Natgraph
EQUIPMENT SOLUTIONS

ULTRA-VIOLET SCREENPRINTING | FORCED AIR STENCIL EXPOSURE | INFRA-RED DRYING TECHNOLOGY

Air Force High Temperature & IR Combination Dryers

- stencil processing
- screen printing
- air force
- ultra violet
- infra red

Natgraph manufacture a range of Air Force High Temperature and IR Combination Dryers that has been developed from many years of experience gained in the design and production of over 150 IR High Temperature Conveyorised Systems, in daily use world-wide. These versatile dryers have the ability to dry specialist inks using either a combination of Infra Red radiation and hot air, hot air alone or even combined with UV.

These dryers have been designed, developed and manufactured for drying surface coatings applied to textiles, glass, telecommunications products, automotive and electronics etc, if there is a special ink available for the application, Natgraph will have a solution.

With 8 standard belt widths, Touch Screen PLC Control System, 4 layouts, IR lamp systems, hot air up to 200°C and modular design, this range of dryers is extremely adaptable, versatile and efficient.

Air Force High Temperature Dryers
Infra Red Combination Dryers
Refrigerated Cold Air Modules
Inlet Filters
Thyristor Drives

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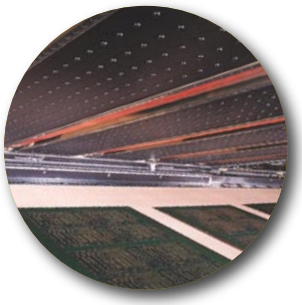
Air Force High Temperature & IR Combination Dryers

Features

- Touch Screen, PLC Control System
- High temperature operation up to 200°C
- High efficiency vented stainless steel reflectors
- Gas filled hood lifting arms
- Vacuum hold-down system
- Modular construction
- P.T.F.E. fibre glass belt
- Castors & jacking feet
- Colour coded to industry standards
- Optional recirculation filters
- Optional inlet filter
- Optional thyristor control



Infra Red lamps and air nozzles

Outer cladding insulation layer

200°C Air Force Dryers

The Natgraph modular range of Air Force Dryers is available in 8 belt widths from 70cm through to 215cm and is also optionally available with high temperature air (up to 200°C). A combination of either Infra Red lamps within the hot air and Ultra Violet lamps within the cold air module, as well as refrigerated air systems, make these dryers extremely adaptable. These versions of Natgraph's world famous Air Force Dryers have all the same features and build quality as a standard unit, but with the added versatility of High Temperature Forced Air, Infra Red and/or UV curing in the same dryer.

The construction of these High Temperature dryers is completely different from a standard unit, with extra insulation layers and air gaps required to keep the external surfaces cool, even though it can be over 200°C inside the dryer. The air recirculation system uses a different principle, as the hot air needs to be retained in a specially insulated, inner ducting system that has an additional insulation layer.

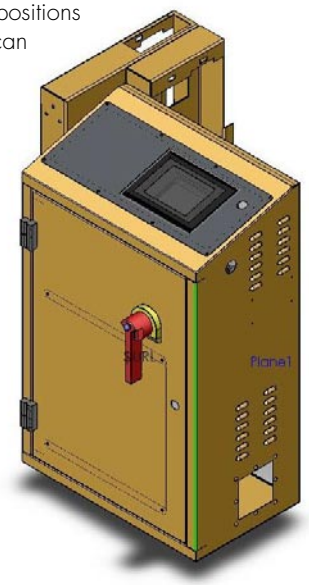
The air is recirculated by being drawn down through the belt into the top of a high efficiency, stainless steel 'hot box' in which the impeller of the high temperature fan rotates to force the air through the fast response electrical heating elements. This 'hot box' can have an optional high temperature filter fitted to remove any airborne particles down to 4 microns. The air is then forced up through the stainless steel ductwork into the triple skinned hood.

The fans used are specifically designed for operating at high temperatures with external bearings contained in special enclosures.

The hot air is delivered onto the substrate through a pattern of special nozzles in removable galvanised steel jet plates located in the hood. This system ensures that an even temperature and drying efficiency is achieved all over the substrate.

The inclusion of IR drying does not extend the length of an Air Force Dryer, as the IR lamp system is incorporated within the 2m hot air module. The medium wave IR lamps are located in vented, stainless steel reflectors that are positioned within the forced air, recessed into special jet plates. Each reflector can accept 2 IR lamps with a maximum of 12 lamps in each 2m hot air module.

The lamps are selected in alternate banks to give half or full power operation as standard, or can have an optional thyristor drive fitted to give control of the lamps on a percentage basis. Depending upon the application, the IR lamps can be installed in different positions within the module, this can be useful if by example a 'ramp up' is required at the beginning of the drying process, or alternatively if a 'final bake' is needed. In these cases the IR is either installed where it is needed, or each bank of lamps can be wired to allow individual selection, as required.



Options

A variety of options are available for the range of Air Force High Temperature and IR Combination Dryers, these are intended to make the dryer more productive and versatile, whilst ensuring they fit into the intended location as efficiently and economically as possible.

Refrigerated Cooler Modules

Refrigeration module

An optional refrigerated cooler module can be specified where extra cooling is required, or the substrate exit temperature needs to be very low. This is also very useful if the printroom is likely to develop very high ambient temperatures. These modules recirculate the air through an internal cooling coil (with air filter) that is connected to an external water chiller plant by flexible pipework. Water is cooled by the chiller plant as required to maintain a controlled temperature within the module.

The chiller plant requires a separate electrical power supply, but is controlled from the dryers PLC system.

