Material processing for the ceramic industry

Over decades we are partner of the ceramic industry and offer highly efficient technology – conserving resources.

EIRICH

The Pioneer in Material Processing®

Ceramic Processing

Partner of the ceramic industry

For many decades Eirich has offered top technologies for the preparation of raw materials and bodies in the ceramic industry, centering on the basic operations of mixing and fine grinding. Many further developments in connection with ceramics became possible in the first place thanks to our innovative solutions. The grades of ceramic bodies needed to manufacture high-quality ceramic products call for extensive knowledge of the raw materials used and their characteristics. Eirich has acquired this knowledge from countless material processing systems which it has installed around the world, accumulating the know-how needed to adapt processes individually and with optimum effect for the different body characteristics required.

Eirich thinks of itself as the customer's partner right along the process chain, from the delivery of the raw materials to the transfer of the finished ceramic body to the molding machine. Through joint process optimization with the customer, Eirich develops and delivers solutions which come complete with all essential units and equipment, be it for new projects, conversions, moderni-zations or extensions.

Preparation technology for...

- raw materials
- mixes
- ceramic bodies
- finished products

Special process know-how for the production of

- press bodies
- granules
- plastic bodies
- slurries
- fiber materials

For nearly all fields of the ceramic industry

- glazings
- refractories
- structural ceramics
- sanitary ceramics
- oxide ceramics
- non-oxide ceramics
- ferrites

Intensive mixers for all ceramic bodies

1 Robust and service-friendly tool
2 Stationary multi-purpose tool as a bottom / wall scraper
3 Rotating mixing pan
4 Product flow with high velocity differential

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

The special characteristics of the Eirich intensive mixers are

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

Unique mixing principle
The materials in the mixing pan are conveyed upwards through the rotation of the inclined mixing pan and fall again from the highest point under the force of gravity. This cycle is promoted by the bottom / wall scraper, which agitates 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 superimposed on the rough mixing performed by the bottom / wall scraper.

Advantages of the Eirich intensive mixer
Compared to conventional compulsory mixers such as ring-trough mixers, planetary mixers or plow share mixers, the Eirich intensive mixer works at far higher circumferential speeds and has far more variability in operation. For the kneading of compounds, for example, it is possible to set the speed particularly low, for the dispersing of fine fractions or the formation of granules particularly high.

Eirich intensive mixers are service-friendly, long-wearing and highly reliable:

- access to the inside of the mixing chamber for maintenance work is straightforward
- drives and gear units are positioned outside
- the mixing pan
- wearing parts are easy to replace
- even a fully loaded mixer is easy to restart

Just the right mixer for all performance classes
The Eirich range of mixers includes sizes from 1 to 12,000 liters, which meet 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.

Globally unique mixing principle

Type of mixer	Max. Capacity		Drive rating in kW (max.)	
	Liter	kg	Rotor	Mixing pan
EL1	1	1,36	0,88	0,17
R01	5	10	3,9	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	110	11
RV16	900	1.440	132	15
R19	1.125	1.800	132	18,5
RV19	1.500	2.400	160	22
R24	2.250	3.600	160	2 x 18,5
RV24	3.000	4.800	200	2 x 22

Excerpt from the range of mixer types for the ceramic industry

Individual system concepts for the preparation of press bodies and granules

For preparation of granules

Granules are produced by Eirich intensive mixers with an inclined mixing pan. These mixers come with features which are similar to the combination of an intensive mixer with a non-inclined mixing pan and a disk pelletizer. As the result, fine sub-stances can be homogenized and pelletized in a single unit. Thanks to the flexibility of the Eirich intensive mixer, the grain spectrum can be controlled within wide limits:

- at high tool speeds, dry basic materials are homogenized to optimum effect and micro-granules formed through the addition of liquids
- at low tool speeds, bigger granules of up to 6 mm can be formed and rounded

Tailor-made system solutions

The following flowchart illustrates by way of example one of the preparation routes often taken in the ceramic industry using machines and equipment from Eirich's own production:

- mills for hard materials and dry clays
- intensive mixers for all kinds of bodies
- EvacTherm® system for preparation and drying
- weighing and batching equipment
- process control and instrumentation

Whatever your specific requirements, in Eirich you have a partner with extensive project experience for jointly developing a tailor-made process concept which is optimally adapted to the individual circumstances.

