

TEST REPORT

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PRODUCT EVALUATED: 3M™ Firedam Spray 200 (red)

EVALUATION PROPERTY: CDPH Specification 01350 v1.1: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers v1.1

Report of for compliance with the applicable requirements of the following criteria: CDPH Specification 01350 v1.1: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers v1.1 and LEED v4.

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2 Introduction

Intertek has conducted testing for 3M on 3M™ Firedam Spray 200 (red) Testing was conducted following the standard methods of CDPH Specification 01350 v1.1: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers v 1.1.

3 Test Samples

3.1.1. SAMPLE SELECTION

One sealed 5 gallon pail of 3M™ Firedam Spray 200 (red) sample ID 98-0400-5588-5 manufactured on 6/29/2016. The material was sampled by Andrew J. Mais at 3M Center, Building 230-BE-16, St. Paul, MN 55144. The sample was shipped on 8/3/2016, and arrived at the lab on 8/5/2016. The Middleton Lab ID Tracking number: MID1608051005-001

3.1.2. SAMPLE AND ASSEMBLY DESCRIPTION

The product density was report at 1.29g/ml. Therefore, 915.21g of sample was spread evenly with a putty knife to make a sample about 0.125 inches thick on an 18.6 by 18.6 inch plate. The sample was immediately transferred to the environmental chamber and the date and time recorded. The wet sample was place directly on the bottom of the square VOC chamber. See the photo in the chamber in section 5 of this report.

4 Testing and Evaluation Methods

Testing was in accordance with CDPH Specification 01350 v1.1: Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers v1.1.

Testing for the private office, and classroom scenario, using 12 m² in classroom and 4 m² in the private office. The chamber volume is 224 L with an inlet flow of 224 L/hour. The load factor was 1.0 m²/m³. The average temperature range was 23 °C +/- 2 and 50 +/- 5 %RH. The sampling started on 8/22/2016 and completed 8/25/2016. All GC and LC testing was completed by Jan 7, 2017.

The VOC for the LC sampling was collected on Sep-Pak DNPH-Silica Cartridges. Collection was performed at 50 ml/min for 20 minutes using a vacuum pump with a mass flow meter. The Sep-Pak DNPH-Silica Cartridges were stored in the refrigerator until eluted according to the manufactures instructions into 5 ml of ACN. The samples were collected at 96 hours within the time limitations specified in the standard. The Sep-Pak DNPH-Silica Cartridges samples were run on Shimadzu HPLC system using a Waters Symetry C18 5um 3.9 x 150 column. A gradient profile was used to run the standard Aldehyde/Ketone –DNPH Mix.

For the HPLC testing, no target VOCs were found at the 96 hr time point. No quantification was required using the standard with minimum of a 5 point curve. A check standard was run during the samples to verify system suitability.

The VOC for the GC/MS was collected on Thermo Desorption (TD) tubes Atas GL (A100054) fritted linters filled with Tenax GR packing material. Collection was performed at 50 ml/min for 20 minutes using a vacuum pump with a mass flow meter. The TD tubes were verified to be clean before testing. The samples were collected at 24, 48, and 96 hours within the time limitations specified in the standard, and tested the same day. The samples were run on Shimadzu GC/MS with an ATAS GL High Performance injector for the TD tubes. A Restek Rtx-VMS 40 meter, 0.18 mm ID, 1um df was used.

For determining TVOC direct injection of toluene was used with at least 5 different concentrations. The LOQ for toluene was determined to be 0.008044 ug/m³. Standard Curves diluted with toluene, were performed in triplicate for each standard. The standard was run with the same GC temperature profile as the TD tubes.

4.1.1. Deviation from Standard Method

There were no deviations from the test standard.

4.2. RESULTS AND OBSERVATIONS

	Private Office	Standard Classroom
Product Quantities:	Composite Sheet	Composite Sheet
Inlet flow rate Q (m ³ h ⁻¹)	0.22414	0.22414
Exposed projected surface area of the test specimen in the chamber A _c (m ²)	0.2232	0.2232
Flow rate of the outside ventilation are Q _B (m ³ h ⁻¹)	20.7	191
Exposed surface area of the installed material in the building A _B (m ²)	4	12
Area Specific flow rate q _A (m ² h ⁻¹)= Q _B /A _B	5.1750	15.9167

