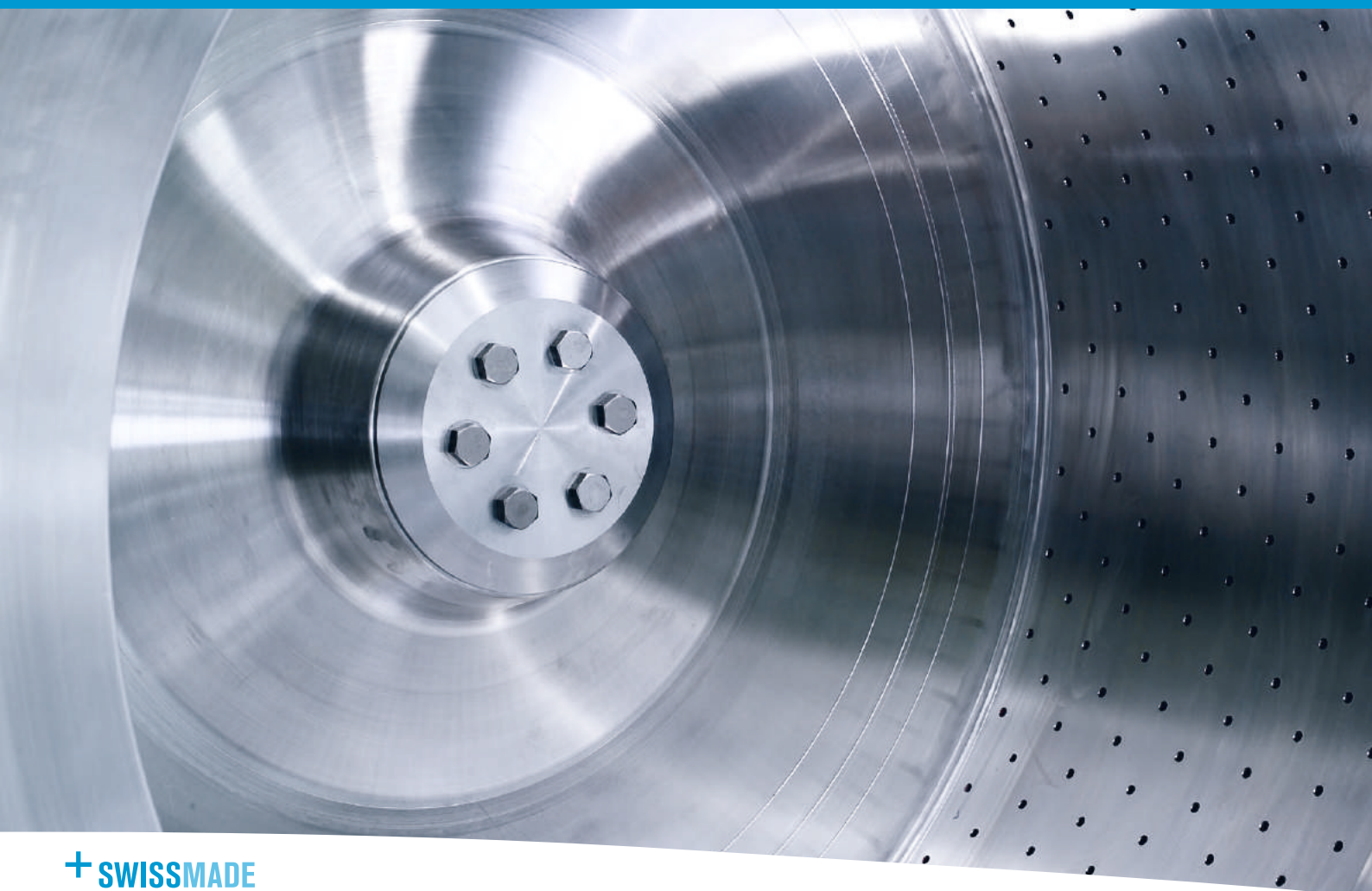


ferrum

**PROFESSIONAL IN DYNAMIC SEPARATION
CENTRIFUGE TECHNOLOGY**



+ SWISSMADE

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FERRUM MORE THAN
100 YEARS
SINCE 1917



TRADITION AND EXPERIENCE⁺ CONVINCING SOLUTIONS

INNOVATIVE FROM EXPERIENCE - COMPETENT FROM TRADITION

Since Ferrum produced the first industrial centrifuges in 1935, the company has developed to a world-leading manufacturer of high-performance scraper and pusher centrifuges. Today, well-known manufacturers in the chemical, fine chemical and pharmaceutical industries trust in the trouble-free solid-liquid separation of Ferrum centrifuges.

