



Post-harvest solutions

for Controlled Environment Agriculture

Proven post-harvest solutions for indoor farming

Controlled Environment Agriculture (CEA) is transforming the production of fresh produce. In this growing segment, Sormac leads the way in post-harvest technology for CEA-grown leafy greens. Building on decades of expertise and closely collaborating with leading indoor growers, Sormac has developed state-of-the-art solutions for these delicate crops.

Whether produced in greenhouses or vertical farms, and across hydroponic, aeroponic, and aquaponic systems, these crops are grown with utmost care and consistency. To ensure uniform product quality and maximum shelf life, this approach must be maintained after harvesting. This requires equipment that handles delicate leafy greens efficiently yet gently, without compromising product integrity, appearance, or food safety. Sormac provides proven post-harvest systems designed to meet these requirements, from harvest through to final processing.



Steps in post-harvest processing

Indoor-grown produce requires a different processing approach than traditionally field-grown crops. Exposure to open-field weather conditions encourages plants to develop thicker cell walls and tougher leaves.

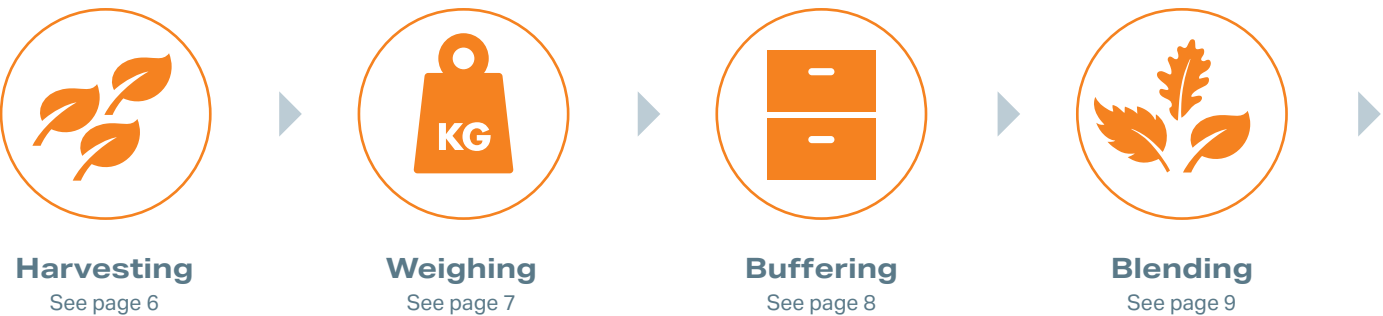
In contrast, due to the mild and consistent indoor conditions, greenhouse-grown leafy greens are characterized by their tender texture, thinner leaves and higher water content. This requires processing equipment and methodology specifically designed to preserve their delicate product quality while maintaining efficiency.

