

Dryer Operating Instructions



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Document Conventions

To help you locate and interpret information easily, this manual uses consistent visual clues. These conventions are explained as follows.

This

Represents

ROUNDBOX

All text enclosed in a round end box refers to a particular push button on the dryer control panel, e.g. **SHUTDOWN** means the pushbutton labeled 'SHUTDOWN'

REVERSED

All text shown reversed represents a 'button' on the area of the touchscreen display

SQUAREBOX

All text shown in a squared box represents a particular screen on the touch screen display, e.g. **MAIN MENU** represents the screen titled 'Main Menu'

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The range of Kentra Continuous Flow Grain Dryers are based on the mixed flow principle, where the grain passes vertically through the Drying Column over alternate layers of Inlet and Exhaust Ducts. This design allows much higher drying air temperatures to be used than in "Cross Flow Dryers" with consequently greater efficiency.

Reserve Holding Section

Wet grain enters the Holding Section at the top of the Dryer, the main purpose of which is to maintain an effective air seal above the Drying Column. As standard the Reserve Section is fitted with a capacitive proximity switch to sense the level of grain in the Holding Section. If the level of grain falls below this switch, due to say a break in feed, then the Dryer will automatically shut down. In circumstances that prevent the Dryer being "flood-fed" (i.e. with a permanent grain overflow) arrangement can be made for the Dryer to control the grain feed equipment, by calling for feed "on-demand". This arrangement calls for the fitting of an additional proximity level switch in the Dryer Holding Section above the level of the "Grain Feed Failure" level switch. When this switch is uncovered and after a short time delay a signal is sent from the Dryer Control Panel calling for the dryer feed equipment to start which then continues to run until the top switch is re-covered.

Drying Column

From the Holding Section the grain passes into the Drying Column where the heated air from the Furnace evaporates the water present in the grain. As the grain passes through the Drying Sections its temperature gradually increases, however, due to the mixed flow principle as previously described the grain does not reach the temperature of the drying air.

Furnace Unit

The drying air is heated by a three stage oil burner in a Direct-Fired Furnace, which is fitted with a special heat distribution unit. This type of arrangement is unique to Kentra Grain Systems Limited and ensures even temperature distribution in the Inlet Air Plenum together with the widest possible operating temperature range without the need for constant nozzle changing as is more usually the case with the more conventional two stage oil burner.

Cooling Section

After passing through the Drying Column the grain then enters the bottom cooling sections of the Dryer where ambient air is used to cool the grain before it is discharged into the Discharge Hopper. As the grain is cooled using ambient air it is obvious that the discharged grain temperature will always be a few degrees above the ambient air temperature. It is for this reason that we always recommend that some form of low volume ventilation is available in the grain store to ensure that the grain can be cooled to a safe temperature necessary for long term storage.

Discharge Unit

After passing through the Cooling Section the grain then passes through the Discharge Unit which is used to control the grain discharge rate through the Dryer and hence the water evaporation rate. The discharge unit in the Kentra Dryer is innovative in that it is a twin-roller unit having twice the number of discharge rollers normally used by other manufacturers. This ensures an even flow of grain through the drying column significantly reducing any risk of blockages. In operation the rollers, which are mounted above the discharge trays, slowly rotate, turning the grain off the discharge trays into the bottom discharge hopper. Adjustment of the speed of the rollers, and hence the discharge rate, is by means of a variable speed dc drive unit.

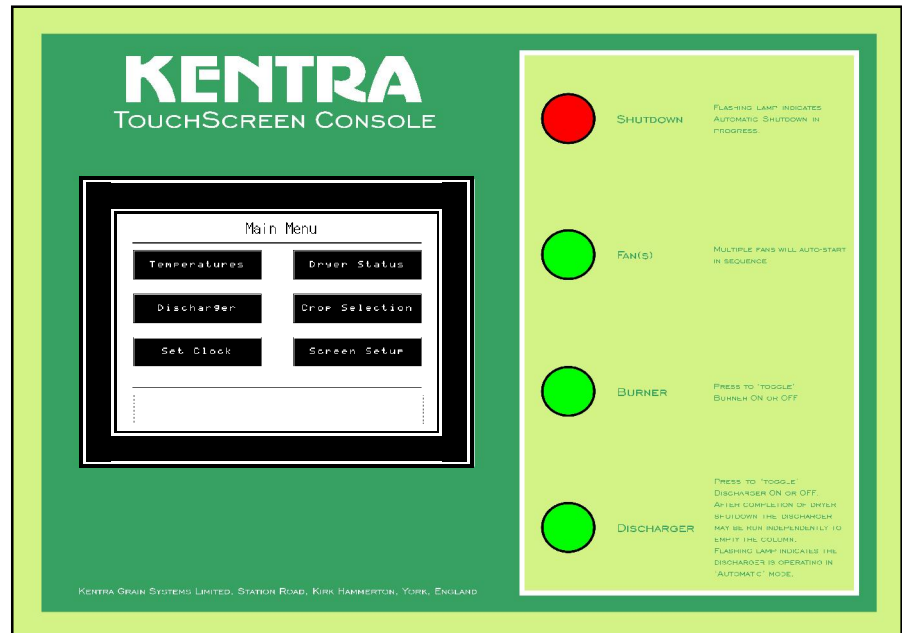
Dryer Control Panel

The Dryer Control Panel contains all the necessary components and is wired to ensure safe and efficient operation of the Dryer. All controls and indicator lamps are clearly labeled for ease of recognition and use

This section of the control panel incorporates a graphics based backlit LCD touchscreen display. Information on this display guides the operator in the setting up of the different operating parameters and is also used for displaying alarms, shutdown information and the operating status of the dryer.

The dryer exhaust fans are controlled by the red and green pushbuttons. The green pushbuttons are used to start the fan units, burner and discharge. The touchscreen display will always reflect the current dryer operational status. Pressing the red pushbutton will initiate the dryer shutdown procedure, it will NOT stop the fans immediately but will shut the dryer down in a controlled fashion.

The burner unit operates automatically as either a two stage burner for low temperatures or a three stage burner for high temperature operation.



The dryer discharge unit can be operated either under manual or automatic speed control. In manual control the speed of the discharge rollers and hence the drying rate are controlled by the operator by selecting the required discharge rate on the dryer Touch Screen display. In automatic mode, once correctly set by the operator, the dryer regulates itself to maintain a constant output moisture content if the incoming grain moisture content varies.

To prevent condensation forming inside the control panel a 60W panel heater is fitted. The heater only operates when the main isolator is in the 'ON' position and the emergency stop button has been locked in the 'OFF' position by pressing it in. It is recommended that the panel is left in this mode when not in use, particularly during the winter months.

Maximum Air and Grain Temperatures

For the safe and economical operation of your Kentra Grain Dryer it is essential that you thoroughly read and understand this section.

The grain and air temperatures in the accompanying table refer to the moisture extraction rate shown; if the moisture extraction rate is GREATER than that shown then the values in the table must be reduced, similarly if the moisture extraction rate is LESS than that shown then the values in the table may be increased, but care must be taken particularly if the crop being dried is required for seed or malting.

