

**Shasta County Department of Resource Management**

**Air Quality Management District**

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**Evaluation Report**

**Regarding Proposed Modification to a  
Title V Operating Permit to**

**Knauf Insulation, GmbH**

**for Equipment Located at:**

**3100 Ashby Road  
City of Shasta Lake, CA 96019**

**August 2012**

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Title V Operating Permit  
Knauf Insulation, GmbH**

## **Introduction**

The District proposes to issue a Title V operating permit to Knauf Insulation, GmbH (Knauf). This evaluation, with the proposed Title V operating permit, sets forth the legal and factual basis for the conditions contained in the proposed permit.

## **Facility Description**

Knauf Insulation is a fiberglass manufacturing facility that produces both blanket insulation and blown insulation. The insulation is produced from silica sand, recycled glass, and other materials as specified in the application. The glass is initially melted in an electric furnace operating at 2500°F. The insulation is produced on the forming line where the glass is formed into fine strands in spinners and laid down onto a moving conveyor. Some of the glass is diverted to the unbonded insulation forming line. The forming lines (bonded and unbonded) are heated with natural gas burners with a total heat input of 55 MMBTU/Hr. The exhaust from the forming lines feed through seven venturi scrubbers in parallel operating at a minimum of 10 psi across the venturi throat. Knauf Insulation submitted an application to the District to reduce the minimum pressure drop across each scrubber from 10 inches water to 3 inches water. This application has been approved and has been incorporated into their current Title V Operating Permit.

The uncured mat from the forming process enters a natural gas fired curing oven where the binder is thermally set or cured. The oven exhaust gases pass through a Regenerative Thermal Oxidizer (RTO). The cured glass fiber mat then passes over a cooling section where cool air is pulled down through the mat and conveyor. Emissions from this section are minor in comparison to the emissions of the forming section. The exhaust gases from the cooling section are fed through a scrubber and are combined with the forming exhaust and pass through the Wet Electrostatic Precipitator (WESP). The RTO and WESP exhaust gases are combined and fed into the main stack.

The finished fiberglass wool mat is trimmed and backed. The volatile organic compound emissions from the application of the backing are insignificant since a water-based adhesive is used. Some of the fiberglass wool mat trimmings and other scrap is processed into Class B blowing insulation by removing the backing, and grinding the wool. The unbonded fiberglass insulation is produced by four spinners without the use of a binder.

Since starting production in 2002, Knauf has made a modification to the formula for the binder used in the manufacturing process. The original binder formulation consisted of formaldehyde and phenol, whereas the current binder consists of a non-toxic, renewable formulation. Knauf has demonstrated through source testing that the new binder formulation meets the current emission limits in the Title V Permit. Knauf has submitted an application to remove the NNN requirements from the permit with the current binder formulation. But Knauf has requested that the NNN requirements remain in the Title V Permit, if the facility reverts back to the formaldehyde and phenol binder formulation.

This evaluation will address the source's Title V permit changes that reflect the non-applicability of 40 CFR 63, Subpart NNN when using a non-toxic binder formulation as well as estimate potential emission changes.

## APPLICABLE RULES AND REGULATIONS

### Shasta County Air Quality Management District:

Rule 2:1A	Permits Required
Rule 2:1, Part 101	New Source Review
Rule 2:1, Part 301	Best Available Control Technology (BACT)
Rule 2:3	Toxics New Source Review for Complying with Federal Clean Air Act, Section 112(g)
Rule 2:11	Fees
Rule 3:2	Specific Air Contaminants
Rule 5	Title V

### Code of Federal Regulations

40 CFR Part 52	Prevention of Significant Deterioration
40 CFR Part 60	Subpart PPP, Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants
40 CFR Part 63	Subpart NNN, National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing

## APPLICATION EVALUATION

### Rule 2:1A

This source is not exempted by Section 42310 of the *California Health and Safety Code*. An application for a permit modification is required. The application was deemed administratively complete.

### Rule 2:1, Part 100

The purpose of this rule is to establish pre-construction review requirements for new modified sources of air pollution and allow for no net increase in emissions. Knauf's request to have the requirements from 40 CFR 63, Subpart NNN to be removed from the operating conditions, while the facility is using a non-formaldehyde/phenol binder, will not require any physical modifications to any of the process equipment or emission control equipment. The facility has done source testing since switching over to the new Ecosol binder and there has not been an increase of any pollutant above the existing permitted limits.

