DF / IDF Series

GAS FIRED COMBINED HEATING AND VENTILATION

NORDAIR NICHE COMBINED HEATING AND VENTILATION

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GAS FIRED COMBINED HEATING AND VENTILATION

Introduction

Nordair Niche is one of the UK's leading specialists in the design and manufacture of gas fired heating equipment.

The comprehensive range of gas fired air heaters provides high efficiency combined heating and ventilation solutions across a broad spectrum of industrial and commercial applications. Combined heating and ventilation units ensure precise control, excellent indoor air quality and optimum energy efficiency.

The units are available as either direct fired units or indirect fired units to give complete flexibility for optimum design capability. Both the direct fired and indirect fired range of units are fully CE approved and a comprehensive range of optional equipment can be added to the standard models to allow systems to be tailored to meet the requirements for factories, warehouses and other types of large open space buildings.

For large open areas the units are available with a wide range of optional air distribution heads to provide ductless air distribution. This is achieved by slightly pressuring the building to ensure very even air distribution both laterally and vertically, thereby eliminating the requirement for extensive distribution ductwork and high level de-stratification fan units.

Where ductwork is required the units can be supplied with either forward or backward curved fans to allow for ductwork resistance up to 2000 pascals thereby making them eminently suitable for use with air induction systems.

Features and Benefits

- CE approved units
- Indoor and outdoor models
- High thermal efficiency for reduced operating costs
- Fully compatible for use with transpired solar panels to facilitate use of renewable solar energy
- Units are supplied fully wired and complete with controls
- Close temperature control
- Fully modulating direct gas fired burner control with 20:1 turn down ratio
- Indirect fired units with turn down ratio of up to 12:1

Model Range and Options

- Indirect gas fired units 150kW-900kW
- Indirect gas fired condensing heaters 55kW-412kW
- Direct gas fired units 30kW-1200kW
- Airflow range 0.5m³/s to 25m³/s
- External static pressures up to 2000 pascals depending on airflow
- Horizontal Units
- Vertical Units
- Indoor models or fully weatherproofed outdoor units
- Variable supply air volume with inverter drives
- Panel and/or bag filters
- Mixing box c/w dampers and optional actuators
- Integral silencer section
- Optional evaporative cooling module
- Heat recovery
- Air distribution heads

System Types

The units are designed to provide the primary heat source across a wide range of applications including:

- Ductless air distribution
- Air Induction systems
- Tempered input ventilation
- Industrial make up air
- Industrial air displacement ventilation
- Pressure ventilation systems

Controls

To maximise the efficiency of operation Nordair Niche supply a range of fully integrated control packages to suit each application.

Units are supplied fully wired and complete with all starters and contactors etc plus time and temperature control via an integral Trend controller. Optimised start and stop is included as standard and controls are password protected to prevent unauthorised adjustment.

For smaller systems a SmartCom control panel may be used instead of the Trend control to provide simple user friendly control with a comprehensive range of features.

The units are also fully compatible with BMS systems and alternative BMS Controls may be integrated within the control strategy.

Applications

- Factory Heating and Ventilation
- Make up air for buildings with mechanical exhaust
- Localised air replacement for booths and extract booths
- Warehouse and distribution centre heating
- Sports halls
- Arenas and exhibition halls
- Swimming pool hall heating and condensation control
- Aircraft hangars