Where germination is important it is your responsibility to have the germination of the crop checked both BEFORE and AFTER drying.

As a general rule of thumb for every percentage point increase in the moisture extraction rate above that shown in the table reduce the drying air temperature by 2° Celsius

Table of maximum air and grain temperatures

Crop Type	Moisture Extraction Rate	Maximum Drying Air Temperature	Maximum Grain Temperature
Feed Barley	20-15%	125° Celsius	62° Celsius
Feed Wheat			
Milling Wheat	20-15%	85° Celsius	48° Celsius
Malting Barley	24-15%	60° Celsius	44° Celsius
	20-15%	70° Celsius	44° Celsius
	18-12%	70° Celsius	44° Celsius
Seed Grain	20-15%	70° Celsius	44° Celsius
Oil Seed Rape	21-16%	85° Celsius	48° Celsius
†Oil Seed Rape	16-8%	85-95° Celsius	50° Celsius
‡Oats for Human Consumption	15-10%	70° Celsius	45° Celsius
Peas/Beans	20-15%	85° Celsius	50° Celsius

† If the input moisture content exceeds 18% MCwb the rape must either be dried in two passes or batch dried. Do NOT dry continuously.

‡ If the maximum grain temperature is exceeded (regardless of input moisture content) the oats should either be batch dried or dried in several passes.

Dryer Operation

Before filling the Dryer with grain, check that all the clean-out doors and access hatches are shut, and that the discharge trays are in the working position. When you are happy that the Dryer is ready to run switch on the control panel mains isolator and press the Emergency Stop (RESET) button.

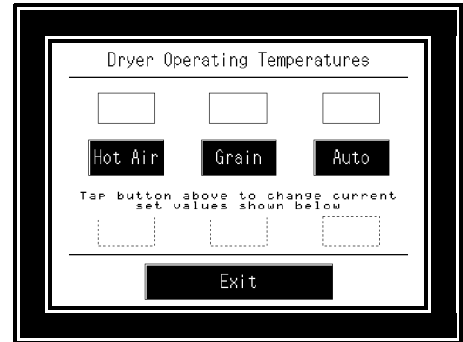
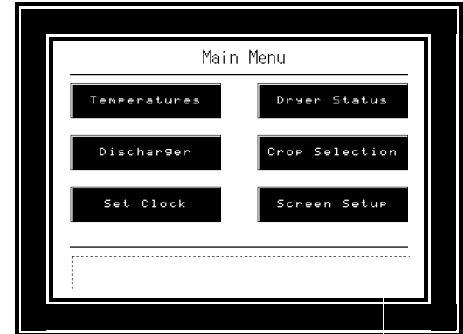
Setting up the dryer

Prior to starting the dryer it is necessary to select the various operating temperatures and the correct crop type. The dryer setup is accessed from the initial **Main Menu** screen by pressing the relevant touch screen area or **Button** which then leads through the various screens necessary to select the dryer operating temperatures and crop type.

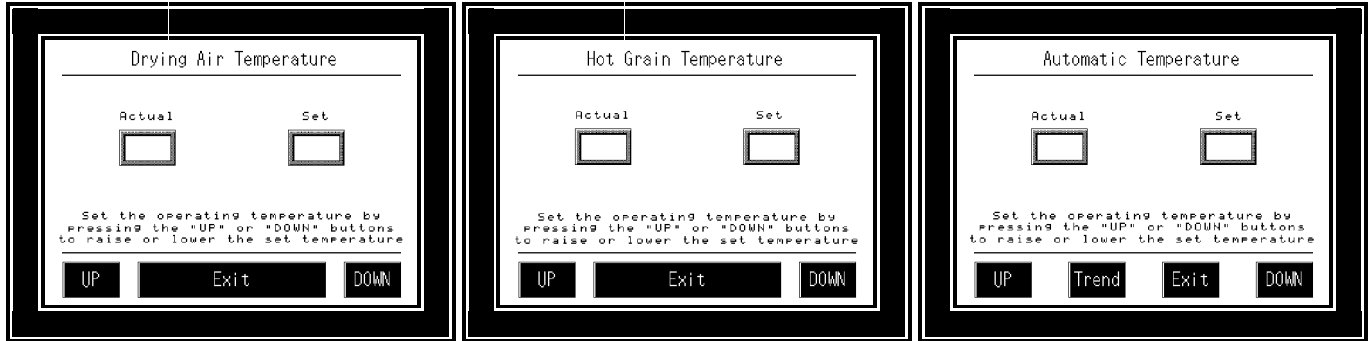
Setting up Operating Temperatures

From the **Main Menu** tap the **Temperatures** button, this opens the **Dryer Operating Temperatures** overview screen which displays the current operating temperatures for the Hot Air, Grain and Auto sensors as well as the current set values. Tapping either the **Hot Air**, **Grain** or **Auto** button will bring up the corresponding screen allowing you to adjust the set value. Tapping the **Exit** button takes you back to the **Main Menu**.

All temperature adjustment screens are of the same format, comprising of two windows showing the operating temperature and the set temperature. There are two buttons at the bottom of the screen **UP** and **DOWN** which are used to increase or decrease the set value. Tapping the button changes the value by one or the button can held 'down' to raise or lower the value continuously. The large **Exit** button is used to return to the previously displayed screen. The Automatic



Operation



temperature screen has a further button which is used to display a trend graph of the automatic temperature. This is useful for determining when the dryer has stabilised as the line plotted will be horizontal with little deviation. This will be explained more fully in the section on Automatic Discharge Control.

Filling the dryer

Fill the Dryer with wet grain. If the Dryer is equipped for "Feed-on-Demand" it is necessary to have the Dryer Control Panel switched on before starting the external feed equipment, when the dryer is full the external feed conveyor controlled by the dryer will then stop automatically.

Starting with wet grain

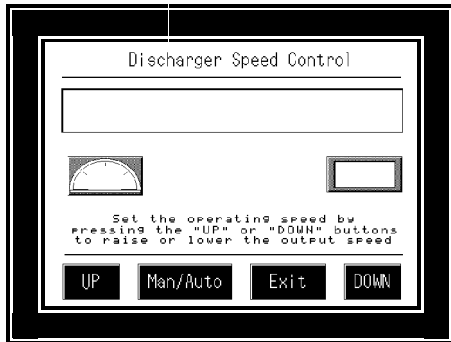
After filling the Dryer with grain, select the required operating temperatures. Press the (START) push-button and the Dryer Fan(s) will automatically start in sequence. Press the (BURNER) push button and the Burner(s) will light and build up the drying air temperature to the set value and then automatically regulate itself to maintain the set value.

Once the fan(s) are up to full speed it may be necessary to regulate the airflow through the dryer to prevent 'lift-off' of the crop. This is most likely to happen with light seeded crops such as oil seed rape and linseed, but may occur in some instances

Operation

with cereals if the seed is abnormally small. To regulate the airflow it is necessary to 'bleed' air into the exhaust air plenum below the fan(s) using the outer slides at the bottom of the plenum. The inner slides, adjacent to the column are for cleaning out only. Using them to bleed air in will cause a venturi effect on the lower laterals making any 'lift-off' problem worse.

