Clean Agent
Fire Extinguishing System

✓ Suppress fire quickly
✓ Restricted damages
✓ Limited floor space
✓ Allow Visibility

since 1983
Fighting fire with technology is our heritage

website:
www.SFFECO.com
# Technical Datasheet

## Clean Agent System

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Heptafluoropropane (CF$_3$CHFCF$_3$) fire suppression agent is the first environmentally acceptable replacement for Halon 1301. It has zero ozone depleting potential, a low global warming potential, and a short atmospheric lifetime. It is particularly useful where an environmentally acceptable agent is essential, where clean-up of other media presents a problem, where weight versus suppression potential is a factor, where an electrically non-conductive medium is needed, and where people compatibility is an overriding factor. Clean Agent can be used to protect a wide range of applications from sensitive electrical equipment to industrial applications using flammable liquids. Consult the current NFPA Standard 2001 for specific applications. Clean Agent fire suppression agent is used with SFFECO's total flooding systems.

Clean Agent is manufactured to these specifications:

- Mole% 99.0 Min.
- Acidity, ppm by weight 3.0 Max.
- Water content, % by weight 0.001 Max.
- Non-volatile residues, gram/100ML 0.05 Max.

The toxicology of Clean Agent compares favorable with that of Halon 1301. The LC50 of Clean Agent is greater than 800,000 ppm which is equivalent to Halon 1301. Clean Agent has been evaluated for cardiac sensitization via test protocols approved by the United States Environmental Protection Agency. Test results show that cardiac tolerance to Clean Agent is much higher than that of Halon 1301 and will be acceptable for safe use in occupied space protection. Clean Agent will decompose to form halogen acids when exposed to open flames. The formation of these acids is minimized by using SFFECO early warning detection systems and proper system installation. When properly applied and installed, the generation of these by-products by Clean Agent should be minimal.

On a weight-of-agent basis, clean agent is a very effective gaseous extinguishing agent. The Clean Agent extinguishing concentration for normal Class A combustibles is approximately 5.8 - 7% by volume. The minimum design concentration for total flood applications should be in accordance with NFPA 2001.
### PHYSICAL PROPERTIES OF CLEAN AGENT

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical Name</td>
<td>Heptafluoropropane (CF₃CHFCF₃)</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>170.03</td>
</tr>
<tr>
<td>Boiling Point @ 760 mm Hg</td>
<td>2.55OF (-16.4OC)</td>
</tr>
<tr>
<td>Freezing Point</td>
<td>-204OF (-131.1OC)</td>
</tr>
<tr>
<td>Critical Temperature</td>
<td>215OF (101.7OC)</td>
</tr>
<tr>
<td>Critical Pressure (psia)</td>
<td>422 psia (2912 kPa)</td>
</tr>
<tr>
<td>Critical Volume (ft³/lbm) (cc/mole)</td>
<td>0.0258 (274)</td>
</tr>
<tr>
<td>Critical Density (lbm/ft³)</td>
<td>38.8 (621 kg/m³)</td>
</tr>
<tr>
<td>Specific Heat, Liquid (BTU/lb-OF) @ 77OF (25OC)</td>
<td>0.283 (1.184 kJ/kg/OC)</td>
</tr>
<tr>
<td>Specific Heat, Vapor (BTU/lb-OF) @ constant pressure of 1 ATM @ 77OF (25OC)</td>
<td>0.1932 (0.808 kJ/kg/OC)</td>
</tr>
<tr>
<td>Heat at Vaporization (BTU/lb) at Boiling Point</td>
<td>57.0 (132.6 kJ/kg)</td>
</tr>
<tr>
<td>Thermal Conductivity (BTU/h ftOF) of Liquid @ 77OF (25OC)</td>
<td>0.040 (0.069 w/mOC)</td>
</tr>
<tr>
<td>Viscosity, Liquid (lb/ft hr) @ 77OF (25OC)</td>
<td>0.443 (0.184 centipoise)</td>
</tr>
<tr>
<td>Vapor Pressure (psia) @ 77OF (25OC)</td>
<td>66.4 (457.7 kPa)</td>
</tr>
<tr>
<td>Ozone Depletion Potential</td>
<td>0</td>
</tr>
<tr>
<td>Est. Atmospheric Lifetime (years)</td>
<td>31-42</td>
</tr>
<tr>
<td>LC50 (Rats; 4hrs - ppm)</td>
<td>&gt;800,000</td>
</tr>
</tbody>
</table>

### SAFETY CONSIDERATIONS

<table>
<thead>
<tr>
<th>Agent</th>
<th>Use Conc.</th>
<th>NOAEL*</th>
<th>Safety Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Halon 1301</td>
<td>5%</td>
<td>5%</td>
<td>nil</td>
</tr>
<tr>
<td>FM 200</td>
<td>7.5 - 8.7%</td>
<td>9%</td>
<td>3% - 20%</td>
</tr>
<tr>
<td>Novec™ 1230</td>
<td>5 - 6%</td>
<td>10%</td>
<td>67% - 100%</td>
</tr>
<tr>
<td>Inergen</td>
<td>38 - 40%</td>
<td>43%</td>
<td>7% - 13%</td>
</tr>
<tr>
<td>CO2</td>
<td>30 - 75%</td>
<td>&lt;5%</td>
<td>lethal at design concs</td>
</tr>
</tbody>
</table>

* No observable adverse effect level.
The Clean agent fire extinguishing system consists of a series of appropriately sized valves and cylinders that utilize HFC227ea as the extinguishing medium. Each system consists of five basic components and their associated accessories.

