

# Environmental Protective Coatings, Inc.

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## Product Information:

### NU Roof Elastomeric Roof Coating Product

**Description:** NU Roof is a superior grade elastomeric coating formulated for excellent flexibility and durability over most conventional roof substrates. This product is highly water resistant and produces a seamless membrane that actually expands and contracts with changes in weather. NU Roof elastomeric remains flexible even in sub-zero temperatures and is highly UV resistant. Application is fast and easy which reduces costs over conventional roofing methods.

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#### Uses:

Galvanized metal Polyurethane foam Aged built up roofs Cured concrete Asphalt shingles Wood

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#### Performance Information:

Superior exterior durability, Reduces Thermal Shock · Superior UV resistance Low temperature flexibility down to -20F Long term resistance to dirt pick-up Excellent adhesion to most roof substrates Super wet and dry adhesion Highly water resistant· Very economical compared to alternatives Easy soap and water clean-up

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#### Characteristics:

Color - White, custom colors  
 Finish - Flat. 3-6 units at BOF  
 Drying time - @ 77F and 50% relative humidity  
 TO TOUCH: 1 hour  
 TO RECOAT: 8 hours  
 Coverage - 100 sq. ft./gal. @ 16 mils wet (theoretical, no loss)  
 Flash point - 201 F (PMGCJ)  
 Volume solids - 50.8% VOC - 40gms/liter PVC-42.9%  
 Weight solids - 65.9% Weight per gallon - 12.11 Lbs.  
 Viscosity - 104KU  
 Tensile strength - 283psi Elongation - 245% Permeability @ 25 mils dry - 1.25 perms  
 Resistance to pounding water - 0.0456gms/24hrs

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Website: <http://www.enviroprotectcoatings.com>

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### Application:

Method - Brush, roll or spray&nbsp;

Brush - Full body - 20 mils wet

Roll - Full body - 20 mils wet

Airless spray Pressure

3000psi - 5000 PSI

**Fluid hose** - 1 /4' 10 lip - .025-.029' - 0.36'

**Reduction** - None recommended

**Clean up** - Water Storage -DO NOT FREEZE

**Mixing** - Mix thoroughly before use

**Cracks in substrate** - Repair with acrylic caulk and spun-glass cloth if necessary

**Pounding areas** - Build up with sufficient material to allow for drainage

**Multiple coats** - Apply 2 to 3 coats allowing sufficient time between coats for drying

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## NU-ROOF General Introduction

Thanks to Environmental Protective Coatings, Inc. improved technology, we are able to introduce a much improved elastomeric acrylic coating to roof owner users. We have incorporated our superior acrylic polymers into an elastomeric base for an ultimate insulation believed to be far superior to any other conventional coating now available.

Although acrylic latex polymers are known for their exterior durability and ultraviolet resistance, early roofing applications were occasionally problematic because the polymers were designed for applications other than roofing. The new acrylics for roofing, however, are internally plasticized to maintain elastomeric properties, such as high and low-temperature flexibility. In addition, they are combined with unique chemistries that provide both long-term dirt pick-up resistance and outstanding adhesion to many roofing substrates.

The durable 100% acrylic-based coatings can be easily applied over a variety of roofing substrates including aged built-up, polyurethane foam, asbestos, galvanized steel, asphalt shingles, or cured concrete, and offer the following benefits: Superior exterior durability and UV light resistance High temperature stability Low-temperature flexibility down to -15 degrees. Dirt pick-up resistance Excellent adhesion to polyurethane foam and many other substrates High reflectivity which reduces roof surface temperatures, thereby prolonging roof life and reducing interior temperatures and energy costs Easy application

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by spray, brush, or roller - thus lowering application costs Low toxicity and odor Simple water cleanup for manufacturers and contractors

NU-ROOF latex was specifically designed for superior wet and dry adhesion to low and high-density foam. NU-ROOF also exhibits excellent adhesion to a variety of other construction substrates.

## Typical Performance properties of NU-ROOF Elastomeric Roof Coating

Listed below are the individual properties inherent in NU-ROOF technology. It is important to remember that it is the balance of these properties that is unique to this chemistry. Although coatings based upon other technologies may exhibit excellence in one or two performance properties, it is the combination of all the properties that is required for a successful elastomeric roof coating.

### Durability

Since the advent of Plexiglas acrylic plastic sheet during World War II, acrylics have been known for their exceptional durability, offering unequaled resistance to degradation by sunlight and moisture. It was the UV resistance of the acrylic polymer - the lack of which is the major cause of failure in conventional roof systems - that first led manufacturers to consider acrylic polymers for elastomeric roof coatings. Through NU-ROOF technology these acrylic polymers have been tailored specifically for elastomeric roofing applications, although NU-ROOF affords many more hi-tech and practical uses, such as hot and cold industrial plant pipes.

