

3M Science.
Applied to Life.™

3M Extreme Masking Solutions
Reliability • Performance • Productivity

3M Extreme Masking tapes for Anodizing

Tapes that can take it.


Heat. Chemicals. Pressure. Abrasion.

The reality is, a lot of masking tapes just can't cut it in harsh environments when you really need them to perform.

That's where 3M Extreme Masking Solutions come in. Each tape is specifically designed and tested to perform in the harshest conditions required for each application. From anodizing to electroplating and composite bonding to heat deflection, we have the tapes to get the job done.

3M Extreme Masking Solutions

Reliability • Performance • Productivity

The background of the slide is a photograph of an industrial facility, likely an anodizing plant, with complex metal structures, pipes, and scaffolding. A large, vibrant red triangle is superimposed on the left side of the image, pointing towards the right. The text is placed within this red area.

When you've been making masking tape for over 100 years, you learn a lot. Like how the industries that rely on them are constantly changing with new technologies, techniques and challenges. Which is why tapes from 3M Extreme Masking Solutions have evolved right along side—or sometimes ahead of—industry trends and needs.

3M Extreme Masking Solutions:

Reliability

These tapes work consistently time and time again. We invented the masking tape category and have been working to perfect it for 100+ years.

Performance

These tapes are specifically designed for the unique challenges and conditions of the harshest applications.

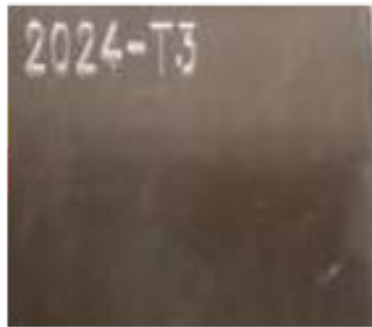
Productivity

Less mess. Less waste. More parts finished on time and on budget. This arsenal of tapes provides the ultimate edge.

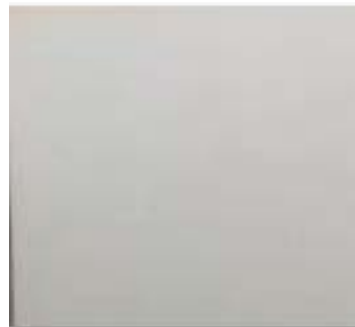
What is anodizing?

As defined by the Aluminum Anodizers Council, anodizing is an electrochemical process that converts a metal surface into a decorative, durable, corrosion-resistant, anodic oxide finish.

Aluminum is ideally suited to anodizing, although magnesium and titanium also can be anodized. Anodizing can be used as a final finish or as a durable primer layer.



