

IMPROVING MIXING PROCESSES FOR INDUSTRIAL APPLICATIONS

**A TWO – DAY COURSE:
19 – 20 NOVEMBER 2025**

**AT FRAMATOME LTD, CRANFIELD,
BEDFORDSHIRE, UK**



fmp.framatomebhr.com/Mixing-Course

ABOUT THE COURSE

Background to the Course

The course will communicate principles of fluid mixing, provide recommendations for process design and scale-up, and enable participants to apply these to their mixing processes/problems. Additionally, the course will discuss specifications for the optimal selection and operation of mixing equipment.

Course Outline

Mixing is fundamental to process efficiency and product quality:

- Flexibility in operation (multiple products from one plant; variable batch sizes).
- Product consistency and repeatability.
- Success in scale-up/scale-down.

These mixing-related concerns require a good understanding of the underlying mechanisms and principles which will be covered in this course.

A comprehensive set of lecture notes will be provided in PDF format on a memory stick.

Who should attend

The course is designed for experienced engineers and graduates, scientists and fluid engineering managers from the chemical, process or related industries (biochemical, pharmaceutical, personal care) who are involved in product or process development, design, operation or research.

IMPROVING MIXING PROCESSES

Course Leader

Dr Nigel Heywood is a Chartered Chemical Engineer & Fellow of the Institution of Chemical Engineers. He initiated fluid mixing courses starting in 1985 and slurry handling courses starting in 1988. He is a senior consultant in slurry handling and applied rheology.

Course Tutors

Mr David Brown has a B. Eng in Chemical Engineering and is the Process & Mixing Engineering Manager at Framatome Ltd. He is an authority on experimental methods and solid-liquid mixing, contributing to the Handbook of Industrial Mixing.

Dr Gustavo Padron is the Technical Lead for the Fluid Mixing Processes (FMP) Industrial Consortium, specialising in liquid-liquid and gas-liquid mixing processes and the design, commissioning, execution and analysis of experimental projects related to mixing processes.

Dr James Bacon is an FMP Project Engineer. He obtained a Masters and PhD in Chemical Engineering from Loughborough University.

Dr Jan Umashanker is an FMP Project Engineer. She obtained a Masters from Aston University and a PhD from Cambridge University, both in Chemical Engineering.



DAY ONE

Why mixing matters: Introduction

Objectives and layout of course. Importance of mixing in industrial processes, consequences of failures in mixing processes, energy savings and social benefits, examples of capital and operating cost savings.

Mixer types & associated equipment

Different types of mixers (top, submerged and bottom entry mixers, static mixers, jet mixed systems and associated equipment), flow patterns, general guide to impeller selection, mechanical design.

Mixing concepts

Process requirements, dimensionless groups, flow regimes (laminar, turbulent, transitional), power requirements for mixing processes, rules for scale-up and scale-down.

Liquid blending

Mechanisms of blending; blending regimes; blending liquids of low-medium viscosity (turbulent and transitional regimes); scaleup & down; blending high viscosity liquids (laminar regime); blending liquids of different properties (including video demonstrations); CSTRs; blending with jets.

Reactive mixing

Effect of mixing on multiple reactions, micro and meso mixing models, effect of process parameters on reaction productivity, optimisation and scaling of reactive systems to increase productivity and reduce waste in the reactor.

Computational fluid dynamics (CFD)

How and why CFD is used to solve single and multiphase mixing and reaction problems.

Tutorial: Example calculations.

DAY TWO

In-line and high intensity mixing

Blending, gas-liquid mixing and liquid-liquid mixing using in-line equipment (static mixers, ejectors and rotor stator mixers).

Liquid-liquid dispersions

Deformation and break-up of drops, turbulent drop size models, high dispersed phase emulsions, effect of coalescence, minimum dispersion speed, scale-up.

Industrial workshop

Questions and discussion of case studies from Course Attendees.

Heat transfer

Introduction to concepts related to heat transfer in mixing equipment.

Solid-liquid mixing

Solid suspension: mechanistic and empirical models for solid suspension, power requirements, scale-up and down, jet solid suspension; solids distribution: multiple impellers; solids draw-down.

Gas-liquid mixing

Gas-liquid mixing design guidelines for low-to-medium viscosity liquids, gas-liquid flow regimes, the effect of gas on power draw, mass transfer and hold-up, the heterogeneous regime, scale-up.



VENUE

The Course will take place at Framatome Ltd.

Address

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

Accommodation

Delegates are responsible for their own accommodation (if required).
A list of accommodation options can be supplied if required.

Course Fees

Course fees include the cost of tuition, course notes (on USB), lunches and refreshments during the course. There is a 10% early bird discount available for bookings made more than 4 weeks before the course starts

- **By early bird cut-off (22nd Oct)** **£855 + VAT**
- **After early bird cut-off** **£950 + VAT**
- **Web-based Attendance** **£495 + VAT**

For the third and further delegates from the same organisation, a 50% discount is available*.

FMP members are eligible for a further £100 discount on the published prices.

Delegates with any special requirements should contact the course organiser as soon as possible.

*Not available in conjunction with any other offers.

HOW TO BOOK

Payment:

Bank transfer paid to our account at:

JPMorgan Chase Bank

Account number: 80035295 Sort code: 60-92-42
IBAN: GB13CHAS60924280035295 SWIFT BIC: CHASGB2L

To secure a place on the course please send an e-mail with your company name and attendee details. You will receive e-mail confirmation within 48 hrs.
nigel.heywood@framatome.com or mark.willey@framatome.com

For booking queries and for all other enquiries relating to the course please contact:

Dr Nigel Heywood

Course Organiser

Framatome Ltd

The Fluid Engineering Centre
Cranfield, Bedfordshire, United Kingdom MK43 0AJ
T: +44 (0)7957 459 253, E: nigel.heywood@framatome.com

Terms and conditions of booking

Payment in full should accompany your booking. Fees must be paid in full no later than 15 working days before the course commences. Failure to pay may result in attendance being refused.

Cancellations made up to 21 days prior to the course date will be subject to a £100 administration fee. NO REFUNDS will be given for cancellations made less than 21 days prior to the course. Replacement candidates are welcome at any time.

Registrations are accepted on the understanding that the printed programme is given in good faith, but this may have to be re-scheduled or the speakers changed for reasons outside our control. Framatome Ltd reserves the right to cancel or postpone the course, in which case fees will be refunded in full. In the event of cancellation, Framatome Ltd will not be held liable for delegates travel or accommodation expenses.

WHAT PREVIOUS ATTENDEES SAID ABOUT THIS COURSE:

*"A good overview of mixing relevant to my job.
Good level of theory covered"*

*"Very informative, very confident and approachable
lecturers - I will recommend this to more of my
colleagues"*

"Very well-structured course"

