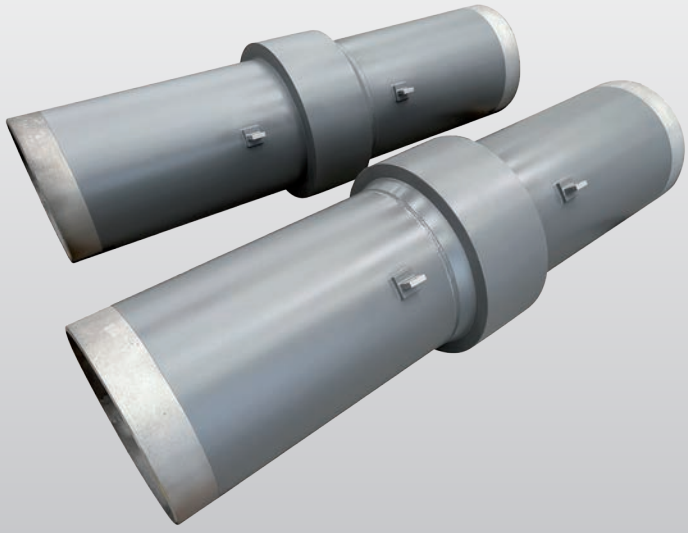
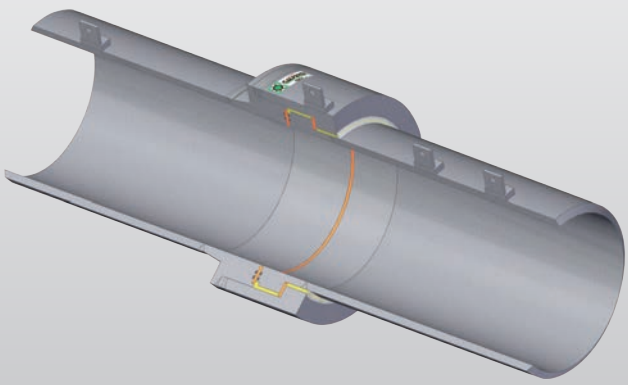
The Original GALPERTI®

TECH FORGED PRODUCTS





G-JOINT - Monolithic Insulating Joints

GALPERTI TYPE G-JOINT®, MONOLITHIC INSULATION JOINTS

Within the range of branded products manufactured by The Original Galperti Group, the Monolithic Insulating Joint G-joint® has now become a certain reference point.
Its use is to electrically isolate sections of a pipeline to ensure full efficiency to cathodic protection systems against corrosion.
G-joint® is fully home-made, engineered, manufactured and tested by Galperti Tech Forged Products S.p.a., in compliance with major international standards and more specific project requirements.

WHY TO USE MONOLITHIC INSULATION JOINTS ON PIPELINES

Dangerous leaks, contamination, pollution, service interruptions, pressure rating reduction, are all usual causes of corrosion on both buried and above-ground pipelines. Metallic contacts and direct connections to earthing systems should be avoided, or the risk of corrosion can be increased. As also strongly recommended by the ISO Internationl Code 15589-1:2015, isolation should be achieved by installing the monolithic isolating joints as connections through pipes, by avoiding all the related damages and costly drawbacks that would be due to their non-use.

BENEFITS AND ADVANTAGES

Installed on behalf of flange's kit connections for certain lengths down the pipeline, the Monolithic Insulation Joints grant the cathodic protection and several other advantages, like:
- Electrical break between the pipeline sections and neighbouring structures
- Reduction on Ground Loops Currents
- No loss of integrity due to thermal expansion or ground stress
- Supplied ready for easy installation
- No specific maintenance required

APPLICATIONS

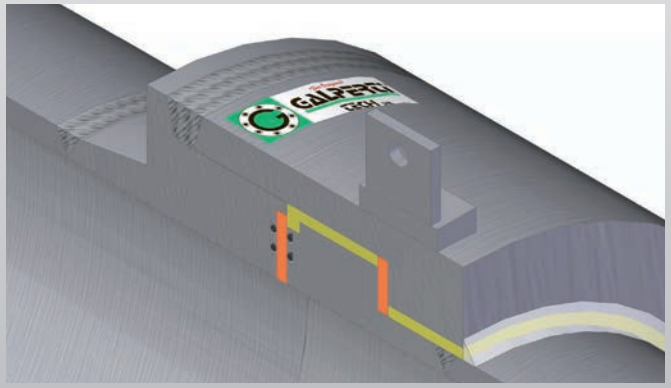
- Existing and new constructions
- Oil & Gas, LNG, Hydrogen and Water lines
- To and from Gas distribution stations
- On Gas or Liquid fuel tanks
- On Subsea applications
- Onshore and Offshore, above ground and buried

APPROVALS AND CERTIFICATIONS

Galperti Tech Forged Products Spa. is accredited with the ISO 9001:2015 Certified Quality System, which means having a close and focused control all over the manufacturing activities.

