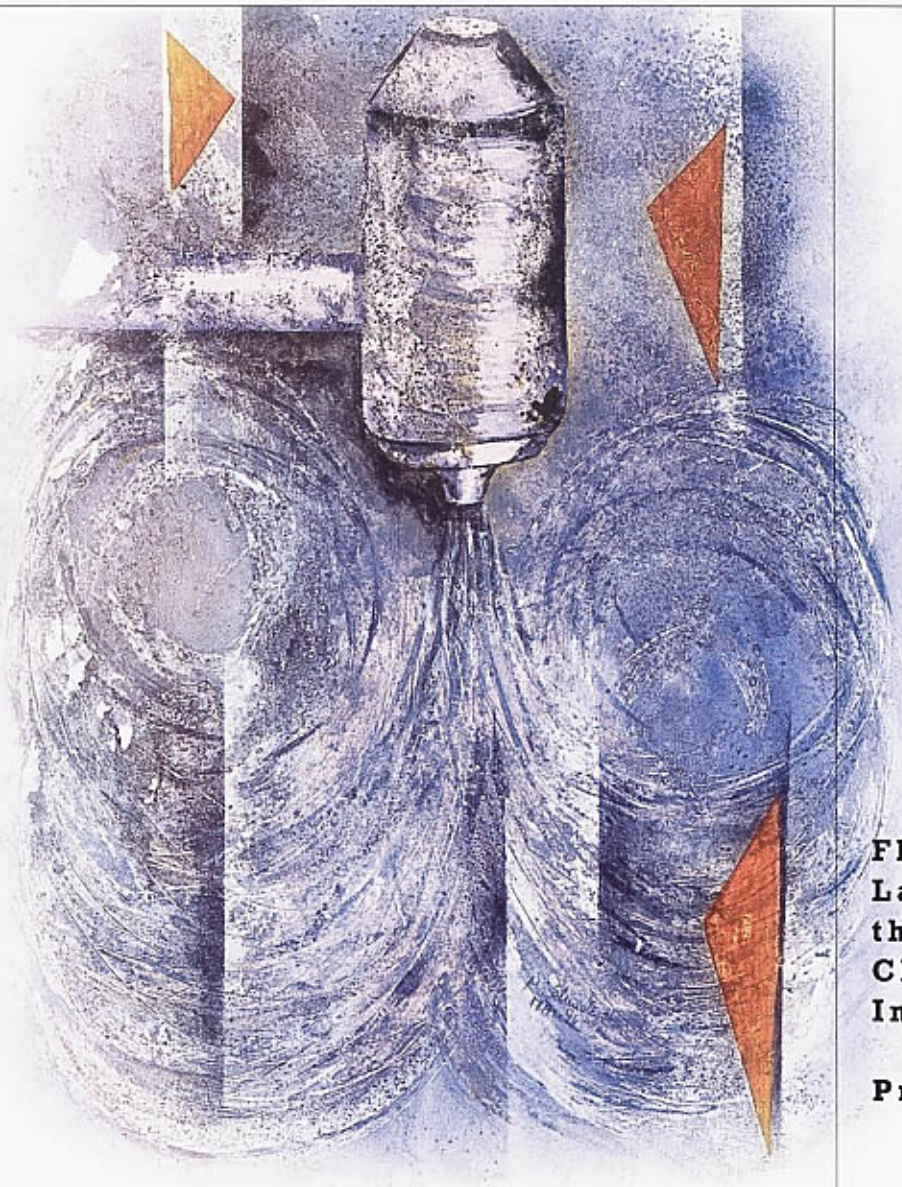
Fluid Bed Systems



Fluid Bed Laboratory Units for the Pharmaceutical, Chemical and Food Industry

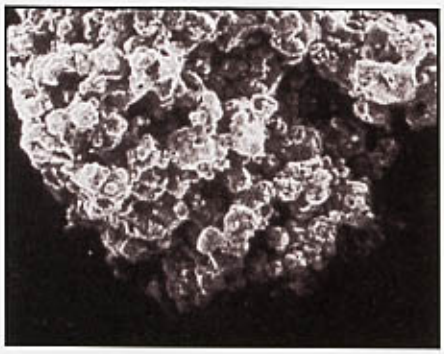
Process Technology

LABORATORY UNITS

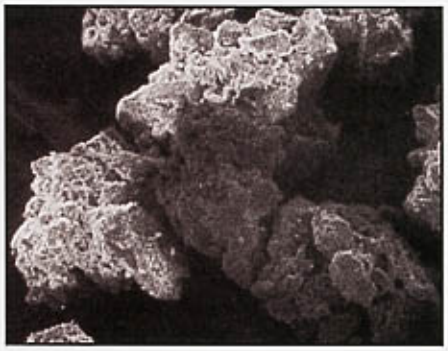
Glatt®

We set the standards

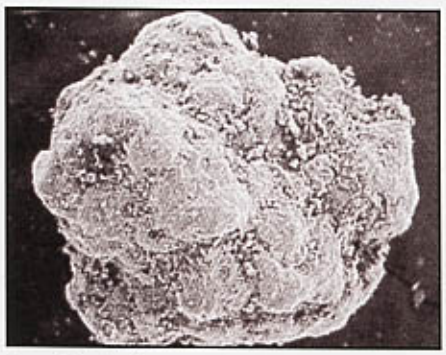
Process Technology: Top Spray



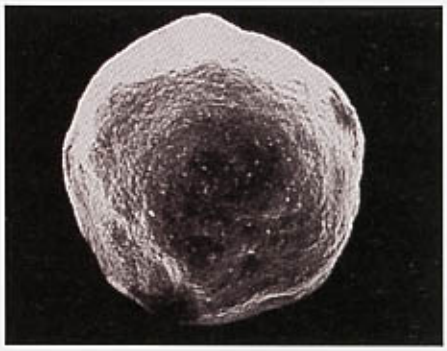
Instantized flavor granule



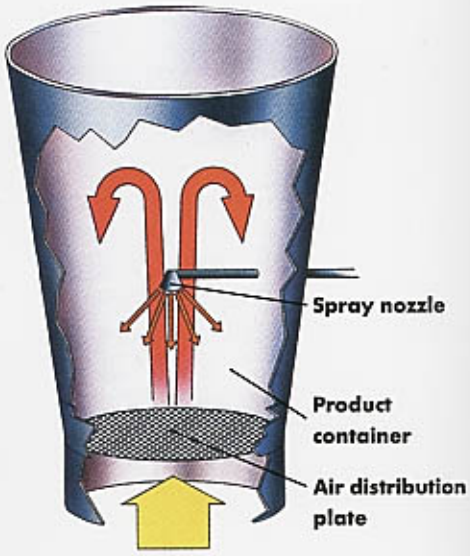
Granulated pharmaceutical



Granulated pharmaceutical



Top spray enteric coated pharmaceutical



Top Spray

Agglomeration/ Granulation

- Reduce fines / dust
- Enhance flowability
- Eliminate segregation
