CURTISS-WRIGHT

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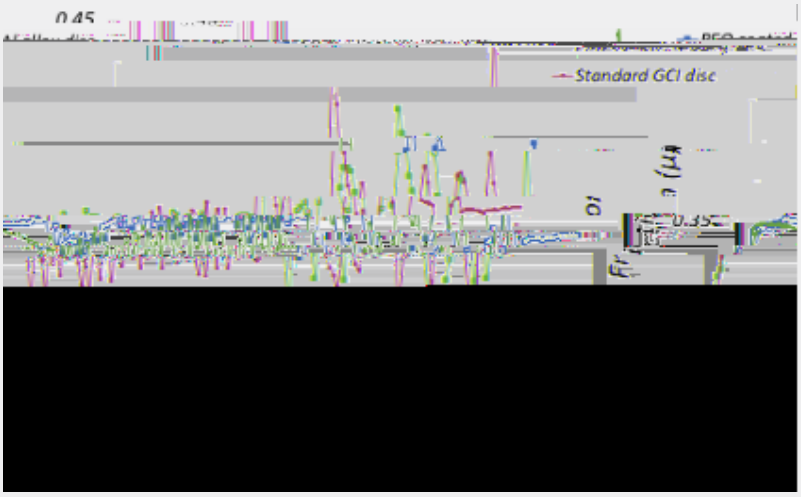
The innovation is based on the application of a unique, proprietary Keronite Plasma Electrolytic Oxidation (PEO) process to a light-weight aluminium brake disc (Fig.1). The PEO converts the brake disc's surface layer into a dense and super-hard crystalline Al_2O_3 ceramic coating (Fig.2), capable of surviving temperature extremes, corrosion, extreme wear and thermal stresses. PEO is a conversion layer (rather than a deposited ceramic coating or brazed ceramic layer), and offers excellent adhesion to the substrate metal, which makes the ceramic coating extremely robust and able to withstand relatively high coefficient of thermal expansion (CTE) mismatch.



E ?

- PEO technology is essentially plasma-assisted anodising in an environmentally safe, low-concentration alkaline electrolyte that is free of Cr, heavy metals, volatile organic compounds and strong acids.
- Millions of very short-lived plasma discharges, like microscopic bolts of lightning on he surface of a component (Fig.3) transform the surface layer into materials such as Corundum (Al_2O_3) on Aluminium.
- Similar to anodizing, but employs much higher potentials (typically 400V-1000V), so that discharges occur and the resulting plasma modifies (and enhances) the structure of the oxide layer.
- Due to very high hardness and a continuous barrier, these coatings offer enhanced protection against wear, corrosion as well as electrical/thermal insulation in addition to many other properties.

i Dizdar S. et al: 'Grey Cast Iron Brake Discs Laser Cladded with Nickel-Tungsten Carbide - Friction, Wear and Airborne Wear Particle Emission', Atmosphere 2020, 11, 621; doi:10.3390/atmos11060621.
ii UK DEFRA and DTI, 'The costs of reducing PM10 and NO2 emissions and concentrations in the UK.'
iii Maher et al, 'Magnetite-pollution-nanoparticles in the human brain', 2016.
iv Pankhurst et al, 'Increased-levels-of-magnetic-iron-compounds-in-Alzheimer's disease. J. of Alzheimers Disease 13(1), p.49-52, 2008.
v Kirschvink et al., 'Magnetite bio-mineralization in the human brain. Proc. Natl. Acad Sci. USA 89 (16), 1992, p.7683—7687.
vi COMEAP Report, 2010. ISBN 978-0-85951-685-3.