Received
May 22, 2023
WV DEP/Div of Air Quality

Division of Air Quality Permit Application Submittal

Please find attached a permit application for : Roxul USA Inc, dba ROCKWOOL

[Company Name; Facility Location]

- DAQ Facility ID (for existing facilities only): 037-00108
- Current 45CSR13 and 45CSR30 (Title V) permits associated with this process (for existing facilities only): R14-0037

- Type of NSR Application (check all that apply):
  - ☐ Construction
  - ☑ Modification
  - ☐ Class I Administrative Update
  - ☐ Class II Administrative Update
  - ☐ Relocation
  - ☐ Temporary
  - ☐ Permit Determination

- Type of 45CSR30 (TITLE V) Application:
  - ☐ Title V Initial
  - ☐ Title V Renewal
  - ☐ Administrative Amendment**
  - ☐ Minor Modification**
  - ☐ Significant Modification**
  - ☐ Off Permit Change

****If the box above is checked, include the Title V revision information as ATTACHMENT S to the combined NSR/Title V application.**

- Payment Type:
  - ☑ Credit Card (Instructions to pay by credit card will be sent in the Application Status email.)
  - ☐ Check (Make checks payable to: WVDEP – Division of Air Quality)
    Mail checks to:
    WVDEP – DAQ – Permitting
    Attn: NSR Permitting Secretary
    601 57th Street, SE
    Charleston, WV 25304

Please wait until DAQ emails you the Facility ID Number and Permit Application Number. Please add these identifiers to your check or cover letter with your check.

- If the permit writer has any questions, please contact (all that apply):
  - ☐ Responsible Official/Authorized Representative
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45CSR13 Modification Permit Application

Roxul USA Inc.

RAN Facility

May 2023

The business of sustainability

CONTENTS

WVDAQ PERMIT APPLICATION FORMS

1. INTRODUCTION

1.1 Background

ROXUL USA Inc. dba Rockwool, (ROCKWOOL) submits this application for a permit modification to the West Virginia Department of Environmental Protection (WVDEP), Division of Air Quality (WVDAQ) to reflect modifications to Permit No. R14-0037. The modifications outlined in this application results in a net decrease in emissions of all regulated pollutants.

1.2 Application Overview

This permit application narrative is provided to add clarification and further detail to the permit application forms being provided to the WVDAQ for this project.

This section (Section 1) contains introductory information. Section 2 presents an overview of the proposed updates to processes and equipment. Processes with no changes have been omitted from Section 2. A summary of emissions changes is provided as Section 3. Section 4 provides a review of updates to federal regulatory requirements. A review of updates to state regulatory requirements is provided as Section 5. The WVDAQ permit application forms are provided as Appendix A.

2. PROCESS UPDATES OVERVIEW

The modifications included in this permit application reflect an aggregation of changes in equipment sizing, location, and source details. The types of permitting updates can be categorized into the following sets of changes:

- Removal of coal transfer, storage, and preparation equipment from the permit. The RAN facility will not fire coal and these sources have not been installed.
- Reallocation of eight (8) pounds per hour of carbon monoxide (CO) emissions from the Melting Furnace (IMF01) to the WESP (HE01).
- Removal, addition, and modification of raw material handling sources, including haul roads.
- Removal and modification to the capacity of various storage tanks.
- Removal of cooling towers.
- Modifications to the sizing of the combustion sources.
- Updates to release point parameters, including stack height and stack location coordinates.
- Removal of PMARK – Product Marking from the permit. Inkjet (VOC) marking was not installed at RAN.
- Removal of Rockfon. The Rockfon production line currently has no plans to be constructed.
- Reduction of the annual hours of operation of the mineral wool production facility to 8,400 to reflect required annual turnarounds. The process mandates that the mineral wool production line is shut down for 2 weeks each year to conduct routine maintenance on the facility. The 8,400 hours of operation represents the maximum hours of operation of the mineral wool production line. The material handling, tanks, and paved roads will remain at 8,760 hours per year.
- Reduction of the annual hours of operation and application rate on Fleece Application Vents 1 & 2 (4,200 hours per year). This value is reflective of the maximum expected operations due to product demand.

A description of the changes to the manufacturing process and associated emission points is provided in Attachment G – Process Description.

3. SUMMARY OF EMISSION CHANGES

The updates proposed in this application will result in a net decrease in emissions. The original potential to emit, the changes due to the updates outlined in Section 2, and the resulting potential to emit are shown in the table below:

Table 3-1: Summary of PTE Changes

Pollutant	Permitted Facility Emission Rate (tons/year)	Changes due to Updates (tons/year)	New Facility Emission Rate (tons/year)
CO	71.40	-11.23	60.17
NO_x	238.96	-71.90	167.06
Total PM	250.87	-175.37	75.50
Filterable PM	129.23	-54.10	75.13
PM_{10}	153.19	-80.13	73.06
$PM_{2.5}$	133.41	-66.80	66.61
SO_2	147.45	-6.11	141.34
VOC	471.41	-275.23	196.18
CO_2e	152,934.82	-30,931.87	122,002.95
Formaldehyde	68.63	-51.99	16.64
Methanol	106.61	-3.73	102.88
H_2SO_4	16.37	-8.52	7.85
Lead	2.47E-04	-5.80E-05	1.89E-04
Total HAP	392.59	-128.98	263.61
HF	1.62	-0.07	1.55
HCl	1.29	-0.05	1.24
COS	1.64	-0.07	1.57
Arsenic	3.93E-04	-1.60E-05	3.77E-04
Mercury	2.55E-03	-1.00E-04	2.45E-03
Phenol	100.22	-24.90	75.32
Mineral Fiber	112.28	-47.99	64.29
Hexane	0.26	-0.15	0.11
Benzene	0.05	-4.95E-02	5.17E-04

4. FEDERAL REGULATORY REQUIREMENTS

New Source Performance Standards (NSPS) are established for specific industrial categories in 40 CFR Part 60. West Virginia regulations in WV 45 CSR 16 incorporate the federal NSPS by reference. A review of the NSPS categories has been performed for applicability and is presented below.

4.1 Non-Applicable NSPS Standards

The NSPS subparts discussed in this section are not applicable but are addressed for documentation purposes.

4.1.1 40 CFR 60 Subpart Dc – Small Industrial Steam Generating Units

There are no changes to applicability of NSPS Subpart Dc due to the updates discussed in this application. Additionally, the Coal Mill Burner (IMF05) was not installed and is proposed to be removed from the permit.

4.1.2 40 CFR 60 Subpart Kb – Volatile Organic Liquid Storage Tanks

There are no changes to applicability of NSPS Subpart Kb due to the updates discussed in this application. Two of the thermal oil tanks have updated sizing, but both tanks will still have a capacity of less than 19,813 gallons (75 m^3) and are therefore not subject to NSPS Subpart Kb.

4.1.3 40 CFR 60 Subpart Y – Standards Of Performance For Coal Preparation And Processing Plants

The facility will no longer prepare of process any coal and therefore is not subject to NSPS Subpart Y.

4.1.4 40 CFR 60 Subpart LL – Standards Of Performance For Metallic Mineral Processing Plants

There are no changes to applicability of NSPS Subpart LL based on updates discussed in this application.

4.1.5 40 CFR 60 Subpart VVV - Standards Of Performance For Polymeric Coating Of Supporting Substrates Facilities

There are no changes to applicability of NSPS Subpart VVV due to the updates discussed in this application.

4.1.6 40 CFR 60 Subpart CCCC – Standards Of Performance For Commercial And Industrial Solid Waste Incineration Units

There are no changes to applicability of NSPS Subpart CCCC due to the updates discussed in this application. The facility remains not subject to this subpart. Additionally, PET Coke and Coal sources were not installed and are proposed to be removed from the permit.

4.2 Applicable NSPS Standards

4.2.1 40 CFR 60 Subpart OOO – Nonmetallic Mineral Processing Plants

NSPS Subpart OOO applies to the following affected facilities in fixed or portable nonmetallic mineral processing plants that commenced construction after August 31, 1983: each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station. A “nonmetallic mineral processing plant” is defined as any combination of equipment that is used to crush or grind any nonmetallic mineral. The definition of nonmetallic mineral specifically mentions limestone, dolomite, and other minerals which may be contained in stone raw materials that will be sieved, crushed (if necessary), and conveyed in the charging building operations.

Per §60.672(d), truck dumping of nonmetallic minerals into any screening operation, feed hopper, or crusher is exempt from PM standards of NSPS Subpart OOO, which would exclude the Raw Material Loading Hopper (B215). Vacuum systems are not identified as affected facilities in NSPS Subpart OOO; therefore, the Charging Building Vacuum Cleaning Filter (IMF21) is not subject to NSPS Subpart OOO. The remaining affected sources subject to PM emissions limits include the belt conveyor connected to the charging building (IMF11); indoor conveyor transfer points IMF12 and IMF16; outdoor transfer point IMF15; indoor sieve, crusher, storage bins, and belt conveyors located inside the charging building (represented by IMF17); Raw Material Reject Outdoor Collection Bin (RM_REJ); and indoor Sieve Reject Collection Bin (S_REJ). The Filter Fines Day Silo (IMF07) and Filter Fines Receiving Silo (IMF10) are conservatively considered as part of the nonmetallic mineral processing plant because the silos will store stone or mineral raw materials that have been through the charging building operations.

After the final belt conveyor transfer from charging building operations to the furnace building, raw materials are dosed to a continuous weigh bin connected to the Melting Furnace. This bin is part of the mineral wool production operations and is not considered part of the nonmetallic mineral processing plant.

A summary of the applicable emission limits to affected sources subject to NSPS Subpart OOO is shown in Table 4-1 on the following page.

Table 4-1: Summary of Applicable Emission Limits to NSPS Subpart OOO Affected Sources

Source ID	Source Description	Control Device (if present)	NSPS Subpart OOO Limit	
			Limit	Citation
RM_REJ	Raw Material Reject Collection Bin	4-sided rubber drop guards	7% opacity	§60.672(b) & Table 3 [fugitive emission limits]
S_REJ	Sieve Reject Collection Bin	Telescopic Chute & Full Enclosure	7% opacity	
IMF14	Raw Material Reject Stockpile	3-sided enclosure	7% opacity	
IMF07	One (1) Storage Silo (Filter Fines Day)	Bin Vent Filter Enclosed Indoors	7% opacity	§60.672(a) & Table 2; §60.672(f) [opacity in lieu of concentration limit for dry control devices on individual enclosed storage bins]
IMF10	Filter Fines Receiving Silo	Bin Vent Filter	7% opacity	
IMF11	Conveyor Transition Point (B215 to B220)	Fabric Filter Enclosed Indoors	7% opacity	§60.672(b) & Table 3 [fugitive emission limits]
IMF17	Indoor sieve, crusher, storage bins, and belt conveyors located inside the charging building B220	Full Enclosure	7% opacity	§60.672(e)(1) [fugitive emissions from building openings]
IMF12	Conveyor Transfer Point	Full Enclosure	7% opacity	
IMF16	Conveyor Transfer Point	Full Enclosure	7% opacity	
IMF15	Transfer Points: Magnet Separator to Iron Container & Vacuum Cleaning	4-Sided Drop Guard	7% opacity	

ROCKWOOL will be required to submit applicable notifications and initial testing results for affected sources subject to NSPS Subpart OOO. Monitoring of baghouses required by §60.674(c) consists of quarterly 30-minute visible emissions inspections using EPA Method 22 or the alternative specified in §60.674(d) for operation of a bag leak detection system. Recordkeeping and reporting requirements will be applicable and will be conducted as required.

