



# Eirich Test Center

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**Center for process technology**  
Ideas and solutions for  
your preparation processes



The Pioneer in Material Processing®

# The Eirich Test Center – platform for fascinating possibilities

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Companies such as Eirich, which has a reputation as a **technological leader in material preparation processes**, demand the highest standards in terms of their own ability to develop new process engineering solutions in close cooperation with companies in the user industries. It was precisely this objective that led to the creation of the Eirich Test Center, which has remained true to the company's motto since its establishment in 1926 of „delivering the best and most advanced products and services to its customers“ to develop into a **highly advanced technology and development center**.

The Eirich Test Center is an experimental laboratory for testing and trialing, a platform for new ideas, a research & development center, and a hub for the international sharing of information – in short: **an engine for innovation in the field of material preparation**.

In almost **500 tests** carried out together with customers and users **each year at the seven Test Center sites** around the world, customtailored

solutions are developed which range from feasibility studies for alternative methods of preparation to scale-up tests and customerspecific optimization solutions. This work is undertaken by a team of no less than 20 engineers and process technicians at the various different sites.

The comprehensive database built up by this work and the many years of practical experience **in virtually every field of material preparation** provide the basis for the safe and reliable layout of machines and systems for a wide diversity of industries and tasks.

**Research & development** have a high priority at Eirich and are important cornerstones of our success as a company.

The Test Center makes a major contribution here, e.g. through close cooperation with universities and research institutes and our own research and development projects.

**You, too, can make the most of the fascinating possibilities offered by the Eirich Test Center!**

Arrange a consulting meeting with us without obligation – and it can take place at your premises if you wish.

## User industries with lasting benefits

A selection of user industries which enjoy lasting benefits of the work of the Eirich Test Center, e. g. as a result of new and groundbreaking process concepts:

- Ceramic industry
- Refractories industry
- Building materials
- Powder metallurgy
- Battery industry
- Metallurgy
- Recycling
- Foundry molding materials



The development of new process engineering solutions in close cooperation with companies in the user industries is carried out in spacious premises using a wide range of machinery.



## Technology leader in material preparation processes

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As a test bed and platform for the performance of tests, the Eirich Test Center provides you with support right through to the successful start of production and beyond. This can cover the entire spectrum of basic process engineering operations.

### **Eirich Technology for infinite possibilities**

Eirich mixers offer enormous flexibility and diversity in terms of process alternatives, for both batch

and continuous processes. Users often only have got a limited awareness of these fascinating possibilities. As a result, the full potential of existing machines is not realized in many cases.

For example, when mixing or homogenizing powdery substances it is possible to achieve selective structural changes at the same time in the same process step through agglomeration, granulation, pelletizing, etc.



**Classical tasks for customers, research partners and other users include, e.g.:**

- Consulting in process technology and the development of economical and ecologically responsible solutions
- Performance of tests with raw materials provided by the customer
- Development of preparation processes for new products
- Development and testing of new types of machine and measuring technologies
- Production of products in quantities which can be used for sampling by end users
- Layout of machinery and systems for a quick return on investment



- Analysis and optimization of production processes in operation or existing machines or systems
- Supply of machinery on a rental basis with the support of experienced engineers, for installation in production lines on a test basis (in-line or bypass)
- Process engineering training courses



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**Platform for  
tests performance**

It is therefore well worth seeking advice in order to utilize the process engineering potential of your machine or system to the full for your application! No matter what task you come to us with – you can always be sure of getting personal advice without obligation and individual assistance every time.

At every stage we give uppermost priority to confidentiality and make sure it is standard practice.



Agglomerating • Mixing • Crushing  
Disagglomerating • Coating • Moistening  
Granulating • Kneading • Hydrophobing  
Homogenizing • Impregnatin • Dispersing  
Reacting Stripping • Plasticizing  
Deaerating • Fine grinding • Dissolving  
Regrinding • Wet grinding • Pelletizing  
Dry grinding • Drying • Slurrying

# Worldwide presence



The locations of the  
Eirich Test Center

### Our seven locations

There is an Eirich Test Center at seven locations in the key economic regions of the world, true to the Eirich policy of „operating internationally and thereby ensuring close proximity to every customer“. Our specialists in your immediate vicinity speak your language and are therefore fully familiar with the specific situation of your region.

The worldwide locations of the Eirich Test Center constitute a network with the Hardheim Test Center at its center. The individual locations maintain constant, intensive contact with each other to exchange information, and regular training courses ensure a continuous transfer of know-how.

This ensures that you as a user have direct access to their entire know-how, no matter where your tests are carried out among the different locations.



