

PPG RAVEN® 405 FS Epoxy

DESCRIPTION

Two-component, 100% solids epoxy coating for use as a corrosion protection and structural enhancement lining system

PRINCIPAL CHARACTERISTICS

- Ultra-high build characteristics
- Fast set
- Fast return to service
- Excellent chemical resistance
- Bonds to dry and damp concrete, masonry, steel, ductile iron and fiberglass
- Acceptable for both new and existing structures
- TYPICAL USES:
- Wastewater structures, buried pipelines, tanks, and other corrosive environments
- Surfaces where a fast return to service is required

COLOR AND GLOSS LEVEL

- Light blue
- Part A is White, Part B is Blue; Mixed product is Light Blue
- Semi-gloss

Note:

- Color changes can occur under UV-exposure without negative impact on the product performance

BASIC DATA AT 72°F (22°C)

Data for mixed product	
Number of components	Two
Mass density	10.2 lb/US gal (1.2 kg/l)
Volume solids	100%
Recommended dry film thickness	30.0 - 250.0 mils (762 - 6350 µm) per coat
Theoretical spreading rate	54 ft ² /US gal for 30.0 mils (1.3 m ² /l for 750 µm) 6 ft ² /US gal for 250.0 mils (0.2 m ² /l for 6250 µm)
Dry to touch	2 hours
Overcoating Interval	Minimum: Coating should no longer leave residue when touched with a gloved finger Maximum: 12 Hours
Curing time	3 hours
Shelf life	Part A: at least 24 months when stored cool and dry Part B: at least 24 months when stored cool and dry

Notes:



PPG RAVEN® 405 FS Epoxy

- Recommended dry film thickness dependent on substrate and service conditions
- If overcoat time is exceeded, abrade and clean surface before recoating
- Curing time reflects ready for service time
- Material should be stored in dry conditions, out of direct sunlight, and in unopened original factory containers, at temperatures above 60°F (16°C) and below 100°F (38°C)

RECOMMENDED SUBSTRATE CONDITIONS AND TEMPERATURES

Steel (immersion service)

- Remove all surface contaminants, oil and grease in accordance with SSPC SP-1
- Abrasive blast with an angular abrasive to an SSPC SP-10 cleanliness or higher. Achieve a surface profile of 3.0 – 5.0 mils (75 – 125 µm)
- Ensure surface is dust free after blasting

Steel (non-immersion service)

- Remove all surface contaminants, oil and grease in accordance with SSPC SP-1
- Abrasive blast with an angular abrasive to an SSPC SP-6 or higher. Achieve a surface profile of 2.5 – 4.0 mils (65 – 100 µm)
- Ensure surface is dust free after blasting

Concrete / Masonry

- Surface must be clean, dry, and in sound condition. Remove all oil, dust, grease, dirt, loose rust, and other foreign material to ensure adequate adhesion.
- Abrade surface to achieve a surface profile equivalent to CSP 3 to CSP 5 in accordance with ICRI 310.2R-2013
- Prepare in accordance with SSPC SP-13 guidelines

Note:

- For best results in limiting outgassing, apply to prepared concrete when the substrate temperature is stable or falling

Ductile iron

- All oils, small deposits of asphalt paint, and grease shall be removed by solvent cleaning per NAPF 500-03-01
- Abrasive blast in accordance with NAPF 500-03-04

Substrate temperature and application conditions

- Substrate temperature during application should be between 2°C (35°F) and 49°C (120°F)
 - Substrate temperature during application and curing should be at least 3°C (5°F) above dew point
-

PPG RAVEN® 405 FS Epoxy

SYSTEM SPECIFICATION

- Primers for concrete (optional): Raven 175, Raven 171FS
- Primers for Carbon Steel: PPG AQUATAPOXY® 190 Primer*
- Primers for non-ferrous metals: PPG AQUATAPOXY® 190 Primer
- Recommended DFT for New/Smooth Concrete: 80-250 mils (2030-6350 µm)
- Recommended DFT for Rough Concrete: 100-250 mils (2540-6350 µm)
- Recommended DFT for Resurfaced Concrete: 80-250 mils (2030-6350 µm)
- Recommended DFT for Masonry/Brick: 125-250 mils (3175-6350 µm)
- Recommended DFT for Resurfaced Masonry/Brick: 80-250 mils (2030-6350 µm)
- Recommended DFT for Steel (Carbon): 30-80 mils (762-2030 µm)
- Recommended DFT for Non-Ferrous Metals: 30-80 mils (762-2030 µm)

Note:

- *Do not use this primer if immersion temperatures will exceed 140°F (60°C)

INSTRUCTIONS FOR USE

Mixing ratio by volume: Part A to Part B 3:1

- Material requires heated plural component airless spray set-up
- Properly mixed material will be a uniform color without light or dark spots

Notes:

- Do not thin with solvents.
- If a lower viscosity is needed, heat smaller quantities of unmixed material by placing containers in hot tap water until the desired flow properties are obtained. For larger quantities, drum heaters or inline heaters may be used.
- Do not heat unmixed material above 150°F (66°C)

Material temperature

- Material Temperature during application should be between 125°F (52°C) and 145°F (63°C) at gun

Pot life

10 minutes at 72°F (22°C)

Notes:

- Longer pot life is possible by mixing smaller amounts and cooling down the components before mixing
- Listed pot life is for 0.5 US gallon (1.9 liter) quantity

PPG RAVEN® 405 FS Epoxy

Airless spray: Plural component

- 3:1 Heated Plural Component Spray system is recommended
- 5:1 or 10:1 transfer pumps
- Heated hoses are recommended
- Achieve 2,000 - 3,000 psi
- Use 1/2" x 3/8", 24-element static wand mixer
- Pot life at whip/gun: 1-2 minutes
- Recommended tip size: 531-535
- Supply pump pressure: 100 psi (0.69 MPa)

