

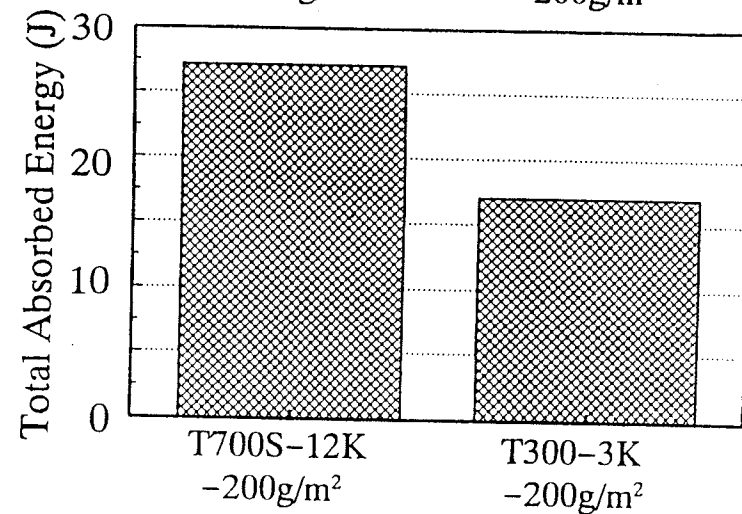
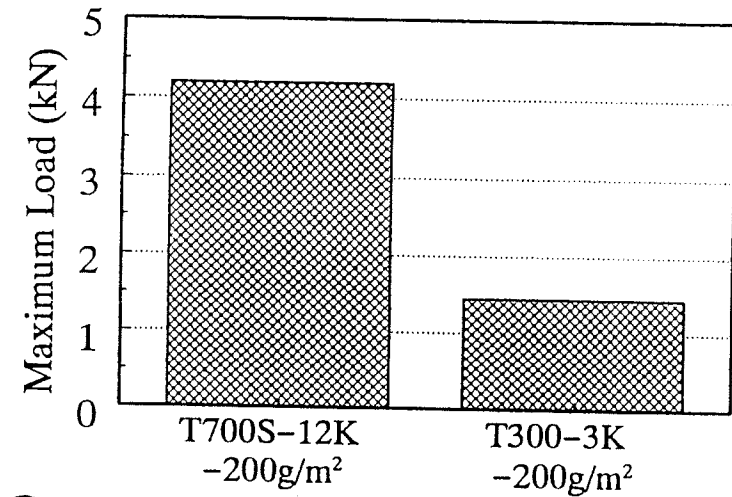
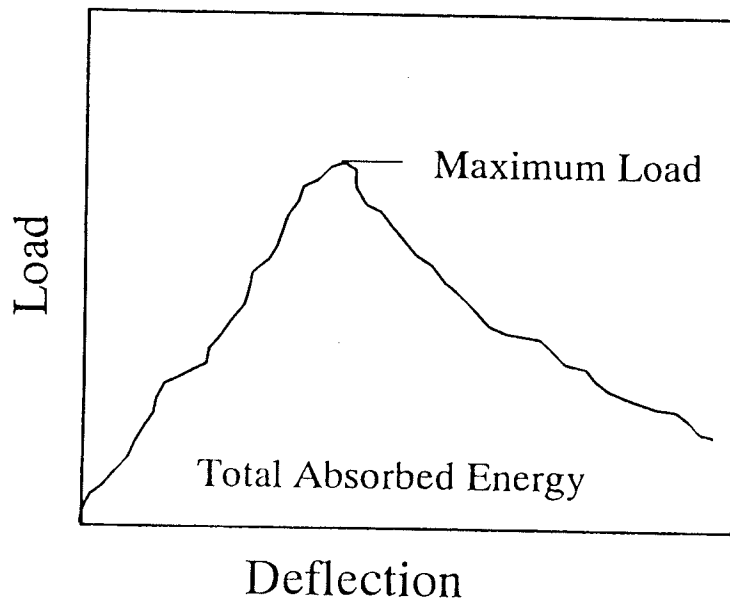
PENETRATION IMPACT TEST RESULTS

