

Protective Chemical PM-226



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INTRODUCTION

3M™ Protective Material PM-226 is a non-fluorochemical product that imparts durable water absorbency (wicking) and stain release properties to 100% polyester fabrics or yarns. These benefits can be seen on other synthetic fabrics such as nylon and acrylic; however, the advantages are not as dramatic as on 100% polyester. PM-226 will, in some cases, marginally improve fabric softness and may enhance dye bath lubrication.

When fabrics are properly treated with PM-226 most stains are generally removed with one home laundering. For stubborn stains additional washes may be required for complete stain removal.

Branding: Only if the formulation meets stringent quality performance specifications are you entitled to make use of the Scotchgard™ Brand name, and provided you are an official licensee of 3M.

Environmental: PM-226 is not based on perfluoroalkyl chemistry including PFOS or PFOA. It is not made, and does not degrade to, any perfluoroalkyl substance including PFOS or PFOA. Additionally, PM-226 is not based on blocked isocyanate chemistry and does not contain alkyl phenol ethoxylate (APE) surfactants or chlorofluorocarbon (CFC) associated with ozone depletion.

TYPICAL PROPERTIES

Appearance	Amber Viscous Liquid
Typical Analysis	20% Solids
	80% Water
Charge	Nonionic
Density	1.0 kg/L (8.3 lbs/gal)
pH	2-4
Shipping & Storage	Non-Red Label

PM-226 should not be stored at temperatures higher than 50°C (120°F).

PM-226 is freeze/thaw stable. If exposed to freezing temperatures, return to room temperature before using. Avoid agitation during the thawing process.



FABRIC PREPARATION

Fabrics to be treated with PM-226 should be clean and as free as possible of processing agents such as sizes, alkalis, printing gums, and the like. Such materials can affect the absorbency of the fabrics, the penetration of the treating bath into the fabric, as well as the performance and durability properties of the resultant finish.

APPLICATION

The application level of 3M™ Protective Chemical PM-226 on the fabric may vary. Factors such as fiber content, chemical additives, treating conditions, and the like will influence what levels are needed to achieve the required performance. Consult the Qualification and Performance Specification documents or contact your 3M sales or technical service representative for assistance and recommendations.

We recommend starting with 1.0–1.5% PM-226 product-on-fabric. Some fabrics may require a greater amount of PM-226 to provide the desired stain release properties.

PM-226 is normally applied by exhaustion during the dye operation and may be added in conjunction with dyeing assists, dyes, or alone. Temperature of addition is not critical.

PM-226 is easily dissolved in water with agitation. Add the required amount of PM-226 directly to the mix tank, or pre-dilute the PM-226 in a separate vessel. Once dispersed, other dye assists and adjuvants may be mixed with the PM-226 solution and added to the dye vessel in one drop.

PM-226 can be applied equally well during atmospheric or pressure dyeing. The conditions necessary to dye polyester at the respective temperatures of these dye processes are more than adequate for the application of PM-226. The stability of PM-226 is excellent under most conditions of pH and temperature commonly found in polyester dyeing.

Curing is not necessary to obtain the desired performance from PM-226 and normal heat setting will not adversely affect the imparted properties.

PM-226 has a propensity to foam in some jet dyeing machines due to the vigorous dye bath agitation. The addition of 0.5–2.0% product in bath of a non-silicone-based antifoam will resolve the foaming problem. When an antifoam is required, add it with the PM-226.

Note: Thoroughly evaluate any silicone in the laboratory to determine its effect on performance prior to inclusion in any mill production, since such materials can severely affect wicking and stain release formulations. All fabrics, as well as mixing and processing equipment must be free of silicones to avoid contamination of the bath. Use of silicones even in earlier production steps could still cause contamination of the bath. Likewise, the use of antistatic agents in a pad bath should be evaluated in the laboratory for their subsequent effects on wicking and stain release performance.



TYPICAL PROCEDURES FOR APPLICATION

The following recommendations are offered as a guide for applying PM-226 to polyester and nylon. Products other than those mentioned may be suitable for use with PM-226. It is suggested that any system first be evaluated in the laboratory, both for compatibility and for performance. **Note:** *The best application is obtained when pH is controlled below pH 6.*

Polyester Application

- A. The following is a typical application procedure to successfully apply PM-226 in a *pressure jet*.
1. Scour and rinse the fabric.
 2. Set jet and mixing bath to a temperature of 30–50°C (86°–122°F).
 3. Weigh the proper amount of PM-226 to achieve 1.0–1.5% product as received on weight of goods (owg).
 4. With thorough agitation, add PM-226 to the mix tank, allow it to dissolve completely, then add carrier, acetic acid and other dye bath additives. Drop this mix into the jet. Rinse mix tank to remove residual solution.
 5. Add premixed dyes.
 6. Raise jet temperature to 130°C (265°F) at 1–2°C (2–4°F) per minute.
 7. Continue dyeing for 15–45 minutes or according to mill practice.
 8. Cool and overflow rinse according to mill practice.
 9. Pull fabric.
 10. Dry and heat set the fabric.
 11. Test fabric for absorbency and stain release performance.
- B. When dyeing *atmospherically*, follow steps 1–5 in the pressure jet procedure above, then:
6. Raise dye liquor temperature to the boil at 1–2°C (2–4°F) per minute.
 7. Continue dyeing for 30–90 minutes or according to mill practice.
- Then follow steps 8–11 from the pressure jet procedure above.

