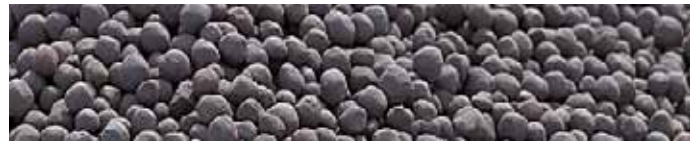


# Preparation Technologies for Metallurgy



# Tailor-made solutions – effective and trendsetting

EIRICH supplies technologies for the economical preparation of raw materials, auxiliary materials and residues for recycling and disposal. The product line includes not only machinery and systems but also a full range of services covering everything from consulting to start-up.

With locations in Germany, France, Russia, Ukraine, USA, Brazil, Japan, China, India, South Africa as well as agencies in over 60 other countries, we are always close at hand with our know-how accumulated from countless projects worldwide.

## Processes

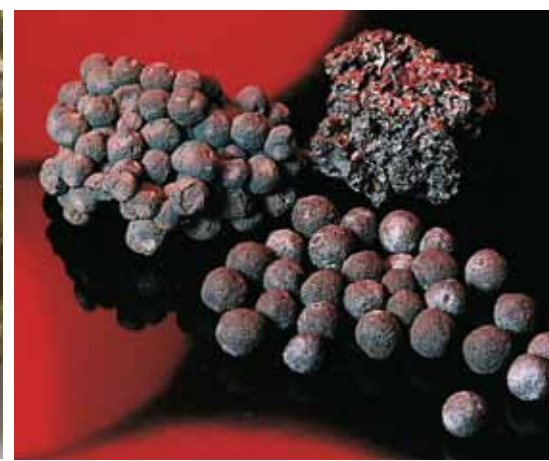
EIRICH typically uses the following processes for its tailor-made solutions:

- Mixing
- Homogenizing
- Fine grinding
- Pelletizing
- Agglomerating
- Plasticizing
- Drying

## Core applications

- **Preparation of pellets and micropellets**
- **Sinter mix preparation**
- **Recycling of valuable residues**  
like dusts, ashes, sludges, slurries
- **Fine grinding**
- **Preparation of carbon paste**  
for graphite electrodes, anodes, cathodes
- **Coal preparation**







# Machines and systems

Our production range covers an extensive selection of highly reliable machines, components and complete systems for continuous and batch operations:

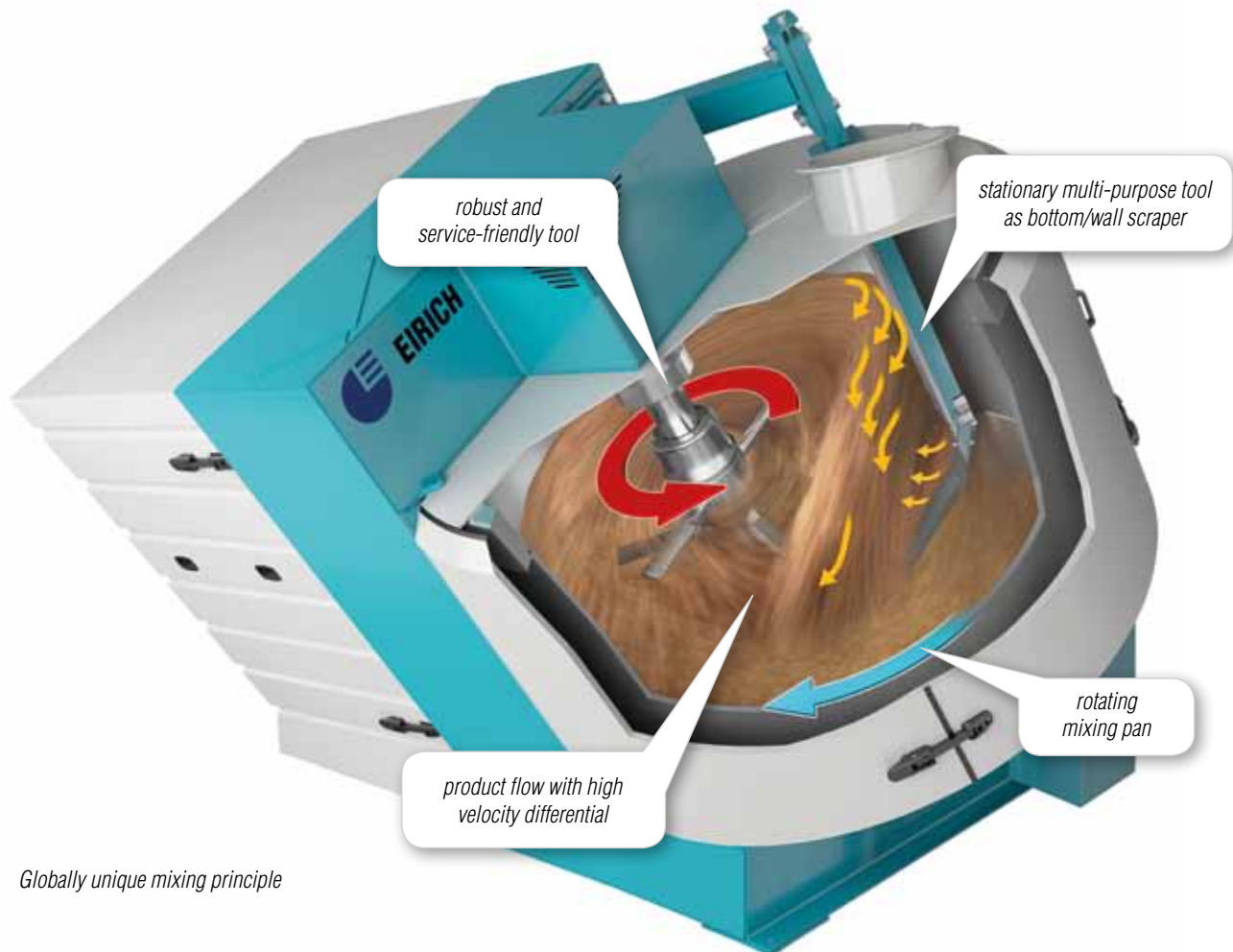
- Intensive mixers
- Mix pelletizers
- EVACTHERM® vacuum mixers and dryers
- Feeding and weighing equipment
- TowerMill vertical agitated media mills