- Homogeneous mixture of all ingredients
- Improve compressibility
- Alter bulk density
- Improve disintegration and dissolution

Instantizing

- Improve dispersibility
- Increase porosity
- Disperse surfactants uniformly

Coating

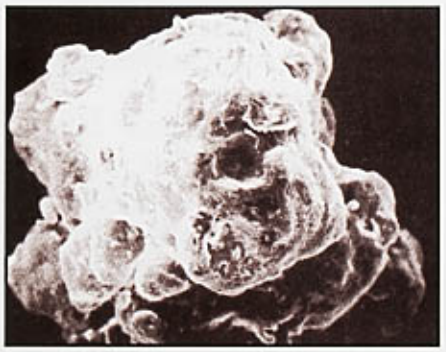
- Hot melts
- Taste masking
- Moisture and oxygen barrier coatings
- Enteric coatings
- Aesthetic coatings

New: Hot Melt Coating

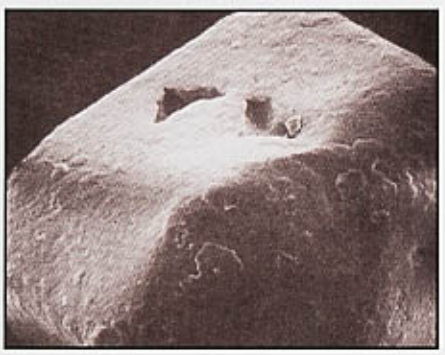
Among the various top spray coatings special attention should be given to hot melt coating. Instead of diluting or suspending the solids in water or organic solvents, a molten lipid or wax is sprayed onto the substrate.

