

PROJECT-BASED MANUFACTURERS OF MONOLITHIC ISOLATING JOINTS



ALFA
ENGINEERING
Società Cooperativa

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PROJECT-BASED MANUFACTURERS OF MONOLITHIC ISOLATING JOINTS

JOINTS FROM 1/2" TO 80" FOR THE PETROLCHEMICAL, OIL&GAS
AND WATER DISTRIBUTION INDUSTRIES.
NEEDED TO PROTECT PIPELINES FROM CURRENT FLOWS AND CORROSION.

WHO WE ARE

Alfa Engineering Società Cooperativa has its headquarters in Modena (North of Italy) and manufactures high-quality monolithic isolating joints for the petrolchemical, Oil & Gas and water distribution industries. Since more than 30 years we work for projects all over the world and we are part of the main vendors' lists in our field.

OUR HISTORY

Alfa Engineering Società Cooperativa, founded in 2011, is a great instance of workers buyout. The company was created after old Alfa Engineering s.r.l.'s closing down, thanks to the will and commitment of the staff, who decided to take the challenge by submitting their joint project to Legacoop and finding its precious support.

Legacoop is an Italian association on a national level which represents producer cooperatives. It takes care of their development and supports them.

ENGINEERED
100% in our company

BUILT
by qualified personnel

TESTED
in our new TESTING AREA

PACKED AND SHIPPED
carefully by our personnel

PROJECTS ALL OVER THE WORLD



GUARANTEE FOR OUR CUSTOMERS

ISO 9001:2015

Thanks to its Quality Dept., Alfa Engineering verifies and makes sure that both the company's procedures and our joints' quality are always met through continuous monitoring.

LEGISLATIVE DECREE N. 231/2001

Alfa Engineering Società Cooperativa has adopted a code of ethics and acts by an efficient Model for Organization and Management called legislative decree n. 231/2001 that involves a supervisory board to grant an always better work arrangement.

PED: CE MARKING AND CERTIFICATION OF PRESSURE EQUIPMENT

Alfa Engineering Società Cooperativa is certified according to "Module H" in conformity with the European Directive 2014/68/UE for pressure equipment, also known as PED (Pressure Equipment Directive).

Alfa's Monolithic Isolating joints for the European market are designed and manufactured in accordance with PED requirements and CE marked, when applicable, as a guarantee of compliance to safety requirements so that, if properly installed, kept efficient and used for their purpose, health and safety of people is not put at risk.

It is important to underline that a Notified Body continuously monitors the effectiveness of company Module H "Full Quality Assurance" through surveillance and periodic audits.



A RELIABLE COMPANY

- Reliability guaranteed thanks to a team of partners. As a matter of fact, Alfa Engineering, founded in 2011, is a great instance of workers buyout
- 100% made in Italy joints: from their design to their packaging
- Customized engineering against customers' specs
- Machining is performed internally by qualified personnel continuously trained
- Welding is performed at Alfa Engineering Soc. Coop. As well, we have more than 140 welding and cladding qualifications
- Assembly is done by specialized personnel
- Tests are carried out at our internal cutting-edge testing area, with remote video-live connection to the inspectors' room
- Excellent sand-blasting and painting: performed at an external specialized facility under Alfa Engineering's quality control. Final tests and packaging are performed at our premises



OUR JOINTS

Our Technical Dept. creates the engineering of each project according to customers' requirements and after analysing the specs received, it suggests the best solutions in compliance with the corresponding standards.

TECHNICAL FACTS

Our joints are designed project-based for sweet or sour service and for above or below ground installation, plus sub-sea installation. We are ISO 9001:2015 and PED certified.

SIZES

from ½" to 80" DN

PRESSURE CLASSES

ANSI: # 150, # 300, # 600, # 900, # 1500, # 2500

API: # 10.000

MATERIALS

Carbon steel, stainless steel, duplex and super duplex, clad

STANDARDS

ASTM, DIN, ASME, DNV, API, ISO, EN, NORSOK, NACE, ARH/DGM

INSULATOR

Nema G11 class H, with best properties on the market.

SEALING

Double O'Ring Sealing system for best sealing performance. Its material type is carefully selected according to service and temperature condition (c.f. pag 15)

WARRANTY

Joints have a standard warranty of 24 months after shipment.

EXTRAS

cable lugs (used for electrical connections)

spark gaps (used to protect joints from sudden electrical discharges)

PRODUCTION CYCLE

We take care of our products from design to shipping, to guarantee the best quality.

