

## Wooden Silos for Indoor Drying and Storage of Grain







# KCT / KCE / KC Wooden Silos

## Safe Storage

Safe storage is all about creating an environment in which ever present, dormant fungi and bacteria do not have enough moisture to develop toxins. Storage with maximum protection against pests demands a fairly low grain moisture and temperature. Optimum condition for such environments is secured with a Kongskilde wooden silo. Wooden panels with louvered aluminium strips ensure an evenly distributed radial airflow. Aeration can work with both full and partly full silos.

## Filling and Emptying

Filling and emptying are both important factors for the functioning of the silo. Even distribution around the central ventilation pipe is ensured by means of the filling distributor. During emptying, the emptying device ensures that layer by layer of crop is emptied from the top of the silo and that moisture content of the delivered grain is even by mixing grain from the area near the ventilation pipe with those that are peripheral.



KCE Emptying Device

## Drying in Partly Full Silos

The distance that air travels through the grain must be the same from any point of the ventilation pipe. If a small batch is to be dried, it is therefore necessary to reduce the height of the ventilation pipe. This is done with a moveable canvas bag over a heavy frame.

To show the position of the valve in the ventilation pipe, an indicator is installed on the outside of the silo wall, making it very easy to adjust for drying of partly full silo.

Drying of large kernels with high moisture content can be a challenging process that can lead to damage and cracks in the kernel surface. However, the drying process at low air temperatures in the Kongskilde wooden silos is gentle and safe, even for large seeds with high moisture content.

Heat consumption for drying depends on the condition of the crop. As a general guideline, it takes 1,200 kcal to remove 1 kg H<sub>2</sub>O. Therefore with sufficient air volume, the capacity at the heat source in kcal/h determines the drying time.



The parts are easy to assemble, and illustrated mounting instructions are packed with the silo sections.

## A Modular Concept for Easy Assembly

The silos are built of modular sections made of wood and aluminium fitted together with angle iron hoops. The galvanised central ventilation pipe comes in sections as well. With this panel system, many different sizes can be built from the same basic components. The modular sections are produced and packed to minimise shipping costs.

## Assembly

Assembly is done locally. The parts are easy to assemble, and illustrated mounting instructions are packed with the silo sections.

## Worldwide Installations

Large grain storage installations have been designed and manufactured by Kongskilde and delivered in Indonesia, Malaysia, Philippines, Japan, Brazil, Paraguay, Mexico, Nigeria, Liberia, Kenya, Denmark, Croatia, Hungary, Portugal, the UK, Sweden, and many others.



The silos are built of modular sections made of wood and aluminium fitted together with angle iron hoops.

# KCT Batch Drier

## With Self-Emptying Flow Base Bottom

Kongskilde KCT 20 - 27 batch driers are used for drying several kinds of free flowing crops. The drying capacity ranges from 1.2 up to 4.0 t/h at low temperature. The batch driers operate with the Kongskilde HVL low-pressure high-volume blowers and oil, gas, or hot water heaters.

Kongskilde batch driers offer a gentle drying process to seed producers. The method of drying at low air temperatures is safe and gentle even for large seeds with high moisture content.

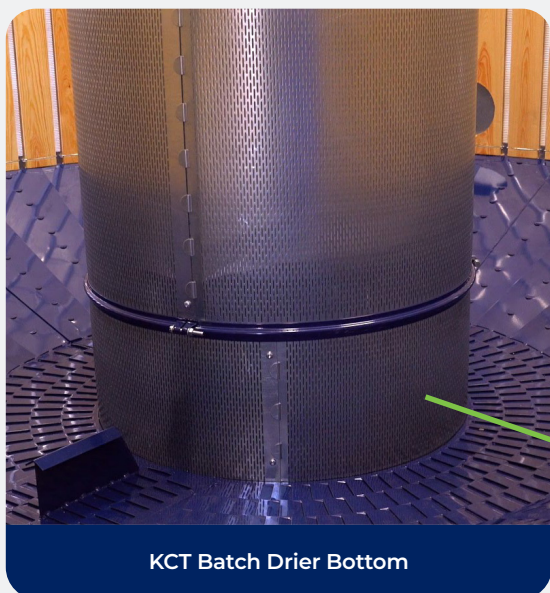
The KCT batch drier has a 770 mm perforated central pipe for higher air rates: 500 - 900 m<sup>3</sup>/m<sup>3</sup> grain/h.

