



Agratechniek b.v.

van Nieuwenhuizen

DRYING INSTALLATIONS & EQUIPMENT



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The company Agratechniek was founded in 1974. The objective then and now was and is the development, production and sale of drying and storage systems for the seed industry and growers, flowerbulb growers and arable farmers.

From the very beginning, we have been listening closely to the demands of our users and have been responding to their questions and ideas by providing practical and reliable installations and equipment. Thanks to a service-focused attitude, the quality of advice and products, the know-how and the flexibility.

Agratechniek is a very strong player in various markets throughout the world, but always immediately in your vicinity.

In this brochure you'll find information about breeding and processing of seed.

- Climate cabinet for tissue culture
- Tissue culture rooms
- Climate cabinets for germination tests
- Drying cabinets for static drying
- Drying cabinets for fluid drying
- Osmosis – Priming columns
- Thermogradient table
- Climate rooms for plant growth tests
- Seed rinsing machines
- Fluid tube drying
- Tray dryer for automatic seed drying
- Tray dryer for drying seed fluidly
- Hotwater treating unit
- Vacuum seed transport
- Flat Screen Sizer unit
- Inverter with outflow funnel
- Turner/tipper for boxes and octabins
- Inverter for octabins
- Optimize machines and production line

Climate cabinet for tissue culture

Various climate conditions can be created for tissue culture. This well insulated climate cabinet can be used to automatically achieve and maintain the configured condition. The cabinet has been equipped with the necessary equipment and the advanced ABC processor.



Heating and Cooling

An electrical heating element in combination with a direct expansion cooling machine will ensure that the desired temperature inside the cabinet is reached and maintained. An oversized cooling block ensures little dehumidification will take place. A filter has been assembled on top of the climate cabinet for the process air. With a number of hoods, various process quantities can be achieved.

Cooled drawers

By guiding the air flow of the conditioned air through the trays, the soils will be on a cold surface. This is to prevent the condensation of moisture against the lids. And subsequently, it prevents drops of condensation on the lid from interfering with the exposure of light.

Humidifier

It is optional to use a humidifier when a high level of humidity is necessary.

Climate cabinet for tissue culture

Lighting and lighting mixes

The cabinet can be equipped with lighting of TLD fixtures or LED lamps. This can be done in various time stages and with or without gradual scale transition; use LED lamps for instance to create a day and night rhythm with dusk and morning glory. The use of various lighting mixes, with or without a dimmable option, is also possible.

Models and process

The process can take place based on fixed configured values or in various steps (stages). The temperature and light composition can be configured per stage. The temperature range of the cabinet can be configured between 2°C and 40°C with the lighting off. Between 4 °C and 40°C, the lighting will be enabled.



Fase	1	2	3	4	5
Tijdsduur (uu.mm)	72.00	144.00	168.00	72.00	144.00
Sterkte (Lux)*	xxxx	yyyy	zzzz	aaaa	bbbb
Rood (%)	27	26	25	24	23
Groen (%)	26	26	27	28	29
Blauw (%)	21	22	23	24	25
Verrood (%)	26	26	25	24	23
T° (°C)	25	25	30	35	25
RV (%)	60	70	52	38	30
AV (gr/kg)	12.0	14.0	14.0	14	6

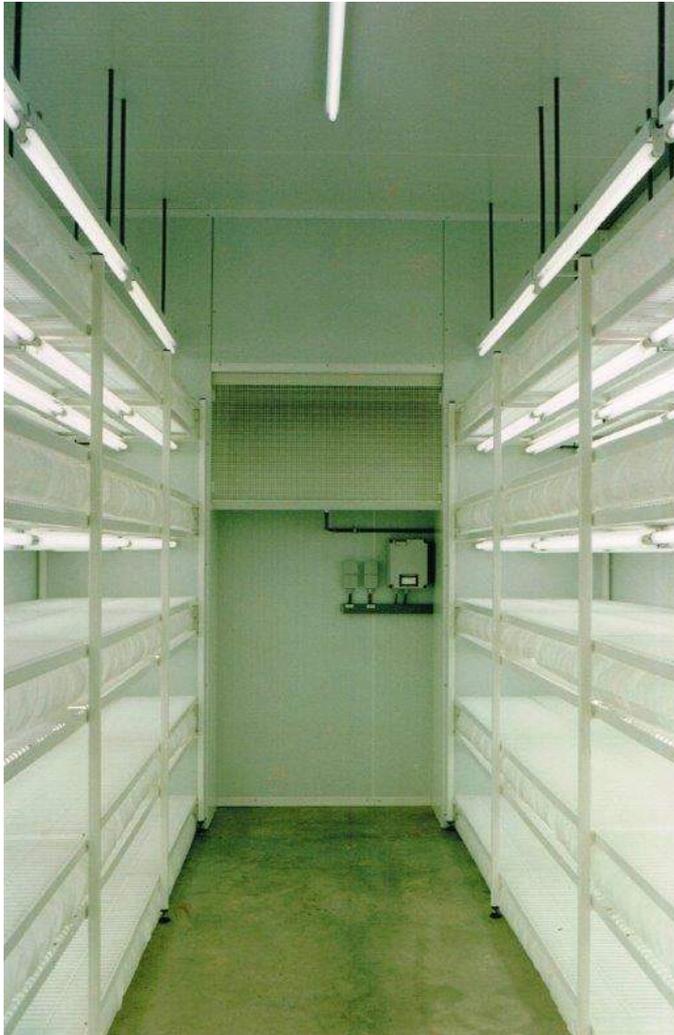
ABC processor

Use the advanced ABC processor to configure and reach every desired air condition (temperature), light intensity and color spectrum on a touch screen. This can be done in various time stages and with or without gradual scale transition; day and night rhythm with dusk and morning glory as an option. The composed menu can be saved as pre-set and used for the next test; 32 pre-sets in total.

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several drying cabinets. Use the ABC processor to configure the air circulation, the temperature and the desired moisture content per phase. When a drying menu has been configured, this can be saved as a pre-set. The menu can be called up again easily. All settings and measurement values can be saved to your pc using the ABC PC program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (pre-sets).

Furthermore there is an SMS module to send an sms in case of emergencies, and a MCM module for operation and monitoring (including graphics) from your smartphone or tablet. The ABC guard thermostats will intervene when the temperature in the cabinet becomes too low or too high. All equipment will be shut down to prevent damage, followed by an alarm. After the alarm, an sms message with detailed information can be send to the responsible persons.

To carry out tissue culture, various climate conditions need to be carefully and as desired be created. Tissue culture rooms are therefore configured and built in close consultation with the users. This consultation will take place with the researcher among others, to determine the correct configuration. It ensures they comply with the specific demands and requirements of the tissue culture. A detailed instruction guide is included.



Vented drawers

In the tissue culture rooms, 2 rows of configurations with special drawers are placed. The drawers consist of a double mesh grid with an air-cooled mattress in between. Through this mattress the cooled air is divided equally along the entire length of the shelf; up as well as down.

No condensation in the propagators

Propagators are placed onto an opened drawer. The cold air from the mattress ensures the temperature of the soil and the air in the propagator remains lower than the air surrounding the propagator. This way no condensation can take place inside the propagator. And subsequently, it prevents drops of condensation on the lid from interfering with the exposure of light.

Heat neutral

Special lighting fixtures hang below the drawers. The cool air from the bottom of the mattress ensures the neutralization of the warmth from the lamps.

Air circulation

This type of air circulation is based on suppression. No air movement can be felt in the space. Partly through the combination of the air-suction filter and the air mattresses, a sterile environment is created.

Lighting exposition

Lighting fixtures are an important element. There are a lot of possibilities and the choice of the correct fixtures is determined in consultation with the user. Naturally you will be advised to make the right choice.

ABC processor

With the advanced ABC processor any desired air condition can be achieved. The brightness and color spectrum can be set on the touchscreen. One ABC processor/ touchscreen can operate multiple drying cabinets.



Pre-set menus

Use the advanced ABC processor to configure and reach every desired air condition, light intensity and color spectrum on a touch screen. This can be done in various time stages and with or without gradual scale transition; day and night rhythm with dusk and morning glory is an option. The composed menu can be saved as pre-set and used for the next test; 32 pre-sets in total.

Stage	1	2	3	4	5
Duration (uu.mm)	72.00	144.00	168.00	72.00	144.00
Intensity (Lux)*	xxxx	yyyy	zzzz	aaaa	bbbb
Red (%)	27	26	25	24	23
Green (%)	26	26	27	28	29
Blue (%)	21	22	23	24	25
Far-red (%)	26	26	25	24	23
T° (°C)	25	25	30	35	25
RH (%)	60	70	52	38	30
AH (gr/kg)	12.0	14.0	14.0	14	6

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several drying cabinets. Use the ABC processor to configure the air circulation, the temperature and the desired moisture content per phase. When a drying menu has been configured, this can be saved as a pre-set. The menu can be called up again easily. All settings and measurement values can be saved to your pc using the ABC PC Program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (Pre-sets).

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Technical room

Behind the double wall, an air-technical room is created. In that room, the following components are installed;

- Filter for the suctioned air
- Cooling installation
- Silent fans with speed control
- Electrical heating

The cooling can also be connected to the present cooling installations. The cooling can also be connected to a cooled water supply pipe.

Sterile

The mattresses are made from white polyester cloth, washable at 85°C, with chlorine-containing washing detergent if desired. This also contributes to a sterile environment.

Climate cabinets for germinations tests

This climate cabinet is developed to conduct germination and growth tests in various climate conditions. The climate cabinet is assembled as desired and adapted to the application. This consultation will take place with the researcher, to determine the correct configuration. The cabinet is then build to customer specifications and delivered ready for plugging. A detailed instruction guide is included.



Models and process

The process can take place with fixed values (temperature and AH/RH) or through a menu in different steps (stages) at which the temperature, RH/AH and air circulation can be configured as desired. An electrical heating element in combination with a direct expansion cooler will ensure that the desired temperature inside the cabinet is reached and maintained. To maintain a high level of humidity, an ultrasonic humidifier can spread a very fine mist.

The temperature range of the cabinet can be configured between 2°C and 40°C with the lighting off. The temperature range of the cabinet can be configured between 4°C and 40°C with the lighting on. The RH can be configured between 10% and 85%. Models with a RH until 99% are also possible.

Climate cabinets for germinations tests



Light

For the execution of germination and or growth tests, TLD fixtures can be used. It is also possible to assemble dimmable LED lighting. Optionally consisting of various spectra. In the example below the colors white, red and far-red are separately dimmable to achieve the correct colors. The plants can be illuminated from the two sides of from above. In sideward lighting, the lighting fixtures are assembled on the left and right side of the shelf. This is to prevent the radiant heat from impacting the plant growth.

Furthermore there are UV lighting options to carry out health tests on plants.



