



ferrum

CENTRIFUGES: THE HEART OF YOUR PROCESS
UNLOCK EFFICIENCY AND LOWER YOUR COSTS



Salt (NaCl)

30'000 TONS PER HOUR SALT PRODUCTION POWERED BY FERRUM

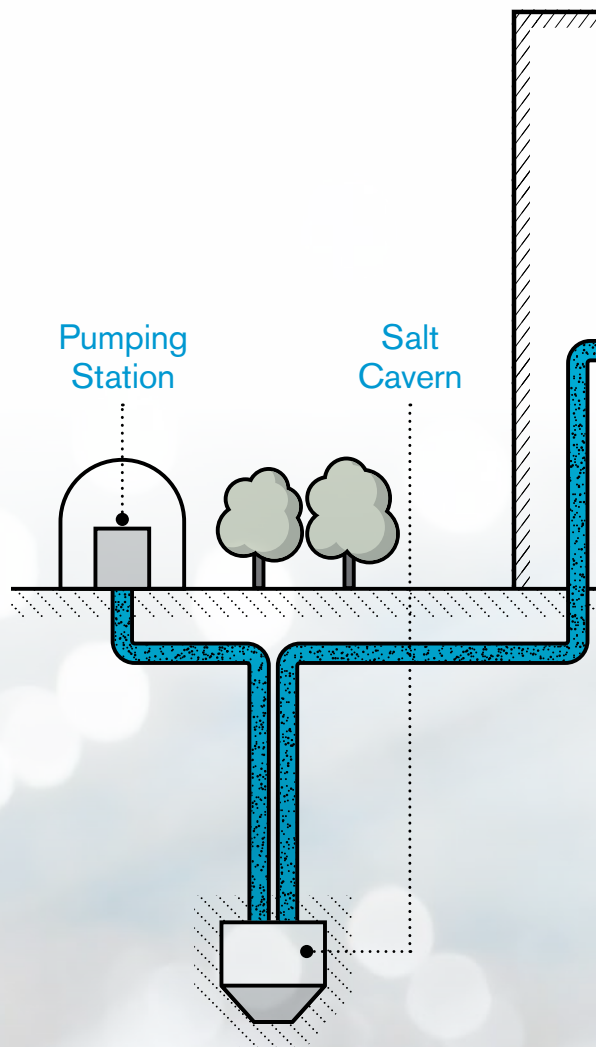
Sodium chloride is extracted from various sources such as rock salt, solution mining, sea salt, etc.

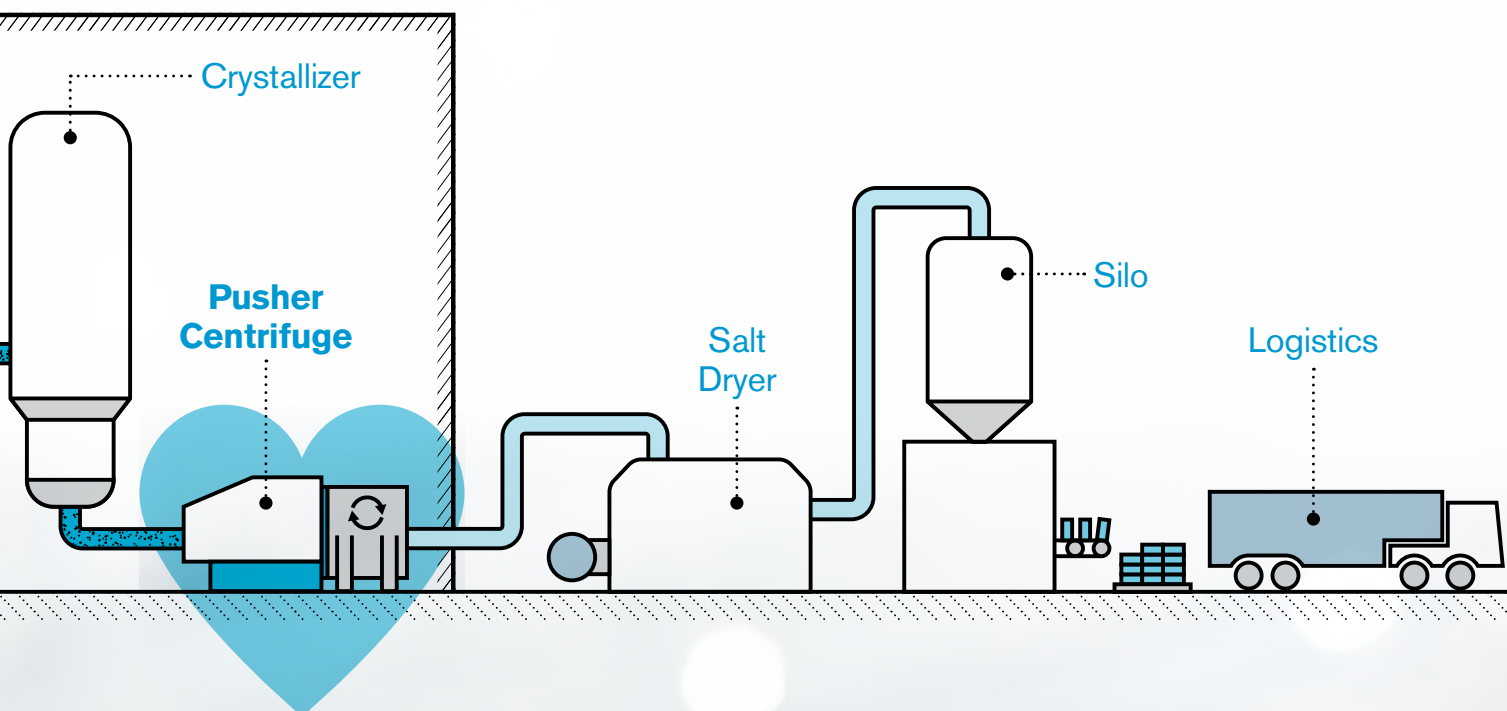
In rock salt, the solid salt is extracted manually from underground deposits, while in solution mining, water is injected into the underground salt deposits, creating brine, which is then evaporated.