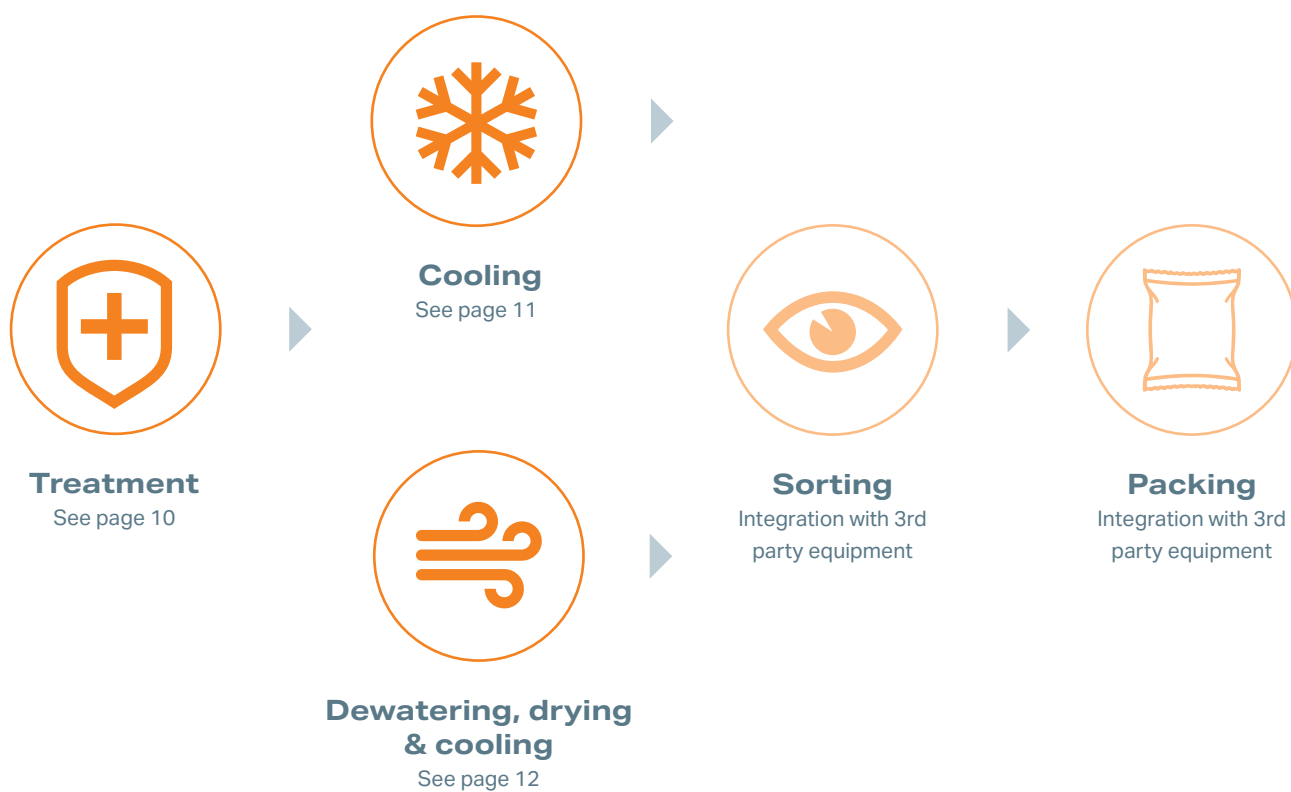
Building on decades of expertise in leafy greens processing equipment, Sormac developed dedicated post-harvest solutions for greenhouse-grown leafy greens starting in 2010, in collaboration with leading indoor growers. The harvested products were manually transferred from the growing area to the processing line.

Since 2020, Sormac has developed innovative, fully integrated post-harvest solutions that seamlessly connect to indoor growing systems. This approach ensures continuous operation from growing to harvesting, processing and packaging. This state-of-the-art process eliminates the need for manual harvesting, transport and handling, significantly reducing labor requirements while safeguarding product quality and improving process efficiency.

The integrated process is illustrated in the chart below and explained in greater detail throughout this brochure.

Whole leaf product







Harvesting

The processing line starts with the harvester unit, where the plants, grown in gutters are harvested. Inside the harvesting machine, the plants are cut from a set height. The gutter, with a part of the stem remaining inside, comes out on the other side of the harvester. This is where the soil is emptied and the gutter is cleaned. The process of growing plants can then be restarted. The harvested plants are fed to the processing line.

CEA Harvester CH-30

The CEA Harvester CH-30 is used to harvest product grown in the greenhouse. Gutters are fed to the machine by a conveyor, and perfectly aligned with the center of the cutting area. Two circular knives, slightly positioned above the gutter are also height adjustable, cutting the leaf from the stem.

The leaves fall onto a collection conveyor, that brings them outside the machine onto a conveyor for further processing. The gutter passes through the machine and collects from the other side. At the cutting area, optionally, a fan blows air from underneath, making sure that all the leaves stand up while being harvested. Doors, equipped with safety sensors, on each side of the machine allow for maintenance and cleaning.



Benefits

- Automated process from cultivation to processing
- Gentle product handling without human interference
- Harvesting machine suitable for gutters

Type	CH-30
Installed power	5.3 kW (7.1 hp)
Dimensions L x W x H	5,065 x 1,245 x 2,970 mm (16' 7 3/8" x 49" x 9' 8 15/16")
Gutter feeding belt width	300 mm (12")





Weighing



After harvesting, the product is weighed. By doing this, the SCADA systems knows exactly how much product is harvested and fed to the line. With the weighing solution, the system also understands how much product still needs to be called from the greenhouse to finish the mix in the line. As you weigh after the harvester, but also at the multihead, the yield in the line can be calculated.