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**Equipment:** Eirich mixers of different sizes, MaxxMill®, TowerMill





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**Equipment:** Eirich mixers of different sizes, TowerMill



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**Equipment:** Eirich mixers of different sizes, APS mixers/blenders





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**Equipment:** Eirich mixers of different sizes



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**Equipment:** Eirich mixers of different sizes





## Mixing to perfection

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Mixing is a key basic operation in material processing. This is defined as the systematic merging of at least two different materials to **result in a mixture which is as homogeneous as possible**.

The quality of a mix, i.e. the mixing quality, is normally determined by sample taking and analytical evaluation. In relation to mixing quality and homogeneity, the mixing system which is used has a critical influence.

**The special Eirich mixing principle** is characterized by the rotating mixing pan and the eccentrically mounted rotating mixing tool, which results in separation between the mixing process and the

material transport. This fundamental difference compared to other systems opens up a whole **range of possibilities for influencing the process** through

- the speed of the mixing tool – this can be adjusted over wide ranges to enable the energy input to the mixing process to be varied
- the direction of rotation of the mixing tool
- individual tool geometries specifically tailored to the task at hand

**This makes it possible to achieve results beyond the feasibility of other mixing systems:**

- Much higher homogeneities
- Shorter mixing times
- Complete disintegration of agglomerates
- Prevention of demixing effects
- Setting of different load factors (from extremely gentle to aggressive), even during a mixing cycle

The advantages of the Eirich mixing system really come into their own when it comes to **demanding mixing tasks** which are considered to be difficult, e. g.

- involving large differences in density between the basic materials
- involving admixing of fibrous materials
- for disagglomeration of ultrafine materials to nanoparticles
- involving homogeneous admixing of tiniest amounts of solid or liquid additives down to the ppm or ppb level
- for high demands in terms of low-contamination preparation (e.g. where there is a need to prevent contamination resulting from abrasion)



Friction lining products

By combining with **Eirich vacuum technology** it is also possible to achieve high levels of homogeneity and rates of disagglomeration for ultrafine material systems involving the need for small quantities to be mixed in homogeneously, e. g. pigments. Removing the air from the material can facilitate the transfer of higher shearing forces and thereby enable even heavily agglomerated raw materials to be completely disintegrated and mixed in homogeneously.



Colored plaster



Refractory products



## Granulation for every requirement

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Granules (latin: granum = grain) are created when individual particles are built up to form a solidified composite with a rounded shape. The individual particles of the granule are no longer identifiable at a macroscopic scale. The moisture content required for the formation of granules has to be determined by experimentation for each specific material system, whereby normal granulation moisture levels are in the range of 5-50 %. In addition, sufficient particle fineness is also required for the production of granules, with a fine fraction of at least 70 % smaller than 100  $\mu\text{m}$ . Granulating mixers and disk pelletizers from Eirich offer

a wide spectrum of solutions for agglomerating, granulating and pelletizing. They range from the production of dust-free bulk material to the selective production of solidified and rounded compact grains with predefined sphericities and excellent flow properties.

The agglomeration or granulation process itself is by means of wet granulation involving the addition of liquids, or alternatively by means of hot melt granulation. The granule size distributions can be varied within a very wide adjustment range.

In addition to the production of dust-free agglomerates such as microgranules ranging from  $< 200 \mu\text{m}$  to  $< 1000 \mu\text{m}$  as substitutes for spray granules, it is also possible to produce spherical granules in the 1-25 mm range in variable distribution ranges without any difficulty.

The Eirich granulation system can be used for granulating an almost unlimited range of materials or material systems such as, e.g.

- for the production of microgranules to granules of several centimeters in size or pellets
- for the production of different sphericities and surface structures
- for the incorporation of fibrous products in granules as well, up to certain fiber lengths
- for the formation of highly stable and abrasion resistant granules through the addition of binders
- for the production of granules with the highest possible densities as a result of granulation after the plastic phase involving the addition of dry materials or the removal of liquid by drying



Cat litter



Lawn fertilizer



Pressed granules for tiles



## Kneading, plasticizing and dispersing

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**Kneading and plasticizing** involves the uniform wetting of dry raw material components with liquids or thermoplastics to produce an end product which is plastic in form.

In the Eirich mixer the production of plastic masses is carried out in two stages: In the dry mixing stage the dry, powdery components are first mixed together homogeneously. This is followed by the addition of the liquid in the quantity specified in the formula. Where binders are added in the form of dry material, they start the dissolving and swelling process as soon as the liquid is added.

The preparation process itself is then finished within just a few minutes. The Eirich mixer demonstrates its strengths to optimum effect here when it comes to the production of homogeneous dry mixes and for the excellent wetting of the surfaces of solid particles with liquids - in contrast to classical kneading with its well-known problems with the distribution of the dry and liquid components in the mixing chamber and resultant lengthy preparation times.