- 1) ENGINEERING
- 2) MECHANICAL PROCESSING
- 3) PIPE CUTTING
- 4) WELDING W1 / W2 AND NDE TESTS
- 5) INSULATING MATERIAL PROCESS
- 6) ASSEMBLY
- 7) WELDING W3 AND NDE TESTS
- 8) RESINATION
- 9) TESTS
- 10) SAND BLASTING AND PAINTING
- 11) FINAL TESTS
- 12) PACKING AND SHIPPING

CUTTING - EDGE TESTING AREA

Our new testing area was designed in order to grant maximum efficiency and safety for our staff and for visitors such as inspectors and customers.

From a point outside the testing area, in a safe zone, the testing operations can be fully monitored.

The testing area is equipped with cameras and instrumentation that allow to remotely follow the tests from the inspectors' room.

TESTS INSIDE OUR TESTING AREA:

- VACUUM TEST
- PNEUMATIC
- HYDROSTATIC
- HYDRO FATIGUE
- BENDING
- TORSION
- HYDRO-THERMAL BENDING

Besides the tests that are performed in our testing area, our qualified personnel carries out the following non-destructive tests:

- RT – RADIOGRAPHIC TESTING
- PT – PENETRANT TESTING
- VT – VISUAL TESTING
- MT – MAGNETIC TESTING
- UT – ULTRASONIC TESTING

MORE TESTS ARE:

- ELECTRICAL RESISTANCE
- DIELECTRIC STRENGTH
- IMMERSION TEST IN 3% SALINE SOLUTION
- PIGGABILITY / DRIFT AT 97% INT. DN
- ADHESION
- HOLIDAY

UPON REQUEST WE PROVIDE:

- 3.2 CERTIFICATION ON MATERIALS
- PSL2 CERTIFICATION ON PIPES
- PWHT ON WELDS
- HIC TEST + SSC TEST ON FORGINGS
- HIC ON PIPES
- FINITE ELEMENT ANALYSIS (FEA/FEM)
- CTOD ON FORGINGS AND PIPES
- HELIUM TEST



WHY TO USE MONOLITHIC ISOLATING JOINTS

The use of Monolithic Isolating Joints is highly recommended to mitigate risks of corrosion and to grant more efficient Cathodic Protection System.

Welded on the pipeline MIJs protect all the line blocking the flow of electric currents, which are the main cause of corrosion and leakages.

Joints are used in order to:

- safeguard the pipeline from corrosion and corrosion-related failures
- isolate the pipeline and to ensure that stray/earthing electricity currents do not cause increased corrosion
- limit spread and the related high cost of traditional cathodic protection system
- electrically "split up" long pipeline into distinctive cathodic protection system
- avoid pipeline shutdown because of failure, replacement or leakage
- increase life time of the pipeline
- decrease overall project life cycle cost (no recurring upkeeps)

Cathodic protection is the main way to prevent metal against corrosion, for this reason isolating joints are essential in an efficient cathodic protection system and ensure the long life of the pipeline.



WHERE TO USE MONOLITHIC ISOLATING JOINTS

MIJs can be installed both onshore and offshore pipeline systems. Their correct placement ensures effective electrical isolation of strategic points in hazardous areas.

In order to save overall cost of corrosion control system, Monolithic Isolating Joints have to be installed:

- between pipeline section or different metallic materials
- at pipeline DN variation
- at the entrance and at the exit of ground level or a plant/refinery
- where pipelines turn from onshore to offshore
- at the beginning and at the end of CP systems
- where there are different ground conformations
- in presence of different cathodic protection systems
- where interferences have to be managed

International codes such as ISO 15589-1:2015 highly recommend the use of monolithic isolating joints in order to effectively segment and protect the pipelines from corrosion. NACE also indicates as “strongly suggested” the use of monolithic isolating joints for an effective CP system protection.



ALFA'S JOINT MODELS

Alfa Engineering is able to design and manufacture different types of joint models, according to the project requirements or customer's specific requests. The most common are:

STANDARD MODEL

Alfa's standard joint has a body made of forged material that follows ASTM classification. The body is welded to pup pieces made of the same API 5L material of the entire pipeline where they have to be installed.

Pups can also be directly taken from the mother pipeline and sent as free issued to our premises by end customer. The standard model features W1 and W2 butt welds (or more, if needed) in addition to closure weld W3. For a better comprehension please see figure 3.

