mostardi platt

Compliance Emissions Test Report

Knauf Insulation
ML2ALB Forming/Curing Stack and EU-WBWALB East and West Forming Stacks

Albion, Michigan
March 19 through 21, 2019

Report Submittal Date
April 15, 2019

Project No. M191005

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Elmhurst, Illinois 60126
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1.0 EXECUTIVE SUMMARY

MOSTARDI PLATT conducted a compliance emissions test program for Knauf Insulation on March 19 through 21, 2019 on the EU-WBWALB East and West Forming Stacks and ML2ALB Forming/Curing Stack in Albion, Michigan. This report summarizes the results of the test program and test methods used.

The test locations, test dates, and test parameters are summarized below.

TEST INFORMATION		
Test Locations	**Test Dates**	**Test Parameters**
ML2ALB Forming/Curing Stack	3/19/19 and 3/20/19	Total Particulate Matter (TPM), Ammonia (NH_3), and Visible Emissions (VE)
EU-WBWALB East and West Forming Stacks	3/21/19	TPM, VE

The purpose of the test program was to demonstrate emissions during normal operating conditions. Selected results of the test program are summarized below. A complete summary of emission test results follows the narrative portion of this report.

TEST RESULTS					
Test Location	**Test Date**	**Source Condition**	**Test Parameter**	**Emission Limit**	**Emission Rate**
ML2ALB Forming/Curing Stack	3/19/19	High LOI	TPM	25.19 lb/hr	21.118 lb/hr
				5.59 lb/ton of glass pulled	See Knauf CBI letter
			NH_3	5.2 lb/ton of glass pulled	See Knauf CBI letter
			VE	20%	≤ 1.83%
ML2ALB Forming/Curing Stack	3/20/19	Low LOI	TPM	25.19 lb/hr	19.709 lb/hr
				5.59 lb/ton of glass pulled	See Knauf CBI letter
			NH_3	5.2 lb/ton of glass pulled	See Knauf CBI letter
			VE	20%	0%
EU-WBWALB Forming Stack East	3/21/19	Normal	TPM	23.98 lb/hr *	13.258 lb/hr
				5.33 lb/ton of glass pulled *	See Knauf CBI letter
			VE	20% *	0%
EU-WBWALB Forming Stack West	3/21/19	Normal	TPM	23.98 lb/hr *	10.642 lb/hr
				5.33 lb/ton of glass pulled *	See Knauf CBI letter
			VE	20% *	≤ 0.10%

*The Emission Limit for the EU-WBWALB are combined for the Forming Stack East and Forming Stack West

The identification of individuals associated with the test program is summarized below.

TEST PERSONNEL INFORMATION		
Location	**Address**	**Contact**
Test Coordinator	Knauf Insulation One Knauf Drive Shelbyville, Indiana 46176	Mr. Adam Estes (317) 421-4702 (phone) Adam.Estes@knaufinsulation.com
Test Facility	Knauf Insulation 1000 E. North Street Albion, Michigan 49224	
Testing Company Representative	Mostardi Platt 888 Industrial Drive Elmhurst, Illinois 60126	Mr. Christopher S. Trezak Senior Project Manager (630) 993-2100 (phone) ctrezak@mp-mail.com

The test crew consisted of Messrs. M. Platt, M. Lipinski, J. Rodgers, V. Addison, S. McGough, and C. Trezak of Mostardi Platt.

2.0 TEST METHODOLOGY

Emission testing was conducted following the methods specified in 40 CFR, Part 60, Appendix A, and 40 CFR, Part 51, Appendix M. Schematics of the test section diagrams and sampling trains used are included in Appendix A and B, respectively. Calculation examples and nomenclature are included in Appendix C and laboratory analysis data are found in Appendix D. Copies of analyzer print-outs and field data sheets for each test run are included in Appendix E and F, respectively.

The following methodologies were used during the test program:

Method 1 Traverse Point Determination

Test measurement points were selected in accordance with Method 1. The characteristics of the measurement location are summarized below.

