
WAY AHEAD IN CORROSION CONTROL

I-ROD[®]

ELIMINATE CORROSION AT PIPE SUPPORTS



Deepwater EU Ltd.

i-rod.com

PERIL AT PIPE SUPPORTS

Process piping failures can have catastrophic results, and corrosion at pipe supports is one of the major causes.

What causes crevice corrosion?

1. The shape of a cylindrical pipe on a flat surface forms a crevice where moisture gathers and can't evaporate.
2. This softens the paint, which fails and causes bare steel to be constantly in contact with water.
3. When moisture is trapped, the resulting corrosion can cause rapid wall loss and eventual failure of the pipe.



Beam supports, saddle supports and pipe shoes all create crevices that retain water. Trapped moisture is what causes corrosion at pipe supports.

Don't blame metal-to-metal contact

External corrosion at pipe supports is an extremely common problem that drives up maintenance costs and creates hazardous conditions.

A major misconception is that metal-to-metal contact is the main cause of corrosion at pipe supports, but that is incorrect; the main culprit at supports is crevice corrosion.

When moisture is trapped and air can't circulate to evaporate it, corrosion damage is likely to occur.

After constantly reporting severe pipe support corrosion during offshore inspections, Deepwater Corrosion Services developed I-Rod, the only product that can prevent this widespread problem.



Both pipes at right have suffered substantial wall loss caused by crevice corrosion.

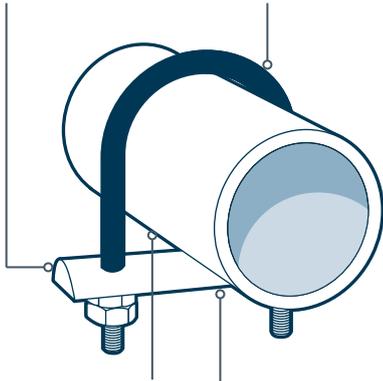


HOW I-ROD WORKS

IT'S A SIMPLE AND INEXPENSIVE SOLUTION

Pipe is supported by the half-round shape of I-Rod®, which minimizes the contact area so water isn't trapped.

NuBolts™ are covered with polyshrink to protect the paint on the pipe during installation.



With pipe elevated by I-Rod®, moisture evaporates before paint fails. Inspection is also much easier.

I-Rod® electrically isolates the pipe from metal supports, preventing galvanic corrosion between dissimilar metals.

When a pipe sits on a flat metal support, there's a perfectly-formed area for trapping moisture.

When the round pipe is supported by the rounded edge of I-Rod, the contact point is minimised so that there's no crevice. Water can't be

trapped, so corrosion no longer occurs. When I-Rod is used, it's far easier to inspect the contact area, and air can circulate and evaporate moisture beneath pipes. I-Rod also electrically isolates the pipe and support, so there's no contact between dissimilar metals.



I-ROD CLIPS

ELIMINATE CREVICE CORROSION ON CLAMPS



The clips are held in place by the weight of the pipe and an adhesive strip, and can be easily retrofitted on existing pipe runs.

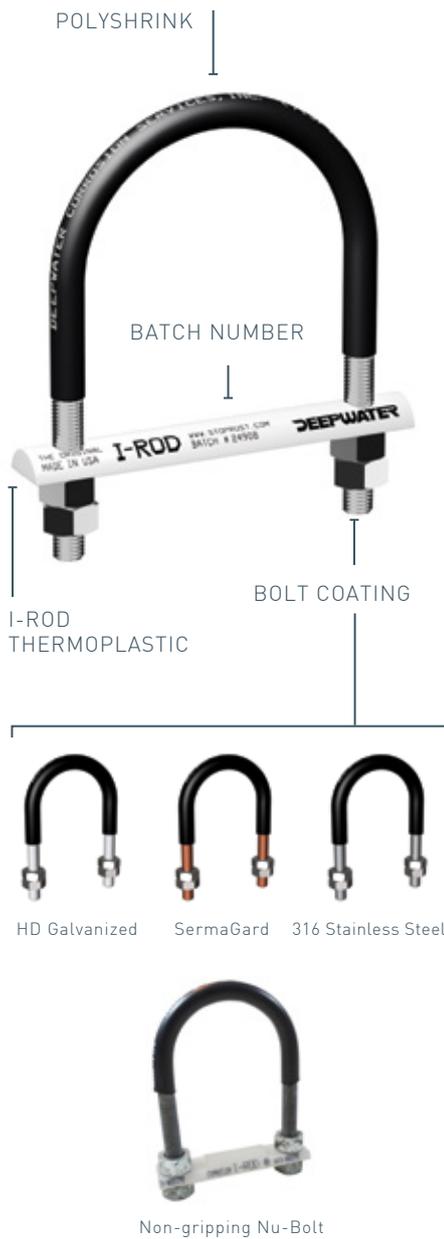
The I-Rod Clip eliminates crevice corrosion at saddle clamp supports, Grinnell clamps and pipe shoes, all of which tend to trap water.

The I-Rod Clip snaps into the inside diameter of the support, providing a low-profile standoff. This allows ventilation and drainage that prevents water accumulation.

An adhesive strip can be applied to the rear of the clip to secure it during installation.

I-Rod Clips are available in I-Rod, I-Rod HT or PEEK material and can be manufactured to fit any support; just give us the nominal pipe size and the thickness of the saddle or pipe shoes to be fitted.





NU-BOLT™ ASSEMBLY

THE MOST POPULAR I-ROD INSTALLATION METHOD

Designed by Deepwater’s NACE-certified corrosion engineers, our Nu-Bolt assembly combines I-Rod with a modified pipe-U-bolt.