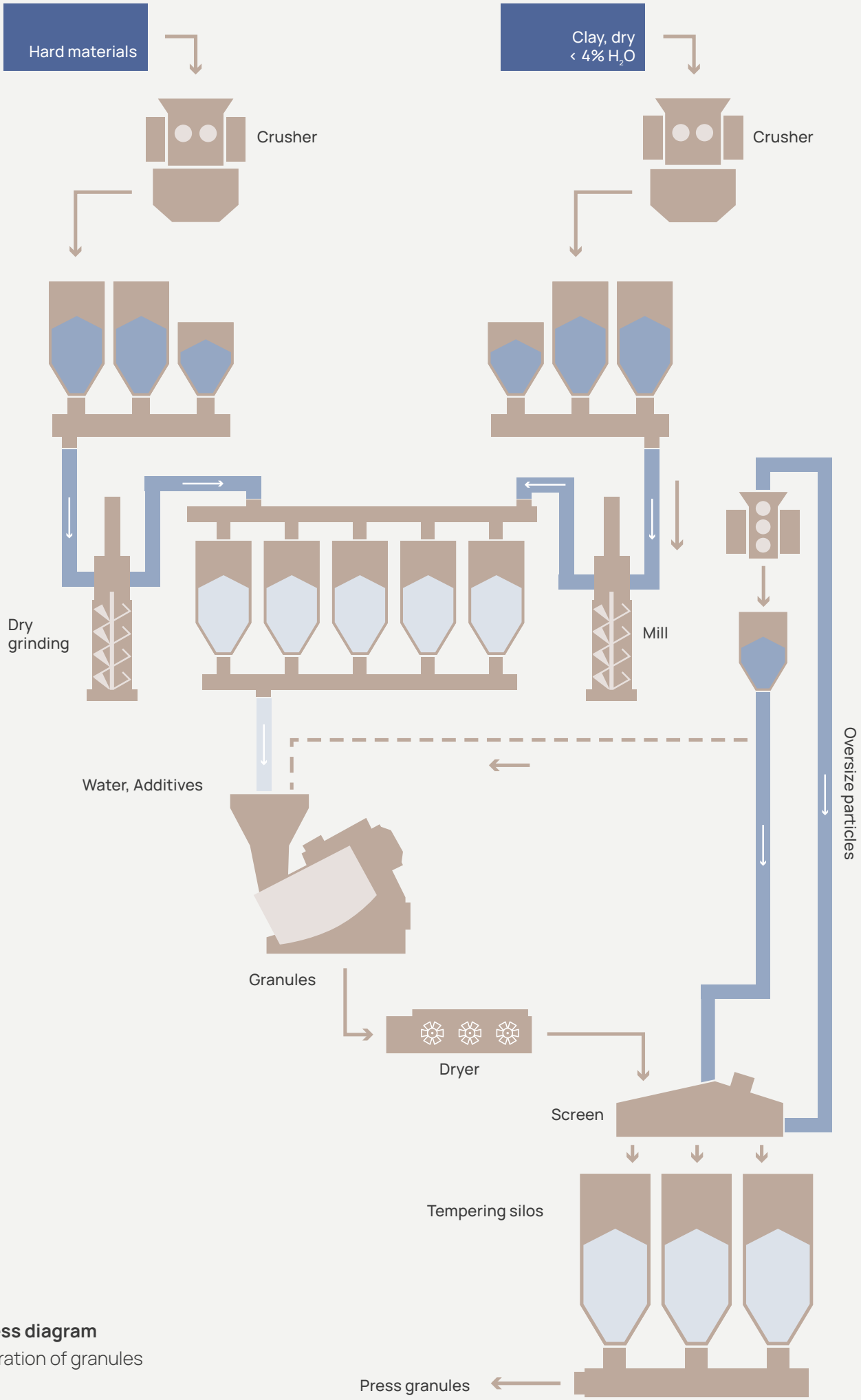
Preparation of press bodies & granules

Press bodies for

- ceramic tiles
- stove tiles
- refractory bricks
- abrasives
- carbon materials
- technical ceramics

Granules for

- molecular sieves
- proppants
- grinding balls
- expanded sand / clay



Process diagram
Preparation of granules

EcoPrep® dry preparation – economic press granules for tiles

EcoPrep® – the new dimension of dry preparations
Premium quality press granules at drastically reduced production costs - the EcoPrep® dry preparation opens up a new dimension in energy efficiency and resource conservation, making it the pioneering method for the production of press granules, particularly for tiles. The quality of the granules prepared in the Eirich granulating mixer corresponds to that of high-grade spray granules when it comes to flow properties and workability in the pressing and firing process.

