



ORIENT 5112™

FK-5-1-12 Clean Agent

DESCRIPTION

Orient Corporation also offers FK 5-1-12 that has received the component recognition from both Underwriters Laboratories (UL) and Factory Mutual (FM). UL and FM are independent third-party organizations that certify the technical specifications as required by NFPA 2001 in order to ensure the effective of clean agents in suppressing fires. Other fire extinguishing agents are available upon request.

Orient 5112 is a trademark of Orient's FK-5-1-12, Dodecafluoro-2-methylpentan-3-one. FK-5-1-12 is another widely used extinguishing clean agent. It is environmentally safe and best used in fire hazard areas containing A, B, & C classes of fire. It has been approved by US EPA and ISO for its safe characteristic and fire extinguishing effectiveness.

FK 5-1-12 has been marketed by 3M with the brand name of NOVEC 1230 and ORIENT 5112 by Orient Corporation. Orient 5112 is acceptable clean agent for Halon 1301 alternative. Clean Agents offered by Orient Corporation is guaranteed to meet the minimum NFPA 2001 Requirement as follows.

CLEAN AGENT PROPERTIES

IUPAC Name	1,1,1,2,2,4,5,5,5-Nonafluoro-4-(trifluoromethyl)-3-pentanone
ASHRAE Designation	FK-5-1-12
Synonym	Dodecafluoro-2-methylpentan-3-one
CAS Registry Number	756-13-8
Chemical Formula	$\text{CF}_3\text{CF}_2\text{C}(\text{O})\text{CF}(\text{CF}_3)_2$
Molecular Weight	316.04
Freezing Point	-162.4°F (-108°C)
Boiling Point at 760 mmHg	120.2°F (49°C)
Critical Temperature	335.6°F (168.66°C)
Critical Density	39.91 lbm/ft³ (639.1 kg/m³)
Critical Pressure	270.44 psi (1,865 kPa)
Critical Volume	0.0251 ft³/lbm (494.5 cc/mole)
Viscosity, Liquid at 77°F (25°C)	1.27 lb/ft-hr (0.524 cP)
Solubility in Water at 70°F (21.1°C)	<0.001% by weight
Property	Requirement
Purity	99.0% (minimum)
Water Content (by weight)	0.001%
Non-Volatile Residue (g/100 ml)	0.05
Environmental Impact	
Ozone Depletion Potential (ODP)	0
Global Warming Potential (GWP)	≤1
Atmospheric Lifetime (ATL)	0.014 years
US EPA SNAP (Yes/No)	Yes

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Clean Agent Cylinders (500 PSI System)



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INTRODUCTION

The Orient Engineered FK-5-1-12 Systems, as outlined in this manual, are those that are intended to be designed and installed to protect single or multiple hazards within the limitations tested by a recognized testing agency as stated in this manual ONLY. Authorities Having Jurisdiction (AHJ) should follow the information specified by the Standard on Clean Agent Extinguishing Systems NFPA 2001. The equipment described in this manual is listed by Underwriters Laboratories, Inc. in accordance to the Standard for Halocarbon Clean Agent Extinguishing System Units (UL 2166). Our total flooding fire extinguishing systems are UL listed to utilize the ORIENT 5112 from Orient Corporation under UL File EX 15295.

Cylinders

The Engineered Clean Agent System Cylinders are available in the following capacities: 20 lb., 35 lb., 70 lb., 100 lb., 150 lb., 250 lb., 375 lb. and 560 lb.

Cylinder Model

FK-5-1-12 Clean Agent cylinders are available in the following capacities:

Part Number	Cylinder Size	Max Fill at 75 lb/ft³	Min Fill at 35 lb/ft³	Valve Size
OCI 70020-E*	20 LB	21 LB	11 LB	1" Valve
OCI 70035-E*	35 LB	38 LB	18 LB	1" Valve
OCI 70070-E*	70 LB	76 LB	36 LB	1" Valve
OCI 70100-F*	100 LB	108 LB	51 LB	1" Valve
OCI 70150-E*	150 LB	163 LB	77 LB	1 1/2" Valve
OCI 70250-E*	250 LB	271 LB	127 LB	1 1/2" Valve
OCI 70375-E*	375 LB	406 LB	190 LB	2 1/2" Valve
OCI 70560-E*	560 LB	601 LB	281 LB	2 1/2" Valve

Notes: 1. Each of the basic sizes can be filled with one pound increments to meet the exact amount of FK-5-1-12 Clean Agent required, within their fill ranges.