Stand-alone machines and complete preparation systems are available for capacities from approx. 15 t/h to 1,400 t/h in a single production line.

For quality assurance and/or research and development applications, there are laboratory mixers with working capacities starting from 1 liter as well as complete laboratory systems for reliable scale-ups. Measuring and control technologies, from software development to complete control and computer-aided process control systems, complete the product line.

## **EIRICH machines and systems provide:**

- High-intensity mixing
- Exceptionally high availability
- Easy maintenance conditions and worldwide service



*Globally unique mixing principle*



*DW40 intensive mixer  
for capacities up to  
1,400 t/h*



*DW40 intensive mixer  
inside*

# Machine types

EIRICH intensive mixers are characterized by their unique mixing principle and display outstanding performance and flexibility. For many years, leading producers in the metallurgy have relied on the service-proven solutions from EIRICH for both continuous and batch processes.

The special characteristics of the EIRICH intensive mixers are:

- a rotating mixing pan
- a stationary bottom/wall scraper
- one to four high-speed rotors in an eccentric position relative to the center of the mixing pan

## Unique mixing principle of the EIRICH intensive mixer

A rotating mixing pan continually conveys the materials to the rotating mixing tool. This cycle is supported by the bottom/wall scraper which deflects the mix and conveys it into the area of the rotor. The extremely effective fine mixing that takes place at the high-speed rotor is thus super-imposed on the rough mixing performed by the bottom/wall scraper.

## EIRICH intensive mixers are service-friendly, extremely wear-resistant and highly reliable:

- Drives and gear units are positioned outside the mixing pan
- Wearing parts are easy to replace
- Easy access to the inside of the mixing chamber for maintenance work is guaranteed
- Even a fully loaded mixer can be restarted

## Just the right size for all performance classes

The EIRICH range of mixers includes sizes from 1 to 12,000 liters, meeting user-specific requirements with great efficiency. In many cases, various applications can be performed in succession, step by step, in one and the same mixer.



