

**Equipment for Pre-frying
French Fries, etc.**

Industrial semi-automatic equipment for pre-frying French fries and deep-fat frying of other products with the fryers "Industry 300" or "150"

- Construction/components of a line
- Heating of the large fryers
- Non-automated, semi-automated or largely automated
- The frying oil or fat does not go bad
- Potato sorts for the production of French fries
- Sorting sizes of raw potatoes
- Fats, oils
- Residual moisture in the pre-fried French fries
- Cooling, Deep-freezing
- Potato consumption
- Demand of personnel
- Storage of potatoes and potato temperature
- Packing for Catering

The above mentioned equipment can produce not only French fries but also other fried products such as "fried potatoes", fried potato cubes, chips (UK: crisps), Pommes Parisiennes (fried small potatoes) and other products to be fried.

Due to its simple construction, the equipment is suitable for use in those countries and areas which have little or no experience in frying potatoes. This equipment is to be particularly recommended for those countries where it would be risky to install an expensive and fully automatic plant, or where it is advisable for experience to be gained with the raw products and with sales and distribution.

This equipment is also suitable however, when, for a particular market in a country which already has a sophisticated potato processing industry, a particularly high quality of French fries is to be produced. For e.g. peanut oil is used for frying, which produces excellent tasting French fries and of other fried products, too. The individual, small industrial production of products to be fried is also possible with these large fryers. In order for experience to be gained, a line with the large fryers from the "Industry" series can also be used as a pilot line, which could, at a later stage, justify a large investment.

The large fryers are also suitable for the production of other products to be fried. As the fryers can reach a temperature of 180 - 200 degrees C, products such as pellets, meat, chicken and onion products etc. can be also be fried in them. On the whole the fryers are large industrial fryers in which various products can be fried.

Construction/components of a line

Essential components of a line: Peeling machine, cutting machine, sorting machine, fryer(s), cooling table or cooling conveyor belt. – The plants can be supplied as three different types: non-automated, semi-automated or largely automated.

Heating of the large fryers

Heating is carried out by means of gas (propane gas, natural gas, town gas). This way, the heat under the frying tanks can be well distributed, so that the fat/oil does not burn. More punctual heating, e.g. by means of an oil burner (heating by heating oil) can be detrimental to the frying fat/oil.

No perishing or frying fat or frying oil

The special construction of the large fryers prevents the vegetable fat or oil from going bad. While frying, the product absorbs fat/oil. This quantity of fat/oil must be replenished.

Non-automated, semi-automated or largely automated type

The whole line can be largely automated. The frying itself is carried out by the personnel. This way you can get an individually made product ("home-made", produced in the original way). – Smaller lines can be composed in a simple way, without any automation.

Variety of potato for the production of French fries (UK: chips)

In Germany, Benelux, France and other countries with a clay soil the ' Bintje ' potato is used for the production of French fries and more and more the "Agria" sort, too. Other potato varieties should be tested for their suitability. For the production of other fried potato products other varieties can be used. With the help of the laboratory equipment the suitability of a type can be established, whereby it should be pointed out that the frying suitability of some varieties can alter within a few weeks.

Sorting sizes of raw potatoes

If French fries are to be produced, the size of potato should be approx. 55 mm/upwards, for Pommes Parisiennes the smaller size 28 - 35 mm should be used. For the other

2/2 (707062)

Q14 E5

above mentioned potato products differing sizes can be used.
Fats/oils

Fats, Oils

Soybean fats are generally used for the manufacture of French fries. In the southern hemisphere sunflower oil, palm oil and peanut oil are used. In Central Europe a hardened Soybean fat is preferred (melting point approx. 42 degrees C) for the manufacture of French fries.

The French fries which are pre-fried in the large fryers absorb per kilo finished product with a residual moisture content of 63 - 65 % approx. 8 - 10 % fat/oil.

Residual moisture in the pre-fried French fries

When producing French fries the moisture content of the pre-fried product is an important aspect to consider - one which should be considered from a sales and calculation viewpoint . If French fries are offered with a residual moisture content of approx. 65 per cent, these are commonly accepted as a "well-fried-out" product (this way of expression taken from the Dutch language means that the French fries have been "pre-fried for a sufficiently long time") Out of 10 kg of these goods the catering industry can produce considerably more servings (possibly in bags) than with a residual moisture content of 67 to 68 per cent.

Refrigeration/Deep-Freezing

Most of the pre-fried French fries in Germany are sold as a fresh product (refrigerated between +4 and +10 degrees C). If they are kept refrigerated until consumption, they can usually be kept up to 7 days. Fresh goods are also more popular than frozen ones in the neighbouring West European countries. - In England and in the USA however, frozen products are more popular.

There are cooling tunnels with cooling aggregates and deep-freeze tunnels. The purchase of such tunnels is very expensive.

The smaller production plants described above allow a more simple but more personnel intensive solution to the refrigeration/deep-freeze problem. The pre-fried French fries, which are to be sold as a fresh product, are cooled in a cool room down to the required temperature. This can e.g. be carried out on rack trolleys. If deep-frozen goods are required a "Shock room" (e.g. -38 degrees C) can be set up inside the cool room. In this room the goods to be frozen are put on to freezing trays and trollies. After the shock-freezing the frozen goods are packaged and stored until delivery at -18 degrees.

Potato consumption

When producing fresh goods according the method described above, the potato consumption when using the most suitable potato is 2 - 2,2 times the quantity. If the
3/3 (707062)

Q14 E5

frozen goods are produced with a residual moisture content higher than 65 %, the ratio is immediately more favourable. The factor will be 1.8 or lower.

Personnel requirement (skilled personnel)

For the production of approx. 125 kg/h finished products pre-fried French fries:

Peeling, inspection, cutting, sorting	1 person
frying, refrigeration	1 person
packaging, preparation for delivery	1 person

With skilled planning 2 persons could carry out the required work.

For the production of 250 kg/h finished products pre-fried French fries:

Peeling, inspection, cutting, sorting	2 persons
frying, refrigeration	1 - 2 persons
packaging, preparation for delivery	1 - 2 persons

With skilled planning 3 - max. 4 persons could carry out the required work.

Potato storage and temperature

If possible, the potato temperature should be brought down to a temperature of not higher than 16 degrees C (core temperature) a few days before processing. For this purpose an intermediate storage in boxes would be suitable.

Packaging for Catering

The packaging of French fries and other potato products is usually done in 5 kg cartons or 10 kg cartons for catering. These cartons are placed at the end of the cooling belt. They are filled automatically. The full cartons are pushed to one side, weighed and closed. Empty cartons move up.

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
before the purchase of a peeling machine or system:**

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