NSPS Subpart OOO does not apply to the following operations at the proposed facility as described below.

- The Recycling Plant is not part of a nonmetallic mineral processing plant because only formed mineral wool fibers are handled in this area (i.e., no stone or mineral raw materials).

- The capacity of the Melting Furnace Portable Crusher (170) will be equal to or less than the exemption threshold of 136 megagrams per hour (150 short tons per hour) per §60.670(c)(2). The portable crushing operation is separate from the charging building operations that are subject to NSPS Subpart OOO.
- Fresh and spent sorbent used in the desulfurization system at ROCKWOOL will be stored in silos and pneumatically conveyed either to or from the control system (e.g., no crushing, grinding, or other processing occurs). Sorbent handling is separate from the charging building operations that are subject to NSPS Subpart OOO. Therefore, the Sorbent Storage Silo (IMF08) and Spent Sorbent Silo (IMF09) are not part of a nonmetallic mineral processing plant and are not subject to NSPS Subpart OOO.

4.2.2 40 CFR 60 Subpart IIII - Stationary CI ICE

The Emergency Fire Pump Engine (EFP1) remains subject to this subpart. The installed unit has a maximum capacity of 316 hp (236 kW), as opposed to the original permitted value of 197 hp (147 kW). There are no changes to applicability of NSPS Subpart IIII based on the updates discussed in this application. The installed unit is an EPA certified unit. A copy of the emission guarantee with Reference to the EPA Certificate of Conformity is included in the WVDAQ Permit application forms.

4.3 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP)

NESHAP standards are established for specific pollutants and source categories in 40 CFR Part 61 and Part 63 in accordance with the Clean Air Act Amendments of 1990, which required development standards for sources of HAP. West Virginia regulations in WV 45 CSR 34 incorporate the federal NESHAP by reference. Potential HAP emissions from the ROCKWOOL facility are above the major source thresholds of 10 tpy (9.07 MT/year) of an individual HAP or 25 tpy (22.7 MT/year) of total HAP emissions. Thus, ROCKWOOL is a major source of HAP and is subject to any applicable MACT standards.

There are no existing or proposed NESHAP standards under 40 CFR Part 61 that are applicable to the ROCKWOOL facility.

A review of the NESHAP regulations under 40 CFR Part 63 has been performed for applicability to the ROCKWOOL facility and is presented below.

4.3.1 40 CFR 63 Subpart DDD – Mineral Wool Production

There are no changes to applicability of NESHAP Subpart DDD based on the updates discussed in this application. The Melting Furnace (IMF01) will continue to be subject to and show compliance with the emission limits in 40 CFR 63 Subpart DDD. ROCKWOOL will operate and maintain the Melting Furnace (IMF01) in compliance with 40 CFR 63 Subpart DDD.

4.3.2 40 CFR 63 Subpart JJJJ – Paper and Other Web Coating

There are no changes to applicability of NESHAP Subpart JJJJ based on the updates discussed in this application. Only the application of fleece binder material on the mineral wool line is subject to this regulation. ROCKWOOL will continue to comply with this regulation by using ‘as-applied’ compliant coatings pursuant to the procedures in §63.3370(a)(2). This limits the as-applied binder to a VOC content of 0.016 lb-VOC/lb-binder. VOCs are allowed for use as a surrogate for organic HAP (OHAP) emissions per §63.3370(c)(1) and (2).

4.3.3 40 CFR 63 Subpart ZZZZ – Stationary RICE

Federal NESHAP regulations for stationary Reciprocating Internal Combustion Engines (RICE) are found at 40 CFR Part 63, Subpart ZZZZ (“RICE MACT”). For the Emergency Fire Pump Engine, as a

new emergency stationary RICE with a site rating less 500 brake hp and located at a major source of HAP, the requirements of NESHAP Subpart ZZZZ are satisfied by meeting the requirements of NSPS Subpart IIII (per §63.6590(c)(7)). No further requirements apply for such engines under this part. As discussed in Section 5.2.2, the Emergency Fire Pump Engine complies with NSPS Subpart IIII.

4.3.4 40 CFR 63 Subpart DDDDD - Industrial, Commercial, and Institutional Boilers And Process Heaters

The Natural Gas-Fired Boilers (CM03 and CM04) have an updated heat input capacity of 4.99 MMBtu/hr (1,462 kW). Since these boilers have a heat input capacity less than 5 MMBtu/hr, ROCKWOOL will now be required to perform tune-ups on these boilers every 5 years, rather than biennially, in accordance with §63.7540 and Table 3 of Boiler MACT.

5. STATE REGULATORY REQUIREMENTS

This section outlines the West Virginia state air quality regulations that could be reasonably expected to apply to ROCKWOOL and makes an applicability determination for each regulation based on activities conducted at the site and the emissions of regulated air pollutants. This review is presented to supplement and/or add clarification to the information provided in the WVDEP Rule 14 permit application forms.

The West Virginia State Regulations address federal regulations, including Prevention of Significant Deterioration permitting, Title V permitting, New Source Performance Standards, and National Emission Standards for Hazardous Air Pollutants. The regulatory requirements in reference to the facility are described in detail in the below section.

5.1 45 CSR 02 – To Prevent and Control Particulate Air Pollution From Combustion of Fuel in Indirect heat Exchangers

The Natural Gas-Fired Boilers (CM03 and CM04) have an updated heat input capacity of 4.99 MMBtu/hr (1,462 kW). There are no changes to applicability of 45 CSR 02 based on this update, and these units still qualify for the exemption noted in 45 CSR 2 Section 11, as they have a heat input rating less than 10 MMBtu/hr (2,930 kW). The Rockfon Building Heater (RFN10) will not be installed and has been removed from this application.

5.2 45 CSR 04 – To Prevent and Control the Discharge of Air Pollutants into the Air Which Causes or Contributes to an Objectionable Odor

There are no changes to applicability of 45 CSR 04 based upon the updates discussed in this application.

5.3 45 CSR 05 – To Prevent and Control Air Pollution from the Operation of Coal Preparation Plants, Coal Handling Operations, and Coal Refuse Disposal Areas

There are no changes to applicability of 45 CSR 05 based upon the updates discussed in this application. The facility is subject to the requirements of 45 CSR 7 and therefore, is not subject to this rule.

5.4 45 CSR 06 – Control of Air Pollution from the Combustion of Refuse

There are no changes to applicability of 45 CSR 06 based on the updates discussed in this application. 45 CSR 06 remains applicable to the Curing Oven Afterburner (CO-AB).

5.4.1 45 CSR 6-4.1 - Determination for Maximum Allowable Particulate Emissions

The Curing Oven Afterburner (CO-AB) has been installed with a maximum heat input capacity of 9.86 MMBtu/hr but was originally permitted at 6.83 MMBtu/hr. No updates to flow rate to the Afterburner have been made. The estimated Total PM emission rate of 3.31 lb/hr (1.50 kg/hr) remains below the maximum allowable PM emission rate mandated by 45 CSR 06, and thus there are no changes to applicability based on the updates discussed in this application.

45CSR6 Emission Standards for Incinerators – Section 4.1
Pursuant to §45-6-4.1, PM emissions from incinerators are limited to the value determined by the following formula:

Emissions (lb/hr) = F x Incinerator Capacity (tons/hr)

Where, the factor, F, is indicated in the table below:

Incinerator Capacity	Factor F
A. Less than 15,000 lbs/hr	5.43
B. 15,000 lbs/hr or greater	2.72

The maximum capacity of the afterburner is 24.4 tons/hour. Using this value and an F factor of 2.72, the resultant PM emission limit is 66.37 lbs/hr. The estimated worst-case PM emitted from the afterburner is 3.31 lbs/hr. This is below the allowable of 45 CSR 06.

45CSR6 Opacity Limits – Sections 4.3 and 4.4
Pursuant to §45-6-4.3, and subject to the exemptions of 4.4, the curing oven afterburner will have a 20% opacity limit during operation. Proper design and operation of the curing oven afterburner will prevent any substantive opacity from the afterburner.

5.5 45 CSR 7 – To Prevent and Control Particulate Air Pollution from Manufacturing Processes and Associated Operations

45 CSR 7 regulates the emissions of filterable particulate matter from source operations within manufacturing processes. Manufacturing processes are defined as any industrial or manufacturing actions or processes that emit smoke, particulate matter, or gaseous matter.

ROCKWOOL operates multiple manufacturer processes that will emit filterable PM into the open air, including a mineral wool manufacturing process, and material handling point source activities. These separate manufacturing processes operate with separate source operations, which are defined as the last operation in a manufacturing process preceding the emissions of air contaminants.

The facility shall not emit filterable PM into the open air from any process source operation which is greater than 20% opacity. ROCKWOOL will also have to limit fugitive emissions by equipping manufacturing processes with a system to minimize fugitive PM emissions. ROCKWOOL utilizes a combination of good housekeeping practices, partial/full enclosures, baghouses, and various filters throughout the facility to minimize PM emissions. All haul roads are paved to minimize fugitive PM emissions.

5.5.1 Mineral Wool Line

There are no changes to applicability or compliance based upon the updates discussed in this application.

There will be a reduction of the annual hours of operation of the mineral wool production facility to 8,400 to reflect required annual turnarounds. The process mandates that the mineral wool production line is shut down for 2 weeks each year to conduct routine maintenance on the facility. The 8,400 hours of operation represents the maximum hours of operation of the mineral wool production line.

5.5.2 Rockfon Line

The Rockfon Line was not installed and is being removed as part of this application and will no longer be subject to 45 CSR 7.

5.5.3 Materials Handling Sources

The expected filterable PM emission rate for the materials handling process source operation is 1.49 lb/hr (0.67 kg/hr) and will demonstrate compliance with the Rule 7 requirements. The updates to material handling sources discussed within this permit application will have no impact on compliance with the Rule 7 requirements. There is no impact to the maximum allowable total stack filterable PM emission rate.

5.5.4 Coal Milling

Coal Milling was not installed and is being removed as part of this application and will no longer be subject to 45 CSR 7.

5.6 45 CSR 10 – To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

45 CSR 10 contains requirements that limit SO_2 emissions from fuel burning units, limits in-stack SO_2 concentrations of manufacturing processes, and limits hydrogen sulfide concentrations in process gas streams.

The Natural Gas-Fired Boilers (CM03 and CM04) have an updated heat input capacity of 4.99 MMBtu/hr (1,462 kW). There are no changes to applicability of 45 CSR 10 based on this update, and these units still qualify for the exemption noted in 45 CSR 2 Section 11, as they have a heat input rating less than 10 MMBtu/hr (2,930 kW).

The RAN Facility does not combust any process gas stream that potentially contain hydrogen sulfide gas.

The Melting Furnace stack (IMF01), after control by the sorbent injection system is subject to the limitation on in-stack SO_2 concentrations. Pursuant to §45-10-4.1, the Melting Furnace stack (IMF01) shall not exceed an in-stack SO_2 concentration of 2,000 parts per million by volume. The calculated in-stack SO_2 concentration based on 33.63 lb/hr of SO_2, 21,413.73 acfm, 301.73 ^oF is 227.48 ppm_v. This in-stack SO_2 concentration is less than the 45 CSR 10 allowable.

5.7 45 CSR 11 – Prevention of Air Pollution Emergency Episodes

There are no changes to applicability of 45 CSR 11 based on the updates discussed in this application.

5.8 45 CSR 13 – Permits For Construction, Modification, Relocation And Operation Of Stationary Sources Of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission To Commence Construction, And Procedures For Evaluation

45 CSR 13 outlines the requirements for the submission of deliverables as they apply to the construction or modification of stationary sources of air pollution. ROCKWOOL's initial permitting action was subject to the requirements of this rule based upon the construction of a stationary source

of air pollutants exceeding West Virginia's minor source permitting applicability thresholds (6 lb/hr AND 10 tpy of any regulated air pollutant).

