



New inspirations for your lab



- ④ **Latest company news**
- ④ **New instruments**
- ④ **New opportunities**
- ④ **New insights**

**1920**

Company founded as a technical precious stones dealer

**1955**

Specializing in sample preparation and particle sizing

**1962**

First patent: FRITSCH Planetary Mill

**1985**

First step into Laser-Technology

**1998**

Opening of the first foreign representative office in Singapore

**2007**

Milling down into the nano range

**2012**

FRITSCH *premium line* offensive for high-tech laboratory mills

TRADITION WITH A FUTURE

FRITSCH is more than just a brand: it is backed by a strong, medium-sized, family business in its fourth generation, which has been firmly embedded in the region since 1920 and globally active for decades with subsidiaries in Russia, Singapore, China and the USA as well as 2 employees in France. Today, this tradition is continued by Robert Fritsch, with the support of technical director Wolfgang Mutter, sales manager Wolfgang Simon, and approximately 100 employees. And with Sebastian and Maximilian Fritsch the next generation is ready to follow.

FRITSCH laboratory instruments for milling, sizing, sieving and dividing set the standard worldwide and are synonymous with efficient, reliable operation in industry and research. The innovative ideas of our development department are inspired by the close relationship with our customers and their practical work in the lab. Satisfied customers worldwide count on our quality, our experience and our service. This makes us proud and motivates us.

FRITSCH. ONE STEP AHEAD.



2014

New production facility at company's site in Idar-Oberstein



2015

A new generation is ready to follow

NEW  **ANALYSETTE 28 ImageTec**

Reliable and easy quality control with Dynamic Image Analysis

- **For suspensions and emulsions**
- **Extra wide measuring range of 1 μ m – 2.8 mm, individually adjustable**
- **Robust, high-performance camera with apochromatic lenses**
- **Unique lens revolver for up to 5 lenses**
- **Fast, simple operation via SOP control**
- **Practical tools for reliable quality monitoring**
- **Integrated image analysis software ISS**
- **Extensive library for morphological analysis**
- **Individual presentation of results**
- **Fast alternative to sieving**

Fast analysis of particle shape and size

The new ANALYSETTE 28 ImageTec is the ideal Particle Sizer for easy wet measurement with strong pumping power for particles up to 2.8 mm in suspensions and emulsions. Due to the Dynamic Image Analysis of particle shape and size, agglomerates and other disturbances are recognized even in the smallest amounts and can be viewed as single images and sorted out after the measurement. It is easy to use, for fast and directly accessible results in the FRITSCH Cloud: add sample, start dispersion and measurement, view evaluation – done.

**MEETS THE REQUIREMENTS
OF ISO 13322-2 FOR
DYNAMIC IMAGE ANALYSIS!**



ANALYSETTE 28 ImageTec
for wet measurement of
suspensions and emulsions

FRICTSCH ANALYSETTE 28 ImageSizer

- > For dry measurement of powders and bulk solids
- > Extra wide measuring range of 20 μm –20 mm, individually adjustable
- > Up to 4 telecentric lenses
- > Practical Clean Design of the measuring chamber
- > Optimal sample feeding
- > Measuring time under 5 minutes





QUALITY MADE IN GERMANY

We can essentially only control what we actually produce. This is why all FRITSCH-products are manufactured according to special, constantly verified quality standards at our German headquarters in Idar-Oberstein – with an extensive in-house production depth that is one of our particular strengths. All steel, aluminium and stainless steel metal parts are milled and turned in our CNC prefabrication area. Purchased items such as plastic housing and sheet metal parts are predominantly sourced from long-standing partners in Germany. Our production is meticulously performed manually in small batches by experienced, specialised personnel. With no assembly line and no piece work. This close connection is important to us and is a key condition for that special FRITSCH-quality.

Our in-house development department produces new models from the initial idea right through to the prototype, which is prepared for production after a series of endurance tests – always inspired from your practical work routine as well as from intense interaction with the FRITSCH laboratory.

This is how FRITSCH works.



