3. DESCRIPTION

NOTE!

Some descriptions below may not comply fully to final operation of unit, as programming of drying sequence is made by others than Lytzen. The following is merely a general description of supposed/expected functionality.

3.01 Cabinet

The dryer is an electrically heated convection oven for the temperature range between 40-150 °C, with forced air circulation, built as a profile iron frame with an inside lining of stainless steel sheet and an outside cladding of stainless steel.

Inside lining can be made in full-welded finish (optionally).

The cabinet is effectively insulated by mineral wool.

3.02 Circulator

Centrally in the oven ceiling is placed a centrifugal blower wheel. The hub of the blower wheel is lead through the oven top and fixed directly on the axle of the electric motor.
The direction of rotation is marked by an arrow on the motor bracket.

3.03 Main switch

The dryer is provided with a main switch placed on the control board.

The main switch has holes for separate lock.

The main switch will when turned into position 0 disconnect power and pilot voltage to all electric components.

3.04 EX-proof Electrical Heating element

The dryer is electrically heated by a heating element placed around the recirculation fan, both located in the upper ceiling of the dryer.

The heating element consist of a number of resistor rings, all fully-welded into a fully-welded connection box. The connection box is furthermore fitted with a fully-welded lead-in bush which leads to a junction box located outside the dryer on top of the cabinet.

For the sake of the EX-classification of the dryer chamber, the heating element is provided with an independent Heater Temperature Monitoring System (HTMS) for the purpose of constant monitoring of the surface temperature of the heat resistors. The HTMS protects the heating element from exceeding the maximum allowed temperature (450 °C for temperature class "T1") in the EX-classified chamber. ***NOTE !*** - To rule out any uncertainty cause by for instance system-hysteresis, sensor accuracy etc., the HTMS is set to trigger at 350 °C thus given a safety margin of 100 °C.

HTMS consist of a thermocouple sensor, type J, which is connected to an electronic safety thermostat, named "ALARM MONITOR HEATING ELEMENT SAFETY THERMOSTAT". The thermocouple sensor is clamped directly to the warmest location of the heat resistors and the electronic safety thermostat is located in the main control board. If the alarm limit (max. allowed resistor surface temperature) is reached, the electronic safety thermostat will cut out the heating element and the alarm lamp, marked "HEATING ELEMENT OVERTEMPERTURE" will light.

Possible causes for excessive heating element temperature :

- too rapid heat-up of oven chamber. We recommend maximum heat-up ramp to be 5 °C/minute
- error in oven temperature control system (controller, controller sensor, Solid State Relays etc.)
- thermocouple error in Heating Temperature Monitoring System (HTMS)

Any error in HTMS should be considered critical as EX-classification may be jeopardized. The system may under no circumstances be overruled and normal oven operation should be terminated immediately until the cause of the error has been determined and error fixed.

Upon activation of HTMS, the electronic safety thermostat located inside the control board must be reset manually in order to continue operation. Reset by pressing the 2 leftmost buttons n electronic thermostat simultaneously.

3.05 Temperature controller

The programmable (by user) temperature controller is controlling the wanted heat treatment temperature and the drying sequence in the dryer.

3.06 Safety thermostat

This hard-wired, capillary type safety thermostat is located on top of the oven.

When excessive oven temperature is sensed, the heating element is cut out until the temperature has dropped below alarm limit again.

3.07 Air lack Device

On top of the dryer a pressostat, in these terms called "air lack device", is mounted in order to detect sufficient air flow in the dryer exhaust duct.

If air flow in the dryer exhaust duct is not detected by the air lack device the heat supply is shut down, thus preventing further heat-up.

3.08 Exhaust Fan

This system is not provided with an integrated exhaust fan. A central plant exhaust ventilation system, provided by others, is connected to oven outlet flange

3.09 Recorder

For recording the temperature- and concentration situation in the oven chamber a recorder has been fitted in the control board panel.

Regarding channel descriptions and setup, please see "Factory tests/Set values on delivery".

For detailed operation instructions of the recorder, please see separate recorder manual.

3.10 Pre-drying

The pre-drying time is set in the Programmable Temperature Controller. In the pre-drying phase only the unit circulator should be running.

3.11 Drying

The drying time is set in the Programmable Temperature Controller. In the Drying phase, the circulator, exhaust fan (if applicable) as well as heating element should all be cut-in.

3.12 Heat treatment

The heat treatment time is set in the Programmable Temperature Controller. In the Heat Treatment phase only the circulator and heating element should be cut-in. Exhaust should be cut-out.

3.13 UPS-system

The control system has been equipped with an UPS-power supply backup system. The UPS system provides power supply to the control system ALL THE TIME (even during normal operation). If a process a started and the power supply to the whole oven (read : UPS) for some reason is cut-off, the process program will continue and all switches and relays will remain their position for as long as the UPS-backup-system capacity allows (approx. 5 minutes). The circulator motor and the heating element, however, will stopped/be cut-off during the power failure.

