Laboratory Twin-Screw Kneader

Modular design – easy to use – versatile in application

ZK 25  The flexible laboratory machine for co-rotation and counter-rotation
ZK 35  The high performance machine for pilot plant applications
ZK-D  Lines for direct extrusion of film and sheet

From polymer to information
Laboratory Twin-Screw Kneaders ZK 25 and ZK 35

Application

The COLLIN Twin-Screw Kneader is used in testing, development and production of all types of polymer materials, such as thermoplastics, thermosets, elastomers, paints, foodstuffs, doughs and pastes.

Numerous processing tasks can be carried out, such as:

- Mixing and dispersion of pigments
- Incorporation of fillers and other additives in polymers
- Incorporation of fibre strands
- Alloying of polymers or pastes
- Degassing of volatile constituents from polymers
- Implementing continuous reactions

Special features

- Applications with counter-rotating operation
- Applications with co-rotating operation
- Use as single-screw extruder
- Construction of the barrel from individual segments
- Construction of the screw from modular elements
- Easy cleaning by moving the barrel elements on a sliding rail

The processing units

Barrel

This is formed by single segments in different design. The positioning of each barrel element on one single slide allows easy cleaning and disassembling.

The barrel elements are coupled by C-flanges for ease of operation.

Screws

The screws consist of a shaft on which a multiple of screw elements are arranged. The design grants for high torques to be used and easy assembling and disassembling for cleaning purposes even after long processing time.

The screw kits include a large number of single elements with various pitches and designs. These can take the form of close-comb or open profiles, single and double-start thread mixing and shearing elements for the counter-rotating mode and close profiles for co-rotating screws.
Laboratory Twin-Screw Kneader ZK 25

The highly flexible laboratory machine for co- and counter-rotating operation.

**Special features**

- Hinged C-flanges for easy dismantling
- Motorised axial barrel movement (optional)
- Configurable for co-rotating operation
- Configurable for counter-rotating operation
- Configurable for high throughput

**Axially motorised movement of the barrel**

Axially motorised movement of the barrel: Since usually only small batches are processed in experimental operation, frequent cleaning of the machine may be required. This is easily achieved as the barrel and its housing are moveable – motor-driven axially – on a sliding rail and each element can be rotated.

Alternatively, the barrel can be moved manually.

**Drive unit**

The ZK 25 is driven by a 7.5 or 15 kW AC-motor with closed loop speed control. Power is transferred via a bevel gear to the distributor gear. This is designed for high torque and back pressure.

**Control cabinet**

The power components and the main switch are combined in a separate control cabinet. The cabinet forms the machine base and is equipped with wheels.

**Microprocessor control**

The control is arranged ergonomically in an operator panel positioned above the extruder.

The ECS controller serves for:

- 15 temperature regulation zones
- Screw speed control
- Ampere meter or torque measurement
- Melt temperature and pressure measurement

All the signals can be transmitted via a serial interface and software to a separate PC.

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*Laboratory Twin-Screw Kneader ZK 25 x36 D with 6 barrel elements in the opened position*
The Pilot Plant Twin-Screw Kneader ZK 35

The high performance machine for pilot plant applications and small scale production.

- For higher throughputs from 10-70 kg/h
- For processing materials with larger particle sizes (flakes)
- For the application of high shear forces
- Fast cleaning through axial shifting of the barrel elements and additional separating of the individual barrel segments
- For variable processing lengths due to the modular design of the drive unit and the basic units
The modular concept

The new modular concept permits almost universal application in extrusion and compounding.

The modules are:

**Drive unit**

Available are two power units, standard or high speed. Each unit is complete with control cabinet, containing power components and control for downstream units as well as operating panel with microprocessor.

