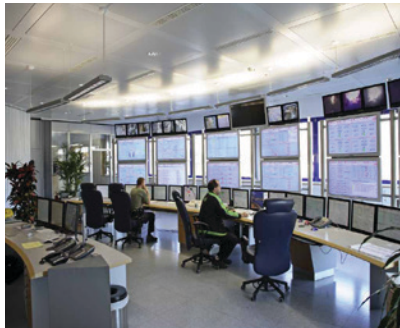


**SEVO**  **SYSTEMS**  
*Safe Environmental Choice*



**MISSION**

SEVO Systems' exclusive mission is to develop and commercialize clean agent, special hazards fire protection equipment optimized to take advantage of the unique properties of 3M™ Novec™ 1230 Fire Protection Fluid, differentiating SEVO from all others in the market.

**CLEAN AGENT FIRE SUPPRESSION SYSTEMS**

# INTRODUCING THE FORCE500™

by SEVO Systems

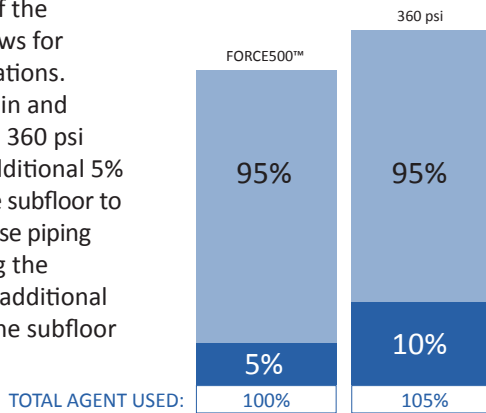
## OVERVIEW

The SEVO™ 1230 FORCE500™ Clean Agent Fire Suppression System is a revolutionary new technology for clean agent systems that utilizes 3M™ Novec™ 1230 Fire Protection Fluid and its unique ability to be pressurized to 500 psi (34.5 bar). It allows for longer pipe runs and smaller pipe diameters in addition to its cost saving benefits of using less clean agent in smaller and/or fewer cylinders per project. Along with these new engineering capabilities, it includes standard monitoring components such as an integrated pressure switch, pressure gauge, and gauge guard. The low vapor pressure of Novec 1230 Fluid allows for use of low pressure welded cylinders and Schedule 40 piping. With these revolutionary features, the FORCE500™ is a standout to conventional 360 psi (25 bar) systems.

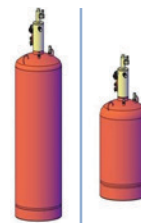
### LESS CLEAN AGENT NEEDED

The higher flow rate of the FORCE500 system allows for enhanced piping limitations. When protecting a main and subfloor hazard with a 360 psi system, a minimum additional 5% agent is required in the subfloor to compensate due to these piping limitations. By Utilizing the FORCE500 system, no additional agent is required for the subfloor or subsequent areas.

FEATURES:



### SMALLER AND/OR FEWER CYLINDERS: REDUCTION IN COSTS

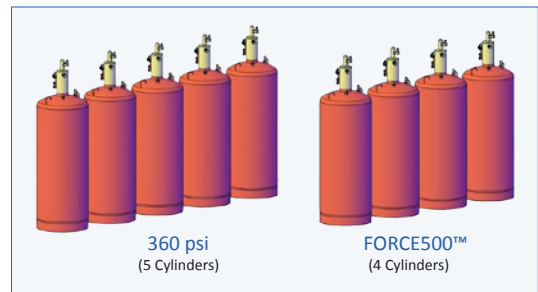


360 psi  
(601 lb.)



FORCE500™  
(322 lb.)

The higher pressure of the FORCE500 system allows the use of smaller cylinder sizes compared to 360 psi systems. In large, multi-cylinder systems, the FORCE500 requires fewer cylinders than the equivalent 360 psi systems due to its added pressure.



360 psi  
(5 Cylinders)

FORCE500™  
(4 Cylinders)

### INCREASED SINGLE NOZZLE COVERAGE

The new SEVO 2 ½ inch nozzle covers 16,640 cu. ft. (500 cu. meters) allowing for fewer nozzles with higher flow rates and less pipe.

