

# Cold Extrusion of Butter

More than thirty years ago, the initial tests of what we now call „cold extrusion of butter“ emerged. Today, there seems to be an increasing interest from the butter, margarine and fats producers to supply their customers with packed products without the cardboard box as a substitute for the traditional filled and packed products. This trend in the market place has arisen for environmental and economical reasons. By altering the production process from filling the crystallized products to packing the products instead, this cardboard box is not necessary. Thus the environmental problems with the disposal of the cardboard box are solved. Not only the producers reduce costs on packing materials, but the customer also reduces costs on the manpower involved in handling the cardboard boxes.

## Pilot Trials

At the SPX innovation center intensive trials on cold extrusion of butter have been conducted on the GS Perfector pilot plant in order to determine the processing conditions and to assess the product quality. The main objective of the trials was to chill butter from the typical filling temperature of 13-16°C to a temperature lower than 7°C since earlier studies have shown that 7°C was the critical temperature with regard to the hardness of the butter. The hardness is an essential factor. If the butter does not exhibit a certain hardness, it is not possible to stack it without deformation of the butter block. In the chilling process it is furthermore required that the quality of the butter in terms of appearance, plasticity, spreadability, etc. remains unchanged or becomes even better.



GS Perfector pilot plant

## Production

The trials showed that it was possible to produce butter with a temperature much lower than 7°C without creating any major changes in the characteristics of the butter quality apart from

the hardness. But the real tests were performed on a production scale where the butter was produced in a conventional Fritz butter process prior to further chilling in the high pressure scraped surface heat exchanger, the GS Perfector.



GS Perfector

In this connection another question arose concerning the re-work of the butter during start-up of the GS Perfector line and in case of down time of the packing line. This challenge was solved in a traditional manner by including another scraped surface heat exchanger in the line, the GS Consistator®. The chilled butter would then be re-heated in the GS Consistator® before returning to the GS butter silo, however, without changing the structure of this butter.



GS Consistator®



GS butter silo

With various GS Perfector rotor designs and type of scrapers, trials were conducted and several samples were collected for further evaluation. Parameters such as capacity and chilling intensity were altered and the product temperatures, the pressure changes over the line, the load on the motors and the appearance of the butter at packing were reported. The production trials showed that the chilled, packed butter was stackable on pallets in the same manner as traditional bag-in-box filled butter. Additionally, the re-heated butter was successfully integrated into the freshly made butter without any detection of mixing in the later chilled butter. At the quality evaluation no changes in the characteristics of the butter was noted but it was stated that the chilled butter tended to exhibit a better spreadability and plasticity at usage temperature compared to normal butter. The extra mechanical treatment in the GS Perfector during the chilling process may be an explanation for the positive change in plasticity.

### Complete Process Line

SPX has successfully developed the GS cold extrusion process and apart from the various machinery essential for producing cold extruded products, SPX is also capable of supplying assistance with regard to product development.



Denmark: P: +45 7027 8222 F: +45 7027 8223 E: [gs.dk.sales@spx.com](mailto:gs.dk.sales@spx.com)  
Germany: P: +49 451 3709 0 F: +49 451 3709 311 E: [gs.de.sales@spx.com](mailto:gs.de.sales@spx.com)

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