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COMMON PLATING SPECIFICATIONS

Process	Specification	Thickness	Comments	Process	Specification	Thickness	Comments
ANODIZING, CHROMIC ACID Primarily used for corrosion protection. Color will vary from light to dark gray. It is not readily dyed. The coating is very thin and will scratch easily. It is mainly used in the aircraft industry.	MIL-A-8625F	Chromic Acid 0.000050" typical thickness	Parts will be sealed in sodium dichromate unless otherwise requested.	BRASS A decorative coating which can be bright, satin, brushed or antiqued.			Parts will be lacquered unless the customer specifies otherwise.
	Type I		Colors and thicknesses dependant on aluminum alloy.				Typically plated on a nickel undercoating.
	Class 1		undyed	CADMIUM Silvery white metal used for its corrosion resistance, lubricity, or conductivity. Supplementary treatments for Type II can be golden iridescent, amber, black, olive drab. Parts with hardness greater than Rc 35 usually need a stress relief and/or hydrogen embrittlement relief.	AMS-QQ-P-416B		No supplementary treatment
	Class 2		dyed - Process not available.				Type I
ANODIZING, SULFURIC ACID Primarily used for corrosion protection, but it is also used as a decorative finish. It is readily dyed. Adds abrasion resistance and is an electrical insulator.	MIL-A-8625F	Sulfuric Acid 0.0005" thickness 0.00025" buildup	Parts will be sealed in nickel acetate unless otherwise requested.	Type II	Type III		Supplementary Phosphate treatment
	Type II		Popular dyes - black, blue, red, purple, gold, green, brown.				Excellent for plating stainless steels that are to be used in conjunction with aluminum to prevent galvanic corrosion..
	Class 1		Colors and thicknesses will vary according to aluminum alloy.	Class 1	Class 2	Class 3	Corrosion resistance is very good especially with Type II finish.
	Class 2		Aluminum bright dip is available.				0.0005" min
HARD ANODIZE Primarily used for abrasion resistance. Color will vary from light gray to black depending on the alloy and the thickness. Can be dyed black if required. Good dielectric properties. Do not seal coatings where main function is to obtain maximum abrasion or wear resistance.	MIL-A-8625F	Typical thickness 0.002" Buildup is typically 0.001"	For maximum abrasion resistance the hard anodize should not be sealed. If the part is dyed, it will be sealed with nickel acetate.	CHEM FILM Also known as Alodine®, Iridite® or Chemical Conversion coating on Aluminum. A surface treatment which enhances corrosion resistance on aluminum and it works well as a paint base. It is often used when corrosion resistance and conductivity is required on aluminum.	MIL-DTL-5541F	No build-up	Contains hexavalent Chromium
	Type III		Colors and thicknesses will vary according to aluminum alloy.				Contains no hexavalent chromium
	Class 1		not dyed or pigmented.	Class 1a	Class 3		Corrosion Resistance
	Class 2		dyed - only black available				Low Resistivity
BLACK OXIDE COATING A black surface treatment for ferrous metals. Only very limited corrosion protection under mild corrosive conditions.	AMS 2485K	No dimensional change	For moving parts which cannot tolerate the dimensional change of a more corrosive resistant finish. For decorative applications or reduction of light reflections.				The coating will be an iridescent yellow unless specified as clear.
	MIL-C-13924D		Hard Anodize can be impregnated with Teflon for a slicker finish.				RoHS compliant material is available
Black Oxide coatings should normally be given a supplementary treatment to enhance corrosion resistance (i.e. oil, wax, lacquer.)	Class 1		Alkaline oxidizing. For wrought iron, plain carbon, and low alloy steels.	CHROME Excellent hardness, (Rc68-74) wear resistance and erosion resistance. Has low coefficient of friction, and resistant to heat. In addition to the above properties, can be rendered porous for lubrication purposes.	AMS 2460		Bright
	Class 2		Alkaline chromate. Process not available at QP.				Type I
	Class 3		Fused salt oxidizing.. Process not available at QP.	Class 1	Class 2		Corrosion protecting plating with nickel undercoating
	Class 4		Alkaline oxidizing. For corrosion resistant steels.				Type II
							Plated to specified dimensions or processed to specified dimensions after plating

