Material Properties

Impact Toughness at Subzero Temperatures

Braskem FL900PP-CF Carbon Fiber Reinforced Polypropylene (PP) Filament

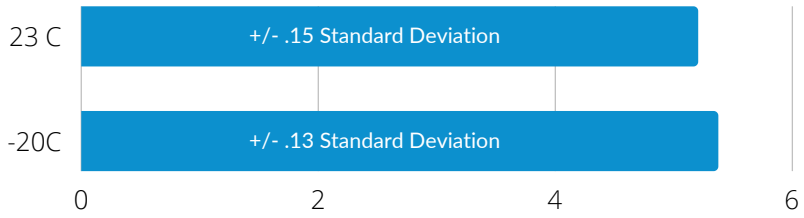
CHALLENGE

Material performance can diminish at subzero temperatures, becoming more brittle and prone to breakage. This presents significant challenges for industries that are looking for additive manufacturing material solutions for cold weather applications.

BRASKEM FL900PP-CF

Braskem Carbon Fiber reinforced polypropylene, FL900PP-CF was tested according to ASTM D3763 to determine impact toughness at subzero temperatures. The tests were conducted at 23C, 0C, and -20C, test results were recorded with a average standard deviation of 2.4%. The incorporation of carbon fiber to the formulation, increased overall cold weather toughness significantly over unfilled PP formulations.

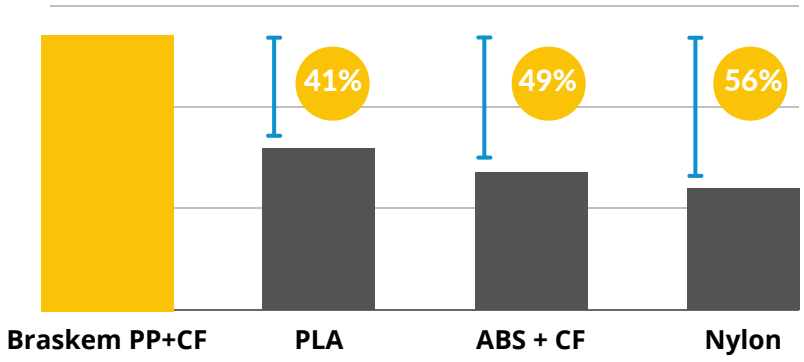
Impact Toughness FL900PP-CF at different temperatures (ft-lbf)



MATERIAL COMPARISON

Braskem FL900PP-CF was compared to 3 other commonly used materials for additive manufacturing using the same conditions. Braskem Carbon Fiber Polypropylene outperformed Nylon by 56% , ABS + CF by 49%, and PLA by 41%.

Impact Toughness Material Comparison at - 20 Celsius



Note: Impact Toughness defined by Puncture Energy at varying temperature ranges in (ft-lbf) according to test method ASTM D3763

At a glance

impact toughness of Braskem FL900PP-CF was tested at -20 degrees C to better understand material performance at subzero temperature conditions. The material demonstrated outstanding performance retaining up to 99% of it impact toughness relative to when measured at 23 degrees C.

Key Results

99%
Impact Toughness retention at -20C vs 23C

+56%
Impact Toughness relative to Nylon at -20C

Note: Information included on this document should be used for informational purposes only. Braskem does not guarantee any results presented in these case studies, Properties may vary based on print conditions and external environment

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