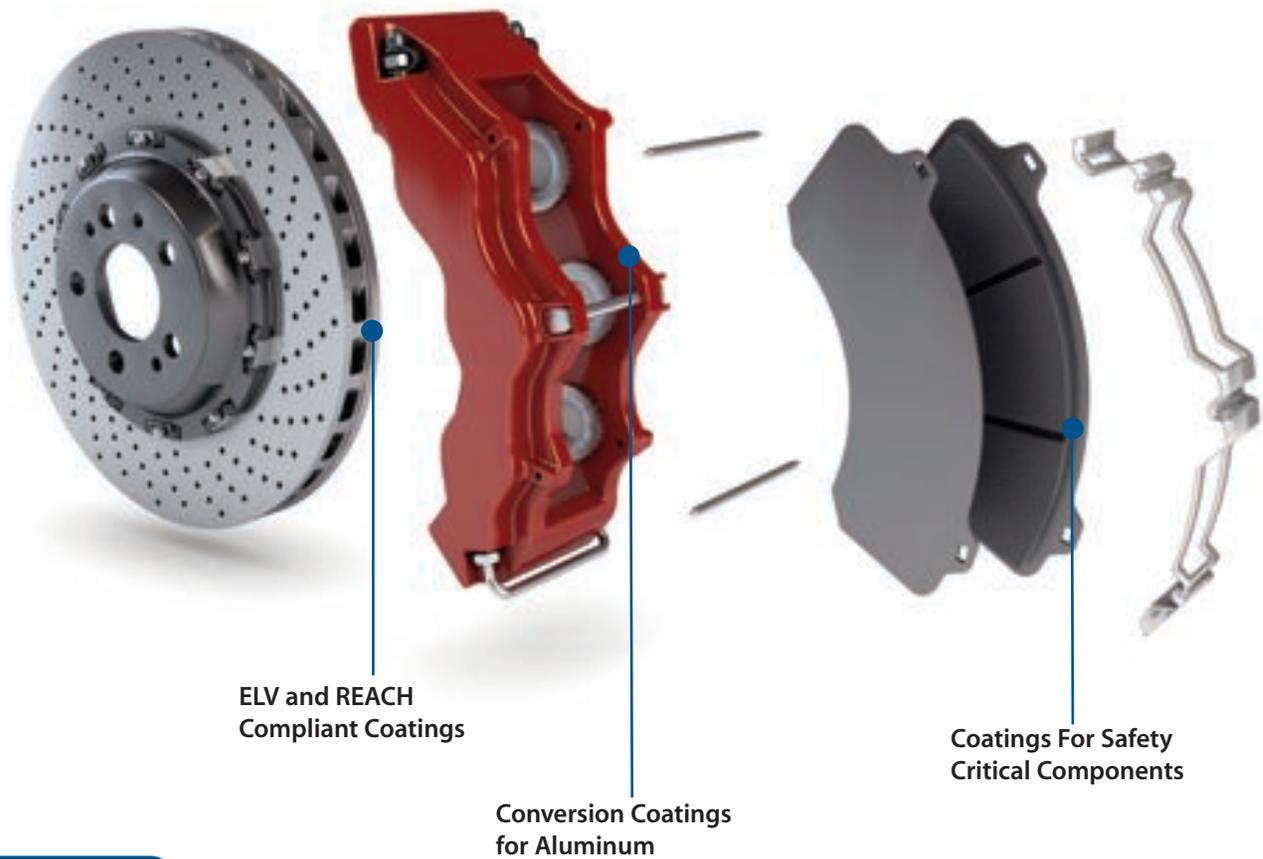


Brake Finishing

High Performance Coatings

ELV and REACH Compliant Coatings For Brake Applications



Key Features

- High Performance Zinc-Nickel Finishes
- Hexavalent Chromium and Cobalt-Free
- Globally Available



 **MacDermid**
Industrial Solutions
A Platform Specialty Products company

Anti-Corrosion Coatings

Ferrous metal corrosion (oxidation) is a chemical reaction between steel and oxygen, in the presence of water. Sacrificial coatings such as zinc and zinc-nickel are applied to the ferrous substrate to prevent this reaction. When the base iron is exposed it is cathodically protected by the zinc coating.

