



GMW 16443 Type 1

Adhesion Performance Requirements for Adhesive Backed Light Trim and Foam Automotive Spec Testing

Technical Bulletin August, 2016

3M tested the following adhesive tapes to the Automotive OEM Spec: GMW 16443 Type 1 Adhesion Performance Requirements for Adhesive Backed Light Trim and Foam. The results of the testing are provided in the following information. Adhesives not listed on this document have not been tested to this spec.

- 3M™ Reinforced Adhesive Transfer Tape L1+RT (3.2 mil)
- 3M™ Double Coated Polyester Tape L1+DCP (3.5 mil)
- 3M™ Double Coated Polyester Tape L2+DCP (4.8 mil)
- 3M™ Adhesive Transfer Tape L2+T5 (5.0 mil)
- 3M™ Adhesive Transfer Tape L3+T5 (5.0 mil)

Test	Test Condition / Environment
180° Peel Adhesion on ABS 300mm / 12 in per min	3.5.3 As Received - 24 hour dwell @ Room Temp
	3.5.4 Heat Age – 168 hours @ 176°F / 80°C
	3.5.5 Humidity GMW14729 – 168 hours @ 40°C / 104°F + 100% RH
	3.5.6 Cycle Exposure – GMW14124 cycle M (not required for type I)

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Adhesive		PU Ester	PU Ether	XLPE Foam	Microcellular Urethane Foam	EPDM Foam	Nitrile Foam	Neoprene Foam	EPDM Rubber	Neoprene Rubber	Santoprene™ Rubber	Butyl Rubber
L1 + RT	As received	F	F	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Heat Age	P	P	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Humidity	P	F	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Cycle	P	P	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L1 + DCP	As Received	P	P	P	P	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Heat Age	P	P	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Humidity	F	F	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Cycle	P	F	P	F	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L2 + DCP	As Received	P	P	P	P	P	P	P	N/A	N/A	N/A	N/A
	Heat Age	P	P	P	P	P	F	P	N/A	N/A	N/A	N/A
	Humidity	P	P	P	P	P	F	F	N/A	N/A	N/A	N/A
	Cycle	P	P	P	F	P	F	F	N/A	N/A	N/A	N/A
L2 + T5	As Received	P	P	P	P	P	P	P	N/A	N/A	N/A	N/A
	Heat Aged	P	P	P	P	P	F	P	N/A	N/A	N/A	N/A
	Humidity	P	P	P	P	P	P	P	N/A	N/A	N/A	N/A
	Cycle	P	P	P	P	P	F	P	N/A	N/A	N/A	N/A
L3 + T5	As Received	P	P	P	P	P	P	P	P	P	P	P
	Heat Aged	P	P	P	P	P	P	P	F	P	P	F
	Humidity	P	P	P	P	P	P	P	F	P	P	F
	Cycle	P	P	P	P	P	P	P	F	F	F	F

P = Pass, F = Fail, N/A = Not Tested

Note: Data reported in this technical bulletin, for all test methods, is the average of three replicates using one typical lot of adhesive.

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L1 + RT Adhesive

3.5.3 As Received - 24 hour dwell @ Room Temp						
L1+RT Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	381	34.82	Clean Peel	Fail
	PU Ether Foam		511	46.71	Clean Peel	Fail
	XLPE Foam		219	20.02	Foam Tear	Pass
	Microcellular Urethane Foam		478	43.69	100% Cohesive	Fail

3.5.4 Heat Age – 168 hours @ 176°F / 80°C						
L1+RT Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	814	74.40	Clean Peel	Pass
	PU Ether Foam		577	52.74	Clean Peel	Pass
	XLPE Foam		206	18.83	Foam Tear	Pass
	Microcellular Urethane Foam		487	44.51	Clean Peel	Fail

3.5.5 Humidity GMW 14729 – 168 hours @ 40°C / 104°F + 100% RH						
L1+RT Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	624	57.03	Clean Peel	Pass
	PU Ether Foam		490	44.79	Clean Peel	Fail
	XLPE Foam		231	21.11	Foam Tear	Pass
	Microcellular Urethane Foam		330	30.16	Clean Peel	Fail

3.5.6 Cycle Exposure – GMW 14124 Cycle M (not required for type I)						
L1+RT Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	689	62.97	Clean Peel	Pass
	PU Ether Foam		577	52.74	Clean Peel	Pass
	XLPE Foam		221	20.20	Foam Tear	Pass
	Microcellular Urethane Foam		440	40.22	Cohesive	Fail

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L1 + DCP Adhesive

3.5.3 As Received – 24 hour dwell @ Room Temp						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L1+DCP Adhesive	PU Ester Foam	ABS	780	71.29	Clean Peel	Pass
	PU Ether Foam		632	57.76	Clean Peel	Pass
	XLPE Foam		238	21.75	Foam Tear	Pass
	Microcellular Urethane Foam		530	48.44	Clean Peel	Pass