FORGED PUP PIECES MODEL

When pipe material is scarcely retrievable, non-standard wall thickness is required or project has specific requirements, Alfa manufactures a joint that features a forged body with forged pup pieces welded to it. These pup pieces are classified as ASTM material instead of API 5L. It features the same welds as the standard model.

WELDLESS MODEL

Alfa has enhanced the properties of monolithic joint by creating a high-performance model fully made of forged material that features no butt welds (figure 1). Alfa's weldless model only foresees closure weld W3, meaning that no weld is in touch with the conveyed fluid. This grants better resistance as welds are the weakest part of the joint itself.

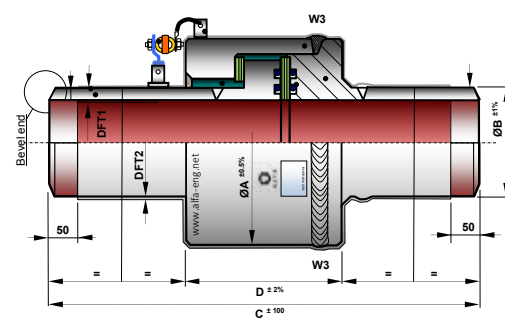


FIGURE 1: Alfa's weldless model. Joint does not feature butt welds W1 and W2, pup pieces are made of the same forged material of the body

FLANGED MODEL

Alfa is able to manufacture joints with flanged ends: Raised Faced or Ring Type Joint flanges according to the customer's requirements are welded at both ends of the joint for proper connection to the pipeline. To minimize weak points, Alfa recommends flanged model to be based on weldless option. This way, the joint only features two butt welds instead of four (figure 2)

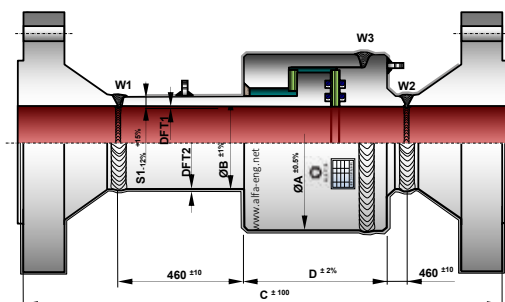
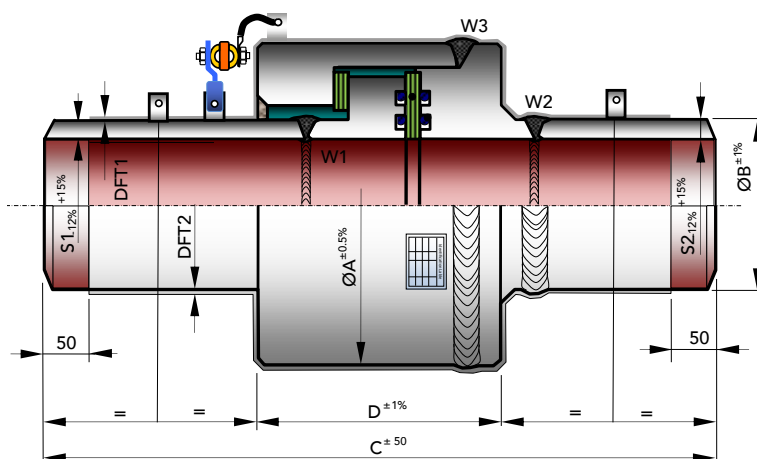


FIGURE 2: Alfa's flanged model. Joint ends with flanges if required

DESIGN DATA



INSTALLATION	ABOVEGROUND / UNDERGROUND/ SUBSEA –On-Shore/Off-Shore	
MATERIALS	PUPS	Carbon Steel All Grades + Low Alloy & Alloy Steel + Duplex & Super Duplex +stainless steel
	BODY PARTS	ASTM / ASME / UNS / EN Materials
	ISOLATING ELEMENTS	NEMA G10/G11 - ASTM D709 –Class H
	“OR” GASKET	Double “O” Ring ASTM D 2000 we can use ANY kind of O’Ring depending on project for SOUR - NON-SOUR - TOXIC environment requirements and special applications.
	BACK SEAL	Silicon Neutral Low Module
	FILLER ISOLATOR	Epoxy Resin Cold Cured
	CABLE LUGS M10	EN 10025 235JR (Carbon Steel)
	INTERNAL / EXT. COATING	Amine Cure Epoxy Resin 200÷1500 microns We can apply any painting system based on customer requirements.