ABC processor

Use the advanced ABC processor to configure and reach every desired air condition (temperature and RH/AH), light intensity and color spectrum on a touch screen. This can be done in various time stages and with or without gradual scale transition; day and night rhythm with dusk and morning glory are an option. The composed menu can be saved as pre-set and used for the next test; 32 pre-sets in total.

Stage	1	2	3	4	5
Duration (hh.mm)	72.00	144.00	168.00	72.00	144.00
Intensity (Lux)*	xxxx	yyyy	zzzz	aaaa	bbbb
Red (%)	27	26	25	24	23
Green (%)	26	26	27	28	29
Blue (%)	21	22	23	24	25
Far-red (%)	26	26	25	24	23
T° (°C)	25	25	30	35	25
RH (%)	60	70	52	38	30
AH (gr/kg)	12.0	14.0	14.0	14	6

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several drying cabinets. Use the ABC processor to configure the air circulation, the temperature and the desired moisture content per phase. When a drying menu has been configured, this can be saved as a pre-set. The corresponding menu can be called up again easily. All settings and measurement values can be saved to your pc using the ABC PC Program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (Pre-sets).

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Drying cabinets for static drying

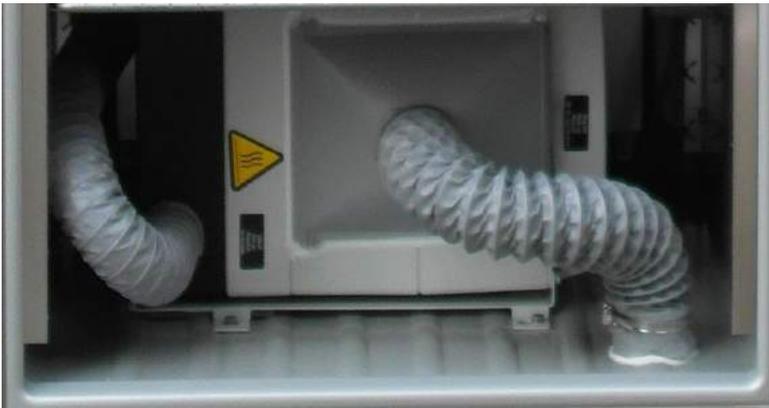
The drying process can take place in various steps (stages). The temperature and speed of moisture absorption can be configured per stage.



In the static drying cabinet, the seeds are dried and conditioned in bulk in trays or in little bags. The air will blow through the seed in bulk with a light flow (in the trays) or through the baskets with little bags.



Drying cabinets for static drying



An electrical heating element in combination with a direct expansion cooler will ensure that the desired temperature and moisture content (tot ca 5 gr/kg; 30% RH at 25°C) inside the cabinet is reached and maintained. To gradually reach the low absolute moisture content (1,5 gr/kg; 15% at 15°C), it is possible to also install an adsorption dryer.

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several drying cabinets. Use the ABC processor to configure the air circulation, the temperature and the desired moisture content per phase. When a drying menu has been configured, this can be saved as a pre-set. The corresponding menu can be called up again easily. All settings and measurement values can be saved to your pc using the ABC pc program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (pre-sets).

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The ABC guard thermostats will intervene when the temperature in the cabinet becomes too high or too high. All equipment will be shut down to prevent damage, followed by an alarm. After the alarm, an sms message with detailed information can be send to the responsible persons.

Drying cabinets for fluid drying

Optimal (controlled) drying of the seeds and pellets in a conditioned cabinet with a fluid drying proces.

When small quantities of (fruit) seeds and pellets is dried, the most optimal conditions are expected. Furthermore it can be necessary to have a product in movement at the start of the drying process. To be able to satisfy this need, a drying cabinet has been developed, in which the seeds or pellets can be dried fluidly. This prevents adhesion or tearing (pellets).

After this stage of pre-drying, the seed can gradually and statically reach the desired moisture content. The inblowing temperature is also automatically adjusted per stage if desired.



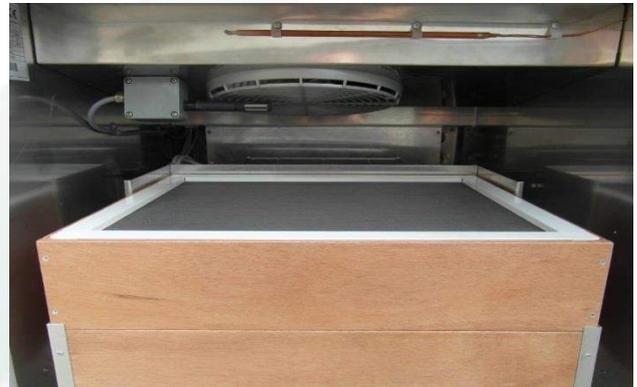
In the climate cabinet the product will be dried in 3 levels. The drying process can take place in various steps (stages) at which per stage, the temperature, air quantity and speed of the moisture absorption can be configured. For a quick drying process a refrigeration dryer is installed (to ca, 5 gr/kg; 30% RH at 25°C). To gradually reach a low absolute moisture content, it is possible to also add an adsorption dryer (1,5 gr/kg; 15% at 15°C). An ultrasonic humidifier is installed to be able to have air circulation, also with a high moisture content. This enables a steady drying process, by gradually decreasing the absolute moisture content (AH).

Drying cabinets for fluid drying



It is possible to configure the air quantity in a pulsating manner. Very vulnerable seeds or pellets will alternate between being in motion and in rest. This way the product will remain loose and aerated without damaging. The product will also dry very evenly.

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several drying cabinets. Use the ABC processor to configure the air circulation, the temperature and the desired moisture content per phase. When a drying menu has been configured, this can be saved as a pre-set. The corresponding menu can be called up again easily.



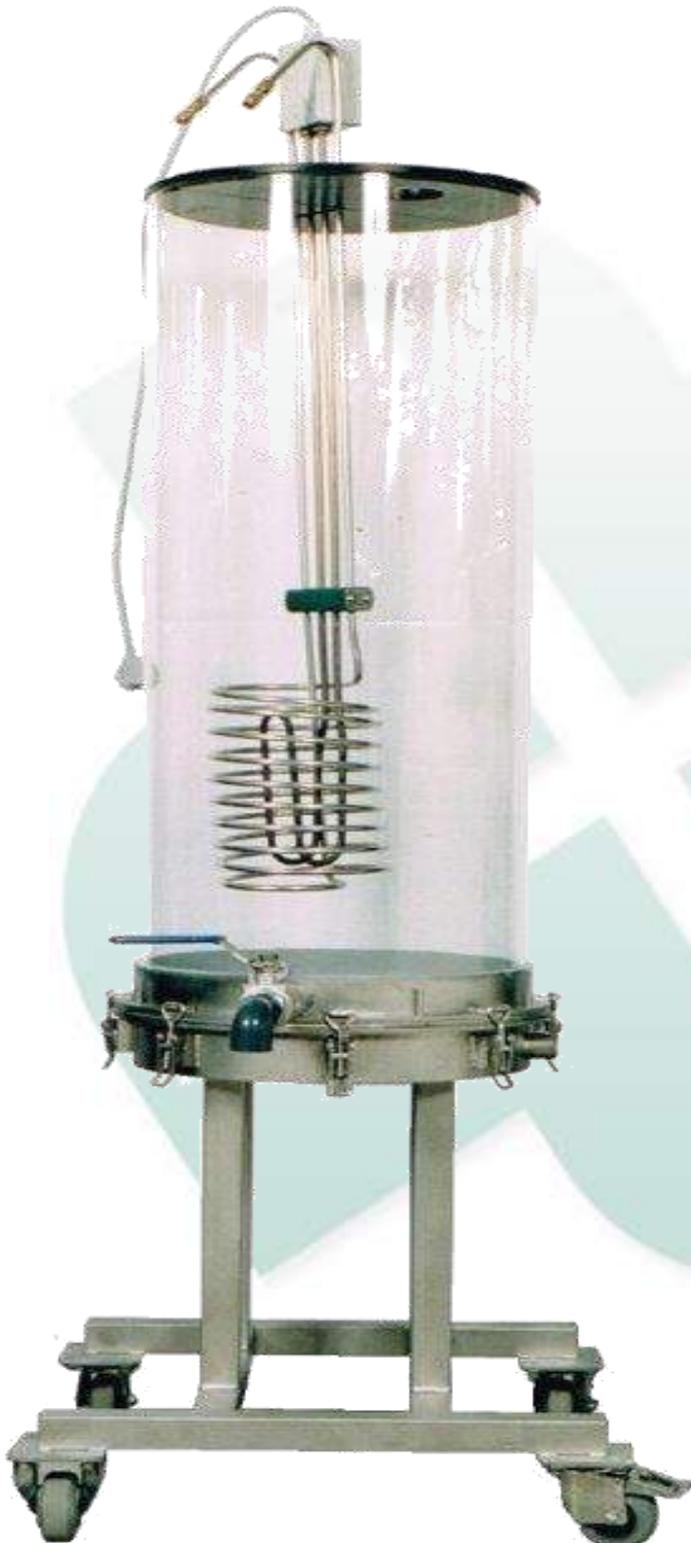
All settings and measurement values can be saved to your pc using the ABC PC Program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (Pre-sets).

Furthermore there is an SMS Module to send an sms in case of emergencies, and a MCM Module for operation and monitoring (including graphics) from your smartphone or tablet.

The ABC guard thermostats will intervene when the temperature in the cabinet becomes too high or too high. All equipment will be shut down to prevent damage, followed by an alarm. After the alarm, an sms message with detailed information can be send to the responsible persons.

Osmosis – Priming columns

For a controlled germination process of the seeds, special priming columns have been developed. The priming columns are configured and build in close consultation with the users. This consultation will take place with the researcher among others, to determine the correct configuration. It ensures they comply with the specific demands and requirements of the priming process. A detailed user guide is included.



A priming column basically consists of a stainless steel frame with an plexiglass cylinder. The cylinder has connections to be able to fill them with water (automatically) and empty them again.

Through an air connection, the conditioned air can be blown through the column with water/glycol.



Above the columns there is a conduit street with connections for the cooling coils, for instance.



Cooled water flows through this coil.



In combination with an electrical heating element, the water temperature in the column is controlled exactly.

Osmosis – Priming columns

Besides the water temperature, the seeds can also be illuminated to have the germination process take place. For more illumination, lighting fixtures can be installed on the conduit street. This light can also be configured as desired per stage. Usually a lot of day light (color 840 in TL) is used.

The entire priming process is controlled automatically with the ABC processor. The operation occurs by means of a touchscreen. One ABC processor/touchscreen can operate several priming columns. It is possible to configure the temperature with the ABC processor. A day and night rhythm can be configured and saved as pre-set. The menu can be called up again easily.

All settings and measurement values can be saved to your pc using the ABC PC Program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (Pre-sets).

