

## Reactor Design & Scale-up

Optimising polymerisation reactors for optimum product quality, safer operation and reduced capital

### Applications

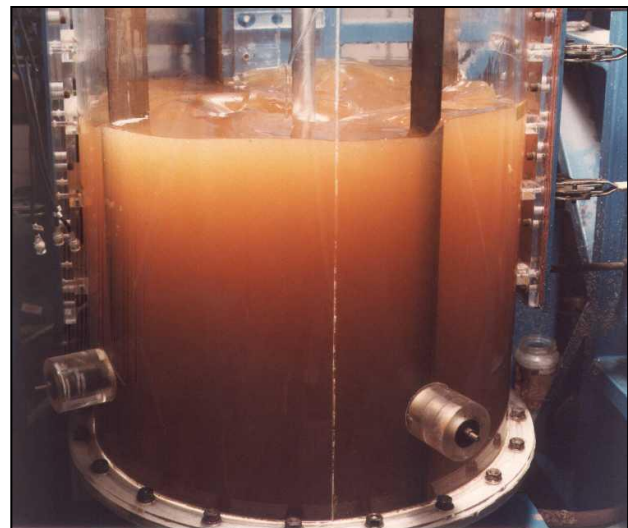
- Polyolefins
- Polyurethanes
- Acrylics
- Polyesters
- Latex
- Polystyrene
- Polyols
- Polyamines
- Polymer post processing
- Emulsion polymerisations

### Benefits

- Purer products
- Tighter control of molecular weight distribution
- Efficient utilisation of raw materials
- Safer operation
- Faster productivity
- Lower capital cost
- Lower operating costs

### BHR Group's Experience

BHR Group is a world centre of fluid mixing expertise and know-how in the design, optimisation and scale up of chemical reactors for single-phase and multiphase processes.



*Physical model study of a high viscosity mixing application*

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# Polymerisation Modelling

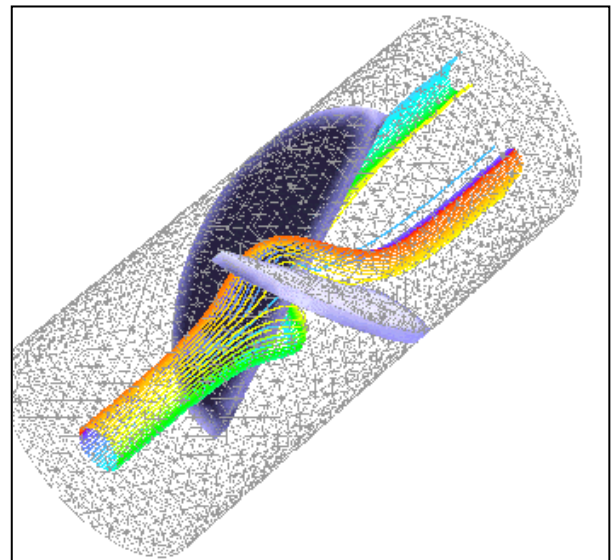
## Services

- Audits of existing polymerisation reactors to provide clear recommendations for improvement
- CFD model studies for:
  - Reactor design, optimisation & scale up
  - Parameter sensitivity studies
  - Monomer/initiator feed strategies
  - Heat transfer optimisation
- Simulation of different reactor operating modes – batch, semi-batch, continuous
- Physical model studies for:
  - CFD Validation
  - Reactor, design, optimisation & scale up
  - Models combining polymerisation kinetics, mixing and changing product viscosity
  - Conversion of batch to continuous, intensified polymerisation reactor
  - Equipment selection & design
  - Complex rheological measurements
  - Literature searches
  - Feasibility studies

## Techniques

- CFD modelling
- 1-D modelling
- Kinetic modelling
- Physical modelling
- LDA to measure local velocities
- LIF to measure local segregation
- Mixer design guides

Mixing is critical to product quality, owing to the interplay between the kinetics of initiation and chain growth on the one hand and mixing and heat transfer rates on the other. Control of initiator levels, dosing, concentration profiles and thermal regime is vital.



*LDP Mixer*

BHR Group provides design and optimisation through physical and/or CFD modelling combined with kinetic modelling or stand-alone consultancy

Contact us for more information or visit our website.

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