LEON
ENABLING NANO NOW

Revolutionizing nanoencapsulation.

Proprietary FR-JET® modular-mixer technology from mixing to manufacturing.

FR-JET technology

Scalable | Clog-free | Modular | Robust | Precision-controlled

LEON's proprietary FR-JET® technology and comprehensive product suite are redefining the future of lipid and polymer nanoparticle manufacturing.

With its scalable, clog-free, robust, versatile and precision-controlled technology, FR-JET® sets new standards in nanoencapsulation - empowering the next generation of nanoparticle-based advanced therapy medicinal products (ATMPs) and vaccines.

We deliver cost-effective, GMP-ready equipment that eliminates complexity while ensuring operational efficiency. Whether in early-stage research or large-scale production, our solutions enable a smooth transition without the need for reformulation or system changes - bringing your therapeutic innovations to market faster and more efficiently.

THE FR-JET® MODULAR MIXER

The FR-JET® Technology is based on jet-impinging principles and features a modular design with interchangeable parts. This innovative approach provides the flexibility to fine-tune process parameters from the early development stages through to large-scale production.

THE UNDERLYING PRINCIPLE

Two liquids are injected into the mixing chamber under pressure through two nozzles. This process establishes a highly turbulent yet stable mixing process, in which the liquids mix in a very short period of time within the mixing chamber.

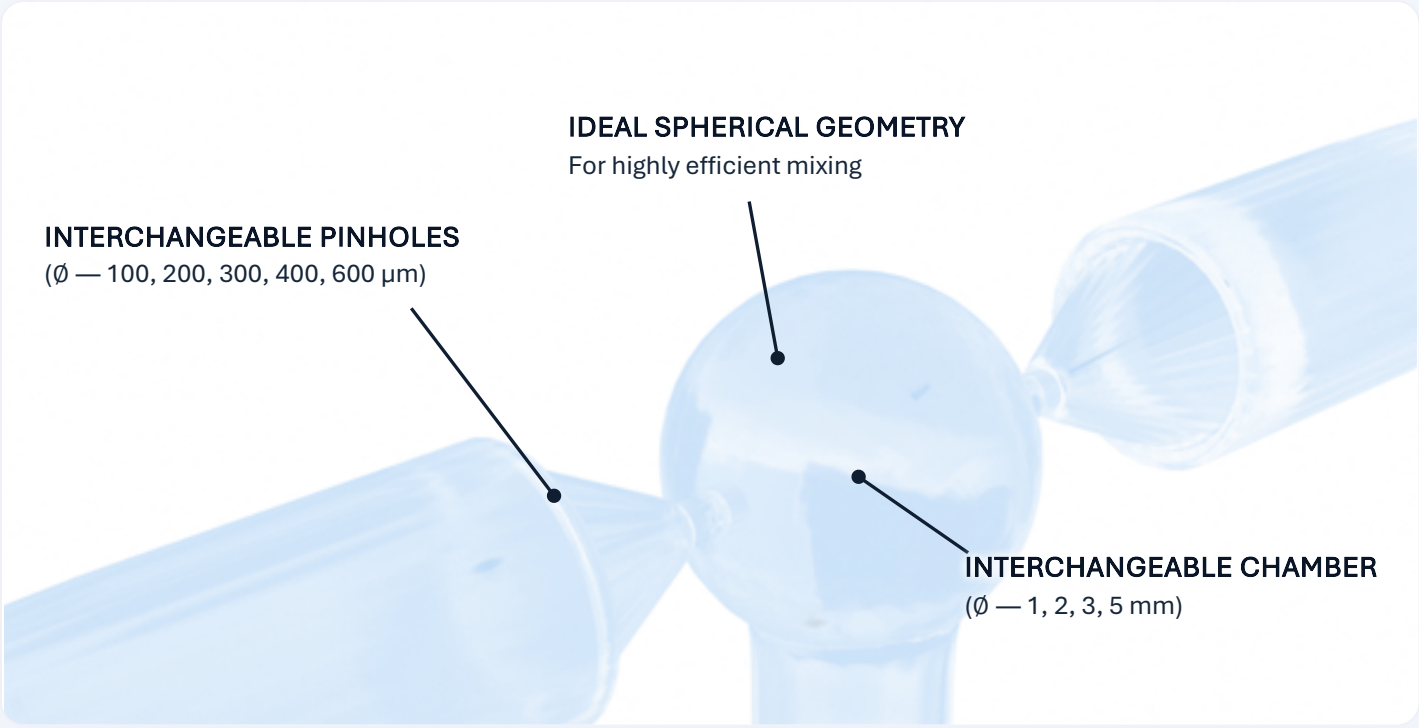
The unique internal geometry of our mixer core maximizes turbulent mixing efficiency by minimizing the surface area-to-volume ratio and reduces deviations from ideal reactors by eliminating stagnant or dead volumes.