Furthermore there is an SMS Module to send an sms in case of emergencies, and a MCM Module for operation and monitoring (including graphics) from your smartphone or tablet. The ABC guard thermostats will intervene when the temperature of the water becomes too high or too high. All equipment will be shut down to prevent damage, followed by an alarm. After the alarm, an sms message with detailed information can be send to the responsible persons.

Thermogradient table

A thermogradient table can be used to perform germination tests. The principle of this product is that the area of the table changes in temperature from the left to the right. This makes it possible to determine at which temperature the germination process is the most powerful.



The usable surface is about 2 by 1 metres.



Microclimate

Various microclimates can be created using the acrylic hoods. It leads to less migration of moisture of the warm side to the cold temperature side.

Thermogradient table



ABC processor

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several products. The ABC processor can be used to configure an independent temperature per section; this will create fluctuations from the cold to the warm side.

When a drying menu has been configured, this can be saved as a pre-set. The corresponding menu can be called up again easily. All settings and measurement values can be saved to your pc using the ABC pc program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (pre-sets).

Furthermore there is an sms module to send an sms in case of emergencies, and a MCM module for operation and monitoring (including graphics) from your smartphone or tablet.

Infrared thermometer

Optionally an infrared thermometer can be delivered along with the table, to perform a correct temperature measurement. Use this instrument to measure the temperature quickly. The accuracy of this thermometer is 0.1°C. This thermometer is equipped with a calibration report to be able to carry out a reliable measurement.

Climate rooms for plant growth tests

To carry out growth tests, various climate conditions need to be carefully and as desired be created. Plant growth rooms are therefore configured and build in close consultation with the users. This consultation will take place with the researcher among others, to determine the correct configuration. It ensures they comply with the specific demands and requirements of the plant growth tests. A detailed instruction guide is included.

Cooling

The plant growth rooms are often executed with a ceiling cooler in combination with an airsock. The dimensioning of the ceiling coolers is closely related to the used lighting. Various types of cooling installations are used. The choice depends on the desired RH in the space.

The refrigeration can also be connected to the present cooling installation and to a cooled water supply pipe.



Air regeneration

The air injection method is based on air suppression. The air flow rate depends on the released warmth of the lighting and is determined per situation. The air flow rate will have to be adjusted again to maintain the correct temperature.

Lighting

There are various kinds of lighting possible. Setups with LED fixtures with day-light color, or dimmable fixtures with the red, far-red and blue light colors are possible.



Climate rooms for plant growth tests

Humidification

Different kinds of air humidifiers are possible. The most used method is an ultrasonic humidifier in combination with a reverse osmosis water treatment unit.



ABC processor

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Stage	1	2	3	4	5
Duration (min)	65	50	130	140	600
Intensity (Lux)*	xxxx	yyyy	zzzz	aaaa	bbbb
Red (%)	30	40	50	60	30
White (%)	10	10	20	20	30
Blue (%)	40	30	10	10	30
Far-red (%)	20	20	20	10	10
T° (°C)	25	25	30	35	15
RH (%)	60	80	60	45	40
AH (gr/kg)	12.0	16.0	16.0	16.0	4.3

The entire process is controlled with the ABC processor which is provided with a touchscreen. One ABC processor/touchscreen can operate several plant growth rooms. All settings and measurement values can be saved to your pc using the ABC PC Program. These values can be called up again in a graphic or table for analysis. This makes it possible to, if needed or desired, have a tailored adjustment of the processes (Pre-sets).

Furthermore there is an SMS Module to send an sms in case of emergencies, and a MCM Module for operation and monitoring (including graphics) from your smartphone or tablet. The ABC guard thermostats will intervene when the temperature in the room becomes too high or too high. All equipment will be shut down to prevent damage, followed by an alarm. After the alarm, an sms message with detailed information can be send to the responsible persons.



Seed rinsing machines



The seed rinsing machine is based on professional or industrial washing machines from the leading brands. These machines are converted, so they will comply with the specifications to be able to professionally clean and treat the seed. On the touchscreen the operator can select the desired recipe or chose an existing recipe. Depending on the user intensity and batch size, the type of machine (professional or industrial) and the capacity (7-180 KG) are selected for you.

On the left a **Primus** washing machine which is used for the professional market. Converted to a seed rinsing machine.

Execution:

The drum, tub and the complete encasing are made from stainless steel. The inside drum is equipped with ribs, which ensures a better mechanical operation. The drum is driven by a frequency-controlled engine. The water is heated by means of electric heating elements. A temperature sensor registers the water temperature. A flow meter ensures the exact desired quantity of water will be added. Water pressure sensors ensure the water remains at the desired level. The machine is equipped with three water connections, through which the machine can be filled with cold or warm water, or a mixture of both.

Programs for seed treatment

The desired program can be configured on a touchscreen or on your pc. The program exists of 4 standard stages:

1. Rinsing stage
2. Treatment stage
3. Drainage stage
4. Centrifugal stage

The following can be configured as a basis:

- Weight of the seed batch.
- The number of liters of water: a fixed value or the number of liters per kilogram of seed.
- Desired water temperature.
- Time period in minutes or hours
- Number of revolutions of the drum
- Rotation direction; to the left, to the right or turning.
- Times for rotation or standstill of the drum

There are additional settings per stage:

- Rinsing stage
 - Option for inlet of cold water, warm water of mixed
- Treatment stage
 - Option for desired chemicals; standard option is 4 chemicals.
 - Setting of the percentage of chemicals in the water
 - Setting of the quantity of water needed to rinse the supply pipe of the chemicals. This water will go to the drum and will be deducted of the total desired quantity of water.
- Drainage stage
 - Option to discharge water to collecting tank of the sewer.
- Centrifugal stage
 - Maximum water level before centrifugal stage can start.

Seed rinsing machines

Process:

The rinsing machine is filled with bags of seed. The desired recipe is chosen. After setting the weight of the batch, it will be known how much water has to be dosed. The rinsing stage is started, followed by the treatment stage. After every rinsing and treatment stage and before every centrifugal stage, there is always a drainage stage.

During the treatment stage with chemicals, a part of the desired water quantity is added. Afterwards the correct quantity of chemicals is added, followed by the rinsing water. After adding the rinsing water, additional water can be added to achieve the total desired water quantity. The standard control is able to suction 4 different chemicals.

The drum has a cycle of (short) rotation and (long) pauses. The rotation direction can be alternated automatically. The maximum treatment time is configured to 24 hours. After the treatment, the water is discharged to a collecting tank or to the sewer. The bags of seed are centrifuged to discharge the adherent water. The door can only be opened when the program has been completed entirely.

As the seed has been centrifuged, the treated seed can be dried immediately after the treatment. Agratechniek has different possibilities: among other things, a fluid tray dryer for 20-100 KG.

Options:

- PH meter
- Dosing installation with 2 flow meters and the 2 frequency-controlled pumps for the chemicals.

Service and maintenance:

The basis of the rinsing machines consists of the brands Primus and Milnor. These are sold worldwide, so maintenance and service to the machine is possible in every country.

On the right is a **Milnor** washing machine which is used in the industrial market. This one is also converted to a seed rinsing machine.

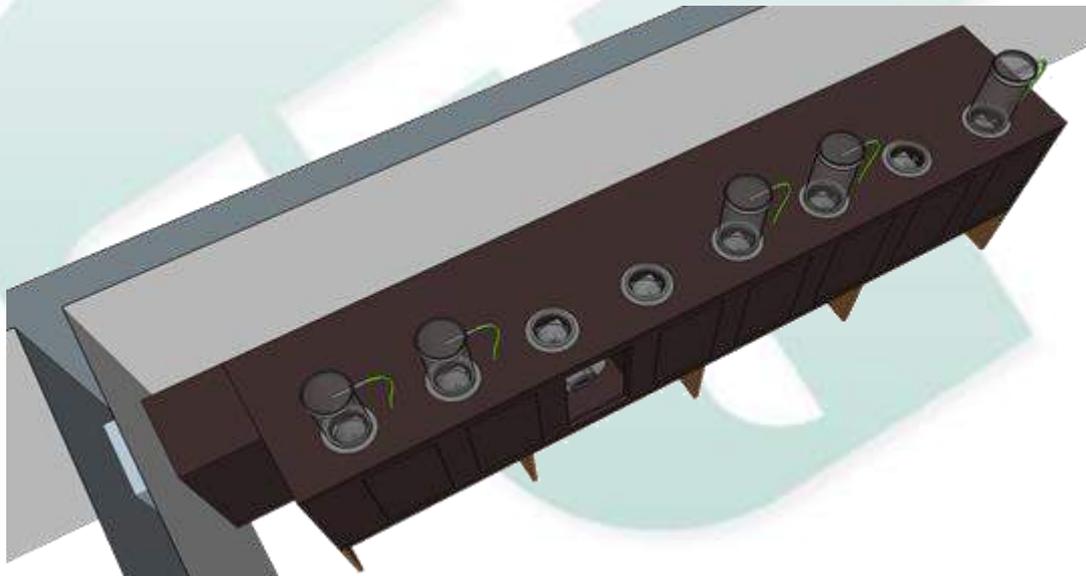


Fluid tube drying

Treated seed samples can be dried fluid in special tubes. The tube can be filled with seed near the treating installation and after that placed on the drying installation.



The fluid tube drying installation are made from 1 tube to 8 and more.



Special connection at the installation for the tubes. Your existing tubes can be used as well.

Fluid tube drying

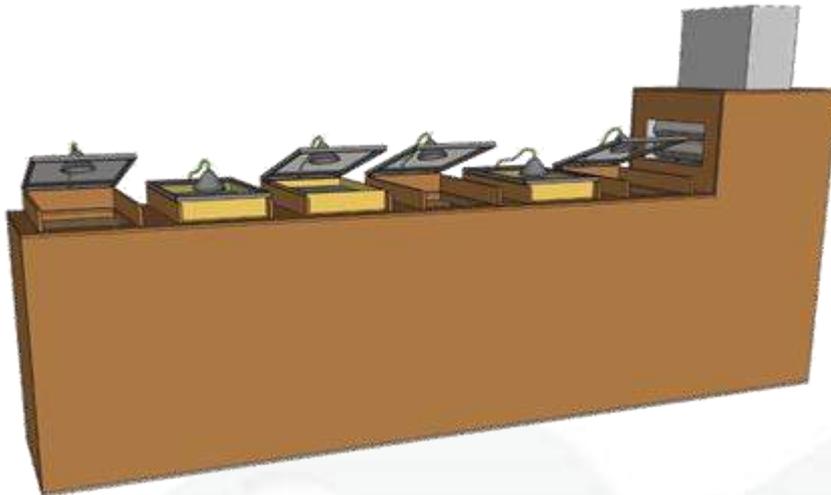


A small high pressure fan blows air through an electrical heater into the tube to make the seed fluid.