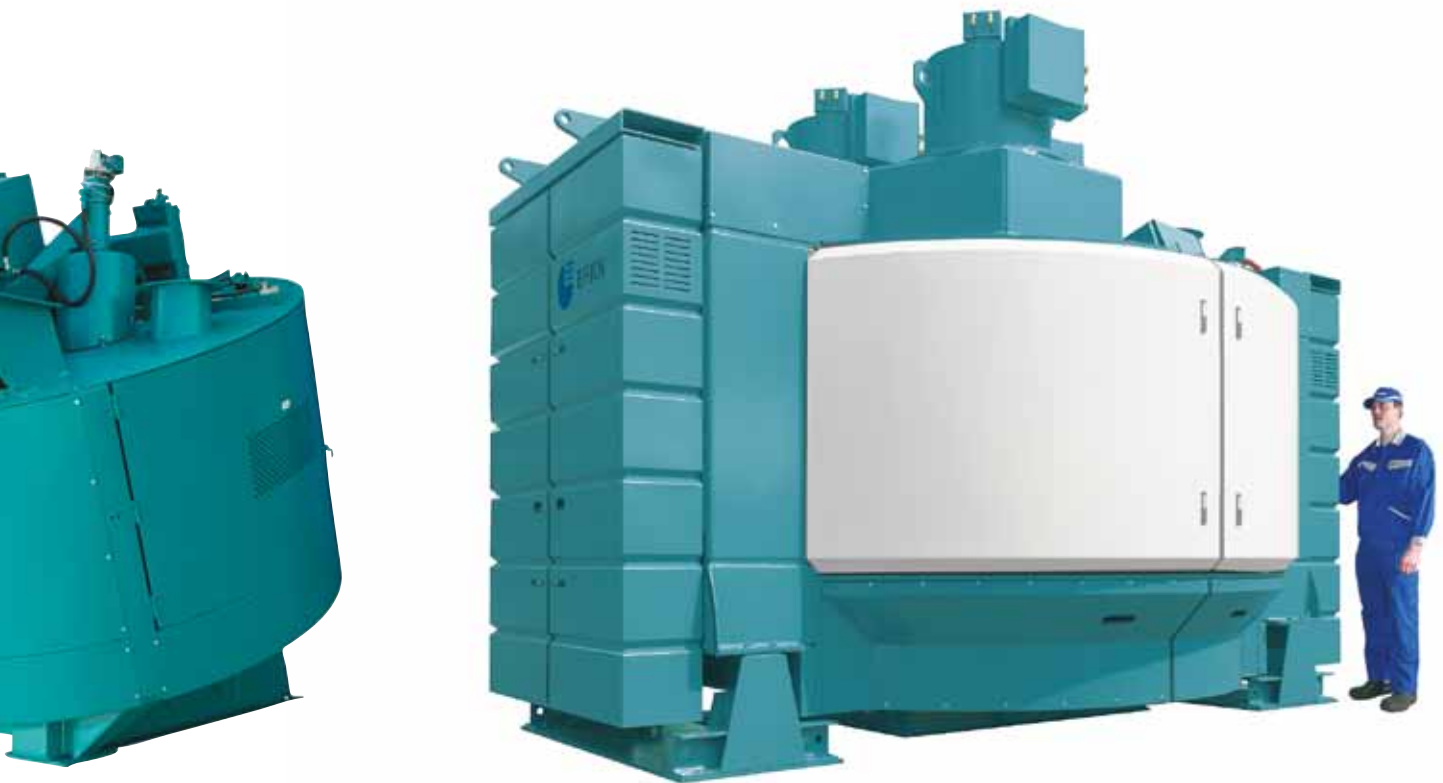
1 liter



400 liters



Mixer type	Capacity (max.)		Installed power kW (max.)	
	Liter	Kilogram	Rotor	Mixing pan
EL1	1	1.6	0.88	0.17
R01	5	8.0	3.8	0.88
RV01	10	16	5.2	0.88
R05T	40	65	15	1.5
R09T	150	240	22	5.5
R12	250	400	55	7.5
RV12	400	650	75	9.2
R16	600	960	55	12
RV16	900	1,440	75	15
R19	1,125	1,800	75	18.5
RV19	1,500	2,400	90	22
R24	2,250	3,600	110	2 x 18.5
RV24	3,000	4,800	132	2 x 22
R28/40	4,000	6,400	1 x 110 1 x 90	2 x 18.5
R28/50	5,000	8,000	1 x 132 1 x 110	2 x 22
RV28/50	5,500	8,800	1 x 132 1 x 110	2 x 22
R33/60	6,000	9,600	2 x 132	2 x 22
R33/70	7,000	11,200	1 x 160 1 x 132	2 x 30
R33/80	8,000	12,800	2 x 200	2 x 30
DW40	12,000	19,200	4 x 160	2 x 45



