



# Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021

Page 1 of 6

## Product designation

**Hygood, FM-200®, engineered gaseous 'total flooding', 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

Johnson Controls  
Burlingham House, Hewett Road, Gapton Hall Industrial Estate, GREAT YARMOUTH, NORFOLK,  
UNITED KINGDOM, NR31 0NN

### Producer

Johnson Controls  
Burlingham House, Hewett Road, Gapton Hall Industrial Estate, GREAT YARMOUTH, NORFOLK, UNITED  
KINGDOM, NR31 0NN

## Conformance criteria and evaluation

The Hygood, FM-200®, engineered gaseous 'total flooding', fire extinguishing system has been evaluated and verified as conforming with the relevant requirements of the following criteria.

1. Australian Standard AS 4214:2018, 'Gaseous fire-extinguishing systems'.
2. Approval Standard FM Class Number 5600, 'Approval Standard for Clean Agent Extinguishing Systems'.
3. Factory Mutual - Evaluation and approval, 'FM approval'.
4. Underwriters Laboratories Standard UL 2166, 'Standard for Halocarbon Clean Agent Extinguishing System Units'.
5. Underwriters Laboratories - Evaluation and listing, 'UL listing'.

## 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.

(Limitations/conditions of conformance continue)

Issued by

David Whittaker  
Executive Officer – ActivFire Scheme



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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.

# Schedule to Certificate of Conformity

Certificate num.	Registration date	Version		Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021	Page 2 of 6

If designed to achieve a concentration of 9% or more, it shall *not* be able to automatically discharge while the enclosure is occupied.

- i. The system shall not be installed in an enclosure that has significant non-closeable openings.
- ii. The FM-200® storage containers shall not be transported or handled in situations where the temperature will be less than minus 0°C or more than 50°C.
- iii. The fill ratio of the storage containers shall not exceed 1.0 kg/litre or be less than 0.50 kg/litre.
- iv. The temperature of the area housing the installed storage containers shall be maintained in the range 16°C to 27°C.
- v. The system shall not be installed where the non-fire enclosure temperature will be less than 0°C or more than 55°C.
- vi. The FM-200® concentration achieved in the enclosure shall be not less than 7.5% for any risk.
- vii. Maximum coverage radius shall be 8.7 m for a 360° nozzle, and 10.05 m for a 180° nozzle.
- viii. Maximum coverage area for either nozzle shall be 95.0 m<sup>2</sup>.
- ix. Nozzles shall be installed at not more than 300 mm below the ceiling soffit.
- x. Maximum enclosure height shall be 4.87 m for a 360° and for 180° nozzles.
- xi. 180° nozzles shall be mounted adjacent to a wall and located to cover the entire area.
- xii. Minimum height of protected void spaces shall be 300 mm.

## Producer's description

The Hygood, FM-200®, engineered gaseous 'total flooding', fire extinguishing system is of the fixed central-storage automatic and/or manual type. Automatic operation is usually by means of smoke or heat detectors in conjunction with a suitable CIE panel or single-hazard system-releasing panel. This system is intended to extinguish fires of Classes 'A', 'B', and 'C' that occur in enclosures which are suitable for gaseous total-flooding type fire protection. Provided that appropriate 'Ex' rated ancillary devices, as covered by this listing, are fitted, this extinguishing system can be installed in hazardous locations. The system covered by this listing includes carbon steel agent-storage containers (custom pre-charged with FM-200® and Nitrogen), container-restraint and -support brackets, manifold-support brackets, container-mounted piston-type agent release valves, stackable and side-mount type release actuators, flexible discharge bend assemblies, carbon steel pre-fabricated storage-system manifolds with inbuilt check valves, wrought-aluminium and brass agent nozzles (supplied custom pre-drilled), pressure switches for monitoring and interlocking, a manual pull station, a remote manual/pneumatic actuator, and various instruction and warning signs.