3.5.4 Heat Age – 168 hours @ 176°F / 80°C						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L1+DCP Adhesive	PU Ester Foam	ABS	551	50.36	Clean Peel	Pass
	PU Ether Foam		532	48.62	Clean Peel	Pass
	XLPE Foam		214	19.56	Foam Tear	Pass
	Microcellular Urethane Foam		484	44.24	Clean Peel	Fail

3.5.5 Humidity GMW 14729 – 168 hours @ 40°C / 104°F + 100% RH						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L1+DCP Adhesive	PU Ester Foam	ABS	399	36.47	Clean Peel	Fail
	PU Ether Foam		400	36.56	Clean Peel	Fail
	XLPE Foam		250	22.85	Foam Tear	Pass
	Microcellular Urethane Foam		413	37.75	Clean Peel	Fail

3.5.6 Cycle Exposure – GMW 14124 Cycle M (not required for type I)						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L1+DCP Adhesive	PU Ester Foam	ABS	548	50.09	Clean Peel	Pass
	PU Ether Foam		431	39.39	Clean Peel	Fail
	XLPE Foam		244	22.30	Foam Tear	Pass
	Microcellular Urethane Foam		388	35.46	Clean Peel	Fail

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L2 + DCP Adhesive

3.5.3 As Received – 24 hour dwell @ Room Temp						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+DCP Adhesive	PU Ester Foam	ABS	584	53.38	Clean Peel	Pass
	PU Ether Foam		660	60.32	Foam Tear	Pass
	XLPE Foam		241	22.03	Foam Tear	Pass
	Microcellular Urethane Foam		596	54.47	Foam Tear	Pass
	EPDM Foam		219	20.02	Foam Tear	Pass
	Nitrile Foam		586	53.56	Cohesive	Pass
	Neoprene Foam		950	86.83	Clean Peel	Pass

3.5.4 Heat Age – 168 hours @ 176°F / 80°C						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+DCP Adhesive	PU Ester Foam	ABS	959	87.65	Clean Peel	Pass
	PU Ether Foam		606	55.39	Clean Peel	Pass
	XLPE Foam		199	18.19	Foam Tear	Pass
	Microcellular Urethane Foam		688	62.88	Foam Tear	Pass
	EPDM Foam		235	21.48	Foam Tear	Pass
	Nitrile Foam		159	14.53	Clean Peel	Fail
	Neoprene Foam		626	57.22	Clean Peel	Pass

3.5.5 Humidity GMW 14729 – 168 hours @ 40°C / 104°F + 100% RH						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+DCP Adhesive	PU Ester Foam	ABS	732	66.90	Clean Peel	Pass
	PU Ether Foam		661	60.41	Foam Tear	Pass
	XLPE Foam		218	19.92	Foam Tear	Pass
	Microcellular Urethane Foam		632	57.76	Foam Tear	Pass
	EPDM Foam		228	20.84	Foam Tear	Pass
	Nitrile Foam		231	21.11	Cohesive	Fail
	Neoprene Foam		112	10.24	Cohesive	Fail

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L2 + DCP Adhesive (Cont.)

3.5.6 Cycle Exposure – GMW 14124 Cycle M (not required for type I)						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+DCP Adhesive	PU Ester Foam	ABS	659	60.23	Clean Peel	Pass
	PU Ether Foam		601	54.93	Foam Tear	Pass
	XLPE Foam		191	17.46	Foam Tear	Pass
	Microcellular Urethane Foam		475	43.41	Clean Peel	Fail
	EPDM Foam		212	19.38	Foam Tear	Pass
	Nitrile Foam		40	3.66	Cohesive	Fail
	Neoprene Foam		87	7.95	Cohesive	Fail

L2 + T5 Adhesive

3.5.3 As Received – 24 hour dwell @ Room Temp						
	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+T5 Adhesive	PU Ester Foam	ABS	937	85.64	Foam Tear	Pass
	PU Ether Foam		628	57.40	Foam Tear	Pass
	XLPE Foam		202	18.46	Foam Tear	Pass
	Microcellular Urethane Foam		666	60.87	Clean Peel	Pass
	EPDM Foam		211	19.28	Foam Tear	Pass
	Nitrile Foam		941	86.01	Foam Tear	Pass
	Neoprene Foam		1170	106.94	Foam Tear	Pass

3.5.4 Heat Age – 168 hours @ 176°F / 80°C						
	Substrate	Substrate	AVG Peel N/m	Avg Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
L2+T5 Adhesive	PU Ester Foam	ABS	939	85.82	Foam Tear	Pass
	PU Ether Foam		595	54.38	Foam Tear	Pass
	XLPE Foam		168	15.35	Foam Tear	Pass
	Microcellular Urethane Foam		1080	98.71	Foam Tear	Pass
	EPDM Foam		218	19.92	Foam Tear	Pass
	Nitrile Foam		480	43.87	Clean Peel	Fail
	Neoprene Foam		1400	127.96	Foam Tear	Pass

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L2 + T5 Adhesive (Cont.)

