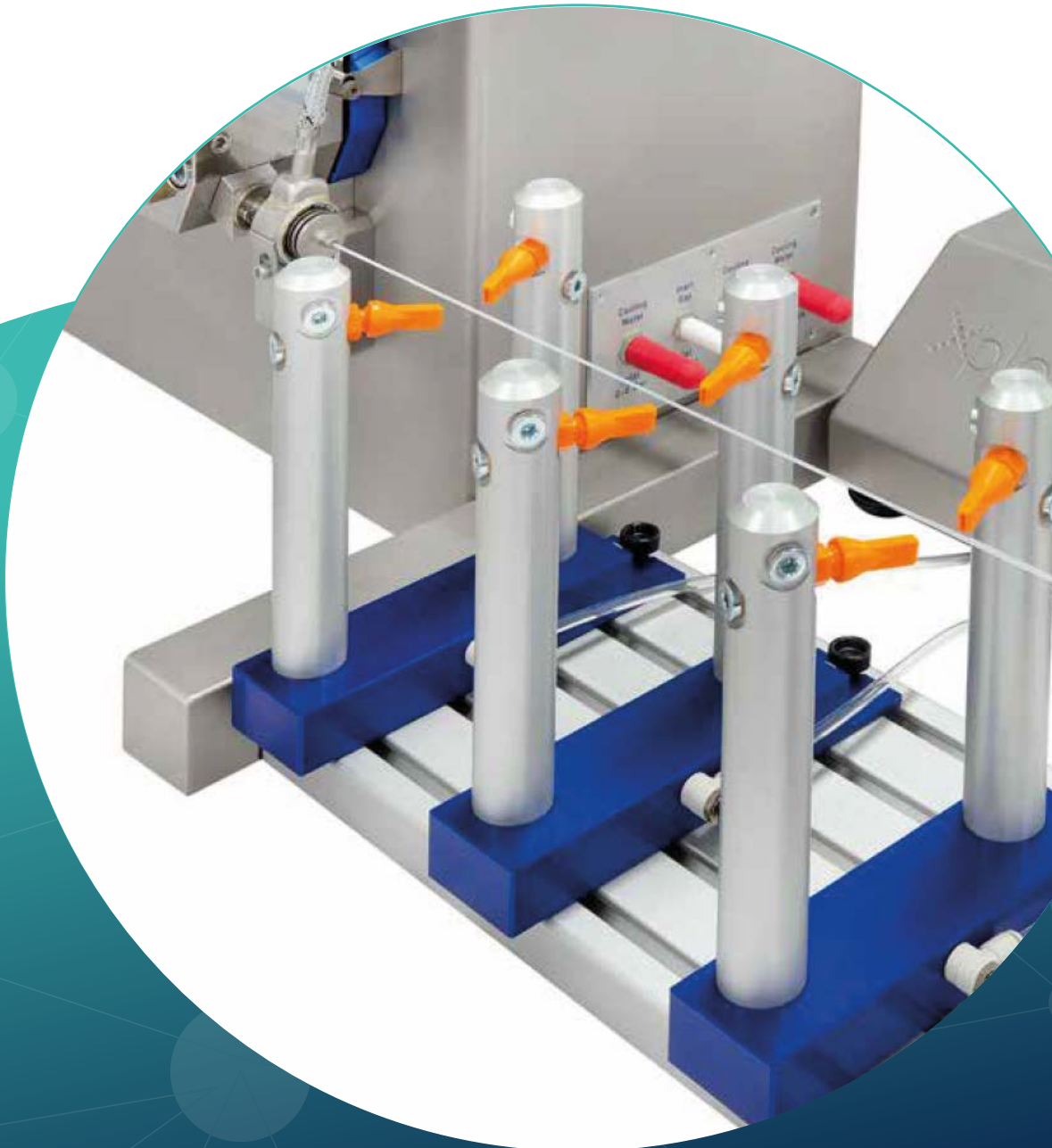
Xplore 3D FL
3D Filament Line

Compose 3D filaments using small amounts of material



xplore-together.com

Add-on for 3D Filament development:

reliable, reproducible and fast R&D results

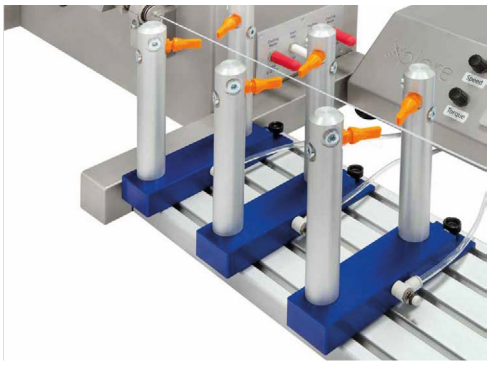
Our 3D Filament line add-on for our larger compounders offers you a solution to make your composition filament for 3D printing applications. The line is generating fast reproducible results with minimum material and waste with less equipment and infrastructural costs. This laboratory 3D Filament Line can be combined with one of our larger compounders. When our compounder is combined with our optional volumetric feeder unit, it provides an accurate throughput of melt, which is the starting foundation for a stable final diameter of the 3D filament. Xplore Instruments BV introduces a 3D print filament screening add-on that enables you to produce filaments Fused Filament Fabrication using polymeric materials with good dimensional stability from small amounts of material. This 3D filament R&D line is a unique asset for the development of nascent filament compositions. In addition, it will create custom product opportunities by delivering fast, reliable test results of filament samples for subsequent testing or analysis purposes. When connected to our Xplore MC 15 HT or MC 40 compounder, it is a fully-fledged 3D printing filament screening line to speed up your R&D efforts. Are you in R&D of 3D printing filament compositions and in need of a tabletop 3D filament Line? Then this is a “must-have” screening tool.

The optional volumetric feeder of our compounders, together with the precise control of the screw speed, guarantees a steady die-pressure in the barrel of the compounder that prevents surging of the extrudate. This enables a constant throughput of melt at a given compounder screw rpm. Hence, a perfect starting point for the R&D of 3D printing filaments. It will ensure a homogeneous, accurately dimensioned 3D filament without any voids. When the filament leaves the dedicated 3D filament die, it enters the air pin quenching zone (see picture 2, next page). The 3D filament line can also be equipped with an optional stainless steel water bath to quench the lesser hygroscopic filament compositions. The 3D filament air pin quench zone guarantees a dimensional stable filament which is convenient while the filament is measured in the laser measuring unit (see picture 5, next page).

This laser measurement unit gives constant information about the diameter of the nascent 3D filament. Further downstream, the custom 3D print filament enters the filament transport godet to control the draw rate, enabling you to be even more flexible in your processing control 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 3D filament 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.

The air pin quenching zone and the water bath have sufficient cooling capacity to cool down the filament gradually; this also limits the warpage of the filament. Furthermore, the optional water bath is equipped with an inlet and outlet connector, where a chiller or thermostat can be connected. The optional water bath is equipped with a dedicated water separator. It enables the removal of excess water on the outside of the filament; the water separator removes the cooling media with compressed air, which can be connected at the bottom of the water separator. When the 3D filament enters the laser unit, the filament diameter is constantly monitored. Hence, this provides immediate awareness when the diameter of the 3D filament tends to travel to the limits of its internationally accepted tolerance. The filament bobbin winder will properly wind the newborn 3D filament onto a standardised industrial bobbin which fits perfectly on your 3D printer. Or can be used for a possible subsequent analysing step or to be fed into a granulator for recycling or other compounding purposes. The 3D FL can produce accurate filaments for typical FFF polymer matrices from a minimum of 500 g of material with a wide range of line speeds, ensuring fast sample material generation for subsequent testing or R&D size production purposes. The 3D FL can easily be added to our latest MC 15 HT and MC 40 micro compounders or any other compatible extrusion system. The 3D FL is backwards compatible with earlier (legacy) models of MC 15 compounders, designed by Xplore.