WARNING !

During any maintenance work on electrical equipment ALWAYS disconnect power on both "Main Switch Breaker" (red/yellow switch) on the control panel and UPS local main switch, and then unplug the power cables as well.

3.14 EEXp Control Board

The control board(s) are EEXp classified, which requires a constantly held over pressure in the board.

After the main power has been re-connected and all front covers are closed and locked, the control board will be flushed for minimum 10 minutes at an over pressure of appr. 80 mmWC.

After the flushing period, the power will automatically be cut-in and over pressure is now appr. 20 mmWC.

NOTE !

If one control board front panel is opened the supervision of all dryers will be cut out.

If service in the board is required, the safety protection system can be overruled by a keyswitch, placed on the backside of the board.

WARNING !

When using the keyswitch, the over pressure protection system (EEXp) will be disabled. Only authorized personnel is allowed to operate the keyswitch.

For further information regarding the EEXp system, please refer to Instructions Manual in separate binder, "EExp Certificates & Eexp Components Manuals".

3.15 Gas-monitor

NOTE !

The gas monitoring system is not within the scope of supply of Lytzen A/S.

System has been ordered directly by Inamed Ltd. at 3rd party supplier and mounted only by Lytzen A/S.

All requests regarding service, safety and maintenance of gas monitoring system should be addressed to Ntron Inc.

For measuring the concentration of solvents in the chamber, a gas monitor has been fitted in the electric control board lower compartment.

The gas-monitor system which includes gas sensor, gas monitor, calibration components and air handling equipment *is not* supplied by Lytzen and system description of this should be obtained from others than Lytzen. *Any problems related to this system that causes for troubleshooting guidance or support in general should also be addressed to others than Lytzen A/S.*

The 3rd party gas monitor system measures the gas-concentration by means of a gas sensor, placed in the control board lower compartment. The gas monitor system is coupled to an alarm system provided by Lytzen with low (AL1)- and high(AL2) limit switch, set to trigger at 12% (low) and 25% (high) of the solvents in the oven chamber.

As long as the concentration is below the low-limit alarm (AL1), the heat will be cut-in. When the concentration is above the set low-limit alarm, heat will be cut-out, and concentration will decrease. In case the high-limit (AL2) value is also reached, an acoustic alarm on the gas-monitor is activated. The dryer cannot be restarted before the high-limit alarm (AL2) is reset manually on the "RESET ALARM" pushbutton.

When the gas-monitor sensor is located in the chamber, the max. temperature must not exceed 140°C or the sensor will be damaged.

For further information, please see separate gas monitor manual provided by 3rd party supplier.

3.16 Functional description

NOTE!

This description may not comply fully to final operation of unit, as programming of drying sequence is made by others than Lytzen. The following is merely a general description of supposed/expected functionality.

When the attendance described in "Daily operation/Start" (item 1-5) has been made, the basic ventilation will be in operation and supervision of the dryer will be in.

The basic ventilation will run, at least, for the preset basic ventilation time (0-60 minutes) set at the basic ventilation timer in control board. When the sufficient pressure difference (air flow) is measured in the exhaust duct by the pressostat, the blue lamp marked "START PROCESS" will lit and the process can be started. If sufficient pressure difference is not achieved within the timer limit, an alarm will occur.

Prior to starting a process a program in the programmable process controller must be selected. To select a program press either of the 2x2 buttons on the "PROGRAM SELECT" device (thromble well) located on the control panel facia until digits read "01" for selecting program no. 1, "02" for program no. 2....etc.

After selecting a program activate the pushbutton/lamp marked "CIRCULATION START" and the air circulation system in the oven will start.

Pushbutton/lamp marked "PROCESS START" is activated and the program will now be loaded in the controller and air circulator as well as exhaust are now running.

When pre-drying expires, the oven automatically shifts to DRYING and the heating is cut-in as well. The temperature will rise to the preset drying setpoint.

When drying expires, the process continues to HEAT TREATMENT phase, and exhaust is cut-out again, while the heating is still cut-in. The temperature will rise to the preset heat treatment setpoint, and will then be held constant until the heat treatment time expires.

When the heat treatment time expires, exhaust is cut-in again, while heating is cut-out.

When the program expires, the "PROCESS COMPLETE" lamp will lit.

Process is now completed and the goods can be removed.

NOTE !

In case the gas-concentration measured by the gas-monitor reaches the low-limit (AL 1) value heating element will be cut-off. When the gas-concentration once has dropped below the low-limit (AL 1) again, the pre-drying timer will start running once more.

To reset a running program in the controller, turn the "RESET PROGRAM" keyswitch .