3,000 liters

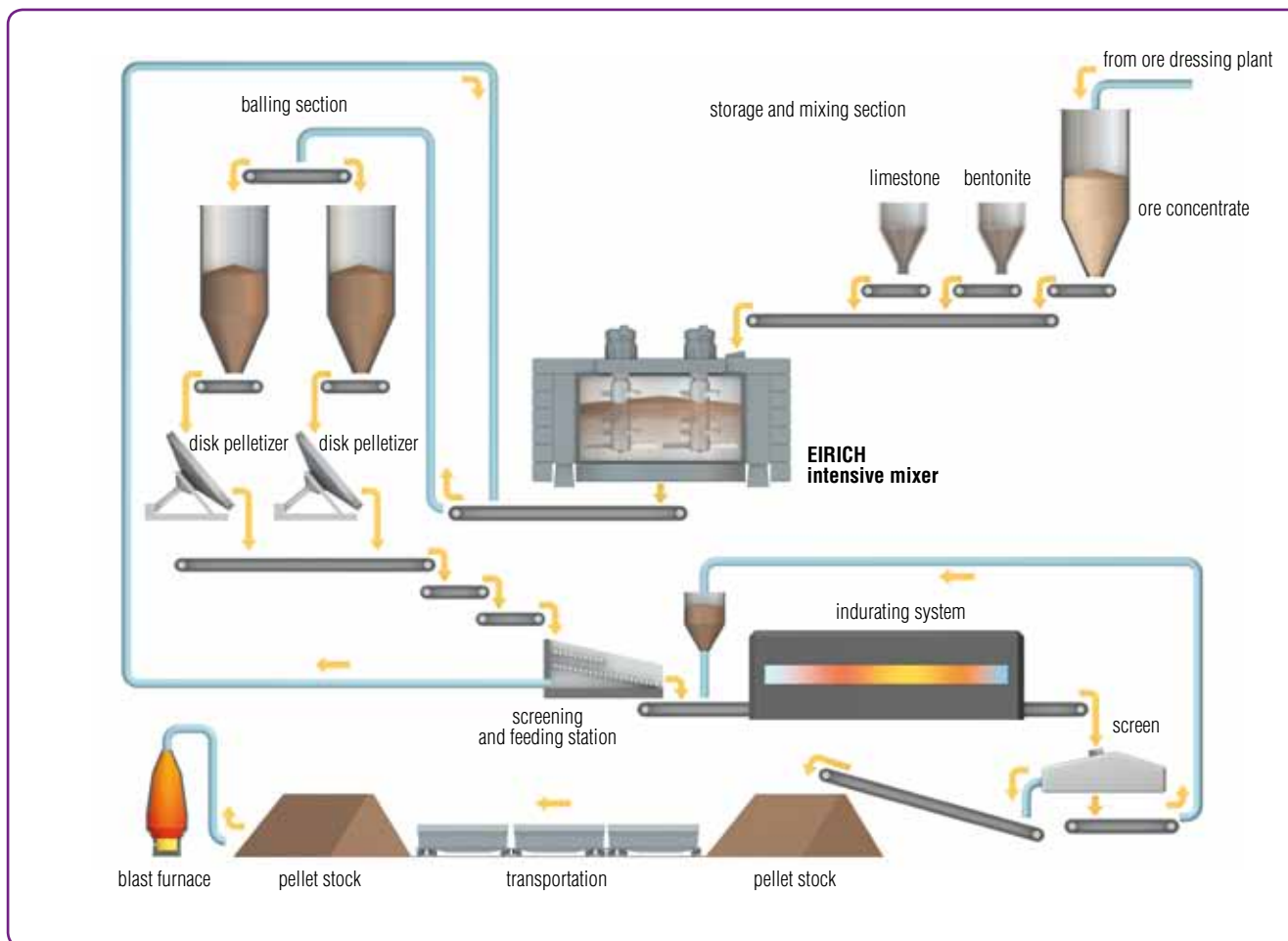
12,000 liters

# Preparation of pellets and micropellets with the EIRICH intensive mixer

In the preparation of material for the production of green pellets, binding agents (e. g., bentonite) and sometimes aggregates (e.g., limestone, dolomite) are added to and mixed with the fine ore.

EIRICH intensive mixers perform this preparation in continuous duty with the following important advantages:

- Low consumption of binding agents
- Reduced energy requirement
- Higher green strength of pellets with a low recycling quota
- High and constant homogeneity of material at throughput rates up to 1,400 t/h
- High operational reliability with little maintenance
- Narrow grain size range / uniform quality
- Low wear



## Smelting and direct reduction

The EIRICH intensive mixer also improves the efficiency of smelting and direct reduction plants, irrespective of whether a shaft furnace, rotary kiln, fluidized bed or smelting reactor is used.

For the production of sponge iron briquettes, a material mix of high and stable homogeneity is required. EIRICH intensive mixers meet this requirement reliably.





**System in operation at:  
LKAB, Sweden**

# Preparation of sinter mix with the EIRICH int

A worldwide trend that can be noted is the ever-increasing portion of fine and ultrafine iron ores that are mined for use in the iron and steel industry.

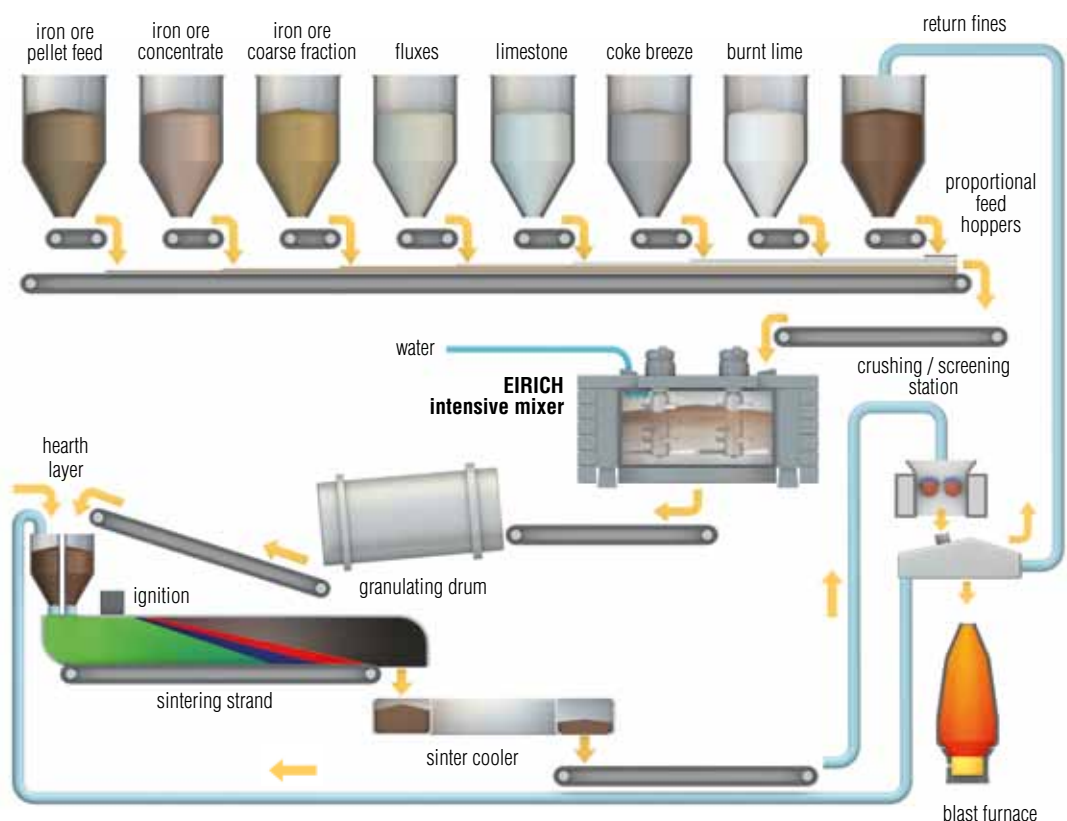
Existing sinter plants, however, are not capable of efficiently processing larger quantities of undersized ore fractions. Extremely fine iron ores must normally be pelletized prior to charging into a blast furnace.