In solar evaporation, solar energy is used to evaporate water from sea salt, leaving behind salt crystals.

Worldwide 30'000 t/h salt is produced with Ferrum centrifuges.

Below is a general description of the solution mining method, whereby the centrifuge plays an important role in the processing:





**PROCESS HEART, BLUE BLOOD:
WHERE EVERY SPIN
INFUSES FRESHNESS AND
PURITY WITH CARE**

The slurry, as the process' «blue blood», holds essential ingredients for quality separation. The centrifuge, acting as the heart, spins it into purity, driving efficient and precise separation at the core.

ENHANCE PRODUCTIVITY AND CUT YOUR COSTS WITH EXPERT SOLUTIONS

Identifying and addressing processing challenges – such as consistent residual moisture levels, minimizing crystal breakage, and achieving optimal purity – is at the forefront of our operations. Ferrum's comprehensive approach significantly reduces operational costs and boosts efficiency.



HIGH PURITY

Innovative washing and multi-stage design ensure top purity with minimal water – without increasing your costs.



EFFICIENT PROCESSING

Gentle feeding, precision sieves and smart mechanics protect crystal quality, reduce moisture and boost your yield.



LOW TCO

Robust design and integrated pre-thickening handle variable feeds with minimal wear – for low costs and long life.



OPERATIONAL EXCELLENCE

With ferruCare and smart monitoring, you benefit from 100 years of expertise – for efficient, stable and perfectly balanced operation.

YOUR BENEFITS AS AN END USER COMPANY



PAIN POINT CLIENT

FEATURE FERRUM

BENEFIT CLIENT

1

- **Managing product fluctuations** along with irregular demand, creates a constant challenge that requires operational flexibility

- Reliable performance under varying operating conditions
- High and consistent throughput
- Low product humidity
- Minimal filtrate and particle loss
- Reduced crystal breakage for coarse products improves overall product quality
- Predictive sensors ensure data-driven operational insight

- Built-in performance buffer allows for flexible adaptation to demand changes
- Consistent output quality thanks to precise and stable machine performance
- High-quality end product enhances value and customer satisfaction

2

- **Constant market pressure to keep salt production costs low**

- Optimally designed machine parts (Hydraulic system, motors) ensure lowest possible energy consumption
- Smooth and trouble-free operation ensures high uptime
- On-time delivery of Spare / wear parts needed for uninterrupted operation

- No unplanned downtime to maximize operating time
- Lower energy consumption significantly reduces running costs
- Familiarity with machine and parts simplifies daily handling
- Great reputation with end customers thanks to consistent product quality and reliability

YOUR BENEFITS AS A LARGE ENGINEERING COMPANY



PAIN POINT CLIENT

FEATURE FERRUM

BENEFIT CLIENT

1

- **Strong cost pressure** from intense market competition requires meeting financial targets even after services are sold and revenue is already booked

