



NeoResins

NeoPac R-9699

A low cost, high solids water borne urethane/acrylic copolymer for air dry coating.

NeoPac R-9699 is a low cost, high solids water borne urethane/acrylic copolymer, specifically designed for high performance uses, where hardness, flexibility, chemical and abrasion resistance are required.

The aliphatic backbone of NeoPac R-9699 provides excellent UV resistance, which makes it particularly useful in exterior applications.

NeoPac R-9699 is cosolvent free, providing wide formulation latitude.

Suggested Markets: Automotive Plastic, Metal Coatings, General Plastic Coatings, Floor Finishes & Brushing Varnishes

Key Benefits

- Low Cost
- High Solids
- UV Resistant
- Abrasion Resistant
- Chemical Resistant
- Impact Resistant
- Flexible

Typical Properties

Appearance	Translucent dispersion
Type	Urethane/acrylic copolymer
Total solids, by weight, %	40.0
Total solids, by volume, %	35.6
pH	8.3
Viscosity, Brookfield, cps, 25°C	100
Weight per gallon, lbs, 25°C	8.80
Elongation, %	160
Specific gravity of solids, 25°C	1.07
Freeze/thaw stability, cycles passed	5
Thermal stability, one month, 52°C	Satisfactory
Mechanical stability	Satisfactory
Acid number, on solids	15
VOC, pounds per gallon minus water, (g/l)	0.25 (30.0)
Volatile Organic Compounds, by weight:	
Triethylamine, %	1.1
Shelf life	1 year

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January 2004



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FORMULATION SUGGESTIONS

Coalescing Solvents

The addition of coalescing solvents to NeoPac R-9699 is required in order to form a good film. Butyl Cellosolve, Carbitol, and Butyl Carbitol are excellent coalescents. It is recommended that blending Butyl Cellosolve with Carbitol or Butyl Carbitol be used at 35% on polymer solids. All additions of coalescents should be premixed with a suitable amount of water to prevent shocking.

Flash Rusting

In high humidity conditions, a flash rust inhibitor is required with NeoPac R-9699. Ammonium Benzoate diluted to 10% in water is very effective in reducing flash rusting.

Mar Agents

If Mar resistance is required, BYK 301 can be used with NeoPac R-9699.

BYK 301

1-2 pounds/100 gallons

Flow and Wetting Agents

Triton GR-7M or Fluorad FC120 can be added at the following levels in order to obtain optimum leveling and substrate wetting with NeoPac R-9699.

Triton GR-7M

0.5-1.0% total formulation

Fluorad FC-120

0.1-0.3% total formulation

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FORMULATION SUGGESTIONS (Cont'd)

Crosslinking

Air dry crosslinkers such as Crosslinker CX-100 may be incorporated in NeoPac R-9699 to improve such properties as water resistance, humidity resistance, corrosion resistance and adhesion.

Crosslinker CX-100	3-5% by weight on resin solids
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Thickening

Addition of external thickeners may be required to increase the viscosity of formulations based on NeoPac R-9699. The following thickeners are recommended in NeoPac R-9699.

Acrysol ASE-60	0.1-0.3% active based on total formulation
Acrysol RM-825	0.1-0.3% active based on total formulation
DSX 1514	0.1-0.3% active based on total formulation

Dispersants

In pigmented formulations of NeoPac R-9699, the following dispersants are recommended.

Triton CF 10 (100%)	0.5-2.0% solids on pigment
Tamol 165 (21.5%)	0.5-2.0% solids on pigment

Defoamers

The following defoamers are suggested for NeoPac R-9699.

Dehydran 1620	1-3 lbs per 100 gallons
Drew Plus L-483	0.5-2 lbs per 100 gallons

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CLEAR FILM PROPERTIES

NeoPac R-9699 will produce films with exceptional flexibility and abrasion resistance.

