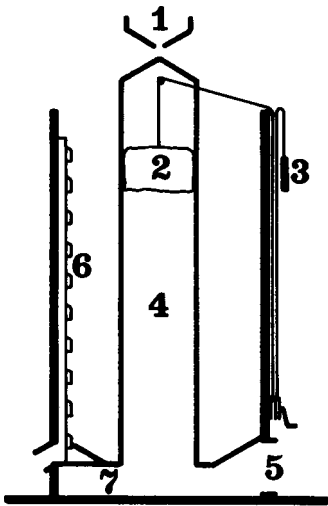


Instructions for Unit Driers



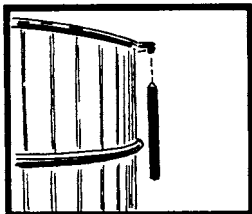
- 1) Filling distributor
- 2) Ventilation valve
- 3) Valve indicator
- 4) Ventilation pipe
- 5) Air duct
- 6) Emptying and mixing units
- 7) Flow base

Prior to filling the Unit Drier

Clean the ventilation system carefully. Remove any dirt from the perforations in the ventilation pipe with a stiff broom. Make sure the ventilation valve (2) bag is whole, that the winch can raise and lower the valve and that the indicator (3) follows it.

Checking the valve indicator

Raise the valve to the top. The indicator should also be at the top.



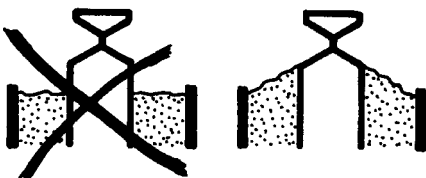
Cleaning

Grain should always be put through a precleaner before being dried.

Filling

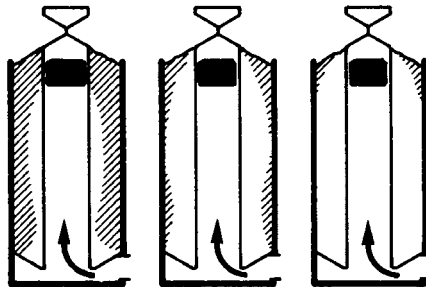
Fill the Drier through the distributor (1). Dirt may collect in pockets if the distributor is not used and can make drying uneven and lengthy.

The natural cone that forms beneath the distributor should not be levelled out as this would cause poor drying of the top grain layer.



Do not walk on grain in the Drier. This will compact it and reduce air flow where you have stepped.

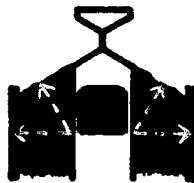
Drying pattern



Drying begins around the ventilation pipe (and across the base when fitted with the Flow Base) and ends at the outermost grain layer against the wall.

Valve adjustment

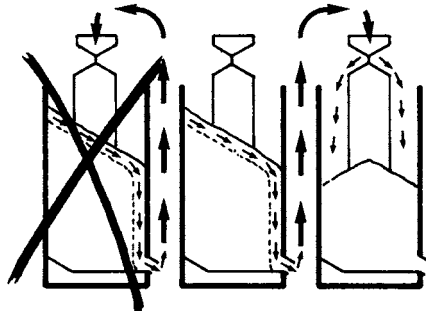
The distance from the base of the valve to the grain's surface should equal the thickness of the grain layer.



The grain will sink during drying to a slightly greater degree than corresponds to the space occupied by the moisture extracted. Sinkage will be roughly 1.1 cm per metre of grain height for each percent extracted. If the valve cannot be lowered over a period in which a large percentage is to be extracted, position it a little too low to begin with.

Turning and mixing

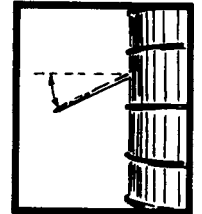
The emptying and mixing unit ensures that grain runs out layer by layer from the top. Therefore, the innermost, drier grain, mixes with the damper along the wall.



It cannot be successfully turned in the same Drier unless all of the grain is taken out before it is refilled into the Drier.

Sample taking

Insert the sampler at an upward slant. Jerk it back and forth 10-15 cm 5 or 6 times. The upward slant will cause grain to run down into the sampler pipe. Extract sampler.



Keep the Thermometer in the Drier

Apart from a probe thermostat, you should have a thermometer inserted in the grain close to the ventilation pipe. After reading it, put it back again so that it is ready to be read next time.

Keep Doors and Windows open

It is most important to have good ventilation around the Unit Drier.

Extractor Fans in the Roof are the best Solution

Moisture extracted from the grain must be allowed to escape. Even when drying in foggy weather the relative humidity built up inside the barn will be greater than outside.

Drying

Drying can be begun, to advantage, during filling. Do not let wet grain lie in the silo after filling without at least ventilating it.

Grain over 24%

Up to about 24% the grain may be dried in one go. If the grain contains a higher moisture content it is desirable to turn once. 4% drying, turning followed by drying is to be considered ideal.

Batches of varying Moisture Content

With a batch of grain which is not of uniform moisture content, it is advisable to turn it before final drying.

