



Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
afp - 1811	15-Feb-2006	Number 7	Issue date 1-Jan-2012	31-Dec-2012

Product designation

Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing system

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

Agent/distributor

Tyco Fire Protection Products
567 Somerville Road, SUNSHINE, VIC, AUSTRALIA, 3020

Registrant

Tyco Safety Products
Burlingham House, Hewett Road, Gapton Hall Industrial Estate, GREAT YARMOUTH, NORFOLK, UNITED KINGDOM, NR31 0NN

Producer

Tyco Safety Products
Burlingham House, Hewett Road, Gapton Hall Industrial Estate, GREAT YARMOUTH, NORFOLK, UNITED KINGDOM, NR31 0NN

Conformance criteria and evaluation

The Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing system has been evaluated and verified as conforming with the relevant requirements of the following criteria.

1. Australian Standard AS 4214-2002, 'Gaseous fire extinguishing systems'.
2. Loss Prevention Council - Evaluation, surveillance and approval, 'LPC approval'.
3. SSL Appraisal Specification FAS-102, Version 3.1, 'Gaseous Extinguishing Systems'.
4. CEN prEN 12094-4, (draft), 'Fixed fire fighting systems - Components for gas extinguishing systems - Part 4: Requirements and test methods for container valve assemblies and their actuators'.
5. Loss Prevention Standard LPS 1024, Issue 2, 1987, 'Components for halon and carbon dioxide fire extinguishing systems - Requirements for testing procedures for container valves'.
6. CEN prEN 12094-10, (draft) (2002-1), 'Fixed fire fighting systems - Components for gas extinguishing systems - Part 10: Requirements and test methods for pressure gauges and pressure switches'.
7. British Standard BS EN 837-1:1998, 'Pressure gauges. Part 1: Bourdon tube pressure gauges - dimensions, metrology, requirements and testing'.

(Conformance criteria and conformation 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



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8. British Standard BS EN 12094-8:1998, 'Fixed fire fighting systems - Components for gas extinguishing systems - Part 8: Requirements and test methods for flexible connectors for CO2 systems'.
9. British Standard BS EN 12094-13:2001, 'Fixed fire fighting systems - Components for gas extinguishing systems - Part 13: Requirements and test methods for check valves and non-return valves'.
10. British Standard BS EN 12094-7:2001, 'Fixed fire fighting systems - Components for gas extinguishing systems - Part 7: Requirements and test methods for nozzles for CO2 systems'.
11. Loss Prevention Standard LPS 1027, Issue 1, 1987, 'Components for halon and carbon dioxide fire extinguishing systems - Requirements for testing procedures for nozzles'.

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.

- i. The system shall be designed, installed, operated, and maintained, in accordance with the Product's Systems Manual.
- ii. Any mechanical ventilation provided should not form part of the normal ventilation system.
- iii. The boiling point of Novec™ 1230 gaseous agent is 49°C (liquid at room temperature).
- iv. The Novec™ 1230 storage containers shall not be transported or handled in situations where the temperature will be less than minus 20°C or more than 50°C.
- v. The minimum nozzle pressure is less than 7 bar (100 psig).
- vi. The maximum filling density for Novec™ 1230 is 1.2 kgs/litre and the minimum 0.5 kgs/litre.
- vii. The maximum coverage radius shall be 6.9 m for a 360° nozzle, and 10.8 m for a 180° nozzle.
- viii. The maximum coverage height for the nozzles is 5.0 metres.
- ix. The maximum quantity of agent to be discharged from one nozzle is 100 kg.
- x. 180° nozzles shall be mounted adjacent to a wall and located to cover the entire area.
- xi. The minimum height of protected void spaces shall be 300 mm.

Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems installed in Australia and New Zealand are subject to the following additional requirements.

- i. Sapphire™ containers shall only be filled and serviced by accredited refill stations.
- ii. Site filling of Sapphire™ containers, where required, shall be in accordance with Tyco Technical Services procedure TSP-080.
- iii. Installation and service of Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems shall be carried out by technicians/staff accredited by Tyco Technical Services in the handling of pressurised containers and the system installation and service manuals.
- iv. Design of Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems shall be carried out by staff accredited by Tyco Technical Services using the Tyco Safety Products, Sapphire™ software calculation program.

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Producer's description

The Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing system is of the fixed central-storage automatic and/or manual type. It uses Novec™ 1230 [(trifluoromethyl)-3-pentanone] gaseous agent, which has been developed as an alternative to Halon 1301, production of which ceased at the end of 1993, under the agreed adjustments made to the Montreal Protocol in November 1992. Novec™ 1230 agent has been developed and is manufactured by 3M Corporation (USA). Chemical formula - CF₃CF₂C(O)CF(CF₃)₂.

Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems utilise one or more storage containers arranged to provide the protected area with a pre-determined quantity of gas. The storage containers are designed to hold Novec™ 1230 in liquid form and Nitrogen, which is used to super-pressurise the container to 24.8 bar (360 psi) at 20°C. Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems are designed and tested to operate in the temperature range -20°C to 50°C or as stated in separate components approvals.

Novec™ 1230 gaseous agent is a colourless and has a density 11 times greater than air. Its atmospheric lifetime is 5 days. It extinguishes the fire through heat absorption and chemical means. Novec™ 1230 has extremely low toxicity and as it extinguishes fires at low concentrations it does not significantly reduce oxygen levels. The LC50 (rat) is > 10% v/v. The NOAEL for cardiac sensitization (The Occupational Exposure Limit) value for Novec™ 1230 is also > 10% v/v, providing a large margin of safety when used at effective design concentrations as a fire protection fluid.

Tyco Safety Products, Sapphire™, engineered, total flooding gaseous fire extinguishing systems are suitable for protection of Class A, B & C hazards. These systems are particularly valuable in extinguishing fires in enclosures containing hazards or equipment where a clean, electrically non-conductive medium is essential or where the cleaning up of foam, water or powder would be problematic. Providing a Class A fire is detected quickly and the Novec™ 1230 gaseous agent discharged promptly and the concentration is maintained for an adequate period of time to allow embers to cool, surface fire and embers associated with the burning of solid materials are quickly extinguished. Class B & C fires are quickly extinguished by Novec™ 1230 at the appropriate concentrations, but in case of Class C fires the risk of explosion should be carefully considered and where possible the flammable gas flow should be isolated before or as soon as possible after extinguishment. The minimum design concentration for Class A hazards is 5.2% and 5.5% for Class B and C hazards.

Technical specification

The following details are a representative extract of the technical specification for the Tyco Safety Products, Sapphire™, engineered, total flooding gaseous 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.

Equipment covered by this listing

Description	Part num.
8 litre Sapphire™ 1230 container assembly (DOT)	303.207.001
16 litre Sapphire™ 1230 container assembly (DOT)	303.207.002
32 litre Sapphire™ 1230 container assembly (DOT)	303.207.003
52 litre Sapphire™ 1230 container assembly (DOT)	303.207.004
106 litre Sapphire™ 1230 container assembly (DOT)	303.207.005
147 litre Sapphire™ 1230 container assembly (DOT)	303.207.006
180 litre Sapphire™ 1230 container assembly (DOT)	303.207.007
6.5 litre Sapphire™ 1230 container assembly (EC)	303.207.009
13 litre Sapphire™ 1230 container assembly (EC)	303.207.010
25.5 litre Sapphire™ 1230 container assembly (EC)	303.207.011
52 litre Sapphire™ 1230 container assembly (EC)	303.207.012
106 litre Sapphire™ 1230 container assembly (EC)	303.207.013
147 litre Sapphire™ 1230 container assembly (EC)	303.207.014
25 mm container valve	302.207.001
50 mm container valve	302.207.002
25 mm union adaptor	309.002.011
50 mm union adaptor	309.002.012
Solenoid Actuator – standard	304.205.010
Solenoid actuator – flameproof	304.205.002
Local manual actuator	304.207.002
Remote manual actuator (Mechanical)	304.207.003
Pneumatic actuator	304.207.004
Pressure switch	305.205.002
Pressure switch – flameproof	305.205.003

