

## LIFECO High Pressure Carbon Dioxide (CO<sub>2</sub>) System

CO<sub>2</sub> is a colourless, odorless, electrically non-conductive, non-corrosive, and non-deteriorating inert Extinguishing agent.

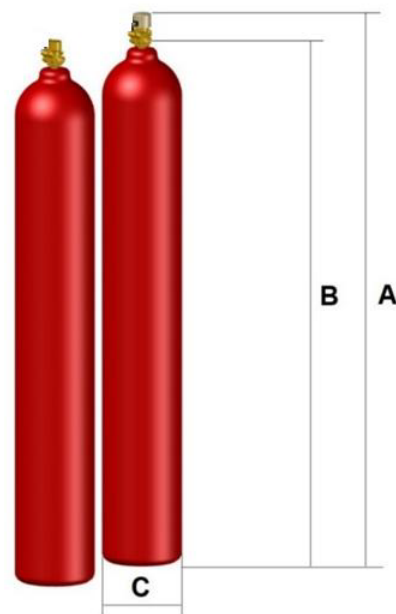
At 0.03% in normal breathing air, CO<sub>2</sub>, in gaseous state, at normal temperature (+15 °C) and atmospheric pressure, CO<sub>2</sub> has a density of 1.87kg/m<sup>3</sup>, is 1.5 times heavier than air and spreads along the ground collecting in low-lying areas such as pits and cellars. It is a colourless and odourless gas (with a slightly pungent odour at high concentrations).

CO<sub>2</sub> can exist as a liquid below the critical temperature of 31°C and above the triple point with a temperature of -56.6 °C and 0.418 MPa gauge.

## LIFECO CO<sub>2</sub> Cylinder Assembly

- a) All CO<sub>2</sub> cylinders and valve assemblies and accessories are arranged to be accessible for inspection, testing and other maintenance when required.
- b) All CO<sub>2</sub> cylinders are the same size, rechargeable and contain the same mass of CO<sub>2</sub>.
- c) Every cylinder comes with a protective cap for safe handling and transportation.

Description	Specification	
Part Number	LF-68CO-SV	LF-68CO-DV
Type	Solenoid valve	Discharge valve
Size	68L	
Cylinder Standard	ISO 9809-1	
Agent weight (CO <sub>2</sub> )	45 kg	
Filled Pressure	58 bar at 21°C	
Cylinder Working Pressure	150 bar	
Cylinder Test Pressure	250 bar	
Total height, A	1597-1614mm	
Cylinder height, B	1532mm	
Cylinder Diameter, C	267mm	
Cylinder Tare Weight	70 kg	



**Cylinder Assembly**

## Pilot Assembly

The cylinder assembly comprises of a cylinder factory fitted with a solenoid discharge valve (PN LFIGEASV200) filled with nitrogen and pressurized to 200 Bar @ 15°C (2900 psi @ 59°F). Cylinders are available in 4L and 10L. Pilot assembly is to actuate cylinders pneumatically in a system and selector valve if system available. Pilot valve adaptor (PN: LF-PVA) is available to adapt the pilot cylinder to the pilot line.

Description	Specification	
Working Pressure	200 Bar @ 15°C	
Size	4L	10 L
Part Number (ISO 9809)	LF-04PC-200	LF-10PC-200
Outlet	W21.8 x 1/14"	
Test Pressure	300 Bar	
Safety Disc Pressure	270 Bar (3916psi)	
Gauge Port	M12 x 1.0	
Equivalent Length	25.84m	
Weight	10kg	19kg
Voltage	24 VDC	
Max Current	0.4 A	
Power consumption	9.3 W	
Protection class	IP65	
Overall height	500mm	950mm
Cylinder diameter	140mm	



Pilot Cylinder Assembly

## Cylinder Valve Assembly

Valve operates by means of pressure differential piston. The valves incorporated with the features to enable it to be connected with manual and pneumatic actuator for actuation purpose. Each valve is provided with an anti-recoil cap. Only removed when connecting cylinder to pipework and refit when disconnecting the cylinder from pipework. There are 2 types of valves:

