



Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
afp - 718	14-Oct-1993	Number 6	Issue date 1-Jan-2012	31-Dec-2012

Product designation

Inergen®, controlled atmosphere fire extinguishing system

(Refer to the Schedule/enclosures for further specified details)

Agent/distributor

Tyco Fire Protection Products
Level 3, 95 Coventry Street, SOUTHBANK, VIC, AUSTRALIA, 3006

Registrant

Tyco Fire Protection Products
Level 3, 95 Coventry Street, SOUTHBANK, VIC, AUSTRALIA, 3006

Producer

Ansul Incorporated
One Stanton Street, MARINETTE, WI, UNITED STATES, 54143-2542

Conformance criteria and evaluation

The Inergen®, controlled atmosphere fire extinguishing system has been evaluated and verified as conforming with the relevant requirements of the following criteria.

1. SSL Appraisal Specification FAS-102, Version 1.0, 'Gaseous Extinguishing Systems'.

Limitations/conditions of conformance

Limitations/conditions of conformance, where identified on this certificate, are derived from qualifications from evaluation(s) for conformity and/or other related technical documentation. All details with respect to design, assembly and installation instructions and restrictions should be checked against the producer's current technical manual/data sheets and the requirements of the Authority having Jurisdiction.

Specified limitations/conditions, determined from the evaluation for conformity, include the following.

- Generally the design and installation of Inergen® Controlled Atmosphere Fire Extinguishing Systems shall only be undertaken by organisations accredited by Grinnell Controlled Atmospheres. Where the system is to be designed by organisations that have not undertaken formal training by Grinnell Controlled Atmospheres, all design criteria and documentation shall be submitted to Grinnell Controlled Atmospheres for analysis and review.

(Limitations/conditions of conformance continue)

This certification is issued within the scope of CSIRO Verification Services – Rules governing ActivFire Scheme and is valid only for the product(s) as submitted for evaluation and verification of conformity, subject to the following conditions.

- Reference to details, limitations and requirements, where documented as a schedule/enclosure with this certificate.
- The Registrant is responsible for their attestation of conformity and ensuring that on-going production complies with the conformance criteria defined in this certificate.
- This certificate will not be valid if any changes or modifications are made to the product which have not been notified and validated by CSIRO Verification Services.
- This certificate is subject to periodical re-validation upon verification that all requirements, as determined by the conformity assessment body, continue to be satisfactorily met by the Registrant.
- This certificate may only be reproduced in its published form, without modification and inclusive of all schedules/enclosures.
- Any changes, errors or omissions, must be submitted in writing and if necessary or requested, substantiated with relevant evidence.
- Any representations, such as advertising or other marketing related activities or articles shall reflect the correct contents of this certificate and conform with all relevant trade practices and consumer protection legislation and regulations.
- Any terms or conditions of use as applicable to content and documentation as published or accessed through web sites administered by the CSIRO Verification Services.

Issued by

David Whittaker
Executive Officer – ActivFire Scheme



Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
afp - 718	14-Oct-1993	Number 6	Issue date 1-Jan-2012	31-Dec-2012

Page 2 of 4

- ii. In general, people with lung disease (eg. coronary artery disease) or heart failure should not be exposed to low oxygen gas mixtures as the effect on their arterial oxygen partial pressure (PO₂) is unpredictable. Such people should therefore not be exposed to an Inergen® gas mixture for more than one (1) or two (2) minutes and should not undertake any physical exertion in such an atmosphere.
- iii. That there is no future objection to the use of Inergen® by the Commonwealth of Australia or State environmental or OH & S authorities.
- iv. That gas filling arrangements as provided by Air Liquide are fully complied with.
- v. Systems are designed, installed, commissioned and maintained in accordance with the findings of SSL Report No. XB1107/R1.
- vi. That commissioning tests, where required, must be carried out on all installations to confirm the following.
 - The concentration level of O₂ does not fall below 12%.
 - The concentration level of CO₂ does not exceed 4.5%.
 - A time delay of 20 to 30 seconds is provided to allow occupant evacuation.
 - All fire and evacuation alarms, interlocks and signage comply with the installation design standards.
- vii. Inergen® systems installed from the date of SSL Report No. XB1107/R1, are modified to bring them into line with Underwriters Laboratories and Factory Mutual Research Corporation equipment test requirements and Standards Australia design, installation and commissioning standards, should the release of such documents necessitate changes to the Inergen® system.