NEW**Variable Speed Rotor Mill**
PULVERISETTE 14 *premium line*

The new standard for Variable Speed Rotor Mills

- **Powerful grinding with 22,000 rpm for particularly fast sample throughput**
- **Max. feed size < 15 mm, sample throughput of up to 15 l/h and more**
- **AutoLOCK grinding chamber for particularly safe work**
- **Final fineness down to $d_{50} < 40 \mu\text{m}$, sieve rings 0.08 – 6 mm**
- **Particularly good cooling of the grinding material**
- **Pleasantly quiet operation**
- **Very easy to clean due to Clean Design**

The FRITSCH Variable Speed Rotor Mill PULVERISETTE 14 *premium line* offers impact, shearing and cutting comminution in one instrument – with a higher performance, better cooling and significantly quieter than comparable instruments. Its powerful motor is ideal for the particularly fast comminution of soft to medium-hard, brittle as well as fibrous materials and temperature-sensitive samples with an extremely fast sample throughput of up to 15 litres and more per hour, depending on the material and parameter settings.

**MORE
POWERFUL**

A high-speed motor with ceramic bearings ensures a particularly high impact and rotor speed with an extra powerful 22,000 rpm.
Your advantage: finer results in shorter times.

COOLER

The new PULVERISETTE 14 *premium line* cools your sample during grinding significantly better than comparable instruments. Your advantage: melting or sticking of the grinding material is greatly reduced, even with temperature-sensitive samples.

SAFER

The new AutoLOCK grinding chamber facilitates automatic opening and closing with clamping and crushing protection. The additional Intelligence-Safety-Control-System only allows the instrument to start if the grinding set is fully and correctly inserted.



**PULVERISETTE 14
*premium line***

Multifunctional: comminution with impact or cutting rotor in one instrument

The best even better

The FRITSCH *premium line* principle

Making the best even better: According to this principle we develop and produce the high-tech laboratory mills of the FRITSCH *premium line*. Additional power gives them an edge over comparable instruments. And even more practice-oriented equipment elements make working with them even easier, more comfortable, faster and safer. Inspired by ideas, which make your work easier – for *premium* results with absolute reliability.

FRITSCH *premium line* – the high-tech standard for the modern laboratory.



Planetary Micro Mill **PULVERISETTE 7** *premium line*

With highest rotational speeds
for ultra-fine grinding results
down into the nano range

premium line

Jaw Crusher
PULVERISETTE 1
premium line

Extra strong
with up to 3 kW drive power



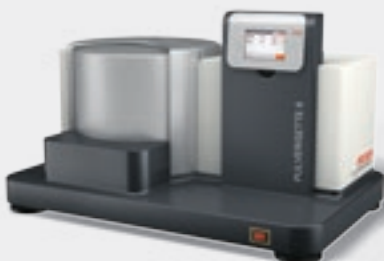
Disk Mill
PULVERISETTE 13
premium line

For efficient fine grinding
of hard-brittle to
medium-hard solids



Planetary Mill
PULVERISETTE 6
premium line

For fast and powerful
wet and dry grinding
down into the nano range



Variable Speed Rotor Mill
PULVERISETTE 14
premium line

Efficient pre- and fine grinding
in one instrument with
impact or cutting rotor



NEW  **Knife Mill PULVERISETTE 11****Multifunctional
an industrial-grade version**

- > Very fast and gentle comminution and homogenisation
- > For moist, oily, fatty, soft, medium-hard and fibrous samples
- > Recipe creation that is simple to programme and save
- > Separated knife holder for easy and thorough cleaning
- > Cost efficient knife replacement
- > Autoclavable 1.3 l collecting vessel made of plastic, glass or stainless steel
- > Practical compression lid for clean grinding
- > Pleasantly quiet operation
- > Cooling possible

NEW  **Universal Cutting Mill PULVERISETTE 19****Now available completely
in stainless steel**