Special Features

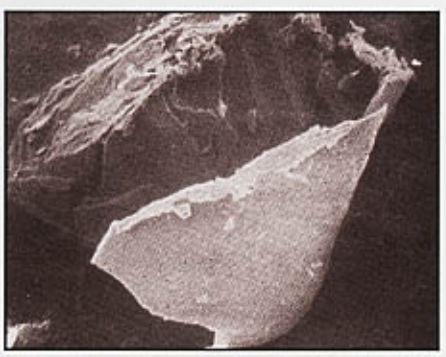
- Very economical and operator-friendly process as no solvent has to be evaporated (spray liquid = 100 % coating agent)
- Inexpensive coating materials taken from the food industry
- Capable of temperature release of active ingredients
- Wide application within the food & feed industries (particularly taste masking)



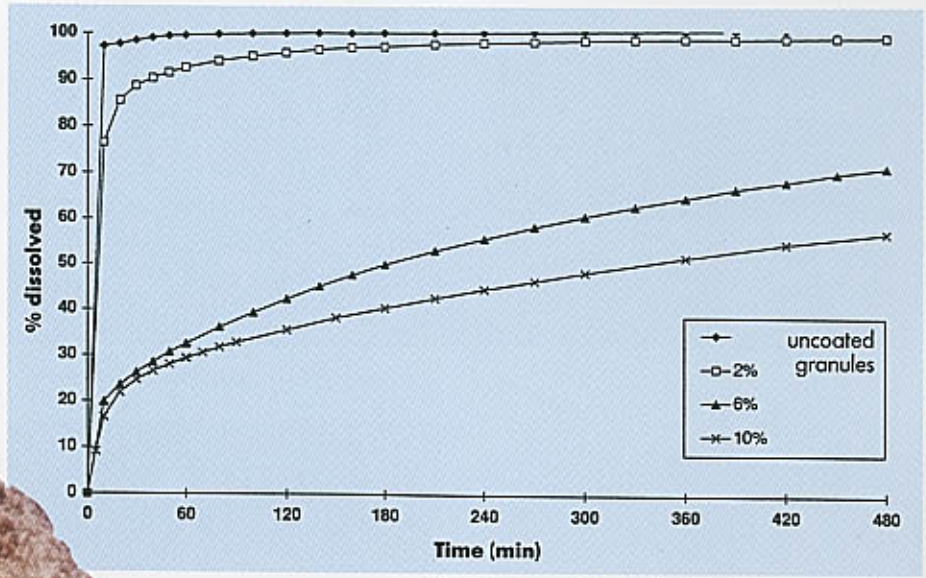
Wax-coated granule



Lipid coated citric acid, surface



Lipid coated citric acid, cross-section

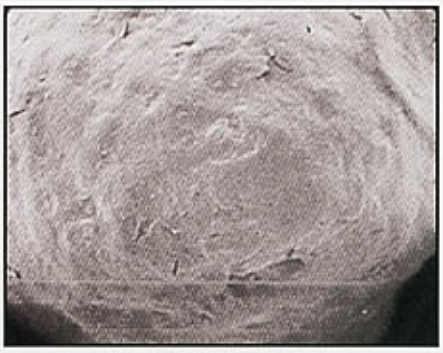


Dissolution of theophylline from coated granules with Compritol® 888 Ato

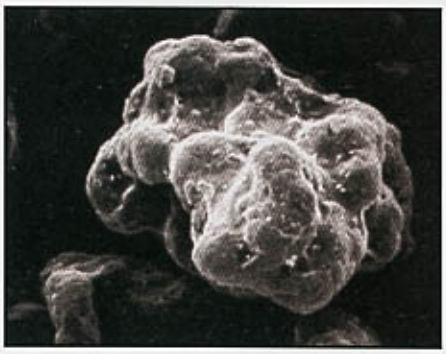
Process Technology:
Bottom Spray / HS Wurster Coating

