PROTECTIVE MATERIALS PRODUCT BULLETIN

Protective Material PM-2688

bluesign® APPROVED

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INTRODUCTION

Properties: PM-2688 is a developmental, hydrocarbon-based product designed to provide excellent durable dynamic water repellency (DWR) to many synthetic fabrics. It can be used on many fiber types and provides protective performance while maintaining fabric breathability. Additionally, PM-2688 has been used on polyester/cotton blends.

Use: PM-2688 offers excellent initial DWR performance as well as durability to repeated home launderings.

Environmental: PM-2688 does not contain alkyl phenol ethoxylate (APE) surfactants, and is not formulated with fluorine-containing compounds. Additionally, PM-2688 is not based on blocked isocyanate chemistry and contains no alkyl phenol ethoxylate (AFE) surfactants. Finally, there are no melamines or silicones used in the formulation of this product.

TYPICAL PROPERTIES

NOTE: THE PROPERTIES BELOW ARE NOT FOR SALES SPECIFICATION PURPOSES.

Appearance	Milky, white to amber dispersion
Typical Analysis	25% Solids 67% Water 8% Propylene glycol
Charge	Slightly cationic
Density	1.01 kg/l at 25°C.
pH	5.0 - 8.0
Shelf life	2 years from date of manufacture

PM-2688 is freeze/thaw stable to -20°C (-4°F). If exposed to freezing temperatures, return to a temperature above 5°C (41°F) before using. Avoid agitation during the thawing process as this can destabilize the dispersion.

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FABRIC PREPARATION

Fabrics to be treated with PM-2688 should be clean and as free as possible of residual processing agents. Materials such as sizes, alkalies, printing gums, dyeing auxiliaries, antifoams, wetting agents/surfactants, can all affect the absorbency and penetration of the treating bath into the fabric. The resulting uneven or inconsistent application can cause reduced durability and inferior repellency performance. Fabric pH (5.5 to 6.5) and percent alkalinity (as NaOH, preferably 0.0 to 0.05%) are recommended. In general, good fabric preparation practices should be followed to obtain the most efficient and effective performance from the product.

APPLICATION

PM-2688 is especially suitable to be used alone as a non-fluorochemical based DWR product. Typical application rates of PM-2688 range from 30-80 grams/liter treatment solution. It is suggested that any formulation first be evaluated in the laboratory, both for compatibility and for performance. Factors such as fiber content, yarn type, thread density, fabric basis weight, chemical additives and treating conditions all influence the level of PM-2688 needed to achieve the desired performance.

Formulations based on PM-2688 are typically applied continuously at the mill by padding, followed by drying/curing on a tenter frame. Padding can be accomplished on conventional mill padding equipment. Bath temperatures of 15°-40°C (60°-100°F) are generally suitable. PM-2688 is easily diluted with water. A wet pick up (WPU) of 20-40% is typical for lightweight, tightly woven low denier fabrics, while a WPU between 55-70% is typical on most other synthetic fabrics. Where mill WPU conditions differ from typical padding WPUs listed, it is necessary to adjust the pad bath concentration of PM-2688 to compensate for the different wet pick-up. For example, a fabric with very low wet pick-up may require a relatively higher pad-bath concentration of PM-2688 in order to deposit the desired amount of product solids on fabric.

Fugitive or non-rewetting agents may be used in order to achieve adequate and uniform wetting of the fabrics to ensure proper penetration into the fabric. Use of such agents, typically applied at 1 g/L, should be screened in the laboratory to ensure the DWR performance is not compromised.

CAUTION! Isopropyl alcohol is considered flammable. Follow all safety procedures. Additionally, some fugitive wetting agents may also have lower flash points. Consult wetting agent (and any other auxiliary) SDS for safe handling practices. Typically, PM-2688 is added after isopropyl alcohol and water; otherwise, flocculation may occur.

In the event of excessive foaming, a defoamer may be required. A non-silicone type is recommended. Always check defoamer or any other bath auxiliaries for overall compatibility and stability, and their effects on DWR performance. Silicones in particular are a known source of contamination, whether present in the bath or remaining on the fabric from a prior operation such as dyeing.

TYPICAL PAD APPLICATION OF 3M DEVELOPMENTAL PM-2688 PRODUCT

The following formulations are offered as a guide only for the application of PM-2688-based formulations on synthetic fabrics. Any formulation must first be evaluated in the laboratory for overall product performance and overall compatibility, and is the responsibility of the mill.

A. Polyester Woven fabrics—including Dobby, Pongee constructions.

0-2 ml/l Acetic acid (60%)

30-80 g/l PM-2688

Balance: water

B. Polyamide Woven fabrics—including Taslanized fabrics, Polyamide/Spandex blends.

0-2 ml/l Acetic acid (60%)

30-80 g/l PM-2688

Balance: water

C. Polyester/cotton Woven fabric.

0-2 ml/l Acetic acid (60%)

50-80 g/l PM-2688

0-10 g/l crosslinker (optional)

Note: Addition of fugitive wetting agent may be used for difficult-to-wet fabrics. See prior notes in "Application" section.

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DRY AND CURE CONDITIONS

The drying and curing of PM-2688 treatments is generally accomplished in one step, immediately after padding. Drying is typically accomplished in the first zones in a tenter frame oven, with curing occurring in the latter zones. Typical dry/cure conditions on a tenter frame are set at a range anywhere from 140°-180°C, with front and end zones using lower temperatures, and intermediate zones using higher temperatures. It is common to use intermediate zone settings between 160°-170°C. Typical dwell times range from 50-90 seconds using conventional tenter frames.

Fabric weight and wet pick-up are key variables in determining tenter frame oven settings and line speeds. Excessive heat exposure to disperse-dyed fabrics may lead to dye sublimation on fabric surface, which may cause reduced colorfastness and crockfastness.

ENVIRONMENTAL HEALTH AND SAFETY

Normal care should be taken to avoid skin contact, eye contact and prolonged breathing of vapors or dusts. Hands should be washed prior to smoking or eating. Before using this product, please read the current PM-2688 Safety Data Sheet (available through your local representative), and the precautionary statement on the product package. Follow all applicable directions.

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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