TECHNICAL DATA SHEET

Flexipel™ HR-100

Nonfluorinated Water Repellent

Overview

- Nonfluorinated water repellent developed for use on fabrics such as cotton, polyester, polyester/cotton blends, and acrylic.
- Economical mill applications with high performance can also be achieved with a 2:1 ratio of Flexipel HR-100 : short-chain cationic fluoropolymer emulsions. Performance was evaluated on fabrics including 100% cotton, 100% polyester, polyester/cotton blend, and 100% acrylic.
- Performance Summary
  Water / Alcohol Repellency:
  6 rating for all test fabrics
  Spray Rating:
  70-85 rating on the test fabrics
  Oil Repellency:
  3-5 rating on the test fabrics
- Dispersible in water at pH <6
- Low VOC

Applications

- Repellent extender for use with short-chain cationic fluoropolymer emulsions to improve water repellency, oil repellency, and spray rating
- Mill applications for cotton, polyester, polyester/cotton blends, and acrylic fabrics
- For use on apparel and upholstery fabrics
- Economical mill application with high performance for blends of Flexipel HR-100 with cationic short-chain fluoropolymer emulsions

Technical Information

Flexipel HR-100 imparts water repellency to commercial fabrics such as cotton, polyester, polyester/cotton blends, and acrylic with recommended use level of 2.5 - 7.5 weight %.

Flexipel HR-100 can also be used as an extender for cationic short-chain polymer emulsions.

In combination with cationic short-chain fluoropolymer emulsions, Flexipel HR-100 can improve water and oil repellency ratings to provide economical mill applications with high performance.

Environmentally responsible, Flexipel HR-100 is non-flammable and has low VOC content.

Formulary

A typical ratio of Flexipel HR-100 to cationic fluoropolymer emulsion is 2:1. It is preferable to keep the pH of the formulations and application baths below 6. Flexipel HR-100 is generally incompatible in alkaline formulations. For a 2:1 ratio of Flexipel HR-100 to cationic fluoropolymer emulsion, a concentrate of 12% Flexipel HR-100 solids and 6% fluoropolymer solids may be prepared by mixing 3 parts water into 5 parts Flexipel HR-100 with gentle, continuous, agitation, then adding 2 parts of a 30% solids cationic fluoropolymer dispersion with gentle, continuous, agitation. The concentrate mixture is added to the dip/nip bath typically at 2.5-10% which corresponds to fluoropolymer solids of 0.15-0.60% in the bath.
To obtain an alternate fluoropolymer ratio, the concentrate ratio and component quantities can be varied.

Typical Properties

PROPERTY	VALUE
Appearance	Hazy, viscous dispersion
Color	Light yellow to yellow
Odor	Mild
Ionic character	Cationic
Water solubility	Dispersible at pH<6 May be insoluble at pH>6
Total solids, %	24.0±1.0
pH (as is)	4.5±1.5
Density@25°C	1.01 g/ml
Boiling Point	approx. 100°C
Flash point	200°F
Storage	Perishable if frozen
Shelf life	12 months

Packaging and Handling

Flexipel HR-100 is available in:
275 gallon totes (Net Wt. 2250 lbs)
55 gallon plastic drums (Net Wt. 450 lbs)
5 gallon pails (Net Wt. 40 lbs.)

Refer to Material Safety Data Sheet (MSDS) for information on the safe use, handling, and disposal of this product.

DOT Classification: Non-Regulated

Whether you're looking for a replacement product or an ingredient for a specific attribute, give us a call. We can provide assistance based upon your particular formulation requirements and composition; please feel free to contact us.

Please refer to back page for important information

Flexipel HR-100 Performance Data

Water/Alcohol Repellency, Oil Repellency, and Spray Rating

Water and Oil Repellency are key performance parameters for textile soil and stain resistance, with fabrics that repel soil and staining liquid being more resistant. High spray rating provides a strong visual for water repellency.
In combination with cationic short-chain fluoropolymer emulsions, Flexipel HR-100 can improve the Water and Oil Repellency as well as the Spray Rating of treated fabrics.

Preparation of Test Fabric Surface Treatment
2.5-10% of an aqueous dilution of a 2:1 ratio (by solids) of Flexipel HR-100 : cationic fluoropolymer emulsion was applied with a dip/nip process and then dried at 120°C for 5 minutes (refer to Formulary Section for full details on preparation of the formulation and application baths).

Water/Alcohol Repellency Drop Test (DuPont Test Method)
To evaluate the water repellency of a treated fabric, the Water/Alcohol Repellency Drop Test is commonly used. In this test, a series of wetting solutions with increasing wetting power are applied to a treated test fabric, with treated surfaces repelling the strongest wetting solution achieving the highest repellency rating. Repellency was measured by applying 3 drops of a test liquid and observing wetting of the treated surfaces. Test liquids ranged from weakly wetting 2% isopropanol in water (1 rating) to strongly wetting 50% isopropanol in water (6 rating). If drops were repelled for longer than 10 seconds, the surface was judged to be repellent to that test liquid.

Oil Repellency Drop Test (AATCC Test Method 118-2002)
To evaluate the oil repellency of a treated fabric, the Oil Repellency Drop Test is commonly used. In this test, a series of solvent solutions with increasing solvent power are applied to a treated test fabric, with treated surfaces repelling the strongest solvent solution achieving the highest repellency rating. Repellency was measured by applying 3 drops of test liquid and observing wetting of the treated surfaces. Test liquids ranged from weakly wetting mineral oil (1 rating) to strongly wetting decane (6 rating). If drops were repelled for longer than 10 seconds, the surface was judged to be repellent to the test liquid.

Water Repellency Spray Test (AATCC Test Method 22-2005)
To evaluate the relative water repellency, and in particular the water beading performance of a treated fabric, the Water Repellency Spray Test is commonly used. In this test, 250 mls of distilled water is sprayed from a funnel fitted with a spray head suspended over a fabric stretched across an embroidery hoop positioned at a 45 degree angle and 6 inches beneath the spray head. The hoop is tapped against a solid surface to remove water beaded on the surface and the fabric is rated from 0-100 based on how much of the surface was wet, and the shape of the repelled/beaded water. A 0 rating is fully wet and a 100 rating has no wetting, with the formation of fine beads or pearls of water.

Performance Data
Data are listed for a 2:1 ratio (by solids) of Flexipel HR-100 to cationic fluorpolymer emulsion.
Test fabrics include cotton, polyester, polyester/cotton blends, and acrylic.

Water/Alcohol Repellency	6 rating
Oil Repellency	3-5 rating
Water Repellency Spray Test	70-85