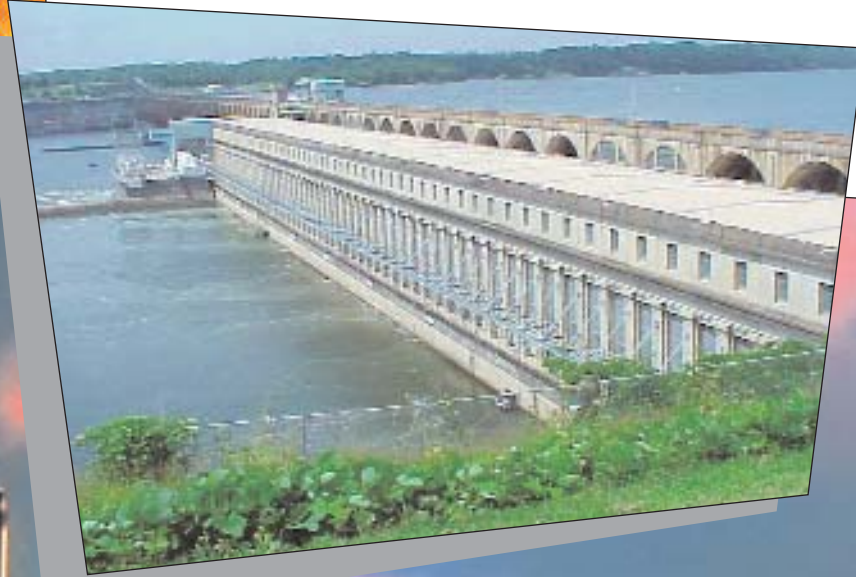


Protecting the World's Power Generation Facilities



- ◆ **INERGEN® Fire Suppression Systems**
- ◆ **AUTOPULSE® Detection and Control Equipment**
- ◆ **CLEANGUARD® Hand Portable Fire Extinguishers**



Fire delays at power generation facilities can mean loss of time, money and sometimes human life.

The potentially devastating effects of fire in a power generation facility can never be underestimated. Not only is the business itself in danger, but interruptions in power mean customer complaints, project delays and sometimes medical emergencies. The automated world we live in leaves few corners of the globe untouched when the lights go out. The potential widespread impact and the high initial cost of power generation equipment make fire protection a vital part of any power facility protection plan.

The Ansul solution

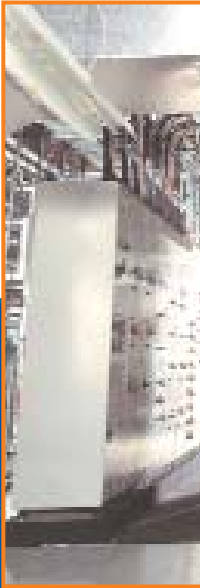
- ◆ INERGEN® Fire Suppression Systems are installed in numerous power generation facilities worldwide. Fires successfully extinguished with INERGEN systems often cause no business or service interruption.
- ◆ INERGEN agent cannot threaten delicate electronic hardware because it does not break down to form acidic gases. INERGEN agent does not produce a significant temperature drop in the protected space upon discharge. It does not produce a dense fog that could collect on hardware or impede evacuation.
- ◆ Early warning fire detectors are connected to an AUTOPULSE® Control Unit. The programmable detection system provides advanced warning, detection, alarm, equipment shut-down and system release functions.
- ◆ Because it is nearly the same density as air, INERGEN agent will maintain its extinguishing concentration for extended periods.
- ◆ The use of selector valves significantly reduces the installed cost of an INERGEN system. Because INERGEN agent is stored and flows as a gas, it can be discharged at significant distances. Agent storage cylinders can be located away from the area they are intended to protect.
- ◆ INERGEN systems come with a long list of built-in features, innovative design, precision manufacturing, exhaustive testing, plus an EVERGREEN Warranty to cover the agent cost whenever the system is discharged.
- ◆ Ansul recommends the installation of CLEANGUARD™ portable fire extinguishers in power generation facilities. These "clean agent" portables meet or exceed the standards set forth by the authority having jurisdiction.

Systems you can depend on
INERGEN agent is the long-term solution to protect lives, property and the environment from fire. Composed of three naturally occurring gases found in the air we breathe – nitrogen, argon, and carbon dioxide – INERGEN agent spreads swiftly throughout a protected space. Fires are extinguished quickly with no residue to clean up. The ozone depletion level, global warming potential and atmospheric lifetime of INERGEN agent are all ZERO. It is listed and approved by governmental, nationally and internationally recognized testing laboratories.



