Weber
Cooling

Vacuum for Cooling

Proven efficiency for Vegetables & Herbs

webervacuum.group

Sales | Rentals | Support | Refurbishments

- Fast & uniform cooling, to the core
- Reducing your cooling space & energy costs
- Preserving quality, maximizing shelf & storage life

Vacuum Cooling for Vegetables & Herbs

Increase Shelf Life

Once harvested, all fresh produce will get stress. This stress results in respiration (breathing) and transpiration (sweating). Both are mainly triggered by temperature. By quick pre-cooling, both respiration & transpiration can be reduced by 75% or more, resulting in quality preservation and shelf & storage life increase: reducing on reject & waste.

Pre-cooling preserves your produce quality and increases your profits.

Decrease Cooling Time

Vacuum cooling is a rapid pre-cooling technology. By continuously reducing the pressure inside the vacuum room, you force (a fraction of) the product's own moisture to evaporate, at decreasing temperatures. This evaporation (= cooking) costs energy, which is taken from the produce in the form of a rapid temperature reduction; your product cools down! Fast, in- and outside, to the core.

Vacuum Cooling is the fastest & most efficient pre-cooling method.

For most vegetables & herbs

A wide range of fresh vegetables & herbs can profit from vacuum cooling. Leafy vegetable & herbs are the most easy and fast to cool. Cooling times of 10-20 minutes can be achieved. Delicate vegetables and mushrooms can cool that fast. More compact vegetables like broccoli will take more time and might benefit from additional water spray.

Vacuum cooling is perfect for most vegetables & herbs.

A wide range of vegetables can be cooled fast & uniform

The larger the surface compared to the weight, the faster the produce can cool. For this reason, leafy vegetables and herbs can cool much faster than compact vegetables. The surface of the produce must be permeable to water-vapor to allow cooling by vacuum. Produce like cucumber, pepper, tomato and drupes cannot be cooled by vacuum.

The best cooling results are usually achieved when around 80 - 85% of the "field heat" (= difference between harvest and storage temperature) is removed by rapid (vacuum) cooling. The remaining heat can perfectly be removed in the cold storage. The vacuum cooling time is far shorter when the final cooling is done in the cold room, thus maximizing the productivity of the pre-cooler!

Examples of produce which can be cooled by vacuum:

Iceberg lettuce: Perfect to cool. Strong extension of storage time and shelf life

Leafy lettuce: Extremely fast cooling possible. Same day to shop, minimized reject

Arugula: Ultra-fast cooling preserves quality, freshness & taste

Spinach: ultra-fast cooling combined with advanced humidity control, ensures peak quality and exceptional taste

Herbs: Cooling & drying by vacuum can result to huge increases in yield & quality preservation

Micro Herbs: Extremely tender, and sensitive to heat, microgreens can absolutely profit from fast pre-cooling.

Sprouts: Cooling times < 10 minutes are possible, preserving all freshness and crispness in the product

Mushrooms: Vacuum is perfect! Cooling to the core, with a dry and perfect skin

Broccoli & broccolini: Hydro-vacuum ensures perfect cooling result and maximizes yield

Brussels sprouts: Extended storage life & reduced waste can be achieved by vacuum pre-cooling

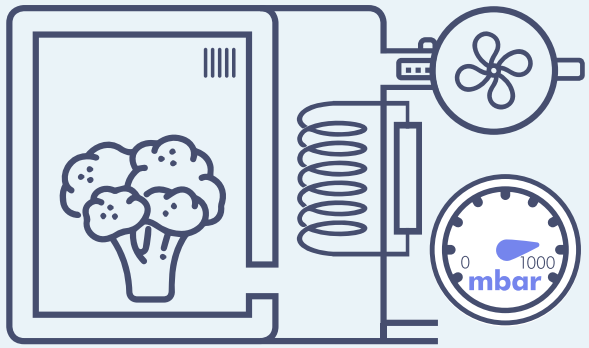
China cabbage: Perfect to cool by vacuum, but not too deep. Optimizes your storage life