- Ferrum as OEM machine manufacturer delivers not only the hardware, but also required services as start-up and after sales, troubleshooting expertise
- Proven, robust machine ensures long-term reliability
- Equipped with sensors for predictive maintenance and optimized operation

- Technical standards and delivery deadlines are met reliably
- Ferrum's strong brand reputation builds trust with stakeholders
- Ferrum supports customers proactively in solving operational challenges

2

- **Warranty obligations** must be secured over the medium term

- Ferrum consistently fulfils extended warranty commitments

- No additional follow-up effort for the customer

3

- **Limited flexibility** due to already sold plant components

- Customer's standards and specifications are met immediately

- Project planning becomes smoother and more practical

4

- **Suppliers must meet all technical specifications** to ensure comparability and compatibility

- Ferrum guarantees full compliance with customer-specific and industry requirements

- Significantly less effort to keep up with compliance regulations

YOUR BENEFITS AS A SMALL ENGINEERING COMPANY



PAIN POINT CLIENT

FEATURE FERRUM

BENEFIT CLIENT

1

- **Meeting delivery deadlines** is critical for project success and client satisfaction

- Ensure specifications and delivery times are met

- The supplier responds flexibly to additional requests and changes during the process

2

- **Reliable suppliers are essential** to meeting established guarantees

- Ferrum ensures full compliance with contractually agreed guarantees

- Standards and specifications are met precisely and on time – ensuring smooth project flow

3

- **Cash flow must be managed carefully**, especially in smaller projects

- Ferrum's solution is tailored for niche markets with targeted performance and scale

- Thanks to Ferrum's customization capabilities all client requests can be fulfilled 100 %

4

- **Financial targets** must still be reached even after services are sold and contracts are in place

- Ferrum offers proven machines with familiar interfaces, enabling seamless project replication

- Customers prefer buying the same machine again – reducing risks, saving time and lowering training effort

CUTTING-EDGE TECHNIQUES

CORROSION



TESTING



SOLID / LIQUID SEPARATION

$$q_f = \frac{\Delta p}{\eta_f h_c} \frac{1}{\rho_s (1 - \varepsilon)} \frac{1}{\alpha}$$

$$\frac{P_{c,s} \Delta p (\Delta p_{c,s})}{\eta_f \nu h_{c,s}} = \frac{P_{c,s} h_c}{P_{c,s} h_{c,s}} + \frac{P_{c,s} h_{c,s}}{P_{c,s} h_{c,s}}$$

DATA ANALYTICS

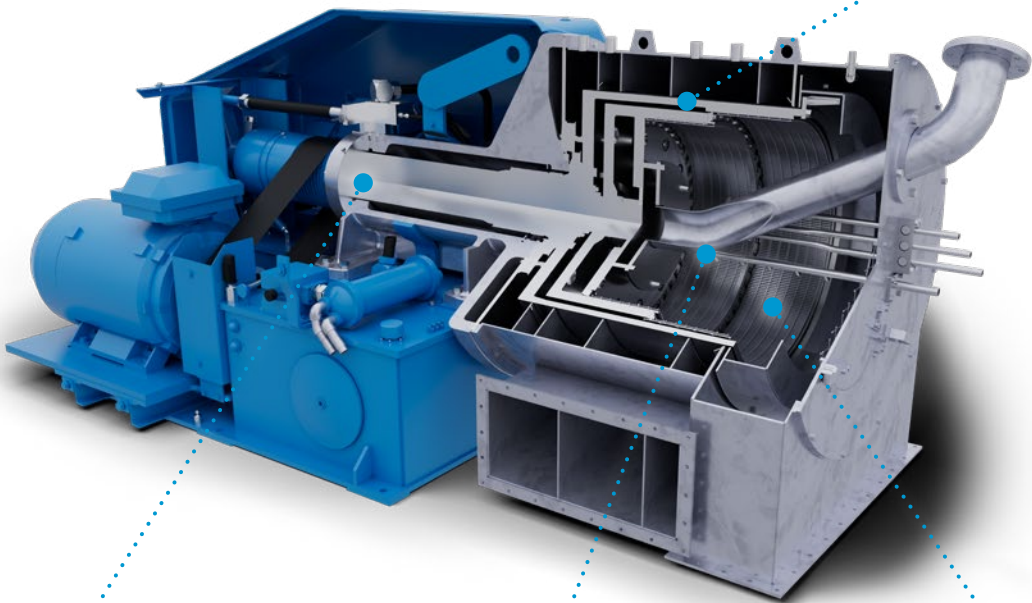
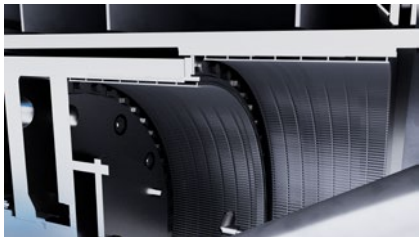


LEVERAGING EXPERIENCE FOR SALT

Almost 100 years of hands-on expertise serve as our guiding compass, enabling us to skillfully navigate and refine traditional extraction processes to achieve unparalleled operational performance and product purity.