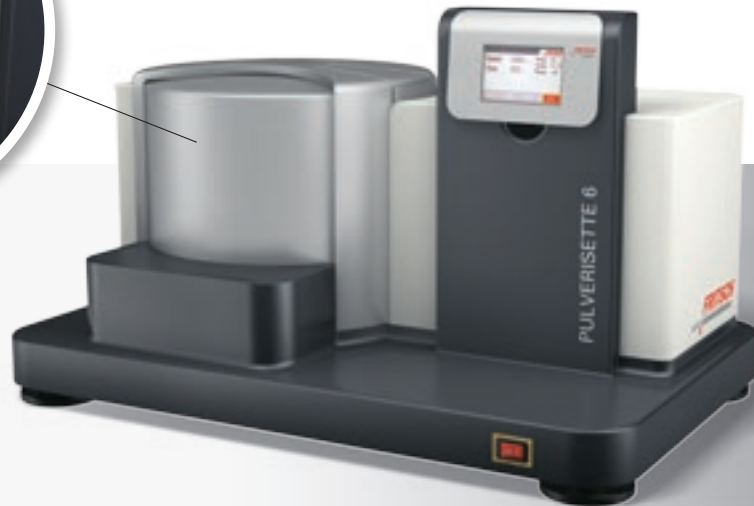
- > Ideal for soft to medium-hard, tough-elastic and fibrous materials
- > Especially for the analytical sector, the food and pharmaceutical industry
- > Completely designed in stainless steel 316L – corrosion-resistant
- > Particularly resistant to alkalis, acids and media containing chloride
- > Easy operation and cleaning
- > Materials comply with the FDA and EU directives for the food and pharmaceutical industry

- > Ideal for combining with the new FRITSCH high-performance cyclone separator





Especially safe:
the new automatic
grinding bowl clamping ServoLOCK
of the PULVERISSETTE 6 *premium line*



NEW  **Planetary Mill PULVERISSETTE 6 *premium line***

High-performance grinding down into the nano range

- **Extra strong 2.2 kW drive power and extremely high centrifugal acceleration**
- **Brand new motor-driven grinding bowl clamping ServoLOCK**
- **2 working stations for grinding bowls with up to 500 ml volume**
- **Tightly sealed grinding bowls even under overpressure**
- **Touchscreen operation with colour display**

The new FRITSCH Planetary Mill PULVERISSETTE 6 *premium line* has been developed as a ,big sister' to the PULVERISSETTE 7 *premium line* for fast wet and dry grinding, mechanical alloying, mixing and homogenising of larger sample quantities with reliable results down into the nano range. With double drive power, even faster comminution and a brand new automatic clamping of the bowls, the mill is easier and safer than ever to use.

Convince yourself!

“Bones with meat scraps – that’s a really special challenge”

An interview with Leo Benes, the new supervisor of the FRITSCH laboratory

> MR BENES, WHY IS IT IMPORTANT THAT FRITSCH HAS AN IN-HOUSE LABORATORY?

To begin with, we work closely with our Development Department by incorporating the user’s perspective into the development of new instruments – mainly in terms of their frequent operation and simple handling as part of the lab routine. Of course we also perform functionality tests on the prototypes. First and foremost however, our laboratory is important because in most cases, it’s not that simple for our customers to decide which is the right mill for them. You

can’t generalize samples. Or to put it another way: There isn’t THE perfect mill for THE sample – the decisive factor is always what is most important for the customer – for example final fineness or grinding time. Only creative thinking and trying things out with more than just one instrument in order to find the best solution help here. This was recognised in the 1960s and led to the setting up of FRITSCH’s own laboratory. Today, customers and potential customers from all over the world send us approximately 3,000 samples each year for free-of-charge sample grinding and analysis.

> DO YOU REMEMBER ANY PARTICULAR CHALLENGES?

There certainly have been some, although it’s hard to name a favourite. But bones with meat scraps – that’s a really special challenge. Reactive samples such as gypsum in water are equally challenging in the area of particle sizing. Or cocoa beans, which are very demanding due to their high fat content. Or samples, which ignited spontaneously without realising this in advance. Recently, nano grinding has become a hot topic – for example nano grinding of lithium ions for fast battery charging times – and we’ve been able to find a



solution here too. Generally, we start by grinding all the samples using the mill desired by the customer and then we test two or three others if we think that they might be more suitable. In the end, we always come up with a clear recommendation.

> ARE THERE ALSO CASES WHERE YOU CAN'T FIND A SOLUTION?

In reality, approximately half of the things that customers want to do with a given instrument won't work that way. In most cases however, the inclination is right and we keep on trying until we find a solution that fits. But this may take us a couple of days. In one instance, for example, a customer wanted to grind cut-up car tyres. The problem was that the metal parts contained in the tyres were left over as long pieces. Our recommendation here was to sieve the ground sample and grind the metal parts separately. However in some cases we can't find a direct solution – for example if customers want a dry grinding right down into

the nano range. Here, we would try to persuade the customer that wet grinding is the only option and would show them how this could be conducted.

> YOU BECAME SUPERVISOR OF THE FRITSCH LABORATORY ON APRIL 1ST, 2015 – SUCCEEDING ULRICH GERBER.