When evaluating the updates contained within the permit application, the most appropriate permitting mechanism for an update to ROCKWOOL's existing air permit has been identified as a Class I Administrative Update. ROCKWOOL understands that WVDAQ will use its discretionary authority to process the permitting update as a Modification and submits this modification application based upon WVDAQ's direction.

The original permit application was submitted to the WVDAQ on November 21, 2017. At that time, the proposed facility was defined as a 'major stationary source' under 45 CSR 14 as shown in Table 3-1. Consistent with WVDAQ policy, permitting actions that are reviewed under 45 CSR 14 are also reviewed concurrently under 45 CSR 13. Permit R14-0037 was issued on April 30, 2018.

With the proposed changes outlined in this application, the RAN Facility will experience a net decrease in emissions of all pollutants. Additionally, this decrease will result in the facility no longer being defined as a 'major stationary source'. This means the facility no longer has the potential to emit two hundred fifty (250) tons per year or more of any regulated NSR pollutant.

This modification application satisfies the WVDAQ's permitting requirements and will establish the facility as a minor source for all regulated NSR pollutants. This application will be subject to public review procedures outlined in §45-13-8. ROCKWOOL will place the required Class I legal advertisement in a newspaper of general circulation in the area and pay the appropriate permit application fees required under 45 CSR 22.

5.9 45 CSR 14 – Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

Federal construction permitting programs regulate new and modified sources of attainment pollutants under Prevention of Significant Deterioration. The requirements of this rule apply to the construction of any new major stationary source. In the pre-construction application (November 21, 2017), the RAN Facility was classified as a major stationary source because the facility potential to emit (PTE) exceeded two hundred fifty (250) tons per year of VOC. Further, emissions of NO_x, SO_2, PM, PM_{10}, $PM_{2.5}$, H_2SO_4 Mist, and CO2e were also subject to PSD review due to potential emissions greater than the PSD significant emission rate (SER) for each pollutant.

This permitting action was evaluated against the regulatory definitions of major modification and minor modification. Due to the large decrease in emissions, the facility is no longer defined as a 'major stationary source'. Therefore, the RAN facility is no longer subject to 45 CSR 14. Because the RAN Facility is not subject to 45CSR 14, air quality modeling or Best Available Control Technology (BACT) analysis is not required as part of this application.

These large emission decreases are realized because the RAN Facility was conservatively permitted to account for a wider range of potential operating conditions. Some of these potential operating conditions were never realized and this permitting action removes their potential use. Additionally, there was a reduction of the annual hours of operation of the mineral wool production facility to 8,400 to reflect required annual turnarounds to account for an annual shutdown for maintenance activities, and a reduction of the annual hours of operation and application rate on Fleece Application Vents 1 & 2 (4,200 hours per year) to reflect maximum expected operations due to product demand.

5.10 45 CSR 16 – Standards of Performance for New Stationary Sources (NSPS)

45 CSR 16 applies to registrants that are subject to 40 CFR 60 Standards of Performance for New Source Stationary Sources (NSPS).

ROCKWOOL is subject to the following NSPS subparts because of processes and equipment used at the facility:

- NSPS Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants; and
- NSPS Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines.

No additional NSPS are applicable for this facility. Additional descriptions of these regulations are provided in the Federal Regulations section of this regulatory discussion.

5.11 45 CSR 17 – To Prevent and Control Particulate Matter Air Pollution from Materials Handling, Preparation, Storage, and other Sources of Fugitive Particulate Matter

The facility is not subject to this rule because sources that are subject to the fugitive PM emission requirements of WV 45 CSR 7 are exempt from the provisions of WV 45 CSR 17.

5.12 45 CSR 21 – To Prevent and Control Air Pollution from the Emissions of Volatile Organic Compounds

There are no changes to applicability of 45 CSR 21 based on updates discussed in this application.

5.13 45 CSR 29 – Rules Requiring the Submission of Emission Statements for Volatile Organic Compound (VOC) Emissions and Oxides of Nitrogen (NOx) Emissions

There are no changes to applicability of 45 CSR 29 based on updates discussed in this application.

5.14 45 CSR 30 – Requirements for Operating Permits

There are no changes to applicability of 45 CSR 30 based on updates discussed in this application.

5.15 45 CSR 34 – National Emission Standards for Hazardous Air Pollutants (NESHAP)

45 CSR 34 applies to registrants that are subject to NESHAP requirements. The RAN facility is subject to the following NESHAP subparts because of processes and equipment used at the facility:

- NESHAP Subpart DDD – Mineral Wool Production;
- NESHAP Subpart JJJJ – Paper or Other Web Coating;
- NESHAP Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines (RICE); and
- NESHAP Subpart DDDDD – Industrial, Commercial, and Institutional Boilers and Process Heaters.

These NESHAP requirements are described in more detail in the Federal Regulations section of this regulatory discussion.

APPENDIX A - WVDAQ PERMIT APPLICATION FORM

WEST VIRGINIA DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF AIR QUALITY

601 57th Street, SE
Charleston, WV 25304
(304) 926-0475
www.dep.wv.gov/daq

APPLICATION FOR NSR PERMIT AND TITLE V PERMIT REVISION (OPTIONAL)

PLEASE CHECK ALL THAT APPLY TO **NSR (45CSR13)** (IF KNOWN):

☐ **CONSTRUCTION** ☒ **MODIFICATION** ☐ **RELOCATION**
☐ **CLASS I ADMINISTRATIVE UPDATE** ☐ **TEMPORARY**
☐ **CLASS II ADMINISTRATIVE UPDATE** ☐ **AFTER-THE-FACT**

PLEASE CHECK TYPE OF **45CSR30 (TITLE V)** REVISION (IF ANY):

☐ **ADMINISTRATIVE AMENDMENT** ☐ **MINOR MODIFICATION**
☐ **SIGNIFICANT MODIFICATION**

IF ANY BOX ABOVE IS CHECKED, INCLUDE TITLE V REVISION INFORMATION AS **ATTACHMENT S** TO THIS APPLICATION

FOR TITLE V FACILITIES ONLY: Please refer to "Title V Revision Guidance" in order to determine your Title V Revision options (Appendix A, "Title V Permit Revision Flowchart") and ability to operate with the changes requested in this Permit Application.

Section I. General

1. Name of applicant *(as registered with the WV Secretary of State's Office):*
Roxul USA Inc.

2. Federal Employer ID No. ***(FEIN):***
99-0378111

3. Name of facility *(if different from above):*
RAN Facility

4. The applicant is the:
☐ **OWNER** ☐ **OPERATOR** ☒ **BOTH**

5A. Applicant's mailing address:
665 Northport Avenue
Ranson, WV 25430

5B. Facility's present physical address:
665 Northport Avenue
Ranson, WV 25430

6. **West Virginia Business Registration.** Is the applicant a resident of the State of West Virginia? ☒ **YES** ☐ **NO**

➪ If **YES,** provide a copy of the **Certificate of Incorporation/Organization/Limited Partnership** (one page) including any name change amendments or other Business Registration Certificate as **Attachment A.**

➪ If **NO,** provide a copy of the **Certificate of Authority/Authority of L.L.C./Registration** (one page) including any name change amendments or other Business Certificate as **Attachment A.**

7. If applicant is a subsidiary corporation, please provide the name of parent corporation: **Rockwool Group**

8. Does the applicant own, lease, have an option to buy or otherwise have control of the *proposed site?* ☒ **YES** ☐ **NO**

➪ If **YES,** please explain: **Applicant owns the site.**

➪ If **NO,** you are not eligible for a permit for this source.

9. Type of plant or facility (stationary source) to be **constructed, modified, relocated, administratively updated** or **temporarily permitted** (e.g., coal preparation plant, primary crusher, etc.):
Mineral Wool Insulation Manufacturing Facility

10. North American Industry Classification System **(NAICS)** code for the facility:
327993

11A. DAQ Plant ID No. (for existing facilities only):
037-00108

11B. List all current 45CSR13 and 45CSR30 (Title V) permit numbers associated with this process (for existing facilities only):
R14-0037

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

12A.

- For **Modifications, Administrative Updates** or **Temporary permits** at an existing facility, please provide directions to the *present location* of the facility from the nearest state road;
- For **Construction** or **Relocation permits,** please provide directions to the *proposed new site location* from the nearest state road. Include a **MAP** as **Attachment B**.

From WV-9 E, take the County Route 1 exit toward WV-480/Kearneysville/Leetown. Turn right onto Leetown Road and travel 0.4 miles. Turn left onto WV 115 and travel for 1.4 miles. Turn left onto Northport Avenue. The facility is located on the left at 665 North port Avenue.

12.B. New site address (if applicable):	12C. Nearest city or town:	12D. County:
665 Northport Avenue Ranson, WV 25430	**Ranson**	**Jefferson**
12.E. UTM Northing (KM): **4362.62**	12F. UTM Easting (KM): **252.06**	12G. UTM Zone: **18**

13. Briefly describe the proposed change(s) at the facility:

Updating various sources to account for facility configuration and source updates that results in a net decrease in emissions. A detailed description of each change is provided in the permit application introduction narrative

14A. Provide the date of anticipated installation or change: / / ➪ If this is an **After-The-Fact** permit application, provide the date upon which the proposed change did happen:	14B. Date of anticipated Start-Up if a permit is granted: / /

14C. Provide a **Schedule** of the planned **Installation** of/**Change** to and **Start-Up** of each of the units proposed in this permit application as **Attachment C** (if more than one unit is involved).

15. Provide maximum projected **Operating Schedule** of activity/activities outlined in this application:
Hours Per Day **24** Days Per Week **7** Weeks Per Year **52**

16. Is demolition or physical renovation at an existing facility involved? ☐ **YES** ☒ **NO**

17**. Risk Management Plans.** If this facility is subject to 112(r) of the 1990 CAAA, or will become subject due to proposed changes (for applicability help see www.epa.gov/ceppo), submit your **Risk Management Plan (RMP)** to U. S. EPA Region III.

18**. Regulatory Discussion.** List all Federal and State air pollution control regulations that you believe are applicable to the proposed process *(if known).* A list of possible applicable requirements is also included in Attachment S of this application (Title V Permit Revision Information). Discuss applicability and proposed demonstration(s) of compliance *(if known).* Provide this information as **Attachment D.**

Section II. Additional attachments and supporting documents.

19. Include a check payable to WVDEP – Division of Air Quality with the appropriate **application fee** (per 45CSR22 and 45CSR13).

20. Include a **Table of Contents** as the first page of your application package.

21. Provide a **Plot Plan,** e.g. scaled map(s) and/or sketch(es) showing the location of the property on which the stationary source(s) is or is to be located as **Attachment E** (Refer to ***Plot Plan Guidance***) **.**

➪ Indicate the location of the nearest occupied structure (e.g. church, school, business, residence).

22. Provide a **Detailed Process Flow Diagram(s)** showing each proposed or modified emissions unit, emission point and control device as **Attachment F.**

23. Provide a **Process Description** as **Attachment G.**

➪ Also describe and quantify to the extent possible all changes made to the facility since the last permit review (if applicable).

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

24. Provide **Material Safety Data Sheets (MSDS)** for all materials processed, used or produced as **Attachment H.**

➪ For chemical processes, provide a MSDS for each compound emitted to the air.

