

Compact 3D Filament Extrusion Line



Labtech Engineering's Compact 3D Filament Extrusion Line is a smaller, more streamlined version of a conventional 3D Filament Extrusion Line, making it suitable for even the most limited spaces. It is easy to use, even for users with no prior experience in filament production. This compact extrusion line can produce filaments from various types of materials available in the market, including PLA, ABS, PETG, Nylon and PP. It can also produce filaments with a wide range of additional additives, such as colorants and fillers.

The line features a 20 mm Single-Screw Extruder, a 3D Filament Die, and a Combi Station combining Cooling Water Bath with a Traverse Spool Winder mounted over a subcabinet. Our 25 mm Single-Screw Extruder is also suitable for this line and is available upon request.

This Compact 3D Filament Extrusion Line is the affordable in-house solution perfect for small-scale projects in businesses and institutions allowing sample testing and development at a minimal material usage crucial for expensive filaments. Universities and research labs can streamline custom 3D filament development and stretch their research budget further, all without investing in large production lines.



20 mm Single-Screw Extruder Type LE20-30/C

The mobile extruder allows for easy in-line installation or standalone operation.

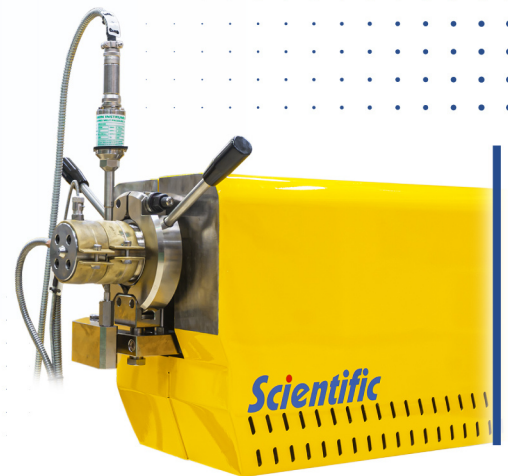
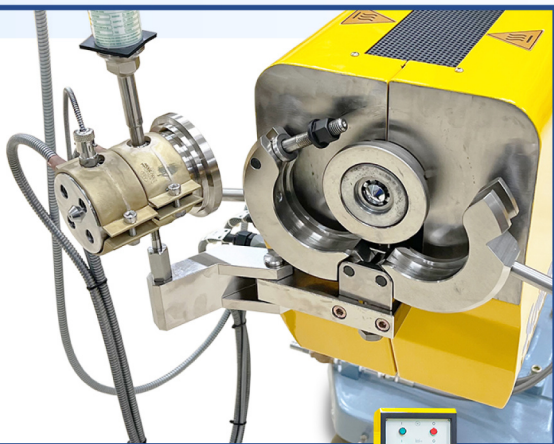
- Variable screw speed up to 150 RPM, driven by a 1.5 kW AC motor (optional 2.0 kW Vector motor drive)
- Nitride barrel and screw (optional bimetallic steel for improved wear and corrosive resistance)
- Maximum Temperature of 300°C (optional High-Heat Version 400°C)

Optional 25 mm Single-Screw Extruder Type LE25-30/C

- Variable screw speed up to 300 RPM, driven by a 4.0 kW AC motor (optional 5.0 kW Vector motor drive)

3D Filament Die

- Small-diameter filament extrusion of 1.75 mm or 2.85 mm (other diameter sizes are also available upon request)
- **Optional** swingable support attachment for easy cleaning and maintenance



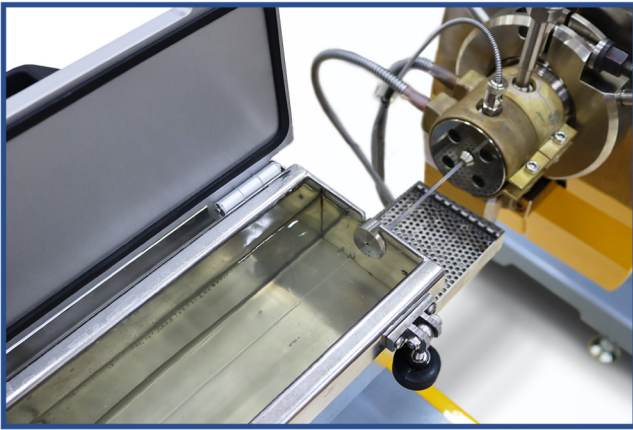
- **Optional** pressure transducer and melt temperature sensor for real-time process monitoring.
- **Optional** closed-loop feedback system with pressure and screw speed control for stable filament quality.

2-in-1 COMBI Station Cooling Water Bath & Traverse Spool Winder

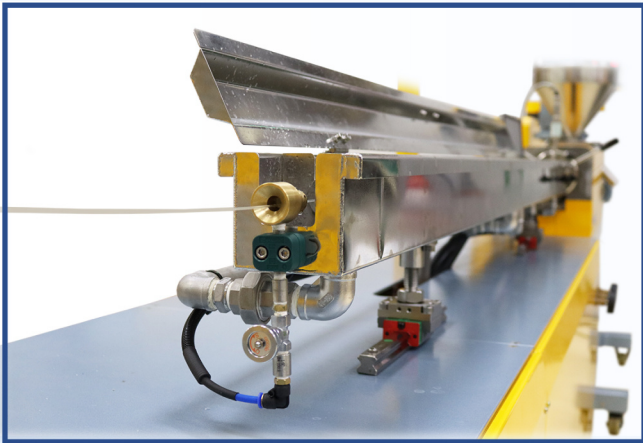
The downstream station of the Compact 3D Filament Extrusion Line features a combined Cooling Water Bath and Traverse Spool Winder Station both mounted on a wheeled subcabinet to occupy a minimum floor space and simplify installation.