**Basic units**

for the basic processes

- Single-screw extrusion
- Compounding with a co-rotating configuration
- Compounding with a counter-rotating configuration

Drive unit of a Twin-Screw Kneader ZK 35 with Twin-Screw lengths of 24, 32 and 44 L/D

Drive unit of a ZK 25 with a Single-Screw Unit attachment
# Laboratory Twin-Screw Kneader

## Plants for direct extrusion of film and sheet

### Use

The direct extrusion is the efficient procedure for the production of products of raw components by evading the two steps preparation with granulating and remelting.

The Dr. Collin GmbH’s wide product range allows the building up of complete production lines for film, sheet, laminate, blown film or tube.

### Melt pump

The melt pump serves, on the one hand, for the increase of the pressure, to build up the necessary pressures to pass mono and coex-dies that follow as well as for the homogenizing of the output.

### Calender

Calender or chill-roll plants for widths from 100 to 600 mm are available. Together with suitable unwinder, laminating equipment, guiding and tension regulations as well as winders, the continuous production of products in close process tolerances is possible.

### Dies

Dies are available for wide operative ranges; for
- Flat films or sheets
- Blown films
- Tubes or hoses

### Compounder

The Type ZK 25 or ZK 35 Twin-Screw Kneader is the central aggregate. Process lengths from 24 to 48 D allow the transaction of all usual compounding tasks. Gears as well as processing units are designed for high loads in continuous operation.

### Feeders

Gravimetric feeding systems for granulate, powder or liquids are available in all capacity classes with throughputs of 50 g/h and more.

### Control system

A central microprocessor control system allows the control as well as the data registration and documentation of all process and machine parameters.

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*Twin-Screw Kneader ZK 25 x 42 L/D with gravimetric feeders, equipped with melt pump and slot die.*
A plant for compounding 5 powdery and liquid components for the direct extrusion of a film and simultaneous laminating with one beam rolling train.

Twin-Screw Kneader ZK 25 x 42 L/D with gravimetric feeders, which are built up as well as melt pump, slot die and Chill-Roll Type 136/350.
**Technical data**

<table>
<thead>
<tr>
<th>Type</th>
<th>ZK 25 / ZK 25 S</th>
<th>ZK 35 / ZK 35 S</th>
</tr>
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<tbody>
<tr>
<td>Screw diam. (mm)</td>
<td>25</td>
<td>35</td>
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<tr>
<td>Length of barrel elements (x D)</td>
<td>6</td>
<td>4</td>
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<tr>
<td>Processing lengths, total (x D)</td>
<td>18 – 48</td>
<td>20 – 48</td>
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<tr>
<td>Heater power per barrel segment (kW)</td>
<td>1,2</td>
<td>1,5</td>
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<tr>
<td>Drive power (kW)</td>
<td>7,5</td>
<td>12</td>
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<tr>
<td>Speed, max. (min⁻¹)</td>
<td>400</td>
<td>350</td>
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<tr>
<td>Drive power Type S (kW)</td>
<td>15</td>
<td>28</td>
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<tr>
<td>Speed, max. Type S (min⁻¹)</td>
<td>800</td>
<td>900</td>
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<tr>
<td>Torque per shaft (Nm)</td>
<td>2 x 85</td>
<td>2 x 160</td>
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<tr>
<td>Cooling Feeding barrel</td>
<td>Water</td>
<td>Water</td>
</tr>
<tr>
<td>Cooling Barrel</td>
<td>Air/Water</td>
<td>Air/Water</td>
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<tr>
<td>Throughput (kg/h)</td>
<td>0,5 – 15 (25)</td>
<td>3 – 30 (40)</td>
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<tr>
<td>Throughput Type S (kg/h)</td>
<td>3 – 40</td>
<td>5 – 70</td>
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<tr>
<td>Dimensions Length (cm)</td>
<td>140 – 220</td>
<td>220 – 300</td>
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<tr>
<td>Weight (kg)</td>
<td>350 – 700</td>
<td>950 – 1450</td>
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Technical modifications reserved

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**Our product range also covers:**

- Two Roll Mills and Calenders
- Platen Presses
- TEACH-LINE®
- Single-Screw Extrusion Systems
- Testing Units

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