25. Fill out the **Emission Units Table** and provide it as **Attachment I.**

26. Fill out the **Emission Points Data Summary Sheet (Table 1 and Table 2)** and provide it as **Attachment J.**

27. Fill out the **Fugitive Emissions Data Summary Sheet** and provide it as **Attachment K.**

28. Check all applicable **Emissions Unit Data Sheets** listed below:

☐ Bulk Liquid Transfer Operations	☒ Haul Road Emissions	☐ Quarry
☐ Chemical Processes	☐ Hot Mix Asphalt Plant	☒ Solid Materials Sizing, Handling and Storage Facilities
☐ Concrete Batch Plant	☐ Incinerator	☒ Storage Tanks
☐ Grey Iron and Steel Foundry	☒ Indirect Heat Exchanger	
☒ General Emission Unit, specify		

Mineral Wool Line - Melting Furnace, Cooling Section, and Curing Vents.

Fill out and provide the **Emissions Unit Data Sheet(s)** as **Attachment L.**

29. Check all applicable **Air Pollution Control Device Sheets** listed below:

☐ Absorption Systems	☒ Baghouse	☐ Flare
☐ Adsorption Systems	☐ Condenser	☐ Mechanical Collector
☒ Afterburner	☐ Electrostatic Precipitator	☐ Wet Collecting System

☐ Other Collectors, specify

Fill out and provide the **Air Pollution Control Device Sheet(s)** as **Attachment M.**

30. Provide all **Supporting Emissions Calculations** as **Attachment N,** or attach the calculations directly to the forms listed in Items 28 through 31.

31. **Monitoring, Recordkeeping, Reporting and Testing Plans.** Attach proposed monitoring, recordkeeping, reporting and testing plans in order to demonstrate compliance with the proposed emissions limits and operating parameters in this permit application. Provide this information as **Attachment O.**

➢ Please be aware that all permits must be practically enforceable whether or not the applicant chooses to propose such measures. Additionally, the DAQ may not be able to accept all measures proposed by the applicant. If none of these plans are proposed by the applicant, DAQ will develop such plans and include them in the permit.

32. **Public Notice.** At the time that the application is submitted, place a **Class I Legal Advertisement** in a newspaper of general circulation in the area where the source is or will be located (See 45CSR§13-8.3 through 45CSR§13-8.5 and ***Example Legal Advertisement*** for details). Please submit the **Affidavit of Publication** as **Attachment P** immediately upon receipt.

33. **Business Confidentiality Claims.** Does this application include confidential information (per 45CSR31)?

☐ **YES** ☒ **NO**

➢ If **YES,** identify each segment of information on each page that is submitted as confidential and provide justification for each segment claimed confidential, including the criteria under 45CSR§31-4.1, and in accordance with the DAQ's "***Precautionary Notice – Claims of Confidentiality"*** guidance found in the ***General Instructions*** as **Attachment Q.**

Section III. Certification of Information

34. **Authority/Delegation of Authority.** Only required when someone other than the responsible official signs the application. Check applicable **Authority Form** below:

☐ Authority of Corporation or Other Business Entity	☐ Authority of Partnership
☐ Authority of Governmental Agency	☐ Authority of Limited Partnership

Submit completed and signed **Authority Form** as **Attachment R.**

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

35A. **Certification of Information.** To certify this permit application, a Responsible Official (per 45CSR§13-2.22 and 45CSR§30-2.28) or Authorized Representative shall check the appropriate box and sign below.

Certification of Truth, Accuracy, and Completeness

I, the undersigned ☒ **Responsible Official** / ☐ **Authorized Representative**, hereby certify that all information contained in this application and any supporting documents appended hereto, is true, accurate, and complete based on information and belief after reasonable inquiry I further agree to assume responsibility for the construction, modification and/or relocation and operation of the stationary source described herein in accordance with this application and any amendments thereto, as well as the Department of Environmental Protection, Division of Air Quality permit issued in accordance with this application, along with all applicable rules and regulations of the West Virginia Division of Air Quality and W.Va. Code § 22-5-1 et seq. (State Air Pollution Control Act). If the business or agency changes its Responsible Official or Authorized Representative, the Director of the Division of Air Quality will be notified in writing within 30 days of the official change.

Compliance Certification

Except for requirements identified in the Title V Application for which compliance is not achieved, I, the undersigned hereby certify that, based on information and belief formed after reasonable inquiry, all air contaminant sources identified in this application are in compliance with all applicable requirements.

SIGNATURE _____ *(Please use blue ink)* DATE: 05/19/2023 *(Please use blue ink)*

35B. Printed name of signee: Mark Graves		35C. Title: Director of Operations
35D. E-mail: Mark.Graves@rockwool.com	36E. Phone:	36F. FAX:
36A. Printed name of contact person (if different from above): Stacey Phillips		36B. Title: Environmental Manager
36C. E-mail: Stacey.Phillips@rockwool.com	36D. Phone: 681-247-0824	36E. FAX:

PLEASE CHECK ALL APPLICABLE ATTACHMENTS INCLUDED WITH THIS PERMIT APPLICATION:

- ☒ Attachment A: Business Certificate
- ☐ Attachment B: Map(s)
- ☒ Attachment C: Installation and Start Up Schedule
- ☒ Attachment D: Regulatory Discussion
- ☐ Attachment E: Plot Plan
- ☒ Attachment F: Detailed Process Flow Diagram(s)
- ☒ Attachment G: Process Description
- ☐ Attachment H: Material Safety Data Sheets (MSDS)
- ☒ Attachment I: Emission Units Table
- ☒ Attachment J: Emission Points Data Summary Sheet
- ☒ Attachment K: Fugitive Emissions Data Summary Sheet
- ☒ Attachment L: Emissions Unit Data Sheet(s)
- ☒ Attachment M: Air Pollution Control Device Sheet(s)
- ☒ Attachment N: Supporting Emissions Calculations
- ☒ Attachment O: Monitoring/Recordkeeping/Reporting/Testing Plans
- ☒ Attachment P: Public Notice
- ☐ Attachment Q: Business Confidential Claims
- ☐ Attachment R: Authority Forms
- ☐ Attachment S: Title V Permit Revision Information
- ☒ Application Fee

Please mail an original and three (3) copies of the complete permit application with the signature(s) to the DAQ, Permitting Section, at the address listed on the first page of this application. Please DO NOT fax permit applications.

FOR AGENCY USE ONLY – IF THIS IS A TITLE V SOURCE:

- ☐ *Forward 1 copy of the application to the Title V Permitting Group and:*
- ☐ *For Title V Administrative Amendments:*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit,*
- ☐ *For Title V Minor Modifications:*
  - ☐ *Title V permit writer should send appropriate notification to EPA and affected states within 5 days of receipt,*
  - ☐ *NSR permit writer should notify Title V permit writer of draft permit.*
- ☐ *For Title V Significant Modifications processed in parallel with NSR Permit revision:*
  - ☐ *NSR permit writer should notify a Title V permit writer of draft permit,*
  - ☐ *Public notice should reference both 45CSR13 and Title V permits,*
  - ☐ *EPA has 45 day review period of a draft permit.*

All of the required forms and additional information can be found under the Permitting Section of DAQ's website, or requested by phone.

Appendix A - WVDAQ Forms

TABLE OF CONTENTS

Attachments:

Attachment A

WEST VIRGINIA
STATE TAX DEPARTMENT
BUSINESS REGISTRATION CERTIFICATE

ISSUED TO:
ROXUL USA INC.
DBA ROCKWOOL
71 EDMOND RD 6
KEARNEYSVILLE, WV 25430-2781

BUSINESS REGISTRATION ACCOUNT NUMBER: **2348-4027**

This certificate is issued on: **10/25/2017**

This certificate is issued by
the West Virginia State Tax Commissioner
in accordance with Chapter 11, Article 12, of the West Virginia Code

The person or organization identified on this certificate is registered to conduct business in the State of West Virginia at the location above.

This certificate is not transferrable and must be displayed at the location for which issued

This certificate shall be permanent until cessation of the business for which the certificate of registration was granted or until it is suspended, revoked or cancelled by the Tax Commissioner.

Change in name or change of location shall be considered a cessation of the business and a new certificate shall be required.

TRAVELING/STREET VENDORS: Must carry a copy of this certificate in every vehicle operated by them. CONTRACTORS, DRILLING OPERATORS, TIMBER/LOGGING OPERATIONS: Must have a copy of this certificate displayed at every job site within West Virginia.

atL006 v.4
L0875932352

Attachment C

Attachment C

Installation and Start Up Schedule

The changes outlined in this application reflect as-built construction of the facility. The facility began operation on May 22, 2021.

Attachment D

Attachment D

Regulatory Discussion

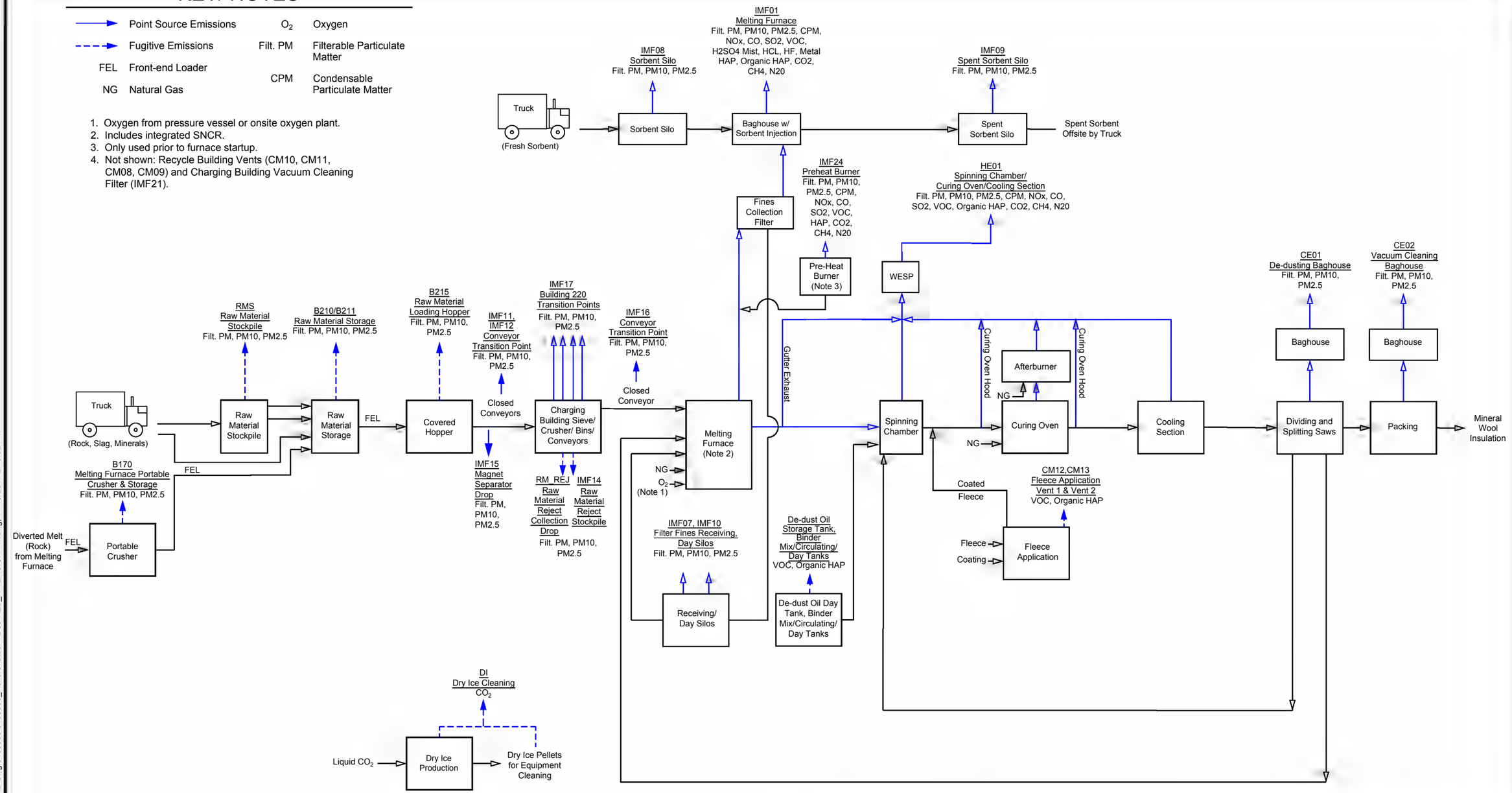
Please see the regulatory discussion in Section 4 and Section 5 of the Introduction of this permit application for the federal and state regulatory discussions, respectively.