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Description	Part num.
Supervisory pressure switch	304.205.006
Pressure trip	305.202.002
25 mm x 180° Nozzle Pre-engineered (Aluminium)	310.207.001
25 mm x 360° Nozzle Pre-engineered (Aluminium)	310.207.002
40 mm x 180° Nozzle Pre-engineered (Aluminium)	310.207.003
40 mm x 360° Nozzle Pre-engineered (Aluminium)	310.207.004
50 mm x 180° Nozzle Pre-engineered (Aluminium)	310.207.005
50 mm x 360° Nozzle Pre-engineered (Aluminium)	310.207.006
15 mm x 180° Nozzle Engineered (Aluminium)	310.207.007
15 mm x 360° Nozzle Engineered (Aluminium)	310.207.008
20 mm x 180° Nozzle Engineered (Aluminium)	310.207.009
20 mm x 360° Nozzle Engineered (Aluminium)	310.207.010
25 mm x 180° Nozzle Engineered (Aluminium)	310.207.011
25 mm x 360° Nozzle Engineered (Aluminium)	310.207.012
32 mm x 180° Nozzle Engineered (Aluminium)	310.207.013
32 mm x 360° Nozzle Engineered (Aluminium)	310.207.014
40 mm x 180° Nozzle Engineered (Aluminium)	310.207.015
40 mm x 360° Nozzle Engineered (Aluminium)	310.207.016
50 mm x 180° Nozzle Engineered (Aluminium)	310.207.017
50 mm x 360° Nozzle Engineered (Aluminium)	310.207.018
25 mm x 180° Nozzle Pre-engineered (Brass)	310.207.001/B
25 mm x 360° Nozzle Pre-engineered (Brass)	310.207.002/B
40 mm x 180° Nozzle Pre-engineered (Brass)	310.207.003/B
40 mm x 360° Nozzle Pre-engineered (Brass)	310.207.004/B
50 mm x 180° Nozzle Pre-engineered (Brass)	310.207.005/B
50 mm x 360° Nozzle Pre-engineered (Brass)	310.207.006/B
15 mm x 180° Nozzle Engineered (Brass)	310.207.007/B
15 mm x 360° Nozzle Engineered (Brass)	310.207.008/B
20 mm x 180° Nozzle Engineered (Brass)	310.207.009/B
20 mm x 360° Nozzle Engineered (Brass)	310.207.010/B
25 mm x 180° Nozzle Engineered (Brass)	310.207.011/B
25 mm x 360° Nozzle Engineered (Brass)	310.207.012/B
32 mm x 180° Nozzle Engineered (Brass)	310.207.013/B
32 mm x 360° Nozzle Engineered (Brass)	310.207.014/B
40 mm x 180° Nozzle Engineered (Brass)	310.207.015/B
40 mm x 360° Nozzle Engineered (Brass)	310.207.016/B
50 mm x 180° Nozzle Engineered (Brass)	310.207.017/B
50 mm x 360° Nozzle Engineered (Brass)	310.207.018/B
6.5 litre Container bracket	311.205.001
13 litre Container bracket	311.205.002
25.5 litre Container bracket	311.205.003
6.5, 13, 25.5 litre Container bracket	311.207.003
8, 16, 147, 180 litre Container bracket	311.207.001
52, 106, 147, 180 litre Container bracket	311.207.002
52, 106, 147, 180 litre Container bracket	311.207.004
T528 manual release unit	526.001.018
25 mm manifold check valve	302.207.001
50 mm manifold check valve	302.207.002
25 mm discharge hose	306.207.002
50 mm discharge hose	306.207.003
Manual release caution plate	314.207.003
65 mm 2 port manifold	307.207.001
65 mm 3 port manifold	307.207.002
65 mm 4 port manifold	307.207.003
80 mm 2 port manifold	307.207.004
80 mm 3 port manifold	307.207.005
80 mm 4 port manifold	307.207.006
80 mm 5 port manifold	307.207.007
80 mm 6 port manifold	307.207.008
100 mm 2 port manifold	307.207.009
100 mm 3 port manifold	307.207.010
100 mm 4 port manifold	307.207.011
100 mm 5 port manifold	307.207.012
100 mm 6 port manifold	307.207.013
150 mm 3 port manifold	307.207.014
150 mm 4 port manifold	307.207.015
150 mm 5 port manifold	307.207.016

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Description	Part num.
150 mm 6 port manifold	307.207.017
150 mm 7 port manifold	307.207.018
150 mm 8 port manifold	307.207.019
150 mm 9 port manifold	307.207.020
150 mm 10 port manifold	307.207.021
Door caution plate (Lock-off)	314.207.002
Door caution plate (No lock-off)	314.207.001
6 mm kunifer (per metre)	308-002-001
1/8" x 6 mm stud coupling	309-010-002
1/4" x 6 mm stud coupling	309-010-003
Flexible pilot hose, 1/4" BSP swivel	306-205-003
6 mm tee	309-013-001
Bleed valve	302-200-021
Adaptor (1/4" BSPT x 1/4" BSPP)	309-013-005
Male tee (1/4" BSPP x 1/4" BSPT)	309-013-003
Male elbow (1/4" BSPT x 1/4" BSPP)	309-013-004
Adaptor (1/8" NPT male x 1/4" BSPP male)	309-013-006
Male tee (1/4" BSPP male x 1/4" BSPP male x 1/8" NPT male)	309-200-021
User manual, Issue 2, Dated 02/2003	14A-06
Flow calculation software, Novec™ 1230	FlowCalc, TEPG3.6a, Novec™ 1230