3M Fiber Optic Polishing

Total Solutions for Your Polishing Needs

3M

Innovative products for your unique polishing system

3M offers complete solutions for fiber optic connector polishing – with a full line of high performance precision abrasives, backed by the technical support of our experienced fiber optics specialists. We're ready to help you generate the finish you need on a wide variety of connectors. We can optimize your polishing operation to produce cost-effective results. Call the 3M Fiber Optic Applications Laboratory today to learn more: 866-866-0922. Or visit us on the web: www.3M.com/electronics

3M™ Lapping Film

Precisely graded minerals are coated on a high strength, 3 mil polyester backing to provide a uniform, consistent finish. Available in silicon carbide film for glass and epoxy removal, and in aluminum oxide for leveling and polishing steps. Available in 0.05 - 30 micron grades, with or without PSA (Pressure Sensitive Adhesive) backing.

3M™ Diamond Lapping Film 661X / 668X

This standard Diamond Lapping Film is comprised of tightly graded diamond minerals uniformly coated on a polyester film backing. It is able to cut and polish hard ceramic ferrules and glass fibers at the same rate and to the same level. Used to radius ferrule connectors or to refine the finish in preparation for the final polish. Available in 0.1 - 30 micron grades, with or without PSA backing.

3M™ Diamond Lapping Film 661XU / 661XU-PSA

Tightly graded diamond mineral is precision coated on a polyester film backing. This durable construction provides consistent results throughout the life of the product. Available in 0.5, 1, 3 and 6 micron grades, with or without PSA backing.

3M™ Diamond Lapping Film - Type H - 662XW / 666XW

Designed for radiusing and leveling operations that require added durability. Diamond Lapping Film - Type H has a thicker diamond coating with a higher diamond concentration and a tougher resin for an increased cut rate and longer life. Type H lasts 2 to 3 times longer than standard DLF. Available in 0.5, 1, 1.5, 3, 6 and 9 micron grades, with or without PSA backing.

3M™ Diamond Lapping Film 660XV

This long life, precision coated 3M™ Diamond Lapping Film is the newest and most durable film in 3M's Diamond Lapping Film product family. It combines a high cut rate with a great finish, and is designed for use on slower rpm polishing machines. Available in 1, 3, 6, and 9 micron grades.

3M™ Trizact™ Diamond Lapping Film 661XA / 661XA-PSA

Micron graded diamond particles contained in a precisely microreplicated structure provide longer life, aggressive cut and superior finish over standard lapping film products. Available in 0.5, 2 and 9 micron grades, with or without PSA.

3M™ Polishing Film 291X, 491X, 591X / 298X, 498X, 598X

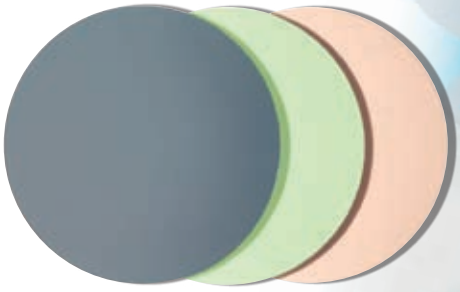
Comprised of micron graded mineral that has been coated onto a fibrous (flocked) polyester film backing. These films are designed to break down into a slurry during use with water for MT-style fiber optic connectors. Available plain or with PSA. (961M/968M are available with no mineral coating.)

3M™ Lapping Film 863X, 863XW / 869X, 869XW

These products are precision coated on a 3 mil polyester backing for the final step in polishing fiber optic connectors. 863XW has a higher mineral content than 863X, providing easier breakdown and faster polishing. Available with or without PSA backing.

3M™ Lapping Film 865X

This advanced polishing film is engineered to last longer – helping you achieve higher yields, less rework and lower costs per parts. This is the longest lasting of 3M's final polish lapping films.



3M™ Lapping Films are available in sheets, discs and rolls for use on any type of polishing equipment. These films are especially designed for use in factory or field applications.