System	ft <sup>3</sup>	Nozzle Quantity	Nozzle Size
FORCE500™	16,640	1	2 1/2"
360 psi	16,640	2	2"



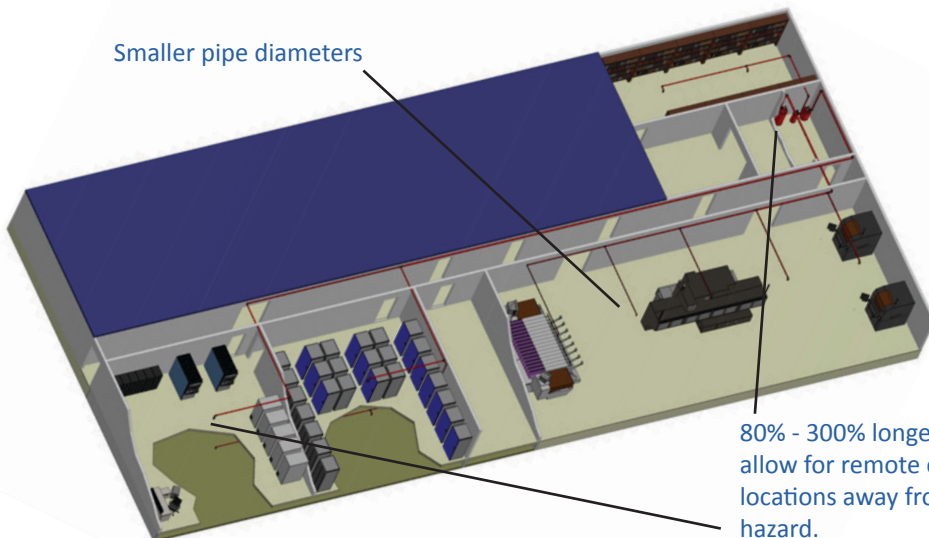
### RETROFIT OF EXISTING HALON & HFC SYSTEMS

#### FEATURES:

SEVO Systems' retrofit of existing halon systems is a 1 for 1 cylinder and nozzle replacement that includes a minimal cylinder footprint expansion. Retrofitting of existing halon systems features longer pipe runs, reduced nozzle pressure, resulting in a reduction of overall cost.

Note: All halon retrofit systems must be installed in accordance with approvals and listings including NFPA/ISO and local standards.

Smaller pipe diameters



80% - 300% longer pipe runs allow for remote cylinder locations away from protected hazard.

### EFFICIENT AND FLEXIBLE PIPE NETWORKS

FEATURES:

The FORCE500 features longer pipe lengths between the cylinder and nozzle as well as longer distances between the first and last nozzle. This allows for complex nozzle layouts with smaller pipe sizes and longer pipe runs.

# SEVO™ SYSTEMS PRODUCTS REVOLUTIONIZE THE WAY YOU DESIGN, INSTALL AND MAINTAIN CLEAN AGENT FIRE SUPPRESSION SYSTEMS.

## DESIGN: CYLINDER & VALVE SYSTEMS AVAILABLE IN 360 OR 500 PSI

SEVO Systems set the bar by being the first company to design special hazards fire suppression systems with 3M™ Novec™ 1230 Fire Protection Fluid. Other companies using this environmentally sustainable solution only offer 25 bar (360 psi) pre-engineered and engineered systems. We raised the bar by being the only company to offer 34.5 bar (500 psi) systems. More pressure allows retrofit of existing Halon 1301 systems while utilizing welded cylinders.

Our True Retrofit® solution enables you to use existing piping and meet the requirements of industry standards and specifications by simply changing your cylinders and nozzles. The cylinder valve assemblies are equipped with a pressure differential high flow rate valve in order to meet the rapid discharge time of 10 seconds, as specified in NFPA 2001. Valves are actuated by electric solenoids, pneumatic actuators or manual actuators relieving pressure above the piston. This permits the piston to fully open the valve to allow the agent to discharge through the valve outlet.



## INSTALL: PIPE FREE UNITS

Our “plug and play” modular units are less costly than others and easy to install. These pre-engineered, factory-built units, with integrated detection and control, arrive pre-piped and ready to use. These modular units have become the industry standard for telecom, power gen and data center installation.

## MAINTAIN: FILL & REFILL SYSTEMS ON SITE

The SEVO CAPS (Clean Agent Pumping System) Fill & Recharge Station is an easy to use, highly portable pumping and pressurization system. This closed filling operation provides a SEVO approved method for filling and pressurization.

The SEVO CAPS Station eliminates the need to remove agent storage cylinders requiring service by providing the user with a lightweight, tray mounted pump that can be taken into the field. All components are housed in a durable rolling case for ease of transportation from site to site.



