

3M Advanced Materials Division

3M™ Fluorosurfactant FC-4430

Introduction

3M™ Fluorosurfactant FC-4430 is a non-ionic polymeric fluorochemical surfactant belonging to a class of coating additives that provides low surface tensions in coating systems best served by fluorochemical surfactants. 3M fluorosurfactant FC-4430 contributes excellent wetting, spreading and leveling properties to a variety of coating systems.

Suggested Applications

3M fluorosurfactant FC-4430 may be used as a flow and leveling agent in various applications, including architectural coatings, inks, paints, adhesives, caulks, high solids coatings, water-reducible coatings, radiation-curable coatings and other industrial coatings.

3M fluorosurfactant FC-4430 can be used in both water- and solvent-based coating formulations and can provide benefits for dirt pickup resistance and stain resistance in certain applications.

Typical Physical Properties

(Not for specification purposes)

Properties	Typical Values
Appearance	Clear, yellow viscous liquid
Specific gravity	1.14 g/cc
Flash point (Setaflash closed cup)	>93°C (200°F)
pH (of 1% aqueous solution)	4.5
Viscosity (cP @ 25°C / 77°F)	2,000 - 6,000
Solubility in water	Dispersible in all proportions
Tg	< 0°C
Type	Non-ionic
Composition	90% polymeric fluorochemical actives
	8% non-fluorochemical actives
	2% co-solvent (DPM, toluene)
Freeze/thaw stability	Protect from freezing*

* If 3M fluorosurfactant FC-4430 freezes, warm it to >86°F (>30°C) until fluid. Freezing will not change physical properties or adversely affect performance.

Note: All values determined at 77°F (25°C) unless otherwise specified

Recommended use level is between 0.05% and 0.3% active surfactant. However, use level can vary depending on the application and concentration of other additives and solvents in the formulation.

Recommended procedure for adding FC-4430 to formulations:

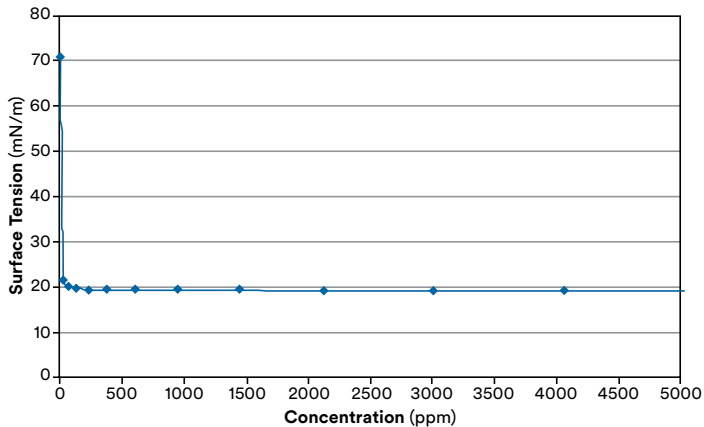
FC-4430 is a viscous liquid at 98% solid. Because the dosage level of 0.05 – 0.5%, depending on the application and formulation, is very low, it is recommended to add the FC-4430 in one of the following options:

- Option 1:** Place the FC-4430 package (unopened drum, pail or can) in an oven or hot room at around 50°C to lower the viscosity before adding to the formulation.
- Option 2:** Pre-dilute FC-4430 with DPM (dipropylene glycol monomethyl ether) or similar solvent to 20% FC-4430 solid. The 20% FC-4430 in DPM is stable with a shelf life of 24 months.
- Add 20 parts of FC-4432 to a container
 - Add 80 parts of DPM
 - Mix well
- Option 3:** Pre-dilute FC-4430 with water/DPM blend if it is desired to have lower VOC content in the formulation. To make 20% FC-4430 solid in DPM:
- Add 20 parts of FC-4430 to a container
 - Add 20 parts of DPM
 - Mix well
 - Add 60 parts of DI water
 - Mix well to make the clear solution (20% FC-4430, 20% DPM and 60% water)
- Option 4:** Pre-dilute FC-4430 with DI water to 10% solid.
- Add 10 parts of FC-4430
 - Add 90 parts of DI water
 - Mix well (the 10% FC-4430 in water is slightly cloudy)

It is recommended to add the pre-warmed or pre-diluted FC-4430 liquid (solution) at the last stage of the water-borne formulation, and to avoid high-speed agitation to minimize foaming.

Surface Tension/CMC (in water)

3M fluorosurfactant FC-4430 is very efficient at reducing the surface tension in aqueous coating systems.



Foaming

3M™ Fluorosurfactant FC-4430 shows low tendency to form foam in aqueous systems. This can translate into the ability to use less defoamer and/or a less aggressive defoamer additive in your formulation.

