CERAKOTE

Rifles

Pistols

Shotguns

Other Items

Cerakoting? What is it and is it Metal Finishing?

- Cerakote is a Brand of coating that it's primarily application has been in the use of coatings firearms.
- Cerakote company– Supplier of coatings and also certifies the training of application of their coatings.
- Cerakote claims to be "The Industry Leading Thin-Film Ceramic **Coating**."

Metal Finishing 6 Core Processes

1. Electroplating

2. Electroless Plating

3. Anodizing

4. Coating (Chromating, Phosphating, and coloring)

5. Chemical Etching and Milling

6. Printed Circuit Board Manufacture

TABLE 3.1. METAL FINISHING CATEGORY UNIT OPERATIONS

Unit Operations	Summary Description of Unit Operations
1. Electroplating	The production of a thin surface coating of one metal upon another by electrodeposition. Ferrous or nonferrous basis materials may be coated by a variety of common (copper, nickel, lead, chromium, brass, bronze, zinc, tin, cadmium, iron, aluminum or combinations thereof) or precious (gold, silver, platinum, osmium, iridium, palladium, rhodium, indium, ruthenium, or combinations thereof) metals. In electroplating, metal ions supplied by the dissolution of metal from anodes or other pieces, are reduced on the work pieces (cathodes) while in either acid, alkaline, or neutral solutions.
2. Electroless Plating	The chemical deposition of a metal coating on a workpiece by immersion in an appropriate plating solution in which electricity is not involved. Copper and nickel electroless plating for printed circuit boards are the most common operations. Immersion plating, which for purposes of the Metal Finishing regulation is considered part of electroless plating, produces a metal deposit by chemical displacement.
3. Anodizing	An electrochemical process which converts the metal surface to a coating of an insoluble oxide. Aluminum is the most frequently anodized material. The formation of the oxide occurs when the parts are made anodic in dilute sulfuric or chromic acid solutions. The oxide layer begins formation at the extreme outer surface, and as the reaction proceeds, the oxide grows into the metal.
4. Coatings	Any operation that includes chromating, phosphating, metal coloring and passivating. In chromating, a portion of the base metal is converted to a component of the protective film formed by the coating solutions containing hexavalent chromium and active organic or inorganic compounds. Phosphate coatings are formed by the immersion of steel, iron, or zinc plated steel in a dilute solution of phosphoric acid plus other reagents to condition the surfaces for further processing. Metal coloring involves the chemical method of converting the metal surface into an oxide or similar metallic compound to produce a decorative finish. Passivating is the process of forming a protective film on metals by immersion in an acid solution, usually nitric acid or nitric acid with sodium dichromate.
5. Etching and Chemical Milling	These operations are used to produce specific design configurations or surface appearances on parts by controlled dissolution with chemical reagents or etchants. Chemical etching is the same process as chemical milling except the rates and depths of metal removal are usually much greater in chemical milling.
6. Printed Circuit Board Manufacturing	This operation involves the formation of a circuit pattern of conductive metal (usually copper) on nonconductive board materials such as plastic

Coatings

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Several Different Products

Cerakote Elite	V-Series
C-Series	W-Series
CL-Series	Chromex Coatings
MC-Series	PC-Series
H-Series	P-Series
Elite Series	

P-Series

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas #	Perc.	Chemical Name
64175	5-10%	Ethanol
78933	30-40%	Methyl ethyl ketone (MEK)
	10-30%	Organic Thermosetting Resin
71363	30-35%	n-Butyl alcohol
9002-84-0	0-30%	Polytetrafluoroethylene
7782-42-5	0-30%	Graphite

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as significantly hazardous to health or the environment and hence require reporting in this section.

W-Series

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredients:

Cas #	Percentage	Chemical Name
1333-82-0	5-10%	Chromium (VI)trioxide, anhydrous
7429-90-5	30-50%	Aluminum (fume or dust)
14808-60-7	0-10%	Silica, crystalline
7631-86-9	1-2%	Silica, amorphous
1344-28-1	2-3%	Aluminum oxide (Al2O3)
7664-38-2	10-35%	Phosphoric acid
	<10%	Phosphoric acid, reaction products with aluminum hydroxide and chromium oxide.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as significantly hazardous to health or the environment and hence require reporting in this section.

COATING

Several types of conversion coating operations such as phosphating, chromating, coloring, and passivating contribute pollutants to raw waste streams. These pollutants may enter the waste stream through rinsing after coating operations and batch dumping of process baths. Coating process baths usually contain metal salts, acids, bases, and dissolved basis materials and various additives.

The phosphates of zinc, iron, manganese, nickel, and calcium are most often used for phosphate coatings. Strontium and cadmium phosphates are used in some baths, and the elements aluminum, chromium, fluorine, boron, and silicon are also common bath constituents. Phosphoric acid is used as the solvent in phosphating solutions.

Coloring can be done with a large variety of solutions. Several metals may be contributed to the waste stream by coloring operations, among them copper, nickel, lead, iron, zinc and arsenic. Passivation can be done in a nitric acid solution (for stainless steel) or a caustic solution (for copper). In both cases, dissolved basis materials enter the wastewater.

