Materials Trading

Raw materials for your applications

Concentrated competence in steel, metal and energy

thyssenkrupp

Corporate philosophy. We make your success our priority.

Operating on a global scale through an international sales and distribution network, thyssenkrupp Materials Trading is your partner for long-term success. With our local contacts around the world we are represented where the customers need us. Our core capabilities embrace complex logistic services for raw and finished materials along with supply chain dependability and consultancy for the downstream manufacturing and metalworking industries.

The driving force, motivation and inspiration behind our activities are our customers. Listening, understanding and then tailoring solutions to cope with new challenges: this is our mission to allow customers to concentrate on their core business.

The basis of our global network are our service-oriented employees. With their longstanding expertise in matters such as product, market and price developments as well as cultural facets, they enable us to precisely understand customer requirements and map out individual solutions from financing down to tailor-made transport concepts.

Thanks to our excellent network of relationships on the raw materials markets including exclusive marketing rights for such things as coking coal and our outstanding contacts with international pipe manufacturers we can ensure optimum price/performance ratios for our products and services.

thyssenkrupp Materials Trading wants to succeed together with you. Focus on your success and we'll take care of everything else. As a successful integrated system partner and universal material and raw material supplier we make your success our priority.

Just contact us - together we can create the best opportunities for further sustainable growth.

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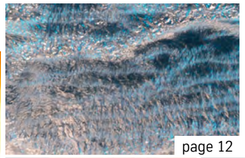
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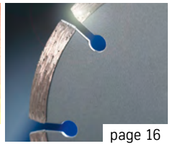
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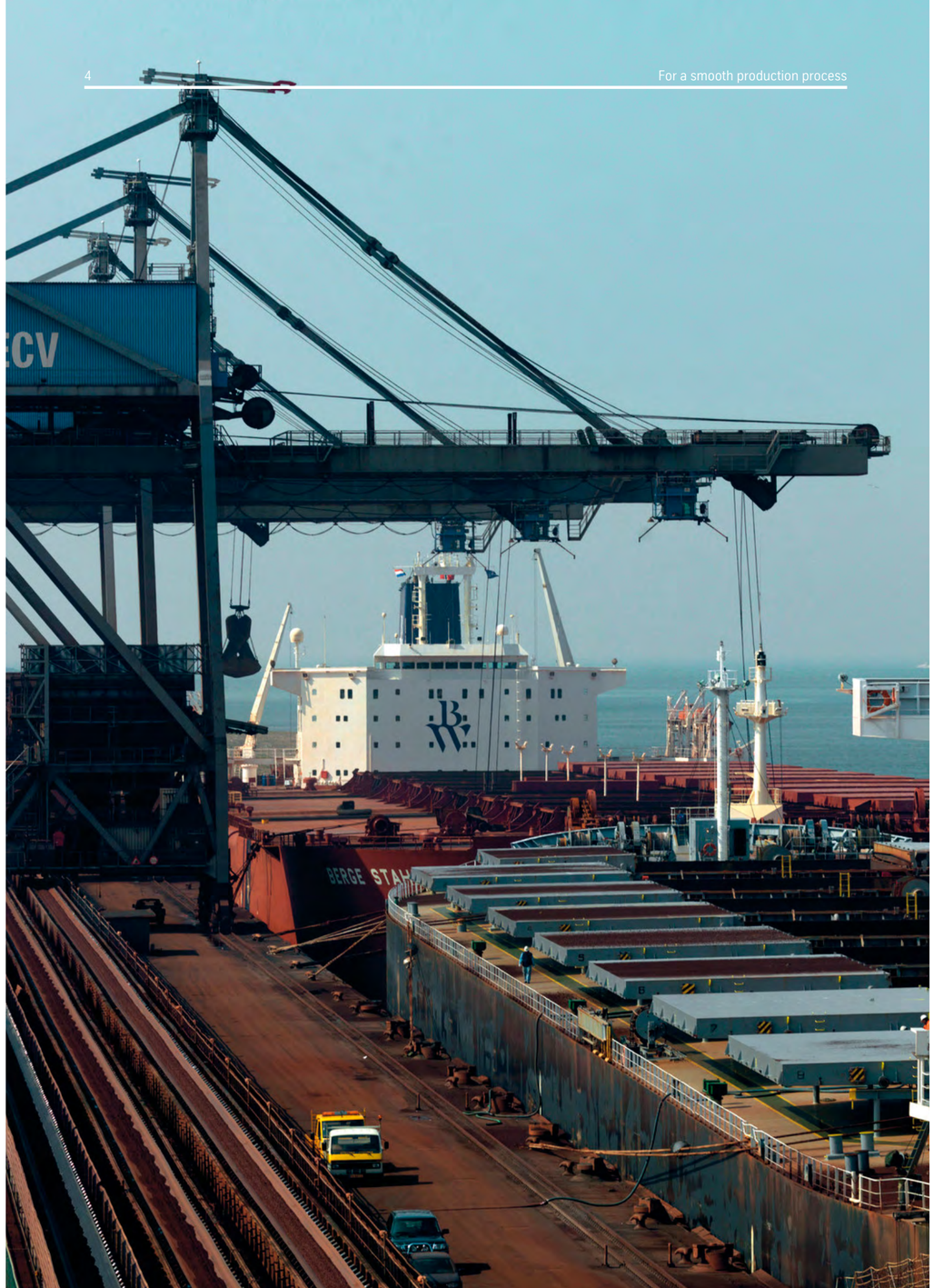


For a smooth production process

The networked company

Making production more intelligent.

