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(September 7, 2021)

Partial Depth Spall Repair – Polyester Concrete

The components of the polyester concrete including the polyester resin binder, aggregate, and high molecular weight methacrylate resin surface primer shall be provided through a single system provider.

Polyester Resin Binder

Polyester resin binder shall be an unsaturated isophthalic polyester-styrene copolymer.

Prior to adding the initiator, the resin shall conform to the following requirements:

Viscosity:	75 to 200 cps (20 rpm at 77°F, RVT No. 1 spindle)	ASTM D2196
Specific Gravity:	1.05 to 1.10 at 77°F	ASTM D1475
Styrene Content:	40% to 50% by weight of polyester styrene resin	ASTM D2369

The hardened resin shall conform to the following requirements:

Elongation:	35% minimum, type I specimen, thickness 0.25" ± 0.03", Rate – 0.45 in./min.	ASTM D638
Tensile Strength:	2,500 psi minimum, type I specimen thickness 0.25" ± 0.03", Rate – 0.45 in./min.	ASTM D 638
Conditioning:	18 hours/77°F/50% + 5 hours/158°F	ASTM D618
Silane Coupler:	1.0% minimum (by weight of polyester-styrene resin)	

The silane coupler shall be an organosilane ester, gamma-methacryloxypropyltrimethoxysilane. The promoter/hardeners shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators. MEKP and CHP initiators shall be used as recommended by the manufacturer.

Polyester resin binder will be accepted based on submittal to the Engineer of a Manufacturer’s Certificate of Compliance.

High Molecular Weight Methacrylate (HMWM) Resin

HMWM resin shall be wax-free, low odor and consist of a resin, initiator and promotor conforming to the following requirements:

Viscosity	<25 cps (Brookfield RVT with UL adaptor, 50 rpm at 77°F)	ASTM D2196
Flash Point:	180°F minimum	ASTM D3278
Tack-Free Time:	400 minutes maximum	California Test 551
SSD Bond Strength	700 PSI minimum at 24 hours and 70 ± 1°F	California Test 551

Specific Gravity	0.90 minimum at 77°F	ASTM D1475
Volatile Content	30 percent, maximum.	ASTM D2369
Vapor Pressure	0.04 inches Hg, maximum at 77°F	ASTM D323

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The promoter/initiator system for the methacrylate resin shall consist of a metal drier and peroxide.

If supplied separately from the resin, the drier shall not be mixed directly with the peroxide. The containers shall not be stored in a manner that allows leakage or spilling to contact the containers or materials of the other.

HMWM resin will be accepted based on submittal to the Engineer of a Manufacturer's Certificate of Compliance.

Aggregate

The aggregate shall be thoroughly washed and kiln dried.

The aggregate for polyester concrete shall meet the requirements of Section 9-03.1 except that ASR mitigation will not apply to aggregate for polyester concrete. Polyester concrete aggregate shall conform to the following requirements for gradation:

Sieve Size	Percent Passing	
	Gradation 1	Gradation 2
1/2"		100
3/8"	100	83-100
#4	62-85	65-82
#8	45-67	45-65
#16	29-50	27-48
#30	16-36	12-30
#50	5-20	6-17
#100	0-7	0-7
#200	0-3	0-3
All percentages are by weight.		

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The combined aggregate shall have a maximum of 45 percent crushed particles.

The surface of the aggregate shall be dry and the absorption shall not exceed 1.0. The moisture content of the combined aggregate shall not exceed one-half of the aggregate absorption when tested in accordance with AASHTO T255. The aggregate temperature shall be between 40°F and 100°F at the time of mixing.

Sand for Abrasive Finish

The sand for abrasive finish shall be commercial quality blast sand having at least 95 percent passing the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested in accordance with AASHTO T 27. The moisture content of the sand shall not exceed 0.5 percent.