



U-SHAPE SEALING



NUOVA GIUNGAS

MONOLITHIC ISOLATION JOINTS | *Engineered. Safe. Durable.*

ISOLATING FLANGE GASKETS

- Two flanges with a gasket to provide isolation.
- Isolation sleeves and washers to prevent electric currents to be transferred through bolting system

DISADVANTAGES:

- Difficulty to achieve perfect isolation because of dirt, contamination, impurities
- Electrical resistance decreases over time
- Open System → Need of inspection
- Limitations of use in pipelines that carry electrically conductive fluids
- Risk of compromising isolation performance during installation
- Poor sealing performance

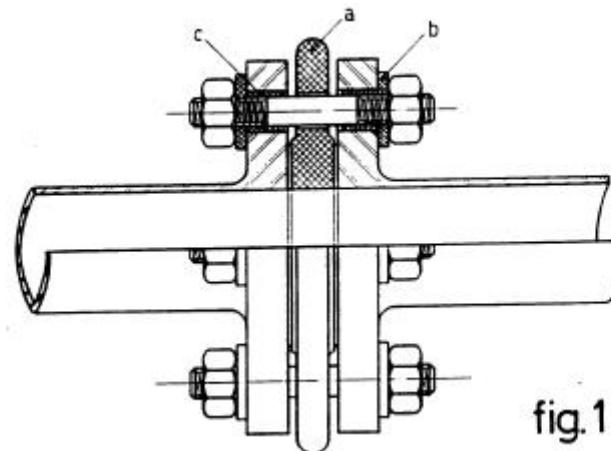


fig.1

THE INITIAL SOLUTION

Reprinted from Gas World 6 November 1965.

Some Problems With Traditional Flanged Insulating Joints

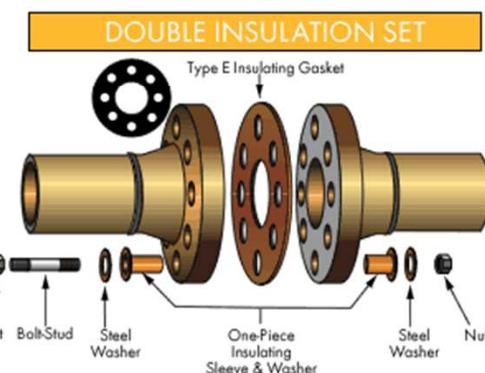
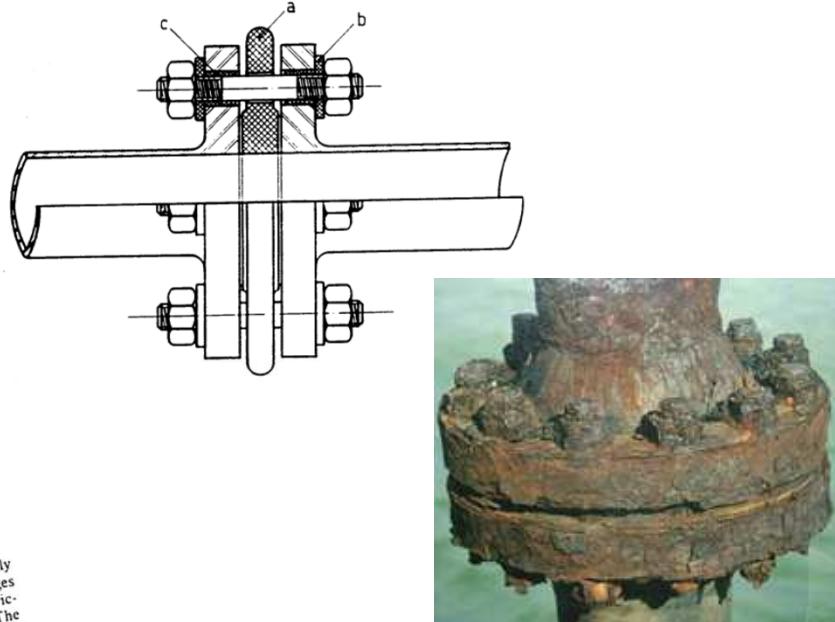
The shortcomings of conventional flanged insulating joints in cathodically protected pipelines is recognized in Great Britain, although the subject does not appear to have received as much attention as it has on the Continent. Problems encountered with these joints are described here by Signore G. Bagnulo, whose company manufactures spigot and socket type insulating joints.

