

In-house Shortening Production

- WHEN AND WHY IT MAKES SENSE

Made of hydrogenated vegetable oils, shortening is widely used across many bakery industries for the manufacture of many items including cookies, pastries, heavy filling creams and dry mix solutions which provide easy, high quality baking solutions for the user. It is often purchased in crystallized form and provided in bag-in-boxes. Handling this at the bakery, however, is a labour intensive process with cartons needing to be unloaded, stored, transported to point of use, opened and measured into the system. The operation is also very open to temperature and consistency changes which can lead to variances in end quality.

If the amount of shortening used in a plant is high enough, operational improvements and cost savings may be achieved through bringing its production in-house. At small facilities it makes sense to buy the shortening in pre-prepared blocks but if the required quantities are higher, the in-house production of shortening becomes a very appealing and profitable option:

- Raw material prices for the liquid oils and fats to produce the shortening are lower than buying in the ready-made cartons
- There is less waste of raw materials as the pre-packed shortening tends to stick to the plastic bags it is contained in and an estimated 1% of volume is lost
- There are no costs for disposal of cardboard and plastic packaging
- Manual operational costs are reduced as there is less labour-intensive movement and handling of products – the raw materials are delivered by tankers and pumped directly into silos with continuous conveyance to other process lines.

There are four basic stages to producing shortening in-house:

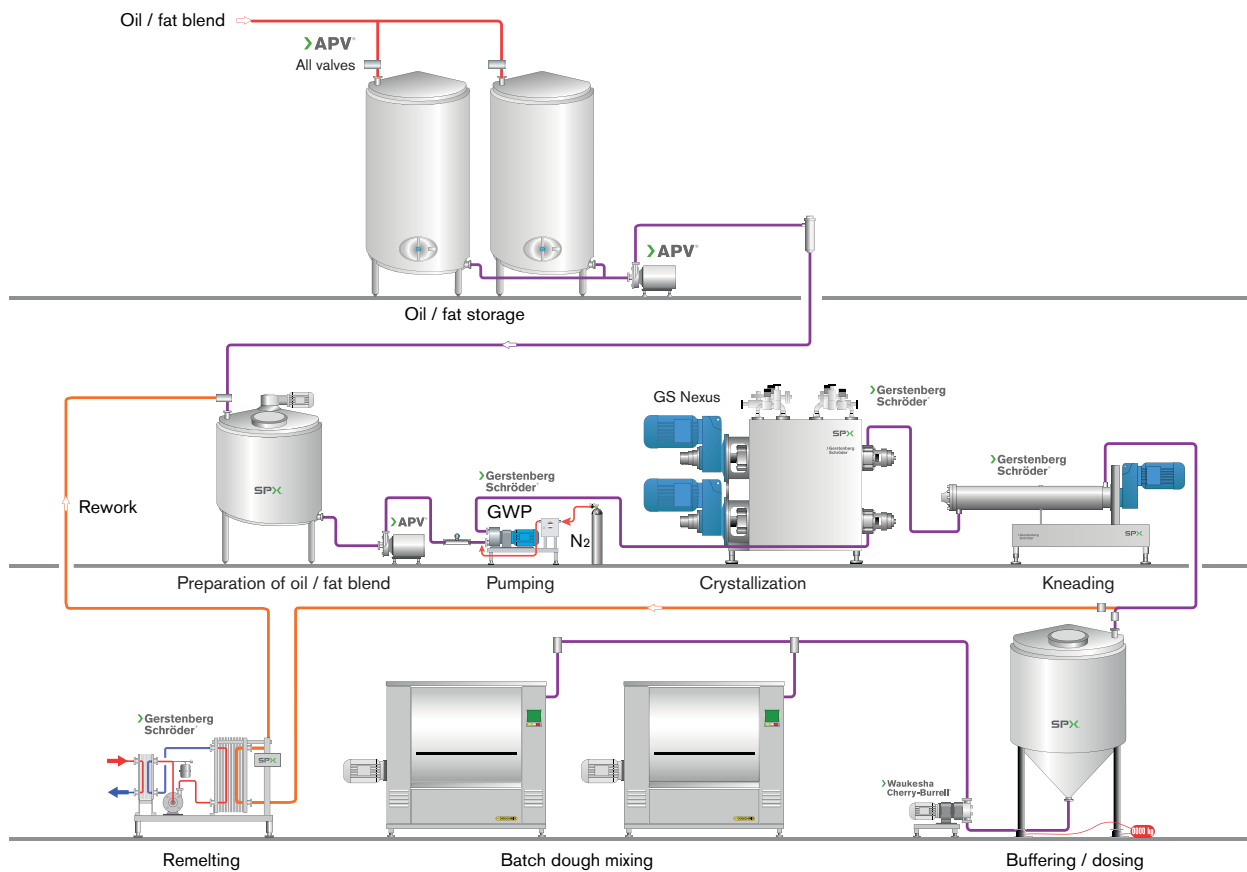
1. Receiving and, if required, storing of the fat blends
2. Processing the fat to crystallize and knead to the required consistency
3. Tempering for final maturation of the crystals to stabilize the product structure
4. Transfer to mixing/blending system in required quantities for the given recipe



