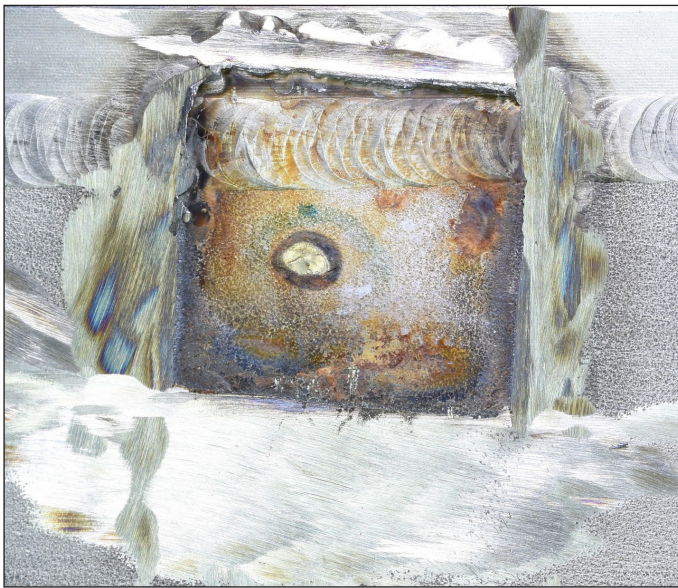


ECM Technologies

Failure analysis to determine the root cause of a leak

ECM Technologies, an industrial furnace manufacturer, asked Cetim to carry out a failure analysis to identify the cause of the leak that developed in the lower chamber of a vacuum furnace and to find solutions to prevent any recurrence.



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OUR CUSTOMER

Corporate name
ECM Technologies

Workforce
600 employees

Turnover
150 million euros

Business activity
As a manufacturer of industrial furnaces, the ECM Technologies Group, which was founded in 1928, is recognised worldwide for its innovations, technologies, processes, solutions and services. These include ICBP® (low pressure carburising) furnaces, vacuum furnaces, induction furnaces, deposition furnaces, photovoltaic furnaces and special furnaces. ECM Technologies' systems make up approximately 75% of the low pressure carburising equipment in service worldwide (1,652 low pressure heat treatment cells / 335 ICBP® systems).

Simply mending a machine is not enough. When a problem occurs on its equipment, ECM Technologies tries to pinpoint the root cause of this problem. One such example is a leak in the lower chamber of a vacuum furnace used for high temperature sintering. The manufacturer carried out a temporary repair so that its customer could continue to use the furnace. Internal tests showed no anomalies, with operating parameters within acceptable limits. *“The leak was clearly caused by corrosion,”* explained Arthur Pélissier, Managing Director Asia at ECM Technologies.

“However, we wanted to determine the root cause and have a fully independent analysis performed. Accordingly, we contacted Cetim-Matcor.” As the cracks had been sealed during the repair, the priority was to preserve the critical evidence required for the analysis, when removing the damaged areas of the vessel. *“The examinations revealed a chloride stress corrosion cracking mechanism at and around the welded regions,”* reported Leonard Tok, from Cetim-Matcor.

An analysis and solutions

To avoid any recurrence, Cetim's specialists have suggested two preventive measures. The first is the more accurate and regular monitoring of the water quality during operation so that any abnormal increase in chloride levels can be quickly detected. The second relates to the design

of the furnace. As cracks have appeared in the cooling channel, sealing the space between the flange and the inner wall by welding will effectively reduce the stress concentration process. *“However, care must be taken to ensure that the welding does not create additional stresses that could affect other parts of the chamber,”* pointed out Léonard Tok.

“During our discussions, we were impressed by the technological and scientific expertise of the Cetim-Matcor team. Their flexibility was also greatly appreciated. The objective approach of their report served as a guarantee for our customer,” enthused Arthur Pélissier.

Cetim's asset



In addition to equipment for the physical-chemical characterisation of the phenomena involved, Cetim's experts have all the skills needed to understand these phenomena.