CONVENTIONAL flanged insulating joints, usually have (see over page) two neck-welding flanges between which is placed a ring *a* made of fabric-laminated or other insulating plastic material. The insulation between these flanges and the clamping bolts is effected by insulating bushes *b* and washers *c* which are also made usually of bakelite laminated fabric.

The efficiency of these joints has always been questioned as they suffer from several disadvantages when operating in gas and oil pipelines; such disadvantages necessitate frequent, expensive inspections and maintenance, so that technicians often prefer some other type of joint more suited to meet operational requirements.

The main acknowledged drawbacks of traditional flanged insulating joints are summarized below:

1. Difficulty of ensuring a joint of high electrical resistance: If the flanged insulating joint is assembled on the spot when it is installed, the efficiency of its insulating characteristics is dependent on the workmen. If extreme care is not used in assembly, some





THE EVOLUTION



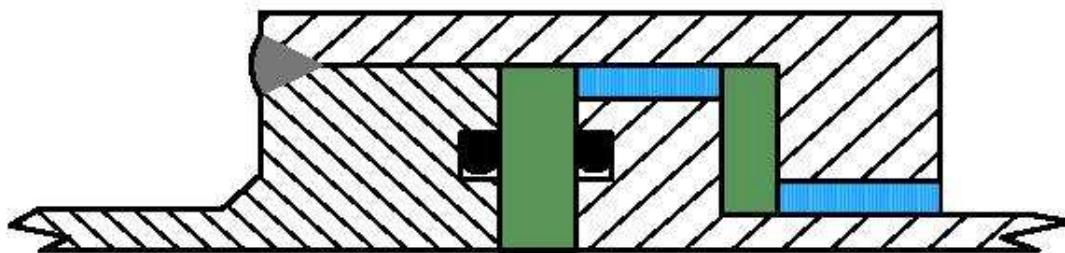
MONOLITHIC ISOLATION JOINTS

They were designed to solve problems found with the use of isolation gaskets between flanges.

It is a simple product of complex technical nature.

Historically, 3 designs have been developed in accordance to their sealing systems:

- O-ring seals
- Rectangular section seals
- "U" shape seal – **THE UNIQUE DESIGN BY NUOVA GIUNGAS**



This is the traditional Sealing System used with Isolation Gaskets between the flanges.

WEAKNESSES OF O-RINGS:

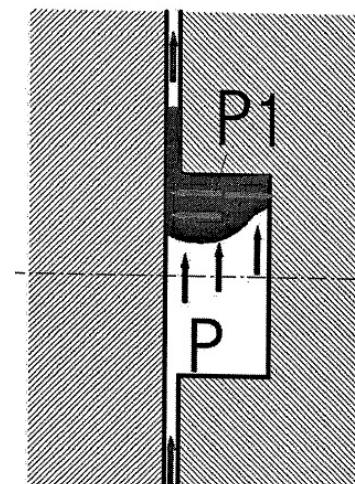
- Sealing section is extremely small.
- Has limited elasticity for deformations.
- The O-Ring gets dislodged or misaligned after several cycles of pressurization and decompression.
- The O-Ring is subject to laceration *damage by Explosive Decompression*
- Under elevated pressure, the O-Ring can be damaged by extrusion.

