HEAT
INDUSTRIAL

Fan Heaters

www.heatingandprocess.com

Introduction

MFH The Bulldog®
Portable Fan Heaters

LFH
Heavy-Duty Fan Heaters

EXHEAT Industrial's expanded range of fan assisted heaters has grown from The Bulldog - the world's first truly portable hazardous area fan assisted heater - to now include the LFH line of heavy-duty units. These heaters combine efficient design with simple functionality to provide a cost-effective heating solution for larger spaces in Zone 1/2 (IIB+H2) or Zone 21/22 (IIIC) hazardous areas.

By making use of EXHEAT Industrial's patented* space-saving and energy-efficient heater design, The MFH and LFH fan assisted heaters can both deliver a powerful stream of warm air that can be felt up to several meters away, even in ambient temperatures as low as -40°C. The heaters are additionally certified to BS EN ISO 80079-36:2016 and BS EN ISO 80079-37:2016 standards for constructional safety, and are suitable for usage in both onshore and offshore environments.

*Patent No: GB2553303A

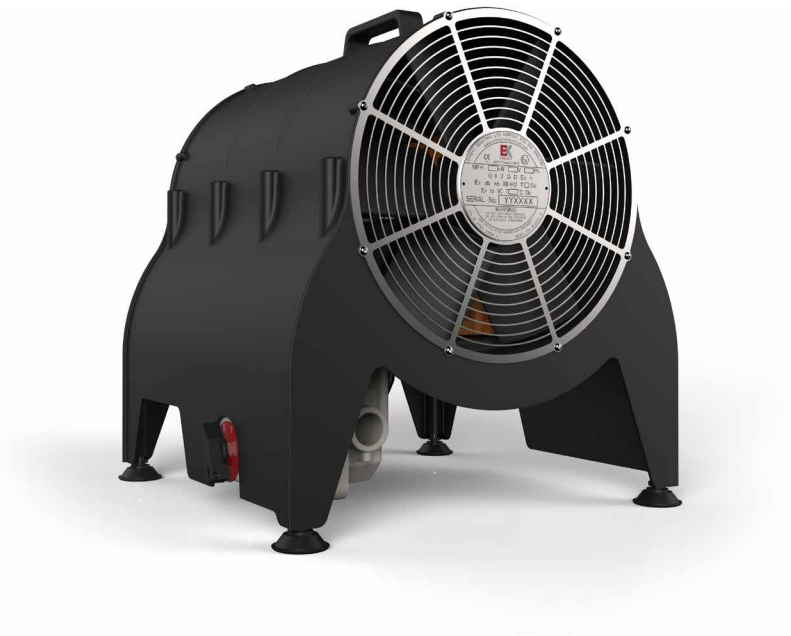
Common Features

- The MFH's lightweight casing is moulded from a steel reinforced polymer, while the LFH heaters utilise a heavy-duty stainless steel casing for a more rugged heating solution.
- Up to 40kW of thermal power can be directed to heat specific areas within a larger room, or warm a mid-sized room to comfortable operating temperatures.
- Suitable for ambient temperatures from -40°C to +40°C.
- Heaters come ready to 'plug and play' with the option of fitting a plug, or hard wiring to an isolator unit.
- Can be fitted with other optional accessories to meet your requirements.
- T2, T3 and T4 options available.
- Voltage from 110V to 690V, for 1 or 3 phase supplies.

TYPICAL APPLICATIONS

- Aircraft servicing areas
- Comfort heating
- Curing or drying paint
- Frost protection
- Offshore containers
- Oil & gas drilling rigs
- Oil refineries
- Paint stores
- Pipe wrapping / composite repairs
- Production platforms
- Ship applications: deck houses / pump stations / engine rooms
- Spray booths
- Temporary enclosures / habitats for maintenance work

MFH 'The Bulldog'
The World's First Truly Portable Fan Heater



- Designed for compactness and portability, with a base weight of only 28kg (excluding optional accessories).
- Durable steel reinforced polymer outer casing reduces overall weight, while providing additional EMI shielding.
- Can be easily transported with fitted castor wheel stands.
- Can be supplied on a long flying lead to get heat where you need it.
- Integrated protection device allows for operation in temperatures as low as -40°C.
- Built in RTD sensor monitors heating elements to ensure temperatures are maintained at safe limits.
- Suitable for Zone 1/2 (IIB+H2) or Zone 21/22 (IIIC) hazardous areas.
- Optional lifting rails available

Certification	**ATEX** Ⓔx II 2 G D Ex h Ex db eb IIB+H2 T3...T4 Gb Ex tb IIIC T200°C...T135°C Db IP65 **CU TR (EAC)** 1Ex db eb IIB+H2 T3...T4 Gb X Ex tb IIIC T200°C...T135°C Db X **IECEx** Ex db eb IIB+H2 T3...T4 Gb Ex tb IIIC T200°C...T135°C Db IP65 **CSA (USA/CAN)** Approval upcoming
Dimensions	L475 x W470 x H530mm. Base Weight 28kg
Main Materials	**Casing:** PA66 30% glass and steel filled with EMI shielding **Impeller:** PA66 30% glass and steel filled with EMI shielding with epoxy coated aluminium hub **Elements:** Finned stainless steel tubular elements **Ex d Enclosure:** Anodised extruded aluminium **Ex e Enclosure:** Stainless steel **Motor Housing:** Epoxy coated aluminium
Mounting	Adjustable feet at each corner allow for a stable standing on uneven surfaces. Wall mounting bracket option available (will require remote isolator for heater access/operation). Anti-static castors available.
Rating	Up to 6kW
Temp Class	Available in T3 and T4 temperature classes
Voltage	**Single-phase:** 110V to 277V **Three-phase:** 380V to 690V, 50/60Hz