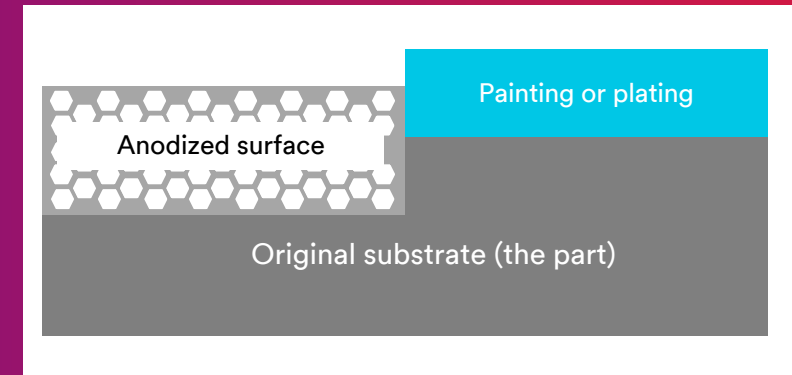
Bare aluminum



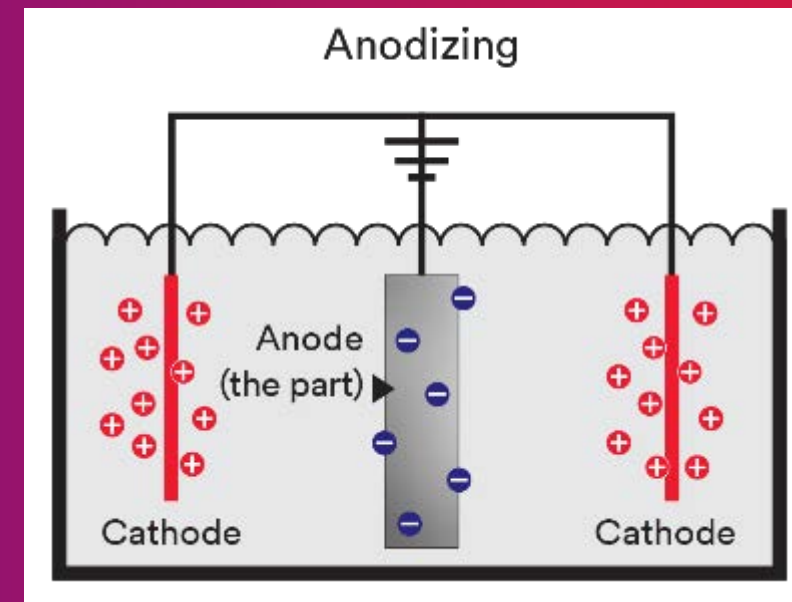
Anodized aluminum

Benefits

- ▶ Hard, abrasion resistant surface that will not peel or chip
- ▶ Electrically insulates
- ▶ Avoids thickness of painting and plating process
- ▶ Color can be embedded for decorative purposes



Anodizing vs. other treatments
Unlike other surface treatments, anodization converts the surface rather than bonding to the top.



After being cleaned and prepared, **parts are dipped into an acid bath where current is applied, converting the surface into an oxide finish.**

There are three common types of anodization processes.

3M has products for all three processes.






Type I — Chromic	Type II — “Regular”	Type III — “Hardcoat”
Summary		
<ul style="list-style-type: none">▶ Chromic acid at 95°F ramping from ~5V up to 40V at 5 to 7V/min▶ Very thin coating of 0.05 to 0.2 mils▶ Minimal impact on fatigue strength of components▶ Excellent corrosion resistance	<ul style="list-style-type: none">▶ Sulfuric acid at room temperature, 10 to 20 Volts▶ Coating of 0.1 to 0.8 mils▶ Harder finish than chromic▶ Clear finish can be dyed▶ Inexpensive	<ul style="list-style-type: none">▶ Sulfuric acid at 0°F to 32°F and up to 90V▶ Coating of up to 2 mils▶ Extreme corrosion resistance and durability▶ Can repair worn surfaces
Typical Uses		
Metalworking components typically for aerospace industry	Optical components	Engine internal parts (e.g. cams, pistons)
Precision machine components	Hydraulic valve bodies	Sliding parts
Welded components/assemblies	Military weapons	Hinge mechanism
As a paint or primer base	Computer and electronic enclosures	Blast shields
	Mechanical hardware	



Note: Several other types of acids are used for anodizing such as oxalic, boric and phosphoric as well as special mixes of the acids together.

3M Extreme Masking Solutions by bath chemistry.

You may have areas on their parts that they don't want anodized. Tapes, liquids and plugs are typically used as masking solutions. Here are our lead tapes by bath.

Chemical Bath Type	Product	Color	Adhesive	Backing	Total Tape Thickness	Features
Boric Sulfuric Acid Phosphoric Acid, Sulfuric & Hardcoat Acid, Tartaric Sulfuric Acid	 3M™ Polyester Tape 8992/8992L	Translucent Green	Silicone	Polyester	Tape 8992: 3.2 mils (0.082 mm) Tape 8992L: lined version of 8992	Lead product choice: listed on multiple OEM specs
Boric Sulfuric Acid Phosphoric Acid, Sulfuric & Hardcoat Acid, Tartaric Sulfuric Acid	 3M™ Vinyl Tape 471/4712	Multiple Colors	Rubber	Vinyl	Tape 471: 5.2 mils (0.13 mm) Tape 4712: lined version of 471	Non-silicone; conformable
Boric Sulfuric Acid Phosphoric Acid, Sulfuric & Hardcoat Acid, Tartaric Sulfuric Acid	 3M™ Lead Foil Tape 420/421	Dark Silver	Rubber	Lead Foil	Tape 420: lined version of 421 Tape 421: 6.3 mils (0.16 mm)	Non-silicone; conformable
Boric Sulfuric Acid Phosphoric Acid, Sulfuric & Hardcoat Acid, Tartaric Sulfuric Acid	 3M™ Aluminum Foil Tape 425/427	Shiny Silver	Acrylic	Dead Soft Aluminum	Tape 425: 4.6 mils (0.12 mm) Tape 427: lined version of 425	Non-silicone; conformable
Chromic Acid	 3M™ Anodizing Masking Tape 8985L	Translucent Purple	Rubber	Polyester	4.0 mils (0.10 mm) lined	Non-silicone

Type I Chromic Acid Anodizing

results in the thinnest anodic surface. While thin, when properly sealed, chromic acid affords equal corrosion protection to the thicker types.