Coating

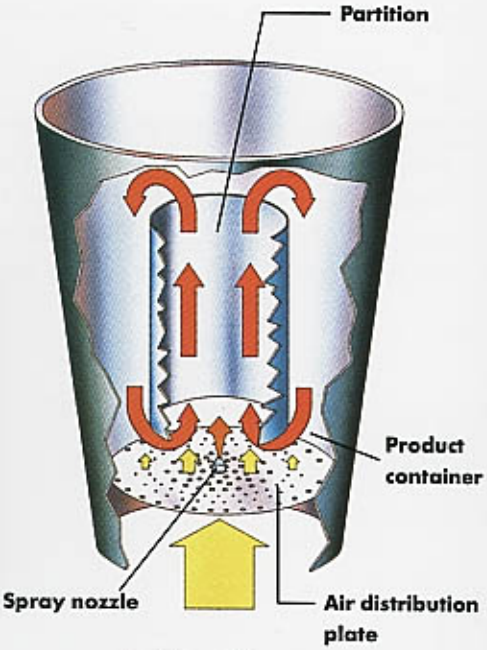
- Aqueous or solvent based solutions or suspensions
- Controlled release coatings
- Enteric release coatings
- Fine particle coating
- Active layering



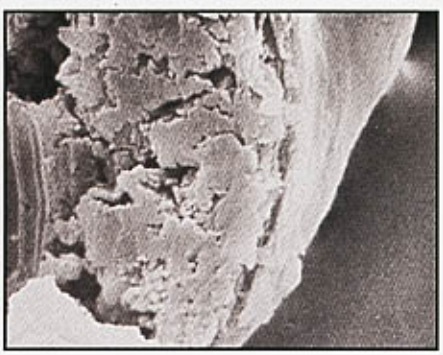
Wurster HS latex coated pharmaceutical (particle size < 150 µm)



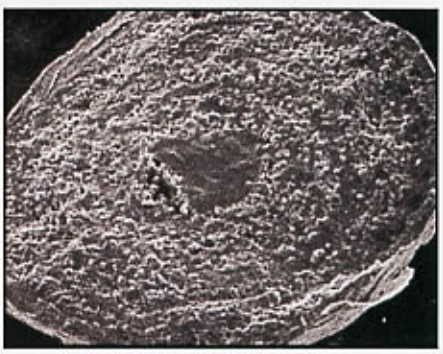
Wurster HS controlled release nutritional



