

3M Advanced Materials Division

3M™ Stain Resistant Additive SRC-220

for Use as a Stain Resistant Additive

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Product Description

3M™ Stain Resistant Additive SRC-220 is an aqueous fluorinated polyurethane dispersion (PUD) that provides stain resistance and release characteristics to various coating formulations, sealer formulations and construction materials. This product is suitable for both indoor and outdoor use.

Suggested Applications

SRC-220 additive can be used as a stain resistant additive to a variety of acrylic and urethane based coatings at 0.2 to 3.0% active solid levels, to improve the water and oil repellency and stain resistance of these coatings. Additionally, SRC-220 additive can be incorporated into construction materials, such as paint, caulk or stucco, to improve stain resistance and stain release characteristics of these materials.

Note: SRC-220 additive is not compatible with xylene, mineral spirits and other non-polar hydrocarbons.

Typical Physical Properties

Not for specification purposes. All values determined at 77°F (25°C) unless otherwise specified.

Properties	SRC-220
Appearance	Slightly translucent solution
Percent actives weight (%)	15%
Viscosity	<30 cps
Density	1.1 g/ml
VOC (ASTM 3960-89)	<240 g/l
pH	7 – 8
Boiling point	100°C
Vapor pressure @ 20°C	18 mmHg
Evaporation Rate	1, Water = 1
Flash Point	>93.3°C
Stability	Minimum one year from date of manufacture under normal storage conditions. Bring to room temperature and stir before using.
Solvent	DPM (5%) and water (80%)

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As an Additive to Concrete Cure and Seal Products

Concrete Cure and Seal Products that are designed to seal water into newly placed concrete are generally acrylic-based. Products employing acrylics that will remain on the surface following full cure of the concrete can benefit from the addition of 3M™ Stain Resistant Additive SRC-220. Laboratory tests of formulations using accepted industry acrylic resins have shown that adding SRC-220 Stain Resistant Additive can provide post-curing stain resistance. Adding SRC-220 additive at approximately 3% solids showed stain resistance when combined with 25% solids of a commercially-available acrylic emulsion from a leading resin supplier.

Because SRC-220 additive is compatible with both water and water-miscible solvents, it can be added to numerous Concrete Cure and Seal formulations. This would include formulations that are blended to meet ASTM C 1315, “Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete,” and ASTM C 309, “Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.” Because formulations vary widely, the user should re-test products formulated to meet ASTM Standards following the addition of SRC-220 additive to verify performance.

Scaling Resistance and Spalling Resistance of Cured Concrete Surfaces

SRC-220 concentrate was combined with a standard acrylic sealer from a leading manufacturer and tested for scaling resistance performance. The test was performed in accordance with ASTM C 672-03, “Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.” The purpose of this test is to determine the resistance to scaling of a horizontal surface in the presence of deicing chemicals.

The test was performed using a concrete mixed in accordance with ASTM C 672-03. Three samples were made and left uncoated and three samples were coated with a blend of 25% commercially available acrylic emulsion and 3% SRC-220 additive. A 4% calcium chloride deicing solution was left standing on the surface of the concrete samples. The samples were subjected to alternate freezing and thawing cycles, as specified by ASTM C 672. The deicing solution was replenished after each cycle. Every five cycles, the samples were rinsed and data were taken. 50 cycles were run on all six samples. Tables 1 and 2 provide data on the concrete samples. The visual ratings will indicate the level of scaling and the mass loss measurements will provide a quantitative indication of spalling resistance.

Notes: Deicing Solution 4% calcium chloride

Rating	Condition of Surface
0	No scaling
1	Very slight scaling (1/8" depth max; no coarse aggregate)
2	Slight to moderate scaling
3	Moderate scaling (some coarse aggregate visible)
4	Moderate to severe scaling
5	Severe scaling (coarse aggregate visible over entire surface)

Table 1: Test Results - ASTM C 672 Control/Uncoated Concrete

Cycle	Cumulative Mass Loss, lb/ft ²				Visual Scale Rating (ASTM C 672)			
	1	2	3	Avg.	1	2	3	Avg.
10	0.01	0.00	0.01	0.01	0.5	0.5	0.5	0.5
20	0.02	0.02	0.01	0.02	0.5	1.0	0.5	0.7
30	0.03	0.03	0.02	0.03	1.0	1.0	1.0	1.0
40	0.04	0.04	0.03	0.04	2.0	2.0	2.0	2.0
50	0.06	0.06	0.05	0.06	2.0	2.0	2.0	2.0

Table 2: Test Results - ASTM C 672 Coated Concrete

Cycle	Cumulative Mass Loss, lb/ft ²				Visual Scale Rating (ASTM C 672)			
	1	2	3	Avg.	1	2	3	Avg.
10	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
20	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
30	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0
40	0.00	0.01	0.00	0.00	0.5	0.5	0.0	0.3
50	0.00	0.01	0.00	0.00	0.5	0.5	0.0	0.3

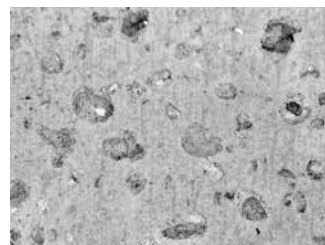


Figure 1: Untreated concrete sample following 50 freeze/thaw cycles in 4% calcium chloride deicing solution.

