



U.S. Department
of Transportation

**Pipeline and Hazardous
Materials Safety
Administration**

1200 New Jersey Avenue, SE
Washington, D.C. 20590

JAN 05 2016

Josh Lepinski
Research & Development Engineer
Tyco Fire Protection Products
One Stanton Street
Marinette, WI 54143-2542

Ref. No. 15-0131

Dear Mr. Lepinski:

This responds to your letter dated June 24, 2015 requesting clarification of the cylinder design requirements under the Hazardous Materials Regulations (HMR; 49 CFR Parts 171-180). Specifically, you asked whether the requirement found in § 178.71(d)(2) for valves to conform to International Organization for Standardization (ISO) 10297 applies to the "pressure relief type seal" that your company plans to use in the manufacturing of fire extinguishing systems with United Nations (UN)/ISO 9809-1 cylinders containing compressed nitrogen.

The answer is no. Upon review of the information that you provided with your request, this Office agrees that the "seal" you plan to use is not a valve. Therefore, the requirement found in § 178.71(d)(2) for valves to conform to ISO 10297 is not applicable. Please note that there are not any regulations under the HMR pertaining to cylinder "seals." Furthermore, § 173.301b, paragraph (b), states that cylinders containing Division 2.2, permanent gases (e.g., nitrogen) are not required to be equipped with an "individual shutoff valve."

In addition, in a related e-mail sent to PHMSA, you ask whether the proposed UN/ISO 9809-1 cylinder designs would be in compliance with the HMR. A cylinder that is designed and manufactured in accordance with the UN/ISO 9809-1 standard, as described in §§ 178.69 through 178.71, would be in compliance with the HMR provided that the design qualification testing of the cylinder is observed by a DOT-approved Independent Inspection Agency (IIA). The IIA will also select random samples from the production lot and send them to a laboratory designated by the Associate Administrator for verification testing, as described in § 178.70(f)(4).

You may obtain additional information on the cylinder approvals process from our website at <http://www.phmsa.dot.gov/hazmat/regs/sp-a/approvals/cylinders>, or by contacting the Pressure Vessels Branch within PHMSA's Approvals and Permits Division at (202) 366-4512.

If the proposed cylinders are not in compliance with the HMR, you may need to apply for a DOT special permit to use the cylinders described in your request. To apply, you must submit an application to the Associate Administrator for Hazardous Materials Safety in conformance with the requirements prescribed in 49 CFR Part 107, Subpart B. In your application, you must provide justification that the packaging you are considering achieves a level of safety that is equal to or greater than that required under the HMR. You may obtain information on the special permit application process from our website at <http://www.phmsa.dot.gov/hazmat/regs/sp-a>, or by contacting PHMSA's Approvals and Permits Division at (202) 366-4511.

I hope this answers your inquiry. If you need additional assistance, please contact this Office again.

Sincerely,



Dirk Der Kinderen
Chief, Standards Development Branch
Standards and Rulemaking Division

Kesko
178.71
Cylinders Specifications
15-0131

Goodall, Shante CTR (PHMSA)

From: Betts, Charles (PHMSA)
Sent: Wednesday, June 24, 2015 4:35 PM
To: Hazmat Interps
Subject: FW: Interpretation of 49 CFR for UN/ISO Cylinders
Attachments: DOT Letter 6-24-2015.pdf

Please log and assign to a specialist for response.

From: Lepinski, Joshua [<mailto:jlepinski@tycoint.com>]
Sent: Wednesday, June 24, 2015 4:08 PM
To: Betts, Charles (PHMSA)
Cc: Goldapske, Brad; Walker, Adam
Subject: Interpretation of 49 CFR for UN/ISO Cylinders

Dear Charles,

I am looking for an interpretation of 49 CFR, in order to determine if a proposed new UN/ISO cylinder design will be compliant with DOT regulations. The attachment describes the concerns and provides support information.

For a little bit of history, on 6-15-'15 we placed a call with the Title 49 Hazardous Materials Information Center and talked with Eileen. She provided the contact information for Mr. Mark Toughiry, and we conducted a conference call with him on 6-16-'15. As the result of this call with Mr. Toughiry, he felt the proposed design would be compliant. We asked to receive this in writing, for documenting purposes of our project files. Mr. Toughiry provided your contact information, and stated to work with you to receive the written statement.

Thank you for your assistance in this matter.

