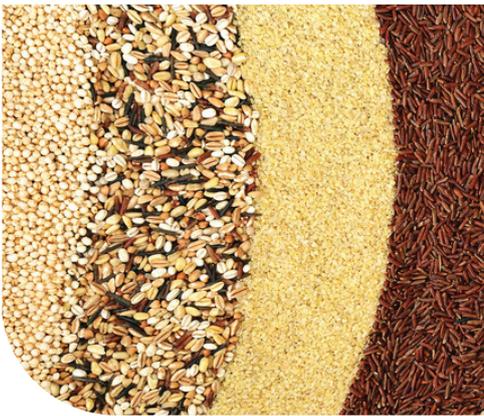


# CISCAL

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## GRAIN QUALITY AND PROCESSING EQUIPMENT



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Unit 1/9 Bearing Rd  
Seven Hills 2147 NSW

**VIC OFFICE**  
Unit 13/63 Ricky Way,  
Epping 3076 VIC

**QLD OFFICE**  
Unit 3. 54-58 Nealdon Drive,  
Meadowbrook, 4131 QLD

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### QLD OFFICE

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Meadowbrook 4131 QLD



# GRAIN AND FLOUR TESTING

# FALLING NUMBER | ALPHA AMYLASE ENZYMES METER 5000



## Purpose :

The Falling Number automatically measures enzyme activity in flours and wheats. FN measuring mode is used for determining natural alpha amylase enzymes. FFN measuring mode is used for determining total (micro-biological + natural) alpha amylase enzymes.

## Technical Specifications :

- Falling Numberas in ICC Standards 107 Falling Number orAlpha Amylase Enzymes Meter 5000
- Falling NumberDetermination of theAlpha Amylase Enzyme according to Hagberg -as a
- Measure of the Degree of Alpha-Amylase Activity in Grain and Flour.
- Changing from FN mode to FFN mode or vice versa can be made by single button.
- The FallingNumber automatically adjusts the boiling temperature according to the
- elevation.
- The company name, company address, company phone, fax numbers and web can be
- saved in the memory of the device.
- In order to save the results, a printer can be connected to the computer if required and
- the company information can be seen on every printer output together with the results.

- When the water level reduces, it passes to the stand-by mode for the safety of the operator and a warning message appears on the screen. It has blue LCD screen. The device has 20 function buttons.
- On the screen of the device, date, hour, interior temperature of the device, measuring mode and operation status of the device (running, printing, stop... etc.) can be displayed.

As ICC : International Association for Cereal Science And Technology:

Determination of the "Falling Number" according to Hagberg -as a Measure of the Degree of Alpha-Amylase Activity in Grain and Flour

Methods Type: Generic Methods

Number :

107/1 Analyte:Alpha-Amylase Activity (Falling Number) Matrix: Grain and Flour Year of Approval:1968 Year of Last Revision:1995 Scope:The method is applicable to meal and flour of wheat, rye, barley, as well as to other grains and to starch containing and malted products. In this standard the word "flour" also means meals and ground grains (wholemeal). By converting the Falling Number into the Liquefaction Number it is possible to calculate the composition of flour mixtures of desired Falling Number.

Principle :

The Falling Number is defined as the time in seconds required to stir and to allow a viscometer stirrer to fall a measured distance through a hot aqueous meal, flour or starch gel undergoing liquefaction due to alpha-amylase activity.

Other Specifications:

Volt/ Hertz	230v -50/60hz
Amper	5A
Power	700W
Device Dimensions W "mm" x L "mm" x H "mm"/Weight. Kg	355 x 435 x 570/ 17 Kg
Package Dimensions W "mm" x L "mm" x H "mm"/Weight. Kg	440 x 550 x 950 / 31 Kg

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- Economical spare parts and consumables available in 10 years,
- Free factory visits, live tests and demos,
- On-Site Warranty and On-Site After Sales Service (for >20.000 USD orders)

Technical Specifications		BRAND / MODEL	
Brand		BASTAK	Competitor
Model		FN 5000	1500
1	FN Mode	Yes	Yes
2	FFN Mode	Yes	Yes
3	Altitude Correction	Yes	Yes
4	Int. ICC Standart	Yes	Yes
5	AACC Standart	No	Yes
6	LCD Screen	<b>Colour LCD</b>	Black&White LCD
7	Screen Digital Lines	<b>4 lines</b>	1 line
8	FN Test Temp °C	Boiling Temp	Boiling Temp
9	FFN Test Temp °C	90°C	90°C
10	Sample FN Test	7 g	7 g
11	Sample FFN Test	5 g	5 g
12	FN Test Solution	25 ml Dis Water	25 ml Dis Water
13	FFN Test Solution	30 ml Acid Solution	30 ml Acid Solution
14	FN Mix Time	60 Seconds	60 Seconds
15	FFN Mix Time	180 Seconds	180 Seconds
16	Direct Choose of FN&FFN	<b>YES</b>	No
17	Reach Test Temp	<b>LESS THEN 10 Minutes</b>	< 20 Minutes
18	Cooling System	Yes	Yes
19	Function Button	<b>19 EACH</b>	18 Each
20	FN Button	Yes	Yes
21	FFN Button	<b>YES</b>	No
22	Left ID Button	No	Yes
23	Right ID Button	No	No
24	Moist Gr Button	No	No
25	Moist FN Button	No	No
26	Mix Button	Yes	Yes
27	Malt Button	Yes	Yes
28	LN Number Button	No	No
29	Avarage Button	No	No
30	Shift Button	<b>YES</b>	No
31	Clear Button	<b>YES</b>	No
32	Esc Button	<b>YES</b>	No
33	Enter Button	Yes	Yes
34	Start Button	Automatic	Automatic
35	Stop Button	Yes	Yes
36	Left ID	No	Yes
37	Write ID	No	No
38	Print Button	Yes	Yes

39	Feed Button	Yes	Yes
40	Code Button	No	Yes
41	Standart Sample	Yes	Yes
42	Service Speed	FAST	Slow
43	Warranty / Service On Site / Customer's Facility	YES	No
44	Spare Parts Support and Delivery	FAST	Slow
45	Spare Parts Cost	LOW	High
46	Training Support Via Whatsapp (Audio and Video)	YES	No
47	Delivery Time	SHORT	Long
48	Product Price	ECONOMICAL	EXPENSIVE



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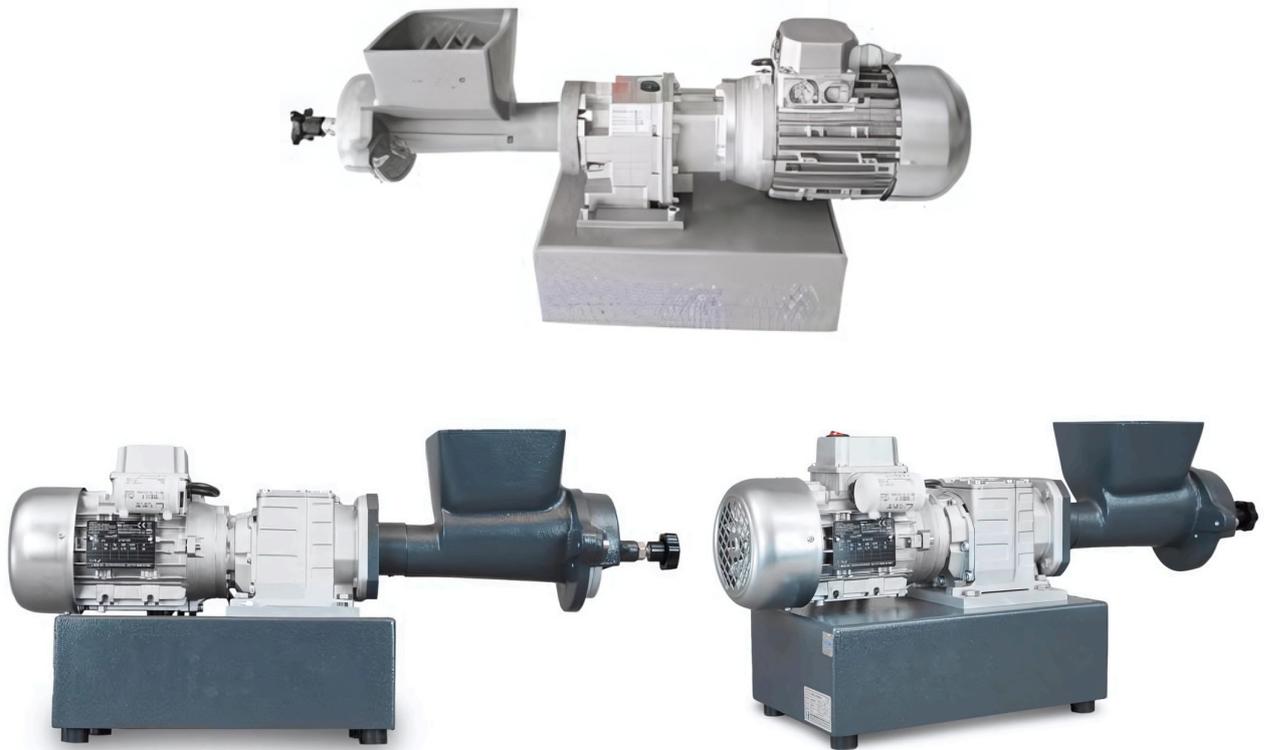
Standard  
Grinding