## Gentle and Economical Drying

The driers work according to the batch principle. In the KCT batch driers, air travels radially through the grain from a centrally placed, perforated ventilation pipe and is exhausted through a wall with louvered openings in the aluminium strips. The air is heated to 15-30°C above the ambient air temperature. The drying cycle includes a cooling period. A typical drying sequence lasts 10-25 hrs.

## Self-Emptying

Kongskilde KCT batch drier has a self-emptying flow base bottom. When emptying the silo, the drying air will guide the last material in the silo to the outlet, so that the silo will be left empty. This function requires a blower, e.g. HVL 55 or bigger.



KCT Batch Drier Bottom





# KCT Drying Capacity

## Holding Capacities and Drying Times

Specification examples for KCT batch driers used with Kongsilde HVL blowers

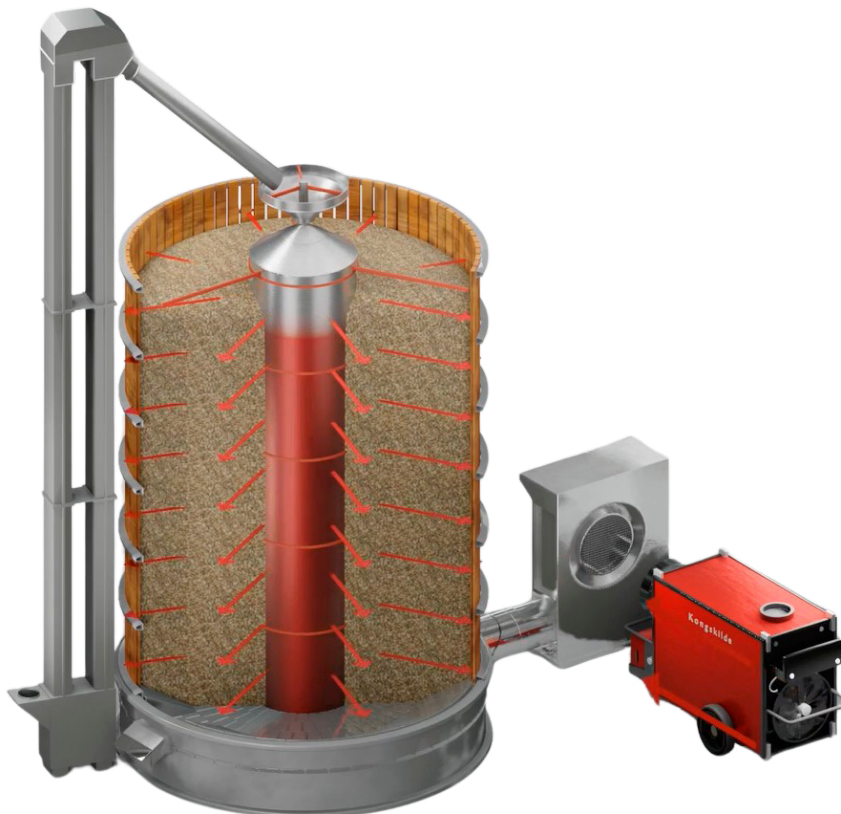
Type	Total Height (m)	m <sup>3</sup>	Content (t) 750 kg/m <sup>3</sup>	Blower HVL	Air Rate m <sup>3</sup> /m <sup>3</sup> grain/h	Heat Capacity kcal/h	Needed Heat Capacity kW	Drying Time Hours	Δ°C	Max. H <sub>2</sub> O %
20/24	3.8	7.1	5.3	30	926	65,000	76	4.6	30	25
20/30	4.4	8.6	6.5	30	802	68,000	79	5.3	30	25
20/36	5.0	10.2	7.7	30	696	70,000	81	6.1	30	25
20/42	5.6	11.8	8.9	30	615	72,000	84	6.9	30	25
20/48	6.2	13.3	10.0	30	552	73,000	85	7.7	30	25
20/54	6.8	14.9	11.2	55	885	131,000	152	4.8	30	25
20/60	7.4	16.5	12.4	55	814	133,000	155	5.2	30	25
20/66	8.0	18.0	13.5	55	759	135,000	157	5.6	30	25
27/30	4.4	16.6	12.5	55	636	105,000	122	6.7	30	25
27/36	5.0	19.6	14.7	55	580	113,000	131	7.3	30	25
27/42	5.6	22.7	17.0	100	721	162,000	188	5.9	30	25
27/48	6.2	25.7	19.3	100	674	172,000	200	6.3	30	25
27/54	6.8	28.7	21.5	100	628	179,000	208	3.2	30	25
27/60	7.4	31.8	23.9	100	587	185,000	215	7.2	30	25
27/66	8.0	34.8	26.1	150	654	226,000	263	6.5	30	25

