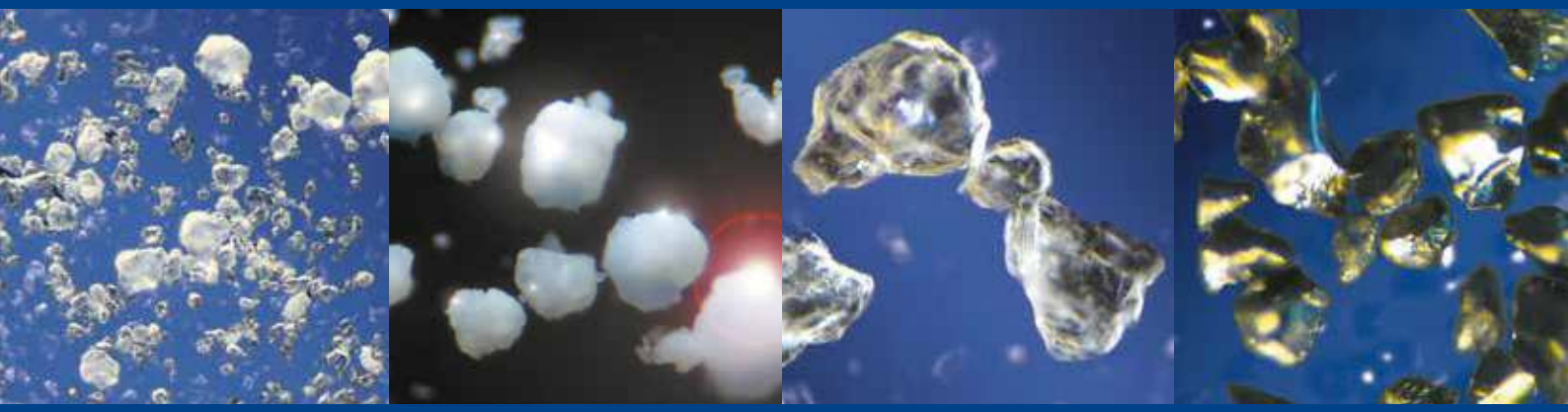
CLAUDIUS PETERS



Technikum

TECHNICAL CENTER

We know how

About

Contents

From its founding in 1906, Claudius Peters has grown to become a globally-respected engineering house and technology leader. From our headquarters in Buxtehude, near Hamburg, Germany and regional offices in the Americas, Asia and Europe, we serve the gypsum, cement, coal, alumina, steel and bulk materials handling industries around the world.

We are proud of our past, but we know it's the future that counts. We are committed to building on our long history of German engineering excellence, innovating and developing new products and solutions to meet the challenges faced by you, our customers. In doing so, we continue to set standards for the design, manufacture and commissioning of materials handling and processing systems.

Supporting sustainability

Our experts are able to assist with materials research to help develop innovative new technologies to support our customers' sustainability goals. Detailed analysis of the properties of materials has allowed us to advise on substitute components to help reduce the use of CO_2 across the industrial process.

Claudius Peters' headquarters, Buxtehude, Germany

Meeting global challenges
with greener solutions

Technikum

Laboratory and industrial-scale testing

The Claudius Peters Technical Center (Technikum) offers you the opportunity to test the physical properties of your materials and analyze how those properties will influence storage and handling. It even has its own industrial scale grinding plant for grinding and calcining various materials.

Leading through advanced research and testing capabilities

State-of-the-art technology to analyze any conveying, handling or storage task

Maintaining our position at the forefront of bulk material handling and processing technology requires hard work and dedication. At the heart of this effort, the Claudius Peters Technikum at our Buxtehude headquarters hosts a continuous program of research, development and test initiatives.

Our advanced laboratory, trial and testing facilities ensure that we meet customer requirements at all stages of the product lifecycle. During development, we are able to comprehensively test new products against operational demands. Every new application of our equipment is fully evaluated before proceeding to full-scale installations. We also have the capabilities to analyze and troubleshoot problems that you may be facing with your existing equipment.

Grinding tests with a real vertical grinding unit

A key part of our test facility is our industrial scale grinding and calcination station. This allows us to test new products or produce new grain sizes in an environment that closely mimics real-world conditions – guaranteeing the validity of our results to actual operating installations.

