Science.
Applied to Life.™

3M™ Betafine™ XL Series

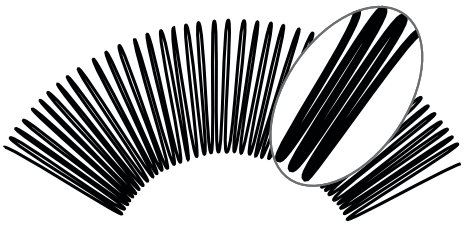
Absolute Rated Pleated Polypropylene Filter Cartridges

Providing Reduced Total Filtration Costs & Consistent Filtration Performance

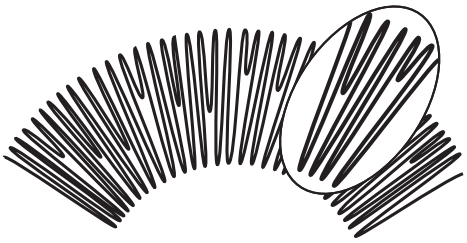
3M™ Betafine™ XL series filter cartridges represent a major advance in pleated filter technology. Building on 3M Purification Inc.'s history of filter design innovation, this absolute-rated, 100% polypropylene, pleated cartridge features Advanced Pleat Technology (APT) that increases the usable filtration surface area while maintaining standard industrial cartridge dimensions. The result is a filter cartridge that has dramatically enhanced service life.

Advanced Pleat Technology (APT)

The service life of a pleated cartridge is often dictated by the accessible surface area. Conventional pleated filters may offer a large gross surface area, but when the media is packed too tightly into the cartridge, only part of the surface area is usable resulting in both flow restrictions and limited contaminant holding capacity. The "blind" or unusable area commonly occurs near the inside diameter (see figures below) where the pleats are packed most tightly. The 3M Betafine XL series filter cartridge is manufactured using a staggered pleat configuration that, when combined with a novel support material, provides more open space between the pleats.



Conventional pleat designs, with full-depth densely packed pleats, fill the upstream pleat surface with contaminant that quickly constrict flow at the pleat's inside diameter.



The 3M™ Betafine™ XL series filter cartridge's Advanced Pleat Technology utilizes a configuration designed to increase the accessible surface area for significantly greater filter media use.

Features & Benefits

Reduced Total Filtration Costs

- Helps reduce cartridges used, change-out frequency, reduced downtime, product waste and labor and disposal costs

Consistent Filtration Performance

- Helps reduce quality checks, product rejects and rework, thereby helping to add productivity and plant capacity

Applications

3M™ Betafine™ XL series filter cartridges are ideal for a wide array of applications. Contact 3M Purification or your local distributor for assistance with your specific applications.

Paint & Coatings	Film and paper coatings, photographic film, lens coatings and magnetic media, can coatings, high quality paints and ink.
Industrial Process	Machine tool lubrication, detergents, process and waste water, plating baths and chemicals, pulp, paper and textiles.
Electronics	CD and DVD media, printed circuit boards, video displays, DI water.
Food & Beverage	Bottled water particulate and turbidity reduction, reverse osmosis membrane and spray nozzle protection, diatomaceous earth or carbon fines trap, beverage blending, rinsing, or wash water.
Petrochemical & Chemical Processing	Clarification of high purity chemicals, organic and inorganic chemical intermediates, and various acids and bases, production of petrochemicals from feed-stocks and intermediates, solvents, polymer solutions, process water for quench and flushing.

The APT staggered pleats with increased open area allow for greater contaminant loading between pleats at the inside diameter, while the reduced length pleats take advantage of existing open space closer to the cartridge's outside diameter. The result is a fully used surface area that provides superior service life.

Superior Service Life

Extensive testing has demonstrated that the 3M™ Betafine™ XL series filter cartridge provides service life superior to competitive pleated filters of equivalent reduction ratings when subjected to the same contaminant load. The result of using filters with significantly longer service life is substantially reduced filtration costs. Betafine XL series filter cartridges provide a service life improvement of up to 4.4 times greater than competitive products. See Graph 1 below.

Superior on-line service life provides significant total filtration cost reductions. From fewer filter cartridges used to a reduction in labor costs by decreasing filter change-out frequency, Betafine XL series filter cartridges provide the ultimate in cost effective pleated filter technology.

