

[ED05]

Firing of limestone in JPN pilot plant

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JPN Pilot Plant was designed and fabricated for firing of limestone. Large limestone particles were crushed into small pieces. Each particle size was 33 mm of sphericity 0.64. The limestone particles were loaded in the firing chamber in the form of one to six layers, each layer of 58 particles was weighed approximately 1.49 kg. The packed bed was heated by using LPG gas burner of 20 kW of heat through the combustion chamber for 1-3 hours of firing time. During the firing process, the temperature profiles across and along the packed bed were recorded. The flame temperature and the outlet flue gases temperature were also recorded. The conversion of the limestone was determined. The temperatures distribution in the packed bed, showed the concave downward curves, indicating the endothermic reaction of the firing of limestone. The temperature variation of the flame showed to be higher than the packed bed temperature, while the outlet flue gases temperature showed to be below both of them. The highest conversion of 95% was achieved by firing 4 layers of limestone for 3 hours.

*JPN = Jalal, Phang, and Norashid, the designers of the pilot plant.