This incurs increased iron-making costs compared to ore agglomeration by means of sintering. In answer to the wish of sinter producers to use higher portions of fine and ultrafine iron ore in the sinter raw mix, an intensive mixing and microgranulation system is mandatory for an economical sintering. Therefore, EIRICH offers two alternative solutions.

## Alternative A:

### EIRICH intensive mixer and locally provided granulating drum

Especially for revamping of existing sinter plants



**System in operation, e.g., at:**  
**Dragon Steel, Taiwan / ArcelorMittal, Belgium**



# ensive mixer

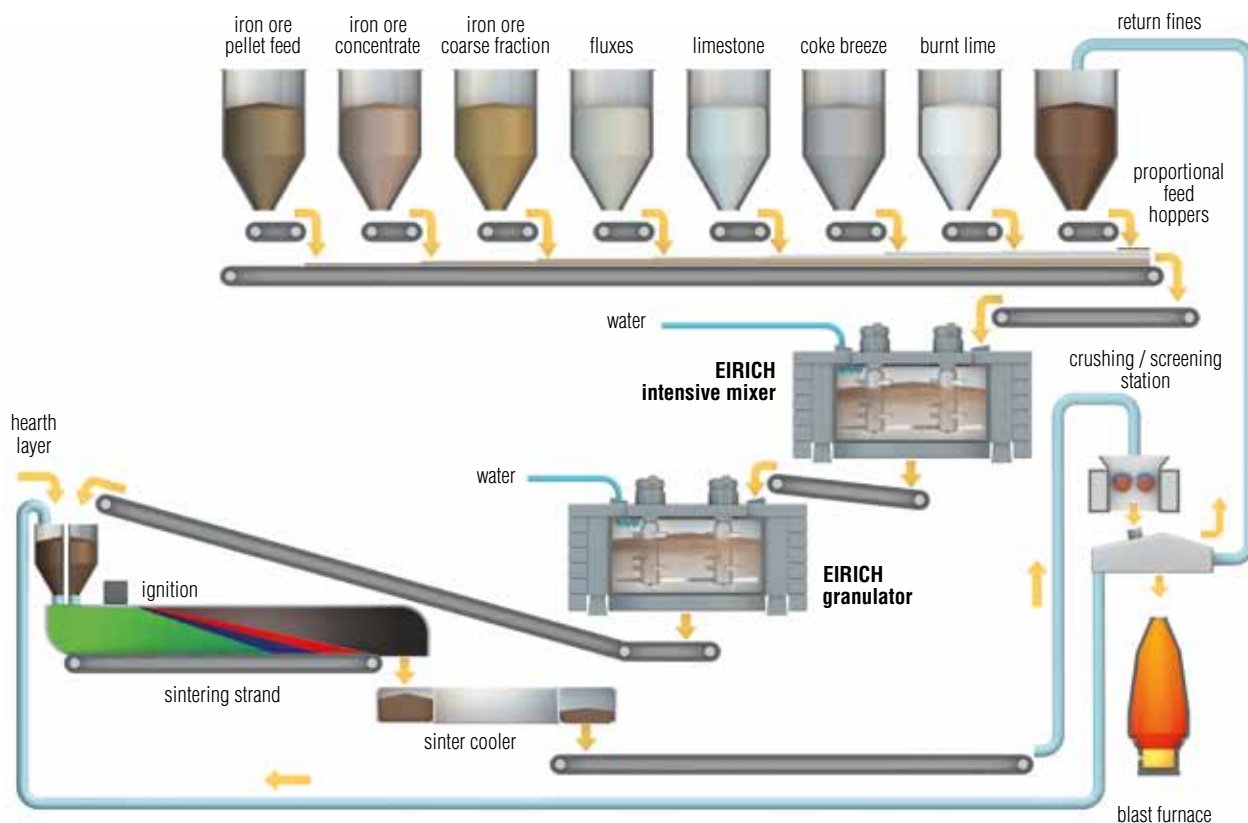
The benefits of both systems have been proven true in many projects and can be summarized as follows:

- Completely homogeneous sinter raw mix with high and even sinter bed permeability
- High productivity of the sinter plant even with high portions of fine and ultrafine iron ore
- Reduced energy consumption
- Low solid fuel consumption
- Equalized burn-through zone
- High and stable sinter quality
- Less return material
- High availability
- Throughputs up to 1,400 t/h

## Alternative B:

### EIRICH intensive mixer & granulator

Especially for greenfield projects



System in operation, e.g., at:  
JSW, India





**System in operation, e.g., at:  
ArcelorMittal, Belgium**

# EIRICH wear protection

EIRICH has decades of experience in the development and use of wear protection solutions. You get the benefit of this know-how in several ways:

- Exceedingly long service lives are assured
- Significantly reduced downtimes and maintenance times
- EIRICH wear parts give you the assurance of unbeatable cost efficiency when measured over the total life cycle

Specifically for beaters, different types of wear protection are used depending on the type of stress associated with the application. The different types are each designed for the maximum service lives of the beaters and are constantly improved as well. All of the work of applying the wear protection is carried out inhouse in the EIRICH workshops specifically set up for the job – the best guarantee for quality and reliability.

