



WICHITA STATE
UNIVERSITY
NATIONAL INSTITUTE
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NMS 818/10 Rev D
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Carbon Fiber Tow, 620 Tensile Strength, 34.4 Tensile Modulus
(Supplier Product Designation: Tenax-J HTS40 E13)
(Old Designation: Tenax-J G30-500 HTA-7C EP03)

(for NMS 451/13 G30-500 3K plain weave fabric Solvay (Formerly Cytec)
MTM45-1 prepreg)

(for NMS 752/3 Park Aerospace Technologies Corp. (Formerly Nelcote)
E752 G30-500 3K PW)

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3 TECHNICAL REQUIREMENTS

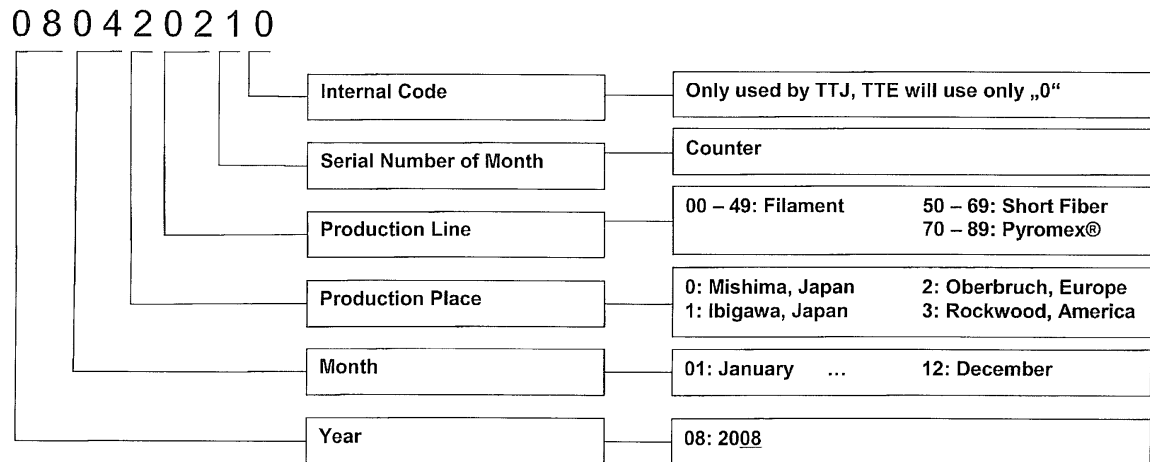
3.2.5 Splices

Splices are allowed for twisted tow (Style TT) only. UT and NT styles shall not be spliced. The frequency of carbon fiber tow splice shall be no more than two per pound.

3.2.9 Storage Life

Ambient storage life shall be 3 years from the date of fiber manufacture. The manufacturer shall not ship any material with less than 12 months of remaining storage life, unless specifically allowed by the purchaser.

Date of fiber manufacture (month and year) can be determined from the fiber lot number as follows:



For example, lot number 080420210 indicates that the fiber is manufactured in April 2008.

3.2.10 Carbon Fiber Lot (definition)

Carbon fibers formed during one essentially continuous, uninterrupted production run under the same steady-state process conditions using unlimited PAN precursor lots. Individual carbon fiber spools must be traceable to the PAN precursor lot. An interruption in the process of up to 72 hours is permitted, provided that another material was not produced on the equipment during the interruption. Production equipment setting may be fine-tuned by the manufacturer during the production of a fiber lot only if the manufacturer is familiar with the effects of the setting on the carbon fiber properties, and for the purpose of meeting the requirements of this specification and corresponding PCD only. The fine-tuned process set-points and as-measured values must be within PCD limits.

3.3 Properties

The carbon fiber tow product shall conform to the requirements of Table 1a or Table 1b.