- 1) Discharge valve
- 2) Solenoid discharge valve

Description	Valve Size
Working Pressure	150 Bar
Part Number	LF-CODV
Outlet	W21.8 x 1/14"
Material	Brass
Test Pressure	360 Bar
Safety Disc Pressure	190 Bar
Equivalent Length	25.84m
Weight	1.16kg



Discharge Valve

## Solenoid Valve



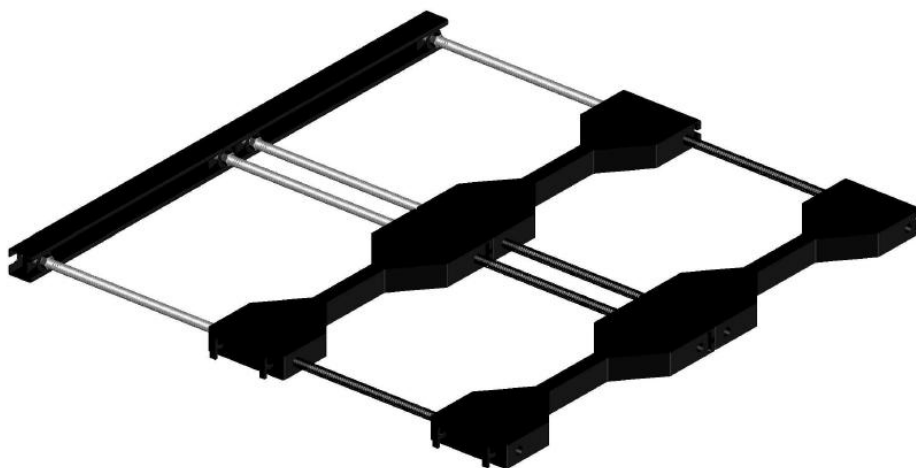
**Solenoid Valve**

### Solenoid Valve Technical Information

Description	Valve Size
Working Pressure	150 Bar
Part Number	LF-COSV
Outlet	W21.8 x 1/14"
Material	Brass
Test Pressure	360 Bar
Safety Disc Pressure	190 Bar
Equivalent Length	25.84m
Weight	1.55kg
Voltage	24 VDC
Max Current	0.4 A
Power consumption	9.3 W
Protection class	IP65

## Cylinder Bracket

All cylinder shall be firmly supported before put on service. The CO<sub>2</sub> cylinder bank are normally braced against a firm surface, such as the wall of the building, using full thread bolt and nuts, supported by an angle bar.



Cylinder Bracket

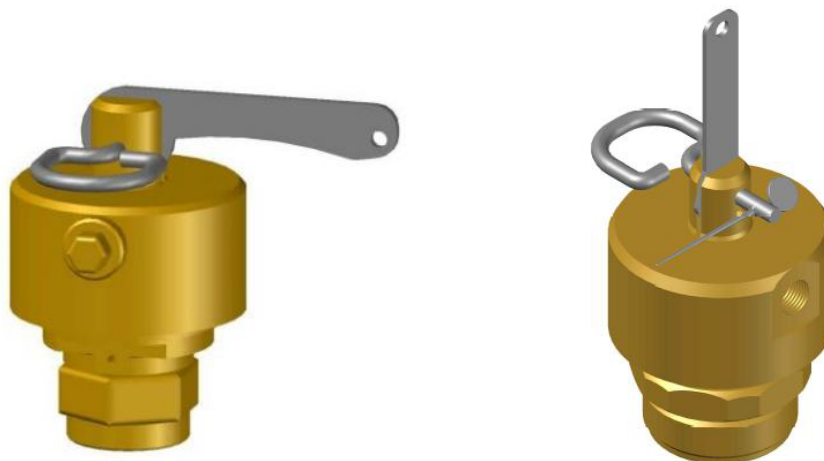
### Cylinder Bracket Technical Information

Description	Specification
<b>Material</b>	Mild Steel
<b>Paint</b>	Epoxy Powder Coating (Black)
<b>Mounting</b>	Unistrut Channel

Part Number	Cylinder Size	Unistrut Channel Length	Row	Set comes with
<b>LF - CB-80</b>	80L	360 mm (14.2 inch)	1 <sup>st</sup> Row	1x Strap, 2x M12 stud with c channel stopper, 2x washer, 2x Nut, 1x Unistrut channel
<b>LF - CBX -80</b>	80L	N/A	2 <sup>nd</sup> Row And above	1x Strap, 2x M12 stud with c channel stopper, 2x washer, 2x Nut, 1x Unistrut channel

## Pneumatic Manual Actuator

Pneumatic Manual actuator is designed to be used and installed on valve for mechanically or pneumatically actuation.