							Testing Scenario:	Private Office	Standard Classroom
							Product Quantities:	Sealant	Sealant
							Sampling Time (hrs):	24 hr	24 hr
Compound name	CAS Number number	Retention Time minutes	Area Count Sample No units	Area Count Background No units	Chamber Concentration Ct (ug m ⁻³)	Chamber background concentration (ug m ⁻³)	*Area Specific Emissions Factor at the sampling time (EF _s) (ug m ⁻² h ⁻¹)	Area Specific Estimated Building Concentration C _B for Target VOC using EF _s (ug m ⁻³)	Area Specific Estimated Building Concentration C _B for Target VOC using EF _s (ug m ⁻³)
Vinyl Acetate	108-05-04	8.876	329042	0	11.307	0	11.3549	2.1942	0.1379
Acetic Acid	64-19-7	10.053	2355405	0	40.507	0	40.6772	7.8603	0.4938
Unknown at 11.445	na	11.445	203339	0	9.496	0	9.5360	1.8427	0.1158
Unknown at 11.625	na	11.625	278943	0	10.585	0	10.6300	2.0541	0.1291
Unknown at 11.753	na	11.753	194492	0	9.368	0	9.4079	1.8180	0.1142
Unknown at 11.807	na	11.807	2343887	0	40.341	0	40.5106	7.8281	0.4918
Unknown at 11.833	na	11.833	2679904	0	45.182	0	45.3729	8.7677	0.5509
Unknown at 11.939	na	11.939	279403	0	10.592	0	10.6366	2.0554	0.1291
Unknown at 11.989	na	11.989	164079	0	8.930	0	8.9678	1.7329	0.1089
Unknown at 12.019	na	12.019	217281	0	9.697	0	9.7377	1.8817	0.1182
Unknown at 12.112	na	12.112	141477	0	8.605	0	8.6408	1.6697	0.1049
Unknown at 12.175	na	12.175	193136	0	9.349	0	9.3883	1.8142	0.1140
2-Ethyl-1- hexanol	105-76-7	12.314	3845824	0	61.983	0	62.2442	12.0279	0.7557
3-methylheptyl Acetate	72218-58-7	12.856	2440558	0	41.734	0	41.9094	8.0984	0.5088
Unknown at 13.281	na	13.281	613874	0	15.412	0	15.4766	2.9906	0.1879
Unknown at 13.314	na	13.314	474814	0	13.408	0	13.4643	2.6018	0.1635
Unknown at 13.656	na	13.656	421213	0	12.635	0	12.6887	2.4519	0.1540
Unknown at 13.758	na	13.758	237668	0	9.991	0	10.0327	1.9387	0.1218
Total:							370.6766	71.6283	4.5002

							Testing Scenario:	Private Office	Standard Classroom
							Product Quantities:	Sealant	Sealant
							Sampling Time (hrs):	48 hr	48 hr
Compound name	CAS Number	Retention Time	Area Count Sample	Area Count Background	Chamber Concentration Ct	Chamber background concentration	*Area Specific Emissions Factor at the sampling time (EF _s)	Area Specific Estimated Building Concentration C _{ib} for Target VOC using EF _s	Area Specific Estimated Building Concentration C _{ib} for Target VOC using EF _s
	number	minutes	No units	No units	(ug m ⁻³)	(ug m ⁻³)	(ug m ⁻² h ⁻¹)	(ug m ⁻³)	(ug m ⁻³)
Vinyl Acetate	108-05-04	8.908	333,670	0	7.6740	0	7.7063	1.4891	0.0936
Acetic Acid	64-19-7	10.011	2,493,861	0	44.2286	0	44.4150	8.5826	0.5392
Unknown at 11.45	na	11.45	232,536	0	9.9167	0	9.9584	1.9243	0.1209
Unknown at 11.63	na	11.63	307,306	0	10.9941	0	11.0404	2.1334	0.1340
Unknown at 11.738	na	11.738	286,974	0	10.7011	0	10.7462	2.0766	0.1305
Unknown at 11.812	na	11.812	2,627,893	0	44.4330	0	44.6203	8.6223	0.5417
Unknown at 11.838	na	11.838	2,865,393	0	47.8553	0	48.0570	9.2864	0.5834
Unknown at 11.944	na	11.944	307,587	0	10.9981	0	11.0445	2.1342	0.1341
Unknown at 11.994	na	11.994	178,961	0	9.1447	0	9.1832	1.7745	0.1115
Unknown at 12.024	na	12.024	232,688	0	9.9189	0	9.9606	1.9248	0.1209
Unknown at 12.116	na	12.116	168,377	0	8.9921	0	9.0300	1.7449	0.1096
Unknown at 12.178	na	12.178	237,985	0	9.9952	0	10.0373	1.9396	0.1219
2-Ethyl-1- hexanol	105-76-7	12.295	4,576,650	0	35.7951	0	35.9459	6.9461	0.4364
3-methylheptyl Acetate	72218-58-7	12.841	2,827,155	0	40.4184	0	40.5887	7.8432	0.4928
Unknown at 13.266	na	13.266	686,647	0	16.4603	0	16.5296	3.1941	0.2007
Unknown at 13.3	na	13.3	573,972	0	14.8367	0	14.8992	2.8791	0.1809
Unknown at 13.518	na	13.518	136,960	0	8.5394	0	8.5754	1.6571	0.1041
Unknown at 13.644	na	13.644	517,245	0	14.0192	0	14.0783	2.7204	0.1709
Unknown at 13.744	na	13.744	293,101	0	10.7894	0	10.8348	2.0937	0.1315
Unknown at 13.78	na	13.78	223,357	0	9.7844	0	9.8256	1.8987	0.1193
Total:							377.0767	72.8651	4.5779

