

Effect of Coronary Insulators in Increasing the Lifespan of Electrolytic Cells: Short-circuit and Heat Resistance

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Abstract : The current study investigates the effectiveness of a new form of permanent baseboard insulators with an umbrella action, hereinafter referred to as Coronary Insulator, in supporting and protecting the assembly of electrodes immersed in an electrolytic cell and in increasing the lifespan of the lateral sides of the electrolytic cell, in both electro-winning and electro-refinery method. The advantages of using a coronary insulator in addition to the top capping board (equipotential insulator) were studied compared to the conventional assembly of an electrolytic cell. Then, a thermal imaging technique was utilized during high-temperature thermal (heat transfer) tests for sample cell walls with and without coronary insulators in their assembly to show the effectiveness of coronary insulators in protecting the cell wall under extreme conditions. It was shown that, unlike the conventional assembly, which is highly prone to damages to the cell wall under thermal shocks, the presence of coronary insulator can significantly increase the level of protection of the cell due to their ultra-high thermal and chemical resistance, as well as decreasing the replacement frequency of insulators to almost zero. Besides, the results of the study showed that the test assembly with the coronary insulator provides better consistency in positioning and, subsequently, better contact, compared to the conventional method, which reduces the chance of electric short-circuit in the system.

Keywords : capping board, coronary insulator, electrolytic cell, thermal shock.

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