Yes, that's right. It's an indescribable feeling, and also quite a lot of pressure to shoulder this responsibility. After all, Ulrich Gerber set up the laboratory and managed it for more than 40 years. Now I've got to gain experience myself. What helps enormously is the fact that I previously worked in the laboratory from 2005 to 2009, and we are going to remain in close contact and exchange ideas and information. It also meant a lot to me to hear him say, on leaving, that he regarded me as a worthy successor.

> ARE THERE ANY AREAS IN WHICH YOU INTEND TO PROVIDE NEW IMPULSES?

I have a different personality, and times have also changed. In specific terms, this means that certain processes have to be modernised – I'm thinking in particular of the digitalisation of our sample processing, which we are intending to rethink and reorganise. New technologies and insights also require new ways of thinking, for example with regard to tests on the ideal ball filling. Here I am pleased to be able to build specifically on the work of Ulrich Gerber, which constitutes an excellent basis.



Send us your sample for a free-of-charge sample grinding or analysis!

The relevant form, together with a comprehensive database of grinding and particle sizing reports, can be found at www.fritsch.de.





New production facility

When the new, 4,900 m² production facility above FRITSCH's company headquarters in Idar-Oberstein was brought into service in the summer of 2014, the entire production process – from the raw materials supply right through to the assembly of the completed instruments – was reunited under one roof. For shorter distances, simpler processes and a pleasant working environment.

The ground floor, with a total floor space of 2,400 m², now provides ample room for three key areas. The first area is for incoming goods: raw metal arrives here via two new loading ramps, where it is cut to size. It then moves on to the CNC prefabrication area, where it is transformed into a full complement of turned and milled metal parts on ten high-performance machines. A state-of-the-art exhaust system, continuous air-conditioning and efficient heating via ceiling spots ensure not only that the air quality is high, but also that the processing quality is at a constant, optimum level.

Finally, the ground floor centrepiece is comprised of seven assembly islands, on which the FRITSCH laboratory instruments are manufactured in small batches. Particular areas are equipped for welding, bonding, painting, and high-voltage tests. The second floor has 800 m² of space, half of which is used as an assembly area for Particle Sizers. The remaining 400 m² is utilized as a large warehouse for individual parts. One other interesting detail: the new facility is connected to the company headquarters by a pneumatic tube system, which allows small items weighing up to 8 kg to be sent from one location to the other.

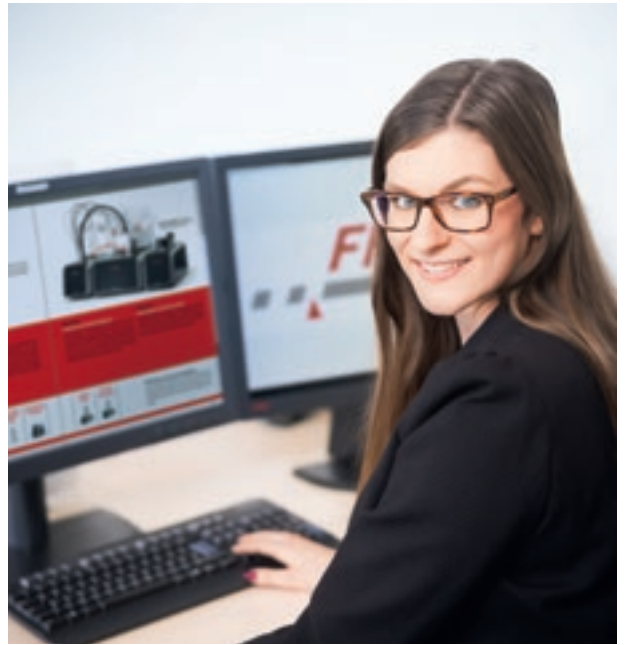




Investing in the future

Companies need skilled staff, and training is a very important topic for FRITSCH. So in addition to our current total of five apprentices, two trainees, one student trainee on a dual study programme and two undergraduate interns, we are also involved in the annual “Education Day”.