Several corrosion-resistant bolt choices are offered to ensure long-term service in the harshest operating environments. For higher-temperature applications, the I-Rod may be replaced with I-Rod HT, which provides higher melting temperatures and compressive strength. For even more extreme conditions, PEEK is available for use in temperatures up to 249°C (480°F).

Bolt coating
Our standard U-bolt is durable galvanized black steel (GPS), but for added protection you can also choose 316 stainless steel (S6PS) or SermaGard®, a tough corrosion coating that endures the most severe conditions with excellent results.

Polyshrink
Polyshrink is applied over the shank of the U-bolt to protect the pipe’s paint system during installation; it is

not designed to protect the U-bolt. The material is a strong, cross-linked polyolefin that is UV-stable and rated for service in temperatures up to 110°C (230°F).

I-Rod, I-Rod HT & PEEK
For most applications, standard I-Rod thermoplastic is the best material choice. It provides excellent support, tremendous compressive strength and low creep. If constant operating temperatures get above 180°F, then I-Rod HT (amber-coloured) or PEEK (tan-coloured) can be used.

Non-gripping option
Non-gripping Nu-Bolts are available for securing pipes to supports while leaving enough clearance to allow for movement due to thermal expansion.

I-Rod’s tremendous record
I-Rod is specified by most major oil companies and has been installed hundreds of thousands of times worldwide. In over 25 years, there has never been a single reported failure of a pipe protected by I-Rod.

I-ROD ADHESIVE

WHEN BOLTING IS NOT POSSIBLE



I-Rod adhesive is designed to securely anchor strips of I-Rod in situations where drilling and bolting would be difficult. It’s a great solution for using I-Rod on solid concrete supports that can’t be fitted with U-Bolts, or for locations where drilling through metal is restricted or would require a hot-work permit.



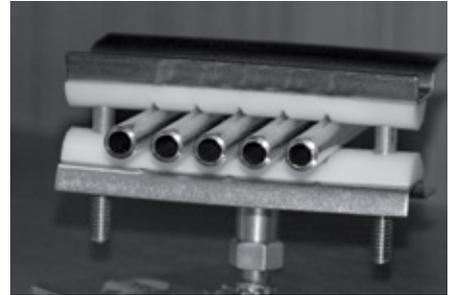
NOTCHED I-ROD

PROTECTS STAINLESS STEEL TUBING



Notched I-Rod is available in lengths up to three feet and can be configured to securely hold different-sized tubing side-by-side.

Stainless steel tubing can suffer considerable corrosion damage if moisture remains trapped beneath it. Notched I-Rod supports allow increased airflow between the surface of the tubing and base to eliminate moisture accumulation or condensation that causes corrosion problems.



HIDDEN DANGER OF PADS

WEAR PADS AND RUBBER PADS CAN INCREASE RISK



1. Sunoco's Marcus Hook refinery explosion was due to corrosion hidden by a wear pad.
2. Pipe corrosion caused by moisture trapped beneath a rubber pad.
3. A wear pad with corrosion visible at the edges; there's plenty more beneath the pad.

A big misconception is that metal-to-metal contact causes most pipe corrosion, so some people use rubber pads. Unfortunately, rubber pads make the situation worse by forming crevices that attract and hold water. The rubber prevents evaporation, which leads to rapid crevice corrosion. Wear pads are possibly even more dangerous. They can trap moisture against steel pipes and cause extensive corrosion because it's impossible to inspect beneath them.



BEWARE OF IMITATIONS

WHY THE FAKES WILL BREAK



Real I-Rod is printed with a traceable batch number as shown, and each shipment includes a certificate of authenticity.

I-Rod products are manufactured from extremely durable materials able to support enormous amounts of weight. During offshore inspections, our technicians routinely discover cheap, low-grade imitations of I-Rod that have broken or crushed, leaving pipes dangerously unprotected. Always make sure you're getting genuine I-Rod and not an inferior copy.



HOW TO ORDER I-ROD



Pipe size

Measure the outer diameter of the pipe. Nu-Bolts™ are available in standard sizes that fit 1/2" to 36" diameters. Custom sizes are available. Pipes 8" and smaller use 1" I-Rod®; those 10" and larger require 1 1/2" I-Rod®.

Temperature

Determine your pipe's maximum operating temperature. Use standard I-Rod® up to 181° F (83° C), I-Rod® HT up to 340° F (171° C), and PEEK™ up to 480° F (249° C). The maximum operating temperature for polyshrink on U-Bolts is 230° F.

U-Bolt finish

Standard Nu-Bolts™ come with a long-lasting, hot-dip-galvanized finish. Alternate options include 316 SS or an ultra-durable Sermagard™ aluminum-ceramic coating for the harshest environments.

Weight load

Use the table at <http://stoprust.com/products-and-services/nu-bolt/> to estimate the weight on each pipe support. Use up to three strips of I-Rod® to meet load requirements. Pipes 8" and smaller use 1" I-Rod®; 10" and larger require 1 1/2" I-Rod®.

I-Rod® Clips

Measure the width of your saddle clamp, pipe hanger or support cradle. These are the edges that the I-Clips™ will snap over.

Select the appropriate material based on operating temperature.

Material	Max Operating Temp. (L Term) °F / °C	Melting Point °F / °C	Comp. Strength ksi / MPa	Coefficient of friction (dry vs steel)
 I-Rod (White)	181 / 83	329 / 168	15 / 103	0.25
 I-Rod HT (Amber)	340 / 171	410 / 210	22 / 152	0.42
 PEEK (Tan)	480 / 249	644 / 340	20 / 137	0.40

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