Best Regards,

Josh Lepinski / Research & Development Mechanical Engineer / Tyco Fire Protection Products
Marinette, WI 54143, USA
Tel: +1-715-735-7411 ext. 73739

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Date: June 24, 2015

PHMSA Office of Hazardous Materials Safety
Attn: PHH-10, US Dept. of Transportation
East Building, 1200 New Jersey Avenue, SE.
Washington, DC 20590-0001

Subject: Interpretation of 49 CFR 178.71

Dear Charles Betts,

I, on behalf of Tyco, would like to have an interpretation on the subject par 178.71(d) of 49 CFR. We are evaluating the possibility of sourcing two different UN/ISO 9809-1 cylinders for Restaurant and Vehicle fire extinguishing systems, and filling the cylinders with Nitrogen in Marinette, WI USA. The filled cylinders could then be shipped throughout the world. My plan is to use a non-refillable, pressure relief type seal on the cylinder. The seals are pierced by an external mechanical device to begin operation of the system. The cylinders are refillable once the seal is replaced. I would like to propose that this seal type would not qualify as a valve, and therefore not need to conform to ISO 10297. Please provide your interpretation on the proposed seal type and if it would need to conform to ISO 10297 when used on the UN/ISO 9809-1 cylinder. Attached are cylinder and system information for your review.

Our goal is to be certain of DOT compliance when transporting the proposed pressurized cylinders out of Marinette, WI before we begin such an endeavor.

As a side note, we have been using the same seal design on DOT 3AA cylinders for many years and it has proven to be very safe and reliable.

Please let me know if you need any additional information.

Thank you for your assistance.

Sincerely,

Josh Lepinski
Office: 715-735-7411 x73739
Email: jlepinski@tycoint.com
Research & Development Engineer
TYCO FIRE PROTECTION PRODUCTS

Cylinder #1 Design

Technical requirements

- Application standard: ISO 9809-1
- Filling contents: compressed gases or liquefied gases
- Environmental climate: -50°C to 65°C
- Material: 30CrMo

Chemical Composition	C	Mn	Si	Cr	Mo	S	P	S+P	V+Nb+Ti+B+Zr
	0.27-0.34	0.40-0.70	0.17-0.35	0.80-1.10	0.15-0.25	≤0.010	≤0.020	≤0.025	≤0.15

- Heat treatment: Quenched and Tempered
- Hydraulic test pressure: 240bar
- Working pressure: 160bar
- Mechanical properties:

Tensile strength	Yield strength	Elongation	Impact value(longitudinal)	Hardness
780MPa(Rm)≤950MPa	Rea≥660MPa	A≥14%		193±B-310±B

- Specification

Specification	Value
Volumetric (water) capacity (l)	1.62
Length	±10(mm)
Tare weight approx.	4kg
Part No.	A

- Spun-tube cylinder
- Out-of-roundness shall not exceed 2% of the mean of the same cross-section diameters
- The maximum deviation of the cylindrical part of the shell from a straight line shall not exceed 3 mm/m length
- The deviation from vertical shall not exceed 10 mm/m length
- The minimum burst pressure shall be 1.6 times the test pressure

NOTE: a. Where there is a risk of hydrogen embrittlement(see ISO1114-1), the Max. Rm shall be 880MPa or, where the ratio Rea/Rm≤0.9, be 950 MPa

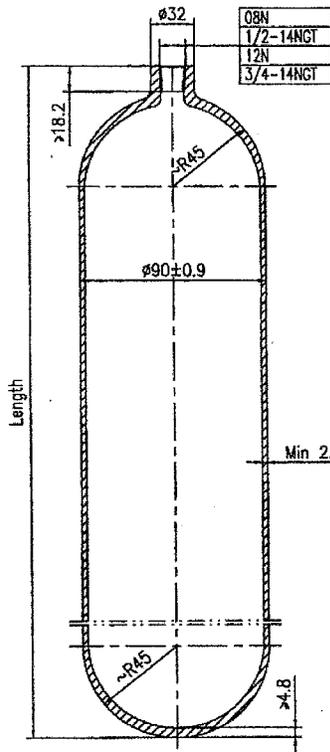
REV.	2								
NO	INDEX	IGN	DATE	GAS CYLINDER			UNISO108-CrMo-000		
							QUANTITY	WEIGHT	SCALE

Note: the min. size of the "UN" mark is 5mm, the min. size of the rest marks is 2.5mm
 Cylinder for gases with hydrogen embrittlement as specified in ISO 1114-1 shall be stamp-marked with the letter "H" before stamp for NDT.