Recommended thinner

No thinner should be added

Nozzle orifice

Approx. 0.031 – 0.035 in (0.78 – 0.89 mm)

Nozzle pressure

1800 - 3000 p.s.i. (approx. 124 - 207 bar; 12.4 - 20.7 MPa)

Notes:

- Part A should be 20°F (11°C) warmer than Part B during processing
- Part A should be maintained at temperature range of 115-145°F (46-62°C)
- Part B should be maintained at temperature range of 90-125°F (32-52°C)

Trowel / Brush

- Product may be applied by brush or trowel by mixing small quantities and applying immediately
- For touch-up or holiday repair only
- HAND MIX INSTRUCTIONS:
- Individually power mix both the Part A and Part B components separately to ensure uniformity
- Measure 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 for at least another minute, scraping the sides and bottom, to obtain a thorough mix.
- Properly mixed material will be a uniform color without light or dark spots

Cleaning solvent

- MEK, acetone, or xylene

ADDITIONAL DATA

Physical data of cured material

Characteristic	Value
----------------	-------



PPG RAVEN® 405 FS Epoxy

Physical data of cured material	
Tensile Strength (ASTM D638)	>7,500 psi (>51.7 MPa)
Tensile Elongation (ASTM D638)	1.5%
Compressive Strength (ASTM D695)	>16,000 psi (>110 MPa)
Flexural Strength (ASTM D790)	>13,000 psi (>89 MPa)
Hardness, Shore D (ASTM D2240)	88
Adhesion to Concrete (ASTM D7234)	To substrate failure

Note:

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

Spreading rate and film thickness	
DFT	Theoretical spreading rate
30.0 mils (762 µm)	53 ft ² /US gal (1.3 m ² /l)
80.0 mils (2032 µm)	20 ft ² /US gal (0.5 m ² /l)
100.0 mils (2540 µm)	16 ft ² /US gal (0.4 m ² /l)
125.0 mils (3175 µm)	13 ft ² /US gal (0.3 m ² /l)
250.0 mils (6350 µm)	6 ft ² /US gal (0.2 m ² /l)

DISCLAIMER

- PPG Protective & Marine Coatings does not accept any responsibility or liability for any odor, taste or contamination imparted to the drinking water from the coatings or products retained in the coating
- This product is specifically suitable for use on the substrates mentioned in this document. For application on any other substrates, please always contact your distributor or PMC representative for specific instructions and in order to make sure that the product performance can be safeguarded.
- For industrial or professional use only

SAFETY PRECAUTIONS

- Read all label and Safety Data Sheet (SDS) information prior to use

WORLDWIDE AVAILABILITY

It is always the aim of PPG Protective & Marine Coatings to supply the same product on a worldwide basis. However, slight modification of the product is sometimes necessary to comply with local or national rules/circumstances. Under these circumstances an alternative product data sheet is used.



PPG RAVEN® 405 FS Epoxy

REFERENCES

- Information sheet | Explanation of product data sheets

WARRANTY

PPG warrants (i) its title to the product, (ii) that the quality of the product conforms to PPG's specifications for such product in effect at the time of manufacture and (iii) that the product shall be delivered free of the rightful claim of any third person for infringement of any U.S. patent covering the product. THESE ARE THE ONLY WARRANTIES THAT PPG MAKES AND ALL OTHER EXPRESS OR IMPLIED WARRANTIES, UNDER STATUTE OR ARISING OTHERWISE IN LAW, FROM A COURSE OF DEALING OR USAGE OF TRADE, INCLUDING WITHOUT LIMITATION, ANY OTHER WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR USE, ARE DISCLAIMED BY PPG. Any claim under this warranty must be made by Buyer to PPG in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life of the product, or one year from the date of the delivery of the product to the Buyer, whichever is earlier. Buyer's failure to notify PPG of such non-conformance as required herein shall bar Buyer from recovery under this warranty.

LIMITATIONS OF LIABILITY

IN NO EVENT WILL PPG BE LIABLE UNDER ANY THEORY OF RECOVERY (WHETHER BASED ON NEGLIGENCE OF ANY KIND, STRICT LIABILITY OR TORT) FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES IN ANY WAY RELATED TO, ARISING FROM, OR RESULTING FROM ANY USE MADE OF THE PRODUCT. The information in this sheet is intended for guidance only and is based upon laboratory tests that PPG believes to be reliable. PPG may modify the information contained herein at any time as a result of practical experience and continuous product development. All recommendations or suggestions relating to the use of the PPG product, whether in technical documentation, or in response to a specific inquiry, or otherwise, are based on data, which to the best of PPG's knowledge, is reliable. The product and related information is designed for users having the requisite knowledge and industrial skills in the industry and it is the end-user's responsibility to determine the suitability of the product for its own particular use and it shall be deemed that Buyer has done so, as its sole discretion and risk. PPG has no control over either the quality or condition of the substrate, or the many factors affecting the use and application of the product. Therefore, PPG does not accept any liability arising from any loss, injury or damage resulting from such use or the contents of this information (unless there are written agreements stating otherwise). Variations in the application environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results. This sheet supersedes all previous versions and it is the Buyer's responsibility to ensure that this information is current prior to using the product. Current sheets for all PPG Protective & Marine Coatings Products are maintained at www.ppgpmc.com. The English text of this sheet shall prevail over any translation thereof.

The PPG logo, and all other PPG marks are property of the PPG group of companies. All other third-party marks are property of their respective owners.

