French Fries (GB: Chips)
Produced by Traditional Method

French Fries (GB: Chips) Produced on a Large-Scale Industrial Base and by Traditional Method Erection of Production Plants for Pre-fried French Fries (Production Facilities for French Fries) in Countries with and without Experience in the Field of Potato Processing

1. The "French fries baker" and his method of production

Throughout the fifties there was not yet any industrial production of pre-fried French fries in Belgium, Holland, Germany, i. e. in the whole of Western Europe, not even on a small scale.

There were neither batch fryers nor continuously working fryers, not even suitable cutting machinery etc. to make such a product in larger quantities. Besides, there was no appropriate know-how for the construction of such fryers where temperatures between 130° and 160° C are required...

It was not until the sixties when such fryers and plants for the industrial production of French fries were developed in Western Europe.

Still, even back in the fifties there were already French fries of an excellent quality..., produced by the snack bar owners themselves in smaller quantities. In Holland, these were suitably called "French fries bakers".

When I used to visit at that time, during the school holidays, my relatives living at Scheveningen, situated at the Dutch North Sea coast, there were some snack bars near the beach offering tasty French fries. I used to buy there many times French fries wrapped in small paper bags which - sprinkled with some salt - were so tasty that this has been one of my fragrant memories until today.

At that time I could not anticipate that by the early sixties it would have become my job to sell French fries production lines and be involved in the production of this potato product...

In the fifties the French fries were prepared by the "French fries baker" in gas-heated fryers with several frying vats put up in the snack bars (French fries booths) themselves. This was done like that: The potato sticks, usually cut in sizes of 11 x 11 mm, were "pre-

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baked", as the Dutch say, i. e. pre-fried in the fryers normally out of main business hours. This procedure took about seven minutes.

After that the pre-fried potato sticks were put on a sheet metal tray above the fryer by means of a ladle. Here they cooled off, with the superfluous fat draining and flowing back into the fryer.

This cooling process, more or less down to ambient temperature, was considered important even at that time in order to achieve a good quality following the after-frying.- When the customers came, during the main business hours, the pre-fried sticks were put once more in the hot fat of the fryer, and a few minutes after re-frying they left the fryer golden-yellow and crisp. Sprinkled with some salt they were then, wrapped in small paper bags, reached over to the waiting customers.

The full taste of the French fries produced that way - using suitable potato sorts and appropriate fats/oils - led to a boost in turnovers and subsequently the idea was born to pre-fry the sticks in a central place, i. e. in especially equipped production plants and to supply them afterwards to French fries snack bars and restaurants.

At that time the Dutch "French fries baker" used to peel the potatoes by himself. However, the sort had to be suitable; in addition, the soil for the growing of the potatoes had to be of a special type: it had to be the "Bintje" sort from a heavy clay soil... "Bintjes" (= plural for bintje) grown in a sandy soil would not have yielded a high-quality finished product, as far as taste and appearance are concerned...Who would have liked to eat a tasteless pale-brown and more earthworm-shaped potatato product? Potato sort and type of soil were important (which they are still today) for a good finished product...

2. The first small-scale industrial producers of pre-fried French fries and their "natural" method of production

Soon it took, however, too much time to pre-fry the French fries on one's own in the snack bars and booths, and some of the "French fries bakers" established plants which only dealt with the pre-frying of French fries...

In the early sixties the first few small-scale industrial French fries producing plants came into being, little by little, in Germany, Holland and the adjacent countries which later became large enterprises, provided they had an efficient management and their owners were given good advice. The writer of this paper experienced this development at close range. Even at that time he was already selling machines and plants to these firms, also to those investors who count nowadays among the biggest French fries producers in Germany (Stöver's, Amberger, Helmer etc.), in Denmark (Flenstedt) and in Switzerland (Kadi-Frites).

In the then small-scale French fries production plants one used to imitate the further above described method of the "French fries baker": First the potatoes were

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mechanically peeled in carborundum peeling machines, as they exist still today. Then the potatoes were cut and the starch sticking to the batons was removed by immersing them in a water bath. Then followed the pre-frying in large batch fryers (just at that time we were selling the successful "Industry" batch fryers) and afterwards the pre-fried goods were cooled off on cooling tables or cooling conveyor belts...

The product made this way on a small-scale industrial base had in general quite a good quality. Capacities of 65, 125,250, 500, 750 and even 1.000 kgs/hr of pre-fried French fries were achieved.

The following quantities of pre-fried French fries were produced (approximate values): 65 kgs/h in a batch fryer of the type "Industry 150", 125 kgs/h in one, 250 kgs/h in two, 375 kgs/h in three, 500 kgs/h in four, 750 kgs/h in six and 1.000 kgs/h in eight batch fryers of the model "Industry 300". - The residual water content in the pre-fried sticks amounted to approx. 65 per cent.

It was possible to largely automate - if higher capacities were required - mechanical peeling, cutting, sorting. Even the way from the batch fryers over the cooling conveyor belt into the carton could be automated...
Only the frying process itself first did not run automatically...This had the advantage that it was easy to imitate the method of the "French fries baker" and to achieve a good finished product.