The combination of competence, experience and spirit of innovation guarantees the proven and long-term benefits of Ferrum centrifuges. The broad range of products, a worldwide presence, as well as a high level of self-financing ensure a strong market position with excellent prospects for the future.



1917

Ferrum Ltd., Engineering works & Foundry, is founded as a family owned company in Rapperswil, Switzerland.

1935

Ferrum manufactures the first industrial filtration centrifuges for the pharmaceutical and chemical industries.

1994

Ferrum takes over the Sulzer-Escher Wyss centrifuge business with the complete range of pusher and scraper centrifuges as well as all the employees with their many years of experience. As a result of this take-over, Ferrum is able to significantly expand its product range and centrifuge know-how.

TODAY

With over 3500 pusher centrifuges delivered as well as more than 2700 scraper centrifuges, Ferrum is a world-leading centrifuge manufacturer.

+ CENTRIFUGE TECHNOLOGY

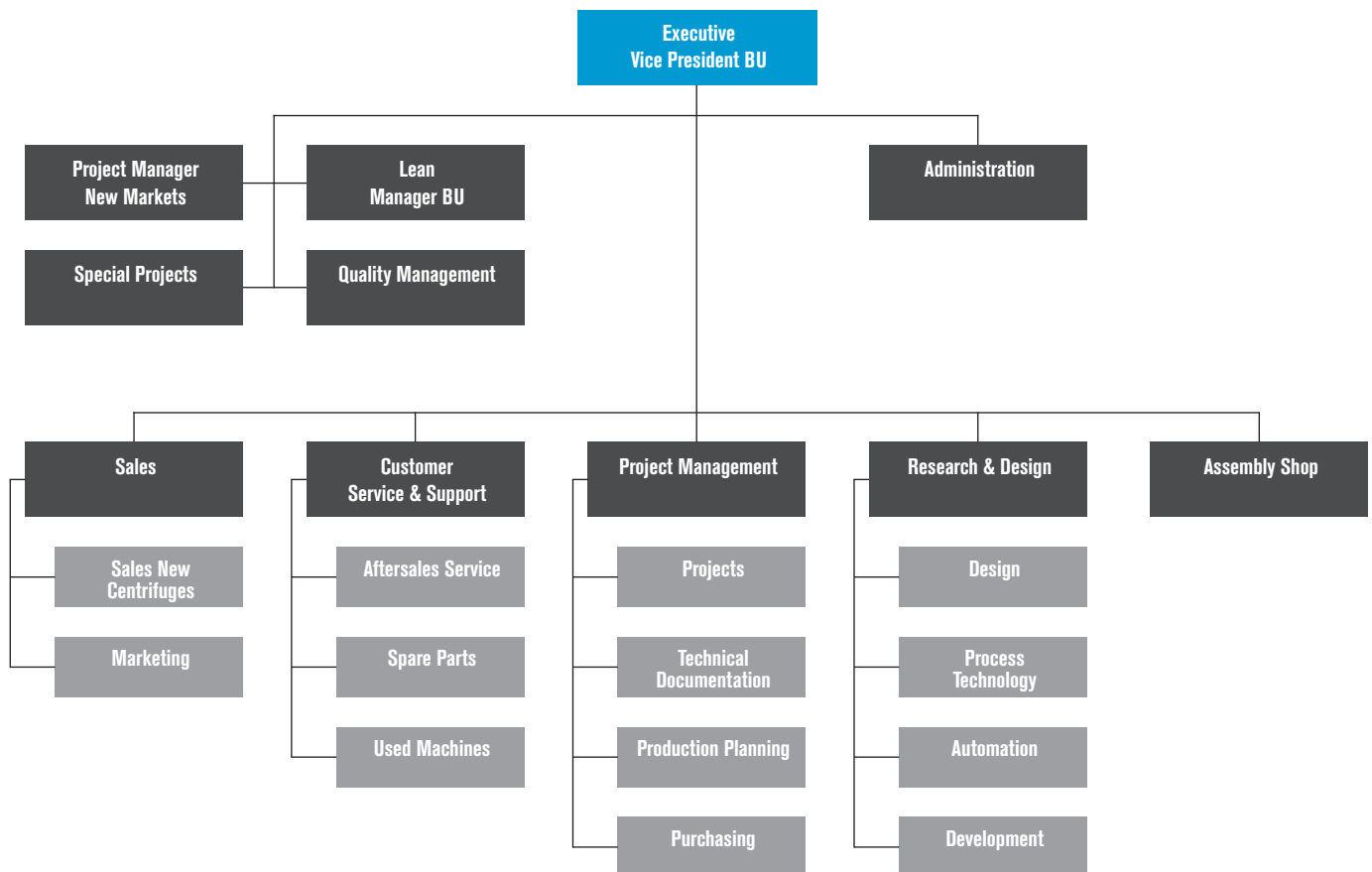
OUR MISSION

VISION

Our major objective is to maintain our position as one of the leading manufacturers and suppliers of high-quality, custom designed pusher and scraper centrifuges. We achieve this through a unique combination of experience, precision quality, a high degree of innovation and close customer contact.

- + Professional in dynamic separation
- + Custom built, intelligent solutions
- + Added value through in-house production and quality control
- + Environmentally sustainable
- + Lean manufacturing and assembly
- + Excellent service support

ORGANISATION



OUR COMPETENCE⁺ YOUR BENEFIT

SALES NEW MACHINES | Individual consultation

Area Sales Managers have appointed responsibilities for their sales regions. Together with a large number of Agents spread worldwide, fast and professional reaction to your enquiries is guaranteed. Back office support from our process engineers, controls and software engineers as well as our construction department ensure solutions that will fulfil your specifications and are complete in every way.

- + Agents local to your production site
- + Experienced, competent Area Sales Managers
- + Worldwide network
- + Customised solutions
- + Short reaction times



PROCESS TECHNOLOGY | Process orientated

