COLLIN®

Laboratory machines for the processing of polymers

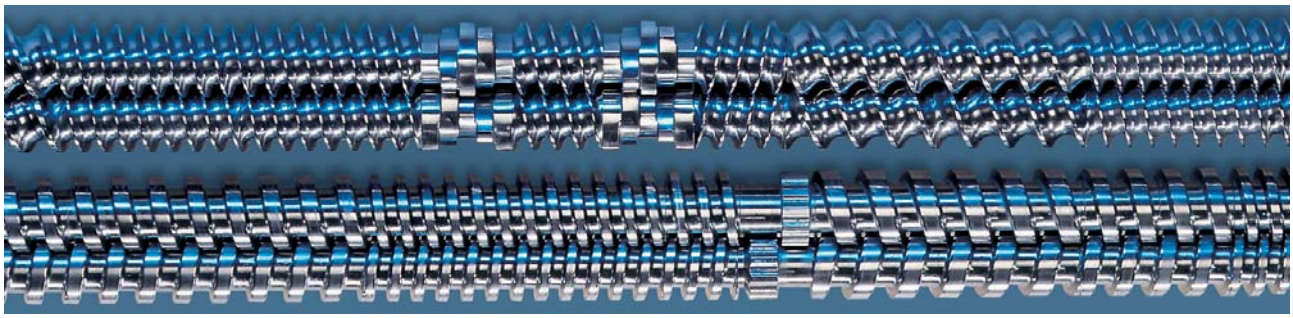
Laboratory Twin-Screw Kneader

Corotating and counter rotating compounder series

High performance compounder for pilot plant applications

Direct Extrusion lines

Modular design – easy to use – versatile in application



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, food and pharmaceutical applications.

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
- Blending of polymers or pastes
- Degassing of volatile constituents from polymers
- Continius reaction extrusion

Special features

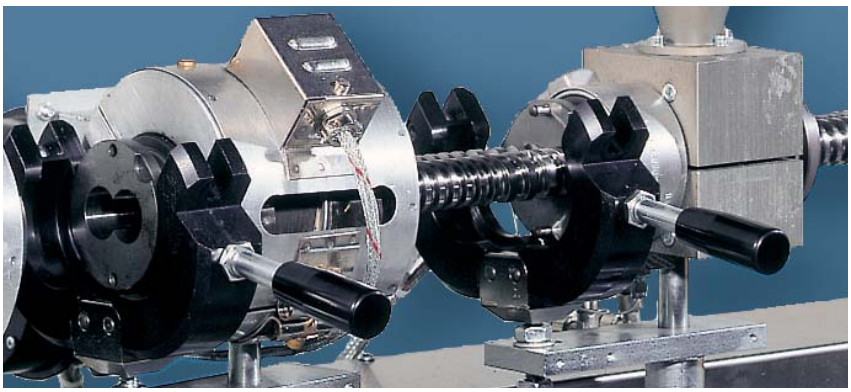
- Modular barrel with individual segments
- Modular screw elements for all kind of mixing tasks
- Easy cleaning by moving each individual barrel element on a sliding rail

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.



Feed section and non-vented barrel element of the ZK 25

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.

Selection of ZK 25 screw elements for co- and counter-rotating

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 (optional: mesurement of the specific energy input)
- Melt temperature and pressure measurement

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

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 drive unit 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

Laboratory Twin-Screw Kneader ZK 35 x 40 D with movable (by electric motor) drive unit

Twin-Screw Kneader ZK 35 x 32 D with top die face pelletizer and air cooling with cyclone

Compounding line for material development and pilot production

ZK 35 equiped with 4 gravimetric dosing stations for solid materials and 3 tempered liquid gravimetric stations

Corotating Twin Screw Extruder ZK35

- Throughput up to 70 kg/h
- Screw diameter 35 mm
- Screw length L/D 56 for high flexibility in development
- Screw speed 700 1/min maximum
- Main feeding section for pellets, side feeding section for fillers
- Three feeding sections for liquids
- Three venting ports for vacuum or atmospheric degassing
- Fast and easy cleaning by motor driven screw pull out

Gravimetric dosing system for ZK35

- Two stations for different pellets (i.e. PP and EPDM)
- Two stations for powder materials (i.e. chalk, mineral fillers, glass fibers, additives)
- Three tempered dosing stations for liquids (i.e. waxes, oils)