Picture 2. Filament air pin quench zone

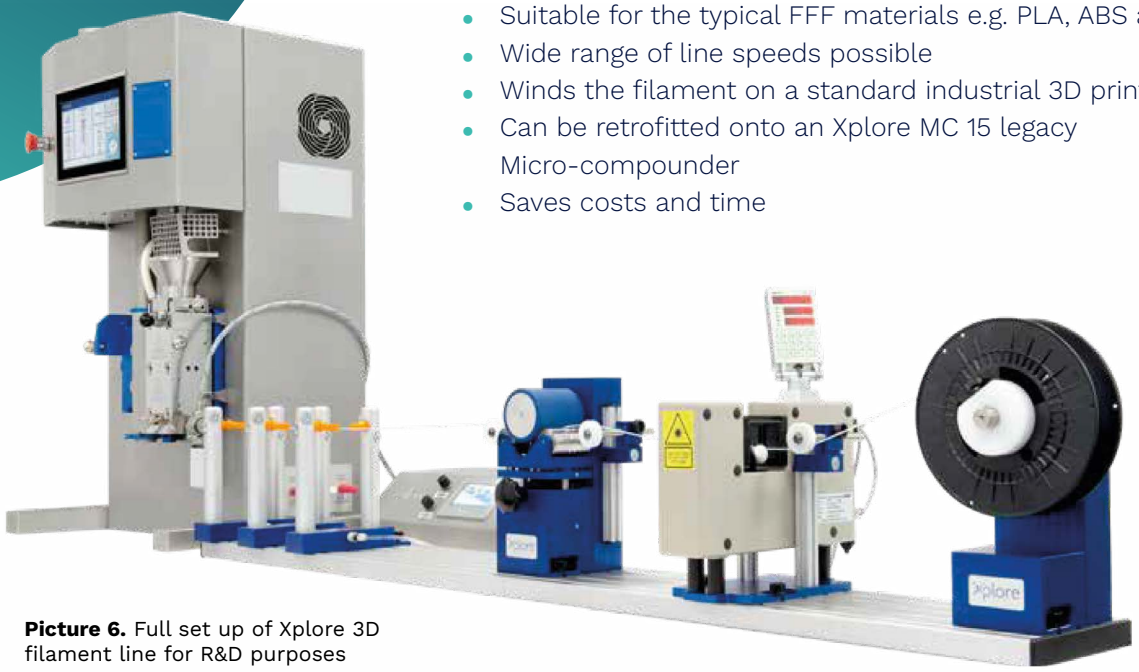
Picture 3. 3D filament die

Picture 4. Filament Transport Godet

Picture 5. Measurering and winding

Benefits:

- Large operating window
- Possibility to fast 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 FFF materials e.g. PLA, ABS and so on
- Wide range of line speeds possible
- Winds the filament on a standard industrial 3D printing bobbin
- Can be retrofitted onto an Xplore MC 15 legacy Micro-compounder
- Saves costs and time



Picture 6. Full set up of Xplore 3D filament line for R&D purposes

Technical Specifications:

- Fits on any Xplore MC 15 (HT), MC 40 compounders or other R&D extruder setups
- Temperature controlled filament die to minimise die-exit filament resonance
- Several die diameters available, to obtain ø1,75 mm or ø2,85 mm filament
- Approximate weight 3D filament Line 12 kg
- Optional water bath* and filament water separator
  *water bath connections available for either heating or cooling
- Optional dedicated table setup
- Supply voltage: 208 - 240 V AC, 50/60 Hz

Xplore Instruments BV
Arendstraat 5
6135 KT, Sittard
The Netherlands

Tel: +31 46 208 97 70
Fax: +31 46 208 97 71

info@xplore-together.com
www.xplore-together.com
Trade Register: 60040114