

Extruder

Twin screw extruder, co-rotating

Table Top: ZE 5 / 9 / 12 / 18 HMI



APPLICATION

Multifunctional extrusion from very small quantities to production scale for research and development as well as production applications. Extrusion results are optimally suited for upscaling or downscaling. The extruders perform complex extrusion tasks under difficult conditions such as high pressure, high torque or steep temperature gradients.

Our miniature-scale laboratory extruders, which we have been developing and producing since 2005, are among the world's smallest devices and can process very small quantities from 1 gram. Due to the compact and user-friendly design, the total costs per experiment are significantly lower than with other devices.

FEATURES

Three-Tec extruders feature a compact design, high torque and intuitive touch-panel operation. They are equipped with easily exchangeable extrusion tools. These can be individually set up and adapted to the extrusion task using different screw segments such as conveying, return conveying, kneading or mixing segments.

Thanks to the minimal space requirement, the laboratory extruders can be quickly set up and used at changing locations. The temperature profiles of the heating zones and the torque profile of the motor are recorded and can be read out via USB or Ethernet interface.

ADVANTAGES OF THREE-TEC EXTRUDERS

- > High mixing effect
- > Short residence time
- > Steep temperature gradients possible
- > Suitable for scale up
- > Continuous process
- > High active ingredient content
- > GMP-compliant
- > Customised solutions

CONTROL

The extruder control is based on the latest PLC technology from Siemens. It can be operated via touch panel, includes extensive software functions and enables the recording of process-relevant data. Customer-specific adaptations to the software and various communication protocols enable additional functions and the integration of the control into higher-level systems and plants.

MATERIAL

Parts in contact with the product	Stainless steel
Barrel, extrusion tools	various stainless steels hardened, adapted to the customer application
Seals	PTFE, silicone (up to 230 °C), metallic up to 400 °C



EXTRUSION TOOLS AND EXTRUSION PERFORMANCE

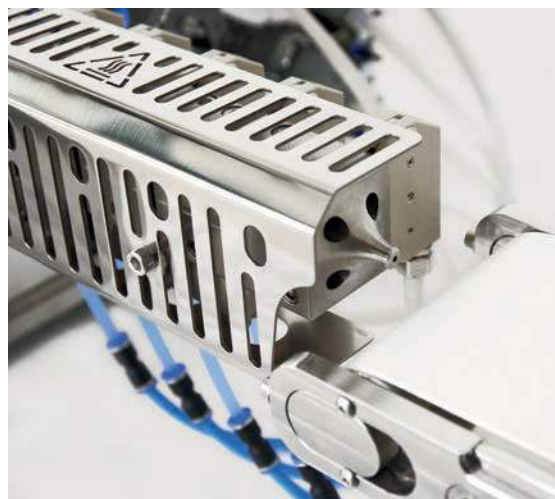
The right extrusion tool is customised to the customer's application. The throughput of the extruder depends on several factors, such as material properties, temperatures, die geometry, viscosity and configuration of the feeding tool (feeding, return, kneading and mixing segments).

For a realistic statement on the achievable throughput, we recommend carrying out tests with original products in our test laboratory.

