Contribution ID: **236** Type: **Oral presentation**

Development of microwave-infrared drying system for industrial prototype of STR20 production

Wednesday 20 May 2015 16:00 (15 minutes)

Rubber block STR20 is a natural rubber product which has highest market need for both locally and internationally. STR20 is used as raw materials for various industries, such as tire, conveyor, elastomeric bearing pad and shockproof rubber case. Drying process is the most important in the rubber block production, which also consume the most of energy use. Typically, the dryers use hot air, supplied by the combustion of fuel oil or LPG, to remove the moisture from rubber granules, before compression for STR20 rubber block. Normally, the drying time is longer than 3 hours, since the heat transfer occurs slowly inside the rubber granule. There have to be temperature gradient between surface and inside of the granule for the heat transfer. Because of energy loss by ambient air and the dryer's wall, hot air dryer has low energy efficiency. Development of new drying technology by using microwave will increase the energy efficiency, reduce the drying time and increase the quality of the rubber block. The microwave can heat the rubber granule uniformly, without energy loss to the air and the environment. In this research, we have developed drying system by using combined microwave-hot air process. The hot air will heat up the surface, while microwave will cause the high temperature inside, resulting as uniform heating of the granule. The drying time is shorter and the quality of the dried rubber is better. For the drying capacity, rubber bed-depth is greater than 30 cm, and drying rate is more than 30 kg/h. The drying technology has potential for development of industrial prototype of STR20 rubber block production in the future.

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Session Classification: Instrumentation, Metrology and Standards

Track Classification: Instrumentation, Metrology and Standards