

Manganese Alloy, Brazing Filler Metal  
66Mn - 16Ni - 16Co - 0.80B  
1770 to 1875 °F (966 to 1024 °C) Solidus-Liquidus Range  
(Similar to UNS W32340)

## RATIONALE

AMS4780E results from a 5 year update and review of this specification. Metric equivalent sieve sizes were added to Table 2.

### 1. SCOPE

#### 1.1 Form

This specification covers a manganese alloy in the form of powder, preforms and a viscous mixture (paste) of the powder in a suitable binder.

#### 1.2 Application

This filler metal has been used typically for joining corrosion and heat resistant steels and alloys where good ductility and moderate heat resistance are required, but usage is not limited to such applications.

### 2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

#### 2.1 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, [www.astm.org](http://www.astm.org).

ASTM B 214 Sieve Analysis of Metal Powders

ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

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### 3. TECHNICAL REQUIREMENTS

#### 3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	--	0.06
Silicon	--	1.00
Nickel	14.00	18.00
Cobalt	14.00	18.00
Boron	0.50	1.10
Other Elements, each (3.1.1)	--	0.10
Other Elements, total (3.1.1)	--	1.00
Manganese	remainder	

3.1.1 Determination not required for routine acceptance.

#### 3.2 Condition

The product shall be supplied in the following condition:

##### 3.2.1 Powder

As fabricated.

##### 3.2.2 Paste

Unless otherwise specified by the purchaser, shall consist of 84 to 90% by weight powder in a suitable binder and shall not contain flux.

##### 3.2.3 Preforms

As fabricated.

#### 3.3 Properties of Paste

3.3.1 Paste shall have a shelf life of not less than 6 months from date of manufacture; not more than thorough mixing shall be required to restore paste for use during that time.

3.3.2 Paste without flux shall leave no adherent residue when heated in a protective atmosphere to a temperature higher than 1000 °F (538 °C).

#### 3.4 Quality

The product, as received by purchaser, shall be uniform in color, quality, and condition and free from foreign materials and from imperfections detrimental to its working qualities.

### 3.5 Sizes and Tolerances

#### 3.5.1 Powder

##### 3.5.1.1 Mesh Designation: 140F (106F).

3.5.1.2 Powder shall be supplied in accordance with the limits on particle size distribution shown in Table 2, unless some other distribution is specified. Tests shall be in accordance with ASTM B 214.

TABLE 2A - PARTICLE SIZE DISTRIBUTION

Mesh Designation	U.S. Standard Sieve No.	Distribution, percent
140F	On a 100 sieve	0.5 max.
	On a 140 sieve	10 max
	Through 325 sieve	55 max

TABLE 2B - PARTICLE SIZE DISTRIBUTION

$\mu\text{m}$ Mesh Designation	$\mu\text{m}$ Sieve opening	Distribution, percent
106F	On a 150 sieve	0.5 max
	On a 106 sieve	10 max
	Through a 45 sieve	55 max

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

The vendor of the product shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the product conforms to specified requirements.

### 4.2 Classification of Tests

#### 4.2.1 Acceptance Tests

All technical requirements, other than shelf life of paste (3.3.1), are acceptance tests and shall be performed on each lot.

#### 4.2.2 Periodic Tests

Shelf life of paste (3.3.1) is a periodic test and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

### 4.3 Sampling and Testing

Shall be in accordance with the following:

#### 4.3.1 Composition

One sample shall be taken from each furnace charge.

#### 4.3.2 Properties Except Shelf Life of Paste

One sample from each lot.

4.3.3 A lot of powder shall be a uniform blend of powder produced from one or more furnace charges, each meeting the requirements of Table 1, and presented for vendor's inspection at one time.

4.3.4 A lot of paste shall be that paste produced from a single lot of powder, combined with binder from the same manufacturing batch, and presented for vendor's inspection at one time.

#### 4.4 Reports

The vendor of the product shall furnish with each shipment a report showing the results of tests on each lot to determine conformance to the composition requirements and stating that the product conforms to the other technical requirements. This report shall include the purchase order number, lot number or numbers, AMS4780F, form and quantity.

#### 4.5 Resampling and Retesting

Not applicable.

### 5. PREPARATION FOR DELIVERY

#### 5.1 Identification and Packaging

5.1.1 The product shall be suitably wrapped, sealed, and boxed or otherwise packaged for protection against injury and contamination during shipment and under normal dry storage conditions.

5.1.2 Each exterior container or package shall be permanently and legibly marked with not less than the lot number, AMS4780F, manufacturer's identification, and weight.

5.1.2.1 Each container and package of paste shall also be marked with the date of manufacture.

5.1.3 Packages of filler metal shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the filler metal to ensure carrier acceptance and safe delivery.

### 6. ACKNOWLEDGMENT

A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.

### 7. REJECTIONS

Filler metal not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.

### 8. NOTES

8.1 A change bar (I) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

8.2 This filler metal has an approximate solidus temperature of 1770 °F (966 °C) and an approximate liquidus temperature of 1875 °F (1024 °C).

8.3 Terms used in AMS are clarified in ARP1917.