Benefits

- **Accurate weighing (accurate to 10 grams)**
- **Measure the yield of the production line**
- **Gentle product handling without human interference**



Batch weighing conveyor **BWC-80**

The Batch weighing conveyor BWC-80 is another solution for weighing incoming product from the harvester. Instead of collecting the product into a bucket, it is collected onto a conveyor. The conveyor is equipped with 4 loadcells to weigh the product. On the motor, an encoder is installed so the position of the product is known. After weighing, the conveyor empties the product into the line.

Type	BWC-80
Installed power	0.6 kW (0.8 hp)
Dimensions L x W x H	3,735 × 1,475 × 1,245 mm (147" x 58" x 49")
Weighing conveyor width	800 mm (31 1/2")
Volume	250 liter (66 gallons)



Buffering

As products are harvested individually in the greenhouse, they must first be buffered before a final blend can be created. The required buffer capacity depends on several factors, including the number of ingredients in the blend, harvesting rates, and the capacity of the processing line.

The buffer is essential for maintaining continuous production. In the event of a temporary stoppage of the packing line, harvesting can continue until the buffer reaches its maximum capacity. This increases overall production uptime and supports efficient operation of both harvesting and processing systems.

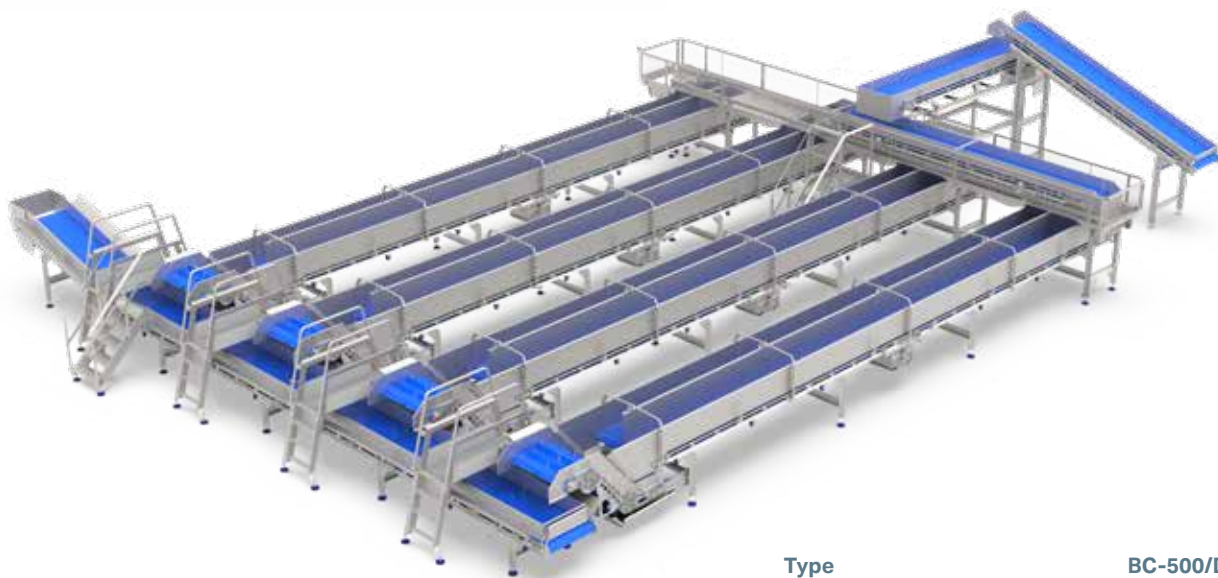


Benefits

- **High degree of flexibility**
- **Full insight into which product is buffered, in what quantity and for which time**
- **Temporary product storage for conditioning**
- **Ensures a continuous process from cultivation to processing (without direct need of packaging)**

Buffer conveyor BC

The Buffer conveyor BC is used to buffer product from the harvester for creating blends down the line. Product from the harvester is fed onto a shuttle conveyor, which is installed on a guiding track, driven by a timing belt. The shuttle conveyor is able to feed every buffer conveyor, each holding a different type of leaf. The buffer conveyor is fed from the back, the belt moves slowly forward until the product is completely filled over the full length of the belt. While one lane is buffering, the other one is emptying. The length of the conveyor can vary, depending on the buffer requirements.