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*\*The information in this document is subject to change without any prior notice or obligation on the part of the manufacturer and should not be construed as a commitment by the manufacturer. The manufacturer assumes no responsibility for any errors that may appear in this document.*

## CRUSHING MILL 1600



### Technical Specifications:

Type: Laboratory type crushing mill with start/stop buttons.

Purpose :To be used to divide/grind large pieces of cereal samples into thin, smaller and homogenous pieces. Sample preparation to make moisture analyse in drying ovens.

Sample Type :Wheat, corn, barley, rye, other grains and oil seeds with 13-15% oil.

Sample Size :10- 250 gram (without stopping and no moisture loss during grinding)

The sample particle size can be adjusted by approaching to each other and moving away from

each other the grinding discs between 0.2-15 mm.

Grind Capacity : 50 –100 gr/minute depending on the product density.

In the ground products, the crust and the interior of the seeds such as; flour and bran in wheat collected into the same collection container.

Disk Type	:	Designed to minimize the heat increase.
Speed Range	:	50-250 rev/min.
Grind Speed	:	200 gr.sample in 2-3 minutes.
Grind Range	:	0.5 mm –10 mm.
Power	:	220 V, 50 Hz.3,2A.1320 rpm
Motor Type	:	0,37 kw.0,5 hp.
Dimensions	:	550 x 250 x 260 mm, 12 kg.
Accessories included	:	2 pcs. of disks. 4-8chamfer/cm and 14-20 chamfer/cm
Repair Time	:	2 months
Documentation	:	User and operation manual.CE, ISO:9001
Certification	:	Available
Warranty	:	10 years of availability
Spare Parts		

Other Specifications:

Volt/hz	230v - 50/60hz
Amper	5 A
Power	700W
Device DimensionsW "mm" x L "mm" x H "mm"/Weight. Kg	250 x 660x320mm / 12 Kg
Package DimensionsW "mm" x L "mm" x H "mm"/Weight. kg	530 x 640 x 440



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## DISCLABORATORY MILL 1650



### Description:

It is a laboratory type disc mill (Grinder). Known as Crushing mill or Disc Mill.

### Purpose:

- It is used to prepare sample by milling the whole grain sample into smaller particles.
- Also can be used for NIR tests.
- Suitable for wheat, corn, barley, rye and many other grains and oilseeds.
- Also it can grind Pasta, Macaroni, Chips, etc...
- Perfect for sample preparation in order to make moisture analyses in drying oven.

### Technical Specifications:

- The grinding capacity is 50–100 gr/minutes depending on the product density.
- Sample size can be adjusted between 0.2-15 mm.
- The sample particle size can be adjusted by easily.
- Disc mill is designed for grain moisture analysis.
- Prevent moisture loss during grinding.
- Designed for reducing the noise sound to the minimum while working.
- No sieving process is applied so milled products are collected in full portion without separation of cores and flour.
- The whole sample is collected in the same collection tray.

### Other Specifications:

---

Volt/hz 380v-50/60hz

---

Amper 1,34A

---

Power 550W

---

Device Dimensions W "mm" x L "mm" x H "mm"/Weight. Kg 245x400x335mm / 30Kg Package

---

Dimensions W "mm" x L "mm" x H "mm"/Weight. kg 42x53x63/37Kg

ABB MOTORS AND GENERATORS

## Motor data sheet

### M2AA 71B 4

Definition	Data	Unit	Remarks
Product code	3GAA072002-***E		
Voltage code	D		
Type/Frame	M2AA 71B 4		
Design	CENELEC		
Efficiency class	IE1		
Rated output $P_N$	0.37	kW	
Rated voltage $U_N$	380	V	± 5 % (IEC 60034-1)
Rated frequency $f_N$	50	Hz	± 2 % (IEC 60034-1)
Rated speed $n_N$	1355	r/min	
Rated current $I_N$	1.02	A	
Starting current $I_S/I_N$	4.1		
Nominal torque $T_N$	2.5	Nm	
Locked rotor torque $T_L/T_N$	1.7		
Maximum torque $T_B/T_N$	1.8		
Efficiency - full load 100%	68.8	%	Acc. to IEC 60034-2-1
Efficiency - 75%	73.5	%	
Efficiency - 50%	72.9	%	
Power factor - full load 100%	0.8		
Bearing DE/NDE	6203-2Z/C3 6202-2Z/C3		
Sound pressure level $L_{pA}$ dB	45	dB(A)	+3dB(A)
Moment of inertia $J = \frac{1}{4} GD^2$ kgm <sup>2</sup>	0	kg-m <sup>2</sup>	
Weight	5.9	kg	

All data subject to tolerances in accordance with IEC. Data subject to changes.



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## GLUTEN INDEX 2100 | CENTRIFUGE



### Definition:

Gluten Index or Centrifuge as in ICC.

### Purpose:

Gluten Index is used in determining the quality of wet gluten. In this way, it is possible to separate into the groups the samples of wheat and flour according to the qualities of wet gluten. Furthermore, the device gives an opinion about the sunn pest destruction of the samples of wheat and flour.

### Features:

- The device is controlled by the microprocessor.
- The device has a blue LCD screen.
- The device has 6 function buttons.
- On the device's screen, date, hour, environment temperature, test duration, device operating revolution and the operation status of the device (ready, testing, stop...etc.) can be displayed.
- The device has to reach to 6000 revolution that is the world standard in 8 seconds and has to operate in 6000 revolution during the remaining 52 seconds period.
- It doesn't operate until the cover is closed due to the security system on its cover, and a warning is displayed on the screen. Furthermore, the cover is locked automatically after it starts to operate.
- It automatically stops the braking system after operating period and gives an audible warning.
- Determination of Wet Gluten Quantity and Quality (Gluten Index ac. to Perten) of Whole Wheat Meal and Wheat Flour (Triticum aestivum)
- Methods Type: Generic Methods Number: 155 Analyte: Wet Gluten Quantity and Quality (Gluten Index ac. To Perten) Matrix: Whole Wheat Meal and Wheat Flour Year of Approval: 1994



#### Scope:

This description specifies a method for the mechanical preparation of wet gluten and the subsequent determination of the Gluten Index according to PerTen, as a measure of gluten characteristics. The method is applicable to whole wheat meals and wheat flours.

#### Principle:

Gluten separated from whole wheat meal or wheat flour by the Glutomatic equipment is centrifuged to force wet gluten through a specially constructed sieve under standardized conditions. The total weight of the gluten is defined as gluten quantity. The percentage of wet gluten remaining on the sieve after centrifugation is defined as the Gluten Index. If the gluten is very weak all of the gluten may pass through the sieve, the Gluten Index is 0. When nothing passes through the sieve, the Index is 100.

