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The service offered comprises the engineering and design, construction, supply as well as erection and commissioning of plants.

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COPPER Process Technology

The "FULL-LINE SUPPLIER" FOR THE NON-FERROUS METALS INDUSTRY

KÜTTNER Non Ferrous is an established "full-line supplier" for the primary as well as the secondary copper producing industry serving clients with complete system solutions out of one hand. With its long record of industrial installations the company covers all major processing steps in the respective metals industry.

The technologies are applied in all major plant areas in the non-ferrous metals industry such as material handling, heat recovery, off-gas treatment and automation. In the field of pyrometallurgy for the copper industry KÜTTNER has developed specific know-how for low grade material smelting and converting, blast furnace treatment, scrap recycling and processing of high quality products.

In addition to plants and systems KÜTTNER Non Ferrous offers Technology Packages for the improvement of process parameters in existing plants. Amongst others the following pyrometallurgical technology is provided by KÜTTNER Non Ferrous:

- Bath Smelting Furnace for treatment of concentrate and low grade scrap.
- Converter Furnace for the treatment of matte to blister copper.
- Rotary Furnace for the refining of blister to anode copper and high quality products.
- Scrap Refining Reverb Furnace for melting and refining of scrap to anode copper and high quality products.
- Shaft Furnace for continuous smelting of cathode, anode and low grade material.

The technology, products and services offered by KÜTTNER encompass a large part of the metals processing chain and are marketed throughout the world.
**EQUIPMENT FOR PYROMETALLURGICAL PROCESSES**

**Material Handling**
Complete systems and key components for material handling and preparation.
- Conveyors for raw material transportation
- Bulk material storage and transport
- Process control and instrumentation
- Skip charging systems for raw material and scrap
- Automated additive charging systems

**Converter Furnace**
A furnace system applied in the primary and secondary copper industry mainly for the conversion of lower grade matte to blister copper. The converter furnace consists of several sections within the furnace, where the primary reactions take place. The furnace is equipped with a system for efficient process control and automation.

**Bath Smelting Furnace**
Efficient top blowing bath smelting furnace for the production of non-ferrous metals. This type of furnace is used in the primary copper industry as well as in the secondary copper industry. A top lance gas/oil and air/oxygen are injected to achieve oxidizing and reducing operation. The furnace is designed for quick change over.

**Reverberatory Furnace**
Batch top blowing threelane furnace for melting and refining of copper matte and high grade copper products. The reverberatory furnace is widely used in the secondary copper industry for recycling of different scrap qualities. Melting is achieved by highly efficient oil and gas burners and refining and smelting treatment is carried out by submerged nozzles.

**Shaft Furnace**
High performance continuous shaft melting furnace for smelting of high grade copper cathodes, crucible scrap and residues. Shaft furnaces are used in the primary and secondary copper industry. The furnace is equipped with a system for efficient process control and automation.

**Rotary Furnace**
Pyrometallurgical, batch operating working furnace applied in the primary and secondary copper industry, used for the production of anode copper quality from blister copper and the secondary metallurgical treatment of high-grade scrap to finished product. AERCO possesses a range of shaft furnaces to meet the demands of suitable process responsive flows.

**Off-gas Treatment**
Various systems and equipment components for the treatment of plant off-gases and heat recovery.
- Abatement scrubbers and thermal steal towers
  - Quenching to scavenging systems
  - Bag house with additive injection
  - Heat exchanger for waste heat recovery and preheating of process media

**Process Automation**
Technology to design innovative process automation and control systems for complete new production facilities as well as for upgrading existing operations.
- Control panels and control systems
- Measuring systems and instrumentation
- Process control and automation systems
- Information management systems (SMS)
  - Archiving of relevant operational data

**Technology Packages**
Technology packages for improvement of process parameters in existing plants to achieve an increase in metallurgical/thermal efficiency and facility life cycle as well as reduction of process costs.
- feasability studies, engineering and designing
- Process investigation, consulting and supervision
- Chilling towers and systems
- Process control and automation systems
- Cooling elements
- Combustion
- Off-gas hoods