CAA goes by several names:

- ▶ Type I anodization
- ▶ Chromic [acid] anodization
- ▶ Chromic [acid] conversion

Chromic acid is the harshest of anodization processes and anodizers have long had issues with masking tape performance as nearly all competitive masking tapes fail in chromic acid anodization.

- ▶ Leave adhesive residue
- ▶ Tape edge leakage
- ▶ Tape pulls away or falls off



Other anodizing masking tapes are prone to leakage in harsh chromic acid baths

For chromic acid anodization, masking liquids have met their match.

3M™ Anodizing Masking Tape 8985L

3M™ Anodizing Masking Tape 8985L features excellent masking lines, lean one-piece removal and no curing time. Eliminate the pain of messy chemicals and unpleasant odors in your process with a masking tape that can take on extreme conditions and harsh environments.

- ▶ Designed to work with or without chemical film on a variety of aluminum alloys
- ▶ Transparent colored tape with printed backing is highly visible for fast positioning and removal
- ▶ Lined for easy die-cutting



Survives chromic acid with excellent masking lines and clean easy removal with a non-silicone adhesive.



Productivity | Mask and de-mask up to 5x faster¹ than liquids. Eliminate rework, extreme leakage or scrapped parts with excellent masking lines and clean, easy removal.

Reliability | Get consistency and peace of mind with a non-silicone tape that won't introduce residue or contamination in their bath or later in production.

Performance | Replace messy, labor-intensive liquids with a reliable tape solution that's built specifically for chemical resistance to chromic acid.

¹Up to 5x faster to apply and remove than liquid masking. 3M internal data.

Product	Color	Adhesive	Backing	Total Tape Thickness	Chemical Bath Type
8985L	Translucent Purple	Rubber	Polyester	4.0 mils (0.10 mm)	Chromic Acid

Size	3M Stock #	Previous 3M Stock #
2,54 cm x 65,8 m	7100207280	70007540340
5,08 cm x 65,8 m	7100207277	70007540365
30,48 cm x 65,8 m	7100207284	70007540373
60,96 cm x 65,8 m	7100211808	70007540381

Size	SAP	3M ID	
121,92 cm x 65,8 m	7100207286	70007540399	
Contact us for other sizes			
Sample sizes	2,54 cm x 2,7 m	7100206814	70007540019

Tape vs. competitive liquid masking.

Both tapes and liquids are used to mask parts during the anodizing process. Tape is more efficient and easier to use than liquids.

3M Extreme Masking Solutions

- ▶ Quick and easy to apply
- ▶ Eliminates cure time
- ▶ No need for premasking step
- ▶ One-piece removal
- ▶ No fumes or nasty odor
- ▶ No special equipment needed

Liquid masking

- ▶ Some liquid maskants are applied hot and can burn workers
- ▶ Solvent based
- ▶ Wait up to 24 hours to cure
- ▶ Needs premasking step to assist with liquid masking placement
- ▶ Doesn't remove in one piece
- ▶ Messy; nasty odor
- ▶ May need special equipment (expensive or needs ongoing maintenance)



Die-cutting tape:

Can reduce labor time and associated costs

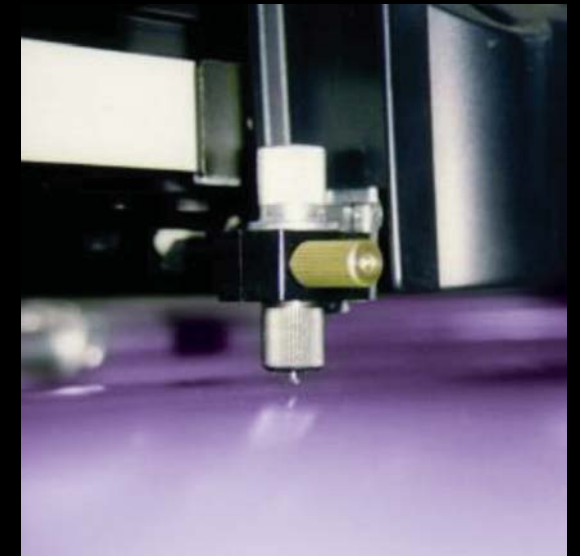
Reduces the number of masking steps

No messy chemicals or unpleasant odors

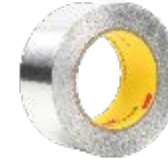
Eliminates curing time for masking

Reduces the need for solvents during removal

Most accounts you visit will have a plotter that they use to die-cut custom shapes for their jobs

