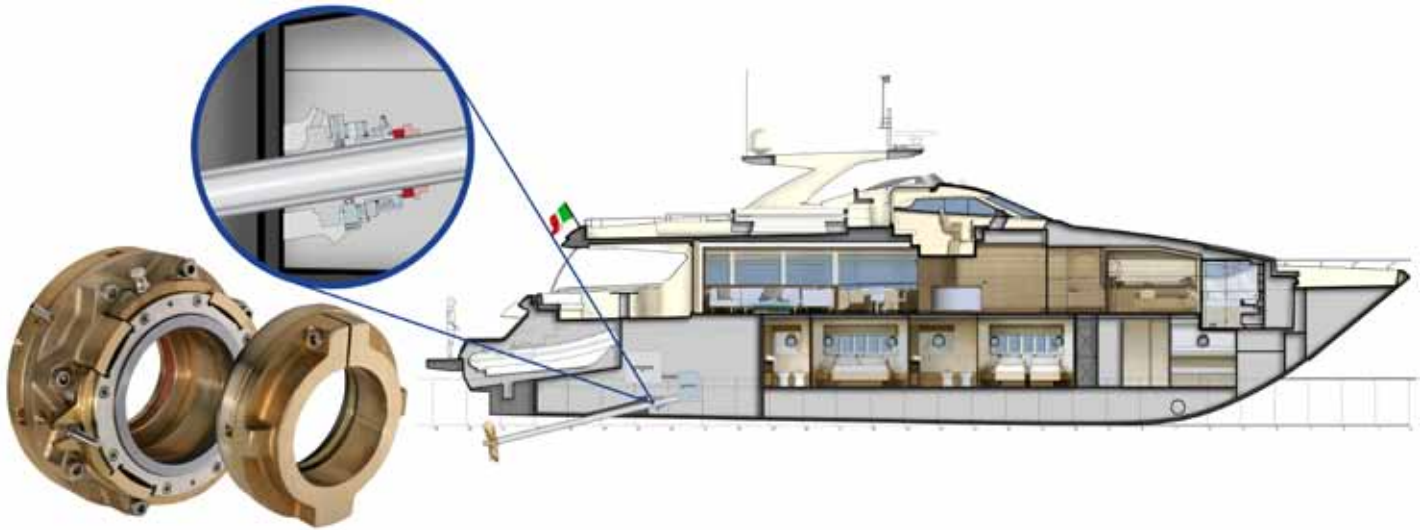




FLUITEN

Tenute Meccaniche Nautica
Nautical Mechanical Seals

FLUITEN: LEADER IN DESIGN AND MANUFACTURE OF MECHANICAL SEALS FOR OVER 50 YEARS



Fluiten has been at the forefront of the design and manufacture of mechanical seals for rotating shafts since its foundation in 1962. Quality is the byword in this Italian company which has contributed to the worldwide reputation of quality Italian-made products.

Fluiten has always distinguished itself by its commitment to technological innovation and its investment in R&D.

Fluiten is one of the few companies in the world able to supply and develop seals for pumps and mixers which are used in the oil and gas and chemical sectors. In these industries the operating conditions are extreme: high pressure, temperature and shaft speeds. In refineries there is also the problem of hazardous emissions. We are able to overcome this, with our innovative technology (Fluilift) in which liquid lubrication is replaced by gas flushing.

This demonstrates Fluiten's flexibility and technological competence in facing challenging or unusual operating conditions.

For over 20 years we have used this expertise in the marine sector to produce seals of incomparable reliability which ensure maximum safety in the water.

For this reason we are the strategic partner of choice for the major manufacturers of medium/large propeller shafts and ship builders of all types. Fluiten is RINA certified and strictly adheres to the international DIN and API regulations.



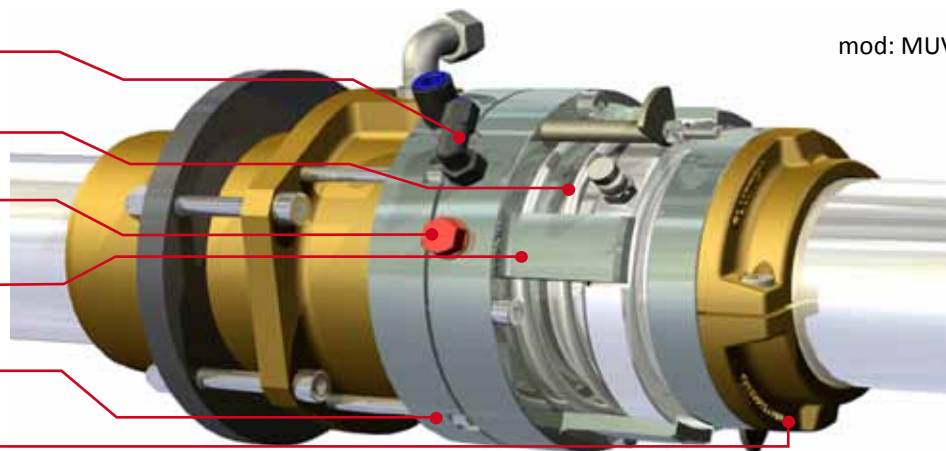
On request seals can be certified by any of the major maritime institutions. Fluiten engineers customise mechanical seals according to the needs and specifications of each customer. Our customers can be assured of using a safe and technologically advanced sealing system.