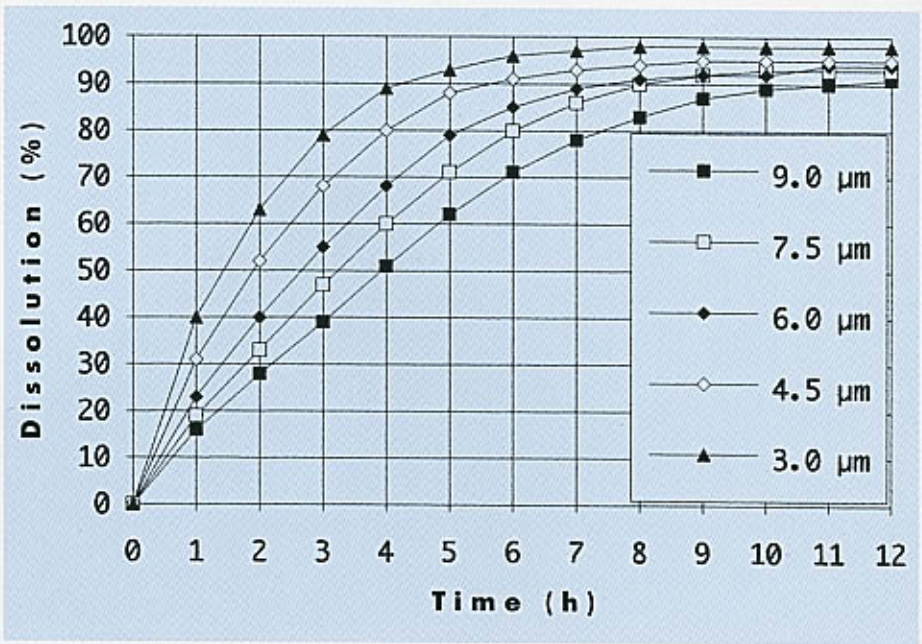
Bottom Spray



Wurster HS latex coated pharmaceutical (particle size < 150 µm) (cross-section)



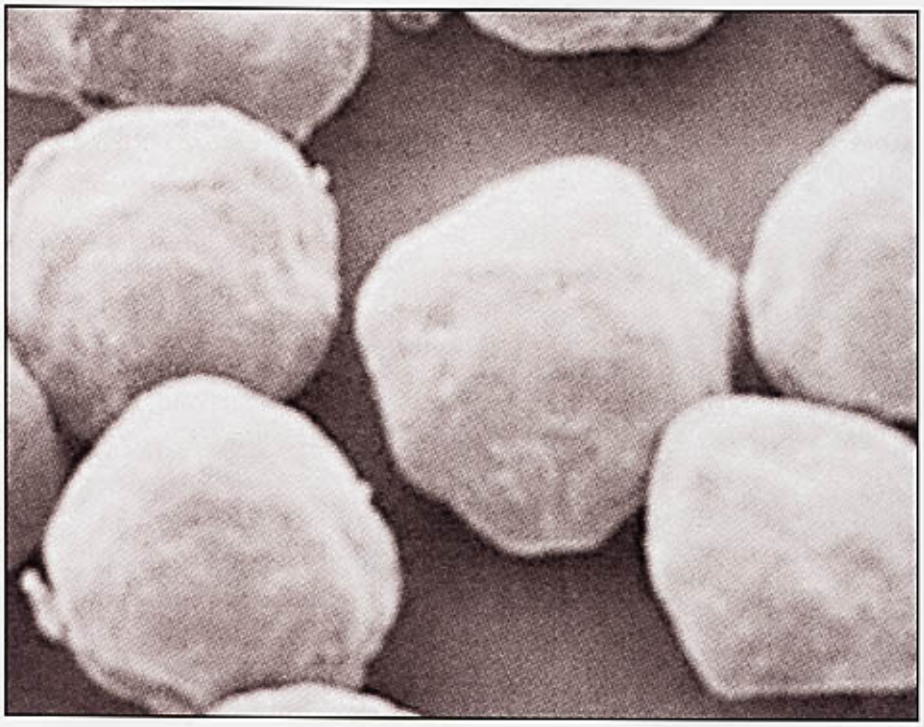
Wurster layered and coated pharmaceutical



Dissolution of theophylline from coated pellets as a function of the thickness of the coating. Coating is ethylcellulose with polyvinylpyrrolidone (PVP) as a pore forming agent

New: HS Wurster (High Speed)

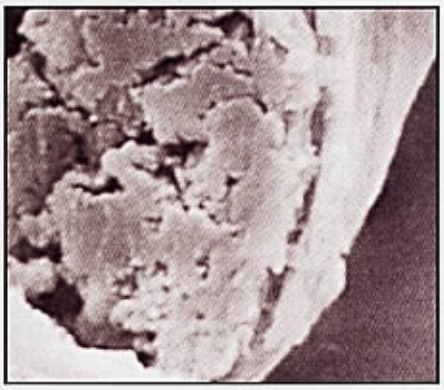
A modification of the conventional bottom spray technology permits the coating of particles down to **10 µm** and therewith the development of oral controlled release suspensions.