The Impact of Service Life on Total Filtration Costs

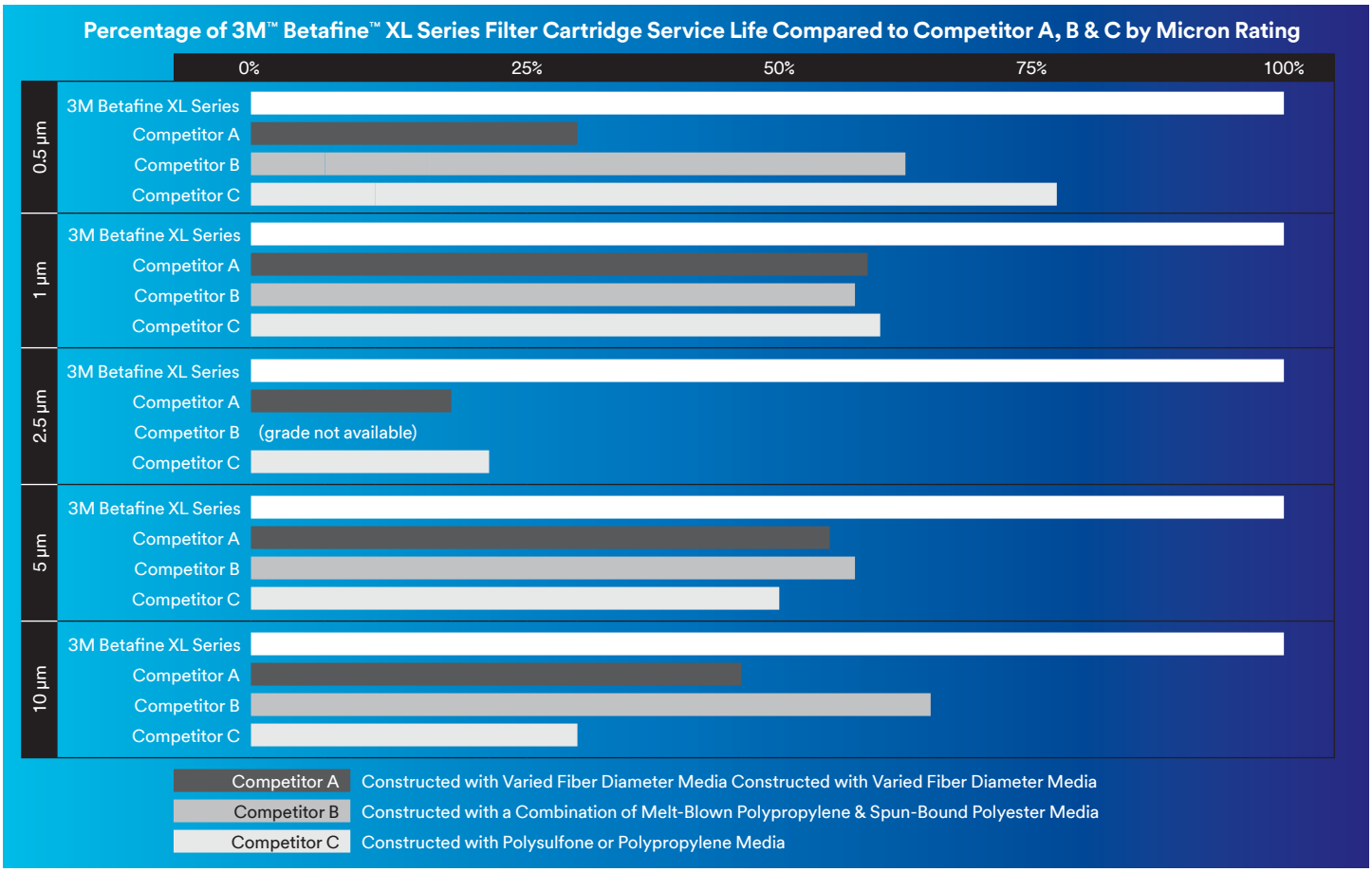
The service life of a filter has a direct impact on total annual filtration costs. To illustrate how great an impact can occur, see Table 1 below.