MARINE MECHANICAL SEALS

mod: MUV

- Lubrication and cooling connection point (connection device not supplied)
- Balanced seal
- Sacrificial anode
- Anti-rotation and anti-tear leg drive
- Optional Idrostop system
- Drive collar



RELIABILITY AND SAFETY IN ALL CONDITIONS

Mechanical seals for propeller shafts fulfil a crucial function in that they separate the inside of the craft from the sea-water in the area where the propeller shaft passes through the vessel itself. Fluiten offers innovative and safe propeller shaft seals for marine use with the following characteristics: robust metal (suited to marine use) body, seal rings of appropriate dimensions, fire-resistant elastomeric gaskets, a spring load and geometry of components which ensure maximum strength and reliability to avoid catastrophic failure at sea. The materials we use are so strong that they remain intact and functional even in the case of fire.

MAXIMUM EFFICIENCY AND RESPECT FOR THE ENVIRONMENT: NO OIL LUBRICATION

The total absence of auxiliary lubrication is essential: the Fluiten seal is flushed directly by sea-water with no leakage of any polluting substance into the environment thus avoiding ecological damage. Another advantage is the reduction of fuel consumption. Fluiten seals are designed to comply with all the customer's specifications, to minimise power absorption, to eliminate the wear of the shaft and the periodic adjustments which other seal systems require.

STRENGTH AND FLEXIBILITY

With the use of a system of leg drives, the surfaces of the two faces remain perfectly parallel and in contact. Therefore the Fluiten seal accepts radial and axial movement and vibrations and performs well in all conditions. Each individual component of the Fluiten seal is carefully designed and produced in materials which withstand the most critical conditions such as dry-running or brief periods of overheating.

FLUICLEAN

Those who spend time at sea know only too well that shipworms and barnacles cause great damage. The Fluiten seal is equipped with a system that protects the critical parts of the seal from microorganisms and maintains the necessary flexibility of the stationary ring, essential to tolerate the movements of the shaft. The Fluiclean device improves the performance of the seal and prolongs its life. As there is no need to remove barnacles, maintenance costs are reduced.

SELF-ALIGNING ROTATING RING

The seal designed by Fluiten has a rotating ring with an unusual geometry and drive pin to guarantee perfect perpendicularity between the propeller shaft and the sliding surfaces. This is essential for the correct functioning of the seal even when the shaft is of large dimensions and of high speed. Furthermore, the drive system does not leave any scratches on the shaft and so seizing does not occur during dismantling.

