Technical Data Sheet

DOWSIL™ HMW 2220 Non-Ionic Emulsion

INCI NAME: Divinyldimethicone/Dimethicone Copolymer (and) C12-13 Alketh-23 (and) C12-13 Alketh-3

Features & Benefits

- Small particle size emulsion of an extremely high viscosity polymer
- Ease of formulation/cold processing
- Compatible with non-ionic, cationic and anionic surfactants systems
- Not tested on animals

Skin Care

- Imparts rich feel to skin care formulations
- Wash-off resistance
- Film barrier properties
- Viscosity builder for water-in-silicone systems

Body Wash

- Superior foam profile
- Superior skin feel

Hair Care

- Increased fragrance intensity
- Prolonged fragrance release
- Prolonged hair color retention (color lock)
- Good wet/dry-detangling and smoothness without weighing hair down

Applications

DOWSIL™ HMW 2220 Non-Ionic Emulsion has been designed as a unique way of incorporating high viscosity polymer (> 120 x 10^6 mm^2/s) into water-based systems.

This product can be used in skin care and body wash applications including:

- Skin creams
- Facial cleansers
- Shower gels

This product can be used in hair care applications including:

- Shampoos
- Rinse-off and leave-in conditioners
- Styling products

Form No. 22-1846-01-0522 S2D

Typical Properties

Specification Writers: These values are not intended for use in preparing specifications.

Property	Unit	Result
Appearance		Milky-white to white liquid, free from particulate
Silicone content	wt%	60
Internal phase viscosity at 0.01 Hz	mm^2/s	> 120,000,000
pH		4.5–7.5
Particle size D50 (microtrac)	microns	< 0.6
Suitable diluent		Water
Emulsifier type		Non-ionic
Preservative system		Phenoxyethanol
Microbiological evaluation	cfu/ml	10 maximum
Cyclotetrasiloxane (D4) content	%	< 0.1
Cyclopentasiloxane (D5) content	%	< 0.1

Description

DOWSIL™ HMW 2220 Non-Ionic Emulsion is a 60% non-ionic emulsion of a very high viscosity (> 120 x 106 mm^2/s at 0.01 Hz) polydimethyl-siloxane/vinyl copolymer.

How to Use

DOWSIL™ HMW 2220 Non-Ionic Emulsion is best added at temperatures below 50°C (122°F) to minimize risk of emulsion separation. The recommended addition level is 2 to 5% silicone active.

How to Apply

Shower Gels

DOWSIL™ HMW 2220 Non-Ionic Emulsion should be added at the end of the process after the final water addition.

Skin Creams

DOWSIL™ HMW 2220 Non-Ionic Emulsion should be added at the end after the preparation of the cream base. Avoiding high shear mixing is important to prevent the emulsion breaking.

Benefits

Pure Product Data

Wash-Off Resistance

40% of DOWSIL HMW 2220 Non-Ionic Emulsion remains on the skin after 3 washes.

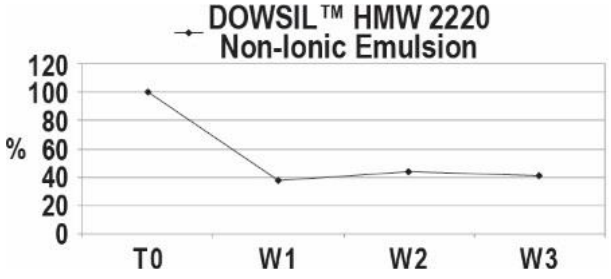

Figure 1: Wash-Off Resistance

Benefits (Cont.)

Skin Protection/Film Barrier Properties
DOWSIL™ HMW 2220 Non-Ionic Emulsion forms a protective film on skin.

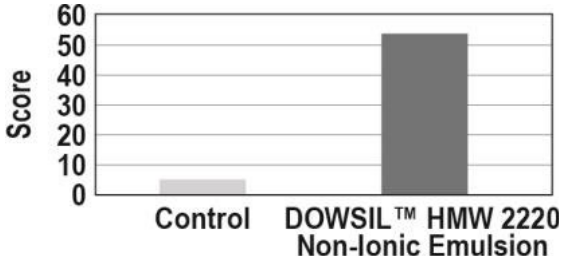

Figure 2: Skin Protection

Formulated Product Data
Shower Gel
Sensory Data
DOWSIL™ HMW 2220 Non-Ionic Emulsion generates foam faster than the control and gives a more creamy foam. Wet skin is more slippery and after drying, skin is smoother and more supple.