Table 1a – Carbon Fiber Tow Properties (for NMS 818/10, Style NT, Grade 3K)

| Paragraph | Property | Requirements, Lot average or individual spool (see Note 1) | Test Method |
|-----------|---|---|------------------------------------|
| 3.3.1 | Tow Tensile Strength (ksi) | 550 (min. lot average) 495 (min. ind. spool) | 4.5.1 |
| 3.3.2 | Tow Tensile Modulus (Msi) | 31.8 to 33.8 (lot average) | 4.5.1 (see Note 3) |
| | | OR | 4.5.1 (see Note 4) |
| 3.3.3 | Percent Elongation | 1.63 (min. lot average) | 4.5.1 (see Note 3) |
| 3.3.4 | Density (g/cm ³) (see Note 2) | 1.73 to 1.79 (lot average) | 4.5.2 |
| 3.3.5 | Mass Per Unit Length (tex or g/km), without size | 196 to 204 (lot average) | 4.5.3 |
| 3.3.6 | Twist (turns/m) | NT 0.8 per inch maximum | Not required for lot acceptance |
| 3.3.7 | Sizing Content (wt. %) | 1.15 to 1.45 (lot average) | 4.5.5 |

Note 1: Individual spool requirements are specification limits used with AQL=1%. Lot acceptance test result report may contain lot average values only; supplier shall ensure that individual spool requirements are met. Additional individual spool requirements are listed in supplier PCD.

Note 2: Density test is on reduced sampling plan and exempted from AQL of 1 percent.

Note 3: Calculation of tensile modulus/elongation according to SACMA SRM16R-94.

Note 4: Calculation of tensile modulus/elongation according to Teijin Limited. (Formerly Toho Tenax) internal test method C01C70011.

Table 1b – Carbon Fiber Tow Properties (for NMS 818/10, Style NT, Grade 6K)

| Paragraph | Property | Requirements, Lot average or individual spool (see Note 1) | Test Method |
|-----------|---|--|------------------------------------|
| 3.3.1 | Tow Tensile Strength (ksi) | 600 (min. lot average) 520 (min. ind. spool) | 4.5.1 |
| 3.3.2 | Tow Tensile Modulus (Msi) | 31.8 to 33.8 (lot average) | 4.5.1 (see Note 3) |
| | | OR 33.0 to 35.0 (lot average) | 4.5.1 (see Note 4) |
| 3.3.3 | Percent Elongation | 1.78 (min. lot average) | 4.5.1 (See Note 3) |
| 3.3.4 | Density (g/cm ³) (see Note 2) | 1.73 to 1.79 (lot average) | 4.5.2 |
| 3.3.5 | Mass Per Unit Length (tex or g/km), without size | 392 to 408 (lot average) | 4.5.3 |
| 3.3.6 | Twist (turns/m) | NT 0.8 per inch maximum | Not required for lot acceptance |
| 3.3.7 | Sizing Content (wt. %) | 1.15 to 1.45 (lot average) | 4.5.5 |

Note 1: Individual spool requirements are specification limits used with AQL=1%. Lot acceptance test result report may contain lot average values only; supplier shall ensure that individual spool requirements are met.

Note 2: Density test is on reduced sampling plan and exempted from AQL of 1 percent.

Note 3: Calculation of tensile modulus/elongation according to SACMA SRM16R-94.

Note 4: Calculation of tensile modulus/elongation according to Teijin Limited (Formerly Toho Tenax) internal test method C01C70011.

4.4 Change Control Approval (additional requirement)

To participate in change control management and be notified when changes occur to this specification and/or PCD, end-users must provide the appropriate contact details (name, title, company, address, e-mail, and phone) to NCAMP, Wichita State University – NIAR, 1845 Fairmount, Wichita, KS 67260-0093.

QUALIFIED PRODUCTS LIST

| Supplier Product Designation | Supplier Name, Location, and Line Number | Date Qualified | Specification Callout |
|--|--|----------------|--------------------------------|
| Tenax-J HTS40 E13 3K 200tex (Old designation: Tenax-J G30-500 3K HTA-7C EP03) | Supplier Name: Teijin Limited (Formerly Toho Tenax America, Inc.) Production Location: Mishima Plant 234 Kamitogari Nagaizumi-cho Sunto-gun Mishima, Shizuoka 411-8720 Japan Line Number: 5 Only | July 2, 2009 | NMS 818/10, Style NT, Grade 3K |
| Tenax-J HTS40 E13 6K 400tex (Old designation: Tenax-J G30-500 6K HTA-7C EP03) | Supplier Name: Teijin Limited (Formerly Toho Tenax America, Inc.) Production Location: Mishima Plant 234 Kamitogari Nagaizumi-cho Sunto-gun Mishima, Shizuoka 411-8720 Japan Line Number: 5 Only | July 2, 2009 | NMS 818/10, Style NT, Grade 6K |