Attachment F

KEY/ NOTES

→	Point Source Emissions	O_2	Oxygen
- - →	Fugitive Emissions	Filt. PM	Filterable Particulate Matter
FEL	Front-end Loader	CPM	Condensable Particulate Matter
NG	Natural Gas		

1. Oxygen from pressure vessel or onsite oxygen plant.
2. Includes integrated SNCR.
3. Only used prior to furnace startup.
4. Not shown: Recycle Building Vents (CM10, CM11, CM08, CM09) and Charging Building Vacuum Cleaning Filter (IMF21).



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ERM Environmental Resources Management

MINERAL WOOL LINE
PROCESS FLOW DIAGRAM
ROXUL USA INC.
RANSON, WEST VIRGINIA

FIGURE 3-1

Attachment G

PROCESS DESCRIPTION

The mineral wool line will produce mineral wool insulation for residential, commercial, and industrial uses. Various types of insulating products can be produced with different densities, binder content, or dimensions to meet the requirements of various market sectors.

Mineral wool or “stone wool” is a natural product made partly from volcanic rocks. Rock may be supplemented with recycled mineral wool and slag from the steel industry. The following types of mineral raw materials are typically used in stone wool production:

Eruptive stones such as basalt/diabase, amphibolite, and anorthosite
- Slags such as blast furnace slag or converter slag
- Dolomite and/or limestone
- Mineral additives, such as olivine sand and high alumina content materials such as bauxite, kaoline clay, and aludross (by-product of the smelting process in the creation of aluminum from bauxite)

The mineral wool fibers are made from melted stone raw materials at very high temperatures (>2,700°F /1480°C), binder, and de-dusting oil. The various raw materials used in the melting furnace are mixed in the correct ratio to achieve the required chemistry of the fibers. The mineral wool manufacturing process consists of material handling/charging, melting, spinning, curing, cooling, cutting, and packing. Raw materials will be delivered to the site via truck, and products will leave the site via truck.

Raw Material Handling

The following changes have been made to the raw material handling from the previous permit application:

Conveyor Transition Point IMF11 is now located indoors. This source has been updated to include an indoor settling factor in addition to the fabric filter already permitted.

Seven material handling fugitive emission points are proposed to be modified in the permit, which are listed below:

- RMS, which includes a raw material stockpile with a base area of 500 m^2;
- IMF17, which now includes 22 transfer points inside B220, Mixer and Crusher emissions inside B220 (previously included IMF18, which is proposed to be removed from the permit), and 2 transfer points with fabric filters inside B220;
- IMF11, which includes one transfer point inside B215;
- IMF12, which includes one transfer point inside B215;
- IMF16, which includes one transfer point inside B300;
- IMF15, which includes one transfer point outside B220; and
- IMF14, which includes a storage stockpile with a base area of 10 m^2.

Melting raw materials will be delivered in bulk by truck and unloaded and transferred with a front-end loader into the raw material stockpile (RMS) with three-sided enclosure. Additionally, diverted melt (rock) from the melting furnace will be delivered to a portable crusher (B170). The material from B170 and RMS will be transferred with a front end-loader to the raw material loading hopper (B215). The loading hopper feeds material onto a series of enclosed conveyors to the charging building (B220), where all subsequent melting raw material handling activities occur. A fraction of oversized material is directed to an indoor sieve and crusher, if required. Materials are then distributed to individual raw material bins. From here, they are dosed onto a belt conveyor to create a batch of charge material. The batch is conveyed into a bucket or similar vertical conveyor and then loaded into a mixer to create a homogeneous charge. The mixer is kept closed and equipped with an add-on filter that vents indoors during mixing.

The material handling sources IMF17, IMF12, IMF16, and IMF15, capture emission sources as material moves from B215 to B220, moves through B220, and exits B220 to B300 (furnace building). IMF12 includes the transfer point from the loading hopper (located inside B215) to a conveyor. From B215, material transfers to a second conveyor, and this transfer point corresponds to IMF11. The material moves outside from B215 to B220, where there is a transfer point from a magnet separator into an iron container with a 4-sided drop guard corresponding to IMF15. Material is delivered to B220 by a conveyor transfer point which is included in IMF17. IMF17 includes 22 conveyor transfer points which are indoors but otherwise uncontrolled, as well as the two conveyor transition points, which are equipped with fabric filters. Additional transfer points inside B220 included with IMF17 are one transfer point from the magnet separator to the iron container with a telescopic chute and two transfer points, one which transfers material from the magnet separator to the feeder and the second from the feeder to the crusher. Once material leaves B220, it is transferred to B300. The conveyor transfer point located inside B300 corresponds to IMF16.

The two mechanical vents on the charging building were not installed. As described above, emissions from the Mixer and Crusher are included with the other new B220 Material Handling emissions (IMF17). IMF18 is proposed to be removed from the permit.

If raw materials entering the charging building are found to be outside of specifications it is possible to collect these materials in two locations, either after the sieve or after the raw material bins. The material is directed into collection bins by conveyor, which is equipped with curtains for enclosure (RM_REJ). S-REJ is proposed to be removed from the permit.

Emissions from material handling consist of filterable PM/PM_{10}/$PM_{2.5}$.

Emission points from material handling include:

- Charging Building Material Handling Building Vents (IMF17)
- Five (5) Conveyor Transition Points,
    - Conveyor Transition Point (B215 to B220) (IMF11)
    - Conveyor Transition Point (B210/B211 to B220) (IMF12)
    - Conveyor Transition Point (B220 No. 1) (IMF14)
    - Conveyor Transition Point (B220 No. 2) (IMF15)
    - Conveyor Transition Point (B220 to B300) (IMF16)

Fugitive emissions from material handling consist of:

- Raw Material Storage (B210/211),
- Raw Material Outdoor Stockpile (RMS)
- Raw Material Loading Hopper (B215)
- Raw Material Reject Collection Bin (RM_REJ)
- Paved Haul Roads

Melting

During start-up a natural gas-fired preheater burner is used to warm the Melting Furnace baghouses to prevent condensation. Hot exhaust from the burner will indirectly heat the Melting Furnace baghouses before exhausting through the preheat burner stack (IMF24). The indirect heat transfer will be done by a thermal oil system including an expansion tank which is used both for preheating transfer of energy and to extract surplus heat for heat recovery. The natural gas preheat burner is rated at 5.12 MMBtu/hr (1,490 kW) heat input. The pre-heat burner will operate for approximately 2 hours (120 minutes) prior to the Melting Furnace startup. Shortly after, stone raw materials are added and heated in the first and second preheat chambers to approximately 1,022 ˚F (550 ˚C) and 1,562 ˚F (850 ˚C), respectively. From here, the preheated raw materials are introduced to the melter.

During melting furnace operation, temperatures in the melter reach approximately 3,000 ˚F (1,650 ˚C) and the resultant melt flows out of the furnace to the spinner. Gutter channels are used to direct melt from the furnace onto the spinners. An exhaust is located above the gutters to remove heat from the area to lower the temperature in the working environment, which will be directed to the Wet Electrostatic Precipitator (WESP) (HE01).

Once the system is operating at a steady state, waste wool and filter fines from the process are recycled into the melter along with stone raw materials.

Tapping is an emptying of the furnace, where melt flows directly out of the furnace and into a collection area. The tapped melt can be crushed in the portable crusher and reused in the melting process. Tapping occurs when the line shuts down, or as a result of an upset.

The melt process in the Melting Furnace is an oxidizing process, which operates with an excess of oxygen. The melting process is open to ambient building air with unrestricted air flow (i.e., there is no cover on the furnace). A “quench hood” is situated above the melter that is connected to an exhaust riser. The flue gas from the melter travels up through the riser and then through each preheating chamber, where the hot exhaust preheats stone raw materials prior to venting to add-on control devices.

In the furnace the amount of air is determined to ensure optimal operation, which includes that the air carries particles (fine material) between the pre-heater cyclones, and this requires a certain flow/air speed. The air flow is also required to cool the air before the dust filters as the filters cannot withstand the hot air from the melting process. Because the air flow is independent of the capacity, the emissions of CO and NO_x are also independent of the furnace capacity (i.e., melt rate).

Aqueous ammonia will be injected for the de- NO_x reaction to reduce NO_x emissions.

The opening at the top of the melter allows for ambient air to be pulled into the riser, which facilitates an adequate temperature for a de- NO_x reaction to occur (typically 1,400-2,000 ˚F or 760-1,093 ˚C). Therefore, it can be said that the Melting Furnace has “integrated” Selective Non-Catalytic Reduction (SNCR) technology. Binder contained in the recycled wool can also contribute in the de- NO_x reaction, but is not relied upon for the control of NO_x.

Hot flue gas is used to preheat incoming combustion air to the melter via heat exchangers situated at the outlet of the furnace. Flue gas is then directed to a baghouse to collect raw material fines. A second baghouse in series is used for control of emissions of filterable PM/PM_{10}/$PM_{2.5}$, and is equipped with sorbent injection to control sulfur dioxide (SO_2), sulfuric acid (H_2SO_4) mist, hydrogen chloride (HCl), and hydrogen fluoride (HF) emissions. Carryover of raw materials fines that are collected in the first baghouse will be pneumatically conveyed to a receiving silo and day silo (IMF07, IMF10) prior to reuse in the melter. The silos vent to a bin vent filter exhausting to the atmosphere.

Emissions from the Melting Furnace stack (IMF01) consist of filterable PM/PM_{10}/ $PM_{2.5}$, CPM, NO_x, CO, SO_2, VOC, H_2SO_4 mist, HCl, HF, metal HAP, CO_2, CH_4, N2O, and small amounts of organic HAP such as carbonyl sulfide (COS) and formaldehyde (HCHO).

As stated, de-sulfurization is applied for the control of sulfur oxides and acid gases. Sorbent material (e.g., hydrated lime as calcium hydroxide or similar) is delivered to the site by truck and loaded into an outdoor storage silo equipped with a bin vent filter. Sorbent is transported in a closed system and injected into the flue gas prior to the second baghouse as a filter media.

Spent sorbent is stored in a silo (IMF09) equipped with a bin vent filter until it is emptied into a vacuum truck for off-site disposal.

The Sorbent Silo emits filterable PM/PM_{10}/$PM_{2.5}$ (IMF08) during unloading of new sorbent. The spent sorbent silo emits PM/PM_{10}/$PM_{2.5}$ (IMF09) (with sulfur and acid gases bound in the material) during the loading of spent sorbent.

Rockwool’s protocol mandates a shutdown for 2 weeks of each year to conduct routine maintenance on the facility. As a result, the hours of operation for the mineral wool production line are proposed to be modified from 8,760 to 8,400 hours per year to represent the maximum potential operating hours for the facility. This modification applies to the following emission points in the melting process:

- Pre-heat Burner (IMF24); and
- Melting Furnace (IMF01).