As one of the world's leading trading companies, thyssenkrupp Materials Trading is a company of key importance for the global steel industry as well as other sectors. By providing a link between raw material suppliers and the processing industry, we find common ground to accommodate the needs of both sides, ensuring smooth production flows throughout the value-adding chain.

Concentrated expertise.

Embedded in the global ThyssenKrupp corporate group, we are able to pool resources and technical expertise to provide solutions for nearly any application in the metallurgical industry. We are exceptionally well connected in the raw material markets, and to some extent we have exclusive marketing rights (e.g. for coking coal). That, along with end-to-end quality surveillance, enables us to offer the best possible price/performance ratio for our products. We also work closely with the LME (London Metal Exchange) and have access to the expertise of the corporate Metal Hedging Competence Center (CCMH), making us the first-choice partner for our international customers.

Variety combined with security of supply.

We have created the intermodal, eco-friendly BlackBoxX container logistics system which is gentle on the products and gives us just-in-time delivery capability. Through our AT.PRO tec subsidiary, we offer the patented Sequence Impulse Process (SIP), an engineering service which increases resource efficiency in blast furnaces, shaft furnaces and cupolas. Our Gas & Power Business Unit supplies the gas and electricity needs of the entire corporation.

Our portfolio extends well beyond procurement. We are the right partner to address for your processing, logistics, engineering and management service needs in every aspect of the metals and energy business.

Our products:
- Carburizers
- Alloys
- Solid fuels
- Industrial minerals
- Metals
- Powder materials
- Technical gases
- Energy services

Competencies and holdings:
- BlackBoxX transportation for foundry coke
- CCMH
- Energy consulting
- Air separation facility
- SIP technology

The benefits to you:
- Consistent quality
- Security of supply
- Competitive prices

For the steel industry

Promoting growth

The steel industry plays a key role in the economy by driving exports and setting the pace of global growth. We supply the basic materials needed for sustained economic expansion.

For demanding applications.

Demand for high-grade raw materials which are used to produce pig iron in a blast furnace or refine steel in a converter or electric furnace continues to increase. Machinery manufacturing is one example of an industry which is driving this trend. Producers are designing in special materials to increase the load rating and efficiency of their machines and reduce environmental impact. Take advantage of our in-depth procurement, processing and logistics expertise to make specific optimizations to your production process so that you always deliver products to your customers that are fit for the future.

Advanced blast furnace technology: SIP.

Pulsed injection of oxygen using our patented SIP (Sequence Impulse) process significantly enhances the melting process in a shaft oven. In our capacity as service provider, we take complete responsibility for installation and integration into your system.

Carburizers
- Calcined anthracite
- Calcined coal
- Calcined (needle, petroleum, pitch) coke
- Synthetic graphite

Solid fuels
- Coke
  - blast furnace coke
  - small coke
  - coke breeze
- Coal
  - pulverized coal (PCI)
  - coking coal

Alloys
- Precious alloys
  - ferro-molybdenum
  - ferro-nickel
  - ferro-niobium
  - ferro-titanium
  - ferro-vanadium
  - ferro-tungsten
- Ferro-chromium alloys
  - ferro-chromium (high, medium, low carbon)
  - South African chromium (charge chromium)
  - ferro-silicon-chromium
- Bulk alloys
  - ferro-silicon
  - ferro-silicon-aluminum
  - ferro-manganese (high carbon, medium carbon)
  - silicon-manganese

Minerals
- Fluorite

Non-ferrous metals
- Primary nickel
  - cathodes
    - Standard LME grade (cut/uncut) (geschnitten/ungeschnitten)
    - premium grade (cut/uncut) (geschnitten/ungeschnitten)
  - briquettes
    - Standard LME grade
    - steel making grade
  - pellets

Process technology
- SIP (Sequence Impulse Process)

Other products:
- Metals
  - aluminum (2A)
  - electrolytic manganese metal
  - titanium sponge
- Ores
  - iron ore
  - manganese ore
- Other
  - calcium-silicon
  - ferro-silicon-nitride
  - graphite electrodes
  - cored wire

Coke

Calcined Petrolcoke

Fluorspar

Ferro-Chromium

Ferro-Silicon

Coaking Coal

Aluminium

For foundries and the metallurgical industry

Guaranteed security of supply

Foundries are part of the mainstream supply chain. In addition to quality and flexibility, security of supply is a key competitive advantage for our customers. As a raw material supplier, we understand that.

