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Moosup, CT 06354
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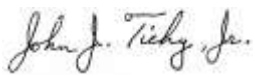
Customer:	General Motors
Specification No:	GMW 14196 (May 2016)
Product Description & Uses:	High density, cellular, polyurethane with low compression set For gaskets in vibration damping, vibration and shock isolation

GM Grade: Type 2/Type 3 **Product: U7E15/17XXX0426**

Property	Test Method	Units	Specification	Result
Mass	GMW 3182 (Oct. 2016)	g/m^2	Per Engineering Drawing	747
Thickness	ISO 2589	mm	Per Engineering Drawing	3.16
Odor	GMW 3205	rating	6 min.	10 wet, 10 dry
Flammability (as rec'd) (machine direction)	FMVSS 302	mm/min	102 max.	45, 26, 41, 40, 38
	GMW 3232	mm/min	100 max.	Bstat – 60 (conforming) Bmax – 45 (conforming)
Flammability (as rec'd) (cross-machine direction)	FMVSS 302	mm/min	102 max.	40, 18, 22, 40, 21
	GMW 3232	mm/min	100 max.	Bstat – 61 (conforming) Bmax – 40 conforming)
Flammability (cycle aged) (machine direction)	FMVSS 302	mm/min	102 max.	42, 52, 51, 48, 52
	GMW 3232	mm/min	100 max.	Bstat – 62 (conforming) Bmax – 52 (conforming)
Flammability (cycle aged) (cross-machine direction)	FMVSS 302	mm/min	102 max.	44, 44, 47, 45, 45
	GMW 3232	mm/min	100 max.	Bstat – 49 (conforming) Bmax – 47 (conforming)
Fogging	GMW 3235	visual inspect	No oily film, droplets or crystals and ≤2 mg condensate	0.3 mg Dry uniform fog conforming
Compression Set - 50%	ISO 1856 Method A	%	10% max.	1.1
CFD at 40% Compression	ISO 3386-1 +A1 (2010-07-01)	kPa	25 – 50 Type 2 50 – 99 Type 3	61
Emission Report	GMW 15634			Attached

Results compiled from testing performed by Intertek, Report No. 102970798GRR-001 Dated May 4, 2017

GRISWOLD LLC



John J. Tichy, Jr.
Technical Director

NOTE: Information of a technical nature is based on laboratory tests which either GRISWOLD LLC conducts or sends to an independent laboratory for testing for determination of uses as requested in writing by customer. GRISWOLD LLC believes these to be reliable. However, GRISWOLD LLC has no control over the application of the material to, or part of, the final **product** and **therefore**, GRISWOLD LLC makes **no express or implied warranty of result, fitness or merchantability.** The customer should determine reliability for the end use or particular application.

Test Report for:

Griswold LLC

GMW15634 (November 2014)
GMW15635 (August 2012)

Emissions Testing:

VOC/SVOC Analysis
Carbonyl Analysis

Materials:

Microcellular Polyurethane Foam Rolls

Part Numbers:

U7E211250426201
U7E171250426204
U7H200930427201
U7H151250427204
U7S151250426201
U7Y201250426201

KYLE TANIS
Project Engineer

TAYLOR GEBBEN
Reviewer

DESCRIPTION OF SAMPLES:

Product Name	Microcellular Polyurethane Foam
Product Category	Automotive Interior
Product Numbers	U7E211250426201 U7E171250426204 U7H200930427201 U7H151250427204 U7S151250426201 U7Y201250426201
Date of Manufacture	Not Specified
Date of Shipment	03/09/17
Date Received by Lab	03/13/17
Dates Tested	03/15/17 - 03/18/17
As Received Sample Condition	Good condition
Sample Condition	Production
Material Specification	GMW14196 (2016)
Lab Sample ID	GRR1703131303-006
Samples Submitted	(6x) Polyurethane foam rolls

WORK REQUESTED / APPLICABLE DOCUMENTS:

VOC/SVOC Analysis:	GMW15634 (November 2014)
Carbonyl Analysis:	GMW15635 (August 2012)

CONCLUSIONS:

VOC/SVOC Analysis:	Results Reported
Carbonyl Analysis:	Conforming

VOC / SVOC ANALYSIS

Description of Samples:

Product Name	Microcellular Polyurethane Foam
Product Category	Automotive Interior
Product Number	U7E211250426201, U7E171250426204, U7H200930427201, U7H151250427204, U7S151250426201, U7Y201250426201
Date of Manufacture	Not Specified
Date of Shipment	03/09/17
Date Received by Lab	03/13/17
As Received Sample Condition	Good condition
Sample Condition	Production
Material Specification	GMW14196 (2016)

Test Conditions:

Dates Test Performed	03/15/17 – 03/18/17
Test Method	GMW15634 (November 2014)
Sample Conditioning	24 hour preconditioning followed by 16+ hours uncovered at 23°C / 50%RH
Sample Size	15 ± 2 mg
Desorption Temperature	VOC – 90°C and SVOC – 120°C
Desorption Time	VOC – 30 minutes and SVOC – 60 minutes
Constant Flow Rate	42 mL/min
Number of Samples	Two (2) samples per material; twelve (12) total
Acceptance Criteria	Referencing GMW16853 (July 2013), Table 4, F7: Results Reported Referencing GMW3059 Appendix C (October 2015), Supplement CG4110 (October 2015) Individual VOC - See Appendix B of this report

Facilities and Equipment:

Instrumentation Used:	Markes TD-100 Thermal Desorption Agilent 7890A GC Agilent 5975C MS
Column Used:	Agilent HP-Ultra 2 (GC)

Test Summary:

The emissions testing were performed according to GMW15634, "*Determination of Volatile and Semi-Volatile Organic Compounds from Vehicle Interior Materials*". After conditioning, samples were prepared to the specifications outlined by Appendix C in the test method and placed in a glass thermal desorption tube. Samples were then subjected to thermal desorption as outlined in the test method and VOC/SVOC emissions were trapped on a sorbent cold trap held at -30°C. These emissions were separated and characterized using gas chromatography with mass selective detection. Total and individual emissions were calculated as equivalent to toluene and n-hexadecane standard calibrations that were run concurrently with the samples. Substance determinations are made using a library match of >90% to the mass fragmentation pattern observed. The prefixed "?" with substance names is included following Appendix E, Table E1 of GMW15634 since a confirmation by retention time was not obtained as these compounds were not included in the calibration mix defined in GMW15634. All single substances measuring in excess of 1.0 ppm (based on calibration compound equivalency) were identified.

Client / Sample Information			
Test Lab:	Intertek - GRR	Technician:	Kyle Tanis
Client Name:	Griswold LLC	Signature:	Kyle Tanis
Sample ID:	**U7E171250426204**	Date of Analysis:	03/21/17
Date of Manufacture:	Not Specified		
Date of Sampling:	Not Specified		
Overall Weight in Vehicle (g):	Not Specified		
Overall Dimensions of Part (mm):	Not Specified		
	Sample 1	*Sample 2*	
Dimensions (mm):	6.8 x 3.0 x 2.7	7.4 x 2.6 x 2.2	
Mass (g):	0.01410	0.01472	

Total VOC / SVOC Emissions Results				
	Limits (µg/g)	Calculated Results (µg/g)		Disposition
VOC	Report Values	Sample 1:	**247.1**	N/A
		Sample 2:	**234.0**	N/A
SVOC	Report Values	Sample 2:	**381.5**	N/A

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Individual VOC Emissions Results (as toluene equivalent)				
Retention Time (min)	Substance Name (with Observed Mass Fragmentation)	CAS No.	Substance Area	Concentration (ppm)
9.684	? Acetylacetone 100 85 72 **43** 41	123-54-6	12906	1.29
19.520	? Unknown compound 102 87 57 **43** 39	-	192638	19.19
26.376	? 2-Oxepanone 114 84 70 **55** 42	502-44-3	632069	62.97
26.649	? Unknown compound 128 110 83 **69** 55	-	51958	5.18
30.343	? Unknown compound 135 107 83 **68** 55	-	307415	30.63
33.299	? Unknown compound 142 97 70 **55** 41	-	10465	1.04
33.621	? Unknown compound 142 124 84 70 **55**	-	77885	7.76
34.368	Tetradecane 99 85 71 57 **43**	629-59-4	11058	1.10
34.958	? Unknown compound 157 129 117 **115** 103	-	37548	3.74
36.866	? Butylated Hydroxytoluene 220 **205** 189 145 115	128-37-0	116968	11.65
37.047	? Unknown compound 187 135 117 105 **91**	-	10461	1.04
37.701	? Unknown siloxane 355 295 221 147 **73**	-	15031	1.50
38.286	? Diphenyl sulfide **186** 185 171 152 109 77	139-66-2	286852	28.58
38.794	? Benzene, (1-butylheptyl)- 232 175 147 105 **91**	4537-15-9	18164	1.81
38.872	? Decanedioic acid, dimethyl ester 199 166 157 74 **55**	106-79-6	71962	7.17
38.950	? Benzene, (1-propyloctyl)- 232 189 133 105 **91**	4536-86-1	23010	2.29
39.267	? Benzene, (1-ethylnonyl)- 232 203 119 105 **91**	4536-87-2	16744	1.67
39.779	? Benzene, (1-methyldecyl)- 232 117 **105** 91 79	4536-88-3	20559	2.05
39.965	? Unknown compound 295 281 221 147 **73**	-	26756	2.67
40.087	? Benzene, (1-pentylheptyl)- 246 175 161 105 **91**	2719-62-2	21320	2.12
40.155	? Benzene, (1-butyloctyl)- 246 189 147 105 **91**	2719-63-3	28326	2.82
40.316	? Benzene, (1-propylnonyl)- 246 203 133 105 **91**	2719-64-4	16119	1.61
40.614	? Benzene, (1-ethyldecyl)- 246 217 161 119 **91**	2400-00-2	15344	1.53
40.677	? Unknown compound 115 97 69 **55** 41	-	75966	7.57
40.945	? Unknown compound **220** 184 152 108 51	-	10329	1.03
41.087	? Benzene, (1-methylundecyl)- 246 117 **105** 91 79	2719-61-1	18995	1.89
41.297	? Benzene, (1-pentyloctyl)- 260 189 161 105 **91**	4534-49-0	17372	1.73
41.384	? Benzene, (1-butylnonyl)- 260 203 147 105 **91**	004534-50-3	11616	1.16
41.809	? Unknown siloxane 295 281 221 147 **73**	-	33184	3.31
42.834	? Dibutyl phthalate 223 205 **149** 121 104	84-74-2	13953	1.39
42.936	? Benzaldehyde, 4-(ethylphenylamino)- 225 **210** 196 167 77	-	67195	6.69
46.191	? Tert-octyldiphenylamine 281 **210** 194 180 167	-	24763	2.47
46.313	? Unknown compound 341 281 **266** 250 207	-	11074	1.10