Galperti Tech Forged Products Spa. obtained the PED certification to manufacture and supply their monolithic insulating joints from 4" to 56", up to #2500 ANSI pressure class, Design Temperature -46°C / +110°C Fluid Group 1/2, according to the Pressure Equipment Directive n°2014/68/EU for pressure equipment, applying the CE marking on their G-joint® product.

The Original GALPERTI® TECH FORGED PRODUCTS



DATASHEET FOR MONOLITHIC INSULATION JOINTS

DESIGN CODE	ASME VIII Div.1 - ASME B31.3/B31.4/B31.8	
DESIGN FACTOR	0.6	1
SIZE RANGE	From 4" to 56"	1
PRESSURE RATING	From PN 20 to PN 420	1
ANSI CLASS	From #150 to #2500	1
DESIGN TEMPERATURE	From -46°C to +110°C	1
END CONNECTION	BW - Butt Weld	1
CORROSION ALLOWANCE	As per customer specification	
EXTERNAL LOADS	Axial, Shear, Bending and Torsional as per customer specification	
FINITE ELEMENTS ANALISYS	Upon request	

INSTALLATION	Abovegroung/Underground/Subsea - On-shore/Off-Shore	
SERVICES	NON SOUR / SOUR / TOXIC / LETHAL	
FLUIDS	OIL / GAS / HYDROCARBONS / CHEMICAL / WATER	

FORGED MATERIALS	Carbon steel, Alloy steel, Stainless steel, Duplex & Superduplex	
PUP-PIECES MATERIALS	Carbon steel, Alloy steel, Stainless steel, Duplex & Superduplex	
INSULATION MATERIAL	Epoxy glass according to ASTM D709, Type IV, Group G11	
O-RING GASKET MATERIALS	Elastomers NBR or FKM according to ASTM D2000	
FILLER MATERIAL	Two-components epoxy resin	
SEALANT	Silicone	

INTERNAL COATING	First layer: Epoxy Primer. Final layer: polyurethane top coat.	1
EXTERNAL COATING	First layer: Epoxy Primer. Final layer: polyurethane top coat.	1

WELDING PROCEDURES	According to ASME IX or ISO 15614	

CERTIFICATIONS	EN 10204 3.1 (3.2 upon request)	
MECHANICAL TESTS	Tensile, Impact and Hardness Tests (on forgings and pup-pieces)	
NDE TESTS	VT, PT, MT, UT, RT (on forgings, pup-pieces and welds)	

HYDROSTATIC TEST	1.5 times Design Pressure	1
DIELECTRIC STRENGTH TEST	3÷5 KV 50Hz AC for 1 minute	1
ELECTRICAL RESISTANCE TEST	> 5 MW with 1 KV DC in dry condition	1
HYDRO-BENDING TEST	Upon request (on assembly) 75% SMYS pipe	1
TORSIONAL TEST	Upon request (on assembly) 5% SMYS pipe	1
HYDRO FATIGUE TEST	Upon request (on assembly)	
PNEUMATIC AIR TEST	Upon request (on assembly)	
VACUUM TEST	Upon request (on assembly)	
PIGGABILITY TEST	Upon request (on assembly)	
IMMERSION TEST (3% saline)	Upon request (on assembly)	
HIC TEST	Upon request (on forgings and pup-pieces)	
SSC TEST	Upon request (on forgings and pup-pieces)	
CTOD TEST	Upon request (on forgings and pup-pieces)	
ADHESION TEST	Upon request (on coating)	
HOLIDAY TEST	Upon request (on coating)	