DURABLE DESIGN

Our durable designs ensure high machine availability. This guarantees long operational lifespans with minimal interruptions.



INNOVATIVE MECHANISM

A precisely adjustable system tailors processes to meet specific requirements. This maximizes performance and enhances efficiency.



PRE-THICKENER (OPTION)

With a solid concentration as low as 15%, no additional upstream equipment is required. This saves resources and reduces capital costs.



EFFICIENT PROCESSING

Our optimized processes achieve superior purity while delivering high yield. Efficiency and quality are always the top priorities.

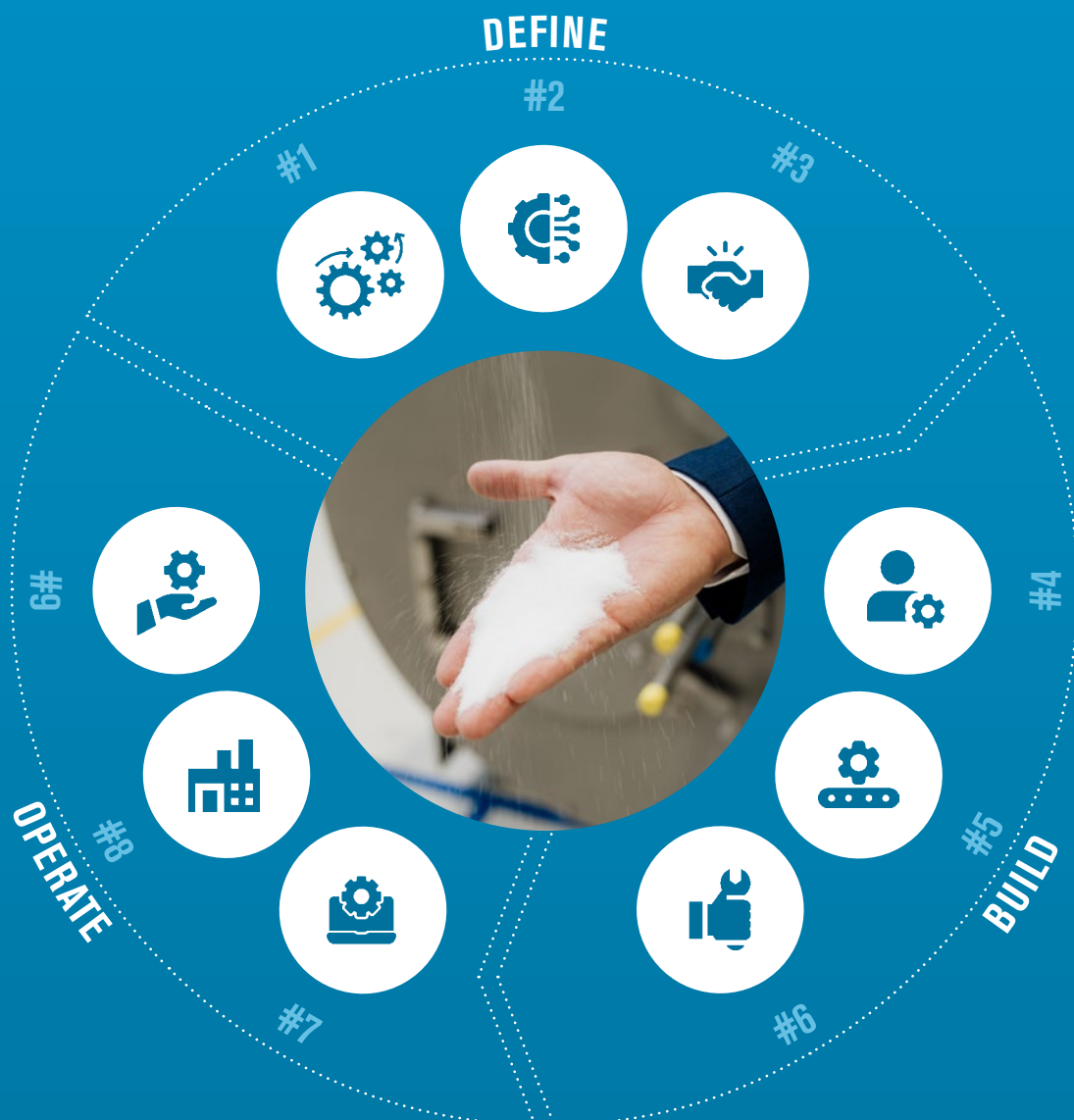


360° METHODOLOGY FOR EXCELLENCE

Our dedication to process optimization shines through our meticulous approach, seamlessly blending data analysis, technical evaluations, and focused experimentation. The result is a suite of solutions tailored specifically to the unique demands of NaCl production.

DEFINE

- #1 TEST SAMPLES IN LABORATORY
- #2 MACHINE CONFIGURATION BY PROCESS ENGINEERING
- #3 SALE OF PERFECT-FIT MACHINE FOR PEAK EFFICIENCY



OPERATE

- #7 FACTORY ACCEPTANCE TEST (FAT)
- #8 SITE ACCEPTANCE TEST (SAT)
- #9 CUSTOMER SUPPORT (ferruCare Centrifuges)

BUILD

- #4 PROJECT MANAGER AS A SINGLE POINT OF CONTACT
- #5 IN-HOUSE MANUFACTURING OF CRITICAL PARTS
- #6 ASSEMBLY

FERRUM CENTRIFUGES: YOUR TRUSTED SOURCE FOR QUALITY SALTS

The salt we provide originates from the precise separation process conducted by our Ferrum centrifuges. This process ensures a high level of purity and quality in the salt crystals.

Each crystal undergoes meticulous separation and purification, resulting in a product that reflects our commitment to precision and excellence in production.

From the centrifuge chamber to various applications, our salt represents a reliable and high-quality choice for diverse uses.



DE-ICING ROAD SALT

The salt extracted from rock salt mines is primarily used for de-icing purposes. High purity is not required and it contains large particles.