1. HFC227ea Storage Components
2. HFC227ea Distribution Components
3. Trim Components
4. Slave Arrangement Components
5. Supplemental Components
6. Control Panel
7. Early Warning Detection and alarm Devices
DESCRIPTION

SFM modular series is a self-contained stand alone system, ideally economical, simple and flexible to suit pre-prevailing local conditions. The Design concept of operation features the sprinkler technology incorporating a gas tight quartzoid bulb sprinkler head fitted with an optional pyrotechnic electric actuator, 24 vdc, means of actuating the system can be from a remote controlled release fire extinguishing control panel or thermally fusing the glass bulb which comes in various fixed temperature ranges.

SFM modular cylinders furnished with ceiling mounting brackets are of carbon steel material, factory argon/CO2 weld, sand blasted, white finished, oven baked and coated with electrostatic powder.

SFM extinguishment chemically known as heptafluoropropane (CF3CHFCF3) is a clean and effective environmentally accepted replacement for halon. It is effective fire extinguishing agent that can be used on surface fire of flammable liquids and solid combustible materials. Likewise, effective for total flooding of normally occupied areas to protect the highly invested equipment.

SFM modular automatic installations are primarily well-suited for the protection of electrical equipment rooms, server rooms, gas stations, paint spray booths, flammable liquid storage areas, engine compartment in particular for boats and small rooms that are particularly exposed to danger of fire. Cylinders are hydrostatically tested at 30 bar.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>SFM 6</th>
<th>SFM 10</th>
<th>SFM 15</th>
<th>SFM 20</th>
<th>SFM 25</th>
<th>SFM 30</th>
<th>SFM 35</th>
<th>SFM 40</th>
<th>SFM 45</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGENT WEIGHT (KG)</td>
<td>6</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>30</td>
<td>35</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>MINIMUM FILL RANGE (KG)</td>
<td>2.5</td>
<td>4</td>
<td>6</td>
<td>8</td>
<td>10</td>
<td>13</td>
<td>15</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>MAXIMUM FILL RANGE (KG)</td>
<td>6</td>
<td>10</td>
<td>15</td>
<td>20</td>
<td>25</td>
<td>31</td>
<td>36</td>
<td>42</td>
<td>47</td>
</tr>
<tr>
<td>PRESSURE (BAR)</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>VOLUME PROTECTED WITH 7% CONC. @ 20°C</td>
<td>10 CU MTR</td>
<td>18 CU MTR</td>
<td>27 CU MTR</td>
<td>36 CU MTR</td>
<td>45 CU MTR</td>
<td>54 CU MTR</td>
<td>63 CU MTR</td>
<td>72 CU MTR</td>
<td>82 CU MTR</td>
</tr>
<tr>
<td>TEMP. RATING</td>
<td>Standard is 68°C (57°C / 79°C / 93°C / 141°C can be supply upon request)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Clean Agent cylinders are filled with one pound increments, as given in the Table-1, to meet the exact amount of agent required. The quantity of agent required for each enclosure can be calculated using SFFECO software, version SF 3.10 (or 4.0), which contains a sophisticated calculation routine for predicting the two-phase as well as two-component flow of agent and nitrogen through the distribution piping network in quasi-steady state from the initiation of the discharge to final gas blow down. The cylinder is then super-pressurized with dry nitrogen to 360 psi at 70°F to provide extinguishment in 10 seconds or less. The 4” stainless steel valve offers excellent flow characteristics for the liquefied gas, allows for long pipe runs and has a greater coverage area. This is the largest Clean Agent cylinder currently manufactured and designed for very large applications. The 1200 lb, 1000 lb and 800 lb. cylinders are manufactured, tested and stamped in accordance with DOT 4BW500.