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Specification

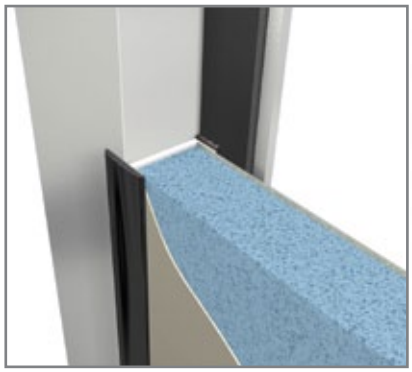
Typical Indirect Fired Unit Heater

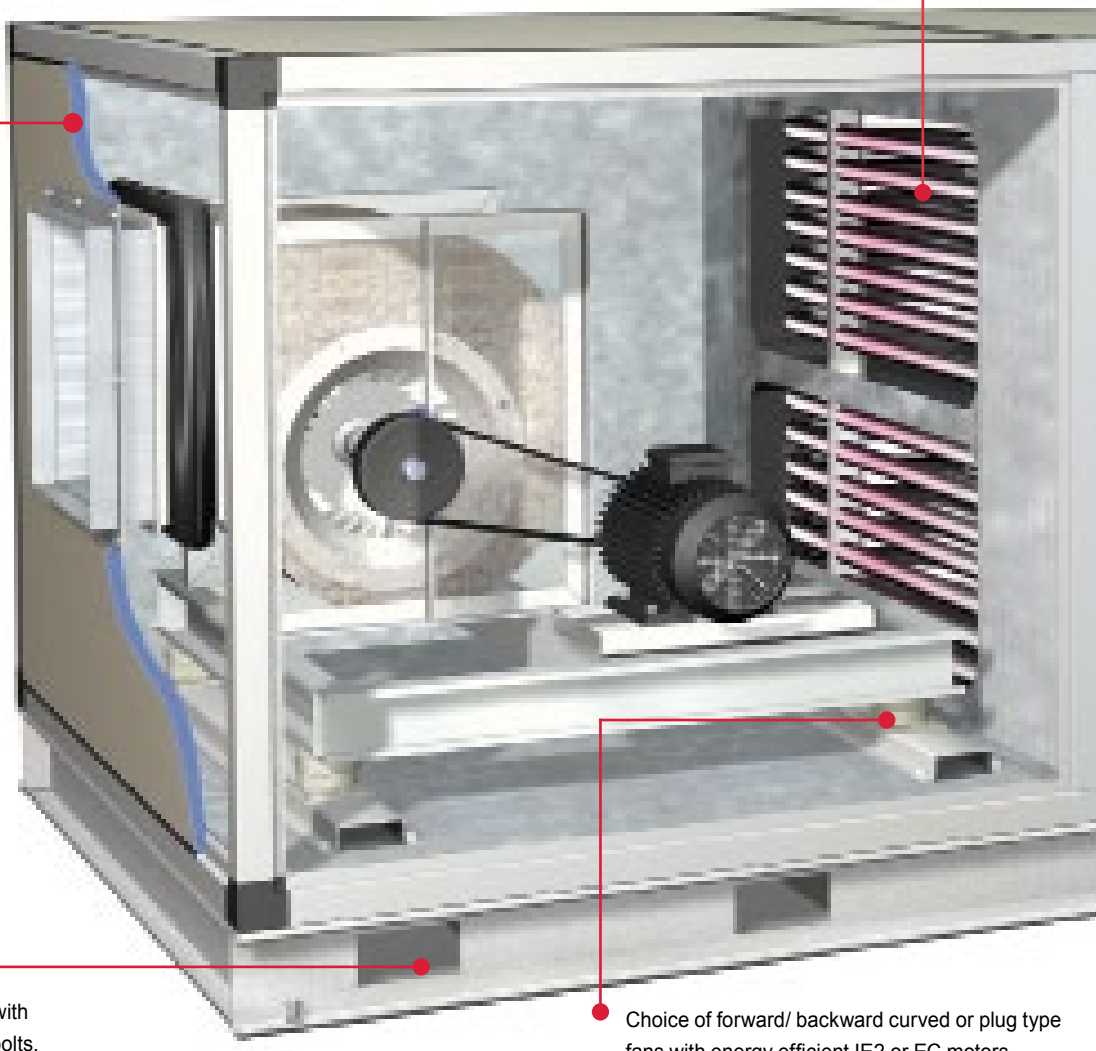
Anodised aluminium framework with optional infill panels.

Option 1 Eco panels with enhanced insulation (0.024w/mk). Patented water hydrotec water formulated polyurethane foam provides enhanced insulation and reduced weight of 8kg/m^2. The injection process guarantees continuity of thickness and adhesion to provide excellent panel rigidity, whilst integral double edge sealing provides improved airtightness.

Option 2 Mineral wool insulation (0.03w/mk), panel weight 16kg/m^2

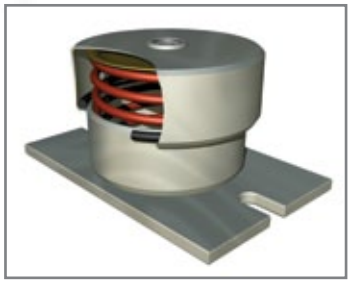
All service panels are hinged for ease of access, with fan and burner compartment sections coming complete with locks.





Galvanised base frame complete with lifting access points and levelling bolts.

Choice of forward/ backward curved or plug type fans with energy efficient IE2 or EC motors.



