

Bring your
ideas
to life

**Niro International
Test Centre**



Where big ideas grow





The world's largest spray drying test facility

In process engineering, there's nothing more satisfying than seeing a product evolve from concept to full-scale production. And if that product happens to be in powdered form, there's no place more suitable to foster that transition than the Niro test centre.

Whether at the early stages of product development or the final phases of process refinement, our test centre offers an unparalleled range of equipment and know-how for spray drying processes.

EVERY APPLICATION

The largest facility of its kind, the test centre is made up of more than 35 plants, covering applications that include freeze, fluid bed and spray drying. This diversity makes it possible to test a huge variety of techniques and conditions. For example, experiment with direct and indirect heating, different atmospheres, closed cycle systems, atomization methods, gas distribution, temperatures, retention times, chamber geometry and numerous other variables. All tests are carried out with the support and supervision of the test centre's highly experienced staff.

INDUSTRY KNOW-HOW

Nobody supplies more spray dryers to the food, chemical and healthcare industries than Niro. As a result we have specific knowledge of:

FOOD

- Drying fatty foods and sticky liquids.
- Enhancing flavour and maintaining nutritional value during drying.
- Freeze drying and extraction.

CHEMICAL

- Drying water-based as well as solvent-based solutions, suspensions, pastes or filter cakes.
- Closed-cycle drying systems for toxic or hazardous substances.
- Altering particle structure and size.

COFFEE

- Rapid extraction under pressure.
- Counter-current extraction at atmospheric pressure.

PHARMACEUTICAL

- Using spray drying in drug formulation.
- Particle design and control.
- Applications include inhalable powders, enhanced bioavailability and encapsulation.

ALL SCALES

Scale isn't an issue either. Pilot plants can be operated in small batches, to produce a few kilos of sample. Or they can be set-up for large-scale, continuous production experiments, yielding hundreds of kilos of product. This is possible because our plants range from laboratory equipment to full-scale industrial installations.

SPECIALISED EQUIPMENT

The Niro test centre also comprises plants for extraction, membrane filtration and the evaporation of liquids prior to final drying. In addition, we have highly specialised systems for rapid drying (Swirl and Spray Fluidizers), creating a granular consistency (High Efficiency Compactor), as well as equipment for the de-dusting or agglomeration/granulation of dried products.

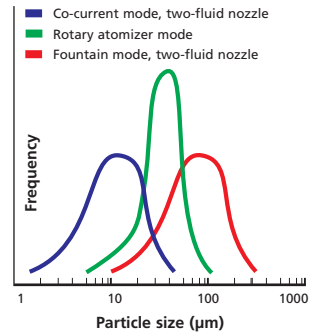
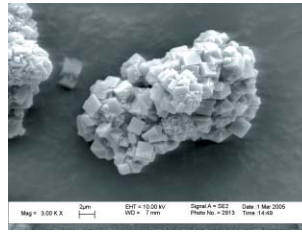
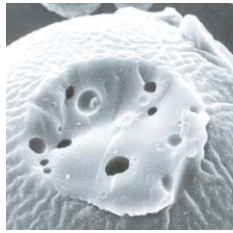
ANALYSING TESTS

Tests, of course, are only as useful as the information they yield. Attached to our test centre is a state-of-the-art analytics laboratory. Our laboratory is equipped to carry out advanced measurement and analyses such as spectroscopy, chromatography, particle size distribution, thermogravimetric analysis and differential scanning calorimetry.



Keeping an open mind





All collaborations considered

The three core services we offer at our test centre are feasibility studies, pilot tests and laboratory analysis. However, the facilities can be used for virtually any project requiring industrial drying equipment and expertise.

FEASIBILITY STUDIES

The first step in assessing any drying technology is conducting a feasibility study. Niro can help you evaluate whether a product can be dried, agglomerated, extracted, concentrated, and much more. In addition we can also investigate a product sample (either a raw material or prototype supplied by the customer) with the aim of making a draft proposal for an industrial production process. The sample can be a solution, slurry, paste, filter cake or a powder.