Resin; Epoxy Resin

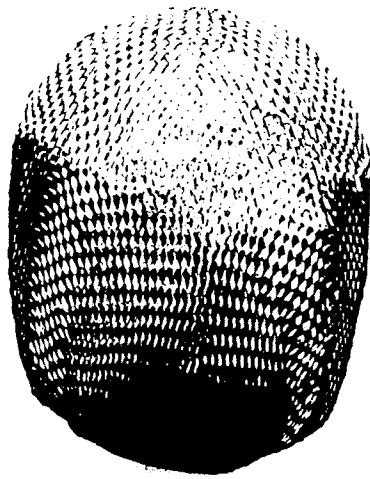
Process; Autoclave

Fiber Volume Fraction=55%

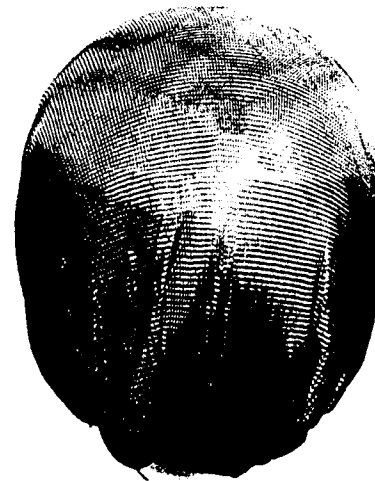
Impact Test Machine; Dynatup GRC8250



DRAPABILITY OF T700S-12K FABRIC