HYDROSTATIC TEST	1.5 Times the Design Pressure (Or as per Customer Requirements)
DIELECTRIC TEST	1.5-5 KV @ 1 minute AC 50÷60 Hz (Special 20 KV @ 1 minute AC 50÷60 Hz)
ELECTRIC INSULATION TEST	> 200 MΩ @ 1000 Volt DC (Special > 100 GΩ @ 5000 Volt DC)
NDE TEST	W1-W2-W3: MT & UT, W1-W2: RT Bevel Ends MT - According to ASME V ASME VIII
WELDING PROCEDURES	W1-W2-W3: According To ASME IX - API 1104 –DNV ISO 15614-1
CERTIFICATION	EN 10204 - 3.1 (EN 10204 - 3.2 if requested)
INSPECTION & TEST/ACCEPTANCE	Manufacturer Standard / Customer Applicable Requirements
HYDRO-BENDING TEST	Based on customer requirements from 5 to 90 % of SMYS
HYDRO-THERMAL BENDING TEST	Based on customer requirements up 100 Celsius
TORSION TEST	5% of SMYS
HYDRO FATIGUE TEST	From 5 to 40 cycles at 80% TP or as per customer requirements
HIC TEST	From Accredia Certified Laboratories; on Forgings and on Pipes
SSC TEST	From Accredia Certified Laboratories; on Forgings and on Pipes
VACUUM TEST	Down to 1 Milli-bar
PIGGABILITY/DRIFT TEST	Up to 98% I.D.
HIGH PRESSURE HELIUM AIR LEAK TEST	Based on customer requirements
3% SALINE IMMERSION TEST	As per customer requirements
PULL OFF TEST-ADHESION TEST	Based on customer requirements
HOLIDAY TEST	From 60 to 5 kv
ADDITIONAL TEST AVAILABLE	Upon request
SERVICES	SOUR / NON SOUR /TOXIC /LETHAL
CORROSION ALLOWANCE	As per Customer Requirements
FLUIDS	Gas, Hydrocarbons, Oil, Chemical Fluids, Water
PIPING CLASS	ANSI: from #150 to # 2500 API: #10000

ANSI 150# (PN or DP 25)

DN (Inch)	Ø (mm)	EU DN	WT (mm)	Pipe Grade	A	C	D	Kg
1"	33,4	25	3,38	B	76	400	92	4,2
2"	60,3	50	3,91	B	104	400	106	5,2
3"	88,9	80	4,78	B	130	400	114	9
4"	114,3	100	4,78	B	155	400	120	12
6"	168,3	150	5,56	B	216	400	134	21
8"	219,1	200	6,35	B	269	400	148	30
10"	273	250	6,35	B	320	450	156	41
12"	323,9	300	6,35	B	378	450	160	54
14"	355,6	350	7,92	B	419	500	190	100
16"	406,4	400	7,92	B	478	600	210	133
18"	457,2	450	7,92	B	529	700	224	154
20"	508	500	7,92	B	580	800	234	187
24"	609,6	600	9,52	B	695	800	274	320
26"	660,4	650	9,52	B	734	900	286	327
28"	711,2	700	9,52	B	784	900	296	356
30"	762	750	9,52	B	840	1000	304	391
32"	812,8	800	9,52	B	890	1000	314	427
34"	863,6	850	9,52	B	940	1100	322	452
36"	914,4	900	9,52	B	990	1200	330	534

ANSI 300-400# (PN or DP 50-64)

DN (Inch)	Ø (mm)	EU DN	WT (mm)	Pipe Grade	A	C	D	Kg
1"	33,4	25	3,38	B	76	400	92	4,2
2"	60,3	50	3,91	B	110	500	108	7,6
3"	88,9	80	5,49	B	150	500	114	15
4"	114,3	100	6,02	B	175	500	120	19
6"	168,3	150	7,11	X52	240	500	140	36
8"	219,1	200	8,18	X52	294	600	160	59
10"	273	250	8,74	X52	352	700	180	86
12"	323,9	300	9,52	X52	404	700	204	127
14"	355,6	350	9,52	X52	448	800	214	154
16"	406,4	400	10,31	X52	495	800	234	185
18"	457,2	450	11,91	X52	546	800	260	236
20"	508	500	11,91	X52	605	900	274	298
24"	609,6	600	14,27	X52	705	1000	324	438
26"	660,4	650	14,27	X52	756	1000	336	483
28"	711,2	700	14,27	X52	815	1200	360	644
30"	762	750	15,88	X52	879	1200	376	762
32"	812,8	800	15,88	X52	884	1200	390	826
34"	863,6	850	17,5	X52	957.5	1300	415	893
36"	914,4	900	19,05	X52	1031	1300	440	1128