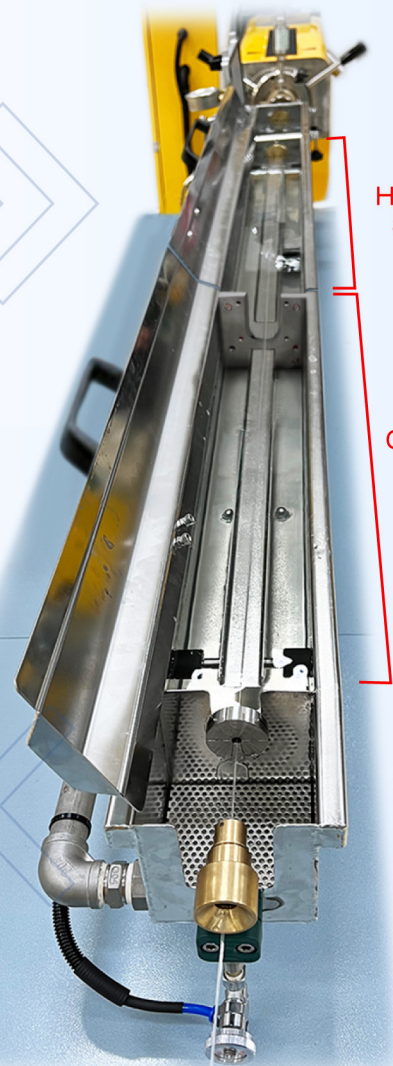
Cooling Water Bath Type LCFW-100/L1.2



The 1.2-meter-long slim Cooling Water Bath features two dedicated sections with continuously circulating water for optimal temperature control. The first section circulates hot water at a max temperature of 85°C to receive the extrudate, preventing thermal shock through gradual cooling. The second section circulates cool water to complete the hardening process.



The tank exit is equipped with an air wipe assembly to effectively remove moisture and ensure proper drying of the filament before winding it up on the spool.



Hot Water Section

Cool Water Section

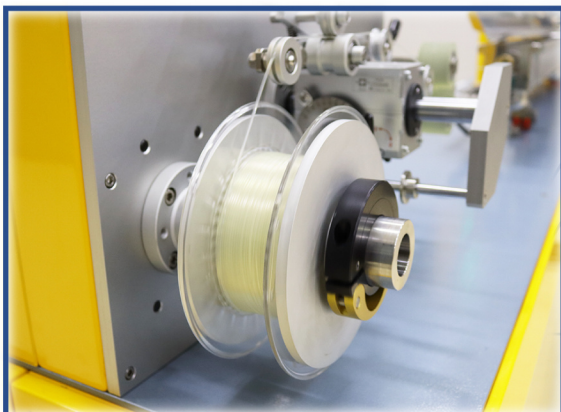
The tank is fitted with a stainless-steel sizing tool at both ends to maintain the proper alignment and shape stability of the filament being steadily drawn along the guide-trough. It also functions as a flood seal to prevent water leaks.

Traverse Spool Winder Type LWU-15

The Traverse Spool Winder Station features a pair of urethane pull rolls and a traversing strand guide that directs the filament onto the loaded spool driven by a servo motor.

An optional Dual-Axis Laser Diameter Gauge can be integrated with the system for real-time monitoring of the filament diameter. For additional control, a closed-loop feedback system option can be directly connected to the spool winder station allowing automatic adjustments to maintain a consistent filament diameter.





Urethane Nip Rolls

The pull roll grips the filament and draws over the grooved guide rolls until it is wound to the spool via the strand guide. The strand guide is mounted over an adjustable traversing unit equipped with mechanical traverse drive motor that oscillates along the inside width of the spool, for a tight and even filament winding distribution.

TECHNICAL DATA

Single-Screw Extruder Type LE20-30/C Type LE25-30/C

Screw Diameter	20 mm	25 mm
L/D Ratio	30:1	30:1
Screw Speed Range	0 to 150 RPM	0 to 300 RPM
Drive Motor Power	1.5 kW (optional 2.0 kW)	4.0 kW (optional 5.0 kW)
Maximum Barrel Temperature	300°C (optional 400°C)	300°C (optional 400°C)
Maximum Output of the Extruder (for Strand Pelletizing LDPE)	6 kg/hr	15 kg/hr

Cooling Water Bath Type LCFW-100/L1.2

Bath Tank Length	1.2 m
Cooling Tank Section Capacity	6.8 L
Reservoir Capacity	90 L (operational at 56 L)
Maximum Water Temperature Setpoint	85°C
Water Pump Power	0.37 kW

Traverse Spool Winder Station Type LWU-15

Maximum Winder Speed	15 m/min
Maximum Spool Diameter Capacity	200 mm
Winder Drive Motor Power	0.40 kW
Single Filament Output for Ø1.75 mm @15 m/min	ABS: 2.2 kg/hr PLA: 2.6 kg/hr
Single Filament Output for Ø2.85 mm @ 10 m/min	ABS: 3.9 kg/hr PLA: 4.7 kg/hr

General Information

Total Dimensions (LxWxH)	5670 mm x 880 mm x 1830 mm
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