T700S-12K-200g/m² FABRIC

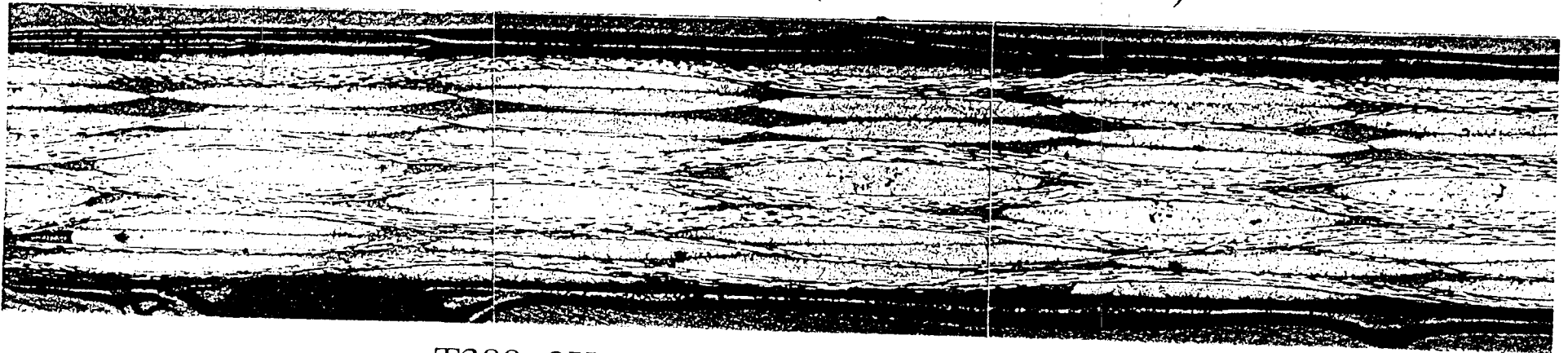


T300-3K-200g/m² FABRIC

CROSS-SECTIONAL VIEW OF FABRIC COMPOSITES

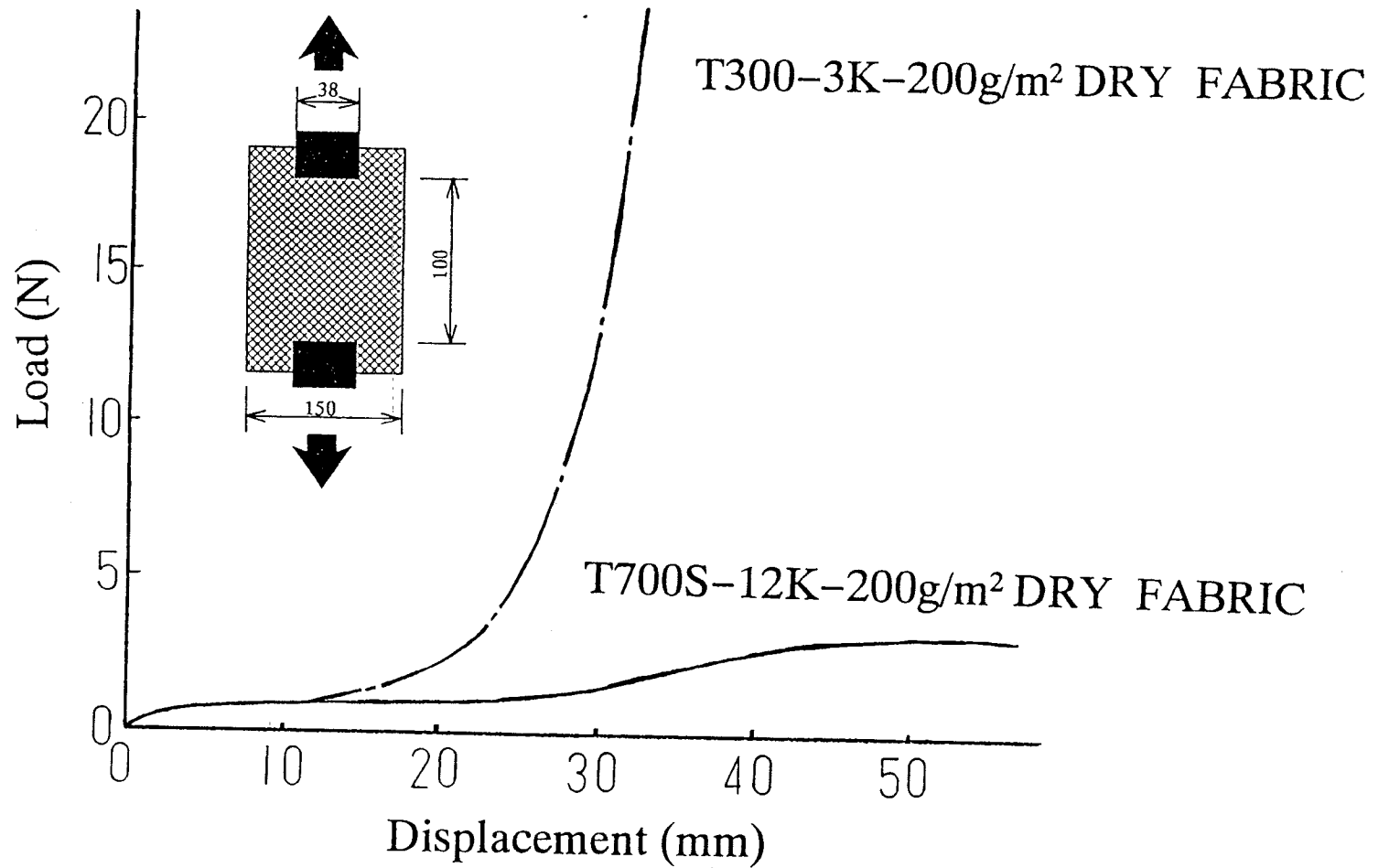


T700S-12K FABRIC (CRIMP ANGLE=3°)