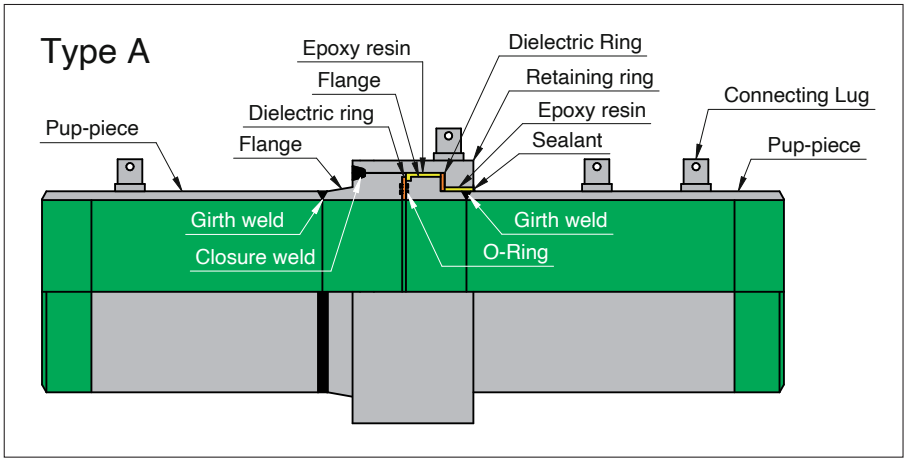
PED CERTIFICATION	Upon request	

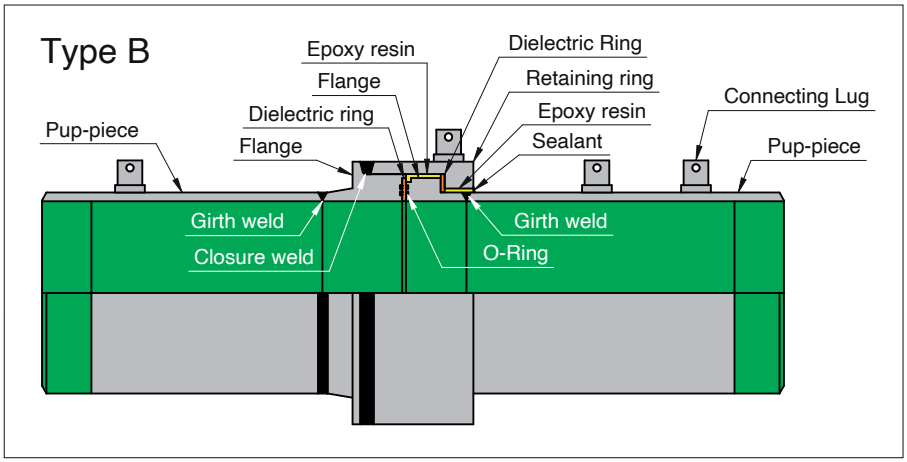
EXTRAS	Connectiong lugs and sparking gaps upon request	

Note I : Standard production; other options available upon request.

COMPONENTS

- Pup-piece, is a pipe segment with bevelled ends.
- Boltless body, made by forged parts, insulating and filler material.
- Retaining ring
- Forged rings
- Dielectric ring
- Seal gasket O-Ring
- Epoxy resin
- Sealant
- Connecting lug (available upon request) Connecting lug is suitable for bolted cable connection and is intended for electrical measurement or for a surge diverter installation.
- Spark-gaps (available upon request)





DESIGN AND TECHNICAL DATAS

Galperti branded Monolithic Insulation Joints are designed in accordance with ASME VIII and applicable codes (ASME B31.3 ASME B31.4 ASME B31.8). Standard calculations "by formula" are performed in accordance with ASME VIII Div.I App.2. The standard Design Factor considered and applied is 0,6, any different one is considered upon request. Finite Element Analysis is also available on request, by ANSYS code.

They are currently covering ranges of manufacturing from 4" to 56" pipe size, from #150 to #2500 pressure class ANSI (greater pressures are available upon request).

G-joint® is generally produced based on the above two standard designs, Type-A and Type-B.
The two typologies differ in the way the forged body is made and assembled; on a Type-B G-joint® the closure welding on the external surface of the body is properly designed to carry out X-Rays, something not feasible on Type-A joints (Ultrasonically tested, instead).

STEEL MATERIALS

Excluding the isolating components, the body of any insulation joint is made up of forged parts of several grade of steel, according to the ASTM classification.
Pup-Pieces are generally made from the same API 5L material of the pipeline the insulating joints are studied to be installed on; that's also why, most of the time, they are "free-issued" from the user or the end-customer to Galperti, the producer, also coming from stock and representative of the same mother pipeline.
According to the project requirement they might be made by forging too.

