AZON SU 311-19T

Structural Thermal Barrier Polymer

Product description

The Azon SU 311-19T thermal barrier polymer is spicifically designed to work in conjunction with today's high-performance finishes. The two components consist of a reactive resin and a polymeric isocyanate. Combined in the prescribed ratio, they react to become a strong insulating polymer specially formulated to provide the shear and structural strength, and insulating properties required in the manufacture of thermal barrier aluminum extrusions. The insulating properties exceed all commercial thermal barrier products. The cured thermal barrier polymer resists fracturing during normal fabrication and exhibits all end-use properties as tested per American Architectural Manufacturers Association (AAMA) and industry specifications.

Table 1: Physical properties of uncured materials

	13-302A A-ISO	SU 311-19T B-Resin	Measurement
Color	dark brown	black	
Specific gravity	1.237 ± 0.006	1.078 ± 0.003	
Density	1.237 (10.32)	1.074 ± 0.010 (8.95 ± 0.10)	g/cm³ (lb/gal)
Viscosity	205 ± 30	950 ± 100	centipoise
Mix ratio	70	100	by volume
Mix ratio	80	100	by weight

Table 2: Processing conditions of materials

	Value	Measurement
Hand gel time (100 gram sample)*	24 ± 3	seconds
Machine gel time (100 gram sample)*	16 ± 3	seconds
Minimum debridging time**	5	minutes
Recommended pour temperature of chemicals and metal	25 ± 5 77 ± 10	degrees Celsius degrees Fahrenheit

All mixing and tests were conducted at 25°C (77°F) unless otherwise noted.

*Gel time may alter slightly with variation in ambient and chemical temperatures.

**Minimum debridging time will vary depending on the shape and size of the extrusion and cavity and on the curing conditions. Measurements should be taken to ensure that the hardness has reached Shore D 65 before debridging. Refer to Table 3 for optimal hardness value.

Table 3: Performance characteristics of cured material (two hours at 70°C [158°F])

	SI	IP	Test method
Tensile strength	38 ± 7 N/mm²	5,500 ± 1,000 psi	ASTM D638
Elongation at break	50 ± 15%	50 ± 15%	ASTM D638
Modulus of elasticity	1,655+ N/mm²	240,000+ psi	ASTM D638
Notched izod impact	85.4 ± 26 J/m	1.60 ± 0.5 ft*lbf/in	ASTM D256
Thermal conductivity K-factor	0.12 W/m-K	0.84 Btu-in/(hr-°F-ft²)	ASTM C518
Heat distortion temperature at 0.46 MPa (66 psi)	65° ± 10°C	149 ± 20°F	ASTM D648
Coefficient of linear thermal expansion	1.68 x 10^{-4} cm/cm°C	9.34 x 10^{-5} in/in°F	ASTM D696
Mixture density	1.141 g/cm³	71.3 lb/ft³	ASTM D1622
	Value		
Hardness	77 ± 3	Shore D	ASTM D2240

Note: The test data herein stated are typical values, which may be used as a guideline in evaluating this material for its intended use. However, because of the variations in testing methods and curing conditions, it is not intended that this information be used as specification criteria. We recommend that polymer properties be tested on a regular basis to ensure that both chemicals and machinery are meeting the requirements of the thermal barrier system.

Adhesion and dry shrinkage

Azon SU 311-19T polyurethane is a high strength structural polymer with thermal transmission properties of 0.84 Btu-in/(hr-°F-ft²) 0.12 W/m-K. Care must be taken to ensure that the pour and debridge cavity has a proper finish for the application of the polyurethane. Dirt, grease, incomplete paint pretreatment, excessive paint overspray, poor rinsing and other factors can adversely affect adhesion and should be controlled during the processing and handling of the unfilled extrusions. Thus, prior to the selection of the thermal barrier material, please take into careful consideration the finish on the aluminum substrate. Azon recommends AAMA thermal cycle testing be performed on the combination of thermal barrier and finish to ensure that adhesion will be maintained.

The adhesion properties of thermal barrier chemicals remains primarily a function of the surface to which they are applied. To ensure a secure bond, Azon highly recommends the use of a mechanical lock.

General

Azon SU 311-19T polyurethane fabricates well. It will accept most commonly used manufacturing techniques, however, drilling and milling are recommended over punching. Notching into the center of a poured cavity should be avoided, if possible, to lessen the danger of establishing leak paths in the design. Special caution should be observed in fabricating and handling in temperatures below 13°C (55°F) as the impact resistance maybe reduced.

Azon SU 311-19T is formulated for rapid curing. It has excellent heat distortion temperatures. The filled and debridged extrusions should be handled with care after initial fabrication since the polyurethane may not reach the ultimate properties for seven days when stored at ambient temperatures 25°C (77°F).

Processing

Care must be taken to avoid debridging the extrusions before the durometer hardness reaches Shore D 65. **IMPORTANT:** Failure to reach Shore D 65 may cause distortion and or a safety problem since the partially debridged sample may be compressed by the drive wheels of the debridge saw and create a kickback condition directly inline behind the milling blade.

As with all thermal barrier polymers, the reactivity and curing of Azon SU 311-19T can vary slightly with the temperature of the chemicals and the aluminum. It is recommended that the chemicals and extrusions be maintained at 25±5°C (77±10°F) for proper curing. Metal temperature should be maintained at a minimum of 18.3°C (65°F) for proper curing of the polymer.

Processing above or below recommended temperatures may result in processing, fabrication and distortion concerns for the manufacturer.

Azon SU 311-19T is not to be used for any other applications unless it is approved by written consent from Azon.