Green asparagus: Optimized cooling logistics, by taking away the main heat-load with vacuum

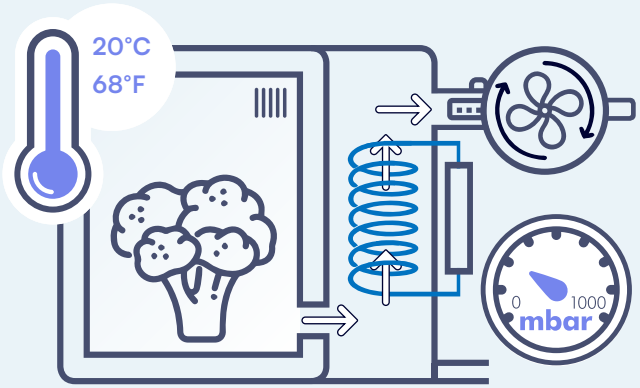
Celery: Only with vacuum, fast & efficient pre-cooling can be achieved. Maximizing your yield

Sweetcorn: Even heavy loads can be cooled fast & efficient by vacuum. To the core of the crates

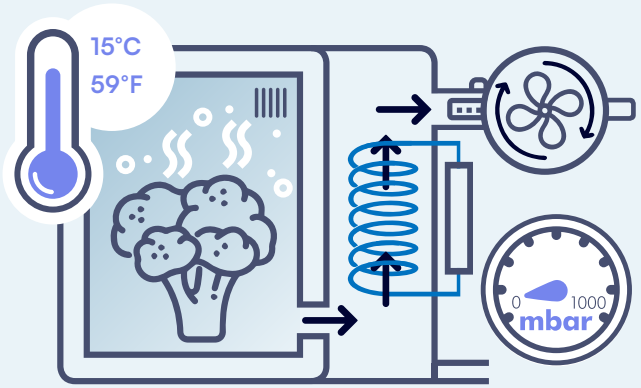
Cyclus - What happens inside the vacuum room?



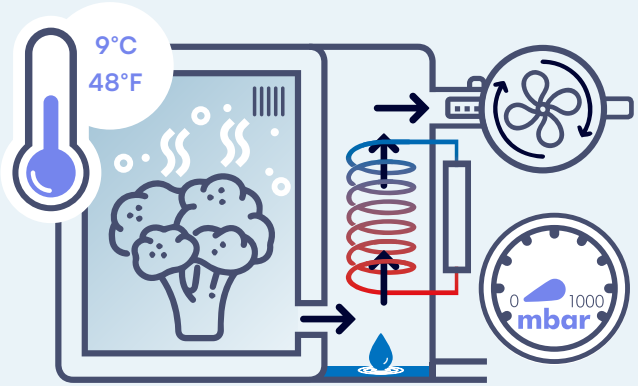
1 The product is placed in the vacuum room and room is closed.



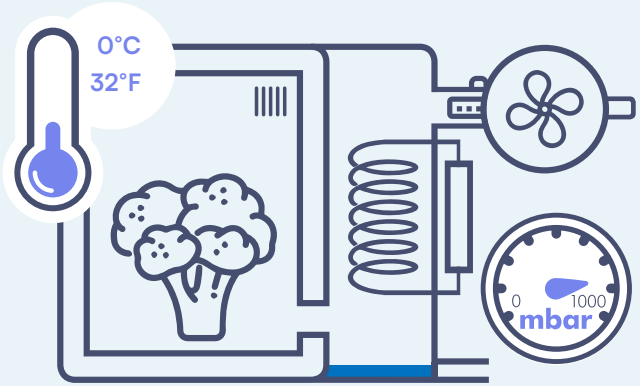
2 The vacuum pump starts and reduces the air pressure in the room from 1000 mbar to the desired pressure.



