AERONAUTICAL MATERIAL SPECIFICATION

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COPPER FURNACE BRAZING

1. ACKNOWLEDGEMENT: The vendor shall mention this specification number in all quotations and when acknowledging purchase orders.

2. APPLICATION: This specification provides for joining carbon and low alloy steel parts which may be subsequently heat treated.

3. PROCESS REQUIREMENTS:

(a) Surface Condition.- The surfaces to be joined shall be cleaned prior to assembly.

(b) Fluxing.- Unless otherwise specified, flux shall be used in brazing corrosion resistant steels, and may at vendor's discretion be used in brazing other steels.

(c) Assembly.- The parts to be joined shall be assembled so that, if practical, there is metal to metal contact between mating surfaces and relative movement of the components does not occur during the brazing operation so that the parts will be in proper alignment after brazing.

(d) Brazing Material.- The brazing material shall be copper conforming to AMS 4500 or AMS 4701. Sufficient copper shall be placed within or in close proximity to the joint.

(e) Joining.- Heating shall be performed in a furnace with a suitable protective atmosphere at a temperature between 2000 F and 2150 F. Parts shall be heated until the copper melts and the joint is formed. Further heating shall be held to a minimum.

(f) Cooling.- After brazing, assemblies shall be cooled in such a manner as to prevent cracks and minimize internal stress, distortion, scaling and decarburization. Cooling from the brazing temperature to below the scaling temperature shall be done in a suitable protective atmosphere. If hardening is to be executed in conjunction with brazing, cooling procedures may be revised accordingly.

(g) Flux Removal.- After brazing and cooling, flux, if used, shall be removed from the parts by a method not injurious to the specified surface finish.

(h) Heat Treatment.- Where hardness is specified for the brazed assembly and heat treatment is required, such heat treatment shall follow the brazing operation.

4. QUALITY: (a) Exterior examination of joints shall show a complete line or ring of copper recessed not more than 10% of the joint depth, between component parts at the end of the joint to which the brazing alloy was introduced and when practical, shall show at least a metallic stain of copper at the opposite end of the joint, to indicate complete penetration of the copper in the joint.

(b) The area joined by copper shall be not less than 80% of the area of the mating portions of the assembly.

(c) Surfaces of parts shall be free of excessive brazing alloy.

(d) Brazed joints shall be sound, clean and free from defects detrimental to performance of assemblies.