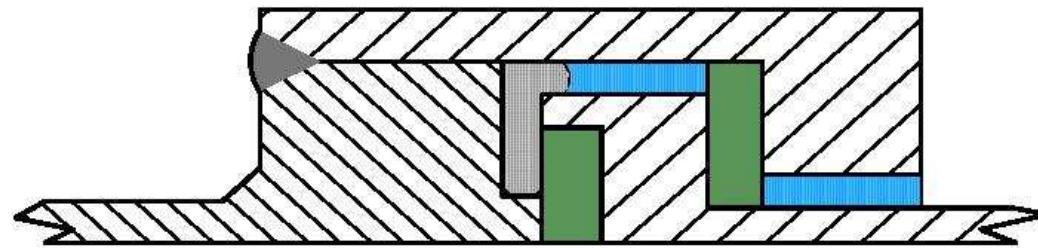
- **LACERATION FROM EXPLOSIVE DECOMPRESSION:**

it occurs when the O-Ring material, while under pressure, absorbs gas and then upon loss of pressure, liberates it suddenly causing ruptures in the material of the O-Ring.

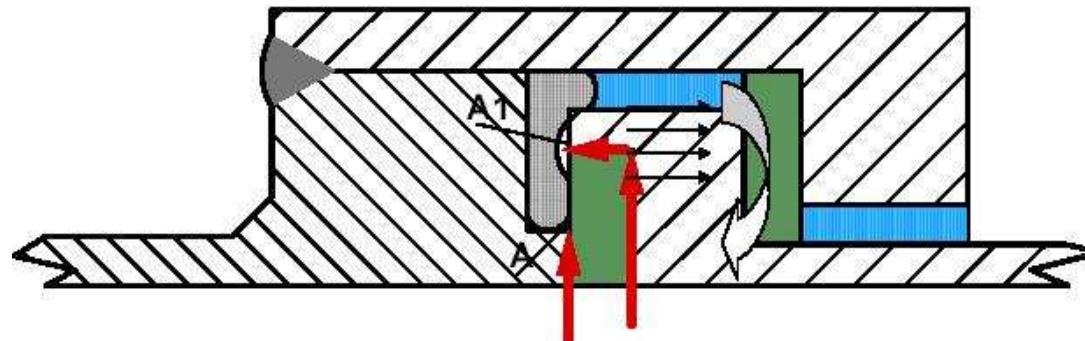


- **O-RING EXTRUSION:** when the O-Ring is under constant pressure from the fluid, it can be deformed, seeping between the space between the Steel and the isolating ring

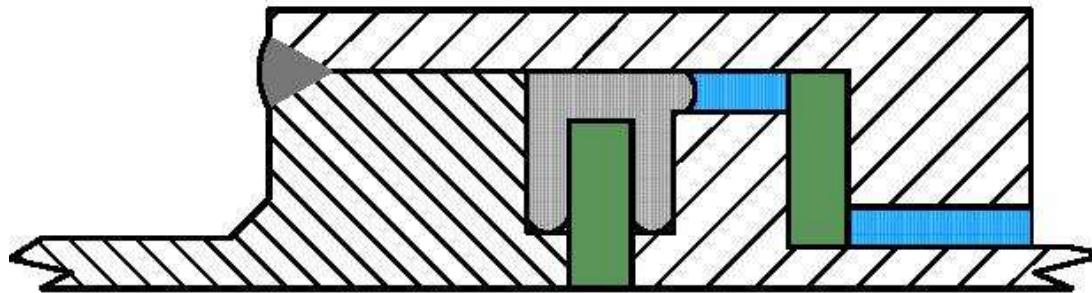




- This was the first type of joint designed specifically to achieve electrical isolation, based on a seal with rectangular shape and large sectional area:
 - Not subject to extrusion or explosive decompression phenomena.
 - Fills all the spaces.
 - Once it is installed, it becomes compressed