Performance Data	At 50Hz	At 60Hz
Avg Air Velocity at Outlet (m/s)	4.8	5
Volumetric Flow Rate (m^3/hr)	1050	1260
Fan Speed (min^{-1})	1380	1460
Motor Rating (kW)	0.09	0.09
Sound Pressure (dBA)	65	68

LFH
Heavy-Duty Fan Heaters

- Stainless steel outer casing provides supreme protection, even in the harshest working environments.
- Higher air flow allows for safe pressurising and heating of habitats for onsite repair works.
- Can be supplied on a long flying lead to get heat where you need it.
- Bespoke protection device allows for operation in temperatures as low as -40°C.
- Built in RTD sensor monitors heating elements to ensure temperatures are maintained at safe limits.
- Various mounting options for floors, walls and even ceilings available.
- Suitable for Zone 1/2 (IIB+H2) hazardous areas.
- Range also includes an even more high-powered range, the XLFH
- Stackable mounting kit options available

Certification

ATEX
Ⓔx II 2 G D Ex h
Ex db eb IIB+H2 T2...T4 Gb
Ex tb IIIC T300°C...T135°C Db IP65

CU TR (EAC)
1Ex db e IIB+H2 T3...T4 Gb X
Ex tb IIIC T200°C...T135°C Db X

IECEx
Ex db eb IIB+H2 T2...T4 Gb
Ex tb IIIC T300°C...T135°C Db IP65

CSA (USA/CAN)
Approval upcoming

Dimensions
LFH: L540 x W600 x H600mm. Base Weight 55kg
XLFH: L690 x W720 x H680mm. Base Weight 75kg

Main Materials
Casing: Stainless steel
Impeller: PA66 30% with EMI shielding with epoxy coated aluminium hub
Elements: Finned stainless steel tubular elements
Ex d Enclosure: Anodised extruded aluminium
Ex e Enclosure: Stainless steel
Motor Housing: Epoxy coated aluminium

Mounting
Floor, wall or ceiling mounting options available as standard. Anti-static castors available.

Rating
Up to 40kW (depending on the model)

Temp Class
Available in T2, T3, and T4 temperature classes (depending on the model)

Voltage
Three-phase: 380V to 690V, 50/60Hz

Performance Data	At 50Hz		At 60Hz	
Model	LFH	XLFH	LFH	XLFH
Avg Air Velocity at Outlet (m/s)	5.5	6	6.6	7.2
Volumetric Flow Rate (m^3/hr)	1950	3050	2340	3660
Fan Speed (min^{-1})	1380	1380	1460	1460
Motor Rating (kW)	1.1	1.1	1.1	1.1
Sound Pressure (dBA)	78	83	80	85

Product Range - MFH

Model	Kilowatts	Volts	T Class	Max Current (A)	Air ΔT (°C/°F)	
					50Hz	60Hz
MFH – T4 Class						
MFH-2.5-110	2.5	110	T4	23.3	7 / 13	6 / 11
MFH-3-120	3	120	T4	25.6	8 / 15	7 / 13
MFH-2.75-220	2.75	220	T4	13.1	8 / 14	6 / 12
MFH-3-230	3	230	T4	13.6	8 / 15	7 / 13
MFH-2.75-240	2.75	240	T4	12.1	8 / 14	6 / 12
MFH-3-254	3	254	T4	12.4	8 / 15	7 / 13
MFH-3-277	3	277	T4	11.4	8 / 15	7 / 13
MFH-2.75-380	2.75	380 (3Ph)	T4	4.8	8 / 14	6 / 12
MFH-3-400	3	400 (3Ph)	T4	4.9	8 / 15	7 / 13
MFH-2.75-415	2.75	415 (3Ph)	T4	4.4	8 / 14	6 / 12
MFH-3-440	3	440 (3Ph)	T4	4.6	8 / 15	7 / 13
MFH-3-480	3	480 (3Ph)	T4	4.3	8 / 15	7 / 13
MFH-3.7-600	3.7	600 (3Ph)	T4	4.2	10 / 19	9 / 16
MFH-3.7-690	3.7	690 (3Ph)	T4	3.7	10 / 19	9 / 16
MFH – T3 Class						
MFH-5.5-220	5.5	220	T3	25.6	16 / 29	13 / 24
MFH-6-230	6	230	T3	26.7	17 / 31	14 / 26
MFH-5.5-240	5.5	240	T3	23.5	16 / 29	13 / 24
MFH-6-254	6	254	T3	24.2	17 / 31	14 / 26
MFH-6-277	6	277	T3	22.3	17 / 31	14 / 26
MFH-5.5-380	5.5	380 (3Ph)	T3	9.0	16 / 29	13 / 24
MFH-6-400	6	400 (3Ph)	T3	9.3	17 / 31	14 / 26
MFH-5.5-415	5.5	415 (3Ph)	T3	8.3	16 / 29	13 / 24
MFH-6-440	6	440 (3Ph)	T3	8.5	17 / 31	14 / 26
MFH-6-480	6	480 (3Ph)	T3	7.8	17 / 31	14 / 26
MFH-6-600	6	600 (3Ph)	T3	6.4	17 / 31	14 / 26
MFH-6-690	6	690 (3Ph)	T3	5.6	17 / 31	14 / 26