Your wish is our command.

To meet the needs in a wide range of applications, castings may have to be exceptionally hard or soft, heavy or light or resistant to heat or cold. The demands placed on the raw materials and the production process are equally challenging. We provide valuable expertise and all of the raw and process materials to meet your needs, ranging from metals and alloys to fuels, slag conditioners, coking agents and raw materials for sliding gate filler sand, and we deliver just in time.

Recarburizers are essential for correcting the carbon content in the molten metal. We have many years of experience in selecting the right grade.

Foundry coke is used in cupolas as a fuel and reducing agent. Foundry coke is large in size (normally 90–250 mm). Compared to blast furnace coke, production of foundry coke takes longer and is performed at lower temperatures.

We supply **alloy materials** in different purity grades to adjust material properties.

Our **chromite sand** is used as molding sand, core sand and facing sand in the production of parts that need to withstand high thermal stress, e.g. core work for engines.

Non-ferrous metals such as nickel and zinc are used in many applications in the automotive industry (e.g. exhaust manifolds and turbochargers), in brass production and in high-grade zinc alloys such as ZAMAK.

Carburizers
- Calcined anthracite
- Calcined coal
- Calcined (needle, petroleum, pitch) coke
- Synthetic graphite

Solid fuels
- Coke
  - foundry coke (BlackBoxX transportation)
  - small coke
  - anode-grade coke

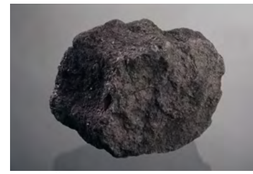
Alloys
- Precious alloys
  - ferro-molybdenum
  - ferro-niobium
  - ferro-titanium
  - ferro-vanadium
  - ferro-tungsten
- Ferro-chromium alloys
  - ferro-chromium (high, medium, low carbon)
  - South African chromium (charge chromium)
  - ferro-silicon-chromium
- Bulk alloys
  - ferro-manganese

Minerals
- Chromite sand

Non-ferrous metals
- Primary nickel
  - cathodes
    - Standard LME grade (cut/uncut)
    - premium quality (cut/uncut)
  - briquettes
    - Standard LME grade
    - steel making grade
  - pellets
- Zinc
  - SHG
  - HG
  - GOB
  - Zn-Al alloy
- Lead/tin
  - refined pure lead
  - pure lead
  - tin

Process technology
- SIP (Sequence Impulse Process)

Other products:
- Metals
  - aluminum (2A)
  - electrolytic manganese metal
  - titanium sponge

