Chemical resistance test on

Ultracur3D® EPD 1086

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® EPD 1086. 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 D638 IV

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Mechanical testing

The immersion of 30 min in Cooling fluid and Acetone creates obvious decrease in all mechanical properties. The immersion for 30 min in the other fluids leads to a decrease in Elongation at break.
The test set immersed in Hydraulic oil for seven days is the most stable one. The immersion in Acetone leads to part failure. The test performed with cooling fluid shows a decrease in all mechanical properties. The other fluids lead to an increase in E modulus and tensile strength, while the Elongation at break decreases.

30 minutes

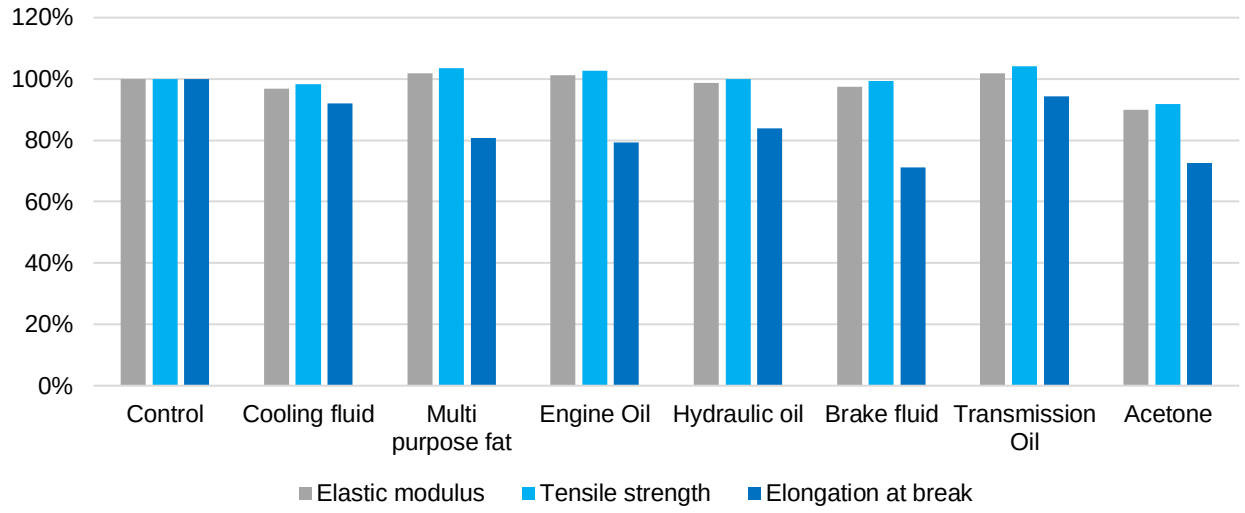

Figure 2 Change in mechanical properties in chemical fluid for 30 minutes

7 days

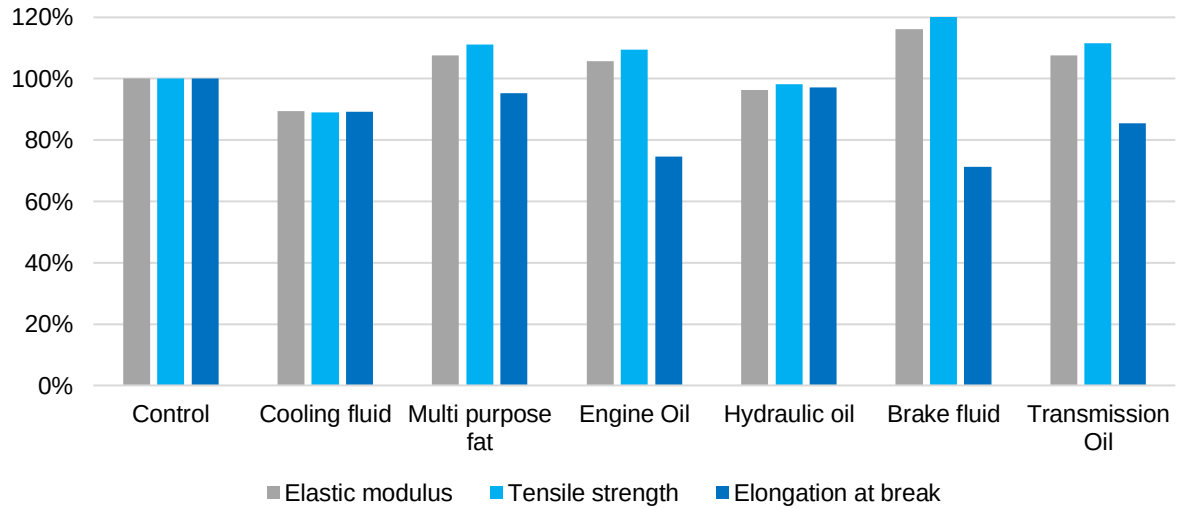