Airflow and Temperature

When the stream of air used for drying has its temperature raised by more than 5°C, it must be of a certain volume per cubic metre of grain to prevent spoilage before the grain is dry. Mould and grain damage readily occurs when the air - and therefore the grain - is warm. Heat and air sources, together with thermostat control, as matched to Unit Drier sizes in the Kongskilde program safeguard against these dangers. If other equipment is used, however, make sure that each cubic metre of grain is ventilated by over 400 cubic metre per hour when temperature of the airflow is raised by more than 15°C. This is equivalent to an airflow of over 500 cubic metre per hour per ton. If the temperature rise is greater the airflow must be increased.

Grain Temperature

Grain temperature should not normally be allowed to exceed 40°C. Set probe thermostats to this figure. It should be noted that the temperature in question is grain temperature, not air temperature. Grain temperature is normally 5-10°C lower than that of the airstream in the ventilation pipe. Therefore, with probe thermostat set at 40°C, and lodges against the ventilation pipe, a safety margin exists. Even seed grain over 22%, which should be treated to start with at a temperature lower than 40°C, can be safely dried.

Cooling after Drying

It is very important that grain be cooled before permanent storage. This can be done in the Unit Drier or in a KC Ventilation and storage silo, or partly in both. Cooling time depends on the duration of drying and the temperatures used and on the air/sources used on cooling. If cooling is undertaken in the Unit Drier, its duration might be from 1/2 up to 3 hours. When the temperature at the middle of the silo has stopped falling

and is about the same as that of the airstream used to cool it, cooling is complete. If the temperature does not rise noticeably in the first 10 minutes after the fan has been switched off, maximum cooling has been achieved.

Grain Storability

Approximately one week after combining, ripe grain is ready for storage at the following temperatures:

Grain temp. °C:	5	10	15	20	25
Grain moisture content %:	19	16	14	13	12

NB When using KC silos for storing see the corresponding instructions board.

Emptying

One emptying and mixing unit is therefore essential for each grain outlet in the silo.

Emptying by Flow Base

When gravity emptying has ceased, stop the fan and lower the valve right to the bottom. Restart the fan. Part of the cooling can be done while the Unit Drier is being emptied. The valve must be lowered gradually as the grain level falls which can be done by uncoupling the winch lock. The valve will then automatically fall with the grain. This saves time but does result in greater wear on the valve bag.

Poor Ventilation can be caused by:

Poor Connection between Blower and Drier Air Duct

Ensure joins are tight and properly sealed.

Incorrect Ventilation Valve Position

Too high - too much air escapes upwards.
Too low - upper layers of grain get insufficient ventilation.
See para "The Grain will sink".

Ventilation Valve allows Air to escape past it

Check the canvas bag and replace it if worn.

The Air Duct has pulled loose from the Ventilation Pipe Foot

Empty the Unit Drier and replace. Secure with split pin. Very wet grain has not been circulated to another silo early enough. Turn as soon as possible.

Very dirty Grain

Clean grain is much easier to dry than dirty, but grain with moisture content above 20-21% is difficult to clean. Therefore, dirt is best removed after partial drying. Grain should be precleaned every time it is moved.

Capacities (wheat) with ventilation pipe diameters

Silo-size	Diameter m	Height m	77 cm		102 cm	
			m ³	Tons	m ³	Tons
20/24	2.0	2.4	6.3	5.0	5.4	4.4
20/30	2.0	3.0	7.9	6.3	6.8	5.4
20/36	2.0	3.6	9.4	7.5	8.2	6.5
20/42	2.0	4.2	11.0	8.8	9.5	7.6
20/48	2.0	4.8	12.6	10.0	10.9	8.7
20/54	2.0	5.4	14.1	11.3	12.2	9.8
20/60	2.0	6.0	15.7	12.6	13.6	10.9
27/30	2.7	3.0	15.3	12.2	14.2	11.4
27/36	2.7	3.6	18.3	14.6	17.0	13.6
27/42	2.7	4.2	21.4	17.1	19.9	15.9
27/48	2.7	4.8	24.4	19.5	22.7	18.2
27/54	2.7	5.4	27.5	22.0	25.6	20.5
27/60	2.7	6.0	30.5	24.4	28.4	22.7
27/66	2.7	6.6	33.6	26.9	31.2	25.0

Time required to extract 4% from 1 ton

Relative humidity 75% - ambient temperature 17°C.

Kcal. pr. hrs.	Cubic m ³ of air per hour heated			Time to dry	
	20°C	15°C	10°C	hrs.	mins.
20.000	3.000	4.000	6.000	2	20
30.000	4.500	6.000	9.000	1	40
40.000	6.000	8.000	12.000	1	15
50.000	7.500	10.000	15.000	1	0
60.000	9.000	12.000	18.000		50
70.000	10.500	14.000	21.000		40
80.000	12.000	16.000	24.000		35
90.000	13.500	18.000	27.000		30
100.000	15.000	20.000	30.000		25

Extraction rates can only be estimated because they depend not only on air volumes and temperature rises but such things as weather conditions, grain ripeness and cleanliness.