Marking of UNISO drawing No.

Cylinder #2 Design

Technical requirements



- Application standard: ISO 9809-1
- Filling contents: compressed gases or liquefied gases
- Environmental climate: -50°C to 65°C
- Material: 30CrMo

Chemical Composition %	C	Mn	Si	Cr	Mo	S	P	S+P	V+Nb+Ti+B+Zr
	0.27-0.34	0.40-0.70	0.17-0.35	0.80-1.10	0.15-0.25	≤0.010	≤0.020	≤0.025	≤0.15

- Heat treatment: Quenched and Tempered
- Hydraulic test pressure: 207bar(3003PSI)
- Working pressure: 138bar(2002PSI)

Tensile strength	Yield strength	Elongation	Impact value(longitudinal)	Hardness
780MPa<Rm<950MPa	Re<660MPa	A>14%		193HB-310HB

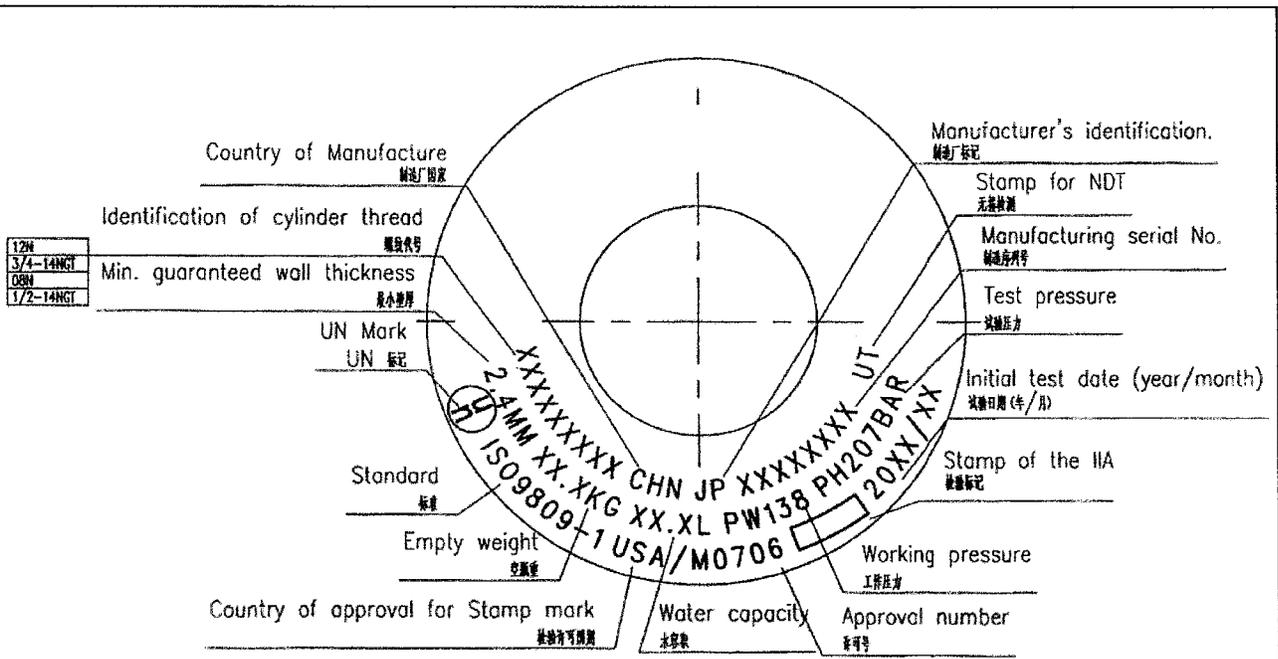
Specification	Volumetric (water) capacity (L)	Length	Tare weight approx. (kg)	Part No.
	1.78	±10(mm)	400	A

- Spun-tube cylinder
- Out-of-roundness shall not exceed 2% of the mean of the same cross-section diameters
- The maximum deviation of the cylindrical part of the shell from a straight line shall not exceed 3 mm/m length
- The minimum burst pressure shall be 331.2bar(4804PSI)

NOTE: a. Where there is a risk of hydrogen embrittlement(see ISO11114-1), the Max. Rm shall be 880MPa or, where the ratio Re/ Rm<0.9, be 950 MPa