TABLE 1
Application Properties of Clear Films
Based on NeoPac R-9699
(Formulation WB-2010)
(70.1°F, 48% RH)

Dry Time		Hardness Development		
Set to touch, min	31		König	Sward
Dry to touch, min	45	4 hrs	49	8
Through dry, min	66	8 hrs	68	12
		24 hrs	82	18
		48 hours	90	20
		1 week	105	22

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TABLE II
Physical Performance Properties of Clear Film*
(Formulation WB-2010)
Based on NeoPac R-9699

Pencil Hardness	H-2H
Taber Abrasion (mg - loss per 1000 cycles, CS-17 wheel, 1000 gram load)	96
Impact Resistance, in - lb	
Direct, pass/fail	160/--
Reverse, pass/fail	160/--
Free Film Properties	
100% Modulus, psi	3800
Tensile Strength, psi	4400
Elongation, %	160
QUV weatherometer (Alclad Aluminum, 1000 hrs)	
Oxidation	NE
Blistering	NE
Yellowing	NE
Loss of Gloss	NE

*Film cast on cold rolled at 1.0 mil DFT, air dried for 7 days.

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CHEMICAL, WATER, HUMIDITY AND CORROSION RESISTANCE

Clear coatings based on NeoPac R-9699 show excellent chemical resistance. Water, humidity, and corrosion resistance can be substantially enhanced by addition of an air dry crosslinking agent such as Crosslinker CX-100.

TABLE III
Chemical, water, humidity and corrosion resistance
(Formulation WB-2010)
(1.0 mil dry films on cold rolled steel, force dried 200°F for 20")

CHEMICAL RESISTANCE
(one hour spot test, one hour recovery)

MEK Double Rubs (100)	Pass
Toluene Spot	NE
Gasoline Spot	NE
IPA Spot	NE
Ethanol Spot	NE
Methanol Spot	NE
O.IN NaOH	NE
Stain Resistance	
Mustard	Slight Stain
Vodka	NE
Ketchup	NE
Lipstick	NE
Fantastik	NE
Hot Coffee	NE

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TABLE III (Cont'd)

**WATER-SOAK RESISTANCE
(100°F, 100% RH, 300 Hours)**

Rusting (ASTM D610)	Slight #8
Blistering (ASTM D714)	Dense #8
Whitening	NE
Loss in Gloss	NE

**HUMIDITY RESISTANCE
(100°F, 100% RH, 300 Hours)**

Rusting (ASTM D610)	NE
Blistering (ASTM D714)	Dense #8
Whitening	NE
Loss in Gloss	NE

**SALT SPRAY RESISTANCE
(5% NaCl, 95°F)**

200 Hours Unscribed	
Rusting (ASTM D610)	NE
Blistering (ASTM D714)	NE

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COMPATIBILITY

In many instances, blending NeoPac R-9699 with NeoCryl acrylic emulsions can enhance specific properties such as adhesion and gloss. The following table displays the compatibility of NeoPac R-9699 versus NeoCryl Acrylic Emulsions.

TABLE IV
Percent NeoPac R-9699 on solids basis

NeoCryl Resin	75%	50%	25%
A-601	H	SH	C
A-614	H	SH	C
A-622	H	H	H
A-633	H	H	H
A-634	H	SH	C
A-655	H	H	H
A-6015	H	SH	C

Key:

C = Clear
SH = Slight Haze
H = Haze

Starting Point Formulas

WB-2010 Clear Gloss Metal Coating
WB-2009 High Gloss White Spray Enamel

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Raw Material Suppliers

Material

Supplier

Heiscore XAB

Cas Chem
(201) 858-7907

Triton CF-10
Butyl Cellosolve
Carbitol
Triton GR-7M

Union Carbide
(800) 335-8550

BYK 301

BYK-Chemie USA
(203) 265-2086

Drew Plus L-483

Ashland Chemical Company
Drew Division
(800) 526-1015

Surfynol 104A

Air Products
(800) 345-3148

Tamol 165

Rohm & Haas
(215) 592-3000

Zopaque RCL-9

SCM Chemicals, Inc.
(800) 638-3234

Dehydran 1620

Henkel
(215) 628-1000

Silane Z-6040

Dow Corning
(800) 252-9899

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