18-14% moisture reduction.

Based on air temperature 20°C heated to 50°C.

For seed grain the recommended max. drying air temperature is 40°C.

Other combinations with larger HVL blowers are available.



The drying process is gentle, uniform and safe, as it dries at low air temperatures, even for large seeds with high moisture content.



# KCE Drying and Storage Silo

## Indoor Silos for Ventilated Storage

The Kongskilde KCE ventilation and storage silos are used for indoor storage of grain such as high-quality feed grain, malting barley, seed grain, and other heavy free-flowing seeds. Under tropical conditions, the indoor wooden silo concept avoids condensation problems in the grain.

## Safe Storage

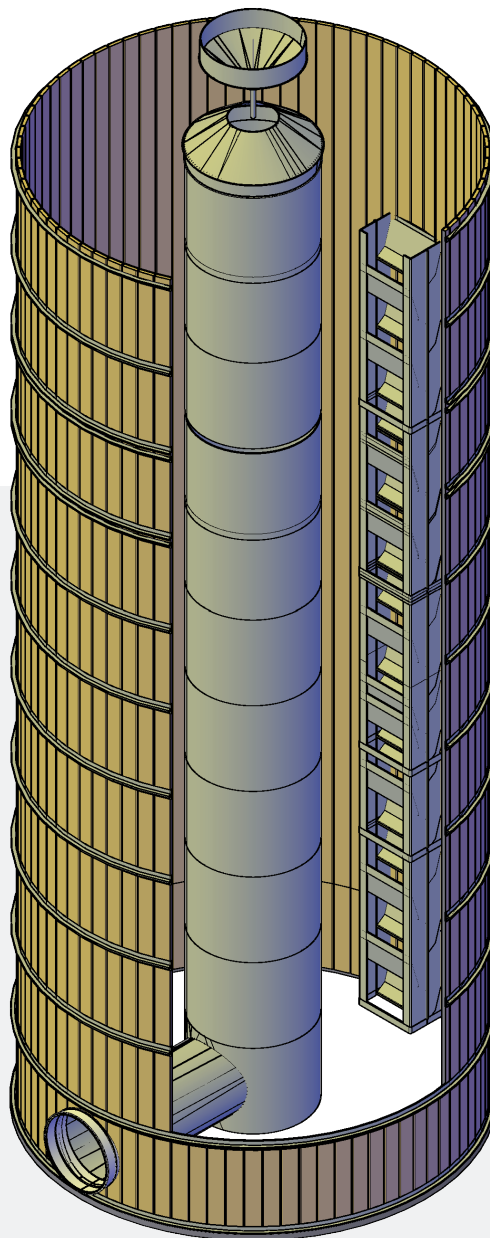
The KCE drying and storage silo is superior when it comes to offering safe storage. For this reason, the KCE is often chosen for high-priced quality products such as seed grain, malting barley, and, especially in tropical regions, feed grain.