Moreover, the plants had the advantage of not being too expensive. Often one used to purchase one fryer at the beginning, then two fryers and later on more machines.

It did not take much time until there were such plants in all regions of Germany; they produced normally 250 to 500 kgs of pre-fried French fries per hour.

As it appeared to be easy to produce in this plants a very good French fries quality, the factories grew rapidly, looking soon for larger units with higher throughputs where the frying process was supposed to be automated, too. Whenever we received enquiries from customers who were already working with the above described "Industry" fryers, they kept demanding that the automatically working continuous fryers should deliver a quality comparable to that of the "Industry" batch fryers...

At that time in the sixties there was little or no experience regarding the construction of automatically working fryers for the French fries production... Still, the efforts to develop such an automatically working fryer, which comprised the good performance data of the "Industry" batch fryers, were successful.

These automatic production lines with the automatically operated fryer were still working, in the majority of cases, with mechanical peeling and always without blanchers (= hot water baths in which the French fries are, in a way, parboiled before the frying process itself starts). - The finished product, i. e. the French fries pre-fried that way, made the sales figures go up rapidly because of their excellent taste and particular appearance.

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3. Modern large-scale industrial production methods

Nowadays we can speak of a mass production of French fries in Western Europe. There are hardly any smaller producers left. This mass production brought about a change in quality of the finished product. The top priority lies on maximum efficiency in the production method.

When I eat, nowadays, French fries in restaurants from fast food chains known all over the world, nothing recalls anymore (as far as taste is concerned) those French fries I used to eat in Scheveningen, but sometimes they rather show a likeness to Italian noodles...The French fries of these days are, in my opinion, too soft, too little crisp and not enough potato-intensive regarding their taste. These factory-made goods have often a more or less flat and boring taste.

Modern production processes must be efficient. The plant should have a capacity of 5 tons or more per hour.

It begins with the intention to reap huge quantities of potatoes by using as much chemical fertilizer as possible. This makes big tubers, but with little taste in them...

Then the potatoes are no longer peeled mechanically, i. e. cold, but they are - even if for a short time only - exposed to great heat in big steam-peelers. This heat effect means further loss of taste.

The violation on the potatoes does not yet stop, however: after cutting in a water cutting system the sticks must often pass through two or three blanchers. These contain hot water at different temperatures and frequently chemicals and colouring matter...

The sticks are normally "parboiled". Due to the constant heat effect and the washing out of flavouring substances resulting from that, the finished product will not be very tasty. It happens frequently that the sticks, before being fried, are still dried in a drying tunnel where they are again exposed to heat.

The climax of this treatment is a short frying cycle in a continuous fryer..., often only for one or one and a half minutes...

It is a matter of fact that, in our times, "pre-fried French fries" are "parboiled, short-time fried starch sticks".

The above described "starch sticks production method" has grown historically. Quality standards have fallen off in favour of mass production and profit...

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The quality of meat production in Western Europe has also been considerably affected. There has been a big deterioration in meat quality due to an - economically grounded - industrial and no longer natural feeding and keeping of animals...Meat does not have any longer the good taste of meat it used to have...Often it contains so much water that a piece of roast meat in the frying-pan looses half of its volume after a short time... Water...Modern processing techniques for the mass production of "pre-fried" French fries make it possible to leave much water in the finished product. Above all in deep-frozen goods one can often find high water contents...Lastly the customer buys more water and less substance. Snack bars or restaurants get less servings from one package containing e. g. 10 kgs of "pre-fried French fries".

They need more time and more energy for after-frying...Often it takes a housewife, who is going to prepare quickly some French fries for her children, 10 minutes or more to get one serving ready (after-fried)...In the meantime the "starch sticks" have absorbed a lot of fat or oil and taste nauseating...

The pre-fried French fries from the above mentioned "French fries baker" and from the first few industrial producers had a water content of some 65 per cent. It was a "dry" product which yielded many servings of French fries to be after-fried. This product did not have, of course, such a smooth and regularly white appearance, but it looked naturally fried. Today you find a water content of up to 73 per cent in the pre-fried deep-frozen goods...One can assess the difference between the cited percentages if one knows that potatoes suitable for the production of French fries have water contents of approximately 78 per cent...

The mentioned development in the field of French fries and meat production cannot be simply "turned back" in the European Union. There is much fear to suffer losses and loose jobs in case of straying from the known path...From an economic point of view production and trade margins are optimized and need no change...

4. Establishment of a French fries production in countries where such large-scale industrial production lines are already in existence

Here, there is only one possibility to do it in a different way than the other producers, that's to say it is necessary to go on from the origins of French fries production.

In the field of chips (GB: crisps) production this trend is already spreading in England and in the USA. The potato chips (crisps, hand cooked) made by hand in batch fryers yield big turnovers...Who would have thought some time ago that the big automatically working chips fryers would get a competitor in a product cooked by hand in batch fryers, i. e. in a more natural way..?.On the package you can read that a production method was consciously chosen which is going on from the beginning of the chips production and that the "potato" raw product is paid the greatest possible attention to...