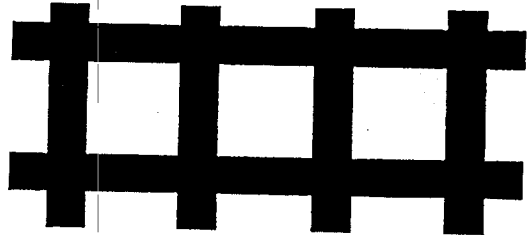
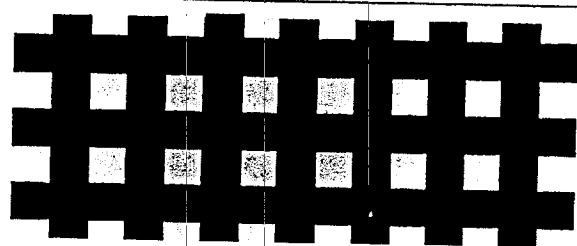
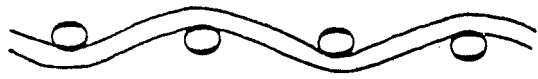



T300-3K FABRIC (CRIMP ANGLE=6°)

SHEAR DEFORMATION TEST



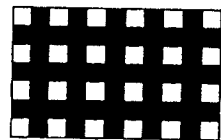
PROBLEM AREA IN 12K FABRIC SYSTEM

		Same Areal Weight	Same Cover Factor
Fabric Structure	Top View		
	Cross-Section View		
Problems		<ul style="list-style-type: none"> ● Decrease in Cover Factor*1 → Non-Uniform Composite 	<ul style="list-style-type: none"> ● Increase in Yarn Crimp Angle*2 → Lower Composite Properties ● Areal Weight Increase → Difficult Resin Impregnation ● Rigid Structure → Less Drapability

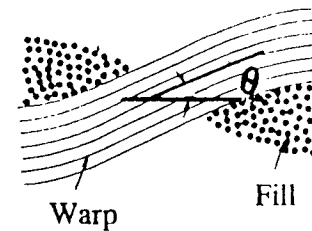


*1: Cover Factor: $[S1 - S2] / S1 \times 100$

S1 : Total Area
S2 : White Area

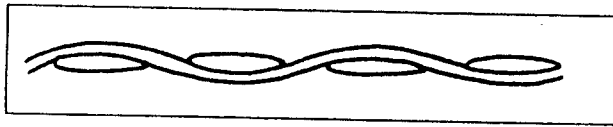


*2: Yarn Crimp Angle

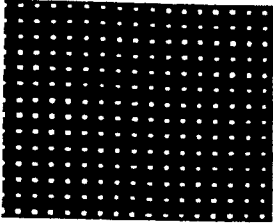
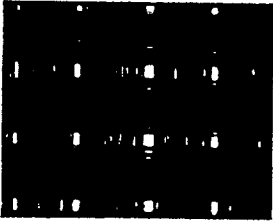
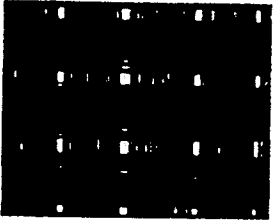

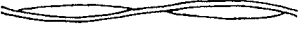
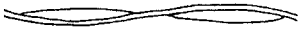


TORAYCA T700S-12K YARN

Yarn	T300-3K	T700S-12K
Tensile Strength (MPa)	3,530	4,900
Tensile Modulus (GPa)	230	230
Strain to Failure (%)	1.5	2.1