Pneumatic Manual Actuator

### Pneumatic Manual Actuator Technical Information

Description	Specification	
Part Number	LF-COMPA	LF-COMPA/1
Used with Valve	Discharge valve LF-CODV	Solenoid valve LF-COSV
Body	Brass C3604BD	
Actuation Pin	Brass C3604BD	
Valve Connection	M36 x 1.5	M20 x 1.5
Pneumatic Connection	2 x 1/8" BSP	
Overall Size	83mm (L) x 40mm (Diameter)	
Pilot Pressure	Min 8 Bar (116 psi), Max 300 Bar (4351 psi)	
Mounting Torque	15 Nm ± 1	

## Manual Actuator

The manual actuator is designed to be used and installed with Master cylinder (PN: LF-68CO-SV) and Pilot Cylinder for mechanically actuation. Safety pin is provided with every actuator to prevent accidental discharge. Actuation by removing safety pin and moving lever to 90°. Manual actuator features retractable pin which reset when level back to original position.



Manual Actuator

### Manual Actuator Technical Information

Description	Specification
Part Number	LF-COMA
Body	Brass C3604BD
Level	Stainless Steel
Safety Pin	Stainless Steel
Piston Rod	Brass C3604BD
Connection	M20 x 1.5
Overall Size	48mm (H) x 28mm (W)
Mounting Torque	15 Nm ± 1

## Pneumatic Actuator

Pneumatic actuator is designed to be used and installed with slave (PN: LF-68CO-DV) for pneumatically actuation. The pneumatic actuator features a pneumatically driven piston that used to depress the valve core and opening the valve. The pressure from the master cylinder is used to actuate the cylinder discharge valve of slave cylinder via flexible hose.



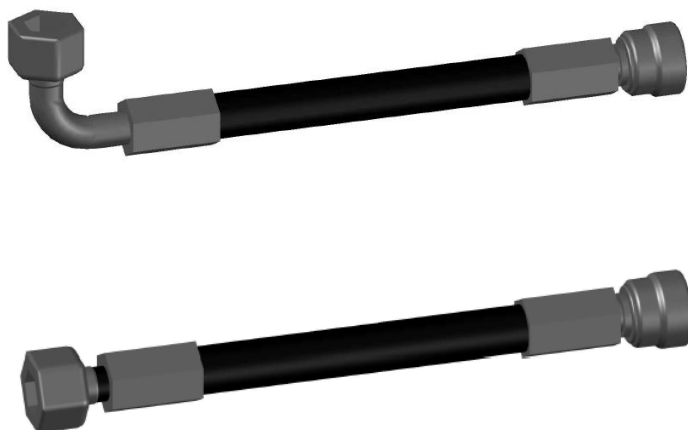
Pneumatic Actuator

### Pneumatic Actuator Technical Information

Description	Specification
Part Number	LF -COPA
Body	Brass C3604BD
Actuation Pin	Brass C3604BD
Valve Connection	M36 x 1.5
Pneumatic Connection	2 x 1/8" BSP
Overall Size	56.5mm (L) x 40mm (Diameter)
Pilot Pressure	Min 20 Bar (290 psi), Max 360 Bar (5221 psi)
Mounting Torque	25 Nm ± 2

## Discharge Hose

The discharge hose is equipped with a female swivel fitting at the inlet and enable to connect the cylinders to the manifold in multiple cylinder arrangements. This feature has enables cylinder to be disconnected during maintenance without any effort to remove other manifold connection and pipework.



Discharge Hose

### Discharge Hose Technical Information

Description	Specification	
Part Number	LF-DH500E	LF-DH500S
Type	90° Elbow	Straight
Hose Material	Synthetic rubber	
Connection Material	Coated Steel	
Inlet Connection	W21.8 x 1/14"	
Outlet Connection	¾" BSP	
Min Bend Radius	250mm	
Max Working Pressure	360 Bar (5221 psi)	
Temperature Range	-20°C to + 50°C (-4° F to 122° F)	
Overall Length	500mm	
Size	DN12	

\*Various length is available upon request.