Coated micro granules (~100 µm)

Special Features

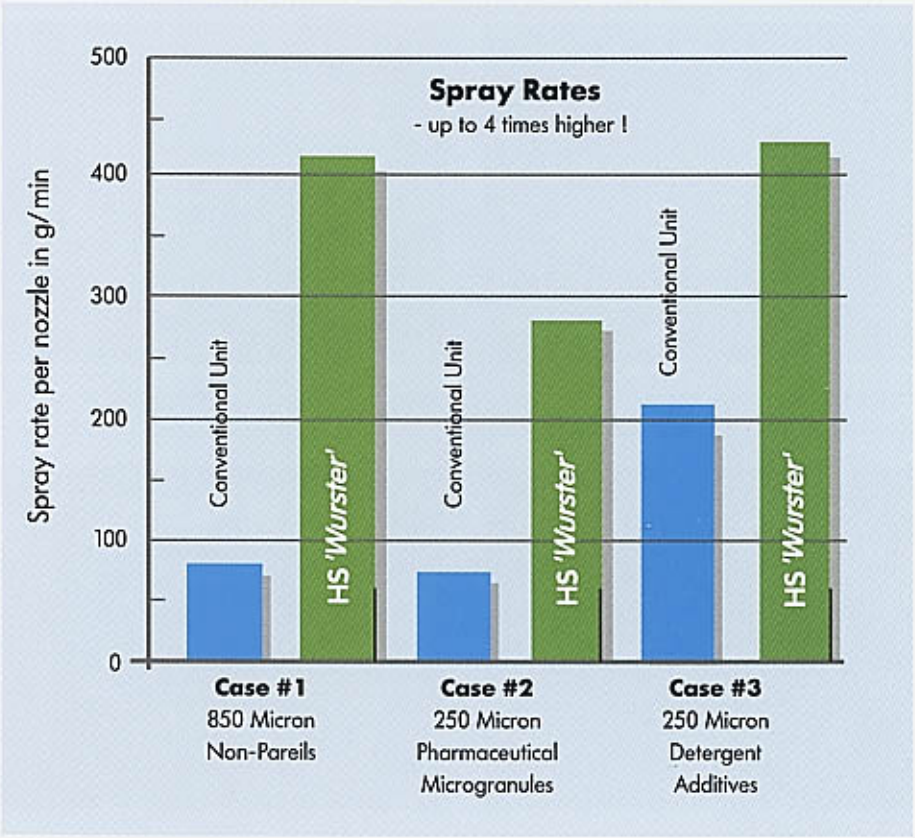
- Higher spray rates
- No agglomeration of microparticles during coating
- Retrofit option for existing conventional Wurster units



Magnification

Cross section of micro granule

Magnification
Coating function: taste masking



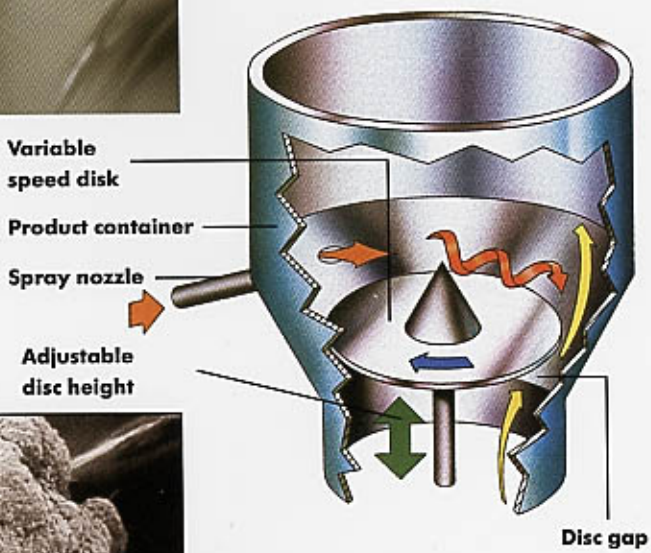
Comparision Wurster - HS Wurster

Process Technology: Rotor

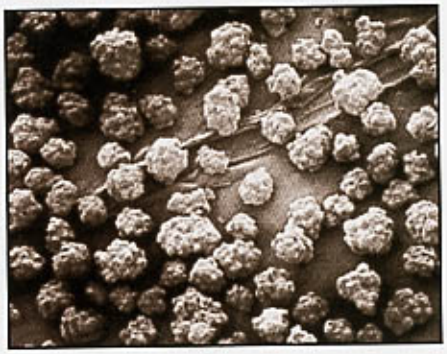
Rotor insert
Easy handling with swivel device