Type	BC-500/DL
Installed power	0.75 kW (1 hp)
Dimensions L x W x H	6,680 - 12,675 × 1,454 × 1,429 mm (21' 11" – 41' 7" × 57 1/4" × 56 1/4")
Length of lane	7,000 mm (275 19/32")
Amount of lanes	Double



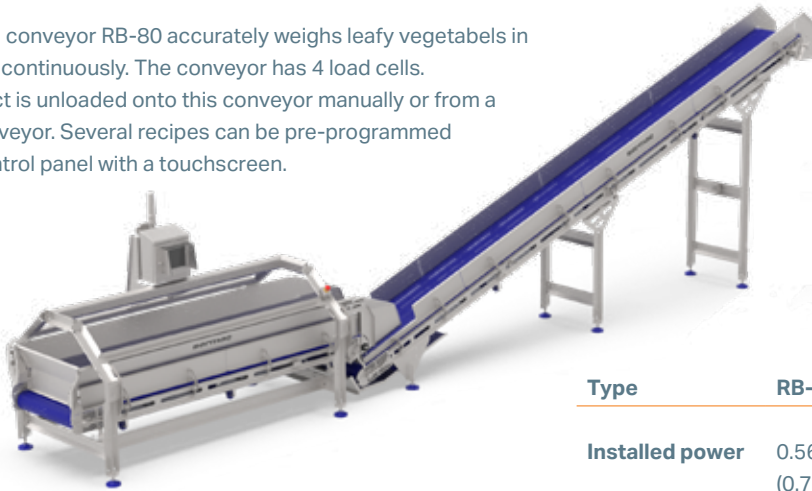
When all the ingredients are available, a blend can be made. They are either fed by a buffer conveyor or by crates. In case of buffer conveyor supplying, an automatic recipe conveyor is used for blending. In case crates are used, either a recipe conveyor (lower capacities) or an automatic recipe conveyor can be configured. When blending, different kind of products are layered on top of each other in the correct blending ratio. When the blend is complete, it is fed down the line.

Benefits

- Option to create custom product mixes with every type of product and amounts which are desired
- Possibility for automated blending process without human interference
- Controlled weighing system with recipe management

Recipe conveyor RB-80

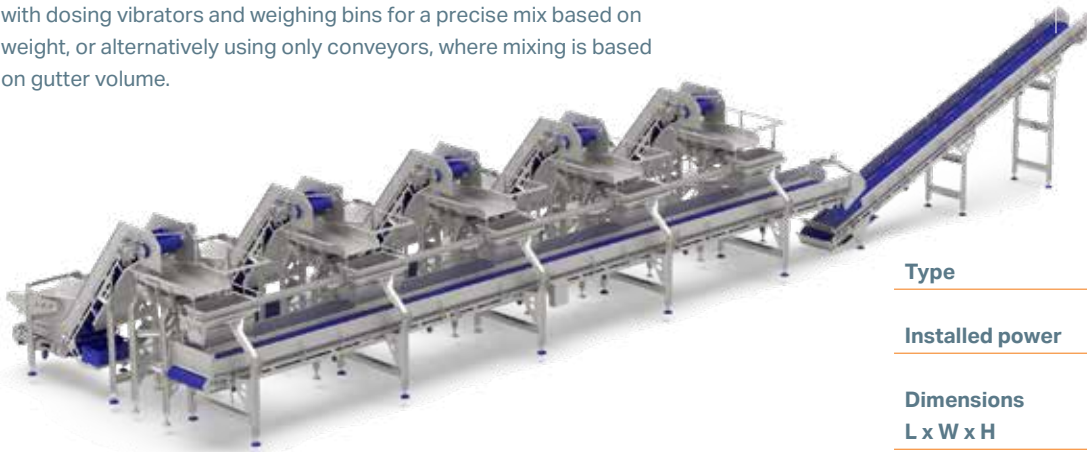
The Recipe conveyor RB-80 accurately weighs leafy vegetables in batches or continuously. The conveyor has 4 load cells. The product is unloaded onto this conveyor manually or from a supply conveyor. Several recipes can be pre-programmed using a control panel with a touchscreen.