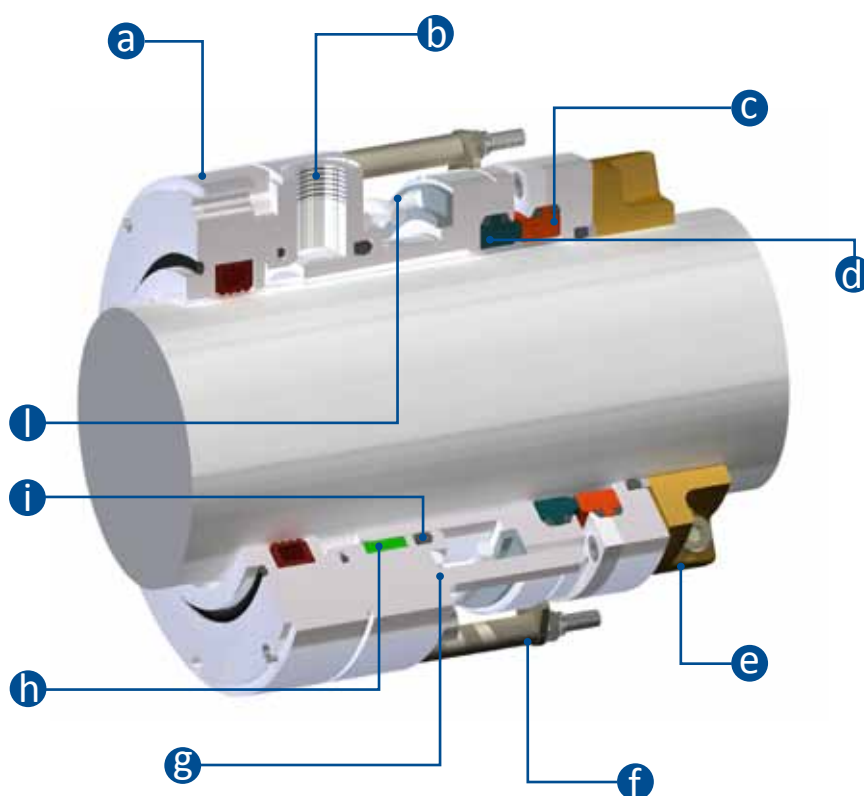
COST REDUCTION

The Fluiten mechanical seal does not have any parts which could cause friction on the shaft and therefore the wear which is present in other systems, such as packing and lips, does not occur. With regards to power absorption saving, the Fluiten seal is hydraulically balanced and absorbs less energy than the aforementioned devices and enhances performance.




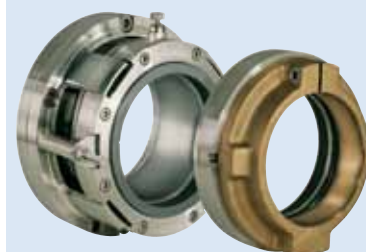
MUV- MUSV MECHANICAL SEALS

The MUV and MUSV models can be installed on shafts from 40mm to 125mm; in these cases the seal ring of the stationary element is in special graphite (Z31) and that of the rotating element is in chrome molybdenum steel (V1) or silicon carbide (U41). On request seals can be certified by any of the major maritime institutions.



Features

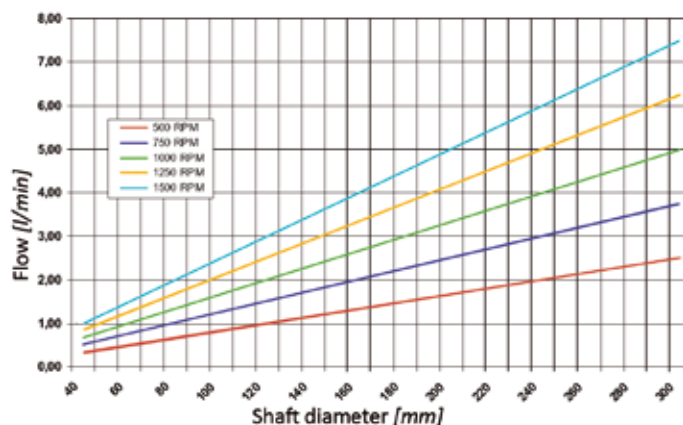
- a) Optional pneumatic security system, IDROSTOP
- b) Lubrication and cooling connection
- c) Rotating ring in anti-wear material for better resistance to abrasion
- d) Balanced stationary ring to reduce power absorption: available also in split version
- e) Self aligning drive collar
- f) Mobile setting plate for easy and correct assembling
- g) Steel body in AISI 316 or marine brass for greater safety and resistance
- h) Fluclean 
- i) Fire resistant gasket; also available in split version
- l) Spring in AISI 316 to tolerate vibration and axial run-out



Operating Limits

DIAMETER [mm]	FROM 40 TO 125
SPEED [m/s]	≤ 10
TEMPERATURE [°C]	-5 TO 80
PRESSURE [bar]	FROM VACUUM TO 5

Operating conditions which differ from those indicated can be evaluated by our Sales Engineers. Speed and pressure values indicated are not strictly prescribed; they should be determined by calculating their P*V bearing in mind the temperature as well as the physical and chemical characteristics of the sealed fluid.