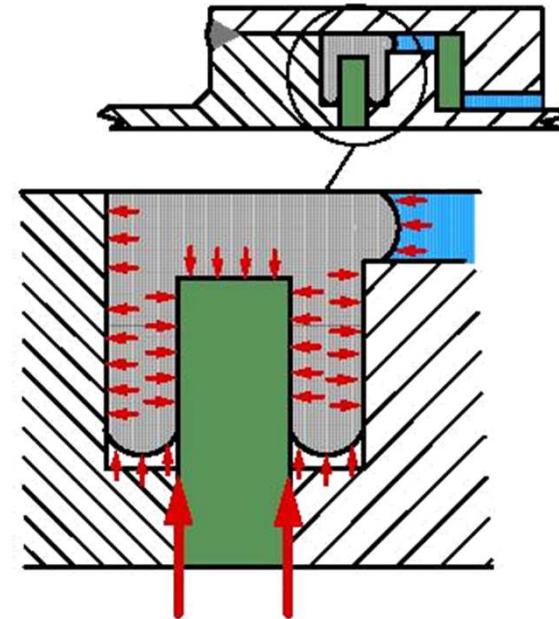
- The sealing system is asymmetric
- The pressure does not acts in a uniform manner and the system becomes unbalanced under extreme conditions.



- This is the latest generation of monolithic isolation joints.
- The Seal has a generous Cross sectional area that allows it to tolerate more mechanical stress and structural deformations
- **Innovation:** this is the part where NGS boasts, the highly innovative U-SHAPE seal !! NGS patent that allows us to ensure a perfect seal of fluid under pressure inside the insulating joint, considered more reliable than a double seal thanks to its ability to "hug" the insulating ring completely.

"THE UNIQUE DESIGN OF NUOVA GIUNGAS"

- The Symmetrical Sectional Area is Auto-Energized with the pressure from the fluid and provides more resistance to leaks.
- 30% Compressed when made
- Have “memory” to regain their space.
- Not subject to extrusion or explosive decompression





"U" SHAPE SEAL



MONOLITHIC ISOLATION JOINTS | Engineered. Safe. Durable.

Paper No.
3989

CORROSION 2014

Collaborate. Educate. Innovate. Mitigate.

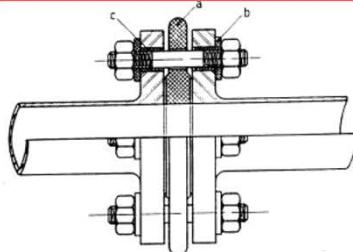
March 9-13, 2014 • Henry B. Gonzalez Convention Center • San Antonio, Texas, U.S.A.

"There is inherent advantage in using seal designs that take the electrical isolation sheet out as a potential leak path. These designs may also provide improvement in robustness of the seals under severe bending or cyclic conditions."

Sam Mishael and Robert Rettew,
Corrosion Subject Material Experts at Chevron

3rd party Technical literature confirms superiority of Nuova Giungas design

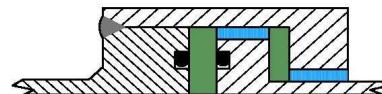
Isolation flanged kits



- Need of **maintenance** and **replacement** over time
- Cannot be buried
- **Poor sealing performance** (risk of leaks)
- Careful **installation** (can compromise performance)
- Low purchasing cost but **highest total cost of ownership**



O-ring design

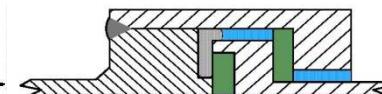


- Performance can be reduced/compromised over time:
 - O-Ring can get **dislodged or misaligned**
 - O-Ring subject to **Explosive Decompression**
 - O-Ring can subject to **extrusion**.