### Low Temperature Flexibility

Coatings for dimensionally unstable roofing substrates must have long-term low-temperature flexibility. This is necessary to accommodate thermal expansion and contraction of the substrate, so that coatings will not fail over an extended period of time or with extreme weather conditions. It should be remembered that the effects of extreme weather conditions are not restricted to cold climates. Evaporation of water after a sudden thunderstorm on a hot day in any geographic location can rapidly drop the roof temperature as much as 100 degrees, causing severe thermal stress on the roof surface. Roof coatings based on NU-ROOF technology can withstand a 180 degree flexibility bend at -15 degrees without cracking. Since there is no plasticizer to migrate from the

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system, this flexibility is retained over time. Long term resistance to cracking extends the life of the roof. It is important to note that elastomeric roof coatings should exhibit good mechanical properties at room and low temperatures before and after exterior exposure.

## Stop Leaks

NU-ROOF stops most small holes by application directly to surface substrate.

## Tensile Strength and Elongation

Thermal movement of a roof requires high tensile strength and elongation as well. The tolerance for movement of these coatings is essential due to the dynamic nature of a roofing substrate which expands and contracts due to climatic conditions and the shifting and settling of the foundation. These properties also give properly-formulated elastomeric roof coatings the needed flexibility and elasticity to withstand impact from foot traffic and other abuse without rupturing.

Dirt Pickup Resistance Polymers designed for NU-ROOF elastomeric roof coatings combine the inherent flexibility of pliable, low Tg polymers with long-term resistance to dirt pickup. Without dirt pickup resistance, the roof coatings would quickly darken with age. Because dark materials tend to absorb heat, dirt pickup can significantly increase roof surface temperatures which, in turn, increases interior temperatures and energy costs. NU-ROOF-based coatings, however, resist dirt pickup and retain their white, reflective appearance. Test roofs have shown that after five years of exposure, the surface temperature of the NU-ROOF-based acrylic coating was 35 degrees cooler than that of a conventional caulk polymer coating and 85 degrees cooler than a black uncoated roof.

## NU-ROOF Elastomeric Coatings

Although designed specifically for superior wet and dry adhesion to high and low density polyurethane foam, elastomeric roof coatings properly formulated with NU-ROOF latex polymer exhibit excellent adhesion to other typical roofing substrates. A variety of ceramics, color chips and metal oxide pigments can be used to produce tinted roofs. NU-ROOF-based elastomeric roof coating formulations can vary due to different climates.

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### Actual Performance Properties of NU-ROOF Elastomeric Roof Coating

Tensile Strength and Elongation NU-ROOF insulating coatings expand and contract along the roofing substrate to which they are applied because of their excellent tensile strength, elongation and recovery properties. Resistance to cracking will be maintained upon long-term exterior exposure because NU-ROOF acrylic does not require a plasticizer. Typical tensile strength, elongation and recovery properties of NU-ROOF elastomeric roof coating are shown in Table 1.

**Table 1** - Typical Mechanical Properties of NU-ROOF Elastomeric Roof Coatings  
 Mechanical Properties After Two-Week Cure 700 / 50% Relative Humidity

Property	74 Degrees F	32 Degrees F	0 Degrees F
Percent Recovery	65 (65)	54 (65)	63 (52)
<b>Percent Elongation</b>			
Maximum Stress	240 (140)	120 (110)	80 (70)
Break	245 (230)	215 (180)	130 (120)
<b>Tensile Strength (psi)</b>			
Maximum Stress	173 (242)	245 (394)	728 (699)
Break	167 (232)	220 (385)	659 (699)

### Note:

The numbers in parenthesis are after an additional 50 hours Weather-Ometer exposure. These numbers show noticeably lower elongation and higher tensile strength than after only a two-week cure. The additional Weather-Ometer exposure ensures complete cure of the mastic and also leaches out the water-sensitive components of the formulation, e.g. ethylene glycol, HEC thickener and dispersants which act to hydroplasticize the roof mastic film. The use of 50-hour Weather-Ometer exposure or a "zero-point" is recommended for monitoring changes that occur in accelerated or real-world exposure studies.

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## Other Performance Properties

### *Mechanical Properties*

Room Temperature Tensile Strength	670 psi
Room Temperature Elongation	460%
0 Degrees F Tensile Strength	2100 psi
0 Degrees F Elongation	100%

**Low Temperature Flexibility @ 180 degrees Bend** Passes @ -25degrees F  
**Clear track Firm** Low

### *Adhesion to PUF*

Dry (pound/inch)	5 A/C
Wet (pound/inch)	2A

**Perms** 14

**Water Swelling (30 days)** 8%

## **Dirt Pickup-Resistance and Low-Temperature Flexibility**

The combination of dirt pickup resistance and low-temperature flexibility is unique to NU-ROOF based on acrylic polymers formulated in NU-ROOF. Surfaces coated with these formulations retain the initial white, reflective color, thereby decreasing the exterior surface temperature of the roof and further reducing interior building temperatures. This could mean a savings in air conditioning costs. It is necessary for roof mastics to have low-temperature flexibility because they must accommodate the thermal expansion and contraction of the roof substrate. In addition, they must resist the impact of hailstones prevalent in most climates. Our NU-ROOF formulation can be bent over 180 degrees over a 1/8 inch mandrel at 15 degrees without breaking.