## Aeration System

The KCE drying and storage silo has a 770 mm perforated central pipe for higher air rates: 100 - 900 m<sup>3</sup>/m<sup>3</sup> grain/h. All wall panels have louvered aluminium strips ensuring an evenly distributed radial airflow. Aeration can work with both full and partly full silos.

## Drying in the KCE Drying and Storage Silo

The KCE allows for grain drying without recirculation. It can dry grain from 20% with large volumes of mainly unheated air. However, the silo diameter is a determining factor in this context. In principle, the KCE is a storage drying facility. The KCE is especially applicable to sensitive seed such as peas, beans and other seeds which may lose germination ability, if dried at high temperature in drying systems.



Silo walls and ventilation pipes are built of modular sections with a height of 60 cm.

Together with the height of the silo element the silo diameter is defining the type.

The filling distributor is defining the total height of the silo.

As an example the silo type 40/66 has a diameter of 4 m and a wall height of 6.6 m.



# KCE Drying Capacity

## Holding Capacities and Drying Times

Specification examples for KCE driers used with Kongskilde HVL blowers

Type	Total Height (m)	m <sup>3</sup>	Content (t) 750 kg/m <sup>3</sup>	Blower HVL	Air Rate m <sup>3</sup> /m <sup>3</sup> grain/h	Heat Capacity kcal/h	Needed Heat Capacity kW	Drying Time Hours	Δ°C	Max. H <sub>2</sub> O %
20/24	3.2	6.4	4.8	30	926	65,000	76	4.6	30	25
20/30	3.7	8.0	6.0	30	802	68,000	79	5.3	30	25
20/36	4.3	9.6	7.2	30	696	70,000	81	6.1	30	25
20/42	4.9	11.1	8.3	30	615	72,000	84	6.9	30	25
20/48	5.5	12.7	9.5	30	552	73,000	85	7.7	30	25
20/54	6.1	14.3	10.7	55	885	131,000	152	4.8	30	25
20/60	6.7	15.8	11.8	55	814	133,000	155	5.2	30	25
20/66	7.3	17.4	13.0	55	759	135,000	157	5.6	30	25
27/30	3.7	15.6	11.7	55	636	105,000	122	6.7	30	25
27/36	4.3	18.6	14.0	55	580	113,000	131	7.3	30	25
27/42	4.9	21.7	16.3	100	721	162,000	188	5.9	30	25
27/48	5.5	24.7	18.5	100	674	172,000	200	6.3	30	25
27/54	6.1	27.7	20.8	100	628	179,000	208	3.2	30	25
27/60	6.7	30.8	23.1	100	587	185,000	215	7.2	30	25
27/66	7.3	33.8	25.3	150	654	226,000	263	6.5	30	25

18-14% moisture reduction.

Based on air temperature 20°C heated to 50°C. For seed grain the recommended max. drying air temperature is 40°C.

33/36	4.4	31.3	23.5	55	311	38,000	44	34	12	25
33/42	5.0	36.2	27.2	100	388	56,000	65	27	12	25
33/48	5.6	41.1	30.8	100	368	60,000	70	29	12	25
33/54	6.2	46.1	34.6	100	344	63,000	73	31	12	25
33/60	6.8	51.0	38.3	100	325	66,000	77	33	12	25
33/66	7.4	56.0	42.0	100	309	68,000	79	34	12	25
33/72	8.0	60.9	45.7	150	340	82,000	95	31	12	25
33/78	8.6	65.8	49.4	150	323	84,000	98	33	12	25

18-14% moisture reduction.

Based on air temperature 20°C heated to 32°C.

40/42	5.6	54.5	40.9	55	175	28,000	33	81	9	21
40/48	6.2	61.7	46.3	100	225	41,000	48	63	9	21
40/54	6.8	69.0	51.8	100	214	44,000	51	66	9	21
40/60	7.4	76.2	57.2	100	206	47,000	55	69	9	21
40/66	8.0	83.5	62.6	100	192	48,000	56	73	9	21
40/72	8.6	90.8	68.1	100	181	49,000	57	78	9	21
40/78	9.2	98.0	73.5	100	173	50,000	58	82	9	21

18-14% moisture reduction.

