Agrifood & Bio-ethanol

Drying & Cooling Processes

starches
proteins
distiller's grains
by-products
Barr-Rosin

Pioneers in Drying Technology

Broad Product Range
Dr Rosin & Dr Barr, forefathers of Barr-Rosin, invented the Flash and Ring drying technologies in 1932 and 1948 respectively. Since starting trading in 1959, the Company has continued to innovate drying technologies with the Feed-Type Ring Dryer in 1964 adding exhaust gas recycle in 1967, through the P-type ring dryer in 1974 to the Superheated Steam Dryer in 2003. This drying system has set a new standard for energy in the renewable fuel industry.

In addition, Barr-Rosin boasts a wealth of experience in Rotary, Fluid Bed, Column and Paddle drying processes.

Barr-Rosin can rightly claim to be at the forefront of drying technologies with over 2000 references worldwide.

To maintain this leading position we continue to focus on:
• Product quality
• System reliability
• Energy savings
• Emission control

Customer Focus
Barr-Rosin uses their experience to customise proven technology and develop new solutions to meet customers’ needs. Furthermore, technology centres in Canada and UK spearhead the development of new technology led by market demands. In addition, due to worldwide support of the GEA Group and its agents, Barr-Rosin can service the customer in his own market place. Barr-Rosin’s project management and design team engineer, test and deliver quality.

Construction managers and experienced process engineers provide site support for erection, commissioning and training.

Customers are assured in the process and mechanical design of their system and can be confident in the support of a dedicated after sales service team.

The above illustrates the level of support customers can routinely expect throughout the lifetime of their system in which they have invested.

Products Processed
Many drying and cooling installations have been supplied by Barr-Rosin for a diverse range of Agrifoods which includes:
• Corn Starch & Corn Gluten
• Wheat Starch & Wheat Gluten
• Corn & Wheat Feed
• Potato Starch & Protein
• Pea Starch, Protein & Fibre
• Tapioca Starch & Fibre
• Rice Starch
• Modified Starches
• Starch Derived Sugars
• Corn Germ
• Distiller’s Grains (DDGs)
• Spent Yeast
• Soya Fibre

Environmental Awareness
Barr-Rosin is aware of the environmental impact of drying processes. All new systems meet the latest emissions legislations and safely optimise energy consumption.

Energy Efficiency
Barr-Rosin has led the drive to more efficient drying systems. The direct fired exhaust gas recycle system increases the thermal efficiency of the dryer. The humid exhaust stream provides a valuable source of heating for a waste heat evaporator.

The superheated steam dryer provides a steam exhaust to an evaporator, distillation column or molecular sieve increasing the overall thermal efficiency of the drying system to up to 85%.

Waste heat sources such as turbine exhaust gases can be utilised to increase overall thermal efficiency.

Use of alternative fuels is possible.

Barr-Rosin uses high efficiency components for example, motors, frequency inverters and heat exchangers.

Any of the above energy efficiency features can be retro-fitted to existing drying installations.

Pioneers of a range of drying & cooling technologies, Barr-Rosin has accrued an enviable wealth of expertise and experience in the Agrifood industries.
Suction Discharge Systems
At the end of the drying process, the well-proven Barr-Rosin suction discharge system achieves excellent atmospheric emission levels and often eliminates the requirement for wet scrubbers and bag filters. This system also minimises dependence on mechanical handling equipment, significantly reducing maintenance requirements whilst largely avoiding product cross-contamination.

High Speed Cascading Feeder
Barr-Rosin’s unique design of high-speed cascading screen rotor improves dispersion of wet feed into the venturi section. It also helps to lower exhaust temperatures and is the key to more efficient drying than in previous systems. The result is a better grade of final product, with minimal grits and rejects and a higher bulk density for better packing efficiency and product characteristics.

Flash Dryers
The single pass Flash dryer is ideal for products that dry rapidly, due to the easy removal of free moisture. This makes the process suitable for most types of starches. Wet material is introduced into a stream of heated air where moisture is removed quickly without heat damage. High rates of heat and mass transfer are achieved as the material passes through the system. The design also has the advantage of being simple and easy to maintain. Continuous development of this technology ensures that Barr-Rosin can offer the most effective pneumatic drying and conveying system.

P-Type Ring Dryer
(Modified Starches)
High quality modified starches benefit from drying in the P-Type Ring dryer. This enhanced design of the Flash dryer recycles wet and heavy modified starch particles into the low temperature region of the system, facilitating gentle drying with prolonged residence times and high product quality with precise control of particulate moisture.

Continually developed over the years, Barr-Rosin Ring dryers can be designed to utilise a variety of heat sources, including steam, gas or turbine exhaust gases. The ability to precisely control material recycle and residence times ensures the final products are of the very highest quality.

