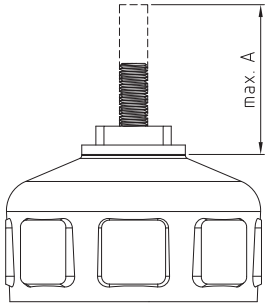
Accesories

Electrical feedback signaller



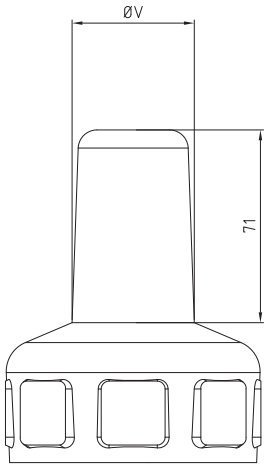
VALVE SIZE	CODE
DN15-25	B701515
DN32-65	B701516

Max. stroke limitation



VALVE SIZE	CODE	max. A
DN15-25	B637866	40
DN32-50	B637867	55
DN65	B637868	55

Min./max. stroke limitation



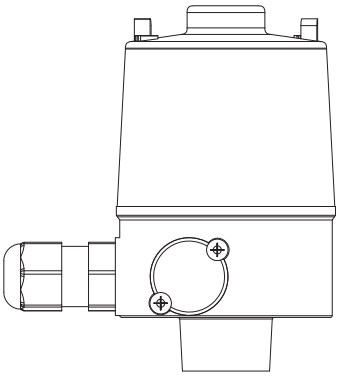
VALVE SIZE	CODE	øV
DN15-25	B636820	39
DN32-50	B636821	53
DN65	B640703	53

In combination with limit switch box series 8697

VALVE SIZE	CODE	øV
DN15-20	B689353	39
DN25	B689354	53
DN32-65	B689355	53

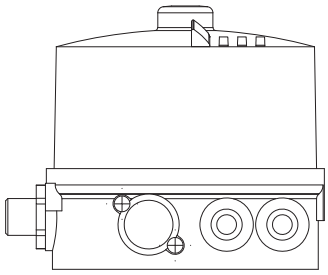
Accesories

Limit switch box series 8697



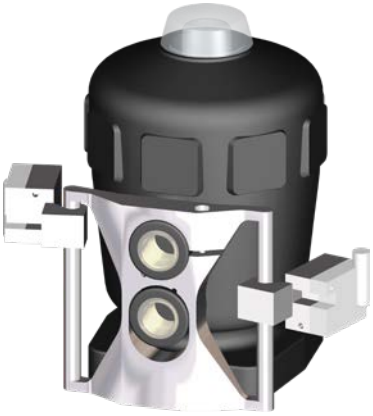
CODE	DESCRIPTION
B248833	2 micro switch 24VDC
B248825	2 micro switch 50-250VAC/DC
B248826	2 inductive detectors 24Vdc, PNP, 3 wire, with LEDs
B248827	2 inductive detectors NAMUR, 8,2Vdc, 2 wire, with LEDs
B248831	2 inductive detectors schileßer, 2 wire, with LEDs

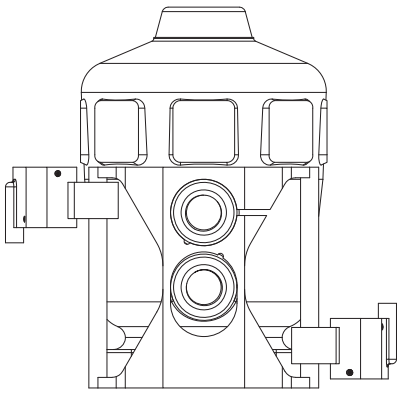
Limit switch box series 8690



CODE	DESCRIPTION
B227236	2 micro swtich 24VDC
B265146	2 inductive detector 3 wires, 24Vdc, PNP
B248831	2 induct. detectors NAMUR, 8Vdc, zone 21/1

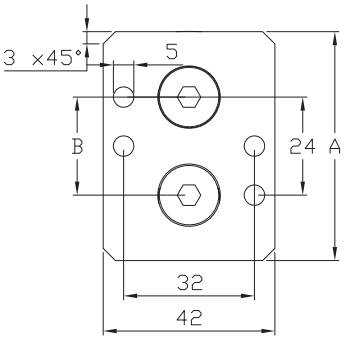
External magnetic inductive position feedback





VALVE SIZE	CODE
DN15	B2FCINME3MP050
DN20	B2FCINME3MP063
DN25	B2FCINME3MP080
DN32-50	B2FCINME3MP100
DN65	B2FCINME3MP125

Namur-adapter for pilot valves



VALVE SIZE	CODE	A	B
DN20-50	B637113	46	24
DN65	B637114	58	30

Actuation Selection Chart - Single Acting - Rubber Diaphragm

Reverse Acting (actuator closes at air failure, air to open/spring to close).

Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Open (bar)
DN15	BNC14869700015	8	7	5
DN20	BNC14267100020	10	8	5.5
DN25	BNC142497K0025	10	8.5	5.5
DN32	BNC142499V0032	10	9	5.5
DN40	BNC142500A0040 BNC14350200040*	6	5	5.5
DN50	BNC142502Y0050 BNC14368800050*	4	3.5	5.5
DN65	BNC142730F0065 BNC14836100065*	7	4.5	5.5

**For valves with laminated PTFE diaphragm*

Direct Acting (actuator opens at air failure, spring to open/air to close).

Valve Size	Actuator Type	Max. Closing Pressure (bar)	Air Supply to Close (bar)
DN15	BNA16926800015	10	4,5
DN20	BNA14377100020	10	4,5
DN25	BNA14377400025	10	5,5
DN32	BNA14377500032	10	5
DN40	BNA14377600040	10	6,5
DN50	BNA14377800050	5,5 8	6 8
DN65	BNA16502400065	8 10	6 7

Actuation Selection Chart - Double Acting - Rubber Diaphragm

Valve Size	Actuator Type	Max. Closing Pressure (bar)	Air Supply to Close (bar)
DN15	BDE14143500015	10	3,5
DN20	BDE14143700020	10	2,5
DN25	BDE14143900025	10	2,5
DN40	BDE14659200040	10	4,5
DN50	BDE14144600050	6 8	6 8
DN65	BDE16185400065	8 10	6 7

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Straight Through Type Diaphragm Valves

Codification

S	D	0	0	D	I	1	0	D	1	0	0	5	0

BODY DESIGN	
W	Weir
S	Straight Through
F	Full Flow

BODY/BONNET MATERIAL	
C	Cast iron
D	Ductile iron
A	Carbon steel
S	St. steel 316
I	Chr. iron 24%
J	Chr. iron 30%
B	Bronze
K	St. steel 316L
E	St. steel 304
M	Monel
H	Hastelloy
X	St. steel 1.4435
Y	St. steel 1.4435 BN2

BODY BASE MATERIAL	
00	Unlined
HR	Hard rubber
SR	Soft rubber
BR	Butyl rubber
ER	EPDM rubber
NL	Neoprene rubber
HY	Hypalon® rubber
PF	PFA
FE	FEP
ET	ETFE
HL	Halar®
LN	Linatex

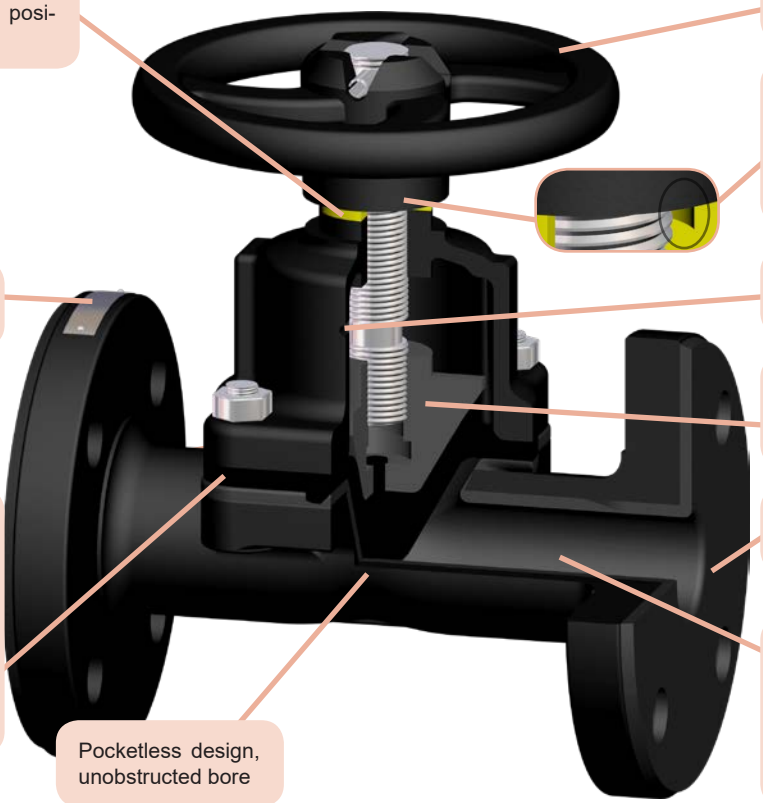
FACE TO FACE/DRILLING	
DI10	DIN3202F1 PN10
AS15	BS5156 ASA 150
BS10	BS5156 PN10
0B SP00	Threaded BSPP
0B ST00	Threaded BSPT
0N PT00	Threaded NPT

DIAPHRAGM/SEALING	
D10	Natural rubber
D15	White natural rubber
D20	EPDM
D2V	EPDM vacuum service
D30	Butyl
D40	NBR
D4V	NBR vacuum service
D50	Neoprene
D60	Hypalon
D70	Viton
D92	PTFE/EPDM
D93	PTFE/Butyl
D97	PTFE/Viton
DLN	Linatex
D9E	Laminated PTFE with EPDM back

SIZE	
015	DN15
050	DN50
100	DN100

Design Attributes

Straight Through Type Diaphragm Valves are linear motion valves, bidirectional, for stopping the flow of the service fluid when necessary, not being suitable for regulation purposes. Valves close by turning the handwheel clockwise. Valves are bolted bonnet, seatless design, with a diaphragm as closure element, with rising handwheel. Valves are offered with a broad range of diaphragms and linings materials to resist to abrasion and corrosion duties. Their straight passage makes them more suitable for on/off applications in comparison to Weir Type, when low pressure drop is required or in case of abrasive media. The valves are inexpensive and easy to maintain, being the optimal solution for a large number of applications.