3.5.5 Humidity GMW 14729 – 168 hours @ 40°C / 104°F + 100% RH						
L2+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	916	83.72	Foam Tear	Pass
	PU Ether Foam		632	57.76	Foam Tear	Pass
	XLPE Foam		224	20.47	Foam Tear	Pass
	Microcellular Urethane Foam		750	68.55	Foam Tear	Pass
	EPDM Foam		223	20.38	Foam Tear	Pass
	Nitrile Foam		719	65.72	Clean Peel	Pass
	Neoprene Foam		910	83.17	Clean Peel	Pass

3.5.6 Cycle Exposure – GMW 14124 Cycle M (not required for type I)						
L2+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	1050	95.97	Foam Tear	Pass
	PU Ether Foam		558	51.00	Foam Tear	Pass
	XLPE Foam		178	16.27	Foam Tear	Pass
	Microcellular Urethane Foam		894	81.71	Foam Tear	Pass
	EPDM Foam		231	21.11	Foam Tear	Pass
	Nitrile Foam		510	46.61	Clean Peel	Fail
	Neoprene Foam		532	48.62	Clean Peel	Pass

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L3 + T5 Adhesive

3.5.3 As Received – 24 hour dwell @ Room Temp						
L3+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m or 47.98 oz/in or foam tear
	PU Ester Foam	ABS	1030	94.14	Foam Tear	Pass
	PU Ether Foam		593	54.20	Foam Tear	Pass
	XLPE Foam		211	19.28	Foam Tear	Pass
	Microcellular Urethane Foam		605	55.30	Clean Peel	Pass
	EPDM Foam		200	18.28	Foam Tear	Pass
	NitrileFoam		867	79.24	Clean Peel	Pass
	Neoprene Foam		1250	114.25	Foam Tear	Pass
	EPDM Rubber		276	25.23	Clean Peel	Fail
	Neoprene Rubber		1120	102.37	Clean Peel	Pass
	Santoprene™ Rubber		623	56.94	Clean Peel	Pass
	Butyl Rubber		749	68.46	Clean Peel	Pass

3.5.4 Heat Age – 168 hours @ 176°F / 80°C						
L3+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	946	86.46	Foam Tear	Pass
	PU Ether Foam		590	53.93	Foam Tear	Pass
	XLPE Foam		204	18.64	Foam Tear	Pass
	Microcellular Urethane Foam		754	68.91	Foam Tear	Pass
	EPDM Foam		249	22.76	Foam Tear	Pass
	Nitrile Foam		1230	112.42	Clean Peel	Pass
	Neoprene Foam		1670	152.64	Foam Tear	Pass
	EPDM Rubber		93	8.50	Clean Peel	Fail
	Neoprene Rubber		726	66.36	Clean Peel	Pass
	Santoprene™ Rubber		622	56.85	Clean Peel	Pass
	Butyl Rubber		296	27.05	Clean Peel	Fail

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L3 + T5 Adhesive (Cont.)

3.5.5 Humidity GMW 14729 – 168 hours @ 40°C / 104°F + 100% RH						
L3+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	849	77.60	Foam Tear	Pass
	PU Ether Foam		625	57.12	Foam Tear	Pass
	XLPE Foam		229	20.93	Foam Tear	Pass
	Microcellular Urethane Foam		657	60.05	Foam Tear	Pass
	EPDM Foam		246	22.48	Foam Tear	Pass
	Nitrile Foam		1200	109.68	Foam Tear	Pass
	Neoprene Foam		1110	101.45	Foam Tear	Pass
	EPDM Rubber		156	14.26	Cohesive	Fail
	Neoprene Rubber		850	77.69	Clean Peel	Pass
	Santoprene Rubber		706	64.53	Clean Peel	Pass
	Butyl Rubber		502	45.88	Clean Peel	Fail

3.5.6 Cycle Exposure – GMW 14124 Cycle M (not required for type I)						
L3+T5 Adhesive	Substrate	Substrate	AVG Peel N/m	AVG Peel oz/in	Observation	Requirement 525 N/m / 47.98 oz/in or foam tear
	PU Ester Foam	ABS	877	80.16	Foam Tear	Pass
	PU Ether Foam		558	51.00	Foam Tear	Pass
	XLPE Foam		177	16.18	Foam Tear	Pass
	Microcellular Urethane Foam		803	73.39	Foam Tear	Pass
	EPDM Foam		226	20.66	Foam Tear	Pass
	Nitrile Foam		940	85.92	Clean Peel	Pass
	Neoprene Foam		1430	130.70	Clean Peel	Pass
	EPDM Rubber		86	7.86	Clean Peel	Fail
	Neoprene Rubber		515	47.07	Clean Peel	Fail
	Santoprene™ Rubber		377	34.46	Clean Peel	Fail
	Butyl Rubber		76	6.95	Clean Peel	Fail

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