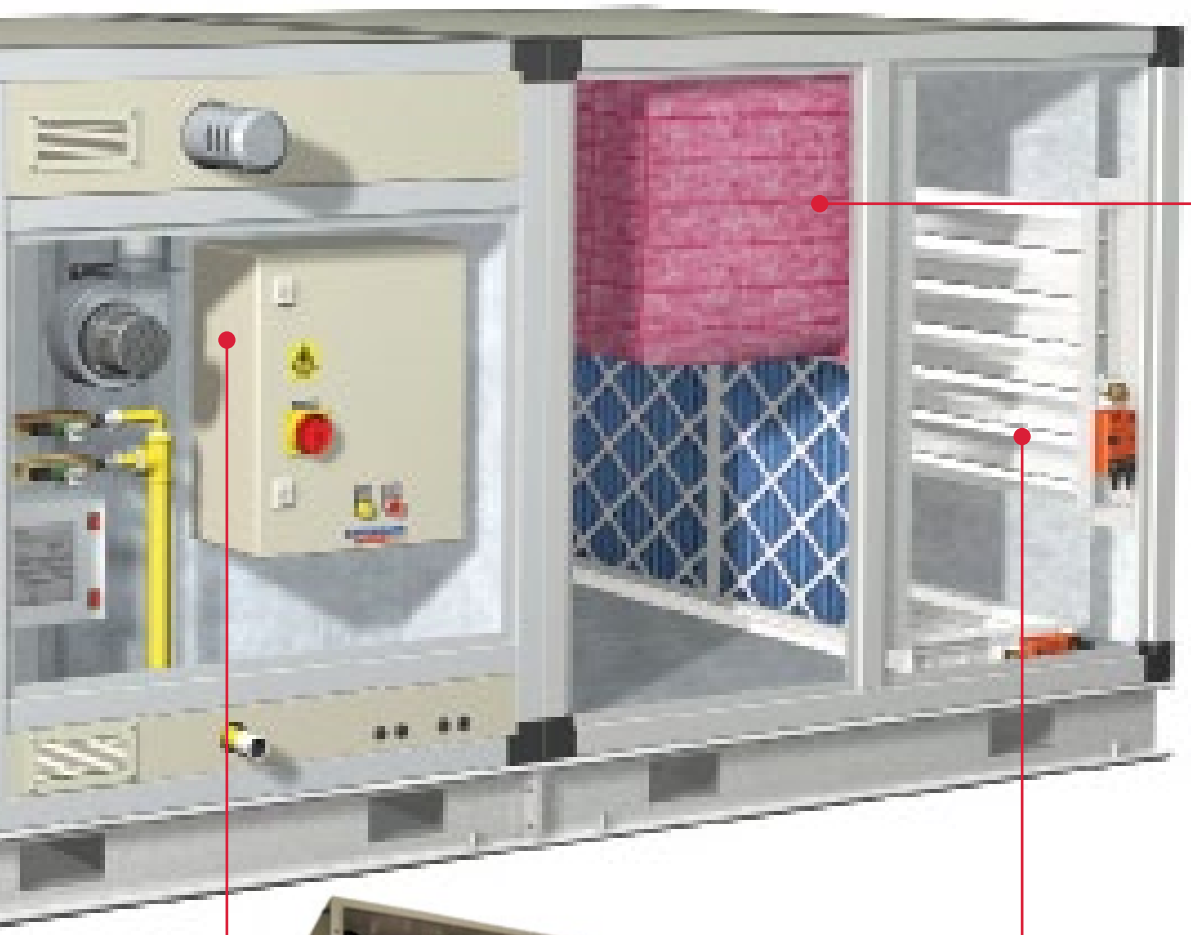
Fans and motors are mounted on a separate base frame complete with anti-vibration mounts and flexible connections

Indirect gas fired sections comprise CE certified coils. Standard gas fired coils provide high efficiency in excess of 91% with high turndown ratio.

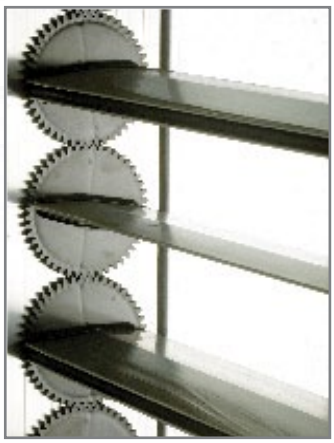
Coils provide thermal efficiencies of up to 102% with turn down ratio of 12:1 depending on output

Direct gas fired sections are fully CE certified and provide 100% efficiency (NCV) and a turn down ratio of up to 20:1

Direct fired units provide the ideal energy efficient solution for applications requiring permanent ventilation or for buildings with higher air infiltration rates.