Yellow position indicator, for clear and positive valve position from any angle

Ergonomic and rugged rising handwheel

Grease reservoir integrated in the spindle chamber that lubricates the spindle along operations thus avoiding valve spindle jamming

Nameplate incl. batch no. for full traceability

Witness hole to detect leakage at diaphragm failure

Precise compressor plate; guides and operates the diaphragm up and down

Closure Diaphragms; manufactured from elastomeric materials; provide 100% seating tightness in both directions while isolating the valve trim from fluid. Wide choice of polymers to satisfy any industrial application

Full rubber flange face in all rubber lined valves as standard

Porousless linings; provides the application engineer with a wide choice of linings of high chemical and abrasion resistance without need of expensive basic metal valve materials

Pocketless design, unobstructed bore

Main Features

Valve design: EN 13397, EN 12516
Face to face length: EN 558 Series 1 (DIN 3202F1) or EN 558 Series 7 (BS 5156)
Valve end connections: Flanged to EN 1092-2 type 21/B, PN10/16 (DN15-150); PN10 (DN200-300)
(*valves DN65 with 4 holes as accepted variant in standard*)
option drilling to ASA150#
- Female threaded ends to ISO 228-1 (DIN 259-BSPP) / ISO 7-1 (DIN 2999-BSPT) / ASME B1.20.1 (NPT)

Marking: EN 19
Pressure Tests: EN 12266-1
Seat leakage rate: Rate A (full seat tightness in both directions)
Inside and outside primer paint layer black color for protection during storage and transport.
Epoxy coating for Fluoropolymer lined. Min. average thickness 60µm
Product compliant with Directive 2014/68/EU on Pressure Equipment (PED) and Machinery Directive 2006/42/EC

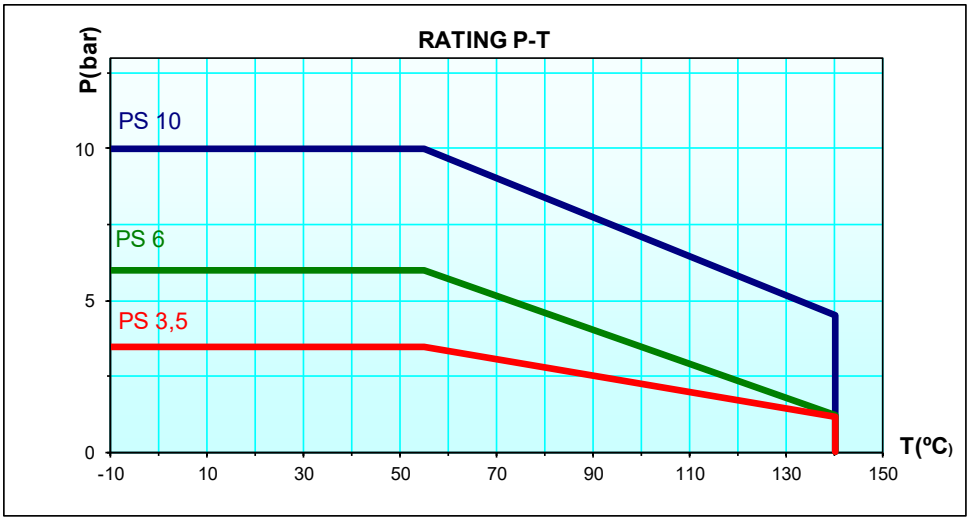
Options

Other materials, other ratings and connections, pneumatic or electric atuator, limit switches, sealed bonnet, interlocking arrangement, padlocking or handwheel hood to avoid non-authorized operation. Please consult us

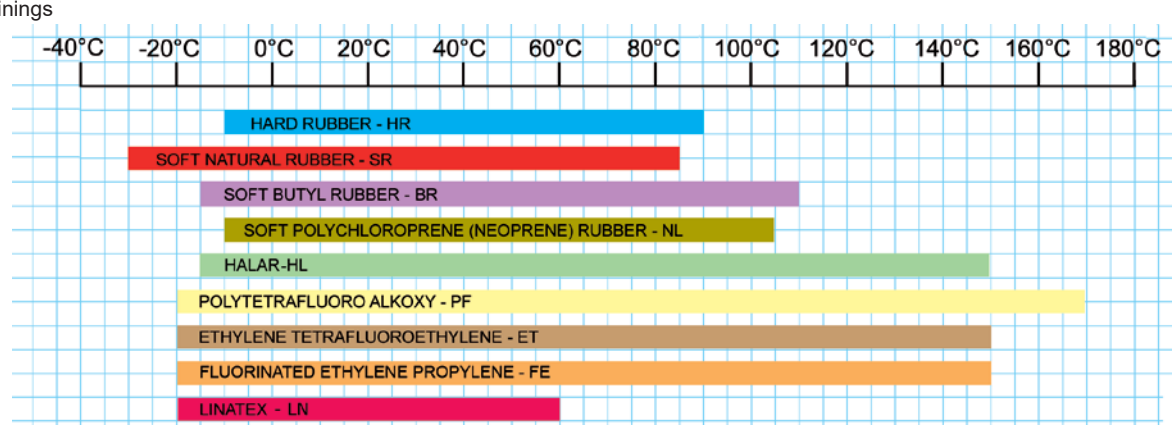
Main Duties / Limits of use

Liquids compatible with materials of construction, acc. to Directive 2014/68/EU, Annex II tables 8 (group 1*) & 9 (group 2*) up to category I
PS 10 bar DN15-100 (Art.4-Parr.3)
PS 6 bar DN125-150 (Art.4-Parr.3)
PS 3,5 bar DN200-300 (Art.4-Parr.3)
Combination of Body + Lining + Diaphragm determines the P-T limit of use of the valve
Questions referring to chemical resistance, please consult us
Observe also pressure/temperature limits on diagrams under
**Classification of fluids (group 1 or 2) acc. to Directive 2014/68/EU, Article 13*

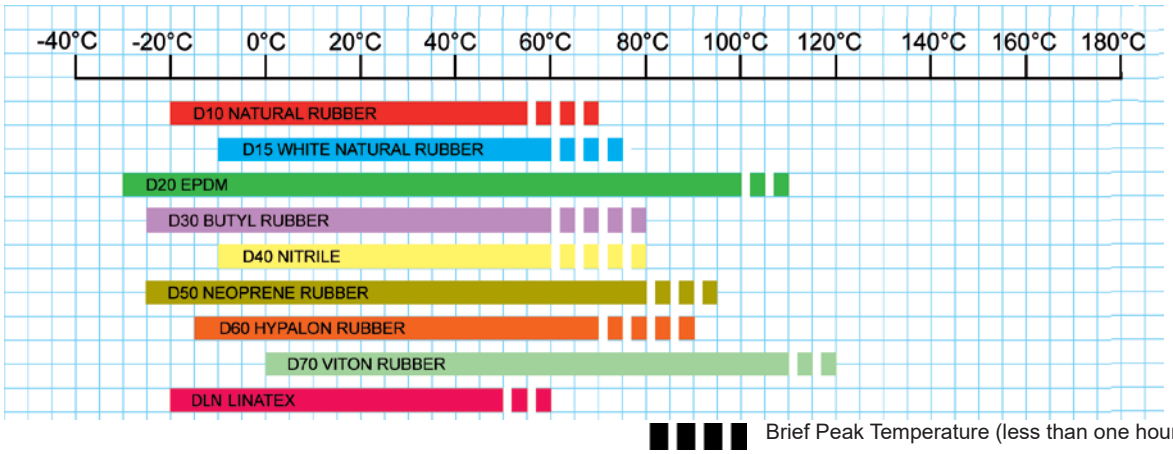
Bodies (Ductile iron)



Linings



Diaphragms



■■■■ Brief Peak Temperature (less than one hour)

Temperature values are for neutral fluids and not plotted against any pressure parameter, the application engineer should consider that working limits are affected by the actual pressure / temperature relationship.Temperature values also depends on medium through the valve.