- All voltage values in "Volts" column have a voltage tolerance of +0/-10%.
- All voltages are Phase 1, unless specified.
- Max currents include motor inrush.
- Air ΔT (Delta T) refers to the air temperature difference at the inlet and outlet. For example, if the ambient is +6°C and the ΔT (temperature rise) is 15°C, then the outlet will be +21°C.
- Minimum SWA multicore cables required: 3Ph 380V–690V heaters require 4mm², 1Ph 220V-277V T4 heaters require 4mm², 110V-120V T4 & 220V-277V T3 heaters require 6mm², 110V-120V T3 heaters require 10mm².
- All values based on 25m cable lengths and an acceptable voltage drop of 4% at +40°C ambient.
- MFH-SA models with robust, Safe Area designs available

Product Range - LFH

Model	Kilowatts	Volts	T Class	Max Current (A)	Air ΔT (°C/°F)	
					50Hz	60Hz
LFH – Fixed Design						
LFH-6.5-380-T4	6.5	380	T4	10.0	19 / 34	15 / 28
LFH-7.5-400-T4	7.5	400	T4	12.0	22 / 40	18 / 33
LFH-8-415-T4	8	415	T4	12.0	23 / 41	19 / 34
LFH-9-440-T4	9	440	T4	13.0	26 / 47	21 / 39
LFH-11-380-T3	11	380	T3	18.0	28 / 50	23 / 41
LFH-12.5-400-T3	12.5	400	T3	19.0	32 / 58	26 / 48
LFH-13.5-415-T3	13.5	415	T3	20.0	34 / 61	28 / 50
LFH-15-440-T3	15	440	T3	21.0	38 / 68	31 / 56
LFH – Portable Design						
LFH-7.5-230-T4	7.5	230 (3Ph)	T4	12.0	22 / 40	18 / 33
LFH-9-690-T4	Max 9	Max 690	T4	Based on voltage	Max 26 / 47	Max 21 / 39
LFH-12.5-230-T3	12.5	230 (3Ph)	T3	33.0	32 / 58	26 / 48
LFH-15-690-T3	Max 15	Max 690	T3	Based on voltage	Max 38 / 68	Max 31 / 56
LFH – Misc						
LFH-24-690-T2	24	Max 690	T2	Max 38.0	TBC	TBC
LFH-C Advanced Controls	24	Max 690	T2	38.0	TBC	TBC

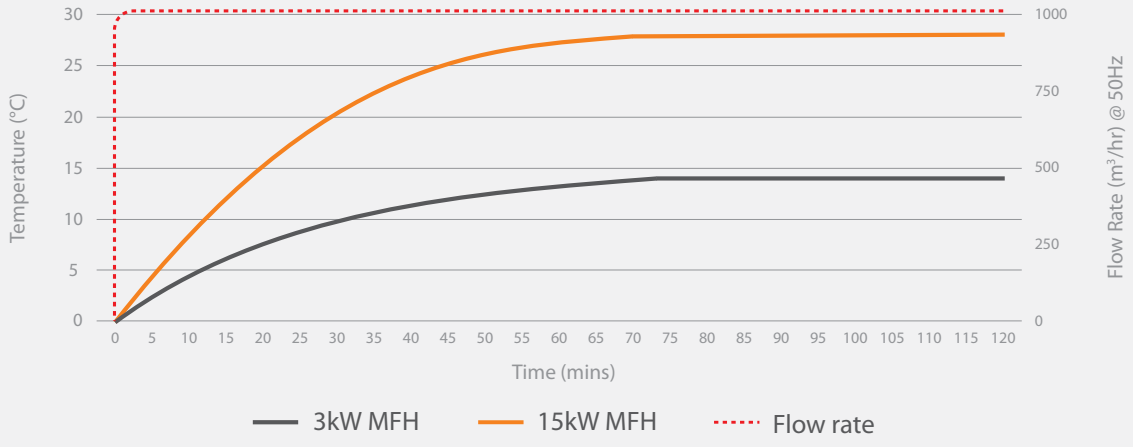
Model	Kilowatts	Volts	T Class	Max Current (A)	Air ΔT (°C/°F)	
					50Hz	60Hz
XLFH – Fixed Design						
XLFH-11-380-T4	11	380	T4	17.0	24 / 43	20 / 35
XLFH-12-400-T4	12	400	T4	18.0	26 / 47	21 / 39
XLFH-13-415-T4	13	415	T4	19.0	29 / 52	24 / 43
XLFH-14.5-440-T4	14.5	440	T4	20.0	32 / 58	26 / 48
XLFH-18-380-T3	18	380	T3	28.0	34 / 61	28 / 50
XLFH-20-400-T3	20	400	T3	30.0	38 / 68	31 / 56
XLFH-21.5-415-T3	21.5	415	T3	31.0	41 / 74	34 / 61
XLFH-24-440-T3	24	440	T3	32.0	46 / 82	38 / 68
XLFH – Portable Design						
XLFH-12-230-T4	12	230 (3Ph)	T4	32.0	26 / 47	21 / 39
XLFH-14.5-690-T4	Max 14.5	Max 690	T4	Based on voltage	Max 37 / 64	Max 30 / 53
XLFH-20-230-T3	20	230 (3Ph)	T3	55.0	38 / 68	31 / 56
XLFH-24-690-T3	Max 24	Max 690	T3	Based on voltage	Max 46 / 82	Max 38 / 68
XLFH – Misc						
XLFH-36-440-T2	36	440	T2	TBC	TBC	TBC
XLFH-40-690-T2	40	Max 690	T2	Max 63.0	TBC	TBC
XLFH-C Advanced Controls	40	Max 690	T2	63.0	TBC	TBC

- Max currents include motor inrush.
- Air ΔT values measured at outlet.
- LFH/XLFH also available in 480V, 600V and 690V options (upon request).
- LFH/XLFH "Portable Design" heaters are supplied with local isolator, anti-static castors and dual lifting rails.