ANSI 600# (PN or DP 100)

DN (Inch)	Ø (mm)	EU DN	WT (mm)	Pipe Grade	A	C	D	Kg
1"	33,4	25	3,38	B	76	400	92	4,2
2"	60,3	50	5,54	B	110	500	108	7,6
3"	88,9	80	5,49	B	150	500	116	15
4"	114,3	100	6,02	B	175	500	130	20
6"	168,3	150	7,11	X52	240	500	150	37
8"	219,1	200	8,18	X52	294	600	178	63
10"	273	250	9,27	X52	352	600	204	94
12"	323,9	300	9,52	X52	404	700	224	137
14"	355,6	350	9,52	X52	453	700	250	177
16"	406,4	400	10,31	X52	502	800	274	215
18"	457,2	450	11,91	X52	552	800	300	267
20"	508	500	11,91	X52	609	800	322	337
24"	609,6	600	14,27	X52	739	900	358	570
26"	660,4	650	14,27	X52	783	1000	386	667
28"	711,2	700	14,27	X52	836	1200	376	828
30"	762	750	15,88	X52	907	1200	426	978
32"	812,8	800	17,5	X52	946	1300	430	1342
34"	863,6	850	19,05	X52	1013	1300	461	1480
36"	914,4	900	19,05	X52	1080	1300	492	1503

NOTE: Higher Pressure Class (#900, #1500, #2500, #5000 and #10.000) available upon request.
Larger Diameters available upon request.

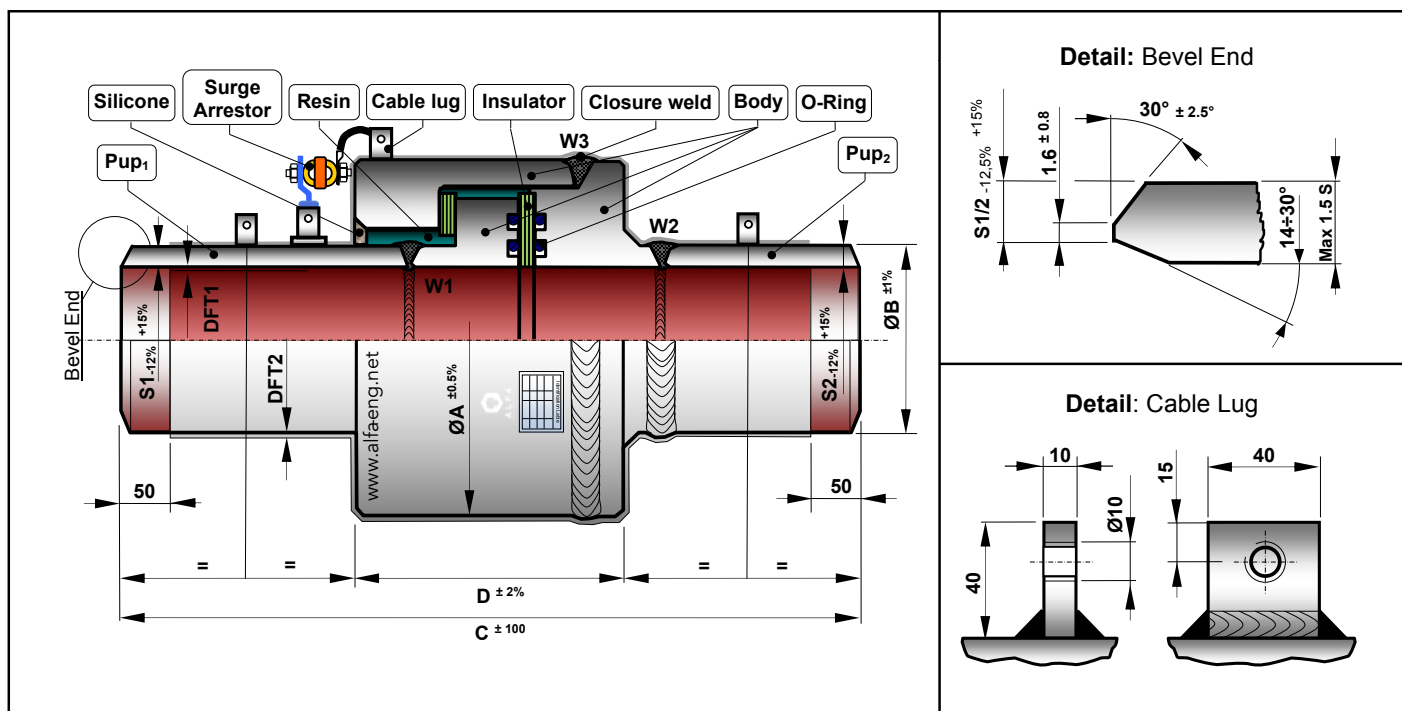


FIGURE 3: Alfa's standard model. Forged parts are kept together by closure weld W3; pup-pieces are connected to the body through butt welds W1 and W2