Valves Flow Data

A valve flow coefficient represents the standard flow rate which flows through the valve at a given opening, referred to pre-established conditions:

* Kv value is the volume of water at 20ºC, in cubic meters per hour (m3/h), that will flow through the valve at a static pressure drop of 1 bar across the valve

* Cv value is the volume of water at 60ºF, in gallons per minute (gpm), that will flow through the valve at a static pressure drop of 1 psi across the valve

Conversion from Kv to Cv can be roughly calculated by means of the following expression:
Cv = Kv x 1,17

Flow rate through the valve with other liquids can be calculated with the following expressions

Kv = q (SG / dp)1/2
where
q = water flow (cubic meter per hour)
SG = specific gravity (1 for water)
dp = pressure drop (bar)

Cv = q (SG / dp)1/2
where
q = water flow (US gallons per minute)
SG = specific gravity (1 for water)
dp = pressure drop (psi)

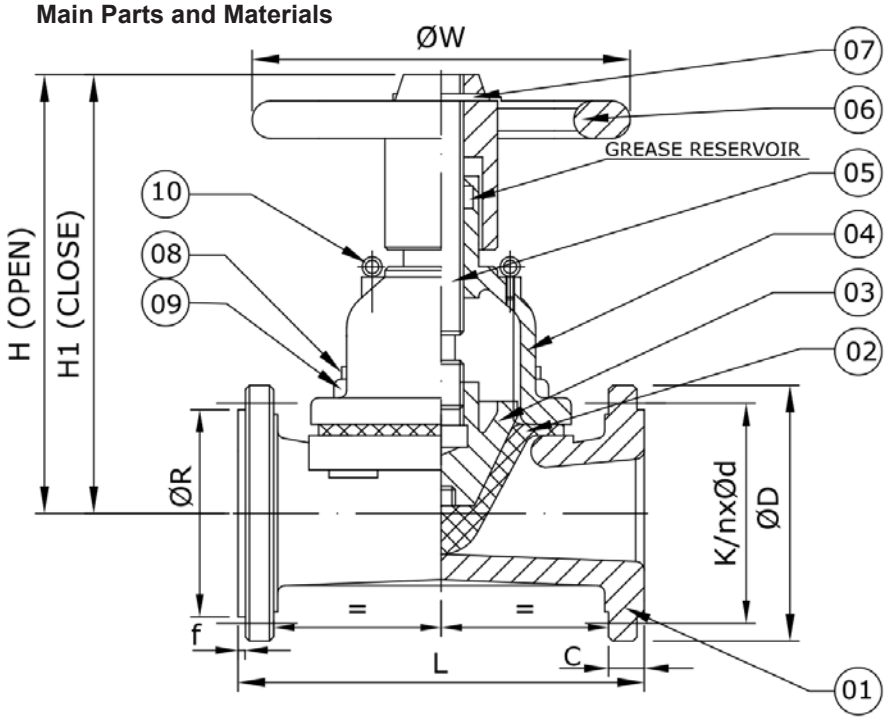
Straight Through Kv (m^3/h) values with valve fully open *

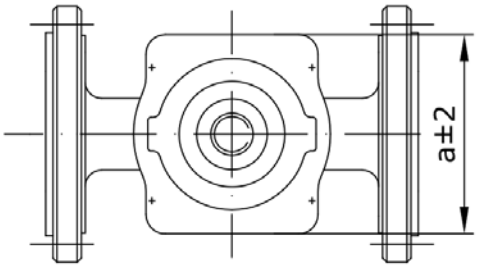
DN mm	Ductile iron	Rubber Lined	Halar® Lined
15	7,5	5,5	7,6
20	18	13,5	18,5
25	32	26	33
32	47	39	48
40	64	56	67
50	110	90	116
65	204	165	214
80	293	222	302
100	504	406	524
125	792	618	813
150	1440	1105	1510
200	2211	1895	2290
250	3446	2960	3596
300	5168	4250	5314

*Since Straight Through Diaphragm Valves are only suitable for on/off service we only provide Kv values for valves fully open.

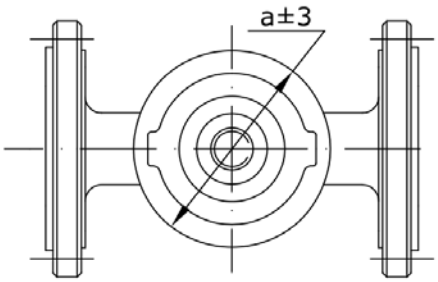
Unlined valves with flanged ends

Main Parts and Materials





SIZE: DN 15 TO DN 80



SIZE: DN 100 TO DN 300

NO.	PART		MATERIAL
1	BODY	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)
2	DIAPHRAGM	Rubber	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)

NO.	PART	MATERIAL
5	SPINDLE	Steel
6	HANDWHEEL	Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN	Steel (EN42)
8	BODY STUDS	Steel
9	BODY NUTS	Steel
10	EYE BOLT*	Steel

* Only for some sizes

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	108	114	127	146	159	190	216
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	110	108	132,5	130,5	131,5	194,5	220
	H1 (close)	102	100	120	118	119	177	196
	a	71	71	85	85	85	115	130
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	ØR	45	58	68	78	88	102	122
	f	2	2	2	2	3	3	3
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13	14,5	16	17,5
	ØR	35	43	51	64	73	92	105
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	3,3	3,6	4,3	6,5	7	10,5	15,5
	EN 558 S1 (DIN 3202 F1)	3,8	4	4,8	7,5	8	11,5	16,5

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Unlined valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	254	305	356	406	521	635	749
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	245	265	342	452	475,5	595,5	748
	H1 (close)	228	245	305	404	413	523	653
	a	171	Ø200	Ø234	Ø290	Ø350	Ø430	Ø512
	ØW	240	270	318	360	460	525	600
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	ØR	138	158	188	212	268	320	370
	f	3	3	3	3	3	3	4
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#*	ØD	191	229	254	279	343	406	483
	C	19,5	24	24	25,5	29	30,5	32
	ØR	127	157	186	216	270	324	381
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x19	8x19	8x22	8x22	8x22	12x26	12x26
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	22,5	30	44	63	112	170	258
	EN 558 S1 (DIN 3202 F1)	25,5	32	46	69	126	185	273

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

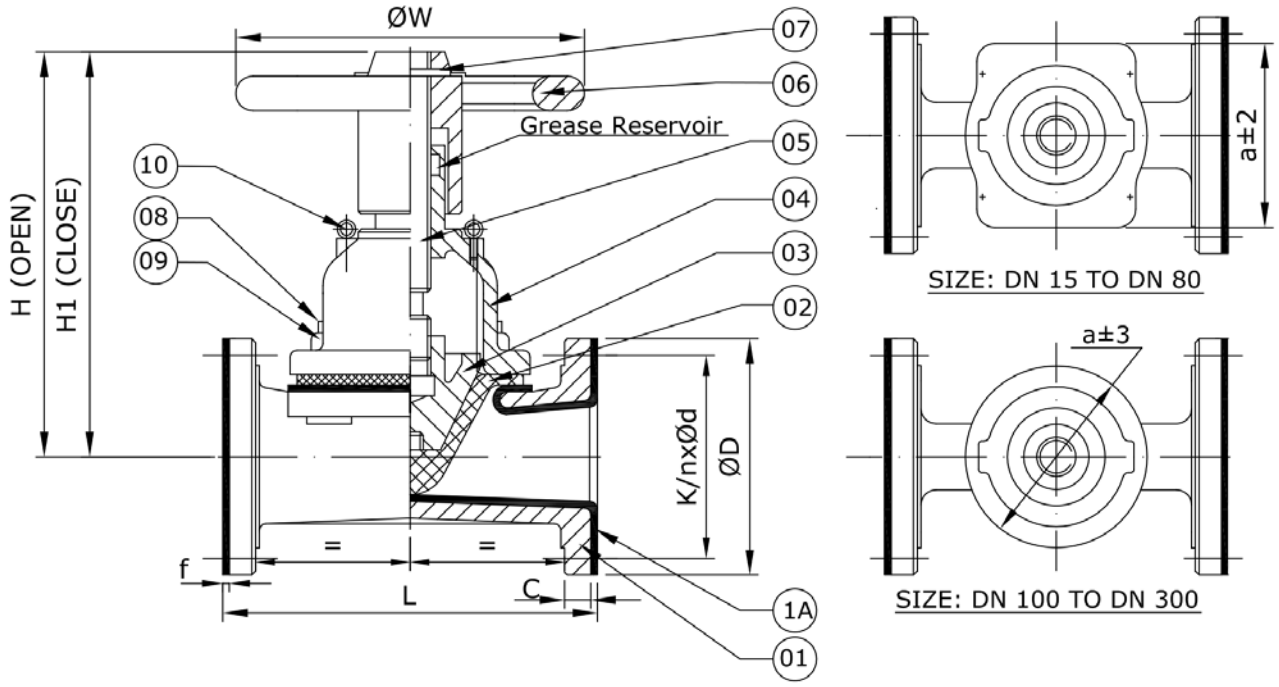
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Rubber lined valves with flanged ends

Main Parts and Materials



NO.	PART		MATERIAL
1	BODY	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)
1A	LINING	_HR_	Hard rubber
		_SR_	Soft rubber
		_BR_	Butyl rubber
		_ER_	EPDM rubber
		_NL_	Neoprene rubber
2	DIAPHRAGM	Rubber	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)

NO.	PART		MATERIAL
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)
5	SPINDLE		Steel
6	HANDWHEEL		Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN		Steel (EN42)
8	BODY STUDS		Steel
9	BODY NUTS		Steel
10	EYE BOLT*		Steel

* Only for some sizes

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	114	123	133	152	165	196	222
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	113	111	135,5	133,5	134,5	197,5	223
	H1 (close)	105	103	123	121	122	180	199
	f	3	3	3	3	3	3	3
	a	71	71	85	85	85	115	130
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13,0	14,5	16,0	17,5
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	3,6	4	4,5	7	8	12	17
	EN 558 S1 (DIN 3202 F1)	4,1	4,5	5,0	8	9	13,5	18

