



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: **IECEX SGS 23.0053X** Page 1 of 3 [Certificate history:](#)  
Status: **Current** Issue No: 0  
Date of Issue: 2024-01-12  
Applicant: **ITW Air Management**  
10125 Carver Road  
Cincinnati  
Ohio 45242  
**United States of America**  
Equipment: **Zone 1/21 Vortex A/C Enclosure Cooler**  
Optional accessory:  
Type of Protection: **Non-Electrical**  
Marking: **Ex h IIC T3 Gb**  
**Ex h IIIC T200°C Db**  
**Ta +10°C to +80°C**

Approved for issue on behalf of the IECEx  
Certification Body:

**G Manifold**

Position:

**Accreditation Manager**

Signature:  
(for printed version)

pp M. Powney

Date:  
(for printed version)

17/1/2024

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**SGS United Kingdom Ltd**  
**Rockhead Business Park**  
**Staden Lane**  
**Buxton, Derbyshire SK17 9RZ**  
**United Kingdom**





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Manufacturer: **ITW Air Management**  
10125 Carver Road  
Cincinnati  
Ohio 45242  
**United States of America**

Manufacturing locations: **ITW Air Management**  
10125 Carver Road  
Cincinnati  
Ohio 45242  
**United States of America**

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

#### STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

[IEC 60079-0:2017](#) Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

[ISO 80079-36:2016](#) Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic methods and requirements  
Edition:1.0

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

#### TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[GB/SGS/ExTR23.0047/00](#)

Quality Assessment Report:

[US/ETL/QAR23.0014/00](#)



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## EQUIPMENT:

Equipment and systems covered by this Certificate are as follows:

Zone 1/21 Vortex A/C" enclosure coolers are compressed air powered devices that are intended to cool electronic/electrical enclosures that are located in Zone 1 and Zone 21 areas. The products will be classified as equipment and are for use only in areas in which explosive atmospheres caused by mixtures of air and gases, vapours or mists or by air/dusts mixtures are unlikely to occur or, if they do occur, are likely to do so only infrequently and for a short period only and for ensuring a normal level of protection, even under expected malfunctions or fault conditions.

There are no electric/electronic components in these products - they are purely mechanical devices - they are entirely non-electrical. The cooling that they produce is driven by an internal vortex tube which is located inside of an ATEX certified non-metallic carbon loaded enclosure, which serves as the external housing for the product. A vortex tube is a compressed air powered device that has no moving parts. From a high pressure (6.2 to 6.9 bar) clean and dry compressed air source, the vortex tube creates a cold air stream and a hot air stream, both of these air streams are at low pressure (less than 0.2 bar.) The vortex tube's cold air stream is directed inside the (customer's) protected enclosure while the hot air stream is exhausted outside of the Zone 1/21 Vortex A/C to the ambient environment. The hot exhaust air is vented out of the Zone 1/21 Vortex A/C through an opening in the non-metallic housing. The opening in the non-metallic housing is protected from jets of water and dust by a baffled shroud on the back of the product. The Zone 1/21 Vortex A/C must be used in conjunction with a purge/pressurization system, which is provided by another source. It is the responsibility of the end user to select and install the purge/pressurization system on his enclosure.

The Zone 1/21 Vortex A/C is mounted directly on the top or side of the enclosure to be cooled via a 49mm diameter hole (two 49mm holes are required for the 8170/8170BSP models) in the enclosure. Nitrile gasket(s) between the Zone 1/21 Vortex A/C and the enclosure maintain an air and liquid tight seal at this interface. When mounted correctly to the top or side of the enclosure, the product will maintain an environmental rating of IP56. The cold airstream is directed inside the enclosure through a one-way check valve and then through a "cold air ducting kit" which can be used to distribute the cold air evenly throughout the enclosure, if desired. As the cold air stream cools the air inside the enclosure, it loses its refrigeration ability and warms up. This warmer air must be vented outside of the protected enclosure so as not to over-pressurize the enclosure. The air is vented outside of the enclosure through the purge system's spark arrestor vent. The spark arrestor vent is selected by the end user to vent the purge air in addition to the cooling air from the Zone 1/21 Vortex A/C. The one-way check valve closes when the Vortex A/C is not operating (not producing cooled air) so that the purge system can maintain adequate enclosure pressure.

