



Halotron® I Clean Fire Extinguishing Agent

The Clean Extinguishing Agent of Choice



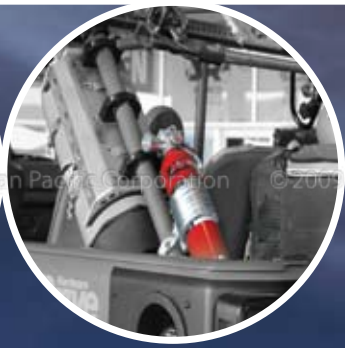
Halotron® I is a proven clean extinguishing agent effective on a wide range of fires. These include class A (ordinary combustibles, wood, paper, rubber, plastics, cloth), class B (involving flammable liquids, greases, oils, paints, solvents, alcohols, flammable gases, etc.), and class C (involving energized electrical equipment). Since it is a clean agent, it does not leave a residue after application, and therefore minimal or no collateral damage occurs from the agent itself to equipment and other assets in the area where it is employed. This is in contrast to dry chemical agents such as mono-ammonium phosphate (MAP), and potassium bicarbonate which generate volumes of fine particle dust that have to be cleaned up and that can be corrosive. Halotron® I has undergone extensive testing and has been employed widely in portable fire extinguishers since 1994. It is discharged as a rapidly evaporating liquid, allowing for extended discharge throw lengths of 6 ft. (1.8 m) to 45 ft. (13.7m).

Halotron® I is effective in streaming and local applications. The agent is based on an HCFC raw material and two gases. Halotron® I was approved in early 1994 for commercial/industrial and military use as a substitute for halon 1211 in streaming applications by the U.S. Environmental Protection Agency (EPA) in its Significant New Alternatives Policy (SNAP) program. The SNAP program evaluates candidate chemical replacements for CFCs and halons, based on environmental and health effect characteristics.

Production and fire testing facilities are located in Iron County near Cedar City, Utah, U.S. The production facility is located within the AMPAC southern Utah specialty chemical manufacturing facility.

***Clean . Safe . Non-Corrosive . Electrically Non-Conductive
Rated for A-B-C Fires***

Applications



Aviation

- Aerospace
- Aircraft Manufacturing
- Aircraft Ramps
- Aircraft Rescue & Fire Fighting
- FAA Control Towers
- Flight Crew Training
- Live Fire Training
- On-Board Aircraft

Marine

- Boats, Ships and Yachts
- Engine Compartments
- Ship Control Rooms

Commercial

- Art Galleries
- Banking Facilities
- Cable Trays
- Computer Rooms
- Fiber Optics
- Hotels
- Libraries
- Offices
- Public Transportation
- Retail / Wholesale
- Schools
- Telecommunications
- Utility Vaults

Industrial

- Clean Rooms
- Conventional & Nuclear Power Plants
- Electronic Equipment
- Heavy Equipment
- Laboratories
- Motor Control Rooms
- Process Control
- Textiles
- Transmission Facilities
- Warehouses
- Some Hazardous Materials
- Utility Vaults

Transportation

- Auto Racing
- Classic Automobiles
- Engine Compartments
- Exotic Automobiles
- Four Wheel Drive Automobiles
- Railroad

Military

- Computer / Control Rooms
- Flight Lines
- Heliports
- Military Electronics
- Military Training

"By using your 'clean' product, minimal cleaning was required, and millions of dollars were saved in replacement parts and labor. Foam or a dry chemical would have only extended the damage."

**- Adam J. Reichwald, Fire Inspector
Sikorsky Aircraft, 2001**

The Advantage of a Clean Agent

Available in Listed Hardware



Halotron® I has a unique and long list of qualifications that make it the most widely used halocarbon clean extinguishing agent for streaming applications.

Underwriters Laboratories Inc. (UL) Component listed (File EX5107).
Available in the U.S. in a complete line of A-B-C rated, UL listed, portable extinguishers.