After approximately 15 minutes start the dryer discharge by pressing the **DISCHARGE** push button. The speed of the discharger can be regulated from the **Discharger Speed Control** screen which is accessed from the **Main Menu**.



MAKE SURE ALL THE NECESSARY CONVEYORS AND ELEVATORS ARE RUNNING!

The Wet Grain in the Cooling Section of the Dryer should now be re-circulated back to the top of the Dryer until the output moisture content of the grain is within 2% of the target value.

If, due to the plant design, it is not possible to re-circulate the grain the following procedure should be adopted:

After pre-heating the grain in the drying column start the discharger to start continuous drying, ensuring that there is an adequate feed of grain to the Dryer to prevent it from running empty. However, as the grain that is initially discharged from the Dryer is still wet it should either be diverted to a trailer or to a convenient place in the store where it can be easily returned to the intake pit for processing later. Again, when the output moisture content is within 2% of the target value the discharged grain should be diverted to the store.

Once grain is being sent to the store regular checks should be carried out every 30 minutes of the grain output moisture content. If the grain remains WETTER than desired the discharge speed should be slightly REDUCED, or if the grain remains DRYER than desired the discharge speed should be slightly INCREASED.

Auto Discharge Control

During the initial period after re-circulation it is not uncommon for the grain temperature to vary erratically for no apparent reason. This is due to partially dried grain passing through the grain column for a second time and should quickly settle down once fresh wet grain from the intake enters the Dryer.

After approximately 2 hours the Dryer should have stabilised sufficiently to allow automatic operation, which is described in more detail later .

Re-starting a Full Dryer

When re-starting a Dryer full of grain from a previous drying session, first ensure that the Reserve Holding section is full of grain. It is not necessary to re-circulate as the cooling sections of the Dryer are full of dried grain. However it is still necessary to pre-heat the Dryer for approximately 5 - 10 minutes before starting to discharge grain.

If the Dryer has been run previously on automatic and provided the previous settings have been retained automatic operation can be resumed after initially running the discharge on manual for 10-15 minutes.

Dryer Shutdown

To finish a drying session it is only necessary to press the **SHUTDOWN** push-button. This immediately stops the Discharge and Oil Burner but the Dryer Fans continue to run for anything up to 45 minutes. This is essential to both cool the grain and to prevent condensation occurring in the drying column. An alternative method of stopping the Dryer is to cut off the grain feed. The Dryer will continue to run, of course, until the grain feed failure proximity level switch is uncovered whereupon an alarm will be activated causing the Dryer to automatically go into shutdown. This has an added advantage in that it clears all the Dryer feed equipment of grain still in flight.

Auto Discharge Control

Description

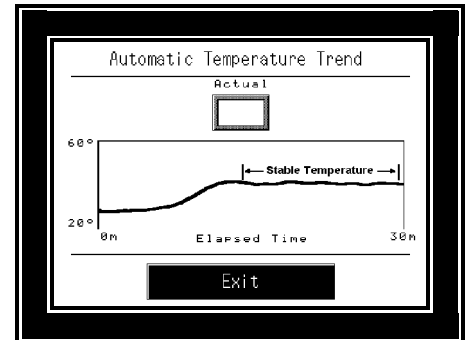
The purpose of the Auto-Discharge controller is to maintain a constant grain output moisture content irrespective of the input grain moisture content. It is however only possible to maintain any level of accuracy ($\pm 1\%$) within a finite range of input moisture content. (typically $\pm 5\%$)

It is a fact that for a constant drying air temperature with a constant moisture extraction rate the Dryer exhaust temperature also remains constant. If the input moisture content **increases** the exhaust temperature will **decrease** and similarly if the input moisture content **decreases** the exhaust temperature will **increase**. By monitoring these changes in temperature it is possible to control the grain output moisture content by varying the discharge rate of the Dryer.

To control the discharge rate of the Dryer the controller is allowed to stop the discharge drive, however to prevent the possibility of grain over heating this stop period is limited to a maximum time of 2 minutes. In addition the automatic discharge controller will also regulate the speed of the dryer discharge, either speeding up or slowing down the discharge rate as required.

Auto Discharge Control Setup Procedure

To be successful in operating the Dryer on automatic control it is essential that the drying process is stabilised before attempting to switch to automatic, under normal circumstances this can take up to 2 hours. The automatic temperature trend graph screen can be used to determine when the dryer has stabilised



After stabilising the Dryer the discharge rate is **INCREASED** by 2% (e.g. from 40% to 42%) by tapping the **UP** pushbutton while the **Discharge Speed Control** screen is displayed. It is necessary to

Alarms and Fault Finding

increase the discharge rate initially to ensure that the Automatic Discharge Controller can react successfully to reductions in input moisture content.

The Automatic Discharge Temperature set value is now adjusted to the same value as the actual reading, e.g. if the actual value displayed is 34.6°C then the set value is adjusted to 34.6°C also. Finally automatic control is selected on the [Discharge Speed Control] screen by tapping the **Man/Auto** button.

Automatic Discharge Control Fault Finding

If the Automatic Discharge Controller is incorrectly set the output grain moisture content will either be higher or lower than required.

If the grain output moisture content is lower than required and the discharge drive is running constantly then the discharge speed needs **INCREASING**.

If the grain output moisture content is higher than required and the discharge drive is constantly stopping then the discharge speed needs **REDUCING**.

If the grain output moisture content is consistently either wetter or dryer than the required moisture content, but the Automatic Discharge Control appears to be functioning correctly, then the Auto Discharge Temperature requires slight adjustment. If the grain output moisture content is lower than required then **REDUCE** the setting by 0.5°C. If the grain output moisture content is higher than required then **INCREASE** the setting by 0.5°C.

Alarm Functions

The alarm function for the dryer utilises the touch screen alarm annunciator function and an alarm log function. Both functions use a 120-point data area in the touch screen memory (called the alarm area).

Alarm Area

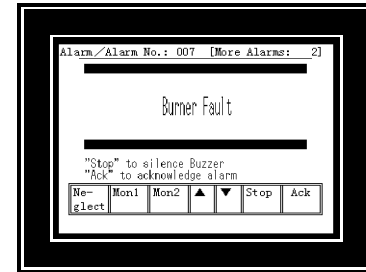
The alarm area is a 120-point memory area used by the alarm function. This is allocated to the dryer PLC data registers and expansion inputs. When the alarm function is in use, the touch screen periodically monitors this area of the dryer PLC.

Annunciator Function

If there is an input to the alarm area from the dryer PLC, the Alarm screen is displayed. This screen operates independently from the basic screens, and regardless of what basic screen is currently being displayed, when an alarm is input, the annunciator operates. However, if a print screen is being displayed, the touch screen does not switch to the Alarm screen.

Alarm Screens

There are two types of Alarm screens, the Alarm Screen (for displaying alarms) and the Confirmation screen (for taking action with respect to alarms). When a fault occurs the corresponding Alarm Main Screen is displayed. Simultaneously both the touch screen buzzer and the external siren will sound. You can use the **Stop** button to stop the buzzer and siren outputs, but they will sound again should a new alarm occur. When there are multiple alarm inputs, the up ▲ or down ▼ arrows on the screen can be used to switch to the other alarm screens. Tapping the **Ack** button will the display the Confirmation screen which will display information regarding possible causes of the fault.