Claudius Peters Technikum

Advanced testing of our products; new ideas for our customers

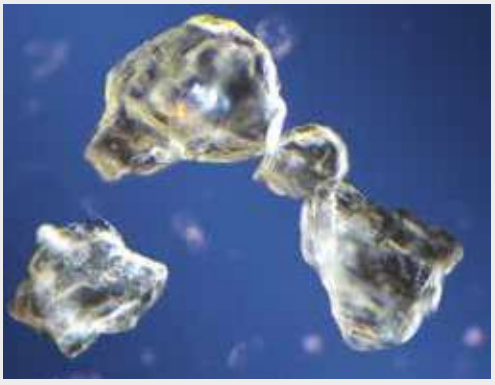
Laboratory

Thorough testing delivers best solutions

Setting the standard for analyzing dry powders

When characterizing powders, experience plays a decisive role – and we have been doing it longer than most, developing our first test protocol back in 1928.

Since that first test – which involved sieving graphite – we have amassed over 15,000 powder samples in our database and set benchmarks for the testing of dry powders. Indeed, for some industries, our test protocols have become the standard starting point for classifying and characterizing dry powders.



Gypsum granules magnified x100 (© Claudius Peters)

Our experts not only perform standard testing programs; they are also constantly expanding our testing capabilities, characterizing powders for our clients and for our own engineering projects.

Our testing and analysis procedures have come a long way since those early days. Today, we offer sophisticated material analysis – although sieving remains a key process!

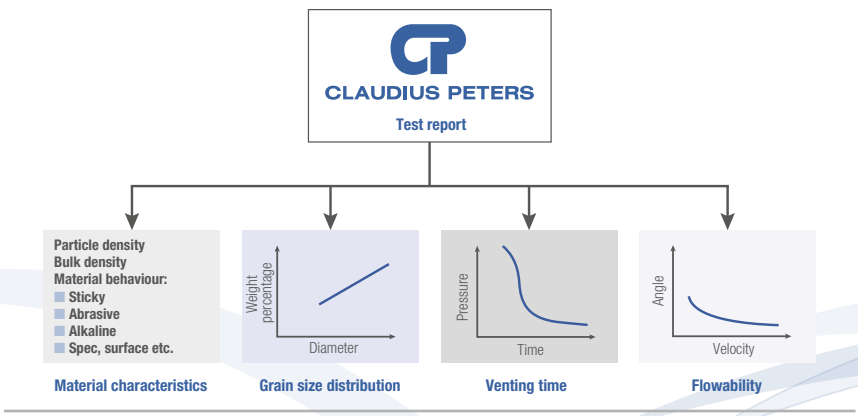
But we don't just analyze the properties of the powder; we look beyond to the implications for your processes and operations. As an engineering company, we are focused on using our knowledge and expertise to create viable and efficient solutions to solve real-world challenges.

Our workshop is where we put the insight gained in the laboratory into practice. Here, we are able to build prototypes, and small- or large-scale designs, to verify proposed solutions.

Specific testing includes:

- **Particle density**
- **Bulk density**
- **Particle size distribution**
- **Flow properties**
- **Fluidization properties**
- **Wear and attrition**
- **Setting times of gypsum**
- **Strength testing**
- **Climate chamber testing**
- **Grindability**
- **Shear testing**

Everything starts with a material test report



Conveying and Storage

Pneumatic conveying and FLUIDCON

Thorough testing delivers optimal power efficiency

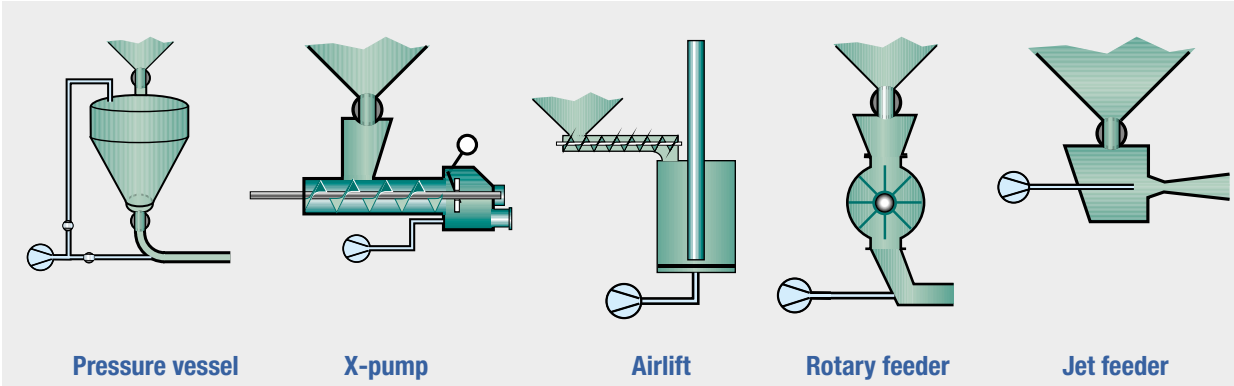
The Technikum provides you with the opportunity to test pneumatic conveying application in real-world conditions and scale, while varying the length and diameter of the pipeline, and the velocity of the powder.