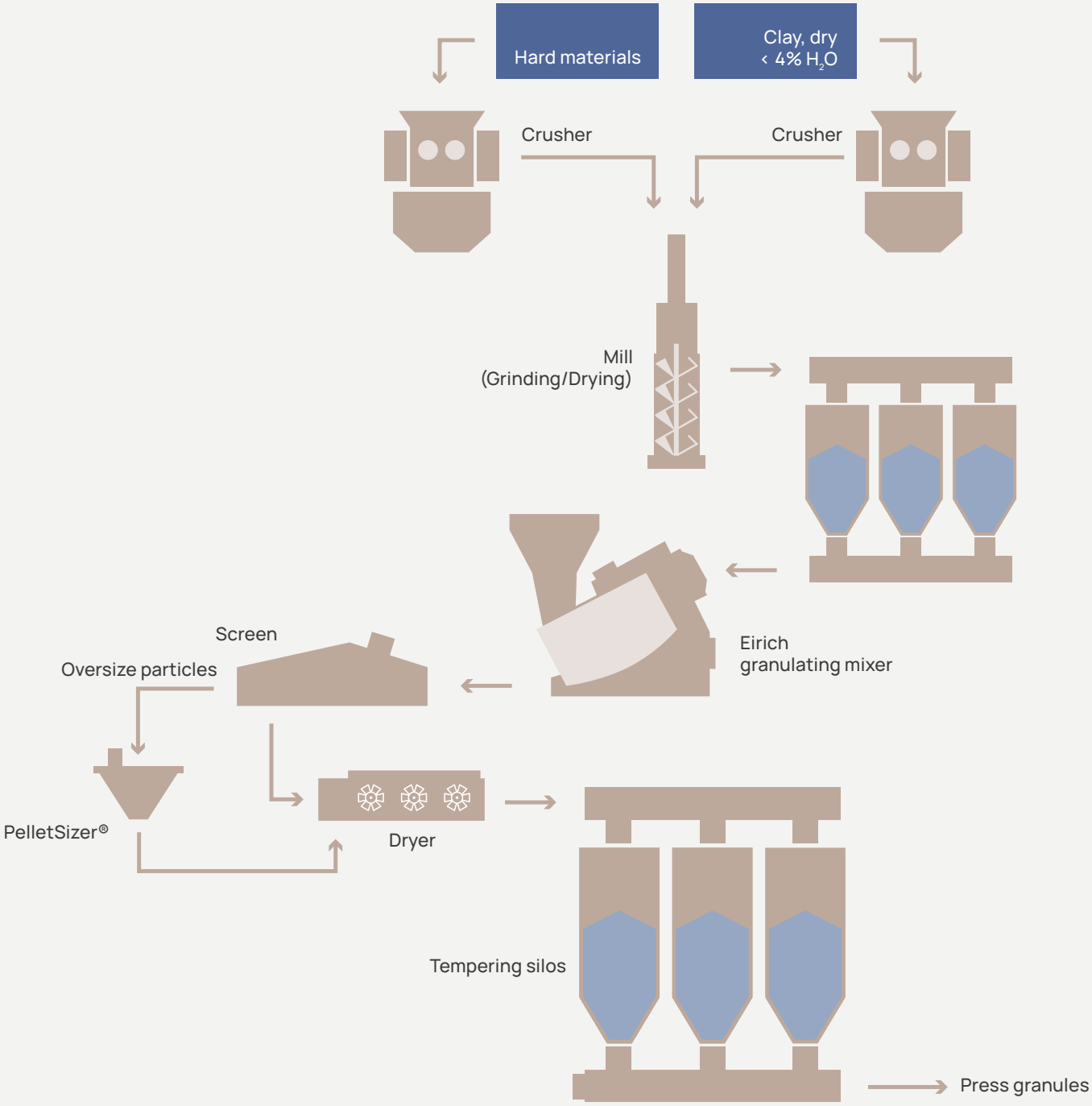
Compared with conventional preparation methods using a spray tower, what the EcoPrep® dry preparation offers in particular is an outstanding improvement in the energy balance. The enormous reduction in production costs that this achieves ensures that investment in this method pays off after just a short time.