Alarm Screen



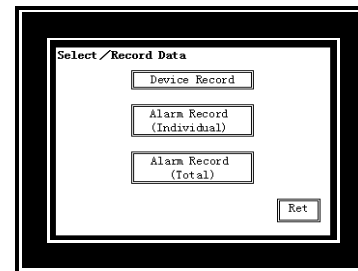
Confirmation Screen

Alarms and Fault Finding

After dealing with the cause of the fault, e.g. cleaning a dirty photocell, then you can press the green **Start Fans** push button. The alarm confirmation screen will be cleared and the dryer will continue in normal operation.

Alarm Logs

All alarm occurrences are logged with both the time and the date when the alarm took place. The alarm log screen can be accessed from the **Dryer Status** screen. Tapping the **Alarm Record Total** button lists all alarm records in date order with the most recent first. The **Alarm Record Individual** button allows you to list all occurrences of a single fault type, e.g. Selecting record no. 5 will list all burner faults in date order.



Fault Finding

Fault Protection and Shutdown Procedure

To ensure safety and efficiency the Dryer Control Panel constantly monitors the Dryer whilst it is in operation. If any fault occurs whilst the Dryer is in operation the Dryer Control Panel will activate the shutdown procedure immediately switching off the oil burner and dryer discharge and activating the automatic shutdown procedure which allows the fan(s) to run for up to a further 45 minutes, the final shutdown duration being determined by the hot grain temperature. An external alarm sounder (if fitted) will also activate.

Grain Feed Failure

The dryer is protected from running out of grain by a capacitive proximity level switch situated in the reserve section at the top of the dryer. If the supply of grain is interrupted and the level switch is uncovered the alarm sounder will be activated. The operator has to re-establish the grain supply, or top up the dryer if it is being re-circulated, to allow the dryer to continue operation.

Alarms and Fault Finding

Discharge Blockage

Fitted into the dryer discharge hopper is a capacitive proximity level switch which if covered with grain will initiate a discharge hopper blocked alarm. It will be necessary to clear the blockage before the fault can be cleared.

Grain Temperature Overheat

If the actual grain temperature exceeds the value set by the operator then the dryer will go into alarm and shut down. Once the grain temperature has cooled below the set value it will be possible to cancel the alarm as prompted on the display screen and restart the dryer after establishing the cause of the overheat. Typically grain temperature overheat is caused by over drying, particularly at start up when the dryer is being re-circulated and partially dried grain is returning to the top of the drying column. In this situation it is acceptable to temporarily increase the grain temperature set value until the dryer is stabilised and then resetting the correct value once the dryer has settled down. Do not leave the dryer unattended whilst using this procedure!

Hot Air Temperature Overheat

Hot air temperature overheats are usually caused either by a fault with the burner servo motor or solenoid valves. This is a very rare occurrence but if a burner fault is suspected please call us for advice.

Burner Lockout

The LAL burner control can be found on the side of the burner body. Reference to the lock out indicator on the LAL 2.25 and the accompanying table will enable you to isolate the cause of the burner lock out.

Electrical Fault Finding Procedure

Should a fault occur in the Dryer Control Panel all fuses and circuit breakers should first be checked for correct function, and all electrical connections should be checked to ensure good contact. In general, most dryer electrical problems occur because of an external wiring fault, (wires eaten by rodents, loose connections, water ingress, etc) and so annual electrical checks become essential both for uninterrupted operation during harvest and safety.

Alarms and Fault Finding

If basic checks do not solve the problem, reference to the circuit diagram supplied with the Dryer should enable any competent electrician to rectify the fault. Should the fault appear to be in the PLC Controller and you are at all unsure what to do, please do not hesitate to contact us either directly or through your Dealer for advice.

Health and Safety Considerations

Noise Hazard

If the dryer is installed inside the grain store along with other grain handling equipment it will be necessary to check the total noise level of the plant to ensure that the operator is not subjected to an excessive noise level in the workplace. 'Action Levels' are values of 'daily personal exposure to noise', shortened to LEP,d. These depend on the noise level in the working areas and how long people spend in them during the day. The first action level is an LEP,d of 85 dB(A) and the second action level is an LEP,d of 90 dB(A).

Decide whether you might have a problem

If people have to shout or have difficulty being understood by someone about two metres away, you might have a problem. To be sure about this you will need to get the noise assessed. Your local dealer should be able to help you with this, otherwise we can put you in touch with a noise consultant.

Ear protection

If people have to work in noise-hazardous areas they will need ear protectors (ear muffs or ear plugs). However, these should not be regarded as a substitute for noise reduction.

Between the first and second action levels you should make sure that:

- protection is freely available
- the workers know that unless they wear it there is some risk to their hearing.

Electrical Hazard

All electrical equipment must be installed in accordance with the latest IEE regulations, currently 16th edition, BS7671 1992 incorporating Amendment No1 1994 (amd. 8536).

The dryer control panel incorporates a number of circuit protection devices such as circuit breakers and thermal overloads. These devices are for your protection and if they operate they do so for a reason! Always find out the reason why a safety device operates before resetting it and if in doubt ask us or your local qualified electrician for guidance.

Before working on any electrical components or circuits the dryer control panel **MUST** be isolated from the mains supply by switching off the door mounted isolator. Do not rely on emergency stop buttons, these only isolate the dryer control circuits, **NOT** the main 3 phase power circuits. If you wish you can padlock the isolator in the OFF position, this is recommended if it is your intention to work inside the dryer whilst carrying out routine maintenance, etc.

Fire Hazard

The process of drying grain at high temperatures requires the input of extremely large amounts of energy. To reduce the risk of fire occurring within the dryer it is necessary to maintain the dryer in good mechanical condition and to keep the dryer clean. A build up of chaff and dust within the dryer plenums and drying column will ultimately lead to blockages creating 'dead areas' where grain flow is impaired. In these 'dead areas' the grain starts to overheat and over dry, any chaff becoming tinder dry. A stray spark from the dryer furnace will ignite this dry material very easily. In case of fire it is essential to stop the dryer fans and extinguish the burner as quickly as possible, this can be achieved by pressing the **EMERGENCY STOP** which is situated on the front of the dryer control panel (Your electrician may have fitted further Emergency Stops around the plant, please make sure you are aware of all their positions). Having stopped the dryer get it emptied as quickly as possible so that the emergency services, if required, can deal with the burning material easily, on the ground. However, **DO NOT TAKE ANY RISKS**, if you are at all unsure what to do, call the Fire Brigade.

Lubrication

Worm Gear Unit

Gear unit size NMRV70 as fitted to Type 20 & 25 Dryers is supplied lubricated for life, packed with synthetic grease; accordingly, this unit has a filler and drain plug, but no level indicator plug. Gear unit size NMRV90 as fitted to Type 40 & 50 Dryers is supplied filled with mineral oil, and is provided with filler, drain and level plugs; care must be taken once the unit is installed that the breather plug fitted to this unit is kept clear.

Pre-season Maintenance

Maintenance Schedule

To ensure trouble free service during the drying season the dryer should be fully serviced in good time beforehand by a competent engineer familiar with grain dryers and pressure jet oil burners.