Our process engineers configure the centrifuges and peripheral components to suit the specific application in accordance with your requirements. With more than 6200 centrifuges delivered, we can draw on extensive experience in the field of solid-liquid separation.

- + Product tests at our fully equipped laboratory
- + Product tests by our process engineers on the client's site
- + Pilot tests on your site
- + Commissioning of new installations
- + Optimisation of existing installations



PROJECT MANAGEMENT | Customised

From project start (kick-off) through acceptance test (FAT) at our factory to commissioning (SAT) on your site, our project managers guarantee professional project management. Together we will run through the various approval as well as project phases based on an agreed schedule.

Every client order is supported by a project manager in a customised way and using the shortest communication routes.

- + Personal contact
- + Short communication routes
- + Experienced, motivated team



RESEARCH AND DESIGN | Optimal solutions

In research and development, modern tools are used for design and simulation as well as prototypes for test runs and verification. Many designs and solutions developed are intellectual property of Ferrum who supplies

innovative designs and leading technology for a wide range of applications and processes. Profound knowledge and many years of experience together with an enormous database are essential for meeting customer expectations.

- + Continuous optimisation and improvements leading to top products
- + Modular design and standardisation of components allowing fulfilment of almost any customer requirements
- + State of the art automation solutions guarantee easy and safe operation and handling
- + Online monitoring and remote control to reduce costs and to increase efficiency and availability
- + Process technology as key competence for designing the right centrifuges

AUTOMATION | Reliable control

Automation of centrifuge systems is of central importance to Ferrum. Ferrum has invested many years into the development of centrifuge automation systems. Proven, standardised hardware and software modules are used as a basis and are supplemented with customer-specific elements. We use components from leading suppliers such as ABB, Siemens, Control Techniques, Bartec, Stahl, Pepperl+Fuchs, Pilz, etc.