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COPPER Matte to a very shiny finish.. Good corrosion resistance when used as an undercoat. As a decorative finish it can be bright, satin or antiqued. Other uses include undercoating and a shield for carburizing.	AMS 2418G			NICKEL Nickel is a very versatile plating which is used for functional and decorative purposes. It is used for corrosion protection, hardness, solderability, adhesion and decoration.	AMS 2403L AMS 2423D AMS 2424E		General Hard Nickel Deposit Sulfamate Nickel Corrosion resistance plating Engineering plating Nickel has a low coefficient of thermal expansion.
	Type 1	0.0005" - 0.0007" or as specified	Engineering				
	Type 2	0.002" nominal	Plating for masking for heat treatment stop-off. For carburizing decarburizing shield also used to prevent basis metal migration into tin (prevents poisoning solderability)				
DOW PROCESSES #1 A chrome pickle for magnesium.. Color varies from matte gray to yellow-red. #7 A chromate treatment for magnesium..	AMS-M-3171			Passivation of Stainless Steel Three fold purpose of passivating is to clean, remove free iron from surface and promote growth of nickel and chrome oxides.	ASTM A380-06 ASTM A967-05 AMS 2700C	No dimensional change	There are many variations in these three specifications. High iron stainless steels (ie 400 series) can be etched depending on heat treatment
	Type I	Removes metal. About 0.0006" for wrought-less for die castings)	Used mainly for protecting magnesium during shipment, storage and machining. Can be used as a paint base. NOTE: Must remove Type I coating before applying Type III treatments. Good paint base and protective qualities for all magnesium alloys				
	Type III	No dimensional change	Color varies from light brown to dark brown depending on alloy.	PHOSPHATE COATING: LIGHT Intended as a general purpose pretreatment prior to painting. HEAVY Grey to black in color. Intended as a base for holding/retaining supplemental coatings which provide the major portion of the corrosion resistance.	TT-C-490E Type I Type V MIL-DTL-16232G Type M Type Z	Difficult to measure because of soft crystalline structure	Light coating used as a paint base. 300 - 500 mg/sq ft 500 - 1,100 mg/sq ft manganese phosphate zinc phosphate These specifications require pre-production approvals before processing production parts
ELECTROLESS NICKEL Use when hard and smooth surfaces are required on coated parts. Excellent uniform deposits are produced on irregular parts for corrosion protection and abrasion resistance.	AMS 2404F			SILVER White matte to a very bright in appearance. Good corrosion resistance depending on base metal. Will tarnish easily.	AMS 2412G ASTM B700-08		
	Class 1		As Coated		Type I Type II Type III		
	Class 2		Heat treated to obtain required hardness. May be used on all metals not affected by heating to 500°F and above.	Grade A Grade B Grade C Grade D			Matte Bright, chemical Bright, mechanical Semi-bright
	Class 3		Thermal treatment on non-heat treatable aluminum alloys to improve adhesion	Class S Class N			Anti-tarnish post treatment No post treatment.
	Class 4		Thermal Treatment on heat treatable aluminum alloys to improve adhesion				
	(Grade A) (Grade B) (Grade C)	0.001" min.. 0.0005" min. 0.0015" min	RoHS compliant material is available.				
GOLD Matte to bright finish depending on basis metal. Good corrosive resistance, and has high tarnish resistance. Provides a low contact resistance, and is a good conductor. Has excellent solderability. * check with us	MIL-DTL-45204D			TIN₂ BRIGHT ACID Color is grey-white in a plated condition. Corrosion resistance is good. Solderability is excellent. Tin is not good for low temperature applications..	ASTM B545-97(2004)		
	Type I Type II Type III		99.7% gold minimum 99.0% gold minimum 99.9% gold minimum				
	Grade A Grade B Grade C Grade D*		90 Knoop maximum 91-129 Knoop 130-200 Knoop 201 Knoop and over				
	Class 00 Class 0 Class 1 Class 2* Class 3* Class 4* Class 5* Class 6*	0.00002" 0.00003" 0.00005" 0.00010" 0.00020" 0.00030" 0.00050" 0.00150"				0.0003" min or as specified	

Process	Specification	Thickness	Comments
ZINC A gray metal primarily used as a corrosion preventative on steel. Sacrificial coating can improve its corrosion resistance by applying a chromate after plating. Used commonly on threads and sheet metal.	ASTM B633-07		
	Type I		as plated without supplementary treatment
	Type II		With colored chromate conversion coating
	Type III		With colorless chromate conversion coating
	Type IV		With phosphate conversion coating
SC 1		0.0002" min	
SC2		0.0003" min	
SC3		0.0005" min	Chromate colors yellow, black, olive drab
SC4		0.001" min	
			RoHS compliant chromates are available