## APPLICATIONS

- Medical Equipment/Facilities
- Merchant Marine Vessels
- Mix Rooms
- Network Centers
- Turbine Enclosures
  
- Electric Utility Facilities
- Engine Protection
- IT Systems/Software
- Gas Compressor Rooms
- Manufacturing Facilities
  
- Offshore Oil Rigs
- Paint Rooms
- Pleasure Craft
- Pump Stations
- Mass Transit Vehicles
  
- Clean Rooms
- Combat Vehicles
- Computer Rooms
- Data Storage Facilities
- Libraries & Museums
  
- Archives
- Automobiles
- Cable Spreading Rooms
- Cellular Sites
- Generators

# 3M™ Novec™ 1230 Fire Protection Fluid

3M's Blue Sky<sup>SM</sup> Warranty is a 20-year protection against regulatory bans or restrictions on the use of 3M™ Novec™ 1230 Fire Protection Fluid

## A long-term, sustainable technology

With zero ozone depletion potential, extremely low global warming potential and short atmospheric lifetime, Novec 1230 Fluid is the first chemical halon replacement to offer a viable, long-term, sustainable technology for special hazards fire protection.

ENVIRONMENTAL PROPERTIES	NOVEC 1230	Halon 1301	HFC-125	HFC-227ea
Ozone Depletion Potential <sup>1</sup>	0.0	12.0	0.0	0.0
Global Warming Potential <sup>2</sup>	1	7140	3500	3220
Atmospheric Lifetime (Years)	0.014 (5 Days)	65	34.2	29
SNAP (Yes/No)	Yes	N/A	Yes	Yes

<sup>1</sup> World Meteorological Organization (WMO) 1998, Model-Derived Method

<sup>2</sup> Intergovernmental Panel on Climate Change (IPCC) 2007 Method, 100-year 1TH

## Today's largest margin of safety

Because its use concentration is much lower than its No Observable Adverse Effects Level (NOAEL), Novec 1230 fluid offers the largest margin of safety of any chemical halon replacement available on the market today. Note: Industry standards require egress from a protected enclosure prior to system discharge.

SAFETY MARGIN	NOVEC 1230	Halon 1301	HFC-125	HFC-227ea
Use Concentration	4-6%	5%	8.7-12.1%	7-8.7%
NOAEL <sup>3</sup>	10% <sup>4</sup>	5%	7.5%	9%
Safety Margin	71-138%	Nil	Nil	3-20%

<sup>3</sup> NOAEL for Cardiac Sensitization

<sup>4</sup> NOAEL for acute toxicity, including cardiac sensitization

3M™ Novec™ 1230 Fire Protection Fluid is based on sustainable technology, designed to balance industry concerns for human safety, performance, and the environment. This unique agent is an advanced replacement for halon and first generation halon alternatives.

For more information on the benefits of Novec 1230 Fluid, please visit [3M.com/Novec1230fluid](http://3M.com/Novec1230fluid).



# WORLDWIDE PROTECTION:

## SEVO MISSION CRITICAL SERVICES

### ENGINEERING DESIGN & SPECIFICATIONS



Our NICET certified engineering staff works to provide design solutions and assistance to meet your specifications utilizing our Design & Installation Drawing Package.

These services include:

- Design
- Specification
- Hydraulic Flow Calculations
- Mechanical & Electrical Drawings
- Submittal Drawings
- Installation Drawings

### TRAINING

Proper knowledge and training of fire extinguishing systems and agents is imperative to maintain safety in the industry. SEVO Systems offers training sessions to provide classroom instruction and hands-on training of the SEVO 1230 product line and 3M™ Novec™ 1230 Fire Protection Fluid.

### INSPECTION OF INSTALLATION

SEVO Systems offers field support services conducted by a factory field representative to give verification that the installation of the SEVO 1230 Clean Agent System meets our manufacturer guidelines, NFPA 2001 requirements and local jurisdiction. The SEVO factory representative trains the contractor onsite, giving the knowledge of verification to meet future code compliance for installations of SEVO 1230 Clean Agent Systems.

These services include:

- Verification of code compliance with NFPA 2001 (2008 edition)
- Preconstruction Project review
- Mechanical equipment review & verification
- Room Integrity Test - Preliminary/AHJ Requirements
- Retrofit Certification – replacement of Halon 1301 systems

### REFILL & RECHARGE



The SEVO CAPS (Clean Agent Pumping System) Refill & Recharge Station provides a SEVO approved method for refilling and pressurization. SEVO Systems' global network of authorized retailers allows for immediate onsite refill after a system discharge to meet NFPA 2001 requirements.

### ROOM INTEGRITY TESTING



A room integrity test (also referred to as a door fan test) is a recommended procedure in lieu of a discharge test on clean agent fire suppression systems.

