

# MUSCAT

# FastRak Oven



FastRak Oven - FR-1100T

**For all your resist drying and curing you only need one oven, and that's the Muscat FastRak oven.**

**The FastRak Oven series is designed and built by Muscat Limited, a company dedicated to supplying equipment for the Printed Circuit and Chemical milling industries.**

By using a FastRak conveyerised thermal oven, throughput can be dramatically improved, and curing time reduced. For instance, when curing LPISM panels, the advised final cure temperature and time may be 60 minutes at 150 °C, but customers report times reduced to between 35 and 40 minutes.

These advanced ovens are designed specifically for thermal tack curing and post-curing of a variety of inks commonly found within these industries. Inks such as Liquid Photo Imageable Solder Mask (LPISM), Legends, and Primary inks.

The design of the FastRak oven incorporates many features not found on batch ovens or other thermal conveyor ovens. Specifying a Nubal FastRak conveyerised thermal oven gives you, ease of operation, speed, repeatability and,

most importantly, consistency, .

Available in a number of configurations, the FastRak oven range, starts with a very small footprint oven (just over three metres long) capable of drying up to 180 panels or more an hour. Longer ovens are available by adding extra 1100mm oven sections at build time. Although the standard oven accepts 24" x 24" (610mm x 610mm) panels other sizes may be available to special order.

**General overview.** The FastRak oven is a conveyerised thermal oven primarily intended for use with the Nubal Electronics FastRak handling system. Although designed for this rack system these ovens can also be used as free-standing units. They are able to replace many batch ovens, at the same time reducing the footprint and improving ease of access and throughput. An added advantage these ovens have over batch type ovens is that the panels cannot be removed (except in an emergency) once the process is underway, thus ensuring consistent results. The feed of the panels is via a carefully controlled chain system, on which the racks are located. The movement of the chain uses an index system enabling set-up times to be easily and effectively controlled.

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By using the FastRak trolleys and FastRak racks, panels need never be handled. Racks feeding the oven are simply rolled on to the entry conveyor and the oven takes over control. Once the panels are cured the carrier racks are held on the exit conveyor (normally two racks maximum) until ready for transfer to the next process. Once again, if the FastRak trolley system and racks are used, panels can be moved to the next process quickly and with minimum effort, and once again with no panel handling.

All functions can be easily programmed using the conveniently placed control panel. Standard control is by individual digitally operated temperature sensors, fan speed controls and index counters.

As an option, a neat touch-panel LCD PLC controller can replace the normal controls. Not only does this make operation easier, but also pre-set memories can be supervisor set. All the required functions are programmable. The PLC controller can have up to five memory pages, each having up to 10 pre-set memories. This allows pages to be categorised by job type and individual variations

easily set by buttons on each page. Delays and alarms can also be incorporated and programmed. For instance when the oven is first switched on, the drive is disabled, until the correct temperature has been achieved, thus preventing badly cured panels. Another example is when changing the cure from one setting to another. In this case the changes to time and temperature will not take place until a check is made that the oven is empty.

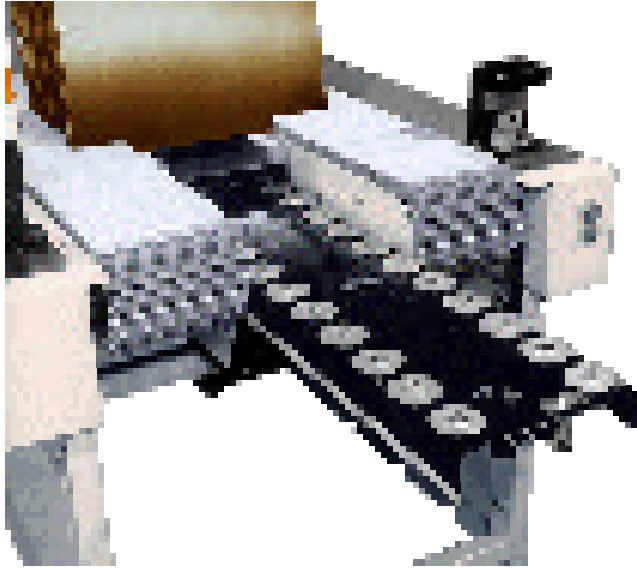
Also the oven can be set to go to stand-by mode when the oven is empty.

