



# AEROSPACE MATERIAL SPECIFICATION

AMS2767™

REV. B

Issued 2013-12  
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Superseding AMS2767A

## Uphill Quenching of Aluminum Alloy Product

### RATIONALE

AMS2767B results from a Five-Year Review and update of this specification with changes to clarify that process approval is the responsibility of the cognizant engineering organization (see 1.2.3, 3.3.5, 3.3.7, 4.4, 4.4.2, and Section 7), relocate Definitions (see 2.3), and update Default Condition (see 1.2.4), Applicable Documents (see Section 2, 2.2, and 3.2), temperature control requirements (see 3.2 and 3.3.4.2.1), Procedures for All Types/Classes/Levels (see 3.3.2), Thermal Processing Following Uphill Quenching (see 3.3.6), and Personnel Training (see 3.3.8).

#### 1. SCOPE

This specification establishes the engineering requirements for the uphill quenching process of aluminum alloy product. Uphill quenching immerses product in liquid nitrogen followed by exposure to a high-pressure/high-velocity steam blast or boiling water.

##### 1.1 Application

1.1.1 These processes are applicable to both wrought and cast aluminum shapes to reduce internal residual stresses.

1.1.2 This document is applicable when called out on an engineering drawing, required or permitted by a heat-treating specification, or specified by the purchase order.

##### 1.2 Classification

This process is categorized by types, classes, and levels as follows:

###### 1.2.1 Types

Type I - Uphill quench using high-velocity steam as the heating medium.

Type II - Uphill quench using boiling water as the heating medium.

###### 1.2.2 Classes

Class 1 - Applications where the uphill quench process is preceded by solution treatment and quenching (AQ).

Class 2 - Applications where the uphill quench process is performed on material in any other condition (e.g., F, O, W, T5, T6, T7, T8, etc.) than as specified in Class 1.

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### 1.2.3 Levels

Level 1 - The process is controlled and qualified by a procedure developed by the processor.

Level 2 - The process is controlled and qualified by a procedure developed by the processor and approved by the cognizant engineering organization (CEO) that may include a stress reduction test method defined by the CEO.

1.2.4 When no type, class, or level is specified, Type 1, Class 1, Level 2 shall be the default condition

## 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 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 1-877-606-7323 (U.S. and Canada only) or 1-724-776-4970 (outside U.S. and Canada), [www.sae.org](http://www.sae.org).

AMS2770 Heat Treatment of Wrought Aluminum Alloy Parts

AMS2771 Heat Treatment of Aluminum Alloy Castings

AMS2772 Heat Treatment of Aluminum Alloy Raw Materials

AS7766 Terms Used in Aerospace Metals Specifications

### 2.2 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 E230 Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples

### 2.3 Definitions

Terms used in AMS are defined in AS7766.

## 3. TECHNICAL REQUIREMENTS

### 3.1 Equipment

3.1.1 Liquid nitrogen source.

3.1.2 Liquid nitrogen processing tank.

3.1.3 Type I Processing

3.1.3.1 Steam Boiler

3.1.3.2 Appropriate steam blast fixture designed, if needed or suitable for the individual product.

3.1.4 Type 2 Processing

3.1.4.1 Water tank and heating apparatus.