



uDIAMOND® VIVACE **- NANODIAMOND ENHANCED HARD CHROME PLATING**

Pushing the Limits of Hard Chrome Plating

As designers continue to push boundaries in a quest for higher performing products, while reducing size, mass and emissions, the need arises for a higher performing plated surfaces.

uDiamond Enhancement

Carbodeon's uDiamond® Vivace plating enhancement addresses these needs:

- Hardness: +20-50%
- Wear Resistance: + >100%
- Corrosion Resistance: + 50-100%
- Friction: - 30%

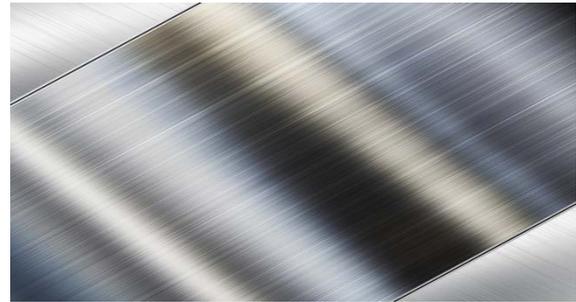
Enhanced adhesion.

How Does uDiamond® Enhancement Work

The 4-6 Nm hard diamond particles disperse throughout the plating electrolyte:

uDiamond® particles control the growth of the plating microstructure – reducing the grain size at nano scale, improving its strength and eliminating porosity.

uDiamond® particles reinforce the plated material by controlling dislocation movement under stress.



uDiamond® particles present hard wearing, low friction surfaces at the operating face.

uDiamond® Vivace has been developed to meet the needs of tomorrow, enabling more durable products, with greater efficiency through lowered friction, and is used throughout industries including automotive, power generation, aerospace, industrial and marine.

uDiamond® deposition in the plated layer is <1wt.%, providing an economic means of performance enhancement. In some cases, the improved performance allows a reduced plating thickness to be used, reducing processing time and material consumption.

Performance

The concentration of Nanodiamond in the plated layer can be adjusted to tailor the properties according to requirements. This is done by control of the concentration of dispersed



nanodiamond particles in the electrolyte as well as other plating parameters.

Coefficient of friction is typically reduced to <0.1

No increase in wear of the counterpart components.

High concentrations are to be used when absolute performance is required, whereas lower concentrations generate significant benefits with reduced costs.

Process

Use any standard hard chrome process by applying Carbodeon uDiamond® Vivace material within the electrolyte. We can support the determination of the correct concentrations and process control according to customer requirements and plating installation.

The Carbodeon Difference:

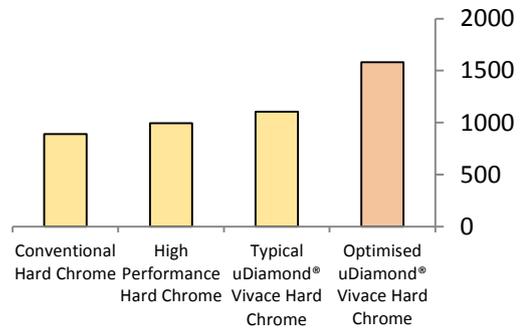
Carbodeon uses unique NanoDiamond processing technology to bring you the highest level of purity, particle size control and surface chemistry options on the market. These materials are served to you alongside expert knowledge in plating process and electrolyte preparation and multi sector industry experience.

How to Obtain uDiamond® Vivace

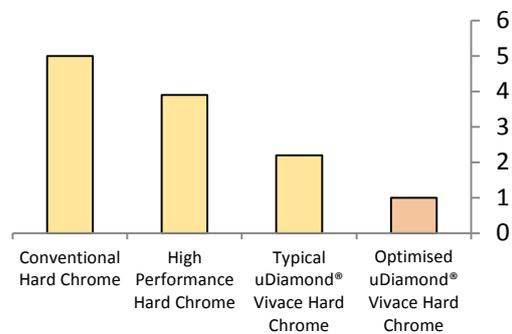
Available directly from Advanced Abrasives Corp, our North American distributor.

Subcontract plating is available through a worldwide network of subcontractors; contact us to find your nearest provider.

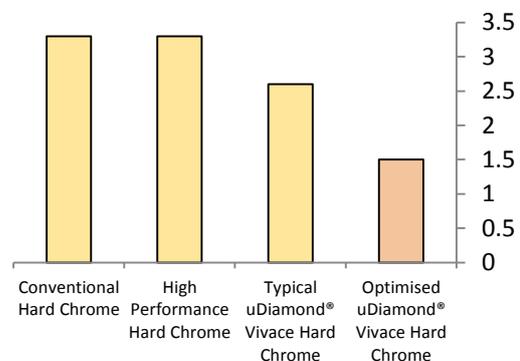
MicroHardness (Hv)



Wear Rate (weight loss%)



Corrosion Rate (g/m2.yr)



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