Table 1. Total Filtration Costs Model Based On a System with a Flow Rate of 250 gpm Using 18 (30" long) Filter Cartridges with a Change-out Frequency of One Week

Process Requirements*	A Filter with 50% of Betafine™ XL Series Filter Cartridge Service Life		Betafine™ XL Series Filter Cartridge	
	Units	Estimated Cost	Units	Estimated Cost
Estimated Filter Usage (annual, based on $75 per cartridge U.S.)	936	$70,200	468	$35,100
Required Labor (1 hour per filter change-out at $40/hr U.S.)	52 hours	$2,080	26 hours	$1,040
Estimated Disposal (56 cartridges per drum at $50/drum U.S.)	17 drums	$850	9 drums	$450
Process Downtime	52 hours	?	26 hours	?
Total Annual Filtration Cost	**$73,130**		**$36,590**	

*** NOTE:** These estimates are based on industry interviews and conditions as noted. Your savings may vary depending on your actual costs.

Graph 1. 3M™ Betafine™ XL Filter Cartridges Provide Significantly Prolonged Service Life When Compared to Conventional Pleated Filters of Like Published Reduction Ratings



Absolute Ratings

The consistency of reproducible contaminant reduction can best be provided by the use of absolute-rated filters. 3M™ Betafine™ XL Series Filter cartridges are absolute rated to 1000 (99.9% efficiency at its rating) and are available in nine distinct ratings from 0.2 to 40 micron. This provides a complete choice of ratings to meet the exacting filtration requirements for the most critical applications. See Table 2 below.

Table 2. 3M™ Betafine™ XL Series Filter Cartridge Absolute Ratings

Grade	Rating*
002	0.2 µm
005	0.5 µm
010	1 µm
025	2.5 µm
050	5 µm
100	10 µm
200	20 µm
400	40 µm

* At maximum recommended flow rate

Flow Characteristics & Sizing Options

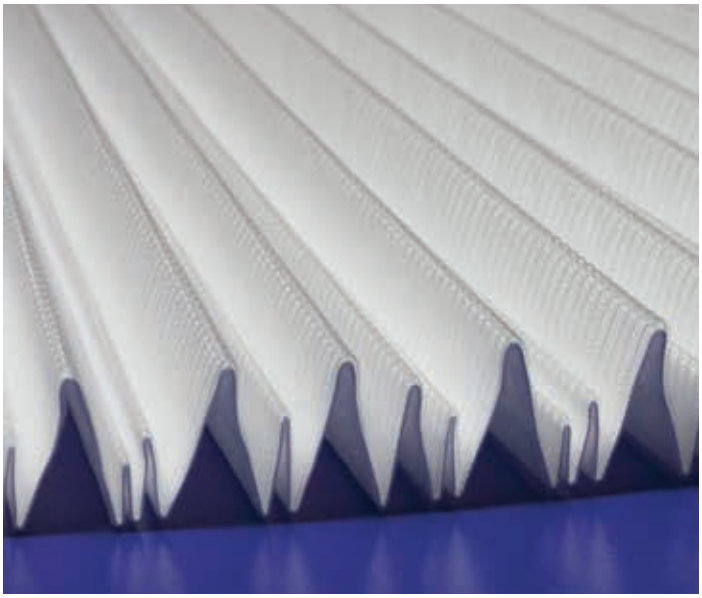
Flow vs. differential pressure for water is depicted in Graphs 2 and 3 for each 3M Betafine XL series filter cartridge grade. A typical filter system is often sized for an initial differential pressure of 0.5 to 1 psi (0.04 to 0.07 bar). Low flow rates further extend the life of the filter.

Reduced Cartridge Change-out Frequency

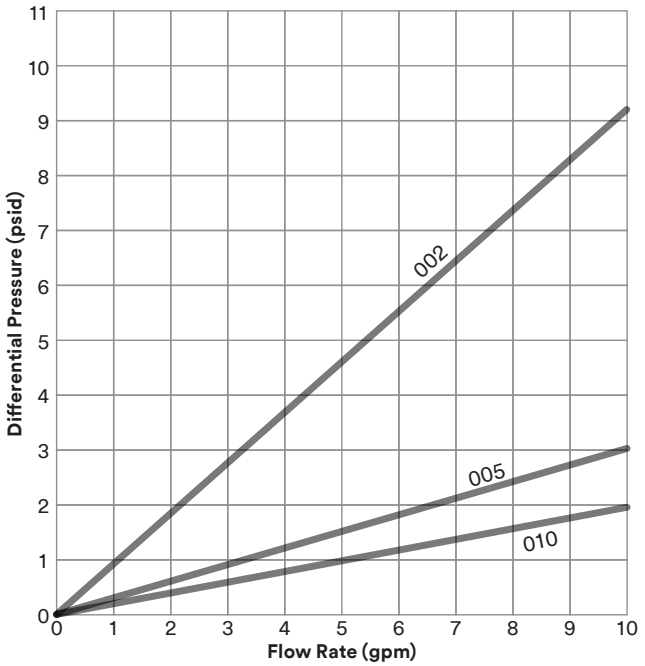
For a given process flow rate, the increased accessible surface area decreases filter cartridge change-out frequency by 30 to 50 percent or more depending on the application.