Based on air temperature 20°C heated to 29°C.

Larger KCE silo models are available on request.



# KCE Drying Capacity

## Holding Capacities and Drying Times

Specification examples for KCE driers used with Kongskilde HVL blowers

Type	Total Height (m)	m <sup>3</sup>	Content (t) 750 kg/m <sup>3</sup>	Blower HVL	Air Rate m <sup>3</sup> /m <sup>3</sup> grain/h	Heat Capacity kcal/h	Needed Heat Capacity kW	Drying Time Hours	Δ°C	Max. H <sub>2</sub> O %
47/48	6.8	85.8	64.4	100	153	30,000	35	118	7	19
47/54	7.4	95.8	71.9	100	147	32,000	37	124	7	19
47/60	8.0	105.8	79.4	100	141	35,000	41	128	7	19
47/66	8.6	115.8	86.9	100	135	36,000	42	134	7	19
47/72	9.2	125.8	94.4	100	128	37,000	43	142	7	19
47/78	9.8	135.9	101.9	150	140	44,000	51	129	7	19

18-14% moisture reduction.

Based on air temperature 20°C heated to 27°C.

53/54	7.4	127.9	95.9	150	120	25,000	29	159	5	17
53/60	8.0	141.1	105.8	150	117	27,000	31	162	5	17
53/66	8.6	154.3	115.7	150	112	29,000	34	170	5	17
53/72	9.2	167.5	125.6	250	134	37,000	43	142	5	17
53/78	9.8	180.7	135.5	250	129	39,000	45	147	5	17

17-14% moisture reduction.

Based on air temperature 20°C heated to 25°C.

60/54	7.4	165.0	123.8	250	109	18,000	21	194	3	16
60/60	8.0	181.8	136.4	250	107	19,000	22	198	3	16
60/66	8.6	198.6	149.0	250	105	21,000	24	202	3	16
60/72	9.2	215.4	161.6	250	103	22,000	26	206	3	16
60/78	9.8	232.3	174.2	250	101	23,000	27	210	3	16

16-14% moisture reduction.

Based on air temperature 20°C heated to 23°C.

Larger KCE silo models are available on request.

# KC Storage Silo

## Indoor Silos for Ventilated Storage

The Kongsilde KC storage silos are used for indoor storage of grain such as high-quality feed grain, malting barley, seed grain, and other heavy free-flowing seeds. Under tropical conditions, the indoor wooden silo concept avoids condensation problems in the grain.

## Aeration System

The KC storage silo has a 280 mm perforated central pipe for air rates of 16 - 48 m<sup>3</sup>/m<sup>3</sup> grain/h. All wall panels have louvered aluminium strips ensuring an evenly distributed radial airflow. Aeration can work with both full and partly full silos.

## Aerating in the KC Storage Silo

In principle, the KC storage silo is an aerated storage facility. The smaller KC silo can dry grain from 18%. However, the silo diameter is a determining factor in this context. We recommend the TRL 75 blower for drying and conditioning of grain in KC storage silos.

## Safe Storage

The KC storage silo is superior when it comes to offering safe storage. For this reason, the KC storage silo is often chosen for high-priced quality products such as seed grain, malting barley, and, especially in tropical regions, feed grain.



The silos are built of modular sections made of wood and aluminium fitted together with angle iron hoops.



The canvas bag is open at the bottom, and the upgoing airstream will press the canvas against the inside of the ventilation pipe and prevent the air from passing by the valve.



The louvered aluminium strips ensure an evenly distributed radial airflow everywhere in the silo. This will secure a gentle and uniform drying process.