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Rubber lined valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	260	313	364	414	529	643	757
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	251	271	346	456	479,5	598,5	752
	H1 (close)	233	250	309	408	417	527	657
	f	3	4	4	4	4	4	4
	a	171	Ø200	Ø234	Ø290	Ø350	Ø430	Ø512
	ØW	240	270	318	360	460	525	600
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#*	ØD	191	229	254	279	343	406	483
	C	19,5	24,0	24,0	25,5	29,0	30,5	32,0
	nxØd	4x19	8x19	8x22	8x22	8x22	12x26	12x26
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	24	32	46	65	115	175	263
	EN 558 S1 (DIN 3202 F1)	27	34	48	71	121	190	278

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

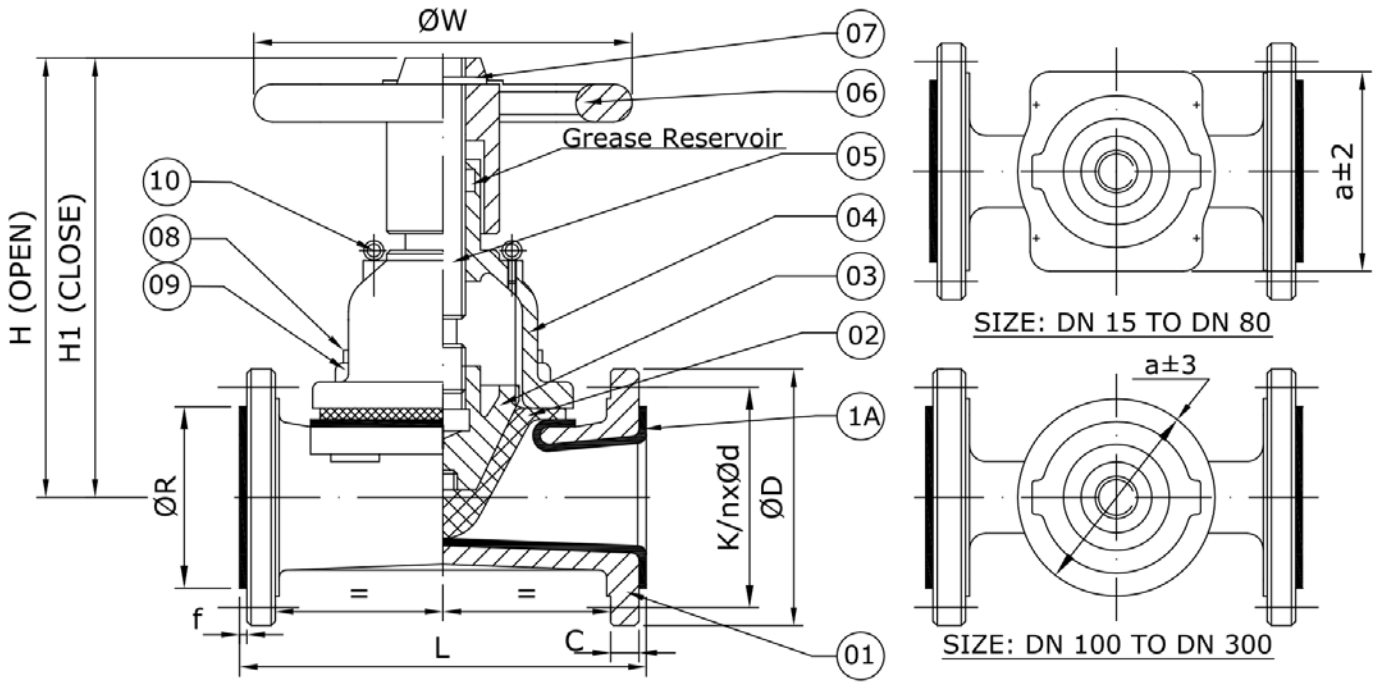
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Fluoropolymer lined valves with flanged ends

Main Parts and Materials



NO.	PART		MATERIAL
1	BODY		Ductile iron EN-JS1030 (GGG40)
1A	LINING	_PF_	PFA
		_FE_	FEP
		_ET_	ETFE
2	DIAPHRAGM	Rubber	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)

NO.	PART	MATERIAL
4	BONNET	Ductile iron EN-JS1030 (GGG40)
5	SPINDLE	Steel
6	HANDWHEEL	Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN	Steel (EN42)
8	BODY STUDS	St. steel SS304
9	BODY NUTS	St. steel SS304
10	EYE BOLT*	Steel

* Only for some sizes

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	114	123	133	152	165	196	222
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	113	111	135,5	133,5	134,5	197,5	223
	H1 (close)	105	103	123	121	122	180	199
	f*	3	3	3	3	3	3	3
	a	71	71	85	85	85	115	130
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#**	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13,0	14,5	16,0	17,5
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	3,6	4	4,5	7	8	12	17
	EN 558 S1 (DIN 3202 F1)	4,1	4,5	5	8	9	13,5	18

* Consult f for PFA
**Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Fluoropolymer lined valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	260	313	364	414	529	643	757
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	251	271	346	456	479,5	598,5	752
	H1 (close)	233	250	309	408	417	527	657
	f*	3	4	4	4	4	4	4
	a	171	Ø200	Ø234	Ø290	Ø350	Ø430	Ø512
	ØW	240	270	318	360	460	525	600
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#**	ØD	191	229	254	279	343	406	483
	C	19,5	24,0	24,0	25,5	29,0	30,5	32,0
	nxØd	4x19	8x19	8x22	8x22	8x22	12x26	12x26
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	24	32	46	65	115	175	263
	EN 558 S1 (DIN 3202 F1)	27	34	48	71	121	190	278

* Consult f for PFA
** Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

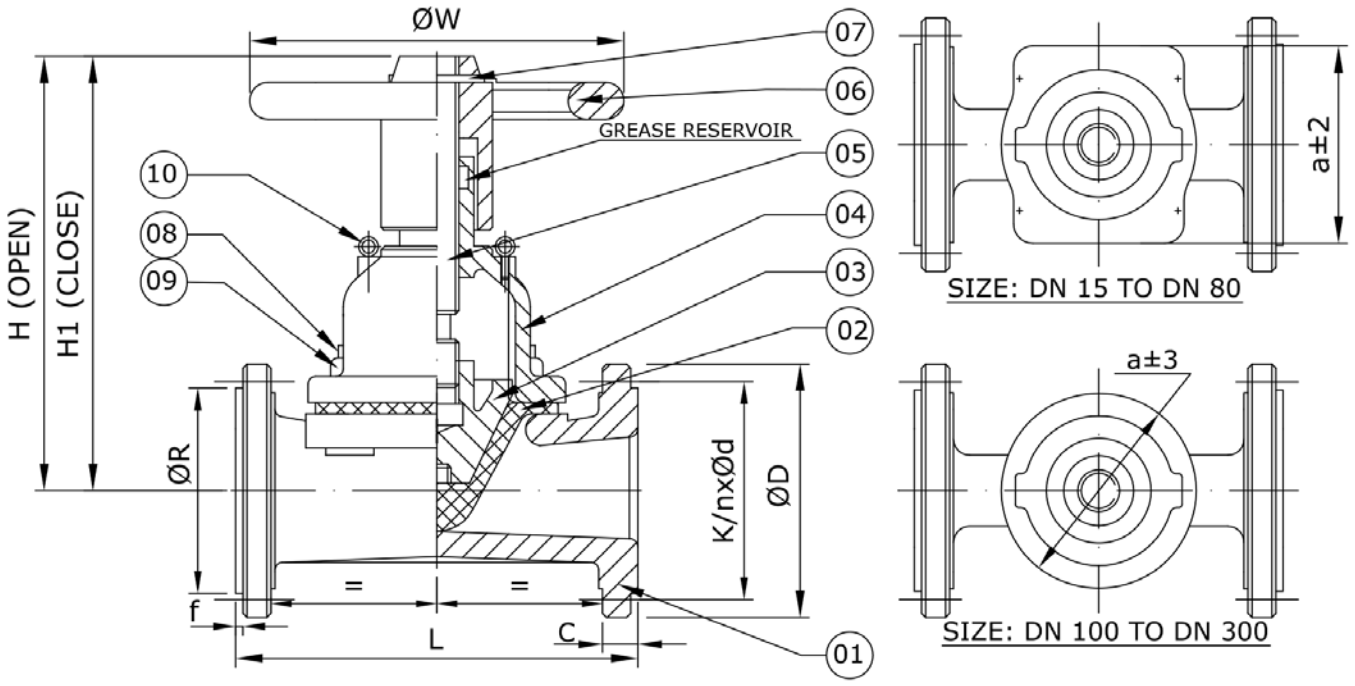
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Halar® coated valves with flanged ends

Main Parts and Materials



NO.	PART		MATERIAL	
1	BODY	SCHL_	Cast iron EN-JL1040 (GG25)	ECTFE (Halar® lined)
		SDHL_	Ductile iron EN-JS1030 (GGG40)	
2	DIAPHRAGM	Rubber	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)	
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)	
4	BONNET	SCHL_	Cast iron EN-JL1040 (GG25)	
		SDHL_	Ductile iron EN-JS1030 (GGG40)	

NO.	PART	MATERIAL
5	SPINDLE	Steel
6	HANDWHEEL	Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN	Steel (EN42)
8	BODY STUDS	St. steel SS304
9	BODY NUTS	St. steel SS304
10	EYE BOLT*	Steel

