Identification of Method to Minimize Glaze Pinhole in Porcelain Tableware

W.A.S.H. Weerakkody[1], P. Hettiarachchi[2], J.T. Cooray[1]
[1]Department of Science and Technology, Uva Wellassa University, Badulla, Sri Lanka,
[2]Dankotuwa Porcelain Plc, Dankotuwa, Sri Lanka

Sri Lankan porcelain industry governs a vast reputation of producing high quality porcelain products. Among different companies Dankotuwa Porcelain PLC upholds a great demand as the world's whitest porcelain manufacturer. Porcelain refers to a wide range of ceramic materials heated at higher temperatures to acquire vitreous qualities. This study was focused on the reduction of the defects that are determined as the faults or failures in porcelain items which can be occurred at any stage of the manufacturing process. The main focused defect in this study is the defect Glaze Pinhole. It is defined as pin pricks or small cavities beneath the surface on the mould side of the article. Aiming a profit maximization through reducing extra processing cost due to repaired and damaged items efficient methodology was built up to reduce glaze pinholes. In our study root causes for glaze pinhole were identified with the aid of a causes and effect diagram. It was identified that the particle size of the ball milled glaze, glaze flow and the dust particles on the porcelain body critically affect the occurrence of glaze pinholes. It was noted that best method to minimize glaze pinhole is dust must be removed perfectly and glaze particle size is within 71-72% (below 8[Im particles). Glaze flow should be within 25 and 26mm. The cost efficiency was calculated as cost reduction due to decreasing of glaze pinholes and the reduction of ball mill grinding time. The energy saving due to the reduction of ball mill grinding time from 28-17 hours worth more than one thousand. As a result of this study it could be minimized the glaze pinhole percentage of porcelain tea cups from 8.21% to nearly 3%.Thus it showed a significant cost reduction worth nearly eighty two thousand rupees due to the 5% decrement of glaze pinhole percentage for nearly twenty thousand pieces.

Keywords: Porcelain, Defects, Glaze pin-holing