KC Storage Silo



# KC Drying Capacity

## Holding Capacities and Drying Times

Type	Total Height (m)	Diameter (m)	m <sup>3</sup>	Tons 750 kg/m <sup>3</sup>	Drying Time Hours
20/24	3.2	2.0	7.6	6	41
20/30	3.7	2.0	9.4	7	51
20/36	4.3	2.0	11.2	8	61
20/42	4.9	2.0	13.0	10	72
20/48	5.5	2.0	14.8	11	82
20/54	6.1	2.0	16.6	12	92
20/60	6.7	2.0	18.4	14	102
20/66	7.3	2.0	20.1	15	112
27/30	3.7	2.7	17.1	13	93
27/36	4.3	2.7	20.3	15	112
27/42	4.9	2.7	23.6	18	131
27/48	5.5	2.7	26.8	20	149
27/54	6.1	2.7	30.1	23	168
27/60	6.7	2.7	33.4	25	187
27/66	7.3	2.7	36.6	27	206
33/30	3.7	3.3	26.9	20	148
33/36	4.3	3.3	32.1	24	178
33/42	4.9	3.3	37.3	28	207
33/48	5.5	3.3	42.3	32	237
33/54	6.1	3.3	47.5	36	267
33/60	6.7	3.3	52.5	39	296
33/66	7.3	3.3	57.8	43	326
33/72	7.9	3.3	62.9	47	356
33/78	8.5	3.3	68.0	51	386
33/84	9.0	3.3	73.2	55	416
33/90	10.2	3.3	78.3	59	446
33/96	10.8	3.3	83.5	63	476
40/30	3.7	4.0	39.0	29	214
40/36	4.3	4.0	46.3	35	258
40/42	4.9	4.0	53.9	40	300
40/48	5.5	4.0	61.4	46	342
40/54	6.1	4.0	68.8	52	384
40/60	6.7	4.0	76.3	57	428
40/66	7.3	4.0	83.8	63	470
40/72	7.9	4.0	91.3	68	*
40/78	8.5	4.0	98.7	74	*
40/84	9.0	4.0	106.2	80	*
40/90	10.2	4.0	113.6	85	*
40/96	10.8	4.0	121.1	91	*

Type	Total Height (m)	Diameter (m)	m <sup>3</sup>	Tons 750 kg/m <sup>3</sup>	Drying Time Hours
47/30	3.7	4.7	56.8	43	*
47/36	4.3	4.7	67.0	50	*
47/42	4.9	4.7	77.2	58	*
47/48	5.5	4.7	87.4	66	*
47/54	6.1	4.7	97.6	73	*
47/60	6.7	4.7	107.8	81	*
47/66	7.3	4.7	118.0	89	*
47/72	7.9	4.7	128.2	96	*
47/78	8.5	4.7	138.3	104	*
47/84	9.0	4.7	148.5	111	*
47/90	10.2	4.7	158.7	119	*
47/96	10.8	4.7	168.9	127	*
53/30	3.7	5.3	74.4	56	*
53/36	4.3	5.3	87.7	66	*
53/42	4.9	5.3	101.1	76	*
53/48	5.5	5.3	114.5	86	*
53/54	6.1	5.3	127.8	96	*
53/60	6.7	5.3	141.2	106	*
53/66	7.3	5.3	154.6	116	*
53/72	7.9	5.3	168.0	126	*
53/78	8.5	5.3	181.3	136	*
53/84	9.0	5.3	194.7	146	*
53/90	10.2	5.3	208.0	156	*
53/96	10.8	5.3	221.4	166	*
60/30	3.7	6.0	94.3	71	*
60/36	4.3	6.0	111.3	83	*
60/42	4.9	6.0	128.2	96	*
60/48	5.5	6.0	145.2	109	*
60/54	6.1	6.0	162.1	122	*
60/60	6.7	6.0	179.1	134	*
60/66	7.3	6.0	196.0	147	*
60/72	7.9	6.0	213.0	160	*
60/78	8.5	6.0	229.9	172	*
60/84	9.0	6.0	246.9	185	*
60/90	10.2	6.0	263.8	198	*
60/96	10.8	6.0	280.8	211	*
67/42	4.9	6.7	158.5	119	*
67/48	5.5	6.7	179.5	135	*
67/54	6.1	6.7	200.5	150	*
67/60	6.7	6.7	221.4	166	*
67/66	7.3	6.7	242.4	182	*
67/72	7.9	6.7	263.4	198	*
67/78	8.5	6.7	284.3	213	*
67/84	9.0	6.7	305.3	229	*
67/90	10.2	6.7	326.2	245	*
67/96	10.8	6.7	347.2	260	*