Continued in Annex

## SPECIFIC CONDITIONS OF USE: YES as shown below:

1. When the equipment is to be used on an enclosure intended to be protected by a concept according to IEC 60079-2 the pressurised air supply to the equipment must be of the same quality as that used to purge and pressurise the enclosure to which it is installed on.
2. When the equipment is to be used on an enclosure intended to be protected by a concept according to IEC 60079-2 the equipment shall be fitted to, and assessed/tested, as part of the enclosure.
3. The equipment shall be suitably earthed (grounded) prior to operation. Earth continuity shall be maintained between the equipment and the enclosure to which it is installed on.
4. The equipment shall be mounted to the top or side face of the enclosure to which it is installed.
5. Inlet pressure shall not exceed 6.9 Bar (100PSIG).
6. Inlet air temperature shall not exceed 49°C (120°F).
7. WARNING: Potential Electrostatic charging hazard ~ cleaned only with a damp cloth.
8. When installed, consideration shall be given to the guidance given in PD CLC/TR 60079-32-1 'Explosive atmospheres - Electrostatic hazards, guidance'.

## Annex:

[IECEX SGS 23.0053X Annex.pdf](#)

If there is an electrical malfunction inside the protected enclosure and a spark or incendiary particle is produced, the spark cannot escape the protected enclosure as it will be captured and extinguished by the purge/pressurization system's spark arrestor vent. When the Zone 1/21 Vortex A/C is not providing cooling (see below), the air path through the cold outlet of the unit is closed off and sealed via the one-way check valve on the unit.

The Zone 1/21 Vortex A/C utilizes a built-in mechanical thermostat (thermal actuator) that monitors and controls the temperature inside the customer's enclosure within a set temperature range. The thermostat senses the temperature inside the enclosure and then opens or closes an internal valve that controls the compressed air flow to the internal vortex tube. When high temperatures (32 to 38°C) inside the customer's enclosure are sensed, the thermal actuator opens the internal valve which allows compressed air to flow into the vortex tube and start cooling the enclosure.

Once the temperature inside the enclosure drops to approximately 25 to 28 C, the thermal actuator closes the valve and the compressed air flow to the vortex tube is stopped, therefore stopping the flow of cold air into the protected enclosure. At this point, the purge system maintains a safe level of enclosure pressure.

The main ignition source from the Zone 1/21 Vortex A/C is from the hot air exhaust and surface temperatures that it can develop. The temperature of the hot air exhaust is dependent on the temperature and the pressure of the compressed air that is supplied to the product. When the compressed air pressure is limited to a maximum of 6.9 bar (100 psig) and a maximum temperature of 49 C (120 F) and the ambient temperature does not exceed 80°C (175°F), then the hot exhaust air temperature and corresponding surface temperatures on or inside the product will not exceed 135 C (275°F) under normal conditions. Under fault conditions and worst case compressed air and ambient temperature conditions (6.9 bar compressed air pressure and 49°C compressed air temperature and 80°C ambient), the maximum surface temperature will not exceed 302°F (150°C). This corresponds to a temperature classification of T3. Fault conditions may occur when an internal orifice at the hot end of the vortex tube becomes restricted or clogged with foreign material or dirt. To reduce the chances of fault conditions occurring, a 5 micron compressed air filter is supplied with every model to remove foreign material from the compressed air supply and reduce the possibility of fault conditions. It is imperative that the compressed air supply conditions and ambient temperatures be stated and adhered to.

The Zone 1/21 Vortex A/C is available in four different cooling capacities: 900, 1500, 2500 and 5000 BTUH (264, 440, 732 and 1465 watts). Eight different models are offered:

Model No.	Cooling Capacity (BTUH)	Compressed air inlet thread size and type	Compressed Air Consumption (scfm)	Supplied with a 5 micron compressed air filter?
8115	900	3/8" NPT	15	Yes
8125	1500	3/8" NPT	25	Yes
8135	2500	3/8" NPT	35	Yes
8170	5000	3/8" NPT	70	Yes
8115BSP	900	3/8" BSPP	15	Yes
8125BSP	1500	3/8" BSPP	25	Yes
8135BSP	2500	3/8" BSPP	35	Yes
8170BSP	5000	3/8" BSPP	70	Yes