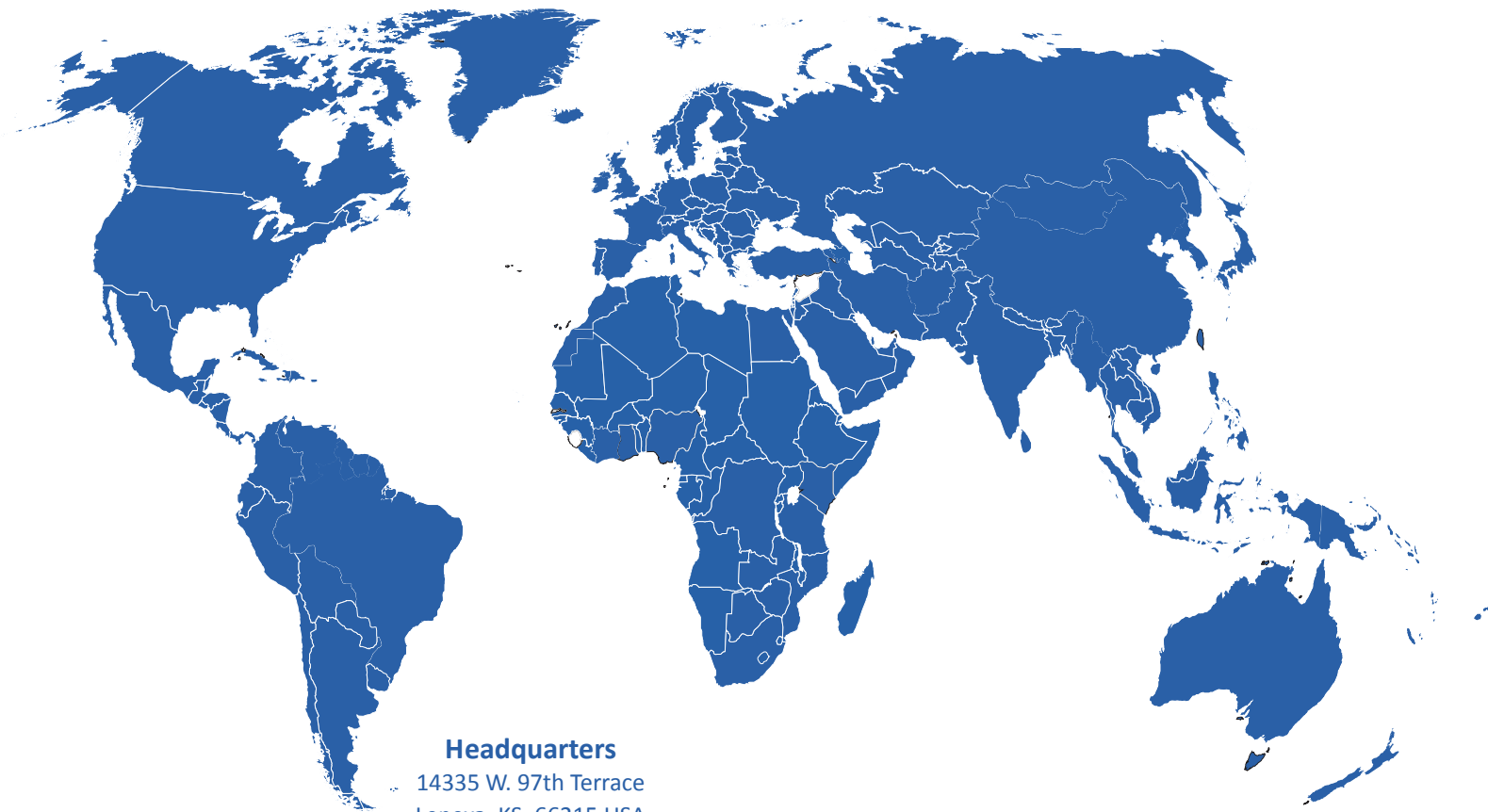
Both NFPA 2001 and 12A require an enclosure test (section 4-7.2.3) as part of the acceptance procedure for all clean agent systems. Our technicians are trained on and use only Retrotec room integrity testing equipment. Our commitment to use state of the art testing equipment assures you will receive the most accurate information available. A fan test performed by us gives you the peace of mind of knowing the fire suppression system will hold the concentration of agent as designed.

### SERVICES:

- DESIGN
- INSPECTION
- ROOM INTEGRITY TESTING
- TRAINING
- REFILL



SEVO™ SYSTEMS DISTRIBUTION IS ESTABLISHED IN OVER 60 COUNTRIES, DESIGNING, INSTALLING, COMMISSIONING AND MAINTAINING SEVO 1230 SYSTEMS IN MISSION CRITICAL FACILITIES.