MEDIUM/LARGE
SHAFTS



HIGH TOLERANCE
OF AXIAL RUN-OUT



NO CATASTROPHIC
FAILURES



BIDIRECTIONAL
SEAL

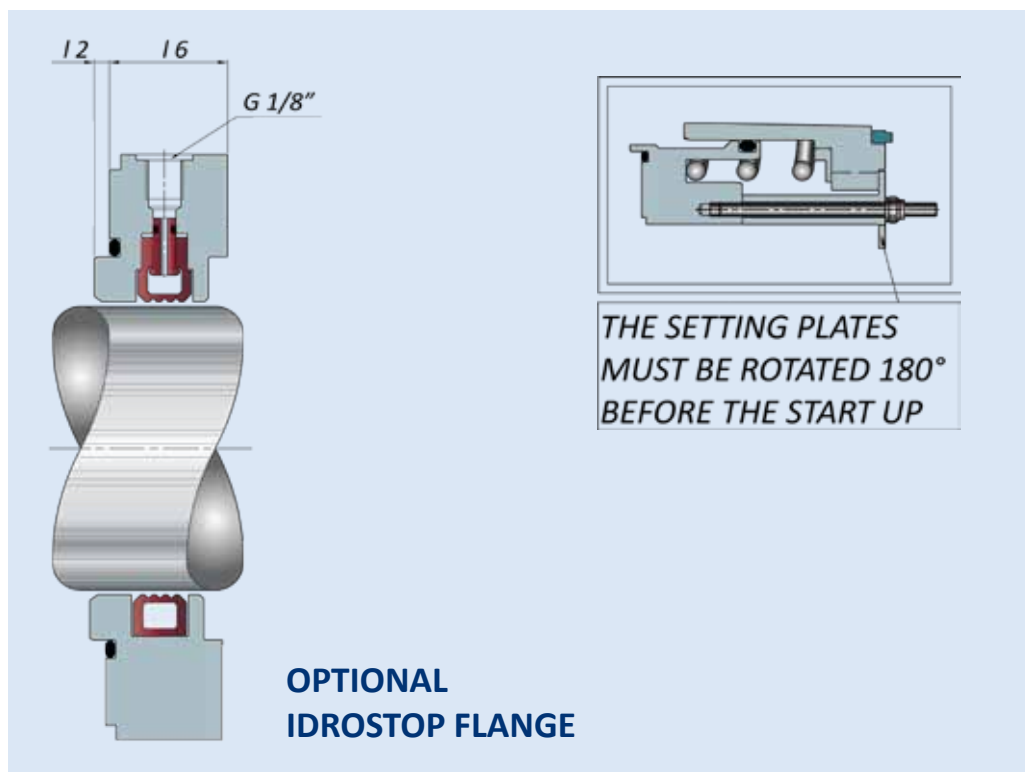
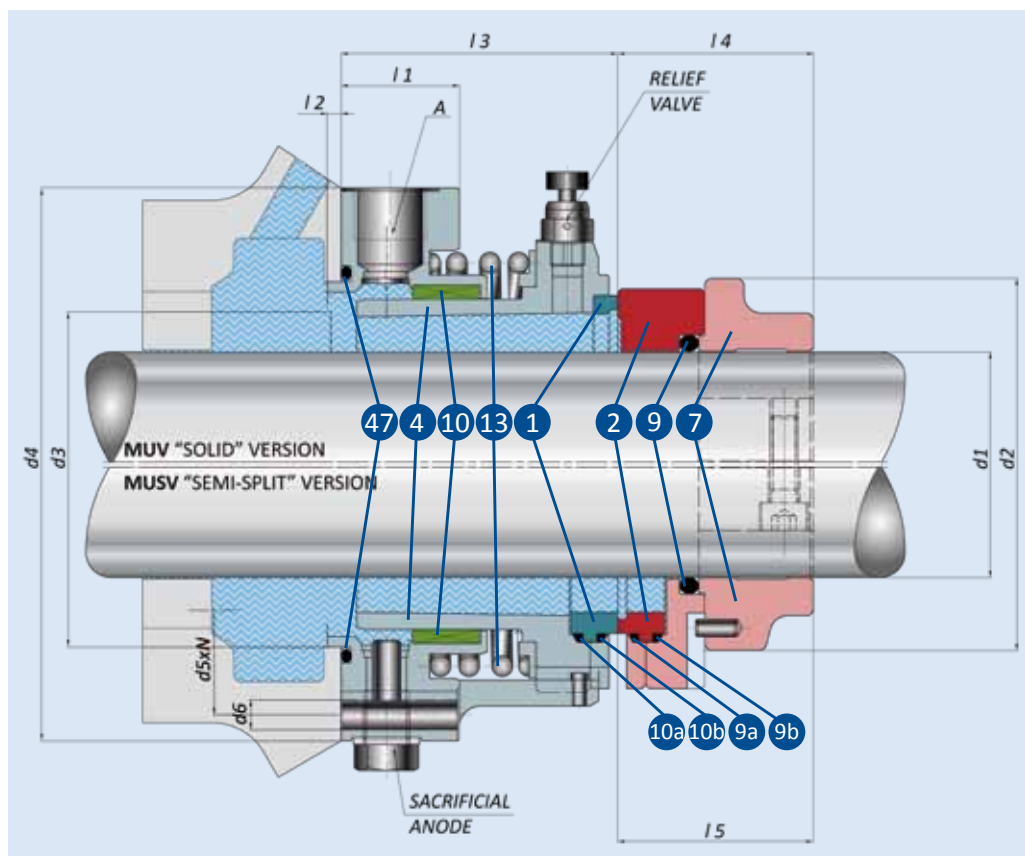


SPECIAL ANTI-CORROSION
MATERIALS



FLUCLEAN

Images and dimensions may differ slightly from those indicated in this brochure



Part list

MUV SEAL

- 1) Stationary ring
Z32: Resin impregnated Graphite
Z12: AISI 316 + Antimonio impregnated Graphite
- 2) Rotating ring
Y1: Chrome steel
U31: Silicon Carbide
- 4) Seal body
E: AISI 316
B6: Marine brass
- 7) Drive collar
B6: Marine brass
E: AISI316
- 9) Rotating ring gasket
V/V3: Fluoroelastomer
- 10) Stationary ring gasket
V/V3: Fluoroelastomer
- 13) Spring
E: AISI 316
- 47) Seal body gasket
V/V3: Fluoroelastomer