The emission points for material handling operations, tanks, and paved roads remains unchanged at 8,760 hours per year.

It is proposed to remove 8 pounds/hour (35.04 tons/year) of Carbon Monoxide from the Melting Furnace (IMF01) potential to emit and add it to the WESP (HE01) potential to emit. The new Melting Furnace (IMF01) CO emission rate will be 3.21 pounds/ hour (13.48 tons/year).
The Secondary Energy Materials Storage Silo (IMF07B) was not installed. The source IMF07 now only contains the Filter Fines Day Silo (IMF07A) which has also been updated to include an indoor settling factor.

Spinning, Curing, and Cooling

The melt flows out of the lower part of the furnace and is led to the spinning machine via the gutter channels. The spinners are equipped with quick-rotating wheels onto which the melt is applied.

The fibers are drawn from the wheels of the spinning machine by centrifugation combined with a powerful air stream that is blown into the spinning chamber. At the same time binder and cooling water is added to the flow of fibers. Also, the material is sprayed with de-dusting oil to give water-repellent properties and reduce dust emission in the factory and the finished products. Binder and water are dosed as small droplets through nozzles on the spinning machine.

Fibers not recovered in the spinning process are directed to the Recycle Plant for re-use in the furnace.

The binder-coated fibers are collected on a perforated surface (filter net). The fibers settle on the surface as primary wool web, and air is sucked through the perforation by means of under pressure in the chamber in a vertical direction.

Emissions from the Spinning Chamber consist primarily of filterable PM/PM_{10}/$PM_{2.5}$, CPM, VOC, and organic HAP (formaldehyde, methanol, phenol).

Exhaust from the Spinning Chamber will be conditioned (e.g. with quenching or water spraying) prior to the WESP (HE01).

The wool web is conveyed to the pendulum (B400) which arranges multiple layers of wool onto the wool lane. For some products the edges will be cut along the wool lane by means of a mechanical saw before the curing oven. The removed edges, which is uncured wool (wet wool) is sent to the Recycle Plant via conveyors.

The density of the secondary wool lane is measured by means of isotope or x-ray device.

The wool lane is conveyed into the Curing Oven, where the remaining water in the product is evaporated and the binder is cured by means of hot air supplied from two natural gas-fired circulation burners (via direct heating). The circulation burners have a maximum heat input capacity of 5.81 MMBtu/hr (1,700 kW) each.

A natural-gas fired afterburner controls CO, VOC, and organic HAP emissions, where after the gases are directed to the WESP (HE01). The Curing Oven afterburner is rated at 9.86 MMBtu/hr (2,000 kW) heat input capacity. Emissions from the Curing Oven consist of filterable PM/PM_{10}/ $PM_{2.5}$, CPM, NO_x, CO, SO_2, VOC, organic HAP (formaldehyde, methanol, phenol), CO_2, CH_4, and N_2O.

The curing oven is equipped with hoods at the inlet and outlet end to control the working environment in the event that hot air escapes the curing oven due to system pressure changes. The inlet and outlet hoods vent to the WESP (HE01).

After leaving the Curing Oven, the wool web is conveyed through a Cooling Section where ambient air (from the production hall) is sucked through the cured wool web to cool it prior to cutting.

Emissions from the Cooling Section consist of filterable PM/PM_{10}/ $PM_{2.5}$, CPM, VOC, organic HAP (formaldehyde, methanol, phenol) and small amounts of NO_x and CO.

In summary, the following sources will be directed to the WESP as a combined emission point HE01:

- Gutter Exhaust;
- Spinning Chamber;
- Curing Oven Hoods;
- Curing Oven (following afterburner control); and
- Cooling Section.

The following emission points in the spinning, curing, and cooling process are proposed to be modified from 8,760 to 8,400 hours per year to represent the maximum potential operating hours for the facility:

- Curing Oven (CO), Curing Oven Afterburner (CO-AB), and Cooling Section (CS) (HE01);
- Dry Ice Cleaning (DI);
- De-dusting Baghouse (CE01); and
- Vacuum Cleaning Baghouse (CE02).

The spinning, curing, and cooling section are contributors of Carbon Monoxide to the WESP (HE01). As described in the Melting section above, it is proposed to remove 8 pounds/hour (35.04 tons per year) of Carbon Monoxide from the Melting Furnace (IMF01) potential to emit and add it to the WESP (HE01) potential to emit, based upon stack testing results from a similar facility.

The combined spinning, cooling, and curing will now have a CO emission rate of 9.82 pounds/hour (37.41 tons/year).

Fleece Application Vent 1 (CM12) and Fleece Application Vent 2 (CM13) will be modified so that the annual hours of operation and application rate is reduced to 4,200 hours per year. This is

reflective of the maximum expected operation for the fleece application, considering product demand.

Product Marking (P_MARK) has not been installed and is proposed to be removed from the permit.

Fleece Application

Fleece application stations will be added to the line prior to the Curing Oven for use in specialty products. This permit requests a reduction of the annual hours of operation and application rate on Fleece Application Vents 1 & 2 (4,200 hours per year). This value is reflective of the maximum expected operations due to product demand.

Rolls of fleece (fiberglass or similar facing) will be situated at two unrolling stations, above and below the mineral wool conveyor. Each upper and lower fleece will be unrolled as a continuous sheet and directed via rollers through an open dip “bath” of binder. Each dip bath will coat one side of the upper and lower fleece with binder. The coated fleece will be directed towards the top and underside of the uncured mineral wool via rollers and placed onto the surface of the uncured wool just prior to entry into the Curing Oven. The uncured mineral wool with fleece applied to the top and underside will enter the Curing Oven, where binder in the wool and on the fleece will be cured.

Binder will be fed to the dip baths via enclosed piping from the Binder Day Tank or from IBC containers (approximately 264 gal or 1 m3). The binder coating may be the same binder that is applied in the Spinning Chamber, or it can be a special binder.

Emissions from Fleece Application will consist of fugitive VOC and organic HAP emissions resulting from surface evaporation of binder in the dip tank and binder-coated fleece just prior to the Curing Oven. The majority of emissions from the binder applied to the fleece will be controlled by the Curing Oven afterburner as the fleece is cured onto the wet mineral wool in the Curing Oven. The binder’s content of organic HAPs will be below requirements for additional control per the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Paper or Other Web Coating (NESHAP Subpart JJJJ).

Cutting Section

After the cooling zone, the cured wool web is labeled with product features and cut to size by a water jet and/or mechanical cutting. Edges may be trimmed prior to labeling and transported to the Recycle plant via the line granulator. Labels are branded onto the product using laser marking.

Dust from the mechanical saws is removed pneumatically and directed to a baghouse filter (CE01). The collected dust/filter material is transported via closed conveyors to the Recycle Plant.

Water/fiber generated by water jet cutting is collected in the process water system and reused in the process.

Emissions from the De-dusting Baghouse (CE01) stack consist of filterable PM/ PM_{10}/ $PM_{2.5}$.

Stacking, Packing and Unit Load

After cutting the products are stacked, packaged in polyethylene film, palletized (as needed), and transported to one of the storage areas for finished goods.

A paper surface may be applied to products either before final cutting or after they are cut to size. The paper applied is a pre-coated polyethylene (PE) paper which is warmed in electrically heated drums so that the paper adheres to the wool product.

Dispatch of finished goods in to trucks takes place from the unit load area.

Dust from the packaging area is collected by vacuum and directed to the Vacuum Cleaning Baghouse (CE02).

Emissions from the Vacuum Cleaning Baghouse consist of filterable PM/PM_{10}/$PM_{2.5}$.

Recycling Plant

The Recycle Plant is used to recovered materials (e.g., waste wool and de-dusting fines such as fibers and dust) from the mineral wool manufacturing line that would otherwise be sent to a landfill for disposal. The Recycling Plant can also receive mineral wool products returned from Rockwool customers, such as but not limited to products damaged in shipping, wool waste products from construction sites or directly from customers with the purpose to recover the material for new products.

The Recycle Plant process includes material handling by front end loaders (FEL) and conveyors, milling, and batching.

The Recycle Plant can operations are split in two ways of recycling:

- Direct recycling to the spinning chamber & wool collection process after sizing and milling, and
- Re-melting in the furnace after milling.

Direct recycling of wool waste consists of cured wool waste generated on the production line or damaged products from the warehouse. The cured wool waste is chopped up in pieces by knives in the line granulator, which is placed in the cold end building (B500) or in the edge-trim system with a cutting screw, which is placed in the curing oven building (B400).

The wool pieces are conveyed by covered belt conveyors to a closed recycling silo (B405). From the silo the wool pieces are sent via the dosing system and milled to the required size, and pneumatically conveyed in closed system back to the spinning and wool collection process.

The recycling silo and part of the closed conveyor in this system is placed outside the building.

In case of surplus of wool waste the direct recycling system will unload on the floor inside the building B240 and the wool is collected for re-melting in the furnace.

A FEL will be used to transfer wool waste from indoor collection areas inside the recycling building (B240) and into a loading hopper. Mineral wool products returned from Rockwool customers will be received in big bags (or similar) and fed to the loading hopper via FEL. The loading hopper feeds wool into the mill via a screw conveyor or similar. Wool waste may also be recycled directly to the mill by means of belt and screw conveyor system. Waste wool is ground in the mill and exits via multiple conveyors to storage silos for milled wool waste. The hopper loading is connected to the de-dusting filter system (CE01). The silo area has one exhaust (CM08), and the area with the mill has one exhaust (CM09).

All of the re-melting recycling plant transfer and milling operations are conducted indoors. The building is kept closed with a fast roller gate controlled by the movement of the FEL. The building is equipped with roof ventilation equipped with particulate filters to control the working environment for industrial hygiene purposes (ammonia odor and mobile FEL exhaust gases).

The recycling plant will consists of the following emission points:

- De-dusting vents to De-dusting Baghouse (CE01); and
- Four (4) Recycle Building Vents (CM08, CM09, CM10, CM11).

Binder

Binders will be mixed onsite. The binder raw materials (resin and other binder components) are delivered to the site via tank truck and unloaded into storage tanks or delivered in drums/totes.

The binder storage consists of a series of tanks in a tank farm which is covered with a sheet roof but has no facades. A secondary containment is included in the structure.

The materials may be stored in temperature-controlled tanks equipped with heating and cooling as required. From the storage tanks the components are either mixed as a batch in a mixing tank or mixed in-line. Binder mixed in the Binder Mix Tank is pumped to the Circulating Tank and from here to the Binder Day Tank in the Furnace Building.

A separate storage is made for the de-dusting oil due to fire requirements. Dedusting oil is delivered in bulk by truck or in drums or intermediate bulk container (IBC) and unloaded into the storage tanks. From the storage tank the oil is pumped into a day tank in the furnace building (B300) and from there dosed into the spinning & wool collection process.

Rockwool will use varying binder formulations as technology advances to produce formaldehyde-free resins. This application is designed to address the use of varying resin materials.

The binder consists of aqueous ammonia, silane (coupling agent), silicone oil/resin, ammonium sulfate, water, and sugar syrup that are added to the resin. Additional components of the binder that are present in alternative resins are methanol, organic acid, and inorganic acid.

Tanks storing aqueous ammonia, ammonium sulfate, water, and sugar syrup do not emit regulated pollutants, but are included in this application for completeness.

Emissions from unloading, storage, and mixing of binder consist of VOC and organic HAP (formaldehyde, phenol, methanol).