Recirculation Filters

An optional air recirculation filter system can be fitted to each high temperature module as an option. This unit has a replaceable, slide in filter, rated at 200°C with a filter rating of EU4 (4 microns). It is located within the top of the 'hot box' inside a stainless steel enclosure which has been designed to maintain air efficiency within the dryer whilst preventing contamination.

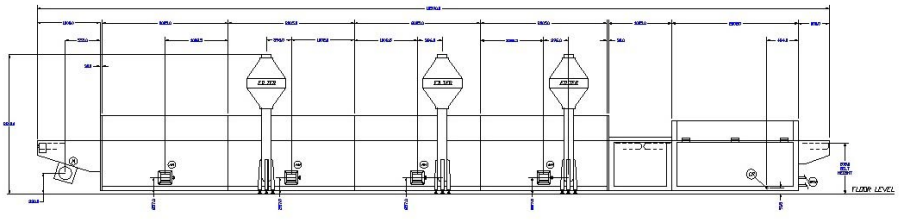
Inlet Filter

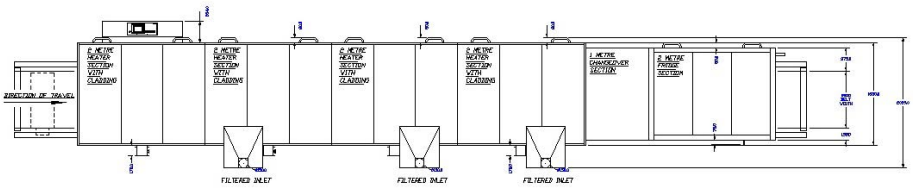
Inlet filter stacks

An optional inlet air filter stack can be fitted to each dedicated air inlet to ensure that the air being drawn into the dryer is free of dirt and dust. This freestanding filter stack has a replaceable, slide in unit, with a filter rating of EU4 (4 microns) and has been designed to maintain air efficiency for the dryer, whilst preventing contamination.

Thyristor Drives

An optional thyristor drive can be fitted to control the output of the Infra Red lamps on a percentage basis, this system can be very useful when the effects of the IR can be critical, or are unknown. The thyristor is controlled by the Touch Screen PLC Control System with a digital output.





Specifications

Air Force High Temperature and IR Combination Dryers

The following specifications are common to all Air Force Dryers

Belt Height	79 – 94cm (31-37") Adjustable by the dryers feet, higher options available.
Belt Speed	3 – 50m per minute (10' – 166') Slower speeds are available to order.
Height	114cm – 129cm (45" – 51") Adjustable by the dryers feet.
Module Length	2m (79")
Voltage	Three Phase 400 Volts 50/60 Hz. AC

These figures apply to individual model sizes.

Model No.	**70**	**90**	**110**	**130**	**155**	**170**	**185**	**215**
Belt/Drying/Curing Width	70cm (28")	90cm (36")	110 (43")	130cm (51")	155cm (61")	170cm (67")	185cm (73")	215cm (84")
Module Width	145cm (57")	165mm (65")	185cm (73")	205cm (81")	230cm (91")	245cm (96")	260cm (102")	290cm (114")

(Weights can be confirmed by Natgraph depending upon the size/type and number of modules used.)

Electrical								
Module Type	2m, high pressure, hot (130°C maximum), air modules							
Model No.	**70**	**90**	**110**	**130**	**155**	**170**	**185**	**215**
Heating Elements	15kW	18kW	18kW	18kW	24kW	24kW	24kW	24kW
Current (Max. Amps)	22	26	26	26	34	34	34	34
Infra Red Lamps (12)	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
Current (Max. Amps)	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
Motor(s)	1.5kW	2.2kW	3kW	3kW	4kW	4kW	6kW	8kW
Current (Max. Amps)	4	5	7	7	10	10	14	17

Air								
	Figures are in 1,000m3/hour, per 2m module							
Model No.	**70**	**90**	**110**	**130**	**155**	**170**	**185**	**215**
	2m, high pressure, hot (130 °C maximum), air modules							
Re-circulated Air	5.1	6.8	8.2	9.5	11.5	12.6	13.1	15.8
Exhaust Air (Adjustable)	1.7	1.9	2.1	2.3	2.6	2.5	2.6	2.9
	2m, high pressure, cold (ambient), air modules.							
Intake Air	3.2	4.3	5.6	6.7	7.7	8.4	8.9	10.3
	2m, high pressure, cold (refrigerated), air modules.							
Re-circulated Air								
Motor(s)	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
Current (Max. Amps)	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
External Chiller Unit	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
Current	tbc	tbc	tbc	tbc	tbc	tbc	tbc	tbc
	2m 2 lamp UV/cold (ambient), air modules.							
Intake Air	2.2	2.8	3.2	3.8	4	4.3	4.8	5.6
Exhaust Air	2.3	2.9	3.4	4	4.2	4.6	5	5.8

NOTE: When calculating power supply sizes for Air Force Dryers, add all the motor and heating element currents of the modules involved together to give the final figure. For Air Force/UV Combinations, add all the motor currents of the modules involved to the lamp current, but do not include the heating elements. This is because a safety interlock ensures that the air heating elements and UV lamps cannot be used at the same time. The UV lamp currents are calculated with 2 lamps at full power.
Example: Model 110 Air Force Dryer, 2m warm, 2m cold = 26 + 7 + 7 = 40 Amps. Model 110 Air Force UV/Combination Dryer, 2m warm, 2m 2 lamp UV cold = 7 + 60 +7 = 74 Amps.

Typical power consumption of a Model 110 Air Force Dryer, 2m warm, 2m cold, running at 50°C with an ambient temperature of 20°C is 10kW per hour (including all motors), at average U.K. power costings, this represents a running cost of below 70p per hour.

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