Selection Guide

3M's technical service representatives suggest using these polishing guidelines for polishing ceramic singlemode or multimode fiber optic connectors. In the top chart, locate your connector type, then refer to tables A, B and C below to select one of the options for each step. These recommended sequences provide typical starting points. Your actual sequences may vary depending on your polishing equipment and finish requirements.

Polishing Processes for Ceramic Fiber Optic Connectors

Connector Type	Step	See Table for Recommended Products	Time (sec.)	Pressure (g/conn)
Ceramic, Ultra PC, Pre-radiused ferrule	Remove Glass (De-nub)	A	Until nub is removed	By hand
	Remove Epoxy	A	30 - 60	200 - 350
	Refine	B	30 - 120	200 - 350
	Refine	B	30 - 120	200 - 350
	Polish	C	15 - 45	150 - 250
Ceramic, Angle PC	Grind Angle	A	40 - 120	200 - 350
	Radius Ferrule	B	60 - 180	200 - 350
	Refine	B	30 - 120	200 - 350
	Refine	B	30 - 120	200 - 350
	Polish	C	15 - 60	150 - 250
Ceramic, Super PC, Pre-radiused ferrule	Remove Glass (De-nub)	A	Until nub is removed	By hand
	Remove Epoxy	A	30 - 60	200 - 350
	Refine	B	30 - 120	200 - 350
	Polish	C	15 - 45	150 - 250
1.25 mm LC and MU Connectors	De-nub-Epoxy Removal	A	30 - 60	75 - 125
	Refine	B	30 - 60	100 - 150
	Polish	C	90 - 120	100 - 150

Recommended Lubricant: DI Water

Table A - De-Nub and Epoxy Removal

	Mineral	Available Micron Sizes					
		5	6	9	12	15	30
3M™ Diamond Lapping Films, 661X, 662XW, 661XU, 660XV	D			BLU		ORN*	
3M™ Trizact™ Diamond Lapping Film, 661XA	D			GRY			
3M™ Lapping Film, 461X	S/C	GRY		GRY		GRY*	GRN*
3M™ Lapping Film, 261X	A/O	BRN		BLU	YEL		GRN

*Common for Angle Grinding

Table B - Refine (Level Connector)

	Mineral	Available Micron Sizes						
		0.5	1	2	3	4	6	9
3M™ Diamond Lapping Films, 661X, 662XW, 661XU, 660XV	D	MNL	LAV		PNK		BRN	
3M™ Trizact™ Diamond Lapping Film, 661XA	D	GRY		GRY				
3M™ Lapping Film, 462X, 463X or 452X	S/C		GRY		GRY			
3M™ Lapping Film, 261X, 262X or 263X	A/O		GRN	TL	PNK			

Table C - Polish (Finish)

	Mineral	Available Micron Sizes			
		0.02	0.05	0.1	0.3
3M™ Lapping Film 865X	SiO_2	Size not specified.			
3M™ Lapping Film 863X* or 863XW*	SiO_2	TRL			
3M™ Lapping Film 263X*	A/O		EGS		WHT
3M™ Lapping Films 261X*	A/O				OFW