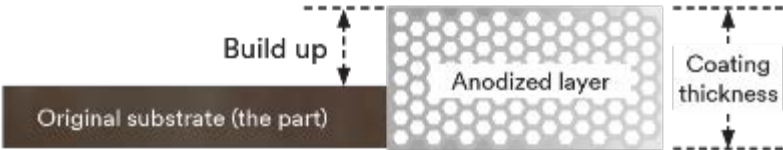


3M Extreme Masking Solutions



	3M™ Anodizing Masking Tape 8985L	3M™ Polyester Tape 8992/8992L	3M™ Vinyl Tape 471/4712	3M™ Aluminum Foil Tape 425/427	3M™ Lead Foil Tape 420/421
Acid	Chromic acid	Boric-sulfuric acid Phosphoric acid		Sulfuric & hardcoat acid	Tartaric sulfuric acid
Features	<ul style="list-style-type: none"> ▶ Engineered specifically for chemical resistance to chromic acid ▶ Minimizes leaking, reducing the need for part rework ▶ Designed to work with or without chemical film on a variety of aluminum alloys ▶ Transparent colored tape with printed backing is easy to see for fast, easy positioning and removal 	<ul style="list-style-type: none"> ▶ 8992 offers excellent chemical resistance to a variety of bath chemistries ▶ Best performance in broadest conditions ▶ Ability to see through tape for positioning and placement ▶ Good initial tack & holding strength, with one-piece clean removal from many surfaces 	<ul style="list-style-type: none"> ▶ Retains stretch without lifting to conform to uneven surfaces ▶ One-piece, clean removal from many surfaces ▶ Rubber adhesive provides holding strength on a variety of surfaces ▶ Consistent unwind throughout roll improves quality and efficiency of masking process 	<ul style="list-style-type: none"> ▶ Dead soft aluminum foil backing conforms to curved and uneven surfaces ▶ Resistant to chemicals to protect surfaces during chemical masking operations ▶ Heat and light reflective tape protects surfaces and enhances lighting efficiency 	<ul style="list-style-type: none"> ▶ Excellent conformability in a variety of application conditions ▶ Superior chemical resistance — resistant to caustic baths ▶ Rubber adhesive provides holding strength on a variety of surfaces ▶ Great line definition, clean removal from most surfaces
Adhesives	Non-silicone formulation helps reduce post-process coating and bonding failures	Silicone adhesive offers high heat resistance compared to many rubber and acrylic adhesives, reducing failure due to softening, oozing and adhesive transfer	Non-silicone adhesive minimizes the risk of silicone contamination in downstream processes such as paint	Highly engineered acrylic adhesive provides protection in harsh environment	Non-silicone adhesive minimizes the risk of silicone contamination in downstream processes such as paint
Liner	Lined for easy die-cutting	Available with liner (8992L) for die-cutting applications	Available with liner (4712) for printing and die-cutting applications	Available with liner (427) for printing and die-cutting applications	Lined for easy die-cutting
Temp	Temperature use range from 4°C to 93°C (40°F to 200°F)	Wide working temperature: -50°C (-60°F) to 204°C (400°F)	Temperature use range from 4°C to 77°C (40°F to 170°F)	Temperature use range from -54°C to 149°C (-65°F to 300°F)	Good thermal properties and will perform over a wide variety of temperature conditions (-54°C to 106°C or -60°F to 225°F)

Industry terms

Chem film	Chem film is a thin coating applied to a surface by spray, brush or immersion. It is commonly referred to as Alodine or Iridite. It enhances the corrosion resistance of a part, as well as acts like a primer for better adhesion for secondary coatings and masking performance.
Build up	Height of anodization layer above the surface of the original substrate. <div></div>

Coating thickness	Total thickness of anodization layer, above and below original surface
Conversion coat	A process by which a surface is chemically converted into a new surface, rather than a traditional coating, which is laid on top of the original surface.
Class 1	A sub-classification of Type I, II or III anodization indicating that no dye is to be applied. More chromic anodization is class 1.
Class 2	A sub-classification of Type I, II or III anodization indicating that a dye is to be applied. Usually, the color of the dye is specified after the class, e.g.: “MIL-A-SPEC 8625 Type II, Class 2, red”

Timeline of acids for anodizing processes



To learn more, visit [3M.com/ExtremeMasking](https://www.3M.com/ExtremeMasking)



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