#### Definition

Wet gluten in wheat flour is a visco-elastic substance made of gliadin and glutenin, which is obtained by means of the specified method contained in this international standard. The Gluten Index is a measure of the gluten characteristics, which indicates whether the gluten is weak, normal or strong.

#### Other Specifications:

---

Volt/hz 230v -50/60hz

---

Amper 0,4A

---

Power 100W

---

Device Dimensions-W "mm" x L "mm" x H "mm"/Weight. kg 210 x 295 x 195mm / 4Kg

---

Package Dimensions-W "mm" x L "mm" x H "mm"/Weight. kg 30 x 38 x 31 / 14Kg

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## GLUTEN WASHER 6000 (Glutomatic)



### Purpose

It is used to determine the amount of wet gluten in wheat and flour samples by extracting wet gluten.

### Technical Specifications

- The device is full automatic.
- The amount of wet gluten of 2 samples can be determined concurrently.
- If required, in order to determine the amount of wet gluten in special samples, the kneading period of the device can be extended from 20 seconds to 63 seconds and the washing period from 5 minutes to 8,5 minutes.
- The device can test whole meal.
- "Start/stop", "pause" and "reset" buttons.
- On the device, there is "mix" light that is on during the kneading periods and "wash" light that is on during washing periods.
- The instrument is working with the world standards methods ICC/No. 155 and 158 besides to 137/1, ISO 21415, AACC/No.38-12.02

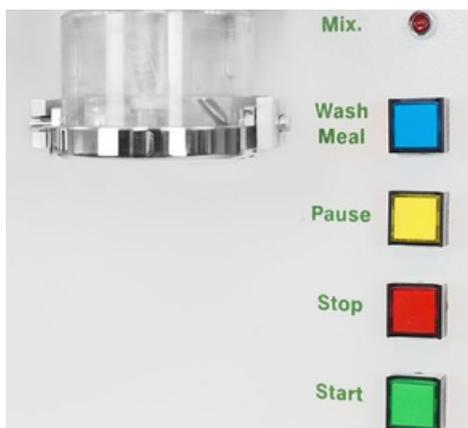
## Mechanical Determination of the Wet Gluten Content of Wheat Flour (Perten Glutomatic)

### Methods Type:Generic Methods

Number:137/1 Analyte:Wet Gluten Content (PertenGlutomatic) Matrix:Wheat Flour Year of Approval:1982  
Year of Last Revision:1994 Scope: This international standard specifies a method for the mechanical determination of the wet gluten content of wheat flour. This method is applicable to different wheat flours (commercial and experimental flours) but not to wheatmeal. Principle:A dough is prepared from a flour sample by adding a buffered sodium chloride solution; the wet gluten is isolated by washing this dough with sodium chloride solution. The residual water adherent to the gluten is removed by centrifugation and the remainder weighed.

### Definition :

Wet gluten in wheat flour is a plastic-elastic substance consisting of gliadin and glutenin and obtained by the method specified in this international standard.



### Other Specifications:

Volt/hz230v -50/60hz

Amper 1,6A

Power 350W

Device Dimensions:W "mm" x L "mm" x H "mm"/Weight. kg360 x 350 x 325mm / 27Kg

Package Dimensions:W "mm" x L "mm" x H "mm"/Weight. kg430x 450x 870/ 35Kg

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## HAMMER MILL 1900 | LABORATORY MILL



**Purpose:** Used to prepare the sample for the Gluten Analysis, Falling Number Analysis and NIR analysis. For setting of grinding use air flow rate on it.

### Specifications:

- Grinding capacity: 300 g in 30-50 seconds.
- Grinding capacity change depending on the moisture degree.
- The ground samples are collected in the container.
- The motor rotational speed is 16,800 rpm and can use the different size of sieves.
- Wheat, barley, corn and other grains can be ground on it.
- After the first sample there is no need to clean for the second sample. With slow feeding it can grind to the 25% moisture of grains.
- With Air flow regulator you can set a flow rate of the samples.

- There is a sensor on the motor cover and when the motor cover is open the device does not work for safety.
- Power is 230 V 50 Hz,

Other Specifications:

Volt/ Hertz	230v - 50/60hz
Amper	7,7A
Power	1,1W
Device Dimensions W "mm" x L "mm" x H "mm"/Weight. kg	560 x 540 x 650 / 61 Kg
Package Dimensions W "mm" x L "mm" x H "mm"/Weight. kg	52 x 63 x 80 / 68 Kg



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## HAMMER MILL 1900 SMART



Purpose : Used to prepare the sample for the Gluten Analysis, Falling Number Analysis and NIR analysis. For setting of grinding use air flow rate on it.

### Technical Specifications:

- Grinding capacity: 300 gr in 30-50 seconds.
- Grinding capacity changes depending on the moisture degree.
- The ground samples are collected in the container.
- The motor rotational speed: 16,800 rpm and can use the different size of sieves.
- Wheat, barley, corn and other grains can be ground on it.
- Through the digital touch screen, the user can be operate the rotation and on the touch screen can be monitored on working time.

- After the first sample there is no need to clean for the second samples. With slow feeding it can grind to the %25 moisture of the grains.
- There is a sensor on the motor cover and when the motor cover is open the device does not work for safety.

Other Specifications:

Volt/ Hertz	230v - 50/60hz
Amper	7,7A
Power	1,1W
Device Dimensions W"mm" x L "mm" x H "mm"/Weight. kg	560 x 540 x 650 / 61 Kg
Package Dimensions W "mm" x L "mm" x H "mm"/Weight. kg	52 x 63 x 80 / 68 Kg



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## LABORATORY SIFTER 8000

- The device is Bastak branded and its model is 8000 .
- The device is used for analysing the homogeneity and the particle size of the flour, and the rates of particles to each other.
- Furthermore, it is used in adjusting the distances of the rolls at the flour factories and in controlling the sieving system by supervising the daily production.
- It is with microprocessor control.
- There are power, start and emergency stop buttons and warning lights on the control panel.
- After 5 minutes of testing, the device automatically stops and gives out visual and audible warning.
- When the wooden hoops of the device are replaced with aluminium hoops, in addition to the flour industry, the device can also be used in categorizing the spices by sieving them in the spice industry and in categorizing the solid products such as soil, sand and stone by sieving them in mining and construction industry.
- 7 wooden hoops are supplied with the device.
- 1 collection container is supplied together with these hoops.
- The outside dimensions of the device are 300×580×670 mm300×580×670 mm and its net weight is 50 kg50 kg.



## ROLLER MILL 4500 - S



**Definition:** Double passaged air circulated laboratory type roller semolina mills. The device is dumped wheat mill but on will can be used on grinding both dumped and undumped wheat. The device consists 2 sections as crushing and grinding in crushing section, the wheat is milled by go through mills and coarse semolina and bran in collector container undersifting part can be separated. On sifting part 850 micron sieve is being used.

### Technical Specifications

- The device has the capacity of grinding at 100gr/minute.
- The flour efficiency can be up to %40-%70 depending on the wheat quality.
- In sieving section the length of sieve is between 340-360 mm.
- In the grinding section, coarse semolina taking from crushing section can be separated as; flour, fine and coarse semolina. In this section sequentially 160 micron and 280 micron sieves are being used.
- In crushing section there are 3 valves and in grinding section there are 3 valves in total 6 valves are being used.
- In front of the device there are sifting sections. In liso part under sifting section there is 1, in grinding section there are 2 in total 3 collector containers being used.
- In order to activate the liso part there is 1-0-2 switch button and to activate sieving section there are 0-1 switch buttons being used.
- On request liso can run in opposite direction thus the sieve is emptied completely and after switching to other direction can do grinding.

