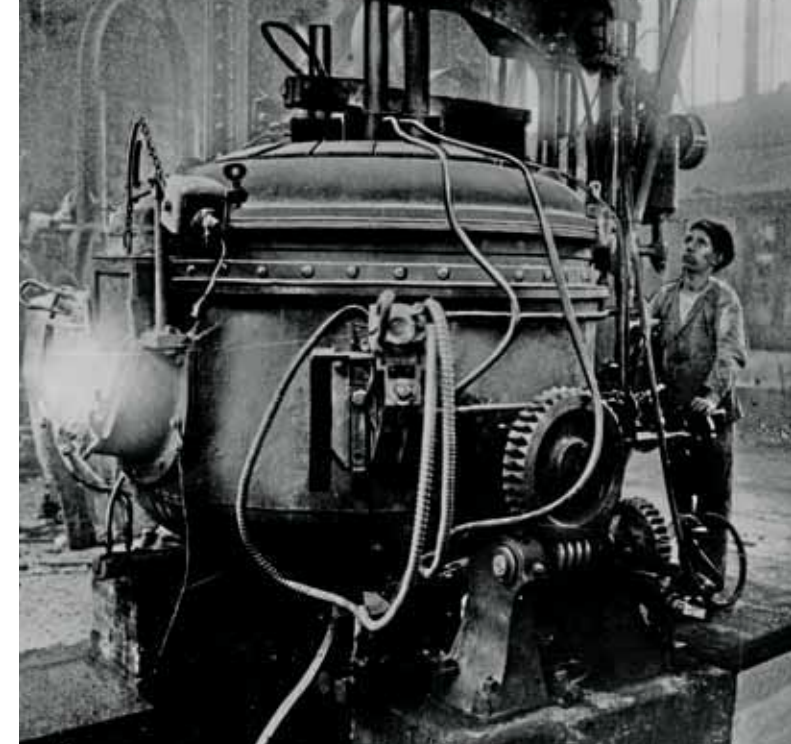


Heritage

Tenova Pyromet is the result of the successful merger between the submerged arc furnace division of Techint Technologies (Tagliaferri) and Pyromet Technologies.

Tenova Pyromet has in-depth knowledge and understanding of the ferroalloys and base metals smelting process and its technology is applied to a wide range of customer solutions. The company has an extensive reference list of successful projects and applies this technology to the benefit of ferroalloy and base metals customers world-wide.

The Tagliaferri furnace design, which has roots dating back to 1968, is part of Tenova Pyromet's proud heritage. The excellent design of Tagliaferri furnaces is acknowledged by clients through their ongoing praise of the furnaces and repeat orders received from their owners.



Tenova Pyromet

Tenova South Africa (Pty) Ltd
Midrand Business Park, Building no 4
563 Old Pretoria Main Road
Halfway House, Midrand 1685
South Africa
T+27 11 480 2000 F+27 86 743 0389
pyromet@tenova.com



Advanced Solutions for Complete Smelting Plants

Tenova is a leading supplier of technological solutions and engineering services for the metals and mining industries, including key segments of the metallurgical process as well as in the mining value chain. Combining innovative engineering with process and automation expertise, Tenova delivers a full range of value-add solutions from greenfield projects, equipment and technology solutions to modernization upgrades and service packages. Passion for technology and a commitment to understanding needs of its global customer base are the key drivers of Tenova's business operations.

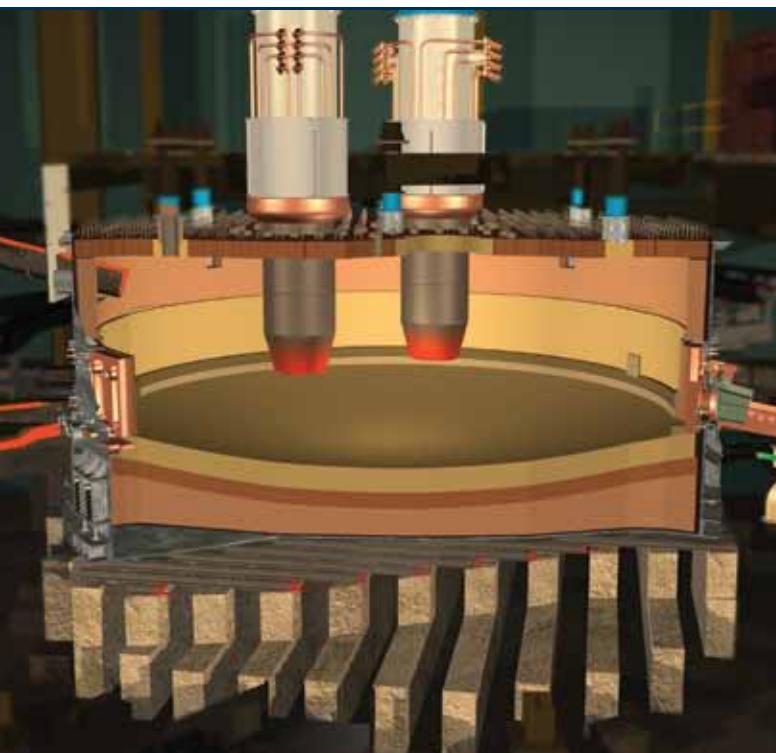
Tenova Pyromet is a leading company in design and supply of high capacity AC and DC furnaces and complete smelting plants for production of ferroalloys, base metals, slag cleaning and refining. Tenova Pyromet also designs and supplies equipment for material handling and pre-treatment, alloy conversion and refining, granulation of metal, matte and slag, furnace off-gas fume collection and treatment, and treatment of hazardous dusts and waste. Tenova Pyromet has several technologies to reduce operating costs and increase production efficiencies.