## Typical wear protection of EIRICH mixers for:

### Sinter mix preparation



#### Tungsten carbide faced with a tungsten carbide end piece

**Production of hardfacing:**  
hard-soldered in our own workshops

**Properties:**  
reduced life cycle costs due to the special EIRICH changeover system



*Interior view of an EIRICH sinter mixer Rotor after 3 months of operation*

### Pellet preparation

Standard type

**4 layers of armoring**

**Production of armoring:**  
manual hardfacing in our own workshops

**Properties:**  
material blows possible; armor material and thickness can be varied



High-performance type

**4 layers of armoring with a tungsten carbide end piece**

**Production of armoring:**  
manual hardfacing in our own workshops

**Properties:**  
reduced life cycle costs due to the special EIRICH changeover system

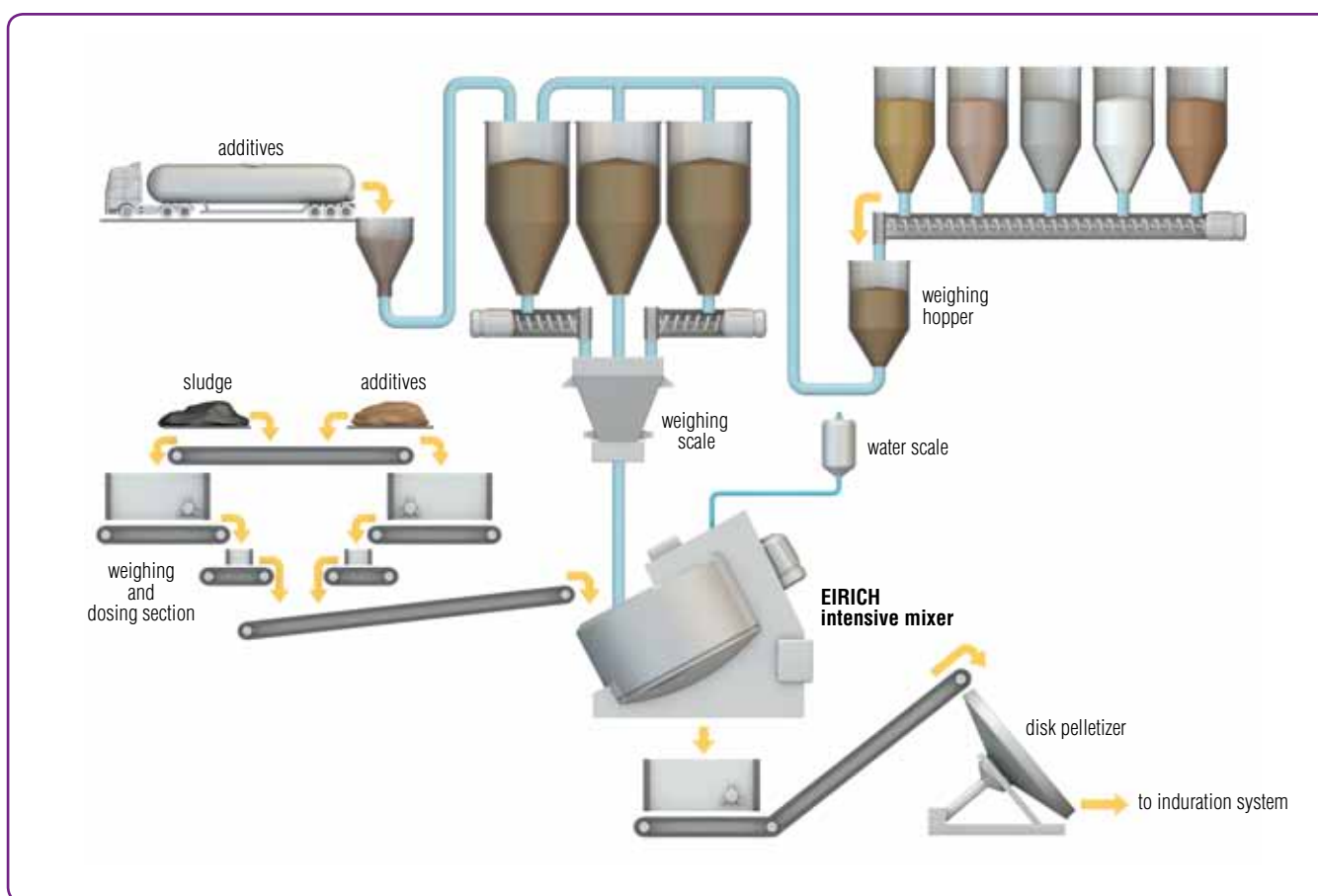


*This configuration can process more than 5 million tons of iron ore in a pellet plant without showing any noticeable wear*

# Recycling of valuable residues

The steel industry is adopting innovative ways of recycling dusts and residues, aiming for zero waste. The common approach is to recycle them into the production line. Most of these residues are difficult to handle and have highly demanding mechanical, chemical and physical properties.

An adequate material preparation decides to a large extent on the result of the process. With the EIRICH mixing system, residues like dusts and sludges from sinter plants, blast furnaces, cast shops, BOF plants and electric arc furnaces are effectively prepared.