After testing over 15,000 samples of dry powders, in most cases we are able to provide the optimum settings for pneumatic conveying applications simply by consulting our extensive database. However, if needed, we can undertake tests of all kinds of pneumatic conveying equipment at the Technikum.

With conveying lengths from a few meters up to 5000m, we are able to study all of the options – exploring new ground and providing innovative solutions, when required. The target is always to find the best solution for your operation.

Characteristics of bulk materials, determined from sample analysis, are used in configuration of the plant. The appropriate conveying procedure is determined by results from the bulk solids test and the conveying tests, along with the customer's basic conveyance data. Once this is determined, the plant can be designed for optimal power efficiency. The required task and the bulk solid's behaviour will then determine selection of the conveying mode.

Pressure vessel cycle



We can run a test with all these types of feeding device and offer you the most suitable.

FLUIDCON, an example of success

Low attrition and energy consumption

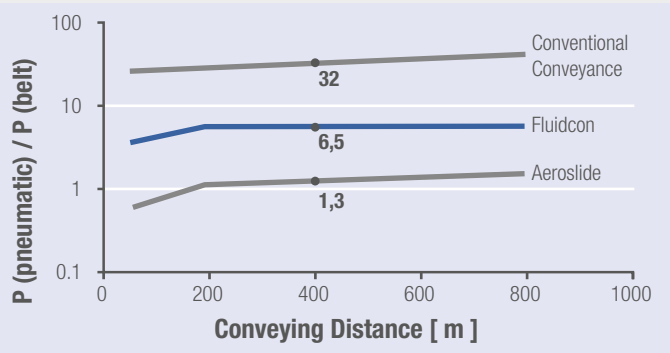
Our groundbreaking FLUIDCON pneumatic conveying system would not exist without the Technikum, where we were able to test different parameters to achieve an optimized design. So cutting edge was the project – and advanced our facilities – that several students wrote their theses on the new system, before the invention went public.

Efficient, environmentally-friendly systems at lower cost

Two pneumatic conveying lines are installed at the Technikum, giving us the opportunity to simulate different operating states under real-world conditions and scale.

Detail of FLUIDCON pipe

The Claudius Peters FLUIDCON system offers the advantages of pneumatic conveying with considerably lower energy requirement owing to it's unique aeroslide transportation principle within the transport pipe. Additionally, it provides a dense phase system with increased bulk material load. Depending on the transport pipe routing, the FLUIDCON system can substantially reduce power consumption, and be used to convey all fine bulk solids which can be fluidized with low air velocities expanding homogeneously during the process.



Grinding

The EM Mill

Grinding tests on an industrial scale

The Claudius Peters EM Mill is the preferred grinding and drying technology for the production of pulverized bulk materials, such as coal and petcoke, metal ores and other materials. A industrial scale mill is available at the Technikum.

At the heart of the Technikum's grinding system is the EM Mill, which brings grinding and classifying functions together in one compact unit.

A dynamic or simple static classifier can be used for grinding tests, while a range of parameters can be varied, including product fineness and temperature. After the test, samples of – or the complete batch – can be bagged and sent back to you for further testing.

