



ResNsand® Ultra

The Virtually Invisible Polymer Aggregate and non-slip additive

Polymer Enhancing ▪ Cross-Linkable ▪ Lightweight ▪ Clear ▪ Durable

100% post-industrial recycled material
Zero Crystalline Silica - Zero Heavy Metals

ResNsand® Ultra used on the deck of the USS Ronald Reagan



Contact us:

+1-800-669-9214

acs.sales@dorfner.com

www.dorfner.com



CLEAR POLYMERIC ANTI-SKID TEXTURED / ENHANCER

What is ResNsand® Ultra?

ResNsand® Ultra (RSU) is a lightweight, optically clear thermoset polymer resin, available in nine standard sizes ranging from 4 mesh (4.76 mm) to 200 mesh (74 micron). RSU is an allyl diglycol carbonate.* Two reactive carbonyl sites on each monomer unit are capable of covalently bonding to a polyamine hardener. The hardener reacts with the epoxy resin matrix, creating a cured final product that is extremely durable and strong. RSU will perform similarly in many other resin systems including polyalcohols and aliphatic or aromatic diisocyanates for polyurethanes, based on a similar mechanism. Polymers without active groups (such as polypropylene) will not possess the same interfacial interactions with the epoxy/hardener system and therefore be less robust/well incorporated.



How tough is a ResNsand® Ultra coating?

The increased strength of the RSU coating system is best illustrated when comparing TABER abrasions of clear coat epoxy (control) to a pigmented epoxy. The clear epoxy control showed 0.3 grams abraded after 1,000 cycles using a 500 gram weight versus 0.42 grams abraded for the pigmented epoxy. In general, the addition of a pigment, mineral, or inert non-mineral filler increases abrasion and decreases physical properties of the epoxy polymer. When RSU was added to the clear epoxy control abrasion was reduced to 0.21 grams, a 30% improvement in abrasion resistance. Abrasion was also reduced to 0.21 grams for the pigmented epoxy when RSU was added, a 50% improvement in abrasion resistance. See graph on opposite page.

Why use ResNsand® Ultra?

- **Weight:** It can reduce the weight of a coating by 50% over a mineral aggregate.
- **Clarity:** In a clear coat, RSU will not distort or discolor any patterns or graphics.
- **Toughness & Durability:** RSU has demonstrated an increase in toughness and durability when used in clear coat epoxies, urethanes, acrylics and polyester gel coats.
- **Chemical Resistance:** It has excellent chemical resistance to mineral acids, alkalis, aggressive solvents, petroleum spirits, aliphatic and aromatic hydrocarbons and harsh detergents.



Which ResNsand® Ultra is recommended?

The grade of RSU used largely depends on the application.

- **ULTRA 4 or 8** if end use is decorative such as countertops.
- **ULTRA 12, 16, or 20** if end use is for an anti-slip industrial floor designed for heavy duty vehicles such as lift trucks.
- **ULTRA 20 or 40** if end use is primarily foot traffic areas like hallways and commercial kitchens.
- **ULTRA 40 or 60** if end use will have barefoot traffic like pools, decks, piers and shower stalls.
- **ULTRA 100 or 200** if end use will come in contact with sensitive skin such as for use in a bath mat.

How much ResNsand® Ultra is recommended?

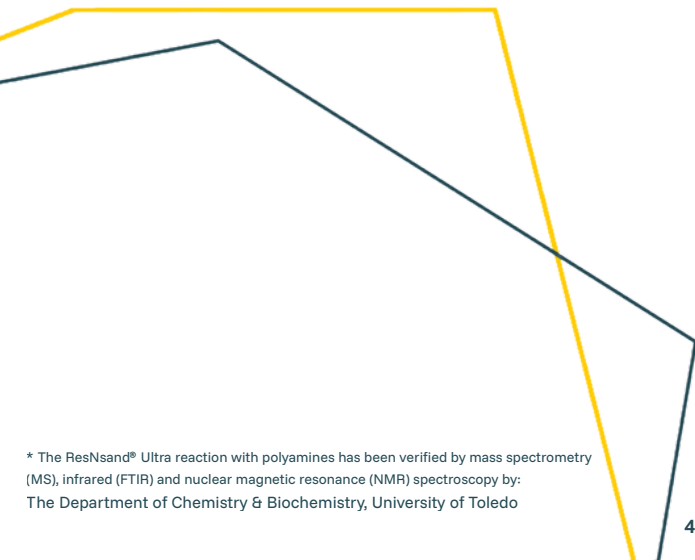
How much to use depends on which particle size you select, thickness of film and type of resin being used. The best way to determine your needs is to make a trial run with no more than 100 grams of resin and hardener (if any). Add various weights of RSU (10% is the recommended starting point), mix well and brush onto a flat surface. Compare the results, which based on your judgment gives the desired anti-slip or textured profile.

How is ResNsand® Ultra applied?

For large areas such as floors, RSU can either be broadcast or formulated into resin. It can also be applied as a premixed product or mixed on site.