Figure 3 Change in mechanical properties in chemical fluid for 7 days

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Weight

Ultracur3D® EPD 1086 does not take up the test fluids as far as measurable. The immersion in Acetone for seven days leads to part failure.

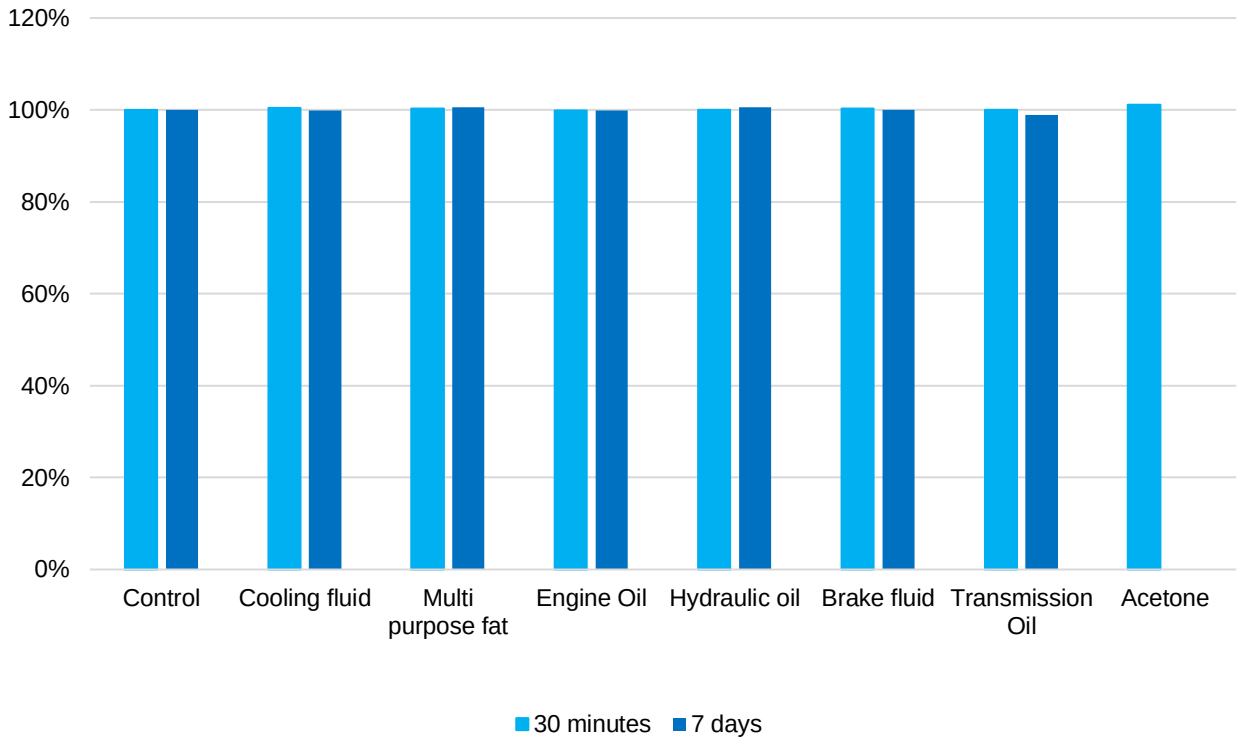

Figure 4 Change in weight in chemical fluid

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Conclusion

The results of the performed tests (30 minutes and 7 days) on **Ultracur3D® EPD 1086** can be summarized in the table below.

Legend

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

Ultracur3D® EPD 1086	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® EPD 1086	7 days			
	Elastic modulus	Tensile strength	Elongation at break	Weight
Control	=	=	=	=
Cooling fluid	↓	↓	↓	=
Multipurpose fat	=	↑	=	=
Engine oil	=	=	↓	=
Hydraulic oil	=	=	=	=
Brake fluid	↑	↑	↓	=
Transmission oil	=	↑	↓	=