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Tyco Safety Products

Suppression Systems


General introduction
Physical properties
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Safety
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Test work
Approvals
Summary

3M Novec™ 1230 Fire Protection Fluid

Key Features

-
- Zero ozone depleting potential
- Negligible global warming potential
- Atmospheric lifetime of less than 5 days
- Safe for use in occupied areas
- Existing halon control system can be adapted for use with Novec 1230 fluid
- Requires minimal storage space
- Provisional S.N.A.P listing by US E.P.A.
- UL FM testing underway
- Submitted for inclusion in ISO and CEN design standards
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**3M™ NOVEC™ 1230
Fire Protection
Fluid**



The search for halon 1301 replacements has been on-going for over 10 years and each alternative brings with it a unique set of properties. We have brought to the market products that match the requirements of industry and our latest research allows us to introduce fire protection systems using Novec 1230 fluid, a new development with some advantages over current technologies. Novec 1230 fluid allows us to complement our existing range of agents as the phase out of halons accelerates in many countries around the world.



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NOVEC 1230 Fluid

Liquid at Room Temperature



Benefits over conventional agents

Ease of transportation

Low pressure storage

Simplified filling

Gaseous Discharge



Low heat of vapourisation 95 kJ/kg

Vapour pressure 40.4 kPa

Super-pressurised with N₂

Nozzle design

NOVEC 1230 Fluid

Environmental Properties

Agent	O.D.P.	G.W.P.	A.T.L.
Halon 1301	16	6900	~ 65 years
HFC227ea	0	3500*	~36.5 years
HFC125	0	3400*	~32.6 years
HFC23	0	12000*	~250 years
CO2	0	1	n/a
Inergen	0	n/a	n/a
Novec 1230	0	1	3-5 days

- ***GWP = global warming potential (*values taken from draft F gas regulation)***
- ***ODP = ozone depleting potential***
- ***ATL = atmospheric lifetime (100 year ITH)***

NOVEC 1230 Fluid

Safety Considerations:- Class A Hazards

Agent	Use Concentration	NOAEL*	Safety Margin
Halon 1301	5%	5%	Nil
HFC227ea	7.9%** (6.4%)	9%	14%
HFC125	11.2%**	7.5%	Negative
Inert gases	39.9%** (34%)	43%	8%
CO2	50%	< 5%	Negative
Novec 1230	5.3%** (4.2%)	10%	89%

*** No Observable Adverse Effect Level / PBPK modelling being applied in some countries**

****Use concentrations and safety margins calculated per ISO14520 : 2006**

Values in parenthesis are UL values (inert gas = Inergen)

NOVEC 1230 Fluid

Safety Considerations:- Marine (Class B hazards)

Agent	Use Concentration	NOAEL*	Safety Margin
Halon 1301	4.2% - 5%	5%	Nil
HFC227ea	8.6%**	9%	5%
Inert gases	40%**	43%	8%
CO2	50%	< 5%	Negative
Novec 1230	5.5%**	10%	82%

* No Observable Adverse Effect Level / PBPK modelling being applied in some countries

*****Use concentrations based on IMO testing - safety margins based on 20 C
Safety margin would be lower with design calculation at 0 C***

NOVEC 1230 Fluid

Transportation

NOVEC 1230 is stored as a liquid and super-pressurised with nitrogen to 25 bar (like halon 1301)

Boiling point 49 degrees C

Negligible vapour pressure

Easy to transport (not pressurised)

Easy to fill (no filling plant needed)