Quality just like out of the spray tower – much cheaper with EcoPrep®!

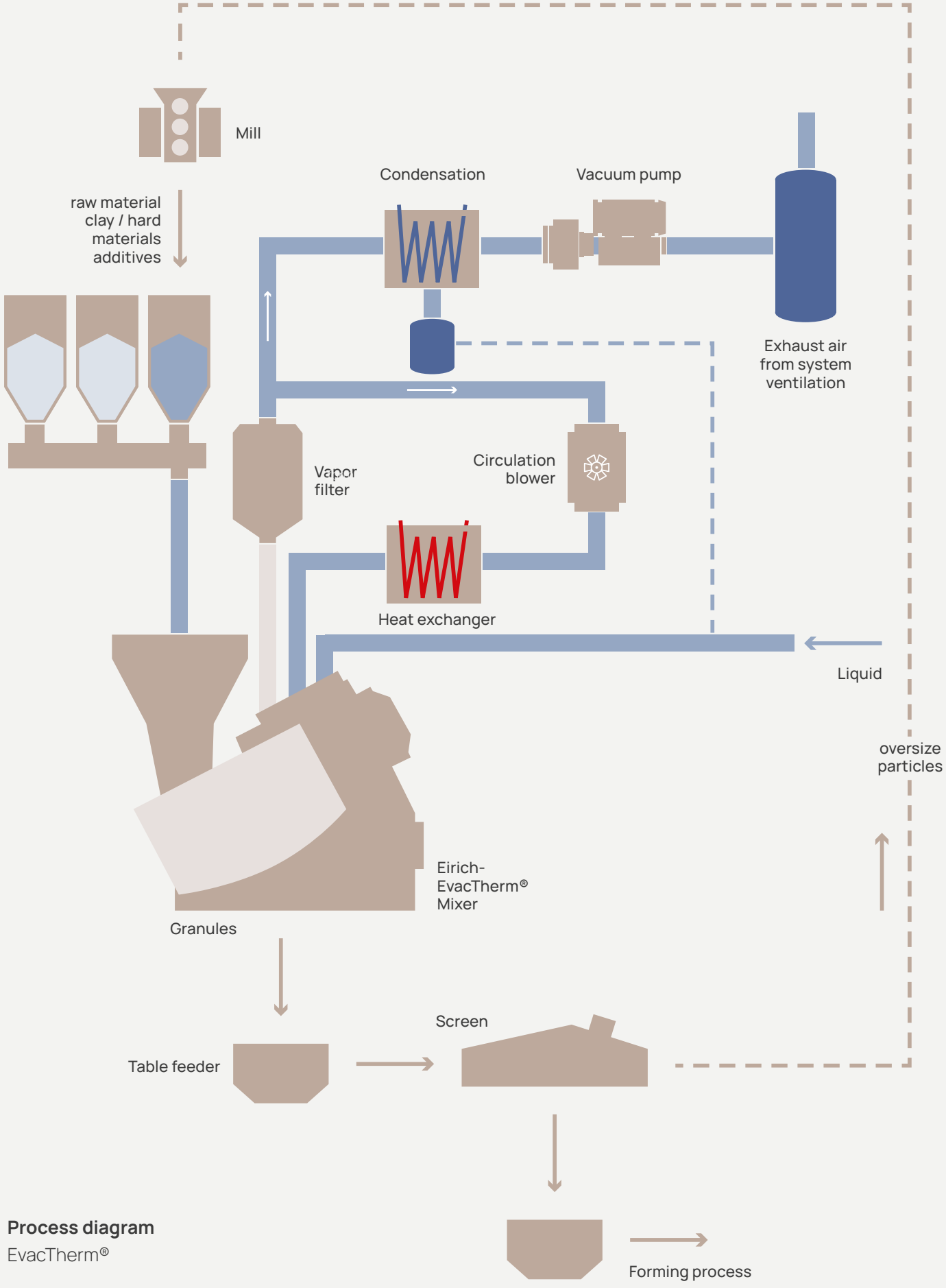
Up to 60% less energy

The advantages compared with wet preparation

- all tile grades and sizes can be produced
- free-flowing granules just like out of the spray tower
- up to 60 % less energy used
- up to 80 % less water used
- 100 % saving in additives
- removal of need for evaporation energy
- reduces production costs
- further savings through the use of local raw materials
- dry grinding of low-soluble clays without the use of additives
- granule distribution flexibly adjustable over wide ranges



