

Chemical test on Ultracur3D® EL 60

This document is intended to provide guidance for manufacturers regarding the compatibility of the 3D printed materials with hydrocarbons and cleaning chemicals. BASF 3D Printing Solutions GmbH has performed specific chemical test for the material Ultracur3D® EL 60. Indications on material changes that can occur during the chemical test were studied. It remains the responsibility of the device manufacturers and/or end-users to determine the suitability of all printed parts for their respective application.

Used hydrocarbons and cleaning chemicals

Fluid
Cooling fluid
Multipurpose fat
Engine oil
Hydraulic oil
Brake fluid
Transmission oil
Acetone

Test method and specimens

75 tensile bars were printed with the material and were soaked in each fluid, one set for 30 minutes and one set for 7 days. After the soaking time the parts were removed from the test fluid and were dried to measure the weight and the mechanical properties like E modulus, Tensile strength and Elongation at break.



Figure 1 Tensile bar ASTM D412 Type C

Mechanical testing

It can be observed from diagrams below that elastic modulus stays stable for all chemical fluids after either 30 min or 7 days. A considerable drop in tensile strength and elongation at break is seen in when immerse in cooling fluid. Tensile strength and elongation at break are strongly affected by acetone and brake fluid, while in other chemical fluids small change is observed.

30 minutes

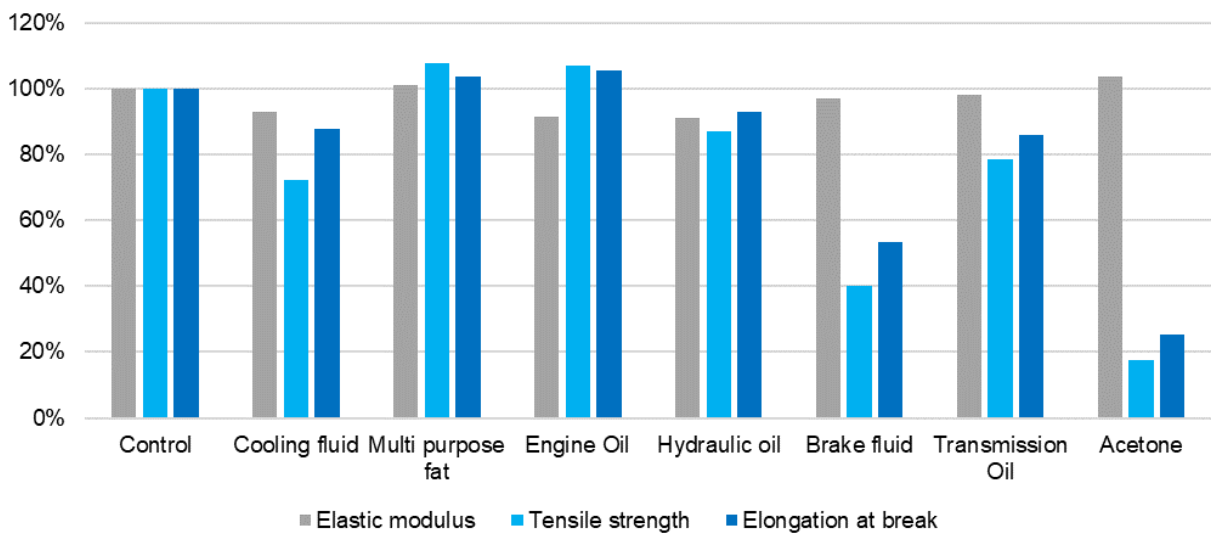


Figure 2 Change in mechanical properties in chemical fluid for 30 minutes

7 days

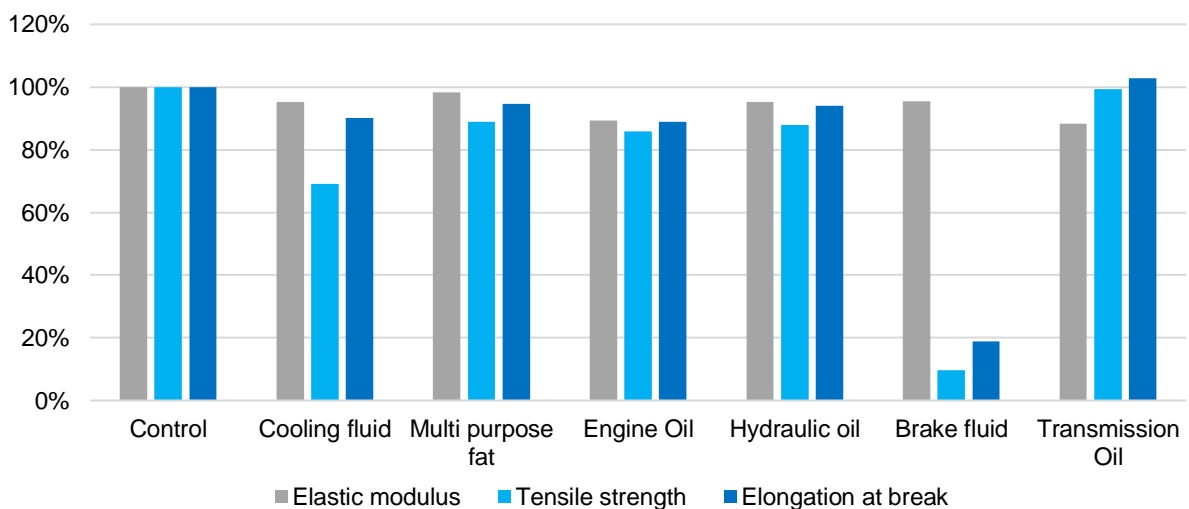


Figure 3 Change in mechanical properties in chemical fluid for 7 days

Weight

The material takes up weight when immersed for 7 days as compared to 30 minutes where no change is noticed. In case of cooling fluid, the increase in weight is noticeable. However, in the rest of the fluids, the increase in weight is significant. The material was deteriorated when immersed in Acetone for 7 days.