Temperature Limits:
32°F (0°C) to 130°F (54.4°C)

System Operating Pressure:
360 psi at 70°F (25.3 kgf/cm² at 21.1°C)

### Table-1: Cylinder Filling Data & Dimensions

<table>
<thead>
<tr>
<th>Model</th>
<th>Capacity</th>
<th>Fill Capacity</th>
<th>Valve</th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFO 20-800</td>
<td>800 Lbs</td>
<td>353 to 806 lbs</td>
<td>4”</td>
<td>56.701”</td>
<td>47.023”</td>
<td>27.76”</td>
</tr>
<tr>
<td>SFO 20-1000</td>
<td>1000 Lbs</td>
<td>439 to 1008 lbs</td>
<td>4”</td>
<td>64.049”</td>
<td>54.381”</td>
<td>27.76”</td>
</tr>
<tr>
<td>SFO 20-1200</td>
<td>1200 Lbs</td>
<td>519 to 1211 lbs</td>
<td>4”</td>
<td>71.516”</td>
<td>61.726”</td>
<td>27.76”</td>
</tr>
</tbody>
</table>

### Cylinder Bracket

The cylinder bracket is manufactured from carbon steel band formed to the radius of the cylinder as shown in Table-2, with flanges for bolting to continuous slot metal framing channel of 12 gauge steel with corrosion resistant paint or galvanized. The channel is to be supplied by the installer. The cylinder bracket shall be secured to a surface that the bracket, that will withstand a load up to 5 times of the cylinder weight. This precaution is to have the bracket safely support the weight of the cylinder and the reaction force of the HFC-227 ea Clean Agent when discharge.

### Table-2: Cylinder Bracket (Wall and Floor Strap)

<table>
<thead>
<tr>
<th>Type</th>
<th>Diameter</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 60790</td>
<td>30.0”</td>
<td>30.225”</td>
<td>35.2”</td>
<td>33.2”</td>
<td>2”</td>
</tr>
<tr>
<td>SF 60772</td>
<td>30.0”</td>
<td>5”</td>
<td>11.85”</td>
<td>10.35”</td>
<td>2”</td>
</tr>
</tbody>
</table>
Cleaning Agent System

Agent Storage Cylinders

Description

The Cleaning Agent cylinders are manufactured, tested and stamped in accordance with DOT 4BW500 or DOT 4BA500. All cylinders are equipped with differential pressure valves. A piston in the valve bore is equipped with a rubber seal that keeps the HFC-227ea Cleaning Agent under pressure within the cylinder. Since the area at the top of the piston is greater than the area at the bottom of the piston, the net force seals the piston against the valve discharge outlet. When the cylinder pressure on the top of the piston is relieved by means of automatic or manual activation, there is only cylinder pressure acting against the piston seal, and the piston slides to full open position, allowing cylinder discharge through the distribution piping network. Each of the basic sizes can be filled with one pound increments to meet the exact amount of HFC-227ea Cleaning Agent required, within their fill ranges as shown in the table below.

Temperature Limits:
32°F (0°C) to 130°F (54.4°C)

System Operating Pressure:
360 psi at 70°F (25.3 kgf/cm² at 21.1°C)

Cylinder Bracket

The cylinder bracket is manufactured from carbon steel band formed to the radius of the cylinder as shown in Table-3 with flanges for bolting to continuous slot metal framing channel of 12-gauge steel with corrosion resistant paint or galvanized. The channel shall be supplied by the installer. The cylinder bracket shall be secured to a surface that the bracket will withstand a load up to 5 times of the cylinder weight. This precaution is to have the bracket safely support the weight of the cylinder and the reaction force of the HFC-227ea Cleaning Agent when discharged.

Cylinder Filling Data and Dimensions

<table>
<thead>
<tr>
<th>Cylinder Model</th>
<th>Cylinder Outer Dia.</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>Bracket Part No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFO 20-20</td>
<td>10.75”</td>
<td>11.00”</td>
<td>14.00”</td>
<td>12.60”</td>
<td>2.00”</td>
<td>OCI 50139</td>
</tr>
<tr>
<td>SFO 20-25</td>
<td>10.75”</td>
<td>11.00”</td>
<td>14.00”</td>
<td>12.60”</td>
<td>2.00”</td>
<td>OCI 50139</td>
</tr>
<tr>
<td>SFO 20-70</td>
<td>12.80”</td>
<td>13.00”</td>
<td>16.05”</td>
<td>14.65”</td>
<td>2.00”</td>
<td>OCI 60780</td>
</tr>
<tr>
<td>SFO 20-100</td>
<td>12.80”</td>
<td>13.00”</td>
<td>16.05”</td>
<td>14.65”</td>
<td>2.00”</td>
<td>OCI 60780</td>
</tr>
<tr>
<td>SFO 20-150</td>
<td>16.00”</td>
<td>16.25”</td>
<td>19.20”</td>
<td>17.80”</td>
<td>2.00”</td>
<td>OCI 60760</td>
</tr>
<tr>
<td>SFO 20-250</td>
<td>16.00”</td>
<td>16.25”</td>
<td>19.20”</td>
<td>17.80”</td>
<td>2.00”</td>
<td>OCI 60760</td>
</tr>
<tr>
<td>SFO 20-375</td>
<td>20.00”</td>
<td>20.25”</td>
<td>23.20”</td>
<td>21.70”</td>
<td>2.00”</td>
<td>OCI 60770</td>
</tr>
</tbody>
</table>

In line with our policy of continuous product improvement, SFFECO reserves the right to modify specifications without prior notice.
DESCRIPTION

The 1/2 inch cylinder valve is a high flow Piston Drive valve with a brass body, a stainless steel piston stem and a NBR rubber seat. The 1/2 inch valve is in sealed position (closed) when the cylinder is filled with HFC-227ea and super pressurized with dry nitrogen to 240 psi. When cylinder pressure is applied to the upper chamber of the 1/2 inch valve, the piston will be driven downwards. Thus, opening the valve for the HFC-227ea to be discharged through its outlet.