### Rule 2:1, Part 301

The purpose of this rule defines the use of Best Available Control Technology (BACT) based on any emissions increase and potential to emit. Knauf Insulation is currently using BACT to control emissions from the production of fiberglass.

This section does not apply because there will be no increase in emissions associated with the modification.

### Rule 2:3

A screening health risk analysis was previously done during the initial permitting process. There is no increase in emissions with this application, therefore a health risk analysis was not required to be done.

### Rule 2:11

There is not addition or subtraction of permitted equipment with the modification application. There will be no change in the annual permitting fee.

### Rule 3:2

Table 1 of this rule specifies that the maximum emissions allowed by any source of pollution not exceed the limits designated in this rule. These emission limits are incorporated into the Permit to Operate and will not change as a result of this modification.

### Rule 5

This rule lists the requirements of the Title V program. All specific applicable requirements imposed by this rule are currently included in the existing Title V permit.

### Prevention of Significant Deterioration (PSD) Permitting

This regulation sets the procedures for the review of new or modifications of existing major stationary emission sources. Knauf was issued the original PSD permit as part of the District's Authority to Construct for the facility. Subsequently, EPA has become the permitting authority for PSD permits. Any portions of 40 CFR 63, subpart NNN that is incorporated into the current PSD permit shall remain in effect and remain in the Title V permit until the time that Knauf Insulation submits an application to EPA Region IX to have subpart NNN removed from the PSD permit.

### 40 CFR 60, Subpart PPP

The New Source Performance Standard (NSPS) for wool fiberglass insulation manufacturing plants was incorporated into the Title V permit when the facility was initially permitted. All the applicable requirements from the NSPS are currently included into the conditions of the current Title V Permit.

### 40 CFR 63, Subpart NNN

The requirements of this subpart apply to the emissions of hazardous air pollutants from new or existing rotary spin wool fiberglass manufacturing line producing a bonded wool fiberglass insulation product. The definition of a wool fiberglass manufacturing facility is defined as "...any facility manufacturing wool fiberglass on a rotary spin manufacturing line...". A rotary spin is defined as "...a process used to produce wool fiberglass building insulation...". The definition of building insulation is "...means bonded wool fiberglass insulation...". Bonded is defined as "means wool fiberglass to which a phenol-formaldehyde binder has been applied." The phenol-formaldehyde binder has been replaced with a binder formulation that does not contain any hazardous air pollutants. Section 63.1380 (c) states the requirements of this subpart do not apply to a manufacturing facility that has demonstrated to the Administrator it is not a major source for

hazardous air pollutants. Published in the Federal Register Vol. 69, No. 130 on Thursday, July 8, 2004, EPA determined that if a facility switches from a phenol-formaldehyde binder to an acrylic binder, then the facility no longer meets the definition of a “wool fiberglass manufacturing facility” as defined in 40 CFR 63.1381, and therefore is no longer subject to Subpart NNN. The new binder formulation at Knauf Insulation is not an acrylic binder. In conversations between EPA, Region 4, and Knauf Insulation, EPA has determined that the same Applicability Determination Index, which is quoted in the Federal Register, is applicable to the binder change at Knauf Insulation. Therefore, 40 CFR 63, Subpart NNN is no longer applicable when Knauf Insulation is using a non phenol-formaldehyde binder. The Shasta County Air Quality Management District, which has delegated authority from EPA for Subpart NNN of Part 63, concurs with this determination.

In the application for the modification, Knauf Insulation has requested that subpart NNN be removed from the operating conditions, while utilizing the Ecosse binder formula. But the facility has also requested that the subpart NNN requirements remain in the Title V Permit if the facility changes back to a phenol-formaldehyde binder formulation at some point in the future. A section will be added to the Title V Permit for when a phenol-formaldehyde binder is utilized at the facility. A new condition will be added stating the facility shall give written notification to the District and EPA Region IX at least 30 days prior to switching back to the phenol-formaldehyde binder.

The sections of subpart NNN that pertain to particulate matter are included as operating conditions in the Prevention of Significant Deterioration Permit (PSD). To ensure consistency between the PSD Permit and the Title V Permit, the sections of Subpart NNN, that have been included in the PSD Permit, shall remain as operating conditions in the Title V Permit.