Common grades of steel used are Carbon steel, Low Tenor Carbon steel, Alloy steel, Austenitic & Martensitic stainless steel, Duplex and Super Duplex stainless steel and Nickel alloys.

SEALING AND ISOLATING MATERIALS

Seals of aging resistant material from nitrile (NBR) or fluoride (FKM) in accordance with ASTM D-2000.
To ensure complete insulation, the dielectric material used are Epoxy-glass laminates or epoxy-glass prefabrications, in accordance with ASTM D709, Type IV Group GII.
Filler material: a two-component epoxy resin is used to fill in the internal part of the joint.

TESTING

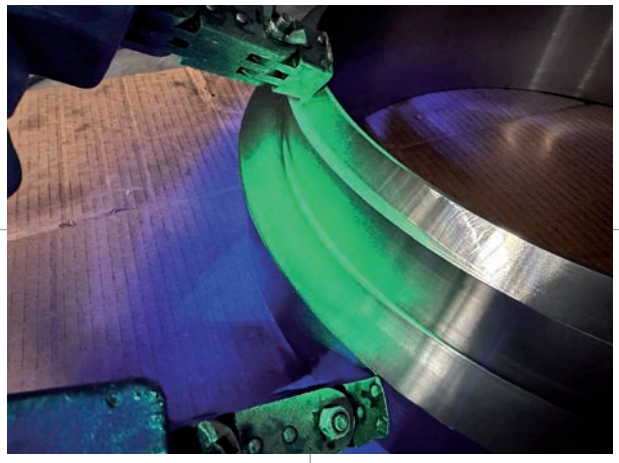
All the following standard tests are performed at Galperti Tech Forged Products premises:

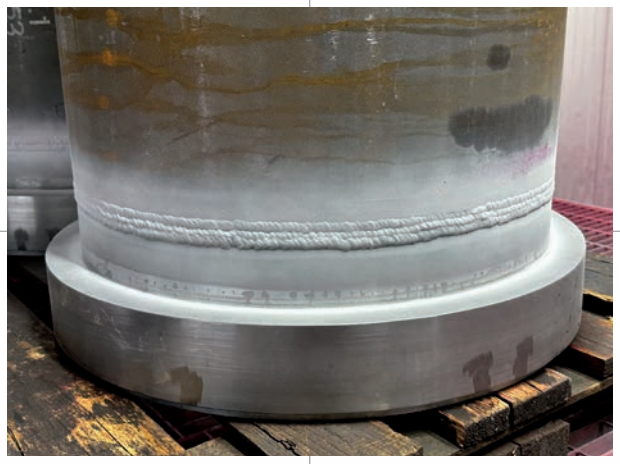
- Mechanical tests (on Pup-Pieces and Forging Material)
- Non-Destructive Testing (on Pup-Pieces, Forging Material and Welding)
- Hydrostatic Pressure Testing (typically 1.5 times the rated pressure)
- Electrical Resistance Testing
- Dielectric Strength Testing
- Dimensional Checks

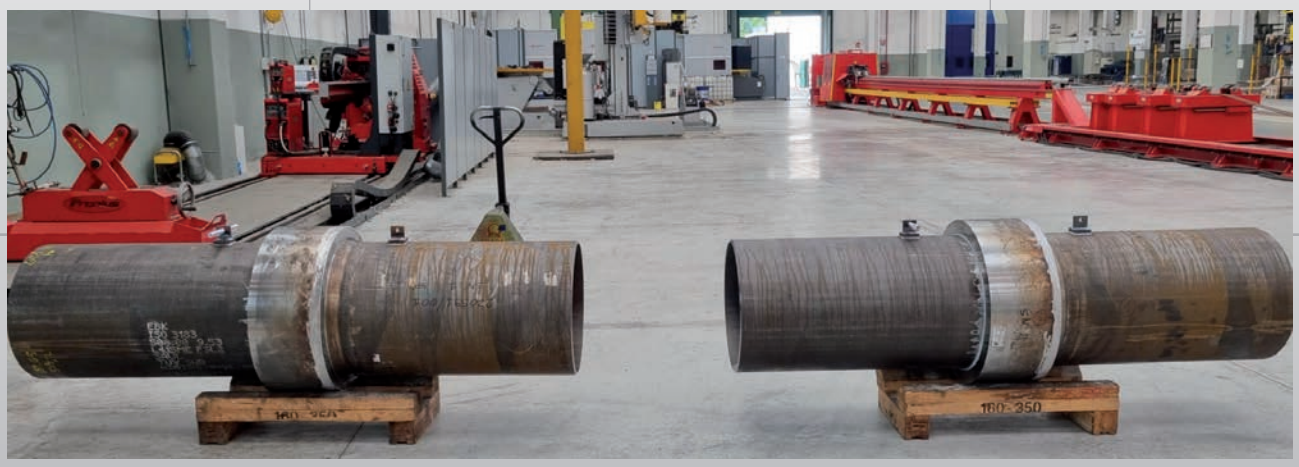
Upon specific request and according to the several technical requirements of major Projects, any G-joint® is also subject to the following non-standard tests:

- Torsional (on the assembly)
- Bending + Hydro (on the assembly)
- Hydrostatic Fatigue (on the assembly)
- Pneumatic (on the assembly)
- Vacuum (on the assembly)
- Saline solution immersion (on the assembly)
- Piggable / Drift (on the assembly)
- HIC, SSC, CTOD (on pipes and forgings)
- Adhesion (on coating)
- Holiday (on coating)

Tests are usually conducted and certified EN 10204 3.1, or eventually 3.2 certified by general official third parties, or by customer himself.







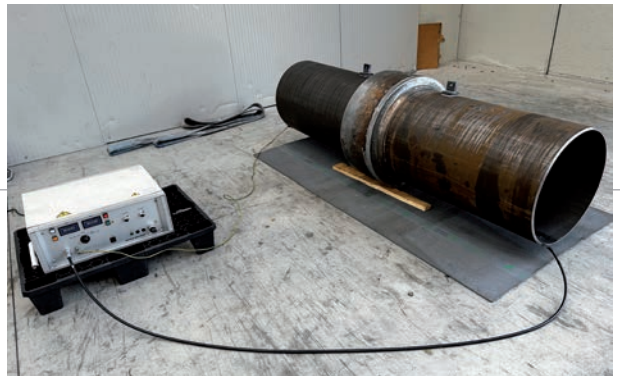
FOCUS ON TESTING

Electrical Resistance (in dry conditions)

The electrical resistance is normally measured by applying a voltage of 1KV DC. The guaranteed electrical resistance is of 5 MΩ; a greater resistance is available upon request.

Dielectric Capacity

Our standard Monolithic Insulation Joins are capable to withstand a dielectric strength test without puncture of coating and formation of sparks by applying a voltage, typically up to 5KV AC with 50Hz for 1 minute.
Dielectric capacity greater than the above available upon request.
Without any specific request from the customer or the project, 3KV with 50Hz for 1 minute is the standard resistance proposed.

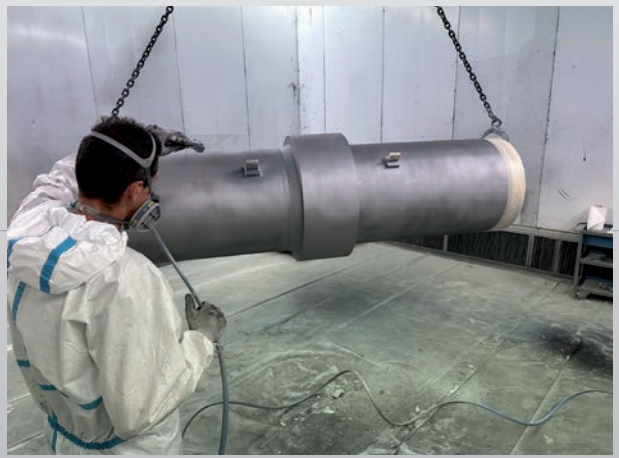


WELDING

Welding activities are carried out in accordance with ASME IX or ISO 15614 rules, and certified by independent and International Authorities. All welds are then examined by Dye Penetrant, Magnetic Particle, X-Ray and Ultrasonic testing.

COATING

Coating on internal and external surfaces shall be composed by a first layer of Epoxy Primer and a final polyurethane top coat, and shall be suitable for the maximum design temperature of the pipeline.
Coating is always complying to the customer and project's requirement. As alternative the G-joint® is supplied with a thin thickness of preservative Anti-Rust Oil.



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FORGING PLANT II - ITALY

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