Available in A-B-C rated, UL listed high-performance, wheeled fire extinguishers of net charge weight 65 lbs. (29 kg) and 150 lbs. (68 kg) from Amerex, Buckeye and H3R.

Additional Approvals

Approved by the U.S. Federal Aviation Administration (FAA) for airport ramp fire fighting in the U.S. (CertAlert 95-03) and in UL listed hardware for on-board aircraft use.

U.S. Coast Guard approved in UL listed portable extinguishers with a net charge weight of at least 5 lbs. (2.27 kg).

Approved, according to local test standards, in other parts of the world, including: Argentina, Brazil, Canada, Central Europe, Indonesia, Korea, Pakistan, Philippines, Saudi Arabia, Singapore, and Thailand.

Buckeye



Amerex



Physical Advantages

Halotron® I has a relatively high boiling point of 80.6°F (27°C), which makes it suitable for use in portable fire extinguishers where the operator can apply the agent from increased distances compared to other agents with lower boiling points. Therefore, Halotron® I has distinct advantages over other agents as it maintains a liquid physical state at elevated temperatures and, in addition, is dependable at the elevated temperatures one would expect when fighting fires, as well as in normal ambient conditions, particularly in warmer climates. These advantages result in the dual benefits of increased range and accuracy. The portables, especially the 15.5 lb. (7 kg) size, are appropriate for light and ordinary occupancy hazards. The wheeled units of 65 lb. (29 kg) and 150 lb. (68 kg) size are appropriate for high hazard occupancies.

Halotron® I is also employed in limited total flooding and local application environments, such as in engine compartments. Other localized flooding applications include: computer cabinets, telecommunications and manufacturing equipment.



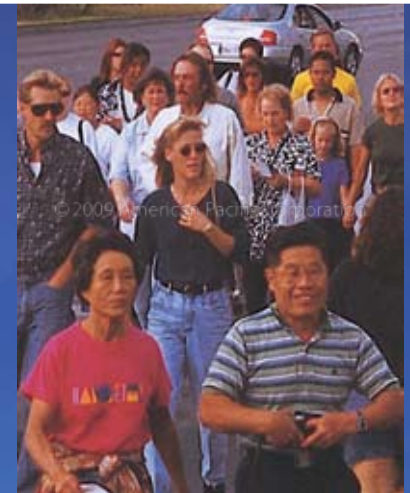
Safety

Halotron® I is based on HCFC-123 (2,2-dichloro-1,1,1-trifluoroethane, and a proprietary gas mixture of two gases). HCFC-123 was studied extensively in the Program for Alternative Fluorocarbon Testing (PAFT) and found to be of low toxicity.

For further information, the following publications are available:

**Material Safety Data Sheet
Filling and Service Bulletin
Health & Toxicity Summary Bulletin
Material Compatibility Charts**

**Auto/Aircraft Paint Compatibility Bulletin
Discharge Hose Compatibility Bulletin
Pressure Gauge Bulletin
Product Specifications Chart**



Product Testing



Halotron® I has been tested extensively to military protocols since 1992. The evaluations have typically included portables in the 20 lb. (9 kg) range as well as 150 lb. (68 kg) wheeled units. The agent has performed well in the evaluations demonstrating its suitability for combatting aircraft type fires. Product testimonials confirm this.

Other notable successful test programs include:

- Full-Scale fire tests for the Federal Aviation Administration (FAA) at Tyndall Air Force Base, Florida in 1993-1994. The fire tests used JP-4 jet fuel, and testing included a three dimensional inclined plane, engine nacelle running fuel, pool fire, agent throw range comparison and a simulated wheel well brake fire.
- Full scale class B pan and hidden fire testing for an on-board aircraft portable according to the FAA Minimum Performance Standard was performed resulting in a UL listed FAA approved unit.
- Full-Scale fire tests for approvals in Argentina, Brazil, Canada, Central Europe, Indonesia, Korea, Pakistan, Philippines, Singapore and Thailand.
- Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC) fire tests for four OEM's. Testing commenced in 1995 with the first listed units on the market in early 1996.
- Compatibility testing by an independent lab according to Boeing standard D6-17487, Revision K, Fire Extinguishing Foams and Liquids.