**Auxiliary Equipment**
- Process automation systems in central control units
- Feasibility studies, engineering and designing
- Process investigation, consulting and supervision
- Chilling towers and systems
- Process control and automation systems
- Cooling elements
- Combustion
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**Material Handling**
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- Chilling towers and systems
- Process control and automation systems
- Cooling elements
- Combustion
- Off-gas hoods
EQUIPMENT FOR PYROMETALLURGICAL PROCESSES

Material Handling
Complete systems and key components for material handling and preparation.
Applications:
- Conveyors for raw material transportation
- Bulk material storage and transport
- Pneumatic transport and injection
- Slag handling systems for raw material and scrap
- Automated silo-hopper charging system
- By-product treatment

Bath Smelting Furnace
Efficient top blowing bath smelting furnace for the production of non-ferrous metals. This type of smelting is applicable in the primary as well as in the secondary copper industry. KÜTTNER has developed a lance design for quick exchange over.
Applications:
- Smelting of copper concentrate
- Smelting of low and high grade scrap
- Converting of copper matte

Converter Furnace
A furnace system applied in the primary and secondary copper industry mainly for the conversion of lower grade matte to blister copper in a discontinuous process by means of suitable process resistant tuyeres.
Applications:
- Matte furnace - for the smelting of matte to blister copper
- Rotary smelting furnace for smelting and refining of high grade scrap to deruid quality
- Melting furnace in casting operations
- Slag and metal separation

Pyrometallurgical, batch operating refining furnace applied in the primary and secondary copper industry, used for the production of anode copper quality from blister copper and the metallurgical treatment of high grade scrap to finished product.
Applications:
- Anode furnace - for the metallurgical treatment of blister to anode copper
- Rotary smelting furnace for smelting and refining of high grade scrap to deruid quality
- Melting furnace in casting operations
- Slag and metal separation

Rotary Furnace
Pyrometallurgical, batch operating refining furnace applied in the primary and secondary copper industry, used for the production of anode copper quality from blister copper and the metallurgical treatment of high grade scrap to finished product.
Applications:
- Rotary furnace - for the metallurgical treatment of blister to anode copper
- Rotary smelting furnace for smelting and refining of high grade scrap to deruid quality
- Melting furnace in casting operations
- Slag and metal separation

Shaft Furnace
High performance continuous shaft smelting furnace for smelting of high grade copper cathodes, crucible scrap and residues. Products from the shaft furnace are fed into continuous casting lines or downstream metallurgical converting and smelting furnaces. The different kinds of shaft furnaces are either operating on high velocity gas/oil burners or on industrial coke and hot blast. Furnace types and applications:
- Cathode : Anode shaft melting furnace for smelting cathodes, high grade scrap and rejected anodes for low value casting machines
- Reaction shaft furnace - Melting of highly contaminated scrap or residues, e.g. bronze, brass, converter and anode furnace slag for production of copper

Reverberatory Furnace
Batch smelting shaft furnace for smelting and refining of scrap to semi-finished and high grade quality products. The reverberatory furnace finds its application mainly in the secondary copper industry for recycling of different scrap qualities. Melting is achieved by highly efficient side wall or roof burners, refining and metallurgical treatment is carried out by submerged nozzles.
Applications:
- Lower grade scrap to anode quality
- Higher grade scrap to semi-finished quality

Reverb Furnace
Batch operating tiltable reverb furnace for melting and refining of scrap or residues, e.g. bronze, brass, converter and anode furnace slag for production of copper.
Applications:
- Reaction shaft furnace - Melting of highly contaminated scrap or residues, e.g. bronze, brass, converter and anode furnace slag for production of copper

OFF-GAS TREATMENT

Various systems and equipment components for the treatment of plant off-gases and heat recovery.
Applications:
- Exhausting flues to chimney and thermal waste boilers
- Quenching to avoid dross formation
- Kiln house with sidestraight burner
- Crude oil vaporisers for separation of HCL, SO2 and HF
- Heat exchangers for waste heat recovery and preheating of process media