TEST POINT INFORMATION						
Location	**Duct Diameter (Feet)**	**Area (Square Feet)**	**Upstream Diameters**	**Downstream Diameters**	**Test Parameter**	**Number of Sampling Points**
EU-WBWALB East Forming Stack	11.0	95.033	>0.5	>2.0	TPM	24
EU-WBWALB West Forming Stack	5.95	27.805	>0.5	>2.0	TPM	24
ML2ALB Forming/Curing Stack	7.41667	43.202	>0.5	>2.0	TPM, NH_4	24

Method 2 Volumetric Flowrate Determination

Gas velocity was measured following Method 2, for purposes of calculating stack gas volumetric flow rate at all test locations. S-type pitot tubes, differential pressure gauges, thermocouples and temperature readouts were used to determine gas velocity at each sample point at each test location. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix G.

Method 3A Oxygen (O_2)/Carbon Dioxide (CO_2) Determination

Stack gas molecular weight was determined in accordance with Method 3A at all test locations. ECOM analyzers were used to determine stack gas oxygen and carbon dioxide content and, by difference, nitrogen content. All of the equipment used was calibrated in accordance with the specifications of the Method and calibration data are included in Appendix G. Copies of the gas cylinder certifications are included in Appendix H.

Method 5 Particulate Determination

Stack gas particulate concentrations and emission rates were determined in accordance with Method 5 at all test locations. An Environmental Supply Company, Inc. sampling train was used to sample stack gas at an isokinetic rate, as specified in the Method. Particulate matter in the sample probe was recovered using an acetone rinse. The probe wash and filter catch were analyzed by Mostardi Platt in accordance with the Method in the Elmhurst, Illinois laboratory. Laboratory data are found in Appendix D. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix G.

Method 202 Condensable Particulate Determination

Stack gas condensable particulate matter concentrations and emission rates were determined in accordance with USEPA Method 202, in conjunction with Method 5 filterable particulate sampling at all test locations. This method applies to the determination of condensable particulate matter (CPM) emissions from stationary sources. It is intended to represent condensable matter as material that condenses after passing through a filter and as measured by this method.

The CPM was collected in the impinger portion of the Method 5 (Appendix A, 40CFR60) type sampling trains. The impinger contents were immediately purged after each run with nitrogen (N_2) to remove dissolved sulfur dioxide (SO_2) gases from the impinger contents. The impinger solution was then extracted with hexane. The organic and aqueous fractions were then taken to dryness and the residues weighed. A correction was made for any ammonia present due to laboratory analysis procedures. The total of both fractions represents the CPM.

All sample recovery was performed at the test site by the test crew. Mostardi Platt personnel at the laboratory in Elmhurst, Illinois, performed all final particulate sample analyses. Laboratory data are found in Appendix D. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix G.

Method 9 Visible Emission Determination

Visible emissions are determined in accordance with Method 9. The observers stood at a distance providing a clear view of the emissions with the sun oriented in the 140° sector to their back. As much as possible, the line of vision is approximately perpendicular to the plume direction.

Opacity observations are made at the point of greatest opacity in the portion of the plume where condensed water vapor is not present. Observations are made at 15-second intervals for the duration of the test run. Tests will be a minimum of 60 minutes and conducted simultaneously with the USEPA Method 5E, 40CFR60, Appendix A particulate matter testing.

Visible emissions observations were conducted and recorded by Messrs. M. Platt, B. Garcia, and C. Trezak, who are certified visual emissions observers. Copies of the observers' certifications are presented in Appendix I.

CTM-027 Ammonia (NH_3) Determination

Ammonia concentrations were determined using USEPA Conditional Test Method (CTM) 027 at the ML2ALB Forming/Curing Stack test location. An integrated 24-point sample was extracted from the gas stream and passed through dilute (0.1 N) sulfuric acid. In the dilute acid, ammonia dissolves and forms ammonia ions. The ammonia ions were then analyzed by ion chromatography. The sample train consisted of a glass-lined probe followed by a heated filter, and four impingers. The first and second impingers contained the dilute sulfuric acid, the third impinger was empty, and the fourth impinger contained silica gel to absorb any remaining moisture. The sample train was leak checked prior to and after each test run. The samples were recovered by quantitatively transferring the contents of the first three impingers and deionized water rinses to glass sample jars. The samples were labeled, and the level marked. The samples were analyzed by Mostardi Platt in the Elmhurst, Illinois laboratory. Sample analysis data are found in Appendix D. All of the equipment used was calibrated in accordance with the specifications of the Method. Calibration data are presented in Appendix G.