CASE STUDY

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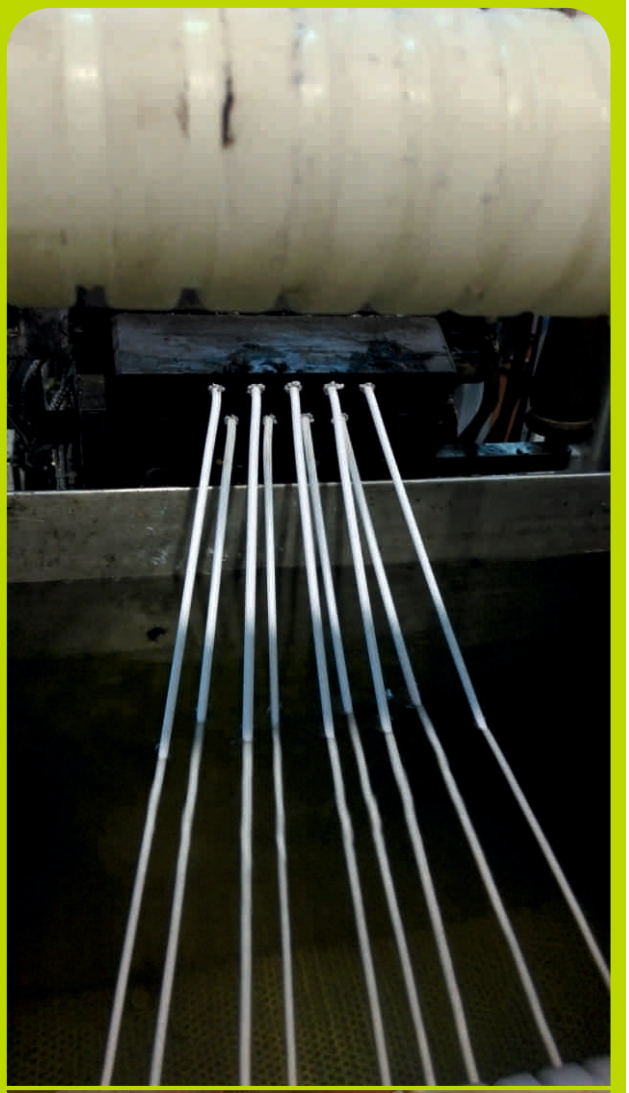

STEER standardises process parameters for optimum dispersion in volatile applications using patented Intelligent Processor

Compounding Polylactic Acid (PLA) with Aluminium Trihydroxide (ATH) & Glass Fibre

Executive Summary

Achieving optimum dispersion in compounding Polylactic Acid (PLA) with Aluminium Trihydroxide (ATH) & Glass Fibre is an industry issue. STEER Engineering took up the challenge and conducted trials at its Application Development Centre, Bengaluru, India. Following multiple R&D trials, STEER was successful in achieving optimum dispersion – maintained homogenous structure of Polymer matrix in the Application.

Challenges

- Achieving an optimum dispersion while compounding PLA with ATH and Glass Fibre because of an untested process (PLA has a relatively low glass transition temperature while ATH, the largest selling fire retardant additive in the world, liberates water when it is processed).
- Controlling temperature while processing ATH, as any variation would lead to liquefy of application
- Poor temperature control makes it difficult to compound PLA with ATH and Glass Fibre resulting in poor dispersion of Application
- Consequently, the Application is either watery/ sticky / non-pellet form

Objectives

- Develop standard process parameters using co-rotating twin screw extruder to compound PLA with ATH & Glass Fibre
- Achieve good dispersion during compounding of the Application in Pellet form

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Solutions

- Deployed lab extruder Omega 25 Class L/D:40 machine for R&D trials
- Calibrated materials for the trials and designed/configured screws for the extruder accordingly
- Process parameters, such as, Temperature Profile, Melt Pressure, Melt Temperature, power consumption, RPM, and torque were evolved and monitored for stability during the trials

Results

- No property loss of the PLA
- No degradation of the ATH
- Oils were finely dispersed
- Minimal attrition of glass fibers, average fiber length was 2.5mm
- The product had a very high degree of homogeneity of all components
- Through Intelligent Compounding practices and effective energy management enabled by patented STEER Omega technology a very difficult compounding task was completed producing a product comprising very shear and heat sensitive components.

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About STEER

STEER is a creator of materials platform technologies that transforms and functionalise materials in the fields of plastics, pharmaceuticals, food & nutraceuticals, biomaterials and biorefining. Founded in 1993 by Dr. Babu Padmanabhan with a vision to steer a new world, STEER today has 5 global offices and 10 satellite offices, serving over 39 countries and employs over 500 gifted engineers, scientists and technicians across the globe. With 60 patents for breakthrough innovations, the company is committed to the design, creation and implementation of advanced platform technologies, components, elements, peripherals and applications that help in the creation of safer, stronger, lighter, more sustainable products.

For more information, please visit www.steerworld.com