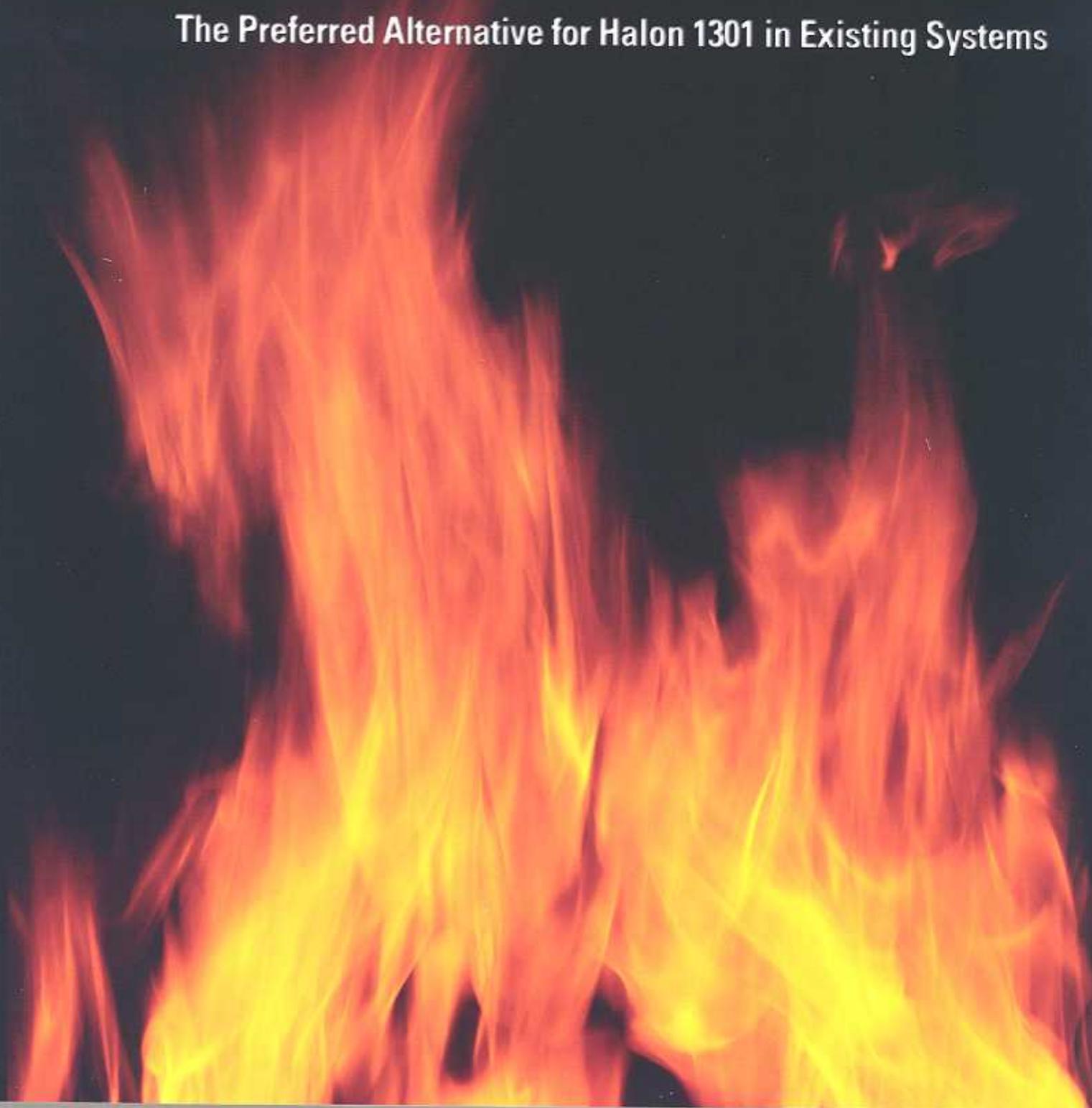
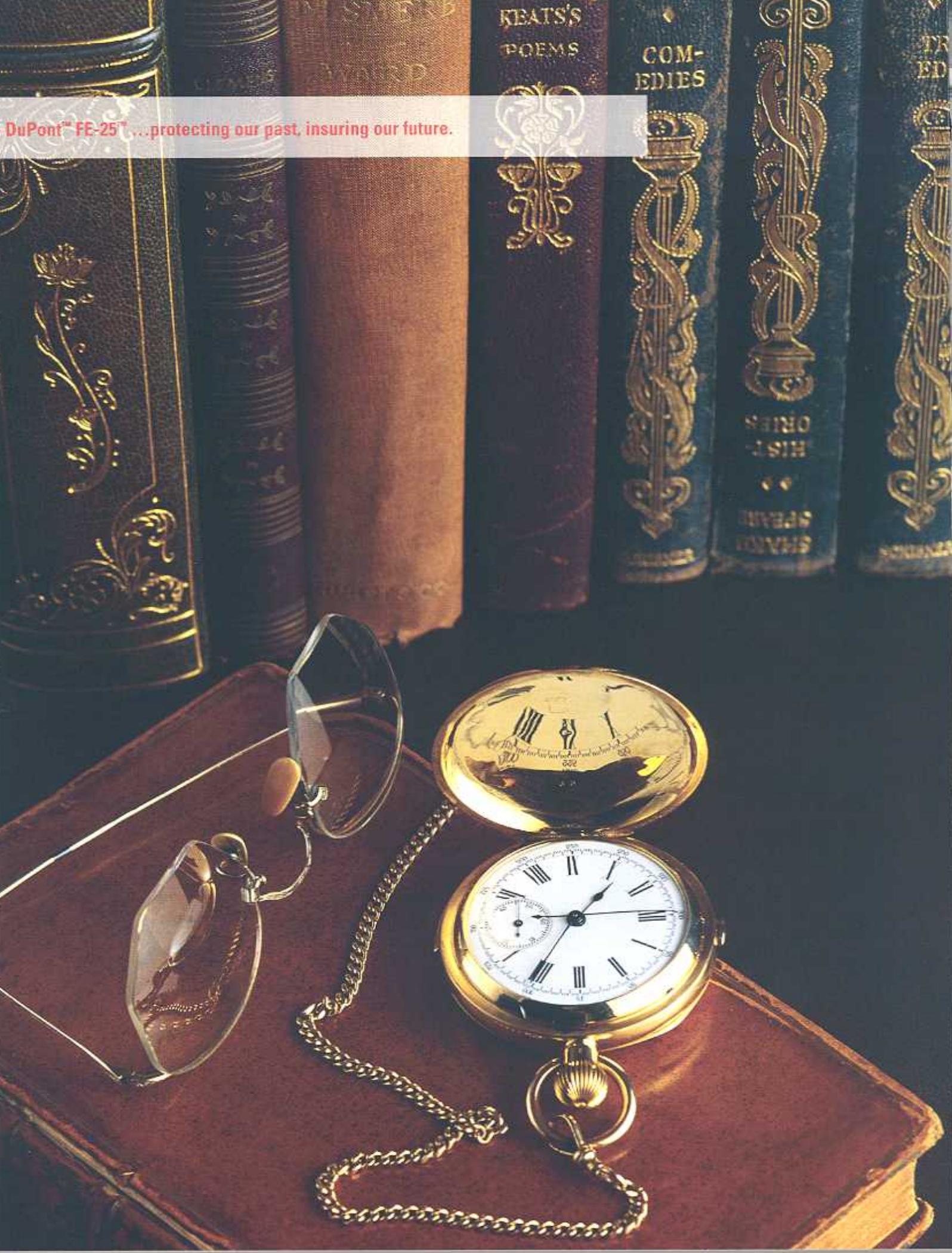