Type	RB-80/200	RB-80/250	RB-80/300
Installed power	0.56 kW (0.75 hp)	0.56 kW (0.75 hp)	0.56 kW (0.75 hp)
Dimensions L x W x H	2,235 × 1,345 × 1,855 mm (88" x 53" x 73")	2,720 × 1,345 × 1,855 mm (107" x 53" x 73")	3,225 × 1,345 × 1,855 mm (127" x 53" x 73")
Length of lane	200 mm (7 7/8")	265 mm (10 27/64")	325 mm (12 51/64")

Automatic recipe conveyor RBA-80

The Automatic recipe conveyor RBA-80 is the most advanced solution when it comes to weighing and mixing. The principle is similar to the recipe conveyor, however, raw product is fed into weighing buckets by conveyors and dosing shakers. Several recipes can be pre-programmed. RBA can be configured either with dosing vibrators and weighing bins for a precise mix based on weight, or alternatively using only conveyors, where mixing is based on gutter volume.



Type	RBA-80
Installed power	14 kW (18.8 hp)
Dimensions L x W x H	6,935 × 5,740 × 2,415 mm (22' 9" x 18' 10" x 95")
Weighing hoppers	2 - 5



Treatment

For CEA grown products, it is not always necessary to wash the product in a washer. To kill the potential germs on the leaf, Sormac can provide an UV-C tunnel. The UV-C light deactivates the growth of pathogens, such as bacteria, spores, parasites and viruses. UV-light is a form of light with a wavelength just outside the visible spectrum. Its wavelength ranges from 240 to 280 nm. UV-C light penetrates the cell walls and disrupts the DNA in the cell's nucleus, which results in the death of the microorganism. The benefit of UV-C light treatment is that there are no chemicals and water involved. Disinfection of the product is very durable.

UV disinfection tunnel **UVT**

The UV disinfection tunnel UVT is ideal for surface disinfection of a wide range of (leafy) vegetables. The product is transported through the tunnel onto a belt. Beater bars underneath the belt ensures the product tumbles, so all the sides of the leave are hit by the UV-C light. The in- and outfeed side of the machine is protected with a cover, so there is no light leakage to it's surroundings. Large hinged doors on the side of the machine allow access for cleaning and maintenance.

Type	UVT
Installed power	7.5 kW (10 hp)
Dimensions L x W x H	5,155 × 1,525 × 2,690 mm (16' 11" x 60" x 106")

Benefits

- **Increases the food safety**
- **Disinfection without water and chemicals**
- **Very gentle leaf treatment**



Washing flume **WF-60**

The Washing flume WF-60 transports and washes leafy vegetables. The stainless steel water conveyor channel has an air injection system that creates turbulence in the water, ensuring that the product is effectively and thoroughly cleaned. The design of the flume allows the desired form to be simply incorporated in different plants and in different lengths. Optionally the flume may also be provided with multiple air injection systems.

Type	WF-60
Installed power	6 kW (8.2 hp)
Dimensions L x W x H	5,791 × 2,210 × 2,337 mm (18' 12" x 87" x 92")





CEA-grown leafy greens typically do not require washing, as there is no external contamination in a closed environment. However, prior to packaging, the crop must be conditioned to the correct temperature. The Sormac Air cooling tunnel LDT-100/3 CO is designed to cool unwashed, delicate leafy vegetables and greenhouse crops to the required packaging temperature.

Benefits

- **Cooling of delicate leafy greens to required packaging temperature**
- **Gentle cooling by calibrated airstream**
- **Closed-loop system process with no energy loss**

Air cooling tunnel LDT-100/3 CO

The product is cooled by an upward-directed, regulated air stream at a temperature between 1 and 6°C. The airspeed is calibrated so that the product floats, allowing an even product cooling.

The airstream absorbs heat from the surface of the leaves and is then passed through two consecutive cooling exchangers, where the air is cooled to the required temperature before it is brought in contact with the product again. No energy (heat and/or moisture) is dissipated into the surrounding factory-controlled environment, as the entire process takes place within a closed system.