NON-METALLIC MATERIALS

The monolithic isolation joint is an assembly of different mechanical parts and it has to fulfil its insulating function; it needs to handle any pressure for which it has been designed and to which it will be subjected during its whole operating life.

O-RINGS

Elastomer or composite ring that guarantees sealing from internal pressure.

More details can be found on page 16.

INSULATOR

High resistance fiberglass-epoxy composite with the main function of electrically isolating the two sides of the joint. At the same time, it grants rigidity and resistance of the joint itself as it is not subjected to considerable deformation.

RESIN FILLER

Two-component epoxy resin filler used to keep the internal parts of the joint firmly locked in position, and to prevent the penetration of humidity and thus corrosion.

SILICONE

Applied on the external part of the joint to prevent humidity from penetrating inside the resin crevice.



PAINTING

The last stage of production of Alfa's monolithic joint is the application of internal lining and external coating, with a dry film thickness DFT according to customer's request.

After analysing the project specifications and the chemical composition of the fluid, Alfa selects the most appropriate type of paint among a huge variety of top-quality products, the most common are amine cure epoxy and polyurethane.

Alfa is also familiar with suitable paints to be applied in case of potable water lines.

Internal lining is essential in order to enhance the insulating properties of the joint as well as to protect the underlying parts from the fluid passing through the line.

The maximum durability of the isolating function is granted when joints are supplied fully painted.





O-RING DOUBLE SEALING SYSTEM

In order to better accomplish the joint's function in pressurisation and depressurisation condition, good mechanical practice requires the adoption of elastomer ring pieces.

In the elastomer sealing ring selection for isolation joints, it is essential to ensure the use of correct type of polymer for each specific application, fluid nature and temperature.







Behind this description, there is a very remarkable technology in synthetic rubber compounding and the need to produce high precision details with aside the necessary extensive quality control.

Alfa Engineering, as manufacturer of a very strategical product intended for various sectors of industry, uses double sealing system with 4 O-rings as a minimum design standard, so to guarantee outstanding performance and reliability against any risk of leakage during the lifetime of the monolithic isolation joint. Furthermore, under some specific requests and for more stringent projects, ALFA ENGINEERING can adopt even more conservative design increasing further the number of sealing rings.

Sealing design is carried out in strict accordance with several international codes and standards such as ASTM D2000, AS 568A, BS 1806, SMS 1586, DIN 3771, ISO 3601, and ASME VIII.