Ferrum centrifuges with in-house manufactured screens and a state-of-the-art pusher mechanism offer a perfect combination of throughput and residual moisture.



CHEMICAL INDUSTRY SALT

Salt is essential for chlor-alkali processes, soda ash production, and other industrial uses. High purity and high quality salt is of utmost importance. Ferrum centrifuges are designed to meet the required high purity and quality standards with minimal crystal breakage, low filtrate loss and constant residual moisture.



FOOD GRADE SALT

A person needs about 3–5 g salt per day. The salt must meet food safety standards and shall be of high-purity.

The solution mining and sea salt method is generally used to extract food grade salt. The construction of our centrifuges guarantees safe cleaning and the innovative design allows maximum performance to meet the safety standard.

FERRUM PROCESS SYSTEMS

ALWAYS WITHIN REACH



- LOCATIONS
- REPRESENTATIVES
- SERVICE PARTNER

FERRUM PROCESS SYSTEMS LTD.

Industriestrasse 11
5503 Schafisheim
Switzerland
T +41 62 889 14 11
centrifuges@ferrum.net

FERRUM PROCESS SYSTEMS (KUNSHAN) CO., LTD.

No. 329, Jujin Road, Zhangpu Township
215321 Kunshan City, Jiangsu Province
P.R. China
T +86 512 3662 5403
centrifuge@ferrumchina.com

FERRUM PROCESS SYSTEMS INC.

9499 Old Bailes Rd. Suite 216
Fort Mill, SC 29707
USA
T +1 877 933 3778
sales@ferrumus.com

FERRUM POLAND SP. Z O.O.

ul. Powstańców Wlkp. 23
64-510 Wronki
Poland
T +48 67 25 40 561
contact@ferrum.net

FERRUM TECHNOLOGIES INDIA PVT LTD.

W - 29D, Additional Ambarnath MIDC
Ambarnath - 421 506
India
T +91 251 262 0202
nitin.kamble@ferrumin.com



LEARN MORE ABOUT
FERRUM CENTRIFUGES

► ferrum.net/centrifuge



CONTACT OUR CENTRIFUGE
EXPERTS WORLDWIDE

► ferrum.net/centrifuge-contact

Ferrum Process Systems Ltd. | Industriestrasse 11 | 5503 Schafisheim | Switzerland
T +41 62 889 14 11 | centrifuges@ferrum.net | ferrum.net