Type	LDT-100/3 CO
Installed power	19.5 kW (26.2 hp)
Dimensions L x W x H	4,870 x 2,600 x 3,600 mm (15' 11 3/4 x 8' 6 3/8" x 11' 9 3/4")





Dewatering, drying & cooling

To increase the shelf life of the product, it is important that after washing, the product is dried and cooled down to packing temperature. When the product is not washed but treated in an UV-C tunnel, then the product can be transferred directly to the air drying tunnel LDT-100/3.

When the product is washed, first excessive moisture needs to be removed before entering the air drying tunnel. This is done by dewatering conveyors. Each conveyor is configured with beaters bars, suction or blowing fans, in the most efficient way. Ideally, product enters the air drying tunnel with a residual moisture level of below 10%. The air drying tunnel can range in length, depending on the capacity of the line.

Benefits

- Extend shelf life through optimal product drying and cooling process
- Fast process to cool the product back to the desired packaging temperature
- Gentle leaf treatment by the air drying and cooling system

Air drying tunnel LDT-100/3

The Air drying tunnel LDT-100/3 is suitable for drying and cooling unwashed product. Product is transported on the product belt through the tunnel. In the first section, warm air is blown through the product, absorbing any potential condensation (residual moisture level lower than 4%) on the leaf. In the second section, the product temperature is brought down to packing temperature.



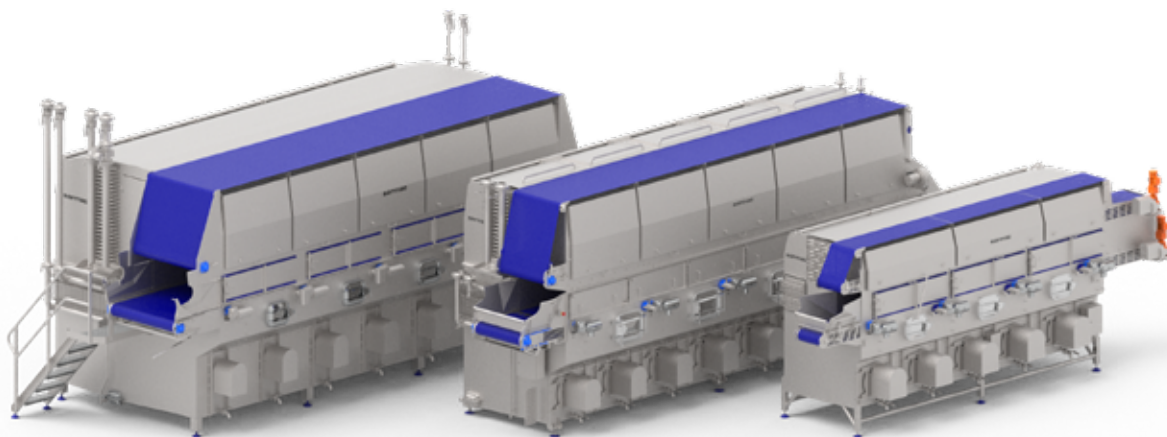
Type	LDT-100/3
Installed power	19.5 kW (26.2 hp)
Dimensions L x W x H	4,870 x 2,600 x 3,600 mm (15' 11 3/4 x 8' 6 3/8" x 11' 9 3/4")
Tunnel length	3,000 mm (9' 10 1/8")



Air drying tunnel LDT-100/5-11

The Air drying tunnel LDT-100/5-11 series are ideal for drying and cooling washed product. The air drying tunnel works the same as the LDT-100/3 tunnel, but the length of the drying section is longer, as the product entering the tunnel is wetter. In front of the tunnel, dewatering conveyors are installed to remove the excessive moisture.

Type	LDT-100/5	LDT-100/7	LDT-100/9	LDT-100/11
Installed power	31 kW (41.6 hp)	42.5 kW (57 hp)	54.7 kW (73.4 hp)	66.2 kW (88.8 hp)
Dimensions L x W x H	6,820 x 2,600 x 3,600 mm (22' 4 1/2" x 102 3/8" x 141 3/4")	8,870 x 2,600 x 3,600 mm (29' 1 1/4" x 102 3/8" x 141 3/4")	10,862 x 2,600 x 3,600 mm (35' 7 5/8" x 102 3/8" x 141 3/4")	12,862 x 2,600 x 3,600 mm (42' 2 3/8" x 102 3/8" x 141 3/4")
Tunnel length	5,000 mm (16' 4 7/8")	7,000 mm (22' 11 5/8")	9,000 mm (29' 6 5/16")	11,000 mm (36' 1 1/16")





Turnkey projects Taking care of your needs

We are specialized in complete solutions for post-harvest controlled environment agriculture. From initial planning and design to the installation and commissioning of the equipment. With our expertise in the process, we have a thorough understanding of the challenges faced by farmers and food processors. Our dedicated project managers work closely with our customers to ensure that all their requirements are met.

