

Cooling water

Roll coolant systems



Systems custom designed with the coolant flow rate, cleanliness and heat dissipation meeting the specific requirements of the rolling mill.

Fully automatic systems maintaining the quality of the product produced.

Only high quality products with proven reliability used to provide a system with a long, low maintenance operational life.

Full system supply/installation or design/partial supply contracts undertaken.

The primary functions of Roll Coolant Systems on either Hot or Cold Steel or Aluminium Rolling Mills is to lubricate the surface of the metal and to remove the heat induced by the reforming of the metal.

However, the treatment of the coolant before application and the dispersement of the coolant onto the product are of prime importance in the quality of the final product.

The Cooling medium, usually soluble oil-in-water for hot mills or kerosene based oil for cold mills, is delivered at a controlled temperature to spray headers. After being sprayed, the coolant is collected and returned to the main holding reservoir through a filtration system.

The quality of the coolant being delivered in terms of its degree of cleanliness has a very marked effect on the surface finish of the final product, especially on thin gauge material such as aluminium foil.

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Technical data

The flow rate of the coolant is determined by the mill manufacturer taking into account the heat load to be removed, the maximum width of the material and the spray nozzle pattern requirements. The mill manufacturer would also specify the pressure required in the spray header necessary to give the desired performance of the spray nozzles.

DELIMON Cooling's Design Engineers can now size the system calculating the pressure losses through the heat exchangers, control valves etc., and selecting centrifugal pumps to give the desired flow/pressure head. Pumps with sharply inclined design curves give the best control characteristics to provide the performance required.

Filtration

The degree and type of filtration required influences the design of the complete system.

The simplest and least expensive method is using a flat bed belt driven micronic paper media filter over a single holding reservoir. The used coolant is pumped from the mill sump onto the filter media from where it falls under gravity into the main-holding reservoir. The media feed is controlled and discharged automatically depending on the weight of contaminants on the paper. This method of filtration is only suitable for some hot mill applications.

Generally the clarification required necessitates the use of a bypass filtration system. Coolant is returned from the mill sump to either a dirty coolant tank or the dirty compartment of a twin tank. It is then re-circulated through the filter at a flow rate greater than that being delivered to the mill and returned to the clean tank with excess flow spilling back into the dirty tank for reprocessing. The filters are of the pre-coat type with either a candle or pressure plate design. The filter cake is normally composed of Diatomaceous Earth (DE) and Fullers Earth (FE). The mixture and grade of these two components is dependent upon the process, length of desired filter run and the desired filtered coolant quality. With these types of filters, it is necessary to periodically stop the filtration process, remove the contaminated cake and to pre-coat before switching back on line. This means that the clean and dirty reservoirs have to have sufficient excess capacity to cater for this cleaning cycle period whilst maintaining a flow of coolant to the mill, dual filters, or other bypass methods.

Pressure and Flow Control

The coolant system will have to cater for changes in width of product which will increase or decrease the number of nozzles in service. It will also have to be capable of being switched on-line or off-line in an instant. Control valves are fitted close to the mill supply header to maintain a constant pressure in the spray header and 'inline' valves to prevent the pumps over-running when the divert valve is opened to isolate the mill. These are normally pneumatically operated valves.

Temperature Control

Either shell and tube or plate type heat exchangers are fitted to remove any induced heat not dissipated in the pipework or reservoirs. A pneumatically actuated control valve maintains the coolant temperature by opening or closing a bypass valve either in the coolant line or in the cooling water circuit.