Wide choice of both panel and bag filters.



Standard units are supplied complete with all wiring and controls.

Aluminium aerofoil section dampers complete with edge seals for precise control of fresh air and recirculation air.

A comprehensive range of damper actuators may be factory fitted and wired to provide occupancy ventilation or fresh air free cooling.

Direct Fired Units

GAS FIRED COMBINED HEATING AND VENTILATION

The Principle of Direct Firing - Make Up Air

Where air is extracted from a building either for process or environmental reasons a supply of heated replacement air is required to balance the system and maintain comfort. If make up air is not provided the extract system will perform inefficiently at reduced capacity and a negative pressure will be created. This results in cold air being drawn in around the perimeter of the building and causing cold spots and unpleasant draughts.

For new installations the supply of heated make up air can often provide the required ventilation without the need to install additional extract units, where matching extract is required this can be integrated in the same unit to supply both input and exhaust with the option of heat recovery from the extract air. Direct gas firing provides a highly efficient and cost effective method of providing heated replacement air with thermal efficiencies of 100% (based on LCV) and fully modulating burner control with up to 20:1 turndown ratio.

Variable air volume or air recirculation units allow systems to be matched to constantly changing extract rates or to provide full space heating in applications where reduced winter ventilation rates are required

Combined Heating and Ventilation

In heating mode Nordair Niche units provide controlled amounts of fresh air to slightly pressurise the building and the supply air temperature is constantly monitored and adjusted via a fully modulating burner control to optimise the heat input to match the precise building requirements. Close control of the air discharge temperature virtually eliminates heat stratification whilst slight building pressurisation ensures very even distribution both laterally and vertically over large areas, eliminating the requirements for extensive ductwork distribution.

The amount of fresh air automatically adjusts to meet the ventilation requirements of the space.

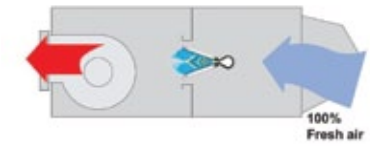
The units provide the ideal solution to large areas with variable occupancy or industrial heating applications where ventilation rates may change throughout the day.

In summer mode the units provide 100% fresh air, the large primary air volumes provide improved air change rates for optimum 'free cooling', optional evaporative cooling modules may also be added.

Features and Benefits

- High efficiency for reduced operating costs
- Fully modulating burner with high turn down ratio (up to 20:1)
- Close control with rapid response to temperature changes
- Low maintenance costs
- Improved indoor air quality
- Summer fresh air for "free cooling"
- Alternative model options allows systems to be tailored to suit a wide range of applications
- Horizontal or vertical units
- Indoor or fully weatherproofed outdoor units.
- Optional evaporative cooling can be added

DF/MUA



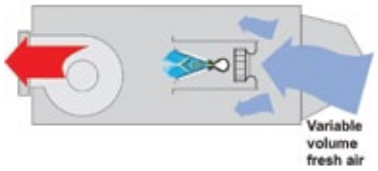
Constant volume direct fired make up air heaters to provide a fixed rate of heated fresh air to the space.

The units are ideal for supplying heating and make up air to large areas or to individual spray booths etc where constant extract rates are used.

Generally units are sized to introduce slightly more make up air into the space than the extract air volume. A balanced amount of make up air can provide a slight positive pressure to uniformly distribute the air throughout the building and eliminate random air infiltration.

For special applications such as kitchen make up air and certain industrial processes where the transfer of odours or dust etc to surrounding areas needs to be avoided the volume of make up air supplied is lower than the extract rate.

DF/VAV



The variable air volume models allow the volume of heated make up air to vary to suit the changing requirements of the building or changing exhaust rates.

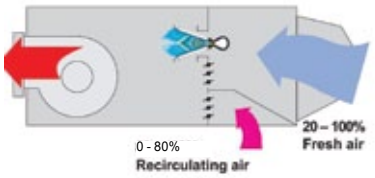
The units are fitted with a special box burner system c/w integral fan(s) to ensure optimum combustion throughout the range of varying volume main air supply.