## Check Valves

Check valve is connected between discharge hose and constant pressure regulator before the manifold to prevent backflow of the agent during a discharge.

Description	Specification
Part Number	LF -CV
Nominal Size	12mm
Material	Stainless Steel
Connection	3/4" BSP Male
Working Pressure	360 Bar (5221 psi)
Overall Size	65mm (L) x 38mm (W)
Equivalent Length	0.48 m



Check Valve

## Bleed Valve

Bleed valve is used and installed in pneumatic pilot lines to prevent and release unintended pressure developed in the pilot line.

Description	Specification
Part Number	LF -BVPL
Material	Stainless Steel
Connection	1/8" BSP
Max Working Pressure	360 Bar (5221 psi)
Temperature Range	-20°C to + 65°C (-4° F to 149° F)
Overall Size	64mm (L) x 22mm (W)
Pressure	Closing : 0.4 Bar Increasing Pressure Opening: 0.5 Bar Falling Pressure

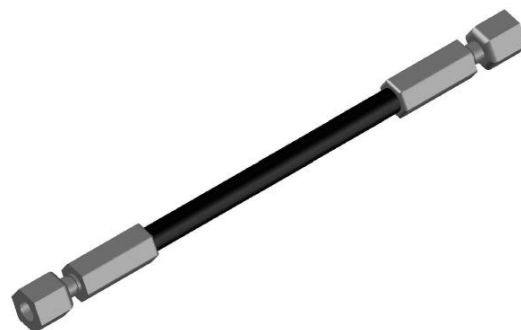


Bleed Valve

## Flexible Hose

The flexible hose is used to connect between the master cylinder valve port and slave cylinder pneumatic actuator and slave to slave cylinder pneumatic actuator. This flexible hose is act as a pressure connector.

Description	Specification	
Part Number	LF-PH350	LF-PH450
Hose Material	Synthetic rubber	
Connection Material	Coated Steel	
Connection	M12 x 1.5	
Min Bend Radius	30mm	
Max Working Pressure	360 Bar (5221 psi)	
Temperature Range	-20°C to + 65°C (-4° F to 149° F)	
Overall Length	350mm (L)	450mm(L)
Size	DN6	

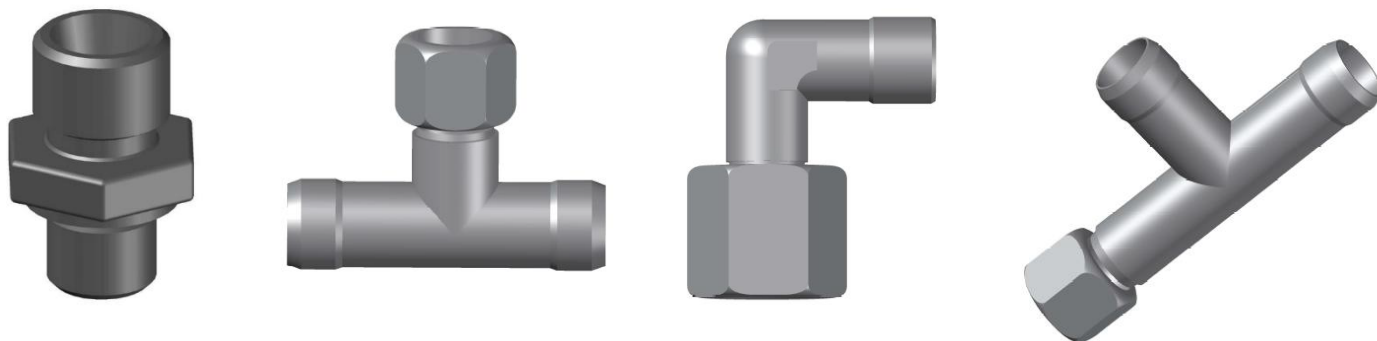


Flexible Hose

\*Various length is available upon request.

## Pilot Hose Fitting Adaptor

Connection adaptor and fitting for pilot line.

