

## INERGEN® 150-Bar Fire Suppression System

### Environmental Impact

INERGEN® agent is a mixture of three naturally occurring gases: nitrogen, argon, and carbon dioxide. As INERGEN® agent is derived from gases present in the earth's atmosphere, it exhibits no ozone depleting potential, does not contribute to global warming, nor does it contribute unique chemical species with extended atmospheric lifetimes. Because INERGEN® agent is composed of atmospheric gases, it does not pose the problems of toxicity associated with the chemically derived Halon alternative agents.

### Description

The INERGEN® Fire Suppression System, manufactured by Johnson Controls, is an engineered clean-agent system utilizing a fixed nozzle agent distribution network. The system is designed and installed in accordance with the National Fire Protection Association (NFPA) Standard 2001, *Clean Agent Fire Extinguishing Systems*. When properly designed, the INERGEN® system will suppress surface burning fire in Class A, B, and C hazards by lowering the oxygen content below the level that supports combustion.

INERGEN® agent has also been tested by Factory Mutual (FM) for inerting capabilities. Those tests have shown that INERGEN® agent, at design concentrations between 40% and 50%, has successfully inerted mixtures of propane/air, and methane/air.

The system can be actuated by detection and control equipment for automatic system operation along with providing local and remote manual operation as needed. Accessories are used to provide alarms, ventilation control, door closures, or other auxiliary shutdown or functions.

When INERGEN® agent is discharged into a room, it introduces the proper mixture of gases that will allow a person to breathe in a reduced oxygen atmosphere.

A system installation and maintenance manual is available containing information on system components and procedures concerning design, operation, inspection, maintenance, and recharge.

The system is installed and serviced by Authorized ANSUL® Distributors that are trained by the manufacturer.

**Basic Use** – The INERGEN® system is particularly useful for suppressing fires in hazards where an electrically non-conductive medium is essential or desirable; where clean-up of other agents presents a problem; or where the hazard is normally occupied and requires a non-toxic agent.

The following are typical hazards protected by INERGEN® systems:

- Computer rooms
- Subfloors
- Tape storage
- Telecommunication/Switchgear
- Museums
- Libraries
- Normally occupied or unoccupied electronic areas where equipment is either very sensitive or irreplaceable

**Composition and Materials** – The basic system consists of suppressing agent stored in high strength alloy steel containers. Various types of actuators, either manual or automatic, are available for release of the agent into the hazard area. The agent is distributed and discharged into the hazard area through a network of piping and nozzles. Each nozzle is drilled with a fixed orifice designed to deliver a uniform discharge to the protected area. On large hazards, where three or more containers are required, a threaded or welded pipe manifold assembly is employed. The container(s) is connected to the distribution piping or the manifold by means of a flexible discharge bend and check valve assembly.

**Additional equipment includes** – Control panels, releasing devices, remote manual pull stations, corner pulleys, door closures, pressure trips, bells and alarms, and pneumatic switches. All or some are required when designing a total system.

**INERGEN® Agent** – INERGEN® agent is a mixture of three inerting (oxygen diluting) gases: 52% nitrogen, 40% argon, and 8% carbon dioxide. INERGEN® gas suppresses fire by lowering the oxygen content below the level that supports combustion. When INERGEN® agent is discharged into a room, it introduces the proper mixture of gases that still allow a person to breathe in a reduced oxygen atmosphere. It actually enhances the body's ability to assimilate oxygen. The normal atmosphere in a room contains 21% oxygen and less than 1% carbon dioxide. If the oxygen content is reduced below 15%, most ordinary combustibles will cease to burn. INERGEN® agent will reduce the oxygen content to approximately 12.5% while increasing the carbon dioxide content to about 3%. The increase in the carbon dioxide content increases a person's respiration rate and the body's ability to absorb oxygen. Simply stated, the human body is stimulated by the carbon dioxide to breathe more deeply and rapidly to compensate for the lower oxygen content of the atmosphere.

**Containers** – The containers are constructed, tested, and marked in accordance with applicable Dept. of Transportation (DOT) and the U.S. Bureau of Explosives specifications. As a minimum, the containers must meet the requirements of DOT 3AA2300, or 3AA2015+, or ISO 9089-1.