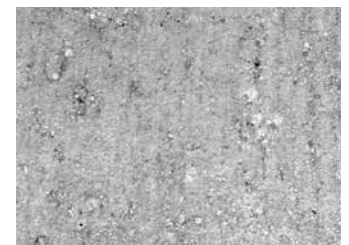
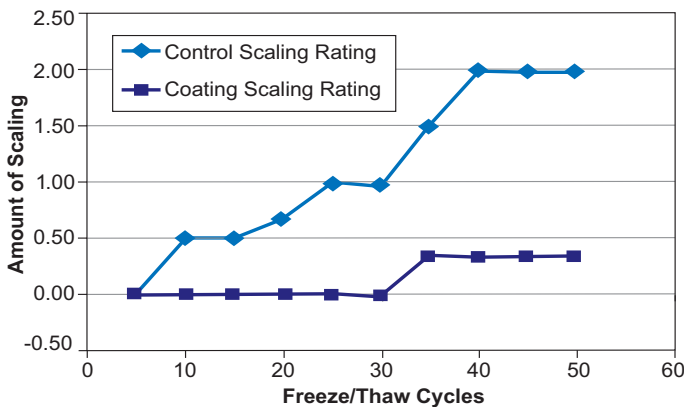


Figure 2: Coated concrete sample using SRC-220 additive and acrylic following 50 freeze/thaw cycles in 4% calcium chloride deicing solution.

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Figure 3: Concrete Scaling Level



Tables 1 and 2, and Figures 1, 2 and 3 show that the treated concrete samples were less affected by the deicing solution than the untreated samples.

Note: SRC-220 can be applied in diluted form (3% to 5% solids) to cured concrete to provide resistance and stain release to cured concrete. See your 3M representative for additional information.

As an Additive to Coatings and Sealers

3M™ Stain Resistant Additive SRC-220 concentrate was added to a number of commercially-available coating and sealer products at 1.0% active solids (5.0% SRC-220 aqueous 205 concentrate). The coatings containing SRC-220 additive were then coated on the surface intended for the original product and allowed to dry for three days. Advancing water and hexadecane contact angles were measured. The results in Table 3 show that with 1.0% SRC-220 additive, higher advancing water and hexadecane contact angles are achieved; therefore exhibiting improved water and oil repellency. It is recommended that a 0.2 - 1.0% active solids level of SRC-220 additive be used.

In general, SRC-220 can be added to numerous materials at less than 1% solids to provide stain resistance and

Table 3: Contact Angle Improvement with SRC-220 Addition

Coating Formulation	Advancing Water Contact Angle	Advancing Hexadecane Contact Angle
Urethane floor coating A	76.6	24.4
Product A + 1.0% Solids SRC-220	97.2	67.3
Two Parts Epoxy Coating B	67.0	28.3
Product B + 1.0% Solids SRC-220	106.6	73.3
Clear Wood Finish C	93.3	Too low to measure
Product C + 1.0% Solids SRC-220	117.6	79.3

stain release to the base materials. This can enable the manufacturer to differentiate products with minimal formulation change and it provides broad latitude for product development. A partial list of products that can show improved stain resistance via the addition of SRC-220 is below:

- Urethane Coatings
- Acrylic Coatings
- Caulks
- Putties
- Stucco
- Paints
- Wood Sealers
- Polymeric Products

Formulation Information

Water or water miscible solvents should be added to concentrated SRC-220 additive with agitation to create the required active solid level. Surfactants and defoamers can be added to the formulation, but are normally not required. SRC-220 additive can be added to many coating formulations; however, the user should test each formulation for compatibility before using.

Note: When using solvents or other chemicals, be sure to read and follow the manufacturer's precautions and directions for use before using.

Storage

SRC-220 additive is stable after limited freezing and thawing. Repeated freezing and thawing should be avoided. The shelf life of the product is one year from date of manufacture under normal storage conditions. SRC-220 additive is classified as "non-hazardous and non-flammable" by the U.S. Department of Transportation.

Regulatory Summary

SRC-220 additive contains low levels of volatile organic compounds (VOCs).

3M has been a leader in developing next generation surface protection materials with performance and environmental advantages. SRC-220 additive is based upon stable polymers with minimal environmental impact and is not bioaccumulative.

The components of SRC-220 additive are in compliance with the chemical notification requirements of TSCA.

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Product Safety and Handling

3M™ Stain Resistant Additive SRC-220 is intended for use in contained and non-dispersive applications. Before using this product, read the product label and Safety Data Sheet (SDS) and follow all precautions and directions for use.

3M does not recommend this product for use in food content applications or applications involving repeated exposure of wet material through skin contact, inhalation or ingestion. It is not intended for medical or pharmaceutical applications. Neither 3M nor the U.S. Food and Drug Administration has evaluated or reviewed this product for such applications.

It is the user's responsibility to determine whether this product is durable and properly cured for the end use.

Incinerate in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Facility must be able to handle halogenated materials. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste.

For additional information about safety, handling, and disposal, see the product Safety Data Sheet.

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