**CLEANGUARD™ Hand
Portable Fire Extinguishers**

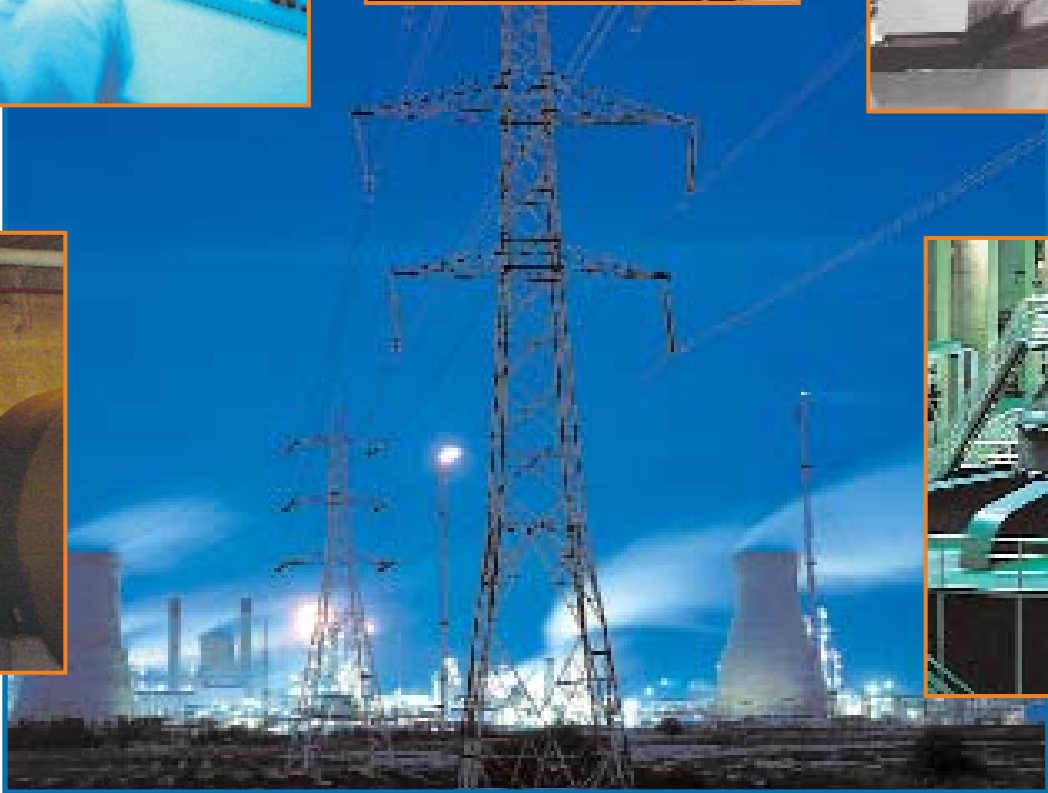
Motor Control Cent



Control Rooms



Oil Storage Rooms



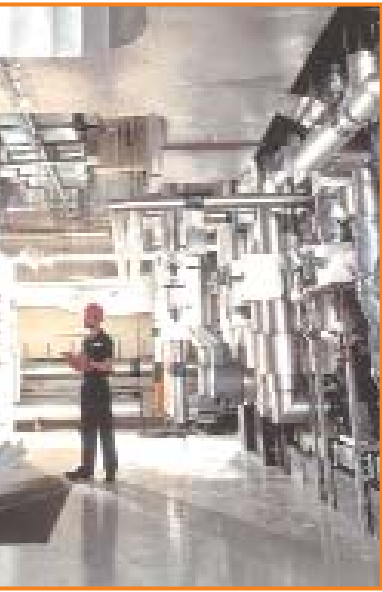
Whatever the fuel source - oil, coal, gas, nuclear or water - every power generation facility contains grave potential for Class B & C fires.



Detection and Control Equipment



AUTOPULSE® Control Units



Cable Spreading Vaults



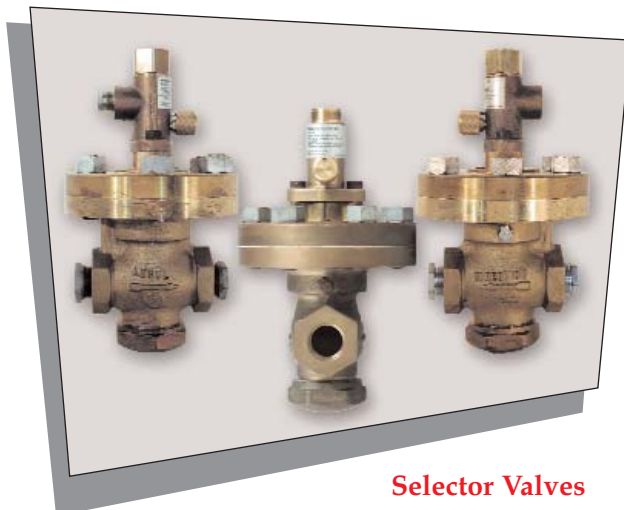
Hydroelectric Plant Generators



INERGEN agent is stored as a gas mixture in DOT approved cylinders. INERGEN cylinders can be installed either vertically or horizontally – and are available in various sizes – allowing the system design engineer to store the proper amount of agent in the fewest number of cylinders to save space and installation costs.



