Electric Arc Furnaces

A complete range of leading-edge products for the steelmaking industry
Tenova is a worldwide supplier of advanced technologies, products and services for the iron & steel and mining industries providing innovative integrated solutions. Combined process automation and metallurgical know-how enhance the value delivered to the customers. Tenova is committed further to develop its technology in the areas that mostly impact the future of the industries it serves: quality of the products delivered by the customers, energy saving and environmental safeguard.

Tenova Melt Shops is a leader in the design and supply of EAF equipment for crude steel production. It offers a fully integrated range of high-quality products, technologies and services for the steelmaking industry.
Global Presence

Tenova Melt Shops is a global benchmark supplier of Electric Arc Furnaces. It boasts engineering offices for the development of steelmaking technologies in Italy and the USA, an R&D center of excellence for EAF process in Canada, operations offices in China and Russia; an integrated network focused on the global market to offer cutting-edge products and technologies delivering tangible benefits for all customers.
The Tenova Melt Shops heritage embraces historical brands such as Tagliaferri, associated with EAF design and manufacture since the earliest days of electrometallurgy, and younger process brands such as EMCI, Core Furnace Systems and Goodfellow, focused on R&D and secondary metallurgy.

More than 2,000 EAFs have been designed and manufactured during 100 years of successful activity.

Today, tradition, experience and a solid steelmaking background qualify Tenova Melt Shops to offer some of the most advanced technologies for new EAFs.

Tenova Melt Shops is the owner of Consteel®, the continuous EAF scrap feeding and pre-heating technology. The TDRH Digital Electrode Regulation system, the KT Injection System® and the EFSOP® real-time off-gas dynamic control system complete its technological offer for the steel industry.
Tenova Melt Shops projects range from complete new melt shops to customized technological upgrades and revamps of existing production units. Its work also covers installation, modification and replacement of individual parts, for example electrode arms, the electrode regulation system or the TBT (Tenova Bottom Tapping) system. Tenova Melt Shops’ success is built largely on innovative technology, flexibility in meeting customer requirements and timely project execution.
Tenova Melt Shops supplies complete furnace packages providing technology and equipment for every type of charging mix:
- 100% scrap, batch charged or continuously charged with the Consteel® system
- Up to 100% DRI or HBI, continuously charged
- Up to 80% hot metal, charged by ladle tilting devices

Tenova Melt Shops can supply AC as well as DC-powered EAFs.
Tenova Melt Shops EAFs deploy cutting-edge proprietary technologies:
• Consteel®, the exclusive continuous feeding technology for liquid steel production
• EFSOP®, the off-gas control system for the melting process
• iEAF®, the innovative dynamic process control for real-time management of arc furnace melting
The success of Tenova Melt Shops Electric Arc Furnaces is based on an intrinsically simple design concept for reliable, long-life furnaces with a sturdy mechanical structure. The innovative TDRH digital electrode regulation system provides a fast and accurate response, allowing a better transfer of the electric power to the melting charge. As a result, electrode regulation is faster and more accurate and the electrodes are not subject to the bending stress of oscillating electrode arms.
Electrode Arms

Tenova Melt Shops offers the latest concept in power conductive arms for maximum reliability. Built using bimetallic sheet (steel+copper), the arms combine the high strength of steel with the current carrying capability of copper. Tenova Melt Shops also supplies power conductive arms in aluminium for a lighter structure. The electrode clamps are made from forged copper for high-pressure contact with low electric contact resistance. Water-cooling channels are drilled inside the clamp body for efficient heat dissipation. The electrode clamping force is achieved by a series of spring washers. The clamps can be hydraulically released for electrode slipping or electrode column change.
The KT Injection System® is a wall-mounted, multi-point system for injecting oxygen and a wide range of fines: carbon, lime, DRI and others. It uses the patented Ultra Safe Cooling System to enable the injectors to be safely submerged in the slag, above the steel bath. The KT® oxygen lances work as burners during scrap melting and as supersonic injectors during refining, to guarantee efficient energy transmission in the bath. Combined with the KT® carbon and lime powder injectors, the lances create a homogeneous layer of foamy slag over the whole bath surface. The KT® burner-postcombustor, installed in the upper shell, is a highly specialized tool to recover chemical energy from the uncombusted off-gases as well as a powerful burner to accelerate scrap melting during the initial process phase. KT® system automation optimizes system start-up and enables process engineers to optimize the process itself.
The TDRH Digital Electrode regulation system uses state-of-the-art Motorola microprocessor technology and a VME bus to achieve a real-time regulation loop. It supports four operating modes, selected to obtain maximum EAF performance:

• constant impedance
• constant current
• constant active power
• constant power factor

Electrode movement and positioning is governed by Tenova Melt Shops proportional HRR servo-valves, which convert the electrical signal into an equivalent flow of fluid for the electrode movement. The HRR valves provide a parabolic response curve to guarantee greater stability during flat bath melting and greater speed when a fast rise is necessary due to a short circuit event.
Tenova Melt Shops automation solutions are based on industry-standard technology. Thanks to their modular structure, they cover every level from basic plant control (Level 1) to integration with production tracking functions and management of manufacturing orders in-progress (Levels 3 and 4). Specific Control Process modules optimize operations and provide shop floor workers and process technologists with essential support. Tenova Melt Shops automation systems can be combined with cutting-edge technology solutions for optimization of energy savings and productivity such as the EFSOP® system and the iEAF® package. Moreover, the automation solutions employ innovative sensors, which work together with sophisticated control models for dynamic, real-time control.
Tenova Melt Shops provides the most advanced technologies for environmental impact control. Its technology is designed to improve the steel plant environment by:

- reducing dust
- reducing fumes and gaseous emissions
- reducing GHG (Greenhouse gases) emissions
- reducing noise levels
- reducing electric network disturbances

The reduction of man-tended operations increases the process consistency to reach better performances.

Tenova Melt Shops offers the most advanced EAF’s technologies to improve safety:

- EAF’s eccentric centre-of-mass
- Water Detection System™
- Movement interlocks supervisor
- Limit-switches monitor and supervisor
- TAT® - Tenova Auto Tapping (man-free EAF’s tapping and preparation)
- Tenova iTemp® (contact free automatic liquid steel temperature measurement)

Safety

Environmental Responsibility

Tenova Melt Shops provides training programs for personnel in charge of operations and equipment maintenance. Courses include practical and theoretical sessions on technologies, equipment functions, maintenance and operational procedures.

Rapid commissioning and a fast learning curve are guaranteed by Tenova expertise and assistance.

After-sales assistance offers a comprehensive spare parts service. Customer requests are handled by a special internal office.
Technological innovation is the main pillar of Tenova Melt Shops competitiveness. Its successful R&D work is based on effective co-operation with:

- Customers, through joint research projects combining Tenova’s engineering capabilities with the customer’s production expertise
- Production specialists in the Techint Group
- Network of research centers where dedicated facilities are available to test R&D project results
- Universities and other Research Institutes

The Tenova Melt Shops R&D Team is an international network of specialists and engineers from the Group’s companies and business units around the world.
Focus on People

People are vital to success and growth at Tenova Melt Shops. Qualified engineers and technicians across 5 continents are the lifeblood of the network.
Outstanding technical 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 Tenova Melt Shops professionals.
With their varied nationalities, Tenova Melt Shops specialists execute projects all over the world. Their multicultural backgrounds equip them to take on new challenges in any location.
Tenova Melt Shops enhances and optimizes the talents of the individual for the good of the team and to the benefit of the customer.
By supervising every stage of professional growth and providing on-going knowledge and skills training, Tenova Melt Shops guarantees the expertise of its people.
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