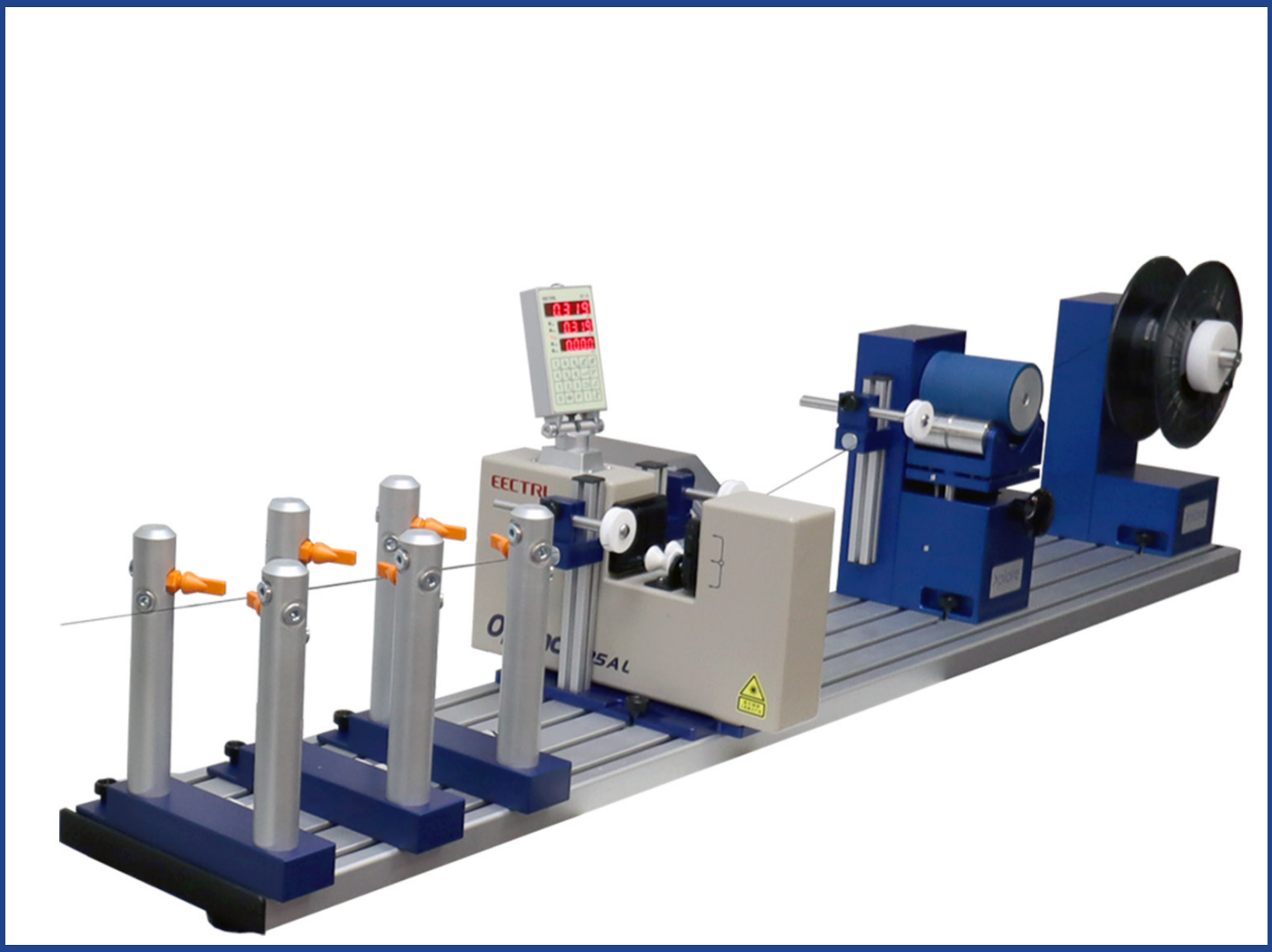
Xplore 3D FL
3D Filament Line

Compose 3D filaments from small amounts of material



xplore

The platform for polymer and rubber development

Add-on for 3D Filament development: reliable, reproducible and fast R&D results

Xplore Instruments BV introduces a 3D print filament screening add-on that enables you to produce FDM (Fused Deposition Modelling) filaments from polymeric materials with good dimensional stability from small amounts of material. This 3D print filament R&D line is a unique asset for the development of experimental nascent filament formulations. It will create custom product opportunities by delivering quick, reliable test results of filament samples for subsequent testing and analysis. When connected to our Xplore MC 15 HT or MC 40 compounder, it is a fully-fledged 3D print filament screening line to speed up your R&D efforts. Are you in R&D of 3D print filament compositions? Then this is a "must-have" screening or feasibility study R&D tool.

