

# SUPERCORE® F91

Low Alloy, All Position · AWS E91T1-B9C/M-H4

## KEY FEATURES

- B9 (P91) alloyed steel: Modified 9CrMo designed to weld equivalent "type 91" 9CrMo steels modified with small additions of niobium, vanadium and nitrogen for improved long term creep resistance, toughness fatigue and oxidation, and resistance at elevated temperatures
- Electrode provides high deposition rates and fast freezing slag for out of position welding
- Features a rutile flux system with an alloyed strip capable of producing low hydrogen weld

## SHIELDING GAS

100% CO<sub>2</sub>  
 80% Argon/ 20% CO<sub>2</sub>  
 Flow Rate: 40-50 CFH

## CONFORMANCES

AWS A5.29:

AWS A5.36M<sup>(5)</sup>:

EN ISO 17634-B:

## TYPICAL APPLICATIONS

- Main Steam Piping
- Oil Refineries
- Coal Liquefaction and Gasification Plants
- Power Generation Plants
- Turbine Castings

## WELDING POSITIONS

All

## DIAMETERS / PACKAGING

Diameter mm [in]	15 kg [33 lb] Spool
1.2 [0.045]	SCF91-12

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

	Yield Strength <sup>(2)</sup> MPa (ksi)	Tensile Strength MPa (ksi)	Elongation %	Charpy V-Notch J (ft-lbf) @ 20°C [68°F]	Hardness HV
<b>Requirements</b> AWS E91T1-B9C/M-H4	565 (82) min	690 (100) min	17 min	–	–
<b>Typical Results<sup>(3)</sup></b> Room Temperature 2 hr @760°C (1400°F) 6 hr @ 760°C (1400°F) High Temperature +566°C (1050°F) +600°C (1112°F) +650°C (1202°F)	660 (96) 630 (91) 360 (52) 288 (42) 245 (36)	790 (115) 750 (109) 450 (65) 420 (61) 396 (57)	20 23 21 27 29	28 (21) 36 (97) – – –	260 250 – – –

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

	%C	%Mn	%Si	%S	%P	%Cr	%Ni
<b>Requirements</b> AWS E91T1-B9C/M-H4	0.08 - 0.13	0.60 - 1.20	0.50 max	0.015 max	0.020 max	8.0 - 10.0	0.80 max
<b>Typical Results<sup>(3)</sup></b>	0.10	0.80	0.30	0.010	0.016	9.0	0.50
	%Mo	%Nb	%V	%N	%Cu	%Al	%Ni+Mn
<b>Requirements</b> AWS E91T1-B9C/M-H4	0.85 - 1.2	0.02 - 0.07	0.15 - 0.25	0.02 - 0.07	0.15 max	0.04 max	1.5 max
<b>Typical Results<sup>(3)</sup></b>	1.0	0.04	0.20	0.05	0.05	0.01	1.3

<sup>(1)</sup>Typical all weld metal. <sup>(2)</sup>Measured with 0.2% offset. <sup>(3)</sup>See test results disclaimer <sup>(4)</sup>Industry specific data, not required by AWS. <sup>(5)</sup>Dependent on shielding gas <sup>(6)</sup>Using 100%CO<sub>2</sub>, the voltage should be increased by 1-2V  
 NOTE: Additional test data available upon request.

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 SAFETY DATA SHEET (SDS) FOR THIS PRODUCT AND SPECIFIC INFORMATION PRINTED ON THE PRODUCT CONTAINER.

## TYPICAL OPERATING PROCEDURES<sup>(6)</sup>

Diameter mm (in)	Polarity	Current (Amps)	Voltage (Volts)
1.2 (0.045)	DC+	140-170	24-26

<sup>(6)</sup>Typical all weld metal. <sup>(7)</sup>Measured with 0.2% offset. <sup>(8)</sup>See test results disclaimer <sup>(9)</sup>Industry specific data, not required by AWS. <sup>(10)</sup>Dependent on shielding gas <sup>(11)</sup>Using 100%CO<sub>2</sub>, the voltage should be increased by 1-2V  
NOTE: Additional test data available upon request.

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

FUMES AND GASES can be hazardous to your health.

- Fumes from the normal use of this product contain significant quantities of potentially hazardous compounds. See consumable product label/insert.
- Keep your head out of the fumes.
- Use enough ventilation and local exhaust to keep fumes and gases from your breathing zone and the general area.
- An approved respirator should be used unless exposure assessments are below applicable exposure limits.

### 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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