Test Results
Shower Gel Deposition

1. Spectrum of neat skin of volar forearm is taken
2. The test zone is washed with the shower gel
3. A spectrum is taken and the relative quantity of silicone is measured

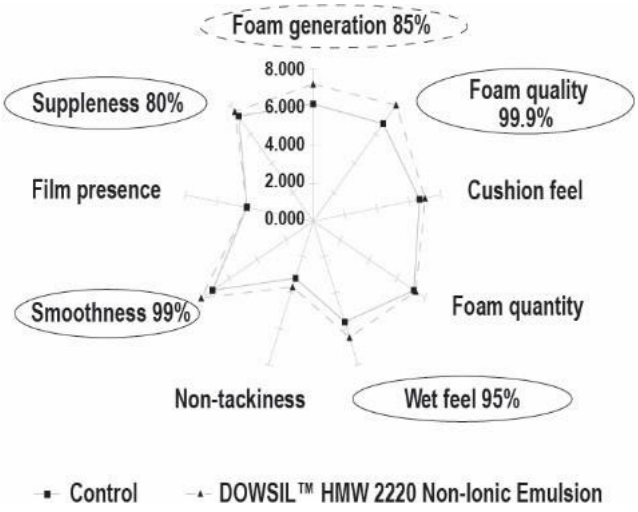

Figure 3: Sensory Profile for Shower Gel Containing DOWSIL™ HMW 2220 Non-Ionic Emulsion Versus Control

Benefits (Cont.)

Deposition Data
The presence of silicone can be detected on the skin after the use of the shower gel.

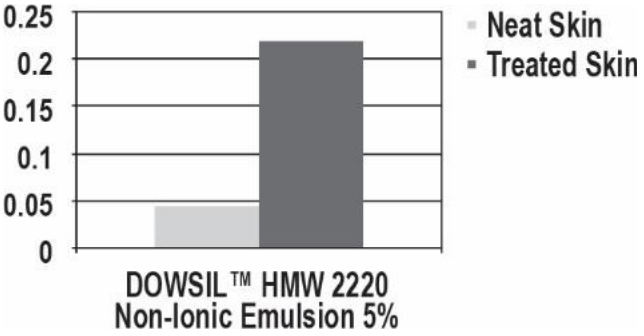

Figure 4: Deposition of DOWSIL™ HMW 2220 Non-Ionic Emulsion on Skin

Water in Silicone Creams
Sensory Data
A water-in-silicone cream containing 2.3% of DOWSIL™ HMW 2220 Non-Ionic Emulsion has been found to have a significantly different feel (99% confidence level) from the same cream without the silicone. In addition, the sensory threshold has been found to be very low to provide expected benefits.

Viscosity Data
DOWSIL™ HMW 2220 Non-Ionic Emulsion helps increase the viscosity of water-in-silicone creams. (See Table 1).

Table 1:
Viscosity Data

Ingredients	Control	DOWSIL™ HMW 2220 Non-Ionic Emulsion
Phase A		
DOWSIL™ 5225C Formulation Aid	10%	10%
XIAMETER™ PMX-0245 Cyclopentasiloxane	20%	18.6%
Phase B		
DOWSIL™ HMW 2220 Non-Ionic Emulsion		2.3%
NaCl	2.0%	2.0%
Water	68%	67.1%
Viscosity 24 hours	19200	72800
3 weeks	16000	46400

Handling Precautions

PRODUCT SAFETY INFORMATION REQUIRED FOR SAFE USE IS NOT INCLUDED IN THIS DOCUMENT. BEFORE HANDLING, READ PRODUCT AND SAFETY DATA SHEETS AND CONTAINER LABELS FOR SAFE USE, PHYSICAL AND HEALTH HAZARD INFORMATION. THE SAFETY DATA SHEET IS AVAILABLE ON THE DOW WEBSITE AT DOW.COM, OR FROM YOUR DOW SALES APPLICATION ENGINEER, OR DISTRIBUTOR, OR BY CALLING DOW CUSTOMER SERVICE.

Usable Life and Storage

When stored between 5°C (41°F) and 32°C (89°F) in the original unopened containers, this product has a usable life of 18 months from the date of production.

Packaging Information

This product is available in 20 kg pails and 200 kg drums.

Samples are available in 250 g.

Limitations

This product is neither tested nor represented as suitable for medical or pharmaceutical uses.

Health and Environmental Information

To support customers in their product safety needs, Dow has an extensive Product Stewardship organization and a team of product safety and regulatory compliance specialists available in each area.

For further information, please see our website, dow.com or consult your local Dow representative.

Disposal Considerations

Dispose in accordance with all local, state (provincial) and federal regulations. Empty containers may contain hazardous residues. This material and its container must be disposed in a safe and legal manner.

It is the user's responsibility to verify that treatment and disposal procedures comply with local, state (provincial) and federal regulations. Contact your Dow Technical Representative for more information.

Product Stewardship

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with each and every individual involved with Dow products - from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Customer Notice

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support. Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

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