Control System

- Human engineered touch screens for the gravimetric system and the extruder integrated in on control panel
- Self explaining graphs provide all parameters (actual and set values) of the complete line
- Pressure/speed control of the extruder
- Administration of recipes for the material flow either in %wt or absolute in kg/h
- Administration of recipes for the extruder parameters connected to the material recipes
- Diagrams for trend analysis of all process parameters
- Measurement and recording of the specific energy (Wh/kg) used for the compound

Completly integrated control system

Direct extrusion lines for film,sheet and pipes

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 COLLIN® wide product range allows the building up of complete production lines for film, sheet, laminates, blown film and pipe.

Calender

All kind of down stream equipment for the production of film, sheet and pipe is available (i.e. calenders and chillroll up to 600 mm width, blown film up to 550 mm lay flat width). 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.

Control system

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

Compounder

The Type ZK 25 or ZK 35 Twin-Screw Kneader is the central aggregate. Process lengths from 24 to 56 D allow to run all 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 up to 70 kg/h.

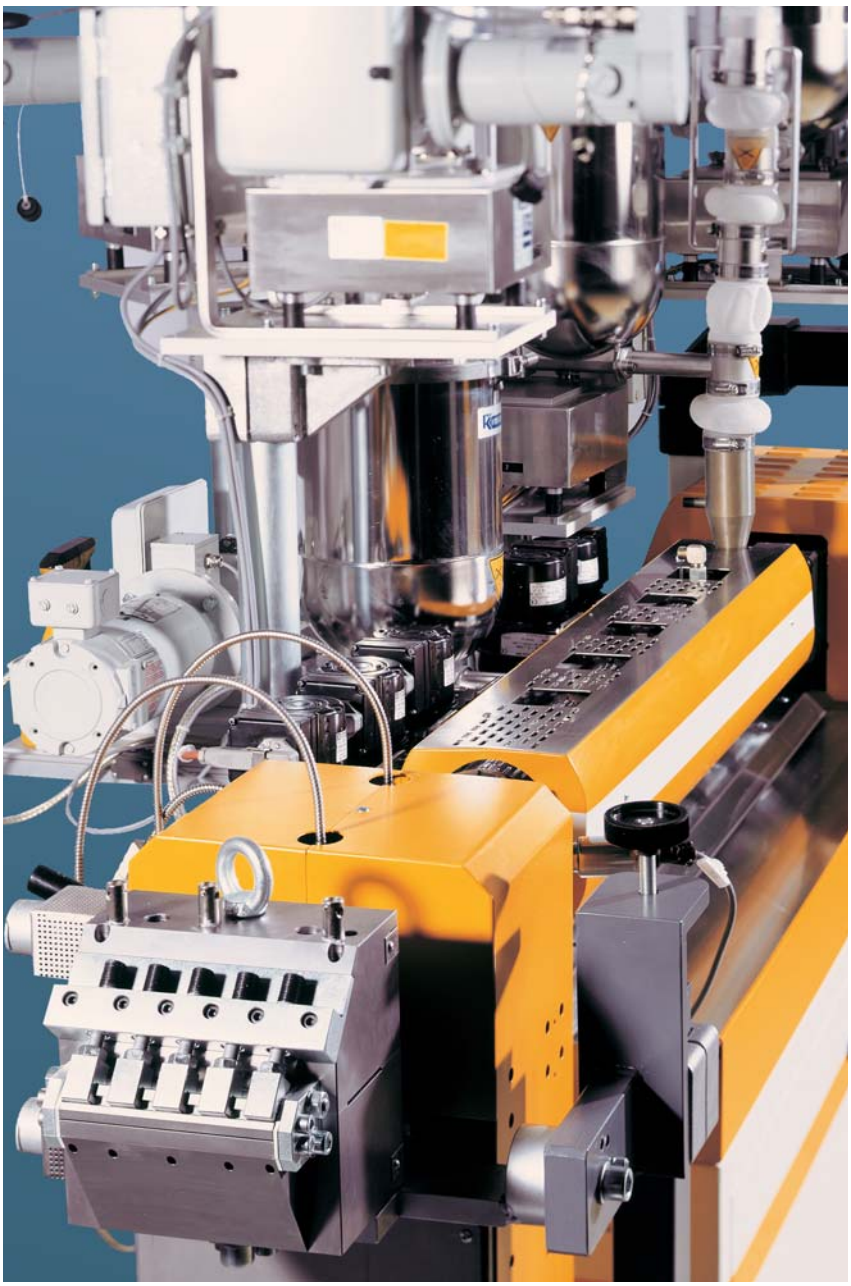
Melt pump

Melt pumps connected via C – Clamp to the extruders overcome the pressure loss in the following die and guarantie a constant througput.

