

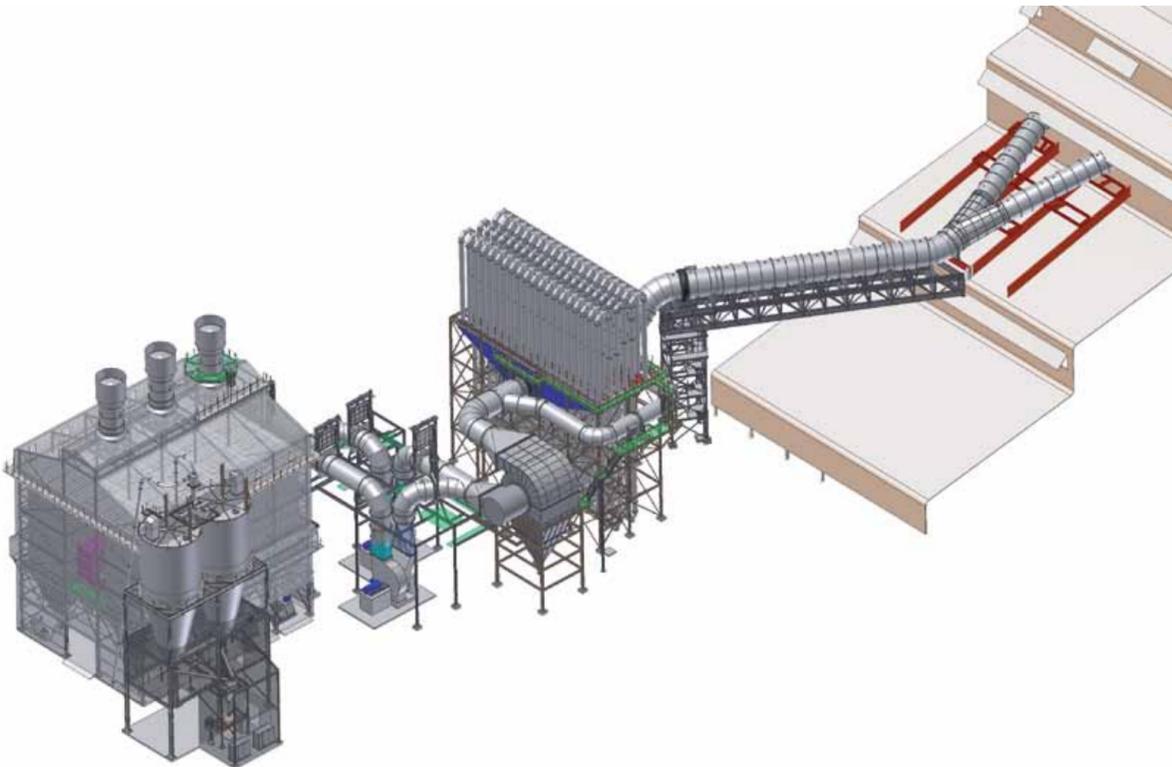
Tenova is a leading supplier of technological solutions and engineering services for the metals and mining industries, including key segments of the metallurgical process as well as in the mining value chain. Combining innovative engineering with process and automation expertise, Tenova delivers a full 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 the design and supply of AC and DC furnaces for the production of ferroalloys, platinum group metals, base metals, slag cleaning and alloy refining. Tenova Pyromet also designs and supplies plant equipment that is associated with furnaces such as 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 provides feasibility studies, construction and commissioning supervision and training and also, provides several technologies to reduce operating costs and increase production efficiencies.

The company has been certified to ISO 9001:2008 for "The Design and Supply of Smelting Technology and Equipment".

Tenova Pyromet has a long-term vision in the smelting industry and takes industry-related environmental issues with a strong sense of responsibility.

Preserving the environment and protecting the health and safety of employees, neighbors, and the public, are an integral part of every decision made by Tenova Pyromet. The overriding goal of all of our products is to meet or exceed all applicable government and industry standards and to consistently reduce environmental emissions and impact.



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A Cleaner Environment

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TECHINT GROUP

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TENOVA is a worldwide supplier of advanced technologies, products, and engineering services for the metals and mining industries.

ENVIRONMENTAL ISSUES

Having a long-term vision in the smelting industry means taking industry-related environmental issues seriously. Consistent with its vision and values, Tenova Pyromet is committed to effective environmental management. Its environmental policy is geared to:

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

REDUCTION OF WASTE

Tenova Pyromet provides AC and DC furnaces to treat waste products or tailings streams from other processes. Its furnaces convert waste products (such as steel plant dust)

into saleable alloys and vitreous slag, that can be used as road fill or cement additives.