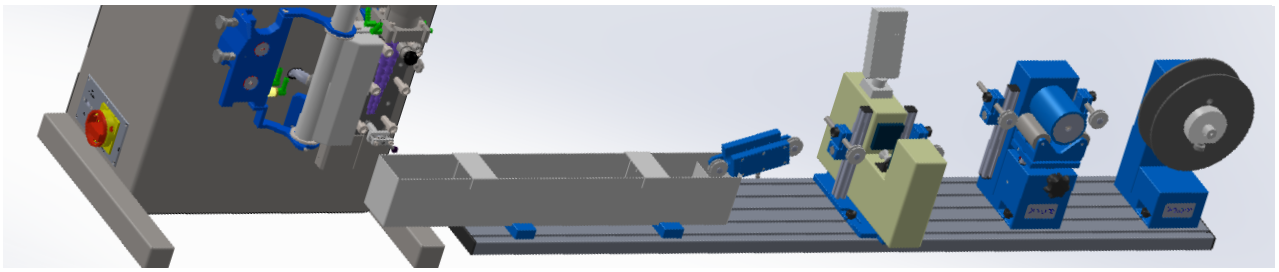
Our 3D Filament line add-on for our larger compounders offers you a solution to make your composition filament for FDM applications: reliable and reproducible, fast results with a minimum amount of material, minimum waste, less equipment and infrastructural costs. In combination with the optional feeder for our larger compounders, it provides an accurate throughput of molten polymeric material, which is the foundation for the correct final diameter of the 3D filament.

The optional volumetric feeder of our compounders guarantees a pressure equilibrium in the main processing barrel of the compounder. This enables a constant throughput of molten material at a given compounder screw rpm. Hence, a near-perfect starting point for processing 3D filaments for R&D purposes. This feature will ensure a homogeneous, accurately dimensioned 3D filament without any voids. The 3D filament line consists of 3 x 2 air cooling columns or can also be equipped additionally with an optional stainless steel water bath with a filament pre-dryer to cool down or control the temperature (no voids) of the nascent filament. Polymer compositions that are absorbing unwanted moisture will, of course, skip the water cooling step in the optional water bath section. The filament pre-dryer, at the end of the optional water bath, guarantees a pre-dried filament for the subsequent air cooling section, which enables a consistent condition for the laser measurement unit, where the filament diameter is continuously monitored. Further downstream, the custom 3D print filament enters the transport godet where you can control the draw rate, enabling you to be flexible in your processing workflow. The inline draw speed can be controlled and monitored on the control box, which is part of the complete setup.

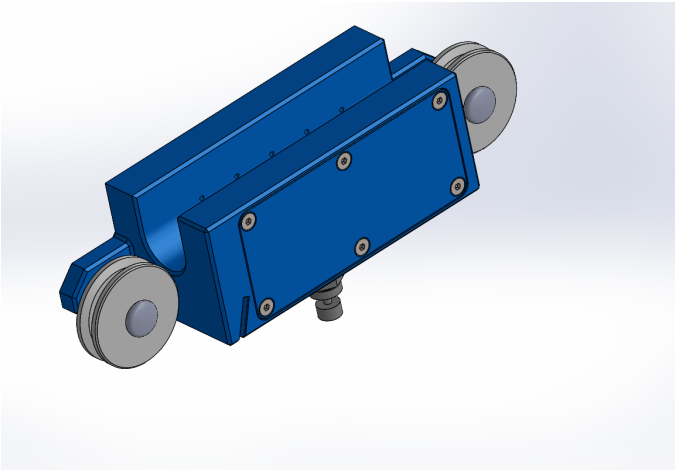
Finally, the 3D print filament needs to be wound onto a standardised industrial bobbin. The torque of this filament winding unit can be controlled to achieve tight winding of the filament.

The 3D print filament line provides the basis to process the typical FFF polymers into an accurate filament, well within the industry norm of ø1,75 mm +/- 0,05 mm 3D print filament with unique (custom design polymer matrix) properties.

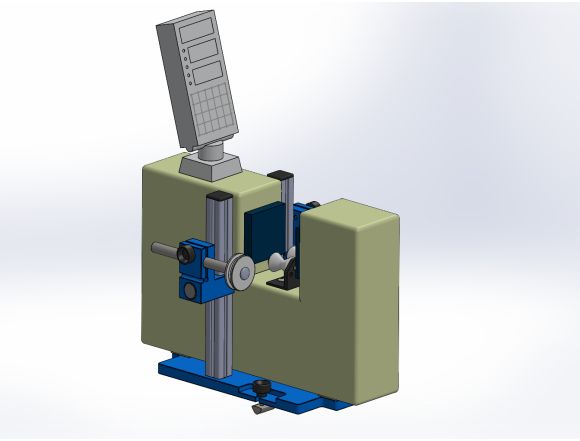
Xplore 3D filament line with air cooling columns



