



WIRE, COMPOSITE CORED ELECTRODE, MODIFIED SILICON BRONZE, BARE

WSB-M4A179-A1

1. SCOPE

The material defined by this specification is a wire basically comprised of a copper sheath with alloying ingredients in the form of metallic powders on the inside. The alloy, when melted, forms a modified silicone bronze, and used as a metal filler material by the thermal arc-spray process.

2. APPLICATION

This specification was released originally as a filler material for metal cladding body panels. The thermal spray process is used to repair vehicle defects prior to painting.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.2 CHEMICAL COMPOSITION (Weight Percent)

Tin	4.5 - 6.5
Silicon	1.6 - 2.4
Aluminum	0.8 - 1.2
Copper	90.0 - 93.0

Test Method: Electrodeposition and ARL-3580 inductively coupled plasma emission spectroscopy.

Note: To obtain samples for chemical analysis, electric arc spray the wire on a clean plain carbon steel surface, according to para 5.4 "Chemistry and Procedure." Allow the metal coating to cool, then scrape the chemical sample from the pad surface.

3.3 Parts clad with the deposits from the wire, shall meet all engineering drawing requirements when the wire is used under the conditions specified by the manufacturing engineering department.

The wire shall be a nominal diameter as specified on the purchase order.

5. GENERAL INFORMATION

The information given below is provided for clarification and assistance in meeting the requirements of this specification.

5.1 Prior to engineering approval, satisfactory results on a minimum trial quantity of two production coils of actual application will be required. The body Resident Engineer will inform Body Materials Engineering of the successful plant trial.

Date	Action	Revisions
2003 09 24	Revised	Para 3.0 inserted; para 3.1, 3.4 and 4 deleted
1991 01 23	C10090438	Released



- 5.2** This composite cored electrode wire, used as a filler material for body panels by the thermal spray process has no AWS classification. It is similar to a modified silicon bronze AWS A5.7, Class ER Cu Si-A.

5.3 COATING PHYSICAL PROPERTIES

Wire size	1.1 mm
Deposit efficiency	*80%
Melting point, approximate	1050 °C
Bond strength	28.0 MPa
Tensile strength	179.3 MPa
Coating texture	**Variable
Hardness	29 Rockwell B
Coating density	***7.60 g/cc
Coating weight	0.6635 g/m ² / micrometre
Shrink	0.008 mm/mm

SPRAYING

Spray Rate	4.5 kg/h/100 amps, 1.1 mm wire
Coverage (wire consumption)	1.10 kg/m ² /100 microns
Spray Pattern****(approx. 200 mm standoff)	Cross Nozzle/Positioner - 25 mm vertical height x 44 mm width Slot Nozzle/Positioner - 50 mm vertical height x 25 mm width
Length of wire per kg	123 m/kg (1.1 mm wire)

*Depends on air pressure, standoff, nozzle cap and target size.

**Coating texture, 150 mm standoff 275 kPa, depends on air pressure - fine with high psi, average with medium psi, and rough with low psi.

***Depends on atomizing air pressure.

****Higher air pressures and lower amperage gives smallest diameter pattern.