Section 63.1382 paragraph (a) - This limits the particulate matter emissions from the furnace stack and the formaldehyde emissions from the main stack. The particulate matter emissions are limited to 0.5 lb of pm per ton of glass pulled. The particulate matter limit specified in subpart NNN is less stringent than the Best Available Control Technology (BACT) determination that was done during the permit modification to increase the fiberglass production limit from 194 tons/day to 225 tons/day. The BACT determination limits the particulate matter to 0.07 lbs per ton of glass pulled and this requirement is in permit condition B2.

The formaldehyde emissions are limited to 1.8 lb of formaldehyde per ton of glass pulled. This is less stringent than the limits specified in permit condition H2. The formaldehyde limit is based on the information that was submitted in the original PSD/Authority to Construct application in table 2.3-1, which was based on actual test results from the Knauf Lanett facility. With an emission limit of 2 lb of formaldehyde per hour and a maximum production limit of 225 tons fiberglass per day, the formaldehyde limit was calculated to be 0.21 lb of formaldehyde per ton of glass pulled.

Section 63.1382 paragraph (b) – This paragraph specifies the operating limit requirements for the installed control equipment and the process controls.

The owner/operator must initiate corrective action within one-hour of an alarm from a bag leak detector, and complete the corrective actions in a timely manner. As previously mention, to stay consistent with the PSD permit, this requirement will remain in the Title V Permit in conditions A2, B5, B7, and D4.

The owner/operator must initiate corrective action within one hour when any of the following occur:

- any three-hour block average of the monitored ESP parameters is outside the limit established during the performance test,
- any four-hour average of the glass pull rate exceeds the level established during the performance test by greater than 20 percent,
- the average pressure drop, liquid flow rate, or chemical feed rate for any three-hour block is outside the limits established during the performance test for each wet scrubbing device, or
- any monitored process parameter level(s) are outside the limit(s) established during the performance test.

These requirements are covered in conditions H5 through H7.

The owner or operator must implement a Quality Improvement Plan (QIP) consistent with the compliance assurance monitoring provisions in 40CFR64, Subpart D, if the above deviations occur for more than five percent of the total operating time during a six-month period. This requirement is covered by conditions B22 and C23.

The owner or operator must operate the incinerator used to control the formaldehyde emissions so that any three-hour block average temperature in the firebox does not fall below the average established during the performance test. This is covered by condition H4.

The owner or operator must use a resin in the formulation of binder such that the free-formaldehyde content of the resin used does not exceed the free-formaldehyde range contained in the specification for the resin used during the performance test. Also, the owner or operator must use a binder formulation that does not vary from the specification and operating range established and used during the subject performance test. These requirements are covered by condition H3.

Section 63.1383 paragraph (a) – A written operations, maintenance, and monitoring (OM&M) plan must be prepared for the glass-melting furnace and rotary spin manufacturing line. This requirement is covered in conditions B9 and H9.

Section 63.1383 paragraph (b) – This paragraph specifies the requirements for when a baghouse is used to control particulate matter emissions from a glass-melting furnace. The owner/operator shall install, calibrate, maintain, and continuously operate a bag leak detection system. The OM&M plan must specify correction actions to be followed in the event of a bag leak detection alarm. These requirements are covered in conditions A2, B4, and D4.

Section 63.1383 paragraph (c) – This paragraph specifies the requirements for when an ESP is used to control particulate matter emissions from a glass-melting furnace. The owner/operator must monitor the ESP according to the procedures in the OM&M plan. This requirement is covered in conditions B9 and H9. Elements of the OM&M plan, pertaining to the wet ESP, can be found in conditions C6 and C11.

Section 63.1383 paragraph (f)(2) – This paragraph required that the owner/operator must install a continuous glass pull rate monitor that monitors and records on an hourly basis the glass pull rate on any new glass-melting furnace. This requirement is covered by condition C9.

Section 63.1383 paragraph (g) – This paragraph required that the owner/operator shall install, calibrate, maintain, and operate a monitoring device that continuously measures and records the operating temperature in the firebox of each thermal incinerator. This requirement is covered by condition C11.

Section 63.1383 paragraph (h) – This paragraph requires that when a wet scrubbing device is used, the owner/operator must install, calibrate, maintain, and operate monitoring devices that continuously monitor and record the gas pressure drop across each scrubber and scrubbing liquid flow rate to each scrubber, according to the OM&M plan. The pressure drop monitor is to be certified to be accurate within  $\pm 1$ ” Water Column, and the flow rate monitor is to be certified to be accurate  $\pm 5$  percent over the operating range of the gauges. The owner/operator must continuously monitor and record the feed rate of any chemical added to the scrubbing liquid. These requirements are covered by conditions B9, C5, C11, and C26.