There are a number of conversion coating processes which utilize chromium-containing solutions. These include chromating, black oxidizing and sealing rinses. Chromating baths are usually proprietary solutions which contain concentrated chromic acid and active organic or inorganic compounds (even cyanide in some instances). Both hexavalent and trivalent chromium will be found in chromate conversion coating baths and in the rinses associated with them. Black oxidizing is done in solutions containing dichromate while sealing rinses used extensively following phosphating are usually made up of very dilute chromic acid. Any of these conversion coating operations will also contribute small amounts of basis material to their respective wastewater streams.

The wastewater contribution of conversion coating operations is as follows:

Common metals - Phosphating, nitric acid or caustic passivation, coloring.

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Not regulated under Metal Finishing

- Cerakote Elite – Polymer/Ceramic
- C-Series – Resin/Ceramic
- CL Series – Resin/Ceramic
- H Series – Resin/Ceramic
- Elite Series – Metal-modified Organic base
- MC Series - Resin
- P-Series – Resin
- PC Series - Resin
- V-Series – Resin/Ceramic

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Glacier Chrome (W-400)	Phosphoric Acid solution
W-Series	Phosphoric acid Chromium (VI) trioxide Aluminum oxide
Chromex Coatings	Aluminum Phosphate Chromate Phosphoric acid solution

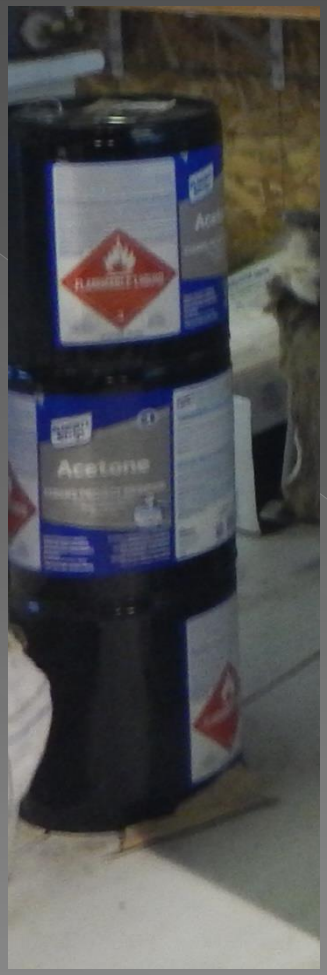
Other Concerns

- Preparation processes

Sand Blasting

Dip Tanks

Chemicals



Spray Booth

Why be concerned?

3. COMPOSITION & INGREDIENT INFORMATION

CHEMICAL NAME(S)	CAS No.	RTECS No.	EINECS No.	%	EXPOSURE LIMITS IN AIR (mg/m³) ACGIH ppm TLV	ACGIH ppm STEL	NOHSC ppm ES-TWA	NOHSC ppm ES-STEL	NOHSC ppm ES-PEAK	OSHA ppm TLV	OSHA ppm STEL	OSHA ppm IDLH	OTHER
WATER	7732-18-5	ZC0110000	231-791-2	60-100	NE	NE	NF	NF	NF	NE	NE	NE	
SELENIOUS ACID	7783-00-8	VS7175000	231-974-7	1-5	(0.2)	NA	(0.2)	NF	NF	(0.2)	NA	NA	
	Acute Tox. 3; Acute Tox. 3; Aquatic Acute 1; Aquatic Chronic; H301, H331, H400, H410												
NITRIC ACID	7697-37-2	QU5775000	231-714-2	1-5	2	4	2	4	NF	2	NA	25	
	Ox. Liq. 3; Skin Corr. 1A; H272, H314												
CUPRIC NITRATE	10031-43-3	NA	221-838-5	1-3	1	NA	NF	NF	NF	1	NA	NA	
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2; H302, H315, H319												
CUPRIC PHOSPHATE	7798-23-4	GI7875000	232-254-5	1-3	1	NA	NF	NF	NF	1	NA	NA	
	Aquatic Chronic 3; H412												

9. PHYSICAL & CHEMICAL PROPERTIES

9.1	Appearance:	Clear liquid
9.2	Odor:	Odorless
9.3	Odor Threshold:	0.29 to 0.98 ppm (Nitric Acid)
9.4	pH:	1.0
9.5	Melting Point/Freezing Point:	NA
9.6	Initial Boiling Point/Boiling Range:	> 100 °C (> 214 °F)
9.7	Flashpoint:	NA
9.8	Upper/Lower Flammability Limits:	NA
9.9	Vapor Pressure:	NA
9.10	Vapor Density:	< 1.0 (air = 1.0)
9.11	Relative Density:	1.080
9.12	Solubility:	Soluble
9.13	Partition Coefficient (log P_{ow}):	NA
9.14	Autoignition Temperature:	NA
9.15	Decomposition Temperature:	NA
9.16	Viscosity:	NA
9.17	Other Information:	Evaporation Rate: < 1.0 (ethyl ether = 1.0)

Certified Applicator Operations Issues

- Most applicators want to do the right thing but do not know they have regulations.
- Chemical suppliers do not tell them about Environmental requirements.
- Applicators do not look at their Safety Data Sheets(SDS).

In Conclusion

Learn the trade names or process names such as:

- Alodine
- Bluing
- Cerakote

Use suppliers websites to identify applicators

QUESTIONS?

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Photos Courtesy of Robin Sage Coatings

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