### Other Specifications:

Volt/hz	380V 50/60 Hz
Amper	3 A
Power	950 W
Device Dimensions W "mm" x L "mm" x H "mm"/Weight. Kg	780 x 530 x 870 mm, 110kgs
Dimensions W "mm" x L "mm" x H "mm"/Weight. kg	760 x 920 x 870 mm, 165kg



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## ROLLER MILL 4500



**Description:** It is a laboratory type double passaged mill.

**Purpose:** It is used to determine the quality of the wheat which will be used for flour production. You can get very similar flour like a factory flour. It is used for both dampened and undampened wheat grinding. It is the mixture laboratory mill that enables making necessary modifications and amendments by predetermining the values of the flour to be ground in the factory.

### Technical Specifications:

- The device consists of two parts as crushing and liso.
- The wheat milled and divided into three parts as flour, bran(sharp) and semolina by passing through three fluted rollers at the crushing section.
- Flour and semolina collected into different drawers by two 160  $\mu$  and 800  $\mu$  sieves and bran(sharp) taken from the front side of the device.
- The company can be informed about the capacity of semolina of wheat right after crushing.
- Semolina which passes through between two flat rollers divided as flour and bran by 160  $\mu$  sieve.
- Harmed amylum amount can be controlled by adjusting the distance between soft rollers.
- The device has the capacity of grinding at 600 gr/minute, can be operated 65 %-75% flour efficiency, depending upon the wheat quality.
- Physical, chemical and rheological ( water retention and energy graphics ) analyses can be done on an obtained flour correctly

**The outcome flour suitable to be used in:**

- Brabender Farinograph-E
- Brabender Extensograph-E
- Chopin Technologies Alveolab
- Chopin Technologies Mixolab
- Bastak Absograph500
- Bastak Resistograph
- And otherrheological dough properties analysis

**Other Specifications:**

Volt/hz	380v - 50/60hz
Amper	3a
Power	300W
4500Device Dimensions	780 x 603 x 870mm / 110 Kg
W "mm" x L "mm" x H "mm"/Weight. Kg	
4500S Device Dimensions	780 x 530 x 870 / 103 Kg
W "mm" x L "mm" x H "mm"/Weight. Kg	
Package DimensionsW "mm" x L "mm" x H "mm"/Weight. kg	76 x 92 x 87 / 165Kg / 158 Kg



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## ROLLER MILL - 4000



**Purpose :** It is a laboratory type roller mill and used for both dampened and un dampened wheat grinding. After grinding, flour and bran are taken out from two separate containers, so mixing of them is avoided. It is the mixture laboratory mill that enables making necessary modifications and amendments by predetermining the values of the flour to be ground in the factory.

### Technical Specifications

- Depending on the wheat quality, it has a flour productivity of 40–60 %.
- In the device, grinding speed and amount can be adjusted by means of the feeding adjustment.
- The front part of the device is glass. After grinding, this glass part can be easily removed and the grinding area can be cleaned. In this way, the samples are prevented from mixing into each other.
- The sieving process can be monitored visually by means of the glassed window that is on the section where the sieve unit is located.
- By means of this window, the sieve brush is cleaned after every sample and thus the samples are prevented from mixing into each other.
- Since V belt system is used in the device, no blockage occurs during grinding. The device can operate straightly and reversely.
- A warranty of 1 year and a spare parts warranty of 10 years are provided exclusive of usage faults.

Note: Special productions resulting in an extreme quality semolina are performed for macaroni (pasta) factories.

**Other Specifications:**

Volt/ Hertz	380v - 50/60hz
Amper	1,34A
Power	550W
Device Dimensions	
W "mm" x L "mm" x H "mm"/Weight. kg	425 x 570 x 600mm / 59Kg
Package Dimensions	
W "mm" x L "mm" x H "mm"/Weight. kg	52 x 66 x 78 / 66Kg



Sensitive  
Nutrition



High  
Efficiency



Monoblock  
Study Body



Standard  
Grinding



Personal  
Security



# DEBUGGER -ECOLOGICAL HEAT TREATMENT



DEBUGGER	DB 09	DB 18	SC 6000	Power distribution
<b>Fan</b>				
Volume flow rate [m3/h]	800	5.400	6.000	
Heat output [kW]	4,5 / 9	9 / 18	-	
<b>Electrical data</b>				
Power [kW]	9,1	19,1	1,1	various sockets
Max. current consumption [A]		30	3	
Electrical connected load 1) [A]	16	32	16	
<b>Dimensions</b> [L x W x H in mm]	490 x 430 x 620 <sup>3)</sup>	710 x 570 x 1.250	620 x 600 x 1.350 - 2.150	850 x 500 x 1.350 150
<b>Weight 2)</b> [kg]	26	85	45	

**Technical features of the DEBUGGER:**

- Connecting cable with CEE plug
- Room thermostat
- Temperature controller and safety temperature limiter Fan protection grill
- Air deflector
- Cable holder DB 18
- Transport pallet DB 18
- Eyelets DB 18
- Power distribution
- Extension cable
- Infrared thermometer
- wheels
- extraction hose DB 09
- pivot frame DB 09

All specifications are valid for 400 V-3 Ph-50 Hz

- 1.CEE compliant
- 2.ncluding cables and plugs
- 3.Without telescopic pipe and air-hose

Subject to technical change without notice.



## Heat treatment using the DEBUGGER method

Companies that process and sell foodstuffs, such as mills and bakeries, must work according to an HACCP system – which presents great challenges to such companies.

HACCP stands for "Hazard Analysis Critical Control Points" and is a risk analysis of all stages of the manufacturing process: from the preparation, processing and production to the packing, storage, transport, distribution, handling and sales of foodstuffs, the HACCP system defines all details that are potentially critical for food safety. Accordingly, the company must establish, implement, maintain, monitor and document appropriate safety measures.

In order to maintain these standards, a systematic monitoring and, where necessary, control of pests is required. For this purpose, a technically appropriate and natural pest control method for the containment of beetle populations has proved to be effective in many companies: heat treatment.

### The DEBUGGER method:

Heat treatment makes use of the fact that, at air temperatures greater than 45 °C, insects will die as a result of protein coagulation. The DEBUGGER method kills not only the adult insects, but also their egg depositions and larvae. At the same time, the method also ensures that the room temperature never exceeds 60 °C in order to prevent damage to the building or furnishings and equipment. Not only the temperature, but also the duration of exposure significantly influences the effectiveness. After heat treatment, dust and deposits are easily removed due to the drying effect, which considerably reduces the potential for mould growth. Depending on the local conditions or regulations, it may be necessary to employ heat treatment equipment with ATEX certification.

### Treatment management:

Not only the frequency of treatment is important. It can also be advantageous to carry out treatment in sections (by room, by floor, etc.). In the case of the DEBUGGER method, good air circulation is important, as all rooms that are to be treated must reach the necessary temperature for a positive result to be achieved. It may make sense to treat critical areas separately.

### FrigorTec GmbH is certified according to DIN EN ISO 9001 : 2008. The company is a member of:

- Society for the Support of the German Milling School Braunschweig e.V., Bonn / Germany
- Rationalisation Curatorship for Agriculture, Rendsburg / Germany
- School providing vocational education in Agribusiness Burg Warberg e.V., Warberg / Germany
- ALB, Stuttgart / Germany
- AGF, Detmold / Germany

### Cost-effectiveness:

For every operating company, the operating costs of insect eradication are a considerable financial factor. In order to meet these financial requirements, air recirculation methods and/or heat pumps with optimum performance coefficients are used. Fans with suitably adapted characteristic curves are also advantageous.



