Fluon EA-2000

AGC

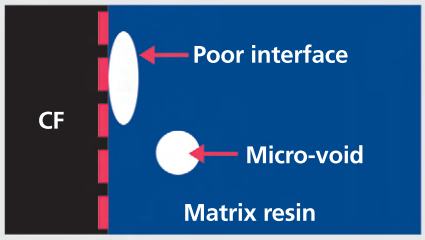
Functional Fluoropolymers for Sizing Agent of Carbon Fiber in CFRP/CFRTP

High heat engineered resins (*) used in CFRP/CFRTP require high temperature processing, which can degrade sizing agent chemistries employed by most carbon fibers. Outgassing as a result of thermal degradation will cause micro-voids at the polymer-fiber interface, decreasing the mechanical properties of the material.

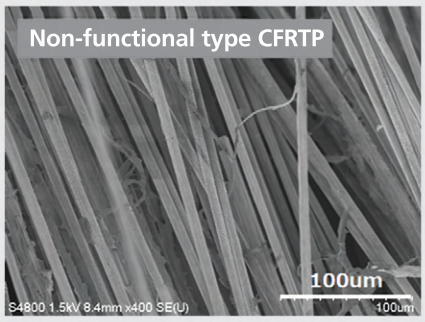
AGC's functional fluoropolymer technology can withstand the high processing temperatures of engineered resins, as well as improve the incorporation of carbon fiber within the polymer matrix.

Carbon Fiber – Polymer Interface

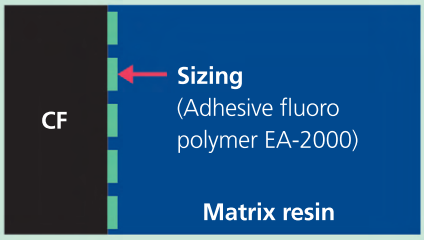
Conventional CFRP



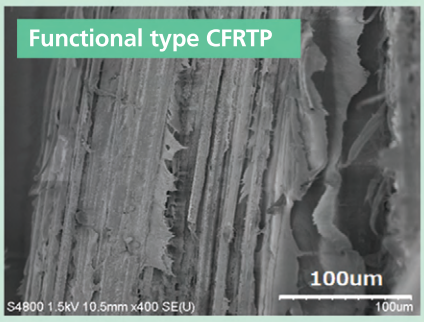
Sizing T stability: Poor
Fiber – polymer interaction: Low



CFRP w/ functionalized sizing agent



Sizing T stability: Excellent
Fiber – polymer interaction: High



CFRTP

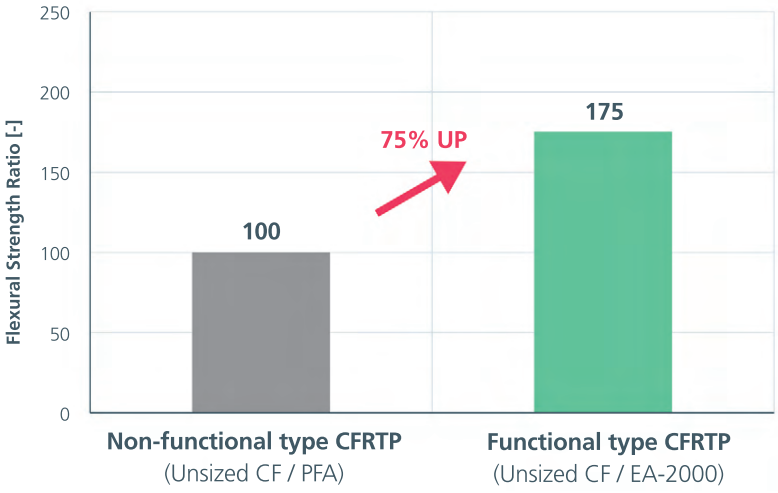
Chopped-CF composite

EA-2000 aqueous dispersion

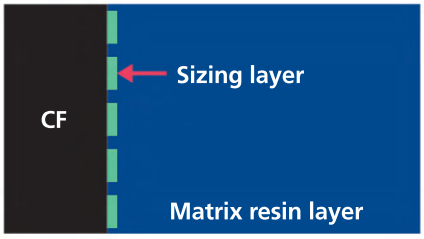
* High heat engineered resins:
PA, PAEK, PEKK, BMI, Cyanate ester resin, etc.

Improvement of Mechanical Properties By Using EA-2000

CFRTP made with unsized CF and functionalized fluoropolymer shows greatly improved flexural strength compared to non-functionalized polymer matrix. The functionality allows for improved CF incorporation.



* CFRTP was molded after removing sizing agent on CF under N2 / 450°C / 20min condition.



Sample structure

Adhesive Strength Towards Engineered Resins

EA-2000 shows strong adhesion to engineered resins.

Engineered Resin	Laminate Condition	Adhesive Strength [N/cm]	
		PFA	Adhesive PFA EA-2000
PEKK	370°C*12min*2.2MPa	4	13
BMI	180°C*6h => 243°C*6h	0	26
Cyanate Ester Resin	135°C*60min*0.6MPa => 250°C*120min*free stand	0	24
PI	340°C*1.5MPa*10min	0	13
PA9T	340°C*2MPa*10min (PA9T: semi-aromatic polyamide)	3	15

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