**Nozzles and
Manifold Orifice
Devices**



Selector Valves



Specifications

1.01 SYSTEM ARRANGEMENT

- A. The INERGEN fire suppression system shall be of the engineered fixed-nozzle type with all pertinent components provided by Ansul Incorporated.
- B. Agent storage cylinders shall be centrally located, free-standing cylinders with wall-mounted retaining brackets. Where multiple cylinders are required for the same hazard, a common manifold shall be employed.
- C. One cylinder shall be designated as the pilot cylinder and employ the electric actuator, mechanical manual actuator, or both. All remaining cylinders shall be pneumatically operated from the INERGEN agent using back pressure from the manifold.
- D. Manifold cylinders shall employ a flexible discharge hose to facilitate installation and system maintenance. Each cylinder on a manifold shall also include an agent check valve connected to the valve outlet.

1.02 FLOW CALCULATIONS

- A. Computerized verification of flow calculations shall be submitted for each INERGEN fire suppression system and include the following data as a minimum:
 - 1) Quantity of agent per nozzle.
 - 2) Manifold orifice device and nozzle orifice diameters.
 - 3) Pressure at nozzle.
 - 4) Nozzle body nominal pipe size.
 - 5) Number and size of cylinders.
 - 6) Total agent quantity.
 - 7) Pipe size and schedule per pipe section.
 - 8) Number, size and type of fitting per pipe section.
 - 9) Actual and equivalent lengths per pipe section.
 - 10) Discharge time.

2.01 PIPE MATERIAL

- A. System piping shall be of noncombustible materials having physical and chemical characteristics such that its integrity under stress can be predicted with reliability.
- B. As a minimum, piping materials shall be black steel pipe conforming to ASTM A-53A ERW or ASTM A-106A seamless.
- C. Under no conditions shall ordinary cast iron pipe, steel pipe conforming to ASTM A-120 or ASTM A-53/A-120 be used.
- D. Piping joints shall be suitable for the design conditions and shall be selected with consideration of joint tightness and mechanical strength.
- E. As a minimum, fittings beyond the manifold orifice device shall be black, 300 lb. class conforming to ANSI B-16.3. Ordinary cast iron fittings shall not be used. Distribution piping downstream of the manifold orifice device must be a minimum of Schedule 40.
- F. The system manifold up to the manifold orifice device must be constructed of a minimum Schedule 80 piping and 2000 lb. or 3000 lb. forged steel fittings.
- G. All piping shall comply with NFPA 2001: *Standard on Clean Agent Fire Extinguishing Systems*.
- H. Piping shall be installed in accordance with good commercial practice to the appropriate codes, securely supported with UL Listed hangers and arranged with close attention to the design layout since deviations may alter the design flow performance as calculated.
- I. Piping shall be bracketed within 12 in. (300 mm) of all discharge nozzles.
- J. All piping shall be reamed, blown clear and swabbed with appropriate cleaner to remove mill varnish and cutting oils before assembly.
- K. Multi-outlet fittings, other than tees, shall not be permitted.
- L. Assembly of all joints shall conform to the appropriate standards. On threaded pipe joints, TEFLON® tape shall be applied to the male threads only.

2.02 EXTINGUISHING AGENT

- A. The agent shall be INERGEN®, a trademark registered to Ansul Incorporated.

2.03 STORAGE CYLINDERS

- A. Cylinder assemblies shall be of steel construction with a red enamel paint finish. Each cylinder shall be equipped with a pressure-seat type valve and gauge. The cylinder shall utilize Ansul CV-98 forged brass valve assemblies providing a leak-tight seal at the valve-to-cylinder connection. Each valve shall include a safety pressure relief device per CGA test methods.
- B. Filling of the cylinder assembly shall be by Ansul Incorporated or an authorized INERGEN systems distributor in conjunction with a factory authorized INERGEN agent filling station.

Filling and recharge shall be performed in accordance with the manufacturer's established procedures and shall not require replacement components for normal service.

