

# INERGEN® FIRE SUPPRESSION SYSTEMS DATA SHEET

# SYSTEM SPECIFICATIONS

## PRODUCT NAME

INERGEN® 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.

## PRODUCT DESCRIPTION

The INERGEN Fire Suppression System, manufactured by Ansul, is an engineered 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 extinguish 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 FMRC 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 present 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
- Vaults
- Process equipment
- All 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 screwed 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 4%. 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 Dept. of Transportation (DOT) and the U.S. Bureau of Explosives specifications. As a minimum, the cylinders must meet the requirements of DOT 3AA2300 or 3AA2015+.

**Cylinder Assembly** – The cylinder 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 cylinder providing a leak tight seal. The valve also includes a safety pressure relief device which provides relief at 2900-3300 psi (20685-23167 kPa) per CGA test method. Cylinder charging pressure is 2175 psi at 70 °F (14997 kPa 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** – Two types of manual/pneumatic actuators are available for lever actuation on the cylinder valve. Manual actuation is accomplished by pulling the hand lever on the actuator. The lever design contains a forged mechanical detent which secures the lever in the open position when actuated.

**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. Ten sizes of nozzles are available. 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.

**Pipe and Fittings** – The system manifold must be constructed of Schedule 80 or 160 piping and class 2000 or 3000 lb. 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.

Agent is listed and approved by Underwriters Laboratories, Inc. (UL) and Factory Mutual Research Corporation (FMRC).

## 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.

## PRODUCT WARRANTY

**Warranty** – The components of the fire suppression system supplied by Ansul Inc. ("Ansul") are warranted to you as the original purchaser for one year from the date of delivery against defects in workmanship and material. Ansul will replace or repair any Ansul supplied components, which, in its opinion, are defective and have not been tampered with or subjected to misuse, abuse, or exposed to highly corrosive conditions provided that written notice of the alleged defect shall have been given to Ansul within 30 days after discovery thereof and prior to the expiration of one year after delivery, and further provided that if Ansul so instructs, such article or part thereof is promptly returned to Ansul with shipping charges prepaid.

### Disclaimer of Warranty and Limitation of Damage

– The warranty described above is the only one given by Ansul concerning this system. ANSUL MAKES NO OTHER WARRANTIES OF ANY KIND, WHETHER EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE. ANSUL'S MAXIMUM RESPONSIBILITY FOR ANY CLAIMS WHETHER IN CONTRACT, TORT, NEGLIGENCE, BREACH OF WARRANTY, OR STRICT LIABILITY SHALL BE LIMITED TO THE PURCHASE PRICE OF THE SYSTEM. UNDER NO CIRCUMSTANCES SHALL ANSUL BE RESPONSIBLE FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES OF ANY KIND. Ansul does not assume or authorize any other person to assume for it any additional liability in connection with the sale of this system.

For repairs, parts, and service of the Ansul fire suppression system, contact a local Ansul representative, or Ansul Incorporated, Marinette, WI 54143-2542, 800-TO-ANSUL (862-6785).

## FALSE DISCHARGE WARRANTY

Subject to the conditions set forth below, Ansul will, as purchaser's sole remedy, replace INERGEN gas and pay reasonable costs to recharge the INERGEN/Detection and Control System where, in Ansul's opinion, the discharge has occurred due to a defect in the material or workmanship of the products provided by Ansul. This warranty is extended only to the original purchaser of the INERGEN/Detection and Control System and only for a period of one year from the date of installation of the INERGEN/Detection and Control System.

Ansul will only replace INERGEN gas and pay reasonable costs to recharge the INERGEN/Detection and Control System where the discharge occurs due to a defect in the material or workmanship of the products provided by Ansul. For example, Ansul will not be responsible for discharges due to faulty maintenance or installation or service, intentional acts by the owner or third parties, or circumstances over which Ansul has no control. Ansul will not be responsible for discharges of the INERGEN/Detection and Control System which occur if the INERGEN/Detection and Control System, as initially installed, has been altered or modified.

This warranty shall be effective only if the original purchaser maintains a semi-annual service agreement for the INERGEN/ Detection and Control System with an Authorized Ansul Distributor from the date of installation. This warranty covers only those INERGEN/Detection and Control Systems purchased from Ansul or its Authorized Distributors and only those INERGEN/ Detection and Control Systems which incorporate and use only hardware and components, including detection and control devices manufactured, sold, or approved by Ansul. This warranty may not be assigned or transferred to others.

