



AEROSPACE MATERIAL SPECIFICATION

AMS2767™**REV. A**Issued 2013-12
Revised 2020-05

Superseding AMS2767

Uphill Quenching of Aluminum Alloy Product

RATIONALE

AMS2767A revises Logs (4.2), and results from a Five-Year Review and update of this specification.

1. SCOPE

This specification establishes engineering requirements for the uphill quenching process. Uphill quenching immerses product in liquid nitrogen followed by exposure to a high pressure/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:

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

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

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

Class 2 - Applications where 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.

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

Level 2 - Process is controlled and qualified by a procedure developed by the processor and approved by the purchaser that may include a stress reduction test method defined by the purchaser.

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

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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: 877 606 7323 (inside USA and Canada) or +1 724 776 4970 (outside USA), or www.sae.org.

AMS2750	Pyrometry
AMS2770	Heat Treatment of Wrought Aluminum Alloy Parts
AMS2771	Heat Treatment of Aluminum Alloy Castings
AMS2772	Heat Treatment of Aluminum Alloy Raw Materials
ARP1917	Clarification of Terms Used in Aerospace Metals Specifications

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 part.

3.1.4 Type 2 Processing

3.1.4.1 Water tank and heating apparatus.

3.1.5 A digital surface temperature indicator with appropriate thermocouple.

3.1.6 When required by processing plan, refrigeration equipment with temperature control and recorder.

3.2 Temperature control and measuring equipment shall meet the requirements of AMS2750, Class 2, except that temperature uniformity survey for equipment used for uphill quenching steps is not required. Temperature uniformity survey is applicable to solution heat treatment and precipitation hardening performing in conjunction with AMS2770, AMS2771, or AMS2772 as appropriate.

3.3 Procedures

3.3.1 Class 1 Only

Product shall be solution heat treated and quenched in accordance with AMS2770, AMS2771, AMS2772 or other controlling specification as defined by the purchase order. Uphill quenching shall either commence within 30 minutes of quenching from solution heat treatment or, if the product is held in the AQ condition after solution heat treatment, the AQ product shall be placed in a freezer within 30 minutes and maintained at a temperature equal to or lower than 0 °F (-18 °C) for a maximum of 7 days and uphill quench shall be performed within 30 minutes after removal from the freezer.