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I wouldn't hold that only in batch fryers one can make good, natural pre-fried French fries. This is also possible in properly constructed automatic fryers...which we can supply.

However, in this case and for the above described reasons, I would advise against peeling by means of steam (steam peeling).

Besides I would advise against blanching the sticks before frying.

The frying can be done in suitable batch fryers or continuous fryers.

The water content of the pre-fried French fries should not be higher than 65 per cent in fresh material.

As it is the case in any food stuff production, the raw material must meet the relevant requirements. One should have the possibility, at least in the long run, to take influence on the potato cultivation. A "controlled cultivation" of potatoes (not to be mistaken for biological cultivation) should be given preference. - In Western Europe the potato sort "Agria" becomes increasingly popular instead of the "Bintje" sort. In England and in the USA there are different sorts which are preferred. - One should only use good natural oils or fats...Peanut oil provides for an especially good taste...but it is expensive and not available everywhere.

Goods produced this way can and have to be more expensive than mass production goods. But every carton and every package should be provided with an informative advertising text. It must be indicated how many servings of e. g. 150 g each of after-fried French fries can be produced from a 10 kgs carton of this naturally made frying product...It's only this what counts, not the price of the 10 kgs of pre-fried French fries...Moreover, it is possible to emphasize in the text the following: the taste intensity of the goods, the water content in per cent, possibly the sort and the "controlled cultivation" of the potatoes. Instructions for use should be enclosed, too. They must contain notes regarding the required quality features of the fryer in which the after-frying is to be carried out. It would be optimal to prescribe the type of fat for after-frying and to add it to the delivery. Suitable fryers can possibly be supplied, too.

The potatoes and the products made of them should be accompanied from the seeds up to the snack bar or restaurant where they are consumed. It is advisable to "practice" the after-frying technique with the cook of such a restaurant.
We advise against co-operating with restaurants where cooks are in the habit of after-frying French fries in fats or oils they use for meat, fish and other products. Snack bars and restaurants should be supplied with pre-fried French fries only if one can be sure these are after-fried according to the instructions of the producer.

Thus it is possible to give a certain guarantee that the French fries produced in a natural way will gain a considerable share in the market.

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The seller of the French fries produced in this natural way can, at the same time, be the driver of the delivery van, carrying along a small fryer (and a suitable frying fat/oil for after-frying) which he can get ready in a couple of minutes for every buyer of the pre-fried French fries.

Any trade name should be registered. -

By means of prepared forms the buyer of pre-fried French fries should be warned not to make mistakes regarding further treatment of the pre-fried French fries. The proper treatment of this product is an essential prerequisite to increasing turnover figures.

Should the owner of a snack bar/restaurant/big canteen fail to observe the producer's instructions regarding further treatment of the pre-fried French fries, it appears to be advisable to stop deliveries to him.

The investor should be guided by severe quality standards, starting from the growing of the potatoes up to their consumption on the plate of the end user!

5. Erection of a French fries production in countries with no or little experience in potato processing

Here, the erection of large plants as they are in operation in Western Europe, does not come into question anyway at the beginning.

(Please read our paper Q52: "Organization of a new potato processing industry in regions with little know-how regarding processing, production and marketing").

In most cases it appears to be reasonable to start production with the "Industry" batch fryers mentioned in this paper.

From the beginning it is possible to produce a good quality, provided suitable potato sorts are used. The laboratory equipment we supply can help buy the right potatoes.
It should be the aim of the investor to establish, in the long run, production facilities as suggested in item 4.
This is also the least expensive solution for a start.

Should it later become desirable for the investor to install plants for mass production as described above, we would suggest even now to keep the production line for naturally produced French fries and to go on selling them under a particular trade name.

6. The above described items - non-committal observations

It goes without saying that the above observations are not binding for me/for us. It is up to the investor to have a market study conducted. The above comments are to be understood as non-committal support for taking decisions. They have to be checked by

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the investor and his consultants. We do not lay claim to completeness. - For any delivery of machines and/or plants our order confirmation acknowledged by you will be the only legal base.-

Supporting treatises:

Q14 : "Description of **semi-automatic equipment** for pre-frying French fries and deep-fat frying of other products"
Q26 : "The DORNOW roller peeling machines of the **R-OW** series in industrial peeling plants and in the potato processing industry"
Q44 : **"Cooling and deep-freezing** of pre-fried French fries in a simple way"
Q50 : "**Advantages of manually operated DORNOW batch fryers of the "Industry" series**, models 150, 151, 300, 301 for the production of pre-fried French fries and/or chips (GB: crisps) as against fully automatic fryers of the same capacity"
Q52 : "**Organization of a new potato processing industry** in regions with little know-how regarding processing, production and marketing"
Q59 : **"A simple way of cleaning waste water** in the potato and vegetable processing industry"
Q63 : "What is the meaning of **'peeling without water and waste water'** (on mechanical peeling machines) for in-plant practice?"
Q70 : **"Utilization of peeling 'waste'** from mechanically working dry peeling machines," especially of potato peeling 'waste'"
Q84 : **"Traditional hand-cooked crisps** (US: 'chips', India: 'wafer chips')"

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