

Dynamic Corrosion Resistance Test of ZYP's BN Coatings Conducted by the Edward Orton Jr. Ceramic Foundation, Westerville, OH August 2020

Test specifications:

- Duration: 96 hours
- Temperature: 720°C
- Cover gas: Argon
- Rotation rate: 2 feet/minute, switching directions every 30 minutes
- Depth of sample in molten aluminum: Approximately 3 ¼"
- Substrate = Pyrocast FS73 AL
<https://www.pyrotek.com/DeliverFile/eead96273dd01778c3c757950b2af0b7>
- Aluminum = A356 [92% Al, 7% Si, 0.35% Mg, 0.2% Fe, 0.2% Cu, 0.1% Mn, 0.1% Zn]
- Rotating pins: ½ inch diameter, 7 inches length

Coatings used:

- BN Lubriccoat Blue
- BN Lubriccoat-ZV Blue
- BN Releasecoat Blue
- BN Hardcoat

Each coating protected the FS73 AL substrate without any reduction in the substrate diameter, within error. The primary differences between the four coatings are within the coatings' respective binder systems, which affects the adherence of the coating to the substrate. Given that this test was conducted under argon, the differences in relative adherence of the coatings were not a factor.

ADDITIONAL INFORMATION:

One ceramic pin was tested with each coating type. Each pin was coated by brushing with two layers of the respective coatings, drying in between coatings. Argon cover gas was used in order to eliminate dross that would have added abrasion into the testing: the test was thus designed to evaluate corrosion resistance in a pool of molten aluminum alloy that is subjected to flowing metal at typical melt temperature of 720°C.



Dynamic melt test set-up at the Edward Orton Jr. Ceramic Foundation. Clockwise from top left: Coated FS73 AL test pins; coated pins inserted into rotating crucible lid; test in progress; and A356 aluminum prior to melting.