## Advantages of Eirich mixers for kneading and plasticizing

- Very short processing times compared to a kneader, i.e. the preparation process is completed in just minutes instead of hours, with correspondingly less energy input
- Binders are distributed homogeneously in the material due to the dry mixing process, meaning that there is no danger of the dreaded formation of lumps when the liquid is added.
- The shearing and stress regimens in the plastic material can be varied by selecting different tool geometries and speeds according to specific requirements.
- In addition to powdery components it is also possible to completely separate fibrous substances or fiber bundles as well and distribute them homogeneously in the mix.

## Examples of products for kneading

- Manufacture of honeycomb structures
- Manufacture of extruded round rods used powder metallurgy

For **dispersing** solid matter or the production of suspensions Eirich uses the mixer's strength of being capable of processing a highly plastic phase as well. The **suspension** is not prepared by adding the powder to a liquid premix, as this generally leads to the formation of lumps and therefore more time needed to prepare the sus-

pension. In the Eirich mixer the suspension is produced in a single pot process involving the continuous addition of liquid to what is initially a dry phase which subsequently becomes plastic, along with further dilution.

## Advantages of Eirich mixers for dispersing

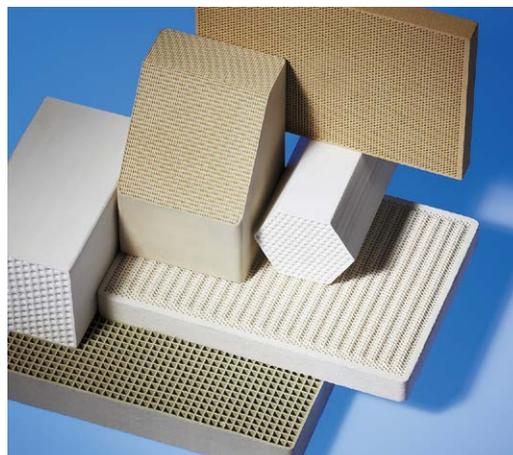
- Drastic reduction in processing times; from hours to just minutes
- Any desired suspension viscosity can be achieved by varying the controls for the amount of liquid added.
- The processing properties can be adjusted by adding dispersing agents and/or thickeners in minute quantities during processing.
- Homogeneous distribution results in major savings on dispersing agents and additives compared to other processes in certain cases.

## Examples of applications for dispersing

- Clay slurry for ceramic applications
- Coating slurries for lithium-ion batteries
- Paper coating compounds



Sanitary ware  
© Duravit AG.



Ceramic honeycombs



Ceramic foils



## Coating, hydrophobing and functionalizing

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The particular strength of the Eirich mixer is that it is capable of distributing the tiniest amounts of liquids or solids homogeneously onto the surfaces of solid matter by applying shearing forces of sufficient strength. To do this, different tool speeds

and geometries are used here depending on the specific product. They are configured to prevent any negative impacts on the original components and ensure that the material is completely covered.

**This means that the list of potential applications is almost unlimited:**

- With the use of chemical additives dissolved in water or solvents it is possible to precisely functionalize the surfaces of solid particles or granules
- In hydrophobing this involves the application of silanes, for example. Temperature control can also be used here for reaction control purposes.
- Superimposed redrying can also be used to remove any excess carrier liquids again, leaving only the additive on the surfaces of the particles in the tiniest of quantities, even down to the ppb scale if required.
- Granules or coarsegrained feedstock are also capable of being coated with liquids and/or powdery solids. This is also possible in multiple layers.
- The liquid can be added by pouring or spraying.

**Examples of applications**

- Hydrophobing of sand
- Increasing the flowability of cohesive bulk material by adding aerosils
- Coating of abrasive grit
- Coating of instant products



Colored decorative sand



Abrasive grit for grinding wheels



Hydrophobic jointing sand



## Drying, reacting and grinding

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The Eirich mixer has a practically unlimited range of applications and with the relevant functional peripherals it can also be used for **drying**, e.g. of filter cakes and sludge, and even for **reaction control** for chemical solid matter or solid matter and liquid reactions. EVACTHERM® technology offers excellent temperature control and monitoring possibilities

here, even where strong exothermal reactions are involved. With regard to **drying technology**, the removal of the liquid can be carried out on both an atmospheric basis or under vacuum using conductive and convective drying processes with hot air, inert gases or superheated steam, both with or without explosion protection.

In addition to just straight drying it is also possible to integrate the coating, granulation and mixing of raw material components as well. The drying process takes place in a mechanically generated fluid bed and permits any consistency to be processed, ranging from suspensions to filter cakes and dry materials, which need to be wetted with liquids at the start.

### Examples of applications for drying

- Galvanic sludges
- Pesticides
- High-tech ceramics
- Friction linings
- Paint sludges

The versatility of the Eirich mixer is also demonstrated by the fact that the functional principle can also be used for in the field of **size reduction technology** or **grinding technology**.