MUSV SEAL

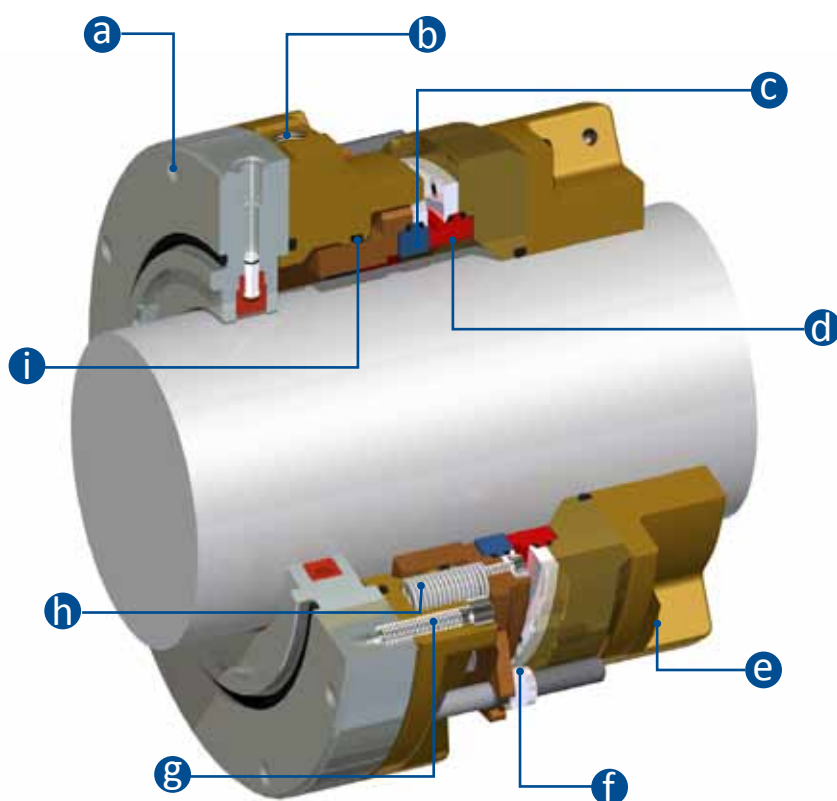
- 1) Stationary ring
U41: Silicon carbide
- 2) Rotating ring
Z31: AISI 316 + Graphite
- 4) Seal body
E: AISI 316
B6: Marine brass
- 7) Drive collar
E: AISI 316
B6: Marine brass
- 9) Rotating ring gasket
V/V3: Fluoroelastomer
- 9a) Gasket of rotating ring insert
V/V3: Fluoroelastomer
- 9b) Gasket of rotating ring insert
V/V3: Fluoroelastomer
- 10) Stationary ring gasket
V/V3: Fluoroelastomer
- 10a) Gasket of stationary ring insert
V/V3: Fluoroelastomer
- 10b) Gasket of stationary ring insert
V/V3: Fluoroelastomer
- 13) Spring
E: AISI 316
- 47) Seal body gasket
V/V3: Fluoroelastomer

d1	d2	d3 H8	d4	d5	N	d6	I1	I2	I3 ±0,5	I4	I5	I6	A	Sliding
040÷050	84	85	135	120	4	8,5	26	4	74	39	46	20	3/8"	+10/-8,5
055÷070	107	105	159	144	4	8,5	34	4	79,5	46	56	20	1/2"	+10/-8,5
075÷095	140	115	175	162	4	8,5	33	4	103,5	56	59	31	1/2"	+10/-8,5
096÷125	175	160	224	209	8	8,5	44	5	109,5	61	74	30	1/2"	+10/-8,5

Dimensions are in millimetres. For measurements which differ from those indicated, contact our Technical Department at info@fluiten.it

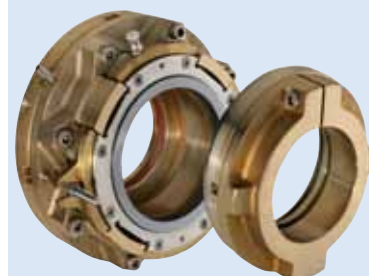
MMS MECHANICAL SEAL

The Fluiten MMS seal is ideal for marine shafts from 100 mm to 300 mm. Equipped with multi springs which guarantee a uniform load and tolerance of axial and radial movement and vibrations. In emergencies, the worn parts of the MMS seal can be replaced with the semi-split component spare-part kit, without dismantling the shaft.