Individual SVOC Emissions Results (as n-hexadecane equivalent)				
Retention Time (min)	Substance Name (with Observed Mass Fragmentation)	CAS No.	Substance Area	Concentration (ppm)
11.191	? Unknown Aromatic 157 142 117 **115** 91	-	36011	1.67
13.055	? Diphenyl sulfide **186** 185 171 152 51	139-66-2	250342	11.60
13.231	? Decanedioic acid, dimethyl ester 199 166 125 98 **55**	106-79-6	231795	10.74
14.753	? Unknown ester 128 **115** 97 69 55	-	294380	13.64
14.983	? Unknown compound **220** 184 152 108 51	-	61814	2.86
15.397	? Acridine **179** 151 126 98 89	260-94-6	25790	1.19
15.841	? Unknown compound 188 167 **155** 142 127	-	21964	1.02
16.154	? Unknown compound 94 **79** 67 55 41	-	33615	1.56
16.329	? Benzenepropanoic acid, 3,5-bis(1,1-dimethylethyl)-4-hydroxy-, methyl ester 292 **277** 219 203 147 + ? Unknown Compound 127 111 93 **81** 55	6386-38-5	484402	22.44
16.505	? Dibutyl phthalate 223 205 **149** 121 104	84-74-2	36312	1.68
16.642	? Unknown aromatic 225 **210** 195 182 167	-	843251	39.07
17.481	? Unknown compound 281 **266** 250 236 220	-	62419	2.89
18.130	? 7-Oxabicyclo[4.1.0]heptane-3-carboxylic acid, 7-oxabicyclo[4.1.0]hept-3-ylmethyl ester 143 127 110 81 **41**	2386-87-0	1748630	81.01
18.252	? Unknown compound 295 281 **266** 194 73	-	108520	5.03
18.349	? Unknown compound 143 127 110 81 **41**	-	815179	37.77
18.501	? Unknown compound 207 **144** 115 91 77	-	34005	1.58
19.720	? Tert-octyldiphenylamine 281 224 **210** 194 182	-	514338	23.83
19.837	? 4,4'-Di-tert-butyl-diphenylamine 281 **266** 250 236 220	4627-22-9	321618	14.90
20.203	? Unknown amine **266** 250 234 220 193	-	26931	1.25
20.369	? Unknown compound 337 **322**, 250 207 153	-	36985	1.71
21.687	? Unknown compound 390 375 219 **57** 43	-	22865	1.06
21.838	? Unknown compound 390 375 219 **57** 43	-	163343	7.57
22.248	? Unknown compound 154 **138** 72 56 43	-	837750	38.81
22.394	? Unknown compound 390 375 219 **57** 43	-	158634	7.35
22.594	? Unknown compound 390 375 219 **57** 43	-	331100	15.34
22.736	? Unknown compound 390 375 219 **57** 43	-	68614	3.18
24.063	? Unknown compound 337 **266** 250 **236** 57	-	221621	10.27

The most abundant mass fragmentation is identified by a bolded value.