Tenova Pyromet benefits from the world-wide network provided by Tenova offices located on 5 continents. This network of qualified and competent people provides knowledge about local business practices and language and enables real time service to customers.

Commitment to Innovation

Tenova Pyromet's involvement in a smelter project can be tailored to suit the customer's requirements, and may cover:

- Turnkey supply of furnace equipment, which can be expanded to include associated equipment and basic engineering for client scope
- Supply of key equipment, for new and furnace upgrade projects
- Erection and commissioning supervision
- Studies, from feasibility through to bankable level
- Engineering and modelling investigations



Focus on People

People are vital to sustainable success and growth at Tenova Pyromet, with our highly qualified and experienced staff the lifeblood of the company.

Outstanding engineering and management expertise in every area of activity, a strong focus on the customer, a passion for innovation and continuous flexibility: these are the features that distinguish and differentiate Tenova Pyromet professionals.

Tenova Pyromet enhances and optimises the talents of the individual for the good of the team and to the optimal benefit of the customer. By supervising every stage of professional growth and providing on-going knowledge and skills training, Tenova Pyromet guarantees the expertise of its people.



Quality

To meet our customer expectations with everything that we do, quality and continuous improvement of service in line with best industry practices and standards are priorities at Tenova Pyromet.

Tenova Pyromet's quality management system is certified to ISO 9001:2008, for "The Design and Supply of Smelting Technology and Equipment". ISO 9001:2008 directs attention to customer focus, meeting customer needs and continuous improvement.



TECHINT GROUP

July 2017

tenova
PYROMET

Environmental Responsibility

Having a long-term vision in the smelting industry, means that at Tenova Pyromet we take industry-related environmental issues very seriously.

Consistent with this vision and values, Tenova Pyromet is committed to effective environmental management, having adopted an environmental policy that includes:

- Reduction of waste
- Energy recovery
- Prevention of pollution
- Conservation of resources





Tenova Pyromet Electrode Column

The patented Tenova Pyromet electrode holder is now widely considered to be the industry standard, setting new records in reliability and availability.

Tenova Pyromet also has access to the complete Bateman and Tagliaferri design library. All designs ensure fail-safe clamping solutions, providing operators with peace of mind during all situations.

The new Tenova Pyromet lower electrode system has been engineered to provide significantly improved availability, with lower risk of electrode breakages.

The patented copper pressure ring provides a complete shield around the contact shoe, thereby ensuring improved electrode baking and operating availabilities.

Furnace Technology

Tenova Pyromets' specialization in Furnace design and technology and a comprehensive list of current and past furnace projects ensure continuous operation and technical feedback.

This further increases Tenova Pyromets' leading edge technology and depth of experience in fulfilling our passion for continuous improvement and providing the best available practices to customers.

The raw materials, operating philosophy and smelter layout of these projects are unique for each customer, providing the opportunity for Tenova Pyromet design, project and process engineers to interact with the customer to design a smelter which combines the best available practice, with the customer's particular unique needs around raw materials, operating philosophy and site layout.

The most important aspects of designing a furnace are understanding the effect of the client's specific raw material on the furnace design and determining the correct furnace critical dimensions, such as diameter and depth of the furnace crucible, electrode diameter, electrode spacing, length, width, feed chute arrangement, alternating or direct current, transformer characteristics and bustube arrangement.

Tenova Pyromet has mastered these fundamental design aspects, which are custom designed for each project. This cutting-edge knowledge is clearly demonstrated in the way all our furnace designs regularly exceed contracted performance guarantees. Control of the furnace process, safety and equipment protection is achieved using advanced automation, as developed by Tenova Pyromet with input and collaboration from the customer.