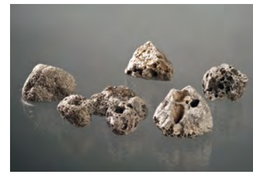


Foundry Coke

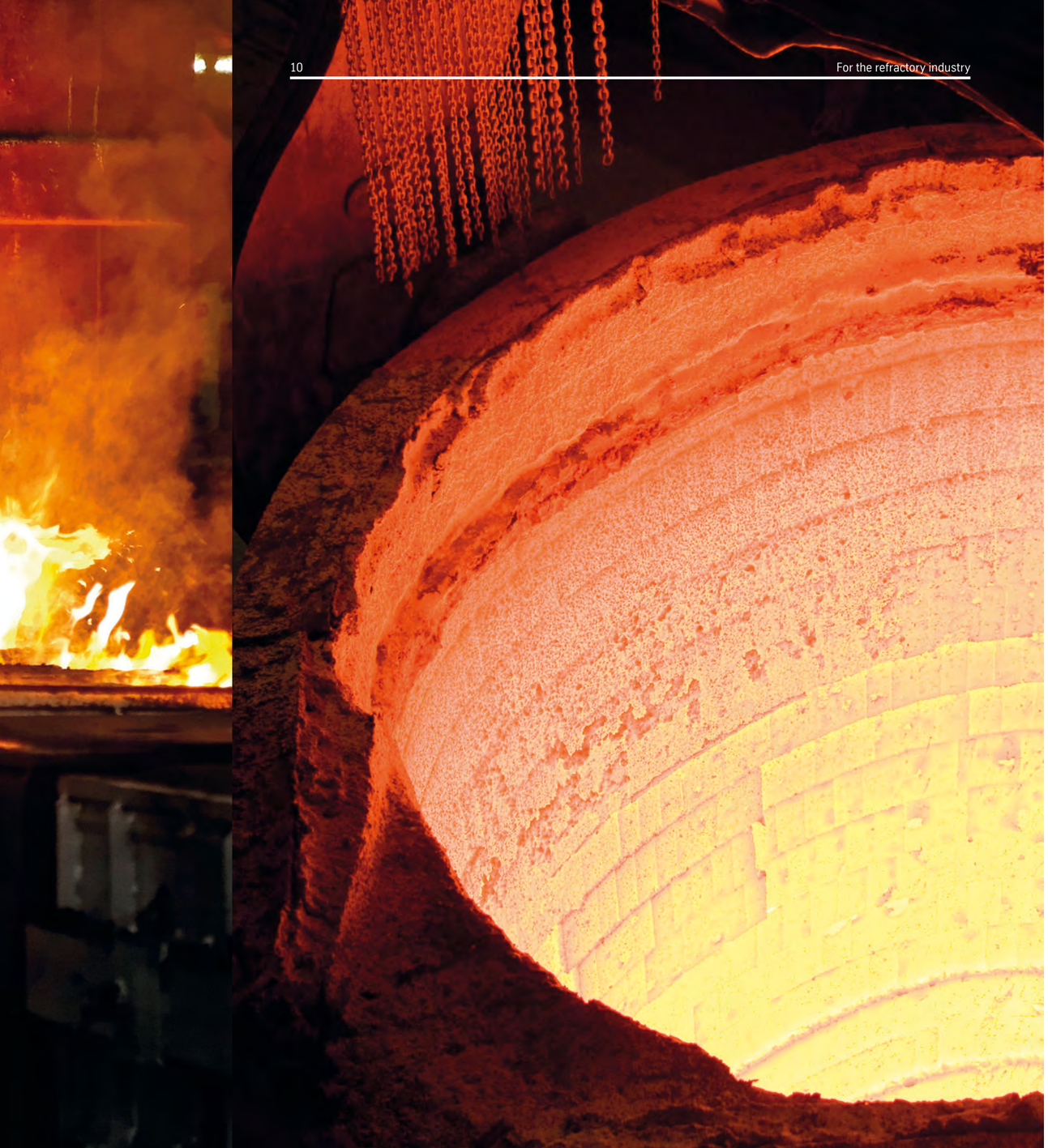
Chromite

Manganese Metal

Nickel Briquettes



Ferro-Chromium



For the refractory industry

Ensure quality

Minerals

- White fused alumina
- Brown fused alumina
- Bauxite
- Chamotte/flint clay
- Fused magnesia
- Sintered magnesia
- Chromite sand
- Graphite
- Ferrosilicon-nitride

Other products:

- Metals
  - aluminum
  - silicon

The quality of refractory linings depends to a large extent on the raw materials used to produce them. We have many years of experience and in-depth expertise, and we will help you make the right choice.

For temperatures up to 2,000°C and above.

Production/combustion of steel, ceramics, glass and refuse takes place for the most part at very high temperatures. Molded or unmolded refractory products make it possible to work at these temperatures. We supply high-grade materials for linings in applications with very high thermal and physical stress, e.g. on furnace runner troughs, in industrial furnace manufacturing, for high-wear materials and in crucibles.

Our **industrial minerals** are pressed, poured or hand shaped to make refractory brick. In combination with binders, including hydraulic binders, our raw materials are also used in a broad range of monolithics (compounds).

Our refractory range also includes **metals** such as silicon and aluminum.