On the larger ovens with more than one oven section, the temperature profile can be customised for each section, thus giving a more controlled cure profile.

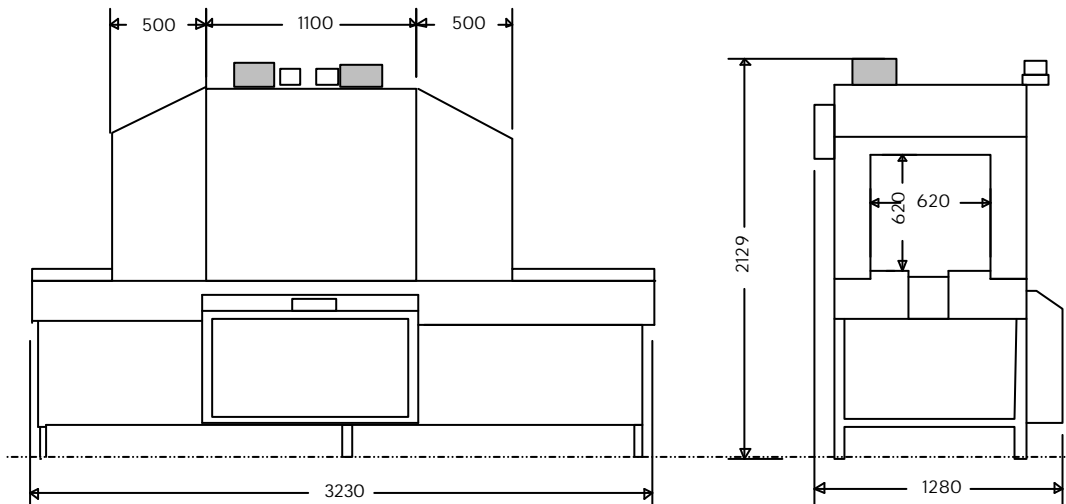
Uniquely each rack can have oven

door(s) attached, giving an "moving oven in a tunnel" effect. Although not necessarily essential during continuous operation, when processing small batches the oven can be controlled more effectively and efficiently using these mobile oven doors.

In operation by balancing extraction and fresh air intake there is negligible air loss to the surrounding environment eliminating unwanted room heating.



**FastRak Classic Collector / Feeder**



- ◆ Repeatability time/airflow profiles giving consistent results throughout the life of the oven
- ◆ Extremely even temperature distribution across panel
- ◆ Operation up to 40% faster than batch ovens on many types of panels
- ◆ Ideal for LPISM “Tack Dry” and “Final Cure” and for primary ink curing
- ◆ Low capital outlay
- ◆ Low running cost
- ◆ Low maintenance
- ◆ Smaller foot print than the equivalent capacity door type batch oven and very much smaller than equivalent tunnel oven.
- ◆ Accurate pre-set temperature and speed profile making operation operator friendly
- ◆ Excellent solvent extraction
- ◆ Oven section lengths available from 1100mm upwards in 1100mm sections
- ◆ Each oven section can be separately programmed

**All FastRak ovens have an in-feed conveyor, three process stages and an out-feed conveyor. The three main stages are:**

#### PRE-HEAT / FLASH OFF

This section is used to pre-heat panels and extracts as much of the solvent as possible. Pre-heating panels gradually avoids curing problems such as blistering, solvent entrapment and contact adhesion. The air used for this section is

