



MATERIAL PROPERTY TEST REPORT

Test Standard: Subaru TS346-05-056 & TS420-00-002 (2015)
Material Type: Expanded Polypropylene Foam HB Series
Testing Completed & Certified by: MGA Labs. Greer, SC, USA (A2LA Cert. 850.02)

Certified MGA Ref#	C15A9-058.3				C15A9-058.1				C15A9-058.2								
Physical Property Data	(g/cm³)				(g/cm³)				(g/cm³)								
	Density				Density				Density								
	0.025				0.03				0.039								
	Density Tested				Density Tested				Density Tested								
	0.028				0.033				0.039								
Compression As Received	Spec (Mpa)	Tolerance	Initial Value	Status	Spec (Mpa)	Tolerance	Initial Value	Status	Spec (Mpa)	Tolerance	Initial Value	Status					
	35%	0.19	±15%	0.16	Pass	35%	0.20	±15%	0.18	Pass	35%	0.34	Pass				
	50%	0.24		0.20	Pass	50%	0.25		0.24	Pass	50%	0.40	0.34	Pass			
	65%	0.32		0.28	Pass	65%	0.37		0.34	Pass	65%	0.53	0.46	Pass			
Recovery Ratio	88% min		96.88%		Pass	88% min		96.21%		Pass	82% min		96.09%		Pass		
Compression After Heat Resistance and Aging 240Hrs at 80C	MPa				MPa				MPa								
	35%	0.16	±10%	0.15	Pass	35%	0.18	±10%	0.18	Pass	35%	0.29	±10%	0.263	Pass		
	50%	0.20		0.20	Pass	50%	0.24		0.23	Pass	50%	0.34		0.32	Pass		
	65%	0.28		0.29	Pass	65%	0.34		0.33	Pass	65%	0.46		0.42	Pass		
Recovery Ratio	88% min		94.31%		Pass	88% min		95.18%		Pass	88% min		94.49%		Pass		
Compression After Heat Cycle Resistance 15.5 hrs. @ 80C / 0.5 hrs. @ 20C 7.5 hrs. @ -40C / 0.5 hrs. @ 20C	MPa				MPa				MPa								
	35%	0.16	±10%	0.145	Pass	35%	0.18	±10%	0.18	Pass	35%	0.29	±10%	0.26	Pass		
	50%	0.20		0.19	Pass	50%	0.24		0.23	Pass	50%	0.34		0.31	Pass		
	65%	0.28		0.28	Pass	65%	0.34		0.34	Pass	65%	0.46		0.42	Pass		
Recovery Ratio	88% min		94.40%		Pass	88% min		93.91%		Pass	88% min		93.26%		Pass		
Dimensional Change Ratio % After Heat Resistance & Aging 240Hrs at 80C	Longitudinal %	Lateral %			Longitudinal %	Lateral %			Longitudinal %	Lateral %							
	+5%	-0.17	0.01		Pass	+5%	0.06	0.12		Pass	+5%	-0.48	0.34		Pass		
	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass		
Dimensional Change Ratio % After Heat Cycle Resistance 15.5 hrs. @ 80C / 0.5 hrs. @ 20C 7.5 hrs. @ -40C / 0.5 hrs. @ 20C	Longitudinal %	Lateral %			Longitudinal %	Lateral %			Longitudinal %	Lateral %							
	+5%	0.8	-0.12		Pass	+5%	0.47	-0.38		Pass	+5%	-0.06	0.18		Pass		
	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass		
Dimensional Change Ratio % Humidity Resistance 120 hrs. @ 49 & 98% RH Water Absorption	Longitudinal %	Lateral %			Longitudinal %	Lateral %			Longitudinal %	Lateral %							
	+5%	-0.06	0.18		Pass	+5%	0.24	-0.05		Pass	+5%	-0.28	-0.04		Pass		
	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass		
Dimensional Change Ratio % Water Proof 24 hrs. Immersion Water Absorption	3% max	1.68%			Pass	3% max	1.41%			Pass	3% max	1.07%			Pass		
	Longitudinal %	Lateral %			Longitudinal %	Lateral %			Longitudinal %	Lateral %							
	+5%	-0.16	-0.07		Pass	+5%	0.12	0.10		Pass	+5%	-0.21	0.18		Pass		
Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass	Appearance - no abnormalities allowed				Pass			
Chemical Resistance (Oils -Torque Converter, Engine, Transmission, Silicon , Break, Diesel), 36wt%H ₂ SO ₄ , Gasoline, Grease, Window Washer Fluid, Coolant, Isopropyl Alcohol,	No abnormalities such as peeling, swelling or fusion between beads allowed				Pass	No abnormalities such as peeling, swelling or fusion between beads allowed				Pass	No abnormalities such as peeling, swelling or fusion between beads allowed				Pass		
	CLTE - Coefficient Linear of Thermal Expansion					CLTE - Coefficient Linear of Thermal Expansion					CLTE - Coefficient Linear of Thermal Expansion						
	24 hrs. @ 80C					24 hrs. @ 80C					24 hrs. @ 80C						
15.0 x 10 ⁻⁵ max				7.3 x 10 ⁻⁵	Pass	15.0 x 10 ⁻⁵ max				7.5 x 10 ⁻⁵	Pass	15.0 x 10 ⁻⁵ max				7.2 x 10 ⁻⁵	Pass
24 hrs. @ -40C					24 hrs. @ -40C					24 hrs. @ -40C							
8 x 10 ⁻⁵ max				6.5 x 10 ⁻⁵	Pass	8 x 10 ⁻⁵ max				6.6 x 10 ⁻⁵	Pass	8 x 10 ⁻⁵ max				6.7 x 10 ⁻⁵	Pass
Flammability TS420-00-002	102mm/min max					102mm/min max					102mm/min max						
	Minimum		59.3		Pass	Minimum		63.5		Pass	Minimum		51				
	Max		62.2			Max		68.9			Max		56.3				
	Avg		60.8			Avg		66.3			Avg		54.2				

This certifies that the above material meets the requirements for the Production Part Approval Process per the Subaru Motors Engineering Specification for 2015

William A. Pate

Date 6/2/2015

William A. Pate
Technical Service Manager
Hanwha Advanced Materials America LLC