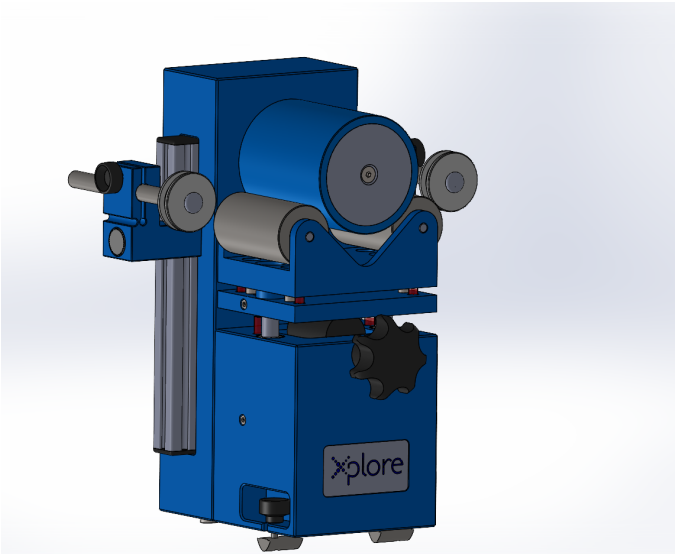
The optional water bath "pro" version consists of a water bath, and under it, an overflow container. This "pro" version has sufficient cooling capacity and is equipped with an inlet and outlet connector, where a chiller or thermostat can be attached. Furthermore, this "pro" version enables you to let the nascent 3D enter the water in a nearly horizontal manner. Hence, a more gradual cooling (crystallisation) effect and can hereby prevent warpage of the final diameter of the 3D filament. As mentioned before, the filament is dried with compressed air, which can be connected at the bottom of the filament dryer.
The Filament Drawing Godet provides the opportunity to control the drawing speed, hence control over the diameter of the 3D filament. This feature becomes handy when the diameter of the filament tends to travel to the limits of its internationally accepted tolerance.
The Take-up Winder unit will properly wind the newborn 3D filament onto a standardised industrial bobbin for possible subsequent testing or analysing steps or fed into a granulator for recycling or other compounding steps. The 3D FL can produce accurate filaments of FDM typical Polymer matrixes from a minimum of 500 grams of material with a wide range of line speeds, ensuring the generation of fast R&D results. If you do not need to produce a bobbin, such as feeding the 3D filament directly into a 3D printer, the winding section can be omitted. The 3D FL can be easily added to our latest MC 15 HT and MC 40 micro compounders. The 3D FL is also backwards compatible with earlier (legacy) MC 15 compounders, designed by Xplore.



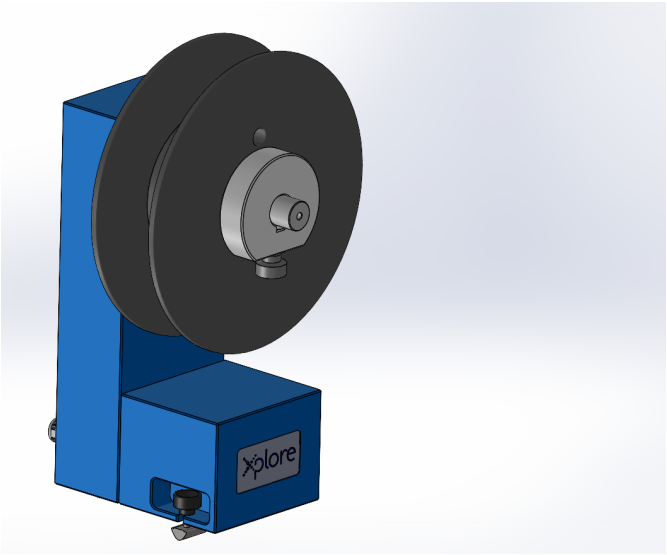
Filament Pre-Dryer



Laser Measurement Unit



Filament Drawing Godet



Take-up Winder

Benefits:
- Possibility to screen 3D filaments of different compositions with small amounts of materials
- Enables you to conduct feasibility studies in a quick and efficient manner
- Suitable for the typical FDM materials e.g. PLA, ABS and low viscous polymers like PA and so on
- Wide range of line speed ranges possible
- Winds the filament on a standard industrial bobbin
- Can be retrofitted onto an Xplore MC 15 legacy Micro-compounder
- Saves costs and time

Custom set up; Xplore 3D filament line with optional water bath and filament pre-dryer

Technical Specifications::

- Fits on any Xplore MC 15 (HT), MC 40 compounders or other R&D extruder setups
- Temperature controlled filament die to have excellent control on flow properties
- Two heated standard die diameters available, to obtain ø1,75 mm or ø2,85 mm filament
- Approximate weight 3D filament Line 50 kg
- Optional water bath or water bath pro version
- Optional dedicated table setup
- Supply voltage: 208 - 240 V AC, 50/60 Hz

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