

Pharma Twin Screw Extruder



Applications - Focusing On

- Solubility enhancement of poorly soluble API's
- Taste masking of bitter tasting API's
- Adjustment of prolonged drug release with reduced risk of dose dumping
- Monolithic and multi-particulate dosage forms
- Film extrusion as strips or patches
- Wet extrusion
- Wet granulation

Features & Benefits

- Small sample size for development scale (PTSE 12/36)
- Easy to use
- Easy cleaning
- Clamshell barrel
- Segmented screws
- Removable liner
- Ideally suited for continuous compounding
- Processing length can be easily adapted
- Support from research to production by Brabender® Pharma
- High max. torque allows the processing of highly viscous pharmaceutical melts at lower temperatures
- Fast and accurate temperature control due to temperature regulation of both upper and lower part of the barrel
- Hardware and software completely designed and manufactured by Brabender® (Quality made in Germany)



Twin Screw Extruder PTSE 12/36

Twin Screw Extruder PTSE 20/40

Twin Screw Extruder PTSE 30/40

Diameter [mm]	12	20	30
Max. Torque [Nm]	30	80	260
Screw Speed [rpm]	600	1200	1200
Troughput [kg/h]	0.08 - 1	0.2 - 10	0.5 - 25
Max. Pressure [bar]	150	300	300

Easy cleaning and removable liner



Easily sterilized extruder components

- No cables and housings in material contact
- Easy material changes by quick exchange of parts in material contact
- Removable liner provides easy cleaning and sterilization
- High IP classes available, standard IP 54

... your extrusion solution.

Feeding systems

Peripheral Equipment

Necessary auxiliary equipment like measuring and control units or metering systems (gravimetric, volumetric, liquid feeding) as well as downstream equipment are available, offering a turn-key solution for your extrusion process.



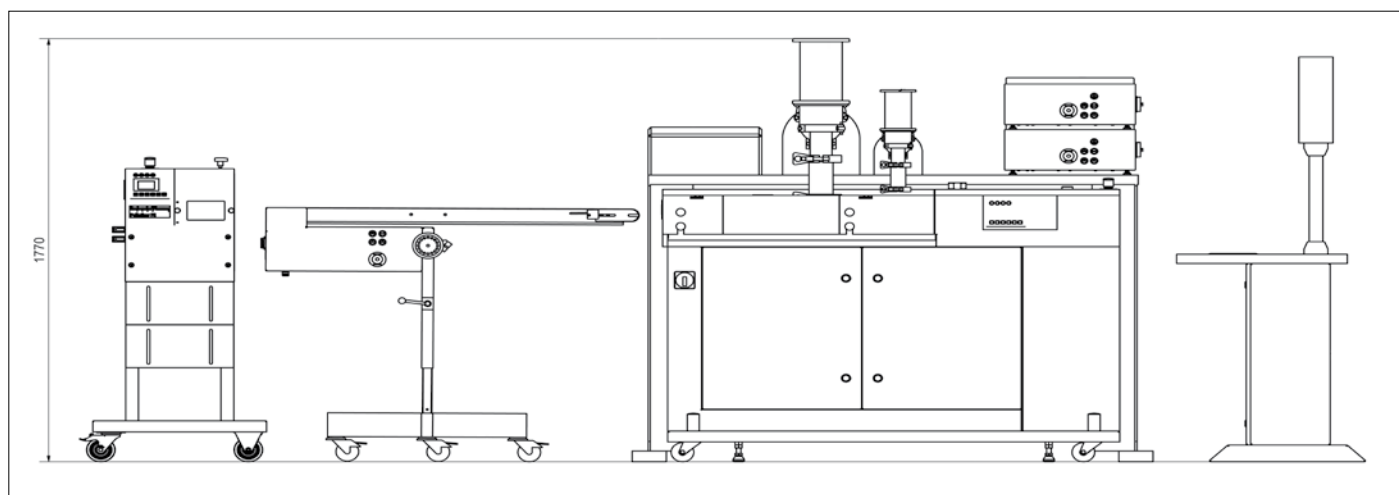
Gravimetric feeder DDW-DDSR20 Hyg from Brabender® Technologie KG

