



PYROTEK ROLL-BONDED CATHODE CLADS

FOR USE IN SMELTER POTROOMS

Roll-bonding: The Superior Option for Clad

Roll-bonding creates a material that is metallurgically bonded. Materials are permanently joined for 100 percent electrical continuity, and demonstrate the characteristics of contiguous metal at the bond interface. Bond is inter-crystalline rather than mechanical interleaving.

The uniformity of the bond produced via roll-bonding is unmatched. Explosion-bonding produces small voids in the bond line. These voids allow intermetallics to form and weaken the bond. Pyrotek's bond is perfectly uniform with no room for intermetallics to form.

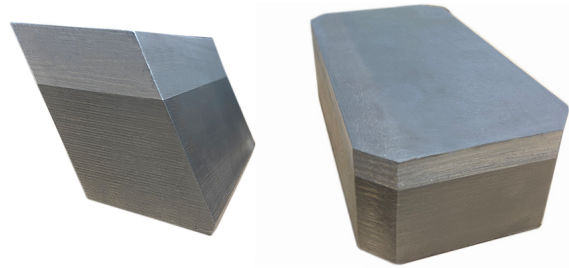
Pyrotek clads feature options for a performance enhancing interlayer. Most commonly a thin and highly conductive chromium interlayer is used. The chromium interlayer allows the clad to withstand higher temperatures with minimal electrical and thermal resistance. Optionally, no chromium interlayer can provide cost savings in cathode applications where the increased temperatures do not occur.

Electrical

The electrical resistance of a transition insert is nominally the series resistance of the components. There is no resistance increase or electrical conductivity loss associated solely with the bond or bonding process.

Strength

The technology is tensile tested at the bond to exceed the strength of the aluminium. High purity aluminium is typically 85-90 MPa in tensile strength, while the Pyrotek roll-bonded transition insert demonstrates a bond tensile strength of greater than 125 MPa as-rolled.



All parts have representative bend tests that depict the bond integrity and continuity. The bend testing consists of 3-4 mm slices of the insert cross section bent at 90 degrees at the bond interface. One hundred percent bonding will demonstrate no separations, pinholes, or tears at the interface.

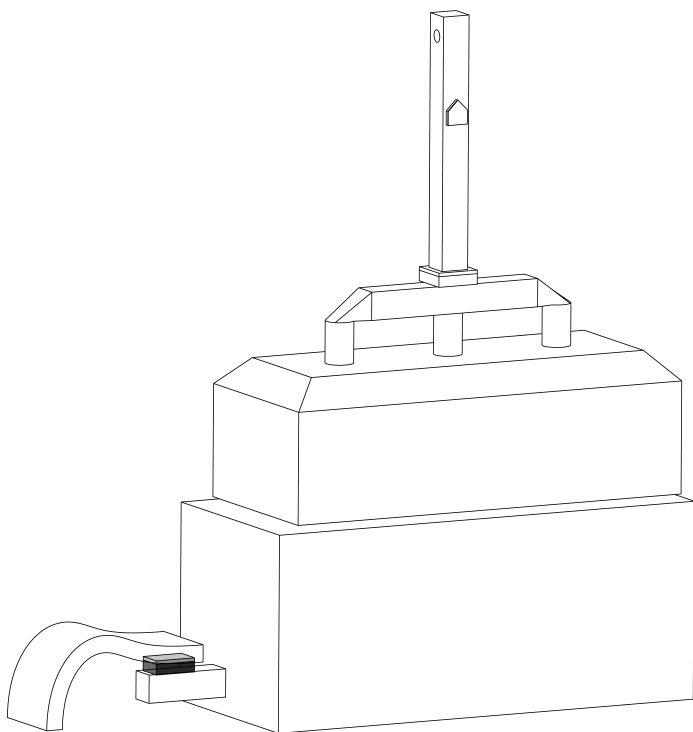
Temperature

Aluminium-steel inserts can operate safely at elevated temperatures. The parts have been tested per ALCAN – Pechiney AP 18–30 qualifying tests. For the 20°C Tensile test, clads always meet the 150MPa minimum requirement, often exceeding 180MPa. At 500°C, the minimum requirement is 85MPa, Pyrotek clads typically exceed 120MPa.

Clads with no interlayer can withstand consistent temperatures up to 400°C. Adding a chromium interlayer allows for operating temperatures up to 500°C.



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Materials

The typical standard aluminium grade is 1050. The standard steel is 1008. OFHC 101/102 copper is the standard for copper clads. Design flexibility allows for other material options that fit each individual application.

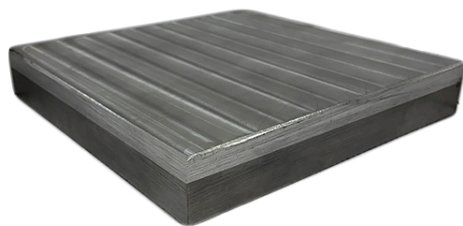
Fabrication

The clads are cut to customers' required dimensions, +/- 1 millimeter, unless otherwise requested. Typical total thickness for steel cathode clads is 38.1 mm with 12.7 mm of aluminium. Thickness can be customized based on application requirements.

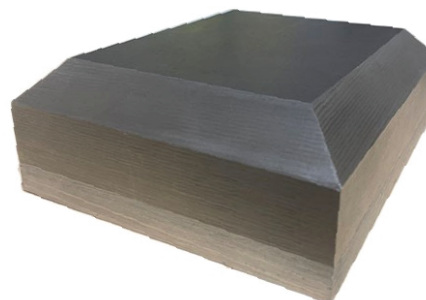
Parts can be fabricated in any number of geometries. Custom designs can be produced via our wide array of saws, water-jet and CNC mills.

FABRICATION OPTIONS

Machined Surfaces



Weld Preparation



Machining and Forming



Chamfers