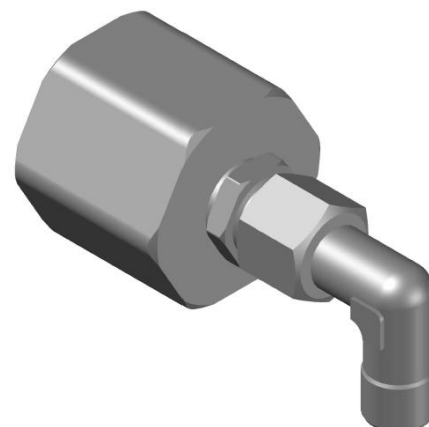


Connection adaptor and fitting

Description	Specification			
Part Number	LF-PHA	LF-SORS	LF-PVE	LF-SORT
Type	Straight	Tee (swivel on side)	Elbow	Tee (swivel on run)
Material	Steel (Zinc plated)			
Connection	1/8" BSP x M12 x 1.5	M12 x 1.5	M12 x 1.5	M12 x 1.5
Working Pressure	360Bar (5221psi)			

## Pilot Valve Adaptor

Description	Specification
Part Number	LF-PVA
Material	Brass
Connection (Pilot Hose)	M12 x 1.5
Connection (Valve)	M21.8 x 1/14"
Working Pressure	360Bar (5221psi)



Valve Adaptor

## Pilot Line Check Valve

The pilot line check valve is used to maintain pressure in a particular section of the pilot line or to ensure that nitrogen pressure from the pilot cylinder is operating the correct bank of cylinders.

A system using selector valve which consist of different numbers of cylinders for each hazard enclosure, can use the pilot line check valve to ensure the pilot pressure opens only the correct cylinder from the bank.



Pilot Line Check Valve

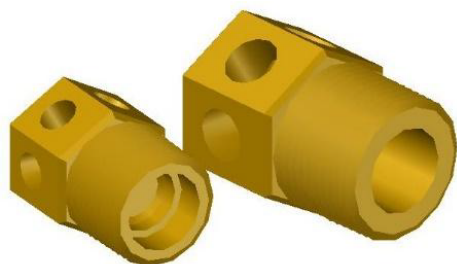
Description	Specification
Part Number	LF-CVPL
Material	Stainless steel
Connection	1/8" BSP Female
Working Pressure	360Bar (5221psi)

## Discharge Nozzles

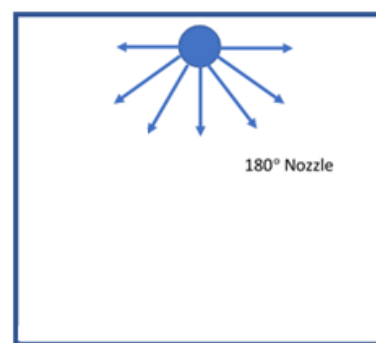
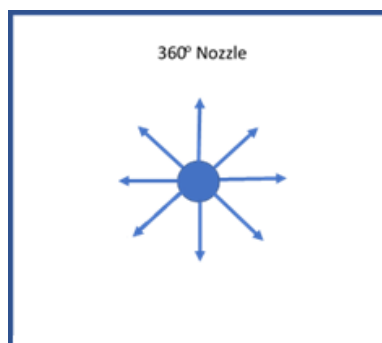
Nozzle sizes for ½" and ¾" pipes are available.

2 types of discharge pattern are available.

Type 360° discharges in all directions, while the Type 180° discharges in half circle, facing the direction of the discharge outlet holes. ½" Nozzles are equipped with filter at the inlet. Please see Table 5.16, for details on Discharge Rate of a particular orifice at a given pressure.



Discharge Nozzles



Discharge Nozzles Discharge Pattern

### Pilot Valve Adaptor Technical Information

Description	Specification
Material	Brass (Nickel Plate)
Insert	Brass
Connection	BSPFemale/ NPT Female
Working Pressure	90 Bar(1305 psi)