The units supply 100% fresh air at all times but the volume of fresh air is automatically adjusted either by the application of a building pressure sensor or temperature sensors.

The building pressure sensor can be set to maintain a slight positive or slightly negative pressure inside the building to suit the requirements of the application.

When used for space heating temperature sensors adjust both the air discharge temperature and the supply air volume to a rapid warm up and maintain minimal stratification levels.

DF/REC



Nordair Niche variable air recirculation models are fully CE approved and patented to provide a constant air volume with up to 80% recirculation air.

The variable air recirculation option combines a constant supply of 20% fresh air which passes over the burner with the remaining air volume being either fresh air, recirculation air or a mixture of fresh and recirculated air.

The variable percentage of fresh air and recirculation air is accurately controlled via a fully modulating face and by pass damper with fresh air introduced using the burner section and recirculation air via an integral by pass.

The fully modulating burner control and modulating damper control functions are fully Integrated via a microprocessor control to completely co-ordinate the heating and ventilation functions.

The system can provide variable make up air or full building heating or a combination of both controlled via building pressure sensors and temperature sensors to automatically respond to building pressure and temperature requirements.

Indirect Fired Units

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Indirect Gas Fired Heat Exchanger

Nordair Niche gas fired air heaters incorporate a high efficiency gas fired heating coil. Standard coils have a with a minimum thermal efficiency of 91%, and currently qualify for Enhanced Capital Allowances.

Gas fired condensing coils have a thermal efficiency up to 102% to minimise energy consumption and reduce emissions.

The gas fired heating coils have a number of advantages compared to traditional heat exchangers and enable the heat exchanger section to be closely matched with the filter sizes etc to minimise the airflow resistance and reduce the specific fan power required. The heating coils also provide an excellent turn down ratio for close temperature control.

Units are fully CE approved and are supplied with all necessary safety and monitoring controls, each coil is fitted with a power flue venter and a differential pressure switch automatically shuts down the burner in the event of blocked flue or combustion air inlet.

Qualified for Energy Technology List
www.eca.gov.uk

Features and Benefits

- Extended heat transfer area for high efficiency and reduced operating costs
- Reduced operating temperature for enhanced life expectancy
- Standard coils manufactured from heat resisting stainless steel tube
- Optional aluminised steel tube heating coils available at reduced cost for units operating on full air recirculation
- Modular coils utilised on higher output units to avoid the possibility of a complete plant shut down in the event of a burner lockout
- Enhanced reliability: each burner is fitted with a multi try ignition system which allows for five ignition attempts with a pre and post purge on each ignition sequence
- Pressure switch automatically shuts down the burner in the event of blocked flue or combustion air inlet
- Alternative wall or roof flue terminations for indoor units
- Simple wall flue outlet reduces installation costs and eliminates roof penetrations and potential roof leaks

Model Range and Options

- Heat outputs :
  Standard units 50kW-900kW
  Condensing models 55kW-412kW
- Airflow range 1.5m³/s to 25m³/s
- External static pressures up to 2000 pascals depending on airflow
- Horizontal Units
- Vertical Units
- Indoor models or fully weatherproofed outdoor units.
- Panel and/or bag filters
- Mixing box c/w dampers and optional actuators
- Integral silencer section
- Heat recovery
- Air distribution heads

Heat Recovery

Recuperative Heat Recovery

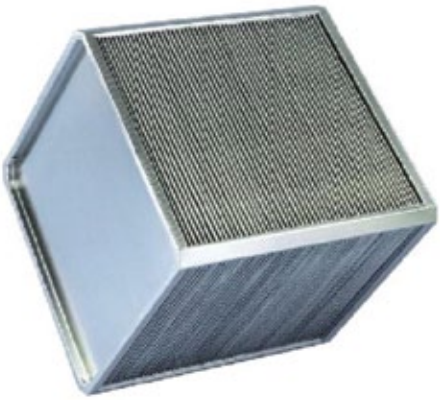
To reduce energy consumption and CO_2 emissions it is desirable to recover heat from any air extracted from the building.

For new buildings where mechanical ventilation is specified, the use of heat recovery is generally a requirement for Building Regulation compliance.

Combined supply and extract units with heat recovery are ideal for these applications. Standard heat recovery units utilise a plate heat exchanger to achieve 50-90% heat recovery. The cool fresh air and warm exhaust air streams pass each other in a cross flow direction, heat is transferred from the warm exhaust air to pre-heat the incoming fresh air stream.