Reduced Filter Housing Costs

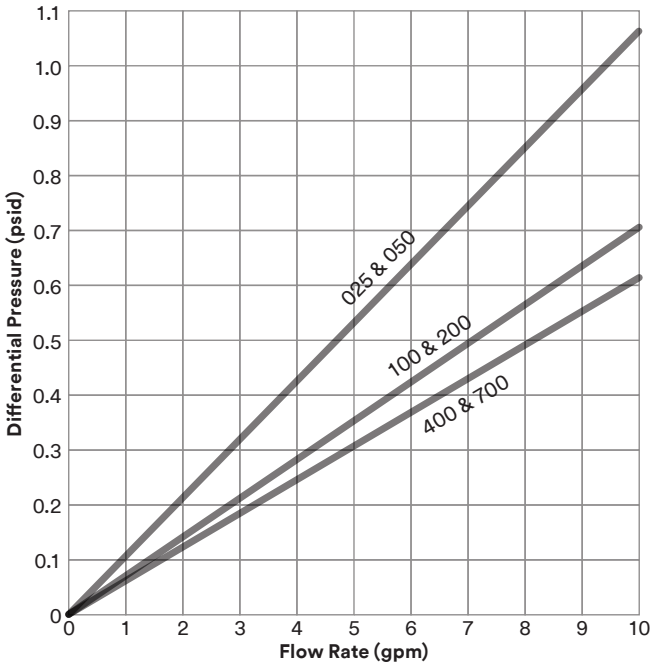
For new applications, the low pressure drops of the 3M Betafine XL series filter cartridge allow smaller or fewer housings to be required. Fewer filter cartridges and smaller housings help provide lower capital and operating costs, year after year.



Graph 2. Water Flow Rates for Grades 002, 005 & 010 3M™ Betafine™ XL Series 10" Filter Cartridges.

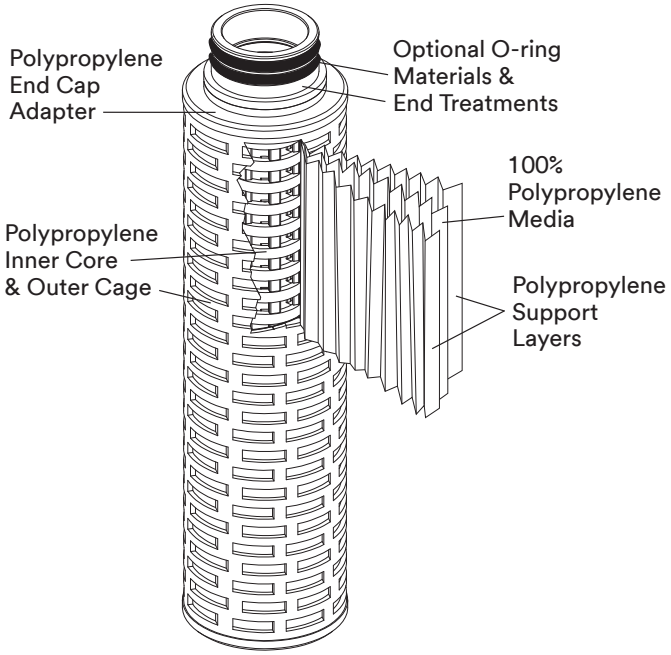


Graph 3. Water Flow Rates for Grades 025, 050, 100, 200, & 400 3M™ Betafine™ XL Series 10" Filter Cartridges.