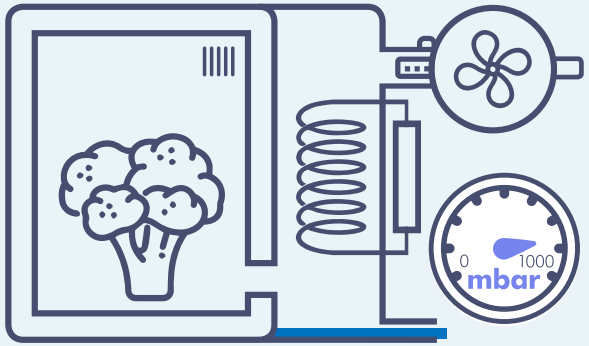
3 A small amount of water within the product will start boiling when pressure reaches temperature level of the product. This boiling process requires heat that is extracted from the product, enabling the cooling.



4 The water vapor is condensed by passing a “cold wall”. The dried air goes out through the vacuum pump.



5 The cycle ends when the product is cold and the pressure returns to 1000 mbar.



6 The condensed water is drained and the vacuum cooler is ready for the next load.

Weber Cooling is leading in Vacuum Cooling

We offer a wide range of standardized, affordable but powerful vacuum coolers, designed to cool all kinds of vegetables and herbs!

Weber BASE ONE

Fully standardized low cost and ultra-fast cooler for one pallet. Designed for minimal cost and foot print. Supplied in one version, with a manual hinged door.

Weber COMPACT

Front-loaded systems with integrated sliding door. Designed for two pallets, placed side by side. One model for Euro Pallets and a model for Standard pallets. High speed, intelligent control.

Weber NEXT GEN

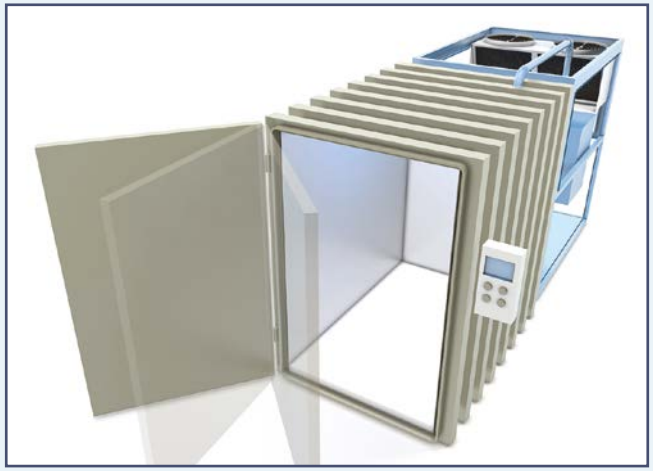
Full range of efficient, cost optimized and modular vacuum coolers. We offer solutions for up to 12 pallets per room. Separate model ranges for Euro and Standard pallets.

Weber TAILOR MADE SYSTEMS

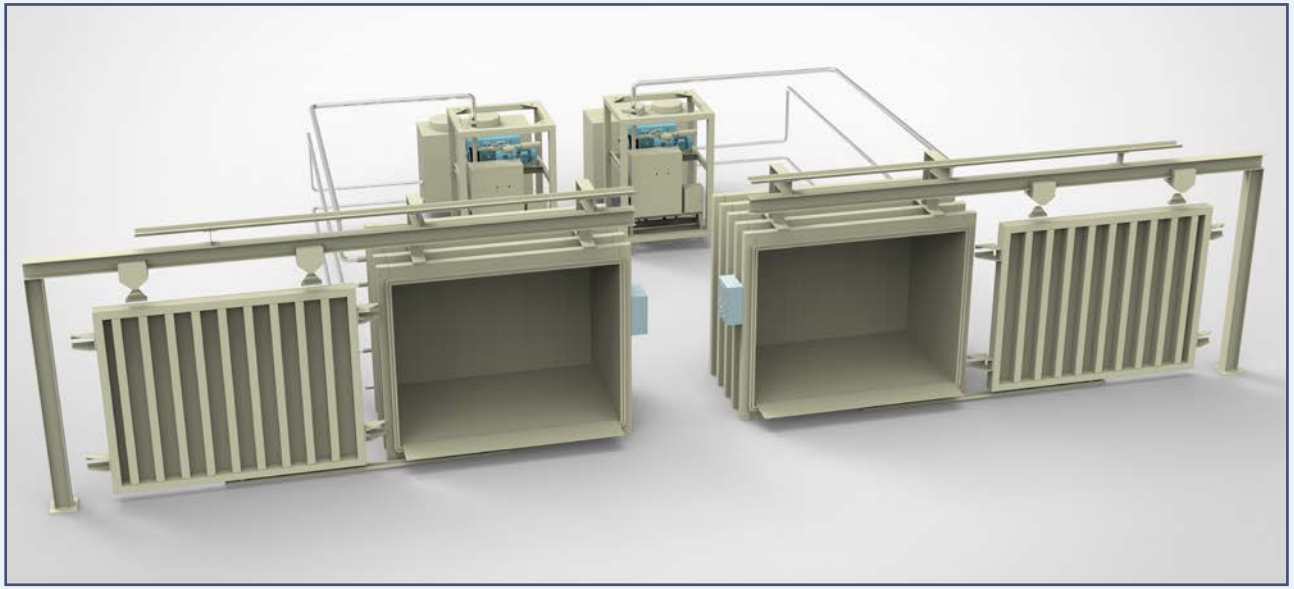
We offer Multi-Room solutions and Tailor -Made Systems based on our Next Gen range and also Ultimate Solutions for AirCraft pallets. We've build solutions which can cool up to 300.000 kg of fresh produce per day, using ultra energy efficient cooling solutions.

