EQUILIBAR®
PRECISION PRESSURE CONTROL

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Equilibar back pressure regulator improves flow control for liquid gas dosing in polyolefins research

Background

Development of improved polyolefin catalysts is an important area of research to meet a growing demand for more and more specialized polyethylene (PE) and polypropylene (PP) polymers. In particular, new research to develop multi-functional and fully recyclable polyolefins is needed to close the materials loop for polyolefin polymer production.

ILS-Integrated Lab Solutions, GmbH, has a long-history of designing polyolefins catalyst testing units. The most recent development includes a fully-automated 6-parallel batch polymerization unit capable of doing slurry, gas and bulk PE and PP synthesis.

Challenges

To ensure proper functioning of the ILS testing units, it is necessary to provide quantitative and stable monomer flow control over extremely wide flow and pressure ranges. A mass flow controller (MFC) alone is only able to provide stable mass flow control over a limited pressure range using its integrated electronic flow control valve. This instability is primarily due to the flashing issues resulting from dosing liquid gas monomers such as propylene and 1-butene.

Benefits of Equilibar technology for flow control

Integrating a dome-loaded multiple orifice back pressure regulator (BPR) directly after the thermal or Coriolis MFC enables steady monomer flow control over extremely wide flow and pressure ranges.

By placing an Equilibar valve downstream of the MFC and upstream of the reactor, the MFC experiences the same upstream and downstream pressure regardless of the pressure fluctuations in the reactor. This setup results in superior monomer flow control over the entire flow range of these high-throughput polyolefin testing units. *See diagram below.*

Additionally, the compact size of the Equilibar BPR allows it to fit easily into compact spaces and it is easy to heat the BPR to counteract Joule-Thomson cooling effects which often occur during liquid gas dosing.

Figure 1: Fully-automated 6 parallel batch polymerization unit

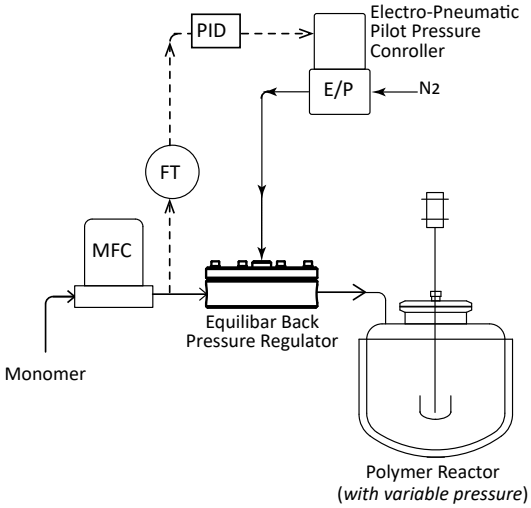

Figure 2: Schematic of ILS polymerization unit with Equilibar BPR providing consistent pressure to MFC for improved flow control

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Equilibar is a provider of unique and innovative fluid control solutions based near Asheville, North Carolina. The patented fluid control technology is used in a wide array of processes including catalyst, petrochemical, supercritical and other industrial applications. For more information contact an Equilibar application enigneer at inquiry@equilibar.com or 828.650.6590.

About ILS-Integrated Lab Solutions, GmbH

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