



Rolling Diaphragms

INDUSTRIAL APPLICATIONS



We make it ***possible***



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INTRODUCTION

1 – HUTCHINSON GROUP

To meet the needs of our customers around the world, in the air, on the ground and at sea, Hutchinson has been designing, developing and manufacturing high-performance solutions for more than 170 years.

Our innovations cover a wide variety of particularly demanding markets: automotive, aeronautics, defence, energy, and the entire general industry.

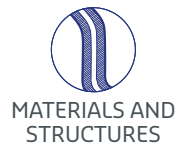
As a world leader in anti-vibration systems, fluid management and sealing solutions, our group is characterised by a multi-market and multi-expertise approach, a source of synergies and added value.

A wide spectrum of resources

Our Research & Innovation Centres employ over 200 engineers and technicians dedicated to both fundamental and applied research. Innovative solutions are developed by combining our technologies and key competencies.

- Chemistry and materials science
- Mechanical engineering
- Composite materials
- Processing
- Vibration and acoustics
- Thermal insulation
- Mechatronics

Our specialized teams develop high added-value solutions in our technical centres spread around the world. They dedicate their resources to our customers in the field of applied engineering.



*Our ambition: to be part of the mobility of the future.
Safer, more comfortable, more responsible mobility.*



> 41,700
employees



25
countries



100
sites



5% invested
each year in R&D



> €4,400 million
turnover



2 – HUTCHINSON PRECISION SEALING SYSTEMS

Expert manufacturer of sealing solutions, Hutchinson - Precision Sealing Systems designs and manufactures static and dynamic sealing solutions for its customers from many industrial sectors.

Complete control of the entire process, from development to production, allows us to offer our customers a wide variety of approved materials, tailor-made solutions, and a certified guarantee of origin.

Our project team relies on constant experimentation and innovation, to develop solutions that are perfectly tailored to the needs of our customers.

Technical Support

- Assistance with material selection
- Dimensional definition
- Computer-aided design (CAD)
- Numerical simulations

Skills & Technologies

- Formulation and processing of elastomers
- Adhesion to plastic, metal and/or textile substrates
- Injection or compression molding
- Extrusion

Certifications



ROLLING DIAPHRAGMS

1- DESCRIPTION

Rolling diaphragms are flexible devices used to regulate fluids. They provide a seal in systems involving a piston and a cylinder.

These diaphragms are made from a fabric with very high mechanical characteristics covered by a thin layer of elastomer, which allows them to take on any shape or size.

The materials used as standard provide:

- Pressure resistance: up to 50 bars
- Temperature resistance: -60°C and +250°C
- Resistance to various fluids: water or water emulsion, mineral oil, etc.

We offer 3 classes of membrane, differentiated by their fastening system.

Class A : with toroidal flange

The flange of the membrane is completed by a half-O-ring type bead. This ensures that it stays in position during installation.

Class A diaphragms must be turned upside down when fitted to the piston.



Class B : with flat flange

The flange of the diaphragm is designed to seal as a gasket between the two flat surfaces of the cylinder and the piston head. A hole can be drilled to hold it in position.

Class B diaphragms must be turned upside down when fitted to the piston.



Class C : with toroid

This type of diaphragm has no flange. An O-ring is moulded at the base of the diaphragm, as an extension of the wall.

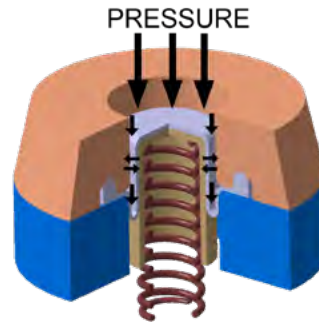
Class C diaphragms do not need to be turned over when fitted to the piston.





2- OPERATING PRINCIPLE

The diaphragm is attached to the piston head. It unwinds and retracts in synchronisation with the piston movements, moving from high to low position. It rests alternately against the cylinder wall and the piston skirt.