We have made Vacuum Cooling for Vegetable & Herbs affordable for YOU!

Weber BASE ONE



Weber COMPACT



Weber
NEXT GEN

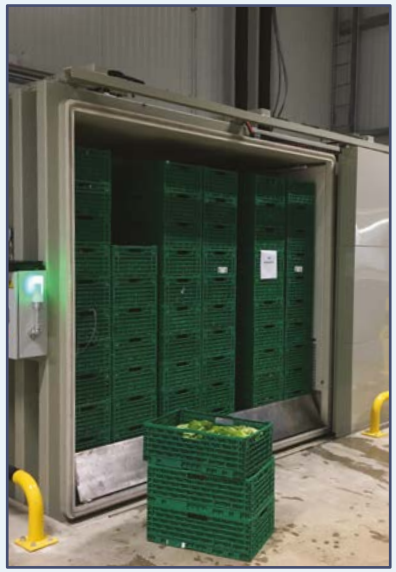
- Ultra- fast cooling
- Longer shelf life
- Better quality

! We can build solutions for each demand!

Should you require higher capacities, or have special requirement, we can supply! Some recent examples include multiple room vacuum cooling systems, in standard configuration, and with ultra-wide rooms.

Videos about vacuum cooling

Watch more videos →



Market references

Iceberg Lettuce are among the most common vegetables being cooled by our vacuum systems, all around the world. With our standard performance solutions cooling times vary between 20 — 30 minutes. Faster pre-cooling is possible with our high-performance solutions.

Delicate herbs can be given substantial increase in shelf life and vacuum cooling is also often used to just take away the moist from the skin, which can give a dramatic increase in yield! Herbs can cool extremely fast: A new customer in Columbia is cooling his herbs within 10 — 12 minutes, although 15 — 20 minutes is standard.

Broccol, Cabbage & Asparagus is being cooled by one of our new customers in New Zealand. "*We've achieved great results, and customers are happy. 10 pallets of broccoli can be cooled down to 3 oC within 34 minutes, and cabbage within 29 minutes*", according to our customer, who is using a standard performance machine.

Celery & Sweetcorn are among the densest products, with the highest weight per pallet. One of our customers in the USA: "*We are cooling 1.000 kg of Celery from 65 oF (18 oC) down to 41 oF (5 oC) within 30 — 40 minutes. Next year we will outgrow our small (one pallet) machine and we will need a larger one*".

