



RHOPLEX™ E-32 NP and RHOPLEX E-358 Emulsions
 Versatile, Solvent-Resistant, Durable, Acrylic Binders for Nonwovens

Regional Product Availability

- North America

Description

RHOPLEX™ E-32 NP and RHOPLEX E-358 Acrylic Emulsions are self-crosslinking polymers which offer excellent strength and solvent resistance to both durable and disposable nonwovens. They perform well with synthetic fibers, cellulose and blends and can be used on conventional bonding, drying and curing lines. Both water-based emulsions are hydrophilic, impart an intermediate hand and are suitable where maximum durability to washing or dry cleaning is required.

Typical Applications

These versatile emulsions can be used in various applications including interlinings, wet wipes and home furnishings. They are especially suitable for applications where the bonded web will be subjected to some solvents such as those used in dry cleaning or industrial wipes. In addition, RHOPLEX™ E-32 NP Emulsion and RHOPLEX E-358 Emulsion are able to withstand long term exposure to lotions such as those found in premoistened towelettes. RHOPLEX E-358 Emulsion is supplied as a high solids (60%) emulsion making it suitable for bonding composite nonwovens such as scrim laminates where rapid drying is required.

Key Features

- Excellent solvent resistance to some solvents used in dry cleaning or industrial wipes
- Excellent durability to washing and dry cleaning
- Excellent wet and dry tensile strength
- Intermediate hand

Typical Physical Properties

(These properties are typical but do not constitute specifications.)

Property	RHOPLEX™ E-32 NP Emulsion	RHOPLEX E-358 Emulsion
Appearance	Milky-white liquid	Milky white liquid
Type	Self-crosslinking acrylic	Self-crosslinking acrylic
Ionic Charge	Nonionic	Nonionic
Solids Content, %	46	60
pH (as packed)	2.5	7.0
Brookfield Viscosity at 25°C, cP	50	300
Glass Transition Temperature, Tg °C (DSC method)	+5	+8
Density, 25°C lb/US gal kg/l	8.8 1.06	8.9 1.07

Typical Performance Features

Table 1 shows that webs bonded with RHOPLEX™ E-32 NP Emulsion and RHOPLEX E-358 Emulsion have excellent tensile strength under both dry and wet conditions. Both the carded rayon and polyester webs bonded with these binders survived 10 wash cycles or 5 commercial dry cleaning cycles, demonstrating their excellent durability. Table 1 also compares the hand and drape-flex of these emulsions. RHOPLEX NW-2744F Emulsion, a general purpose, low formaldehyde, self-crosslinking nonwoven binder with a softer hand ($T_g = -11^\circ\text{C}$), was included for comparison. All webs were bonded, dried, cured, and tested under laboratory conditions.

Table 1 – Properties of Carded Nonwoven Webs^a
Bonded with RHOPLEX™ E-32 NP Emulsion, RHOPLEX E-358 Emulsion
and RHOPLEX NW-2744F Emulsion
 (These properties are typical but do not constitute specifications.)

	RHOPLEX™ E-32 NP Emulsion	RHOPLEX E-358 Emulsion	RHOPLEX NW-2744F Emulsion
Rayon Webs			
Tensile, g/inch width (MD/CMD)			
Dry	3000/500	3200/500	2900/500
Water wet	1100/300	1400/300	1200/200
Isopropanol wet	2500/300	2400/400	2000/300
Hand ^b	3.1	3.9	1.9
Drape-Flex ^c , mm	74	79	64
Polyester Webs			
Tensile, g/inch width (MD/CMD)			
Dry	4300/1100	4500/1300	4200/1000
Water wet	2700/600	2600/700	2400/600
Isopropanol wet	1700/400	1800/400	1000/400
Hand ^b	2.3	2.3	1.0
Drape-Flex, mm	110	114	92

^aPrebonded with 0.25% polyvinyl alcohol; fiber/binder

^bAverage rating of 7 panelists; lower numbers = softer hand.

^cLength of unsupported sample strips (MD) required for a 41.5° overhang.

Formulation Guidelines

Crosslinking

As self-crosslinking acrylic emulsions, neither RHOPLEX™ E-32 NP Emulsion nor RHOPLEX E-358 Emulsion require the addition of an external crosslinking agent for durability or wet strength. However where maximum solvent resistance is required, a thermosetting resin such as methylated melamine formaldehyde resin at 0.5 to 3% solids on emulsion solids can be used.

Catalyst

Acid catalysts such as ammonium nitrate and oxalic acid can be used to accelerate the cure of RHOPLEX E-32 NP Emulsion and RHOPLEX E-358 Emulsion where curing capacity is limited. The following levels of catalyst are recommended:

Catalyst	Concentration (solids on emulsion solids)	Comment
oxalic acid	0.5%	Add as a 10% solution
ammonium nitrate	1.5%	Add as a 25% solution

Formulation
Guidelines (cont.)

Surfactant

A nonionic surfactant is recommended in the formulation to achieve better wetting of the fibers. This surfactant should be used at a starting level of 0.5% solids on polymer solids and diluted with at least 3 times its weight of warm water before being added to the formulation. An anionic surfactant should be used where rewetting properties in the end product are desirable. The same solids level and predilution can be used.

Defoamer

A general purpose defoamer is recommended with RHOPLEX™ E- 32 NP or RHOPLEX E-358 Emulsion at a starting level of 0.05 to 0.1% (product as supplied) on the total weight of the formulation. Prior to use, any defoamer should be pre-emulsified with at least an equal weight of warm water and added to the emulsion, under agitation, before other compounding agents.

pH

To maximize emulsion shear stability, the pH of the bath should be adjusted to 8.0 to 8.5 with a volatile base such as ammonium hydroxide.

Starting Point
Formulations

The following formulations are offered as starting points for general purpose polyester nonwovens. For a specific balance of properties, recommendations will be provided upon request.

General Purpose Durable Polyester Nonwoven Formulation Using RHOPLEX™ E-32 NP Emulsion or RHOPLEX E-358 Emulsion Binder

Ingredients in Order of Addition	Parts Product by Weight (as supplied)		Parts Product on a Solids Basis	
Water	67.04	74.34	—	—
General purpose defoamer	0.10	0.10	0.10	0.10
Warm water premix	0.10	0.10	—	—
Nonionic Surfactant	0.07	0.07	0.07	0.07
Warm water premix	0.21	0.21	—	—
RHOPLEX E-32 NP Emulsion	31.60	—	14.55	—
RHOPLEX E-358 Emulsion	—	24.30	—	14.57
Ammonium nitrate, (25%)	0.88	0.88	0.22	0.22
Ammonium hydroxide	to pH 8.0 to 8.5	to pH 8.0 to 8.5		
Total	100.00	100.00	14.94	14.96

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