

## 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.

### Benefits of Equilibar technology for flow control

Quantitative and stable monomer flow is essential for proper functioning of these testing units. By using an Equilibar® back pressure regulator (BPR) directly after the thermal or Coriolis mass flow controller (MFC), it is possible to obtain steady

monomer flow control over extremely wide flow and pressure ranges. Without the Equilibar BPR, the Bronkhorst mass flow controller is only able to provide stable mass flow control for a very limited dP range over the electronic solenoid control valve. This instability is primarily due to the flashing issues resulting when dosing liquid gas monomers such as propylene and 1-butene.

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

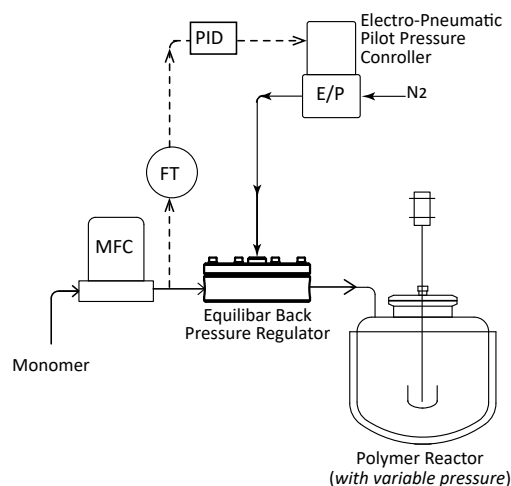


Figure 2: Schematic of ILS polymerization unit with Equilibar BPR providing consistent pressure to MFC for improved flow control

### Contact Equilibar

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 engineer at [inquiry@equilibar.com](mailto:inquiry@equilibar.com) or 828.650.6590.

### About ILS-Integrated Lab Solutions, GmbH

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