Example: Continental Mills In-house Shortening Production for Dry Bakery Mix Products

Continental Mills delivers high quality, dry bakery mix products to retail, large merchandisers and food service providers. One of its core competencies is the production of in-house shortening to enable fat to be incorporated directly into the final dry mix product and allowing consumers to “just add water” to attain quality baking results.

At one of its dry mix plants in Kent, Washington, USA shortening production had been a relatively manual process which required every parameter to be monitored and operators to make adjustments accordingly. The characteristics and quality of the produced shortening was, therefore, subject to variation depending upon the operator responses and the process was very labour intensive. In early 2010 the system was changed to an automated SPX Gerstenberg Schröder (GS) shortening production process line, bringing significant cost savings and increased production efficiency. The system has been running smoothly since its start-up.



In-house shortening plant for batch dough mixing with preparation tanks

About the Process

Bulk hydrogenated oil is received at the facility and used as input to the shortening production process. After pre-cooling the oil is pumped through a GS scraped surface heat exchanger (SSHE) to crystallize it and pin rotor machine to knead it. The shortening is kept in the storage tank for a minimum of two hours for the product to mature and allow the crystals to grow to a stable structure.

At its Kent facility, Continental Mills produces three different types of shortening, all using the GS process line. Each process batch produces 1,814 kg and four storage tanks can hold a total of up to 7,257 kg. The raw material cost and operational savings for these quantities are significant compared with buying and handling cubes or dry flakes of ready-made shortening. The whole process line is completely automated and, unless additional additives are required, one button press produces 1,814kg of shortening without manual intervention. The shortening production process further connects directly into the automatic blending system, again without manual intervention.

Grant Wunschel, Engineering & Maintenance Manager at the Continental Mills Dry Mix Plant in Kent, commented, "We had a very positive experience from working with SPX. The approach to

the project from first sales contact through commissioning and onto service was very smooth. We selected this solution because of a complete commitment and understanding of crystallization technology and SPX's ability to provide the entire system, not just the SSHE."

SPX has vast experience in the food processing market. It pulls together knowledge and understanding from all of its brands to deliver a complete solution that delivers reliable, high quality results while improving operational efficiencies and reducing costs. Continental Mills has been producing in-house shortening to add to the quality of their brands for over 30 years and the new system delivers savings and increased efficiency now while offering the flexibility to easily add more recipes and formulae for the future.