The 1/2 inch cylinder valves are installed in 3 lb, 6 lb, 12 lb, 18 lb cylinders in Pre-Engineered Systems.
DESCRIPTION

The 1 inch cylinder valve is a high flow Piston Drive valve with a brass body, a stainless steel piston stem and a NBR rubber seat. The 1 inch valve is in sealed position (closed) when the cylinder is filled with HFC-227ea and super pressurized with dry nitrogen to 240 psi. When cylinder pressure is applied to the upper chamber of the 1 inch valve, the piston will be driven downwards. Thus, opening the valve for the HFC-227ea stored within the cylinder to be discharged through its outlet.

The 1 inch cylinder valves are installed in 35 lb and 70 lb cylinders in Pre-Engineered Systems.
DESCRIPTION

The 1 inch cylinder valve is made of ASTM B-16, 1/2 hard brass. It is designed as a back pressure type valve. The piston in the valve is equipped with a rubber seal that keeps the HFC-227ea Clean Agent under pressure within the cylinder. A small hole in the piston allows cylinder pressure to be equalized on both sides of the piston. Since the area at the top of the piston is greater than the area at the bottom of the piston, the net force seals the piston against the valve discharge outlet. When cylinder pressure on the top of the piston is relieved by means of automatic or manual actuation, there is only cylinder pressure acting against the piston seal, and the piston slides to its full open position, allowing HFC-227ea discharge through the valve outlets.

The 1 inch cylinder valves are installed in 35 lb and 70 lb cylinders in Engineered Systems.
DESCRIPTION

The 1 1/2 inch cylinder valve is made of ASTM B-16, 1/2 hard brass. It is designed as a back pressure type valve. The piston in the valve is equipped with a rubber seal that keeps the HFC-227ea Clean Agent under pressure within the cylinder. A small hole in the piston allows cylinder pressure to be equalized on both sides of the piston. Since the area at the top of the piston is greater than the area at the bottom of the piston, the net force seals the piston against the valve discharge outlet. When cylinder pressure on the top of the piston is relieved by means of automatic or manual actuation, there is only cylinder pressure acting against the piston seal, and the piston slides to its full open position, allowing HFC-227ea discharge through the valve outlets.

The 1 1/2 inch cylinder valves are installed in 150 lb and 250 lb cylinders in Engineered Systems and 140 lb and 240 lb cylinders in Pre-Engineered Systems.
2.5 INCH CYLINDER VALVE

DESCRIPTION

The 2 1/2 inch cylinder valve is made of ASTM B-16, 1/2 hard brass. It is designed as a back pressure type valve. The piston in the valve is equipped with a rubber seal that keeps the HFC-227ea Clean Agent under pressure within the cylinder. A small hole in the piston allows cylinder pressure to be equalized on both sides of the piston. Since the area at the top of the piston is greater than the area at the bottom of the piston, the net force seals the piston against the valve discharge outlet. When cylinder pressure on the top of the piston is relieved by means of automatic or manual actuation, there is only cylinder pressure acting against the piston seal, and the piston slides to its full open position, allowing HFC-227ea discharge through the valve outlets.

The 2 1/2 inch cylinder valves are installed in 375 lb and 560 lb cylinders in Engineered Systems and 360 lb and 520 lb cylinders in Pre-Engineered Systems.
DESCRIPTION

The 4 inch cylinder valve is made of AISI304 Stainless Steel. It is designed as a back pressure type valve. The piston in the valve is equipped with a rubber seal that keeps the HFC-227ea Clean Agent under pressure within the cylinder. A small hole in the piston allows cylinder pressure to be equalized on both sides of the piston. Since the area at the top of the piston is greater than the area at the bottom of the piston, the net force seals the piston against the valve discharge outlet. When cylinder pressure on the top of the piston is relieved by means of automatic or manual actuation, there is only cylinder pressure acting against the piston seal, and the piston slides to its full open position, allowing HFC-227ea discharge through the valve outlets.

The 4 inch cylinder valves are installed in 1200 lb cylinders in Engineered Systems.
DESCRIPTION

The Electric Solenoid valve is a normally closed valve that requires electrical energy to open. It is used to vent the pressure from the top of the piston in the cylinder valve, allowing the piston to slide upward and commence cylinder discharge. The electric solenoid valves are available in 24 VDC. The source of the electrical energy will determine the number and rating of the electric solenoid used. The solenoid circuit must be supervised for a break in the wiring, a ground or a short circuit.