### Headquarters

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### HISTORY OF SEVO SYSTEMS

SEVO Systems was formed in 2001 to develop and commercialize a revolutionary new technology, 3M™ Novec™ 1230 Fire Protection Fluid. This development represented a major breakthrough in halon replacement technology - combining high extinguishing efficiency with excellent environmental, health and safety properties. Exclusively utilizing Novec 1230 Fluid, SEVO revolutionizes the way clean agent fire suppression systems are designed, installed and maintained.

CLEAN AGENT FIRE SUPPRESSION SYSTEMS

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**SEVO**  **SYSTEMS**  
*Safe Environmental Choice*

# Cylinder Valve Assembly Series



Designed with:  
3M™ Novec™ 1230  
Fire Protection Fluid

## CV, PCV, FCV and MCV series

### CV Series (Cylinder/Valve)

Cylinder/Valve  
Assembly with:

- Cylinder & Valve



### PCV Series (Pre-Engineered Nozzle/Cylinder/Valve)

Cylinder/Valve  
Assembly with:

- Cylinder & Valve
- Cylinder Strap
- 24V DC Electric Solenoid  
- Not ASCO
- Nozzle (Pre-engineered),  
Sidewall or Central



### FCV Series (Frame/Cylinder/Valve)

Frame Cylinder/Valve  
Assembly with:

- Cylinder & Valve
- Cylinder Strap
- 24V DC Electric Solenoid  
- Not ASCO
- Nozzle (Pre-engineered),  
sidewall or central
- Modular Frame
- Pre-engineered Piping/  
Fittings



### MCV Series (Modular/Cylinder/Valve)

Modular Cylinder/Valve  
Assembly with:

- Cylinder & valve
- Cylinder Strap
- 24V DC Electric Solenoid  
- only EA-45 listed w/UL  
- Not ASCO
- Nozzle (pre-engineered),  
sidewall or central
- Agent Release Control  
Panel
- 2- Battery
- 1- Photoelectric Detector,  
24 VDC w/ Base
- 1- Ionic Detector, 24 VDC  
w/ Base
- Combination Horn/Strobe,  
24 VDC
- Strobe Ceiling Mount
- Modular Frame
- Pre-engineered Piping/  
Fittings





# Cylinder Valve Assembly Series



Designed with:  
3M™ Novec™ 1230  
Fire Protection Fluid

**Models: 40, 76, 164, 322, 601 and 910**

## Cylinder Valves:

The cylinder valves are of a pressure-seated high flow rate design, in order to meet the rapid discharge time specified in NFPA 2001. Each has a brass body, a brass piston with resilient seat, a pressure releasing pilot check, a safety disc assembly, a pressure gauge, and an electric solenoid valve. This relieves the pressure above the piston and permits the piston to travel upward, thus fully opening the valve and permitting the agent to discharge through the outlet. The discharge outlet is fired with an anti-recoil plug, which is a safety device to prevent violent movement of the cylinder in the event of discharge while the cylinder valve is not connected to the piping system structure.

Each Novec™ 1230 fluid fill and use shall be in accordance with the instructions in the engineered or pre-engineered system design manual as required by UL Listing or FM approval.

## Architecture/Engineering Specifications:

- Filled at factory in single lb. increments
- High flow rate valve
- Electric solenoid operation
- Novec 1230 Clean Agent Extinguishing Fluid
- Optional:
  - Liquid Level Indicator
  - Pneumatic Actuation
  - Manual Actuation
  - Pressure Switch
    - Low Pressure
    - Operational

## Key Features

All sizes are charged with agent and pressurized with nitrogen to 360 psig (25 bar) or 500 psig (34.5 bar) at 70°F/21°C. They are manufactured, tested, and marked in accordance with D.O.T. and T.C. specifications: 4BA500 or 4BW500 or TPED for the various sizes.



Cylinder Sizes	Allowable Fill (lbs)	Part Numbers	Listings/Approvals	
			360 PSI/25 Bar	500 PSI/34.5 Bar
40	16-40	CV140069	UL/ULC	FM, UL/ULC
76	31-76	CV140079	UL/ULC	FM, UL/ULC
164	66-164	CV14817	UL/ULC	FM, UL/ULC
322	129-322	CV140057	UL/ULC	FM, UL/ULC
601	241-601	CV14813	UL/ULC	FM, UL/ULC
910	390-910	CV140107	UL/ULC	FM, UL/ULC