2.04 CYLINDER BRACKET

A. Each cylinder assembly shall be furnished with a welded steel bracket. The bracket shall hold the cylinders in a saddle with a front securing device. The brackets shall be modular in design to allow added bracketing or stacking of cylinders depending on installation requirements.

B. Cylinder brackets shall be UL listed and/or FM approved for use with the INERGEN system.

2.05 SELECTOR/CYLINDER VALVE ACTUATORS

A. Electric valve actuators shall be of brass construction and stackable design with swivel connections to allow removal for maintenance or testing.

B. Actuation devices shall be UL listed and/or FM approved for use with the INERGEN system.

2.06 DISCHARGE HOSE/CHECK VALVE

A. When manifolding, all cylinder assemblies shall include a flexible discharge hose and check valve for connection to the manifold inlet.

B. All hose/check valves shall be UL listed and/or FM approved for use with the Ansul CV98 valve.

2.07 DISCHARGE NOZZLES

A. Discharge nozzles shall be of two-piece construction and sized to provide flow rates in accordance with system design calculations.

B. A nozzle inlet orifice plate shall be included. A computerized, UL listed, flow calculation program shall determine the orifice size.

C. Orifice(s) shall be machined in the nozzle body to provide a horizontal discharge pattern based on the approved coverage arrangements.

D. Nozzles shall be permanently marked with the manufacturer's part number and threaded directly to the discharge piping without the use of special adapters.

E. Nozzles shall be UL listed as manufactured by Ansul Incorporated.

2.08 MANIFOLD ORIFICE DEVICE

A. An orifice device shall be included in the manifold to reduce pressure in the downstream pipe network.

B. Manifold orifice devices shall be rated at 2000 lb. Class minimum.

C. Manifold orifice devices shall be permanently marked with the manufacturer's orifice code.

D. Manifold orifice devices shall be UL listed and/or FM approved for use with the INERGEN system.

2.09 DETECTION AND CONTROL

A. The detection system shall be an AUTOPULSE control system with battery backup providing 24 hours of standby and 5 minutes in alarm.

B. Early warning smoke detectors shall be installed at no more than 250 sq. ft. (23.2 sq. m) coverage per detector with the first detector in alarm providing general alarm and the second detector in alarm starting the release sequence.

C. Manual pull operation shall provide immediate system discharge and all shutdown functions.

D. An alarm bell shall indicate first detector in alarm, a sounder/strobe shall indicate the start of the release sequence, and a strobe shall indicate system discharge.

E. The release circuit shall be compatible with the INERGEN system and selector valve actuators.

F. The detection and control system shall be UL Listed as compatible with the INERGEN system.

2.10 SYSTEM CHECKOUT AND TESTING

A. The completed installation shall be inspected by factory authorized and trained personnel. The inspection shall include a full operational test of all components per the equipment manufacturer's recommendations (including agent discharge).

B. Inspection shall be performed in the presence of the owner's representative, architect or engineer's representative, insuring authority, and/or the local authority having jurisdiction.

C. All mechanical and electrical components shall be tested according to the manufacturer's recommended procedure to verify system integrity.

D. Inspection shall include a complete checkout of the detection/control system and certification of cylinder pressure. A written report shall be filed with the owner.

E. The contractor shall provide as-built drawings (2 copies) indicating the installation details. All routing of piping, electrical conduit, and accessories shall be noted.

F. Equipment installation and maintenance manuals shall be provided in addition to the as-built drawings.

G. Prior to final acceptance, the contractor shall provide operational training to the owner's key personnel. Training shall consist of:

1) Control system operation. 2) Trouble procedures.

3) Abort procedures. 4) Emergency procedures.

5) Safety requirements. 6) Demonstration of the system (excluding INERGEN release).

H. The quantity of agent shall reflect the actual design quantity.

I. A functional test shall be completed prior to the concentration test consisting of detection, alarm, accessories related to the system, control unit and a review of the cylinders, piping, fittings, hangers and cylinder pressure.

3.01 WARRANTY

A. All INERGEN system components furnished under this contract shall be guaranteed against defects in design, material and workmanship for the full warranty time which is standard with the manufacturer and/or supplier but not less than one (1) year from the date of system acceptance. In addition, the installing contractor must guarantee the system against false actuation or leakage due to faulty equipment, design or workmanship for a period of one (1) year from final acceptance.

**For more information about Ansul
Fire Protection Systems...**

Contact your local Ansul Distributor...

Or Call:

1-800-TO-ANSUL (USA/CAN)

1-715-735-7411 (International)

www.ansul.com

tyco

Safety
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