# STUDIES REGARDIND THE HEAT TREATMENT'S TECHNOLOGIES OF ALUMINIUM AND ALUMINIUM ALLOYS

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**Extended Abstract**: The discovery of the precipitation hardening capability of aluminum alloys at the beginning of the 20th century opened up high performance applications in automobiles to aerospace. A hundred years later there is still much to learn and exploit from both the fundamental understanding and practical implementation aspects of aluminum heat treating. The heat treatment of aluminum alloys requires precise control of the time-temperature profile, tight temperature uniformity and compliance with industry-wide specifications so as to achieve repeatable results and produce a high-quality, functional product. Robotics, roller conveyor systems, manipulators and charging cars are typical examples of equipment supplied to increase production efficiency while reducing manpower requirements. Often plant floor space is important and compact designs are highly desirable. Integrating with the SCADA systems for real-time data acquisition and integration with upstream and downstream processes is essential. The heat treatment of aluminum demands that all aspects of the process are monitored and controlled. Proper solution heat treatment of the aluminium alloys requires an expert knowledge of the alloy being treated plus the correct heat treatment plant.
Equipment designs include Aluminum Solution and Aging Furnace Systems, Aluminum Modular Furnace Systems, Precision Air Quench Systems, Basketless Heat Treating System (BHTS) for the T4, T5, T6, T7 processing of aluminum castings & forgings

Manufacturers of mass-produced cast-aluminum engine blocks and cylinder heads can take advantage of the quality and cost-benefit improvements that can be realized through the use of new basketless heat-treating and quench technologies. These improvements include: minimum reduction of 40% in fuel consumption when compared to similar solution-treated and aged components processed in a conventional roller-hearth system. As a result of reduced fuel consumption, CO2 emissions are reduced, compact design provides a 30% reduction in floor-space requirements as a result of optimal allocation of furnace space, significant reduction in mechanical components when compared to roller-hearth or chain-conveyor basketless heat-treatment systems.

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