Complete separation of airstreams eliminates cross contamination or transfer of moisture, odours, dirt or bacteria etc.

The amount of heat recovery is dependent on the exchanger surface area. By varying the number of heat exchanger plates and their spacing, the efficiency can be optimised to meet a particular specification. With high efficiency, heat recovery condensation can occur in the exhaust air stream as dew point conditions are reached; all units are therefore fitted as standard with a condensation tray.



Features and Benefits

- Reduced energy consumption
- Reduction in size of heating capacity required and associated installation costs
- Heat exchanger has no moving parts for guaranteed reliability
- Additional transfer of latent heat when condensation occurs: increased heat exchanger efficiency.
- Optional epoxy coating when additional corrosion protection is required
- Optional by pass damper on plate heat exchangers for summer operation when heat recovery is not required.

Applications

- Arenas
- Factories where extraction is required
- Kitchen and dining areas
- Retail outlets
- Sports halls
- Spray booths
- Swimming pools

Regenerative Heat Recovery

Rotors or thermal wheels are the most effective system to recover heating or cooling energy from the exhaust air stream.

The fresh air and exhaust air pass through the aluminium rotor matrix in a counterflow design.

Heating and cooling energy is absorbed by the matrix and transferred to the incoming fresh air as the wheel rotates, providing up to 80% energy saving.

DIRECT FIRED TECHNICAL DATA

Model				Std burner size minimum kW output	Std burner size maximum kW output	Minimun air flow m^3/s	Maximun air flow m^3/s
DF1	MUA	VAV		26		0.51	0.86
DF2	MUA	VAV		53	66	1.03	1.41
DF3	MUA	VAV		66	132	1.79	2.82
DF4	MUA	VAV	REC	92	198	2.57	4.00
DF5	MUA	VAV	REC	132	264	3.85	5.13
DF7	MUA	VAV	REC	198	330	5.13	7.00
DF9	MUA	VAV	REC	264	462	6.42	9.00
DF11	MUA	VAV	REC	264	594	8.98	11.55
DF14	MUA	VAV	REC	396	660	10.27	14.00
DF18	MUA	VAV	REC	462	924	14.12	18.18
DF25	MUA	VAV	REC	594	1056	17.96	25.71

1 DF-MUA are fixed volume fresh air units for make up air applications, DF-VAV models are full fresh air models complete with inverter drive to supply variable air volumes to suit demand. DF-REC models are complete with patented air recirculation to provide full fresh air or up to 80% recirculation air in variable proportions.

2 Each unit is available wit ha range of air flows and different burner sizes to give required temperature rise through the units up to a maximum of 42ºC Δ T.

3 Maximum airflow for DF25 REC is 22.5m^3/s.

4 Units may be specified to suit alternative airflows and a range of external static pressure requirements up to 40 pascals (dependent on options fitted). For higher static pressures please consult Nordair Niche

DIRECT FIRED MUA & VAV APPROXIMATE DIMENSIONS

Model	MUA & VAV horizontal units				MUA & VAV vertical units				Outlet size std fan mm^2	Air inlet size h x w mm	Approx weight exc filters kg
	Height mm	Width mm	Length mm	Length C/W filters mm	Depth mm	Depth C/W filters mm	Width mm	Height mm			
DF1	800	860	1800	2420	700	1390	860	2854	229	600 x 460	225
DF2	800	860	1800	2420	700	1390	860	2854	322	600 x 760	250
DF3	1100	1100	2000	2640	1000	1690	1100	3554	453	900 x 1000	300
DF4	1350	1250	2600	3240	1250	1940	1250	3954	507	1150 x 1150	400
DF5	1800	1500	2900	3540	1650	2340	1500	4604	638	1550 x 1500	500
DF7	1800	1500	2900	3540	1650	2340	1500	4604	715	1550 x 1500	515
DF9	2050	2000	3200	3840	1900	2590	2000	5354	801	1800 x 1900	900
DF11	2050	2000	3200	3840	1900	2590	2000	5354	898	1800 x 1900	925
DF14	2350	2200	3500	4140	2200	2930	2200	5854	1007	2100 x 2100	1200
DF18	2500	2600	3500	4140	2350	3080	2600	6404	1130	2250 x 2500	1400
DF25	2500	2600	3500	4140	2350	3080	2600	6404	1267	2250 x 2500	1600
Model	REC horizontal units				REC vertical units						
DF4	1800	1500	3540	4180	1650	2340	1500	4700	507	1550 X 1400	700
DF5	1800	1500	3540	4180	1650	2340	1500	4700	638	1550 X 1400	800
DF7	1800	1500	3850	4490	1650	2340	1500	4700	715	1550 X 1400	900
DF9	2050	2000	4200	4840	1900	2590	2000	5050	801	1800 X 1900	1100
DF11	2350	2200	4280	4920	2200	2930	2200	5520	898	2060 X 2060	1350
DF14	2350	2200	4540	5180	2200	2930	2200	5720	1007	2060 X 2060	1450
DF18	2500	2600	4640	5280	2350	3080	2600	6020	1130	2210 X 2460	1650
DF25	2750	2600	4880	5520	2600	3330	2600	6445	1267	2460 X 2460	1800