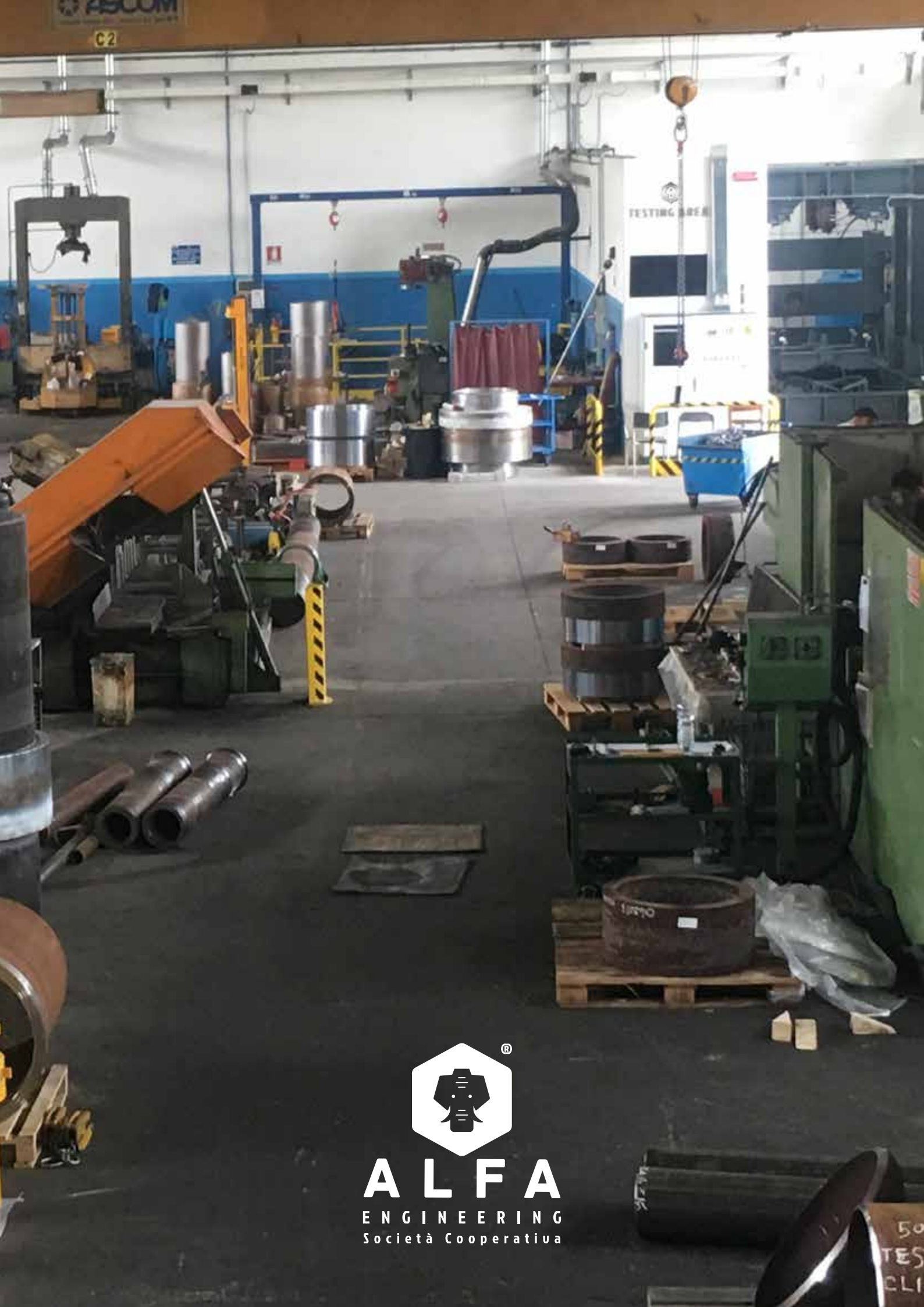
O-rings are not affected by temperature change within the design range, as they can expand and contract easily in the groove. Compression set is not a problem as the pre-compression is of small entity for static applications.

It is worthwhile to mention that O-Ring seal design is the only recognised and coded application for static, dynamic and intermittent use under low, medium and very high pressures. O-rings are recommended for all pressure vessels, are commonly used for pressure equipment such as valves, cylinders, isolation joints and have large and secure application in aerospace and naval engineering practice.

