



Memorandum

U.S. Department
of Transportation
**Federal Aviation
Administration**

Subject: ACTION: Policy on Acceptability of Temperature
Differential between Wet Glass Transition
Temperature (T_{gwet}) and Maximum Operating
Temperature (MOT) for Epoxy Matrix Composite
Structure

Date: FEB 18 1999

From: Manager, Regulations and Policy Branch
Small Airplane Directorate, ACE-111

Reply to
Attn. of: Lester Cheng
816-426-6941

To: SEE DISTRIBUTION


The Small Airplane Directorate received recent requests asking for clarification on the acceptability of the temperature differential between the wet glass transition temperature (T_{gwet}) and the maximum operating temperature (MOT) for epoxy matrix composite structure. We reviewed this matter and have developed the following policy. This policy is only applicable to Part 23 aircraft.

In general, a minimum of "50° Fahrenheit differential" will be used as a guideline in determining the acceptability of the temperature differential between T_{gwet} and MOT for epoxy matrix composite structure. This "50° Fahrenheit differential" is based on past service experience of epoxy matrix composite structure used in both civilian and military aircraft and is considered conservative.

If a temperature differential of less than 50° Fahrenheit is requested, more rigorous environmental testing studies, including some large scale tests for hot/wet conditions, are required to confirm the composite structure has adequate stiffness, strength, and durability. This approach should consider the stress levels and design detail of each specific application. Past experience indicates that large scale testing for hot/wet performance will generally result in lower environmental knockdown factors. Large scale tests also help identify if significant out-of-plane loads exist due to secondary loading effects for a particular composite design. Such weaknesses could be aggravated by poor environmental resistance to hot/wet conditions.

The method of intersecting slopes for the Dynamic Mechanical Analysis (DMA) storage modulus curve is recommended for the T_{gwet} measurement. Other equivalent methods of determining T_{gwet} may be used if approved by the FAA.

If you have any questions or need additional information, please contact Mr. Lester Cheng, at 816-426-6941.


David R. Showers

DISTRIBUTION:

Manager, Project Support Branch, ACE-112
Manager, Atlanta Aircraft Certification Office, ACE-115A
Manager, Chicago Aircraft Certification Office, ACE-115C
Manager, Anchorage Aircraft Certification Office, ACE-115N
Manager, Wichita Aircraft Certification Office, ACE-115W
Manager, Boston Aircraft Certification Office, ANE-150
Manager, New York Aircraft Certification Office, ANE-170
Manager, Seattle Aircraft Certification Office, ANM-100S
Manager, Denver Aircraft Certification Office, ANM-100D
Manager, Los Angeles Aircraft Certification Office, ANM-100L
Manager, Airplane Certification Office, ASW-150
Manager, Special Certification Office, ASW-190
Dr. Larry Ilcewicz, NRS-Advanced Composite Materials, ANM-115N