### Advantages of the DEBUGGER method:

- No chemical substances required
- Cost-effective, particularly with suitably adapted treatment management
- Easy to perform
- Guaranteed removal of insects in all stages of development

### Potential applications:

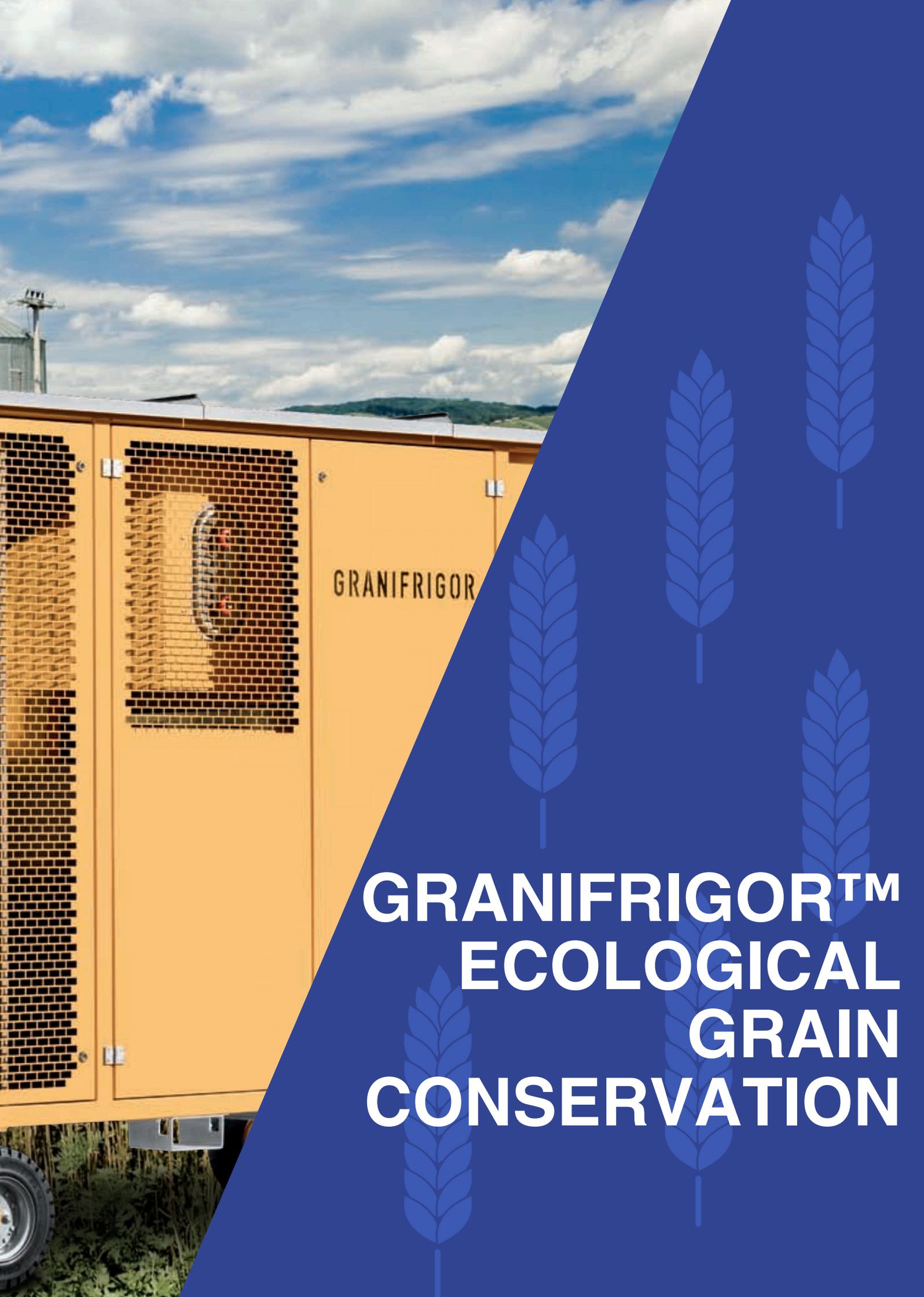
Insect eradication is carried out in a wide variety of business operations. These include: mills, bakeries, grain stores, pasta production, herb processing, coffee processing, the tobacco industry, associated control rooms and cereal stores. However, the method is also being increasingly used for debugging mattresses, in hotels, for example.

The modular setup of the DEBUGGER method provides a high degree of flexibility for accommodating the structural characteristics of buildings, and permits rapid deployment (assembly and disassembly).



**We pass on only what we have produced by our own hands – Made in Germany.**





GRANIFRIGOR

**GRANIFRIGOR™  
ECOLOGICAL  
GRAIN  
CONSERVATION**



GRANIFRIGOR™	GRANIVENT™ 200/280 SL	GC 40 Europe	GC 60 / 80 Europe Tropic
<b>Cooling performance in 24 hours 1) 2) [t/day]</b>		<b>30 – 60</b>	<b>55 – 120</b>
<b>Chilled air fan</b>			
Volume flow [m <sup>3</sup> /h] 3)	10.800 / 15.200	2.400	4.600
Pressure [Pa] maximum 5)	6.000 / 6.000	3.200	3.400
<b>Refrigerating capacity compressor [kW] 6) 7)</b>	-	10	20 25
<b>Electrical data 9)</b>			
Output (average) [kW]	11 / 15	4,2	9
Max. current consumption [A]		18	32 23
Electrical connection 4) [A]	32	32	32
<b>Connections</b>			
Ø Connection cold air hose [mm]	400	300	300
Condensation water runoff average [l/h]	-	6	15
Ø Condensation water runoff hose [inch]	-	<sup>3</sup> / <sub>4</sub>	<sup>3</sup> / <sub>4</sub>
<b>Dimensions [L x W x H in mm]/ weight [kg]</b>			
with tyres	3.580 x 1.640 x 1.660 / 700	3.450 x 1.350 x 1.750 / 600	3.570 x 1.320 x 1.880 / 700
with swivelling casters	2.200 x 1.400 x 1.450 / 600	2.050 x 950 x 1.570 / 550	2.230 x 990 x 1.695 / 650

All specifications are valid for 400 V-3 Ph-50 Hz

- Cooling of air to 10 °C
- At an average outside temperature (daily median) of 20 °C, an average relative air humidity (outside air) of 52%, and an average grain humidity of 16% and 1000 Pa counter pressure
- At 1000 Pa counterpressure
- acc. CEE
- Higher pressures are possible upon request
- Europe version at 0 °C evaporation temperature and 30 °C condensation temperature
- Subtropic/Tropic/Desert versions at 10°C evaporation temperature and 40°C condensation temperature
- HP version (high pressure)
- HYGROMAT™ is included as a standard feature

Subject to technical change.

**GRANIVENT™:**

The GRANIVENT™ is ideal for aerating immediately after bringing in the harvest. The subsequent cooling with a GRANIFRIGOR™ ensures that insects and moulds do not damage the grain.

- Suitable for tower silos and flat storage
- Humidistat and thermostat for safe aerating
- Robust and sound-proof



GC 140 Europe	GC 180 Europe	GC 220 / 240			GC 310 / 320		
		Europe	Subtropic	Tropic	Europe	Subtropic	Tropic
140 – 220	170 – 280	220 – 370			310 – 520		
7.700	10.800	12.500			12.500		
4.700	6.000 / 8.000 <sup>8)</sup>	6.000 / 8.000 <sup>8)</sup>			6.000 / 8.000 <sup>8)</sup>		
32	43	63	82	105	82	106	160
16	20	28	30	35	34	37	53
56	63	96	100	92	120	125	118
63	63	100			125		
300	400	400			600	600	400
20	30	35 - 40			30		
3 / 4	3 / 4	3 / 4			3 / 4		
3.620 x 1.330 x 2.265 / 950	3.800 x 1.650 x 2.280 / 1.150	3.300 x 1.550 x 2.450 / 1.650			3.710 x 1.810 x 2.550 / 2.000		
2.520 x 1.130 x 2.085 / 860	2.680 x 1.320 x 2.150 / 1.060	2.950 x 1.550 x 2.250 / 1.560			3.370 x 1.810 x 2.410 / 1.900		

**GRANIFRIGOR™ – benefits:**

- Low power consumption
- Fully automatic control Siemens S7
- State-of-the-art refrigeration technology
- Guaranteed dry, cool air
- Easy operation
- Silent
- 24/365 service
- Many additional options possible
- Suitable for high outside temperatures
- Remote monitoring by modem
- Large filters
- Robust industrial construction
- Quality inspection with trial run at factory