6

3- APPLICATIONS

Rolling diaphragms offer many advantages in control and regulation equipment, as well as in hydraulics and pneumatics.

They are used in devices such as flow regulators, control cylinders and geothermal pumps.

As well as providing a perfect seal, these membranes operate without friction or lubrication. They are ideally suited to systems that need to react quickly to pressure changes. They are therefore ideal for guaranteeing the strength, resistance and hygiene required in the agri-food sector, particularly for drinks dispensers, valves, liquid distribution tanks or diaphragm pumps.



Markets

- | | |
|------------------------|------------------|
| - Aerospace | - Drinking water |
| - Nuclear | - Food |
| - Petrochemicals | - Heating |
| - Industrial equipment | - Off road |

MATERIALS

1 – ELASTOMERS

Four materials are available as standard. They cover the requirements of most applications.

Reference	Rubber Family	Hardness (Shore A)	Color	Temperature range (°C)
BF7	Nitrile (NBR)	45	Black	-40 / +110
SL506*	Silicon (MVQ)	60	Translucent	-60 / -220
EP506	Ethylene Propylene (EPDM)	50	Black	-45 / +140
DF651	Fluorocarbon (FKM)	60	Black	-15 / +250

* Formulated with raw materials that comply with the FDA positive list - 21 CFR § 177-2600.

In addition, Hutchinson offers a wide range of rubber materials to meet any specific requirements.

2 – POLYESTER FABRICS

The fabric is determined by the pressure of use. These fabrics are carefully dimensionally stabilised using a hot preforming process.

Fabric	Thickness (mm)	Breaking strength, mini (daN)		Tensile strength, mini (%)		Number of wires/cm	
		chain	weft	chain	weft	chain	weft
401	0,11 ± 0.015	15	15			38	39
501	0,18 ± 0.020	50	50	25	25	20	19
701	0,18 ± 0.040	135	135	25	25	20	20
903	0,25 ± 0.015	90	90	31	31	16	16

* Type 501 is the standard fabric.

Our knowledge of materials and our expertise in processing them enable us to meet specific needs.

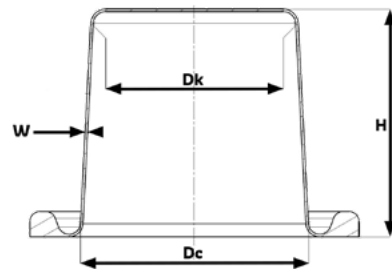
Our technical department is available to study and propose membranes adapted to each project: high pressures, extreme temperatures, special fluids, etc.



PARTS LIST

Design: class A - Material: BF7 - Fabric501

The membranes are made to the standard dimensions specified in the table below. They are manufactured to class A design, in BF7 material, reinforced with type 501 fabric.



Hutchinson part number	Description	Cylinder Ø (mm) <i>Dc</i>	Piston Ø (mm) <i>Dk</i>	Height (mm) <i>H</i>	Thickness (mm) <i>W</i>
220 000	13x8x11x0,4	13	8	11	0,4
220 001	16x12x13x0,4	16	12	13	0,4
220 004	25x20x10x0,4	25	20	10	0,4
220 005	25x20x15x0,4	25	20	15	0,4
220 007	25x20x20x0,4	25	20	20	0,4
220 009	25x20x25x0,4	25	20	25	0,4
220 010	30x25x10x0,4	30	25	10	0,4
220 011	30x25x18x0,4	30	25	18	0,4
220 013	30x25x25x0,4	30	25	25	0,4
220 014	30x25x30x0,4	30	25	30	0,4
220 016	35x30x10x0,4	35	30	10	0,4
220 017	35x30x15x0,4	35	30	15	0,4
220 018	35x30x22x0,4	35	30	22	0,4
220 019	35x30x28x0,4	35	30	28	0,4
220 020	35x30x35x0,4	35	30	35	0,4
220 022	40x35x10x0,4	40	35	10	0,4
220 023	40x35x18x0,4	40	35	18	0,4
220 025	40x35x25x0,4	40	35	25	0,4
220 027	40x35x35x0,4	40	35	35	0,4
220 028	40x35x40x0,4	40	35	40	0,4
220 029	45x40x10x0,4	45	40	10	0,4
220 030	45x40x20x0,4	45	40	20	0,4
220 032	45x40x25x0,4	45	40	25	0,4
220 033	45x40x35x0,4	45	40	35	0,4
220 034	45x40x45x0,4	45	40	45	0,4
220 035	50x45x20x0,4	50	45	20	0,4
220 036	50x45x30x0,4	50	45	30	0,4