Services

The combination of Tenova Pyromet's innovative culture and an in-depth understanding of the smelting business has ensured many innovations, ranging from detailed design improvements that improve efficiency and reliability, through to ground-breaking changes that effect the direction of the industry.

Tenova Pyromet offers a comprehensive list of services to its clients, including:

- Full LSTK execution
- Design, supply and supervision package
- Site supervision services, including commissioning assistance and operator training
- Plant productivity analysis
- Studies
- Engineering Modelling and Investigations, including FEA and CFD Modelling

Copper Products

Tenova Pyromet's copper products include:

- Copper furnace sidewall coolers
- Copper launders
- Copper tapholes
- Other speciality products

These products are designed using advanced techniques such as Finite Element Analysis (FEA) and Computational Fluid Dynamics (CFD), and are manufactured using high purity copper to exact quality standards.

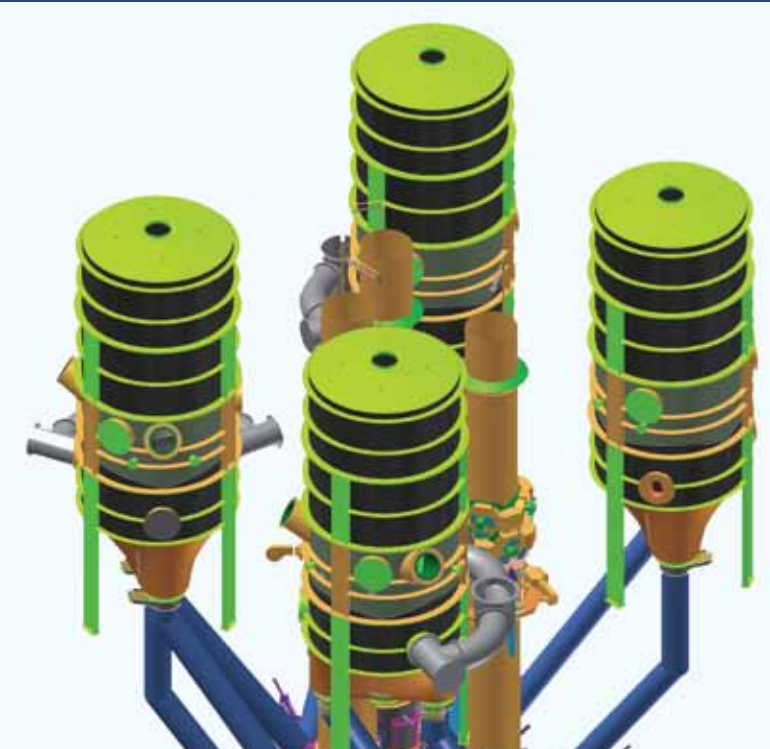
Each copper product solution is tailored to the specific requirements of every plant and process need.



Multiple Pre-Heating System

The process of pre-heating uses energy contained in furnace waste gas, to pre-heat the mix being fed into the furnace to temperatures up to 550°C. Advantages of utilising the Tenova Pyromet Multiple Pre-Heating system are:

- Reduction of specific power consumption per ton of product
- Reduction of the moisture content and volatiles of the material being fed into the furnace
- Improvement of control and stabilization of the furnace
- Increases furnace production
- All recycled gas is combusted in a combined combustion/mixing chamber, improving control
- Lower furnace building, 10 - 15m (compared with single shaft pre-heater)
- Good maintenance flexibility
- Capability to feed different raw material mixes to each unit



Environmental Products

To be effective in reducing emissions and waste, equipment and systems must be reliable, with high availability and high efficiencies.

Tenova Pyromet is committed to preserving the environment, which includes the control of pollution arising from industrial activities, as well as the conservation of natural resources.

As technology suppliers to the smelting industry, this entails identifying and investigating available technologies and where appropriate, developing new technologies, as well as the design of suitable plant and equipment, for:

- Reduction of emissions
- Reduction of waste
- Reduction of energy use



Performance and Reliability

Tenova Pyromet is committed to offering tailored solutions to meet customer requirements and targets.

The company's solid track record is characterized by projects completed on, or earlier than the planned schedule, fast ramp-up to design production capacity, meeting and exceeding emission control requirements and above all, by the supply of reliable and efficient technology and equipment.

Tenova Pyromet's success is attributed to a combination of innovative technology, leading design, extensive experience and sound project execution.

Control System

The Tenova Pyromet control system is designed to be user friendly with improved efficiency and is suitable for new and existing submerged arc furnaces. The system can easily be retrofitted to existing furnaces.

Furnace Control

The automatic furnace controller achieves a higher average power input to the furnace and maintains stability in the furnace.

Lining Management System

The Lining Management System (LMS) is a tool that enables furnace operators and managers to monitor the sidewall and hearth lining condition and the delivery of energy to the process.

