



## Superior Whey Protein Processing Technology

When designing a new whey protein powder plant, or upgrading an existing facility, it is essential to maintain a global perspective of the entire process. Maintaining the highest quality from farm to formulation requires a blend of technology know-how that only years of experience and innovation can provide. No one knows this better than GEA. GEA technology solutions for whey protein take great consideration of quality throughout the process, mindful of whey handling, thermal treatments, mechanical impact and hygienic design.

In order to produce and market, high-quality, high-value whey protein products, the desired end product must be kept in

mind – considering, what does the end user demand and how can the process be designed to meet those requirements?

### What you can expect from GEA for the whey protein process (WPCs and WPIs):

#### Mechanical Separation

Quality whey protein powder requires upstream pre-treatments such as clarification, whey cream separation and bacteria removal. Whey clarification removes cheese fines to improve whey cream skimming performance, further the fines can be concentrated with a decanter and may be recovered for use in processed cheese formulas.

Subsequent separation of whey cream, recovers whey cream for utilization in cheese milk or butter making and minimizes fat content in whey protein powders to meet customer specifications.

Both processes, clarification and whey cream separation support the running time of membrane filtration units due to reduction of membrane fouling. If high microbiological quality powder is required, bacteria removing centrifuges may be integrated into the pre-treatment process to remove bacteria and specifically aerobic and anaerobic spores, which cannot be inactivated in the following drying process.

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## Membrane filtration

With our extensive theoretical and practical experience with membrane filtration, along with our well-defined standard modules, we are able to design membrane filtration units for dairy applications such as harvesting of high-value proteins. Our unique plant sizing software ensures the optimal plant configuration without jeopardizing the final performance of the plant. The 'plug-and-produce' unit philosophy provides our customers with several benefits such as space saving designs, seamless integration and short installation time.

Our continued focus on design improvement has led to filtration solutions with optimized CIP design for reduced energy, CIP and water consumption; product yield enhancement; and high total solids designs for lower energy consumption and improved final product properties.

## Spray Drying

The desired final protein powder properties drive spray dryer selection. Spray dryer design encompasses final product requirements with process parameters selected to ensure:

- Best product quality
- Low energy consumption
- Protection of the environment
- Extended operation time between CIP
- High level of plant safety

Our Multi-Stage Dryer MSD™ manufactures high demand powders for today's market with the flexibility to produce higher density non-agglomerated powders in addition to excellent agglomerates that are coarse, free flowing and dustless. To achieve the best instant properties lecithin can be added to the agglomerated powder. The MSD™ is specifically designed to meet the requirements of the dairy industry, incorporates the latest in dairy processing

and spray drying technology.

Acknowledged for its high efficiency and documented hygienic design, the MSD™ has been setting the standards within agglomerated dairy powders ever since its introduction in the market; and, hence, it holds a prominent position within the dairy industry.

## Process control and monitoring

GEA's range of process control and monitoring systems are designed to optimize the spray drying process, giving you the best possible return at the lowest cost of ownership.

One of these systems is DRYCONTROL™. Our customer benefits from this control system adjusting for common input variations to always operate the spray dryer at maximum capacity while precisely controlling the residual moisture in the final powder that a standard PID loop controller cannot match. Using DRYCONTROL™ means increased utilization of spray drying capacity as well as increased yield with higher moisture content in the final powder.

Even the smallest deviation in quality and consistency during the drying process can lead to downstream problems, rejected product or loss of production time. GEA's POWDEREYE™ issues warnings to the operator, thereby preventing costly out of spec production and provides a basis for final product control and process adjustments. The POWDEREYE™ is situated after the last drying stage and measures in an adjustable frequency:

- Bulk density
- Tapped density
- Scorched particles with high resolution imaging
- Residual moisture in the powder
- Powder color

## Powder conveying

Great care is needed when conveying agglomerated powders, particularly when long distances and multiple stages are involved. GEA's range of positive pressure and vacuum conveying systems are designed to ensure minimal breakdown of these powders. Using various flow control systems coupled with integrated software solutions, GEA can convey sensitive powders from dryer fluid bed right through to finished packing.

## Bag/Sack Powder Fillers

GEA can provide fully automated packing lines for low, medium and high production capacities. Our filler range features a bottom-up filling system that minimizes the displacement of air and the resulting dust emissions are dramatically reduced compared with more conventional systems. This makes them very clean and safe to operate, and the reduced product losses through better dust control mean greater product yields for our customers.

## Limited Intervention Filling

In today's world the safety of our customer's personnel and their product are paramount. That is why we designed the 'Li' system to be an extension of the automated powder manufacturing process.

The 'Li' system delivers a safe, hygienic bag handling and filling solution for powdered products offering the highest levels of accuracy and reliability. The system is designed to run with low operator input, with the only manual requirement being for cleaning and maintenance. The high operational efficiency of the system virtually eliminates the need for a full time operator inside the packing room, leaving them free to attend to other areas of the production process.

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