



Case History

Application: Precious Metal Recovery Electric Arc Furnace
(Electro Melt 9PT: 1,000,000 watts)

Operating Temperature: 2400°F

Emisshield® Product Used: Emisshield® ST-4 (US Patent 6,921,431)

Problem: The roof of this furnace is dome shaped and constructed with Kala Brick manufactured by Harbison-Walker. Once up to operating temperature, this roof lasts for four to five weeks under normal conditions. Because the roof is domed, it starts to “heave” and cracks appear on the outer surface after one and a half weeks which need repaired after three and a half weeks. Hot spots can also be found on the outer surface, ranging from 300°F to 600°F. These temperatures are taken by employees using a hand held optical pyrometer.

Results at three weeks after applying Emisshield®: An optical pyrometer was used to measure surface skin temperatures and there were no “hot spots”. Instead, a uniform temperature of 300°F was found. The engineer in charge of the furnace concluded that the disappearance of hot spots was due to the re-radiation of energy by the ST-4. The cracking that normally begins after one and a half weeks had not started at this time.

Results at five weeks after applying Emisshield®: The roof of the furnace had already been scheduled to be taken down as it would normally. However, no hot spots were found and cracking on the outer surface was minimal. After the roof was taken down, the engineer stated, “In my opinion, it [furnace roof] would have lasted three to four weeks longer”. Because of this opinion, it was decided to coat another furnace roof and allow it to run until failure, thus determining the overall improvement of refractory life.

Follow up January 07, 2003: The second furnace (cover coated with Emisshield® ST-4) was put into service November 27, 2002. Cracking in the roof did not start until the sixth week. The furnace continued to run for a total of eight weeks before it was scheduled to come down because of this cracking. Emisshield® Ceramic/Refractory ST-4 almost doubled the life of the Kala Brick in this furnace. This will not only save its operator material and labor costs, but will also have a positive impact on productivity, since a roof replacement puts the furnace out of service for four days. This is a demonstration of how Emisshield® can help save time and money.

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