

**CHAPTER 10 QUARTZ FIBER COMPOSITES**

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**10.1 INTRODUCTION**

**10.2 QUARTZ - EPOXY COMPOSITES**

**10.3 QUARTZ - POLYESTER COMPOSITES**

**10.4 QUARTZ - BISMALEIMIDE COMPOSITES**

#### 10.4.1 Astroquartz II/F650 8HS data set description

##### Material Description:

Material: Astroquartz II/F650

Form: 8 harness satin weave fabric, fiber areal weight of 285 g/m<sup>2</sup>, typical cured resin content of 37%, typical cured ply thickness of 0.010 inches.

Processing: Autoclave cure; 375°F, 85 psi for 4 hours. Postcure at 475°F for 4 hours

##### General Supplier Information:

Fiber: Astroquartz II fiber is a continuous, high strength, low modulus ceramic fiber made of pure fused silica. Typical tensile modulus is  $10 \times 10^6$  psi. Typical tensile strength is 500,000 psi.

Matrix: F650 is a 350°F curing bismaleimide resin. It will retain light tack for several weeks at 70°F.

Maximum Short Term Service Temperature: 500°F (dry), 350°F (wet)

Typical applications: Primary and secondary structural applications, fire containment structures, radomes or any application where high strength and/or electrical properties are required.

**10.4.1 Astroquartz II/F650 8-harness satin weave\***

MATERIAL:	Astroquartz II/F650 8-harness satin weave			<b>Q/BMI Astroquartz II/F650 Summary</b>
PREPREG:	Hexcel AQII581/F650 8-harness satin weave			
FIBER:	J.P. Stevens Astroquartz II	MATRIX:	Hexcel F650	
T <sub>g</sub> (dry):	600°F	T <sub>g</sub> (wet):	T <sub>g</sub> METHOD:	
PROCESSING:	Autoclave cure: 375°F, 4 hours, 85 psig; Postcure: 475°F, 4 hours			

\* DATA WERE SUBMITTED BEFORE THE ESTABLISHMENT OF DATA DOCUMENTATION REQUIREMENTS (JUNE 1989). ALL DOCUMENTATION PRESENTLY REQUIRED WERE NOT SUPPLIED FOR THIS MATERIAL.

Date of fiber manufacture	Date of testing	
Date of resin manufacture	Date of data submittal	4/89
Date of prepreg manufacture	Date of analysis	1/93
Date of composite manufacture		

LAMINA PROPERTY SUMMARY

	75°F/A		450°F/A					
Tension, 1-axis								
Tension, 2-axis								
Tension, 3-axis								
Compression, 1-axis								
Compression, 2-axis								
Compression, 3-axis								
Shear, 12-plane								
Shear, 23-plane								
SB strength, 31-plane	S---		S---					

Classes of data: F - Fully approved, I - Interim, S - Screening in Strength/Modulus/Poisson's ratio/Strain-to-failure order.

MIL-HDBK-17-2E

\* DATA WERE SUBMITTED BEFORE THE ESTABLISHMENT OF DATA DOCUMENTATION REQUIREMENTS (JUNE 1989). ALL DOCUMENTATION PRESENTLY REQUIRED WERE NOT SUPPLIED FOR THIS MATERIAL.

		Nominal	As Submitted	Test Method
Fiber Density	(g/cm <sup>3</sup> )	2.17		
Resin Density	(g/cm <sup>3</sup> )	1.27		
Composite Density	(g/cm <sup>3</sup> )	1.78	1.73	
Fiber Areal Weight	(g/m <sup>2</sup> )	285		
Ply Thickness	(in)	0.0100	0.010	

LAMINATE PROPERTY SUMMARY



Classes of data: F - Fully approved, I - Interim, S - Screening in Strength/Modulus/Poisson's ratio/Strain-to-failure order.

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MATERIAL:		Astroquartz II/F650 8-harness satin weave				<b>Table 10.4.1(a)</b> <b>Q/BMI 285-8HS</b> <b>Astroquartz II/F650</b> <b>SB strength, 31-plane</b> <b>[0]12</b> <b>75/A, 450/A</b> <b>Screening</b>
RESIN CONTENT:	37 wt%	COMP: DENSITY:	1.73 g/cm <sup>3</sup>			
FIBER VOLUME:	51 %	VOID CONTENT:				
PLY THICKNESS:	0.010 in.					
TEST METHOD:	ASTM D 2344		MODULUS CALCULATION:			
NORMALIZED BY:	Not normalized					
Temperature (°F)	75	450				
Moisture Content (%)	ambient	ambient				
Equilibrium at T, RH						
Source Code	21	21				
$F_{31}^{sbs}$ (ksi)	Mean	6.41	6.56			
	Minimum	6.31	6.43			
	Maximum	6.50	6.72			
	C.V.(%)	1.06	1.69			
	B-value	(1)	(1)			
	Distribution	Normal	Normal			
	C <sub>1</sub>	6.41	6.56			
	C <sub>2</sub>	0.068	0.111			
	No. Specimens	5	5			
	No. Batches	1	1			
Approval Class	Screening	Screening				

(1) B-values are presented only for fully approved data.

**10.5 QUARTZ - POLYIMIDE COMPOSITES**

**10.6 QUARTZ - PHENOLIC COMPOSITES**

**10.7 QUARTZ - SILICONE COMPOSITES**

**10.8 QUARTZ - POLYBENZIMIDAZOLE COMPOSITES**

**10.9 QUARTZ - PEEK COMPOSITE**

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