



AEROSPACE MATERIAL SPECIFICATION

AMS6885™/2

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Unidirectional Carbon Fiber Tape Epoxy Repair Prepreg, Vacuum Curing
Part 2 - Qualification Program for Fiber, Carbon Fiber Tape Prepreg, and Film Adhesive

RATIONALE

Provide a unidirectional carbon fiber tape epoxy repair prepreg capable of curing under vacuum for repair of carbon fiber reinforced epoxy structures. The prepreg system includes a film adhesive to be applied in a co-bonding process with the prepreg for solid laminate and sandwich bonding. AMS6885/2 defines the qualification test program.

FOREWORD

AMS6885/2 belongs to the Technical Specification system explained in AMS6885.

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1. SCOPE

AMS6885/2 gives specific information about the qualification program for unidirectional carbon fiber tape epoxy repair prepreg capable of curing under vacuum for repair of carbon fiber reinforced epoxy structures. The prepreg system shall include an epoxy film adhesive to be applied in a co-bonding process with the prepreg for solid laminate and sandwich bonding.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS6885	Unidirectional Carbon Fiber Tape Epoxy Repair Prepreg, Vacuum Curing, Part 0 - Introduction
AMS6885/1	Unidirectional Carbon Fiber Tape Epoxy Repair Prepreg, Vacuum Curing, Part 1 - General Requirements

2.2 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.pri-network.org.

PRI-QPL-AMS6885 Performance Review Institute - Qualified Products List of AMS6885

Individual Product Sheets (IPS) of Qualified Products, Appendix to PRI-QPL-AMS6885

2.3 Other Publications

Refer to Section 2 of AMS6885/1 for reference to all other documents listed within this part specification.

2.4 Definitions

Refer to AMS6885/1.

3. REQUIREMENTS

Refer to AMS6885/1 and the relevant Material Specification (MS).

4. QUALIFICATION

Refer to AMS6885/1. The qualification program is given in:

[Table 1](#) - Material qualification program for carbon fiber

[Table 2](#) - Base material batches and batch combinations for test

[Table 3](#) - Material qualification program for uncured carbon fiber tape prepreg - physical and chemical properties

[Table 4](#) - Material qualification program for uncured film adhesive - physical and chemical properties

[Table 5](#) - Material qualification program for cured carbon fiber tape prepreg - physical properties

[Table 6](#) - Material qualification program for cured neat film adhesive - physical properties

[Table 7](#) - Material qualification program for cured carbon fiber tape prepreg - cure cycle tolerance

[Table 8](#) - Material qualification program for composite - main properties

[Table 9](#) - Material qualification program for composite - fluid resistance properties

[Table 10](#) - Material qualification program for composite - design related laminate properties

[Table 11](#) - Material qualification program for composite - design related joint properties

[Table 12](#) - Material qualification program for composite - sandwich properties

[Table 13](#) - Material qualification program for cured adhesive - bondline properties

[Table 14](#) - Material qualification program for composite - shop trial and porosity

Additional information and requirements are in:

[Table 15](#) - Laminate, sandwich, and co-bonded panel specification

[Table 16](#) - Nomenclature of abbreviations

[Table 17](#) - Number of specimens per test

[Table 18](#) - Fluid soaking and humidity aging conditions

[Table 19](#) - Authorized ancillary materials

Table 1 - Material qualification program for carbon fiber

No.	Property	Number of Batches for Test
1.1	Tensile Impregnated Yarn	q3
1.2	Fiber Density	q3
1.3	Sizing Content	q3
1.4	Linear Density	q3
1.5	Filament Diameter	q3

NOTES:

See [Table 16](#) for nomenclature.

See [Table 17](#) for number of specimens per test.

Test methods as per AMS6885/1.

Table 2 - Base material batches and batch combinations for test

		Base Material Batches and Batch Combinations for Test				
Carbon Fiber Tape Prepreg	Prepreg Batch	1	2	3	4	5
	Carbon Fiber Batch	Fi1	Fi2	Fi3	Fi2	Fi3
	Resin Film Batch ⁽¹⁾	R1	R2	R3	R1	R2
Repair Film Adhesive Batch ⁽²⁾⁽³⁾		A1	A2	A3	-	-
Adherend Material A Batch ⁽⁴⁾		AMA1	-	-	-	-
Adherend Material B Batch ⁽⁴⁾		AMB1	-	-	-	-

⁽¹⁾ For qualification, three unique resin batches are required.

⁽²⁾ For joint test specimens (see [Tables 9](#) [test id 9.2], [11](#), and [12](#)) at least two film adhesive batches will be used. The specific combinations with the carbon fiber tape prepreg batches to be agreed between the manufacturer and the CACRC-QPG.

⁽³⁾ For tests on the repair film adhesive one or three batches are to be used as defined in the relevant tables (see [Tables 4](#), [6](#), and [13](#)).

⁽⁴⁾ The use of Adherent Material A and/or Adherent Material B for joint test specimens to be agreed between the manufacturer and the CACRC-QPG.

NOTES:

See [Table 16](#) for nomenclature.

See [Table 19](#) for Adherent Material A and Adherent Material B.