# DuPont™ FE-25™

The Preferred Alternative for Halon 1301 in Existing Systems



DuPont™ FE-25™ ...protecting our past, insuring our future.



DuPont was founded in 1802 in Wilmington, Delaware, USA by Eleuthère Irénée du Pont de Nemours.

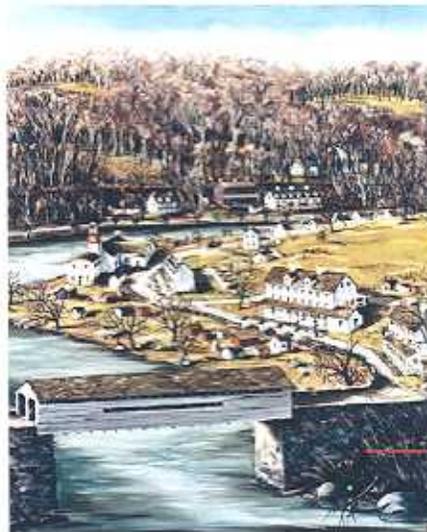


## INTO OUR THIRD CENTURY – A TRADITION IN SAFETY

**F**ounded in 1802, DuPont enters its third century on the firm foundation of its longstanding core values - safety, health and environmental stewardship, ethics, and respect for people. More than an internal philosophy, these values are also reflected in our business pursuits. The continued development of products and services that promote safety and improved quality of life for people around the world is a goal that is fully integrated into the culture of DuPont.