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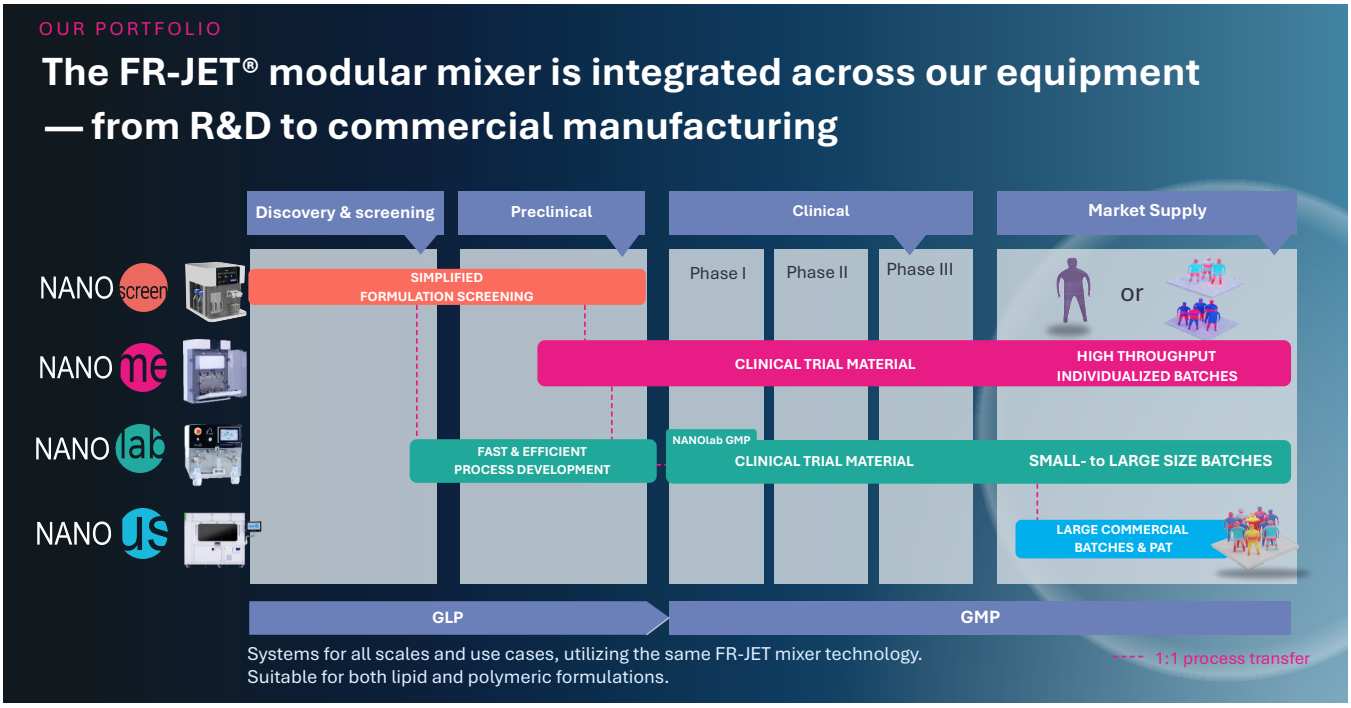
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Revolutionizing nanoencapsulation with our holistic platform - from mixing to manufacturing.

UNIQUE MODULAR CONCEPT



INTEGRATED ACROSS OUR EQUIPMENT



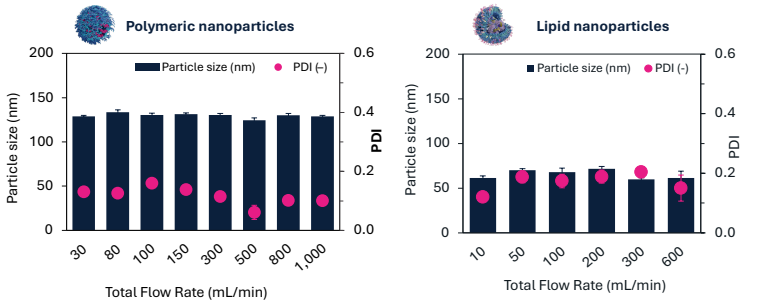
Benefits of LEON's platform technology:

- € Multi-million € direct cost savings
- Earlier to clinic & earlier to market
- Longer time in market (maximized NPV)

Recognizing the complexity of the emerging drug modalities, LEON has introduced the FR-JET® modular mixer with the following features addressing the challenges of conventional methods:

EASY SCALE UP

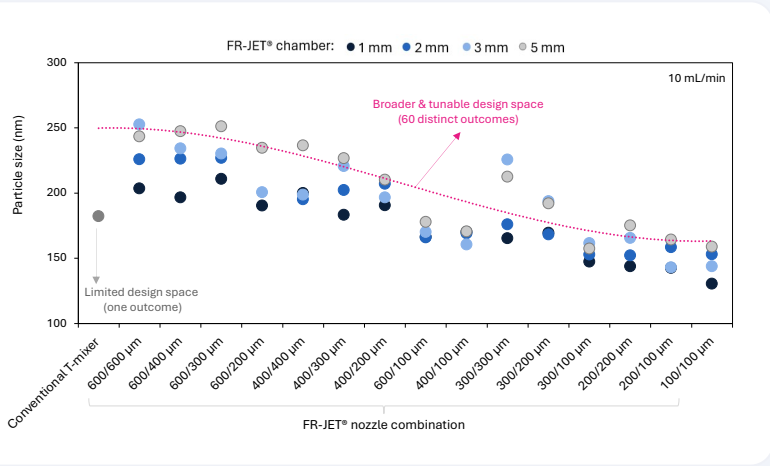
- Robust and simple scale-up with predictive mathematical tools
- Simple 1-step process transfer to GMP systems