- a. Thoroughly clean down the dryer, including the plenum chambers, the drying column and the furnace heat exchanger.
- b. The oil burner should be thoroughly cleaned and the nozzle head, combustion tube and diffuser checked for carbon contamination and oil leaks. A build up of carbon would indicate that the burner was incorrectly set. Each nozzle should be removed and the nozzle filter should be cleaned.

DO NOT ATTEMPT TO CLEAN THE NOZZLE ORIFICE UNLESS YOU ARE ABSOLUTELY SURE OF THE CORRECT PROCEDURE.

- c. The burner electrodes should be cleaned and checked for correct adjustment.
- d. Remove and clean the fuel filter and check for water contamination.

Service

- e. Remove, clean and check for correct operation of the QRB flame sensor.
- f. Lightly lubricate all burner linkages.
- g. Inspect all fuel lines for leaks and damage.
- h. Check all PT100 temperature sensors are clean, undamaged, in the correct positions and function correctly.
- i. Check all proximity switches are clean and functioning correctly.
- j. Check and lubricate the discharge drive chain.
- k. Check all drive sprockets for wear and/or misalignment. Rectify if necessary.
- l. LIGHTLY grease discharge roller bearing housings. (One stroke from a grease gun will be sufficient)
- m. Check that all the discharge trays can open fully and that all the gas springs are functioning correctly.
- n. Operate the discharge throughout its full speed range and ensure that minimum and maximum speed can be attained.
- o. Inspect all electrical cables for fraying, damage, loose connections, rat or mice damage and repair or replace as necessary.
- p. Clean the inside of the control panel and check for correct function of all overload relays, etc. Ensure all electrical connections are tight with no signs of contact corrosion.

Post-season Maintenance

Maintenance Schedule

- a. Remove all grain, straw and other residues from the bottom of the plenum chambers and the whole of the drying column. It may be necessary to use an industrial vacuum cleaner or even a high pressure hot water cleaner to properly remove any oil seed residues. (If high pressure water is used ensure all electrical connections are water tight and that mains power is OFF before starting)
- b. Check the inside of all the air ducts for build up of chaff and straw and remove if present using a long handled brush.
- c. Check the fans for damage and/or loose blades and clean.
- d. Thoroughly clean the dryer discharge unit and check the roller drive chain for correct tension and lubricate.
- e. Clean down the oil burner, check for fuel leaks and repair if required.
- f. Switch off the control panel, open the door and thoroughly clean out the interior of the panel removing all traces of dust, chaff, spiders webs, etc.
- g. With all the hatches open run the dryer fan(s) until the dryer has been thoroughly ventilated and dried out. If you wish to run the oil burner do not set the air temperature higher than 50° C.
- h. Keep the dryer well ventilated when it is not in use and do **NOT** use the drying column as a storage silo.

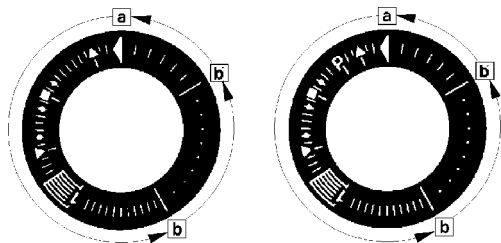
LAL Burner Control

In case of a flame failure the LAL sequence mechanism stops and with it the 'Lock Out' indicator. The symbol above the pointer in the indicator window gives the cause of the 'lock out':



- ◀ No start, because one contact has not been closed or lock-out during or after completion of control sequence due to extraneous light (e.g. non-extinguished flames, leaking fuel valves, defects in flame supervision circuit, etc.)
- ▲ Interruption of start-up sequence, because the OPEN signal has not been delivered to terminal 8 by limit switch 'IV'. Terminals 6, 7 and 15 remain under voltage until the fault has been corrected!
- P With LAL2: Lock-out, because there is no air pressure indication at the beginning of air pressure control. Every air pressure failure after this moment in time leads to a lock-out. This only applies to gas burners, oil burners are not fitted with an air pressure switch.
- Lock-out due to a fault in the flame supervision circuit
- ▼ Interruption of start-up sequence, because the position signal for the low flame position has not been delivered to terminal 8 by auxiliary switch 'II'. Terminals 6, 7 and 15 remain under voltage until the fault has been corrected!
- 1 Lock-out, because no flame signal is present after completion of the safety time
- | Lock-out, because the flame signal has been lost during burner operation.

Lock Out Indication



a-b
Start-up sequence
b-b'
Idle steps (without contact confirmation)
b(b')-a
Post-purge program

The burner control can be reset immediately after a lock-out has occurred. After resetting (as well as after correction of a fault which resulted in a controlled shutdown or after each mains failure) the sequence mechanism always returns to its start position. It is only then that the burner control begins with a new burner start-up.

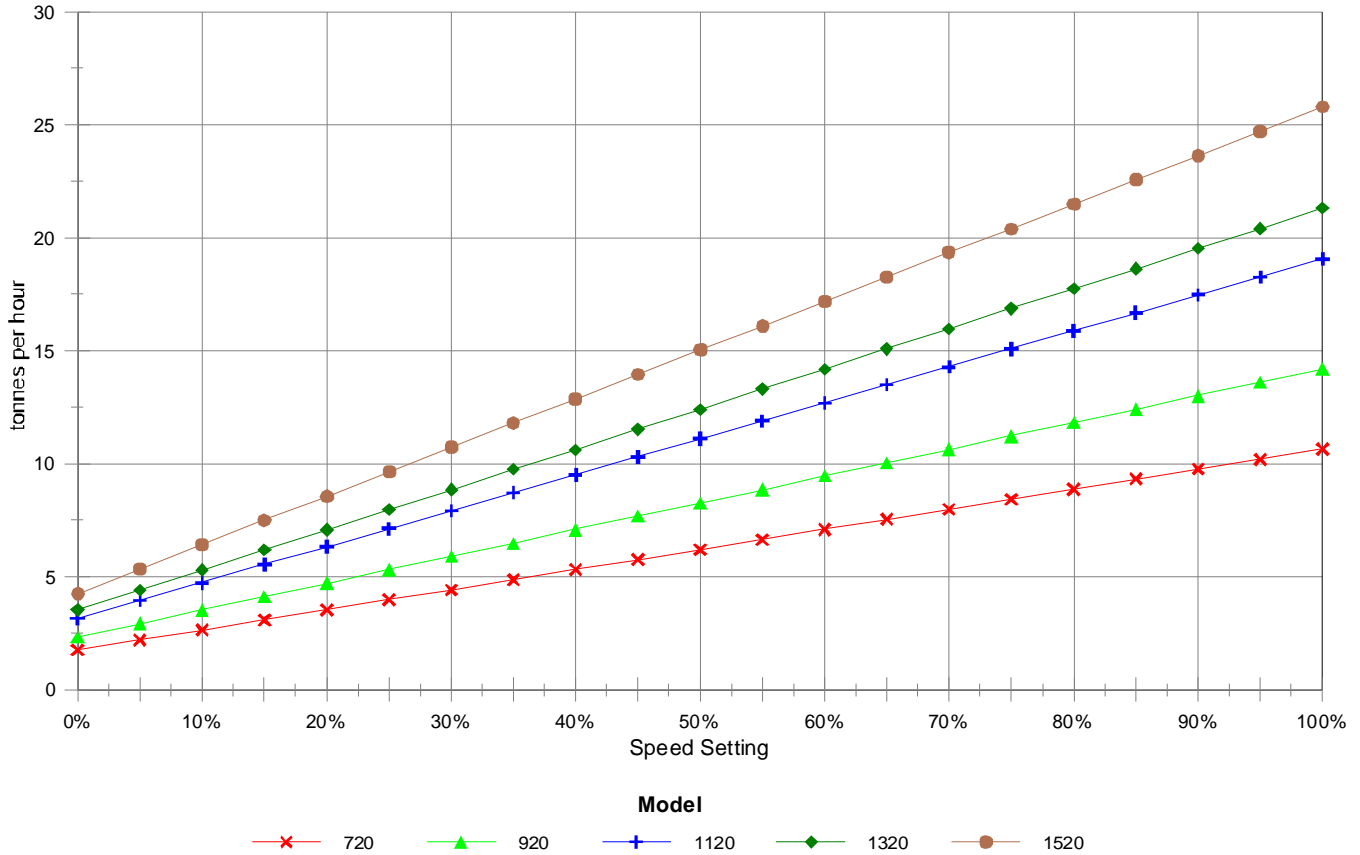
Note: Do not press the lockout reset button longer than 10 seconds!