*Available with PSA Backing

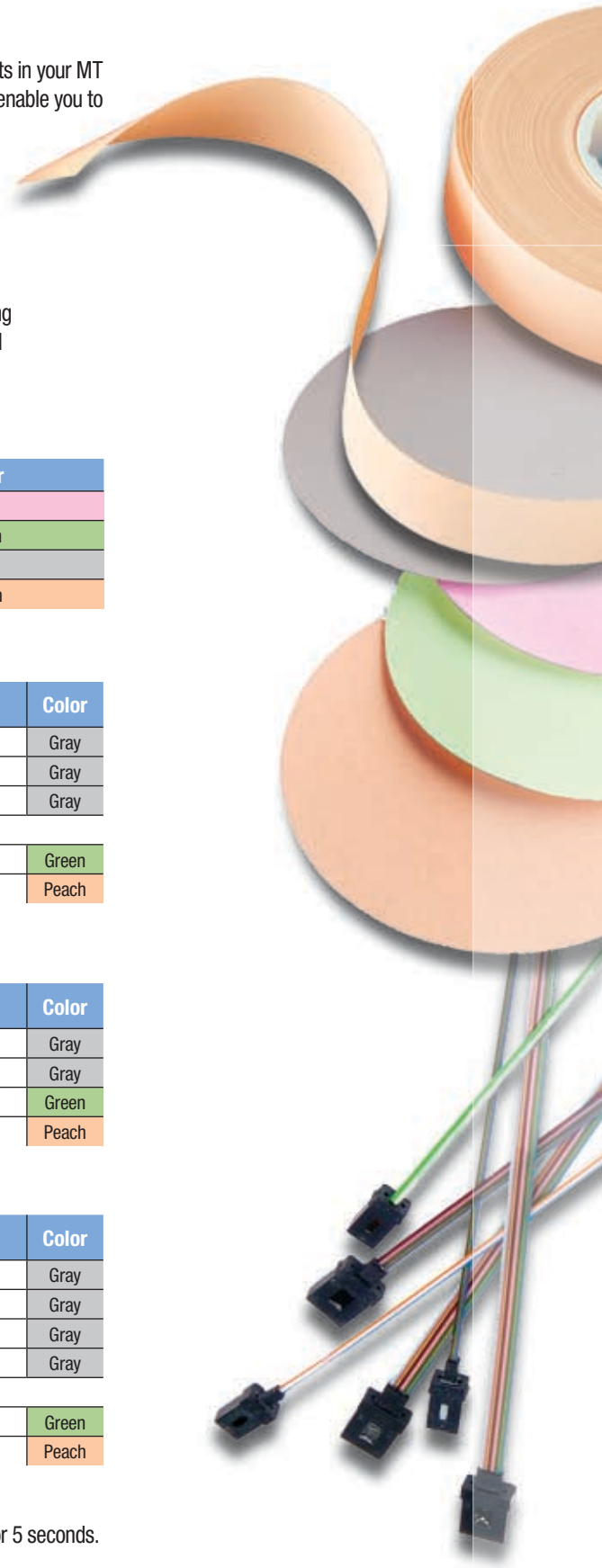
GRY (Gray)
GRN (Green)
BRN (Brown)
YEL (Yellow)
ORN (Orange)
OFW (Off-White)
PNK (Pink)
BLU (Blue)
LAV (Lavender)
TL (Teal)
MNL (Manila)
EGS (Eggshell)
WHT (White)
TRL (Translucent)

Mineral Key	
A/O	Aluminum Oxide
S/C	Silicon Carbide
D	Diamond
SiO_2	Silicon Dioxide

3M™ Polishing Film helps you consistently meet geometry and fiber height requirements in your MT connector polishing operation. Precisely graded minerals coated on a fibrous backing enable you to generate fiber protrusion and attain the proper ferrule geometry.

3M Polishing Film can provide:

- Control of fiber protrusion
- High throughput
- Less cleaning than a slurry process
- Low rejects



Suggested Process for Polishing MT Fiber Optic Connectors

3M Technical Service Engineers recommend using the following sequences for polishing MT fiber optic connectors. These sequences provide typical starting points. Your actual process may vary depending on your polishing equipment and finish requirements.