2. * add “-SS” if valve is Stainless Steel

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

System Operating Pressure: 500 psi at 70°F (35.2 kg./cm² at 21.1°C) are available

Cylinder Bracket

The cylinder bracket is manufactured from galvanized steel band formed to the radius of the cylinder with flanges for bolting to the continuous slot metal framing channel of 12-gauge steel with corrosion resistant paint or galvanized. The channel must be supplied by the installer. The cylinder bracket must 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 supports the weight of the cylinder and the reaction force of the FK-5-1-12 Clean Agent when discharge.

Part Number	Cylinder O.D	A	B	C	D	E	F	Bracket Part #
OCI 70020-E	10.00"	11"	14"	12.6"	1.5"	5.6"	2"	OCI50139
OCI 70035-E	10.00"	11"	14"	12.6"	1.5"	5.6"	2"	OCI50139
OCI 70070-E	10.00"	11"	14"	12.6"	1.5"	5.6"	2"	OCI50139
OCI 70100-F	12.75"	13"	16.05"	14.65"	1.65"	6.475"	2"	OCI60780
OCI 70150-E	12.75"	13"	16.05"	14.65"	1.65"	6.475"	2"	OCI60780
OCI 70250-E	16.00"	16.25"	19.2"	17.7"	1.5"	8.2"	2"	OCI60760
OCI 70375-E	16.00"	16.25"	19.2"	17.7"	1.5"	8.2"	2"	OCI60760
OCI 70560-E	20.00"	20.25"	23.2"	21.7"	1.5"	12.2"	2"	OCI60770

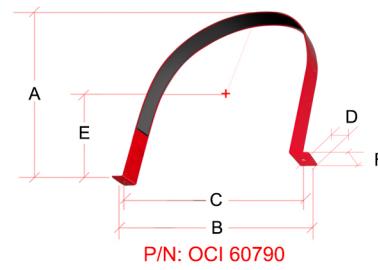
For the 20 lb. to 250 lb. cylinders - One cylinder bracket must be used

For the 375 lb. to 560 lb. cylinders - Two cylinder brackets must be used



Cylinder Dimension

Part Number	A	B	C
OCI 70020-E*	10.750"	13.632"	18.633"
OCI 70035-E*	10.750"	18.677"	23.678"
OCI 70070-E*	10.750"	28.166"	33.167"
OCI 70100-F*	12.795"	26.709"	31.709"
OCI 70150-E*	12.795"	37.343"	43.172"
OCI 70250-E*	16"	40.099"	45.928"
OCI 70375-E*	16"	57.248"	65.351"
OCI 70560-E*	20"	55.516"	63.619"



1200 lb Clean Agent Cylinder (500 PSI System)



Orient Corporation

DESCRIPTION

The OCI 71200-E 1200 lb. cylinder is filled with one pound increments from a minimum of 606 lb. to a maximum of 1297 lb., to meet the exact amount of agent required. The quantity of agent required for each enclosure can be calculated through Orient's software, version OCI K4.0, 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 500 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. cylinder is manufactured, tested and stamped in accordance with DOT 4BW500.

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

System Operating Pressure: 500 psi at 70°F (35.2 kg/cm² at 21.1°C)

The cylinder is equipped with a 4" stainless steel back pressure type valve and a 4" Victaulic male outlet. A piston in the valve bore is equipped with a rubber seal that keeps the 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 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 its full open position, allowing cylinder discharge through the distribution piping network.

Attached to the bottom of the cylinder valve is a siphon tube, which is straight and runs from the top of the cylinder to the bottom of the cylinder. The cylinder must be installed in an upright position (valve on top). Each cylinder installation shall use a top plug or a top plug adapter. The electric solenoid uses a 24 VDC 15 Watts (OCI 50025-6).

