



SPI Performance Coatings
Mopes Ln, Purton, Wiltshire
SN5 4HG

Raven® 405

Technical Data Sheet

Selection and Specification Data

Description

Raven® 405 is a 100% solids, ultra-high build, solvent free epoxy coating formulated with exceptionally high physical properties and chemical resistance. 405 exhibits a superior bond to dry and damp concrete, masonry, steel, ductile iron and fiberglass and is specifically designed as a corrosion protection and structural enhancement lining system which can be used on and in wastewater structures, buried pipelines, tanks, and other corrosive environments.

Typical Uses

Severe Wastewater Environment—New or existing concrete and steel structures where rehabilitation of an existing structure requires enhancement of the structural integrity and where exposure to concentrated acids and caustics may be expected. Also, designed to reduce the Inflow and Infiltration (I&I) to sewer collection systems.

Color & Stability (Limitations)

The Part A Resin is white; the Part B Curing Agent is blue. When mixed the product is light blue. Limited special colours may be available on request. Discolourations and yellowing can and will occur upon exposure to UV (exterior applications). Discolouration or down-glossing does not affect performance.

Theoretical Coverage Rates

Theoretical coverage is 37.8 square meters per liter at 1 mil DFT film thickness. Actual surface coverage will depend on substrate porosity and roughness. A wet film thickness gauge may be used to determine exact coating coverage.

Surface Preparation

General

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.

Steel (Immersion Service)

Clean the surface prior to surface preparation in accordance with "Solvent Cleaning" (SSPC SP- 1) to remove oil, grease, and other soluble contaminants.

Dry Film Thickness

Recommended thickness will vary from 30 – 250+ mils per coat based on service conditions.

Recommended Dry Film Thickness (Typical)

Concrete, New/Smooth	80-250+ mils DFT
Concrete, Rough	100-250+ mils DFT
Concrete, Resurfaced	80-250+ mils DFT
Masonry/Brick	125-250+ mils DFT
Masonry/Brick, Resurfaced	80-250+ mils DFT
Carbon Steel	30-80 mils DFT
Non-Ferrous Metals	30-80 mils DFT

Physical Properties (typical)

Description	Method	Results
Tensile Strength	ASTM D638	>9,000 psi
Tensile Elongation	ASTM D638	>6%
Compressive Strength	ASTM D695	>18,000 psi
Flexural Strength	ASTM D790	>15,000 psi
Hardness, Shore D	ASTM D2240	45
Adhesion, Concrete	ASTM D7234	Substrate Failure
VOC's	Calculated	0.0 lb/gal
Taber Abrasion, CS-17 wheel	ASTM D4060 1kg load/ 1000 cycles	57

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.

Surfaces 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.

Ductile Iron Pipe (Atmospheric and Immersion Service)

All oils, small deposits of asphalt paint and grease shall be removed by solvent cleaning (see NAPF 500-03-01). Abrasive blast to accordance with NAPF 500-03-04. More information on cleaning ductile iron pipe can be found at www.napf.com Steel (Atmospheric/



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SN5 4HG

Raven® 405 Trowel

High Build Epoxy
Technical Data Sheet

Steel (Atmospheric/Non-Immersion Service)

Visible deposits of oil, grease, or other contaminants shall be removed according to SSPC-SP 1 followed by SSPC SP-6/NACE No. 3 Commercial Blast Cleaning, resulting in a sharp angular anchor profile of 2.5-4.0 mils.

Concrete & Masonry

Reference SSPC SP-13/NACE No. 6 Surface Preparation of Concrete. 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.

Primers (Suggested)

Concrete (optional)	Raven 175 Raven 171FS Raven 155
Carbon Steel (blast holding)	AquataPoxy 190* Raven 490*
Non-Ferrous Metals	AquataPoxy 190

PVC, PE, PP, PS, & HDPE- Contact SPI Performance Coatings

*Do not use this primer if immersion temperatures will exceed 60°C

Mixing & Thinning

Components & Mix Ratio

Part A Resin: Part B Curing Agent mix ratio is 3:1 by volume.

Hand Mixing (touch-up or small repairs)

Individually power mix both Part A and Part B containers prior to measuring out 3 parts of Part A to 1 part of Part B by volume into a clean disposable pail. Completely mix combined A & B for a minimum of one minute before transferring contents to a clean pail. Continue mixing at least another minute, scraping the sides and bottom, to obtain a thorough mix before application. Properly mixed material will be a uniform color without light or dark spots.

Thinning

Do not thin with solvents. If lower viscosity is needed, heat unmixed material by placing the containers in hot tap water until the desired flow properties are obtained. To heat larger quantities, drum heaters or inline heaters on specialized spray equipment may be used. Unmixed material should not be heated above 150°F (66°C).

Pot Life

The pot life is ~20 minutes for one gallon at 22°C. Longer pot life is possible by mixing smaller amounts and cooling down the part A & B before mixing.

Application & Equipment Guidelines

Spray Application

Optimal proportioning and mixing is achieved with the use of a Raven Lining Systems approved plural-component airless spray system. Raven recommends the use of fixed ratio (3:1), such as, Graco XP 50 or 70 Plural-Component Pump System. Viscon Fluid Heaters and heated hoses are recommended. Carefully monitor, heating devices such as drum blankets or bands to avoid scorching of the material or melting drum liners. Pre-heating containers must not exceed temperatures greater than 65°C.

Recommended Spray Temperatures

46-62°C for Part A and 32-51°C for Part B. Temperature is dependent on ambient conditions and hose lengths. To equalize viscosities and reduce

operating pressure, Part A should be 11°C warmer than Part B during processing.

Brush/Trowel

For touch-up and holiday repair only.

Spray Application

Heated Hose Temp	51-62°C
Typical Spray Pressure	1800 - 3000 psi
Recommended Tip Sizes	531-525
Pro life at whip/gun	1-2 minutes
Supply pump pressure	100 psi



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Application & Service Conditions

Environmental & Substrate Conditions

Minimum recommended substrate temperature 4° C
Maximum recommended substrate temperature: 49°C.
For best results in limiting outgassing, with a primer or not, apply to prepared concrete when the substrate temperature is stable or falling.

Service Temperatures (Temperature Resistance)

Maximum recommended dry temperature: 66°C. May be post-cured for service up to 93°C. Wet temperature resistance depends on chemical concentration and exposure time. Contact SPI Performance Coatings for additional information.

Curing Schedule & Recoat Window

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 22°C substrate temperature to pass between coats, higher temperatures will shorten this window. Before recoating; visually 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.

Cure Time

The set time varies with substrate temperature and application thickness. Generally, the coating will be tack-free in 3.5 hours at 22°C and dry-hard in about 5 hours. **Cure to Service** (Municipal wastewater): 5 hours at 15.5°C.

Packaging, Handling & Storage

Packaging

Available in 4.5 and 9 litre kits supplied in the correct proportions of parts A & B; also available in 11L 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).

Clean Up & Safety

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.

Safety

SDS's are available on the website (spiperformancecoatings.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.

Warranty

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.

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