The cylinder discharge valve that is equipped with a solenoid valve is to be connected to a control panel that is UL listed for releasing devices and compatible with SFFECO Fire Suppression equipment.

Connect solenoid pigtails to actuation circuit wires with wire nuts within a junction box or by means designated by the authority having jurisdiction.

Whenever an Electric Solenoid is used as the sole means of actuation, a top plug must be used to seal the top of the cylinder valve.

Termination for Electric Solenoid (SF 50025-2)

Connect the terminals of the solenoid to the releasing module illustration shows in series. A third terminal (ground) is for grounding.

Most releasing circuits are supervised by an EOL (End of Line) Resistor

**NOTE:** Two 12 VDC solenoids can be wired in series in a 24 VDC actuating circuit.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Electrical Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 50025-2</td>
<td>ELECTRIC SOLENOID</td>
<td>24 VDC, 11 Watts</td>
</tr>
<tr>
<td>SF 91225-2</td>
<td>ELECTRIC SOLENOID</td>
<td>24 VDC, 15 Watts</td>
</tr>
</tbody>
</table>
DESCRIPTION

Latching Solenoid is used to open a Schrader valve on the top plug adaptor of the cylinder valve. The application provides a solution with a fast response and a high latching force to be used with the SFFECO Clean Agent Fire Suppression System.

It was determined that a latching solenoid with an optional local manual control head is the best solution for the application. The actuator is held in the latched position without power until a signal from the agent release control panel cuts off the permanent magnet. When release, the latching solenoid opens the cylinder valve allowing the extinguishing medium to discharge from the cylinder into the system. The fast response time allows the SFFECO 22™ system to be released in the event of a fire. The latching solenoid is designed with an emergency release local manual control head to manually force the pin to depress the cylinder valve to release the extinguishing medium when needed. In order to reset the system, the solenoid is to manually returned to the latched position.

TECHNICAL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual Actuation Force</td>
<td>12-40 lb (5.4-18kg) max</td>
</tr>
<tr>
<td>Operating Force</td>
<td>20-25-14.6 lb (90-65 N) min</td>
</tr>
<tr>
<td>Power Requirement</td>
<td>24 VDC</td>
</tr>
<tr>
<td>Current</td>
<td>6.5A @ 24 VDC</td>
</tr>
<tr>
<td>Electrical Connection</td>
<td>DIN 43 850-A/ISO 440 3Mk</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>4 1/31°C to 56°C</td>
</tr>
<tr>
<td>Weight</td>
<td>1.9 lbs (0.86 kg)</td>
</tr>
</tbody>
</table>

LOCAL MANUAL CONTROL HEAD

The Local Manual Control Head features a local lever driven push rod that depresses a Schrader check valve thru the latching solenoid when fitted onto the top of the solenoid, thereby venting the pressure from the top of the piston in the cylinder valve, allowing the piston to slide upward and commence cylinder discharge. The Local Manual Control Head can be mounted directly to a top plug adapter, which is the top piece of the cylinder valve.

ELECTRICAL DIAGRAM:

- White wire to pin of SO-100 solenoid actuator body
- Black wire to pin of SO-100 solenoid actuator body
- Yellow wire to pin of SO-100 solenoid actuator body
- Green wire to pin of SO-100 solenoid actuator body
- White wire to SO-100 solenoid actuator body
- Black wire to SO-100 solenoid actuator body
- Yellow wire to SO-100 solenoid actuator body
- Green wire to SO-100 solenoid actuator body

MANUAL ACTUATION BUTTON

Part Number: SF 61033-2

PLASTIC TAMPER SEAL

Material: PHENOLIC (RED)
**Descripción**

- **Usado** para la actuación manual del cilindro
- **Equipo** con seguridad de pin de liberación para prevenir el desgaste accidental de Agente Limpio
- **Auto-vaciado**
- **Construcción de bronce sólido**
- **Pin de bloqueo de operación de acero inoxidable**

**DESCRIPCION**

La Manija de Control Manual Local presenta un mango de liberación de tirador que aprieta un válvula de válvula de Schrader, lo que permite el vaciado de la presión desde la parte superior del pistón en el cilindro de válvula, permitiendo que el pistón suba y comience el descarga del cilindro. La Manija de Control Manual Local se monta directamente en un adaptador de tapa superior, que se encuentra en la parte superior del cilindro de válvula.