Nearly 400 school students used the Education Day to find out about the possibility of an apprenticeship or traineeship, in an informative and entertaining mix of presentations, guided tours, demonstrations and discussions. In the presentations and subsequent rounds of talks, job descriptions of industrial clerks and industrial mechanics were presented, a model example of a training schedule was discussed, and insights given into typical training and working days, as well as further professional development opportunities. Production manager Hermann Michel then gave visitors a tour of the facility to explain right there on the factory floor how the laboratory instruments are manufactured, from raw parts right through to the finished product, and answered



many questions. An important and popular aspect of the day was the opportunity to exchange ideas and information with FRITSCH's current apprentices which provided answers to specific questions and generated enthusiasm for their apprenticeship.

QUALITY CONVINCES > At the EUROLAB 2014 trade fair in Warsaw, the new FRITSCH Particle Sizer **ANALYSETTE 28 ImageSizer** distinguished itself from the many other laboratory instruments on show by receiving a prize in the **Best Products at EuroLab 2014** competition in the category Laboratory Measuring Instruments.

The independent, high-calibre jury, consisting of professors from the faculty of the University of Technology (Institute for Chemistry) Warsaw and led by Prof. Dr. Hab. Jerzy Golimowski, paid tribute with this award to the FRITSCH-innovation for measurement of particle shape and size using Dynamic Image Analysis. Among the instrument's

**FRITSCH
innovation
convinced
high-calibre jury**

many features are its measuring range of 20 µm – 20 mm, the optical analysis of particle shape and size, which enables damaged particles, contaminants, agglomerates and oversized or undersized particles to be quickly and accurately identified and viewed as single images, and its fast measuring

time: delivering an immediate result under 5 minutes depending on the sample quantity.



All the best!

If there's one thing a company can be particularly proud of, it's surely its long-standing employees, whose experience shapes our work, is passed on to junior colleagues, and even benefits our customers. This is why honours and farewell parties are firm fixtures on FRITSCH's annual calendar.



Karl Sauerbeck and Frank Schatto have each achieved 28 years with the company. Both bring with them many years of experience in manufacturing FRITSCH-instruments.

And our new retirees and former colleagues Paul Kovavec, Wilfried Schäfer, Günter Thömmes and Horst Martin, have collectively worked an amazing 136 years at FRITSCH.

Ulrich Gerber set up and then ran the FRITSCH laboratory for an impressive 43 years. FRITSCH-customers and colleagues all around the world appreciate the immense knowledge of "Mister Laboratory" in the field of sample preparation and particle sizing. Now he is passing the baton to the next generation, although he will keep in touch even in retirement.

> We say: All the best!

Team spirit

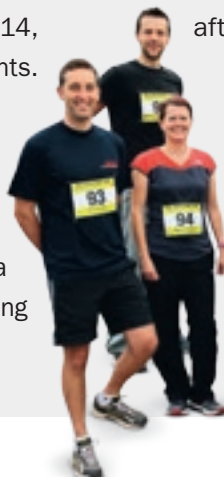
The FRITSCH-team's sporting activities show that work and fun can really go together – and prove to be a winning formula! At the annual corporate challenge race "Die Wirtschaft läuft" at Birkenfeld, our runners fought their way to 19th place in September 2014, out of a total of 66 teams and 580 race participants.

> Congratulations on this fantastic achievement!

FRITSCH's soccer team is also doing the company proud, winning the opening game at the Breitenenthal sports festival in May with a respectable final score of 3:2 against neighbouring firm Leysser.

The team demonstrated impressive speed and agility and finished the tournament in second place overall.

FRITSCH's in-house fitness studio offers all those who want to stay fit the opportunity to get in shape or unwind during their lunch break or after work.



And on each 1st and 3rd Tuesday of every month, the mobile massage therapists provide a 20-minute massage for a relaxed back. All employees can choose between the offer of a massage, or an allowance for a professional fitness studio.

What's new? FRITSCH at ACHEMA



“New inspirations for your lab” – this is the slogan under which FRITSCH will be presenting its latest ideas and innovations at the ACHEMA 2015 trade fair in Frankfurt – hall 4.1 · stand J49

As ever, the question at the heart of the matter is how to make daily work in the laboratory easier, more efficient and safer. For example with totally new, self-clamping of the grinding bowls of the new Planetary Mill PULVERISETTE 6 *premium line*, which can now be used to grind even bigger quantities down into the nano range; with a new standard for Variable Speed Rotor Mills; or with the Laser Particle Sizer ANALYSETTE 22 for measurements with static light scattering down into the nano range.

