

DEVELOPMENT OF A SEMI-WET PROCESS FOR CERAMIC WALL TILE GRANULE PRODUCTION

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ABSTRACT

In ceramic tile manufacturing industry, the wet process including wet grinding and spray drying, is widely used for preparing granule. However, due to the high energy consumption for the water evaporation in spray dryer has become a major problem in wet process. In recent years, there have been vast amount of researches for developing of dry granulation processes that consist of dry mills such as vertical roller mill or pendular mill and a granulator, have various problems on the granule shapes and granule size distributions that cause quality problems in the final products.

In this research, it is aimed to develop a new production system, called as Semi-Wet Process. The new system consists of a horizontal dryer, dry ball mill, separator and an additional high speed mixture. The raw-materials having low humidity are ground to the required fineness in dry size reduction process. The other components of recipe, that are prepared in conventional wet process, are mixed with the dry prepared powder in the mixing slurry tank. The addition of dry powder reduces the water ratio of final suspension, in other words, the bulk density of the slurry increases. Hence, the natural gas consumption of the water evaporation in spray dryer is reduced substantially.

The industrial application of the developed Semi Wet System has been carried out in Kaleseramik Factory, which is the largest ceramic manufacturer in Turkey. The sintered wall tile wastes were ground in the developed system to the fineness of under 63 µm sieve. The dry prepared powder was added by 15 % to the body slurry in the mixing tank, so that the bulk density of the wall tile slip has risen from 1632 g/l to 1750 g/l. As a result, the natural gas consumption has reduced from 52,52 sm³/ton to 37,52 sm³/ton. The use of Semi Wet System can provide savings around 6.750.000 sm³/year for the current granule production rate of 450.000 ton/year at the factory that refers to 28,5 % reduction on gas consumption.

Keywords: spray dryer, semi-wet granulation, granule, wall tile

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