ResNsand® Ultra Uses:

- Floors, decks, piers, pools, bath and shower stalls = anti-slip
- Polyester gel coats (ULTRA 100 & 200) = abrasion resistance
- Marine coatings (ULTRA 16, 20 & 40) = anti-slip and abrasion resistance
- Surf boards, garage floors (ULTRA 40 & 60) = anti-slip
- Solid Surface (all sizes) = decorative and abrasion resistance
- paints and coatings (ULTRA 200)



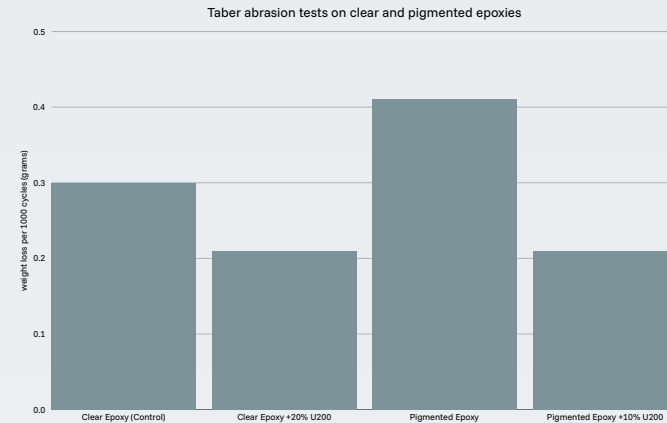
* The ResNsand® Ultra reaction with polyamines has been verified by mass spectrometry (MS), infrared (FTIR) and nuclear magnetic resonance (NMR) spectroscopy by: The Department of Chemistry & Biochemistry, University of Toledo

TECHNICAL DATA SHEET

TYPICAL PHYSICAL PROPERTIES:	
Specific Gravity (H ₂ O=1)	1.26
Density (lbs. per gal)	10.90
Color (in dispersion)	Clear
Color (in raw form)	White
Hardness (Rockwell)	M95-M110
Solubility	
<ul style="list-style-type: none"> Ethanol, Acetone Insoluble Non Polar Solvent Insoluble 	
Melting Point	Decomposes ~400°F

TYPICAL CHEMICAL RESISTANCE:

Alkali
 Strong and weak acids
 Alcohols
 Ketones and esters*
 Aliphatic hydrocarbons
 Aromatic hydrocarbons
 Detergents
 Gasoline
 Anti Freeze
 *ResNsand® will swell in ketone and ester solvents



Grade	Mesh Size	Microns
Ultra 4	4 – 8	2380 – 4760
Ultra 8	8 – 12	1680 – 2380
Ultra 12	12 – 16	1190 – 1680
Ultra 16	16 – 20	840 – 1190
Ultra 20	20 – 40	420 – 840
Ultra 40	40 – 60	250 – 420
Ultra 60	60 – 100	150 – 250
Ultra 100	100 – 200	75 – 150
Ultra 200	< 200	< 75

TYPICAL SIZE DISTRIBUTION (% Retained)

Screen	U4	U8	U12	U16	U20	U40	U60	U100	U200
+1/2	0	-	-	-	-	-	-	-	-
+4	2-4	0	0	-	-	-	-	-	-
+8	70-90	0-5	-	0	-	-	-	-	-
+12	0-20	0-95	0-10	0-3	0	-	-	-	-
+16	-	-	75-100	0-20	0-3	-	-	-	-
+20	-	0-20	-	-	0-15	0	-	-	-
+30	-	-	-	0-20	-	-	0	-	-
+40	-	-	-	-	-	0-15	-	-	-
+60	-	-	-	-	0-20	75-100	0-10	0	-
+80	-	-	-	-	-	-	-	-	-
+100	-	-	-	-	-	-	-	0-15	-
+120	-	-	-	-	-	-	75-100	-	-
+140	-	-	-	-	-	-	-	-	-
+200	-	-	-	-	-	-	-	-	-
Pan	0-8	0-1	0-25	0-5	0-5	0-25	0-25	85-100	-

Just How Good Is ResNsand® Ultra?

After many years of research, development and testing, a new coating evolved for the taxi and impact landing areas of aircraft carriers. The new coating, which contains ResNsand® Ultra, is significantly lower in weight and is more durable than the conventional alumina anti-skid additive.

How Light Is It?

The unit weight of a drum reduced from 75 lbs to 40 lbs/unit or almost 47% when ResNsand® Ultra replaced a mineral anti-skid. As for the carrier deck, the weight reduction was close to 8,000 lbs.

How tough and durable is it?

A coating containing ResNsand® Ultra received approval by the U.S. Department of Defense for the use on aircraft carrier decks. This special non-slip coating (formulated with epoxy resins and ResNsand® Ultra) is used on hanger and flight decks, including the impact landing areas. To qualify for this honor, the ResNsand® Ultra coating had to withstand 15,000 impact landings, whereby the incoming plane's tail-hook snags a hydraulic arresting wire, slams down and drags across the coating surface as the plane is brought to a stop. Not only did ResNsand® Ultra pass this test with flying colors, but the resulting wear on the tail-hook and cable was significantly less with ResNsand® Ultra than that caused by traditional coatings. Furthermore, Taber abrasion analysis shows that ResNsand® Ultra improves abrasion resistance by more than 50% over conventional coatings containing alumina, a much harder substance. ResNsand® Ultra is also resistant to fire and jet blast, most acids, alkalis, solvents, grease, oil, gasoline, jet fuels, hydraulic fluids, detergents, and alcohol.

As of this report, ResNsand® Ultra epoxy coating has been applied to the decks of the following ships:

United States -

USS STENNIS
 USS RONALD REAGAN
 USS ABRAHAM LINCOLN

France -

CHARLES DE GAULLE

Japan -

IZUMO