

# China Steel Aluminium

## Two-phase Casthouse Expansion

KAOHSIUNG, TAIWAN



China Steel Aluminum Co., Ltd (CSAC) is the largest aluminum rolling manufacturer in Taiwan. The Corporation's business is centered on the production of aluminium plates, sheets, coils, foils, aluminium alloy ingots, zinc alloy ingots, zinc anodes for electro galvanizing, and aluminium bars, rods and drops.

Mechatherm completed a two phase casthouse modernisation and expansion project for CSAC at their Kaohsiung plant in Taiwan.

Phase one of this project comprised a 60T dual chamber melting furnace (for melting contaminated scrap), an 80T clean scrap melting furnace, a 75T tilting holding furnace and a fully automated 75T VDC casting machine. Phase two comprised two 80T melting furnaces, two 75T holding furnaces and a 75T VDC casting machine to the same design.

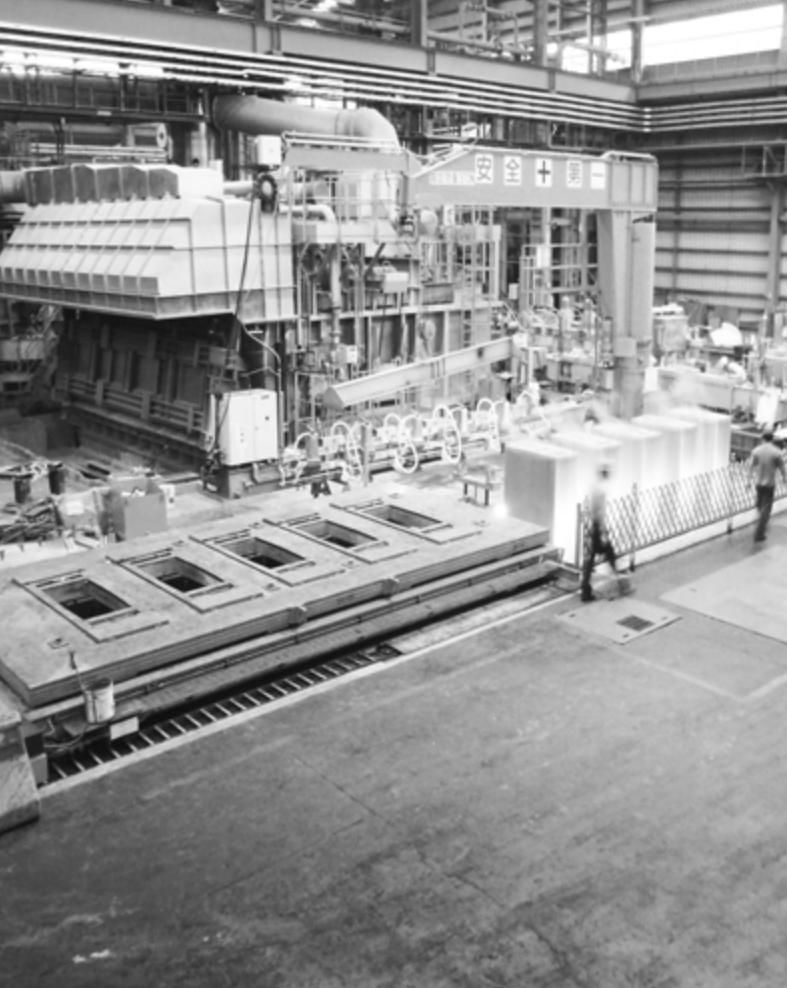
The 60T dual chamber furnace features a combined melting rate of up to 10 tonnes per hour of contaminated and clean scrap mix. Scrap contaminated with paints or lacquer is charged onto a dry hearth section in one chamber, where the paints and lacquers are burnt off.

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**"Mechatherm work with passion and commitment. They are very knowledgeable, professional and they work hard. They worked with us from morning til midnight. We became one team, we worked together and we learnt much from them. So it's effect proves that we had made the best choice."**

**Mr Fong-Der Shyu**  
DIRECTOR OF SALES





The scrap is then pushed into the molten metal bath at the rear of the chamber where it is melted in a constant stream of hot metal flow recirculating from the main clean aluminium chamber. Heating is provided by gas fired twin head regenerative burners.

The three 80 tonne melting furnaces remelt aluminium ingots at 22 tonnes per hour each. Features of the furnaces include a full width clamped door, regenerative burners, shared under-hearth electro-magnetic stirrers and monolithic refractory linings.

The melting furnaces are loaded by three rail-bound Mechatherm 20T rotating charging machines built to withstand high impact during loading and high temperatures inside the furnaces. The rapid loading minimises door open times and ensures low heat losses and faster production.

After melting, the molten metal is transferred to the holding furnaces. Their tilting systems are integrated into the overall automation system controlling the casting machines and mould metal level control.

Mechatherm also supplied all the transfer launders between furnaces and machines. The in-house designed casting machines interfaced with the customers own rolling ingot moulds. The machines each included casting cylinders with ceramic coated rams and traversing mould carriages with extending pit barriers, automatic clamping and self-sealing water connections.

Automated mould metal level control systems were fitted to the casting machines. These Mechatherm systems comprised a distribution launder, from which lasers and actuators were mounted to sense the relative level of the metal in the moulds. Metal flow to the moulds is automatically and accurately controlled via a spout and motorised stopper pin assembly.

All the Mitsubishi PLC gear control software, hardware and control panels were supplied by Mechatherm and custom engineered in-house. The whole system also featured a unique Level 2 automation and control system, tailored to our clients specification, the requirements of which was interpreted into a unique process line using Mechatherm in-house technology. All software was simulated in the UK, before being transferred into the site equipment in Taiwan for final commissioning. The clients existing site operation remained undisturbed whilst commissioning engineers adjusted the function and behaviour of each machine to correspond with



## BENEFITS OF THIS SOLUTION:

- Fully automated plant
- Turn-key equipment supply
- Bespoke, innovative control & automation system
- Safe & quick furnace charging
- High efficiency energy recovery system
- Faster production times

the specification. The result is a fully automated plant operating upon the direct command of the client's standard operating procedure.

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