3M™ Polishing Film

Product I.D.	Mineral	Micron Grade	Color
298X	Aluminum Oxide	0.5	Pink
298X	Aluminum Oxide	1	Green
498X	Silicon Carbide	3	Gray
598X	Cerium Oxide	0.5	Peach

Thermoset MT (Singlemode or Multimode)

Step	Micron Grade	Mineral	Product I.D.	Description	Color
Remove Epoxy	15	Silicon Carbide	468X	3M™ Lapping Film	Gray
Step 2	3	Silicon Carbide	468XW	3M™ Lapping Film	Gray
Step 3	3	Silicon Carbide	498X	3M™ Polishing Film	Gray
Repeat Step 3 with fresh abrasive for increased protrusion					
Step 4	1	Aluminum Oxide	298X	3M™ Polishing Film	Green
Step 5	0.5	Cerium Oxide	598X	3M™ Polishing Film	Peach

Thermoplastic MT (Singlemode or Multimode)

Step	Micron Grade	Mineral	Product I.D.	Description	Color
Remove Epoxy	15	Silicon Carbide	468X	3M™ Lapping Film	Gray
Step 2	3	Silicon Carbide	468XW	3M™ Lapping Film	Gray
Step 3	1	Aluminum Oxide	298X	3M™ Polishing Film	Green
Step 4	0.5	Cerium Oxide	598X	3M™ Polishing Film	Peach

Thermoplastic Angled MT

Step	Micron Grade	Mineral	Product I.D.	Description	Color
Remove Epoxy*	15	Silicon Carbide	468X	3M™ Lapping Film	Gray
Step 2 (cut angle)	15	Silicon Carbide	468X	3M™ Lapping Film	Gray
Step 3	3	Silicon Carbide	468XW	3M™ Lapping Film	Gray
Step 4	3	Silicon Carbide	498X	3M™ Polishing Film	Gray
Repeat Step 4 with fresh abrasive for increased protrusion					
Step 5	1	Aluminum Oxide	298X	3M™ Polishing Film	Green
Step 6	0.5	Cerium Oxide	598X	3M™ Polishing Film	Peach

*Remove epoxy in flat fixture

For multimode, add or replace last step with Final Polish Film 865X, 863X or 863XW for 5 seconds. All products listed above are available without PSA.

3M Final Polish Products for Fiber Optic Connectors

3M™ Lapping Films 865X, 863X and 863XW Offer a Clean Break From Slurries

3M™ Lapping Film final polish products can deliver high yields, reducing the need for costly rework in final polishing of ceramic fiber optic connectors. The film easily produces optimal fiber height and minimal visual defects, allowing finished connectors to meet Telecordia GR-326 standards.

These high-performing films feature silicon dioxide particles coated on a 3 mil, high-strength polyester backing. 3M final polish products are part of a complete lineup of lapping films designed for fiber optic connector polishing. They provide precision polishing alternatives to messy slurries that require time-intensive cleanup.

Lapping Films 865X, 863X and 863XW

With a choice of three film variations designed for the final step in the polishing sequence, 3M lets you select the film based on your requirements.

Films 865X, 863X and 863XW are available in discs, sheets and rolls.

Film 865X

Performance Characteristics

- Longest life 3M final polishing film
- Consistent performance
- Less rework
- Positive protrusion

Polishing Machine Compatibility/Backings

- Excellent for use on all polishing equipment

Film 863X

Performance Characteristics

- Polishes more slowly than 863XW
- More controlled cut rate

Polishing Machine Compatibility/Backings

- For use on most polishing machines and fixtures, including machines that run at higher speeds and higher pressure
- Available with pressure sensitive adhesive backing Product ID is 869X

Film 863XW

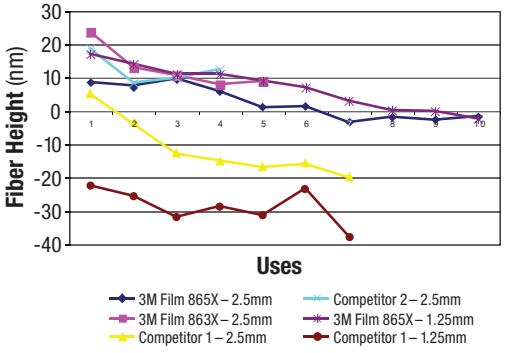
Performance Characteristics

- Higher mineral content than 863X enables faster polishing

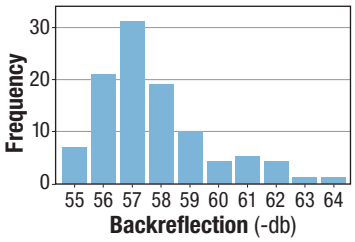
Polishing Machine Compatibility/Backings