**DIMENSIONES**

- **1.00''**
- **1.62''**
- **.98''**
- **.25''**
- **.72''**
- **3.00''**
- **1.62''**
- **.98''**
- **.25''**
- **.81''**
- **1.62''**
- **1.00''**
- **1.62''.98''**
- **1.20'' 2.90''**
- **.95''**
- **.75''**
- **1.38''
- **.75''**
- **1.20'' 2.15''**

**VISTA LATERAL**

**VISTA SUPERIOR**

**VISTA POSTERIOR**

La Manija de Control Manual Local presenta un mango de liberación de tirador que aprieta un válvula de válvula de Schrader, lo que permite el vaciado de la presión desde la parte superior del pistón en el cilindro de válvula, permitiendo que el pistón suba y comience el descarga del cilindro. La Manija de Control Manual Local se monta directamente en un adaptador de tapa superior, que se encuentra en la parte superior del cilindro de válvula.
Technical Datasheet
Clean Agent System

PISTON ACTUATOR

DESCRIPTION

- High quality brass construction
- Mounts directly on top of cylinder valves
- Self-venting

The Piston Actuator features a pneumatically driven piston that depresses a Schrader check valve, thereby venting the pressure from the top of the piston in the cylinder valve, allowing the piston to slide upward and commence cylinder discharge. The pneumatic pressure required to operate the Piston Actuator is obtained from the "M" port of the cylinder, which is designated as "Master" cylinder that is either mechanically and/or electrically actuated. Multiple cylinders equipped with Piston Actuators can be activated from one master cylinder using 1/4" copper tubing or 1/4" metal flex hose. The Piston Actuator mounts directly to a top plug adapter, which is located on top of the cylinder valve.

SECTIONAL VIEW
(Piston Actuator Control Head-Slave)

Pressure Supplied from Port M of Master Cylinder Valve

NOTE:
When using the metal 1/4" Flex hose SF 50192 (20°), SF 50192-1 (24°), SF 50192-2 (36°), the length of the flex hose is to be subtracted from total length of copper tubing in the Table above-mentioned to determine the max. length of copper tubing that can be used. At no time may the total length of copper tubing and the flex hose exceed the stated length.

<table>
<thead>
<tr>
<th>Cylinder Size</th>
<th>Valve Size</th>
<th>Max. Quantity of Piston Actuator</th>
<th>Total Max. Length Copper Tube</th>
</tr>
</thead>
<tbody>
<tr>
<td>35</td>
<td>1&quot;</td>
<td>7</td>
<td>50 ft.</td>
</tr>
<tr>
<td>70</td>
<td>1&quot;</td>
<td>7</td>
<td>50 ft.</td>
</tr>
<tr>
<td>150</td>
<td>1 1/2&quot;</td>
<td>7</td>
<td>50 ft.</td>
</tr>
<tr>
<td>250</td>
<td>1 1/2&quot;</td>
<td>7</td>
<td>50 ft.</td>
</tr>
<tr>
<td>375</td>
<td>2 1/2&quot;</td>
<td>6</td>
<td>30 ft.</td>
</tr>
<tr>
<td>560</td>
<td>2 1/2&quot;</td>
<td>6</td>
<td>30 ft.</td>
</tr>
<tr>
<td>1200</td>
<td>4&quot;</td>
<td>6</td>
<td>30 ft.</td>
</tr>
</tbody>
</table>
Technical Datasheet
Clean Agent System

PRESSESURE GAUGES

240 PSI PRESSURE GAUGE
Part Number: SF 27-15-18

NOTES:
1. All Printing are no more than .5344" from center of dial.
2. Color:
   - Dial face (white)
   - Pie area (red,green,red)
   - All printing (black)
   - Mark (black)
   - RU logo (black)
3. Bars are to be .477" and .524" from center (black)
4. Font sizes (color):
   - 8 Point - "Recharger", "Overcharged", "M" (black)
   - 6 Point - "Up with HFC227ea only" (black)
   - 5 Point - "0 psi", "150", "0°F", "390", "130°F", "480", "240", "70°F" (black)

360 PSI PRESSURE GAUGE
Part Number: SF 27-15-17

NOTES:
1. All Printing are no more than .6244" from center of dial.
2. Color:
   - Dial face (white)
   - Pie area (red,green,red)
   - All printing (black)
   - Mark (black)
   - RU logo (black)
3. Bars are to be .524" and .477" from center (black)
4. Font sizes (color):
   - 8 Point - "Recharger", "Overcharged"
   - 6 Point - "360", "20°F", "Use with HFC227ea only"
   - 5 Point - "0 psi", "288", "33°F", "302", "110°F", "700"
   - 9 Point - "M" (black)

In line with our policy of continuous product improvement, SFFECO reserves the right to modify specifications without prior notice.
**DESCRIPTION**

Check Valves are used when two or more agent storage cylinders are manifolded together with one common discharge piping configuration. Their purpose is to prevent the loss of agent in the event that any of the agent storage cylinders are not connected to the manifold at time of system discharge and to prevent back flow of agent into other cylinders attached to the manifold.

All components of the Check Valves are constructed from brass for durability and protection against corrosion. The metal to metal sealing area of the disc and seat is precision lapped, providing a very tight shut-off of both gas and fluid.

**NOTE:**
The 1", 1 1/2", and 2 1/2" Check Valves must be installed in the vertical position only with check disc on top.