Features

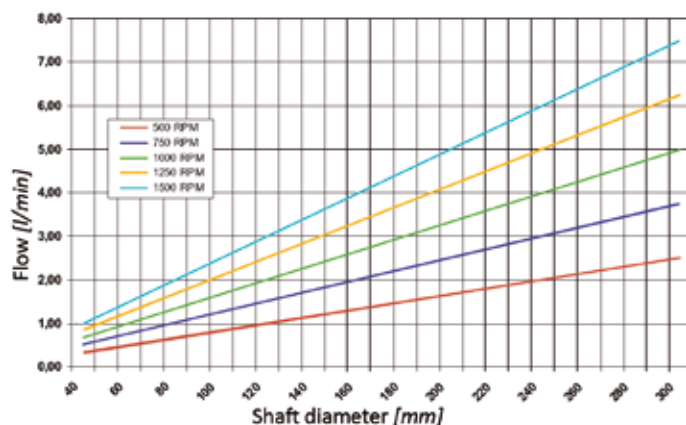
- a) Optional pneumatic security system "IDROSTOP"
- b) Connection for lubrication and cooling
- c) Balanced stationary ring to reduce power absorption
- d) Rotation ring in abrasion resistant anti-wear material
- e) Self-aligning drive collar
- f) Mobile positioners for easier and correct installation
- g) Seal body in marine brass for improved safety and resistance
- h) Springs in AISI 316 to tolerate axial vibrations and sliding
- i) Gaskets in fire-resistant material



Operating Limits

DIAMETER [mm]	FROM 100 TO 300
SPEED [m/s]	≤ 10
TEMPERATURE [°C]	-5 TO 80
PRESSURE [bar]	FROM VACUUM TO 5

Operating conditions which differ from those indicated can be evaluated by our Sales Engineers. Speed and pressure values indicated are not strictly prescribed; they should be determined by calculating their P*V bearing in mind the temperature as well as the physical and chemical characteristics of the sealed fluid.



MEDIUM/LARGE
SHAFTS



HIGH TOLERANCE
OF AXIAL RUN-OUT



NO CATASTROPHIC
FAILURES

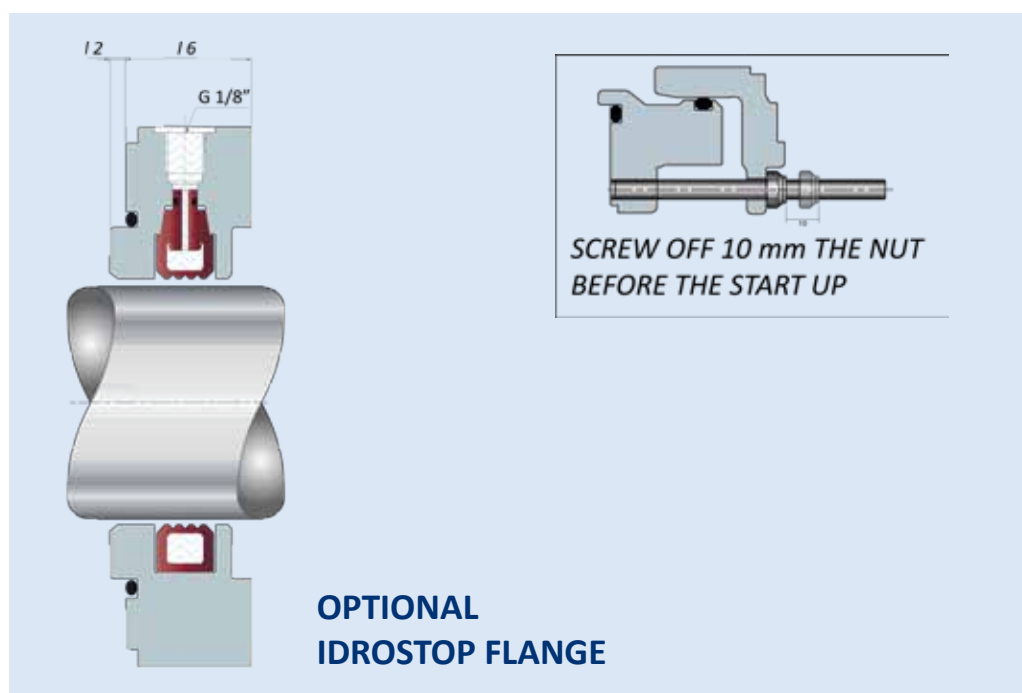
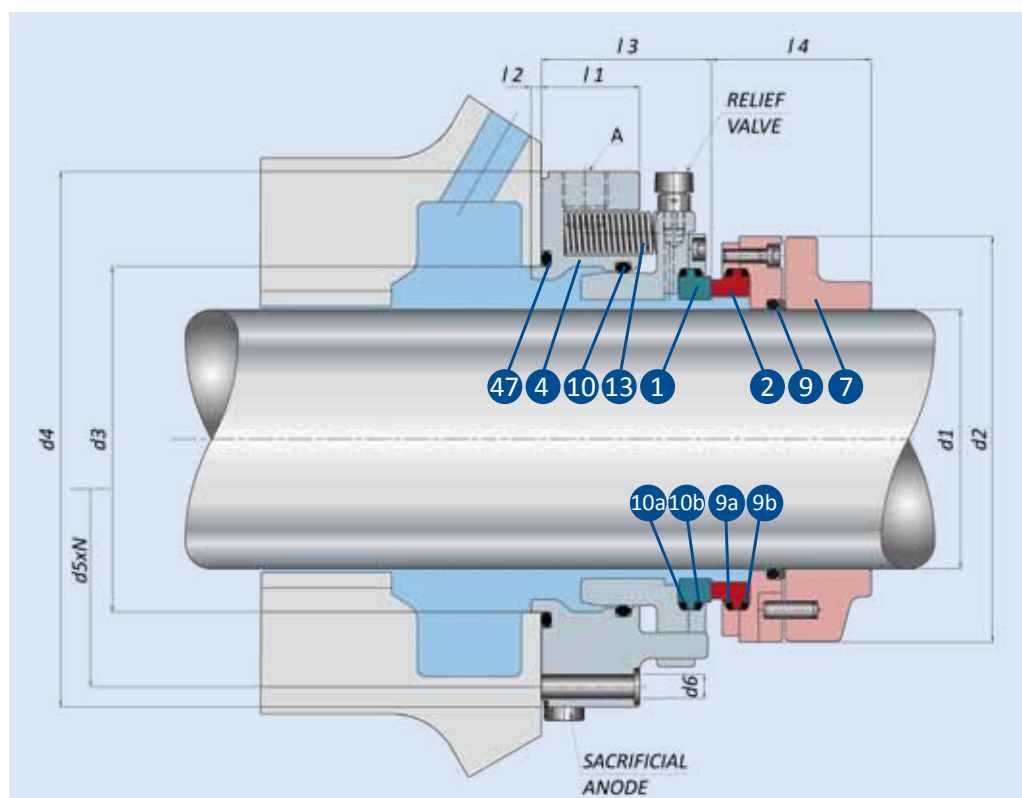