Ansul Product Services Department must be notified within three days of the discharge of the INERGEN/Detection and Control System and must approve the cost of INERGEN gas and recharge service in advance.

Except as provided above, ANSUL MAKES NO WARRANTIES OF ANY KIND, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, UNDER NO CIRCUMSTANCE SHALL ANSUL HAVE ANY LIABILITY FOR CONSEQUENTIAL, INCIDENTAL, SPECIAL OR SIMILAR DAMAGES. ANSUL SHALL HAVE NO LIABILITY FOR ANY DAMAGES DUE TO DELAY IN RECHARGING THE "INERGEN"/DETECTION AND CONTROL SYSTEM. ANSUL'S MAXIMUM LIABILITY FOR DIRECT DAMAGES IS LIMITED TO THE REPLACEMENT OF INERGEN GAS AND REASONABLE COSTS TO RECHARGE THE "INERGEN"/DETECTION AND CONTROL SYSTEM.

This warranty is not effective unless Ansul Form No. F-9346 is completed and returned to Ansul within 10 days of the commissioning of the INERGEN/Detection and Control System.

## 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.

## TECHNICAL SERVICES

For information on the proper design and installation, contact a local authorized INERGEN System distributor. The Ansul applications engineering department is also available to answer design and installation questions. Call 800-TO-ANSUL (862-6785).

ANSUL, AUTOPULSE and INERGEN are registered trademarks.

# INERGEN® FIRE SUPPRESSION SYSTEMS DATA SHEET

# EXTINGUISHING AGENT

## APPLICATION

INERGEN® extinguishing agent used in Ansul engineered systems is particularly useful for hazards where an electrical, non-conductive medium is essential or desirable; where clean-up of other agents presents a problem; where hazard obstructions require the use of a gaseous agent; 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
- Telecommunications/Switchgear
- Vaults
- Process equipment
- All normally occupied or unoccupied areas where electronic equipment is either very sensitive or irreplaceable

## 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

INERGEN agent is a plentiful, non-corrosive gas that does not support combustion nor react with most substances. INERGEN agent contains only naturally-occurring gases which have no impact on the ozone or the environment in general. INERGEN agent is a mixture of three inerting (oxygen diluting) gases: 52% nitrogen, 40% argon, and 8% carbon dioxide. INERGEN agent 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 approximately 21% oxygen and less than 1% carbon dioxide. If the oxygen content is reduced below 15%, most ordinary combustibles will not burn. INERGEN agent will reduce the oxygen content to approximately 12.5% while increasing the carbon dioxide content to about 4%. 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.

## PERFORMANCE

INERGEN is an effective fire extinguishing agent that can be used on many types of fires. INERGEN extinguishing system units are designed for total flooding protection against Class A surface burning, Class B flammable liquid, and Class C fires occurring within an enclosure by lowering the oxygen content below the level that supports combustion.

INERGEN agent has been tested by FMRC 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.

## PHYSICAL PROPERTIES OF INERGEN

Specific gravity  
0.085 lbs./cu. ft. (1.36 kg/m<sup>3</sup>)

Vapor pressure  
1925 psi @ 32 °F (132.7 bar @ 0 °C)  
2175 psi @ 70 °F (149.9 bar @ 21 °C)  
2575 psi @ 130 °F (177.5 bar @ 54 °C)

Vapor density  
1.1 (Air = 1)

Approximate molecular weight  
34

## ORDERING INFORMATION

INERGEN filled cylinders for use in engineered systems may be ordered in sizes of 200, 250, 350, 425, and 435 cu. ft. (5.7, 7.1, 9.9, 12.0, and 12.3 cu. m.).

## APPROVAL

INERGEN agent complies with the NFPA Standard 2001, Standard for Clean Agent Fire Extinguishing Systems and EPA Program SNAP, Significant New Alternate Policy.

Agent is listed and approved by Underwriters Laboratories, Inc. (UL) and Factory Mutual Research Corporation (FMRC).

Containers meet the applicable Department of Transportation (DOT) specifications.

ANSUL and INERGEN are registered trademarks.