Aviation Testimonials & FAA Approvals



In 1995, Halotron® I was approved by the FAA for airport ramp fire protection. It was the first post-halon 1211 halocarbon substitute approved in this key application for commercial airports across the U.S. In June, 1995 the FAA released a document (shown below) specifying that Halotron® I can meet the requirements already met by halon 1211 in CFR 14 Part 139.317, when used in ARFF vehicle systems. In September, 2002 the Halotron® I portable was UL/FAA approved for on-board air-craft use, meeting the requirements of DOT/FAA/AR-0137.

Rural/Metro Fire Department
30 Years of Serving Others

Sikorsky Aircraft Fire Rescue

January 22, 2001

Jim Owens/Halotron Div.
American Pacific Corp.
3770 Howard Hughes PKWY
Suite 300
Las Vegas, NV 89109

Dear Sir:

On December 1, 2000, Sikorsky Aircraft Fire Rescue responded to a working fire onboard a test helicopter at the Sikorsky Flight Development Test Center. Upon arrival, fire crews found the test pilots had evacuated from the aircraft. There was heavy smoke rolling from the side cabin door. Fire was visible, but not extensive enough to require wetting the whole aircraft with a foam agent from a turret. Due to the high cost of the helicopters, we train to use foam as a last resort. In its place the department utilizes Halotron 1, as was used by the attack team who advanced the front bumper line of the Oshkosh T-3000. From the doorway of the aircraft, the fire was expeditiously extinguished due to the total flooding capability of Halotron 1. The agent proved so effective that the fire could not reignite, and the firefighters were able to proceed in disconnecting any power remaining to the aircraft deeming it safe to begin overhaul. The aircraft was then opened, and the smoke evacuated.

It was found during investigation that a hydraulic line and electrical wires had been rubbing together. Eventually both lines rubbed through causing a high-pressure hydraulic leak and an electrical arc that ignited the fire mist.

By using your "clean" product, minimal cleaning was required, and millions of dollars were saved in replacement parts and labor. Foam or a dry chemical agent would have only extended the damage.

Halotron 1 is easy to use, provides a quick knockdown, and the extinguishing capabilities are remarkable. Your product prevented the workload other agents would have caused. Fewer personnel were required to perform overhaul duties thus lessening the overall stress of the fire crews on-scene.

Halotron 1 is truly a fine fire-extinguishing agent, and it proved itself that day!

Sincerely,
Adam J. Reichwald
Adam J. Reichwald
Fire Inspector
Rural/Metro Fire Department

CERTALERT

ADVISORY CAUTIONARY NON-DIRECTIVE

FOR INFORMATION, CONTACT CERTIFICATION BRANCH, AAS-310 287 4728

DATE: 12 JUNE 1995 NO. 95-03

TO: AIRPORT CERTIFICATION PROGRAM INSPECTORS

The production of Halon 1211 has been halted because of its environmental effects. An acceptable alternate agent, Halotron 1, has been identified and is being manufactured. Tests have shown that Halotron 1 will suppress or extinguish fire in the same manner as Halon. As a result, Halotron 1 has been approved as an airport firefighting agent.

A tank that holds 500 pounds of Halon can hold slightly less Halotron 1, namely 460 pounds. However, testing by the FAA and the military has indicated that the 460 pounds of Halotron 1 provides an acceptable level of firefighting capability.

We have been informed that replacing the Halon with Halotron may require some minor modification or retrofitting of nozzles and seals. Such costs are expected to be less than \$1000. But, because of the difference in costs per pound between Halon and Halotron, such expenditure would be cost beneficial.