- Designed for use on machines that run at lower speeds and lower pressures
- Designed for use on fixtures with individual pressure control that allow connectors to float independently
- Available with pressure sensitive adhesive backing. Product ID is 869XW

Fiber Height Values for Number of Uses on 2.5mm and 1.25mm Ceramic Connectors



3M™ Lapping Film 865X Backreflection Results



Using 3M™ Lapping Film 865X, 863X, or 863XW for your final polishing step helps you easily meet Telecordia back reflection standards.

3M™ Novec™ Contact Cleaner for Fiber Optic Connector Cleaning

3M™ Novec™ Contact Cleaner combines fast, effective cleaning performance with an excellent safety and environmental profile. Designed for a variety of assembly level and field maintenance cleaning tasks, Novec contact cleaner uses an advanced 3M solvent technology that offers a number of significant advantages over many conventional spray cleaners, including:

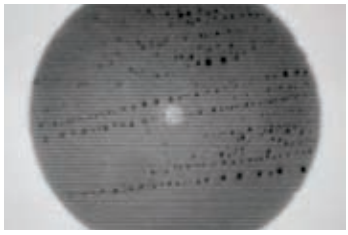
- Fast drying
- Low in toxicity
- Streak free
- Non-flammable

Novec Contact Cleaner also features an excellent environmental profile. The product is non-ozone depleting, is exempt from the U.S. EPA's and most state and district definitions of a volatile organic compound (VOC) and contains no nPB or HAPS. It is based on a sustainable technology and offers an alternative for cleaners containing HCFC-141b or HCFC-225.

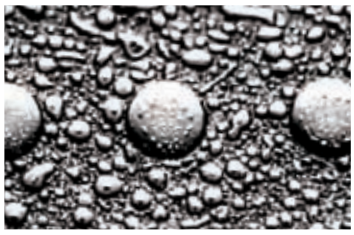
- Removes particulates, oils, light grease, silicones, dust and other soils from connector end faces
- Quick drying and non-corrosive
- Safe for plastics and metals

Performance

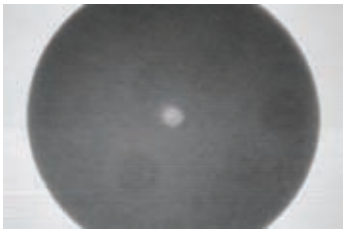
The photos below compare identical connectors that were wiped with isopropanol (IPA) and Novec Contact Cleaner. The Novec Contact Cleaner does not leave residual contamination on the surface that can affect fiber optic circuit performance.



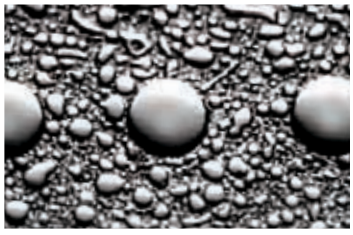
Ceramic Connector Cleaned with IPA



MT Connector Cleaned with IPA



Ceramic Connector Cleaned with Novec Contact Cleaner



MT Connector Cleaned with Novec Contact Cleaner

For Additional Information

To request additional product information or to arrange for sales assistance, call toll free: 1-800-251-8634.
Address correspondence to: 3M Electronics Markets Materials Division, Building 21-1W-10, 900 Bush Avenue, St. Paul, MN 55144-1000.
Our fax number is 651-778-4244 or 1-877-369-2923. In Canada, phone: 1-800-364-3577.
In Puerto Rico, phone: 1-787-750-3000. In Mexico, phone: 52-70-04-00.

For technical assistance call the Fiber Optics Applications Development Lab toll free, 1-866-866-0922

Important Notice: Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use.

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