Brabender® Twin Screw Extruders
for Laboratory and Pilot Plant Applications

... where quality is measured.
Principle - application area

The basic steps of compounding can perfectly be realized with co-rotating twin screw extruders. This makes modular co-rotating twin screw extruders the ideal companion for plastics from synthesis up to recycling.

Users will benefit from the harmonized, modular conception of screws and barrels for optimally realizing all processing steps (feeding, conveying, plasticizing, dispersing, reacting, venting, pressure build-up).

The system configuration of each model can easily be adapted to the individual processing task – anytime and at low cost.

Or combine several processing steps within a continuously working extruder and use your Brabender twin screw extruder as a modern in-line compounder.

Depending on the extruder size, the type of material to be tested, as well as the processing task, throughputs as low as 0.06 kg/h or up to 30 kg/h can be reached. This opens up the entire application range to these extruders – from material development up to small scale production.

Of course, the necessary additional equipment like measuring and control units, feeders (gravimetric, volumetric, liquid) and downstream equipment (water bath, pelletizer, conveyor belt) is available as well and allows for modular setup of complete extrusion lines.

Expansion with different kind of feeders or follow-up machines is possible whenever needed.

The design allows a complete instrumentation of the extruders. All of the measured values such as torque, melt and zone temperatures, melt pressure are recorded continuously and can be visualized in various graphs or sheets. With these parameters, you will easily find the optimum processing conditions on your production scale.

Advantages

Intermeshing co-rotating twin screw extruders stand out for decisive processing features:

• Self-cleaning of the screws by intermeshing flights
• Good feeding characteristics, even with materials with poor flow properties
• High conveying constancy without pulsation or irregular thermal loads
• Constantly high quality of the extrudate
• Narrow residence time spectrum of the melt within the screw area
• Well-defined plastification time and purposive shearing
• High output at long energy transfer
• High energy input as compared to the free screw volume
• Good control of the pressure in the melt for optimum venting
• Gentle mixing at low shear rate and high quality homogenization
• Gentle material treatment without temperature peaks even at high speed
• Variable shearing by using manifold mixing and kneading elements
• Kneading blocks with different disk widths and offset angles
• Good control of the pressure in the melt for optimum venting

Application examples

TSE 20/40 used as a 20 D
Venting of polyethylene/polypropylene

TSE 25/32
Glass reinforcement of polyamide 6.6

TSE 20/40
Blending of a polyphenylene oxide

TSE 25/42
Peroxide cross-linking of polyethylene

Principle - application area
Twin Screw Extruder TSE 20/40

Designed to be a versatile solution for most of the compounding tasks — you can adapt the machine configuration easily and effectively to the different applications.

- Full barrel length 40 D with top openings at 10 D, 20 D, 30 D, 40 D — you can use multiple feeders, reduce the processing length or vary the place of venting
- Side openings at 12 D and 22 D to attach further dosing units
- Our dosing systems allow you to feed any consistency of the materials such as granules, powders, fibers and even fluids
- The complete barrel is split horizontally ("clamshell design") and allows quick opening and access to all parts in contact with the material, easy and effective cleaning and the analysis of the extrusion process

- Torsion-free, hardened, highly abrasion resistant barrel for a long lifetime
- Modular screw design — supported by our dedicated software — offers almost unlimited possibilities to optimize the configuration to your application
- Optional built-in vacuum pump
- Up to 1200 rpm screw speed is possible with the suitable drive units
- Available as a processing unit of our modular system, or as a compact stand-alone machine