Dies

Dies are available for wide operative ranges; for

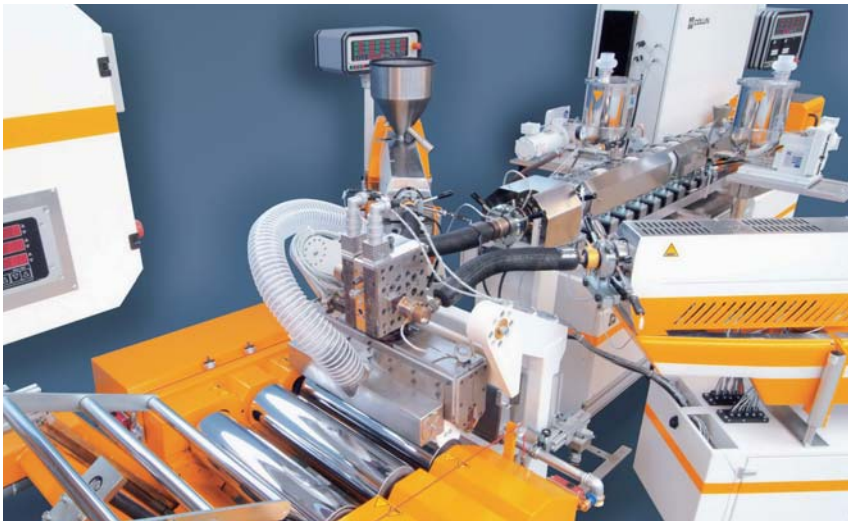
- Flat film or sheet
- Blown film
- Pipe



Twin-Screw Kneader ZK 25 x 42 L/D with gravimetric feeders, equipped with melt pump and slot die.

Direct extrusion lines for Blown film and flat film

5 Layer coextrusion blown film line with direct extrusion of the central layer



5 Layer coextrusion flat film line with direct extrusion of the central layer

COLLIN®

Technical data

		Type	ZK 25 E	ZK 25	ZK 25 S	ZK 35
Screw diam.		(mm)	25	25	25	35
Length of barrel elements		(x D)	6	6	6	4
Processing lengths, total, on request		(x D)		(24/30)*	(24/30)*	(30/34/38) (44/48/52)*
Processing lengths, total, Standard		(x D)	36/42	36/42/48	36/42/48	40/56
Heater power per barrel segment		(kW)	06 - 1,6	06 - 1,6	06 - 1,6	0,8 - 1,5
Drive power		(kW)	7,0	9,7	16,8	27
Speed, max.		(min^{-1})	460	460	800	700
Torque per shaft		(Nm)	2 x 60	2 x 90	2 x 90	2 x 160
Cooling	Feeding barrel		Water	Water	Water	Water
	Barrel		Air	Water (Air)*	Water	Water
Throughput		(kg/h)	1 - 15	0,5 - 20	3 - 40	5 - 60
Dimensions	Length	(mm)	1500 - 1700	1500 - 2200	1500 - 2200	2500 - 4000
	Width	(mm)	700	800	800	1000
	Height	(mm)	1900	1900	1900	2000
	Weight	(kg)	300 - 400	300 - 400	300 - 400	1030 - 2350

Technical modifications reserved. *on request

Our product range also covers:

- **Two Roll Mill and Calenders**
- **Platen Presses**
- **Single-Screw Extrusion Systems**
- **Test Equipment**
- **TEACH-LINE®**

Represented by:

Dr. Collin GmbH
Sportparkstr. 2, D-85560 Ebersberg, Germany
Phone ++49 (0)8092/2096-0, Fax ++49 (0)8092/20862

www.drcollin.de, eMail: collin@drcollin.de

5250D-05J500