Table 3 - Material qualification program for uncured carbon fiber tape prepreg - physical and chemical properties

No.	Property	Storage Life ⁽¹⁾⁽²⁾⁽³⁾⁽⁸⁾	Tack Life/Work Life ⁽⁴⁾⁽⁵⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾	Number of Batches for Test
3.1	Mass per Unit Area	-	-	q5, s, r, p
3.2	Fiber Mass per Unit Area	-	-	q5, s, r, p
3.3	Resin Content	-	-	q5, s, r, p
3.4	Volatile Content ⁽⁹⁾	-	-	q5, s, r, p
3.5	Viscosity Profile ⁽¹⁰⁾ (Dynamic 2 °C/min)	-	-	q5, s, r, p
3.6	Viscosity Profile ⁽¹⁰⁾ (Nominal Cure Cycle)	-	-	q5, s, r, p
3.7	Gel Time (Isothermal) ⁽⁹⁾	-	-	q5, s, r, p
3.8	DSC - Uncured	0	0	q5, r, p
3.9	DSC - Uncured	0	1	q1
3.10	DSC - Uncured	1	0	q1
3.11	DSC - Uncured	1	1	q1
3.12	HPLC ⁽⁹⁾	-	-	q5, r, p
3.13	Infrared Spectroscopy ⁽⁹⁾	-	-	q5, r, p
3.14	Tack ⁽⁹⁾	0	0	q1
3.15	Tack ⁽⁹⁾	0	1	q1
3.16	Tack ⁽⁹⁾	1	0	q1
3.17	Tack ⁽⁹⁾	1	1	q1

⁽¹⁾ Minimum requirement for material storage life from the date of manufacture as indicated in the relevant Material Specification or as agreed between the manufacturer and the CACRC-QPG.

⁽²⁾ Storage life = 0.

Means: Material is at the beginning of its storage life.

Tolerance: (-0/+90) days from manufacturing date.

⁽³⁾ Storage life = 1.

Means: Material is at the end of its storage life.

Tolerance: (-0/+90) days from expiration date.

⁽⁴⁾ Minimum requirement for material work life as indicated in the relevant Material Specification or as agreed between the manufacturer and the CACRC-QPG.

⁽⁵⁾ Age material with backing paper prior to layup and bag (refer to AMS6885/1).

⁽⁶⁾ Work life = 0.

Means: Material is at the beginning of its work life.

Tolerance: Any number of days between 0 and 5.

⁽⁷⁾ Work life = 1.

Means: Material is at the end of its work life.

Tolerance: (-0/+5) days from end of work life.

⁽⁸⁾ Specific test intervals to be agreed between the manufacturer and the CACRC-QPG.

⁽⁹⁾ Specific test parameters to be agreed between the manufacturer and the CACRC-QPG.

⁽¹⁰⁾ Test to be performed on resin film.

NOTES:

See [Table 16](#) for nomenclature.

See [Table 17](#) for number of specimens per test.

See [Table 18](#) for aging conditions of uncured prepreg.

Test methods as per AMS6885/1.

Table 4 - Material qualification program for uncured film adhesive - physical and chemical properties

No.	Property	Storage Life ⁽¹⁾⁽²⁾⁽³⁾⁽⁸⁾	Tack Life/Work Life ⁽⁴⁾⁽⁵⁾⁽⁶⁾⁽⁷⁾⁽⁸⁾	Number of Batches for Test
4.1	Mass per Unit Area	-	-	q3, s, a
4.2	Volatile Content ⁽⁹⁾	-	-	q3, a
4.3	Adhesive Flow ⁽⁹⁾	-	-	q3
4.4	Viscosity Profile (Dynamic 2 °C/min)	-	-	q3, s, a
4.5	Viscosity Profile (Nominal Cure Cycle)	-	-	q3, s, a
4.6	Gel Time (Isothermal) ⁽⁹⁾	-	-	q3, s, a
4.7	DSC - Uncured	0	0	q3, a
4.8	DSC - Uncured	0	1	q1
4.9	DSC - Uncured	1	0	q1
4.10	DSC - Uncured	1	1	q1
4.11	HPLC ⁽⁹⁾	-	-	q3, a
4.12	Infrared Spectroscopy ⁽⁹⁾	-	-	q3, a
4.13	Tack ⁽⁹⁾	0	0	q1
4.14	Tack ⁽⁹⁾	0	1	q1
4.15	Tack ⁽⁹⁾	1	0	q1
4.16	Tack ⁽⁹⁾	1	1	q1

⁽¹⁾ Minimum requirement for material storage life from the date of manufacture as indicated in the relevant Material Specification or as agreed between the manufacturer and the CACRC-QPG.

⁽²⁾ Storage life = 0.

Means: Material is at the beginning of its storage life.

Tolerance: (-0/+90) days from manufacturing date.

⁽³⁾ Storage life = 1.

Means: Material is at the end of its storage life.

Tolerance: (-0/+90) days from expiration date.

⁽⁴⁾ Minimum requirement for material work life as indicated in the relevant Material Specification or as agreed between the manufacturer and the CACRC-QPG.

⁽⁵⁾ Age material with backing paper prior to layup and bag (refer to AMS6885/1).

⁽⁶⁾ Work life = 0.

Means: Material is at the beginning of its work life.

Tolerance: Any number of days between 0 and 5.

⁽⁷⁾ Work life = 1.

Means: Material is at the end of its work life.

Tolerance: (-0/+5) days from end of work life.

⁽⁸⁾ Specific test intervals to be agreed between the manufacturer and the CACRC-QPG.

⁽⁹⁾ Specific test parameters to be agreed between the manufacturer and the CACRC-QPG.

NOTES:

See [Table 16](#) for nomenclature.

See [Table 17](#) for number of specimens per test.

See [Table 18](#) for aging conditions of uncured film adhesive.

Test methods as per AMS6885/1