Rationale: Increase stability and life expectancy of murals, especially when graffiti vandalism is a threat.

Purpose: Verify the efficacy of PSS 20 and APP S, providing new tools to artists, conservators and concerned authorities, to face the growing challenge of graffiti vandalism.

Research Questions:
• Are PSS 20 and APP S susceptible to photodegradation?
• Are PSS 20 and APP S efficient as anti-graffiti? If yes, will they remain efficient after aging?
• Will the paint layer remain unchanged as the coating and the graffiti vandalism are removed?
• Does the wall texture have an effect?

Mural Surrogates and Samples Preparation:
98 Mural surrogates:
• Red clay brick and cement board substrates
• Zinsser Bulls Eye 123® water based primer
• Golden Fluid Acrylic Colours
• Anti-Graffiti coatings PSS 20 and APP S
42 Samples casted on glass slides

Determination of Graffiti Resistance:
Artificial Light Aging:
• Unaged, aged for the equivalent of 3 years and 10 years
• In Q-Sun Xenon Test Chamber model Xe-1-8C instrument with a xenon light source and a Window Glass-Q filter 420nm.
• Water spray cycle, 40% of time at 75% RH

Marking Surrogates with Graffiti Products:
Solvent-based spray paint Krylon®, gloss cherry Red
Solvent-based permanent marker Sharpie, black

Removal of Graffiti Products:
Pressurized water lance

Analysis & Tests
FTIR/ATR
PSS 20
APP S
Both coatings were similar in composition. Negligible change in chemistry after aging.

GPC
Both coatings showed a significant decrease in both their number average molecular weight (Mn), and their weight average molecular weight (Mw).

Water Contact Angle:
Average angle: 61°
Remained stable after aging.
Average angle: 80°
Improved hydrophobicity of acrylic surface, less efficient after aging.

SEM
Cross sections for both coatings showed similar results: black Sharpie marker penetrated the coating and stained the paint layer; Krylon red spray paint has not visibly stained the paint layer.

Optical Microscopy
No abrasion to the paint layer was detected after graffiti removal.

Colorimetry
For both coatings: no noticeable colour change of the coating after aging; an after graffiti

ΔE°ab value above 1 for surrogates aged for an equivalent time of 10 years.

Gloss
Average gloss: 68°
Increase in gloss through aging/spray.

Hardness
Average gouge hardness: 4H
Average scratch hardness: 2B

pH
Both coatings became slightly more alkaline after aging.

Theoretical Conclusions:
• PSS 20 and APP S degraded with artificial visible light aging.
• Both coatings remained clear and transparent after aging.
• APP S imparted hydrophobicity to the surface.
• Overall, PSS 20 and APP S are chemically similar.

Practical Conclusions:
• Both coatings, unaged and aged for three years, remained efficient as a barrier against graffiti vandalism.
• Both coatings were less efficient to protect against solvent-based Sharpie marker.
• Texturized surfaces (cement boards) were more difficult to clean, and more vulnerable to pressure washer.
• Overall, PSS 20 and APP S were efficient as barrier layer against graffiti vandalism. They both offered similar performances.