Process diagram:
EcoPrep®



Process diagram
EvacTherm®

3 Steps –
in one aggregat

EvacTherm® system
of modular design

EvacTherm®
mixing, granulating & drying in one unit

The EvacTherm® system was developed by Eirich for the preparation, granulation and drying of ceramic bodies that have to satisfy special quality standards.

Depending on the given task, EvacTherm® can be used for

- the defined redrying of bodies and/or
- the production of press-moist granules.

The EvacTherm® system works in a closed circuit and is therefore also suited for the use of organic solvents and for applications performed under protective gas and explosion-protection conditions.

Further relevant properties of the quality of the final product:

- moisture content
- grain spectrum
- granule density
- granule strength

Advantages of the EvacTherm® system:

- low-energy production of granules from solids, without the need for slurrying
- no moisture gradients in the individual granules
- no maturing cycles prior to further processing
- minimum cleaning effort required when the
- formula is changed
- compact system configuration with low space requirement

Preparation of plastic bodies

Ceramic bodies must display defined and constant properties for plastic deformation. Intensive preparation is essential for a homogeneous body with a high degree of plasticity. This requires sufficient energy to be channeled into the mix, particularly in the viscoplastic range.

The special Eirich working principle enables

- dry mixing and plasticizing in just a single unit
- optimum distribution of additives in the ppm range
- quick and homogeneous mixing in of liquid components, even in small quantities
- fast subsequent corrections to the moisture level
- short processing times with high throughput rates

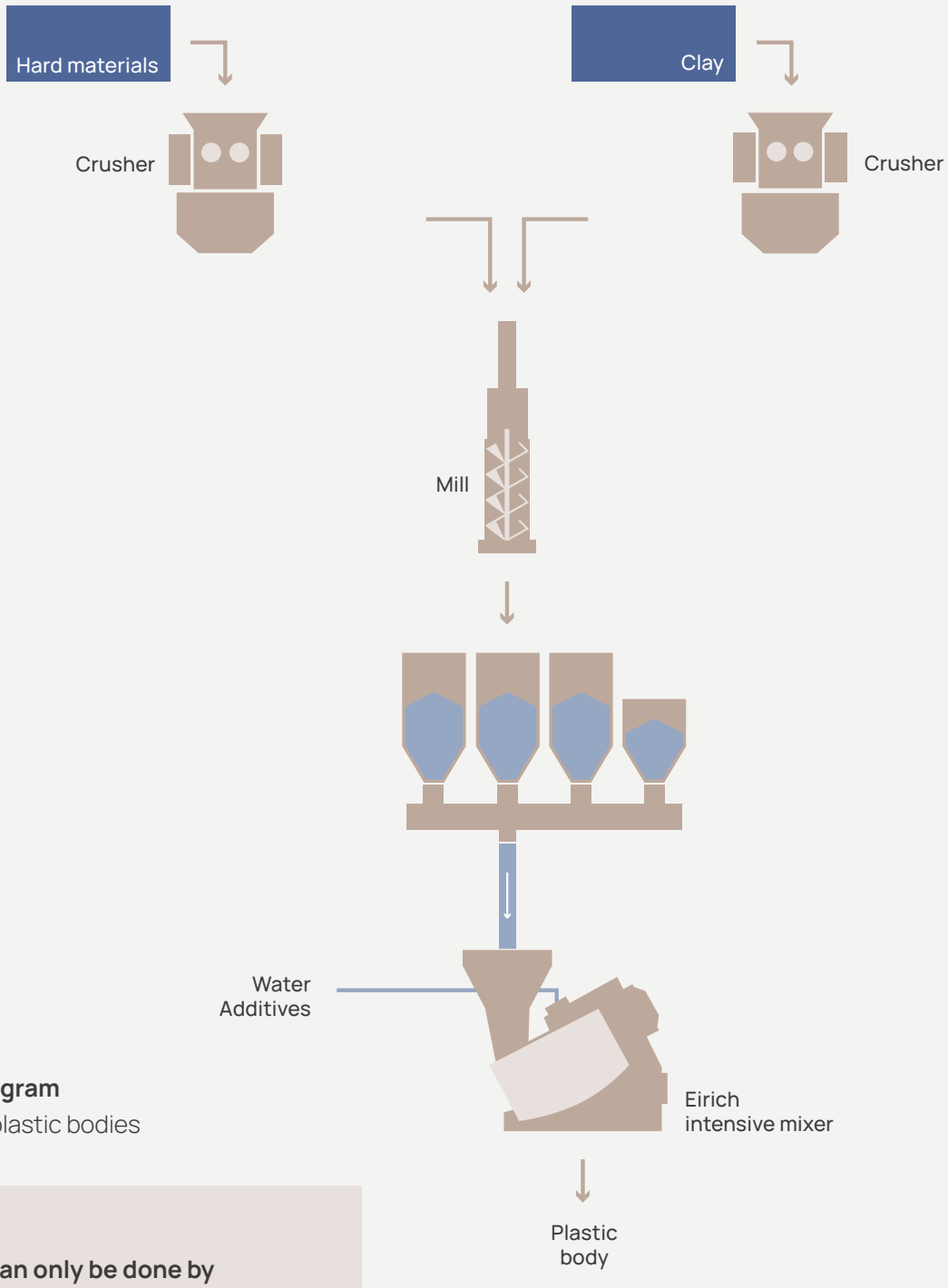
Eirich thus offers the ideal preparation solution for the production of extrudable and/or formable bodies for many areas of the ceramic industry such as for