If an after clear is necessary, we recommend using:

- 1.0% soda ash (sodium carbonate), owg
- 1.0% hydro (sodium hydrosulfite), owg

Note: *Avoid using sodium hydroxide or other strong bases as they will remove PM-226 from the fabric.*

- C. The following is typical application procedure to successfully apply PM-226 by *pad* at 100% wet pick-up. Following pad application, PM-226 requires a dry and cure. The minimum cure temperature recommended is 130°C (265°F).
- 15–30 g/L PM-226
 - 3 g/L EDTA
 - 3–5 g/L Acetic Acid (desired pH 4–5)

Nylon Application

- A. The following is a typical application procedure to successfully apply PM-226 during atmospheric dyeing.
 1. Scour and rinse the fabric.
 2. Weigh the proper amount of PM-226 to achieve 1.0–1.5% product as received on weight of goods (owg).
 3. With thorough agitation, add PM-226 to the mix tank, allow it to dissolve completely, then add carrier, acetic acid and other dye bath additives. Drop this mix into the jet. Rinse mix tank to remove residual solution.
 4. Add premixed dyes.
 5. Raise temperature to 88–95°C (190–200°F) at 1–2°C (2–4°F) per minute.
 6. Continue dyeing for 45 minutes or according to mill practice.
 7. Cool and overflow rinse according to mill practice.
 8. Pull fabric.
 9. Dry and heat set the fabric if normally done.
 10. Test fabric for absorbency and stain release performance

NOTES ON APPLICATION

Some fabrics are more difficult to treat than others due to yarn and/or fabric construction, and the recommendations given in the application procedures may not produce acceptable performance. The following suggestions are made if adequate performance is not obtained.

1.0% EDTA owg

The addition of EDTA chelating agent to the exhaust treatment has been found to enhance the PM-226 performance, particularly in the absence of disperse dyes. **Note:** *Addition of EDTA will generally produce a buffer around pH 9–10. Larger than normal additions of acetic acid (or use of an alternate acid) may be required to control the pH to below 5.*

2.5% Magnesium Chloride (MgCl₂), owg (product as received)

If the EDTA does not boost the PM-226 performance to an acceptable level, we recommend adding magnesium chloride. The addition of MgCl₂ to the exhaust treatment reduces the solubility of PM-226 at elevated temperatures and enhances the exhaustion of the product. Dissolve the MgCl₂ fully and add it before the disperse dyes. **Note:** *The MgCl₂ must be added as a separate drop after the PM-226 and other dye bath additives to avoid precipitation of the dyes and bath additives.*

2.0% PM-226, owg

Finally, the addition of more PM-226 will improve the performance results. We recommend evaluating higher chemical application levels. In some instances, it may be necessary to use a combination of two or all three of these recommendations. When a successful treatment is realized, the level of the products in these suggestions should be optimized.





DRY AND CURE CONDITIONS

PM-226 can be dried on fabric at temperatures used for normal heat setting or fabric finishing. Curing is not necessary (except as recommended under the pad application procedure) to obtain good performance, and normal heat setting will not adversely affect the imparted proper.

ENVIRONMENTAL HEALTH AND SAFETY

Before using this product, please read the current PM-226 Material Safety Data Sheet (available through your 3M sales or technical service representative), and the precautionary statement on the product package. Follow all applicable directions for personal protective equipment. When using auxiliary products with PM-3705, be sure to also review the appropriate Safety Data Sheet for each material used.

IMPORTANT NOTICE TO PURCHASER:

The information in this publication is based on the tests we believe are reliable. Your results may vary due to differences in test type and conditions. You must evaluate and determine whether the product is suitable for your intended application. Since conditions of product use are outside of our control and vary widely, the following is made in lieu of all express or implied warranties (including the warranties of merchantability or fitness for a particular purpose). Except where prohibited by law, 3M's only obligation and only remedy is replacement or, at 3M's option, refund of the original purchase price of the product that is shown to have been defective when you received it. In no case will 3M be liable for any direct, indirect, special, incidental, or consequential damages (including, without limitation, lost profits, goodwill, and business opportunity) based on breach of warranty, condition or contract, negligence, strict tort, or any other legal or equitable theory.



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