

Applications

Steam peeling - mechanical peeling

Steam peeling - mechanical peelings in small, medium and large-scale industrial enterprises

What peeling method is used where?

The peeling methods' modes of operation

During steam peeling, the fruit to be peeled is exposed to high temperatures in a pressurised container for a short time. After that, machines downstream rub off the nearly loose peel and/or wash them. The surface of the peeled fruit is smooth. However, this external layer consists of a “cooking ring” of varying thickness arising from the short but intensive impact of the heat. This “cooking ring” (approx. 2-4 mm deep) consists of the parboiled, “slightly cooked”, i.e. the no-longer raw layer.

With mechanical peeling, the peel of the fruit is rubbed off by means of a coarse or fine-grained carborundum coating or removed in blade-peeling systems with blades. No “cooking ring” is produced. The surface of the peeled fruit can appear either rough or – depending on the grain of carborundum chosen – very smooth if it is peeled in continuous “roller peelers” or in our “multi-disc-peeling machines”. If one peels with blade peeling systems, a smooth blade cut is produced.

Fields of application for steam peelers

Steam peelers are, in general, used in western Europe due to the high investment and operational costs (a steam-generating boiler is also required) when large quantities of fruit (from 7.5 to 20 t/h) have to be peeled in very small space, but only when the appearance of the “cooking ring” does not constitute any problem for the final product.

This “cooking ring” is not acceptable in the potato chip industry (GB: crisp industry) since it adversely affects the appearance of the final product. This is why, in the potato chip industry, mechanical peelers are used, whereas the manufacturers of French fries (GB: chips) work with steam peelers because of the necessarily high performance required. The “cooking ring” is not a problem here as long as the potatoes are processed further immediately.

Steam peelers are also the preferred choice for difficult small and delicate produce, e.g. gherkins, baby carrots and carrots as thick as a finger.

We would like to draw your attention to further developments. Amazing results can be achieved with our roller peeling machines and multi-disc peeling machines (for details please see our web entry).

Fields of application for mechanical peelers

Today there already are high-performance roller peelers (measurements of internal space: approx. 4 m length, diameter of screw conveyors up to 2.5 m). Significant levels of performance can be achieved with them, up to approx. 10-20 t/h raw produce (depending on field of application) per large machine.

With roller peelers, the following items can achieve excellent peeling results: potatoes, carrots, celeriac, beetroot (cooked or uncooked), purple-topped turnips, kohlrabi and other tubers and root vegetables. Even some sub-tropical and tropical fruit can be peeled mechanically with excellent results.

The appearance of the peeled fruit can be very smooth.

Mechanical peeling must be used in these areas: in the potato chip industry (GB: crisps industry) and in the catering area in commercial peeling enterprises in which, for example, potatoes are peeled for canteens, restaurants etc. In these cases, the "cooking ring" would lead to a hardening of the peeled potatoes, to a "second skin", which would not appeal to, for example, the guest in a restaurant.

A true story: Years ago, the social director of a well-known German chemical plant (12,000 meals a day for the staff) bought a steam peeler for his works' canteen. The "second skin" (the "cooking ring") meant that the guests of the in-company canteen could not easily cut the potatoes on the plate using their forks. The fork could not be easily manoeuvred because of the "second skin". When trying to cut the potatoes, they often slipped off the plate along with the gravy and onto the clothes of the canteen user. This also happened in the in-company restaurant for the higher echelons in the works and their guests. The social director was fired. Our company installed a mechanical peeling system.

Very good peeling results can also be achieved when root vegetables and tubers are peeled with mechanical multi-disc peelers (MSS). The latter can also work with blades as well as with carborundum peeling tools.

Peeling wastes when using the two peeling methods

The percentage of waste produced by responsibly built, modern, mechanical peeling systems does not necessarily have to be higher than that of steam peelers. The DORNOW peeling machines can peel very economically by using "micro-soft peeling". This process uses very fine carborundum grains, which only remove the outermost part of the peel.

On the other hand, it does not always make sense to talk about “little waste” because ultimately the peeled fruit has to achieve a certain level of cleanliness! In order for this to be achieved, one has to accept more waste.

It is not right to claim that steam peeling or the downstream brush machine would also remove all or most of the eyes and damaged parts from the steam-peeled tubers and root vegetables!

Since steam peeling or the machines downstream cannot do this, it must be assumed that many steam-peeling systems are downstream of mechanical peeling systems or accompany them. Only by doing this can a relatively good product be obtained.

One incident: Many years ago I accompanied a customer who was interested in buying our machines on a visit to a well-known south German canning factory. A steam-peeling system and a DORNOW roller peeler were in operation here at the same time. Industrial carrots were peeled here.

The carrots peeled in the steam peeler still had many black spots. A number of staff was busy removing these spots.

The carrots from the DORNOW roller peeler operating next to it were much more cleanly peeled, and not even a tenth of the inspection staff was required to remove damaged parts. Without doubt the roller peeler caused a lot more waste at that time but the peeled product was as clean as is required in a canning factory.

The fact that DORNOW roller peelers can also work with low levels of waste was proven in the potato chip industry (GB: crisps industry): the machines (depending on their setting) peeled with 2-10 % of waste. Of course, the potatoes peeled in such a way are not quite clean but achieved a level of cleanliness generally satisfactory in the potato chip industry.

Take on the other hand celeriac: their peel has deep cracks that have, in the main, to be peeled away. The steam peeler has difficulty with this. The DORNOW roller peelers, on the other hand, whose peeling rollers can be rotated quickly and aggressively, peel the tubers so clean that they can, with a clear conscience, be used in further production.

The DORNOW roller peelers can, however, also peel “gently”: cooked beetroot are peeled clean in an instant.

Summary

Steam peeling is of economic interest when optimum peeling results have to be achieved in a very small space. At the same time, it peels some difficult and small products. The steam ring (“cooking ring”) that arises must, however, not represent a problem for the final product!

Mechanical peeling is used in the “lower” performance segment up to a max. 10 t/h of raw produce per machine and where it is indispensable: in the potato chip industry and in the catering sector (e.g. for potatoes, carrots, celeriac, kohlrabi etc., for the fresh food sector and salads).

A list of interesting articles and essays regarding the topics of the preparation and processing of tubers and vegetables and associated specialist areas can be found at our Internet site at www.dornow.de, Treatises.

**Review of your current peeling results or
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