REV.	0							

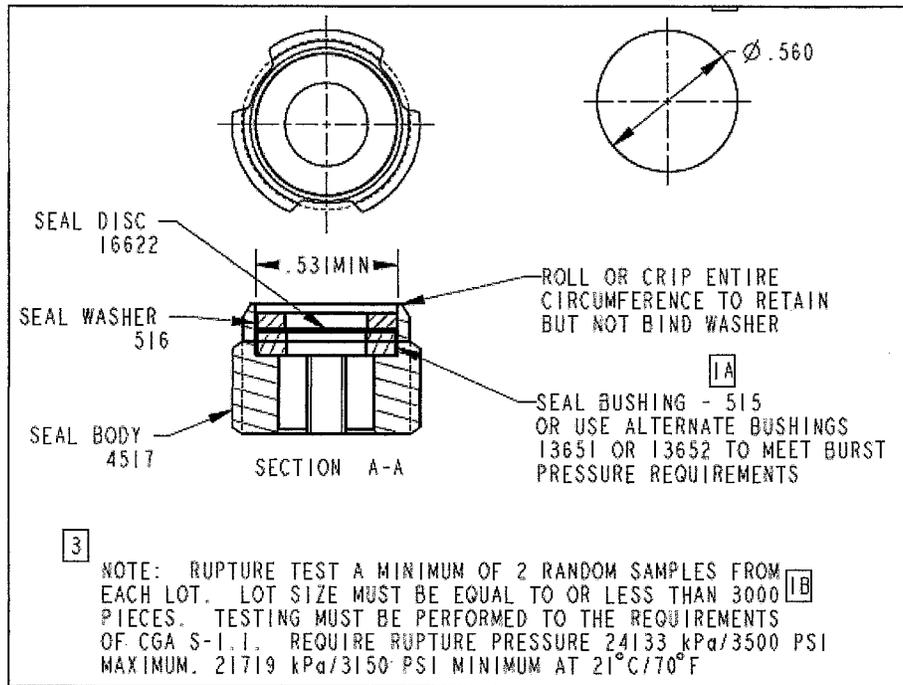
GAS CYLINDER		UNISO90-CrMo-000	
QUANTITY	WEIGHT	SCALE	



Note: The min. size of the "UN" mark is 5mm, the min. size of the rest marks is 2.5mm
Cylinder for gases with hydrogen embrittlement as specified in ISO 11114-1 shall be stamp-marked with the letter "H" before stamp for NDT.

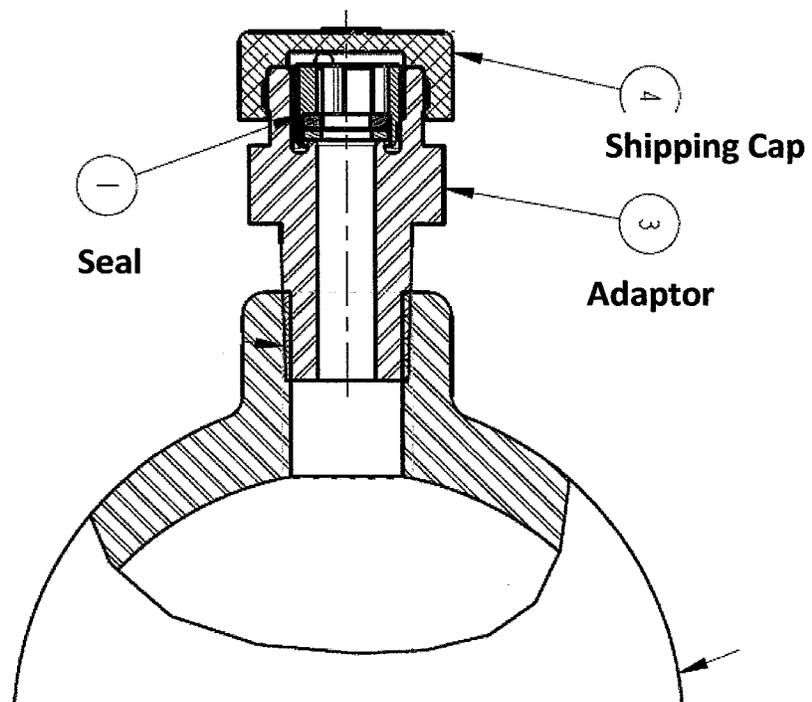
Marking of UNISO drawing No.