In a braking application, the deposit thickness is typically an average of 8µm. This provides both an exceptionally economic and corrosion resistant finish while respecting the dimensional tolerance of thread and small diameter holes.

MacDermid have a long history of providing automotive braking applications with high performance coatings. These include components such as cast iron calipers, fluid transfer tubes and fasteners in less demanding requirements.



The choice of zinc plating process will depend on the specific application and corrosion resistance required. Where exceptional corrosion resistance of more than 1000 hours to base metal corrosion and minimal white corrosion products is required, zinc-nickel is the #1 choice.



Brake Calipers are processed in our **Kenlevel Ni** acid zinc-nickel. **Fluid Transfer tubes**, often subject to post-plate deformation, are treated in our ductile **Enviralloy Niflex 12** alkaline system. **Enviralloy Ni 12-15** is recommended for all types of **fasteners**. If the requirement is for 480 hours to base metal corrosion, **Kenlevel** acid zinc is recommended for cast iron and **Envirozin** alkaline zinc for fasteners.

Both zinc-nickel and zinc deposit corrosion resistance is enhanced by our trivalent chromium and cobalt-free **TriPass ELV** passivates. Finally the brake fluid compatible **HydroKlad SI** Sealer (non-lubricated applications) and **Torque 'N' Tension** dry film lubricants complete these ELV and REACH compliant coatings.



Engineering Coatings

Electroless Nickel

With the continued concerns about the use of hexavalent chromium for brake piston coatings, MacDermid offer our hexavalent chromium-free, ELV compliant electroless nickel processes. These meet the application requirements for hardness of 650-700 HV, brake fluid compatibility and a neutral salt spray resistance of 12 hours.

Elnic 101 is a high phosphorus deposit which gives the maximum corrosion resistance possible from an electroless nickel coating. Where a design engineer needs to achieve the best wear resistance, **NiKlad ELV 835** medium phosphorous electroless nickel is recommended.

Conversion Coatings

Increasing concerns over the health and ecological effects of hexavalent-chromium have inspired the development of chromium-free coatings for protection of aluminum. **Iridite NCP** offers corrosion resistance that is equal to hexavalent chromates on most aluminium alloys.

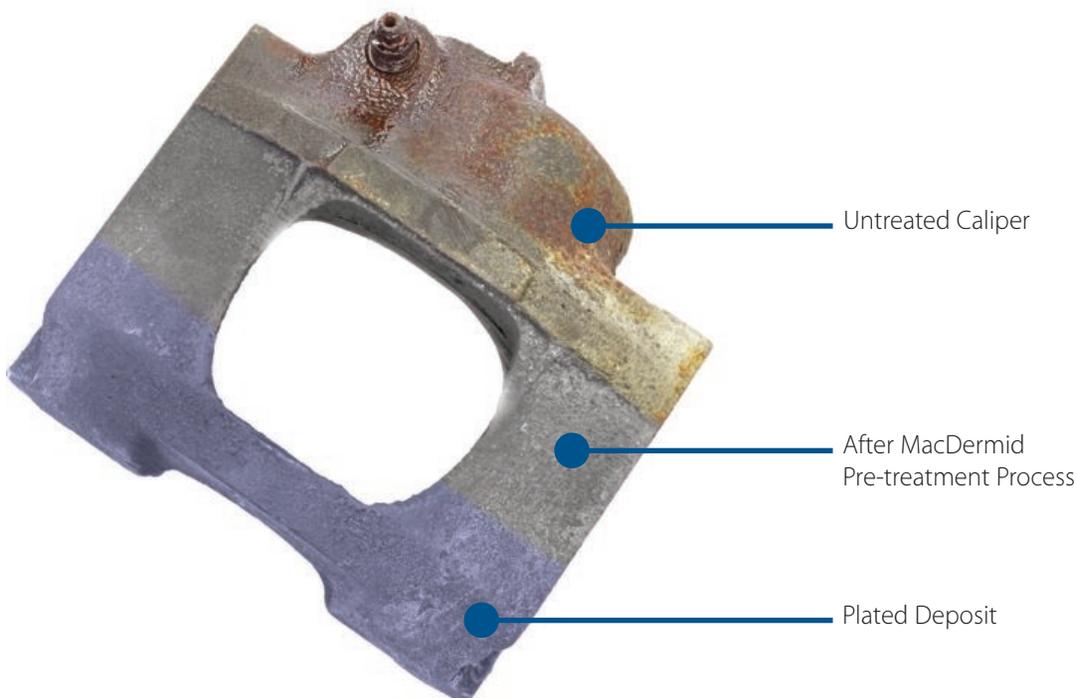
The coating can be used as a final finish and can also serve as a base for paints, high performance topcoats, powder paints, lacquers, or as a base for rubber bonding.