International presence

85 % EXPORTS

85% of our sales are generated through exports. FRITSCH has a corresponding presence at various international trade fairs, either directly or through our partners. In 2015, for example at CISILE in Beijing, Ceramics Expo in Cleveland / Ohio, POWTEX in Osaka, KHIMIA in Moscow, Analytica in Vietnam or ARABLAB in Dubai.

Details of all current trade fair attendances can be found at www.fritsch.de/fairs.

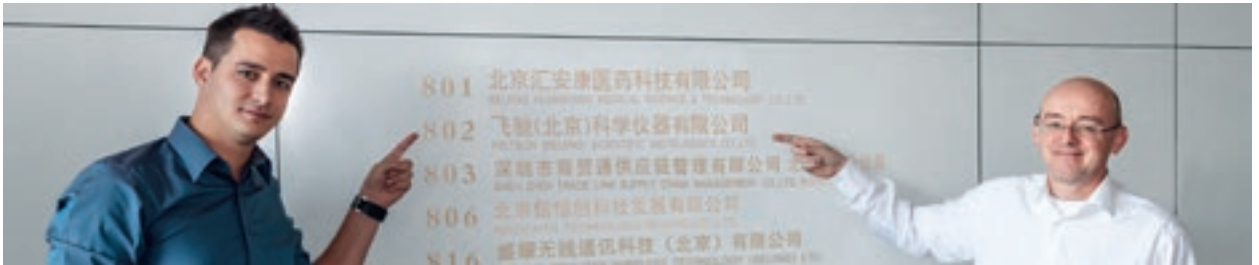
Showing you how it's done

FRITSCH-workshops, which are conducted all over the world, continue to be in high demand. The workshops, where participants can exchange ideas and information with our milling and sizing experts in sessions that are always tailored to their specific interests, have a theoretical part offering direct, expert insights into the possibilities of sample preparation and analysis. During the practical part, samples brought in from the participants are ground or measured in order to show participants their ideal FRITSCH-instrument in action and to test its simple operation.

Interested in attending a workshop?

You can find all our current workshop dates and a contact for registering at www.fritsch.de/workshops.

Second FRITSCH-subsi-dary in China



FRITSCH HAS TAKEN ANOTHER STEP FORWARD by opening a second Chinese office in Shanghai. From this base, the company can now maintain and further develop its markets in South China and in Hong Kong, which is only 120 km away. “Experience has shown that the Chinese market is split into 3 segments for us”, explained FRITSCH’s sales manager Wolfgang Simon. “Customers in research

areas such as universities and government institutions constitute the first segment. Chinese companies exporting to the EU also play a major role – they prefer to buy FRITSCH-instruments in order to be able to meet European standards. The third group is made up of multinational companies with a presence in China and which already know our laboratory instruments. They appreciate their

reliability and also like working locally with FRITSCH-products for sample preparation and particle sizing.” And a further expansion of the company’s presence in China is already being planned, with one or two additional FRITSCH-offices scheduled to open in the People’s Republic in the medium term.

FRITSCH. 领先一步

BIOFUEL 2.0 from straw and wood



Everybody is talking about biofuels as the only renewable alternative fuel for the mobility sector. Its drawback: the competitive situation for food production, which many detractors have criticised. This is where the development of climate-friendly and socially responsible second generation biofuels comes in, which only use elements that cannot be utilised for food – mostly the shoot axes or leaves of the plant.

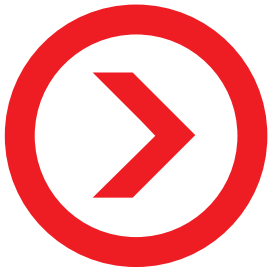
So in order to produce bio-ethanol from this via biocatalysis (fermentation) and bio process technology, preparation of the residual material is usually required. For this purpose, one of the largest chemical manufacturers in the world is working with the FRITSCH Universal Cutting Mill PULVERISETTE 19: the plant raw material comminuted using this mill is subsequently fermented in an enzyme bio-reactor and converted into biofuel. We have also determined the perfect mill and the ideal grinding parameters in a series of test grindings. And thus find ourselves right in the middle of the exciting field of Green Technology.



**Always informed:
FRITSCH E-news**



If you would like to receive regular, free-of-charge E-mails, with details of current developments, trends and useful information on milling and sizing, new FRITSCH-products, company news and much more, subscribe to the FRITSCH E-news by simply clicking on the link at **www.fritsch.de/e-news**.