Wunschel continued, "SPX designed, sourced and integrated the entire system to deliver the best value for us. For example, SPX global connections meant that tanks were supplied from around the world to ensure the best performance and value for our requirements. Support throughout the project was excellent and the project manager was present for the whole two weeks throughout start-up to ensure everything went smoothly. The expertise they

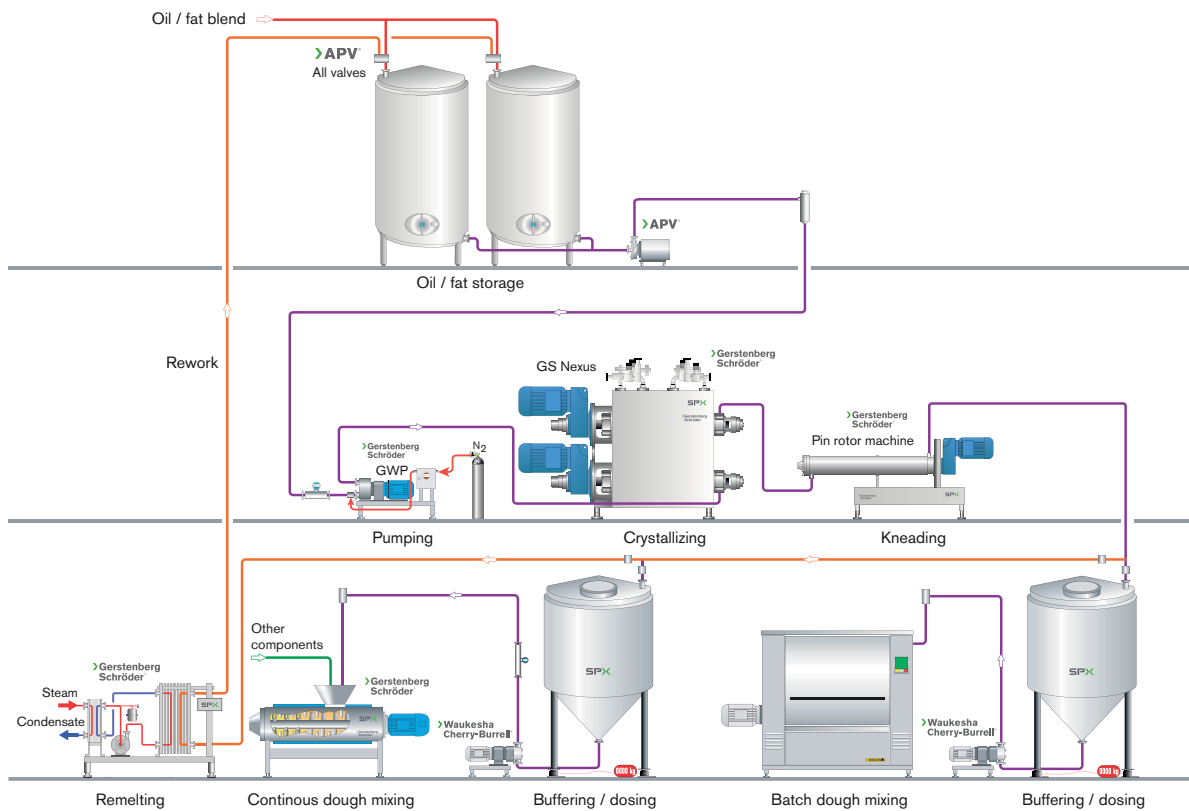
showed was great and we had every confidence they knew exactly what they were doing – we feel we got great value and results from the whole process.”

shortening machinery is just one to two years. Savings are realised in raw material costs and required labour. Operational efficiencies can be maximised with no manual intervention to the process and tighter control over end product quality can be achieved.

Summary

In-house shortening production can be realised utilising machines such as the Nexus SSHE from SPX which utilises CO₂ for higher efficiency cooling and faster product crystallisation for improved product quality. Using a natural refrigerant further reduces environmental impact and excellent process efficiencies are obtained with high capacity, low energy operation.

Adding in an automated process line to produce shortening in-house can make good business if the fat is used in high enough quantities. If production is over approximately 907kg per hour, the estimated period for return on investment for the purchase of the



In-house shortening plant for batch and continuous dough mixing



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