Property	FC-4430
Foam Quality, %	85.58
Foam Stability, minutes (t1/2 value)	2

Solubility

Solvent	Solvent grams of FC-4430/100 grams of solvent
Butyl cellosolve	>25
Toluene	>35
Methyl ethyl ketone	>25
Dimethylformamide	>25
Isopropyl alcohol	>25
Methanol	>25
Dowanol™ PM	>25
Texanol™	>25
Proglyde™ DMM	>25
N-methyl pyrrolidone	>25
Mineral spirits	<1

3M™ Fluorosurfactant FC-4430 Static Surface Tensions in Water-Borne Resins

Resin	Control	HC Surfactant 1%	FC-4430 0.3%	Competitive FC Surfactant 0.3%	Silicone Surfactant 0.5%
NeoCryl™ A-6099	39.1	29.0	24.3	26.1	27.3
NeoRez™ R-941	43.1	29.8	21.2	24.4	23.8
NeoRez™ R-9621	47.4	33.1	21.2	24.2	22.8
Joncryl® 537	37.4	31.8	19.7	25.6	27.6
Joncryl® 1532	38.4	32.9	21.2	26.9	28.9
Joncryl® 1925	41.0	31.2	19.7	25.4	27.1
Joncryl® 1972	38.9	27.6	22.4	26.3	27.6

Interfacial Surface Tensions

Surfactant	Interfacial Tension Light Phase: Heptane (dynes/cm)			Interfacial Tension Light Phase: Cyclohexane (dynes/cm)		
	200 ppm	0.5%	1.0%	200 ppm	0.5%	1.0%
Control		43.7			51.2	
FC-4430	3.5	2.2		2.5	1.5	
SDS ¹	15.4	6.1	5.8	12.9	5	4.9
SDBS ²	15.9	4.1	3.7	13.5	2.9	2.6
Silicone Dispersant	14.4	10.9	10.5	11.7	8.8	8.8

¹Sodium Dodecyl Sulfate

²Sodium Dodecyl Benzene Sulfonate

Static Surface Tensions in Organic Solvents/Systems

Solvent	Weight % FC-4430			
	0.0	0.1	0.2	0.5
Distilled Water	72	23	21	20
Methyl Alcohol	23	23	23	23
Butyl Cellosolve	28	27	27	27
Butyl Carbitol	30	29	29	29
Methyl Ethyl Ketone	25	24	24	24
Toluene	28	28	28	28
Dimethylformamide	33	33	33	32
Polyethylene Triol LG-56	33	23	22	22
Cycloaliphatic Epoxy Resin	46	35	35	27
Epon™ Resin 828-RS	45	22	19	18

Note: Data not for specification purposes

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Thermal Stability

The active ingredient in 3M™ Fluorosurfactant FC-4430 exhibits good thermal stability when used in thermal processing applications.

TGA data for FC-4430

This data shows the excellent thermal stability of 3M fluorosurfactant FC-4430 if used in a thermal processing application.

Regulatory Summary

Temperature (°C)	FC-4430 Specified % Weight Loss
195	5%
255	10%
305	50%
330	80%
355	90%
405	95%

(10 mg sample heated at 5°C/minute in air).
Temperatures (°C) at which specified % weight loss occur.

- The PFBS-based surfactants produced by 3M have been reviewed by the U.S. EPA and placed on the TSCA inventory. There is a testing consent order in place which only applies to 3M, not 3M customers. The products are REACH compliant in Europe. The products are available for purchase in China, Korea, New Zealand, the Philippines and on a limited basis in Australia, Canada and Japan.
- PFBS and PFBS-based surfactants are not included in the U.S. EPA's PFAS Final Significant New Use Rule (SNUR) (67 Fed. Reg. 72854).

Packaging

3M fluorosurfactant FC-4430 is currently available in:

- 8-lb. pails
- 40-lb. drums
- 250-lb. drums

Product Safety and Handling

3M fluorosurfactant FC-4430 is intended for use in non-dispersive applications.

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

It is the user's responsibility to determine whether a coating containing this product is durable and properly cured for the end use. Any used or unused material for disposal should be incinerated in an industrial or commercial facility in the presence of a combustible material. Combustion products will include HF. Facility must be capable of handling halogenated materials. As a disposal alternative, dispose of waste product in a facility permitted to accept chemical waste. For additional disposal information, see the product Safety Data Sheet.

For additional product safety and handling information, please read the product label and Safety Data Sheet before using this product.

3M Resources

To request a sample, place an order or request additional information, please contact your local 3M representative, an authorized 3M distributor or call 1 800 367 8905.

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