Performance Simulation - MFH

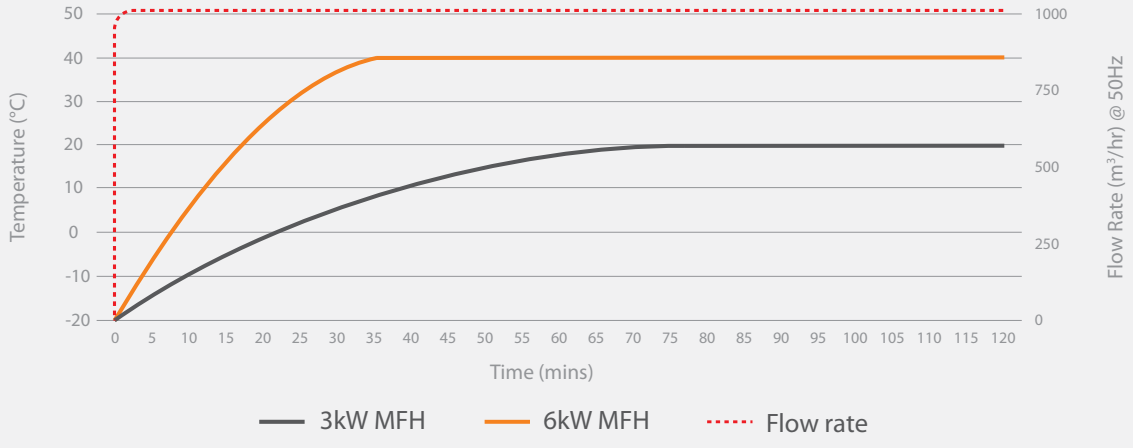
20ft Container

Uninsulated, Ambient 0°C



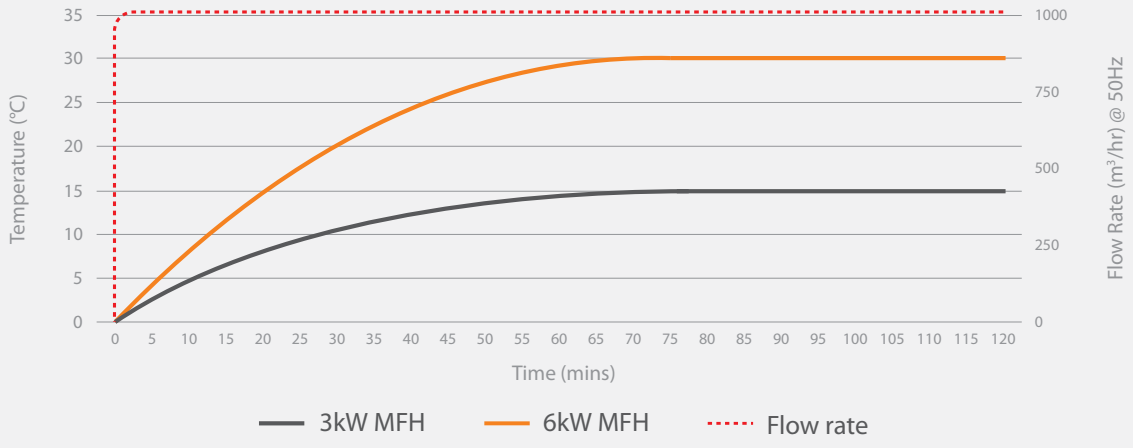
24m³ Room

Poorly insulated, Ambient -20°C



Large 110m³ Storage Room

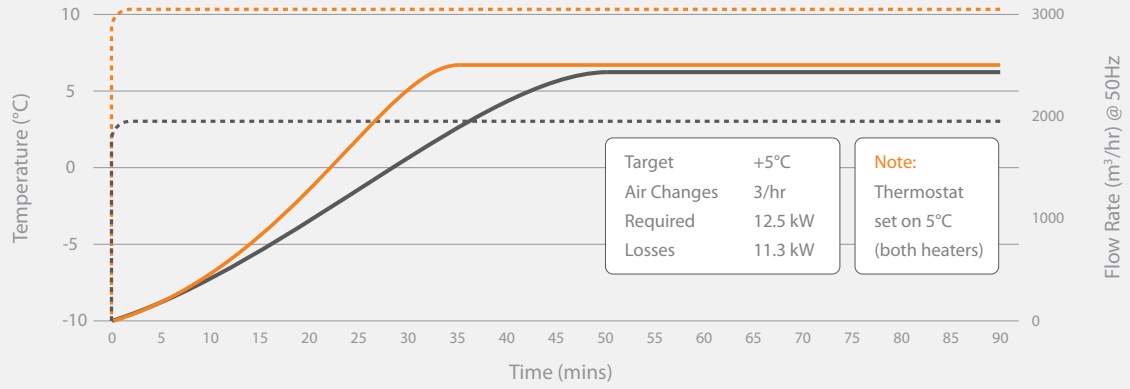
Well insulated, Ambient 0°C



Performance Simulation - LFH

40ft Container

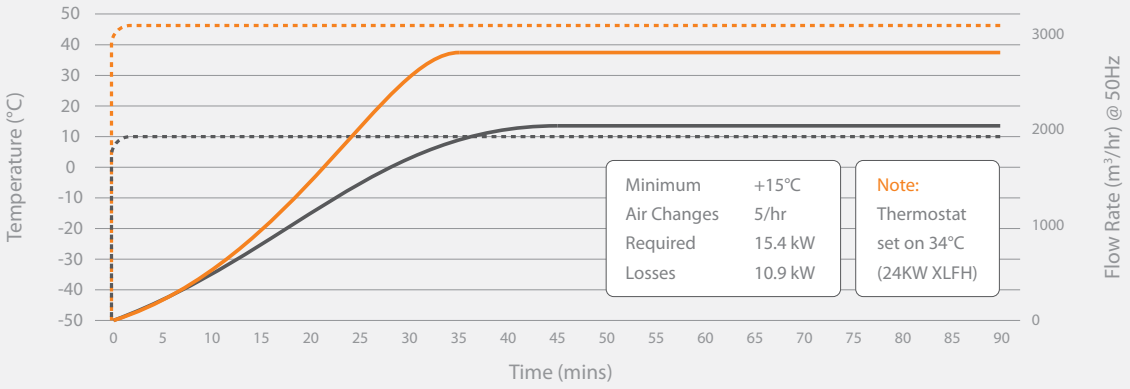
Uninsulated, Ambient -10°C



