

ResNsand® Ultra

The Virtually Invisible Polymer/Resin Aggregate and Extender

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

ResNsand Ultra used on the deck of the USS Ronald Reagan



🌿 100% post-industrial recycled material 🌿

🚫 Zero Crystalline Silica 🚫 Zero Heavy Metals 🚫



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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 countertop.

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

* 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

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 | |
| - Ethanol, Acetone | Insoluble |
| - Non Polar Solvent | Insoluble |
| Melting Point | Decomposes ~400°F |

TYPICAL CHEMICAL RESISTANCE:

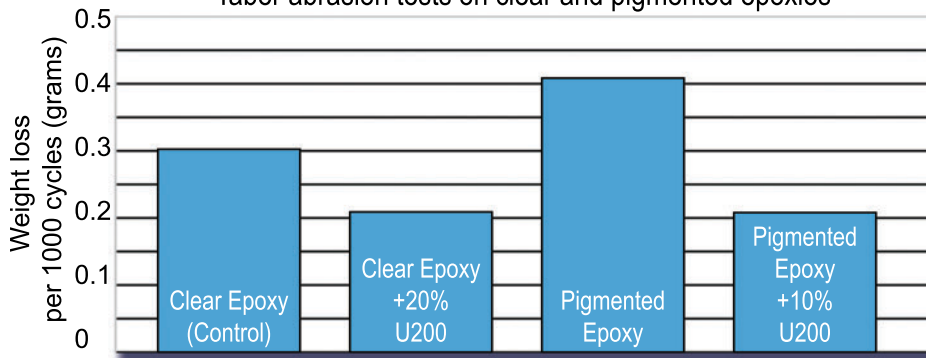
| | |
|------------------------|-------------------|
| Alkali | excellent |
| Strong and weak acids | excellent |
| Alcohols | excellent |
| Ketones and esters* | good to excellent |
| Aliphatic hydrocarbons | excellent |
| Aromatic hydrocarbons | excellent |
| Detergents | excellent |
| Gasoline | excellent |
| Anti Freeze | excellent |

*ResNsand will swell in ketone and ester solvents

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 | - | - | - | - | - | - | - | - | 0 |
| +100 | - | - | - | - | - | - | - | 0-15 | - |
| +120 | - | - | - | - | - | - | 75-100 | - | - |
| +140 | - | - | - | - | - | - | - | - | - |
| +200 | - | - | - | - | - | - | - | - | 0-25 |
| Pan | 0-8 | 0-1 | 0-25 | 0-5 | 0-5 | 0-25 | 0-25 | 85-100 | 75-100 |

Taber abrasion tests on clear and pigmented epoxies



| 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 |

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

Not just one example.

ResNsand Ultra has received similar reports from the manufacturers of flooring, shower and tub bases, bath mats, decks, piers and handicap ramps. ResNsand has also had favorable results with companies that have used it in epoxies, urethanes, polyester gel coats, UV curable, water-based acrylic and latex-based coatings.

*For more information regarding the approval process, please contact us.



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