Superior Adhesion to Polyurethane Foam Formulations based on NU-ROOF technology acrylics exhibit superior adhesion to polyurethane foam. The standard 180 degree peel adhesion test measures the wet and dry adhesion properties of an elastomeric roof coating formulation. Samples of NU-ROOF acrylic were tested on an Inston Unit. According to test results, the weakest point was found to be in the cohesive strength of the foam rather than the bond between the roof mastic and the foam. The adhesion data reveal that formulation of NU-ROOF elastomeric actually tore the adhesion during the test. This type of failure is referred to as cohesive failure in the substrate. The conventional acrylic

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roof mastic failed adhesively in the same test, and the values were significantly lower than those recorded for our NU-ROOF formulation. The excellent peel adhesion data obtained in the laboratory were also found in the tests run under the exterior exposure conditions. Results appear in Tables 2 and 3.

**Table 2** - Adhesion to Polyurethane Foam Formulation

Formulation Binder	NU-ROOF		Conventional Acrylic Binder Roof Mastic Latex	
	Peel Adhesion (lb./in.)		Peel Adhesion (lb/in.)	
Foam Density (lb./ft)	Dry(1)	Wet(2)	Dry (1)	Wet(2)
2.5(3)	5.0 C	3.0 C	1.0 A	< 0.2 A
3.5 (3)	3.5 C	2.0 C	1.0 A	< 0.2A
4.0 (4)	3.6 C	3.5 C	1.0 A	< 0.2A

A = Adhesive Interfacial Failure  
 C = Cohesive Failure in Substrate

- (1) Sample cured two weeks at 75°F/25°C and 50% relative humidity and tested.  
 (2) Sample cured two weeks at 75°F/25°C and 50% relative humidity and then immersed in water for one week and tested while wet.  
 (3) Smooth surface texture.  
 (4) Orange peel surface texture.

**Table 3** - Adhesion of NU-ROOF Acrylic to Polyurethane Foam after Exterior Exposure

Cure Time	Adhesion	Failure
One week dry (1)	4.8 lb./in.	Cohesive
One week dry plus one week water soak (2)	4.1 lb./in.	Cohesive
Eight Weeks exterior (3)	4.4 lb./in.	Cohesive
Twenty-eight weeks exterior (3)	4.0 lb./in.	Cohesive
Two years exterior	5.0 lb./in.	Cohesive

- (1) Sample cured two weeks at 75°F/25°C and 50% relative humidity and tested.  
 (2) Sample cured two weeks at 75°F/25°C and 50% relative humidity and then immersed in water for one week and tested while wet.  
 (3) Samples exposed horizontal face up, Southeastern Pennsylvania. Samples not cured in the laboratory.

Early prototypes of NU-ROOF based coatings have been on exposure since the late 1980's and in actual roofing applications since 1989. These exposures continue to demonstrate excellent performance.

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NU-ROOF elastomeric roof coating formulation also has excellent adhesion to many common construction substrates.

Some examples are in Table 4.

**Table 4** -Adhesion of NU-ROOF Elastomeric to Common Construction Substrates

Substrate	Peel Adhesion (lb./in.)	
	Dry (1)	Wet (2)
Polyurethane Foam	5.0 cp	3.5 cp
Galvanized Steel	5.0 cp	2.0 cp
White Pine	6.0 cp	0.5 A
APP Modified Bitumen	1.3	0.4 A
Asphalt Shingles	1.5 A	0.5 A

A = Adhesive Failure  
CP = Cohesive Peak Failure

(1) Sample cured two weeks at 75°F/25°C and 50% relative humidity and tested.

(2) Sample cured two weeks at 75°F/25°C and 50% relative humidity and then immersed in water for one week and tested while wet.

## Safe Handling Information

Based on final composition, NU-ROOF elastomeric acrylics are not expected to be acutely toxic. There may be a slight moderate skin, eye, or respiratory irritant.

NU-ROOF Material Safety Data Sheets (MSDS) contain pertinent data that you may need to protect your employees and customers against any known health or safety hazards associated with our products.

Under the OSHA Hazard Communication standard, workers must have access to and understand MSDS on all hazardous substances to which they are exposed. Thus, it is important that you provide appropriate training and information to your employees and make sure they have available to them MSDS on any hazardous products in their workplace.

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