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**DESCRIPTION:**

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Nukote FR is a fast set, Class 1 fire-rated, multi component, 1:1, 100% solids, hot liquid applied, modified polyurea liner system for wood, metal, concrete, fiberglass and other substrates. Nukote FR is designed as a fire rated membrane and also performs well in anticorrosion and waterproofing applications on steel, concrete, and many other substrates. Nukote FR can be applied at temperatures ranging from -22° to 250° F (-30° to 120° C). Nukote FR displays excellent fire resistance properties, chemical resistance, and thermal stability and UV resistance. Nukote FR exhibits very good resistance to aggressive termites. Its moisture insensitivity makes it suitable for application on wooden utility poles.

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**FEATURES:**

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- Meets ASTM E-84 Class 1 Fire Test Criteria
- 100% solids with zero VOC
- Fast reactivity and cure time resulting in almost immediate return-to-service time
- Can be applied in -22 °F (-30 °C) and upwards
- Performs in constant temperatures from -22 °F to 250 °F (-30 °C to 120 °C)
- Retains physical properties on weathering
- Good elongation properties
- Seamless, resilient, flexible and tough
- Chemical resistance (consult NCSI)
- Good corrosion protection
- Impact, tear and abrasion resistance
- Low temperature flexibility

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**TYPICAL USES:**

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- General fire protection on wood, utility poles, steel structures
- General waterproofing combined with fire protection on concrete
- Tunnel linings with improved fire rating properties
- Warehouse floorings for highly inflammable products
- Cargo holds, cargo liners
- Boat lining
- Horse trailers, walkways
- Encapsulation and protection of Fiberglass bodies
- Encapsulation and protection of Polystyrene, PU spray foams
- Secondary containments

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**COLORS:**

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Standard green. Custom colors, blended to match any RAL number, are available upon request subject to minimum quantity.

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**PACKAGING:**

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100-gallon (380-liter) drum sets shipped in metal drums of 50 gallons (190 liters) Side A, 44 gallons (166.5 liters) Side B and 6 gallons (23.5 liters) of side C

10-gallon (38-liter) kits shipped in plastic pails of 5 gallons (19 liters) of side A, 4.4 gallons (16.65 liters) of side B and 0.6 gallons (2.35 liters) of Side C.

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**COVERAGE:**

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Nukote FR may be applied at any rate to achieve the desired thickness.

Calculation for theoretical coverage: 40 ft<sup>2</sup>/gal @ 40 mils (1 m<sup>2</sup>/liter @ 1mm).

**STORAGE:**

Six months in factory delivered, unopened drums. Store on pallets and keep away from extreme heat, freezing, and moisture. The use of drum heaters is encouraged to reduce material viscosity at low temperatures.

<b>TECHNICAL DATA (All values @ 77 °F / 25 °C)</b>	<b>US</b>	<b>Metric</b>
Solids by volume (ASTM D2697)	100%	100%
Volatile organic compounds (ASTM D2369)	0 lb./gal	0 gm/ lit
Theoretical coverage	40 ft <sup>2</sup> /gal @ 40 mils	1m <sup>2</sup> / lit @ 1mm
Specific Gravity of materials (ASTM D792)	Mixed: 13.06 lbs./gal	Mixed: 1.570 kg/ liter
Viscosity at 158 °F/70 °C in cps ±10% (ASTM D4878)	A:150±50, B: 200±20	A:150±50, B: 200±20
Shelf life @ 77 °F/25 °C	6 months	6 months
Tensile strength (ASTM D412-C)	1600 ± 200 psi	11 ± 1.5 MPa
Elongation (ASTM D412-C)	45 ± 20 %	45 ± 20 %
Hardness (ASTM D2240)	50 ± 5 Shore D	50 ± 5 Shore D
Flexibility (2mm mandrel ASTM D522)	Pass	Pass
Water vapour transmission rate (ASTM E96)	0.042-0.045grains/hr-ft <sup>2</sup>	0.35 to 0.40 gms/hr-m <sup>2</sup>
Water absorption -24 hours (ASTM D570)	~ 1 %	~1%
Crack Bridging @ -13 °F/-25 °C (ASTM C1305), 25 cycles	Pass	Pass
Tear strength (ASTM D642)	350 ± 20 pli	61 ± 3.5 kN/m
Impact Resistance (ASTM G14), No Holidays	> 175 in-lbf	> 18 J (N-m)
Fire Rating (ASTM E 84)	Class I	Class I
Flash point Pensky Martin	>200 °F	>93 °C
Service temperature (Dry)	-22 °F to 250 °F	-30 °C to 120 °C
Service temperature (Wet)	40 °F to 120 °F	4 °C to 50 °C
Abrasion Resistance (ASTM D4060) weight loss	< 30 mg loss Taber CS 17 wheel 1Kg/1000 rev	
<b>PROCESSING PROPERTIES (Under standard lab conditions)</b>		
Mix Ratio V/V	1:1	
Pot life	3 to 6 seconds	

Tack free time ( DFT & Temperature dependent)	10 to 30 seconds
Recoat time	0 to 12 hours
Post cure time	24 hours
<i>Properties and values are highly dependent on equipment, spray gun, mix chamber temperature, pressure and related parameters. Variations are possible and expected.</i>	

### **MIXING:**

Nukote FR might not be diluted under any circumstance. Thoroughly mix Nukote FR part B resin material with a heavy duty mixer and bring it to solution. Mixing paddle design should be capable of accomplishing a thorough homogeneous mixture including the settled fillers in the bottom of the Side B drum. Add part C to the Side B resin and mix it again until a homogeneous mixture and color is obtained. Use appropriate solvent for purge line and flushing of equipment and if spraying stops for a period of time in excess of the pot life of the material.