---

### Part Number	| Description	| Valve Size
---|---|---
SF 60261	| Check Valve	| 1"
SF 60262	| Check Valve	| 1 1/2"
SF 60263	| Check Valve	| 2 1/2"
SF 60264	| Check Valve	| 4"

---
**DESCRIPTION**

The brass shuttle valve is used to connect two cylinders to a common discharge pipe and nozzle(s). All threads are available with 1" or 1-1/2" NPT. The purpose of having a reserve supply is that after the first cylinder (main) is discharged, the second cylinder (reserve) can be manually transferred via main/reserve switch to restore fire fighting readiness.

The shuttle valve contains a shuttle check that closes off the piping to the first cylinder (main) when empty. When the second cylinder is discharged, the shuttle check prevents the charge of the second cylinder into the first empty cylinder (main) connected on the same manifold, thus reducing unnecessary Clean Agent loss.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 50123</td>
<td>Shuttle Check Valve 1&quot;</td>
</tr>
<tr>
<td>SF 60619</td>
<td>Shuttle Check Valve 1 1/2&quot;</td>
</tr>
</tbody>
</table>

**ISOMETRIC VIEW: Shuttle Check Valve 1 1/2"**

Shuttle Valve 1 1/2" (Part No. SF 60619) for use with Model SF 90150-E or Model SF 90250-E

Shuttle Valve 1" (Part No. SF 50123) for use with Model SF 90035-E or Model SF 90070-E
**DESCRIPTION**

The Flex hoses are used to connect the agent storage containers to the manifold in multiple cylinders arrangement. Flex hoses are constructed of high pressure hydraulic rubber in the 1" and 1-1/2" sizes and stainless steel corrugated inner core with stainless steel braided in the 2-1/2" size. All sizes are fitted with male NPT thread on both ends.

There are two options available for the 1200 lb. cylinder. They are a flex hose alone and flex hose & check valve assembly. The flex hose alone is 4" in diameter (Part # SF 91230) and 30-1/2" in length. The combination of flex hose and check valve, which has a diameter of 4" (Part # SF 91231) and a length of 26-1/2", is used when using a manifold in a piping network. All are manufactured from a stainless steel corrugated inner core with stainless steel braided. The flex hose has 4" Victaulic fittings on both ends.

### Table: Flex Hoses Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Length</th>
<th>Diameter</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 91230</td>
<td>Flex Hose</td>
<td>30 1/2&quot;</td>
<td>4.0&quot;</td>
<td>Stainless Steel Braided</td>
</tr>
<tr>
<td>SF 91231</td>
<td>Flex Hose &amp; Check Assy</td>
<td>26 1/2&quot;</td>
<td>4&quot; x 6&quot;</td>
<td>Stainless Steel Braided</td>
</tr>
</tbody>
</table>

**Hose (Stainless Steel Braided)**

<table>
<thead>
<tr>
<th>PART NO.</th>
<th>A</th>
<th>B</th>
<th>MATERIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 90255</td>
<td>15&quot;</td>
<td>1&quot;</td>
<td>RUBBER</td>
</tr>
</tbody>
</table>

**Male NPT for Connection to Cylinder Valve**

**Male NPT for Connection to Check Valve or System Pipe**
DESCRIPTION

The Liquid Level Indicator is a simple, manually operated device, which provides a means to determine the Clean Agent liquid level in vertically mounted agent storage containers. Once the liquid level is determined, it can then be converted into the weight of Clean Agent present in the agent storage container.

OPERATION

A magnet equipped float moves with the liquid level along the unit stem. Level readout is obtained by simply removing the protective cap and pulling out a calibrated tape until magnetic interlock with the float is felt. With the tape in this position, the reading is obtained at the point where the tape emerges from the unit housing.

When the liquid level is determined, the reading is then referred to a chart in the Engineering Manual and the corresponding weight of Clean Agent is determined. Accurate readings can be obtained over a +40° F to +90° F temperature range.

FEATURES

Reduced Maintenance Time - Weight in an agent storage container can be determined in a fraction of the time it would take to remove and weigh them.

Continuous Fire Protection - Use of the liquid level indicator does not require taking out the cylinder from the system, thus providing uninterrupted fire protection.

Field Installation Capability - The indicator can easily be installed in the field using a single wrench as long as the container is empty and is equipped with a mounting boss.

Compact - When not in use, the unit requires no more space than that required by the container.

Flexibility - The flexible tape design allows the unit to be used in tight spaces that would otherwise hinder the use of a rigid type indicator “stick”.

Availability - Units are available for all SFFECO containers from sizes of 150 lb. thru 1200 lb.

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 60020</td>
<td>Liquid Level Indicator for 150 LB &amp; 250 Cylinders</td>
<td>26&quot;</td>
<td>29&quot;</td>
<td>1 1/2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>SF 60020-1</td>
<td>Liquid Level Indicator for 375 LB &amp; 560 Cylinders</td>
<td>40&quot;</td>
<td>43&quot;</td>
<td>1 1/2&quot;</td>
<td>3&quot;</td>
</tr>
<tr>
<td>SF 60020-2</td>
<td>Liquid Level Indicator for 1200 LB Cylinders</td>
<td>40&quot;</td>
<td>43&quot;</td>
<td>1 1/2&quot;</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>
### Description

The function of the Discharge Nozzle, in a fire extinguishing system, is to distribute the Clean Agent in a uniform, pre-determined pattern and concentration. The nozzles are designed to complete the discharge of Clean Agent in 10 seconds or less when installed within the design limitations stated in the installation instructional manual.