PROCESS AUTOMATION

Technology to design innovative process automation and control systems for complete new production facilities as well as for upgrading existing operations.
Applications:
- Control panels and control systems
- Monitoring systems and instrumentation
- Process control and automation systems
- Information management system (IM) - Archiving of relevant operational data

TECHNOLOGY PACKAGES

Technology packages for improvement of process parameters in existing plants to achieve an increase in metallurgical/thermal efficiency and facility life cycle as well as reduction of process costs.
Improvement solutions:
- Feasibility studies, engineering and moulding
- Process investigation, consultancy and supervision
- Changing dies and system
- Ingots, string
- Cooling elements
- Cathodes
- Off-gas treatment
Equipment for Pyrometallurgical Processes

Material Handling
Complete systems and key components for material handling and preparation.
Applications:
- Conveyors for raw material transportation
- Bulk material storage and transport
- Pneumatic transport and injection
- Skid changing systems for raw material and scrap
- Automated sideloading charging system
- Byproducts treatment

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Applications:
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- Smelting of low and high grade scrap
- Smelting of copper concentrate

Converter Furnace
A furnace system applied in the primary and secondary copper industry mainly for the conversion of lower grade matte to blister copper in a discontinuous process by means of suitable process supportive flows.
Applications:
- Annealing furnace for the smelting of blister to anode copper
- Rotary smelting furnace for smelting and refining of high grade scrap to blister copper
- Melting furnace in casting operations
- Skid and metal separation

Shaft Furnace
High performance continuous shaft melting furnaces for smelting of high grade copper cathodes, crucibles, scrap and residues. Products from the shaft furnace are fed into continuous casting lines or downstream metalurgical converting and smelting furnaces. The different kinds of shaft furnaces are either operating on high velocity premix burners or on industrial coke and hot blast.
Furnace types and applications:
- Carbonate/Anode shaft melting furnace for smelting of high grade copper cathodes, crucibles, scrap and residues
- Rotary shaft furnace – Melting of high contaminated scrap or residues, e. g. bronze, brass, converters and anode furnace slag for production of copper

Rotary Furnace
Pyrometallurgical, batch operating melting furnace applied in the primary and secondary copper industry, used for the production of anode copper quality from blister copper and the non-ferrous metal treatment of high grade scrap to finished product. Metalurgical treatment is driven down by means of suitable process supportive flows.
Applications:
- Annealing furnace for the smelting of blister to anode copper
- Rotary smelting furnace for smelting and refining of high grade scrap to blister copper
- Melting furnace in casting operations
- Skid and metal separation

From Low Grade to Blister Treatment and Cathode Processing

Reverberatory Furnace
Batch melting thimble reverberatory furnace for melting and refining of scrap to semi-finished and high grade quality products. The thimble reverberatory furnace finds its application mainly in the secondary copper industry for recycling of different scrap grades. Melting is achieved by highly efficient side wall or roof burner furnaces and reverberatory treatment is carried out by submerged nozzles.
Applications:
- Low grade scrap to anode quality
- Higher grade scrap to blister quality

Off-gas Treatment
Various systems and equipment components for the treatment of plant off-gas and heat recovery.
Applications:
- Abating scrubbers and thermal stress boilers
- Quenching to avoid dust formation
- Bag house with sideloading separator
- Catalytic scrub for separation of HCl, SO2, and HF
- Heat exchanger for waste heat recovery and preheating of process media

Process Automation
Technology to design innovative process automation and control systems for complex new production facilities as well as for upgrading existing operations.
Applications:
- Control panels and control systems
- Monitoring systems and instrumentation
- Process control and automation systems
- Information management system (iM) - Handling of relevant operational data

