

MAGNA 39

FC TIG "RootGard"

PRODUCT DATA SHEET

It is an innovative pipe welding solution as a flux-cored TIG rod for the most efficient, reliable and economical single-sided welding. MAGNA 39 helps welders in eliminating the need for back shielding or purging using inert gas, excessive downtime, and all related set-up costs in maintenance pipe welding. The backside of the root pass can be shielded by MAGNA 39 against the destructive impact of atmospheric oxygen & oxygen. MAGNA 39 is an ideal in-situ maintenance welding formulation suitable particularly for applications in food & beverage processing plants and pulp & paper mills.

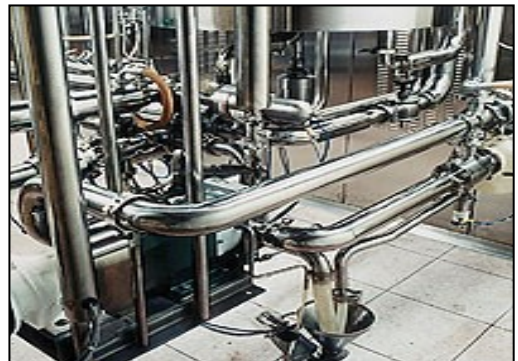


MAGNA 39 is characterized by its spiral-seamed wire – demonstrating the superior technology in producing this one-of-a-kind TIG flux-cored wire

CHALLENGES TO PIPE WELDERS

Welders always come across the challenge of welding pipes. Especially while welding stainless steel pipes or vessels, shielding of the back of the root pass with inert gas is a must. Without back shielding, the penetration at the root of the weld joint would be improper. The reverse side of the root run can also be easily oxidized when exposed to the atmosphere, due to chromium content of the weld metal.

To overcome this penetration and oxidation problem back shielding or purging with inert gases such as Argon or Helium, is normally resorted to. For a normal 10m long, 300 mm diameter pipe, pre-purge time at 24 LPM (litres per minute) ranges from 150 to 170 minutes. For this operation the overall additional costs per weld joint such as - inert gas consumption, setup time, labor and downtime – can be huge. Unfavorable site conditions in refineries, power plants or chemical plants can only add to the complications and resultant costs, besides compromising the quality of the maintenance weld job.



UNIQUE ADVANTAGES

The new and unique advantage of **MAGNA 39 FC TIG “RootGard”** lies in its unique flux formulation contained inside a tubular stainless steel rod. This innovative flux core is fused by the arc heat to become molten slag. The molten slag is formulated to flow smoothly to the reverse side of the root to uniformly cover the penetration bead formed inside the pipe. The red hot molten weld metal will then be protected by the molten slag against the corrosive impact of nitrogen and oxygen in the atmosphere.

When the weld cools down, the penetration bead will be covered by thin, fragile slag, which detaches easily by lightly hitting the face of the joint with a chipping tool. A quality bead will result on the face and reverse sides of the root with a smooth, uniform ripple, without oxidation. **MAGNA 39 FC TIG “RootGard”** provides regular penetration through the entire part of the pipe in all positions – creating excellent welds on single-sided weld joints.



Left: Cross-sections of stainless steel pipe (2mm thick, dia. 50mm) & mild steel pipe (4mm thick, dia. 60mm), welded with MAGNA 39 showing smooth uniform bead on both sides; Right: Oxidized inside of pass welded with an ordinary solid wire.

GENUINE BENEFITS

- ❑ **MAGNA 39** is a state-of-the-art flux-cored wire that promotes real cost & time saving in maintenance welding of pipes & vessels.
- ❑ **MAGNA 39** eliminates the need for back shielding or purging using inert gas, excessive downtime, and all related setup costs in maintenance pipe welding.
- ❑ **MAGNA 39** shields the backside of the root pass from destructive effects of atmospheric nitrogen & oxygen.



RECOMMENDED APPLICATIONS

- 316 stainless steel type deposit for outstanding corrosion resistance

- Extra low-carbon formulation to minimize intergranular corrosion due to chromium carbide precipitation
- In-situ maintenance welding of pipe systems (especially) in food & beverage and paper & pulp plants.