15kW LFH (T3) / 14.5kW XLFH (T4) — LFH Flow rate — 24kW XLFH (T3) — XLFH Flow rate

Large Battery / Switchgear Room

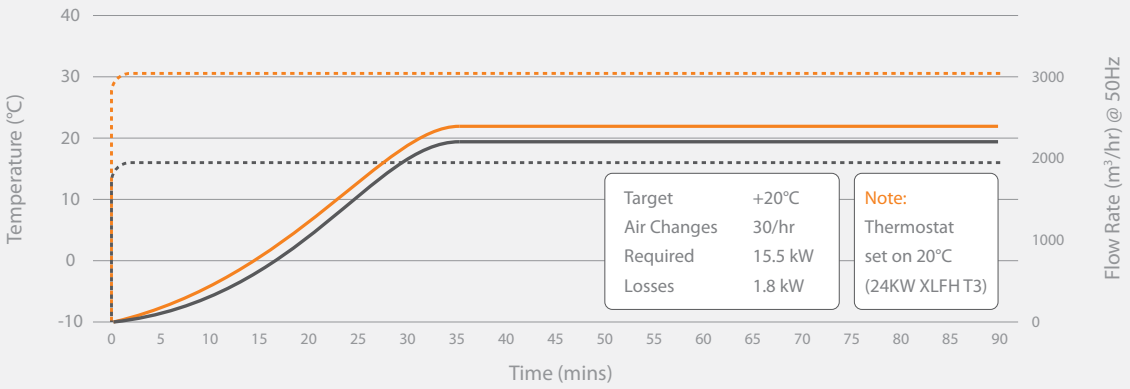
12 x 6 x 2.5 metres, 2" insulation, Ambient -50°C



15kW LFH (T3) / 14.5kW XLFH (T4) — LFH Flow rate — 24kW XLFH — XLFH Flow rate

Temporary Enclosure / Habitat for Maintenance

6 x 4 x 2.4 metres, 1" insulation, Ambient -10°C



15kW LFH (T3) / 14.5kW XLFH (T4) — LFH Flow rate — 24kW XLFH (T3) — XLFH Flow rate