Filter Cartridge Construction

3M™ Betafine™ XL series filter cartridges are constructed of 100% polypropylene and help provide excellent chemical and thermal compatibility. The filter media is constructed from continuous micro-fibers that are precisely controlled to provide a uniform matrix and consistent effluent quality. 3M Betafine XL series filter cartridges incorporate a polypropylene support upstream and downstream of the media to provide optimum flow characteristics and long service life. The all-polypropylene cartridge components are thermally bonded — no resin or binder compounds are used. All materials used in the manufacture of 3M Betafine XL series filter cartridges comply with the requirements of the Food and Drug Administration's (FDA) Code of Federal Regulations (CFR), Title 21 parts 170-199 for contact with food. Available in nine distinct micron ratings and integral lengths from 9.75" to 40" with a wide selection of end treatments to fit common filter housing designs, 3M Betafine XL series filter cartridges are ideal for a wide variety of applications.



Cartridge

Chemical Compatibility

The 100% polypropylene construction helps provide excellent chemical compatibility in many demanding process fluid applications. Listed in Table 3 below are commonly requested compatibilities. Compatibility for specific fluids may vary and is influenced by operating conditions. Consult 3M Purification Inc. or your local distributor for more information.

Table 3. Chemical Compatibility of 3M™ Betafine™ XL Series Filter Cartridges

Chemical	Temperature
Acetic Acid 20%	175°F (80°C)
Ammonia 10%	140°F (60°C)
Bleach 5.5%	70°F (21°C)
Ethylene Glycol	140°F (60°C)
Alkanolamines	140°F (60°C)
Hydrogen Peroxide	100°F (38°C)
Methyl Ethyl Ketone	70°F (21°C)
Mineral Oil	70°F (21°C)
Nitric Acid 20%	100°F (38°C)
Potassium Hydroxide	140°F (60°C)
Sodium Carbonate	100°F (38°C)
Sodium Hydroxide 70%	140°F (60°C)
Sulfuric Acid 20%	140°F (60°C)
Sulfuric Acid 70%	100°F (38°C)
Urea	140°F (60°C)

3M™ Filter Housings

3M manufactures a broad variety of filter housings. Housings are available in a selection of materials and sizes that range from holding a single filter cartridge to hundreds. This breadth of design choice allows a match to your application requirements.

3M™ ES Series Filter Housing

The 3M™ ES Series Filter housing is a durable, ASME Code designed, high volume filter housing. Conceived to maximize flexibility of design, it is available in carbon steel, 304L or 316L stainless steel and with variety of internal configurations to handle various filter cartridge formats. For more information, ask your local 3M Purification distributor for brochure 70-0201-8711-1.

3M™ CTG Series Filter Housing

The 3M™ CTG Series Filter design provides a totally enclosed system using separate pressure vessel and filter pack to isolate process fluid from the housing. This system greatly reduces the costs involved with filter change-out while protecting the environment and operator from exposure to the process fluid. For more information, ask your local 3M Purification distributor for brochure 70-0201-8693-1.

3M™ DC & SS Filter Housings

3M™ DC and SS Filter housings offer a cost-effective alternative for moderate volume filtration (up to 400 GPM). Constructed from 304L stainless steel (Model DC) or 316L stainless steel (Model SS), housings are available for a wide range of flow rates and applications. For more information ask for literature 70-0201-8757-4 and 70-0202-2106-8.

Application Engineering

3M has a global team of market-focused scientists and engineers who excel in supporting and collaborating with end-users. Our technical teams are skilled in either performing on-site bench-scale or in-house tests and relating results to full scale manufacturing operations and optimizing cost of purification. When unique processing problems are encountered, our product and application specialists are equipped to identify solutions using either 3M's broad array of existing products or potentially develop a custom solution for your application.

3M™ Betafine™ XL Series Operating Parameters & Specifications								
Cartridges								
Filter Rating	0.2 – 40 µm							
Dimensions								
Nominal Length (see ordering guide)	9.75"	10"	19.5"	20"	29.25"	30"	39"	40"
Diameter, Outer (nominal)	2.62"							
Materials of Construction								
Filter Media	Polypropylene							
Support Layers								
Inner Core & Outer Cage								
End Cap Adapters								
Flat Gasket & O-ring Options	Silicone, Fluorocarbon, Ethylene Propylene (EPR), FEP/PFA-encapsulated Fluorocarbon, Polyethylene & Nitrile							
Operating Conditions								
Maximum Forward Differential Pressure	60 psid @ 77°F (4 bar at 25°C)							
Maximum Reverse Differential Pressure	40 psid @ 77°F (2.6 bar at 25°C)							
Maximum Operating Temperature	175°F (80°C)							
Cleaning Considerations	Can be autoclaved, steamed in place or hot water sanitized (for cartridges with 222 or 226 O-ring end modifications, order option with reinforcing ring).							
Regulatory Status								
CFR 21 Compliant	Filter components are constructed from materials that comply with the requirements of the Food and Drug Administration's (FDA) Code of Federal Regulations (CFR), Title 21 parts 170-199 for contact with food.							