It is precisely this principle that has been applied to the **MaxxMill® agitated media mill**, which is designed for dry and wet grinding in the 5-70 µm range. Here, grinding balls in the rotating mixing/grinding chamber are set in motion by the eccentric mixing/grinding tool. True size reduction of the original product takes place as a result of impact and friction in the moving pack of balls.

### Examples of applications for grinding

- Frits
- Silica sand
- Fillers

These are supplemented by large-scale **TowerMill agitated media mills** for bulk products such as ores.



Lead acid pastes for starter batteries



Pesticides



Engobes/glazes for roof tiles

# The right technology for your task

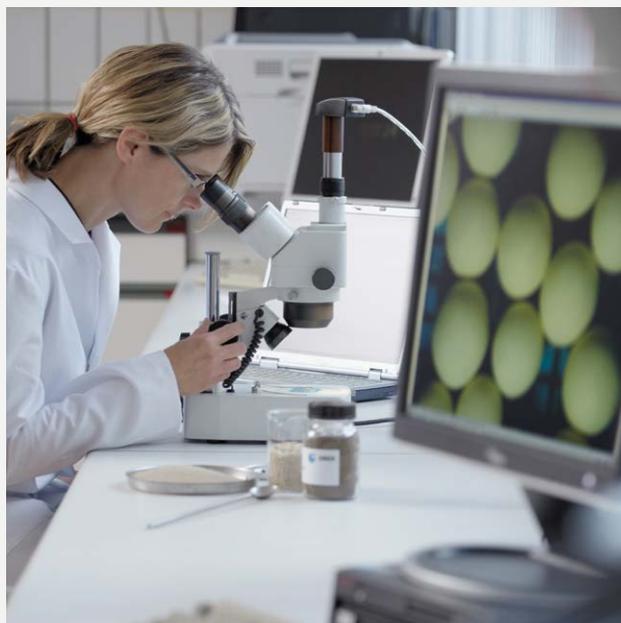
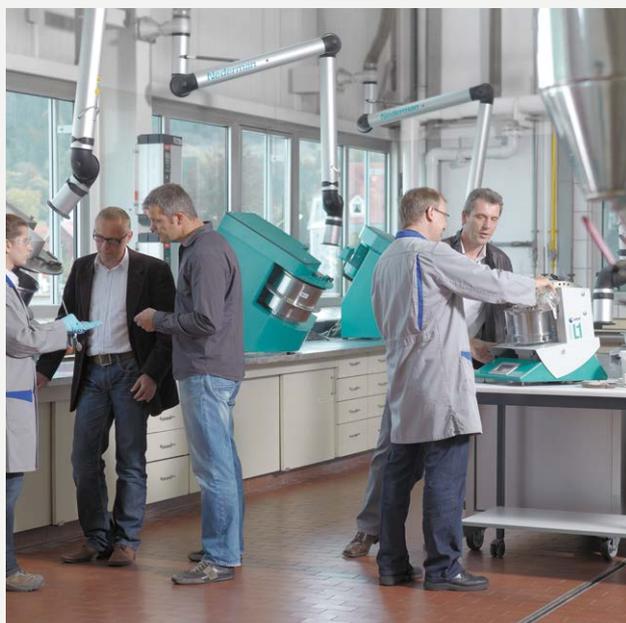
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Spacious premises with 2,500 sqm of floorspace house modern machines which are constantly modernized and added to for all relevant applications:



## Realistic investigations

- Laboratory and pilot machines, both for batch and continuous operation
- Complete processing lines with extensive peripheral equipment
- Process data acquisition
- State-of-the-art computation and simulation methods



An in-house test laboratory offers the following extensive equipment:

- Standard processes for particle measurement (dry and wet screening, air jet screening, cam-sizer, laser diffraction analysis)
- Microscopes with image capture
- Quick-test moisture measurement devices
- Drying chambers, muffle furnaces, diverse scales for analytical, fine and coarse weighing
- Molding sand testing units
- Photometers, IR cameras
- REM microscope
- Texture analyzer (a testing machine for determining the physical properties of diverse materials) for, e.g. determining granule strength

It is also possible to set up **temporary plant installations** for realistic investigations of process and system constellations.

Explosion-protected machines and systems enable tests to be carried out with combustible and potentially explosive solid materials and solvents.

Many customers and users make use of the opportunity to have **tests carried out with original materials**. On a laboratory scale materials in amounts of at least 50 g can be processed. On a production scale material amounts of up to approx. 500 kg can be processed.

You, too, can make the most of the fascinating possibilities offered by the Eirich Test Center and arrange a consulting meeting with us without obligation – and it can take place at your premises if you wish. Our professional team will be glad to advise you!





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

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More information at  
**[www.eirich.com](http://www.eirich.com)**