							Testing Scenario:	Private Office	Standard Classroom
							Product Quantities:	Sealant	Sealant
							Sampling Time (hrs):	96 hr	96 hr
Compound name	CAS Number	Retention Time	Area Count Sample	Area Count Background	Chamber Concentration Ct	Chamber background concentration	*Area Specific Emissions Factor at the sampling time (EF _s)	Area Specific Estimated Building Concentration C _{ib} for Target VOC using EF _s	Area Specific Estimated Building Concentration C _{ib} for Target VOC using EF _s
	number	minutes	No units	No units	(ug m ⁻³)	(ug m ⁻³)	(ug m ⁻² h ⁻¹)	(ug m ⁻³)	(ug m ⁻³)
Vinyl Acetate	108-05-04	8.884	431808	0	12.7881	0	12.8420	2.4815	0.1559
Acetic Acid	64-19-7	10.152	3055359	0	50.5927	0	50.8059	9.8176	0.6168
Unknown at 11.448	na	11.448	263154	0	10.3579	0	10.4015	2.0100	0.1263
Unknown at 11.629	na	11.629	227617	0	9.8458	0	9.8873	1.9106	0.1200
Unknown at 11.661	na	11.661	154209	0	8.7880	0	8.8250	1.7053	0.1071
Unknown at 11.763	na	11.763	287957	0	10.7153	0	10.7604	2.0793	0.1306
Unknown at 11.811	na	11.811	2819113	0	47.1885	0	47.3873	9.1570	0.5753
Unknown at 11.837	na	11.837	3219065	0	52.9516	0	53.1748	10.2753	0.6456
Unknown at 11.942	na	11.942	354862	0	11.6793	0	11.7286	2.2664	0.1424
Unknown at 11.993	na	11.993	216225	0	9.6816	0	9.7224	1.8787	0.1180
Unknown at 12.023	na	12.023	295754	0	10.8276	0	10.8732	2.1011	0.1320
Unknown at 12.115	na	12.115	222266	0	9.7687	0	9.8098	1.8956	0.1191
Unknown at 12.179	na	12.179	290126	0	10.7465	0	10.7918	2.0854	0.1310
2-Ethyl-1- hexanol	105-76-7	12.325	5070251	0	39.6902	0	39.8574	7.7019	0.4839
Unknown at 12.806	na	12.806	79230	0	7.7076	0	7.7400	1.4957	0.0940
3-methylheptyl Acetate	72218-58-7	12.867	3393531	0	26.4589	0	26.5703	5.1344	0.3226
Unknown at 13.292	na	13.292	782130	0	17.8361	0	17.9113	3.4611	0.2175
Unknown at 13.329	na	13.329	703493	0	16.7030	0	16.7734	3.2412	0.2036
Unknown at 13.543	na	13.543	180640	0	9.1689	0	9.2075	1.7792	0.1118
Unknown at 13.67	na	13.67	585095	0	14.9969	0	15.0601	2.9102	0.1828
Unknown at 13.777	na	13.777	340387	0	11.4708	0	11.5191	2.2259	0.1398
Unknown at 13.813	na	13.813	145163	0	8.6576	0	8.6941	1.6800	0.1056
Unknown at 13.863	na	13.863	205649	0	9.5292	0	9.5694	1.8492	0.1162
Total:							419.9126	81.1425	5.0980