PHYSICAL CHARACTERISTICS

- Most suitable for low carbon 18% Cr-12% Ni-3% Mo grade stainless steels
- Applicable for 316 and 316L type steels
- Excellent X-Ray result
- Classification: ASME / AWS A5.22 R316LT1-5



PRODUCT DATA

Welding Current:

DC - EN

Shielding gas:

Argon

Gas Flow Rate – 10-15 litres/minute

Mechanical properties	Specified	Typical
Tensile Strength (of the deposited weld metal), N/ mm ²	485	535
Elongation, %	30	37
Ferrite, FN	-	7.6

Product dimensions:

Diameter	2.2 mm
Length	915 mm
Weight per piece	25g

Recommended welding parameters:

Plate thickness	Welding current
3 – 5 mm	80 – 90A
6 – 9 mm	90 – 105A
≥ 10 mm	90 – 110A

Magna 39's Welded Sample



Front view of sample welded by MAGNA 39 (right), ordinary weld by solid wire (left) on the same stainless steel pipeline



Backside of sample pipeline welded by Magna 39 (right), ordinary weld, (left) – rough finish exposed to oxidation



A closer view of the backside of the sample welded by Magna 39 (right), ordinary weld, (left) – rough finish exposed to oxidation



Bottom view of sample welded by MAGNA 39 (right) and ordinary weld (left) – you can see clearly the rough finish on the right

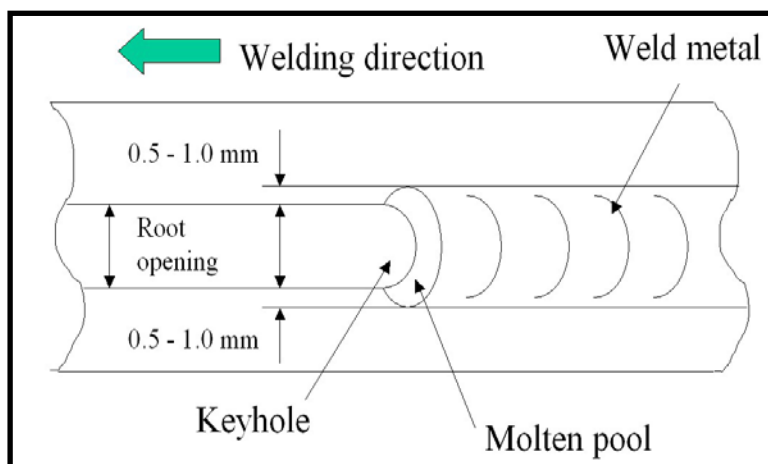
User Tips

MAGNA 39 FC TIG “RootGard” can be used in almost the same way as solid filler rods. Please refer to the following specific steps to achieve a high quality weld.

1. Prepare proper root opening to assure a sound penetration bead.

Groove preparation			
Plate thickness (T)	4 mm	6 mm	≥10 mm
Root opening (G)	2.0 mm	2.5 mm	3.0 mm

2. Use the proper keyhole technique to help the molten slag flow to the backside of the root.



3. Feed a **MAGNA 39 FC TIG “RootGard”** little by little with a higher pitch, than with a solid filler rod, to ensure adequate fusion of the rod and a sound penetration bead. This technique is to compensate a little lower deposition efficiency of **MAGNA 39 FC TIG “RootGard”**.
4. Keep the solid slag on the crater and the reverse side bead when re-starting an arc to join the preceding bead. The re-arcing point should be stepped back from the edge of the crater by approximately 10 mm. This technique protects the reverse side bead from oxidation. In 5G position welding, the termination of the succeeding bead onto the crater of the preceding bead should be done in the uphill positions to help create the keyhole.
5. **MAGNA 39 FC TIG “RootGard”** is suited for only root pass welding.

PRECAUTION

For complete safety and handling information, please refer to the appropriate Material Safety Data Sheets prior to using this product.

Warranty: Magna Industrial Co. Limited will replace any material found to be defective. Because the storage, handling and application of this material are beyond our control we can accept no liability for the results obtained.

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