On site refilling a possibility



NOVEC 1230 Fluid

Filling Operations



NOVEC 1230 Fluid

Design Rules - Industrial Systems

Designs may follow : - NFPA 2001 or ISO 14520

NFPA bases design concentrations on UL testing

ISO bases design concentrations on ISO testing

Design Rules – Marine Systems :- based on IMO Circular 848

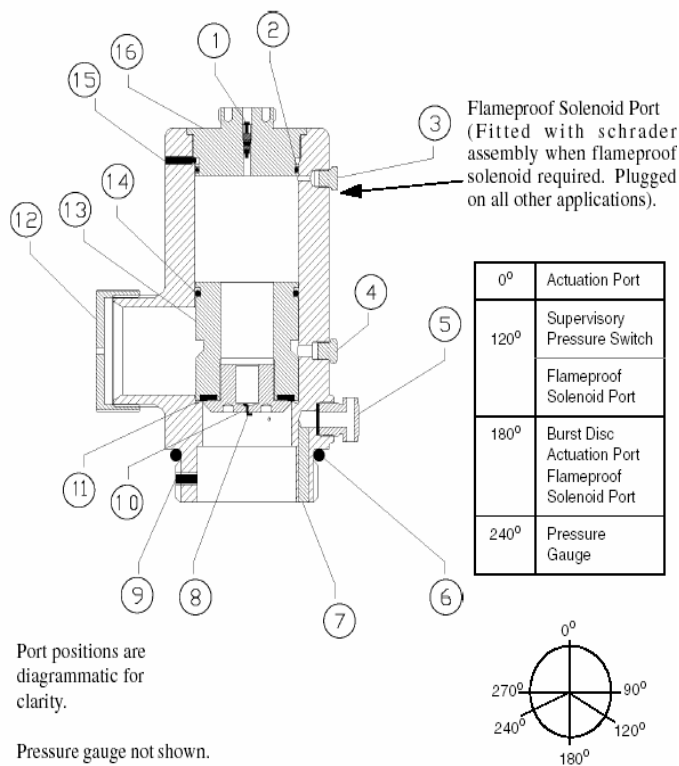
Design Rules – Off-shore :- based on UL or IMO rules

Hydraulic flow calculations using Hughes software, fully tested and listed in accordance with UL2166, approved by LPCB and accepted by Marine authorities

NOVEC 1230 Fluid

Standard halon type equipment - high flow valve to achieve 10 second discharge time

Item	Description	Qty
1	Schrader Valve	1
2	Bonnet 'O' Ring	1
3	Solenoid Adaptor Port Blanking Plug	1
4	Pilot Pressure Port Blanking Plug	1
5	Burst Disc Assembly	1
6	Neck 'O' Ring	1
7	Hidden Detail of Burst Disc Port	1
8	Restricting Wire	1
9	Syphon Tube Locking Screw	1
10	Seat Retainer	1
11	Main Seat	1
12	Recoil Cap	1
13	Piston	1
14	Piston 'O' Ring	2
15	Bonnet Locking Screw	1
16	Bonnet	1



NOVEC 1230 Fluid

Existing halon 1301 pipework may be able to be re-used with Novec 1230 Fluid in some cases