### Discharge Nozzle Selection - Sidewall 180°

Typically to be installed adjacent to the center of the one wall of one enclosure. Its discharge path will be across the enclosure. At no time shall the area coverage be exceeded.

### Discharge Nozzle Selection - Central 360°

Typically to be installed at the center of the enclosure. Its discharge path will be across the enclosure. At no time shall the area coverage be exceeded.

### Table: Discharge Nozzle Selection

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Nozzle Type</th>
<th>A (NPT)</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>DRILL DIAMETER RADIUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF 60704-2</td>
<td>180° Sidewall</td>
<td>1/2</td>
<td>1.50</td>
<td>0.918</td>
<td>2.763</td>
<td>1.050</td>
<td>2.050</td>
<td>N/A</td>
<td>0.0781 TO 0.1960</td>
</tr>
<tr>
<td>SF 60703-3</td>
<td>360° Central</td>
<td>1/2</td>
<td>1.50</td>
<td>0.918</td>
<td>2.763</td>
<td>1.050</td>
<td>2.050</td>
<td>N/A</td>
<td>0.1960</td>
</tr>
<tr>
<td>SF 60705-3</td>
<td>180° Sidewall</td>
<td>3/4</td>
<td>1.50</td>
<td>1.215</td>
<td>2.873</td>
<td>1.000</td>
<td>2.000</td>
<td>N/A</td>
<td>0.1360 TO 0.2610</td>
</tr>
<tr>
<td>SF 60703-3</td>
<td>360° Central</td>
<td>3/4</td>
<td>1.50</td>
<td>1.215</td>
<td>2.873</td>
<td>1.000</td>
<td>2.000</td>
<td>N/A</td>
<td>0.2610</td>
</tr>
<tr>
<td>SF 60706-2</td>
<td>180° Sidewall</td>
<td>1</td>
<td>1.75</td>
<td>1.356</td>
<td>2.595</td>
<td>1.250</td>
<td>2.250</td>
<td>N/A</td>
<td>0.1660 TO 0.3320</td>
</tr>
<tr>
<td>SF 60706-3</td>
<td>360° Central</td>
<td>1</td>
<td>1.75</td>
<td>1.356</td>
<td>2.595</td>
<td>1.250</td>
<td>2.250</td>
<td>N/A</td>
<td>0.3320</td>
</tr>
</tbody>
</table>

### INSTALLATION

Refer to SFFECO's Installation, Maintenance & Service Technical Manual for Discharge Nozzle Area Coverage and Application Selections.
Technical Datasheet
Clean Agent System

DISCHARGE PRESSURE SWITCH

Upon activation of the cylinder valve, the operation pressure switches contacts transfer to indicate discharge or to perform disconnect/activation required during system operation.

Characteristics:
- 0.125 – 27 NPT male thread
- 58± psig actuation pressure
- 40± psig release pressure
- Temperature -65°F
- 250 proof pressure
- 5,000 burst pressure
- Contacts – Silver – 20 amps
  - 120VAC / 240 VAC
  - DPS 10 -370

Normally open – Normally closed,
- Normally Open : Red
- Normally Closed : Black
- Common : White

PRESSURE SUPERVISORY SWITCH

The Pressure Supervisory Switch is normally wired into a supervisory circuit to give a trouble signal upon activation.

Characteristics:
- 0.125 – 27 NPT male thread
- 430 ± 10 psig actuation pressure
- Temperature -65°F to 275°F
- 600 psig proof pressure
- 5,000 burst pressure
- Contacts – Silver
  - 2AMP 28VDC
  - 375 VA 120 VAC Pilot Duty

Normally open – Normally closed,
- Normally Open : Blue
- Normally Closed : Black
- Common : Violet

In line with our policy of continuous product improvement, SFFECO reserves the right to modify specifications without prior notice.
WARNING SIGNS

**DO NOT ENTER:** caution sign to alert the room is protected by HFC227ea system and all doors should be closed in case of fire.

Size: 10” x 13”

**EVACUATE:** caution sign to alert the room is protected by HFC227ea system and evacuate the area when alarm sounds.

Size: 8” x 8”

**MANUAL DISCHARGE STATION:**

This sign will identify each manual release associated with HFC227ea system. This reduces the risk of a manual discharge station being mistaken for a fire alarm system station.

Size: 8” x 4”

**SYSTEM ABORT:** sign to identify the presence of the system abort station.

Size: 2.25” x 4”
In line with our policy of continuous product improvement, SFFECO reserves the right to modify specifications without prior notice.

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