Many DuPont products and technologies are used for protecting people and valuable assets around the world. The company's offering of fire protection products provides a good illustration covering a broad spectrum of areas. Examples include fire resistant plenum cable made of Teflon<sup>®</sup>, fire protection coatings made of Unitherm<sup>®</sup>, fire resistant clothing made of Nomex<sup>®</sup>, and its family of clean agent fire extinguishants

DuPont is proud to continue its tradition of safety with the introduction of FE-25<sup>™</sup> as the preferred replacement for Halon 1301 in existing systems. With FE-25<sup>™</sup>, DuPont is the only supplier capable of providing a full range of extinguishants for both new and existing systems on a global basis. Through the miracles of science, DuPont continues to reinforce its commitment to safety, and technology leadership.



DuPont Powder Mills on the Brandywine River

FE-25™ is particularly well-suited for sensitive applications, such as clean rooms.



In total flooding applications, FE-25™ is well-suited for enclosures such as a ship's engine room to prevent a disaster at sea.



## WHY FE-25™?

### Closest Match to Halon 1301

DuPont™ FE-25™ closely matches Halon 1301 in terms of physical properties such as flow characteristics and vapor pressure. The pressure traces, vaporization, and spray patterns for FE-25™ nearly duplicate that of Halon 1301. FE-25™ has a low boiling point, like Halon 1301, and can be used and/or stored at sub-freezing temperatures. The low boiling point also leads to rapid dispersion throughout an enclosure. The improved flow of FE-25™ versus other potential alternatives allows for remote cylinder storage as was the case with Halon 1301.

Due to the physical similarities between FE-25™ and Halon 1301, FE-25™ is the best choice to retrofit existing Halon 1301 systems. When retrofitting existing Halon 1301 systems, the nozzles and cylinder assembly will need to be upgraded, however, the piping likely will not need to be changed, which is key to a cost-effective retrofit that minimizes business interruption.

### Safer for the Environment

FE-25™ is an environmentally preferred alternative to Halon 1301. Unlike Halon, FE-25™ does not contain chlorine or bromine and therefore has zero ODP. FE-25™ has relatively low global warming potential (GWP) compared with other commercially available chemical agents. GWP, less FE-25™ is other Halon alternatives leading to a reduced overall environmental impact. Overall environmental impact is also minimized by improved detection technology and rates into the environment.



Combined with its low required by weight than used in fire protection, environmental footprint is also minimized by improved, extremely low discharge.

The loss of data and archives can be devastating to a business. FE-25™ protects your information and keeps the data flowing.

DuPont™ FE-25™ protects people. It is suitable for use in normally occupied spaces for Class A fire hazards.



## FE-25™ THEN AND NOW

In 1992, FE-25™ (HFC-125) was the leading candidate for the replacement for Halon 1301 in total flooding and inerting applications. Since the flow and vapor characteristics of HFC-125 were closest to the properties of Halon 1301, many suppression system manufacturers were developing DuPont™ FE-25™ systems. When the extinguishing concentration of HFC-125 for Class B fires (based upon n-heptane) was determined to be above the No Observed Adverse Effect Level (NOAEL) of 7.5%, the use of HFC-125 was limited to applications for unoccupied spaces. With this limitation, the market migrated to other products such as HFC-227ea, commonly referred to as heptafluoropropane or FE-227™, a trademark of the DuPont Company.

Since that time a couple of factors have changed, re-energizing the development work for FE-25™ in total flooding systems. As a result of these two key factors, DuPont™ FE-25™ was determined to be suitable for use in Class A fire systems in normally occupied spaces.

### Safe for People

First, the NFPA and ISO began incorporating the use of a US EPA sponsored Physiologically Based Pharmacokinetic (PBPK) model to determine allowable human exposure limits for halocarbon agents. The PBPK model provides a more accurate assessment of the length of time that a person can be exposed to a chemical. Based on PBPK Standard lists, HFC-125 as people are normally present extinguishing concentrations PBPK methodology raised the FE-25™ in occupied spaces



modeling, the NFPA 2001 acceptable for use where (normally occupied spaces) at up to 7.5%. In essence, the allowable concentration for from 10.0% to 11.5%

Enjoy peace of mind knowing that FE-25™ saves time and money without sacrificing performance.

DuPont™ FE-25™ protects assets; it is the preferred alternative for Halon 1301 in existing systems.



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## Safe for Assets

Second, the industry determined that the previous extinguishing concentrations calculated from the Class B fire test, with n-heptane, were not good indicators of the required extinguishing concentration for Class A fire applications. By using n-heptane as the standard for all hazards, more extinguishing agent than necessary was being used. This added cost to the end-user by increasing the required agent amount, hardware and storage space.

