Ceramic Epoxies
Changing the Paradigm for Protecting Steel Water Storage Tanks
The AQUA Solution
D102 Contents

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• Standard
  – General, References, Definitions, Requirements,
  – Verification, Delivery
• Appendixes
  – Selection and Use, Environmental Concerns,
    Checklist, Tables
Exterior Systems

- OS1: 3 or 4 Coat Alkyd System
- OCS2: 3 Coat Moisture Cured Urethane System
- OCS3: 3 Coat Zinc Rich Primer/Acrylic/Acrylic System
- OCS4: 3Coat OZR Primer/Urethane/Fluorourethane
- OCS5: 3Coat Epoxy/Epoxy/Urethane System
- OCS6: 3 Coat OZR Primer/Epoxy/Urethane System
- OCS7: 3 Coat Epoxy/Epoxy/Urethane (all water based) System

*****STRIPE COAT*****
Interior Systems

- ICS1: Epoxy/Epoxy
- ICS2: Epoxy/Epoxy/Epoxy
- ICS3: OZRP(optional)/Epoxy (100% solids)
- ICS4: OZRP(optional)/Polyurea or Polyurethane (100% solids)
- ICS5: OZRP/Epoxy/Epoxy

***** STRIPE COAT*****
Stripe Coat

• Generic NSF approved Epoxy
• Applied by brush or roller to:
  • Angles, joints, weld seams, irregular surfaces and pitted areas
Interior Stripe Coating
AWWA D-102
Inside System #3

Single Coat Epoxy System

100% Solids

20 Mil minimum Dry Film Thickness

**Primer and stripe coat are optional**
Inside # 3 Specification

Surface Preparation:

SSPC SP#10 Near White Specification
Profile of 2.5 mils minimum

Painting:

Primer: MC67 @ 2.5 – 3.5 mils DFT
Stripe: Aquaclean @ 2.0 – 5.0 mild DFT
Finish: Permaclean 100 @ 25 – 35 mils DFT
CERAMIC TECHNOLOGY

Now available to the rest of the Water/Wastewater Market
PROTECTO 401

- THIRTY-FIVE YEARS IN USE. And Counting.
- THOUSANDS OF MILES LINED. And Counting.
- NUMBER ONE INDUSTRY-WIDE. And Holding.
- No reported failures.
Permaclean 100
50 – 100 mils
INTRODUCING OUR REVOLUTIONARY NEW CERAMIC EPOXIES

Permasafe 100 Ceramic Epoxy
Permaclean 100 Ceramic Epoxy
Ceramasafe 90 Ceramic Epoxy
Ceramapure PL 90 Ceramic Epoxy
Ceramapure TL 70 Ceramic Epoxy
Induron’s Ceramic Epoxies

**ABSOLUTE MINIMAL UNDERCUTTING**
- Actually self-heals pinholes and spot corrosion
- A-Rated cathodic disbondment

**UNRIVALED FILM BUILD**
- Minimize the risk of holidays, and improve edge protection, with up to 80 mils in a single coat

**ULTRA-LOW PERMEABILITY**
- Keep corrosive liquids away from your substrate

**NON-ABLATIVE SURFACE**
- Inhibits microbiological contamination and prevents acidithiobacillus growth
Water (Electrolyte)

Tank Wall

Anodic Area (Corrodes)

Metallic Return Path

Cathodic Area (Protected)

Current Flow
Composition

Ceramic Beads
Hydrophobic Carbon

Proprietary Epoxy
Binder

No Solvent
No VOC’s
No Haps

SUBSTRATE
Permaclean 100
Superior Flexibility
Mountain Home Tank
Permaclean 100 – Superior Edge Protection
Performance Criteria

PermaSafe + Permaclean 100 Ceramic Epoxies

A solvent free, immersion grade lining incorporating ceramic pigment for maximum corrosion protection of steel and concrete substrates immersed in sewage or exposed to similar aggressive environments.

- Single Coat Application
- Applied up to 80 mils in a single coat
- 0.0 Metric perms per ASTM D-1653 Standard Test Method for Permeability
- 20% Sulfuric Acid Immersion: NO EFFECT after 7,000 hours per ASTM D-714
- 25% Sodium Hydroxide Immersion: NO EFFECT after 7,000 hours per ASTM D-714
- Gasoline, diesel, jet fuel – NO EFFECT!!!
- 100% Volume Solids
- 0.0 lbs per gal HAPS (Hazardous Air Pollutants), 0.0 VOC’s
- No Solvent (Minimal Odor)
- No (ZERO) Isocyanates
Plural Component Equipment

- Expensive ($30,000.00+/-)
- Limits Contractor Pool
- Increases contractor quality
Pt. Lookout MD
Sludge Holding Tank
Pt. Lookout MD
Sludge Holding Tank
Pt. Lookout MD
Severe Pitting
Pt. Lookout MD
Interior Blasting – SSPC SP10
Pt. Lookout MD
Interior Holding Primer – PE70
Pt. Lookout MD
Permaclean 100 – 1\textsuperscript{st} Coat
PermaSafe 100
DFT – 2 coats = 80+ mils
Backrolled application over pits – 100 + mils
Pt. Lookout MD
Interior Completed
Permaclean 100 Ceramic Epoxy

• Ultra high film build (great barrier protection)
• 100% solids - **ZERO** solvent
  – No pinholes
  – No solvent entrapment
• No chance of delamination
  – No inter-coat adhesion problems
  – Great adhesion (substrate profile =/> 3.0 mils)
• Fast return to service
Croydon Tank
Interior Shell - Erection
Croydon Tank
During Construction
Croydon Tank
Interior Shell – Spot Primed
Croydon Tank
Exterior Shell – Spot Primed – PE 70
Croydon Tank
Interior – Permaclean 100 – 25 mils + DFT
Croydon Tank
Interior Finished
Croydon Tank
Exterior Finished
Pickering Clearwell
Winter Conditions
Trench Welding
Tented Blasted Surface
Permaclean 100
Completed Interior
Flourourethane Technology

Relatively new technology

Liquid Kynar

Extremely expensive resin

Phenomenal resistance to Ultraviolet Ray decomposition
Permagloss

![Graph showing gloss changes over hours for Perma-Gloss and HF](image-url)
Why Permagloss?

Additional Cost = Material differential ($200/g)
Surface preparation – same
Prior Coats – same
Application cost – same

Appreciably increases gloss and color retention
Adds 10 – 15 years to life of the exterior system
Bensalem Tank

Extremely High Visibility

Will Need Containment

Maximize Repainting Schedule
Aqua PA Bensalem Tank
Exterior Stripe Coating
Bensalem Tank
Exterior Specification

• Surface Preparation:
  – SSPC SP 6 COMMERCIAL BLAST CLEAN
    • Profile of 2.5 mils

• Painting
  – Primer: MC67 @ 2.5 – 3.5 mils DFT
  – Stripe: Permaclean II @ 2.0 – 4.0 mils DFT
  – Inter: Permaclean II @ 2.0 – 4.0 mils DFT
  – Finish: Permagloss @ 2.0 – 4.0 mils DFt
Glassboro, NJ Repaint
Glassboro - Completed
Tanks.... for your attention

Love your project.... Protect it with Induron.