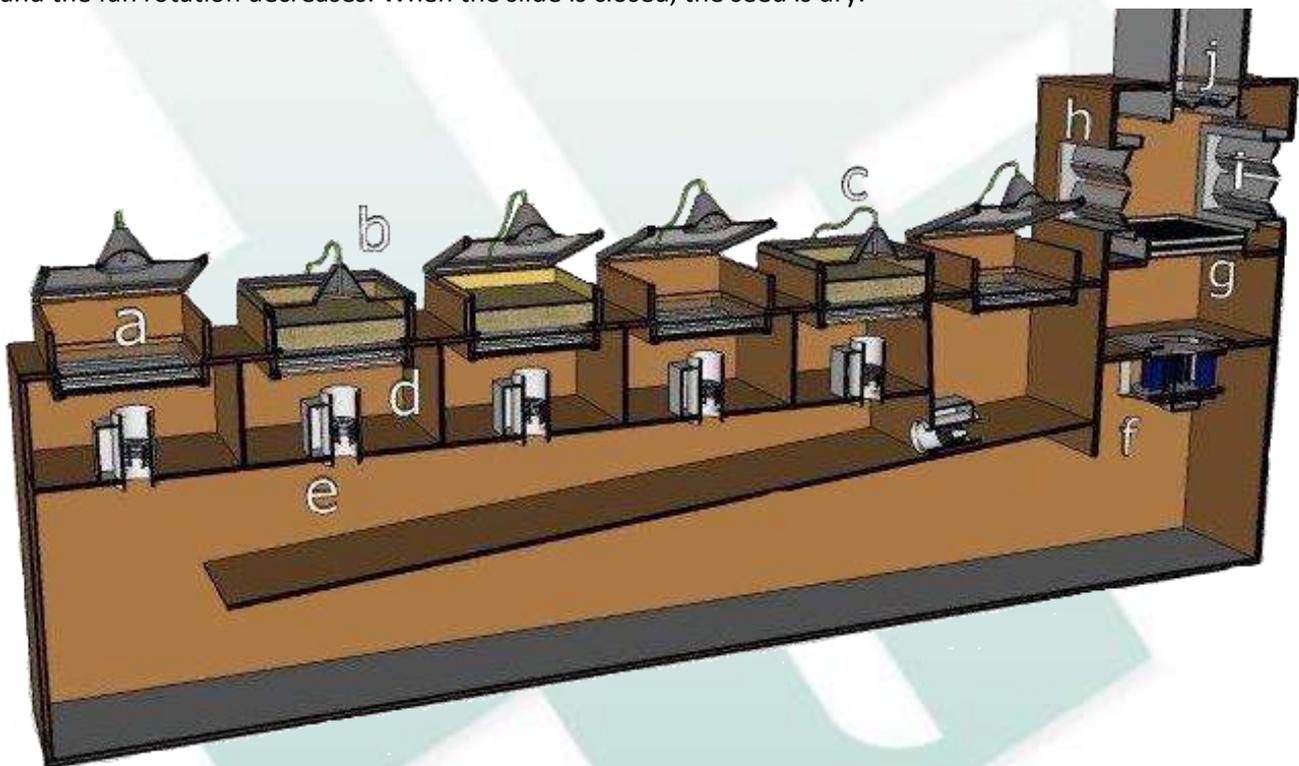
Air will be extracted from a central duct at the back; fresh and dry air to prevent recycling of damp air.

Tray dryer for automatic seed drying



Drying of a small amount of seed does not always get the attention it deserves. The tray dryer of Agratechniek dries the seed in every tray automatically to the desired moisture content. This can vary per tray. The drying process starts automatically when the tray is placed and the mesh lid (b) is closed.

The fan rotation (f) will increase to create the desired amount of additional air. A T° and RH sensor (c) above each tray measures the air from the seed. When the desired moisture content is reached, the slide (d) closes gradually and the fan rotation decreases. When the slide is closed, the seed is dry.

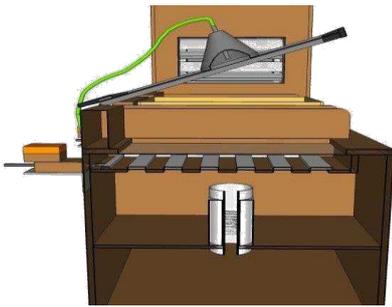


Cross section of the static tray dryer (in this example containing 6 trays; more or less trays is possible):

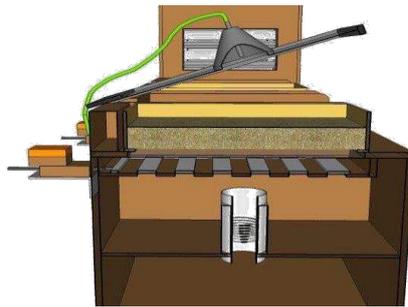
- | | |
|--|---|
| a) Place a tray with an opened mesh lid. | f) Central fan for air measurement |
| b) Tray placed and mesh lid closed. | g) Heating radiator for desired basic T° |
| c) Measurement of T° and RH of the air from the seed | h) Valve register for inside air (recirculation). |
| d) Slide for automatic opening and closing. | i) Valve register for aspiration of outside air. |
| e) Electrical heating for additional heating up. | j) Valve register for supply of dried air. |

The electric heating (g) ensures a separate temperature can be provided per tray or per drying phase. After the desired time or desired moisture content, the T° can be readjusted in a next phase.

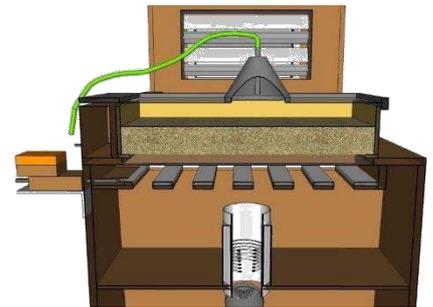
Tray dryer for automatic seed drying



Cross section without tray; the lid with sensor (c) has been opened to place a tray.

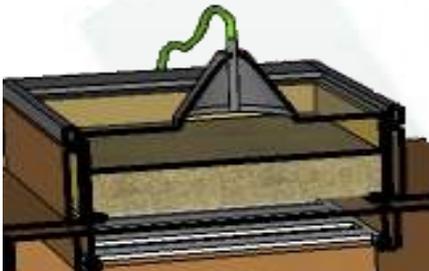


Cross section of tray with mesh lid still open; drying process has not started yet

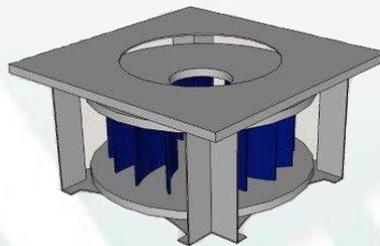


Cross section of tray during drying process; mesh lid closed and slide (d) opened.

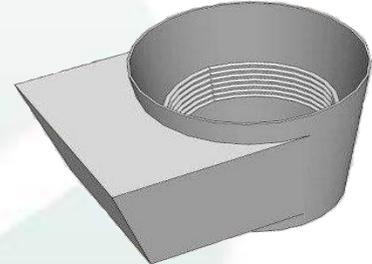
The fan automatically provides more air when an additional tray is placed. When the seed in a tray begins to dry, the slide (d) closes gradually. When this occurs, the air quantity will decrease automatically, during which the desired moisture content is maintained.



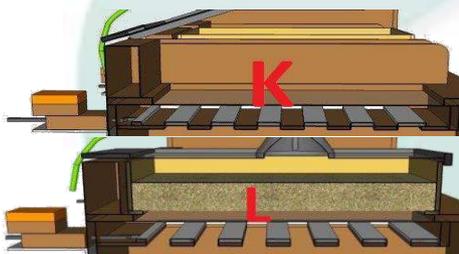
The T°+RH measurement sensor (c) has been mounted onto the cover grid using a funnel, to measure the air condition from the seed.



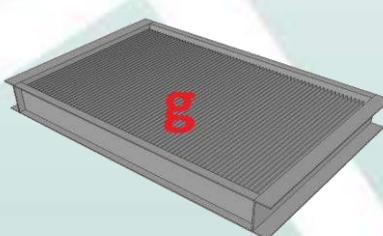
A high pressure fan (f) with built-in air measurement can give additional air quantity when placing a tray.



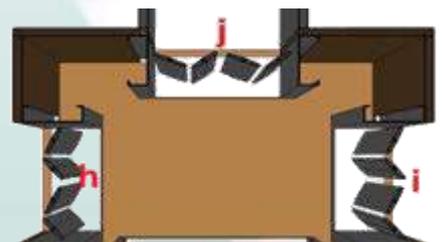
An electric heating (g) ensures the air T° can be heated up additionally per phase.



The slide is closed when no tray has been placed and the lid is opened (K). The slide is opened to dry a tray of seed with a closed lid (L).



A heating radiator (g) ensures the air is heated up to a desired basic T°. Afterwards the T° can be heated up additionally per phase.

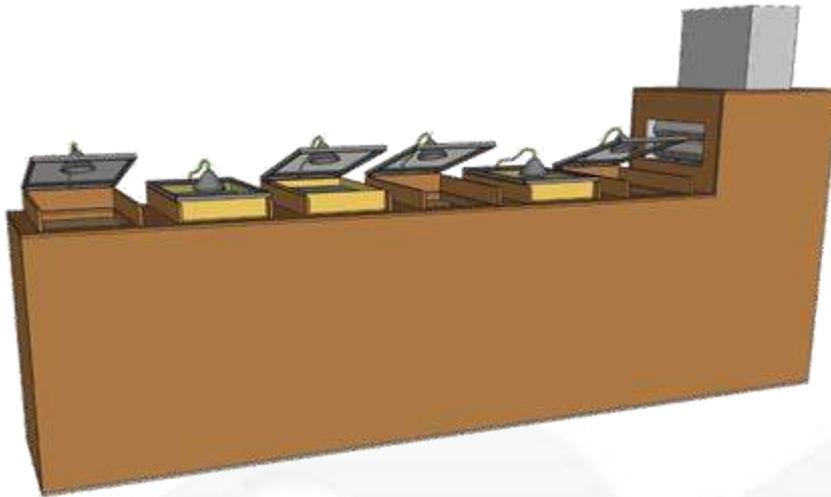


Valve section for aspiration of inside air (h), outside air (i) and dried air (j) from the central air dryer.

The dried air from the central air dryer mixes with the inside or outside air. Therefore, it continuously creates the desired moisture content of the air. This can vary per phase. The drying process takes place completely controlled and always reaches the desired moisture content.

The drying process usually stops when the air from the seed has reached the desired moisture content. Therefore the air from the seed will be measured (c). Another possibility is to end the drying process when a desired amount of moisture around the seed has been evaporated. Drying process will stop when the original weight of the seed has been reached.