Above examples are based on: Air temperature 17°C. Relative humidity 80%. Blower TRL 75.

Heating of drying air is not recommended for silos larger than Ø2.7m. In the above examples no extra heat is added.

\*With a grain and air temperature of 17°C and 80% humidity the max. storage time is 20 days (480 hours). Therefore silos larger than Ø4m and Ø4m silos with walls higher than 6 m are suitable for venting and storage only. They are not suitable for drying.



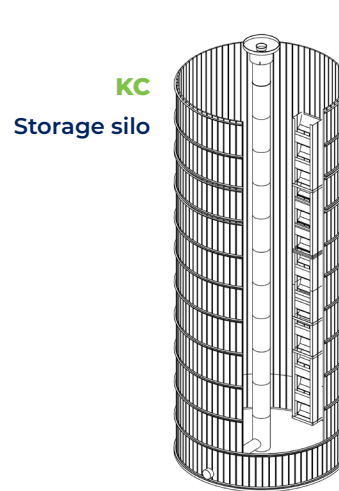
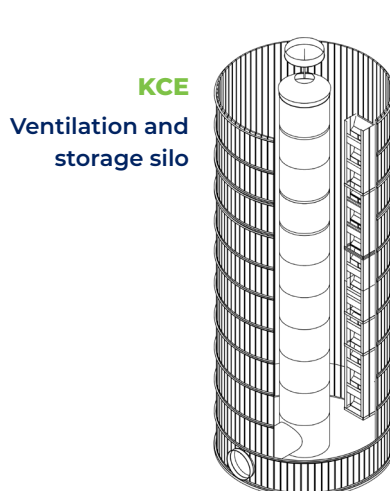
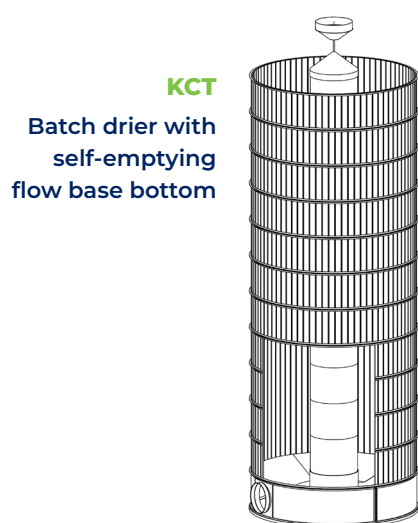
Technical Specifications	KCT	KCE	KC
Ventilation pipe, mm	Ø770	Ø770	Ø280
Size range, m	Ø2.0 - Ø2.7 height up to 6.6	Ø2.0 - Ø6.0 height up to 7.8 *)	Ø2.0 - Ø6.7 height up to 9.6
Content, m <sup>3</sup> (tons)	7 - 35 (5 - 26)	6 - 232 (5 - 174) *)	8 - 347 (6 - 260)
Ventilation blower	HVL 30 - HVL 250	HVL 30 - HVL 250	TRL 20 - TRL 40 - TRL 75

\*) Larger KCE models are available on request.

## The Breathable Silo

Manufactured in Denmark, Kongskilde's wooden silos offer flexible, gentle, and efficient crop storage solutions. The breathable wood construction maintains crop quality, while perforated, self-cleaning aluminium strips ensure optimal drying and ventilation.

With visible content levels and various sizes available, these silos optimise space utilisation. The easy installation process also minimises costs, making Kongskilde silos a practical and reliable choice for your storage needs.



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