Service

Discharge Rate Graphs

Appendix

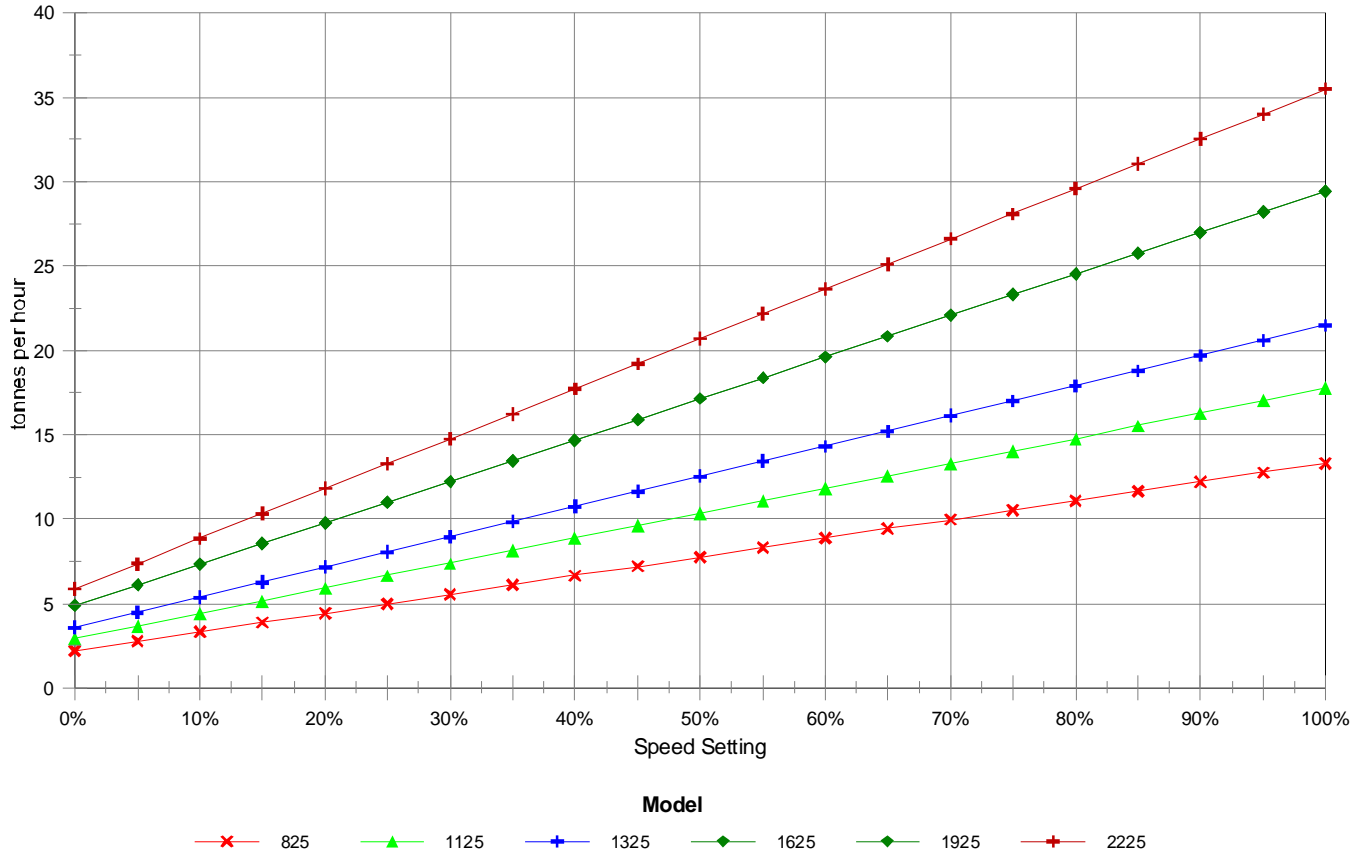
20 Series Dryers Discharge Output Rate



Appendix

25 Series Dryers

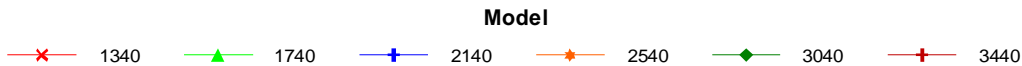
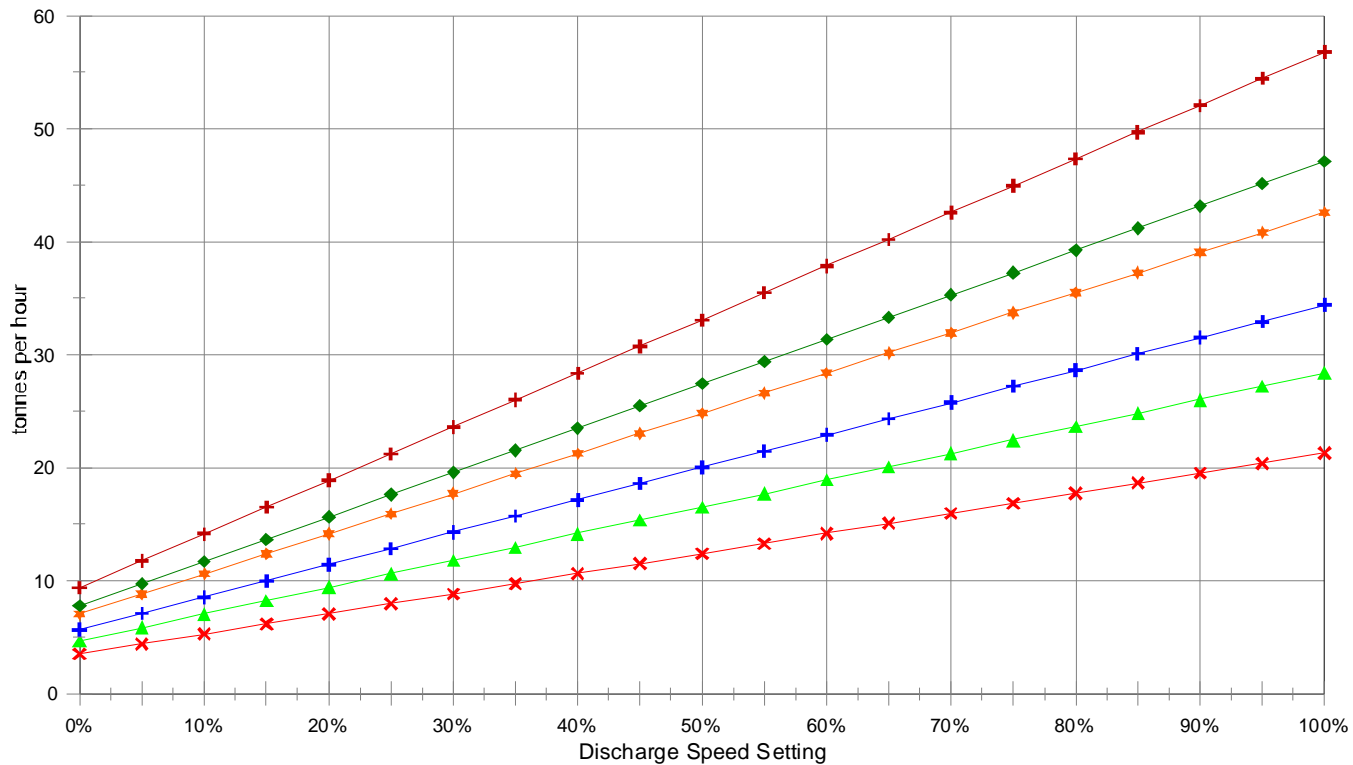
Discharge Output Rate