Producer's description

The Inergen®, controlled atmosphere fire extinguishing system and methods of actuation is typical of most gaseous suppression systems. Upon a signal from a fire detection system, or by manual operation, a valve or valves is/are opened, gas is released from the storage cylinder(s) and is reticulated via a pipework system and nozzles into a protected enclosure.

The principle of suppression used in the case of Inergen® is to extinguish fires by reducing the oxygen concentration in a protected enclosure to less than 15%, below which combustion will not be sustained for most burning materials. This O₂ depression is achieved by using the Inergen® gas which is a combination of nitrogen, argon and carbon dioxide in the following concentrations.

- (a) 40% by volume Argon
- (b) 8% by volume Carbon Dioxide
- (c) 52% by volume Nitrogen

Under normal conditions, the reduction of O₂ concentration to less than 15% would result in adverse physiological affects on humans exposed to the modified atmosphere. This effect is compensated by the use of a small, controlled concentration of CO₂ that increases the rate of respiration which makes the environment sustainable for occupants within the protected enclosure.

The effect of Inergen® discharge into an enclosure is demonstrated in the following example. If 52% by volume of Inergen® is injected into an enclosure, the final O₂ concentration after mixing will be 12.6% and the CO₂ concentration will be 4% by volume.

Like all gaseous agents, Inergen® can be used on all classes of fires, although care needs to be taken with Class C fires and special provisions made for deep seated Class A combustibles.

Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
afp - 718	14-Oct-1993	Number 6	Issue date 1-Jan-2012	31-Dec-2012

Page 3 of 4

Technical specification

The following details are a representative extract of the technical specification for the Inergen®, controlled atmosphere fire extinguishing system and may be subject to change. Complete and current details should be determined from the designated producer's technical manual/data sheets.

Based on the Inergen® product manual and the draft Australian Standard 4214 Sections 1 and 2, the design objectives of Inergen® systems should be as follows:

Typical design concentrations

Electrical control & distribution centres	37.5% Inergen®
Computer centres:	40% Inergen®

Note:

No system in an occupied area to exceed 0.43% Inergen® by volume.

Pre-discharge warning time for egress	20-30 sec. minimum
Time to 0.34 m ³ /m ³ :	1 minute
Time to design concentration:	2 minutes
Holding time:	10 minutes at 15% volume O ₂ or less.

Gas concentrations limits after discharge:

Oxygen:	no less than 12% by volume
Carbon dioxide:	no greater than 4.5% by volume
Nozzle coverage:	30m ² per nozzle maximum

The components that have been evaluated and form part of the listed system include the following.

Gas storage cylinders

Storage cylinders designed and manufactured in accordance with AS 2030:Part 1 and approved as having a working pressure of 15.0 MPa and hydrostatically tested at a minimum of 22.5 MPa.

Cylinder valve

Ansul Part No. CV-90, as detailed on Drawing No. 419425 Rev 2, with a maximum working pressure 18.2 MPa and incorporating a pressure relief device set to between 18.27 MPa and 20.6 MPa.

Pressure gauge

Ansul Part No. 416030

Valve actuators

Solenoid type, Honeywell skinner valve division, Part No. 701X072B, for use with CV-90 cylinder valve, hydrostatic test to 41.3 MPa.

Slave type, Ansul Part No. 79075, drawing No. X-416084 Rev 0.

Manual type, Ansul Part No. 32094, manual cable pull type.

Manual type, Ansul Part No. 70846, local actuator, push type.

Flexible manifold connector hose

Ansul Part No. 42424.

Pressure reducing orifice

Grinnell Supply Sales Part Nos IG ORIF 025, IG ORIF 032, IG ORIF 040, IG ORIF 050

Discharge nozzles

Grinnell Supply Sales Part Nos IG NOZ 015, IG NOZ 025

Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
afp - 718	14-Oct-1993	Number 6	Issue date 1-Jan-2012	31-Dec-2012

Page 4 of 4

Piping requirements

There exists two types of piping used for the Inergen® gas flooding system.

1. High pressure piping from the storage cylinders to the pressure reducing orifice.
High pressure piping shall be designed and installed in accordance with Section 7 of the Australian Standard AS 4214 Part 2: Gaseous Fire Extinguishing Systems, Nitrogen/argon/carbon dioxide mixture total flooding systems.

Low pressure piping from the pressure reducing orifice to the discharge nozzles.

Low pressure piping shall be designed and installed to the appropriate pressure requirement in accordance with Section 7 of Australian Standard AS4214 Part 2: Gaseous Fire Extinguishing Systems, Nitrogen/argon/carbon dioxide mixture total flooding systems.