



A Tyco International Company

# INERGEN 200-BAR FIRE SUPPRESSION SYSTEM

## Data/Specifications

### 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 Tyco, 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 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 extinguishing agent stored in high strength alloy steel cylinders. 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 cylinders are required, a threaded or welded pipe manifold assembly is employed. The cylinder(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 extinguishes 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.

**Cylinders** – The cylinders are constructed, tested, and marked in accordance with applicable Department of Transportation (DOT) specifications. As a minimum, the cylinders must meet the requirements of DOT 3AA3000.

**Cylinder Assembly** – The cylinder assembly is of steel construction with a red standard finish. One size is available. Each cylinder is equipped with a pressure seat-type valve equipped with gauge. The valve is constructed of forged brass and is attached to the cylinder providing a leak tight seal. The valve also includes a safety pressure relief device which provides relief at 4000-4480 psi (276-309 bar) per CGA test method. Cylinder charging pressure is 2900 psi at 70 °F (200 bar at 21 °C). The cylinders are shipped with a maintenance record card and shipping cap attached. The cap is attached to the threaded collar on the neck of each cylinder to protect the valve while in transit. The cylinder serial number and date of manufacture are stamped near the neck of each cylinder.

**Electric Actuator** – Electric actuation of an agent cylinder 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** – Three types of manual actuators are available for lever actuation on the cylinder 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 cylinders. 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.

## DESCRIPTION

**Pipe and Fittings** – System manifold piping must be constructed to withstand a minimum pressure of 3000 psi (206.9 bar). Distribution piping downstream from the orifice union must be constructed to withstand the maximum downstream pressure as determined by the flow calculation.

**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 many 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.