Seal Design



Sample Cylinder with Seal Installed

Cross-Section Design View



R-102 Restaurant Fire Suppression Systems

Features

- Low pH Agent
- Proven Design
- Reliable Gas Cartridge Operation
- Aesthetically Appealing
- UL Listed – Meets Requirements of UL 300
- ULC Listed – Meets Requirements of ULC/ORD-C1254.6
- CE Marked

Application

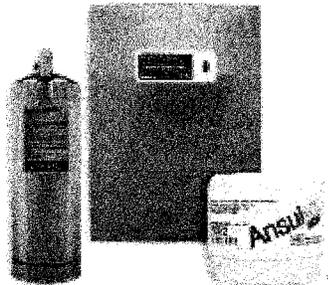
The ANSUL® R-102 Restaurant Fire Suppression System is an automatic, pre-engineered, fire suppression system designed to protect areas associated with ventilating equipment including hoods, ducts, plenums, and filters. The system also protects auxiliary grease extraction equipment and cooking equipment such as fryers; griddles and range tops; upright, natural charcoal, or chain-type broilers; electric, lava rock, mesquite, or gas-radiant char-broilers; and woks.

The system is ideally suitable for use in restaurants, hospitals, nursing homes, hotels, schools, airports, and other similar facilities.

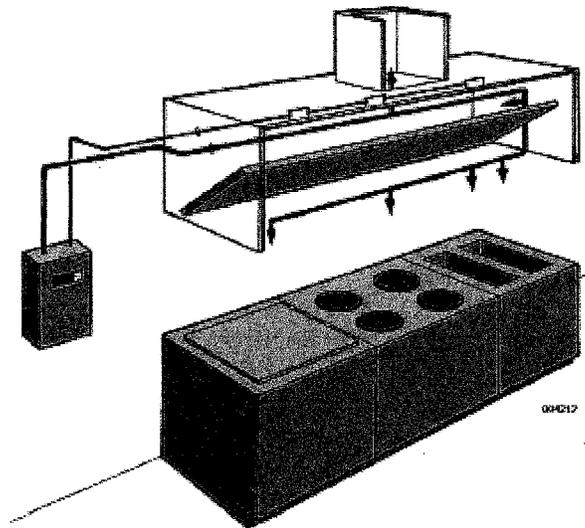
Use of the R-102 system is limited to indoor applications or locations that provide weatherproof protection within tested temperature limitations. The regulated release and tank assemblies must be mounted in an area where the air temperature will not fall below 32 °F (0 °C) or exceed 130 °F (54 °C). The system must be designed and installed within the guidelines of the UL/ULC Listed Design, Installation, Recharge, and Maintenance Manual.

System Description

The restaurant fire suppression system is a pre-engineered, wet chemical, cartridge-operated, regulated pressure type with a fixed nozzle agent distribution network. It is listed with Underwriters Laboratories, Inc. (UL/ULC).



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The system is capable of automatic detection and actuation as well as remote manual actuation. Additional equipment is available for building fire alarm panel connections, electrical shutdown and/or interface, and mechanical or electrical gas line shut-off applications.

The detection portion of the fire suppression system allows for automatic detection by means of specific temperature-rated alloy type fusible links, which separate when the temperature exceeds the rating of the link, allowing the regulated release to actuate.

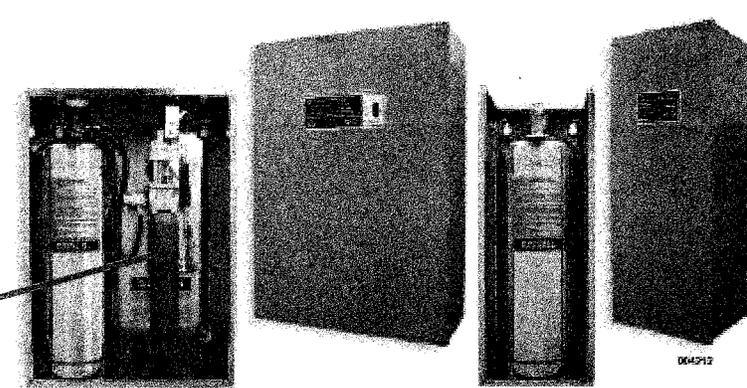
A system owner's guide is available containing basic information pertaining to system operation and maintenance. A detailed technical manual, including system description, design, installation, recharge and resetting instructions, and maintenance procedures, is available to qualified individuals.

The system is installed and serviced by authorized distributors that are trained by the manufacturer.

The basic system consists of an AUTOMAN regulated release assembly which includes a regulated release mechanism and a wet chemical storage tank housed within a single enclosure. Nozzles with blow-off caps, detectors, cartridges, agent, fusible links, and pulley elbows are supplied in separate packages in the quantities needed for fire suppression system arrangements.

