



MSRTM

MicroSphere Refiner

Microsphere Drug Production: **Redefined**

PSL has pioneered technology that is disrupting the way microsphere drugs are developed and manufactured around the world.

The **MSR™ MicroSphere Refiner** is an all-in-one solution that combines all the individual stages required in microsphere processing, offering unique features and process designs. It addresses all the major manufacturing challenges of microspheres and removes operator variability, reduces plant footprint and optimises capital investment.

A Complete Solution

The MSR™ condenses multi-stage microsphere processing within a single, Current Good Manufacturing Practice (cGMP) instrument.

It naturally maximises product recovery, batch repeatability and production flexibility of the microspheres as it is capable of completing the following processes in one single system:

- **Size Classification**
- **Loop Filtration/De-watering**
- **Product Washing**
- **Drying/Freeze-drying**
- **Aseptic Discharge/Recovery**

Complete process flexibility is achieved with the MSR™ Process Support Module. This allows full automation of each step with prebuilt recipes, and is customisable using the MSR™ sequence configurator.

Filtration and drying occur within the MSR™ vessel, operating to secure maximum product discharge. Where more complex formulation is required, product freeze-drying can also be performed in bulk inside the vessel.



Key Features and Benefits

Batch Reproducibility

The MSR™ MicroSphere Refiner is a fully automated system designed to remove manual product handling by operators throughout production.

This enables maximising batch-after-batch reproducibility while minimising the risk for human error.

Product Recovery

Product recovery from the MSR™ is unique as it is fully automated and it does not require any manual product off-loading by operators through an aseptic isolator, for example.

Being an all-in-one solution, the MSR™ method also minimises the number of transfers and connections to aid maximising product yield.

Successful Scale-up

The MSR™ product range was designed to simplify the scale-up development of microsphere drugs, from early R&D activities to GLP batches and then from clinical trials to commercial production. Our solutions can ensure that key process objectives (such as product yield, product quality and integrity, batch consistency, etc.) and key production parameters (such as filtration time, washing time, drying time, etc.) can be maintained at every scale.

Process Automation

Speed and flexibility in manufacturing processes is achieved with the PSL automation platform.

This allows drug manufacturers to pre-design and pre-load software process recipes incorporating the relevant process parameters suitable for their specific production requirements.

PAT-Verified

The MSR™ incorporates Process Analytical Technology (PAT) allowing drug manufacturers to complete real-time monitoring of their microsphere product quality and integrity during various stages of production.

This aids right first time manufacturing, reducing drug development times for microspheres.



GFD®



LabMSR™



MSR™

Agility

Repeatability

Recovery

Scalability



Taking Your Process Further, **Together.**

For over 30 years, Powder Systems Limited (PSL) has been at the forefront of designing and engineering advanced technology to support process development. We are a globally recognised, award-winning business with expertise in pharmaceutical and chemical processing.

Our focus is to help clients and partners address challenging manufacturing processes by providing fit-for-purpose solutions from our wide range of Microsphere Processing, Filtration and Drying ranges.

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