BIDIRECTIONAL SEAL



SPECIAL ANTI-CORROSION
MATERIALS

Images and dimensions may differ slightly from those indicated in this brochure



Part list

MMS SEAL

- 1) Stationary ring U41:
Silicon Carbide
- 2) Rotating ring
Z32: Resin impregnated
Graphite
Z12: AISI 316 + Antimonio
impregnated Graphite
- 4) Seal body
B6: Marine brass
- 7) Drive collar
B6: Marine brass
- 9) Rotating ring gasket
V/V3: Fluoroelastomer
- 9a) Gasket of rotating ring insert
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V/V3: Fluoroelastomer
- 13) Spring
E: AISI 316
- 47) Seal body gasket
V/V3: Fluoroelastomer

d1	d2	d3 H8	d4	d5	N	d6	l1	l2	l3 ±0,5	l4	l6	A	Sliding
100÷124	188	160	248	229	8	11	45,5	5	79	74	30	G 1/2"	+6/-4
125÷149	238	185	285	260	8	13	45,5	5	80	111	31	G 1/2"	+6/-4
150÷174	266	210	310	285	8	13	45,5	5	78	120	38,5	G 1/2"	+6/-4
175÷199	306	250	360	330	8	17	45,5	5	78	141	52,5	G 3/4"	+6/-4
200÷229	350	290	410	380	8	17	54	6	95	147	52,5	G 3/4"	+6/-4
230÷259	380	320	440	410	8	17	54	6	95	147	59,5	G 3/4	+6/-4
260÷300	425	370	515	475	8	21	62	8	115	176	59,5	G 3/4"	+6/-4

Dimensions are in millimetres. For measurements different to those indicated, please contact our Technical Department at info@fluiten.it

ASSEMBLY AND MAINTENANCE

MAINTAINING THE SEAL FACES

1. Handle the seal carefully in a very clean place in order to prevent shock and contact with dirty parts. The seal surfaces are micro-lapped; scratches or knocks could damage them. Verify the shaft dimensions.
2. Slide the seal body onto the shaft including the stationary ring while ensuring that the O-ring between the seal body and stern tube fits in its seat.
3. Position the body so that the vent valve is on top.
4. Screw on tightly the mechanical seal onto the stern tube using the appropriate screws.
5. Lubricate the shaft using a light layer of lithium grease.
6. Slide the rotating ring with the gasket and drive collar onto the shaft.
7. Assemble the transmission coupling making sure that the stationary and rotating parts do not touch.
8. Clean the seal surfaces with a clean soft and dry cloth. Remove the grease from the setting plate area.
9. Position the drive collar and the rotating ring so that they are in contact with the stationary ring.