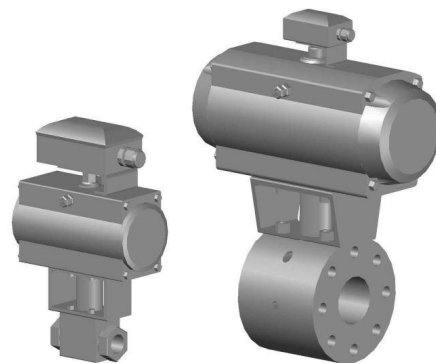
### Nozzle Specification

Part No	Description	Port	Port Size (mm)	Drill Size (mm)
LF -360CO2 -15	CO2 Discharge Nozzle 1/2"NPT 360deg	6	7	1.2 - 9
LF -360CO2 -20	CO2 Discharge Nozzle 3/4"NPT 360deg	6	10	10 - 16
LF -360CO2 -25	CO2 Discharge Nozzle 1" NPT 360deg	6	15	17 - 22
LF -180CO2 -15	CO2 Discharge Nozzle 1/2"NPT 180deg	4	7	1.2 - 9
LF -180CO2 -20	CO2 Discharge Nozzle 3/4"NPT 180deg	4	10	10 - 16
LF -180CO2 -25	CO2 Discharge Nozzle 1" NPT 180deg	4	15	17 - 22

## Selector Valve

Selector valves are flow control valves with open and closed condition. Selector valve used in application where multiple enclosure or areas require to be protected from a single bank cylinder system. All selector valves are equipped with pneumatic actuators and limit switches.

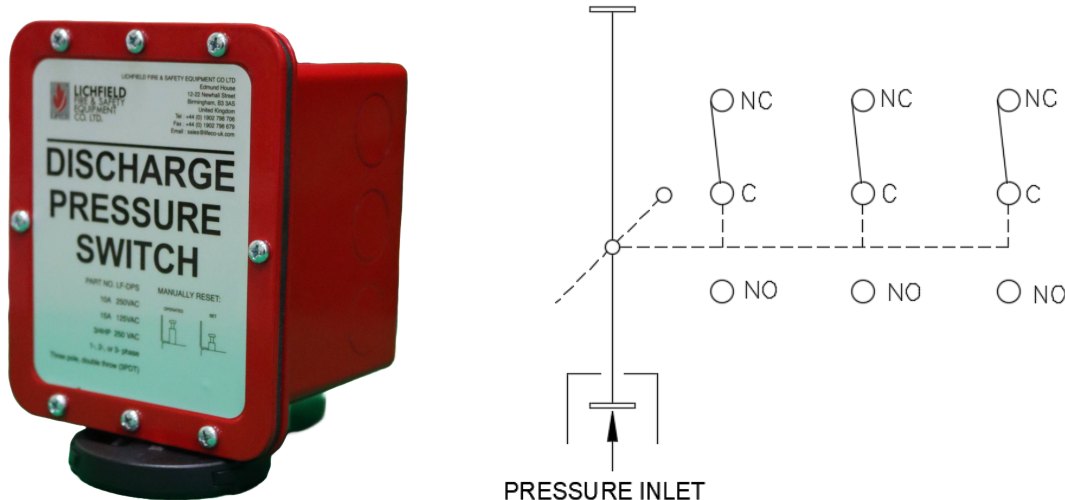
Description	Specification
Material	Stainless Steel
Connection	BSP
Working Pressure	140 Bar (2030 psi)
Nominal Control Pressure	6 Bar
Control Pressure zone	6 – 10 Bar
Complete Switching Time	≤ 3 s
Opening Angle	90°C
Voltage	12 – 250 V AC/DC
Operating Current	0.1 – 10 A
Limit switch	2 change over contacts



Selector Valve

## Discharge Pressure Switch

The discharge pressure switch function by sending signal to a control panel during a system discharged. It activates by the agent pressure during discharged and can be reset manually by pushing the top stem after activation.




Discharge Pressure Switch & Wiring Diagram

### Discharge Pressure Switch Technical Information

Description	Specification
Part Number	LF-DPS
Body Material	Brass
Cover Plate	Mild Steel
Connection	1/2" NPT
Switch Configuration	3PDT, Three Pole Double Throw
Minimum Actuation Pressure	4 bar (58psi)
Maximum Operating Pressure	60 bar (870psi)
Electrical Rating	10A 250VAC 15A 125VAC 3/4HP, 250VAC 1,2, or 3 phase
Overall Size	100 mm (L) x 92mm (W) x 123mm(H) 3.94 inch(L) x 3.62 inch(W) x 4.84 inch(H)