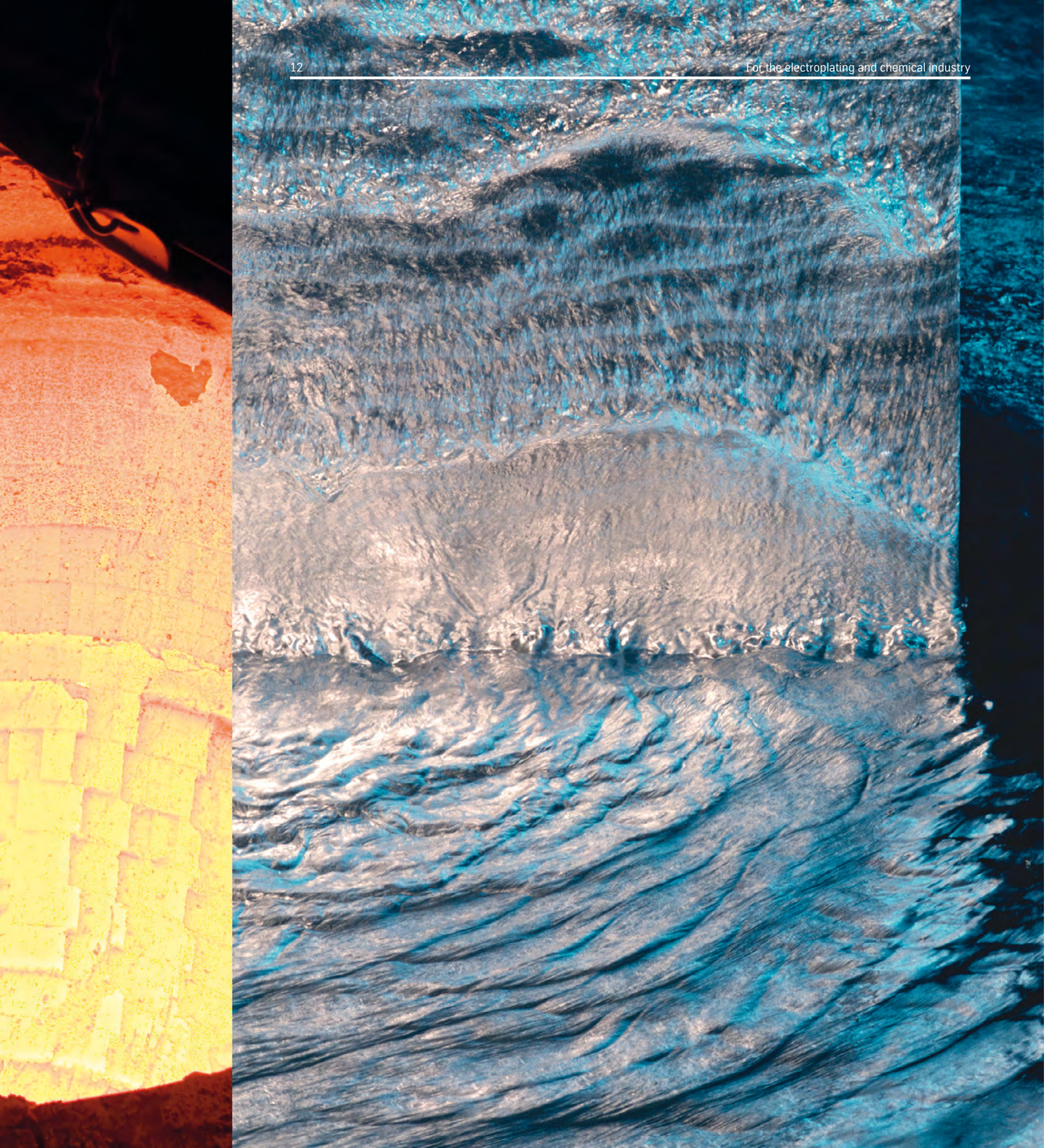
Magnesia (fused)

Chromite

WFA

Bauxite

Magnesia (sintered)



For the electroplating and chemical industry

Shaping the future

The chemical industry too has not escaped the effects of rising commodity prices in world markets. It is also clear, however, that demand for high-tech chemical products will continue to increase. We are well prepared.

Ready to take on the challenges.

The **nickel** we supply to the electroplating industry is used in a variety of different process applications. Our products are used for top-class surface treatment to meet the most demanding durability, functionality and visual requirements.

Our **zinc** is converted into zinc oxide which is used in the production of car tires, paint and pharmaceuticals.

In microchip and surface treatment applications, the **silicon** we deliver is used to an increasing extent in inorganic chemistry to produce trichlorosilanes (semiconductors) and methylchlorosilanes for making silicones.

We also offer a broad portfolio of **alloys** for the electroplating and chemical industries, e.g. alloys used in hard chrome-plating or as chemical catalysts.

Electroplating industry

Non-ferrous metals

- Primary nickel
  - cathodes
    - Standard LME grade (cut/uncut)
    - premium quality (cut/uncut)
  - briquettes
    - Standard LME grade
    - steel making grade
  - pellets
- Zinc
  - SHG
  - HG
  - GOB
  - Zn-Al alloy
- Lead/tin
  - refined pure lead
  - pure lead
  - tin

Chemical industry

Alloys

Ferro-chromium alloys
- ferro-chromium (high, medium, low carbon)

- Bulk alloys
  - ferrosilicon

Other products:

- Metals
  - aluminum
  - electrolytic manganese metal
  - magnesium
  - silicon

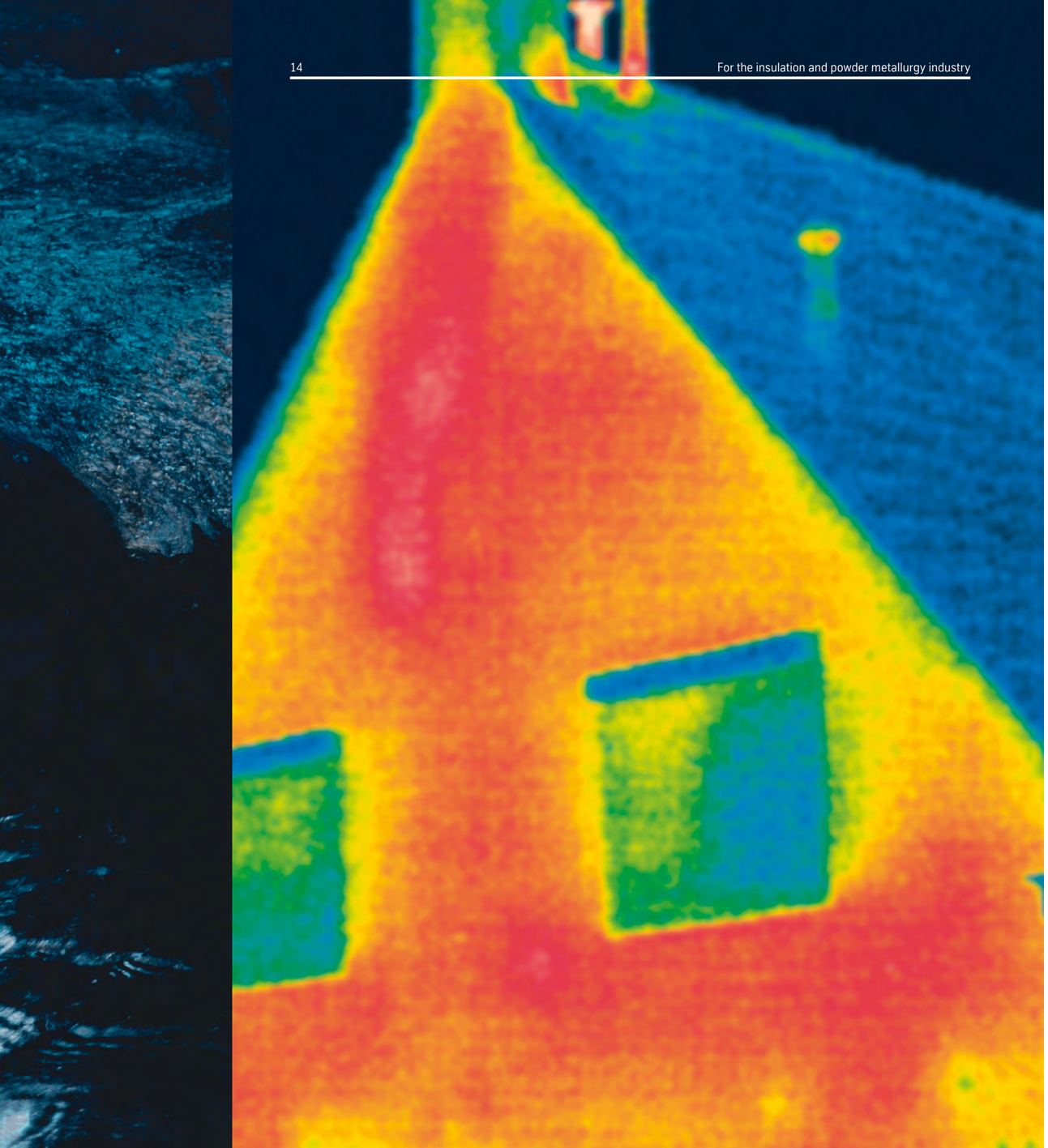
Nickel Pellets

Zinc Ingots

Ferro-Chromium

Ferro-Silicon

Silicon Metal



For the insulation and powder metallurgy industry

Achieve goals

Insulation materials

Solid fuels

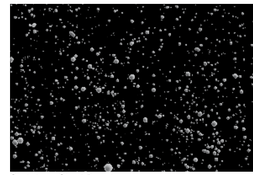
- Coke
  - foundry coke
  - anode-grade coke

Powder metallurgy applications

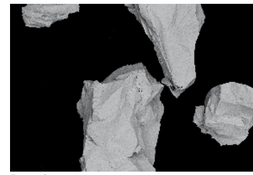
Products

- Ferroalloys
- Carbides
- Pure metals
- Extra-fine high-alloy powder (metal injection molding)
- Nitrides
- Nitride

Foundry Coke



Stainless Steel Powder (microscop.)



