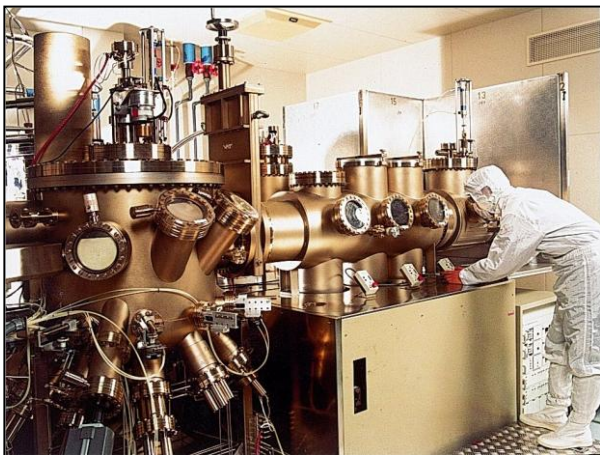




Services for the Pharmaceutical Industry

Through its core expertise in fluid engineering and over 50 years experience in delivering benefits to its customers across the globe, BHR Group addresses the key drivers affecting today's pharmaceutical manufacturing industry, from active ingredient to dose delivery.



Customer Benefits

Reduced Time to Market

- Fast, reliable scale-up
- Improve cleaning & reduce downtime

Improved Product Quality

- Improve batch to batch repeatability
- Maintain required impurity profile
- Reliable scale-up
- Improve crystallisation performance

Flexible Production

- Effective design and rating of multiproduct plant
- Manage variable batch sizes

Improve Containment

- Avoid leakage of highly active materials

Meet Validation Requirements

- Consistent product quality
- Equipment validation

Meet Environmental Consents

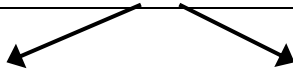
- Improve yield
- Improve product recovery
- Reduce solvent use

Improve Dose Control

- Improve batch homogeneity
- Reliable, repeatable filling systems

BHR Group Core Expertise

Mixing	Crystallisation
• Single phase	Heat transfer
• Liquid liquid	Piping system design
• Gas liquid	Sealing technology
• Solid liquid	Mechanical design
• Multiphase	
Mathematical modelling	
Physical modelling	



Primary Manufacture

Reactor engineering
Interaction of chemistry & mixing
Process Intensification
Batch to continuous
Catalyst distribution
Biocatalysis

Secondary Manufacture

Emulsification
Complex rheologies
Nano and microparticle dispersion
Flow distribution in filling lines
Tablet dissolution testing
Drug delivery

Services for Pharmaceutical Manufacturers

BHR Group adopts a 'best approach' methodology to address its clients' business requirements, from simple desk studies up to complex physical or mathematical studies, always focused on providing innovative solutions which are both robust and cost effective.

Process Consultancy

- Expert consultancy by world-renowned specialists
- Process and plant audits
- Process analysis
- Unique, validated design and scale up correlations
- Benchmarking of equipment



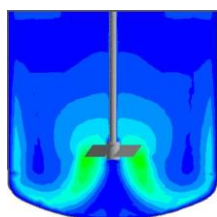
Physical Modelling

- Range of test vessels up to 15,000 lt
- Wide range of impellers available
- Bespoke models
- Validated performance measurement techniques
- Selection of test materials
- Rheometric testing



Mathematical Simulation

- Computational Fluid Dynamics (CFD)
- Modelling of complex physics and chemistry
- Crystallisation modelling
- Finite Element Analysis (FEA)
- Multiscale modelling



Process Research & Development

- Cost-sharing collaborative R&D to address common problems
- Confidential R&D
- Access to UK government and EU R&D funding



Process Intensification

- Design of PI processes
- Rental or supply of flexible pilot scale PI facilities

Training

- Mixing
- Process Intensification
- Public or tailored in-house courses

Pharmaceutical Clients

AstraZeneca
Eli Lilly
Genentech
Genzyme
GSK
Merck, Sharpe & Dohme
Pfizer
Rhodia Pharma Solutions
Sanofi-Aventis
Schering Plough

Contact us for more information or visit our website.

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Office contact information:

Telephone: +44 (0) 1234 750 422
Facsimile: +44 (0) 1234 750 074
Email: contactus@bhrgroup.co.uk
Website: www.bhrgroup.com

The Fluid Engineering Centre
Cranfield, Bedfordshire
MK43 0AJ
United Kingdom



Global Experts in Fluid Engineering