### **SURFACE PREPARATION:**

#### **Wood:**

All wood should be clean, dry and free of any knots, splinters, oil, grease or other contaminants. Splintered or rough areas should be sanded. Knots should be repaired using Nukote BG with sand. Upon full cure of the repair agent, prime the entire surface intended for coating.

#### **Concrete:**

The surface of a concrete subfloor should be dry, smooth, structurally sound and free of depression, scale, or foreign deposits of any kind. Remove all curing compounds. Abrasive blast, sweep blast or water blast to remove all latent material and expose voids. Use a good quality epoxy filler or mortar for void and spall filling, skim coat or repairs. Prime, fill imperfections in the substrate surface to limit out-gassing. All concrete substrates, on or below grade level should be tested for moisture content. On-grade or below-grade concrete floors or slabs should have a moisture barrier installed to protect from ground moisture. The surface preparation of concrete should meet and conform to Joint NACE 6/SSPC-SP 13 standards and achieve a concrete surface profile of CSP 3 to CSP 6 as per ICRI Guideline No.03732 for optimum performance.

#### **Metal:**

All surfaces should be clean and free from contamination. The surface should be assessed and treated in accordance with ISO 8504, Abrasive blast the surface to minimum NACE-2/SSPC SP-10/Sa 2.5, as per ISO 8501-1, for a visual assessment of surface cleanliness with an anchor profile of 3 to 4 mils (75 -100 microns). Soluble salts must be removed to an acceptable levels.

*Refer to NCSI surface preparation manual for detailed procedures for different types of substrates.*

### **APPLICATION:**

Both Side-A and Side-B (mixture of B and C) materials should be preconditioned to 90-100°F before application. Both Side-A and Side-B materials should be continuously agitated before and during application. Agitate at least one hour prior to application using heavy duty drum agitator. Both Side-A and Side-B lines must have filters removed. Use a round pattern disc for spraying. Orifice diameter must be 0.042” or greater. Recommended surface temperature must be at least 5°F (3 °C) above the dew point.

Nukote FR must be applied utilizing high-pressure, heated plural component spray proportioning equipment, such as Graco Reactor 2, or equivalent, capable of delivering materials without loss of pressure or drop in temperature for the appropriate hose length on a consistent basis. For optimum performance, the substrate should be abrasive blasted. Concrete substrates should be allowed to cure a minimum of 30 days. On concrete, Nukote FR should always be applied over a suitable primer for maximum adhesion. For all submersed or immersion applications, use of a suitable primer is absolutely essential. On horizontal surface applications, a texture “stipple” coat can be applied for non-skid

purposes, after reaching the initial desired film thickness. Recommended DFTs are a function of the project specific requirements. Please review your specific project with Nukote technicians.

**EQUIPMENT CLEAN UP:**

Cured product may be disposed of without restriction. Uncured Isocyanate and resin portions should be mixed together and disposed of in accordance with local regulations. Containers should be disposed of according to local environmental laws and ordinances.

**LIMITATIONS:**

Do not open until ready to use, and store in a sealed container after opening. Adding a nitrogen blanket is strongly recommended for the ‘A’ component when storing after opening.

Both Part-A and Part-B containers must be fitted with a desiccant device during use.

**WARNING:**

This product contains Isocyanate and curatives

**CHEMICAL RESISTANCE:**

Each Nukote product formulation has varying levels of resistance to specific chemicals. Please review the chemical immersion test data included in the Nukote Test Book for general resistance to specific chemicals at specific concentration levels. Chemical concentrations are complex and when combined with temperatures above ambient levels this complexity increases exponentially. Contact Nukote Technical Personnel for specific recommendations for chemical resistance prior to specifying these products in this application type. Consult with NCSI for more details on product and chemical resistance. The following chart is the results of Polyurea immersed in chemicals and tested as per modified ASTM D 3912.

Chemicals	Resistance	Chemicals	Resistance
Hydrochloric acid upto 10%	R	Ammonium Hydroxide 20%	R
Sulphuric Acid 15%	R	Ammonium Hydroxide 50%	RC
Phosphoric Acid 10%	R	Pottasium Hydroxide 10%	R
Acetic Acid 10%	R	Pottasium Hydroxide 20%	RC
Sea water	R	Sodium Hydroxide 20%	R
Waste Water	R	De ionized Water	R
Water @ 176 °F (80 °C)	R	Diesel Fuel, Gasoline (unleaded)	R
Hydrogen Sulphide (gas)	R	Motor Oil, Brake Oil	RC
Sodium Hydroxide-50%	RC	Hydraulic Oil	R

**R = Resistant    RC = Slight surface change or discolouration with no loss of hardness**

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**WARRANTIES AND DISCLAIMERS:**

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*Nukote Coating Systems International, a Nevada, USA Corporation warrants that the two components of this product shall conform to the technical specifications published in the product literature. The quality and fitness of the product is dependent upon the proper mixture and application of the components by the applicator. Nukote Coating Systems has no role in the application of the finished polymer other than to manufacture and supply its two components. It is vital that the person applying this product understands the product and is fully trained and certified in the use of plural component equipment and application of plural component materials. There are no warranties that extend beyond the description on the face of this instrument, except when provided in writing, directly by Nukote Coating Systems International and executed under seal by a company officer.*