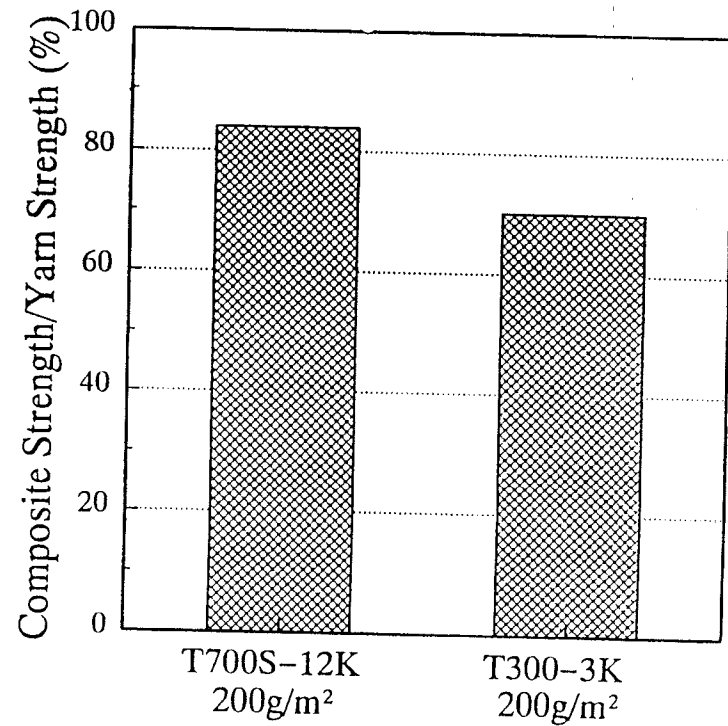
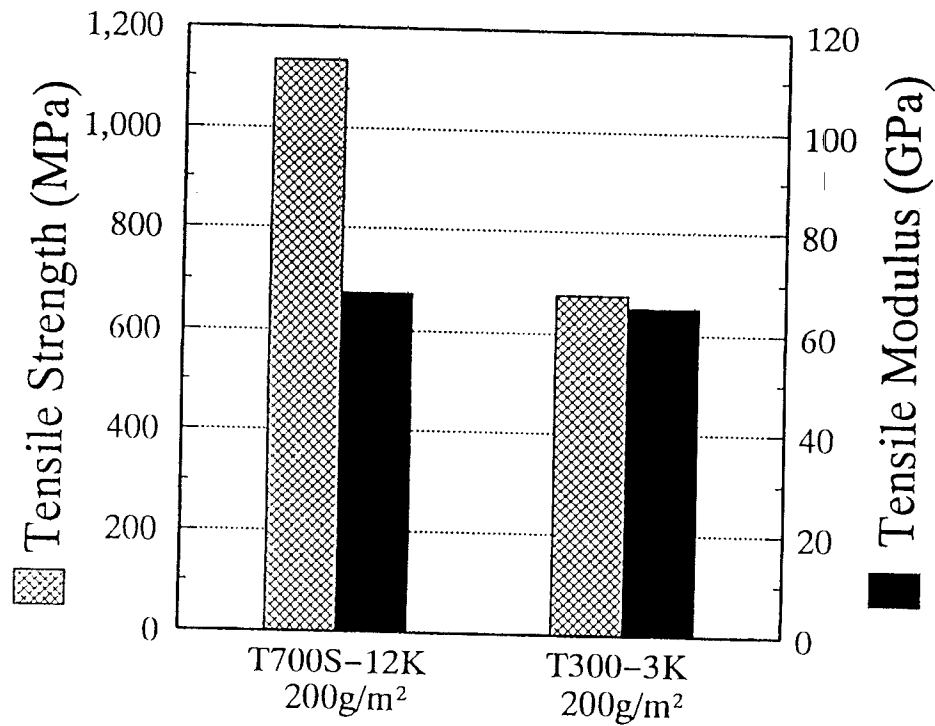


T700S-12K WOVEN FABRICS

	T300-3K -200g/m ²	T700S-12K -200g/m ²	T700S-12K -240g/m ²
Top View			
Cross-Section			
Fabric Thickness (mm)	0.24	0.20	0.25
Cover Factor (%)	97.4	99.8	99.3
Weave	Plain	Plain	Plain

TENSILE TEST RESULTS-(1)