ENERGY RECOVERY

Tenova Pyromet is actively engaged in developing methods to recover and use energy from smelter gas streams, thereby reducing power consumption and greenhouse gas emissions. The development of multiple preheaters seeks to optimize

furnace feed temperatures, by using energy from the waste gas stream. Gas streams containing carbon monoxide are also used as a fuel source for power generation, cutting the smelter's external power requirement.

EVAPORATIVE GAS COOLING/CONDITIONING

An effective method of lowering gas temperatures without introducing large quantities of diluted air, is to inject water droplets inside the vessel by means of lances. Droplet size is reduced by introducing compressed air at the nozzle, which increases the efficiency of the evaporative gas cooler. Features:

- Optimized lance layout to ensure full cover without wetting vessel walls.

- Non-drip atomizing nozzles.
- Proven water and compressed air control.
- Automatic plant control with PLC.
- Easy maintenance.
- Ergonomic design.
- Custom designed according to volume requirements.
- Support for gas temperatures up to 1500° C.



HIGH EFFICIENCY CYCLONES

Cyclones use centrifugal force to separate large abrasive dust particles from the gas stream, and to reduce dust loads on downstream gas-cleaning equipment. Large particles drop to the bottom of the cyclone for removal, while the cleaner gas proceeds to the downstream equipment.

Features:

- High-efficiency particle removal.
- Continuous dust removal to prevent blockages.

Low-cost gas cleaning method.

- Effective protection of mechanical equipment.
- Compact design combined with radiant coolers.
- Dust extraction by flap or rotary valves.
- Wet or dry dust conveyor systems.

RADIANT AND FORCED DRAFT COOLERS

A low-maintenance method of reducing gas temperature, without diluting the gas stream. Draft coolers emit heat into the atmosphere by means of convection, causing the gas temperature to drop.

Features:

- Radiant coolers cool the gas stream by natural convection, with zero power consumption.
- Low maintenance.

Effective means of cooling high-temperature gas.

- Forced draft coolers are more compact, when space is at a premium.
- Forced draft coolers ensure better control of the discharge gas temperature.

REVERSE FLOW BAG HOUSES

Reverse flow baghouses are used to clean dust from gas streams with high dust loads at high temperatures. The reverse flow removes dust particles from the filters, which drop into a hopper situated below the filters for removal.

Features:

- Tailored to customer needs.
- Pressure or suction design.
- Gentle reverse air-flow cleaning.
- Long filter bag life.
- Intelligent cleaning control system.
- Dry dust collection.

- Poppet dampers for effective compartment isolation.
- Low air/gas cleaning costs.
- High efficiency of more than 99.5% even for sub-micron particles.
- Cleaning of large air/gas volumes up to 280° C.



REVERSE-PULSE BAG FILTERS

Reverse-pulse bag filter systems are used to clean easy dust from gas streams with modest to low dust loads at relatively low gas temperatures. The gas stream is filtered to remove the dust particles and a pulse of compressed air cleans the filters. The dust particles drop into a hopper situated below the filters for removal.

Features:

- On - and off-line cleaning.
- Venturi injected reverse-pulse cleaning.

- Venturi - integral part of cage or pulse pipe.
- Circular filter bag compartments up to 6 m.
- No internal moving parts.
- High efficiency maintained under variable operating conditions.
- Easy inspection.
- Maintenance on the clean-air side of the filter bags.
- Intelligent cleaning control system for longer filter bag life.
- Guaranteed emission levels of less than 10mg/Nm³.

VENTURI SCRUBBERS

Venturi scrubbers separate solids or liquids from a gas by scrubbing the gas stream to remove particulate. The scrubbing process uses water to trap the dust particles and thus clean the gas. The scrubber water containing the dust particles is normally cleaned and re-introduced into the scrubbing cycle. Features:

- Ergonomic design.

- Large-diameter nozzles to prevent blockages. Low water pressure design.
- Maintenance friendly.
- Single or two-stage venturi design, depending on dust load and particle size.
- Guaranteed emission levels of less than 25 mg/Nm³.

DRY SCRUBBERS

The Tenova Pyromet patented dry scrubbing process & method is an alternative solution to wet scrubbing systems for cleaning the furnace off gases from furnace processes, where low or high volatile reductants are used. It uses a separation technology, whereby solids are collected and separated from the process gas, by passing it through high temperature filtration elements that are periodically cleaned by using an inert gas. The resultant cleaned CO gas average

solid gas content is below 5 mg/Nm³ and is suitable for direct use used in any power generation or heating system. If high volatile reductants are used, the hot gas with tar in vapor form passes through the separation section for cleaning, before entering a suitable tar removal system, prior to being used in any power generation or heating systems. The collected tars from the tar removal systems can be used as a fuel or can safely be disposed of.

