

DuPont Fire Extinguishants

COMPARISON OF DUPONT FE-13 AND FK-5-1-12 (NOVEC1230)

DuPont FE-13 outperforms FK-5-1-12 (Novec 1230)

DuPont FE-13 not only provides superior performance compared to FK-5-1-12 (Novec 1230), it is more cost effective and safer to use. DuPont FE-13 costs less per kilogram than FK-5-1-12 (Novec 1230) and requires fewer kilograms of agent per application, making it a more cost-effective fire extinguishant. DuPont FE-13 features very low chemical reactivity, so it does not pose special challenges for system designs and end users.

Chemical reactivity

DuPont FE-13

- DuPont FE-13 features very low chemical reactivity
- DuPont FE-13 does not react with water, polar solvents, hydrocarbon solvents, or any commonly encountered chemical compounds (e.g., alcohols, amines, etc.)

FK-5-1-12 (Novec 1230)

- Features high chemical reactivity, undergoing reaction with many commonly encountered chemical compounds, including water, alcohols and amines
- Can be rendered ineffective when in contact with water or solvents (polar or hydrocarbon)^a
- Reacts with water to form HFC-227ea and Pentafluoropropionic acid (PFPA)^b
- Forms HFC-227ea and PFPA when absorbed across the lung-air interface^c

Note: PFPA is highly toxic, causing eye and skin burns, gastrointestinal burns and chemical burns to the respiratory tract. It is also highly corrosive, forming an iron salt.

System design considerations

DuPont FE-13

- Works effectively in all commonly used fire extinguishant systems; does not present any unusual system design challenges



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FK-5-1-12 (Novec 1230)

- Presents risk of liquid discharge, resulting in failure to reach design concentration rapidly
- Requires special system design to ensure gaseous discharge
- Features large negative pressure spike on discharge
- High vapor density results in more rapid stratification of FK-5-1-12 (Novec 1230)/ air mixtures, i.e., decreased
- Reactivity with water leads to the requirement of special procedures for handling and transfer of FK-5-1-12, e.g., the use of nitrogen purging and vent driers to prevent the entry of moist, ambient air into FK-5-1-12 (Novec 1230) storage containers^d

NOTE: Failure to follow these recommendations may result in contamination of the agent and potential failure of the system in which it is used.^g

Concentration requirements

	DuPont FE-13	FK-5-1-12 (Novec 1230)
MEC for heptane	12,6% v/v	4,5% v/v
Design concentration	14,6% v/v	5,9% v/v
Agent for 100 m ³	57,5 kg	87,2 kg

Distribution limits

	DuPont FE-13	FK-5-1-12 (Novec 1230)
Maximum ceiling height, ft	25	14 ^a
Maximum nozzle area coverage, ft	42x42	32x32 ^a
Density of agent/air mixture, kg/m	1,48	1,94

Toxicity concerns

	DuPont FE-13	FK-5-1-12 (Novec 1230)
Target organ	None	Liver ^e
AEL ^f	1,000 ppm	150 ppm ^c
ALC/LC ₅₀	>66%	>10% ^c
Repeated dose LOAEL	>50,000 ppm	997 ppm ^e
Maximum 5-minute human exposure (PBPK)	>30%	PBPK data not available

a. Ansil Installation, Operation Recharge, Inspection, and Maintenance Manual
Sapphire Pre-Engineered Clean Agent Fire Suppression Systems UL EX-4510, 5-15-03.
b. Saloutina, et. al., IZV. Akad. Nauk SSSR (8), 1893 (1982); CA 97:215478.
c. 3M Technical Brief, Novec 1230 Fire Protection Fluid Safety Assessment, Nov. 2004.
d. Novec 1230 Fire Protection Fluid - Storage and Handling Information, 3M, July 2003.
e. NICNAS, August 2002.
f. Acceptable exposure limit, 12 h time weighted average.

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