Materials tested with the grinding mill:

- Alumina
- Anthracite coal
- Ash
- Bauxite
- Bentonite
- Blast furnace slag
- Calcium hydroxide
- Charcoal
- Cinder
- Clay
- Coal
- Coke
- Ferrite
- FGD Gypsum
- Gravel
- Gypsum
- Hard coal
- Kaolin
- Lignite
- Limestone
- Magnesite
- Marble
- Natural gypsum
- Ores
- Phosphogypsum
- Pozzolan
- Pyrite
- Quicklime
- Raw coal
- Recycled gypsum
- Red sandstone
- Sewage sludge
- Silicon
- Slag
- Titanium dioxide
- Titanium ore
- Torrefied wood pellets
- Wood briquettes
- Wood pellets

Equipment testing includes:

- Grinding new products
- Different temperatures
- Different finenesses

Calcining

Different Options

The EM Mill allows for very high inlet temperatures, as the grinding elements move freely inside the grinding ring.

This high inlet temperature, alongside its very consistent product quality, makes the EM Mill an ideal solution for gypsum – a fact that is well known and proven. However, the EM Mill at the Technikum has been used successfully to grind other materials, including calcined petcoke, coal, bentonite, clay, limestone, minerals, sewage sludge and titanium ore.

In addition to the EM Mill, the Technikum hosts the following range of calciners and kilns that are available for product testing.

Flash Calciner

- **Direct calcining of fine raw materials**
- **Two-stage flash calcining**

For temperatures between 400°C and 800°C and very low retention times, the flash calciner is the ideal tool. A industrial scale plant is available at the Technikum.

Horizontal Impact Calciner

- **Direct calcining of fine raw materials**
- **Deagglomerates only**

The Horizontal Impact Calciner (HIC) was developed specifically for the calcining of synthetic gypsum. With no grinding of this material needed, the HIC is designed to deagglomerate the feed material only.

Rotary Kiln

- **Controlled temperature**
- **Long retention time**

For installations that require rotary thermal process technologies, our partner, JND, supplies electrically-heated rotary kilns. Small-scale versions are available at the Technikum for material testing at temperatures up to 1000°C and retention times up to 1 hour.

Solid design meets high temperature in the EM Mill

Claudius Peters Flash Calciner

Claudius Peters Horizontal Impact Calciner

Packing systems

Discover the optimum packing solution for your product

With our in-depth knowledge of material handling properties, we understand that different products – with their different characteristics – require different filling and packing systems.

Palletizing systems

The bag characteristics and formats of the layer formation are decisive in the selection of the suitable palletizer. For this purpose, the requirements on the technology must be investigated and checked with the help of suitable equipment in our Technikum.

Palletizing systems

Big Bag Systems

Which Big Bag Station is the best technical and most economical solution?

Depending on the material and bag properties as well as the weight requirements, a wide variety of dosing systems can be selected:

- **Flow control gate**
- **Feeder screw**
- **Rotary gate**

Appropriate measuring devices are available in our Technikum.

Big Bag Systems

Packing systems

Consulting – by our specialists

Efficiency is crucial in all process steps today. Claudius Peters has the experts for pneumatic conveying, material handling and grinding. We take care of your problems, are happy to help you and develop new solutions. We are happy to share our knowledge with you if there are problems with existing equipment. Either through remote research, analysis of bulk material samples or plant visits.

We know everything there is to know about different bulk materials. Our core business is the handling and grinding of bulk materials. How can we help.

a) Is your plant running optimally?

b) Can resources be saved?

c) Is it worth investing in a new plant?

d) How can you improve the operation of an existing plant?

How can we help?

- **Customer service**

  The first point of contact for questions about our systems is customer service, where you will quickly get the right advice on how to operate your existing system.

- **Remote diagnosis with CP Live**

  If the problem becomes more complex, we offer CP-live. All you need is a secure data connection and a telephone. We walk through your system together.

- **Visit on site**

  We are happy to visit you at your facility and discuss problems in detail on site.

- **Standard tests in the Technikum**

  For product changes, we offer extensive testing options to determine the properties of the new products and to limit problem areas.

- **Customized trials in the pilot plant**

  We can carry out large-scale tests in the Technikum in Buxtehude. We can assess the existing equipment in your plant and optimize the process there. If needed, we can deliver products to our headquarters in Buxtehude and carry out tests.

- **Contact**

  If you need to analyze a previously unknown material or would like to conduct a field trial with your material, please contact us. We look forward to your request.

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STOCKYARD SYSTEMS
MARINE POWDER HANDLING
TURNKEY PROJECTS

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