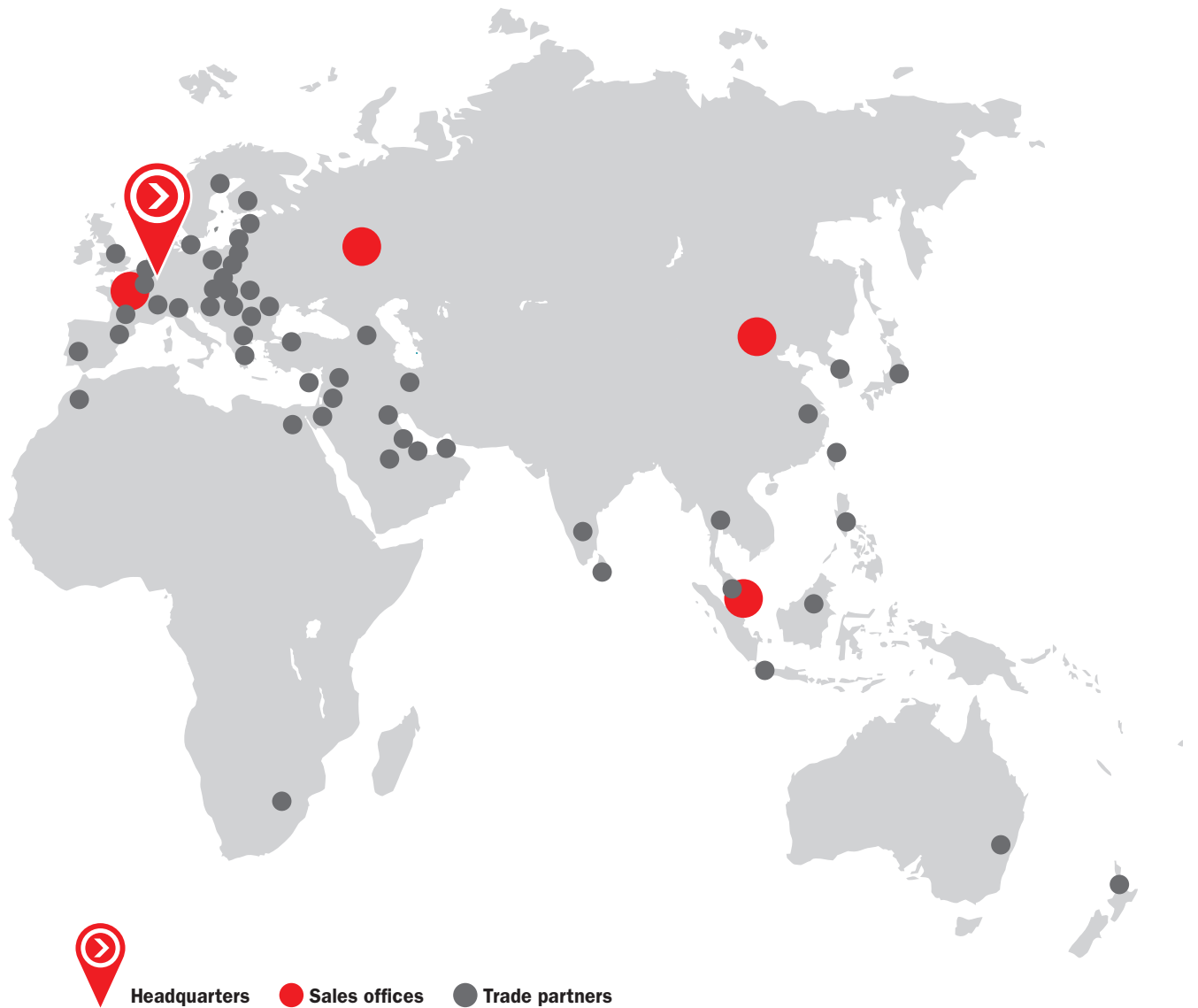
Worldwide

at your service



in 116
countries
around the
world





With its headquarters in Idar-Oberstein, four sales offices in the USA, Russia, Singapore and China, 2 employees in France and about 72 trade partners in all of the world's key economic regions, FRITSCH can always provide its customers with a direct point of contact for application consultation, technical service, and free-of-charge sample grinding and analysis.

On-site, personal and uncomplicated.

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