Halon 1211 may still be used as an approved fire extinguishing agent until the stockpiles are depleted. However, some airport operators may wish to change over to Halotron 1, especially on new equipment.

Benedict D. Castellano
B/D Castellano 6/12/95
Manager, Airport Safety and Compliance Date

CERTALERT DISTRIBUTION LIST

LEE COUNTY PORT AUTHORITY

Postal Entry #181

August 5, 1997

Mr. Robert Ferrara
Director Customers Relations
Halotron, Inc.
3770 Howard Hughes Parkway, Suite 300
Las Vegas, Nevada 89109

Re: Use of Halotron I - Boeing 737 Engine Fire

Dear Bob:

On April 3, 1997, the Lee County Port Authority Aircraft Rescue and Fire Fighting Department was called to a reported engine fire on a Boeing 737 aircraft at the terminal ramp of the Southwest Florida International Airport. Response was excellent, with one ARFF unit already at the terminal building when the call came in. Upon our arrival, we found a minor fire inside the exhaust port of the number one engine. The ARFF personnel quickly pulled a Halotron hand line, and extinguished the fire by application of the Halotron through the thrust port of the engine.

At the time of the call, the aircraft was being pushed back by a tug, and had 109 souls on board including the crew. All passengers and crew were kept inside the aircraft until the fire was extinguished. After securing the fire, the ARFF personnel assisted passengers in safely exiting the aircraft. This aircraft was flown out later the same day, with no damage evident from the fire or extinguishing agent used. Although a minor fire, the Halotron did its job to extinguish the fire and avoid a potentially serious loss.

Sincerely,
LEE COUNTY PORT AUTHORITY
AIRCRAFT RESCUE & FIRE FIGHTING DEPT.
Philip H. Crittenden
Philip H. Crittenden
Acting Fire Chief



Southwest Regional Fire Training Center



The Southwest Regional Fire Training Center is located within the AMPAC southern Utah specialty chemical manufacturing facility and it includes an asphalt area of approximately 10 acres.

Facility Features:

- 1,200 ft² (111m²) Round Concrete Curbed Pit
- 768 ft² (71m²) Rectangular Concrete Curbed Pit
- Pumping Test Draft Pit
- Hot Burn Building
- Fire Training Drill Tower
- Engine Nacelle Simulator
- Square Steel Fire Pans
- Round Steel Fire Pans

Protecting Stratospheric Ozone

Halon 1211 (bromochlorodifluoromethane) was used in high volumes in portable fire extinguishers and in some total flooding applications. Halon 1301 (bromotrifluoromethane) was used in high volumes almost exclusively in total flooding systems. The halons have high Ozone Depletion Potentials (ODPs).

An international treaty, the Montreal Protocol on Substances that Deplete Stratospheric Ozone, was signed by over 60 nations in 1987 and it has been both amended and adjusted several times thereafter. The Protocol prescribed measures to phase-out ozone depleting CFCs and halons with high ODPs. In developed countries, the production of halons ceased on January 1, 1994. In addition to production stoppages, many countries have instituted use controls on halons. The U.S. government implemented the provisions of the Montreal Protocol through the Clean Air Act Amendments of 1990, which required, among other things, the EPA to create a program (Significant New Alternatives Policy or SNAP) to evaluate proposed substitutes for CFCs and halons on the basis of environmental and human health effects.

The ODP of halon 1211 is 7.1 (CFC-11=1.0) and the ODP of halon 1301 is 16. The ODP of Halotron® I is almost zero, 0.0098. Halotron® I also has a low Global Warming Potential (GWP). Overall, Halotron® I has the most well-balanced profile of favorable environmental characteristics and performance of any clean fire extinguishing agent.