Technology Packages
Technology packages for improvement of process parameters in existing plants to achieve an increase in metalurgical/thermal efficiency and facility life cycle as well as reduction of process costs.
Improvement solutions:
- Feasibility studies, engineering and modeling
- Process investigation, consulting and supervision
- Changing drums and systems
- Piping, stringing
- Cooling elements
- Combustion
- Off-pan hoods

Auxiliary Equipment

Material Handling
Complete systems and key components for material handling and preparation.
Applications:
- Conveyors for raw material transportation
- Bulk material storage and transport
- Pneumatic transport and injection
- Skid changing systems for raw material and scrap
- Automated sideloading charging system
- Byproducts treatment

Bath Smelting Furnace
Efficient top blowing bath smelting furnaces for the production of non-ferrous metals. This type of smelter finds its applications in the primary as well as in the secondary copper industry. KÜTTNER has developed a lance design for quick change over.
Applications:
- Smelting of copper concentrate
- Smelting of low and high grade scrap
- Smelting of copper concentrate

Converter Furnace
A furnace system applied in the primary and secondary copper industry mainly for the conversion of lower grade matte to blister copper in a discontinuous process by transition of radiation media through a top lance or submerged nozzles.
Furnace types and applications:
- Alumina crucible – Melting and conversion of low and high grade scrap
- P-Converter – Converting of copper matte to blister copper
- Precious metals smelting

Shaft Furnace
High performance continuous shaft melting furnaces for smelting of high grade copper cathodes, crucibles, scrap and residues. Products from the shaft furnace are fed into continuous casting lines or downstream metalurgical converting and smelting furnaces. The different kinds of shaft furnaces are either operating on high velocity premix burners or on industrial coke and hot blast.
Furnace types and applications:
- Carbonate/Anode shaft melting furnace for smelting of high grade copper cathodes, crucibles, scrap and residues
- Rotary shaft furnace – Melting of high contaminated scrap or residues, e. g. bronze, brass, converters and anode furnace slag for production of copper

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Established in 1949 by Dr. Carl Küttner, this engineering company has evolved into a globally active group of companies supplying turnkey plants for process, melting and conveying technology to the metals producing and processing industry.

KÜTTNER Non Ferrous is an internationally well established "Engineering and Contracting" partner for complete production facilities in the non-ferrous metals industry. Based on extensive experience in the relevant field KÜTTNER Non Ferrous is able to supply customer-tailored plant systems including material handling, pyrometallurgical process technology, heat recovery, off-gas treatment and automation solutions.

The service offered comprises the engineering and design, construction, supply as well as erection and commissioning of plants. The KÜTTNER Group today has a worldwide workforce of more than 500. It is represented in the international markets through a network of affiliated companies and agents. The owners actively work in the company.

KÜTTNER Non Ferrous GmbH
A subsidiary of Küttner GmbH & Co. KG

KÜTTNER Non Ferrous is an established "full-line supplier" for the primary as well as the secondary copper producing industry serving clients with complete system solutions out of one hand. With its long record of industrial installations the company covers all major processing steps in the respective metals industry.

The technologies are applied in all major plant areas in the non-ferrous metals industry such as material handling, heat recovery, off-gas treatment and automation. In the field of pyrometallurgy for the copper industry KÜTTNER has developed specific know-how for low grade material treating and converting, blister treatment, scrap recycling and processing of high quality products.

In addition to plants and systems KÜTTNER Non Ferrous offers Technology Packages for the improvement of process parameters in existing plants. Amongst others the following pyrometallurgical technology is provided by KÜTTNER Non Ferrous:

Bath Smelting Furnace for treatment of concentrate and low grade scrap.
Converter Furnace for the treatment of matte in blister copper.
Rotary Furnace for the refining of blister to anode copper and high quality products.
Scrap Refining Reverb Furnace for melting and refining of scrap to anode copper and high quality products.
Shaft Furnace for continuous smelting of matte, anodes and low grade material.

The technology, products and services offered by KÜTTNER encompasses a large part of the metals processing route and are marketed throughout the world.