Granulation
- enhance disintegration
- improve compressibility
- increase density
- spherical morphology

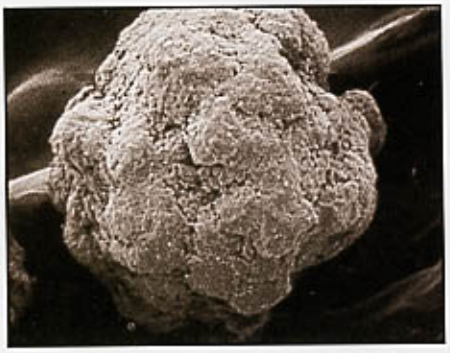
Spheronization
- increase density
- produce spherical particles
- high potency spheres
- smooth surface properties



Rotor



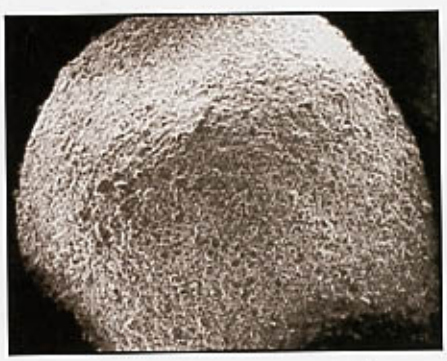
Rotor spheronized pharmaceutical (population)



Rotor spheronized pharmaceutical

Layering
- solution / suspension layering
- powder layering
- high potency pellets
- narrow particle size distribution
- increase density

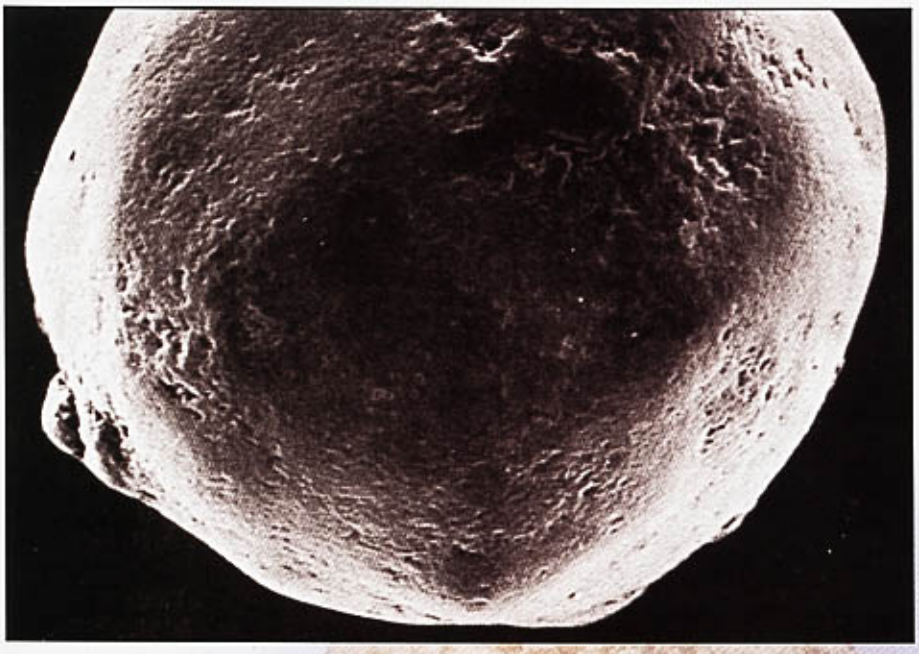
Coating
- film coatings
- enteric coatings
- sustained release coatings
- hot melt coatings



Rotor pelletized pharmaceutical

Rotor solution layered pharmaceutical

New: Dry Powder Layering



Layered pellet with micronized drug suspended in binder solution

Dry powder layering is achieved by depositing powder on a neutral nucleus.