Section 63.1383 paragraph (i) – This paragraph requires the owner/operator that uses process modifications to control formaldehyde emissions must establish a correlation between formaldehyde emissions and the process parameters to be monitored. The owner/operator must monitor the established parameter(s) according to the procedures in the OM&M plan. These requirements are covered by conditions H9 and H17.

Section 63.1383 paragraph (j) & (k) – This paragraph requires the owner/operator to monitor and record the free-formaldehyde content of each resin shipment. Additionally, the owner/operator must monitor and record the formulation of each batch of binder used. These requirement is covered by condition H11.

Section 63.1383 paragraph (l) – This paragraph requires that the owner/operator monitor and record the product LOI and product density every eight hours for each bonded wool fiberglass product manufactured. This requirement is covered by condition H28.

Section 63.1384 – This section specifies the performance testing requirements. The facility shall conduct the performance test in accordance with 40CFR63 subpart A and the following requirements:

- the facility must monitor and record all process and emission control equipment parameters every 15 minutes. And this data shall set the minimum and maximum set points for the process and emission control equipment,
- the glass pull rate must be monitored and recorded every 15 minutes and the average must be calculated for each test run,
- testing shall be done while producing the insulation with the highest LOI content, and resin with the highest free-formaldehyde content, and
- short term experimental production runs, where the process parameters could be outside the established limits, are allowed with the proper agency notification.

All of the testing requirements of this section are currently in the existing Title V permit, and shall remain in the appropriate sections.

Section 63.1385 – This section specifies the test methods to be used to show compliance:

- Test Methods 1-5,
- Test Method 316 or 318 for formaldehyde concentration,

- Test Method contained in appendix A for product LOI,
- Test Method contained in appendix B for free-formaldehyde content of the resin, and
- Test Method contained in appendix C for product density.

Alternate testing methods are allowed if approved by the administrator. These testing requirements are covered by conditions B9, B13, B14, F14, H12, H14, and H15.

Section 63.1386 paragraph (a) and (b) – This paragraph specifies the notification requirements of the facility, that includes the initial notification and initial testing. The initial notifications and initial testing have been previously completed by the facility, and not part of the current Title V permit. Except, if the facility switches back to a formaldehyde based binder, then an initial testing notification would be required. The testing notification is covered by condition H10.

Section 63.1386 paragraph (c) – This paragraph specifies the requirements for startup, shutdown, and malfunction procedures. The owner/operator shall develop a written plan that contains the specific procedures during periods of startup, shutdown, and malfunctions. The owner/operator shall also keep records of each event. These requirements are covered by conditions F7, G3, and H9.

Section 63.1386 paragraph (d) – This paragraph specifies the recordkeeping requirements. Subparagraph 1 requires that all the records be maintained by the facility for at least 5 years. Also, the owner/operator shall maintain records on the following devices:

- Bag leak detectors,
- ESP parameters,
- Binder formulation,
- LOI,
- Product density,
- Process parameters,
- Scrubber pressure drop and liquid flow rate,
- Incinerator operating temperature, and
- Glass pull rate

These requirements are all covered in the appropriate sections of the Title V Permit.

Section 63.1386 paragraph (e) – This paragraph specifies that the owner/operator shall report semi-annually if measured emissions are in excess of the applicable standard or a monitored parameter deviates from the levels established during the performance testing. This requirement is covered by conditions B24, B25, B26, C20, C21, and C25.

### Permit Streamlining

The requirements of NNN are included and are, in some instances, subsumed by other more stringent conditions in the proposed Title V Permit modification. The following streamlining demonstration for 40 CFR Part 63, Subpart NNN, National Emissions Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing, will compare and identify where a more stringent rule applies to this facility.