4.3. EXAMINATION OF RESULTS

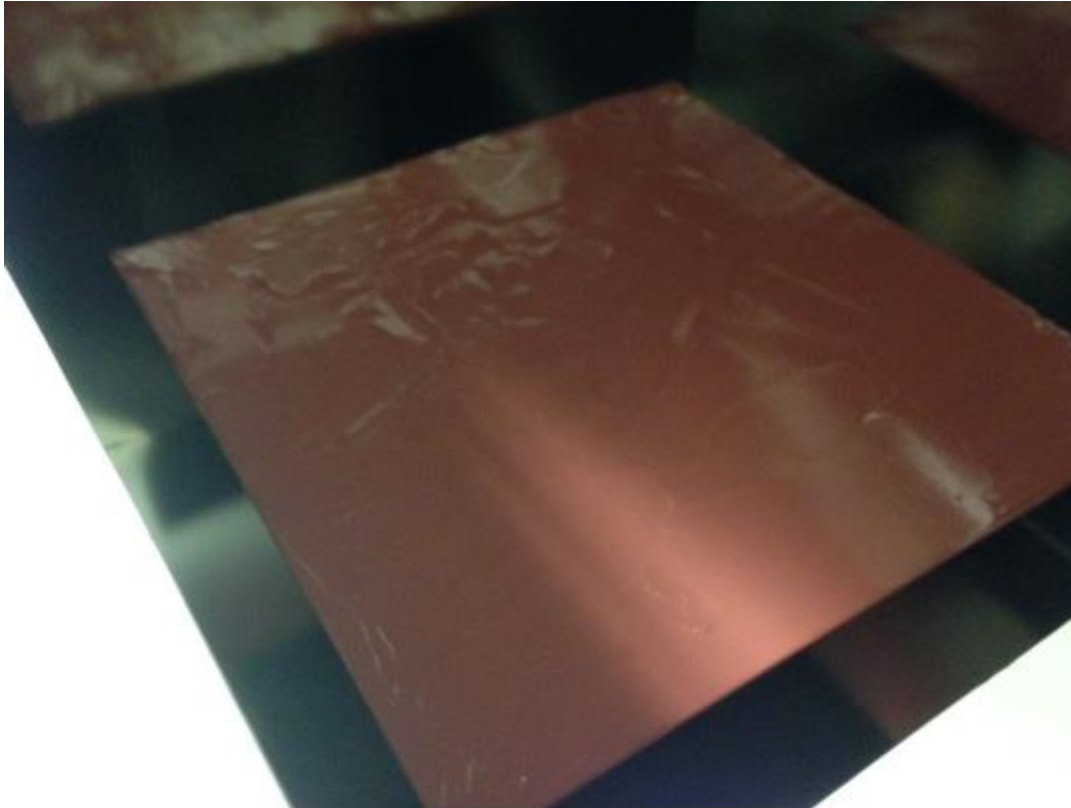
Four compounds were identified. Two of the compounds Vinyl Acetate CAS# 108-05-04 and 2Methyl-1Hexanol CAS# 105-76-7 were confirmed with standards. This was done by injection them onto a clean TD tube and running the TD the same as the sample run to confirm the retention time. Liquid injection are then run for standard curves. The acetic acid did not provide a good standard curve on the GC column, therefore Toluene was used as a surrogate compound. No 3-methylheptyl Acetate CAS# 72218-7 standard could be found, therefore 2Methyl-1Hexanol was used as a surrogate compound for the standard curve.

Vinyl Acetate CAS#108-05-4 is a Target CREL VOC with an allowable concentration of 100 ug/m3. The sample is below the maximum allowable concentration for both of the test scenarios. All other compounds determined by GC/MS are not on the Target CREL VOC list.

No Formaldehyde or Acetaldehyde were found using HPLC analysis.

5 Appendix A

Photo of tested sample:




6 Conclusion

Intertek has conducted testing on 3M™ Firedam Spray 200 (red), to evaluate CDPH Specification 01350 v1.1; Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers v1.1.


3M™ Firedam Spray 200 (red) complies with limits specified in CDPH Specification 01350 v1.1 February 2010 for private office and classroom. The sample passed the LEED v4 for total VOC and Target Chemical listed in CDPH Standard Method.

The conclusions of this test report may not be used as part of the requirements for Intertek product certification. Authority to Mark must be issued for a product to become certified.

INTERTEK
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Reviewed by:


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7 Revision Summary

DATE	SUMMARY
Jan 10, 2017	Original date of report