1 All dimensions and weights are approximate and should be confirmed with Nordair Niche

2 All details are for internal units, please contact Nordair Niche for external unit information.

3 Filter dimensions include side access panel and/or bag filters.

4 Units will be delivered in sections to suit individual project.

5 External static pressures of up to 2000 Pa are available. Contact Nordair Niche for details of non standard units.

DIRECT FIRED TECHNICAL DATA

Model	Std heat exchanger minimum kW output	Std heat exchanger maximum kW output	Minimun air flow m^3/s	Maximun air flow m^3/s
IDF2	15	100	1.00	2.00
IDF3	50	150	1.50	3.00
IDF4	50	200	2.50	4.00
IDF5	75	300	3.50	5.20
IDF7	100	400	5.00	7.00
IDF8	100	400	6.00	8.00
IDF9	100	450	7.00	9.00
IDF11	150	600	9.00	11.00
IDF14	150	825	10.00	14.00
IDF16	175	900	13.00	16.00
IDF18	200	900	14.00	18.00
IDF22	250	900	15.00	22.00

1 Each unit is available with a range of airflows and different heat exchangers to give required temperature rise through the units up to a maximum of 46°C Δ T.

2 The maximum and minimum airflow of each model size is shown. Units may be specified for alternative airflows to suit application requirements. Motor size is dependent on airflow and static pressure required.

3 Units may be specified to suit a range of external static pressure requirements up to 400 Pascals (dependnt on options fitted). For higher pressures up to 2000 Pascals please consult Nordair Niche.

4 Non-standard airflow and heat exchanger combinations are available on request.

INDIRECT FIRED APPROXIMATE DIMENSIONS

Model	Height mm	Width mm	Length mm	Length C/W filters mm	900 silencer section mm	Mixing box section mm	Outlet size std fan mm^2	Air inlet size h x w mm
IDF2	1400	1250	2200	3100	1100	700	453	1200 x 1150
IDF3	1800	1500	2500	3400	1100	700	507	1600 x 1400
IDF4	1800	1500	2700	3600	1100	700	638	1600 x 1400
IDF5	1800	1500	2700	3600	1100	700	715	1600 x 1400
IDF7	2050	2000	3200	4100	1100	900	801	1760 x 1860
IDF8	2350	2200	3400	4300	1100	900	801	2060 x 2060
IDF9	2350	2200	3700	4600	1100	900	898	2060 x 2060
IDF11	2500	2600	3900	4600	1100	1000	1007	2210 x 2460
IDF14	2500	2600	3900	4800	1100	1100	1007	2210 x 2460
IDF16	2500	2600	4600	5500	1100	1200	1130	2210 x 2460
IDF18	2750	3200	4600	5500	1100	1400	1130	2460 x 3060
IDF22	2750	3200	4600	5500	1100	1800	1267	2460 x 3060

1 The above gives an overview of sizes and duties available; for any duty not shown please contact Nordair Niche.

2 All dimensions and weights are approximate and should be confirmed with Nordair Niche.

3 Weights will be calculated once options have been confirmed.

4 All details are for internal units, please contact Nordair Niche for external unit information.

5 Filter dimensions include side access panel and/or bag filters.

6 Units will be delivered in sections to suit individual project. Total length may vary.

7 Silencers are available in various lengths. Contact Nordair Niche for details.

8 Mixing box dimensions are approximate and will vary. Contact Nordair Niche for project specific dimensions.

9 All heights include main support frame.

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