Halotron® I Comparisons

	Halotron® I	Carbon Dioxide	ABC Dry Chemical	PK Dry Chemical
U.S. FAA Approval for Airport Fire Fighting	Yes	No	No	Yes
U.S. Coast Guard Approved Extinguishers	Yes	Yes	Yes	Yes
Fire Class Effectiveness	A-B-C	B-C	A-B-C	B-C
Chemical Formula / U.S. EPA Designation	HCFC Blend B	CO ₂	Mono-Ammonium Phosphate	Potassium Bicarbonate
Molecular Weight	150.7	44.01	114.97	100.11
Boiling Point @ 1 atm, °F (°C)	80.6 (27)	-109.1 (-78.4)	N/A	N/A
Hydrostatic Test Frequency (as per NFPA 10)	Every 12 years	Every 5 years	Every 12 years (5 for s.s. shells)	Every 12 years (5 for s.s. shells)
Protection for Occupancy Hazards (as per NFPA 10)	Yes	No	Yes	No
Caking Build-Up Maintenance	No	No	Yes	Yes
Throw Range	6-45 ft. (1.8-13.7m)	3-15 ft. (0.9-4.6m)	5-45 ft. (1.5-13.7m)	5-45 ft. (1.5-13.7m)
Residue after Applications, Collateral Damage to Equipment	No	No	Yes	Yes
Thermal Shock	No	Sometimes	No	No

Halotron® I Fast Facts

1. Advantage:

The Ozone Depletion Potential (ODP) of Halotron® I is almost zero (0.0098). Halotron® I also has a low Global Warming Potential (GWP) and has relatively low toxicity.

2. Advantage:

Halotron® I is A-B-C rated, UL listed in multiple major OEM hardware in the U.S. and elsewhere. It is discharged as a rapidly evaporating liquid and maintains a liquid physical state at elevated temperatures.

3. Advantage:

Halotron® I is a clean agent and will not leave residue or cause corrosive damage such as dry chemical agents.

4. Advantage:

Tested and approved throughout the world, with distribution in over 15 countries.

5. Advantage:

Since 1995, Halotron® I has been FAA approved for airport ramp fire protection and it is in use at more than 90 commercial airports on Airport Rescue and Fire Fighting (ARFF) vehicles.

6. Advantage:

Halotron® I extinguishers do not require hydrostatic shell testing as frequently as carbon dioxide and in some cases, dry chemical.

7. Advantage:

U.S. EPA approved since 1994 under the Significant New Alternatives Policy (SNAP) program.

8. Advantage:

Throw range - 6 ft. to 45 ft. (1.8 m to 13.7 m).



Proven Protection

Business Profile

American Pacific Corporation, AMPAC (Nasdaq: APFC) was founded in Henderson, Nevada in 1955 for the purpose of manufacturing specialty chemicals, principally oxidizers. Our customers and product distribution now span most of the globe. Our corporate world headquarters is located in Las Vegas, Nevada and our state-of-the-art manufacturing facilities are located in California, New York, and Utah, U.S., the United Kingdom and Ireland.

AMPAC services primarily four industries:

Pharmaceuticals - AMPAC Fine Chemicals supplies active pharmaceutical ingredients (APIs) and registered intermediates to large and emerging pharmaceutical companies. Our major products are used in anti-viral, oncology and central nervous system drug applications. Our sodium azide product is used in the synthesis of blood pressure and flu medications.

Aerospace & Defense - WECCO manufactures our oxidizer products which are used primarily in solid rocket motors for space launch and defense applications. AMPAC-ISP designs, develops and manufactures liquid propulsion engines, components and complete systems for satellite maneuvering and defense applications.

Fire Protection - AMPAC Halotron® products, Halotron® I and II, are used in clean agent fire suppression equipment and systems worldwide.

Water Treatment - PEPCON® Systems designs, manufactures and services electrochemical hypochlorite generation systems for use in water disinfection throughout the world.



Las Vegas, NV



Rancho Cordova, CA



Cedar City, UT



U.S., U.K. & Ireland

Halotron® I

The Clean Fire Extinguishing Agent



www.halotron.com