Storage and handling

Azon thermal barrier components are very stable materials when properly handled. To avoid problems, it is important to understand that these materials are sensitive to moisture. Containers of the components must be stored in a dry area where the temperature range does not fall below 10°C (50°F) and does not exceed 37°C (100°F) for prolonged periods.

The expected shelf life of Azon chemical products is 12 months. When properly stored in unopened, sealed containers, the shelf life is indefinite. It is important to observe good inventory control by using the first in, first used practice.

When it becomes necessary to remove supply lines, always add dry nitrogen or dry air (dew point of less than -40°C [-40°F]) when the partially full container is resealed to protect the contents from moisture.

Disposal

Care should be taken to protect our environment. The user of this product has the responsibility to dispose of unused material or residue in compliance with local governmental guidelines for the disposal of nonhazardous and hazardous waste.

Health and safety

Safety data sheets and product labels must be reviewed prior to use or handling the material. Ordinary hygienic principles, such as washing the compound from the hands before eating or smoking, should be observed. Hands should be washed with a waterless cleaner followed by soap and water. Avoid breathing of vapors, prolonged contact with the skin, contact with open breaks in the skin and ingestion. Use with adequate ventilation.

Ordering

To place orders or for pricing information, please contact Azon customer support at 1.800.788.5942.

Technical service

Please contact the AZO/Tec® department for technical assistance and a review of thermal barrier cavity sizes, locations and mechanical lock recommendation. Through AZO/Tec, Azon will provide analyses and recommendations to improve existing and new thermal barrier products for optimal thermal and structural performance for field use.

Cavity design

The design of the cavity in an aluminum extrusion should conform to the AAMA TIR-A8-16 guidelines depicted on the next page in Figure 1. The AZO/Tec® design and simulation team aids customers with the technical design of structural and energy-efficient fenestration systems by providing thermal simulation studies and a range of design functions.

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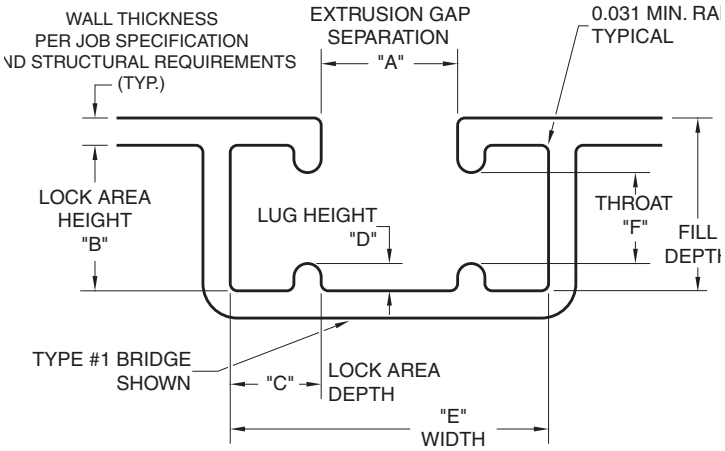
Product Data Sheet

Figure 1: Cavity recommendations



Cavity data

Standard designation	"A"	"B"	"C"	"D"	"E"	"F"	Area mm² (in²)	Volume ml/m (in³/ft)
AA	5.18 (0.204)	6.86 (0.270)	2.79 (0.110)	1.02 (0.040)	10.77 (0.424)	4.83 (0.190)	70.96 (0.110)	71 (1.320)
BB	6.35 (0.250)	7.14 (0.281)	4.06 (0.160)	1.14 (0.045)	14.48 (0.570)	4.85 (0.191)	100.65 (0.156)	101 (1.872)
CC	6.35 (0.250)	7.92 (0.312)	4.78 (0.188)	1.27 (0.050)	15.90 (0.626)	5.38 (0.212)	123.23 (0.191)	123 (2.292)
DD	7.92 (0.312)	8.89 (0.350)	5.49 (0.216)	1.57 (0.062)	18.90 (0.744)	5.74 (0.226)	165.81 (0.257)	166 (3.084)
EE	9.53 (0.375)	9.53 (0.375)	5.74 (0.226)	1.57 (0.062)	21.01 (0.827)	6.38 (0.251)	199.35 (0.309)	199 (3.708)
Conceptual designation								
FF	11.10 (0.437)	11.10 (0.437)	6.68 (0.263)	1.85 (0.73)	24.49 (0.964)	7.39 (0.291)	279.35 (0.433)	279 (5.196)
GG	11.54 (0.453)	11.54 (0.453)	6.93 (0.273)	1.91 (0.075)	25.40 (1.000)	7.67 (0.302)	299.35 (0.464)	300 (5.568)
HH	12.70 (0.500)	9.53 (0.375)	5.74 (0.226)	1.57 (0.062)	24.18 (0.925)	6.35 (0.250)	240.00 (0.372)	240 (4.464)
II	12.70 (0.500)	12.70 (0.500)	7.65 (0.301)	2.11 (0.083)	28.00 (1.102)	8.48 (0.334)	364.51 (0.565)	365 (6.780)
JJ	19.05 (0.750)	19.05 (0.750)	11.48 (0.452)	3.18 (0.125)	41.99 (1.653)	12.70 (0.500)	820.64 (1.272)	821 (15.264)
KK	25.40 (1.000)	25.40 (1.000)	15.29 (0.602)	4.24 (0.167)	56.00 (2.205)	16.94 (0.667)	1,458.71 (2.261)	1,459 (27.132)

NOTES:

AA - EE STANDARD AAMA CAVITY SIZES

FF - KK SCALED VARIATION OF AAMA POCKETS FOR WIDTH "E"