

Nukote Polyureas in Containment Applications

The outstanding features of Nukote Polyureas current provide a clear alternative to traditional lining materials used in containment of potable water, waste water or other liquid containment systems. Nukote Polyureas have become the buzz word, particularly in the rehabilitation of Waste Water Distribution systems. This method of rehabilitation is even more relevant in dense urban locations due to its trench-less application method, which reduces both installation costs and installation time significantly limiting disruptions to vehicular and pedestrian traffic. This method also reduces impact to existing structures, roadways and other infrastructure components.

This remarkable technology offers a range of uses limited only by your imagination. Nukote polyurea sets fast (almost instantly), while providing very high elongation, tensile strength, impermeability, temperature resistance, chemical resistance, impact resistance and other desirable physical properties. The products can be applied at any temperatures and work in process temperatures from -40C to +150C. The products ability to provide high ranges of all properties is unique in the industry. Their ability to maintain these properties over long durations (even in direct ultraviolet exposures) combined with strong thermal cycling capability, while being economical and repair is unmatched by other coating and lining systems in the market.

Polyurea scores heavily over preformed or insitu linings due to its flexibility and strong bond to the substrate. Traditional GRP linings have a very rigid nature that cannot accommodate movement from any cause, whether by settlement or otherwise, are susceptible to fracture and provide little thermal cycling capability. Traditional rubber membrane systems are resistant to fracture and do provide good thermal cycling features due to the elastomeric nature of the product group, but have little abrasion resistance, have numerous seams and are not bonded directly to the substrate. Nukote Polyureas have strong elastomeric properties combined with strong hardness levels providing the desirable features of both GRP and rubber linings in a single product, which is seamless, directly bonded to the substrate, can move with a substrate or structure and still provide high impact resistance, tear resistance and impermeability levels.

Material used in the application or installation of GRP or rubber linings are moisture sensitive, which can adversely affect the integrity and thus the performance of the installed system. Nukote Polyurea is applied using state of the art plural component equipment, eliminating the potential for human error. The products can be applied at any thickness (vertically, horizontally and even overhead) without any layering, sagging or other negative features common to other lining systems. Most failures occur at seams and/or joints. Nukote polyurea products, due to their 100% seamless, monolithic nature, completely avoid these historic failure points.

The strong properties of Nukote products, when combined with its elastomeric, seamless nature are not to be ignored when selecting a suitable lining system. The added benefit of having 100% insurance backed warranty (that can not be provided by other systems) makes the decision to use these products simple.

Comparison between GRP lining Vs Nukote ST

<u>Item</u>	<u>Technical Property</u>	<u>GRP Lining</u>	<u>Nukote XT</u>	<u>Clarification Nukote Benefit</u>
1	100 % Solid Content	No	Yes	100% solids and VOC free. Environment friendly
2	Monolithic	No	Yes	GRP is multilayer
3	Seamless	No	Yes	GRP is applied in Layers
4	Application Speed	Very Slow	Very Fast	Single Application Step
5	Complexity of Application	Complicated	Simple	Single Application Step
6	Method of Application	Hand Applied	State of the art Plural component machine	Nukote process eliminates human error potential
7	Temperature Resistant	From +10 C to +80 C	From -50C to +150C	Polyurea withstands and performs in wider temperature window including minus temperatue
8	Moisture Sensitivity	Solvent cured reacts negatively in presence of water	Hydrphobic. 100% Moisture insensitive.	Moisture while installing can adversely effect the GRP lining integrity.
9	Mixing Ratio	Very sensitive to Stoichometric ratio	Tolerant to slight deviation of mixing ratios	Application of GRP when out of ratio will negatively effect the products cured properties
10	Adhesion to Concrete	No chemical bond	> 3. 5MPa	Nukote bond will be greater than the substrate strength adhesion failure will be equal to substrate failure
11	Adhesion to Metal	Good	> 20 Mpa	Stronger bond to substrate with Nukote Polyurea
12	Tensile strength	Very Poor	> 30 mpa	Reason for cracking in GRP

<u>Item</u>	<u>Technical Property</u>	<u>GRP Lining</u>	<u>Nukote XT</u>	<u>Clarification Nukote Benefit</u>
13	Hardness Shore D	Comparable	55	Comparable
14	Abrasion Resistance	Comparable	< 6mg C17 wheel	Polyurea has higher abrasion resistance
15	Chemical Resistance	Good	Excellent	Polyurea resistant to most acid and/or alkaline chemicals up to 30% concentrations
16	Water Absorption	Comparable	<1.25%	A critical factor
17	Elongation	1%	>400%	Nukote products feature higher levels of elongation and shore hardness at the same time providing better thermal cycling features over time
18	Tear Resistance-Die C	< 50 kN/mm	>95 kN/mm	Higher value by far with Nukote
19	Repair & Maintenance	Difficult	Easy	Cleaning by high pressure water or steam. Repairs easily and monolithically regardless of elapsed duration
20	Application at Critical Areas	Difficult to Achieve	Simple to Achieve	Penetrations, connections and transmissions lines, inlets ,outlets are critical areas and susceptible to failures. Polyurea can be worked around all these.
21	Warranty with Insurance	Not Available	AIG Insurance Backed	Nukote products are the only global coating with this insured warranty backing