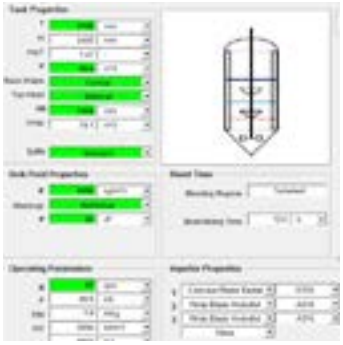
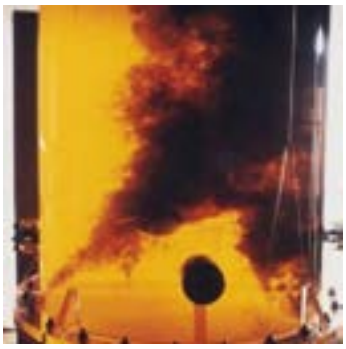
framatome

BHR

FLUID MIXING PROCESSES

Scale-up successfully from lab to pilot, and pilot to production. The process mixing knowledge generated in the FMP consortium can reduce time to market, minimise down-time and reduce production costs.





Framatome BHR's Fluid Mixing Processes (FMP) consortium is an industrially driven mixing research and development project, run continuously since 1983. It is owned and managed by Framatome BHR and funded and steered by its industrial members, which include companies in the bulk and specialty chemicals, pharmaceuticals, food and beverage and personal care markets worldwide. Framatome BHR is independent of any mixer manufacturer, and results and deliverables are confidential to Member companies.

Information available in the public domain is frequently limited, and is often difficult to relate to industrially relevant equipment configurations or operating conditions. FMP is focused on the development of design guidelines and scale-up methods directly applicable to industry, aimed at improving the performance of existing processes and reducing the time and risks associated with developing new or larger scale processes. The work programme is defined annually through a Member voting system, ensuring the continued relevance of the work, along with regular discussions between Members and Framatome BHR engineers at bi-annual Steering Committee Meetings, where the most recent results and analysis are presented.

The research programme is focused on the analysis of data obtained in its specialist laboratory, where tests are performed at a wide range of scales from typical bench top lab testing to full production, ensuring that the impact of scale is confirmed rather than assumed. Tests are largely performed using simulant systems, so results can be applied by the broadest range of Members processes.

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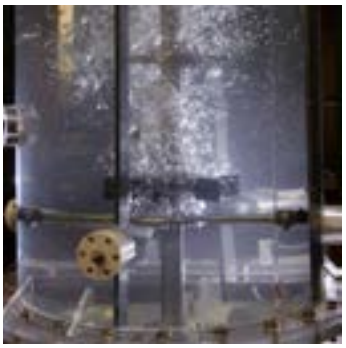
Key deliverables include technical reports and design guides, including the FMP Excel Design Guide. This tool makes the design guidelines and correlations developed by the consortium quick and easy to apply, while also providing guidance on good practice. Performance calculations take seconds, and it is easy to test the impact of changing mixer geometry, operating conditions, or scale. All Members have full visibility of the calculation methods employed, and as the deliverable is in the form of a spreadsheet, it can be easily distributed within the Member company.

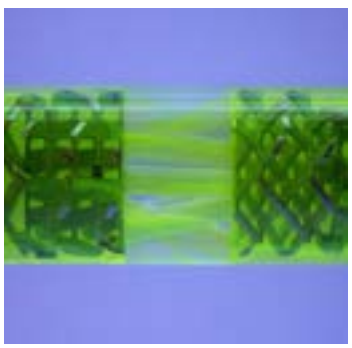
While all Members contribute to steering the consortium and are provided access to all of the results and deliverables, FMP also provides support to individual Members on a confidential basis. This can include the performance of experiments specifically for that Member company, but also can be simply providing advice on a mixing process or helping Members apply the FMP knowledge to their own processes. New Members also receive a customised two day mixing course on their own premises, aimed at familiarising staff with the importance of mixing and introducing them to the FMP information to interpret, improve and scale-up processes successfully.

Stirred vessels | In-Line Mixers| Jet Mixers

Key aspects of the current work-programme include:

- Mixing of complex rheology fluids
- Optimisation and scale-up of mixing sensitive reactions
- Suspension and distribution of solids in stirred vessels
- Gas dispersion and surface aeration
- Prediction of droplet size distribution in immiscible liquid dispersions
- Incorporation and blending of materials with different physical properties in static mixers and stirred vessels
- Blending and de-stratification in jet mixed storage vessels
- Application of Computational Fluid Dynamics to mixing processes.





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