Tray dryer for drying seed fluidly



Pellets and various seeds preferably should dry fluidly to prevent adhesion or clotting. The fluid tray dryer of Agratechniek dries pellets and seeds automatically to the desired moisture content. This desired moisture content, but also the ingoing T° , can be set per tray.

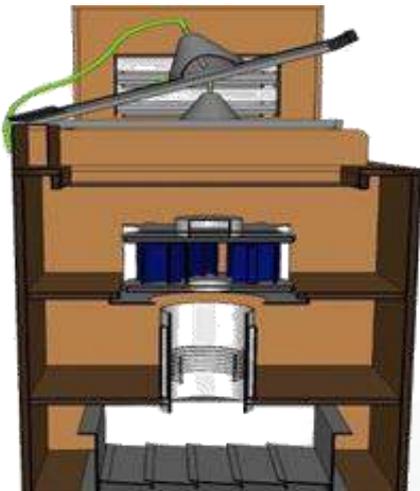
The drying process starts automatically when the tray is placed and the mesh lid (b) is closed. The fan rotation (d) will increase to reach the set amount of air and to create a fluid bed if desired. A T° +RH sensor (c) above each tray measures the air from the seed. The drying process takes place in 5 phases and per phase the desired seed moisture content, the air quantity and temperature can be set. When the desired end moisture content is reached, the fan rotation (d) decreases. When the fan stops, the seed has reached its desired moisture content.



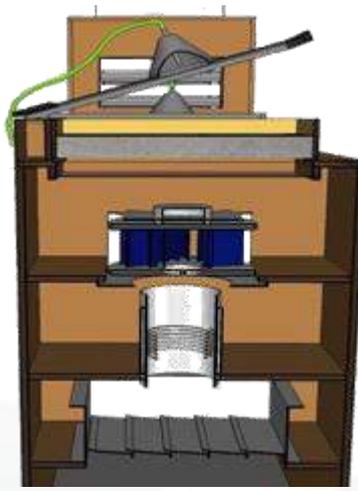
Cross section of the fluid tray dryer (here containing 6 trays, but other quantities are also possible):

- | | |
|--|--|
| a) Space for a tray with the lid opened | g) Air valve opened with airflow (drying) |
| b) Tray placed and mesh lid closed | h) Valve register for inside air (recirculation) |
| c) Measurement of T° +RH of the air from the seed | i) Valve register for aspiration of outside air |
| d) High pressure fan with air measurement | j) Valve register for supply of dried air. |
| e) Electrical heating for additional heating up | The i + j or h + j ensure the correct air conditions are reached |
| f) Air valve closed without airflow | k) Heating radiator for desired basic T° |

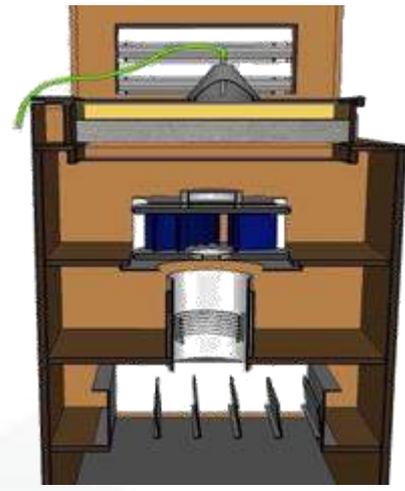
Tray dryer for drying seed fluidly



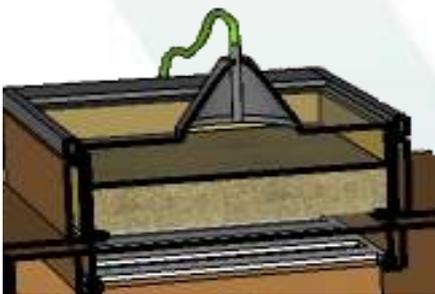
Cross section without tray; the lid with sensor (c) has been opened to place a tray.



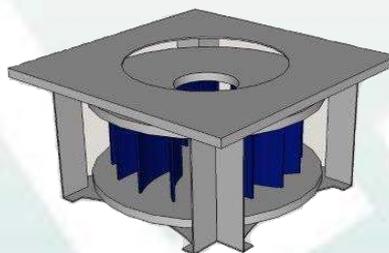
Cross section of tray with mesh lid (b) still open; drying process has not started yet



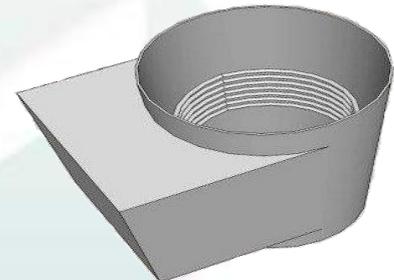
Cross section of tray during drying process; mesh lid (b) closed and valves (g) opened.



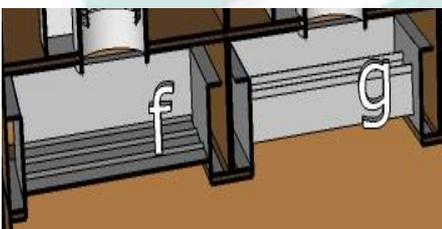
The T°+RH measurement sensor (c) has been mounted onto the cover grid using a funnel, to measure the air condition from air out of the seed.



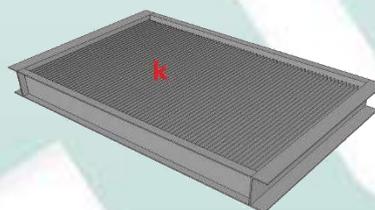
A high pressure fan (d) with built-in air measurement can provide the correct air quantity per tray and per phase.



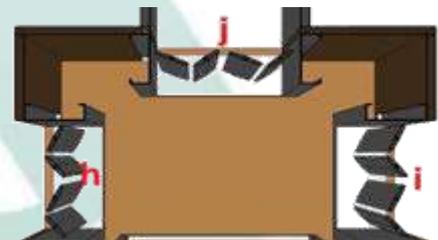
An electric heating (e) ensures the air T° can be heated up additionally per phase.



A valve section will be opened (g) when the drying process of that section is active and stays closed (f) when the drying process has been shut down.



A heating radiator (k) ensures the air is heated up to a desired basic T°. Afterwards the T° can be heated up additionally per phase.



Valve section for aspiration of inside air (h), outside air (i) and dried air (j) from the central air dryer.

The dried air from the central air dryer (j) mixes with the inside (h) or outside air (i) and is heated up by k and e and the . Therefore, it continuously creates the desired air conditions and T°. This can vary per phase. The drying process takes place completely controlled and the seed always reaches the desired moisture content.

Hotwater Treating unit

Seeds are treated in wooden drying boxes. In every box you can treat about 200 litre seeds. The box is provided with a lid with a wired screen. The boxes are automatically plunged into the hot water bath. To guarantee that all seeds are in contact with the hot water the whole box is plunged into the hot water bath and is smoothly moved through the hot water bath.



The water temperature can be heated by a central boiler system, electrical or we can provide the unit with a local boiler system. The temperature fluctuation is about +/- 0.5 °C.

The treating time is controlled by a timer and can be set by the operator. When the treating time is past the box would be take out of the hot water bath and automatically transported to a drying fan. The fan will blow off the clinging water and cool down the seeds.

During this process the next box can be placed in the treating unit. After about 20 minutes the aerated box will be transported to the front of the unit and can be transported by a forklift truck to a drying unit. (see fluid drying)



Hotwater Treating unit

Fluid drying:

Drying installation for the fluid drying of batches seed in special drying boxes. The installation consist out of a dryer section and an absorption dryer. Optional; air-mix units to extract (dry) air from outdoor.

The boxes will be placed into the dryer section. Dry air will be pushed through every individual box to make the product fluid and to dry it homogeneous. In the closed system the wet air will be extracted by the air dryer or discharged outdoor. Dry air from outdoor and/or air from the absorption dryer return back into the boxes.

As an option drying with different temperatures for each box separately; start with a high temperature for wet product and at the end with cooling down until ambient temperature.

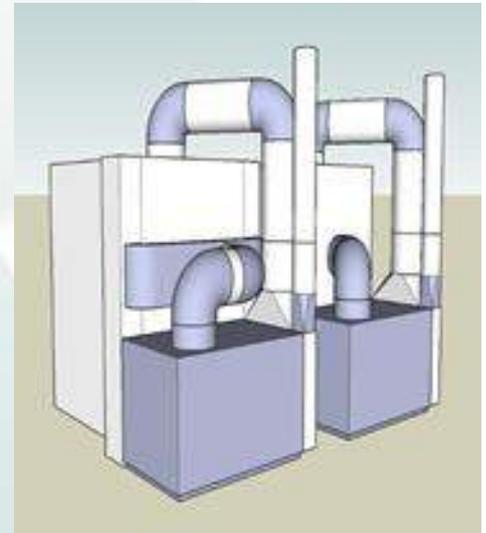
For each drying phase the amount of air will be automatically adjust to avoid damaging of the product and avoid too much dust.



Fluid dryer



Absorption dryer



Back view dryer (absorption unit and air channels)



Drying box with seeds is placed into the drying unit



Fluid drying of wet seeds

Vacuum seed transport

Vacuum transport has been used for various products for decades. Generally with products in bulk, where the capacity is important and damaging plays no role. Continuous transport with high air speeds is the norm.



Other criteria apply with seed and seed pellets; the product may never be damaged and has to be dosed exactly. Machines are not always continuously used, and it can be desirable to use the same vacuum unit at various machines.

To comply with this demand, compact vacuum units have been developed, which can easily be placed above a machine. This is also possible on a dosing container, which in turn can be placed above the supply to the machines.

The transport of the seeds and pellets will take place at a low air speed, where the buffer is continuously complemented. This naturally takes place without producing damages.



A proximity sensor in the funnel or container activates the vacuum unit to be able to maintain enough buffer.



In this set-up the dosing container fills a funnel of the machine below. A funnel has been made on the plateau, at each of the machines below.



The vacuum unit (possibly with a dosing container) can easily be driven on top of the plateau above a next machine.

Vacuum seed transport



On the left: Example of a plateau with funnels above the machines.

On the right: There are several tubes at the plateau where the vacuum units can be connected. The tubes can suck the seed from every working area.



After processing, the seed flows into a small funnel, with a suction opening on the bottom that leads to the tube.



The seed will be sucked to the vacuum unit in pulse mode.



The seed is sucked by the stainless steel tube with wide curves to the next machine and processed further.

Flat Screen Sizer Unit



The segmentation of the seeds is done by flat screen sizers which are provided with sieve frames with electric vibration motors.