The FM-200® (HFC-227ea, Heptafluoropropane) agent is manufactured only by DuPont, U.S.A. Authorised FM-200® stockists/re-fillers are usually located within reasonable distance from installed systems. FM-200® extinguishes fire by a combination of physical and chemical means. It does not significantly deplete the oxygen content in the enclosure, and tests have shown it to be less toxic than Halon 1301. It is stored in the Hygood System as a liquefied gas that is super-pressurised with Nitrogen to 24.8 bar at 20°C. Liquid FM-200® is colourless and odourless, has a vapour pressure of 405.4 kPa abs. at 21°C, an S.G. of 1.48, a boiling point of -16.4°C, and is non-combustible. Gaseous FM-200® has an Ozone Depleting Potential of 'zero' and an Atmospheric Lifetime estimated at 31 to 41 years. The Occupational Exposure Limit (Cardiac Sensitisation) values for FM-200® are NOAEL 9% and LOAEL >10.5%. The design concentration required for Hygood FM-200® systems is 7.5%, but may be considerably higher for flammable liquids and flammable gases (e.g., 13.5% for Methanol, and 17.2% for Hydrogen (AS 4214-2002). In Australia, FM-200® installations having design concentration above 9% must have a discharge-inhibiting arrangement, and those above 10.5% must have a lock-off valve, or serviceable self-contained breathing apparatus readily available to anyone wanting to enter the enclosure.

# Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021
				Page 3 of 6

## Technical specification

The following details are a representative extract of the technical specification for the Hygood, FM-200®, engineered gaseous 'total flooding', 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.

### 1. FM-200® container details

Characteristic	Nominal capacity (kg)											
	4.5	8	16	32	40	52	67	80	106	147	180	343
HYGOOD Part No. 305.205.	026	015	016	017	030	018	031	032	019	020	021	022
Max. FM-200® Capacity (kg)	4.5	8.0	16.0	32.0	40.0	52.0	67.0	80.0	106.0	147.0	180.0	343.0
Diameter (mm)	178	254	254	254	227.2	406	265	276	406	406	406	610
Ht. to Valve Outlet (kg)	280	304	502	833	1352	596	1526	1685	1021	1354	1634	1466
Valve outlet size (mm)	25	25	25	25	50	50	50	50	50	50	50	89
Tare Weight (kg)	7.7	14.8	18.4	26.1	52.2	49.1	81.6	95.3	71.8	89.9	105.8	207

### 2. Schedule of components and/or assemblies

The following is a schedule of validated components and/or assemblies of the certified/listed equipment.

Description	Part num.
4.5 litre FM-200 container assembly	305.205.026
8 litre FM-200 container assembly	305.205.015
16 litre FM-200 container assembly	305.205.016
32 litre FM-200 container assembly	305.205.017
40 litre FM-200 container assembly	305.205.030
52 litre FM-200 container assembly	305.205.018
67 litre FM-200 container assembly	305.205.031
80 litre FM-200 container assembly	305.205.032
106 litre FM-200 container assembly	305.205.019
147 litre FM-200 container assembly	305.205.020
180 litre FM-200 container assembly	305.205.021
343 litre FM-200 container assembly	305.205.022
25 mm container valve (spare part)	302.207.001
25 mm container valve (spare part)	302.209.001
50 mm container valve	302.207.002
50 mm container valve (spare part)	302.209.002
80 mm container valve (spare part)	15150
Electrical actuator - standard (UL) (suppression diode)	304.205.010
Burst disc; 25mm valve (1"): M18 x 1.00	20915
Burst disc; 50mm valve (2"): M18 x 1.00	20915
Burst disc, 80 mm valve (3"): 0.9375-16UN-3A	15330
Side-mounted electrical actuator - flameproof (with Schraeder/swivel-nut assy.) ATEX	304.205.002
Local manual actuator	304.207.002
Local manual actuator	304.209.002
Cable pneumatic manual (CPM) actuator	304.209.013
Electrical actuator - standard (suppression diode)	304.205.001
Electrical actuator - bridge rectifier	304.209.001
Side-mounted electrical actuator - flameproof (with Schraeder/swivel-nut assy.) UL	95550
Pneumatic actuator	304.207.004
Pneumatic actuator	304.209.004
Pressure switch - standard (70bar)	305.205.005
Pressure switch - standard (250bar)	305.205.002
Pressure switch - flameproof	305.205.003
Solenoid adaptor	300.205.550
Supervisory pressure switch - standard (open on fall)	304.205.006
Supervisory pressure switch - special (close on fall)	305.209.005
Pneumatic trip	305.200.001
10mm x 180° BSPP Nozzle (Brass)	310.205.201
10mm x 360° BSPP Nozzle (Brass)	310.205.202

# Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021

Page 4 of 6

Description	Part num.
10mm x 180° NPT Nozzle (Brass)	310.205.215
10mm x 360° NPT Nozzle (Brass)	310.205.216
15mm x 180° BSPP Nozzle (Brass)	310.205.203
15mm x 360° BSPP Nozzle (Brass)	310.205.204
15mm x 180° NPT Nozzle (Brass)	310.205.217
15mm x 360° NPT Nozzle (Brass)	310.205.218
20mm x 180° BSPP Nozzle (Brass)	310.205.205
20mm x 360° BSPP Nozzle (Brass)	310.205.206
20mm x 180° NPT Nozzle (Brass)	310.205.219
20mm x 360° NPT Nozzle (Brass)	310.205.220
25mm x 180° BSPP Nozzle (Brass)	310.205.207
25mm x 360° BSPP Nozzle (Brass)	310.205.208
25mm x 180° NPT Nozzle (Brass)	310.205.221
25mm x 360° NPT Nozzle (Brass)	310.205.222
32mm x 180° BSPP Nozzle (Brass)	310.205.209
32mm x 360° BSPP Nozzle (Brass)	310.205.210
32mm x 180° NPT Nozzle (Brass)	310.205.223
32mm x 360° NPT Nozzle (Brass)	310.205.224
40mm x 180° BSPP Nozzle (Brass)	310.205.211
40mm x 360° BSPP Nozzle (Brass)	310.205.212
40mm x 180° NPT Nozzle (Brass)	310.205.225
40mm x 360° NPT Nozzle (Brass)	310.205.226
50mm x 180° BSPP Nozzle (Brass)	310.205.213
50mm x 360° BSPP Nozzle (Brass)	310.205.214
50mm x 180° NPT Nozzle (Brass)	310.205.227
50mm x 360° NPT Nozzle (Brass)	310.205.228
10mm x 180° NPT Nozzle (Aluminium)	310.205.115
10mm x 360° NPT Nozzle (Aluminium)	310.205.116
15mm x 180° NPT Nozzle (Aluminium)	310.205.117
15mm x 360° NPT Nozzle (Aluminium)	310.205.118
20mm x 180° NPT Nozzle (Aluminium)	310.205.119
20mm x 360° NPT Nozzle (Aluminium)	310.205.120
25mm x 180° NPT Nozzle (Aluminium)	310.205.121
25mm x 360° NPT Nozzle (Aluminium)	310.205.122
32mm x 180° NPT Nozzle (Aluminium)	310.205.123
32mm x 360° NPT Nozzle (Aluminium)	310.205.124
40mm x 180° NPT Nozzle (Aluminium)	310.205.125
40mm x 360° NPT Nozzle (Aluminium)	310.205.126
50mm x 180° NPT Nozzle (Aluminium)	310.205.127
50mm x 360° NPT Nozzle (Aluminium)	310.205.128
10mm x 180° BSPP Nozzle (Aluminium)	310.205.101
10mm x 360° BSPP Nozzle (Aluminium)	310.205.102
15mm x 180° BSPP Nozzle (Aluminium)	310.205.103
15mm x 360° BSPP Nozzle (Aluminium)	310.205.104
20mm x 180° BSPP Nozzle (Aluminium)	310.205.105
20mm x 360° BSPP Nozzle (Aluminium)	310.205.106
25mm x 180° BSPP Nozzle (Aluminium)	310.205.107
25mm x 360° BSPP Nozzle (Aluminium)	310.205.108
32mm x 180° BSPP Nozzle (Aluminium)	310.205.109
32mm x 360° BSPP Nozzle (Aluminium)	310.205.110
40mm x 180° BSPP Nozzle (Aluminium)	310.205.111
40mm x 360° BSPP Nozzle (Aluminium)	310.205.112
50mm x 180° BSPP Nozzle (Aluminium)	310.205.113
50mm x 360° BSPP Nozzle (Aluminium)	310.205.114
Liquid level measuring device: 106 L	300.015.127
Liquid level measuring device: 147 L; 180 L; 343 L	300.015.128

# Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021

Page 5 of 6

Description	Part num.
Street elbow	309.013.008
Container bracket, 4.5 litre sizes	311.205.020
Container bracket, 8; 16; 32 litre sizes	311.205.013
Container bracket, 52; 106; 147; 180 litre sizes	311.205.014
Container bracket, 40 litre sizes	311.205.021
Container bracket, 67 litre sizes	311.205.017
Container bracket, 80 litre sizes	311.205.018
Container bracket, 343 litre sizes	311.205.019
T528 manual release unit	526.001.018
25 mm manifold check valve	302.209.004
25 mm manifold check valve	302.207.004
50 mm manifold check valve	302.209.005
50 mm manifold check valve	302.207.005
65mm 2 port manifold BSPT	307.209.022
65mm 3 port manifold BSPT	307.209.023
65mm 4 port manifold BSPT	307.209.024
65mm 2 port manifold NPT	307.209.001
65mm 3 port manifold NPT	307.209.002
65mm 4 port manifold NPT	307.209.003
80mm 2 port manifold BSPT	307.209.025
80mm 3 port manifold BSPT	307.209.026
80mm 4 port manifold BSPT	307.209.027
80mm 5 port manifold BSPT	307.209.028
80mm 6 port manifold BSPT	307.209.029
80mm 2 port manifold NPT	307.209.004
80mm 3 port manifold NPT	307.209.005
80mm 4 port manifold NPT	307.209.006
80mm 5 port manifold NPT	307.209.007
80mm 6 port manifold NPT	307.209.008
100mm 2 port manifold BSPT	307.209.030
100mm 3 port manifold BSPT	307.209.031
100mm 4 port manifold BSPT	307.209.032
100mm 5 port manifold BSPT	307.209.033
100mm 6 port manifold BSPT	307.209.034
100mm 2 port manifold NPT	307.209.009
100mm 3 port manifold NPT	307.209.010
100mm 4 port manifold NPT	307.209.011
100mm 5 port manifold NPT	307.209.012
100mm 6 port manifold NPT	307.209.013
150mm 3 port manifold flanged	307.209.014
150mm 4 port manifold flanged	307.209.015
150mm 5 port manifold flanged	307.209.016
150mm 6 port manifold flanged	307.209.017
150mm 7 port manifold flanged	307.209.018
150mm 8 port manifold flanged	307.209.019
150mm 9 port manifold flanged	307.209.020
150mm 10 port manifold flanged	307.209.021
65mm manifold bracket	311.205.015
100mm 2 port manifold BSPT (343L)	307.209.038
100mm 3 port manifold BSPT (343L)	307.209.039
100mm 4 port manifold BSPT (343L)	307.209.040
100mm 2 port manifold NPT (343L)	307.209.035
100mm 3 port manifold NPT (343L)	307.209.036
100mm 4 port manifold NPT (343L)	307.209.037
150mm 2 port manifold flanged (343L)	307.209.041
150mm 3 port manifold flanged (343L)	307.209.042

# Schedule to Certificate of Conformity

Certificate num.	Registration date	Version	Valid until	
<b>afp - 1707</b>	24-Sep-2004	Number 15 (Provisional)	Issue date 1-May-2020	30-Apr-2021

Page 6 of 6

Description	Part num.
150mm 4 port manifold flanged (343L)	307.209.043
150mm 5 port manifold flanged (343L)	307.209.044
150mm 6 port manifold flanged (343L)	307.209.045
150mm 7 port manifold flanged (343L)	307.209.046
150mm 8 port manifold flanged (343L)	307.209.047
150mm 9 port manifold flanged (343L)	307.209.048
150mm 10 port manifold flanged (343L)	307.209.049
80mm manifold bracket	311.205.010
100mm manifold bracket	311.205.011
150mm manifold bracket	311.205.012
Flexible pilot hose	306.205.003
80 mm discharge hose and check valve assembly	306.205.006
80 mm valve discharge hose	306.205.005
Male adaptor (1/4" BSPT x 1/4" BSPP)	309.013.005
Male tee (1/4" BSPT x 1/4" BSPT)	91109
Male elbow (1/4" BSPT x 1/4" BSPP)	91101
Male adaptor (1/4" NPT x 1/4" BSPP)	309.013.006
Male adaptor (1/8" BSPT x 1/4" BSPP)	309.013.010
Male elbow (1/4" NPT x 1/4" BSPP)	309.013.009
Male tee (1/4" BSPP x 1/4" BSPP x 1/4" NPT)	309.013.021
Street elbow (1/4" NPT x 1/4" NPT)	309.013.008
6mm copper nickle pipe	308.002.001
Stud coupling (1/8" BSPT x 6mm)	309.010.002
Stud coupling (1/4" NPT x 6mm)	309.010.003
6mm compression tee	309.013.001
Bleed valve (1/4" NPT)	302.200.021
Male pilot hose connector (1/4" BSPP x 1/4" BSPP)	309.013.007
Pressure switch, manual reset type, 4bar rising	304.205.007
25 mm discharge hose	306.207.002
50 mm discharge hose	306.207.003
Manual release notice	314.205.003
Door notice	314.205.001
Door caution plate	314.205.002
Design and Installation Manual (Non-UL), Issue 07, Dated 2009-12	14A-03H
FM-200® Total Flood Fire Suppression Systems Engineered System	14A-07H
Design and Installation Manual (UL/FM version)	
Flow calculation software, FM-200®	TYCO4.00