- ceramic tiles
- plastic refractory bodies
- bricks
- stove tiles
- utility ceramics
- refractory bricks
- technical ceramics such as catalysts on an Al_2O_3 or TiO_2 basis and high-temperature materials

The Eirich intensive mixer can also be used to advantage for the preparation of SiC materials.

Homogeneous preparation of highly plastic bodies

Complete preparation system for structural ceramics



Processing diagram
Preparation of plastic bodies

This can only be done by powerful mixers such as the Eirich intensive mixer, which can also be used without restriction for all consistencies, e.g. for:

- plastically deformable bodies made of clay, ground hard materials, water and additives
- ground clay or spray-formed grain with clay slurry
- the homogenizing of filter cake

Perfect preparation solutions

Eirich working principle
of the dissolver mixer

Preparation of slurries

A particularly economical alternative for the preparation of bodies with a high solids content, pasty bodies and highly viscous bodies is the Eirich intensive mixer in combination with the MaxxMill® and a TowerMill.
Both machines can be ideally integrated in existing systems thanks to their space-saving designs. The special Eirich working principle enables selective control of the power input via the speed of the mixing tool.

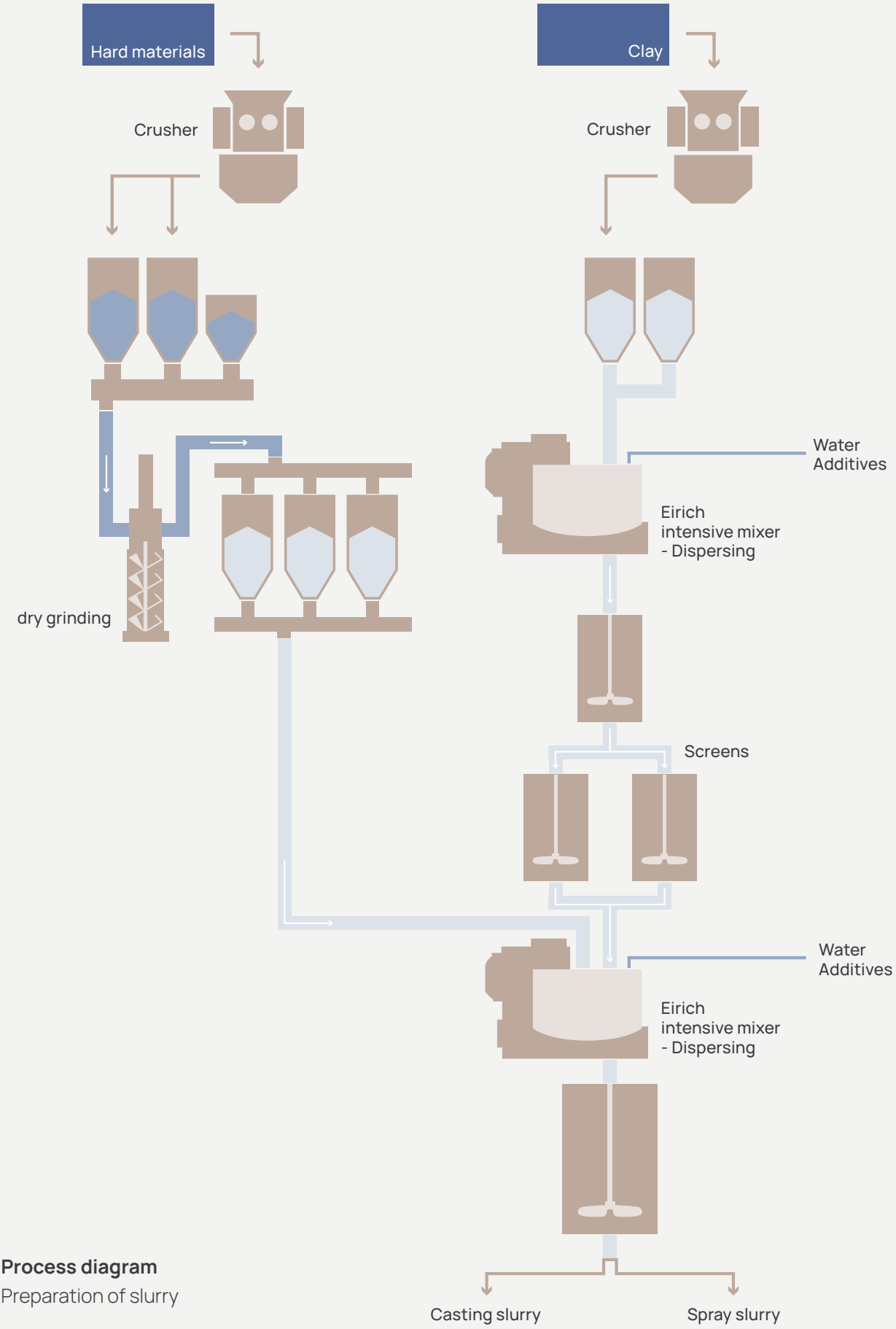
High tool speeds allow
- agglomerates to be disintegrated perfectly
- solids to be dissolved or dispersed completely
- primary particles to be completely coated with an organic solvent film

Spray slurry for