Iridite NCP does not contain lead, cadmium, chromium(hexavalent or trivalent), Mercury or PBB / PBDE compounds. It also meets ELV, RoHS and WEEE directives.

Surface Preparation for Cast Iron

Removing oils, oxidation and carbon residue is a critical stage in achieving the desired corrosion resistance. In particular, failure to remove all the carbon smut from a caliper surface can result in un-plated areas.

MacDermid **Metex** pre-treatment systems have been designed to leave a clean active surface which will allow immediate initiation of the plated deposit. The first stages remove oils from the porous substrate. After removing surface oxides, the next stage ensures the surface is smut-free with our **Isoprep** ultrasonic alkaline cleaners. The surface can now be activated and electroplated.



ZinKlad

Advanced Technologies For Protection And Performance

ZinKlad is the premier global auditing program to support hexavalent chromium-free zinc based automotive coatings. MacDermid ZinKlad coatings are proven in automotive applications for over 15 years. In that time, the steady evolution of the ZinKlad program has enabled many global OEM's and Tier 1 suppliers to specify higher standards than they had previously achieved.

Today ZinKlad represents not only the best method for achieving hexavalent chromium-free performance coatings, but also:

- Approved Applicators:**  Applying these products to a common audited standard ensures the same coating performance throughout the applicator base.
- High Performance:**  Exceeding corrosion resistance of previous hexavalent chromate systems and exceptionally consistent torque and tension characteristics.
- Global Consistency:**  Wherever ZinKlad coatings are applied, applicators know they are using the same high performance products.

ZinKlad Brake 240 is zinc based, hexavalent chromium and cobalt-free coating. It has been specifically developed to meet the automotive requirements for corrosion resistance on brake castings and assemblies. The coating is fully compliant with both ELV and REACH regulations. **ZinKlad Brake 240** is a 'drop in' process suitable for most zinc electroplating lines. It is recommended where the corrosion resistant requirements are 120 hours to first white corrosion and 480 hours to first red corrosion.

ZinKlad Brake 1000 is the low thickness / high performance coating for automotive cast iron calipers and assemblies. It is based on a single layer 8um zinc-nickel coating and is hexavalent chromium and cobalt-free. The deposit has exceptional corrosion resistance and a hardness above 400 HVN. The coating is fully compliant with both ELV and REACH regulations. **ZinKlad Brake 1000** is a 'drop in' process suitable for most zinc electroplating lines. It is recommended where the corrosion resistant requirements are 240 hours to first white corrosion and 1200 hours to first red corrosion.

It takes more than innovative, high performance products and superior technical service to help our customers compete and win in today's global marketplace. It takes a total commitment to understanding their needs and the ability to provide the right solutions—every time.

When success is your only goal, trust MacDermid.



For more information, please contact us at:

Email: prodinfo@macdermid.com

www.zinklad.com

www.macdermid.com/industrial