## Description (Continued)

**Container Assembly** – The container assembly is of steel construction with a red standard finish. Four sizes are available to meet specific needs. Each is equipped with a pressure seat-type valve equipped with gauge. The valve is constructed of forged brass and is attached to the container providing a leak tight seal. The valve also includes a safety pressure relief device which provides relief at 2900 to 3300 psi (200 to 228 bar) per CGA test method. Container charging pressure is 2175 psi at 70 °F (150 bar at 21 °C). The containers are shipped with a maintenance record card and shipping cap attached. The cap is attached to the threaded collar on the neck of each container to protect the valve while in transit. The container serial number and date of manufacture are stamped near the neck of each container.

**Electric Actuator** – Electric actuation of an agent container is accomplished by an electric actuator interfaced through an AUTOPULSE Control System. This actuator can be used in hazardous environments where the ambient temperature range is between 32 °F and 130 °F (0 °C and 54 °C). In auxiliary or override applications, a manual lever actuator can be installed on top of the actuator.

**Manual or Pneumatic Actuators** – Manual or pneumatic actuators are available for lever actuation on the container valve. Manual actuation is accomplished by pulling the hand lever on the actuator.

**Selector Valves** – Selector valves are used to direct the flow of INERGEN® agent into a single hazard or a multiple hazard system.

**Detection System** – The AUTOPULSE Control System is used where an automatic electronic control system is required to actuate the INERGEN® system. This control system is used to control a single fixed fire suppression or alarm system based on inputs received from fire detection devices. The detection circuits can be configured using cross, counting, independent or priority-zone (counting) concepts. The control system has been tested to the applicable FCC Rules and Regulations for Class A Computing devices.

**Nozzles** – Nozzles are designed to direct the discharge of INERGEN® agent using the stored pressure from the containers. Nozzles are available in either 360° or 180° discharge patterns. The system design specifies the nozzle and orifice size to be used for proper flow rate and distribution pattern. The nozzle selection depends on the hazard and location to be protected.

**Pressure Reducer** – The pressure reducer is required in the distribution piping to restrict the flow of INERGEN® agent, thus reducing the agent pressure down stream of the reducer. The pressure reducer contains a stainless steel orifice plate which is drilled to the specific size hole required based on the hydraulic calculation. The orifice plate provides readily visible orifice identification. The pressure reducer is available in nine sizes: 1/2 in., 3/4 in., 1 in., 1 1/4 in., 1 1/2 in., 2 in., 2 1/2 in., 3 in., and 4 in. NPT.

## Product Description

**Pipe and Fittings** – The system manifold must be constructed of Schedule 80 or 160 piping and 2000 or 3000 psi iron fittings, threaded or welded. The distribution piping down stream from the orifice union must be constructed of a minimum of Schedule 40 piping with class 300 malleable iron threaded fittings or welded steel fittings. All piping must be black iron of the following type and grade: ASTM A-53 seamless or electric resistance welded, grade A or B, or ASTM A-106 grade A, B, or C. Do not use ASTM A-120, ASTM A-53 type F or ordinary cast iron pipe or fittings.

**Limitations** – The INERGEN® system must be designed and installed within the guidelines of the manufacturer's design, installation, operation, inspection, recharge, and maintenance manual. The ambient temperature limitations are 32 °F to 130 °F (0 °C to 54 °C). All AUTOPULSE Control Systems are designed for indoor applications and for temperature ranges between 32 °F and 120 °F (0 °C and 49 °C).

## Technical Data

**Applicable Standards:** The INERGEN® system complies with NFPA Standard 2001, *Standard for Clean Agent Fire Extinguishing Systems*, and EPA Program SNAP, Significant New Alternate Policy.

The INERGEN® System is listed by Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC), and is approved by Factory Mutual (FM).

INERGEN® Agent is listed by Underwriters Laboratories, Inc. (UL) and Underwriters Laboratories of Canada (ULC), and is approved by Factory Mutual (FM).

## Installations

All system components and accessories must be installed by personnel trained by the manufacturer. All installations must be performed according to the guidelines stated in the manufacturer's design, installation, operation, inspection, recharge, and maintenance manual.

## Availability and Cost

**Availability** – INERGEN® Systems are sold and serviced through a network of independent distributors located in most states and many foreign countries.

**Cost** – Cost varies with type of system specified, size, and design.

## Maintenance

Maintenance is a vital step in the performance of a fire suppression system. As such, it must be performed by an Authorized ANSUL® Distributor in accordance with NFPA 2001 and the manufacturer's design, installation, recharge, and maintenance manual. When replacing components on the ANSUL® system, use only ANSUL® approved parts.

Safety Data Sheets (SDS) are available at [www.ansul.com](http://www.ansul.com)

**Note:** The converted values in this document are provided for dimensional reference only and do not reflect an actual measurement.

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