## Cylinder Label

### CO2 Label – UL

	<b>LICHFIELD</b> FIRE & SAFETY EQUIPMENT CO. LTD.	<b>LIFECO-CO2</b> <b>CARBON DIOXIDE</b> Extinguishing System Unit
<p><b>CONTENT</b></p> <ul style="list-style-type: none"> <li>THIS CYLINDER IS FILLED WITH CARBON DIOXIDE.</li> </ul> <p>CYLINDER PART NO:</p> <input type="text"/> <p>CYLINDER SERIAL NO:</p> <input type="text"/> <p>TARE WEIGHT:</p> <input type="text"/> <p>AGENT WEIGHT:</p> <input type="text"/> <p>GROSS WEIGHT:</p> <input type="text"/> <p>CHARGE DATE:</p> <input type="text"/>		<p><b>WARNING:</b></p> <p><b>AVOID EXPOSURE OF VAPOURS, FUME, AND PRODUCTS OF COMBUSTION.</b></p> <p><b>CAUTION:</b></p> <p><b>PRESSURIZED CYLINDER. CAPABLE OF VIOLENT DISCHARGE.</b></p> <ul style="list-style-type: none"> <li>EXTREMELY HAZARDOUS AND CAN CAUSE SEVERE INJURY OR DEATH.</li> <li>VALVE OUTLET SAFETY CAP MUST BE SECURELY ATTACHED DURING TRANSPORTATION AND ONLY REMOVE WHEN CYLINDER IS READY FOR CONNECTION TO SYSTEM'S DISCHARGE PIPE.</li> <li>DO NOT REMOVE VALVE FROM CYLINDER.</li> <li>DO NOT INCINERATE CYLINDER.</li> </ul> <p>IF CONTAINER CONTENTS MUST BE REMOVED FOR SERVICE, MAINTENANCE OR DISMANTLING OF THE CLEAN AGENT SYSTEM - PRIOR TO REMOVAL, CONTACT YOUR LOCAL INSTALLER OR MANUFACTURER FOR INSTRUCTIONS ON HANDLING EQUIPMENT AND RECLAIMING OR RECYCLING CLEAN AGENT.</p>
<p><b>INFORMATION</b></p> <ul style="list-style-type: none"> <li>REFER TO DESIGN, INSTALLATION, OPERATION AND MAINTENANCE MANUAL (LF02MAL-0002).</li> <li>68L CYLINDERS SHALL BE TRANSPORTED AND STORED IN HORIZONTAL OR VERTICAL POSITION.</li> <li>CYLINDER FACTORY TESTED AT 250 BAR (3625 PSI) IN ACCORDANCE TO ISO-9809 STANDARD.</li> <li>OPERATING PRESSURE IS 58 BAR AT 21°C (850 PSI AT 70°F)</li> <li>OPERATING TEMPERATURE CYLINDER / STORAGE RANGE -20°C TO 55°C (-4°F TO 131°F).</li> </ul>		<p><b>INSPECTION AND MAINTENANCE</b></p> <ul style="list-style-type: none"> <li>CYLINDER SHALL BE INSPECTED AT LEAST SEMI ANNUALLY OR MORE FREQUENTLY WHEN CIRCUMSTANCE REQUIRED.</li> <li>REFILL OR REPLACE THE CYLINDER WHEN LOSS OF WEIGHT MORE THAN 10 PERCENT, CONTACT SYSTEM SUPPLIER.</li> </ul>
<p align="center">   <b>LISTED</b>  <b>EX29736</b>  <b>5XL9</b>  <b>CARBON DIOXIDE EXTINGUISHING SYSTEM</b>  <small>LABEL PART NUMBER: LF-CL4</small> </p>		<p><b>Hazardous Material Information System (HMIS)</b></p> <p>Health : 1      Flammability : 0      Reactivity : 0</p> <p>MSDS NO: LF-MSDS-CO2</p> <p>Consult : LICHFIELD FIRE &amp; SAFETY EQUIPMENT CO LTD EDMUND HOUSE, 12-22 NEWHALL STREET, BIRMINGHAM, B3 3AS, UNITED KINGDOM.</p> <p>TEL: +44 (0) 1902 798 706      FAX: +44 (0) 1902 798 679 EMAIL: SALES@LIFECO-UK.COM</p>
<p>DO NOT COVER, REMOVE, OR DEFACE THIS LABEL</p>		