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| <p>Accredited Standards Committee H35</p> <p>ALUMINUM and ALUMINUM ALLOYS</p> <p>ANSI Accredited Standards Committee</p> | <p>Secretariat:</p> <p>The Aluminum Association, Inc. 1400 Crystal Drive, Suite 430 Arlington, VA 22202</p> <p>Telephone: (703) 358-2978 e-mail: jcowie@aluminum.org</p> |
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DATE: April 22, 2019

TO: Lee Gearhart
Sr. Metallurgical Engineer
Moog, Inc.
500 Jamison Road
East Aurora, NY 14052

From: John Weritz
Vice President, Standards & Technology
jweritz@aluminum.org

RE: PS19-107 Interpretation Question - Temper Designations

Dear Mr. Gearhart,

The question that you submitted on March 29, 2019 was reviewed by our Technical Committee on Product Standards. The response is summarized as follows:

Your Question:

I have long held for our drawing notes and procurement that additional digits within the Temper Designation System are subsets. In my view, -T651 and -T6511 are both subsets of -T6. Hence if my purchasing guy orders 7050-T74 per AMS4342 and we get 7050-T74510 per AMS4342, I believe it's fine and we have no issue with accepting it. Obviously the reverse is not true: if we order 7050-T74511 and receive 7050-T74, I am going to need an explanation.

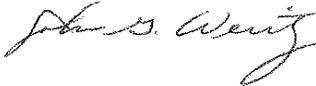
Is this interpretation consistent with the understanding of the Aluminum Association members? I understand it's possible that mechanical properties can vary slightly between material that has been stress relieved by stretching and material that hasn't seen that processing, but I'd always thought the material specifications and the design allowables in MMPDS (which usually reflect specification minimums) had sufficient tolerance that the material will meet. Since most AMS documents list tensile and yield strength as an acceptance test, I won't get material that is lower strength than specification minimums anyway.

Our Response:

Our answer is each temper designation refers to a unique processing parameter resulting in defined minimum mechanical properties. When a purchaser specifies an alloy with a certain temper and receives a somewhat different temper, this has the potential for the aluminum alloy not meeting the minimum properties established for the specified alloy/temper designation. For instance, T651 temper refers to cold finished material, e.g., rolling or drawing or stretched rolled rings for example. In comparison, T6511 refers to extruded rod, bar, profiles, tube and drawn tube. These tempers refer to different processing parameters that may result in differences in the mechanical and physical properties. One cannot assume that slight differences in mechanical properties resulting from different tempers is insignificant.

From an MMPDS perspective A and B material design allowables are statistically determined so that for an A-value 99% of the material meets or exceeds the allowable with a statistical confidence of 95% and for a B-value 90% of the material meets or exceeds the allowable with a statistical confidence of 95%. These distinctions and exact percentages are important for single-load path and redundant-load path structures. There is no "extra margin" intentionally built into these values. If Temper X has a lower allowable than Temper Y, a lesser percentage of Temper X will meet or exceed the Temper Y allowable. The user can determine whether this is acceptable or not for a given application. Each user is also free to develop for their company a list of approved material substitutions (which should be carefully selected).

With best regards,

A handwritten signature in cursive script, appearing to read "John G. Weritz".

John G. Weritz

cc: TCPS Members
ASC H35 Members
Lee Simowitz – Baker & Hostetler
"Response Letter to ANSI Interpretation Questions" Folder