FR-JET® enables consistent particle CQAs during scale-up. Precise particle size control was achieved using the modular FR-JET® system over a 100-fold scale-up, consistently maintaining particle size within ±5% as flow rates increased from 10 to 1000 mL/min.

BROAD DESIGN SPACE

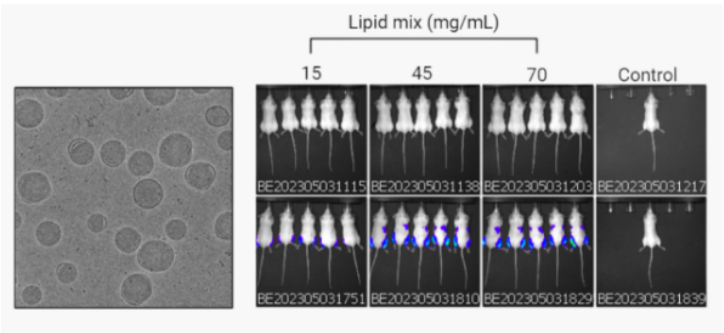
- Performs at both very low and very high flow rates
- Operates across a wide range of flow rate ratios



Effects of specific changes in reactor configuration can be predicted and used to design the process, enabling full exploitation of a broader nanoparticle design space. FR-JET® process design parameters correlate with the calculated mixing energies.

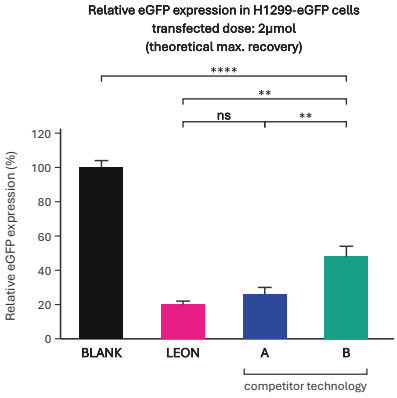
VERSATILE

- Wide variety of nanoparticles (lipid nanoparticles, liposomes, polymeric nanoparticles, nanocrystals, etc)
- Enables encapsulation of diverse payloads (mRNA, siRNA, saRNA, circRNA, pDNA, small molecules...)
- Allows processing at high starting materials concentrations (lipids and RNA)



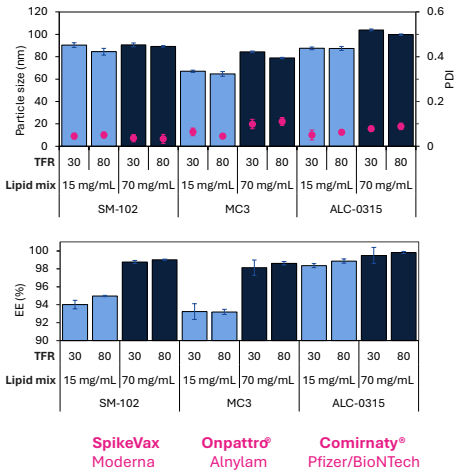
SAME FORMULATION - BETTER PARTICLES

- FR-JET® mixer produces a higher percentage of uniform solid-core nanoparticles
- Same formulation manufactured with FR-JET® mixer shows enhanced biological activity



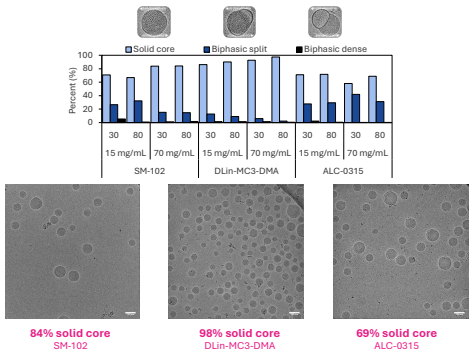
RELIABLE & ROBUST

- Broad chemical compatibility of the FR-JET® stainless steel and polymer mixer
- Handles high-viscosity starting materials
- Minimizes material build-up and reduces risk of clogging
- The FR-JET® modular mixer robustly produced liposomes with consistent particle properties at a high TFR (total flow rates) in all reactor configurations



ENABLING REPRODUCIBILITY FOR LIGAND-TARGETED LNPS

- consistent production of blebless solid-core particles (70–90%) an important parameter for surface reproducibility.
- Controlling bleb formation allows for more consistent ligand density at the particle surface, which is harder to achieve when blebs are uncontrolled.



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SCAN ME