Special Features

- Extremely short processing time with a weight gain of up to 300%/h (800% totally)
- High yield (up to 98%) of essentially spherical pellets with extremely smooth surface
- Energy savings due to reduced air and liquid consumption

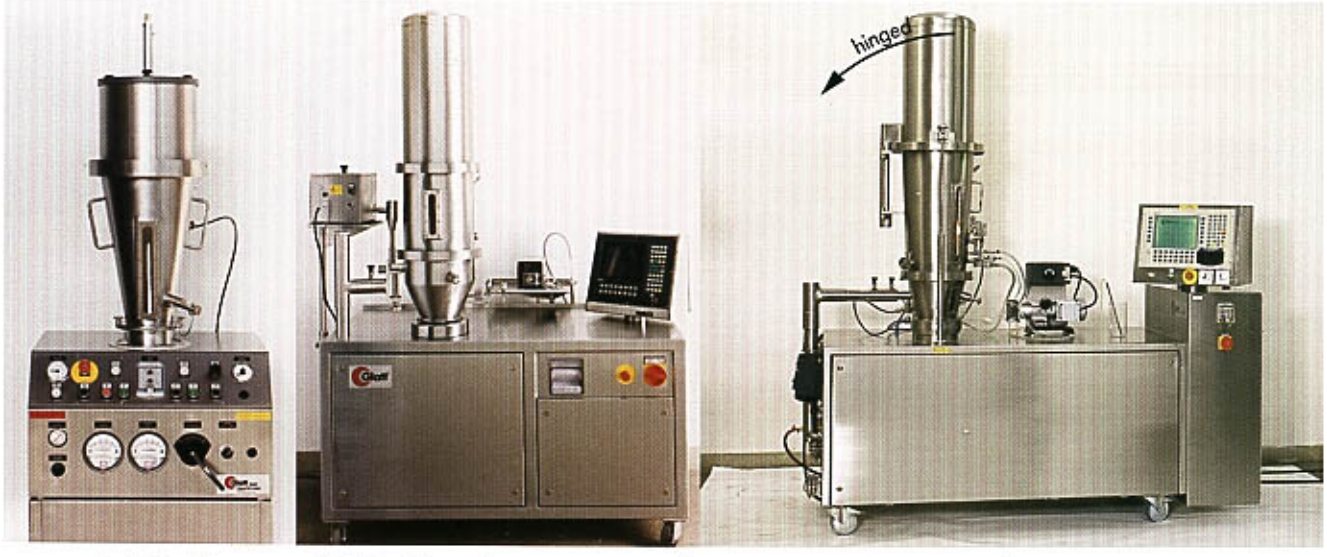
Cross-section

Control Systems

Uni-Glatt:
Manual system with individual push buttons

GPCG 1.1 and GPCG 3.1:
EcoView II® - microprocessor controls with modern flat-screen monitor and membrane key board

Options
- LabView® (Trade mark of National Instruments®): PC-based software package for data acquisition and flow diagram and trend graphics (Excel® compatible) (Excel® = Trade mark of Microsoft®)
- MaintView® = Electronic service manual with integrated error analysis guidance



Uni-Glatt®

GPCG 1.1 with rotor insert and EcoView®

GPCG 3.1 with Wurster insert

Technical Data
(All rights for changes reserved)

Technical data on request

Features of the new GPCG 1.1

- Improved GMP conformity
- Optional HS-Wurster insert for the coating of particles down to 10 µm
- Optional discharge sifter for continuous rotor pelletizing
- Integrated rotor drive with frequency control
- Integrated handling system for process inserts facilitates product handling
- Housing on rollers and hinged filter housing for easy relocation
- Increased table area with separate table for pump, scale and spray liquid container
- Easy-to-handle exhaust air filter
- Modern microprocessor controls
- PID loop control characteristics
- Precise air volume monitoring
- Quick disconnect plugs for all utilities

Additional Features
Dual chamber filter housing with product retaining filter and quick coupling for manual filter change, pneumatically actuated filter shake pistons, various filter materials available with different porosities

Powder feed device with nozzle for powder layering

Sample port on the product container side wall with sample collector for receiving the product.

Integrated handling system

Integrated rotor drive

Different process inserts as modular design technique

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