* Only for some sizes

Main Valve Parameters

	DN	15	20	25	32	40	50	65
L	EN 558 S7 (BS 5156)	108	114	127	146	159	190	216
	EN 558 S1 (DIN 3202 F1)	130	150	160	180	200	230	290
	H (open)	110	108	132,5	130,5	131,5	194,5	220
	H1 (close)	102	100	120	118	119	177	196
	a	71	71	85	85	85	115	130
	ØW	100	100	120	120	120	164	220
FLANGED ENDS TO EN PN10	ØD	95	105	115	140	150	165	185
	C	14	16	16	18	18	20	20
	ØR	45	58	68	78	88	102	122
	f	2	2	2	2	3	3	3
	nxØd	4x14	4x14	4x14	4x18	4x18	4x18	4x18
	ØK	65	75	85	100	110	125	145
FLANGED ENDS TO ASA150#*	ØD	89	98	108	117	127	152	178
	C	11,5	11,5	11,5	13,0	14,5	16,0	17,5
	ØR	35	43	51	64	73	92	105
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x16	4x16	4x16	4x16	4x16	4x19	4x19
	ØK	60,3	69,8	79,4	88,9	98,4	120,6	139,7
Approx. Weight	EN 558 S7 (BS 5156)	3,3	3,6	4,3	6,5	7	10,5	15,5
	EN 558 S1 (DIN 3202 F1)	3,8	4	4,8	7,5	8	11,5	16,5

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Halar® coated valves with flanged ends

Main Valve Parameters

	DN	80	100	125	150	200	250	300
L	EN 558 S7 (BS 5156)	254	305	356	406	521	635	749
	EN 558 S1 (DIN 3202 F1)	310	350	400	480	600	730	850
	H (open)	251	271	342	452	475,5	595,5	748
	H1 (close)	233	250	305	404	413	523	653
	a	171	Ø200	Ø234	Ø290	Ø350	Ø430	Ø512
	ØW	240	270	318	360	460	525	600
FLANGED ENDS TO EN PN10	ØD	200	220	250	285	340	395	445
	C	22	24	26	26	26	28	28
	ØR	138	158	188	212	268	320	370
	f	3	3	3	3	3	3	4
	nxØd	8x18	8x18	8x18	8x22	8x22	12x22	12x22
	ØK	160	180	210	240	295	350	400
FLANGED ENDS TO ASA150#*	ØD	191	229	254	279	343	406	483
	C	19,5	24,0	24,0	25,5	29,0	30,5	32,0
	ØR	127	157	186	216	270	324	381
	f	1,6	1,6	1,6	1,6	1,6	1,6	1,6
	nxØd	4x19	8x19	8x22	8x22	8x22	12x26	12x26
	ØK	152,4	190,5	215,9	241,3	298,4	361,9	431,8
Approx. Weight	EN 558 S7 (BS 5156)	22,5	30	44	63	112	170	258
	EN 558 S1 (DIN 3202 F1)	25,5	32	46	69	126	185	273

*Unless specific agreement with COMEVAL, valves with flanges 150# will be usually supplied as EN/DIN flanges with 150# drilling, since pressure is limited to EN/DIN

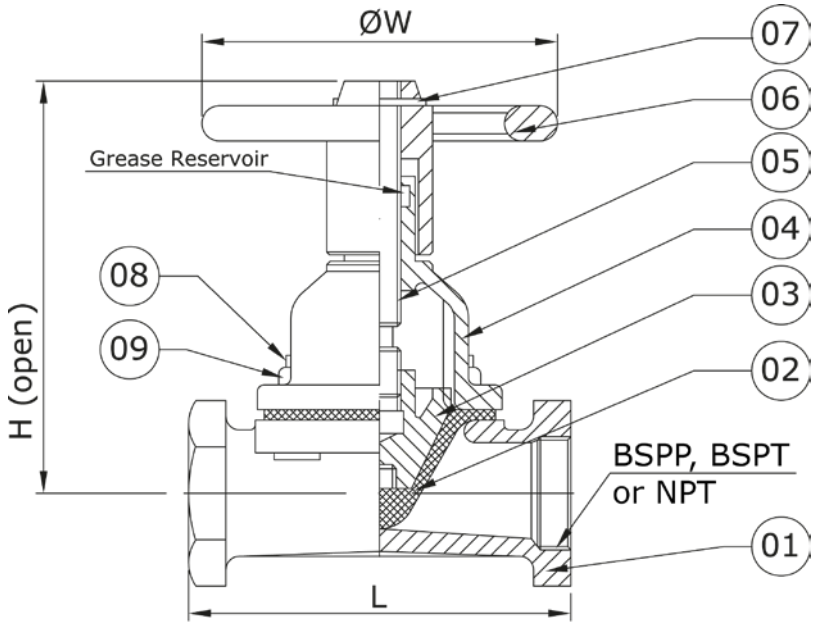
Dimensions in mm subject to manufacturing tolerance / Weights in kg

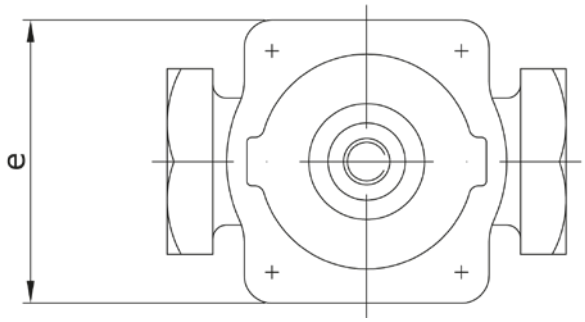
Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Unlined threaded valves

Main Parts and Materials





NO.	PART		MATERIAL
1	BODY	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)
2	DIAPHRAGM	Rubber	Natural (D10) / EPDM (D20) / Butyl (D30) / Nitrile (D40) / Neoprene (D50) / Hypalon (D60) / Viton (D70)
3	COMPRESSOR		Cast iron EN-JL1040 (GG25)
4	BONNET	SC_	Cast iron EN-JL1040 (GG25)
		SD_	Ductile iron EN-JS1030 (GGG40)
5	SPINDLE		Steel
6	HANDWHEEL		Cast iron EN-JL1040 (GG25)
7	H/W DOWEL PIN		Steel (EN42)
8	BODY STUDS		Steel
9	BODY NUTS		Steel

Main Valve Parameters

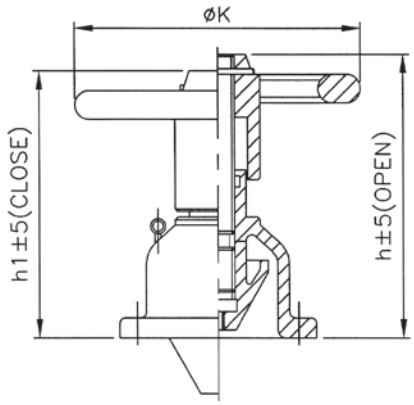
DN	15	20	25	32	40	50	65	80
L	64	83	108	121	140	165	203	254
H (open)	112	117	142	142	140	206	236	284
ØW	100	100	120	120	120	164	220	240
e	71	71	85	85	85	115	130	171
Approx. Weight	1,8	2,2	3	4	4	7,25	12,5	19,5

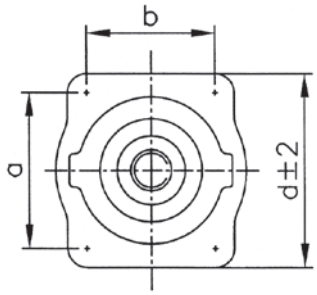
Dimensions in mm subject to manufacturing tolerance / Weights in kg

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

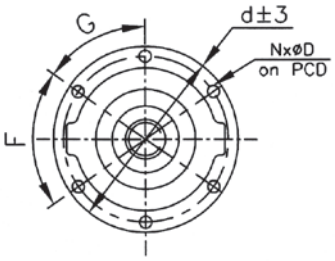
The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Main Bonnet Dimensions