The EIRICH intensive mixer is able to manage several processing steps one at a time:

- Mixing
- Moistening / moisture distribution / moisture removal
- Dispersing
- Compacting
- (Pre-)granulating
- Reacting
- Cooling

## Advantages of the EIRICH mixing system:

- Excellent mixing results
- Stable properties of the intermediate product
- Flexible system able to cope with even greatly varying properties of the residues
- High wear resistance
- Self-cleaning





**System in operation at:  
Votorantim, Brazil**

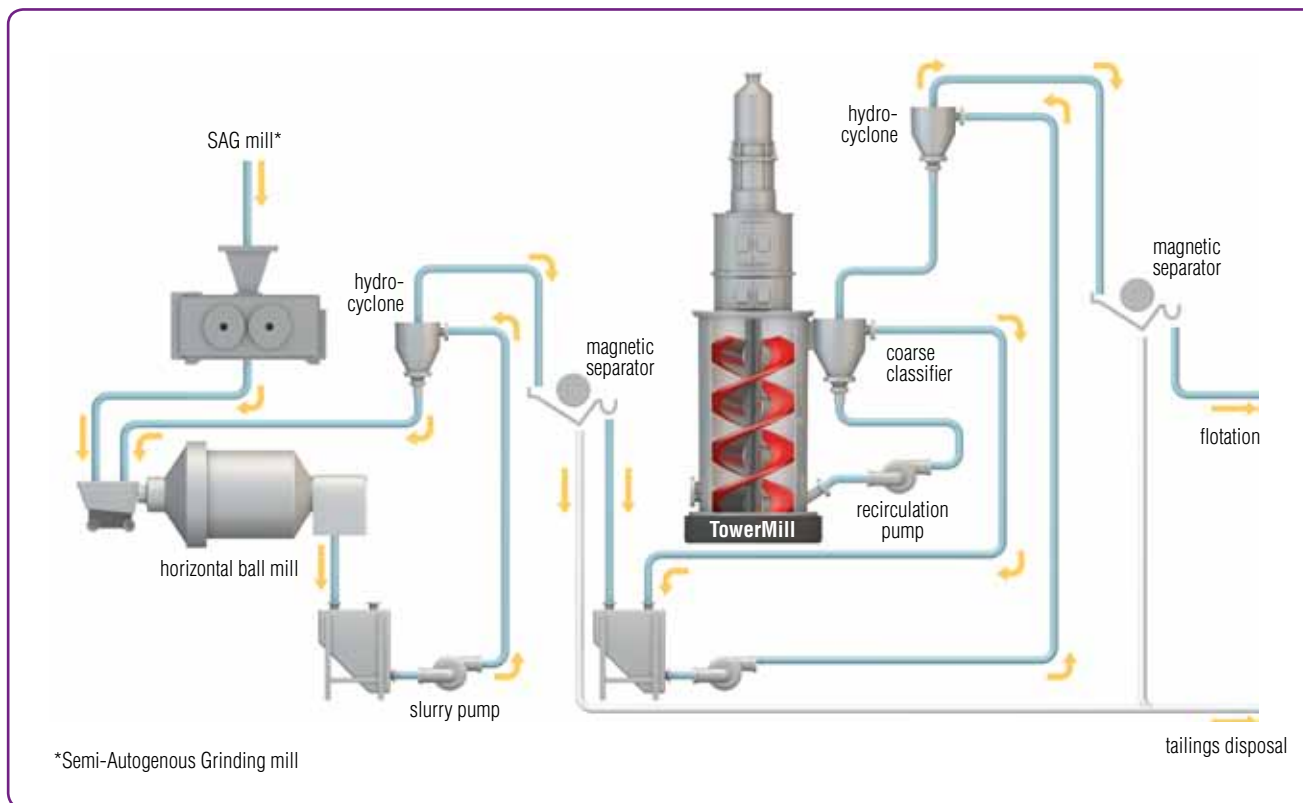
# Fine grinding

To provide an economical solution for modern ore beneficiation plants, EIRICH offers the TowerMill – a proven vertical agitated media mill for energy-efficient fine grinding in the fresh feed size range from 3 mm (hard rock ores) to 10 mm (soft ores) and economical size reduction to 15 microns.

With the EIRICH TowerMill both energy and media consumption are reduced considerably in the ore concentration process.

## The benefits of the EIRICH TowerMill at a glance:

- Energy efficiency
- High throughput
- High availability even in abrasive applications
- Reduced operating costs



### Example

Application: Iron ore - magnetite

TowerMill installation: Western Asia magnetite project

### 5 units ETM-1500

Installed power: 5 x 1.1 MW

Delivery date: 2009

### 4 units

Feed size: F80 = 80 microns

Product size: P80 = 38 microns

Throughput: 130 t/h / TowerMill

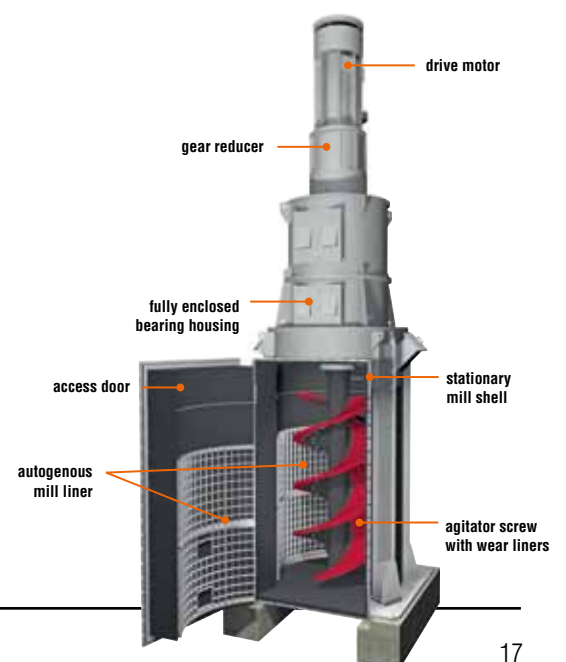
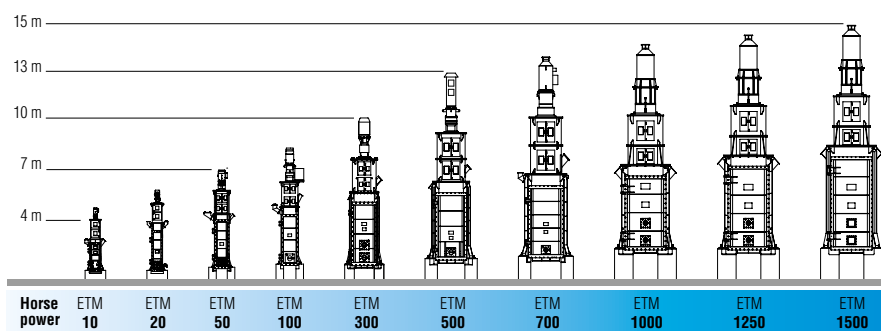
1 unit on standby