PILOT TESTS

Pilot tests are used to obtain the basic design data needed for drying a new or existing product and/or optimising production processes. Niro offers an unparalleled range of test plants, covering all major drying techniques. Plants vary in size from desktop dryers, used to produce R&D samples, right through to full-scale continuous production installations. Finally, Niro's GMP-approved Pharma Test Station meets the strictest regulatory guidelines and is capable of producing material for clinical trials.

LABORATORY ANALYSES

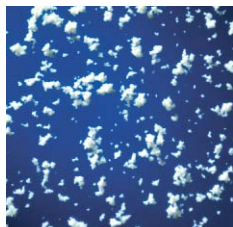
Attached to our test centre is an analytics laboratory, staffed by experienced, qualified personnel. Here we have all the equipment necessary to investigate product characteristics such as total solids content, viscosity and particle size distribution. And product properties can be appraised in terms of droplet formation, pumpability, and expected behaviour during the drying process. These evaluations form the basis for recommending an appropriate atomization method, maximum solids content in the feed, and other process-related data.

OTHER OPPORTUNITIES

Beyond our traditional services, Niro is open to using its test centre in alliances of all types. We have a long history of co-operating with universities, research institutions and private-public joint ventures. Equipment makers have also utilised the facilities to help modify hardware designs. So even if your project doesn't fall under one of our traditional services, we're always happy to discuss new partnership opportunities that reflect your particular needs.



Niro has decades of experience in particle formation and modification. From microscopic medicinal powders for inhalation, to free-flowing coffee granules, we can engineer powder characteristics to suit your application.





We've thought of everything





An unrivalled range of test equipment

Our facilities are comprised of more than 35 pilot plants and a variety of auxiliary equipment. Below is an overview of the main plants and applications available at our test centre.

SPRAY DRYING AND SPRAY COOLING

- Rotary atomization
- Nozzle atomization (pressure nozzles, two-fluid nozzles, combinations)
- Cyclones, bag filters, wet scrubber for the collection of product and cleaning of outlet air
- Co-current, counter-current and mixed configurations
- With integrated fluid beds (Fluidized Spray Dryer - FSD™, COMPACT DRYER™)
- With integrated filter (IFD™ Dryer)
- With integrated belt dryer (FILTERMAT® dryer)
- Closed cycle/open cycle operation
- Water-based or organic solvent-based feeds
- Atmospheric air or nitrogen as drying medium
- Evaporative capacity from a few grams up to more than 100kg per hour

FLUID BED PROCESSING

- Drying, cooling and de-dusting
- Static fluid beds
- Vibrating fluid beds (VIBRO-FLUIDIZER®)
- Pressurised steam fluid bed dryers
- Open cycle / closed cycle
- Atmospheric air / nitrogen as drying medium
- Sizes from a few square centimetres to two square meters



OTHER DRYING PROCESSES

- SWIRL FLUIDIZER™ (drying of filter cakes and pastes)
- SPRAY FLUIDIZER™

AGGLOMERATION / GRANULATION

- Coffee rewet agglomerator
- Dairy products agglomerator with lecithination
- High Efficiency Compactor (HEC™)
- Tumbler de-dusters (V-Blender)
- Fusing / grinding process



CONCENTRATION

- Falling film evaporator
- Freeze concentration and membrane filtration (can be arranged)

EXTRACTION AND RELATED PROCESSES

- Battery extractor
- Continuous counter-current screw extractors
- Atmospheric operation
- Pressurised operation
- Water or organic solvents
- Aroma distillation equipment

Unrivalled expertise

...in industrial drying

Niro is a world leader in industrial drying, with spray drying, spray cooling, flash drying, freeze drying, granulation, and fluid bed processing as core technologies. Plants are supplied to the dairy, food, coffee, chemical and pharmaceutical industries. The Niro companies are part of the Process Engineering Division of the GEA Group.



GEA Niro A/S
Process Engineering
Division

A company of GEA Group

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