- + Safety analyses, safety circuits
- + Design and assembly of control cabinets and operator panels
- + Regenerative breaking units
- + Connection to distributed control systems, remote maintenance
- + Documentation: diagrams, concept descriptions, instructions, safety certificates
- + Commissioning of complete systems on site
- + Modifications and upgrades of existing systems

ASSEMBLY SHOP | Precise and efficient

Innovation in the assembly shop means mainly staying ahead with technological progress. By optimising the centrifuges as well as improving processes we achieve the set goals. High-quality assembly of our centrifuges is guaranteed

- + with a flow assembly line to minimise throughput times and reduce delivery times
- + by avoiding waste as well as systematic problem solving with appropriate monitoring to lower costs and keep assembly as lean as possible
- + with an experienced team and permanent training
- + by cooperation and working as a team
- + by benchmarking to achieve highest standards
- + using a system of continuous improvement



DOCUMENTATION | Complete in every detail

With our centrifuges we supply detailed documentation fulfilling all directives and standards. This documentation includes documents to meet obligations as per customer specification (e.g. EN10204 - 3.1 Certification), various

documents to support DQ / IQ / OQ, As Built documents, data sheets, operating manuals as well as a detailed spare parts catalogues.



AFTERSALES SERVICE⁺ FAST AND RELIABLE

SERVICE

A large team of experienced service specialists as well as various service centres are available to our customers worldwide. This ensures we can provide a fast and uncomplicated service.

- + Prompt and uncomplicated support from our customer service team
- + Worldwide service centres
- + Maintenance, inspections, maintenance contracts based on BGR 500
- + Modifications, upgrades and integration of new drive and control systems
- + Customer-specific training



SPARE PARTS

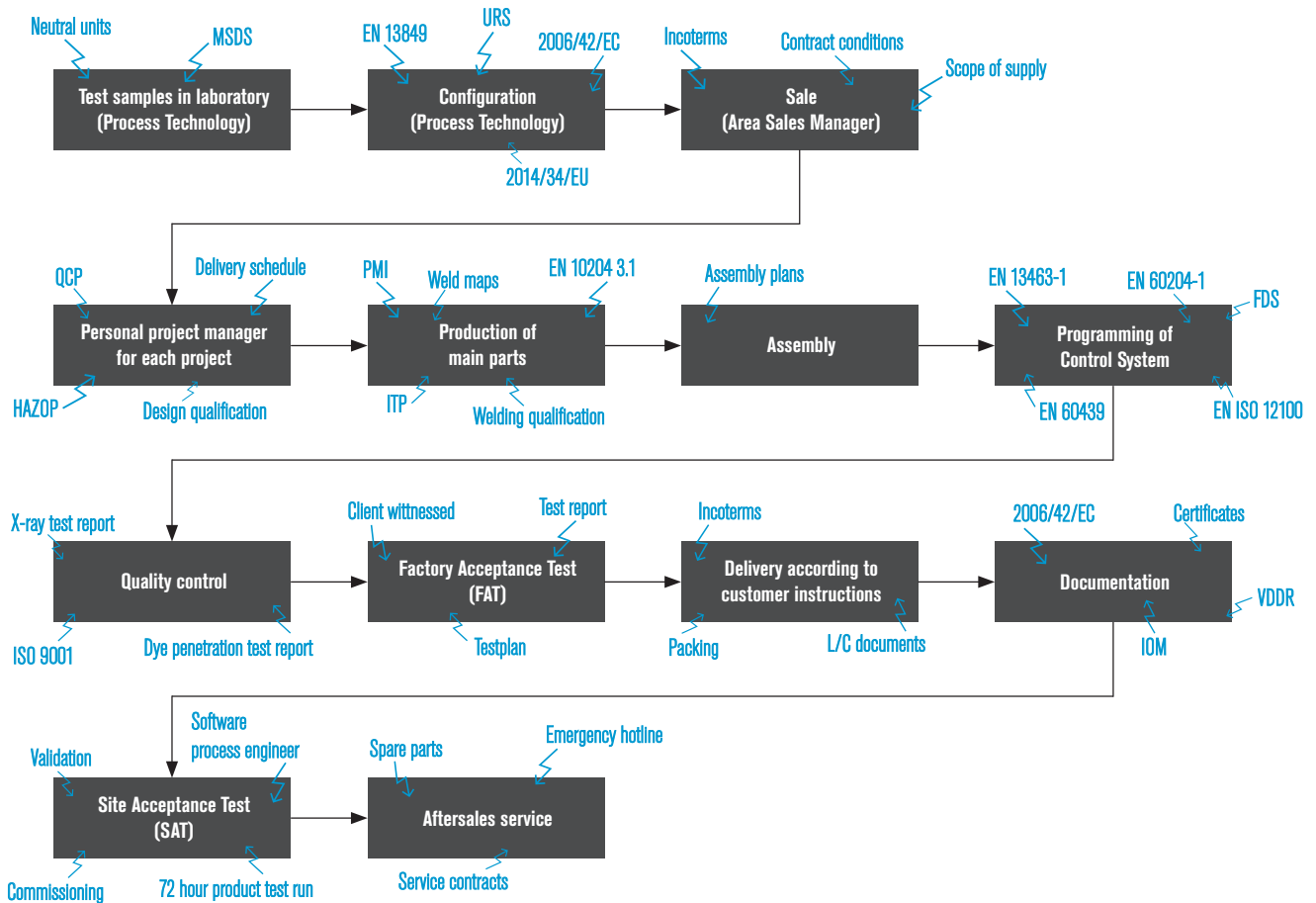
We maintain a large stock of spare parts at our factory in Schafisheim, Switzerland. Our inventory and careful stock management ensure high availability and short delivery times.