Vacuum Cooling
Technology Explained

Vacuum works with pressure. There is a relation between the pressure level and the boiling point of water. The lower the pressure, the lower the boiling point of water. When introducing a product recently harvested into the vacuum room, vacuum pumps start evacuating much of the air lowering the pressure inside the room. When the pressure level reaches the product's temperature, a fraction (0,8 — 2%) of the moisture inside the product is being forced to evaporate. This evaporation process extracts energy (=heat) from the product, cooling the in- and outside of the product evenly, from the core. Because of the created vacuum, not only the outside is cooled down, but the product's core as well, as cooling takes place from inside the product.

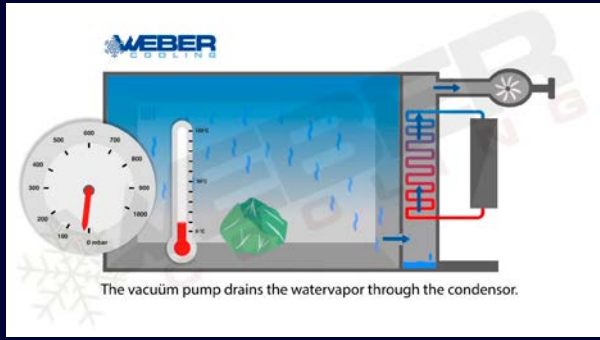
Relation Pressure and Boiling point of water

Pressure on system		Temperature at which water boils	
mBar	Torr mm Hg	°F	°C
1000	760	212	100
56.2	42.2	95	35
42.4	31.8	86	30
31.7	23.8	77	25
28.4	21.3	68	20
20.6	15.5	64.4	18
18.2	137.7	60.8	16
17.0	12.8	59	15
16.0	12.0	57.2	14
15.0	11.3	55.4	13
14.0	10.5	53.6	12
13.1	9.8	51.8	11
12.3	8.6	48.2	9
10.7	8.0	46.4	8
10.0	7.5	44.6	7
9.3	7.0	42.8	6
8.7	6.5	41	5
8.1	6.1	39.2	4
7.6	5.7	37.4	3
7.1	5.3	35.6	2
6.6	5.0	33.8	1
6.1	4.6	32	0

What happens inside the vacuum room and how is the vapor flow handled?

Vapor flow at final pressure is huge and would require very big vacuum pumps. Using a condenser to trap the vapor flow is more economical! Weber Cooling vacuum coolers operate with very efficient condensers using glycol/water coolant (-5 to -0°C) for a fast cooling. The hot vapor passes through the heat exchanger through which it is re-condensed and drained out of the room. When the cycle is finished, vacuum pumps pump air into the room and the door can be opened again.

NOTE: For every 6-7°C reduction in temperature, approximately 1% of the produce weight needs to be turned into water vapor. In an average cycle of 15-25 minutes, weight loss can vary between 2-3%.



Watch the video! →

Weber Cooling is the world leading supplier of Vacuum Cooling Solutions

Weber Cooling is the largest supplier of vacuum cooling solutions in the world. We ONLY do vacuum cooling. For ALL applications where vacuum cooling is used.

We've developed dedicated, tailor made solutions for each of these vacuum cooling applications.

FOOD APPLICATIONS

Bread & Pastry | Food & Kitchen | Rice & Sushi

FRESH APPLICATIONS

Vegetables & Herbs | Flowers & Cold Chain | Turf, Sedum & Substrate

Weber Cooling can provide highest quality solutions at lowest costs, thanks to our:

- **Economies of scale** – we are the largest vacuum cooler supplier in the world.
- **Low overhead** – we combine a lean and agile organization with a strong partner network.
- **Intelligent design** – using modular technology and innovative solutions.

We focus on CO2-reduction → for a greener world!

For all our vacuum cooling systems we now offer 'Hydronic Cooling". This technology is extremely energy efficient and guarantees highest cooling speeds. It reduces the amount of refrigerant by up to 70% and minimizes the risk of leakages.

We can also offer "zero-GWP" cooling solutions, using natural refrigerants like CO2 and Ammonia.

With regional offices in Europe & Asia and a dedicated worldwide partner network we provide fast & reliable maintenance & support. At our head office in the Netherlands we have testing facilities with our demo- and research vacuum coolers for on-site testing.

Contact

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