Additional equipment includes a remote manual pull station(s), mechanical and electrical gas valves, and electrical switches for automatic equipment and gas line shut-off. Accessories can be added such as alarms, warning lights, etc., to installations where required.

Additional tanks and corresponding equipment can be used in multiple arrangements to allow for larger hazard coverage. Each tank is limited to a listed maximum amount of flow numbers.



Cylinder is used here

Component Description

Wet Chemical Agent – The extinguishing agent is a mixture of organic salts designed for rapid flame knockdown and foam securement of grease related fires. It is available in plastic containers with instructions for wet chemical handling and usage.

Agent Tank – The agent tank is installed in a stainless steel enclosure or wall bracket. The tank is constructed of stainless steel.

Tanks are available in two sizes: 1.5 gallon (5.7 L) and 3.0 gallon (11.4 L). The tanks have a working pressure of 110 psi (7.6 bar), a test pressure of 330 psi (22.8 bar), and a minimum burst pressure of 660 psi (45.5 bar).

The tank includes an adaptor/tube assembly. The adaptor assembly includes a chrome-plated steel adaptor with a 1/4 in. NPT female gas inlet, a 3/8 in. NPT female agent outlet, and a stainless steel agent pick-up tube. The adaptor also contains a bursting disc seal which helps to prevent the siphoning of agent up the pipe during extreme temperature variations.

Regulated Release Mechanism – The regulated release mechanism is a spring-loaded, mechanical/pneumatic type capable of providing the expellant gas supply to one, two, or three agent tanks depending on the capacity of the gas cartridge used. It contains a factory installed regulator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities by a fusible link detection system and remote manual actuation by a mechanical pull station.

The regulated release mechanism contains a release assembly, regulator, expellant gas hose, and agent storage tank housed in a stainless steel enclosure with cover. The enclosure contains knock-outs for 1/2 in. conduit. The cover contains an opening for a visual status indicator.

It is compatible with mechanical gas shut-off devices; or, when equipped with a field or factory-installed switch and manual reset relay, it is compatible with electric gas line or appliance shut-off devices.

Regulated Actuator Assembly – When more than two agent tanks (or three 3.0 gallon (11.4 L) tanks in certain applications) are required, the regulated actuator is available to provide expellant gas for additional tanks. It is connected to the cartridge receiver outlet of the regulated release mechanism providing simultaneous agent discharge. It contains a regulated actuator deadset at 110 psi (7.6 bar) with an external relief of approximately 180 psi (12.4 bar). It has automatic actuation capabilities using pressure from the regulated release mechanism cartridge.

The regulated actuator assembly contains an actuator, regulator, expellant gas hose, and agent tank housed in a stainless steel enclosure with cover. The enclosure contains knockouts to permit installation of the expellant gas line.

Discharge Nozzles – Each discharge nozzle is tested and listed with the R-102 system for a specific application. Nozzle tips are stamped with the flow number designation (1/2, 1, 2, or 3). Each nozzle must have a metal or rubber blow-off cap to keep the nozzle tip orifice free of cooking grease build-up.

Agent Distribution Hose – Kitchen appliances manufactured with or resting on casters (wheels/rollers) may include an agent distribution hose as a component of the suppression system. This allows the appliance to be moved for cleaning purposes without disconnecting the appliance fire suppression protection. The hose assembly includes a restraining cable kit to limit the appliance movement within the range (length) of the flexible hose.

Flexible Conduit – Flexible conduit allows for quicker installations and the convenience of being able to route the cable over, under and around obstacles. Flexible conduit can be used as a substitute for standard EMT conduit or can be used with EMT conduit.

Flexible conduit can be used only with the Molded Remote Manual Pull Station.

Pull Station Assembly – The remote manual pull station is made out of a molded red composite material. The red color makes the pull station more readily identifiable as the manual means for fire suppression system operation.

The pull station is compatible with the ANSUL Flexible Conduit.

Approvals

- UL/LC Listed
- CE Marked
- New York City Department of Buildings
- LPCB
- TFRI
- Marine Equipment Directive (MED)
- DNV
- ABS
- Lloyd's Register
- Meets requirements of NFPA 96 (Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment)
- Meets requirements of NFPA 17A (Standard on Wet Chemical Extinguishing Systems)

Ordering Information

Order all system components through your local authorized ANSUL Distributor.