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Raven® 405 Trowel

High Build Epoxy

Technical Data Sheet

Selection & Specification Data

Description

Raven® 405 Trowel is a solvent-free 100% solids, ultra-high build epoxy coating formulated for longer pot life and trowel application. 405 Trowel's high-build ability allows it to be applied on vertical and overhead surfaces. The surface tolerance of 405 Trowel allows it to be used as a structural lining in manholes, tanks and other deteriorated structures.

Typical Uses (Trowel Applied)

Severe Wastewater Environment—New or existing concrete structures where a corrosion resistant coating system is required to enhance the structural integrity and where exposure to concentrated acids and caustics may be expected. 405T is an excellent option when spray applications are not feasible or for resurfacing and holiday repairs with pre-mixed kits.

Color & Stability (Limitations)

The Part A Resin is white; the Part B Curing Agent is blue. When mixed the product is light blue. The addition of the white Raven 240 Part C will shift the color slightly lighter.

Theoretical Coverage Rates

When using mixed part A&B only, coverage is ~20 square feet per gallon at 80 mils. When the optional part C is added, the coverage is ~15 square feet per gallon kit at 125 mils. Actual coverage will depend on the roughness of the substrate. A wet film thickness gauge may be used to determine the applied thickness. Wet film thickness is measured in accordance to ASTM D4414.

Raven 405 Trowel is a 100% solids epoxy with zero shrinkage. Wet film thickness and dry film thickness are the same (i.e. 80 mils WFT = 80 mils DFT). Depending on substrate type and profile, a maximum of 125 mils per coat is recommended to prevent sagging. The optional Raven 240 Part C provides more sag resistance and body.

Recommended Dry Film Thickness (Typical)

Concrete, New/Smooth:	80-250+ mils DFT.
Concrete, Rough:	100-500 mils DFT.
Concrete, Resurfaced:	80-250+ mils DFT.
Masonry/Brick:	125-250+ mils DFT.
Masonry/Brick, Resurfaced:	80-250+ mils DFT.
Steel (Carbon):	30-80 mils DFT.

Physical Properties (Typical) Independent Testing

(1) Properties tested with Raven 240 Part C at 50% by weight of mixed part A & B

Test	Method	Result
Tensile Strength	ASTM D638	4,900 psi
Tensile Elongation	ASTM D638	0.7%
Compressive Strength	ASTM D695	18,600 psi
Flexural Strength	ASTM D790	10,100 psi
Tensile Strength (1)	ASTM D638	4,000 psi
Tensile Elongation (1)	ASTM D638	0.5%
Compressive Strength (1)	ASTM D695	11,200 psi
Flexural Strength (1)	ASTM D790	8,000 psi
Hardness, Shore D	ASTM D2240	85
Adhesion, Concrete	ASTM D7234	Substrate Failure
VOC's	Calculated	0.0 lb./gal

The value ranges stated in this Technical Data Sheet are based on system processing under controlled laboratory conditions. Equipment configuration and/or field application conditions may produce variances in the final system values.



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Surface Preparation									
<p>General</p> <p>Prior to coating, the substrate must be prepared in a manner that provides a uniform, clean, sound, neutralized surface suitable for the specified coating. The substrate must be free of all contaminants, such as oil, grease, rust, scale or deposits. In general, coating performance is proportional to the degree of surface preparation.</p> <p>Steel</p> <p>Surfaces may require “Solvent Cleaning” (SSPC SP- 1) to remove oil, grease, and other soluble contaminants. Sur-faces to be coated should then be prepared according to SSPC SP-10/NACE No. 2 Near-White Metal Blast Cleaning for immersion service. The resulting angular anchor profile shall be 3.0-5.0 mils and be relative to the coating thickness specified.</p>	<p>Concrete & Masonry surfaces must be sound and contaminant-free with a surface profile equivalent to a minimum CSP3 to CSP5 in accordance with ICRI Technical Guideline No. 310.2R-2013. This can generally be achieved by abrasive blasting, shot blasting, high pressure water cleaning, water jetting, or a combination of methods. The pH of the concrete must be >8.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="background-color: #e1eef6;">Primers (Suggested)</th> </tr> </thead> <tbody> <tr> <td style="width: 70%;">Concrete (optional) –</td> <td>Raven 175 Raven 171FS Raven 155</td> </tr> <tr> <td>Carbon Steel (optional)</td> <td>AquataPoxy 190* AquataPoxy 90*</td> </tr> <tr> <td>Non-Ferrous Metals</td> <td>AquataPoxy 190*</td> </tr> </tbody> </table> <p>PVC, PE, PP, PS, & HDPE- Contact Raven Tech Service</p> <p>*Do not use this primer if immersion temperatures will exceed 140°F</p>	Primers (Suggested)		Concrete (optional) –	Raven 175 Raven 171FS Raven 155	Carbon Steel (optional)	AquataPoxy 190* AquataPoxy 90*	Non-Ferrous Metals	AquataPoxy 190*
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Mixing & Thinning									
<p>Components & Mix Ratio</p> <p>Part “A” Resin: Part “B” Curing Agent. Mix ratio is 3:1 by volume. Note: Raven 405 “A” side is compatible with all 405 Series “B” sides. The optional Raven 240 Part C is added to the mixed A&B at 50% by weight.</p> <p>Power Mixing</p> <p>Mix full kits only. Mix each component separately before pouring the Part B into the Part A container. Use a drill with a Jiffy mixer and mix for two (2) minutes. If needed, add Part C and continue mixing for at least another minute before application. Properly mixed material has a uniform color.</p>	<p>Thinning</p> <p>Do not thin with solvents. Unmixed material should not be heated above 120°F (48°C).</p> <p>Pot Life / Work Time</p> <p>The pot life is 30 minutes for 1/2 gallon kit at 72°F. Longer pot life is possible by mixing smaller amounts and/or cooling down the part A & B before mixing.</p>								



