POLYSTEP® HPE

a functional monomer for use in emulsion polymerization systems

POLYSTEP HPE is a phosphate ester functional monomer for use in emulsion polymerization, consisting of the mono and di-ester of 2-hydroxyethyl methacrylate (HEMA). When incorporated into polymers, **POLYSTEP HPE** improves coating properties in architectural and industrial direct-to-metal (DTM) applications at typical use levels of 1-4% active on total monomer content.

Key Attributes:

- ✓ Promotes metal adhesion
- ✓ Improves chemical resistance
- ✓ Promotes pigment dispersion such as TiO_2
- ✓ Provides corrosion resistance

Adhesion Improvement

POLYSTEP HPE improves metal adhesion compared to a methacrylic acid (MAA) containing coating.

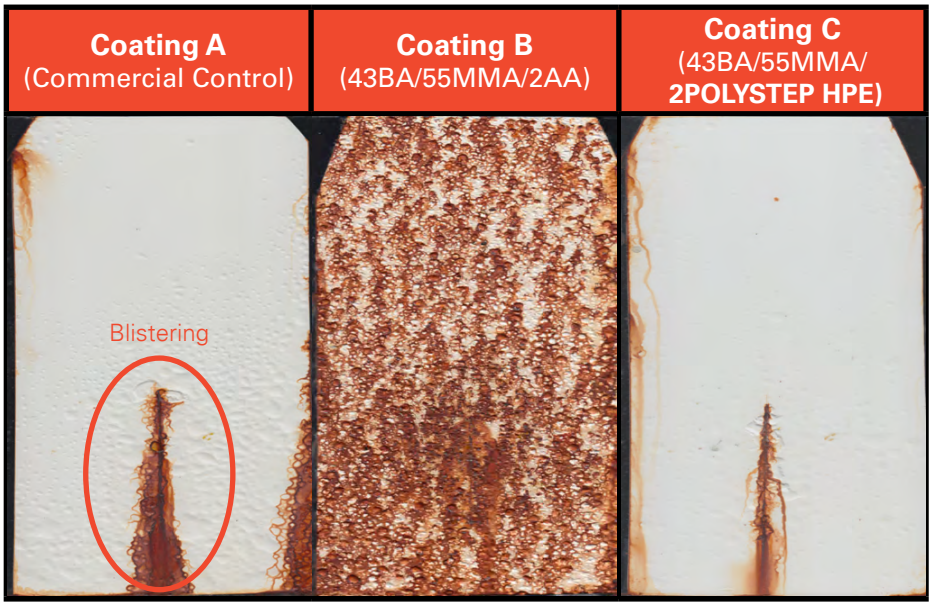
2% **POLYSTEP HPE***

2% MAA

ASTM D3359, on CRS Panels
Stryrene-acrylic Coatings; <50 g/L VOC, PVC = 23%, Tg = 5°C

Corrosion Resistance

Incorporating **POLYSTEP HPE** into the acrylic polymer improves salt spray corrosion resistance compared to an acrylic acid control (Coating B) and provides equivalent resistance to a commercial acrylic latex (Coating A).



BA = Butyl Acrylate MMA = Methyl Methacrylate AA = Acrylic Acid

Blister formation is minimized compared to the commercial latex and is influenced by the choice of emulsifier and colloidal stabilizer. For optimal performance, it is recommended that POLYSTEP TSP-16PE30 (arylphenol alkoxylate phosphate ester, free acid surfactant) be used as the primary emulsifier.

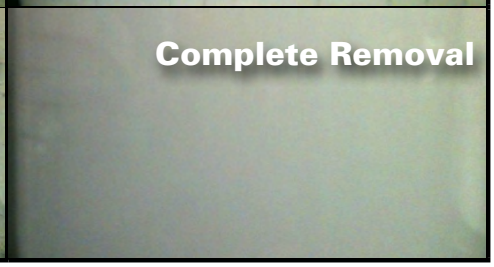
ASTM B117, 500 Hours Exposure, 3.1 Mils DFT
Industrial DTM Waterborne Acrylic Latex Coating; <100 g/L VOC, Tg = 15°C

Stepan®

*All percentages refer to percent active on total monomer content.

Chemical Resistance

POLYSTEP HPE improves chemical resistance compared to an MAA-containing coating.

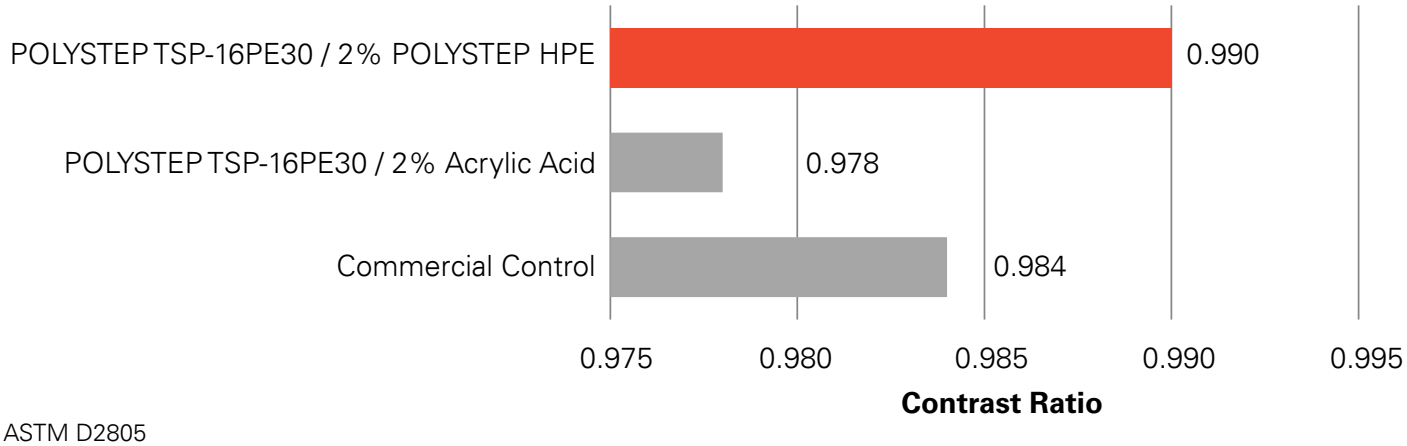
Time in Acetone	2% **POLYSTEP HPE**	2% MAA
1 hour		
3 hours (jar gently mixed)		

High gloss white DTM topcoat was applied to cold-rolled steel (2.2 mil wet; 0.5 mil dry) and dried per ASTM standard. The cured coatings were submerged into acetone baths and sealed.

ASTM D2792, modified, solvent & fuel resistance of traffic paints
Styrene-acrylic Coating; 185 g/L VOC, PVC = 18%, Tg = 40°C

Pigment Dispersion

Phosphate esters are known to improve TiO2 dispersions. Incorporating **POLYSTEP HPE** into the polymer improves TiO2 interaction efficiency. Data shows that improvements in hiding can be achieved by incorporating **POLYSTEP HPE** into the polymer.



ASTM D2805
Industrial DTM Waterborne Acrylic Coating; <100 g/L VOC, Tg = 15°C
POLYSTEP TSP-16PE30: Arylphenol alkoxylate phosphate ester

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