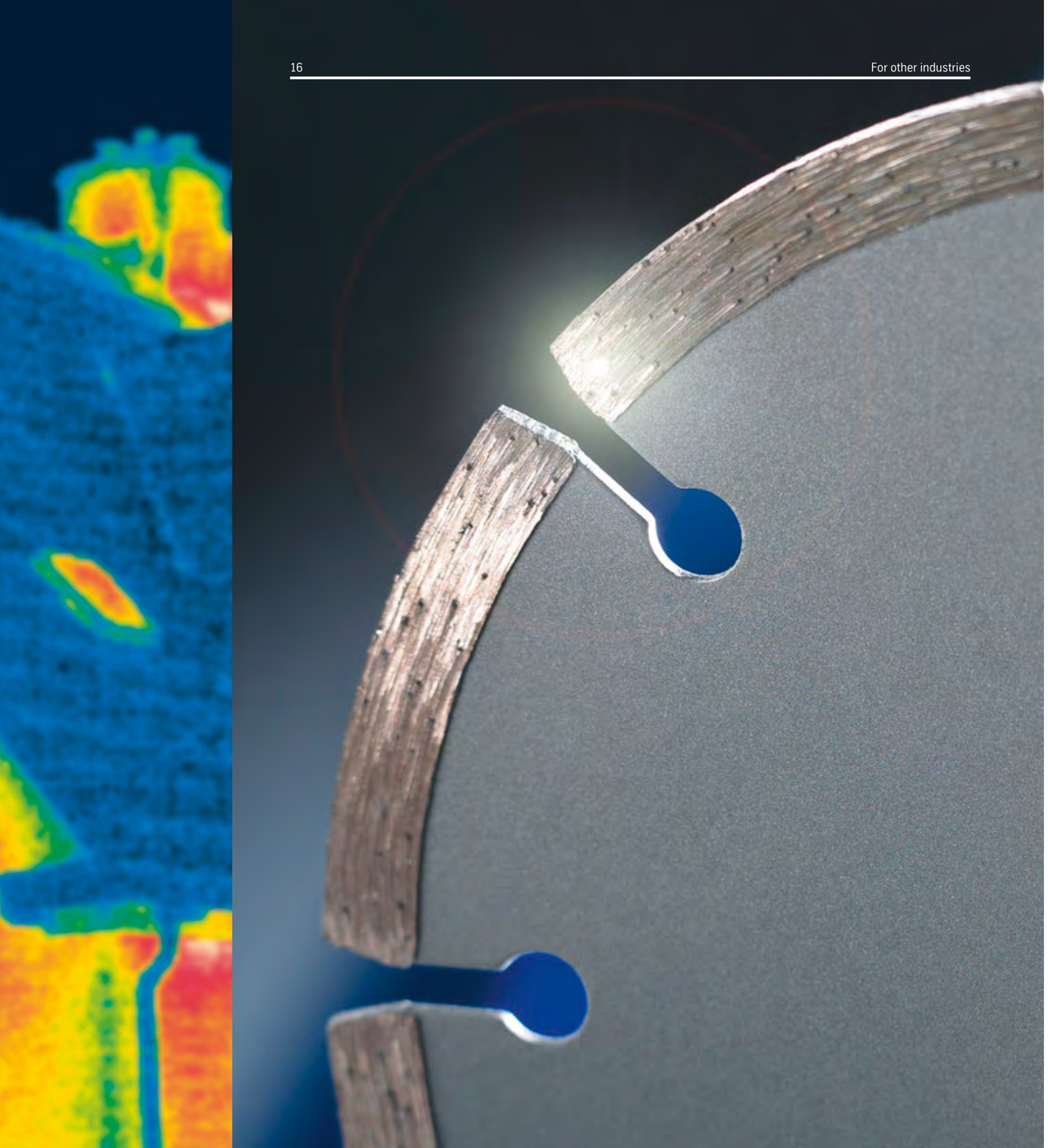
Ferro-Chromium (microscop.)

The materials have to be as varied as the range of applications, and this is particularly true for powder metallurgy. This is not a problem for us.

Custom materials.

Stone wool is a highly effective and very versatile insulation material. **Coke** which we supply in the form of foundry coke is used to melt the rock (basalt or dolomite) for the production of stone wool.

Manufacturers of welding consumables, hard plating and diamond cutting tools as well as companies in the medical equipment and automotive supply industries can procure nearly all of their powder metallurgy materials from us. If it is technically feasible to produce a metal powder, then the product is very likely to be in our portfolio, including low and high alloy and ferrous and non-ferrous alloy products. Besides standard powders, we can also provide engineered alloy powders. Grain shape and size, bulk density and pourability can be varied over a wide range. For example we can supply water atomized powder in grain sizes between 2 and 12 um. The geometric shape of the grains is optimized for the particular application, ranging from irregular to nearly spherical.



For other industries

Use our diverse range

Our raw materials are very versatile and often irreplaceable. We offer a large selection of standard and special products at fair prices.

Cross-industry competence.

Cable manufacturers source **copper** from us to produce a range of semi-finished products including strip, wire, sheet, plate, tube and rod. These products are frequently used in the electrical/electronics, vehicle manufacturing and construction industries.

We supply **zinc** to galvanizing plants for hot-dip galvanizing of steel girders and steelwork. Galvanizing provides corrosion protection for hardware.

We supply **lead** to the automotive industry for battery production.

Metals and manganese alloys are being used to an increasing extent in the aluminum industry to improve product strength and provide better corrosion protection. **Aluminum-silicon** alloys have superior pourability and hardness. In the crucible industry, **silicon in powder form** is used to make alloys which improve hardness and finish.

Coke is used to produce milk of lime for clarification of cane sugar during the sugar production process.

Properties such as good corrosion resistance, low density and a low heat expansion coefficient make **titanium** the material of choice in many industries including aerospace, medical, research and sports.