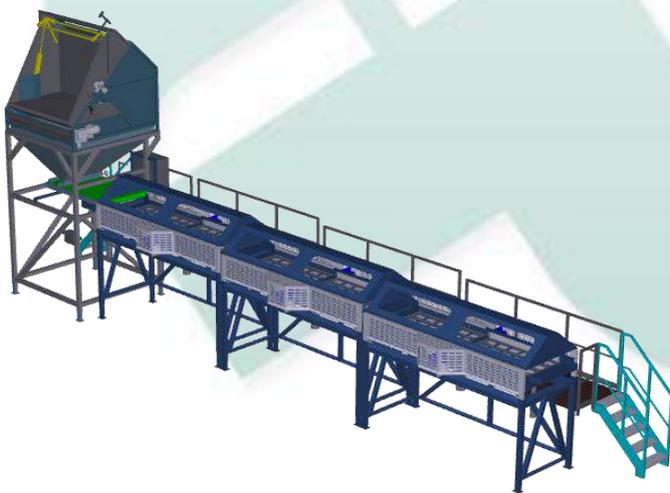
The vibration motors take care for an excellent movement of the sieve frame and this result in a very accurate seed size segmentation. One sieve frame can hold 2 sieves. This can be sieves with round or slotted perforation.

By placing the flat screen sizers in line, seed lots can be calibrated in 3,5,7 or more fractions at once

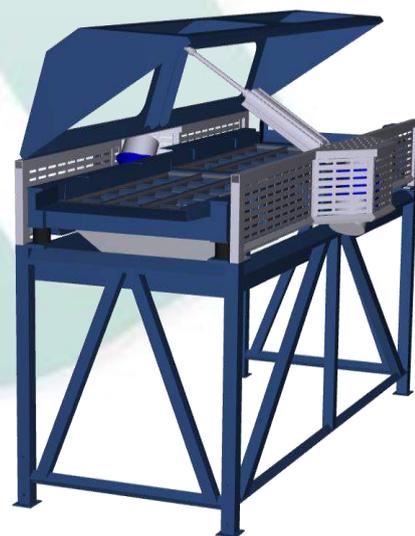
The dimensions of the sieving plate can be:

- 1000 x 400 mm.
- 1260 x 1000 mm.
- 1510 x 1000 mm.

Other sizes available. The screens are made with round and slotted holes.



Flat screen sizer 1000 mm wide with box tipple unit for 7 fractions.



Small flats screen sizer 400 mm wide for 3 fractions. Used for laboratory seed cleaning and pellets.

Flat Screen Sizer Unit

Seed Supply:

Seed can be supplied by hopper bins or with a box tipple unit. The seed supply unit for hopper bins can hold 4 hopper bins. The seed supply is done by a feeding belt. The speed of the dosing belt is adjustable. This result in a very smooth and uniform seed supply. The seed supply can also be done by a box tipple unit. The tipple unit can empty different kind of storage bins. The seeds will be collected in a funnel shape bin and from there dosed to the sizer by a dosing belt.



Box tipple unit



Continues seed supply by vacuum systems on a hopper bin.



Seed supply belt hopper bin installation.



The hopper bins on top dose the seeds in the lower hopper bins. From there seeds will be transported by a belt to the flat screen sizer.

* Double hopper bin supply unit have two small dosing funnels.

** Box tipple supply unit have one larger dosing funnel.

Flat Screen Sizer Unit

Sieve frame:

The sieve frame stand on four air shock absorbers and two vibration motors take care for the movement of the sieve frame. This combination result in an excellent movement of the sieve frame and a very good and accurate calibration process. Other real benefit is that the flat screen sizer is very quiet and that the main frame does not vibrate and send no vibrations to the floor.



Two vibration motors are mounted on the sieve frame.



Sieve frame is mounted on four air shock absorber.



Pneumatic cylinders lock the sieves automatically in the sieve frame.



Calibration of seeds:

Sieve plate is 100 cm wide. High capacity with excellent accuracy will be achieved because of the big screen surface.

Flat Screen Sizer Unit

Capacity numbers:

Crop	Capacity*	Accuracy
Radish	490 kg/hour	99.8%
Cabbage	120 kg /hour	99.8 %
Leek	130 kg/hour	99.8 %
Spinach	180 kg /hour	99.8 %
Carrot	180 kg/hour	99.8 %
Beet	145 kg /hour	99.8 %

*Note: Capacity is specified by an accuracy of 99.8%



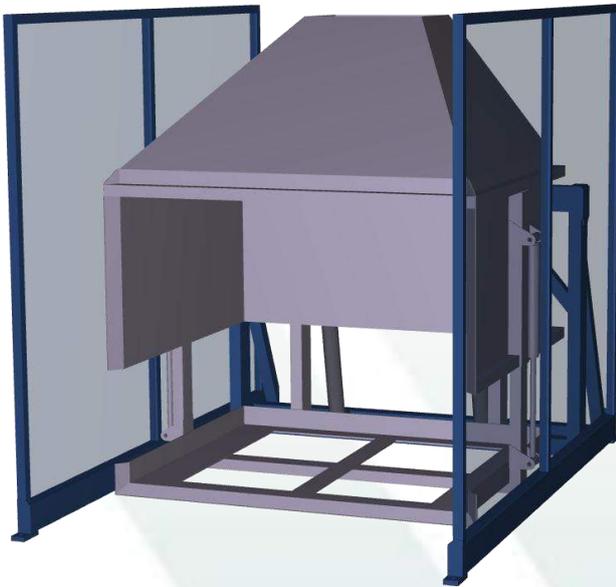
Three flat screen sizers placed in line / seed supply by 90° supply belt.

Benefits:

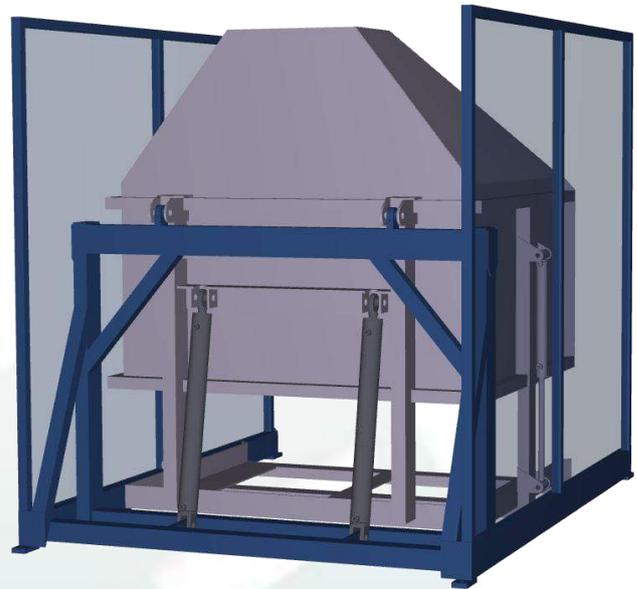
- High capacity
- Easy to clean
- Segmentation in 3,5,7 or more fractions
- 24 hours process possible
- Short set up time
- Low noise calibration process
- Easy to operate
- Good dust protection system

Inverter with outflow funnel

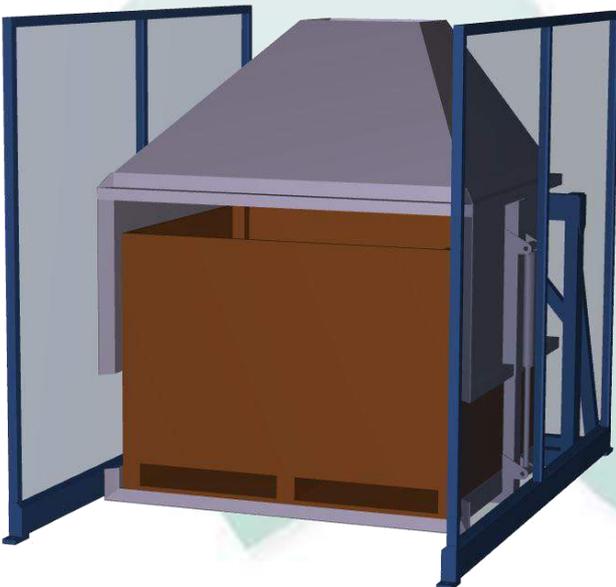
A practical method to invert a box is possible with an inverter equipped with an outflow funnel; the box can be rotated 135°. Therefore the box will discharge completely. The outflow funnel will ensure correct dosage of the seed into another box, bunker or onto a belt or something else. Connecting the funnel to a vacuum transport pipe, is also one of the options.



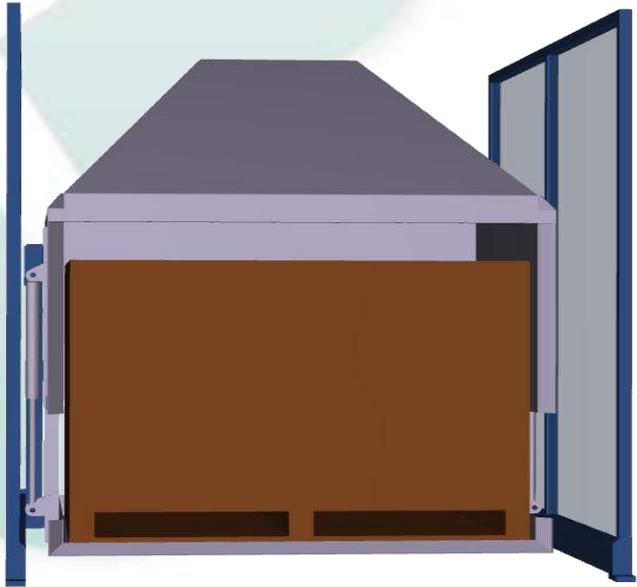
There is enough space on the front to place the box. The sides are provided with safety screens.



The cylinders are used to invert the top of the inverting yoke.

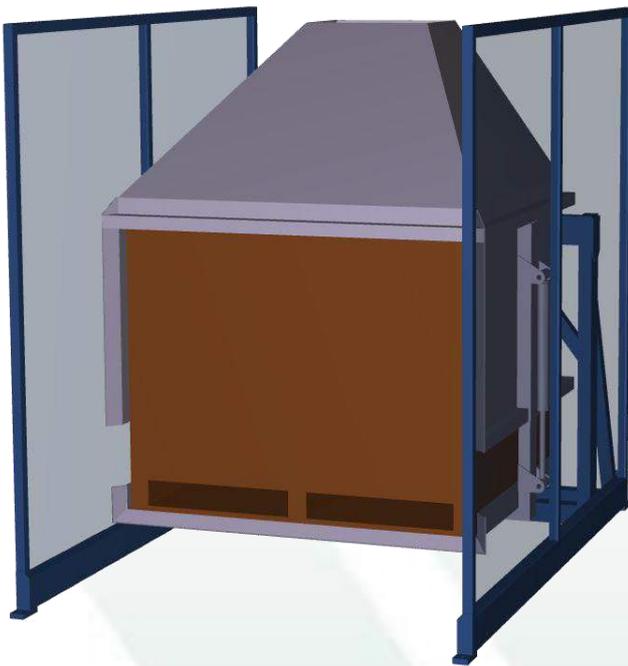


When placing the box, there is space left on the top.