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This 3M™ Betafine™ XL Series filter cartridge is tested and certified by WQA against NSF/ANSI/CAN 61 for material requirements only.*

*For gasket/O-rings G, H, K & L, please consult factory

Cold Water Only:
Install this product in accordance with the instructions provided by the housing manufacturer.

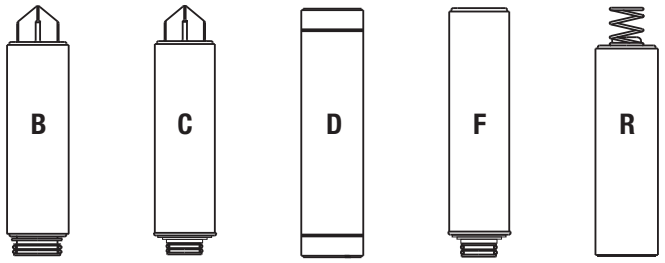
3M™ Betafine™ XL Series Filters Ordering Guide

Cartridges

Cartridge Code	Nominal Length Code	Filter Media Code	Grade Code & Rating	End Modification Code	Gasket/O-ring Material Code
XL	**09**[1] 9.75" **10** 10" **19**[1] 19.5" **20** 20" **29**[1] 29.25" **30** 30" **39**[1] 39" **40** 40"	**PP** Polypropylene	**002** (0.2 µm) **005** (0.5 µm) **010** (1 µm) **025** (2.5 µm) **050** (5 µm) **100** (10 µm) **200** (20 µm) **400** (40 µm)	**B0** — 226 O-ring & Spear, No Reinforcing Ring **B1** — 226 O-ring & Spear, Polysulfone Ring **B2** — 226 O-ring & Spear, Stainless Steel Ring **C1** — 222 O-ring & Spear, Polysulfone Ring **C2** — 222 O-ring & Spear, Stainless Steel Ring **D** — Double Open End (DOE) **F0** — 222 O-ring & Flat Cap, No Reinforcing Ring **F1** — 222 O-ring & Flat Cap, Polysulfone Ring **F2** — 222 O-ring & Flat Cap, Stainless Steel Ring **R** — SOE w/ Stainless Steel Spring	**A** — Silicone **B** — Fluorocarbon **C** — EPR **D** — Nitrile **G**[2] — Polyethylene **K**[3] — FEP/PFA-encapsulated Fluorocarbon

1Not available in B, C, F, Q, R and U end modifications.
2Available in end modifications D, P, Q & R only.
3O-rings only.

PLEASE NOTE: The Order Guide above is for reference only. Not all combinations are available. Please consult with your 3M representative to determine the appropriate part number for your application.



Product Selection and Use:

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. As a result, customer is solely responsible for evaluating the product and determining whether it is appropriate and suitable for customer's application, including conducting a workplace hazard assessment and reviewing all applicable regulations and standards (e.g., OSHA, ANSI, etc.). Failure to properly evaluate, select, and use a 3M product and appropriate safety products, or to meet all applicable safety regulations, may result in injury, sickness, death, and/or harm to property.

Warranty, Limited Remedy, and Disclaimer:

Unless a different warranty is specifically stated on the applicable 3M product packaging or product literature (in which case such warranty governs), 3M warrants that each 3M product meets the applicable 3M product specification at the time 3M ships the product. 3M MAKES NO OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR ARISING OUT OF A COURSE OF DEALING, CUSTOM, OR USAGE OF TRADE. If a 3M product does not conform to this warranty, then the sole and exclusive remedy is, at 3M's option, replacement of the 3M product or refund of the purchase price.

Limitation of Liability:

Except for the limited remedy stated above, and except to the extent prohibited by law, 3M will not be liable for any loss or damage arising from or related to the 3M product, whether direct, indirect, special, incidental, or consequential (including, but not limited to, lost profits or business opportunity), regardless of the legal or equitable theory asserted, including, but not limited to, warranty, contract, negligence, or strict liability.

3M

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