### Step 1. Side-by-Side Comparison of Applicable Requirements:

PM <sub>10</sub>			
Regulatory Basis	SIP, Rule 3:2	PSD/NSR Permit	NESHAP 40 CFR Part 63, Subpart NNN
Emission Standards	- 0.05 grains/DSCF (1.1 pounds per ton of glass pulled)	- 0.67 lb/hr and 0.07 lb/ton of glass pulled on a 3-hour rolling average; and - 2.9 tons/year, on a 12-month rolling sum. (Filterable and condensable PM)	- 0.5 pounds per ton of glass pulled (Filterable)
Monitoring	None	-Continuous bag leak detection system and corrective action requirements - Continuous glass pull rate monitor that records glass pull rate on an hourly basis - Continuous opacity monitor	- Prepare a written O&M plan for each affected glass-melting furnace and manufacturing line. - Continuously operate a bag leak detection system. - An existing glass-melting furnace equipped with a continuous glass pull rate monitors must monitor and record the glass pull rate on an hourly basis.
Recordkeeping	None	- Retain records of the hourly glass rate production averaged on a daily and weekly basis in tons of glass pulled per day -Record hours of operation of the glass melting furnace on a daily basis. - Retain records of performance test measurements. - Retain records of all calculations and measurements. - Retain records of each occurrence of the alarm for the bag leak detection system; the corrective action(s) taken for each occurrence of the alarm; and the duration for completing each correction action(s). - All records are to be retained for a minimum of 5 years.	- Retain all general records required by 40 CFR 63.10(b)(2). - Retain records of each occurrence of the alarm for the bag leak detection system; the corrective action(s) taken for each occurrence of the alarm; and the duration for completing each correction action(s). - Retain records for the glass pull rate on an hourly basis - Retain records of any period that the glass pull rate exceeds the average pull rate during the performance test by more than 20%; date and time of each occurrence and the corrective action; and when the exceedance was corrected. - All records are to be retained for a minimum of 5 years.
Testing	Approved EPA test methods.	- Annual PM testing using EPA Methods 1 through 5, and 202	- Initial performance test using EPA methods 1 through 5.
Reporting	None	- Semi-annual report of all excess emissions and monitoring systems performance. - Semi-annual written report of each occurrence of the alarm for the bag leak detection system; the corrective action(s) taken for each occurrence of the alarm; and the duration for completing each corrective action(s).	- Semi-annual report of all excess emissions and monitoring systems performance. - Semi-annual report of each occurrence of the alarm for the bag leak detection system; the corrective action(s) taken for each occurrence of the alarm; and the duration for completing each corrective action(s). - Semi-annual written report of the glass pull rate on an hourly basis. - Semi-annual written report of each occurrence when the glass pull rate exceeds the average pull rate during the performance test by more than 20%; date and time of each occurrence; the corrective action(s) taken for each occurrence; and the duration for completing each corrective action(s).

## **Step 2. Select most stringent emission limit or performance standard:**

For the PM<sub>10</sub> the limit specified in the NSR/PSD Permit is more stringent than the limit specified in either 40 CFR 63, Subpart NNN or the State SIP requirements. The facility shall be limited for PM<sub>10</sub> at the furnace stack to 0.67 lb/hr and 0.07 lb/ton of glass pulled.

## **Step 3. Conditions ensuring compliance with applicable requirements**

The facility will show compliance at the furnace stack for particulate matter by meeting the streamlined condition B2, with annual particulate testing for the filterable and condensable particulate.

The facility shall retain records for the glass pull rate on an hourly basis at all times. The glass pull rate shall be included in the semi-annual report.

The facility shall retain records of any period that the glass pull rate exceeds the average pull rate during the performance test by more than 20%, the date and time of each occurrence and the corrective action take, and when the exceedance was corrected. These records are only required when the NESHAP is applicable and shall be included in the semi-annual report.

These requirements and associated monitoring and recordkeeping requirement assure compliance.

**Permit Shield:** By meeting the streamlined requirements, all other subsumed applicable requirements would be met. The following shall be added to the permit shield:

“Compliance with permit conditions in the Title V permit shall be deemed compliance with the following subsumed requirements: NESHAP 40 CFR 63.1382(a) and Shasta County AQMD Rule 3:2. A permit shield is granted from these requirements.”

## **CONCLUSIONS AND RECOMMENDATION**

The proposed Title V Permit for the Knauf Insulation, GmbH facility is an affected facility with respect to the requirements of District Rule 5, ADDITIONAL PROCEDURES FOR ISSUING PERMITS TO OPERATE FOR SOURCE SUBJECT TO TITLE V OF THE CLEAN AIR ACT AMENDMENTS OF 1990 (adopted 9-28-93 and amended 5-8-01).

Therefore, it is the recommendation of the District that this Title V Operating Permit be issued.