**5 units ETM-1500  
Western Asia**

**TowerMill range: For each application the size that fits**





# EIRICH services – maximum confidence across the board

EIRICH offers a comprehensive range of services for the metallurgy industry worldwide: from the initial consultation to the planning and implementation of a preparation solution, reliable after-sales service and the dependable delivery of original spare parts.

## **Test centers**

EIRICH maintains test centers on various continents. There, experienced engineers and process technicians join forces with the user in optimizing specific process steps and devising a basis for the optimum performance of new applications with untried mix compositions.

## **Engineering**

Data collected at the EIRICH test center is used as the basis for selecting the right machines and equipment.

## **Systems engineering**

Only machines and equipment developed and built by EIRICH itself and products from efficient and experienced partners are considered in the engineering and order handling stage.

## **Process control and instrumentation**

EIRICH develops and builds its own machine and process control systems and instrumentation for complete preparation solutions. The range covers new installations as well as the modernization or expansion of existing machines and preparation systems. All components are exactly configured for the user's needs. The results are tailor-made solutions covering everything from conventional keyboard control systems and special batch controllers with formula management to the ServiceExpert software package with online documentation and the forward-looking planning of maintenance.

## **Installation and commissioning**

An experienced service team is available for installation and commissioning. Local partners assist us, and the customer's personnel are instructed in the course of the work.

## **Training**

Training for your operating and maintenance team is provided by expert instructors to ensure that you get the most out of your investment over the long term. It includes instructions concerning the system's operation, safety regulations, process optimization, maintenance intervals and repair work.

## **Customer service**

EIRICH after-sales service is your guarantee of expertise, high availability and comprehensive support. The portfolio includes the worldwide supply of genuine EIRICH spare parts, rapid response to production stoppages and fast machine / system repairs.

Particularly beneficial options are:

### ■ **Teleservice**

Remote diagnosis via data link. This is guaranteeing fast, low-cost support when problems occur.

### ■ **Condition Monitoring**

Sensors mounted on key functional elements send data in real time to a central analysis system in order to detect component degradation before a major fault occurs. This can enhance machine availability and reduce maintenance costs.

### ■ **Maintenance software packages**

The software ServiceExpert ECD provides simple access to engineering drawings, images and photos to quickly identify even very small parts, including a shopping basket function. With the ServiceExpert ECS a tailored, comprehensive, state-of-the-art maintenance management software solution is available which helps to maximize machine availability.

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## Industrial Mixing and Fine Grinding Technology

### Tradition and innovation since 1863

EIRICH stands worldwide for a comprehensive range of products and services in the field of preparation technology. Its particular focus is on mixing and fine grinding technology, with know-how developed over 150 years of close cooperation with industrial users, universities and research institutions.

Pursuing a corporate philosophy of operating internationally and thereby ensuring close proximity to every customer, the EIRICH Group has secured its place in all the key economic regions of the world.

The focus is on innovative technology for machinery and systems engineering designed to offer solutions for high-standard preparation tasks from a single source.

Applications and process technology with own test centers, a high vertical range of production and comprehensive after-sales service provide the ideal basis for the development of modern and economical processes for a multitude of industries.

**Building materials – Ceramics – Glass – Carbon paste – Battery paste  
Friction linings – Metallurgy – Foundries – Environmental protection**

#### The EIRICH Group worldwide:



**Maschinenfabrik Gustav Eirich  
GmbH & Co KG**  
Postfach 11 60  
74732 Hardheim, Germany  
Phone: +49 6283 51-0  
Fax: +49 6283 51-325  
E-mail: [eirich@eirich.de](mailto:eirich@eirich.de)  
Internet: [www.eirich.com](http://www.eirich.com)



**Eirich France SAS**  
Saint-Priest, France



**OOO Eirich Maschinentchnik**  
Moscow, Russia



**OOO Eirich Maschinentchnik**  
Dnepropetrovsk, Ukraine



**Eirich Machines, Inc.**  
Gurnee, IL, USA



**Eirich Industrial Ltda.**  
Jandira S.P., Brazil



**Nippon Eirich Co. Ltd.**  
Chiba, Japan



**Eirich East Asia/Pacific**  
Seoul, Republic of Korea



**Eirich Group China Ltd.**  
Shanghai & Beijing, P.R. China  
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