CARBONYL ANALYSIS

Description of Samples:

Product Name	Microcellular Polyurethane Foam
Product Category	Automotive Interior
Product Number	U7E211250426201, U7E171250426204, U7H200930427201, U7H151250427204, U7S151250426201, U7Y201250426201
Date of Manufacture	Not Specified
Date of Shipment	03/09/17
Date Received by Lab	03/13/17
As Received Sample Condition	Good condition
Sample Condition	Production
Material Specification	GMW14196 (2016)

Test Conditions:

Dates Test Performed	03/15/17
Test Method	GMW15635 (August 2012)
Sample Conditioning	24 hour preconditioning at 23°C / 50%RH
Sample Size	100mm x 40mm x part thickness
Bottle Size	1 Liter
Exposure Temperature	60°C ± 3°C
Exposure Duration	180 ± 15 minutes
Rest Duration	60 ± 10 minutes
Number of Samples	Two (2) samples per material; twelve (12) total
Acceptance Criteria	Referencing GMW16853 (July 2013), Table 4, F7: Formaldehyde ≤ 8 µg/g Acetaldehyde ≤ 8 µg/g Acrolein ≤ 8 µg/g Acetone: Report Value Sum of C2 to C6 Carbonyls ≤ 20 µg/g

Facilities and Equipment:

Instrumentation Used:	Agilent 1260 Infinity Series
Column Used:	Poroshell 120 EC-C18, 3x100 mm, 2.7 µm

Test Summary:

The emissions testing were performed according to GMW15635, "*Determination of Aldehyde and Ketone Emissions from Interior Materials*". The samples were prepared to the specifications outlined by Section 3.3.3 in the test method and suspended from a hook in a 1 liter polyethylene bottle. 50 mL of HPLC grade water was then measured into the bottles. The samples were then placed in an environmental chamber held at 60°C for a period of 180 minutes. A blank bottle was run concurrently with no sample. After the exposure and a 1 hour rest period, the sample water was combined in equal amounts with a 2,4-di-nitrophenylhydrazine (DNPH) derivatization solution and 100 µL of phosphoric acid. These samples were then analyzed using high performance liquid chromatography and aldehyde / ketone emissions were determined using calibration curves prepared from pure standards. The moisture content of the samples was determined separately according to Section 4.1.1 of the test method.

Determination of Carbonyl Compounds from Vehicle Interior Materials - GMW15635

Client Name:	Griswold LLC	Technician:	Kyle Tanis
Project Number:	G102970798	Date(s) Tested:	3/15/2017
Samples Tested:	U7E171250426204	Technician Signoff:	Kyle Tanis

Laboratory:	Intertek - GRR
Sample Name:	**U7E171250426204**
Part No.:	416053102
Supplier:	N/A

Sample/Order No. (Internal)	N/A
Date of Production:	N/A
Date of Sample Received:	3/13/2017
Weight of the Component in the Vehicle:	N/A
Overall Dimensions of Component:	N/A

Chromatogram No.:	N/A
Data Path:	Available upon request
Manager:	Jesse Ondersma
Date of Analysis:	3/27/2017
Method:	PMD V12B_5

	Sample 1	Sample 2
Weight of Sample Analyzed (g):	2.81524	2.82601
Dimensions of Sample Analyzed (mm):	97.4x41.6x2.9	98.4x40.5x2.8
Water Content (%):	0.28	0.28

Substance	CAS No.	µg/g		
		Sample 1	Sample 2	Ave.
Formaldehyde	500-00-0	1.20	1.69	1.44
Acetaldehyde	75-07-0	3.44	2.43	2.94
Acetone	67-64-1	0.17	0.18	0.18
Acrolein	107-02-8	BDL	BDL	-
Propionaldehyde	123-38-6	BDL	BDL	-
Crotonaldehyde	123-73-9	BDL	BDL	-
2-Butanone	78-93-3	0.13	0.15	0.14
Methacrolein	78-85-3	BDL	BDL	-
n-Butyraldehyde	123-72-8	BDL	BDL	-
Benzaldehyde	100-52-7	BDL	BDL	-
Valeraldehyde	110-62-3	BDL	BDL	-
m-Tolualdehyde	620-23-5	BDL	BDL	-
Hexaldehyde	66-25-1	BDL	BDL	-
Total Carbonyls		**4.94**	**4.46**	**4.70**
Sum of C2to C6 Carbonyls		**3.74**	**2.77**	**3.26**

Comments or Specific Remarks:

BDL* - Below Detection Limits

The results are conforming to the acceptance criteria outlined in GMW16853.

HPLC Instrument Model	Agilent 1260 Infinity Series
Column Used:	Poroshell 120 EC-C18