GSI FAIR	Technical Guideline	Number	2.31e
B-MT	Thermal Shield Base Materials	Status	2011-04-04

Contents

1. Scope

1) This document defines materials to be used as wrought material for engineering and production of thermal shield shells in applications like
   - magnet cryostats
   - cryogenic supply systems
   - cryogenic transport systems
   - cryogenic current lead boxes
   - auxiliary cryogenic systems

   within FAIR accelerators.
2) This document defines materials to be used for parts, joined to the thermal shield shell within a welding, brazing or soldering process (except pressure loaded components).
3) This document does NOT define any material or wrought material for pressurised components within a thermal shield.
4) This document is NOT related to any other purpose as aforementioned.

2. Definitions

1) A thermal shield shell in terms of this document is an actively (by cooling tubes) or passively (by thermalisation straps) cooled shell like construction of sheet metal representing the main functional part for shielding radiation heat load.

3. Codes and Standards

1) The qualities of Aluminium materials are defined by [1].
2) The qualities of Copper materials are defined by [2].

4. Qualified Materials

1) A qualified Aluminium material for the production of thermal shield shells is:
   - 99.5% Aluminium of the type EN AW-1050A H24 following [1].
2) Qualified Copper materials for the production of thermal shield shells are:
   - 99.9% Copper of the type Cu-DHP (Material Number: CW024A) following [2] for applications where optimised properties for welding, brazing and soldering are of highest priority.
   - 99.9% Copper of the type Cu-ETP (Material Number: CW004A) following [2] for applications where a maximum heat conductivity at low temperatures is of highest priority.
3) In case other materials are planned for the production of thermal shield shells, the material choice shall be agreed with GSI in writing.
4) Only materials being qualified or being agreed with GSI shall be used for production of thermal shield shells.

5. Certificates and Documentation

1) Adequate certificates as defined by [3]
   - stating material properties
   - dated and accredited

   shall be delivered with each lot of material in use for production.

6. References

[1] DIN EN 573-3, Aluminium and aluminium alloys - Chemical composition and form of wrought products – Part 3: Chemical composition and form of products; Deutsches Institut für Normung e.V., Beuth Verlag GmbH, Berlin, Germany, 2009

[2] DIN EN 1652, Copper and copper alloys - Plate, sheet, strip and circles for general purposes Deutsches Institut für Normung e.V., Beuth Verlag GmbH, Berlin, Germany,1997

[3] DIN EN 10204, Metallic products - Types of inspection documents; Deutsches Institut für Normung e.V., Beuth Verlag GmbH, Berlin, Germany, 2004