Aluminum industry

Products

- Aluminum
- Electrolytic manganese metal
- Silicon

Automotive and apparel industries, anode production

Non-ferrous metals

- Primary nickel
  - cathodes
    - Standard LME grade (cut/uncut)
    - premium quality (cut/uncut)
  - briquettes
    - Standard LME grade
    - steel making grade
  - pellets
- Zinc
  - SHG
  - HG
  - GOB
  - Zn-Al alloy
- Lead/tin
  - refined pure lead
  - pure lead
  - tin

Cable industry

Metals

- Copper
  - cathodes Grade A (cut/uncut)
  - standard cathodes
  - fire-refined copper

Lime and sugar industries

Solid fuels

- Coal
- Coke

Alloy production

Solid fuels

- Coal
- Coke

Other products:

- Silicon metal
- Manganese ore

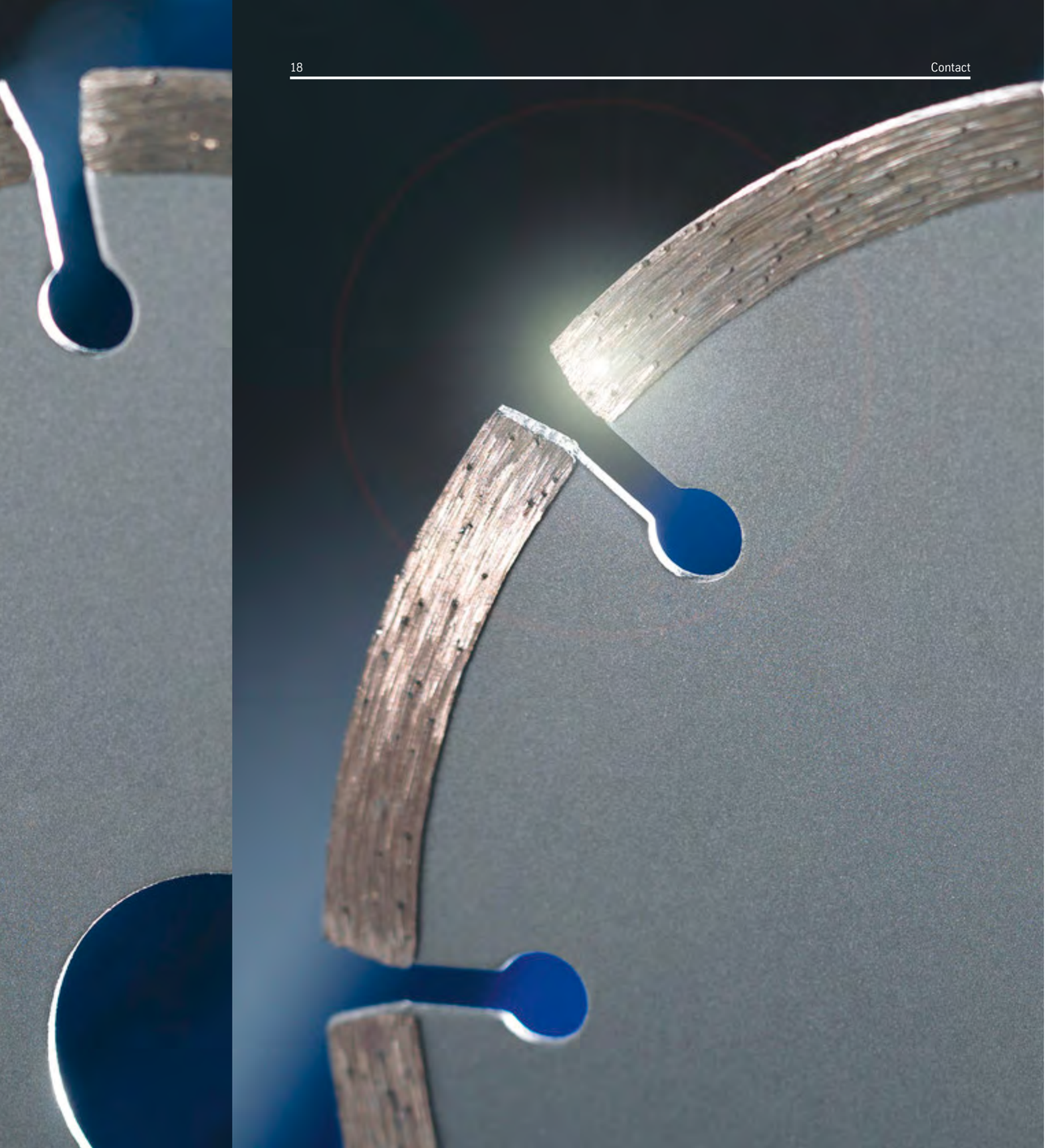
Copper Pellets

Coaking Coal

Zinc Ingots

Nickel Briquettes

Blast Furnace Coke



More information on our product range is available at
www.thyssenkrupp-materials-trading.com

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