Dewatering and Disintegration
Prior to entering the Ring dryer, Wheat Gluten is efficiently dewatered by a conical screw press which squeezes and extrudes the gluten allowing final traces of expressed water to be separated over a screen.

The protein is then extruded in a continuous film through a narrow passage or ‘fish tail’ feeder and across the dryer’s disintegrator. The specially designed rotor shreds the wet Gluten and mixes this with a recycled stream of dry material, resulting in improved heat and mass transfer and a high quality powdered product, with excellent vitality, water absorption and protein retention.

Classifying Mills
Barr-Rosin includes engineering and supply of specialist classifying milling systems as part of its scope. The aspirated vertical grinding mill incorporates an internal classifying wheel with independent drive. By varying the speed of this wheel, oversize particles are deflected back into the mill for further grinding. This combination gives fine control of the particle size and ensures the highest product quality without heat damage.

Packaging Systems
A complete system can be supplied to include transport, storage, and packing. Packing systems can range from semi-automatic to fully automatic bagging units.

Technologies for Starches & Gluten
Corn / Maize, Wheat, Tapioca/Cassava, Potato, Pea, Rice & Modified Starches
For the best corn germ oil yield, Barr-Rosin has a partially closed circuit fluid bed dryer. This produces a crisp product, making germ milling and oil extraction easier and reducing down time.

To overcome the cohesive nature of some materials such as sugars and sweeteners, fluid bed dryers are often fitted with a de-agglomerator or stirring device. A vibrating bed can be supplied to maintain the product in a ‘live’ state at low fluidising velocities.

**Feed-Type Ring Dryer**
The Feed-Type Ring dryer is designed for drying feed and fibrous materials where extended drying times are required without product damage. Features include a cold disintegrator for breaking up agglomerates and a manifold for recycling heavier and wetter particles back to the disintegrator. Barr-Rosin has considerable experience in drying materials including corn fibre/ feed, corn gluten, wheat feed and distiller’s grains. This dryer is capable of evaporative capacities of up to 30 tonnes per hour.

**Fluidised Bed Dryer & Cooler**
In this well-proven system, a fluidised layer of material (or bed) is suspended on a cushion of air passing up through the dryer via a special perforated distributor plate. Bubbles continually form and collapse within the bed of material, creating a fluidised state that promotes intimate contact and rapid heat and mass transfer between the air and material.

**Rotary Dryers & Coolers**
The Rotary dryer is still widely used in the Starch Industry, particularly for drying of special sugars and animal feeds. Its robust design offers flexibility in ‘upset’ conditions. An additional feature is the low headroom requirement, which often benefits installations in existing factories. Rotary dryers can be designed for either co- current or counter-current flow and direct or indirect heating. They are fitted with internal lifting flights, louvers and/or cross-shelf (cruciform) baffles for showering material into the hot drying air stream as the material passes through the rotating cylinder.

**Superheated Steam Dryer (SSD)**
Barr-Rosin has developed a closed circuit system that adopts the key features of the Ring dryer, but replaces the drying air with an indirectly heated stream of superheated steam, generated by the evaporation of water from the product.

Steam drying and re-use of the evaporated steam can offer significant process and energy saving advantages. In particular:
- negligible gaseous exhaust to atmosphere
- steam is available for other uses e.g. heating, distillation or evaporation
- negligible Oxygen present
- efficiency is greatly increased
- product quality can be improved (no oxidation)
- production of by-pass protein
- alternative primary energy source can be applied due to indirect heating

**Efficiency & Integrated Systems**
Traditionally, a particular product stream would be processed in a discrete system with its own dedicated energy source and effluent cleaning system. Barr-Rosin has developed an energy efficient system that integrates all of the ‘feed house’ dryers with a waste heat evaporator (WHE) and regenerative thermal oxidiser (RTO). This global system re-uses the energy from the dryers for the evaporation of steep water (or solubles) and also re-uses heat from the RTO for drying of other by-products. The system has been designed to combine great flexibility of operation and minimal energy usage whilst eliminating odour and reducing exhaust volume.

A common feature of the dryers in an integrated system is that exhaust gas recycle is used to minimise energy requirement and exhaust volume. This also reduces the Oxygen content of the drying airstream and so provides an inherently safe system through self-inertisation.

The advantages of a Barr-Rosin system:-
- Energy-efficient designs
- Exhaust gas recycle
- Feed conditioning
- Low maintenance systems
- High quality dry product

**Distiller’s Grains (DDGS)**
After pioneering drying of distiller’s grains in the Scottish Whisky industry in the 1960’s and 70’s, Barr-Rosin has become the preferred supplier of drying technology in the Bio-ethanol Industry providing distinguished product quality.

To increase efficient energy usage, systems can be heated by turbine exhaust gases or utilise exhaust gas recycle which also renders the system inherently safe.
We live our values.

Excellence • Passion • Integrity • Responsibility • GEA-versity

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