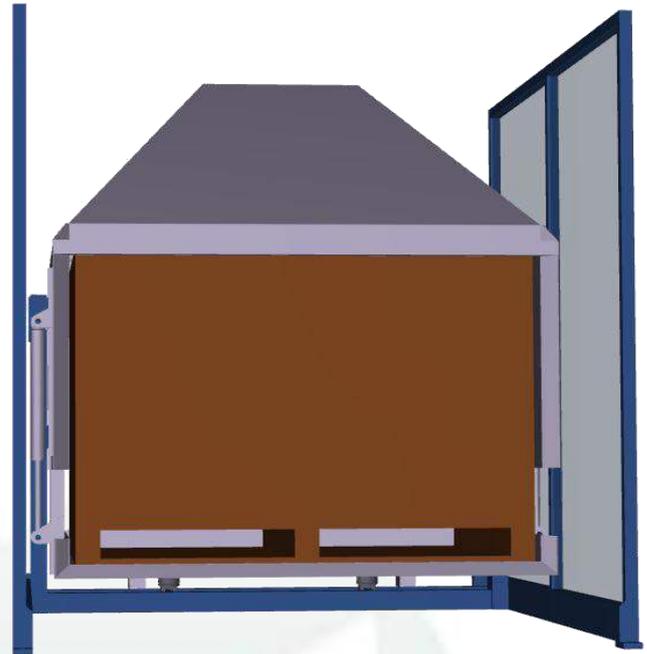


The sides are provided with cylinders to be able to lift the box to close the space between the funnel.

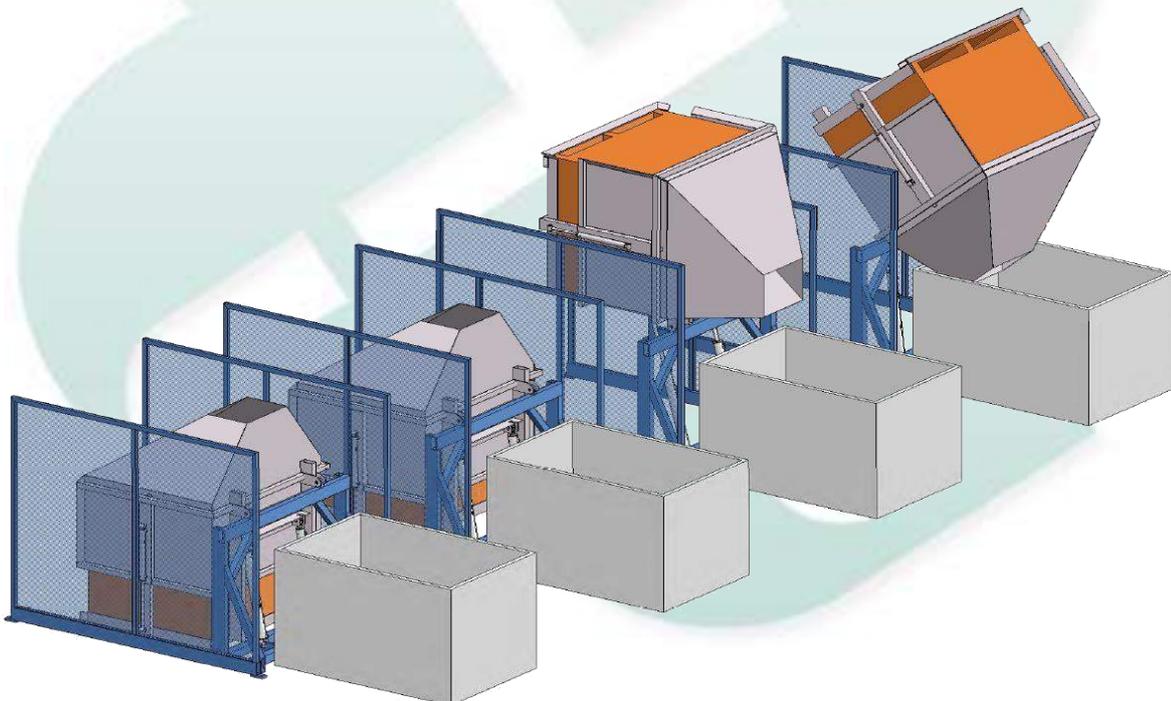
Inverter with outflow funnel



The box will clamp into the funnel.



Thanks to the lifting and clamping possibility, several box sizes can be inverted without leakage.



Here you see the inverting process. The outflow can be adjusted if desired. Can be equipped with a dosing slide or outflow opening for the connection with the vacuum transport system.

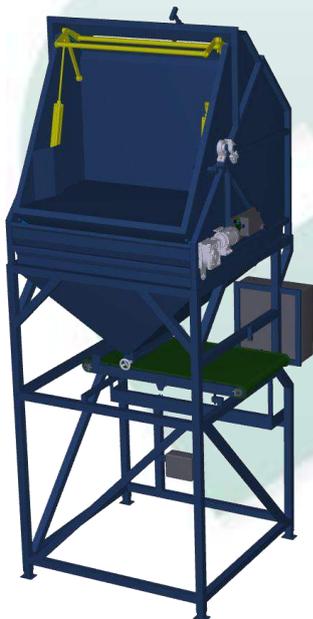
Turner/tipper for boxes and octabins

The use of boxes and octabins has been common in the seed sector for decades. Emptying the trays can occur in many ways, but using special inverters with dosing bunkers is seen as the most effective, accurate and reliable.

These inverters are made to your desires and for your application. Naturally customised to the dimensions of your boxes. Some of the possible applications can be found below.



Opposite you will find an inverter with dosing bunker and feeder to a calibrating/sieve installation.

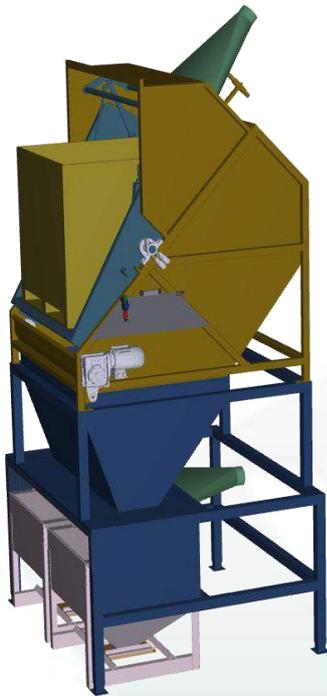


Inverter with dosing bunker to a feeder. This can serve as a supply point for various machines.

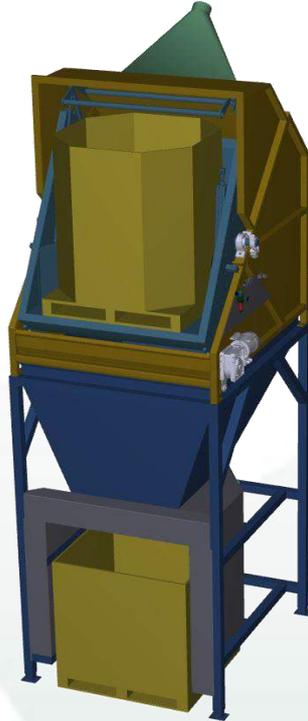


The supply can be controlled by means of dosing on the bottom side. The box or octabin is clamped with a double pressure mechanism, without being damaged.

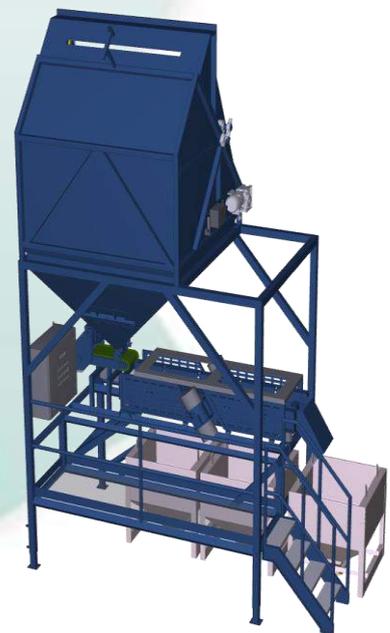
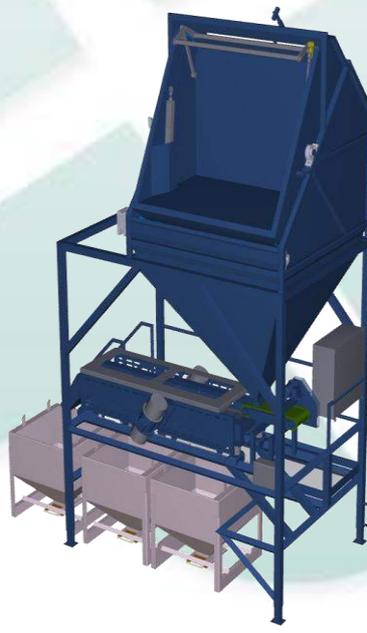
Turner/tipper for boxes and octabins



From box to hopper containers.



From octabin to box with automatic closure and dust extraction.



From box through dosing bunker and feeder to small calibration-sieve unit. The correct dosing is guaranteed!

These are some examples of what our inverters can mean to your process.

Inverter for octabins

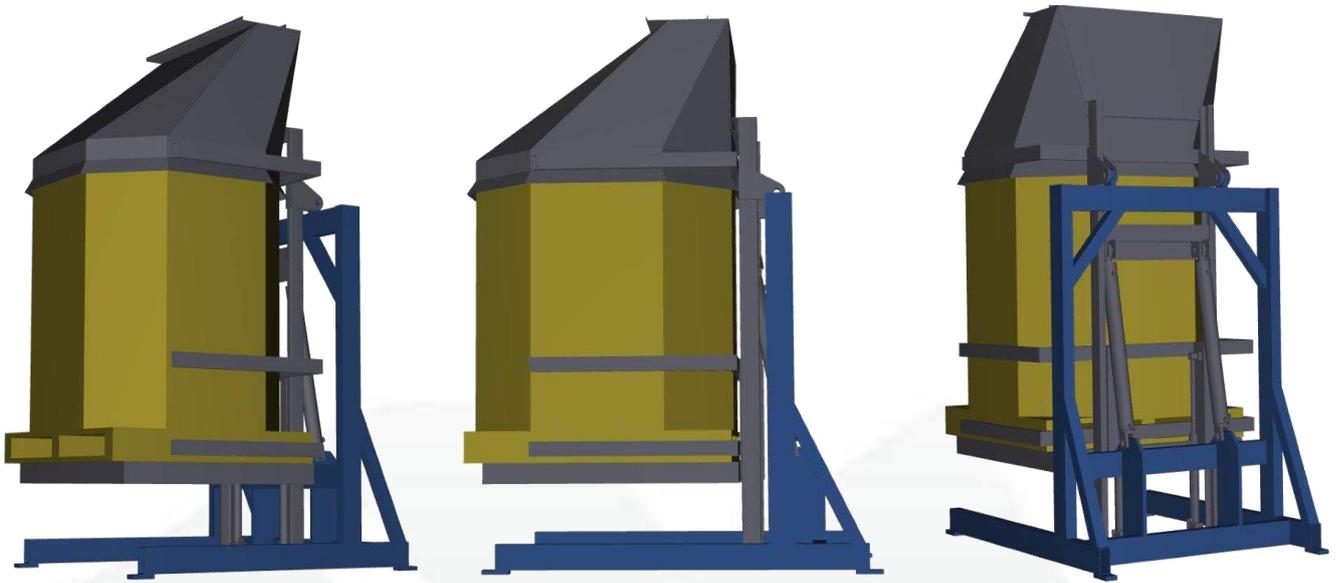


The octabins have been used in the seed sector for decades. Emptying these trays can occur in many ways: one of them is by using a special inverter with dosing bunker (see folder 'Inverters for boxes and octabins'). Another way is using an inverter with a constructed funnel. The octabin can be emptied easily and fast in, for example, a box, supply belt/elevator or a dosing bunker. The funnel can be equipped with a shut-off valve. Naturally the inverter can be adjusted to the dimensions of your octabins.