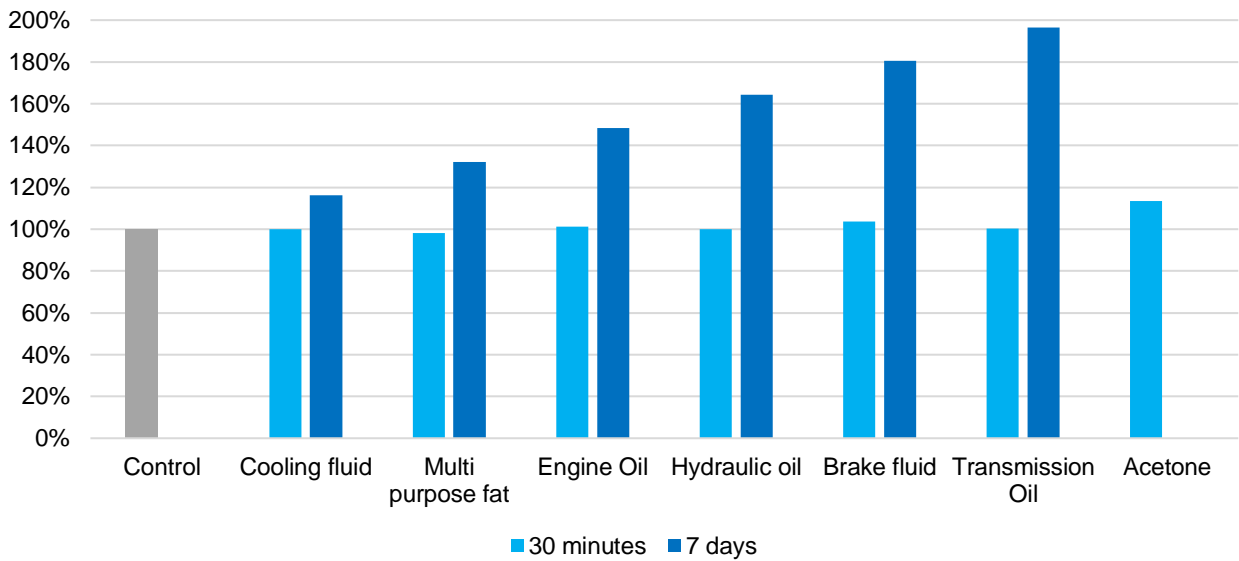


Figure 4 Change in weight in chemical fluid

Conclusion

The results of the performed tests (30 minutes and 7 days) on **Ultracur3D® EL 60** can be summarized in the table below.

Legend

= Change less than 10%; ↑↓ Change between 10%- 30%; ↑↓ Change higher than 30%

Ultracur3D® EL 60	30 minutes			
	Elastic modulus	Tensile strength	Elongation at break	Weight
Control	=	=	=	=
Cooling fluid	=	↓	↓	=
Multipurpose fat	=	=	=	=
Engine oil	=	=	=	=
Hydraulic oil	=	↓	=	=
Brake fluid	=	↓	↓	=
Transmission oil	=	↓	↓	=
Acetone	=	↓	↓	↑

Ultracur3D® EL 60	7 days			
	Elastic modulus	Tensile strength	Elongation at break	Weight
Control	=	=	=	=
Cooling fluid	=	↓	=	↑
Multipurpose fat	=	↓	=	↑
Engine oil	↓	↓	↓	↑
Hydraulic oil	=	↓	=	↑
Brake fluid	=	↓	↓	↑
Transmission oil	↓	=	=	↑
Acetone				

The data contained in this publication are based on our current knowledge and experience. They do not constitute an agreed contractual quality of the product and, in view of the many factors that may affect processing and application of our products, do not relieve processors from carrying out their own investigations and tests. The agreed contractual quality of the product at the time of transfer of risk is based solely on the data in the specification data sheet. Any descriptions, drawings, photographs, data, proportions, weights, etc. given in this publication may change without prior information. The customer and/or user is responsible to consider and respect all hazard and safety issues according to the MSDS of Ultracur3D® EL 60 and take, implement and/or install adequate measures and precautions to avoid any personal injuries, property damages and/or environmental pollution. Therefore, BASF3D Printing Solutions GmbH shall not be liable for any personal injury, property damages and/or environmental emissions arising out of or related to the testing, handling or usage, storage and possession of Ultracur3D® EL 60. It is the sole responsibility of the recipient of our product to ensure that any proprietary rights and existing laws and legislation are observed (02/2020)

Version 1.1