GC 450 Desert	GC 460 / 500 Europe Subtropic Tropic	GC 560 Tropic
340 - 560	460 - 750	560 - 900
25.000	25.000	25.000
6.000	6.000	6.000
165	125 165 225	270
75	65 69 78	92
215	203 210 186	214
250	250	250
600	600 600 600	600
100	65 - 100	120
3 / 4	3 / 4	3 / 4
3.950 x 2.130 x 2.900 / 3.000 3.740 x 2.130 x 2.690 / 2.750	3.950 x 2.130 x 2.900 / 3.000 3.740 x 2.130 x 2.690 / 2.750	3.950 x 2.130 x 2.900 / 3.200 3.740 x 2.130 x 2.690 / 2.950



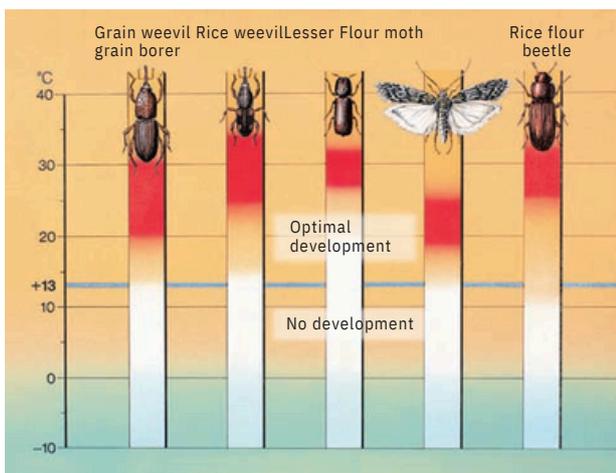
# Prevent the spoiling of your harvest – the ecological and effective way!

**Spontaneous heating of the grain often causes great damage. Systematic hygiene regulations and the call for natural treatment of the produce grain without chemical substances are standards that must be attained. We have an answer for all these demands: GRANIFRIGOR™.**

The GRANIFRIGOR™ cooling device is used to cool down grain immediately after the harvest, independent of the weather. This effective method prevents the spoiling of freshly harvested grains, which heats up spontaneously due to its cellular respiration. Carbon dioxide, water and heat are released by this respiration – with extensive consequences: Loss of dry substance as well as the development of insects, microbes and mildew. Spontaneous heating depends on the grain's moisture and temperature. The principle is also valid for oil seeds such as rapeseed.

**Since we know how grain “functions”, the GRANIFRIGOR™ operates according to two successful principles:**

1. Prompt cooling to below +15 °C once the grain has been stored in: This puts insects into diapause so that they have no chance to multiply (see illustration below). Additionally the development of mildew is effectively prevented, respiration losses are minimised, and drying expenditures are also reduced by the drying effect of the cooling.

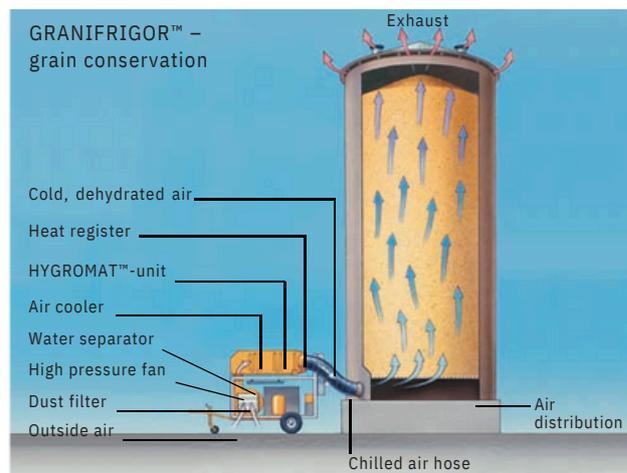


Insects that are dangerous to grain can develop at a temperature starting at +15 °C. GRANIFRIGOR™ cools the grain to below +15 °C and thereby ensures optimal freshness and quality of the harvest.

No ventilation with non-conditioned outside air: Grain seeds are hygroscopic. This means that depending on the temperature an equilibrium develops between the moisture content of the seeds and the relative humidity of the ambient air. Moisture develops if dry grain is exposed to humid air. The grain begins to spoil. Therefore aeration by fans is completely dependent on the weather. Furthermore, the ambient temperature during harvest time is usually much too high.

**Mode of operation:**

The fan of a GRANIFRIGOR™ grain cooler draws in the surrounding air (see illustration below). This air is cooled by an air conditioner (evaporator) to the desired temperature. The following HYGROMAT™ unit warms the cold air again automatically. This lowers the relative humidity and adapts to the conditions of the bulk grain. No moisturizing can occur, which would be rather damaging. This cooled and dried air is fed through the air distribution of the warehouse or the silo system and is forced through the grain. The air is then released to the outside through the exhaust vents of the storage facility. The outgoing air extracts the absorbed heat and moisture.



**We pass on only what we have produced by our own hands – Made in Germany.**





**AIR  
CONDITIONING  
SOLUTIONS**



**CRANEFRIGOR™ – Cooling for containers, crane cabins, and control cabinets**



CRANEFRIGOR™ Container cooling units / control cabinet cooling units		Container Cooling - CC02	Container Cooling - CC05/CC08		Container Cooling - TY
<b>Dimensions</b> [mm]	Length	415	608	998	670
	Width	506	997	763	530
	Height	1.127	1.640	2.200	1.600
<b>Weight approx.</b> [kg]		90	280	450	180
<b>Nominal cooling capacity</b> [kW] <sup>1) 2)</sup> with R134a / R513A		3,4	5,8	11,4	6,4
<b>Heating capacity</b> [kW] <sup>2)</sup>		–	2,3	5,0	4
<b>CO2-equivalent</b> [kg]	R134a	2.002	3.146	5.720	3.289
	R513A	883	1.388	2.524	1.451
	R450A	–	1.331	2.420	1.391
<b>Air flow rate, free blowing</b> [m³/h]		1.500	1.200	2.000	1.000

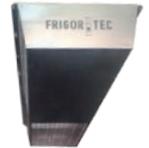


CRANEFRIGOR™ Crane cabin cooling units		Cabin Cooling - OC02	Cabin Cooling - TW	Cabin Cooling - OC07	Cabin Cooling - TX
<b>Dimensions</b> [mm]	Length	600	1.050	880	670
	Width	600	730	460	530
	Height	600	630	2.140	1.600
<b>Weight approx.</b> [kg]		90	140	230	180
<b>Nominal cooling capacity</b> [kW] <sup>1) 2)</sup> with R134a / R513A		3,5	4,6	6,6	6,4
<b>Heating capacity</b> [kW]		2,3	3,5	6,9	4
<b>CO2-equivalent</b> [kg]	R134a	2.002	3.003	2.860	3.289
	R513A	883	1.577	1.262	1.451
	R450A	–	1.512	1.210	1.391
<b>Air flow rate, free blowing</b> [m³/h]		850 <sup>3)</sup>	800 <sup>3)</sup>	1.000 <sup>3)</sup>	1.000 <sup>3)</sup>

1. At 27°C room temperature, 52% rel. room air humidity and 35°C ambient temperature  
2. 400 V / 50 Hz (additional operating voltages available)  
3. controllable.

Subject to technical change.

