

TECHNICAL DATA



TENCATE ADVANCED COMPOSITES

MS-4J

PRODUCT TYPE

280°F (138°C) Fire Retardant Standard Modulus Compression Molding System

SHELF LIFE

6 months at 0°F (-18°C)

FEATURES

- FAR 25.853 (a) Appendix F part 1(a) (i) compliant
- Meets 60 second vertical burn
- Meets 2.5 in/min horizontal burn

PRODUCT DESCRIPTION

MS-4J is a 1" carbon fiber/epoxy resin compression molding system with good flame retardant (FR) resistance. MS-4J is an excellent high performance carbon fiber molding compound developed for use in non-OSU critical aircraft interior components. MS-4J meets all current aircraft FST requirements. In addition, it has excellent out time stability and processes very well in medium to large parts. It has strength typical of similar molding systems.

MS-4J PHYSICAL PROPERTIES

Chop Length 1 in. (25.4 mm)*

Density 1.48-1.58 g/cc

Tg (by DSC)..... 375°F (191°C) Post Cured at 350°F (177°C)

*Other lengths may be available.

MS-4J MECHANICAL PROPERTIES.

Properties	Condition (RTD, ETD, ETW)	Method	Results	
Tensile Strength 0°	RTD	ASTM D 3039	50.5 ksi	348.0 MPa
Tensile Modulus 0°	RTD	ASTM D 3039	9.6 Msi	66.1 GPa
Flexural Strength 0°	RTD	ASTM D 6272	101.9 ksi	703 MPa
Flexural Modulus 0°	RTD	ASTM D 6272	7.4 Msi	51.0 GPa

- All items are net molded coupons unless noted.
- All properties based on an as tested fiber volume of 48-50%
- Actual molding technique and conditions, fiber length, and part geometry may affect properties obtained.
- Data shown for 1 inch (25.4 mm) length material, properties will generally be lower for ½ inch (12.7 mm) and/or ¼ inch (6.35 mm).
- Above values derived after post cure of 350°F/177°C for 2 hours.
- This product does not meet the OSU Heat release values of 65/65. Actual tested results were 150/120.

FAR 25.853 TEST RESULTS

60 Second Vertical Burn

	REQT	MS-4J
Time	< 15 seconds	5 seconds
Burn Length	< 6 inches	1.8 inches
Extinguish Time	< 3 seconds	0 second

FAA smoke density - Pass
NBS smoke density - Pass

PROCESS PARAMETERS

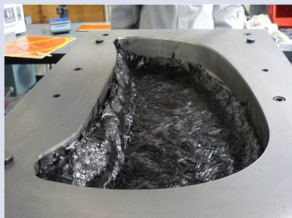
- * Pre-weigh the desired amount of molding compound (the charge).
- * Pre-heat the charge to 160°F ± 10°F (71°C ± 8°C) in an oven for 10 minutes. Form the charge to approximately fit the cavity. Place the charge into the cavity.
- * Cure temperature: 285°F ± 10°F (141°C ± 5.6°C). Pinch pressure: 250 psi for 15-30 seconds. Close mold to 2,000 psi, hold for 30 minutes depending on the part thickness.
- * Post cure at 350°F/177°C for 2 hours for full properties.

TECHNICAL DATA



TENCATE ADVANCED COMPOSITES

MS-4J



Revised 04/2013

All data given is based on representative samples of the materials in question. Since the method and circumstances under which these materials are processed and tested are key to their performance, and TenCate Advanced Composites USA, Inc. has no assurance of how its customers will use the material, the corporation cannot guarantee these properties.

Page 2 of 2

MS-4J_DS_042913

BMC MOLDING GUIDELINES:

1. Pre-weigh the desired amount of molding compound
2. Pre-heat the molding compound at $160^{\circ}\text{F} \pm 10^{\circ}\text{F}$ ($71^{\circ}\text{C} \pm 5.5^{\circ}\text{C}$) for 10 minutes
3. Form a mold charge to approximately fit the mold cavity
4. Place the charge in the mold cavity
5. Cure: $280\text{-}310^{\circ}\text{F}$. Pinch pressure 250 psi for 15-30 seconds.
Close mold to 2000 psi for 15-30 minutes depending on part thickness.
6. Post cure at 350°F / 177°C for 1-2 hours.

TROUBLE SHOOTING:

BLISTERING OR BUBBLES:

- Check mold surface temperature
- Increase molding pressure
- Check for moisture in the material

CRACKS OR STRESS MARKS:

- Check mold surface temperature
- Check cure time
- Clean mold surface and re-apply mold release
- Check ejection pressure, slow down ejection

FLOW MARKS:

- Close press sooner after charge has been placed in the cavity
- Increase press closure speed
- Check mold surface temperature

RESIN STARVATION:

- Check material out-time and staging temperature, Keep charge material covered and in plastic bags
- Adjust charge weight
- Clean mold surface and re-apply mold release

VOIDS:

- Check charge set-up, shape and weight
- Check mold surface temperature
- Check pre-heat time and temperature
- Check press closure time
- Clean mold surface and re-apply mold release

THICK PART – UNEVEN DISTRIBUTION OF MATERIAL

- Pre-consolidate thick sections
- Spread molding compound in measured increments
- Evaluate if press capacity is large enough for even pressure across part

GENERAL NOTES:

Note that 1", 1/2", and 3/4" material will be slightly different with the longer chop length showing as bulkier than the shorter chop lengths. Generally the material does not brick up (unless exposed to heat or warmth) and is typically free flowing as received once broken free of the packaging. Some centering or clumping is not uncommon, however when cool, the material should crumble out of the packaging. The bulk volume of the uncured uncompressed material is ~5X that of the compressed/cured part.

When pre-heated, a pre-formed charge will shrink maybe 10% if no pressure of any kind is applied other than gravity. It may debulk down 20-30% if pressure is applied, even hand pressure.

- The calculated cured density of the material is 1.56 g/cc.

- A 3 lb. bag of 1" material will measure out to a football shape when in a bag of ~12"x10"x5".

- This loosely calculates to a 10 to 1 ratio, however the bagged material is not rectangular in shape.

TENCATE ADVANCED COMPOSITES

18410 Butterfield Blvd.
Morgan Hill, CA 95037 USA
Tel: +1 408 776 0700
Fax: +1 408 776 0107

2450 Cordelia Road
Fairfield, CA 94534 USA
Tel: +1 707 359 3400
Fax: +1 707 359 3495

Amber Drive, Langley Mill
Nottingham, NG16 4BE UK
Tel: +44 (0)1773 530899
Fax: +44 (0)1773 768687

G. van der Muelenweg 2
7443 PV Nijverdal NL
Tel: +31 548 633 933
Fax: +31 548 633 299

www.tencate.com
www.tencateadvancedcomposites.com
www.tencateindustrialcomposites.com
info@tcac-usa.com (USA)
advancedcomposites.europe@tencate.com (Europe)