### Twin Screw Extruder TSE 20/40

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw diameter</td>
<td>20 mm</td>
</tr>
<tr>
<td>Screw length</td>
<td>40 D</td>
</tr>
<tr>
<td>OD/ID ratio</td>
<td>1.60</td>
</tr>
<tr>
<td>Screw speed max.</td>
<td></td>
</tr>
<tr>
<td>TSE 20/40 with Lab-Station drive:</td>
<td>350 min⁻¹</td>
</tr>
<tr>
<td>TSE 20/40 with special gear (option):</td>
<td>1200 min⁻¹</td>
</tr>
<tr>
<td>KETSE 20/40:</td>
<td>1200 min⁻¹</td>
</tr>
<tr>
<td>KETSE 20/40 EC:</td>
<td>600 min⁻¹</td>
</tr>
<tr>
<td>Screw torque</td>
<td>2 x 40 Nm</td>
</tr>
<tr>
<td>Operating temperature max.</td>
<td>425 °C</td>
</tr>
<tr>
<td>Pressure max.</td>
<td>300 bar</td>
</tr>
<tr>
<td>Throughputs⁽¹⁾</td>
<td>0.5 – 20 kg/h</td>
</tr>
<tr>
<td>Dimensions L x W x H</td>
<td></td>
</tr>
<tr>
<td>TSE 20/40:</td>
<td>1350 x 730 x 1160 mm</td>
</tr>
<tr>
<td>KETSE 20/40:</td>
<td>1615 x 730 x 1190 mm</td>
</tr>
<tr>
<td>KETSE 20/40 EC:</td>
<td>1780 x 730 x 1190 mm</td>
</tr>
<tr>
<td>Weight</td>
<td></td>
</tr>
<tr>
<td>TSE 20/40:</td>
<td>323 kg</td>
</tr>
<tr>
<td>KETSE 20/40:</td>
<td>480 kg</td>
</tr>
<tr>
<td>KETSE 20/40 EC:</td>
<td>480 kg</td>
</tr>
<tr>
<td>Mains</td>
<td></td>
</tr>
<tr>
<td>TSE 20/40:</td>
<td>3 x 400 V, 50/60 Hz + N + PE, 32 A</td>
</tr>
<tr>
<td>KETSE 20/40:</td>
<td>3 x 230 V, 50/60 Hz + PE, 32 A</td>
</tr>
<tr>
<td>KETSE 20/40 EC:</td>
<td>3 x 400 V, 50/60 Hz + N + PE, 32 A</td>
</tr>
</tbody>
</table>

⁽¹⁾ depends on product properties and processing task

### KETSE 20/40 compounding line

1. KETSE 20/40 extruder (stand-alone execution)
2. Volumetric main feeder
3. Volumetric side feeder
4. Round die
5. Water bath
6. Pelletizer

### Twin Screw Extruder TSE 20/40 model variants

<table>
<thead>
<tr>
<th>Type</th>
<th>Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modular</td>
<td>TSE 20/40</td>
</tr>
<tr>
<td>Stand-alone (compact)</td>
<td>KETSE 20/40</td>
</tr>
<tr>
<td>Stand-alone (compact)</td>
<td>KETSE 20/40 EC</td>
</tr>
</tbody>
</table>
Twin Screw Extruder TSE 25/16 - 54

Use it as a pilot plant, for recipe development, as an in-line compounder or for small-scale production – there are no limits.

- Segmented barrel design, you can have processing lengths of 16 - 54 D
- Using multiple feeders, more complex processing tasks are possible
- Massive, surface hardened barrel segments to ensure longer lifetime

- Our dosing systems allow you to feed any consistency of the materials such as granules, powders, fibers and even fluids
- The modular screw design – supported by our dedicated software – offers almost unlimited possibilities to optimize the configuration to your application
- Available as a processing unit of our modular system - for more details of the Lab-Station drive unit see our separate brochure

Mini-Compounder KETSE 12/36

With the Mini-Compounder KETSE 12/36, Brabender offers a miniature scale twin screw extruder with application to the chemical and pharmaceutical industry for product development.

- Full barrel length 36 D with top openings at 4.5 D, 10 D, 27 D – you can use multiple feeders, reduce the processing length or vary the place of venting
- Side feeding port at 12 D
- Our dosing systems allow you to feed any consistency of the materials such as granules, powders, fibers and even fluids
- The complete barrel is split horizontally ("clamshell design")

... where quality is measured.
Conical Twin Screw Extruder (CTSE)

The counter-rotating conical twin screw extruder is ideally suited for quality control, product development and research applications.

