

# Wearshield® FROG MANG®

## Severe Impact

### Key Features

- ▶ Designed specifically for building up manganese frogs and manganese crossing diamonds in the railroad industry
- ▶ Provides a high strength, high alloy austenitic manganese deposit to handle the increased loading of railroad cars
- ▶ Unlimited layers with proper preheat, interpass temperatures and procedures
- ▶ Resistant to deformation and the resultant metal flow

### Typical Applications

- ▶ Manganese crossing diamonds
- ▶ Manganese railroad frogs

### Welding Positions

All, except vertical down

### DIAMETERS / PACKAGING

Diameter in (mm)	Length in (mm)	10 lb (4.5 kg) Easy Open Can 30 lb (13.6 kg) Master Carton	12 lb (5.4 kg) Easy Open Can 36 lb (16.3 kg) Master Carton
5/32 (4.0)	14 (350)	ED033134	ED033133
3/16 (4.8)	14 (350)	ED033135	
1/4 (6.4)	18 (450)		

### MECHANICAL PROPERTIES<sup>(1)</sup>

Rockwell Hardness (R <sub>c</sub> )	
As-Welded	Work Hardened
20 - 30	40 - 50

### DEPOSIT COMPOSITION<sup>(1)</sup>

On Carbon Steel	%C	%Mn	%Si	%Cr
6 Layers	1.20	21.0	0.4	5.3

### TYPICAL OPERATING PROCEDURES

Polarity <sup>(2)</sup>	Current (Amps)		
	5/32 in (4.0 mm)	3/16 in (4.8 mm)	1/4 in (6.4 mm)
DC+	140 - 175	175 - 215	235 - 280
AC	150 - 180	185 - 215	235 - 280

NOTE: Weld Preparation Remove all damaged and foreign material by air-carbon arc gouging or grinding. Make sure all defective metal is removed. In the event hairline cracks remain at flangeway depth, use a 3.2 mm (1/8 in) E308 stainless electrode, such as Blue Max® or Red Baron® 308L AC-DC to tie up these cracks. This will avoid hot cracking during the build-up process. Apply only thin layers and do not build-up with E308 stainless. This is for emergency situations where no other alternative is available to repair flangeway cracks.

Use DC+ to avoid excessive spatter. When possible, weld at alternate locations (skip weld) to avoid overheating of metal in a localized area. Do not exceed interpass temperature of 260°C (500°F). Use a temperature marker 13 mm (1/2 in) from the welded area at frequent intervals to ensure that interpass temperature does not exceed 260°C (500°F).

Use a short arc and a stringer bead width of 10 to 13 mm (3/8 to 1/2 in).

Finish the casting by grinding to a safe contour. Leave enough weld metal during the welding process to allow a level and even contour after grinding. Make sure all areas are finished and the casting has no further visible defects. Check with straight edge so that the casting is free of low spots. As with all austenitic manganese welding products, interpass temperatures should be limited to 260°C (500°F) maximum. A stringer bead, or at most, a slight weave is recommended to limit heat build-up. Excessive heat build-up causes manganese carbide precipitation which damages the toughness of austenitic manganese.

#### IMPORTANT: SPECIAL VENTILATION AND/OR EXHAUST REQUIRED

Fumes from the normal use of some welding products can contain significant quantities of components - such as chromium and manganese - which can lower the 5.0 mg/m<sup>3</sup> maximum exposure guideline for general welding fume. BEFORE USE, READ AND UNDERSTAND THE MATERIAL SAFETY DATA SHEET (MSDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

<sup>(1)</sup>Composition and properties depend upon dilution. Single layer deposit properties depend upon base metal and/or build-up material. <sup>(2)</sup>Preferred polarity is listed first.

Material Safety Data Sheets (MSDS) and Certificates of Conformance are available on our website at [www.lincolnelectric.com](http://www.lincolnelectric.com)

### TEST RESULTS

Test results for mechanical properties, deposit or electrode composition and diffusible hydrogen levels were obtained from a weld produced and tested according to prescribed standards, and should not be assumed to be the expected results in a particular application or weldment. Actual results will vary depending on many factors, including, but not limited to, weld procedure, plate chemistry and temperature, weldment design and fabrication methods. Users are cautioned to confirm by qualification testing, or other appropriate means, the suitability of any welding consumable and procedure before use in the intended application.

### CUSTOMER ASSISTANCE POLICY

The Lincoln Electric Company is manufacturing and selling high quality welding equipment, consumables, and cutting equipment. Our challenge is to meet the needs of our customers and to exceed their expectations. On occasion, purchasers may ask Lincoln Electric for information or advice about their use of our products. Our employees respond to inquiries to the best of their ability based on information provided to them by the customers and the knowledge they may have concerning the application. Our employees, however, are not in a position to verify the information provided or to evaluate the engineering requirements for the particular weldment. Accordingly, Lincoln Electric does not warrant or guarantee or assume any liability with respect to such information or advice. Moreover, the provision of such information or advice does not create, expand, or alter any warranty on our products. Any express or implied warranty that might arise from the information or advice, including any implied warranty of merchantability or any warranty of fitness for any customers' particular purpose is specifically disclaimed.

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