Pioneer
METAL FINISHING

TECHNICAL BULLETIN

Conversion Coatings Environmental, Specification and Performance Updates
Pioneer's ELV Conversion CoatingTM offers exceptional corrosion protection

- Conversion coatings (sometimes referred to as "iridite", "alodine", "chromate" or "chemical films") are non-decorative coatings applied to aluminum parts to achieve a thin, electrically conductive coating that will provide corrosion resistance.
- Conversion coatings are also a great base coating for aluminum parts that require painting, as it will aid in the adhesion of the paint to the aluminum.
- If you produce parts for the automotive industry, telecommunications, consumer electronics, or household appliances, you must request a non-hexavalent chromium conversion coating. Hexavalent chromium is banned from parts used in these industries per the new environmental directives: **ELV (End of Life Vehicle)**; **RoHS (Reduction of Hazardous Substance)** and **WEEE (Waste Electrical and Electronic Equipment).** These directives eliminate the use of heavy metals, specifically hexavalent chromium, lead, cadmium and mercury.

Traditional hexavalent yellow chromate (shown above) does not comply with the ELV, RoHS or WEEE environmental directives.

In 2006, the military specification, Mil-C5541 for conversion coatings, was updated to address these directives and now calls out traditional hexavalent chromate and the non-hexavalent chromate:

Mil-DTL-5541 Revision F

- Type I compositions containing hexavalent chromium
- Type II compositions containing no hexavalent chromium

Customers needing traditional chromate need to specify 'Type I'.
Customers needing a conversion coating to meet the environmental directives need to specify 'Type II'.

Pioneer Metal Finishing's Type II conversion coating, ***ELV Conversion Coating™*** is the result of our own extensive research and development. We formulated ELV Conversion Coating™ utilizing a trivalent chromium base (compliant to all the environmental directives) and provide performance characteristics beyond traditional chromates. ELV Conversion Coating™ is generally faint blue to tan and iridescent depending upon alloy.

Traditional hexavalent chromate coatings will range in color from clear to dark yellow, depending on the immersion time in the chromate bath. The conversion coating is soft, but will aid in overall corrosion resistance. Generally, the darker colored hexavalent conversion coatings provide the best corrosion resistance. The protection level will vary, depending on the alloy and surface finish of the aluminum.

The standard for passing the corrosion resistance test for MIL-DTL-5541 is 168 hours of salt spray exposure before showing minimal pitting. This includes 2024-T3 aluminum. The traditional clear hexavalent chromate will generally not provide this level of salt spray resistance, regardless of the alloy of aluminum.

As our test data shows, Pioneer's ***ELV Conversion Coating™*** offers superior performance over traditional chromates:

Process	*6061 Alloy Salt Spray Test Hours*	*2024 Alloy Salt Spray Test Hours*	*Die Cast Alloy Salt Spray Test Hours*	*6061 Alloy Paint Adhesion Wet Tape Test*
Pioneer Metal Finishing's ***ELV Conversion Coating™***	***>1500***	***168***	***100***	***Pass***
Traditional hexavalent chromate dark yellow color	***450***	***168***	***48***	***Pass***
Traditional hexavalent chromate light yellow color	***450***	***80***	***<24***	***Pass***
Traditional hexavalent chromate clear color	***200***	***48***	***<24***	***Fail***