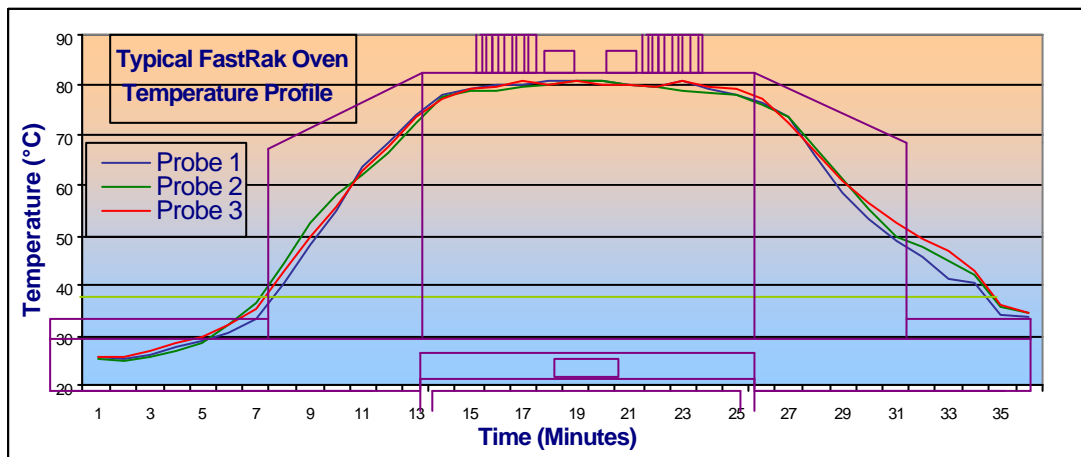
extracted directly from the oven thus avoiding solvent contamination and improving the cure times.

#### OVEN SECTION

This section is the main drying / curing unit. Air is driven across the panel horizontally, giving a very even temperature profile. To maximise economy most of the air is recycled and mixed with fresh air, directed across the digitally controlled heating elements. Additional oven sections can have independent control of temperature and air flow.

#### COOL DOWN

The final stage allows a gentle cool-down of the



## Options

### FastRak Trolleys.

There are two models available. One has a fixed height and the other is adjustable. In most situations the fixed height trolley can be used as some latitude is possible. Using this assumes that all processes are of similar pass heights. This trolley can be adjusted to match the customer's requirements.

### FastRak Racks and Locking Clips

There are three types of rack in the FastRak series: Classic, LC and Universal. All these racks have a maximum contact area of 1/2" (13mm). These racks are intended for

rigid panels. Where panels are semi-rigid or bowed, spacing on the racks can be increased to prevent panels touching. In addition special blocks can be provided which can be clipped onto a rack of panels to lock them together. The use of these can also help reduce bowing within the oven chamber when a problem is expected. In addition to the three standard racks, Muscat Limited can supply special racks, suitable for other types of panels including flexible circuits.

Where curtain coating is used, Muscat has a cassette loader that automatically places panels horizontally in special 36 panel capacity racks, with an extremely small panel contact area. From the loader, racks are moved into the oven in the conventional way.

	FRO-1100T	FRO-1100F	FRO-MT	FRO-MF
Voltage	415v	415V	415V	415V
Current	30A Phase	40A Phase	25A Phase	35A Phase
Heating Elements	1	2	1	2
Power per Element	10kW	14kW	10kW	14kW
Maximum Air Flow [l/hr (ft <sup>3</sup> /hr)]				
Minimum Air flow [l/hr (ft <sup>3</sup> /hr)]				
Maximum Panel Thickness +	3.2mm	3.2mm	3.2mm	3.2mm
Minimum Panel Thickness ++	0.8mm	0.8mm	0.8mm	0.8mm
Maximum Panel Size *	24" x 24" (610mm x 610mm)	24" x 24" (610mm x 610mm)	24" x 24" (610mm x 610mm)	24" x 24" (610mm x 610mm)
Minimum Panel Size	9" x 9"	9" x 9"	9" x 9"	9" x 9"
Maximum Air temperature	120°C	200°C	120°C	200°C
Maximum Time to Reach Temperature (120°C) **	12mins	8mins	12mins	8mins

#### NOTES

- + Additional racks can be specified to accept panels from 3.2mm to 6.4mm thickness
- ++ Special Racks can be supplied for inner layers and flexible circuits. Contact Nubal for
- \* Other sizes can be supplied on request
- \*\* Average time dependant on ambient temperature

**Muscat Limited**  
 Headcorn Road, Sutton Valence  
 Maidstone, Kent  
 ME17 3EH U.K.



As it is a policy of Muscat Limited to continually improve their products, current product levels may not be shown in this documentation. It is therefore advisable to contact Muscat Limited for the current specification. Information within this document does not constitute part of a quotation unless specifically mentioned in any quotation.

Tel +44 (0)1622 843927  
 Fax +44 (0)1622 842284  
 e-mail: sales@muscat-limited.com