Dry Ice Cleaning

For mineral wool products where product quality requirements necessitate additional cleaning of the perforated filter net dry ice will be applied for cleaning. The filter net may also be cleaned using with water. Dry ice pellets will be used for cleaning via blasting onto the perforated filter net. A pressurized storage tank will feed liquid CO_2 to a pelletizer unit which will form dry ice pellets (solid CO_2). The system continuously produces dry ice pellets which are fed to a blasting gun that directs the pellets to the perforated filter net.

Emissions from the production of dry ice pellets and the cleaning activities consist of fugitive CO_2.

OTHER OPERATIONS

Building Heat with Natural Gas Boilers

Building heat is supplied with natural gas boilers. Two natural gas-fired boilers were installed to provide a source of building heat when the furnace is not in operation (CM03, CM04). These two boilers were installed at a lower maximum rated heat input capacity of 4.99 MMBtu/hr (originally permitted at 5.1 MMBtu/hr).

The Rockfon building's natural gas-fired boiler for building heating (RFN10) is proposed to be removed from the permit.

Emergency Fire Pump Engines

The diesel engine fire pump was installed with a rating of 316 horsepower (hp) (236 kW). The emission factors for this source have been updated to reflect the manufacturer rating data, where available.

The engine is certified to NSPS Subpart IIII engine standards and will operate only during emergencies or other limited scenarios as allowed by federal rules (i.e., maintenance checks, readiness testing, etc.).

Process Water System

The process water system consists of a series of tanks and a filter for recirculation of process water. The collected water is filtered on a band filter and stored in buffer tanks.

The filtered process water is used for dilution of binder and for flushing of processes (e.g. to transport fibers back in the system). Process water is also used for operation of the WESP. Process water is collected storm water from outside areas to compensate for water loss due to evaporation. Additional water is supplied from the public water supply.

Storage Tanks

The following storage tanks are being added to the permit:

- One (1) Vertical Additive Buffer Tank, TK-ADB1 (396 gallons);
- One (1) Vertical Additive Buffer Tank, TK-ADB2 (132 gallons); and
- One (1) Vertical Glycol Storage Tank, TK-GLY (396 gallons).

The following storage tanks have updated sizing:

- One (1) Thermal Oil Horizontal Tank, TK-TO3 (5,283 gallons, previously 2,642 gallons);
- One (1) Thermal Oil Horizontal Expansion Tank, TK-TO4 (1,928 gallons, previously 1,321 gallons);
- Six (6) Resin Vertical Storage Tanks, TK-RS1 - TK-RS6 (13,209 gallons each, previously 15,850 gallons);
- One (1) Coupling Agent Vertical Storage Tank, TK-CA (396 gallons, previously 264 gallons); and
- One (1) Additive Vertical Storage Tank, TK-AD (396 gallons, previously 53 gallons).

The following storage tanks have been updated with current AP-42 calculation methodology:

- One (1) Diesel Fuel Horizontal Storage Tank, TK-DF (1,242 gallons);
- Three (3) Binder Storage Containers, TK-BS1-TK-BS3, (ea. 264 gallons); and
- One (1) De-dust Oil Vertical Day Tank, TK-DOD (264 gallons).

The following storage tanks were not installed and are proposed to be removed from the permit:

- One (1) Used Oil Horizontal Storage Tank, TK-UO (581 gallons);
- One (1) Resin Vertical Storage Tank, TK-RS7 (15,850 gallons);
- One (1) Vertical Binder Mix Tank, TK-BM (2,642 gallons);
- One (1) De-dust Oil Vertical Storage Tank, TK-DO (15,850 gallons);
- One (1) Vertical Binder Circulating Tank, TK-BC (4,227 gallons);
- One (1) Binder Vertical Day Tank, TK-BD (793 gallons).

- One (1) Thermal Oil Horizontal Expansion Tank, TK-TO1 (212 gallons);
- One (1) Thermal Oil Horizontal Drain Tank, TK-TO2 (159 gallons);
- One (1) Paint Dilution Storage Tank, TK-PD (793 gallons); and
- One (1) Paint Dilution Day Tank, TK-PDD (397 gallons).
-

If the storage tank is not included in one of these lists, it will remain as originally permitted.

Rockfon Line

The Rockfon Production Line has no plans to be constructed and is proposed to be removed from the permit. This removal applies to the following emission points:

- IR Zone (RFNE1);
- Hot and Press Cure (RFNE2);
- High Oven A (RFNE3);
- High Oven B (RFNE9);
- Drying Oven 1 (RFNE4);
- Drying Oven 2 & 3 (RFNE6);
- Spray Paint Cabin (RFNE5);
- Cooling Zone (RFNE7); and
- De-dusting Baghouse (RFNE8).

Energy Material Handling

The emission points from this section were not installed and are proposed to be removed from the permit. These emission points are:

- Three (3) Coal Storage Silos (IMF03A, IMF03B, IMF03C); and
- One (1) Coal Feed Tank (IMF25).

Cooling Towers

The two cooling towers were not installed, and are proposed to be removed from the permit:
- Melting Furnace Cooling Tower (IMF02); and
- Gutter Cooling Tower (HE02).

Coal Milling

The emission points from this section were not installed and are proposed to be removed from the permit. These emission points are:
- Coal Conveyor Transition Point (B231 to B235) (IMF13);
- Coal Mill Burner & Baghouse (IMF05);
- Coal Milling De-dusting Baghouse (IMF06);

- Coal Conveyor Transition Point (B231 to B235) (IMF04);
- Fugitive emissions from Coal Unloading (B230);
- Fugitive emissions from Coal Loading Hopper (B231); and
- Fugitive emissions from Coal Milling Building (B235).

Attachment I

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
L1 Minwool Line						
B210/211	B210/211	Raw Material Storage	2021	716 ton/day	No Change*	3-sided with cover
RMS	RMS	Raw Material Outdoor Stockpile	2021	0.12 acres 500 m^2	Modification	3-sided enclosure
B215	B215	Raw Material Loading Hopper	NA	562 ton/day	No Change	3-sided w/cover
IMF11	IMF11	Conveyor Transition Point (B215 to B220)	2021	1,137 scfm (1,800 Nm^3/h)	Modification	IMF11-FF Enclosed Indoors
IMF17	IMF17	B220 Material Handling	2021	716 ton/day	Modification	Enclosed Indoors
IMF12	IMF12	Conveyor Transfer Point (B215)	2021	716 ton/day	Modification	Enclosed Indoors
IMF16	IMF16	Conveyor Transfer Point (B300)	2021	716 ton/day	Modification	Enclosed Indoors
IMF15	IMF15	Outside B220 Transfer Point	2021	716 ton/day	Modification	4-sided drop guard
RM_REJ	RM_REJ	Raw Material Reject Collection Drop	NA	6 ton/day	No Change	4-sided rubber drop guards
IMF21	IMF21	Charging Building Vacuum Cleaning Filter	NA	316 scfm (500 Nm3/h)	No Change	None
IMF24	IMF24	Pre-heat Burner	2021	5.12 MMBtu/hr	Modification	None
IMF01	IMF01	Melting Furnace	2021	21,414 scfm	Modification	IMF01-BH De-NOx De-SOx
IMF07	IMF07	Filter Fines Day Silo	2021	790 scfm (1,250 Nm^3/h)	Modification	IMF07A-FF Enclosed Indoors
IMF07B	IMF07	Secondary Energy Materials Silo	NA	790 scfm (1,250 Nm3/h)	Removal	IMF07B-FF
IMF10	IMF10	Filter Fines Receiving Silo	NA	758 scfm (1,200 Nm3/h)	No Change	None
IMF08	IMF08	Sorbent Silo	NA	758 scfm (1,200 Nm3/h)	No Change	None
IMF09	IMF09	Spent Sorbent Silo	NA	758 scfm (1,200 Nm3/h)	No Change	None
DI	DI	Dry Ice Cleaning	2021	630,000 kg/year	Modification	None
CM12	CM12	Fleece Application Vent 1	2021	388,500 kg/year	Modification	None
CM13	CM13	Fleece Application Vent 2	2021	388,500 kg/year	Modification	None
CO	HE01	Curing Oven	2021	18,950 scfm Confidential	Modification	HE01 CO-AB
CO-AB	HE01	Curing Oven Afterburner	2021	9.86 MMBtu/hr	Modification	HE01
CO-HD	HE01	Curing Oven Hoods	NA	25,267 scfm (40,000 Nm^3/hr)	Modification	HE01
GUT-EX	HE01	Gutter Exhaust	NA	15,792 scfm (25,000 Nm^3/hr)	Modification	HE01

Attachment I

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
SPN	HE01	Spinning Chamber	NA	258,986 scfm (410,000 Nm^3/hr)	Modification	HE01
CS	HE01	Cooling Section	2021	50,534 scfm	Modification	HE01
CE01	CE01	De-dusting Baghouse	2021	44,217 scfm (70,000 Nm3/h)	Modification	Baghouse
CE02	CE02	Vacuum Cleaning Baghouse	2021	12,633 scfm (20,000 Nm3/h)	Modification	Baghouse
P_MARK	P_MARK	Product Marking	2021	NA	Removal	NA
CM10	CM10	Recycle Plant Building Vent 1	NA	18,950 scfm (30,000 Nm3/h)	No Change	None
CM11	CM11	Recycle Plant Building Vent 2	NA	18,950 scfm (30,000 Nm3/h)	No Change	None
CM08	CM08	Recycle Plant Building Vent 3	NA	1,579 scfm (2,500 Nm3/h)	No Change	None
CM09	CM09	Recycle Plant Building Vent 4	NA	1,579 scfm (2,500 Nm3/h)	No Change	None
IMF14	IMF14	Raw Material Reject Stockpile	2021	0.002 acres 10 m^2	Modification	3-sided enclosure
B170	B170	Melting Furnace Portable Crusher & Storage	NA	1,800 ton/day	No Change	3-sided enclosure
S_REJ	S_REJ	Sieve Reject Collection Bin	2021	NA	Removal	4-sided rubber drop guard
IMF25	IMF25	Coal Feed Tank	2021	758 scfm (1,200 Nm3/h)	Removal	IMF25-FF
HE02	HE02	Gutter Cooling Tower	2021	308 gpm (70 m3/hr)	Removal	None
IMF18	IMF18	Charging Material Handling Vent 2	2021	NA	Removal	IMF17/18 – FF
IMF02	IMF02	Furnace Cooling Tower	NA	1,321 gpm (300 m3/h)	Removal	None
Rockfon Production Line						
RFNE1	RFNE1	IR Zone	NA	1,895 scfm (3,000 Nm3/h)	Removal	None
RFNE2	RFNE2	Hot Press and Cure	NA	1,895 scfm (3,000 Nm3/h)	Removal	None
RFNE3	RFNE3	High Oven A	NA	5,053 scfm (8,000 Nm3/h)	Removal	None
RFNE9	RFNE9	High Oven B	NA	5,053 scfm (8,000 Nm3/h)	Removal	None
RFNE4	RFNE4	Drying Oven 1	NA	3,158 scfm (5,000 Nm3/h)	Removal	Particulate Filter
RFNE6	RFNE6	Drying Oven 2 & 3	NA	7,580 scfm (12,000 Nm3/h)	Removal	Particulate Filter