They take on the responsibility of managing the entire project, giving their clients peace of mind and allowing them to focus on other aspects of their business. Our commitment to quality and attention to detail has earned us a reputation as a trusted and reliable partner in the industry.

Leafy greens automatic mixing line, 900 kg/h (1,984 lb/h)

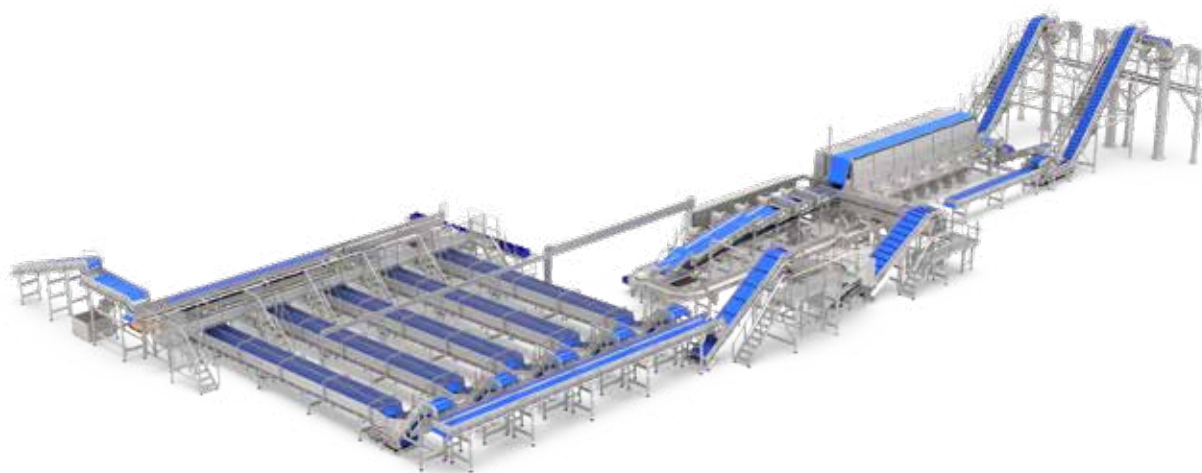
Product from the growing area is harvested, weighed, and stored in the buffer system. A single variety or a mix of multiple varieties is then prepared on the recipe conveyor. Subsequently the product is further transported to packaging.



Leafy greens optical sorting and cooling line, 275 kg/h (606 lb/h)

Product is harvested and automatically fed to the line. The product is inspected on an optical sorter and then dried and cooled down to spec and packaging temperature. As space is limited, the line makes use of the height as efficient as possible.





Leafy greens automatic mixing, washing and drying line, 1,000 kg/h (2,205 lb/h)

Product is harvested, weighed, and stored on a buffer system. From the buffer system a mix is created on the recipe conveyor. Then, the product is washed in a special flume washer and dried on an air drying tunnel.



Leafy greens mixing line, 680 kg/h (1.499 lb/h)

Product is harvested and stored in crates. The crates are delivered to the line where it is manually emptied. After mixing, the product is disinfected in an UV-C tunnel.

Meet our CEA specialists



Roy Lemmen
Sales Director
+31 (0)6 51 96 68 27
r.lemmen@sormac.nl



Niels Mulder
Sales Engineer
+31 (0)6 41 25 34 20
n.mulder@sormac.nl



www.sormac.com

Sormac B.V.

Huiskensstraat 68
5916 PN Venlo
The Netherlands

Sormac Ltd.

Unit B4, Risby Business Park
Bury St. Edmunds
IP28 6RD
United Kingdom

Sormac GmbH.

Amerner Str. 53
41366 Schwalmtal
Germany

Sormac Inc.

6800 Wales Rd.
Northwood
Ohio 43619
United States

CEA-EN2026/1