- wall and floor tiles
- utility ceramics
- technical ceramics

Casting slurry for
- sanitary ceramics
- technical ceramics
- utility ceramics

Dispersing of
- green scrap and drying scrap from tile production
- returns from sanitary ware production (plaster waste, green scrap and white scrap)
- lathe scrap from insulator production
- filter cake

Preparation of dispersible raw materials such as
- clay
- kaolin



Process diagram
Preparation of slurry

Preparing
special materials

Preparation of special materials in the ceramic industry

In the ceramic industry, special materials are playing an increasingly important role in the selective further development of ceramic products and the opening up of new areas of application.

What is needed are innovative preparation solutions with a technology which can be flexibly adapted to sometimes unprecedented requirements. Eirich offers such solutions plus the exper-ience to go with them and is therefore the ideal partner for developing new applications with special materials.

Two fields are described below by way of example.

Fiber materials

The unique capabilities of the Eirich intensive mixer prove particularly useful in the preparation of fiber materials. First the mixer can be used for the separation of all types of fibers, then it can coat them with fillers and binders in a gentle follow-up operation.

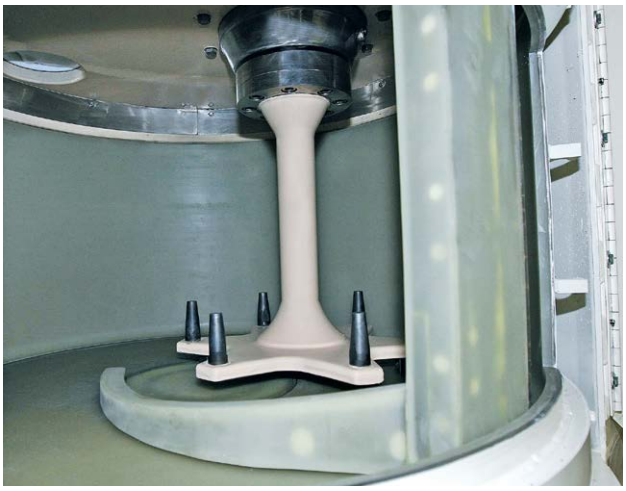
- carbon ceramics
- fiber-reinforced ceramics

Working with organic binders and solvents is easy and environmentally friendly with the EvacTherm® system.