Features - Approval

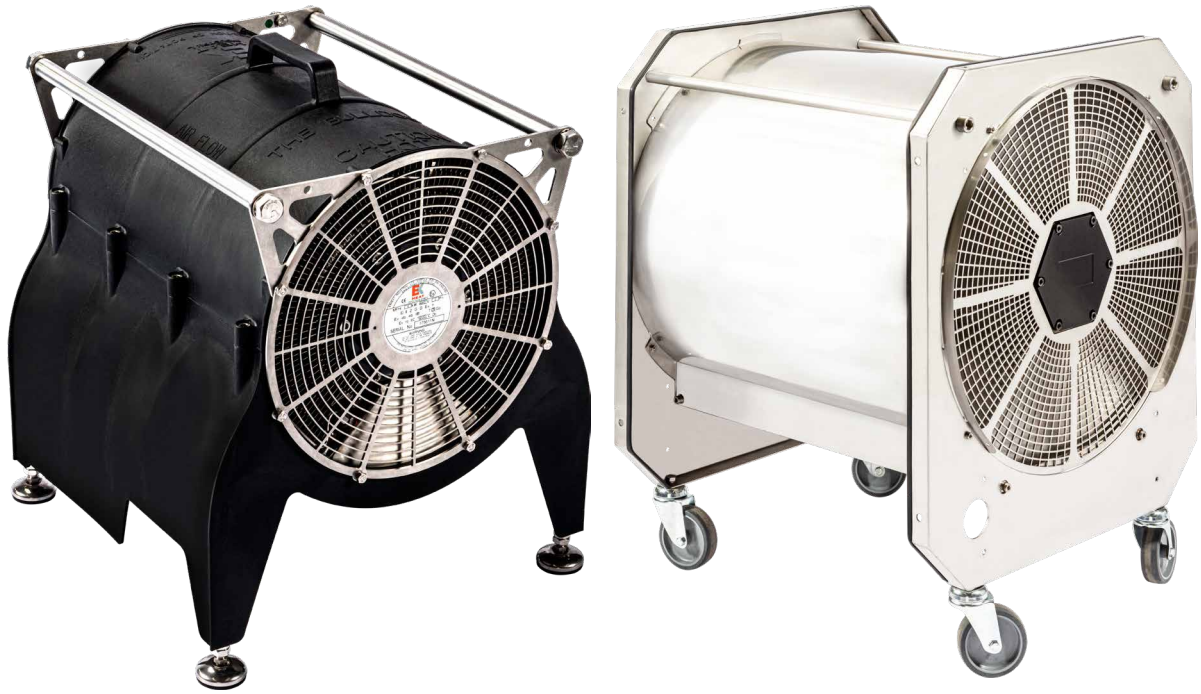
Approvals

In 2016, two new standards were issued to replace the now withdrawn BS EN 13463 range of standards that are to protect non-electrical equipment for use in potentially explosive atmospheres. Adding to the EN IEC 80079 range of standards, BS EN ISO 80079-36:2016 and BS EN ISO 80079-37:2016 were published.

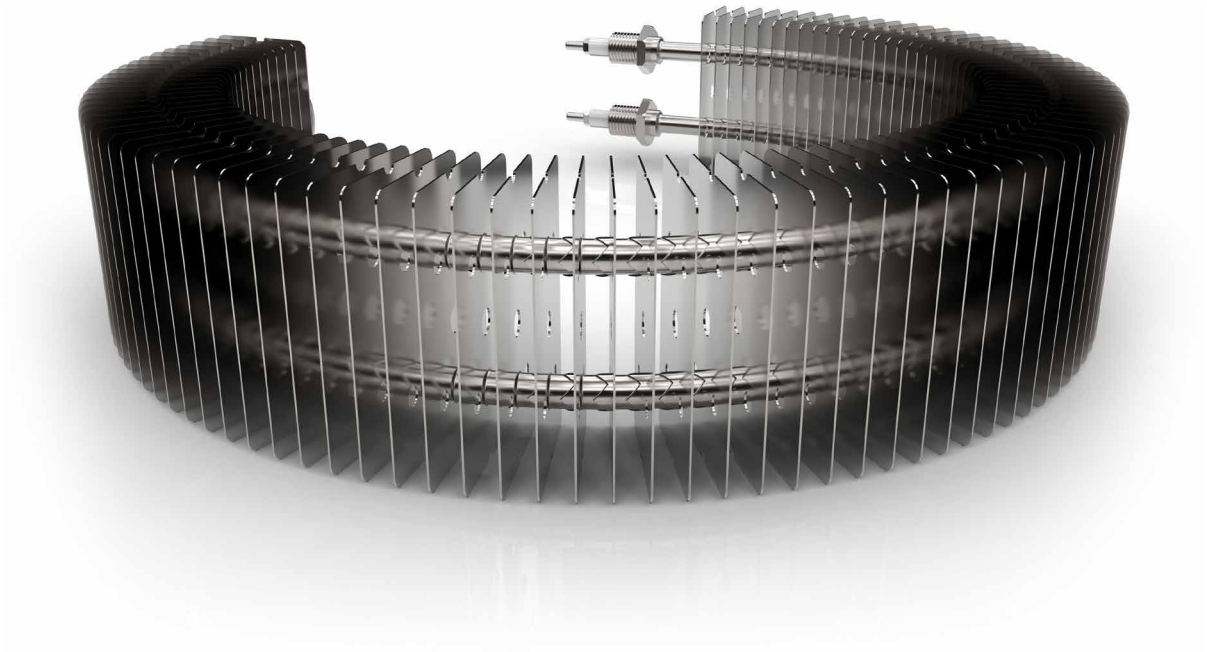
Ex II 2 G D Ex h

Products protected by constructional safety, control of an ignition source and liquid immersion have their ATEX markings suffixed by the letters ‘c’, ‘b’ and ‘k’ respectively. The new standards have compressed these three concepts into a single protection and allow the new Ex h marking to be used.

By including a fan in the design, the ATEX requirements in BS EN 14986:2017 were triggered, which calls on the requirement for constructional safety markings. The MFH and LFH fan heater ranges are marked with the Ex h markings, and have undergone additional testing over and above the standard electrical and mechanical requirements of the BS EN IEC 60079 range of standards in order to confirm compliance. Both fan heater model ranges are also certified to CU TR standards (with CSA approvals upcoming).



Features - Heating Elements



Heating Elements

The MFH/LFH make use of EXHEAT Industrial's patented element array design to offer a more consistent and energy-efficient heating solution for our customers.

Each tubular element is constructed using a premium nickel-chrome resistance wire, compacted in high purity magnesium-oxide powder and sheathed in environment resistant stainless steel. An array of fins are then soldered in place to improve thermal transfer away from the element sheath, allowing for more powerful elements to be run in the same conditions while maintaining the temperature class.

The curved element formation also allows for a very compact assembly, unlike typical hazardous area fan heaters that generally have a rectangular arrangement.