Powder Feeding

- Easy handling and cleaning through tri-clamp connections
- Throughput range for gravimetric feeding systems starting from 0.5 g/min with high accuracy
- Sealing material complies to FDA requirements
- O-ring sealing for connections

Liquid Feeding

- Plasticizers such as TEC, DBS or water for wet extrusion requires accurate metering
- This can be realized by annular gear pumps or tubing pumps depending on the required throughput ranges



PTSE 20/40 - Conveyor Belt - Pelletizer





Brabender® Conveyor Belt

The conveyor belt takes off and transports your extruded items from any Brabender® Pharma Extruder. Together with the speed control unit, the conveyor belt is mounted on a movable frame which can be adjusted in height. The castors can be fixed. Through the CAN-bus system the nominal speed setting can be easily centrally performed through the WINXT software.

Features

- Design allows for easy cleaning
- Easily removed belt, without significant dismantling
- Steplessly variable conveyor speed
- Easily adjustable height
- Optional cooling channel
- Optional cooling ring

Brabender® Pelletizer

Up to 3 strands with diameters of 1 to 3 mm can be pelletized with the Brabender® Pharma pelletizer. Special features are its low-noise operation and its perfected design, including an adjustable floor for secure fixing of various bag sizes or rigid containers. The pelletizer can be controlled manually or through the software.

Features

- Three strands with diameter of 1 to 3 mm can be pelletized
- Variably adjustable pellet length
- Easy discharge through drawer system
- Easy dismantling and cleaning
- Low noise during operation



... your extrusion solution.

Containment Solutions



Buck® Valve HC, DN 100 with Pharma Charge Drum (GEA Pharma Systems)

Required for highly active API's such as development and production of hormones and cytotoxic API's. The containment solutions are customized specifically to the process requirements. Different solutions are offered based on: flexible (glove bags) or semi flexible (glove boxes).



PAT recording

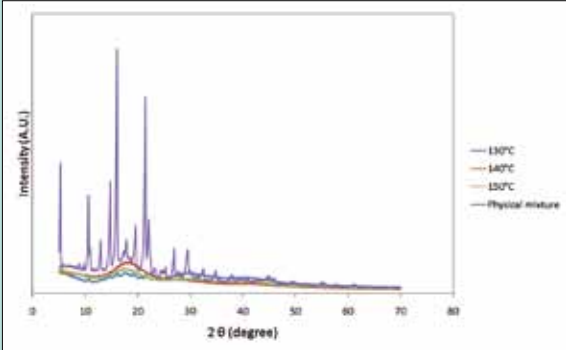
Useful tool to determine inline:

- Whether the process is generating amorphous or crystalline properties
- The uniformity of content

With different spectroscopic processes (Raman or NIR) interesting properties can be determined. The final goal is to use the measured signals and spectras to develop a control model to master the process.



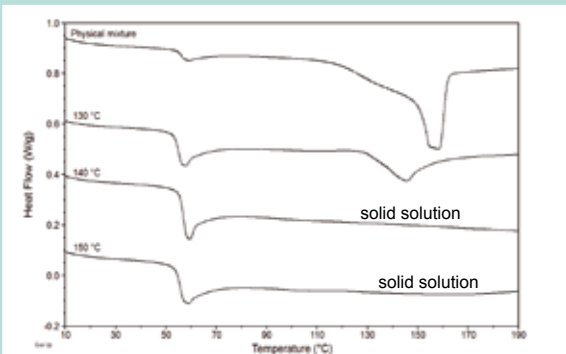
Hot Melt Extrusion



XRD diffractograms of the physical mixture of 50% Celecoxib and 50% Eudragit® E PO, and of the extrudates produced at 130°C, 140°C and 150°C. (extrusion parameters: Screw configuration = FF, screw speed = 175 rpm, Feed rate = 1.5g/min, Barrel temperature profile = 20-70-X-X-X-110°C)



Extrudates containing 50% Celecoxib and 50% Eudragit® E PO
From left to right: 130°C – 140°C – 150°C