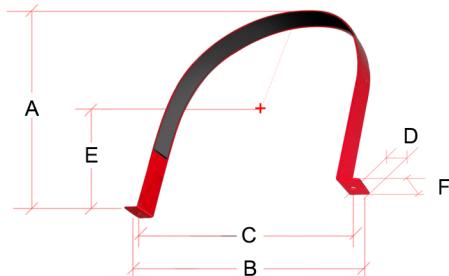
There is a 1/8" NPT outlet stamped "P" on the cylinder valve. This outlet transmits cylinder pressure to an optional low pressure supervisory switch, which when used, monitors the internal pressure of the cylinder. Another 1/8" NPT outlet stamped "M" on the cylinder valve is available for use as a pressure source to drive the piston actuators on a multiple cylinders system or to actuate a pressure operated switch in the event of the cylinder discharge. In multiple cylinders installation, when manifolded together, a maximum of six (6) 1200 lb. cylinders (also known as slave cylinders) can be operated to discharge using this "M" port through the piston actuator.

The cylinder is equipped with 500 psi pressure gauge for quick visual INSPECTION of the cylinder's internal pressure.

Liquid level indicator is available as an option for measurement of weight of the Clean Agent in the cylinder and is highly recommended for ease of maintenance.



P/N: OCI 71200-E

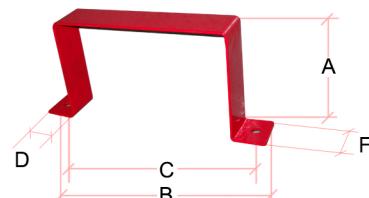


P/N: OCI 60790

Part Number	Cylinder Size	Max Fill at 75 lb/ft ³	Min Fill at 35 lb/ft ³	Valve Size	Diameter	Total Height	Height to Discharge Outlet
OCI 71200-E	1200 LB	1297 LB	606 LB	4" Valve	30.00"	71.985"	62.135"

Cylinder Bracket

The cylinder bracket is manufactured from galvanized steel band formed to the radius of the cylinder with flanges for bolting to the continuous slot metal framing channel of 12-gauge steel with corrosion resistant paint or galvanized. The channel must be supplied by the installer. The cylinder bracket must 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 supports the weight of the cylinder and the reaction force of the HFC-227ea Clean Agent when discharge.



P/N: OCI 60792

Part Number	Diameter	A	B	C	D	E	F
OCI 60790	30.00"	30.225"	35.2"	33.2"	2.5"	15.225"	2"
OCI 60792	30.00"	5"	11.85"	10.35"	1.5"	N/A	2"



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 as stated in the Installation Instruction Manual.

Discharge Nozzles are available in sizes of 1/2", 3/4", 1", 1-1/4", 1-1/2" and 2". Each discharge nozzle comes in two configurations: 180 and 360 degree distribution patterns. Deflector plates are available as an option where sensitive ceiling tiles must be protected.

Discharge Nozzles are made of aluminum with female pipe threads. The orifice size of the discharge nozzle is determined by the hydraulic flow calculations. All nozzles are rated for a maximum hazard height of 16 ft. If hazards exceed 16 ft in height, a second tier of nozzles must be used.

Discharge nozzles are also available in Brass and Stainless steel materials.

Discharge Nozzle Selection – Sidewall 180°

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

Installation

Please refer to Orient Installation, Maintenance & Service Technical Manual for Discharge Nozzles Area Coverage and Application Selections.



Part Number	Description	Part Number	Description
OCI 70704-2	1/2" (180°) Sidewall	OCI 70707-2	1 1/4" (180°) Sidewall
OCI 70704-3	1/2" (360°) Central	OCI 70707-3	1 1/4" (360°) Central
OCI 70705-2	3/4" (180°) Sidewall	OCI 70708-2	1 1/2" (180°) Sidewall
OCI 70705-3	3/4" (360°) Central	OCI 70708-3	1 1/2" (360°) Central
OCI 70706-2	1" (180°) Sidewall	OCI 70709-2	2" (180°) Sidewall
OCI 70706-3	1" (360°) Central	OCI 70709-3	2" (360°) Central