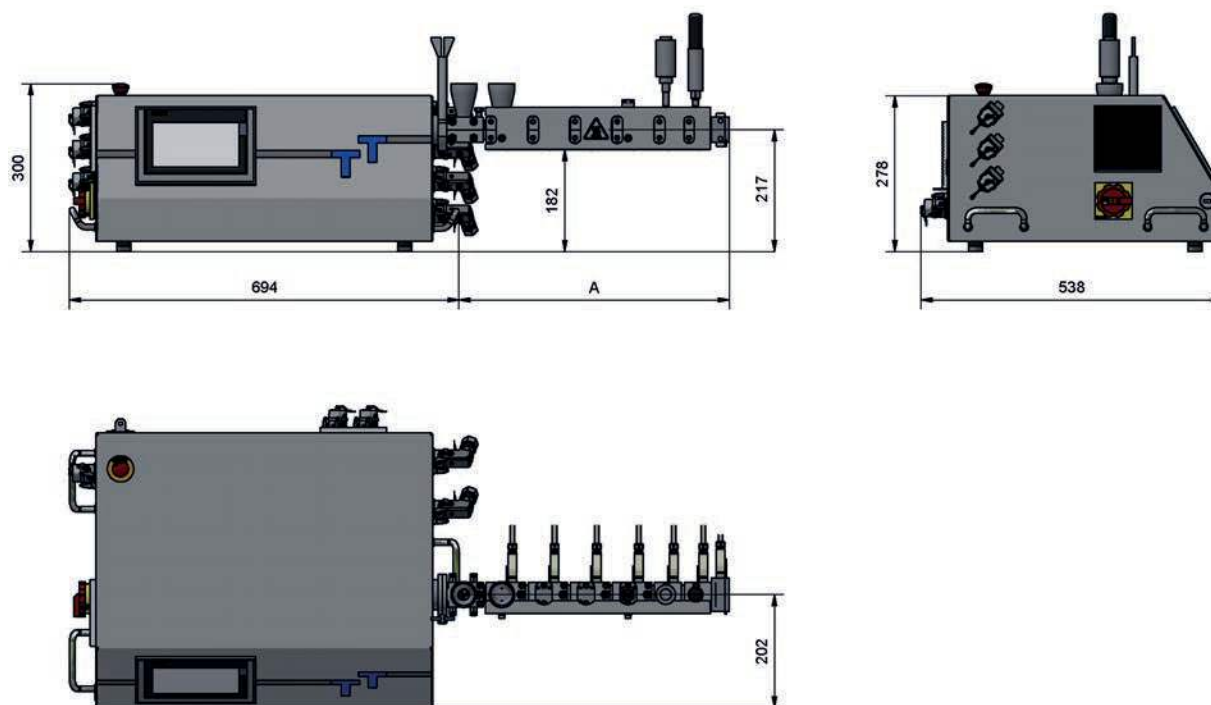
TECHNICAL DATA

	ZE 5	ZE 9	ZE 12	ZE 18
Max. torque (Nm)	2.5 (1.25/screw)	14.5 (7.25/screw)	20 (10/screw)	60 (30/screw)
Max. temperature (°C)	230 (optional 400)			
Cooling	water / air			
Rotational speed (rpm)	0–300, optional 0-1,000			
L/D	15, 20, 25, 30, 40, 50, 60			
Weight (kg) *	≈ 60	≈ 68	≈ 70	≈ 150
Throughput (kg/h)	0.4	1.2	2.5	10
Free internal volume L/D 15 barrel with pitch Ø x 1.0 (cm³)	1.2	6	14	63
Minimum batch size (g) (Input → Output)	1 → 0.72	2 → 0.6	5 → 1.5	30 → 10
Max. processable granulate size (mm)	<1	1–1.5	2.2	4

L/D = Ratio of screw length to screw diameter | * The specifications are variable depending on additional equipment



DIMENSIONS



Dimension «A» depending on the barrel selected, see table below.

LENGTH BARREL

L/D ►	15	20	25	30	40
ZE 5	75	100	125	150	-
ZE 9	135	180	225	270	360
ZE 12	180	240	300	360	480

Other dimensions on request. Figures in mm.

SUITABLE FEEDING DEVICES

Feeding devices ►	ZD 5 FB	ZD 9 FB	ZD 12 B / ZD 12 FB	ED 20 / ED 20 B
ZE 5	X	-	-	-
ZE 9	X	X	-	-
ZE 12	X	X	X	X
ZE 18	X	X	X	X

FB = Flat-tray, B = with discharge aid/bridge breaker, () = without discharge aid/bridge breaker

OPTIONS

- Optical temperature and pressure sensor on the die
- Cooling connections for water or air cooling
- Melt temperature sensor
- Pressure sensor
- Barrel in one piece
- Dispensing tools in one piece (monobloc)
- PTFE seal with purge gas connection
- Special materials on request

ATEX (EXPLOSION PROTECTION)

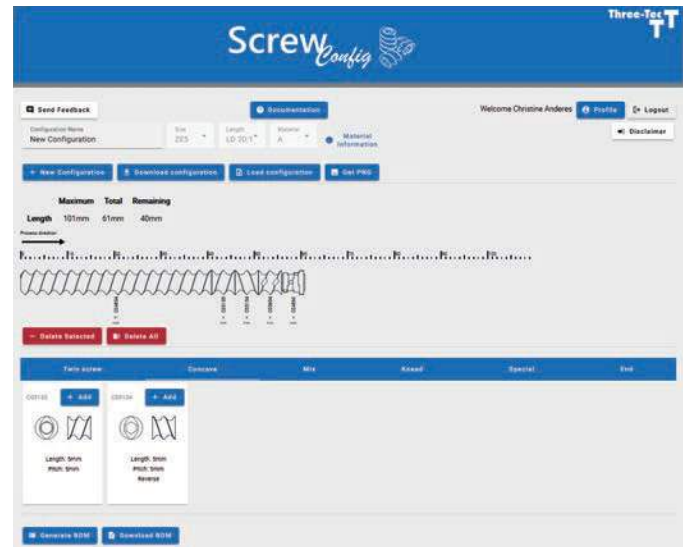
Our equipment can be certified for all categories according to customer requirements in compliance with the ATEX Directive 2014/34/EC.

FDA

All plastic parts and seals in contact with the product that we use for our devices meet the requirements of the Food and Drug Administration (FDA) and are therefore FDA-compliant. The greases and lubricants used are certified according to NSF-H1.

QUALITY AND DOCUMENTATION

- Risk analysis
- GMP documentation
- Material and surface certificates
- Welding certificate and welding seam documentation



SCREW CONFIGURATOR

With our configurator, you can assemble extrusion tools from different segments to exactly match your application purposes. The configuration can be saved to a file that can be loaded, visualised and adjusted from any device. The drag-and-drop functionality makes it easy to change the configuration. Once completed, a material list can be automatically generated, which can be used as a basis for ordering new extrusion tools.

Contact us at info@three-tec.ch to get a login to the screw configurator.

AVAILABLE ACCESSORIES

- Volumetric / gravimetric feeding
- Die with shaping according to customer requirements
- Pelletizer
- Hot cutter
- Spheronizer
- Conveyor belt / cooling conveyor belt
- Cooling bath
- Film roller
- Filament winder
- Calender
- Isolator (High Containment)
- Stuffing feeding device
- Side feeding device