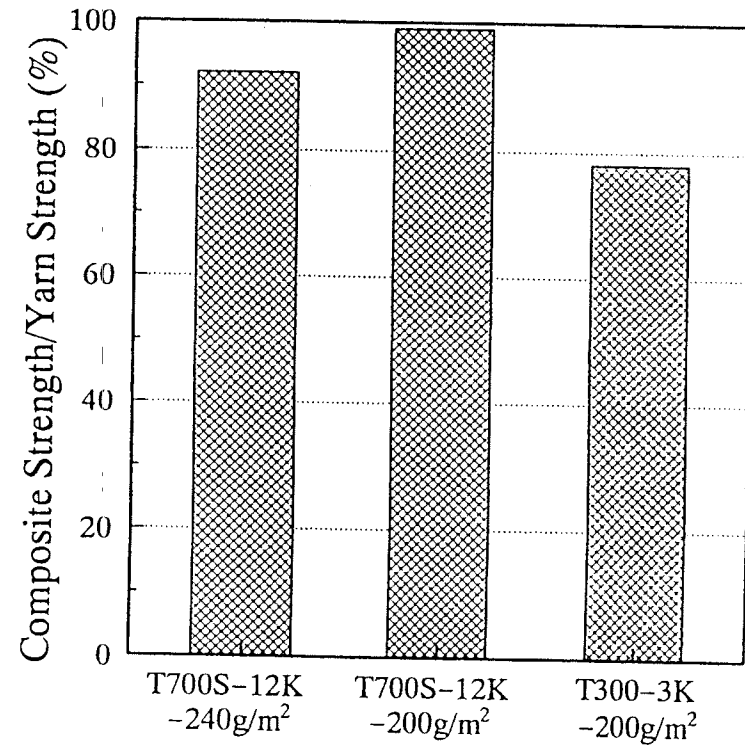
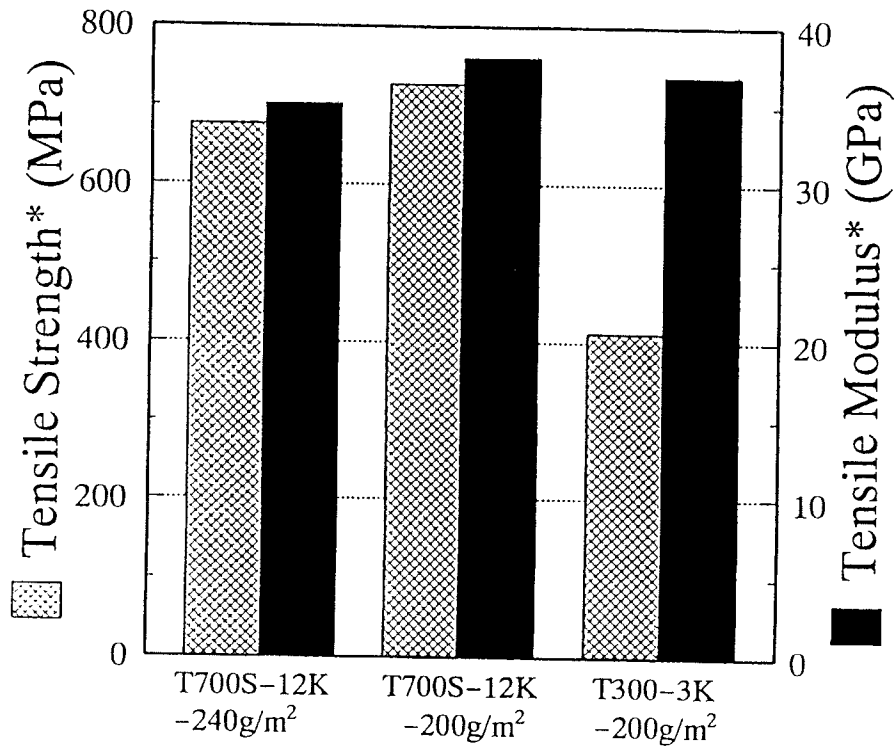
Resin ; Epoxy Resin Process ; Autoclave Fiber Volume Fraction=55%



TENSILE TEST RESULTS-(2)

