

The Use of Additives to Prevent Fouling in Polyethylene and Polypropylene Gas and Slurry Phase Processes

Authors : L. Shafiq, A. Rigby

Abstract : All polyethylene processes are highly exothermic, and the safe removal of the heat of reaction is a fundamental issue in the process design. In slurry and gas processes, the velocity of the polymer particles in the reactor and external coolers can be very high, and under certain conditions, this can lead to static charging of these particles. Such static charged polymer particles may start building up on the reactor wall, limiting heat transfer, and ultimately leading to severe reactor fouling and forced reactor shut down. Statsafe™ is an FDA approved anti-fouling additive currently used around the world for polyolefin production as an anti-fouling additive. The unique polymer chemistry aids static discharge, which prevents the build-up of charged polyolefin particles, which could lead to fouling. Statsafe™ is being used and trailed in gas, slurry, and a combination of these technologies around the world. We will share data to demonstrate how the use of Statsafe™ allows more stable operation at higher solids level by eliminating static, which would otherwise prevent closer packing of particles in the hydrocarbon slurry. Because static charge generation depends also on the concentration of polymer particles in the slurry, the maximum slurry concentration can be higher when using Statsafe™, leading to higher production rates. The elimination of fouling also leads to less downtime. Special focus will be made on the impact anti-static additives have on catalyst performance within the polymerization process and how this has been measured. Lab-scale studies have investigated the effect on the activity of Ziegler Natta catalysts when anti-static additives are used at various concentrations in gas and slurry, polyethylene and polypropylene processes. An in-depth gas phase study investigated the effect of additives on the final polyethylene properties such as particle size, morphology, fines, bulk density, melt flow index, gradient density, and melting point.

Keywords : anti-static additives, catalyst performance, FDA approved anti-fouling additive, polymerisation

Conference Title : ICPCP 2020 : International Conference on Polymer Chemistry and Polymerization

Conference Location : Dubai, United Arab Emirates

Conference Dates : November 09-10, 2020