Hutchinson part number	Description	Cylinder Ø (mm) <i>Dc</i>	Piston Ø (mm) <i>Dk</i>	Height (mm) <i>H</i>	Thickness (mm) <i>W</i>
220 037	50x45x40x0,4	50	45	40	0,4
220 038	50x45x50x0,4	50	45	50	0,4
220 039	55x50x15x0,4	55	50	15	0,4
220 040	55x50x25x0,4	55	50	25	0,4
220 042	55x50x35x0,4	55	50	35	0,4
220 043	55x50x45x0,4	55	50	45	0,4
220 044	55x50x55x0,4	55	50	55	0,4
220 045	60x55x15x0,4	60	55	15	0,4
220 047	60x55x25x0,4	60	55	25	0,4
220 048	60x55x35x0,4	60	55	35	0,4
220 050	60x55x50x0,4	60	55	50	0,4
220 051	60x55x60x0,4	60	55	60	0,4
220 052	70x60x25x0,5	70	60	25	0,5
220 055	70x60x40x0,5	70	60	40	0,5
220 056	70x60x55x0,5	70	60	55	0,5
220 057	70x60x70x0,5	70	60	70	0,5
220 058	80x70x15x0,5	80	70	15	0,5
220 059	80x70x30x0,5	80	70	30	0,5
220 061	80x70x45x0,5	80	70	45	0,5
220 062	80x70x65x0,5	80	70	65	0,5
220 063	80x70x80x0,5	80	70	80	0,5
220 064	90x80x25x0,5	90	80	25	0,5
220 065	90x80x35x0,5	90	80	35	0,5
220 067	90x80x90x0,5	90	80	90	0,5
220 068	100x90x25x0,5	100	90	25	0,5
220 070	100x90x40x0,5	100	90	40	0,5
220 071	100x90x60x0,5	100	90	60	0,5
220 072	100x90x80x0,5	100	90	80	0,5
220 073	100x90x100x0,5	100	90	100	0,5
220 074	110x100x25x0,5	110	100	25	0,5
220 075	110x100x40x0,7	110	100	40	0,7
220 076	110x100x65x0,7	110	100	65	0,7
220 077	120x110x25x0,7	120	110	25	0,7
220 078	120x110x50x0,7	120	110	50	0,7
220 080	120x110x100x0,7	120	110	100	0,7
220 081	120x110x120x0,7	120	110	120	0,7



Hutchinson part number	Description	Cylinder Ø (mm)	Piston Ø (mm)	Height (mm)	Thickness (mm)
		<i>D_c</i>	<i>D_k</i>	<i>H</i>	<i>W</i>
220 082	130x120x30x0,7	130	120	30	0,7
220 083	130x120x55x0,7	130	120	55	0,7
220 084	140x130x30x0,7	140	130	30	0,7
220 086	140x130x140x0,7	140	130	140	0,7
220 087	150x140x30x0,7	150	140	30	0,7
220 088	150x140x60x0,7	150	140	60	0,7
220 089	150x140x90x0,7	150	140	90	0,7
220 090	150x140x120x0,7	150	140	120	0,7

Specific Requirements

Please contact us for any other request:

- Dimensions
- Class B,C
- Material: EPDM, FKM, MVQ...
- Fabrics

This catalogue contains recommendations which should be checked with our teams and which may change depending on the membrane environment. These recommendations do not constitute a commitment on our part and any claim is excluded. It is essential to carry out tests for final validation, which remains the responsibility of the customer.

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