Injection molding compounds

The production of injection molding compounds and extrusion bodies, is performed particularly quickly and economically with the special Eirich working principle:

- one and the same mixer can homogenize, coat, knead, disperse and cool
- effective power input results in intensive
- mixing and kneading
- the customary preparation times of normally several hours are drastically reduced to just several minutes in some cases



Mixer for contamination-free preparation

Preparation of bioceramics in clean-room conditions

5-liter vacuum mixer
Type R02VAC

Complete solutions from a single source – planning & implementation free of interfaces

Eirich offers a comprehensive range of services for the ceramic industry and its raw material suppliers worldwide: from the initial consultations 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. Here, 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
Machines and equipment developed and built by Eirich itself and including products from efficient and experienced partners are used to turn the engineering into reality.

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 Service-Expert 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. It includes the dependable delivery of original spare parts worldwide, prompt reaction to servicing needs, the fast repair of machines and system components, and expert advice if the process requirements should change. A particularly efficient option is remote diagnosis by data link (teleservice), which provides quick and cost-saving support if trouble occurs during operation. Software packages for condition monitoring and maintenance round off the service offering.

Working with Eirich has its advantages – use them!

From the control system, batching system and single mixer to the complete system - everything from one source - from Eirich

Use advantages!
Work with Eirich!

Reduce downtimes

Modular design in systems engineering
The fast track to production

Very early on, Eirich recognized that modular design was the best way forward in preparation systems for ceramic bodies, and it is fully committed to that approach.
All of the subsystems are mounted, assembled and tested on individual platforms. The system can be quickly installed at the customer site, avoiding lengthy downtimes and interruptions for conversions. The cabling and pipework is pre-installed on all of the units, which can therefore be quickly attached to each other using plug-in connectors and fittings.
The control system switchgear is mounted on the mixer platform. Operation from a different location in the production department is possible.

Version A
The mixer, control unit and e.g. scales are delivered in pre-assembled state on platforms. Ideally the steelwork is provided by the customer.

Version B
The entire preparation system is mounted on individual platforms. Eirich or the customer can provide the supporting steelwork. There is no limit to mixer size.

Version C
The modules are supplied complete with front enclosure. All of the units including the silos, etc. are installed in containers. The container walls act as the front enclosure. The walls can be made of insulated sandwich or panel elements. The customer can select the color.

Testing & optimizing in the Eirich test center

Tests are often needed e.g. in order to find the correct process engineering solution for a particular preparation task or to optimize an existing system.

For this purpose, Eirich maintains process engineering test centers at seven locations around the world. Here, experienced engineers and process technicians join forces with the customer in carrying out tests with the particular material and task specifications. The Eirich test center thus contributes to a successful production start-up.

Absolute confidentiality is a top priority and goes without saying.

Testing and optimizing

The satisfaction of the end user lies very important to us.

This service has been gladly used for decades by users in the ceramic industry. Numerous solutions, process engineering upgrades and alternative preparation methods have been developed and put successfully into practice as the result.

Advanced machines and systems from laboratory to production scale, combined with extensive process data acquisition and analysis, permitversatile and flexible testing.

Many years of cooperation with universities and leading research institutes in the ceramics field ensure that the latest research findings are taken into account.

The many different possibilities of the Eirich test center are waiting for you to use. Contact us and arrange a date for a meeting – on your premises if you prefer.

Our team of experts will be glad to advise you!

EIRICH

The Eirich Group, with Maschinenfabrik Gustav Eirich as its strategic center in Hardheim, is a supplier of machines, systems and services for mixing technology, granulating/pelletizing, drying and fine grinding. Our core competencies are procedures and processes for the treatment of loose materials, slips and sludges. We are a family-run company with 15 locations worldwide.

Further information at:
www.eirich.de

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