

MEMO

BOMBARDIER

DATE Thursday, May 24, 2018

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CC Keith Engleka, (K.ENGLEKA@UNIVSTAINLESS.com), Graham McIntosh (G.McIntosh@UNIVSTAINLESS.com), Kevin Seidel (K.Seidel@UNIVSTAINLESS.com); Gary Lawrence (g.lawrence@UNIVSTAINLESS.com) Louis-Philippe St-Michel, Max Stein, Souheil Osseiran, Guylaine Gallant, Frédéric Grenon, Hasan Salek

FROM Marie Piché

SUBJECT Universal Stainless Steel (Bridgeville) - Qualification of AMS5659 in Precipitation Hardened Condition

REFERENCE No MP:18/3954 rev --

References:

- [1] RFSE#1000059283
- [2] AMS 5659 S - Steel, Corrosion-Resistant, Bars, Wire, Forgings, Rings, and Extrusions 15Cr - 4.5Ni - 0.30Cb (Nb) - 3.5Cu
- [3] AMS 5659/H 1025 A - Steel, Corrosion-Resistant, Bars, Wire, Forgings, Rings, and Extrusions 15Cr - 4.5Ni - 0.30Cb (Nb) - 3.5Cu Consumable Remelted, Solution and Precipitation Heat Treated (H1025)
- [4] PCD Method 0222 Rev 0 - 15-5PH-Bombardier-Aged_Bloom_Bar_(≥ 1.00in Thick) dated May 18, 2018
- [5] Historical Data Bombardier 15-5PH H1025 Mechanical Test Data.xls

BOMBARDIER Aerospace Materials and Processes Engineering (BAMPE) has reviewed the qualification package submitted by Universal Stainless & Alloy Products Inc. (600 Mayer St., Bridgeville, PA, US, 15017-2705 SAP 108677 / EMCM 134) for

- AMS 5659 bars in H1025 condition

The documentation [5] meets the requirements of AMS 5659 [2] and AMS 5659/H1025 [3].

Universal Stainless & Alloy Products Inc. is approved for the production of AMS 5659 in precipitation hardened condition according to Method 0222 Rev 0 [4].

Please note that the Bombardier Aerospace system makes the Supplier of materials totally responsible for the conformance of the products supplied. This means that Bombardier will consider Universal Stainless & Alloy Products Inc. responsible for all the manufacturing processes of AMS 5659 stock. If these are performed by an outside supplier, then Universal Stainless & Alloy Products Inc. must ensure that the supplier's work is in conformity with the applicable industry specification, and records of any audits performed must be kept on file at Universal Stainless & Alloy Products Inc.

Note that Universal Stainless & Alloy Products Inc. is also listed in EMCM-001 for the following material specifications:

- AMS 5617 HI-RES CUSTOM 455 BAR
- AMS 5629 CRES PH13-8 Mo BAR & EXTRUSION, SOLUTION HEAT TREATED
- AMS 5643 CRES 17-4PH BAR/TUBE/RINGS
- AMS 5659 CRES 15-5 PH BARS SOLUTION HEAT TREATED
- AMS 5731 HT-RES A286 BARS / TUBING / RINGS
- AMS 6487 STEEL H-11 BARS

Regards,

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Marie Piché
Bombardier Aerostructures and Engineering Services
Materials and Processes Engineering

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Hasan Salek
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