As a result, the NFPA and ISO organizations developed new tests to determine the extinguishing concentrations for all of the commercial extinguishing agents protecting Class A fire hazards. In the case of FE-25™, for Class A fires, the accepted Minimum Extinguishing Concentration (MEC) is 6.7% based upon the testing requirements in the Underwriters Laboratory (UL) Standard 2166. The actual design concentration for a suppression system will be the MEC multiplied by a safety factor determined by the local Authority Having Jurisdiction (AHJ). In the cases of NFPA and ISO, the safety factors are 20% and 30%, respectively. Class A fire assets represent greater than 95% of all commercial fire protection scenarios. For Class A fire assets, FE-25™ is the preferred alternative for Halon 1301 in existing systems for the total flooding of enclosures and applications considered normally occupied spaces, such as computer rooms, telecommunication switch stations and facilities, semi-conductor manufacturing facilities, data processing centers, clean rooms, industrial process control rooms, museums, libraries and historical sites.

FE-25™ can also be used to suppress Class B fire hazards for areas that are not normally occupied or have limited access. Examples of these applications include: pleasure craft engine compartments, petrochemical facilities, chemical storage rooms, paint lockers and other applications with hydrocarbon-based materials. FE-25™ was selected by the U.S. Department of Defense as a replacement for Halon 1301 for engine nacelle applications in new aircraft designs. As a result, the Navy has specified FE-25™ for the engine nacelles of aircraft such as the F/A-18 E/F and V-22. FE-25™ is also used in the area of explosion suppression with the primary application in grain elevators.

DuPont™ FE-25™ – as the preferred Halon 1301 retrofit replacement, it is safe for people, safe for assets and safer for the environment.



## PROTECTING WHAT MATTERS MOST

The reasons for using DuPont™ FE-25™ versus other Halon 1301 replacement options when retrofitting an existing suppression system are compelling. FE-25™ is safe for people, safe for assets and safer for the environment. There is no question that DuPont™ FE-25™ is the preferred Halon 1301 retrofit replacement. DuPont is committed to working with its partners in the marketplace to develop solutions that add value to the fire protection industry, improve the safety and quality of life for people around the world, and provide you with peace of mind. Our goal in fire protection, like that of our customers, is to protect people and valuable assets - it's what matters most. It is a practice and tradition that served us well for more than 200 years, and one that will play an important role in our future.

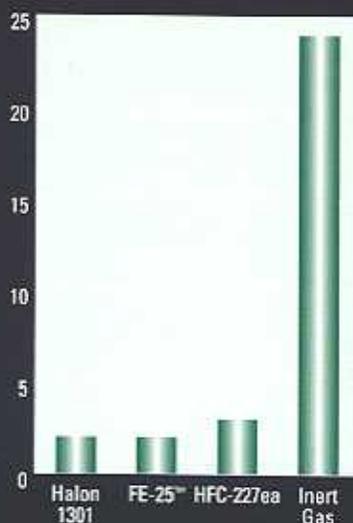
DuPont™ FE-25™ ...protecting our planet and paving the way to the future.



### Properties of DuPont™ FE-25™

Chemical Formula	CF <sub>3</sub> -CHF <sub>2</sub>
Chemical Name	Pentafluoroethane
ASHRAE Designation	HFC-125
Molecular Weight	120.02
Boiling Point	-48.3°C -55°F
Liquid Density @ 25°C @ 77°F	1189.7 kg/m <sup>3</sup> 74.27 lb/ft <sup>3</sup>
Vapor Pressure @ 25°C @ 77°F	1381.5 kPa 200.4 psia
Ozone Depletion Potential	Zero
Atmospheric Lifetime	32.6 years

### Relative Volume Storage Requirements At Design Concentration Levels for Class A Hazards



### \*Other DuPont Clean Agent Fire Extinguishants

#### FE-36™

FE-36™ is an advanced, zero ozone-depleting replacement for Halon 1211 in streaming applications. It can also be used as a replacement for Halon 1301 in modular suppression systems. Portable fire extinguishers using FE-36™ have been listed by Underwriters Laboratories for use on Class A, B and C fires and are proving to be the standard in-kind replacement for Halon 1211.

#### FE-13™

FE-13™ is a clean, environmentally acceptable, "people friendly" replacement for Halon 1301 as a total flooding agent under all use conditions. It is particularly applicable where high concentrations are needed for improved safety margins, the protected spaces are large, or where temperatures are likely to go below 0°C (32°F).

#### FE-227™

FE-227™ is a clean agent fire extinguishant replacement for Halon 1301 with zero ozone depleting potential. It is used in total flooding applications for the protection of people and high value assets, such as those found in computer rooms, telecommunication facilities, museums, and clean rooms. The EPA and National Fire Protection Association (NFPA) classified heptafluoropropane or HFC-227ea as acceptable for total flooding of normally occupied spaces at controlled concentration and egress times.

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