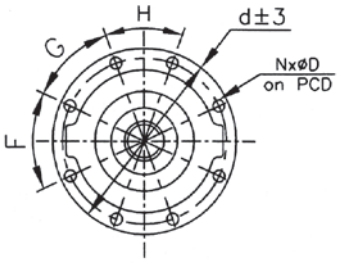




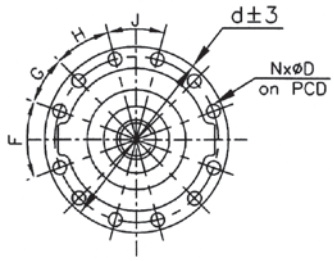
SIZE: DN 15 TO DN 80



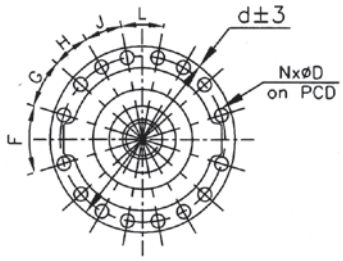
SIZE: DN 100



SIZE: DN 125 TO DN 200



SIZE: DN 250

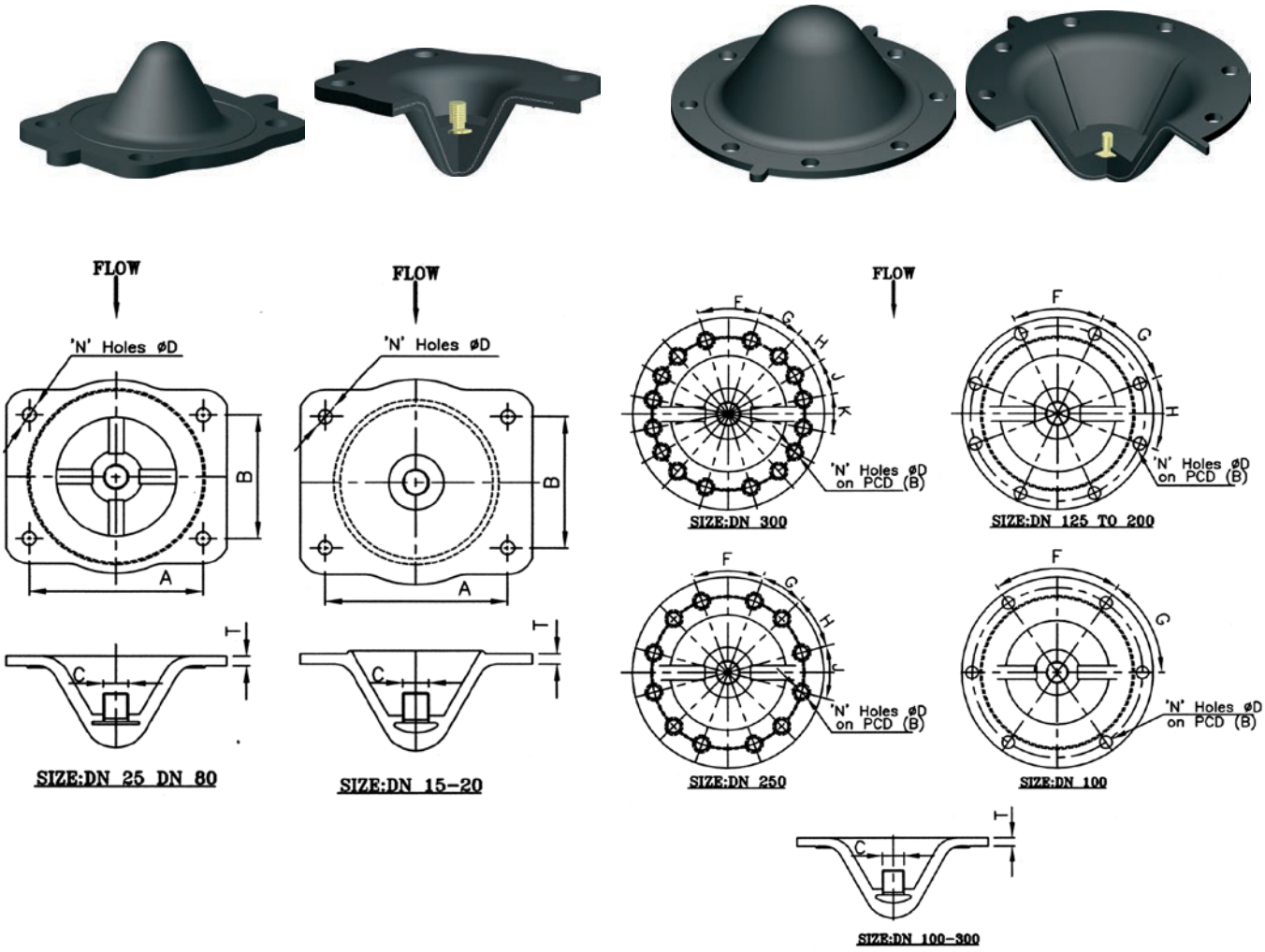


SIZE: DN 300

DN	a	b ØPCD	d	h	h1	ØK	NxØD	Weight	ANGLES BETWEEN THE HOLES F	G	H	J	L
15	54	30	71	93,5	86,0	100	4x7	1,2	---	---	---	---	---
20	54	30	71	93,5	86,0	100	4x7	1,2	---	---	---	---	---
25	64	51	85	105,0	93,0	120	4x9	2,0	---	---	---	---	---
32	64	51	85	105,0	93,0	120	4x9	2,0	---	---	---	---	---
40	64	51	85	105,0	93,0	120	4x9	2,0	---	---	---	---	---
50	89	64	115	165,0	147,5	164	4x11	4,5	---	---	---	---	---
65	102	83	130	185,0	161,0	220	4x13	7,0	---	---	---	---	---
80	137	102	171	231,0	201,0	240	4x17	11,0	---	---	---	---	---
100	---	Ø171	Ø200	243,0	210,5	270	6x13	14,5	70º	55º	---	---	---
125	---	Ø205	Ø234	264,0	226,5	270	8x13	18,0	50º	45º	40º	---	---
150	---	Ø254	Ø290	346,0	295,0	360	8x13	31,0	60º	40º	40º	---	---
200	---	Ø305	Ø350	395,0	333,0	460	8x17	50,0	60º	40º	40º	---	---
250	---	Ø381	Ø430	507,0	434,5	525	12x21	79,0	40º	25º	30º	30º	---
300	---	Ø451	Ø512	641,0	546,0	600	16x21	115,0	34º	24º20'	19º	19º	21º20'

Dimensions in mm subject to manufacturing tolerance / Weights in kg

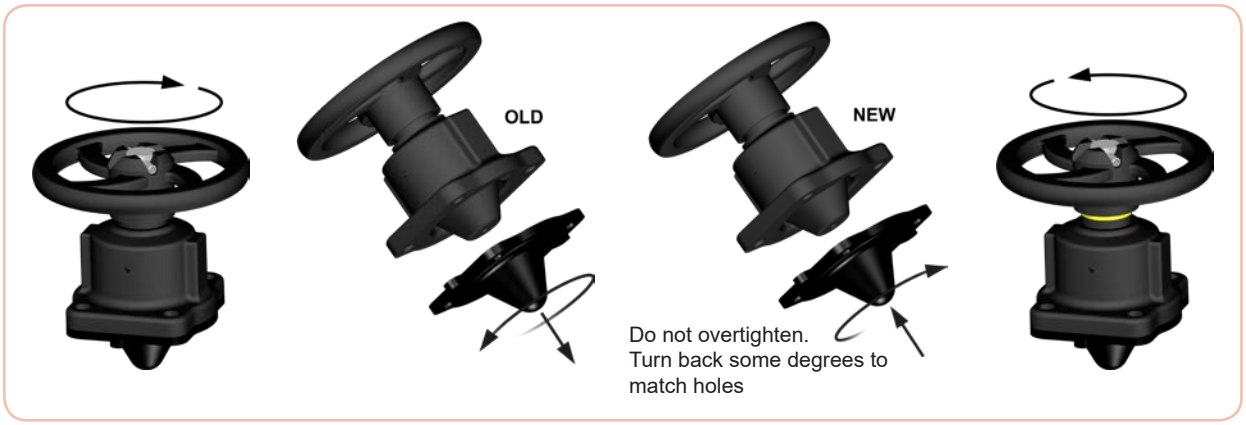
Main Spare Diaphragms Dimensions

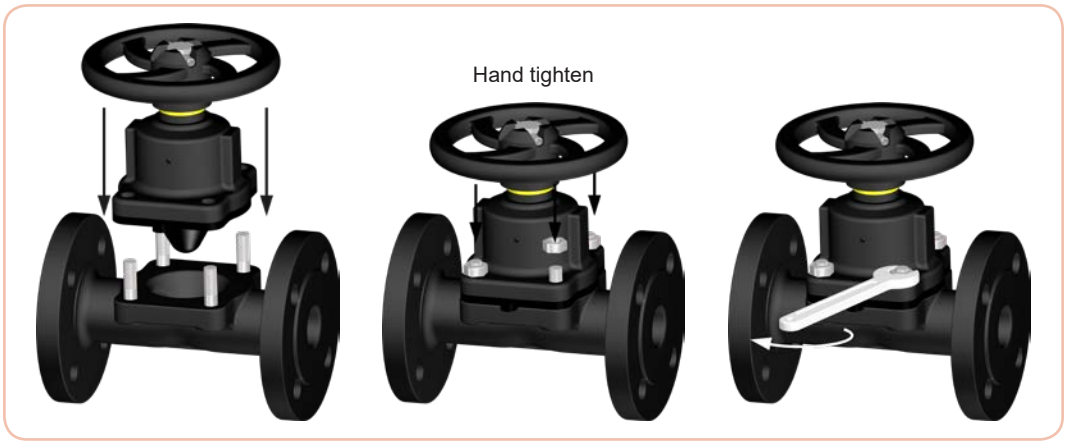


	DIMENSIONS OF DIAPHRAGM						ANGLES BETWEEN THE HOLES				
DN	**A**	**B**	**C**	**ØD**	**Nº HOLES**	**T**	**F**	**G**	**H**	**J**	**K**
15	54	30	3/16" BSW	7.0	4	2.5	---	---	---	---	---
20	54	30	3/16" BSW	7.0	4	2.5	---	---	---	---	---
25	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
32	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
40	64	51	1/4" BSW	9.5	4	6.0	---	---	---	---	---
50	89	64	1/4" BSW	12.0	4	5.0	---	---	---	---	---
65	102	83	5/16" BSW	14.0	4	5.5	---	---	---	---	---
80	137	102	3/8" BSW	18.0	4	5.5	---	---	---	---	---
100	---	Ø171	3/8" BSW	13.0	6	7.0	70º	55º	---	---	---
125	---	Ø205	3/8" BSW	14.0	8	7.5	50º	45º	40º	---	---
150	---	Ø254	5/8" BSW	14.0	8	8.0	60º	40º	40º	---	---
200	---	Ø305	5/8" BSW	20.0	8	8.5	60º	40º	40º	---	---
250	---	Ø381	5/8" BSW	20.0	12	10.0	40º	25º	30º	30º	---
300	---	Ø451	1" BSW	20.0	16	10.0	34º	24º20'	19º	19º	21º20'

Dimensions in mm subject to manufacturing tolerance / Weights in kg

Brief Guide of Instructions: Replacing an old diaphragm





Straight Through Type Diaphragm Valves with Pneumatic Actuator

Main Features

- For DIAVAL manufactured valves in weir and straight through type, with rubber diaphragms and PTFE / rubber backed diaphragms.
- Rugged & compact design, long life span at the plant. Favourable size / performance ratio.
- Rolling diaphragm design, allowing long cycle operations.
- Single acting (Direct and reverse actions).
- High quality spring, large thrust.
- Visual position indicator for open / close.
- Burnished stem protected by bellow.
- Maintenance-free O-ring sealing with flexible guiding.
- Possibility of assembly of additional devices / accessories.
- Operating ambient temperatures -40ºC to +100ºC.
- Fully traceable at the manufacture facility, identified by aluminum riveted plates.
- Optional top mounted emergency hand wheels for manual operation.
- Compliant with Machinery Directive 2006/42/EC

DP Direct Acting

DP Reverse Acting

Working Principle

Direct Acting actuator is designed to operate from a normally open position. Air pressure on the top side of actuator diaphragm closes the valve and the spring opens the valve when the air is released from the actuator.