Refrigerant Type	GWP value:	Area of application:
R134a	1.430	Up to 70°C
R513A	631	Up to 70°C
R450A	605	Up to 85°C



Cabin Cooling - CK 12/18/24			Cabin Cooling - CK 10/16/22/30				Cabin Cooling - CVD1 Split	Cabin Cooling - DV Split
1.048	1.148	1.148	2.132				854	916 - 2.116
638	838	838	1.200				1.200	908
1.845	1.945	1.945	960				912	270
410	480	510	590	610	620	620	290	35 - 91
12,3	19,5	24,2	17,9	26,6	31.4	33,5	10 - 20	10 - 30
6,9			6.2/12.3				-	-
11.440	13.585	18.590	12.87	20.020	24.310	25.740	-	-
5.048	5.994	8.203	5.679	8.834	10.727	11.358	-	-
4.840	5.747	7.865	5.445	8.470	10.285	10.890	-	-
2.500	3.500	4.000	3.500	4.300	6.800	7.000	-	1.850 - 6.420



Filter device	Condensate evaporator	Condensate evaporator
FT15	KVV wall mounting	KV1 floor and wall mounting
370 370 480 - 1.170	550 140 240	980 166 355
Voltages: 24 V DC, 115 V, 230 V	Control by cooling unit	Control via integrated control cabinet
Possible filter class: G2/G3, M5/F7, chemical filters, activated charcoal filter	2,3 - 3,6 kW heat output at 400 V - 500 V	2,3 - 3,6 kW heat output at 400 V - 500 V
-	-	-
-	-	-
Volume flow [m3/h]3): 100-400	Possible control voltage: 110 V 50 / 60 Hz, 230 V 50 / 60 Hz	Possible control voltage: 110 V 50 / 60 Hz, 230 V 50 / 60 Hz



# CRANEFRIGOR™ – Air conditioning units, custom-made and in serial production

For over 50 years, FrigorTec has produced crane air conditioning units for container terminals and harbours, as well as for hot areas, such as foundries, steel works, and mills. On the one hand, the devices create optimal working conditions in the cabin for crane drivers; on the other hand, they ensure reliable room temperatures for sensitive performance and control electronics. The devices, which have been put to the test worldwide, are available in many installation variations and with various output stages.

CRANEFRIGOR™ air conditioning units for cooling containers, crane cabins, and control cabinets, have been specially developed for use in harbours and container terminals. The compact and robust design, and the materials used, make them perfectly suited for small installation spaces, salty air, and constant vibrations. Compact or split devices are also used depending on the profile of requirements.

In the case of a split device (Fig. 1), the condenser unit is installed outside the space to be cooled, with the air conditioning unit inside. The two devices are connected by refrigerant lines. The air conditioning unit is positioned directly above the heat source, making it especially effective. A wide range of individual component combinations allow for an exact output adjustment.

### Container/control cabinet cooling

The air conditioning unit is mounted externally on the container wall (Fig. 2). The spatial conditions determine whether a vertical or horizontal design is chosen. In both cases, the

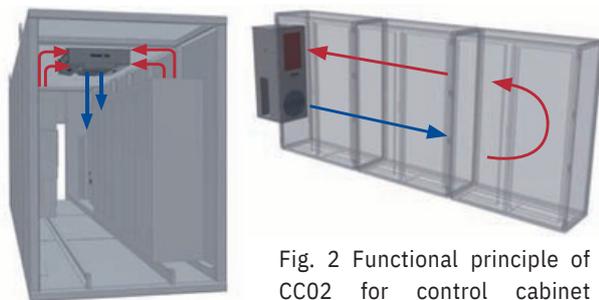


Fig. 1 Functional principle for container cooling of split device CVD1

Fig. 2 Functional principle of CC02 for control cabinet cooling

device blows cool air from below into the space. At the top, the heated air is sucked in through a fan and extracted.

The air conditioning unit for the control cabinet cooling is mounted directly on the control cabinet. A simple air distribution is also supplied in the case of large or long control cabinets.

### Crane cabin cooling

The air conditioning unit for crane cabin cooling is mounted directly on the cabin wall (Fig. 3). It operates very quietly and is easy to operate. In the case of cooling, cold supply air flows underneath the ceiling into the crane cabin. In the case of heating, warm supply air flows above the floor. This provides optimal comfort for the crane driver.

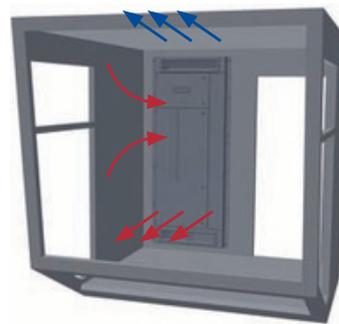


Fig. 3 Operating principle of OC07 for crane cabin cooling

### Technical features of the CRANEFRIGOR™ cooling units

- Long-lasting condenser made of copper, or on request, with different materials or coated
- Corrosion-resistant housing available for installation in aggressive atmospheres
- Robust sheet-steel construction, designed for extreme shock-loads
- Robust refrigerant compressor in various constructions
- Coated with acid- and alkaline-resistant paint
- Potential for individual applications due to compact or split devices
- Condensate evaporator and fresh air filter devices as optional package

# CRANEFRIGOR™ air conditioning units for container/ control cabinet and crane cabin cooling

In harbours and container terminals work is often done under extreme conditions:

- high ambient temperatures
- very high air humidities
- a high level of direct sunlight
- salty air
- high level of exhaust pollution
- high noise levels
- vibrations

Air conditioning units from FrigorTec achieve a good working environment for your employees even under these extreme conditions. In this way, normal operations and all logistics processes can be carried out safely and efficiently.

## Cooled air for man and machine

The guidelines for workplace conditions are met by air conditioning the crane cabin. Your employees work under comfortable, performance-enhancing conditions.

Likewise, the sensitive crane control units have to be reliably cooled – operation reliability depends on this during normal operations and logistic processes. It makes no difference if individual control cabinet lines are involved or entire electric containers.

## High performance and variable installation – individually designed for your application profile

Air conditioning units from FrigorTec come in a wide product range, with a concise differentiation of specific performance features. We choose the exact device to fulfil your individual needs on location.

Your benefits:

- reliable cooling at ambient temperatures of up to +90°C
- robust construction
- split designs allow for a variety of installation options
- versatile electrical arrangements regarding voltage, frequency, and current type

## Tried and tested

The calculated performance data for the devices is tested in our technology department. When doing so, we simulate the temperature conditions of high-heat operations, and operate the device at the required electrical connection values.

In this way, Cranefrigor has produced air conditioning units for container/control cabinet and crane cabin cooling for over 50 years. Our devices are used successfully in more than 80 countries.

**Tell us your requirements, we will be pleased to send you an individual offer.**



Examples of application: Our air conditioning units for container, control cabinet, and crane cabin cooling are used for the most diverse and challenging requirements in harbours and container terminals all across the world.

We pass on only what we have produced by our own hands.





**CRANEFRIGOR™ – Cooling of crane cabins and crane electronics**



CRANEFRIGOR™ Compact devices	CF Compact - TX/TY	CF Compact - TB	CF Compact - TC
<b>Dimensions</b> [mm] L x W x H FS10 KVV			
vertical	670 x 530 x 1.600	600 x 910 x 1.270	660 x 960 x 1.430
horizontal	-	680 x 1.765 x 640	750 x 1.870 x 720
<b>Weight</b> approx. [kg] vertical / horizontal	180 / -	270 / 287	380 / 395
<b>Nominal cooling capacity</b> [kW] with R 134a / R513A <sup>1) 2)</sup>	6,4	7	12,5
<b>Heating capacity</b> [kW] <sup>2)</sup>	4	3,5	2,3 – 4,5
<b>CO2-equivalent</b> [kg] <sup>3)</sup>	R134a	6.006	5.720
	R513A	2.650	2.524
	R450A	2.541	2.118
<b>Air flow rate, free blowing</b> [m <sup>3</sup> /h]	1.000 <sup>4)</sup>	1.200 <sup>4)</sup>	2.000 <sup>4)</sup>



CRANEFRIGOR™ Split devices <sup>2)</sup>	CF Split - VX	CF Split - VB	CF Split - VC
<b>Dimensions</b> [mm] L x W x H FS10 KVV			
vertical	630 x 530 x 910	600 x 880 x 825	660 x 930 x 905
<b>Weight</b> (Condenser unit) approx. [kg]	70	150	250
<b>Nominal cooling capacity</b> [kW] with R 134a / R513A <sup>1) 2)</sup>	6,4	7	12,5
<b>Heating capacity</b> [kW] <sup>2)</sup>	-	-	-
<b>CO2-equivalent</b> [kg] <sup>3)</sup>	R134a	7.436	15.444
	R513A	3.281	6.878
	R450A	2.904	6.111
<b>Air flow rate, free blowing</b> [m <sup>3</sup> /h]	-	-	-

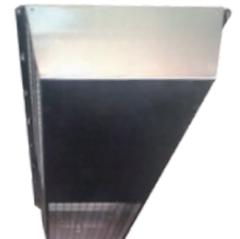
1. With ambient temperature of 27°C, 52% relative indoor air humidity and 35°C ambient temperature
2. 400 V / 50 Hz (additional operating voltages available)
3. Standard version
4. adjustable

Type	GWP value:	Area of application:
R134a	1.430	Up to 70°C
R513A	631	Up to 70°C
R450A	605	Up to 85°C

Subject to technical change.