- + Large stock of spare parts
- + Fast delivery
- + Reliable service worldwide
- + Competitive prices
- + Top manufacturer quality
- + Original parts



+ EXPERTISE ALL UNDER ONE ROOF

Ferrum offers you customer-specific complete systems from a single source and, with its unique vertical range of manufacture, guarantees the highest quality without interface problems. We build our centrifuges and automation systems in-house; we also manufacture many of the mechanical components in our foundry and manufacturing department.

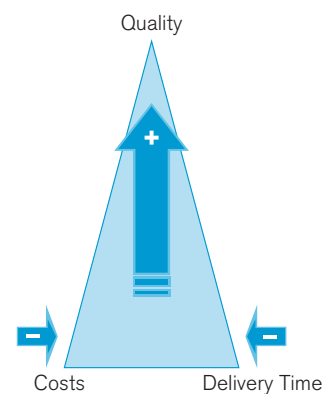


LEAN MANAGEMENT | Customer satisfaction

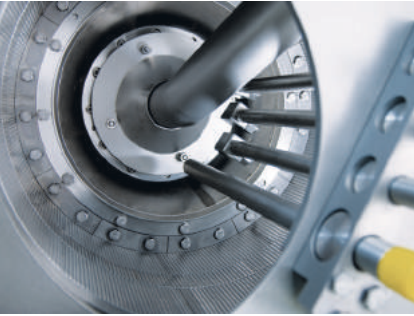
With continuous improvement processes and timely development steps we achieve best customer satisfaction and comply with highest international industry standards. By supervising processes and key data we guarantee consistent, high-quality products and services.

- + High customer satisfaction
- + Best quality
- + Shortest delivery times
- + Lowest costs

ferruLean⁺



INNOVATION⁺ ONE STEP AHEAD



THICKENING CONE

Integrated thickener | For pusher centrifuges developed and patented by Ferrum

- + No need for separate external pre-thickening
- + High efficiency on a small filtration area
- + Compensation of fluctuating feed concentrations
- + Improved cake formation
- + Vibration-free centrifugation

PULSED WASHING

Conventional washing | Continuous jet of wash liquid sprayed onto product

Pulsed washing | Discontinuous (pulsed) jet of wash liquid sprayed onto product

- + Higher product purity
- + Lower wash liquid consumption
- + Lower solubility losses
- + Lower energy consumption

