

WATER TREATMENT AND COOLING PLANTS

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Did you know that up to 100,000 liters of water can be necessary to produce 1 ton of steel?

The importance of water in steel melt shops and in rolling mill plants is obvious, especially for the direct cooling circuits where the polluted water is treated in order to reuse it in the plant.

No water no steel: without water, steel cannot be produced.

At the same time, however, today a great attention is given to the management of available water resources.

Our mission is to help our Customers to improve the quality of the steel products, to guarantee a long life of the equipments and to limit the environmental consequences by reducing the amount of makeup water and waste water at an attractive cost.

Our most important goals are to obtain high reliability, to guarantee low maintenance and low energy consumption, to respect the environmental thresholds, to respect the technical requirements and to guarantee the quality required by the suppliers of the machinery and/or the plants.

The easiest way to obtain this, is a close collaboration with the Customer.

The main activities that **PERTECO** is able to provide are:

- *Engineering (Process, Mechanical, Electrical and Automation)*
- *Project Management*
- *Supply of Equipments*
- *Supply of "Turn-key" Plants*
- *Services (supervision to erection, commissioning and start-up)*
- *Revamping of existing plants*



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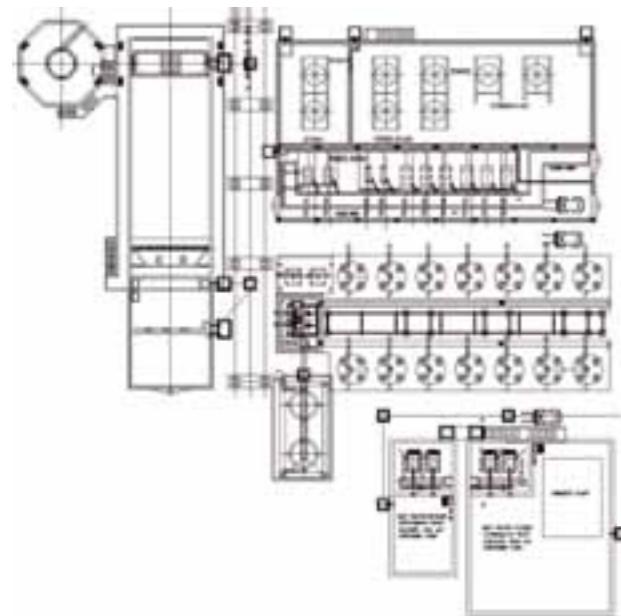
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Starting from the technical data: cooling water flow rate, inlet pressure and site conditions (such as available water quality, wet bulb temperature and local regulations) **PERTECO** is able to provide the correct sizing evaluation of all the process figures and, of course, the basic or detail design for all the equipments and accessories.

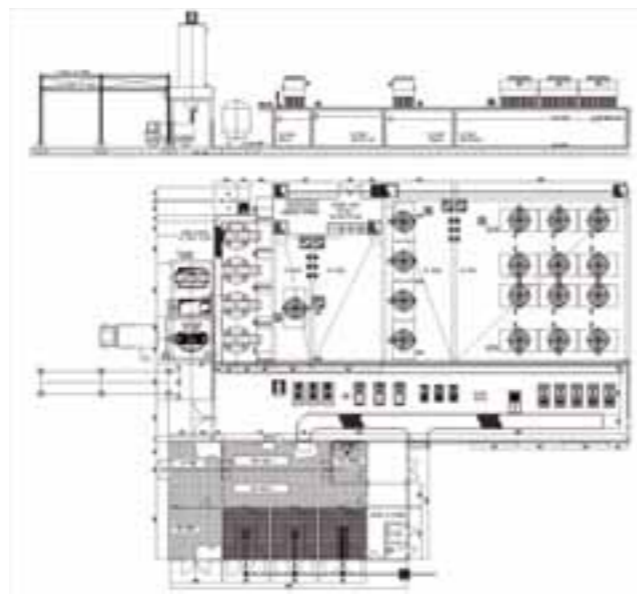
In the steelmaking process, water can be classified as indirect or direct water. Indirect application means the use of water for general purposes where water does not contact the steel in process. Direct water includes all the applications of water directly used in the steel process.

PERTECO has gained a lot of experience in the steelmaking water treatment plants such as WTP for:

- **ELECTRIC ARC FURNACES:** the EAF is an extensive user of water, especially indirect. Indirect water applications include water cooled duct, panels, roof, electrode clamps and arms. Direct cooling water is used for slag cooling, electrodes cooling and spray cooling system (quenching tower).
- **LADLE FURNACES:** water used in LF is similar to the EAF. Indirect water is used to cool the roof, arms, electrodes and clamps.



- **VACUUM DEGASSER:** when the vacuum is generated by injecting steam, the steel exhaust emissions are in contact with the steam and the condensate water is polluted by particulate (direct circuit). For indirect circuits it depends on the design of the VD/VOD system and water is used to cool the equipments.
- **CONTINUOUS CASTING:** water use and quality are very important in the continuous casting process. Water used in the caster machine is divided in: primary (mould – indirect closed), secondary (spray – direct) and tertiary (auxiliary equipment – indirect open). **The primary cooling system needs a very high quality water** in order to pass through a copper mould. The spray cooling (secondary) is used at the exit of the mould where it allow for the cooling of the billet steel surface. In the tertiary circuit water is used to cool the equipments, such as motors, supports, rolls and so on.
- **HOT ROLLING MILLS:** contrarily to what happens in the EAF, in the rolling mills the greatest consumption of water is due to the direct circuits. Indirect water is used for the reheating furnace and, sometimes, for motors and exchangers. Direct water is generally used on the stands where rolls are cooled in order to prevent surface damages caused by changing temperatures. **The control of the quality of water permits ensuring a long life of the grooves.** Another use of direct water is in a quenching system where the quality of the water ensures the good quality of the final product.



PERTECO designs and supplies water treatment and cooling plants for both steel melt shops and rolling mills. The main equipments installed in a **PERTECO** WTP are:

- Horizontal and submersible pumps
- Evaporative cooling towers for both direct and indirect opened cooling circuits
- Heat exchangers for indirect closed circuits
- Settling basins (Rolling Mill direct circuits)
- Filters (CCM sprays and Rolling Mill direct circuits)
- Sludge thickeners and dewatering systems (CCM sprays and Rolling Mill direct circuits)

For the elimination of suspended solids, **PERTECO** has developed an innovative filtering system based on special self-cleaning filters. They substitute the traditional sand filter, which, anyhow **PERTECO** offers and produces on the base on its own engineering. Self-cleaning filters have great advantages, such as a reduced space of installation, lower costs of management and maintenance and a perfect control of the outlet water. This filtering system has a perfect application in the revamping, where the available space is a very important element.

Furthermore, the proposed system grants maximum flexibility: the operations of ordinary and extraordinary maintenance can be carried out in a restricted period of time. This can be done thanks to the fact that each single filter can be isolated from the bank in the case of replancing operations, extraordinary cleaning and particular controls. It is also possible to change the final filtration degree of the system with extreme speed by simply replacing the net made of polyester or stainless steel AISI316, which is the main element of the sandwich cartridge of the filter.

Thanks to the excellent results achieved, **PERTECO** suggests this system also for all the new productive installations.