Assuming that :-

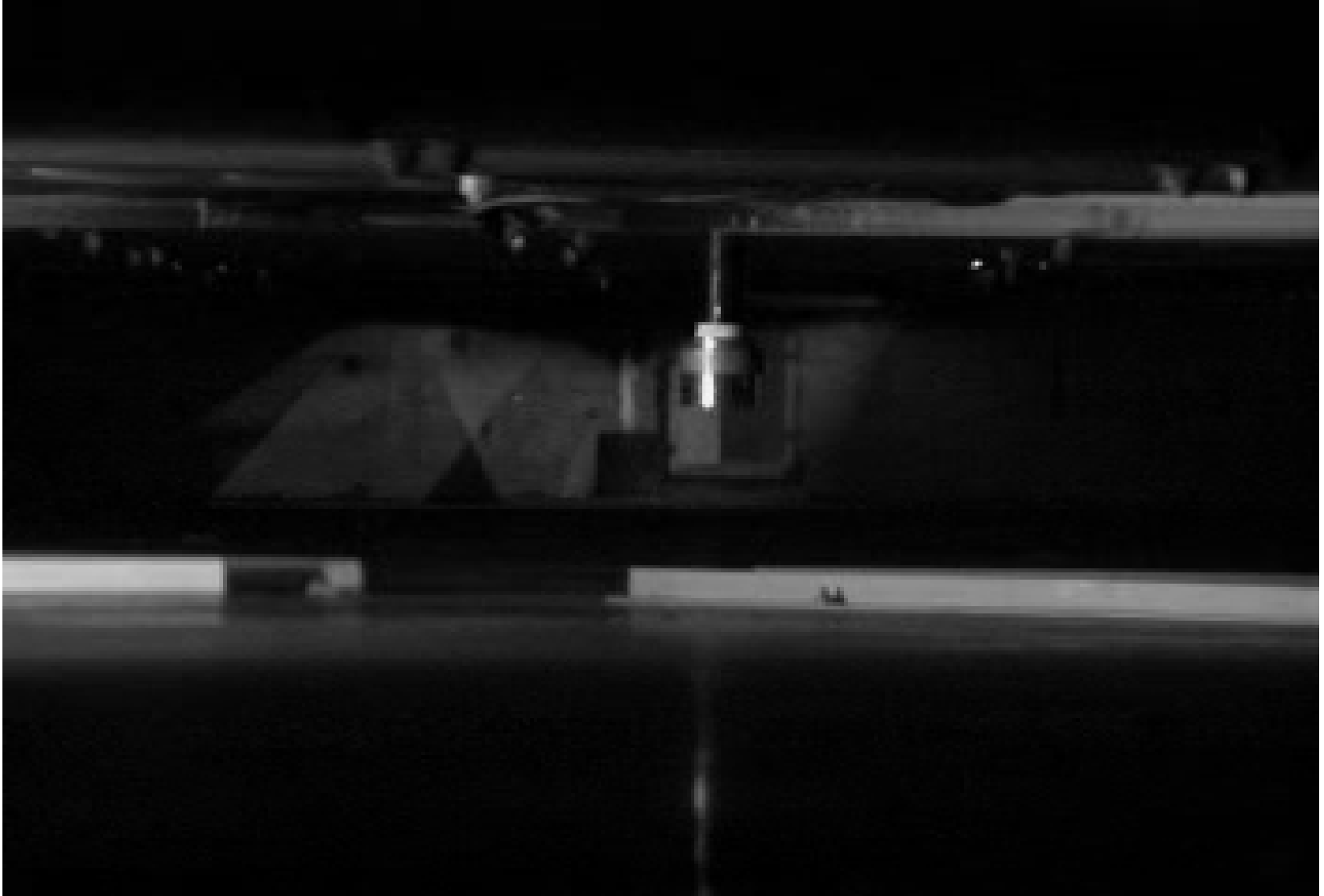
It is the correct grade for halon
Tee splits are properly installed
Nozzle locations are appropriate



NOVEC 1230 Fluid



NOVEC 1230 Fluid



NOVEC 1230 Fluid

MARINE

MSC Circ. 848 testing - successfully completed February 2002
at U.S.C.G. F&S.T.D.

Mobile Alabama

Witnessed by :-

US Coast Guard

Lloyds Register of Shipping

MCA

UL (for USCG)



NOVEC 1230 Fluid

IMO 500 cu.m Test Enclosure : Mobile Alabama



NOVEC 1230 Fluid

IMO Fire Scenario # 4

4 sq.m diesel tray

Total fire load 6MW



NOVEC 1230 Fluid

IMO Fire Scenario # 2a

0.25 sq.m heptane tray under engine

Horizontal low pressure heptane spray

High pressure diesel / fuel oil spray

Total fire load 7.95 MW



NOVEC 1230 Fluid

IMO Fire Scenario # 3

2 sq.m diesel tray below steel obstruction

Low pressure / low flow heptane hidden spray fires

Wood crib

Total fire load 4.4 MW



NOVEC 1230 Fluid

Next generation chemical extinguishing agent

Safe for people - large safety margin

No environmental issues

US EPA SNAP listing / HAG

Compact storage

Low pressure agent

LPCB approved

UAE/Kuwait approved

UL/FM approved

Major Marine approvals

Included in NFPA 2001 : 2004

Included in ISO 14520 : 2006

Large installed base

