

# AEROSPACE MATERIAL SPECIFICATION

**SAE AMS5373**

**REV. D**

Issued 1948-03  
Revised 1987-07  
Noncurrent 1994-11  
Reaf Nonc 2012-04

Superseding AMS5373C

Alloy Castings, Sand, Corrosion and Heat Resistant  
16Co - 29Cr - 4.5W  
As Cast

UNS R30006

## RATIONALE

AMS5373D has been reaffirmed to comply with the SAE five-year review policy.

## NONCURRENT NOTICE

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of November 1994. It is recommended, therefore, that this specification not be specified for new designs.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

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on this Technical Report, please visit  
<http://www.sae.org/technical/standards/AMS5373D>**

## 1. SCOPE:

### 1.1 Form:

This specification covers a corrosion and heat resistant cobalt alloy in the form of sand castings.

### 1.2 Application:

Primarily for parts such as nozzles, rubbing seals, rollers, guides, and supports requiring wear and/or erosion resistance in combination with corrosion and heat resistance for use up to 1600°F (870°C).

## 2. APPLICABLE DOCUMENTS:

The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

### 2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

#### 2.1.1 Aerospace Material Specifications:

|          |                                      |
|----------|--------------------------------------|
| AMS 2350 | Standards and Test Methods           |
| AMS 2635 | Radiographic Inspection              |
| AMS 2645 | Fluorescent Penetrant Inspection     |
| AMS 2694 | Repair Welding of Aerospace Castings |
| AMS 2804 | Identification, Castings             |

### 2.2 ASTM Publications:

Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

|           |                                                                                                                |
|-----------|----------------------------------------------------------------------------------------------------------------|
| ASTM E18  | Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials                                      |
| ASTM E354 | Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys |
| ASTM E446 | Reference Radiographs for Steel Castings Up to 2 in. (51 mm) in Thickness                                      |

### 2.3 U.S. Government Publications:

Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

#### 2.3.1 Military Standards:

MIL-STD-794 Parts and Equipment, Procedures for Packaging and Packing of

### 3. TECHNICAL REQUIREMENTS:

#### 3.1 Composition:

Shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354, by spectrochemical or other analytical methods acceptable to purchaser:

|            | min  |   | max       |
|------------|------|---|-----------|
| Carbon     | 0.90 | - | 1.4       |
| Manganese  | --   |   | 1.00      |
| Silicon    | --   |   | 1.50      |
| Phosphorus | --   |   | 0.04      |
| Sulfur     | --   |   | 0.03      |
| Chromium   | 27.0 | - | 31.0      |
| Tungsten   | 3.5  | - | 5.5       |
| Nickel     | --   |   | 3.0       |
| Molybdenum | --   |   | 1.5       |
| Iron       | --   |   | 3.0       |
| Cobalt     |      |   | remainder |

#### 3.2 Condition:

As Cast.

#### 3.3 Casting:

A melt shall be the metal poured from a single furnace charge of 15,000 lb (6800 kg) or less. A lot shall be all castings of the same part number poured from a single melt in not more than eight consecutive hours.

#### 3.4 Test Specimens:

Chemical analysis specimens shall be of any convenient size, shape, and form.

#### 3.5 Properties:

Castings shall conform to the following requirements:

- 3.5.1 Hardness: Shall be not lower than 40 HRC, or equivalent, determined in accordance with ASTM E18.

### 3.6 Quality:

- 3.6.1 Castings, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the castings.
  - 3.6.1.1 Castings shall have smooth surfaces and shall be well cleaned. Metallic shot or grit shall not be used for final cleaning.
- 3.6.2 Castings shall be produced under radiographic control. This control shall consist of radiographic examination of castings in accordance with AMS 2635 until proper foundry technique, which will produce castings free from harmful internal imperfections, is established for each part number and of production castings as necessary to ensure maintenance of satisfactory quality.
- 3.6.3 When specified, castings shall be subjected to fluorescent penetrant inspection in accordance with AMS 2645.
- 3.6.4 Radiographic, fluorescent penetrant, and other quality standards shall be as agreed upon by purchaser and vendor. ASTM E446 may be used to define radiographic acceptance standards.
- 3.6.5 Castings shall not be repaired by peening, plugging, welding, or other methods without written permission from purchaser.
  - 3.6.5.1 When permitted in writing by purchaser, defects in castings may be removed and the castings repaired by welding in accordance with AMS 2694.

### 4. QUALITY ASSURANCE PROVISIONS:

#### 4.1 Responsibility for Inspection:

The vendor of castings shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the castings conform to the requirements of this specification.

#### 4.2 Classification of Tests:

Tests to determine conformance to all technical requirements of this specification are classified as acceptance tests and shall be performed on each melt or lot as applicable.

#### 4.3 Sampling:

Shall be in accordance with the following:

4.3.1 Two chemical analysis specimens in accordance with 3.4 from each melt or a casting from each lot.

4.3.2 Two or more castings from each lot.

#### 4.4 Approval:

4.4.1 Sample castings from new or reworked patterns and the casting procedure shall be approved by purchaser before castings for production use are supplied, unless such approval be waived by purchaser.

4.4.2 Vendor shall establish for production of sample castings of each part number parameters for the process control factors which will produce acceptable castings; these shall constitute the approved casting procedure and shall be used for producing production castings. If necessary to make any change in parameters for the process control factors, vendor shall submit for reapproval a statement of the proposed changes in processing and, when requested, sample castings. Production castings incorporating the revised operations shall not be shipped prior to receipt of reapproval.

4.4.2.1 Control factors for producing castings include, but are not limited to, the following:

Type of furnace

Furnace atmosphere

Fluxing or deoxidation procedure

Gating and risering practices

Metal pouring temperature (variation of  $\pm 50^{\circ}\text{F}$  ( $\pm 30^{\circ}\text{C}$ ) from the established limit is permissible)

Solidification and cooling procedures

Cleaning operations

Methods of inspection

4.4.2.1.1 Any of the above process control factors for which parameters are considered proprietary by the vendor may be assigned a code designation. Each variation in such parameters shall be assigned a modified code designation.

#### 4.5 Reports:

4.5.1 The vendor of castings shall furnish with each shipment a report showing the results of tests for chemical composition of at least one casting or of specimens as in 3.4 from each melt represented and the results of tests on each lot to determine conformance to the hardness requirement. This report shall include the purchase order number, lot number, AMS 5373D, part number, and quantity.