In comparison with most other conventional "fixed-installation" fan heaters in the market that generate heat using a heat exchanger, EXHEAT Industrial's fan heaters utilise a direct "over-element" technology to ensure consistent temperature output. Below are some reasons why our fan heaters are a better option:

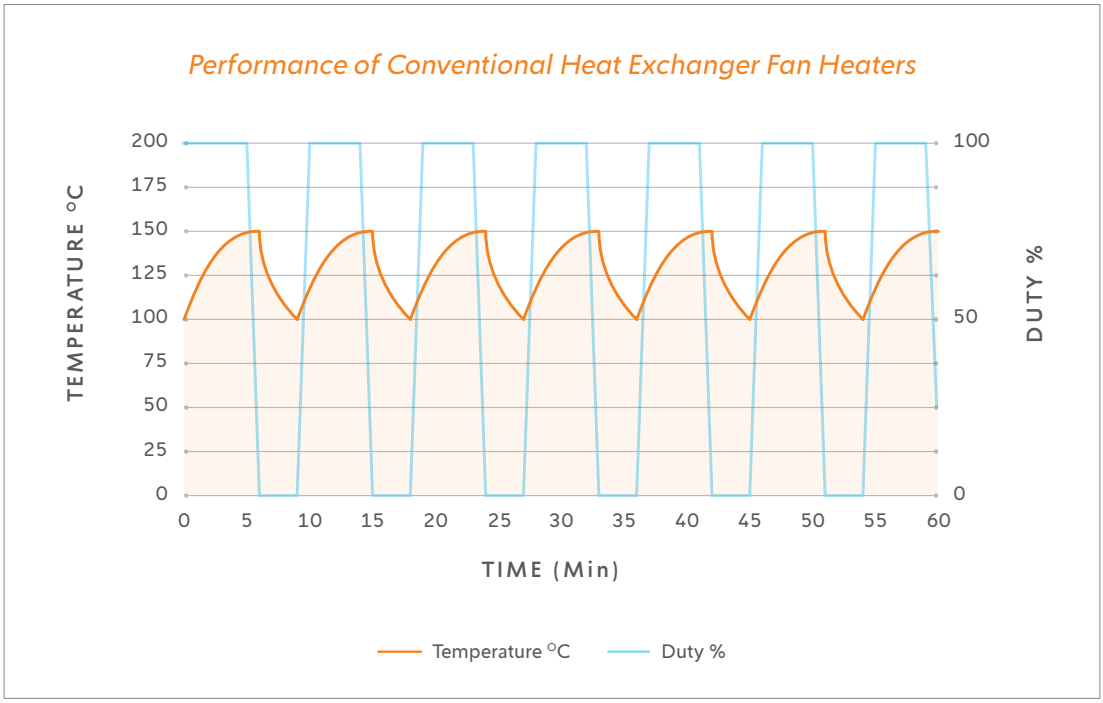
How Does a Conventional Heat Exchanger Work?
A heat exchanger has a large radiator covered in fins that is used to house heat transfer fluid (most commonly a water and glycol mixture), and has a small heater bundle to provide the full duty.

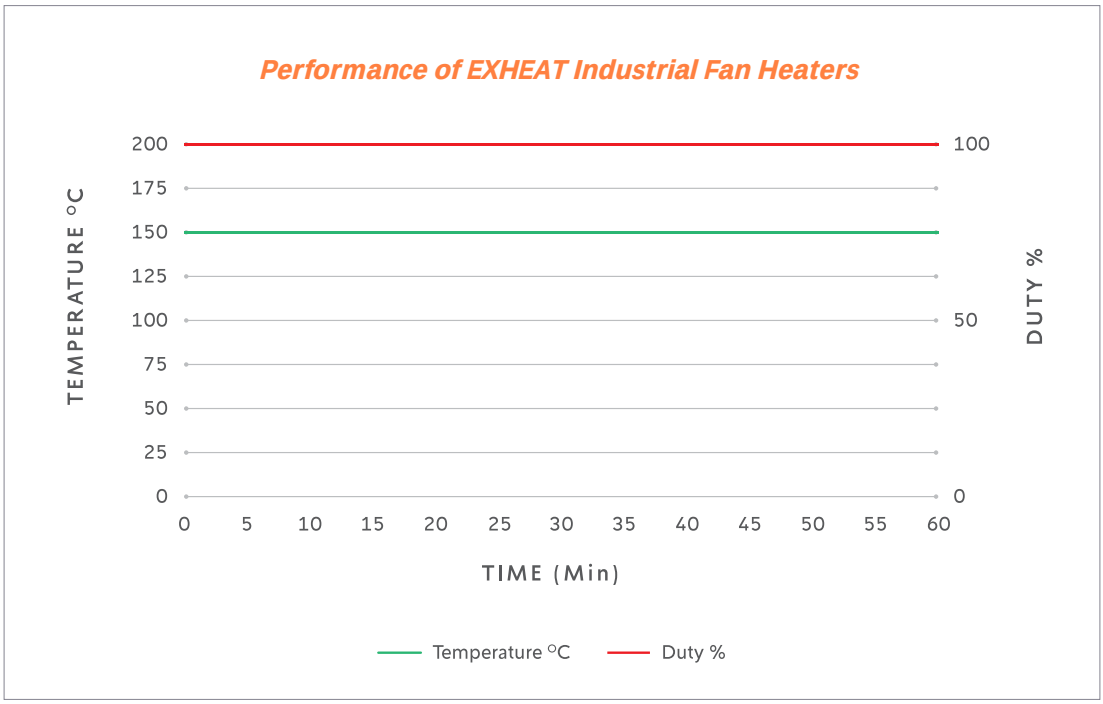
To prevent overheating, a temperature control device is fitted to ensure the heater does not exceed its T-Class. As the temperature increases, the heater de-energises and no longer provides 100% of its duty. Once the fluid in the exchanger cools, the heater will re-engage the elements and begin to increase the temperature again. This method results in a heater that does not run at 100% all of the time and subsequently, a larger heater may need to be specified.

Features - Heating Elements

How Are EXHEAT Industrial's Fan Heaters Better Than a Conventional Heat Exchanger Type Fan Heater?