- Gentle and effective mixing properties at shear sensitive materials such as PVC
- Nitrided barrel surface to ensure long lifetime even with abrasive materials
- Polished chrome plated screws – various special steel grades available as well
- Vent port

### Conical Twin Screw Extruder (CTSE)

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw diameter</td>
<td>32 / 20 mm</td>
</tr>
<tr>
<td>Screw length</td>
<td>342 mm</td>
</tr>
<tr>
<td>Flight depth</td>
<td>2.2 mm</td>
</tr>
<tr>
<td>Screw speed max.</td>
<td>with Plastograph EC Plus: 150 min⁻¹</td>
</tr>
<tr>
<td></td>
<td>with Lab-Station EC: 200 min⁻¹</td>
</tr>
<tr>
<td></td>
<td>with Lab-Station: 375 min⁻¹</td>
</tr>
<tr>
<td>Screw torque</td>
<td>2 x 100 Nm</td>
</tr>
<tr>
<td>Operating temp. max.</td>
<td>400 °C</td>
</tr>
<tr>
<td>Pressure max.</td>
<td>700 bar</td>
</tr>
<tr>
<td>Throughputs max.</td>
<td>0.5 - 10 kg/h</td>
</tr>
<tr>
<td>Dimensions L x W x H</td>
<td>on mobile frame: 1100 x 1600 x 670 mm</td>
</tr>
<tr>
<td></td>
<td>on docking station: 1100 x 1600 x 600 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>75 kg (w. frame) / 110 kg (w. docking station)</td>
</tr>
</tbody>
</table>

(1) depends on product properties and processing task

**Software support**

With the WinExt software you can easily configure and give the initial settings to your extrusion line. The software automatically recognizes the main machine components via the CAN bus connection and controls not only the extruder with the drive unit, but all the auxiliaries (die, feeders, follow-up equipment) either.

During operation, you can follow and visualize in graph the following values:
- up to 8 zone temperatures
- up to 4 melt temperatures
- up to 8 pressures
- torque
- extruder speed
- speed of the different auxiliaries, such as feeders and follow-up units

These measured values can be stored throughout the extrusion process either so that you can evaluate them later.

With the correlation software you can compare the recorded data of several different extrusion processes. Automatic calculation and numerical and graphical display of mean values and standard deviations make it easy to spot irregularities, assess trends in data or compare against standards. Determination of mastercurves according to the time-temperature superposition principle is another outstanding feature of the correlation software.

With the screw configuration software you can easily optimize your modular screw designs and save them for further usage. The graphical display shows all screw elements and barrel openings. The screw length is calculated automatically and listing of the screw elements is also displayed.
The Brabender MetaBridge

Discover the Brabender MetaBridge

The new software is characterized by its easy and intuitive handling. After log-in, the user finds all information about the device and a choice of options for his purpose on the start screen.

The advantages

- User-friendly operation by touch – perfect for tablets and smartphones
- Responsive web design: screen resolution adjusted automatically
- Ready to use, no installation necessary
- Security of tests and data through easy, password protected user log-in
- Live test tracking by authorized users from multiple end devices all over the world at a time

Intelligent features

Benefit from new and optimized functions:

- Administration mode for user access rights
- Webbased solution – possibility of sharing information and data with other users worldwide
- Live tracking of tests with end time indication for logged-in users
- Optimized basic functions like data recording and evaluation, printing and export of test results – clearer, easier, faster
- Central test administration and data storage provides for quick and easy access of authorized users
- Easy definition, clear display and quick integration of reference curves
- Optimized functions for editing and adapting diagrams to your individual needs

The Brabender support

Our state of the art application laboratory is always made available to our customers.

You can choose to send material to us for testing or schedule a specific Lab Trial with our expert team. In our application laboratory, you will have access to our full product line to help come to a solution for your application.

Brabender application laboratory