Reverse Acting actuator is designed to operate from a normally closed position. Air pressure on the bottom side of the actuator diaphragm opens the valve. When air is released spring closes the valve.

Control Accesories

There is a number of control accessories available to be assembled on to the ARI actuators. These accessories are comprehensive of limit switches (mechanical or inductive type), proximity sensors, solenoid valves, air speed regulators, positioners, air gauge sets… and many other customized solutions.
Control accessories may be specified and provided by the customer or by DIAVAL, however, only those accessories installed and tested at any DIAVAL facilities are covered by a performance guarantee.

Tests - After Market

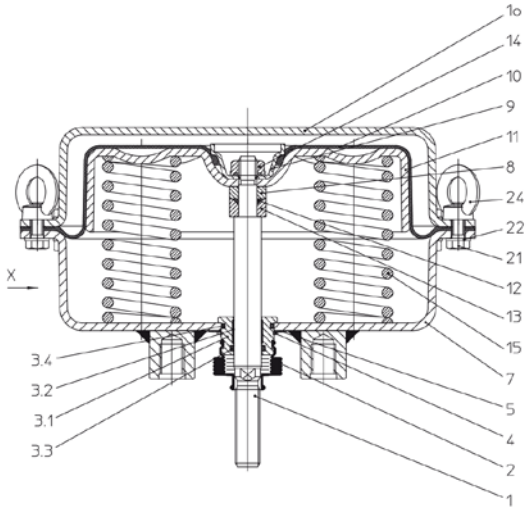
All actuators are tested after assembly and before dispatch. Tests are comprehensive of visual and functional tests as per EN-12266-1/DIN 3230 P.3 - EN.10.204/2.2
Actuators can be serviced at DIAVAL facilities where a stock of common spares is permanently available. Off site service engineers are available on demand and against usual service rates.

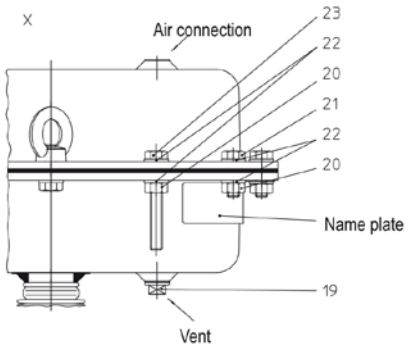
Operating and Maintenance Instructions

Please ensure that the DIAVAL Operating and Maintenance Instructions are provided by your supplier along with the valves. Do not try to start maintenance without having read and understood the Essential Safety Guidelines. Please consult us for further information.

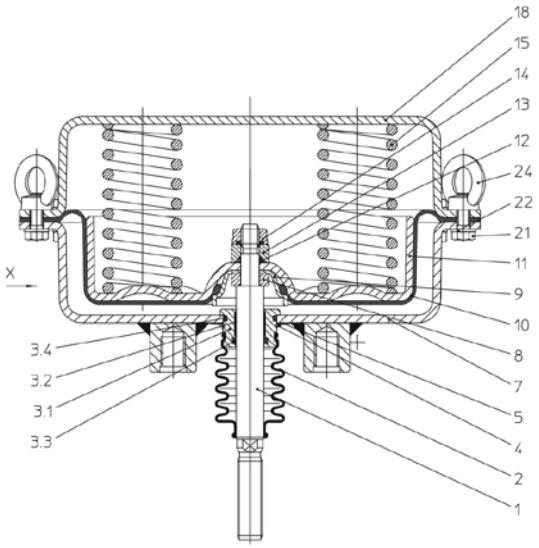
Standard Materials

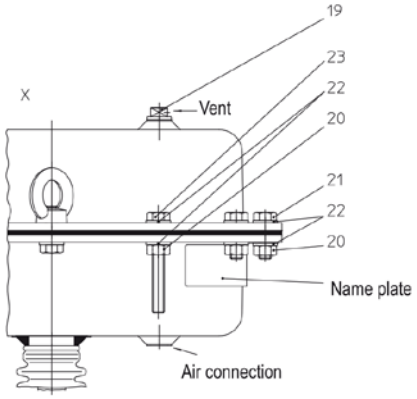
Only the best quality materials are incorporated to the DIAVAL manufacturing process and are subject to a strict quality control by our DIAVAL engineers at the assembly plant.





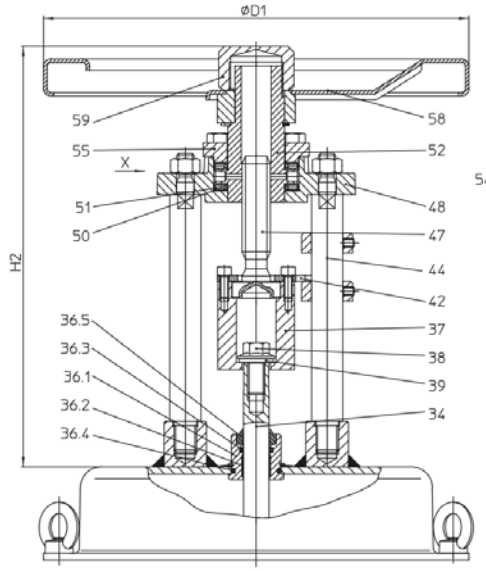
DP Direct Acting

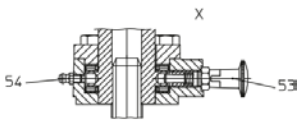




DP Reverse Acting

DP reverse & direct	DP30	DP32	DP33	DP34
Actuator weight (kg)	5	9	15	45





Dimensions and weights	DP30	DP32	DP33	DP34
ØD1	225	225	300	397
H2	284	284	297	458
Weight (with actuator)	10	14	20	62

Dimensions in mm subject to manufacturing tolerance / Weight in kg

Top Handwheel (Optional)