The MFH/LFH utilise EXHEAT Industrial's patented heating element technology to operate indefinitely at 100% of their installed duty, ensuring that there is no fluctuation in the temperature of the warm air stream (other than the changes with ambient temperature). This means that lower duty heaters can be specified, as the additional “redundancy” of heat exchange does not need to be considered.





Features - Casing, Components

Casing

EXHEAT Industrial's fan heaters are designed with casings that have been designed to not only be tough and durable, but to also assist with air flow through the central air tunnel, ensuring that optimal thermal transfer can be achieved.

- **MFH:** Uses a casing moulded from aliphatic polyamide (PA66) reinforced with glass and steel fibres, making it tough and durable with a reduced overall weight. This composite material also provides additional static charge dispersal and EMI shielding properties for added internal component protection.

- **LFH:** Utilises stainless steel for its casing, offering a bigger and more rugged heating solution.

Portable and Stacking Kits available.

Components

All components used within the MFH and LFH have been specially selected and constructed with equipment robustness and effective heating in mind.

Stainless steel bracketry and fixings allow the heater to endure harsh marine environments, while parts like the motor and impeller have been specially chosen to provide the right air flow throughout the heaters for maximised efficiency.

Features - Enclosures, Over-Temp Protection

Enclosures

The MFH and LFH both comprise two enclosures that allows users to operate it safely:

- **Flameproof Ex d Enclosure:** Housing sparking electrical components, this enclosure is made from hard anodised aluminium for use in offshore environments. By utilising aluminium for various other, normally heavier components, EXHEAT Industrial has been able to drastically reduce the 'normal' weight that is associated with a fan assisted heater.

- **Increased Safety Ex e Enclosure:** Made from stainless steel, this enclosure allows for easy access to wiring, and is safe to use in the harshest of working environments - both onshore and offshore.

By directly mounting the enclosures to one another, EXHEAT Industrial ensures that there are no looping wire runs to be caught up in the impeller or heating elements. This provides you with a single neat cabling solution ensuring safe connections between the protection device, and the wiring of the elements and motor.

Each enclosure can be accessed separately, whether to manually reset the protection device in the Ex d enclosure, or to undertake the routine maintenance within the Ex e.

Over-Temperature Protection

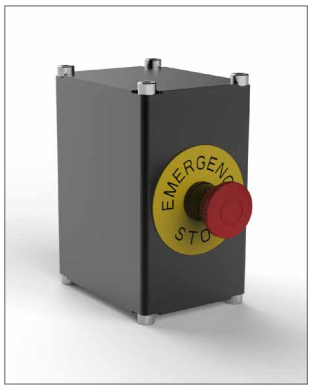
Both fan heater model ranges are fitted with their own customised protection device, which allow them to operate consistently at ambient temperatures as low as -40°C, where normal thermal protection circuits would struggle to run below 0°C.

The heaters are also equipped with an inbuilt RTD sensor. This device constantly monitors the hottest part of the heating element in order to protect the unit from exceeding assigned T-Class temperatures (whether through fault or misuse).

Accessories

	MFH	LFH
Cable and plug	✓	✓
Earth leakage protection	✓	✓
Emergency stop button	✓	✓
Dual lifting rails	✓	✓
Indicator lamps	✓	✓
Isolator	✓	✓
Thermostat	✓	✓
Transformer	✓	✓
Cable junction box		✓
Ducting		
Flexible ducting, PVC fabric	✓	✓
Flexible wye-splitter ducting, PVC fabric	✓	✓
Air flow director, stainless steel		✓
Mounting		
Castor wheels, anti-static	✓	✓
Fixed feet, rubber	✓	✓
Brackets, wall-mount	✓	✓
Portable kit	✓	✓
Stacking kit		✓

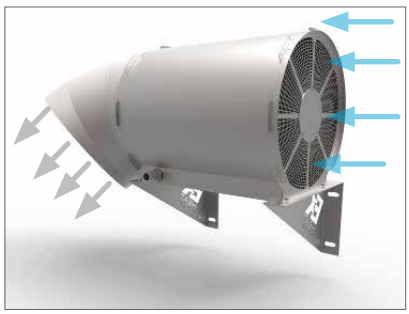
Isolator



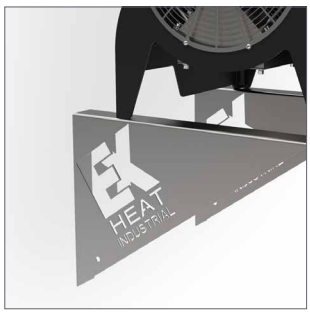
E-Stop

Indicating Lamps

Ducting



Air flow director



Wall Mounting Brackets

Warranty, Packing & Ordering

Warranty

Our standard warranty is 18 months from date of despatch or 12 months from putting into service, whichever is earlier. Premiums for extended warranty on the motor and heating element parts only are available on request based on a maximum of 36 months from installation.

Please note that the associated Installation and Operating Manual and supporting Hazardous Area Certificates are available to view on our website www.exheat-industrial.com

Packing

18mm pallet box for domestic (within UK) shipments or air/sea worthy packaging for export shipments.

How to Order

Simply quote your model code and information about your specific application and call us on +44 191 410 4292 or via email at hpsales@thorneandderrick.co.uk. Alternatively, you can enquire and order directly from our recognised distributor below.

THORNE & DERRICK INTERNATIONAL

THORNE & DERRICK

7 Lumley Court, Drum Industrial Estate
Chester-le-Street, DH2 1AN, UK
Tel: +44 (0)191 410 4292
Fax: +44 (0)191 411 1323
Email: hpsales@thorneandderrick.co.uk
Web: www.heatingandprocess.com