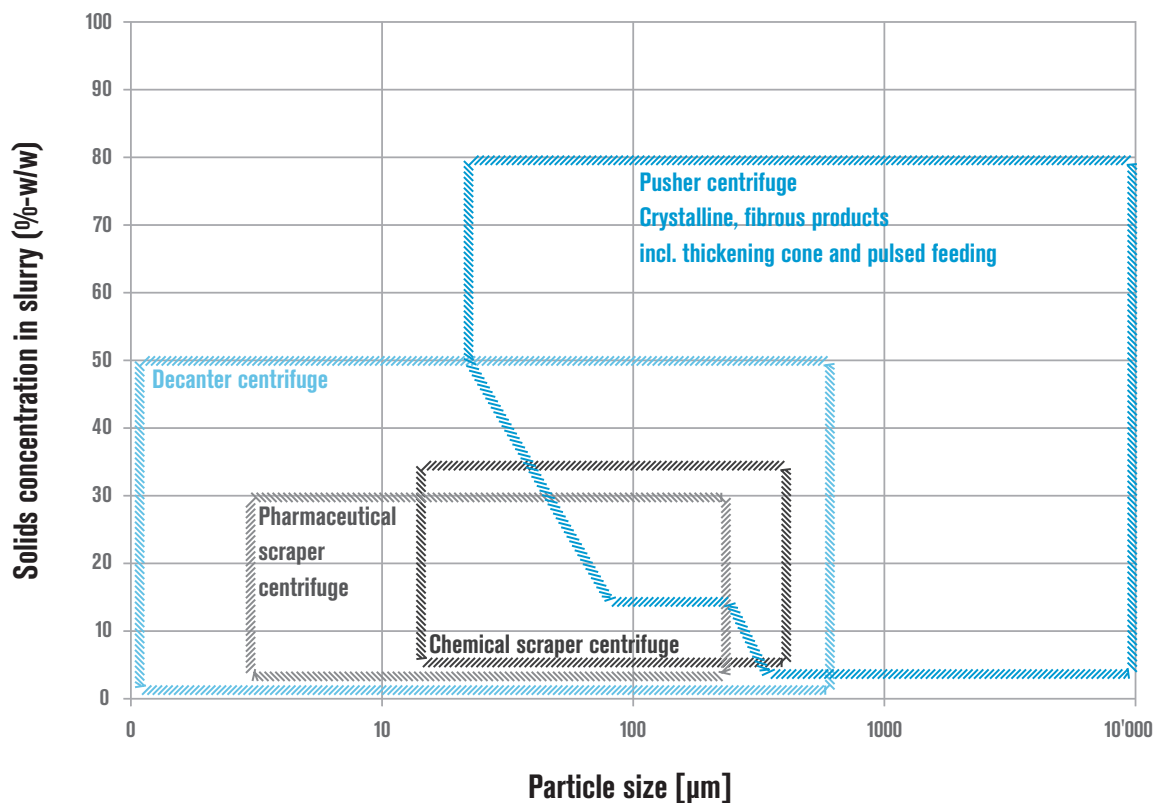


METALLIC FILTER CLOTHS FOR SCRAPER CENTRIFUGES

Metal fibre fabrics | Alternative filter media with many benefits

- + Very robust
- + Reduced residual heel
- + Long service life
- + Easy installation
- + Complete upgrade kit for many baskets
- + Available in stainless steel 1.4404 and hastelloy 2.4602 (others on request)

+ CENTRIFUGE TECHNOLOGY OPERATION RANGES



- + Each type of Ferrum centrifuge has an optimal operating range with regards to particle size and solids concentration.
- + For larger particles and higher solid concentrations, a continuously operating pusher centrifuge can be considered.
- + For small particles and low solid concentrations a discontinuously operating scraper centrifuge or a decanter centrifuge should be considered.

APPLICATIONS⁺ SPECIFIC DESIGNS

CHEMICAL INDUSTRY

Chlorides | Sodium chloride | Sea - Lake - Evaporator salt | Potassium chloride | Ammonium chloride | Trichloroisocyanuric acid | Sodium dichloroisocyanurate

Sulphates | Sodium sulphate anhydride | Sodium sulphate decahydrate | Gypsum | Potassium sulphate | Magnesium sulphate | Ammonium sulphate | Iron sulphate heptahydrate

Chlorates | Sodium chlorate | Potassium chlorate

Nitrates | Sodium nitrate | Potassium nitrate | Lysine

Urea | Different processes

Intermediate Products | Sodium bicarbonate crude | Sodium carbonate monohydrate | PAP P-aminophenole

