

# MAGNA 309

**Magna 309 FC TIG “RootGard”** is a unique flux cored TIG welding rod designed for root run application without the need of inert gas purging for back shielding. It is the most versatile root pass TIG welding rod for repairing pipes of many types of austenitic steel, carbon steel, low alloy steel, and their combinations, ie. dissimilar steels. Applicable on a wide range of steel pipes without inert gas purging, Magna 309 is an efficient solution for maintenance welders or professionals in many industries such as oil refineries, petrochemical/chemical plants, and thermal power stations with complicated network of pipelines.



## Saves Time & Cost of Back Shielding

To ensure proper penetration of root pass weld and to protect the back-side weld bead from oxidation by the atmosphere, pipe welders using normal pipe welding rods need to apply inert gas purging. This kind of operation consumes large amount of inert gas (Argon or Helium), requires tremendous labor and time in setting up the necessary and proper procedures, and inevitably incurs downtime. The overall costs can be very huge if the site conditions of the pipe repair jobs are unfavorable. To avoid the time and money spent on applying inert gas purging and yet achieving excellent back-side protection, Magna 309 FC TIG “RootGard” is the solution.



**Magna 309 penetrates the pipe and protects the back-side weld bead from oxidation effectively**

MAGNA 309 is designed with unique flux formulation contained inside a tubular rod. This flux core, upon fusing by the arc heat, becomes molten slag flowing smoothly to the reverse side of the root to uniformly cover the penetration bead formed inside the pipe. The molten weld metal will then be protected by this molten slag against the corrosive impact of nitrogen and oxygen in the atmosphere even without back shielding. When the weld cools down, the penetration bead will be covered by a layer of removable slag, which can be easily removed 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 and uniform ripple.

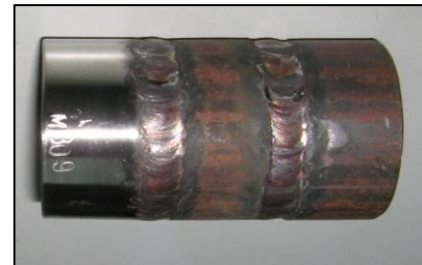
### Suitable for a Wide Range of Steel Pipes

**MAGNA 309** is an innovative root pass TIG rod for austenitic steel, carbon steel, low alloy steel, and their combinations (i.e. dissimilar steels). Magna 309 is probably the only kind of root pass TIG welding rod suitable for joining dissimilar steels. It is formulated with optimum alloying elements to prevent martensite formation in the weld metal after post-weld dilution by the two base metals. Without back shielding, a welder can join carbon steel to stainless steel or low alloy steel to stainless steel using Magna 309. With over 70% of pipes and tubes made of carbon steel and low alloy steel in oil refineries, petrochemical/chemical plants and thermal power stations, Magna 309 is the ideal root pass TIG rod for the maintenance professionals in these industries.



### Additional Features & Benefits

- X-Ray quality welds (proven by test report using API standard)
- Formulated with optimum alloying elements to prevent martensite formation in the weld metal after post-weld dilution by the two base metals
- Classification: ASME / AWS A5.22 R309LT1-5



**Magna 309's welded sample –  
Stainless steel to carbon steel to  
carbon steel**

### Recommended Applications

- Suitable for root pass welding pipes and tubes of austenitic stainless steel, low alloy steel, carbon steel, and their combinations in oil refineries, petrochemical / chemical plants, thermal power stations, etc.
- For emergency minor repairs on Cr-Mo pipes
- Works well in 1G (flat), 2G (horizontal position) & 5G (all position)



## PRODUCT DATA

### **Welding Current:**

### **Shielding gas:**

DC-EN	Argon Gas Flow Rate – 10-15 litres/minute
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### **Mechanical properties:**

Mechanical properties of all weld metal	Specified	Typical
Tensile Strength, N/ mm <sup>2</sup>	>520	546
Elongation, %	>30	44
Ferrite, FN	-	14.1

### **Product dimensions:**

Diameter	2.2 mm
Length	915 mm
Weight per piece	25g

### **Pack-size**

2 Kg & 4Kg

## APPLICATION INFORMATION

### **Recommended welding parameters:**

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

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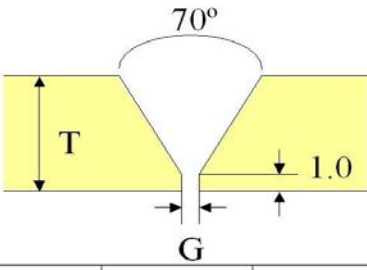
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PIM 309.3	Version 2.0	Revision 1.0	Rev. Date: 1 January, 2016	Reference: CKL
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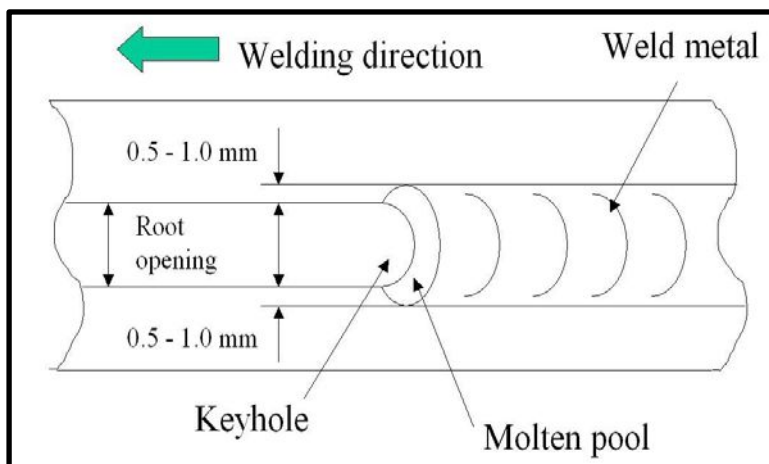
## User Tips

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
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 309 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 309 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 309 FC TIG “RootGard”** is suited for only root pass welding.

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## PRECAUTION

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

Warranty: ITW PP & F Korea 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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