

## IMPROVING THE THERMOPLASTIC EXTRUSION PROCESS IN CABLE MANUFACTURING

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### ABSTRACT

Cable manufacturing in a developing country like Nigeria today is faced with a number of problems that affect the quality of cables produced from extrusion to insulation of conductors. The main cause of the problems is the low and variable output rate from extruder causing non-uniform conductor diameter which results in insulation surface appearance defects. These defects manifest in form of pimples, dimples, cracking, air cavity, voids and porosity within the plastics which are insulation.

The conductor insulation normally used is the Polyvinyl chloride (PVC) which is normally sourced locally or imported. The locally produced PVC is cheaper in cost than the imported one but at the expense of quality due to inconsistency in the percentage combination of plasticizers, fillers, stabilizers, lubricants, and other additives required for producing quality PVC resin for cable applications. If the local manufacturers of PVC are not patronized, it will lead to employees losing their jobs and most likely their family income with other attending societal ills.

The work in this paper takes a close look at what should be done to improve the quality of locally produced PVC at little or no increase in cost. It has been discussed while working with one of the manufacturers that the required additives to produce an acceptable level of quality PVC resins for cable application are not optimally combined proportionately. In order to improve the quality of local plastics, optimum proportion of the required additives for quality cable insulation were experimentally determined at a comparable cost and better additive material consumption.

The ratio of weight per charge (Kg/charge) of additives especially plasticizer and chalk gave a good output comparable in quality to the imported ones. The test results obtained from the analysis of the local plastics with optimum proportion of additives are comparable to the imported one. The analysis is based on insulation test, cost savings, material consumption/wastages, viscosity, melt temperature, flows and pressure requirements associated with extrusion process of thermoplastic.

**KEYWORDS:** Extrusion, Output Rate, PVC Resin, Additives, Weight per Charge, Material/Cost Analysis