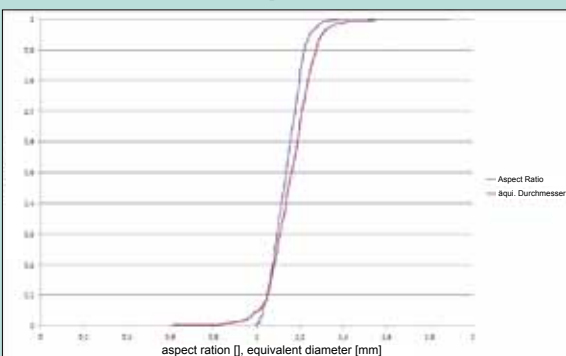
DSC thermograms of the physical mixture of 50% Celecoxib and 50% Eudragit® E PO, and the extrudates produced at 130°C, 140°C and 150°C. (extrusion parameters: Screw configuration = FF, screw speed = 175 rpm, Feed rate = 1.5g/min, Barrel temperature profile = 20-70-X-X-X-110°C).

With PTSE 12/36 Brabender® Pharma GmbH offers a twin screw extruder in miniature scale which is profitable for the pharmaceutical industry for the development of pharmaceutical products. The scale-down of the machine (screw diameter 12 mm, processing length 36 D) combined with the comprehensive adaptability to almost each processing task and the easy handling and cleaning of the system constitutes the distinction of the PTSE 12/36 as an excellent laboratory instrument.

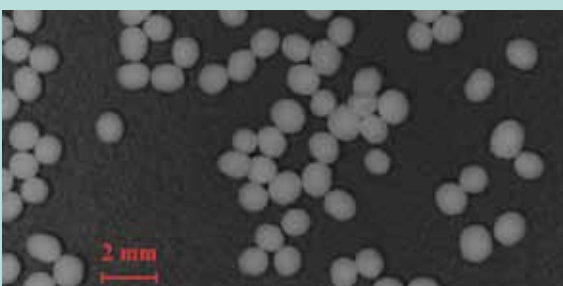


PTSE 12/36

Wet Extrusion / Spheronization



Lactose / MCC 80:20 pellets, aspect ratio and equivalent diameter



Lactose / MCC 80:20 pellets, image analysis



Lactose / MCC 80:20, 1mm die, Powder feeding rate 2g/min, liquid feeding rate 1.07g/min



Lactose / MCC 80:20 pellets, SEM

... your extrusion solution.

Modular Systems

Modular and scalable development and processing equipment. Completely controlled through Brabender® field bus technology. Completely integrated software.



Brabender® Plastograph



Brabender® Lab-Station



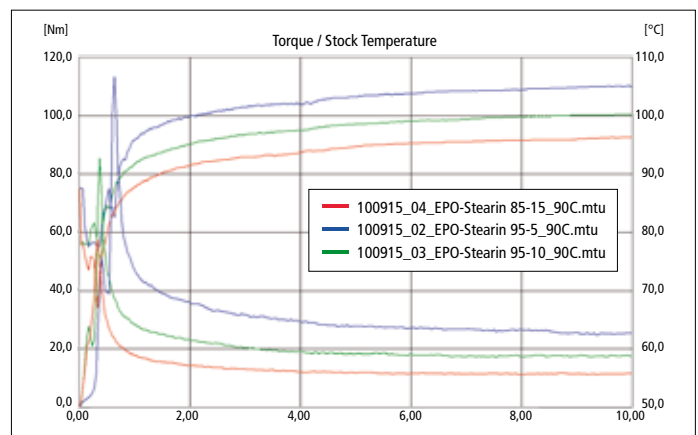
Brabender® Mixer Typ 30/50

Advantages:

- Testing of extrudability of HME formulations are easily accomplished utilizing Brabender® measuring mixers
- Screening of HME formulations are easily accomplished utilizing Brabender® measuring mixers



Brabender® Plasti-Corder and Mixer Measuring Head Evaluation: Semi Automatic Universal Evaluation



Correlation curve of a Measuring Mixer Typ W 50 EHT



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