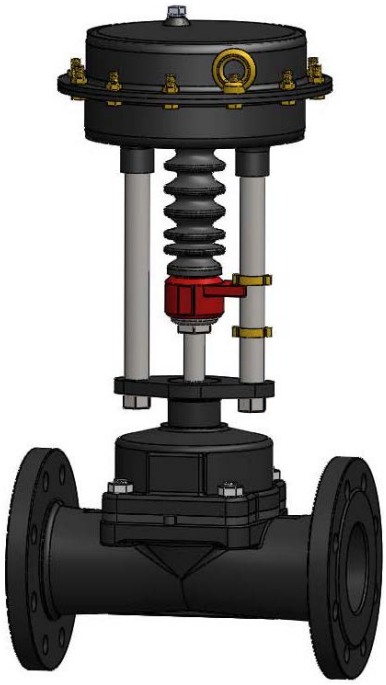
Standard Materials

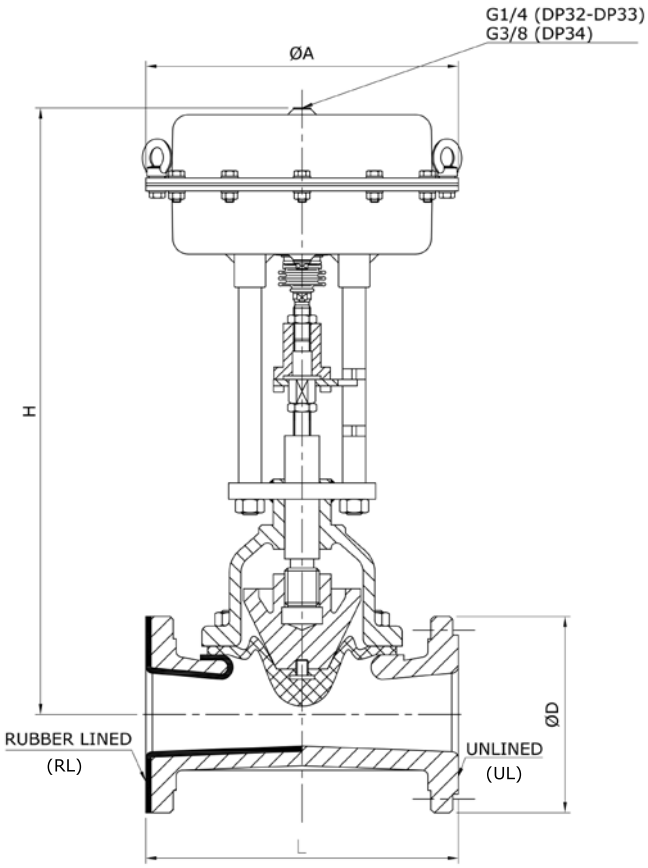
Pos.	Description	Material
1	Stem	X20Cr13+QT, 1.4021+QT
2	Bellow seal	EPDM50 or 42CR
3	Stem guiding *	X20Cr13+QT, 1.4021+QT
3.1	Stem guiding *	X20Cr13+QT, 1.4021+QT
3.2	Guiding band *	PTFE + 25%C
3.3	O-ring (stem) *	NBR
3.4	O-ring (guiding) *	NBR
3.5	Scraper *	NBR
4	Retaining ring	FSt - A3B
5	Spring plate	FSt (Fe/Zn12B)
6 / 7	Lower diaphragm casing (DP32-34Tri)	DD13+QT, 1.0335+QT (powder coated)
7	Lower diaphragm casing (DP35)	P265GH, 1.0425 / S235JR, 1.0037
8	Bushing	X20Cr13+QT, 1.4021+QT
9	Diaphragm lange	DD13+QT, 1.0335+QT (Fe/Zn12B) or X20Cr13+QT,
10	Rolling diaphragm *	NBR + webbing
11	Diaphragm plate (DP32-34Tri)	1.4021+QT
11	Diaphragm plate (DP35) *	DD13+QT, 1.0335+QT (Fe/Zn12B)
12	O-ring	St 52-3 G 03 g, 1.0570 G 03 g
13	Bushing	NBR
14	Flange nut	X20Cr13+QT, 1.4021+QT
15	Compression spring *	8 - A4G
16	Spring centring	FDSiCr
17	Spring centring	DC01, 1.0330 (Fe/Zn12B)
18	Upper diaphragm casing (DP32-34Tri)	St 52-3 G 03 g, 1.0570 G 03 g
18	Upper diaphragm casing (DP35)	DD13+QT, 1.0335+QT (powder coated)
19	Screwed cap	P265GH, 1.0425 / S235JR, 1.0037
20	Hexagon nut (DP32-34Tri) 1)	Polyäthylen
20	Hexagon nut (DP35) 1)	8 - A4G

Pos.	Description	Material
21	Hexagon screw (DP32-34Tri) 1)	C35E, 1.1181
21	Hexagon screw (DP35) 1)	8.8 - A4G
22	Washer	8.8 - A4G
23	Hexagon screw (DP32-34Tri) 1)	St - A4G
23	Hexagon screw (DP35) 1)	8.8 - A4G
24	Eye nut 1)	10.9 - A2G
34	Stem extension	8-A4G
36.1	Bellow seal *	X20Cr13+QT, 1.4021+QT
36.2	Guiding band *	X14CrMoS17+QT, 1.4104+QT
36.3	O-ring *	PTFE +25%C
36.4	O-ring *	NBR
36.5	Scraper *	NBR
37	Bushing	NBR
38	Hexagon screw	X20Cr13+QT, 1.4021+QT
39	Washer	8.8 - A4G
42	Torsion lock	X20Cr13+QT, 1.4021+QT
44 1	Distance column	8.8 - A4G
47	Stem	1SMn30+C, 1.0715+C (Fe/Zn12B)
48	Traverse	X20Cr13+QT, 1.4021+QT
50	Axial-washer	EN-JS1049, EN-GJS-400-18U-LT (Fe/Zn12B)
51	Axial-dial ring	St
52	Threaded bush	St
53	Catch pin	CuZn35Ni3Mn2Al-Pb-R490, CW710RR490
54	Lubricating nipple	St, Cu
55	Covering for traverse	5.8 - A4G
58	Handwheel	S235JR, 1.0037 (Fe/Zn12B)
59	Safety cap	Fe P01, 1.0330 (epoxy coating)

Straight Through Type Diaphragm Valves with Direct Acting Pneumatic Actuator- Rubber Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	420	95	250
20	150	117	123	423	105	250
25	160	127	133	453	115	250
32	180	146	152	455	140	250
40	200	159	165	463	150	250
50	230	190	196	493	165	250
65	290	216	222	685	185	250
80	310	254	260	716	200	250
100	350	305	313	754	220	405
125	400	356	364	780	250	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Direct Acting (actuator opens at air failure, springs to open/air to close).

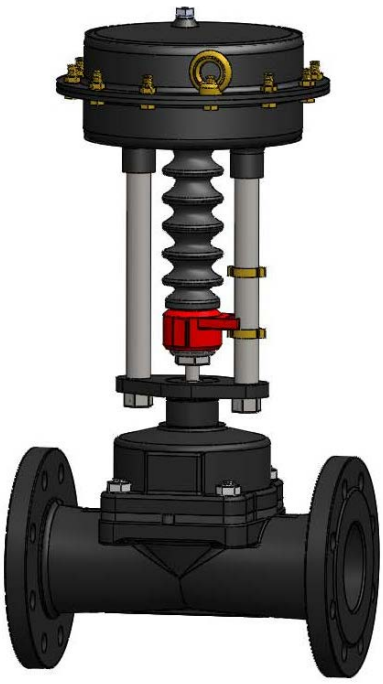
Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Close (bar)
DN15	DP32021020NA	8	8	2,0-2,5
DN20	DP32021020NA	8	8	2,5-3,0
DN25	DP32021030NA	8	8	2,5-3,0
DN32	DP32021030NA	8	8	2,5-3,0
DN40	DP32021030NA	8	7	2,5-3,0
DN50	DP32021030NA	8	6	4,0-4,5
DN65	DP34021050NA	8	6	2,5-3,0
DN80	DP34021065NA	8	6	3,0-3,5
DN100	DP34021065NA	8	6	3,5-4,0
DN125	DP34021065NA	6	4	4,0-4,5

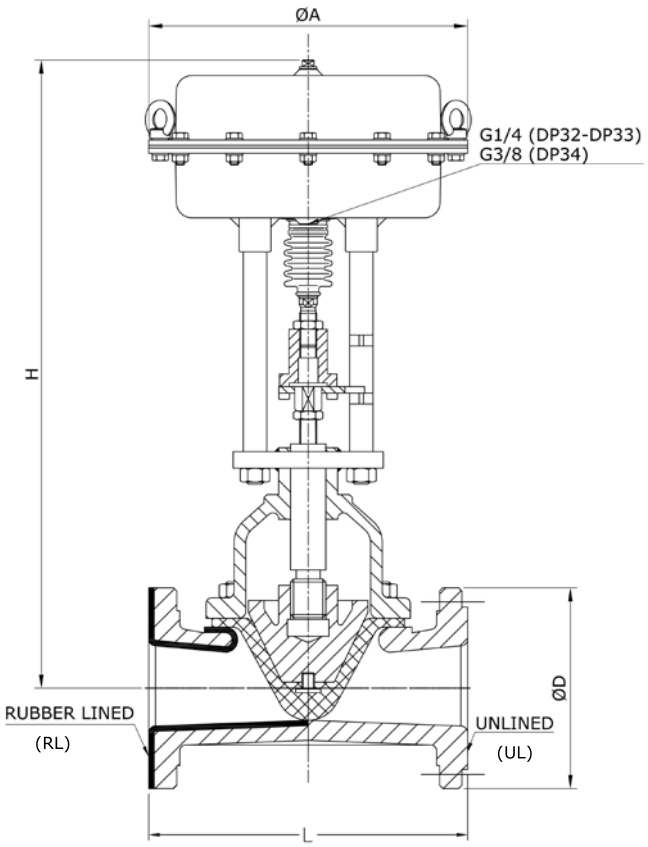
Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

Straight Through Type Diaphragm Valves with Reverse Acting Pneumatic Actuator- Rubber Diaphragm

Main Dimensions





DN	L			H	ØD	ØA
	EN 558 S1 (DIN 3202 F1)	EN 558 S7 (BS 5156)				
	UL/RL	UL	RL			
15	130	108	114	420	95	250
20	150	117	123	423	105	250
25	160	127	133	453	115	250
32	180	146	152	455	140	250
40	200	159	165	463	150	250
50	230	190	196	493	165	250
65	290	216	222	685	185	250
80	310	254	260	716	200	250
100	350	305	313	754	220	405
125	400	356	364	780	250	405

Dimensions in mm subject to manufacturing tolerance.

Dimensions are based on the serialized manufacture and should be taken as preliminary.

Please, bear in mind the service clearance area when planning a skid or when installation happens in a very tight area.

Actuation Selection Chart

Reverse Acting (actuator closes at air failure, air to open/spring to close).

Valve Size	Actuator Type	Max. Closing Pressure 100% ΔP (bar)	Max. Closing Pressure 0% ΔP (bar)	Air Supply to Open (bar)
DN15	DP32041220NC	8	8	2,0-2,5
DN20	DP32082420NC	8	8	3,0-3,5
DN25	DP32082430NC	8	8	3,0-3,5
DN32	DP32082430NC	8	7	3,5-4,0
DN40	DP32082430NC	8	6	3,5-4,0
DN50	DP33153030NC	8	6	4,0-4,5
DN65	DP34082450NC	8	6	3,5-4,0
DN80	DP34102065NC	8	6	3,5-4,0
DN100	DP34204065NC	8	6	5,0-5,5
DN125	DP34204065NC	6	4	5,0-5,5

Information / restriction of technical rules need to be observed!
Installation, Operating and Maintenance Manual can be downloaded at www.comeval.es

The engineer, designing a system or a plant, is responsable for the selection of the correct valve
Product suitability must be verified, contact manufacturer for information

New Horizons in the
Process Industry.

Diaval®

Comeval®
A COMPANY OF THE ARI ARMATUREN GROUP

www.diaval.com