Appendix

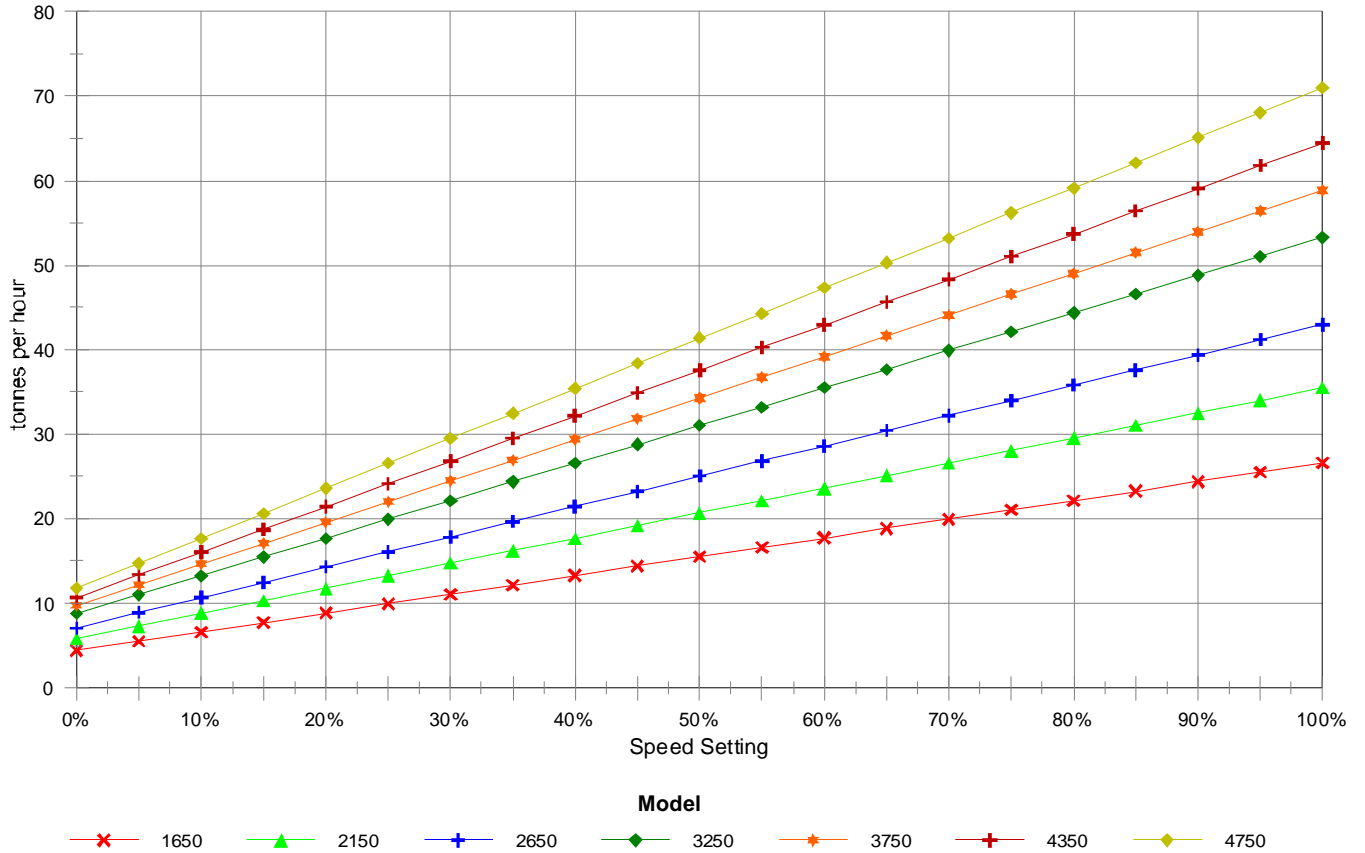
40 Series Dryers

Discharge Output Rate



Appendix

50 Series Dryers
Discharge Output Rate



Appendix

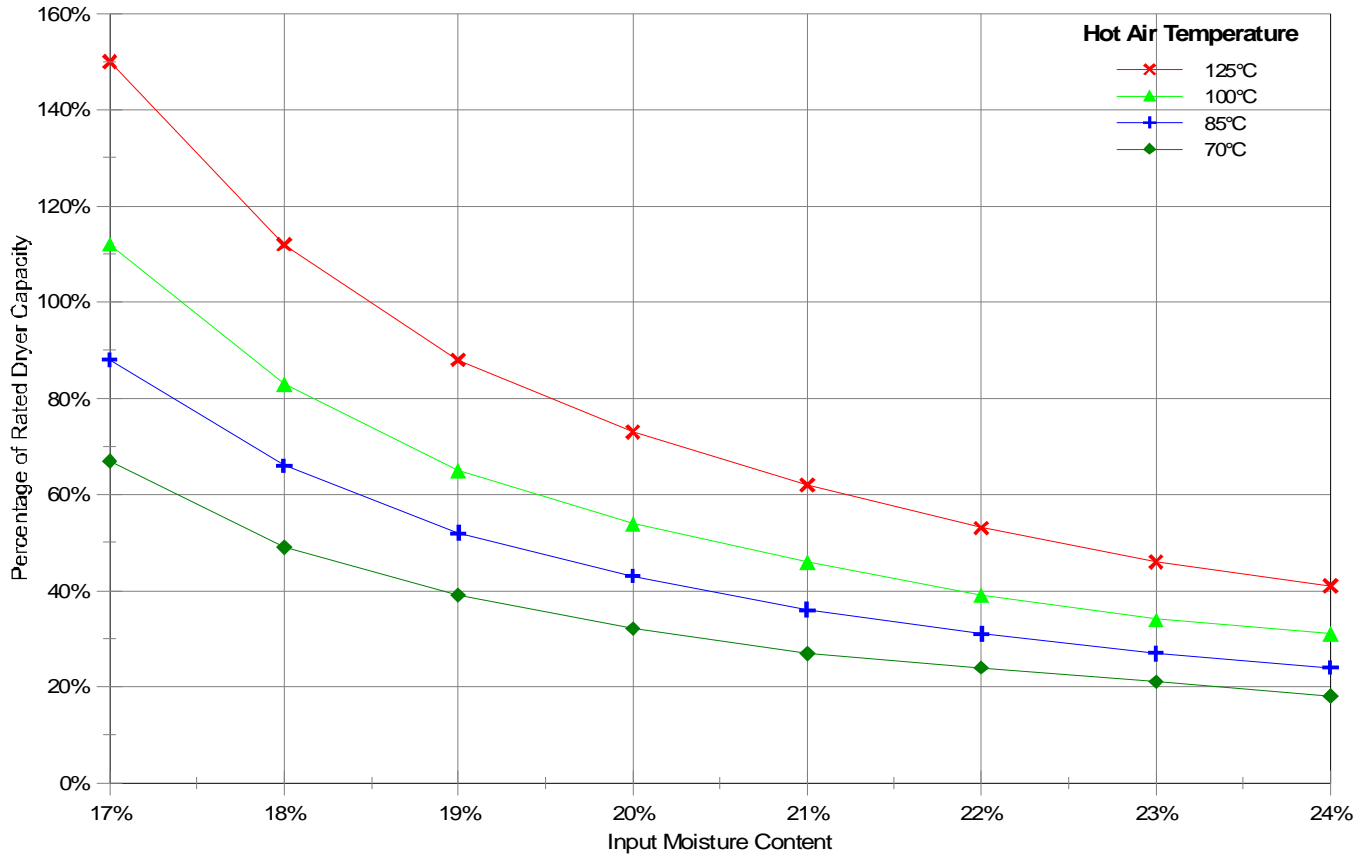
Dryer Capacity Graphs

Note: Information supplied in the following charts is for use as a guide only to assist with setting up the dryer, and does not guarantee dryer performance under any particular conditions

Appendix

Dryer Capacity Chart

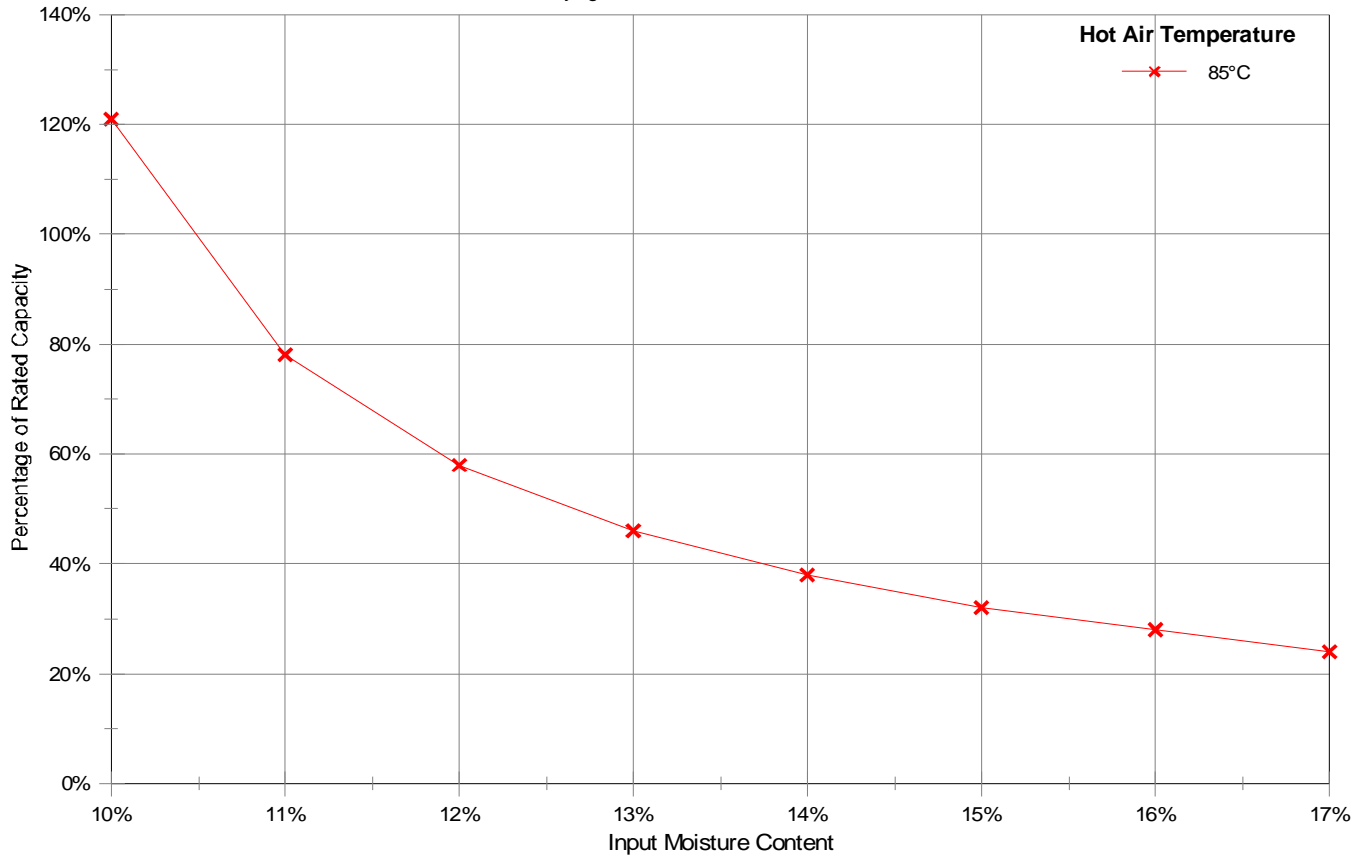
Drying Cereals to 14% MCwb



Appendix

Dryer Capacity Chart

Drying Oilseeds to 8½% MCwb



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EC Declaration of Conformity

In accordance with EN 45014:1998

Kentra Grain Systems Limited
Station Road, Kirk Hammerton
YORK

Declare that:

**Continuous Flow Grain Dryers
Type 20, 25, 40 and 50 Series**

Conform to the basic requirements of the following directives:

73/23/EEC
89/336/EEC
98/37/EC

The Low Voltage Directive
The Electromagnetic Compatibility Directive
The Machinery Directive

June 2002



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