Condenser Tube Sheet Repair and Protection in a Power Plant

ID: 10274

Industry:	*Power*	Customer Location:	*Jeddah*
Application:	*HEX-Heat Exchangers*	Application Date:	*May 2026*
Substrate:	*Carbon steel*		
Products:	*Belzona 1111 (Super Metal),Belzona 1321 (Ceramic S-Metal)*		

Problem

A major power plant was experiencing severe corrosion damage to condenser tube sheets, resulting in deterioration of the tube sheets and associated tubes. The mechanical contractor initially recommended complete replacement of the tube sheets and related tubing. However, this raised significant concerns for the plant authorities due to the high replacement cost, extended shutdown duration, and potential impact on power generation operations.

Hatcon proposed an alternative solution to rebuild and protect the existing tube sheets using the proven combination of Belzona 1111 (Super Metal) and Belzona 1321 (Ceramic S-Metal). This approach eliminated the need for replacement while providing long-term corrosion and erosion protection.

Initial condition of the heat exchanger tube sheets.

Cork plugs installed prior to abrasive blasting to protect the tubes during surface preparation.

Tube sheets after abrasive blasting to SSPC-SP10 / ISO 8501-1 Sa 2.5 cleanliness standards.

Tube sheets rebuilt using Belzona 1111 (Super Metal) and coated with Belzona 1321 (Ceramic S-Metal).

Application Situation

A major power plant was facing severe corrosion issues that were causing damage to the tube sheets and associated tubes. The mechanical contractor initially recommended complete replacement of the tube sheets and related tubing. However, this created major concerns for the plant authorities due to the high replacement costs, long shutdown duration, and potential impact on the power generation process.

Hatcon proposed an alternative rebuild-and-protect solution for the existing tube sheets using the proven combination of Belzona 1111 (Super Metal) and Belzona 1321 (Ceramic S-Metal). This solution eliminated the need for replacement while providing long-term corrosion and erosion protection.

Application Method

1. Grit blasting of the internal surfaces was carried out using angular abrasives to achieve the required SSPC-SP10 / ISO 8501-1 Sa 2.5 cleanliness and a minimum surface profile of 3 mils (75 microns). The blast profile was verified by conducting test patches using Testex Press-O-Film Replica Tape and a micrometer, while chloride ion contamination testing was performed using Elcometer 134S test kits.
2. Belzona 1111 (Super Metal) was mixed and applied using Belzona applicators to areas affected by pitting and metal loss.
3. Belzona 1111 (Super Metal) was allowed to cure in accordance with the Belzona Instructions for Use (IFU), followed by sweep blasting of the repaired surfaces prior to coating application.
4. Belzona 1321 (Ceramic S-Metal) was mixed and applied to the entire prepared surface using a stiff bristled brush in two coats at the recommended dry film thickness (DFT).
5. Masking tapes were removed immediately after application to ensure a neat and clean coating finish.
6. Upon completion of the coating application, a visual inspection was carried out to identify any runs, misses, or sags.
7. A final inspection of the coated surfaces was conducted jointly with the client's engineer prior to the successful handover of the project.

Belzona Facts

A cost-efficient, fast, and reliable corrosion protection solution, providing a viable alternative to expensive equipment replacement.