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Application & Service Conditions	
<p>Apply mixed A&B with squeegee, brush, roller or other suitable method. When the optional Raven 240-Part C is added to the A&B, apply with trowel or putty knife. For best results, apply to bare or primed concrete when the concrete temperature is stable or falling.</p> <p>Substrate Temperature Minimum recommended substrate temperature: 50°F (10°C)</p>	<p>Substrate Temperature (continued) Maximum recommended substrate temperature: 120°F (48°C)</p> <p>Temperature Resistance Maximum recommended dry temperature: 200°F. Wet temperature resistance depends on chemical concentration and exposure time.</p>
Curing Schedule & Re-Coat Window	
<p>Cure Time Film set time varies with substrate temperature and application thickness. Generally, the coating will be tack-free in 3 1/2 hours at 72°F (22°C) and dry-hard in about 5 hours.</p>	<p>Recoat Time This product may be recoated as soon as it becomes tacky but does not transfer to the finger. When applying multiple coats, do not allow more than 12 hours at 72°F substrate temperature to pass between coats. Higher temperatures will shorten the recoat window. Before recoating; inspect, clean and dry surface thoroughly to remove all contamination, including amine blush or condensation. If the recoat time is missed, abrade and clean surfaces prior to recoating.</p>
Cleanup & Safety	
<p>Cleanup To clean tools, use acetone, MEK or xylene. To clean skin, wash immediately and thoroughly with soap and water. Refer to the Safety Data Sheet (SDS) for additional information on health and safety.</p>	<p>Safety SDS's are available on the Raven Lining Systems website (www.ravenlining.com) or upon request. All personnel should read and understand the safety recommendations as set forth in the SDS. Keep uncured product away from children at all times.</p>



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Packaging, Handling, & Storage	
Packaging Available in 1 and 2 gallon kits supplied in the correct proportions of parts A & B; also available in 2.42 gallon kit when the optional part C is added. The part A & B components must be mixed together before use. The optional Raven 240-part C may then be added to provide additional body.	Shelf Life and Storage Product shelf life is 1 year from purchase date in original unopened containers, store in a sheltered area between 60°F (16°C) and 100°F (38°C).
Warranty	
<p>Limited Warranty. Company warrants its goods to be free of manufacturing defects. Goods manufactured by Company will comply with all applicable federal, state and local laws and regulations. Company makes no warranty as to any parts or equipment manufactured by others. Customer shall look solely and only to the manufacturer of such parts or equipment with respect to any warranty claims. Company hereby assigns to Customer the original manufacturer's warranties to all such equipment and parts, to the full extent permitted. THE AFORESAID IS THE EXCLUSIVE WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. SPECIFICALLY, THERE ARE NO WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.</p> <p>Limitation of Liability. COMPANY'S LIABILITY FOR DEFECTIVE OR NON-CONFORMING GOODS SHALL BE LIMITED TO, AND SHALL IN NO EVENT EXCEED, THE AMOUNT PAID BY CUSTOMER FOR SUCH DEFECTIVE OR NON-CONFORMING GOODS. UNDER NO CIRCUMSTANCES SHALL COMPANY BE LIABLE FOR ANY SPECIAL, PUNITIVE, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR FOR LOST PROFITS. In no event may any claim by Customer arising from or relating to any sale of any goods or services referenced herein be brought more than one year after the date of delivery of such Goods.</p>	