03



04



01



05



02



06

10. Secure the drive collar onto the shaft, tightening the screws as indicated in the User Manual (IST007).
11. For the MUV/MUSV seals rotate the setting plate (see p. 5) then retighten the nuts. For MMS seals, loosen the nuts and slide 10mm (see p. 10).


07

08

09

10

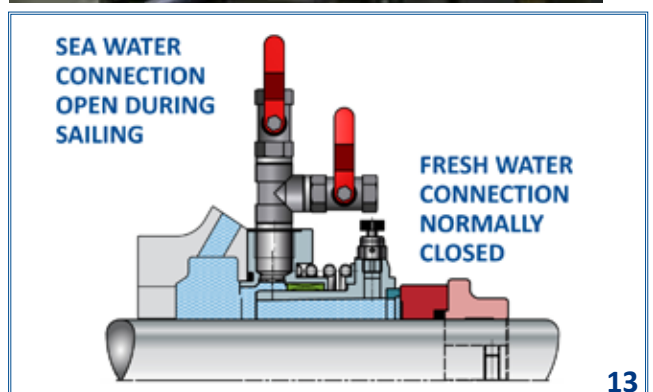
12. Connect the flushing tube to the appropriate connection located on the seal body. Open the water valve and vent using the appropriate valve. (See fig 03)
13. It is advisable to arrange a T fitting with a fresh-water and sea-water outlets. Both connections have close/open taps which simplify the flushing/washing of the seal.

When the craft is in dry-dock, wash the seal with fresh water.

The seal should be washed periodically when the craft is stationary (as in the case of the shaft bushings) with a fresh water connection. Before starting the engine, ensure that the seal is clean both inside and outside.

The seal must be carefully washed if there are any dirt.


11

12

13

IDROSTOP PNEUMATIC SAFETY SYSTEM

To improve safety, Fluiten **MUV-MUSV** and **MMS** seals can be equipped on request with the **IDROSTOP**; this device blocks the infiltration of water from the stern tube when inflated.

The barrier is created by a special silicone rubber air chamber, shaped and inserted into a specially dimensioned flange. An internal valve allows air to be blown in which in turn inflates the Idrostop, and makes it adhere to the shaft, preventing water infiltration when the shaft is still. The inflation kit is not included. The inflation pressure must be 2 barg.

This optional system allows for extra maintenance in the case of seal leakage, even when the craft is not on land. The device is installed between the seal and the stern tube. Once inflated, it can be also used when the seal is being repaired thus avoiding having to take the boat into dry-dock.

In the case of mechanical failure, the Idrostop makes it possible to bring the craft into port. It's important to block the shaft to avoid damage to the air chamber of the Idrostop.



TEMPERATURE DETECTION ALARM

A correct lubrication and cooling of the seal, which for Fluiten seals is done by sea-water are fundamental for maintaining the correct functioning of the seals. A special temperature detection kit has been developed to monitor the functioning of the seals.

By monitoring the temperature of the seal rings it is possible to:

- prevent dry-running
- prevent catastrophic failure
- detect any abnormalities in the cooling system
- detect signs of ring breakage.

The optional basic kit includes a K type thermocouple, electrically insulated so as not to be affected by stray currents and to guarantee perfect functioning. When placed near the seal rings, the thermocouple monitors temperature and any possible damage that may occur. The kit can comprise just the thermocouple for detection or can include a specially customised control panel.



Example of a customised control panel.

RE-ENGINEERING OF ALL TYPES OF SEALS

Fluiten offers its clients the possibility of improving and updating the seal system on the propeller shaft of their craft. It is now possible to improve the level of security of any craft; we have optimised our organisation so that we can now offer:

- **Repair** of any type of propeller shaft mechanical seal
- **Conversion and updating** of different seal systems
- Installation **service**
- **Training** courses (theoretical and practical) for maintenance staff

When choosing Fluiten seals, customers can be assured that our experienced and highly specialised technical staff will provide the best solutions, designed specifically for their requirement and operating condition.

Our Service Department, which functions independently from our manufacturing department, offers excellent and flexible repair and upgrading services, available also for non-Fluiten seals.

Apart from routine repairs, the Fluiten Service department offers feasibility studies for the upgrade of existing seals for a new process or new regulations in force.

Our service and R&D departments work in close cooperation to provide the customer with bespoke solutions. With the part to be substituted or its dimensions in hand, our engineers will develop the most suitable Fluiten seal with the necessary modifications to ensure maximum safety in the water.



Examples of NON-Fluitten seals to be completely substituted.