CF Split - TD	CF Split - TF	CF Split - TH	Self-cleaning filter/ overpressure unit	Condensate evaporator
			Overpressure Unit - FS10	Condensate Evaporator - KVV Wall Mounting
930 x 1.160 x 1.900	1.070 x 1.430 x 2.200	1.260 x 1.760 x 2.520	760 x 570 x 1.310	-
1.020 x 2.270 x 995	1.160 x 2.790 x 1.180	1.360 x 3.420 x 1.400	-	550 x 140 x 240
628 / 660	1.140 / 1.260	1.360 / 1.475	150	20
24,5	36,5	55,5	-	-
3 - 9	3 - 9	3 - 9	-	2 - 3.6
7.865 3.471 3.328	14.300 6.310 6.050	21.450 9.465 9.075	-	-
2.500 4)	4.800	7.000	1.500	-



CF Split - VD	CF Split - VF	CF Split - VH	CF Split - WDV	CF Split - DV
930 x 1.130 x 1.900	1.380 x 1.070 x 1.240	1.680 x 1.260 x 1.440	935 x 670 x 355	916 - 2.116 x 908 x 270
400	700	950	78	35 - 91
24,5	36,5	55,5	2,5 - 6,5	10 - 30
-	-	-	2,3 - 3,1	-
34.320 15.270 13.613	45.617 20.255 18.029	94.257 41.962 37.268	-	-
-	-	-	750 - 1.400 <sup>4)</sup>	1.850 - 6.420



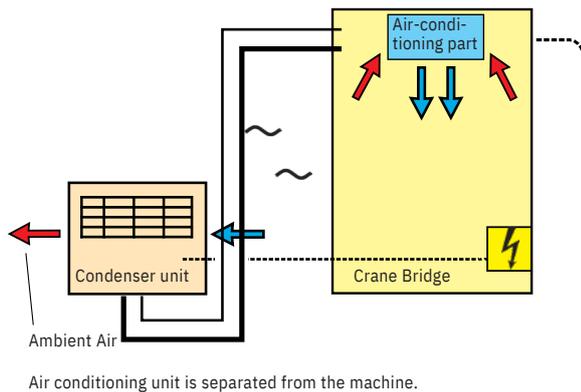
# CRANEFRIGOR™ – Crane air conditioning units, custom-made and serial production

## The V model – Custom-made split devices

V model air conditioning units are split devices: Condenser unit (condenser) and air conditioning part (evaporator) are set up separately. The air conditioning part is connected to the condenser unit with refrigerant lines (see fig. 1).

The air conditioning part is situated directly next to the heat source and works most effectively here. A wide range of individual component combinations allow for an exact output adjustment. The heat absorbed into the air conditioning unit is dissipated with ambient air.

Fig.1 Process principle for the crane air conditioning unit V model



## Technical features of the V and T models

- Long-lasting condenser made of copper, or on request made with different materials or coated
- Corrosion-resistant housing available for installation in aggressive atmospheres
- Robust sheet-steel construction, designed for extreme shock-loads
- Robust refrigerant compressor in various constructions
- Separate electrical control cabinet in the cooling space (V model) or integrated and air conditioned airconditioning part (T model)
- Painted with acid- and alkaline-resistant paint

## The model T – Compact air conditioning units

Compact air-conditioners of the series T consist of two modules: the condenser unit and the air-conditioning part. As shown in the diagram (fig. 2), both modules can be configured in various ways.

This construction unit system allows for simple layout and accommodation to their needs.

The cooled air is guided through channels to the crane bridge or cabin and then, supplemented with fresh air, drawn back by air circulation. The heat absorbed into the

air conditioning unit is drawn off with the surrounding air in the condenser unit.

Fig. 2 Possible variation from the T model air conditioning unit and condenser unit

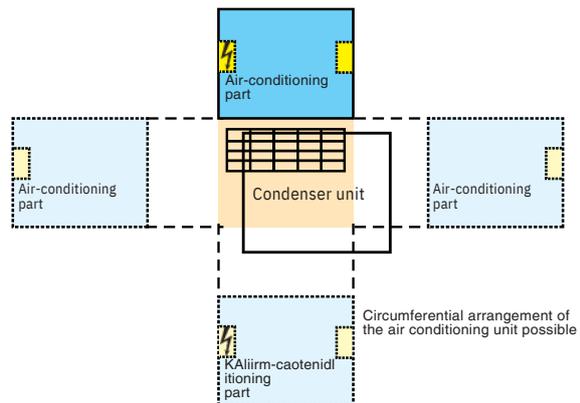
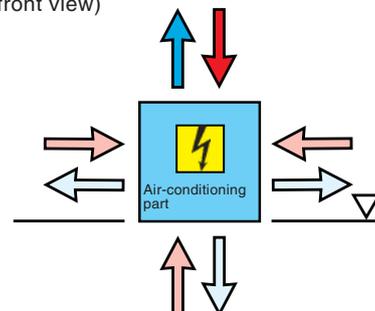


Fig. 3 Circumferential connection of the air duct possible (front view)



# CRANEFRIGOR™ Crane air conditioning for the V and T model – for a higher production safety

In high-heat operating conditions work is done under extreme conditions:

- Very high air temperature
- High thermal radiation and movement of air
- Extreme exposure to dust, odours, and gases
- High noise level

Air-conditioning devices achieve a good working environment for their employees even under these extreme conditions. A safe and efficient production process can be guaranteed.

### Cooled air for man and machine

By air-conditioning the crane cabin, guidelines for workplace regulations are met. Your colleagues work under comfortable, performance-enhancing conditions. Likewise, the crane control unit has to be reliably cooled – operation reliability depends on it.

### High performance and variable installation for their application

With a wide product range and concise differentiation of specific performance features air-conditioning devices can be selected to suit their specific on-site requirements.

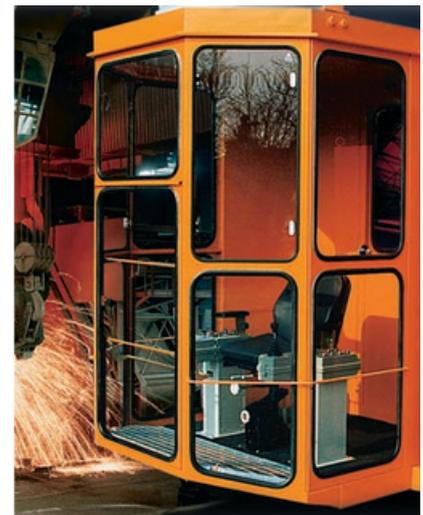
This guarantees:

- Reliable cooling at ambient temperatures of up to +90° C
- Compact construction with precise machine and airconditioning unit measurements
- Split construction (V model) allows for a variety of installation options
- Versatile electrical arrangements related with voltage, frequency, and current type

### Tried and tested

The calculated machine performance data is checked by our technicians. Where the temperature conditions of high-heat operations are simulated and the machine is operated at the required connected wattage.

**Name us your requirements, we'll send you an individual offer.**



Examples of application: The air conditioning units for high heat operators can be used in steel works, smelting works, foundries, and mills and many other places.

**We pass on only what we have produced by our own hands.**



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CALIBRATION YOU CAN TRUST

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