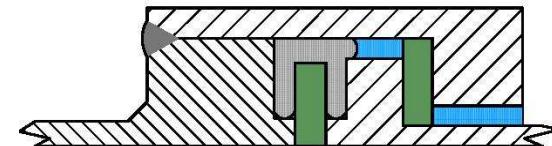


Monolithic Isolation Joints (MIJs)

Rectangular section gasket



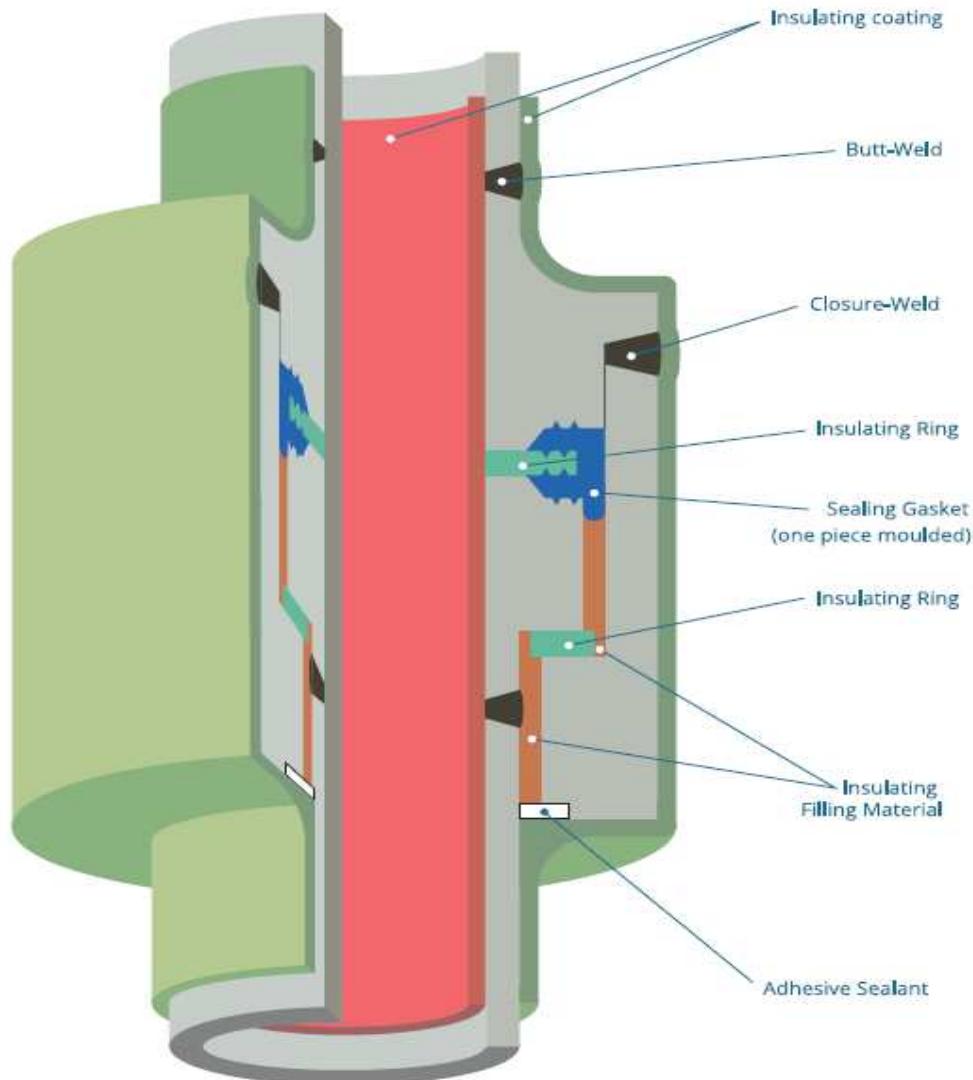
“U” section gasket



- The sealing system is **asymmetric**
- The pressure does not act in a uniform manner and the system can become **unbalanced** and potentially leak.

- **Symmetric** sealing system, with a **generous cross sectional area** that allows it to tolerate mechanical stress and structural deformations.
- **State of the art for MIJs**
- **Valvitalia/Nuova Giungas** is the **only manufacturer**





Nuova Giungas MIJs:

simple in concept with
high technical
complexity



THANK YOU!



NUOVA GIUNGAS

MONOLITHIC ISOLATION JOINTS | *Engineered. Safe. Durable.*