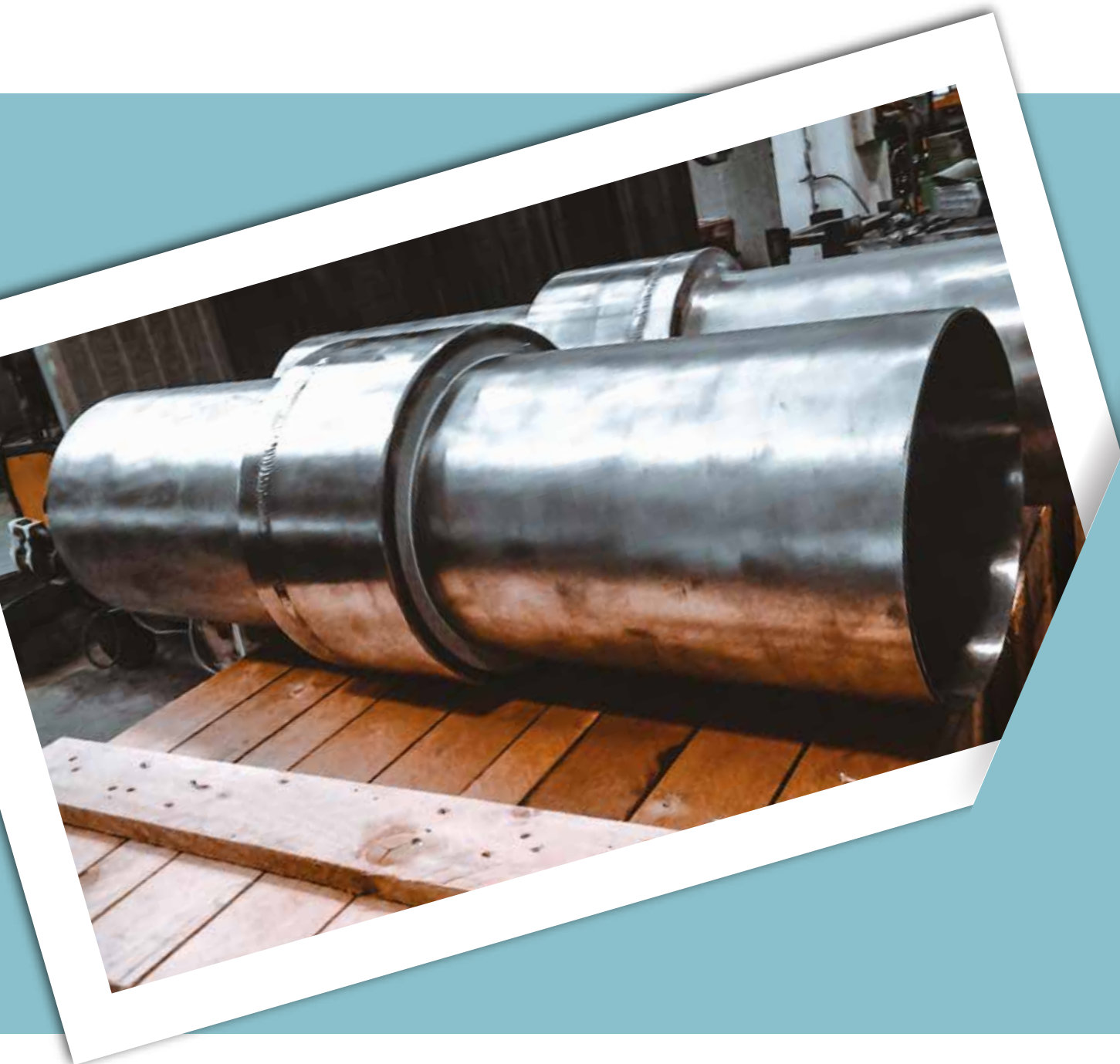
DESIGNATION	MATERIAL	RECOMMENDED APPLICATION	NOT RECOMMENDED FOR	TEMPERATURE RANGE
NBR	Nitrile Butadiene Rubber (Buna-N)	General purpose sealing, petroleum oils and fluids, natural gas, cold water	Ketones (MEK), halogenated hydrocarbons, strong acids, sunlight, ozone, weathering	-30/110°C 
HNBR	Hydrogenated Nitrile Butadiene Rubber	Mineral oil-based hydraulic fluids, animal and vegetable fats, diesel fuel, ozone, sour gas, hot water, dilute acids and bases	Ketones (MEK), halogenated hydrocarbons, strong acids, sunlight, ozone, weathering	-40/150°C 
FPM/FKM (Viton®)	Fluoroelastomer	Vacuum, most acids/chemicals, halogenated hydrocarbons, di-ester lubricants, petroleum oils/fuels, silicone oils/greases	Ketones (MEK), amines (Ammonia), Acetone, Ethyl Acetate, hot water and steam (except specialty grades), low molecular esters and ethers	-20/230°C 
FFKM (Markez®, Chemraz®, Kalrez®, Simriz®)	Perfluoroelastomer	High temperature applications, chlorine wet/dry, petroleum oil, chlorinated hydrocarbons	Molten metals, gaseous alkali metals, halogenated freons/fluids.	-45/315°C 
PTFE encapsulated (Teflon®, FEP-O-SEAL®)	Polytetrafluoroethylene encapsulated, silicone or FKM core	Chemical processing and production, extraction (on shore and off shore), petrochemical refining, pharmaceutical production, food and drink processing	Dynamic use where high speeds and poor finishes are encountered. Where the housing design requires excessive stretch or collapse of the O-ring during installation.	-60/260°C (silicone core) -20/205°C (FKM core) 
PTFE spring energized (Teflon®, Enerseal®)	Polytetrafluoroethylene energized, metal spring core	Chemical processing and production, extraction (on shore and off shore), petrochemical refining, pharmaceutical production, food and drink processing	Dynamic use where high speeds and poor finishes are encountered. Where the housing design requires excessive stretch or collapse of the O-ring during installation.	-250/260°C 







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