Fibrous Products | Nitrocellulose Chips - Fibres | CMC

Various | Calcium tartrate



FINE CHEMICAL AND PHARMACEUTICAL INDUSTRY

Fine Chemicals | Sodium bicarbonate refined | Pigments | Herbicides, insecticides | Sodium cyanide | Carbofurans

Pharmaceuticals | Antibiotics, APIs | Intermediates

Vitamines | A, E

Foods | Amino acids

Starch | Various



MINERAL PROCESSING

Mining | Rock phosphate | Rock salt (NaCl), Sea salt | Potassium chloride from Flotation

PETROCHEMICAL INDUSTRY

Basic Products | Adipic acid | Bisphenol A | Caprolactam | Paraxylene | ABS, MBS | Polyethylene | PP | MEG reclamation



+ PRODUCT RANGE OVERVIEW

PUSHER CENTRIFUGES



PM-23 | Simple and robust

Low maintenance costs due to mechanical pusher drive

P-32 - P-120 | Proven and efficient

Based on the Sulzer Escher Wyss design - consistently improved and developed



DECANTER CENTRIFUGES



ZDC-20 - ZDC-140 | Compact and reliable

Optimised flow characteristics for minimal energy consumption



HORIZONTAL BASKET CENTRIFUGES



HPZ 630 - 1600 | Highest purity

Suitable for pilot plants as well as for production plants in the demanding pharmaceutical industry

HCZ 1000 - 2000 | Durable performance

Specially designed for high throughput and continuous operation under toughest conditions in the chemical and fine chemical industry



VERTICAL BASKET CENTRIFUGES

VTC 630 - 1600 | Batch discharge

Manual discharge, with filter bag or with suction system



VBC-C 1250 - 1600 | High flexibility

For different applications, with specific options and systems for every budget



VBC-W 1000 - 1600 | Modular

For many application areas thanks to modularity and comprehensive range of optional equipment.



VBC-S 1000 - 1250 | Swivel open

Especially designed for the use in the demanding pharmaceutical industry



SPECIAL DESIGN CENTRIFUGES

VGC 1250 - 1600 | Latest design

Separation of gypsum from wet FGD systems



VTC-M 320 - 400 | Compact and mobile

Combination of centrifuge, control system, drive components and inertisation system in a turnkey mobile unit



VTC-I 320 - 400 | HAPI

Specially designed for use in an isolator for highly toxic substances without contamination of the next process step



+ PERIPHERAL ELEMENTS RISK-FREE OPERATION

Ferrum supplies various peripheral components that are required for the operation of the centrifuge. If necessary, these components can be integrated into the customer's or Ferrum's control system.



- + Various valves and butterfly valves
- + Flexible connections and flow sight glasses
- + Siphons and pressure relief valves to ensure the nitrogen overpressure is maintained in the centrifuge
- + CIP collectors and valves for the regulation of the CIP cleaning cycles
- + Collectors on the centrifuge for the distribution of instrument air, nitrogen and hydraulic oil
- + Pilot valve blocks for the control of various system parts
- + Dosing devices and agitators below static thickeners
- + Hydrocyclones to thicken suspension prior to the centrifuge feed

INERTISATION SYSTEMS⁺ ABSOLUTE SAFETY

INERTOSAFE® SIL 2

- + Validation according to SIL 2 (EN 61511)
- + Validation certificates included



INERTOSAFE® PL d

- + Validation according to PL d (EN 13849-2)
- + Validation certificate included

+ **USED CENTRIFUGES** **RELIABLE AND SAFE**

NEARLY AS GOOD AS NEW

Used centrifuges offer an interesting alternative to new machines. As the original supplier our years of experience are at your disposal. We offer consultation and support to implement customer-specific requirements.

- + Know-how from the original equipment manufacturer
- + Safe operation and fulfillment of all current regulations
- + Short delivery time and 12 month guarantee
- + Complete overhaul
- + Application-specific modifications
- + Detailed documentation



WORLDWIDE



1 BRAND – 3 BUSINESS UNITS



CANNING TECHNOLOGY



CENTRIFUGE TECHNOLOGY



MANUFACTURING