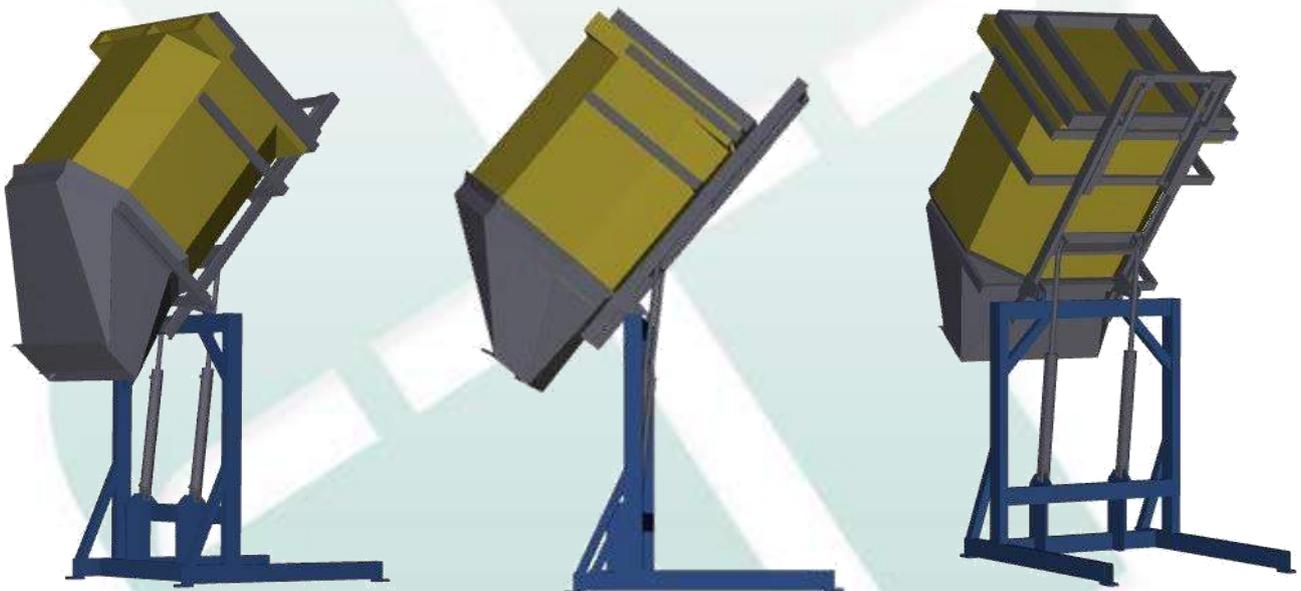


The octabin with pallet is placed in the inverter. The funnel is lifted to have enough space to place the octabin.

Inverter for octabins



The octabin is lifted to be able to turn it over. The funnel encloses the octabin perfectly.



Cylinders ensure that the octabin will turn over. The funnel outlet reaches the box, elevator or bunker.

Other solutions are also possible. We are happy to discuss your own wishes and ideas with you.

The inverters are equipped with standard safety precautions (not displayed).

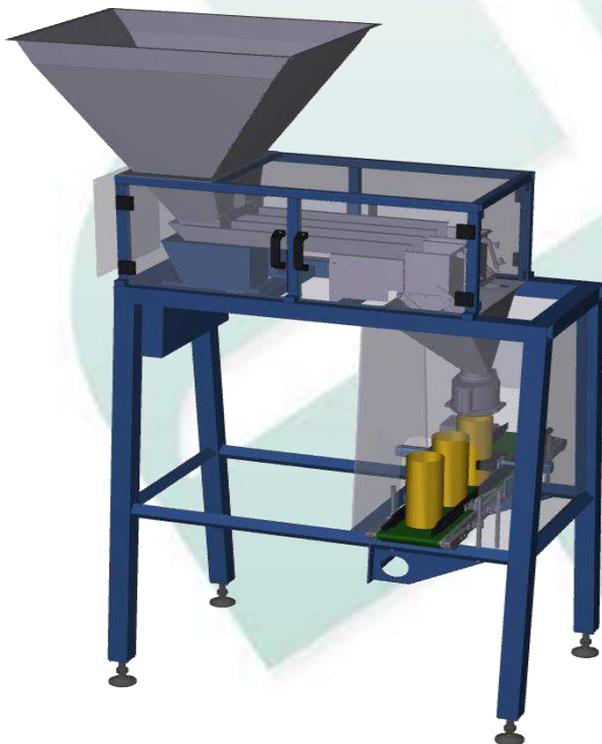
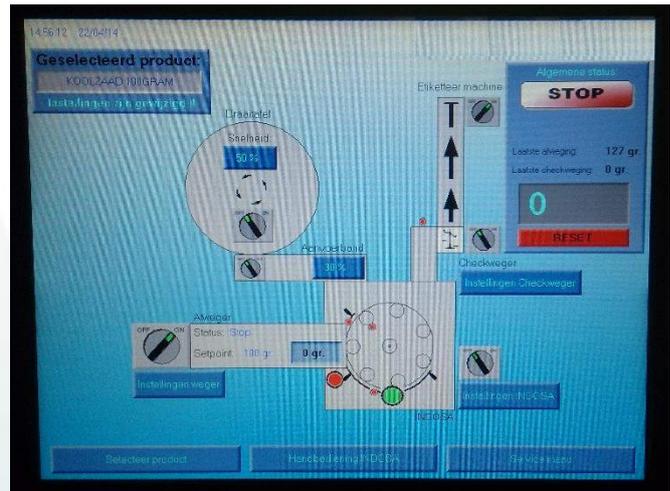
Optimize machines and production line

Agratechniek cooperates closely with engineers specialized in the optimization of processing machines and processes. These engineers have earned their stripes in food processing. Together with Agratechniek they can use their knowledge to also improve and optimize the existing processes in the seed sector; make adjustments to existing machines and align the various machines in a production line. Furthermore, there is new software of individual machines or production lines with clear and user-friendly operation.

Your wish or issue is our challenge!

The production line capacity depends on the weakest link. This could be the supply or discharge, a specific element of the machine, the entire machine or the software of individual machines which are not aligned to each other etc.

By cleverly connecting existing machines mechanically and/or using software, and possibly replacing the crucial elements, the production capacity can be increased significantly. The customized central software ensures the operations are aligned to each other. This improves operation friendliness greatly.



Often the operation of production lines with machines of different manufacturers is standalone and therefore not aligned to each other. Each have their own control and rarely are adapted to the desires in the seed sector. By equipping each machine (partly) with specific software and converging it to one software program for the entire line, the operation is much easier.

- Operation of the production line from 1 panel
- Optional control panels with several machines.
- Improved overview of the complete process.
- Easy adjustment of machines.
- Much clearer.

The replacement of improved pneumatics and mechanical components, can also improve the return on the machine greatly and adjust it to the current requirements.

Optimize machines and production line

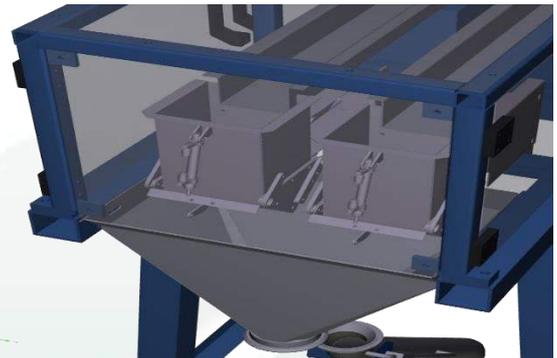
Example: Filling line for cans

The canning machine, check weighing, labeling machine and packaging machine can be from different manufacturers.

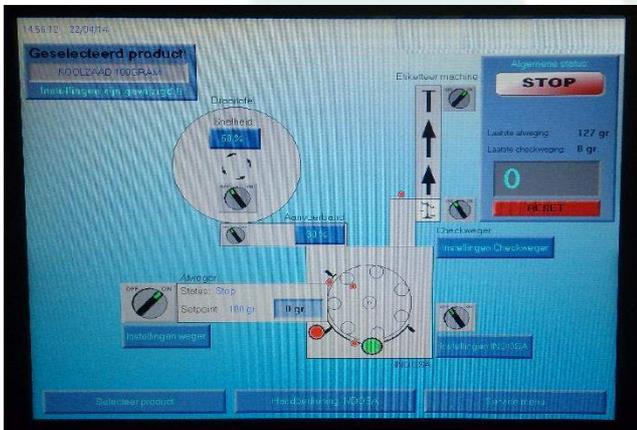
Right: In the new (central) software the operation of the labeling machine was simplified, which enables easy and fast setting of the label position.



The check weighing has changed from belt weighing to static weighing: more accuracy and less sensitivity to failures.



A self-developed weighing unit was implemented in an existing canning line for which the deviation was reduced to 1gr/kg of seed.



The machines are supplied with new software which is aligned to each other. A clear central operation panel makes the entire process insightful. All settings can easily and clearly be configured using a 12" touch screen.



The can filling and seaming machine was equipped with new pneumatics and the existing line supply and discharge was optimized.

Because everything has been aligned, the entire process is much calmer and with less risk of errors and failures. The capacity of the existing line has been increased from ca. 300 to 1000 cans per hour, by making relatively small adjustments.

Almost every machine and production line can be improved greatly on a reasonable budget: higher capacity, more accuracy, more reliability, improved user friendliness and online direction and registration. Naturally 'return-on-investment' is an important objective. Our experts can give you an indication of the possibilities for your company. You can contact us for more information or to make an appointment.