Resin ; Vinylester Resin

Process ; Hand Lay-up



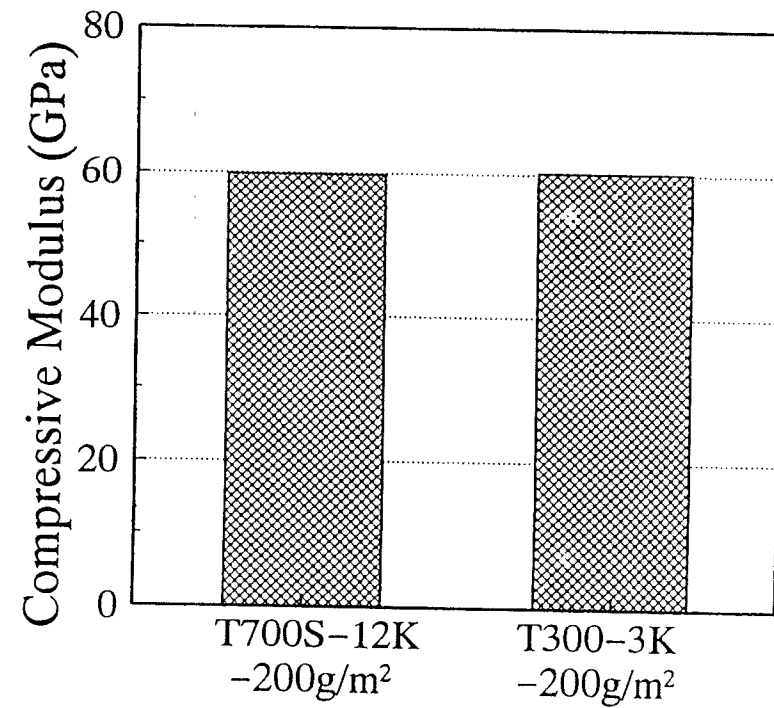
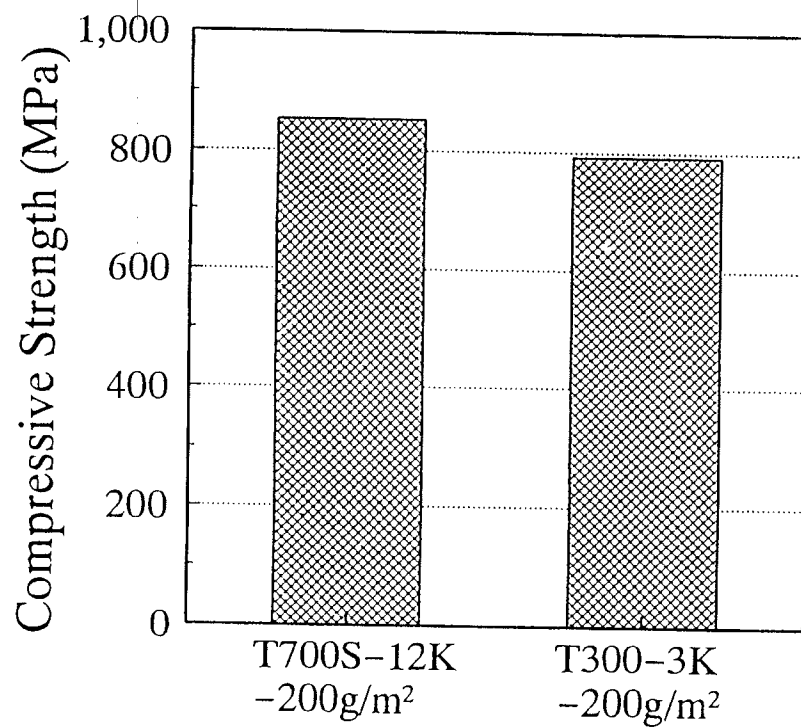
*;Normalized to Vf=30%

COMPRESSIVE TEST RESULTS

Resin;Epoxy Resin

Process;Autoclave

Fiber Volume Fraction=55%



CONCLUSIONS

- 1 . Newly developed T700S-12K fabric has the less fiber crimp structure and the higher cover factor compared to T300-3K fabric.
- 2 . The tensile and compressive strength of T700S-12K fabric composite are higher than T300-3K fabric composite.
- 3 . The impact resistance of T700S-12K fabric composite is also higher than T300-3K fabric composite.
- 4 . T700S-12K fabric offers improved drapability.