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Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
RFNE5	RFNE5	Spray Paint Cabin	NA	6,317 scfm (10,000 Nm3/h)	Removal	Particulate Filter
RFNE7	RFNE7	Cooling Zone	NA	15,792 scfm (25,000 Nm3/h)	Removal	None
RFNE8	RFNE8	De-dusting Baghouse	NA	74,419 scfm (117,813 Nm3/h)	Removal	Baghouse
RFN10	RFN10	RFN Building Heat	NA	NA	Removal	NA
Coal Milling						
IMF05	IMF05	Coal Milling Burner & Baghouse	2018	2,873 scfm (4,547 Nm3/h)	Removal	IMF05-BH
IMF06	IMF06	Coal Milling De-Dusting Baghouse	2018	6,317 scfm (10,000 Nm3/h)	Removal	IMF06-BH
IMF04	IMF04	Coal Conveyor Transition Point (B231 to B235)	2018	1,137 scfm (1,800 Nm3/h)	Removal	IMF04-FF
IMF13	IMF13	Coal Conveyor Transition Point (B231 to B235)	2018	1,137 scfm (1,800 Nm3/h)	Removal	IMF13-FF
B235	B235	Coal Milling Building	2018	NA	Removal	Enclosed Indoors
B230	B230	Coal Unloading	2018	NA	Removal	3-sided enclosure with cover
B231	B231	Coal Unloading Hopper	2018	NA	Removal	3-sided enclosure with cover
IMF03A	IMF03A	Coal Storage Silo A	NA	758 scfm (1,200 Nm3/h)	Removal	IMF03A-FF
IMF03B	IMF03B	Coal Storage Silo B	NA	758 scfm (1,200 Nm3/h)	Removal	IMF03B-FF
IMF03C	IMF03C	Coal Storage Silo C	NA	758 scfm (1,200 Nm3/h)	Removal	IMF03C-FF
Other Facility-Wide Sources						
CM03	CM03	Natural Gas Boiler 1	2021	4.99 MMBtu/h (1.462 MW)	Modification	None
CM04	CM04	Natural Gas Boiler 2	2021	4.99 MMBtu/h (1.462 MW)	Modification	None
EFP1	EFP1	Emergency Fire Pump	2021	316 hp (236 kw)	Modification	None
Rd_RM	RD_RM	Raw Material Paved Haul Roads	NA	NA	No Change	None
Rd_FP	Rd_FP	Finished Product Paved Haul Road	NA	NA	No Change	None
Facility Storage Tanks						
TK-DF	TK-DF	Diesel Fuel Tank	2021	1,242 gal 4.7 m^3	Modification	None

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
TK-UO	TK-UO	Used Oil Tank	2018	581 gal 2.2 m3	Removal	None
TK-DO	TK-DO	De-dust Oil Storage Tank	2021	15,850 gal 35.7 m3	Removal	None
TK-TO1	TK-TO1	Thermal Oil Expansion Tank – Rockfon	2021	212 gal 0.8 m^3	Removal	None
TK-TO2	TK-TO2	Thermal Oil Drain Tank – Rockfon	2021	159 gal 0.6 m^3	Removal	None
TK-TO3	TK-TO3	Thermal Oil Tank – IMF	2021	5,283 gal 20 m^3	Modification	None
TK-TO4	TK-TO4	Thermal Oil Expansion Tank – IMF	2021	1,928 gal 7.3 m^3	Modification	None
TK-RS1	TK-RS1	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS2	TK-RS2	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS3	TK-RS3	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS4	TK-RS4	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS5	TK-RS5	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS6	TK-RS6	Resin Storage Tank	2021	13,209 gal 50 m^3	Modification	None
TK-RS7	TK-RS7	Resin Storage Tank	2018	15,850 gal 60 m3	Removal	None
TK-BM	TK-BM	Binder Mix Tank	2021	2,642 gal 10 m3	Removal	None
TK-BC	TK-BC	Binder Circulation Tank	2021	4,227 gal 16 m3	Removal	None
TK-BD	TK-BD	Binder Day Tank	2021	793 gal 3 m3	Removal	None
TK-CA	TK-CA	Coupling Agent Storage Tank	2021	396 gal 1.5 m^3	Modification	None
TK-AD	TK-AD	Additive Storage Tank	2021	396 gal 1.5 m^3	Modification	None
TK-BS1	TK-BS1	Binder Storage Container	2021	264 gal 1 m^3	Modification	None
TK-BS2	TK-BS2	Binder Storage Container	2021	264 gal 1 m^3	Modification	None
TK-BS3	TK-BS3	Binder Storage Container	2021	264 gal 1 m^3	Modification	None
TK-DOD	TK-DOD	De-dust Oil Day Tank	2021	264 gal 1 m^3	Modification	None

Attachment I

Emission Units Table

(includes all emission units and air pollution control devices that will be part of this permit application review, regardless of permitting status)

Emission Unit ID[1]	Emission Point ID[2]	Emission Unit Description	Year Installed/ Modified	Design Capacity	Type[3] and Date of Change	Control Device[4]
TK-ADB1	TK-ADB1	Additive Buffer Tank	2021	396 gal 1.5 m^3	New	None
TK-ADB2	TK-ADB2	Additive Buffer Tank	2021	132 gal 0.5 m^3	New	None
TK-GLY	TK-GLY	Glycol Tank	2021	396 gal 1.5 m^3	New	None
TK-PD	TK-PD	Paint Dilution Tank	NA	793 gal 3 m^3	Removal	None
TK-PDD	TK-PDD	Paint Dilution Day Tank	NA	397 gal 1.5 m^3	Removal	None

[1] For Emission Units (or Sources) use the following numbering system:1S, 2S, 3S,... or other appropriate designation.
[2] For Emission Points use the following numbering system:1E, 2E, 3E, ... or other appropriate designation.
[3] New, modification, removal
[4] For Control Devices use the following numbering system: 1C, 2C, 3C,... or other appropriate designation.
* At the time of this permit application submittal, B211 has not been constructed. However, there are plans to construct B211 in the future.

Attachment J

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 1: Emissions Data

Emission Point ID No. *(Must match Emission Units Table & Plot Plan)*	Emission Point Type[1]	Emission Unit Vented Through This Point *(Must match Emission Units Table & Plot Plan)*		Air Pollution Control Device *(Must match Emission Units Table & Plot Plan)*		Vent Time for Emission Unit *(chemical processes only)*		All Regulated Pollutants - Chemical Name/CAS[3] *(Speciate VOCs & HAPS)*	Maximum Potential Uncontrolled Emissions[4]		Maximum Potential Controlled Emissions[5]		Emission Form or Phase *(At exit conditions, Solid, Liquid or Gas/Vapor)*	Est. Method Used[6]	Emission Concentration[7] (ppmv or mg/m3)
		ID No.	Source	ID No.	Device Type	Short Term[2]	Max (hr/yr)		lb/hr	ton/yr	lb/hr	ton/yr			
Mineral Wool Line															
IMF11	Enclosed Indoors	IMF11	Volume	IMF11-FF	Fabric Filter	C	8400	PM_{10}			<0.01	<0.01	Solid	EE	
								$PM_{2.5}$			<0.01	<0.01			
IMF24	Upward Vertical Stack	IMF24	Volume			C	8400	NOx			0.36	1.52	Gas/Vapor, Solid	EE	
								SO_2			0.00	0.01			
								CO			0.42	1.76			
								VOCs			0.03	0.12			
								PM_{10}			0.04	0.16			
								$PM_{2.5}$			0.04	0.16			
								CO_2e			599.87	2519.44			
								Lead			<0.01	<0.01			
								Hexane			0.01	0.04			
								Total HAPs			0.01	0.04			
IMF01	Upward Vertical Stack	IMF01	Point	IMF01-BH	BH SCR SIS	C	8400	NOx			37.37	156.95	Gas/Vapor	EE	
								SO_2			33.63	141.25			
								CO			3.21	13.48			
								VOCs			0.31	1.29			
								PM_{10}			2.32	9.73			
								$PM_{2.5}$			2.32	9.73			
								CO_2e			18351.66	77076.96			
								H_2SO_4			1.87	7.85			
								Lead			<0.01	<0.01			
								HF			0.37	1.55			
								HCl			0.30	1.24			
								COS			0.37	1.57			
								Formaldehyde			<0.01	0.02			
								Arsenic			<0.01	<0.01			
								Mercury			<0.01	<0.01			
								Phenol			<0.01	<0.01			
								Mineral Fiber			2.32	9.73			
								Total HAPs			3.43	14.42			
IMF07	Upward Vertical Stack	IMF07	Point	IMF07-FF	FF	C	8400	PM_{10}			<0.01	0.01	Solid	EE	
								$PM_{2.5}$			<0.01	0.01			
HE01	Upward Vertical Stack	HE01	Point			C	8400	NOx			1.57	6.60	Gas/Vapor, Solid	EE	
								SO_2			0.01	0.05			
								CO			9.82	41.24			
								VOC			44.65	187.55			
								PM_{10}			12.00	50.39			
								$PM_{2.5}$			12.00	50.39			
								CO_2e			8492.77	35669.62			
								Total HAPs			56.65	237.95			
								Formaldehyde			3.27	13.74			
								Phenol			17.05	71.61			
								Mineral Fiber			12.00	50.39			
								Methanol			24.34	102.21			
CE01	Upward Vertical Stack	CE01	Point	Baghouse	Filter Bag	C	8400	PM_{10}			0.77	3.24	Solid	EE	
								$PM_{2.5}$			0.22	0.94			
CE02	Upward Vertical Stack	CE02	Point	Baghouse	Filter Bag	C	8400	PM_{10}			0.22	0.93	Solid	EE	
								$PM_{2.5}$			0.22	0.93			

Other RAN Facility-Wide Sources															
CM03	Upward Vertical Stack	CM03	Point			C	8760	NOx			0.18	0.77	Gas/Vapor, Solid	EE	
								SO_2			<0.01	0.01			
								CO			0.41	1.79			
								VOC			0.03	0.12			
								PM_{10}			0.04	0.16			
								$PM_{2.5}$			0.04	0.16			
								CO_2e			584.32	2559.32			
								Lead			<0.01	<0.01			
								Hexane			0.01	0.04			
								Total HAPs			0.01	0.04			
CM04	Upward Vertical Stack	CM04	Point			C	8760	NOx			0.18	0.77	Gas/Vapor, Solid	EE	
								SO_2			<0.01	0.01			
								CO			0.41	1.79			
								VOC			0.03	0.12			
								PM_{10}			0.04	0.16			
								$PM_{2.5}$			0.04	0.16			
								CO_2e			584.32	2559.32			
								Lead			<0.01	<0.01			
								Hexane			0.01	0.04			
								Total HAPs			0.01	0.04			
EFP1	Upward Vertical Stack	EFP1	Point			EM	500	NOx			1.80	0.45	Gas/Vapor	EE	
								SO_2			<0.01	<0.01			
								CO			0.40	0.10			
								VOC			0.04	0.01			
								PM_{10}			0.08	0.02			
								$PM_{2.5}$			0.08	0.02			
								CO_2e			362.00	90.50			
								Formaldehyde			<0.01	<0.01			
								Benzene			<0.01	<0.01			
								Acetaldehyde			<0.01	<0.01			
								Toluene			<0.01	<0.01			
								Xylene			<0.01	<0.01			
								PAH			<0.01	<0.01			
								Total HAPs			<0.01	<0.01			

RAN Facility Storage Tanks

TK-DF	Vent	TK-DF	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
TK-TO3	Vent	TK- TO3	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
TK-TO4	Vent	TK- TO4	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
TK-RS1	Vent	TK- RS1	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-RS2	Vent	TK- RS2	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-RS3	Vent	TK- RS3	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-RS4	Vent	TK- RS4	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-RS5	Vent	TK- RS5	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-RS6	Vent	TK- RS6	Point			C	8760	Formaldehyde	<0.01	0.02	<0.01	0.02	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	0.02	<0.01	0.02			
								Total HAPs	<0.01	0.02	<0.01	0.02			
TK-CA	Vent	TK-CA	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
TK-AD	Vent	TK-AD	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
TK-BS1	Vent	TK- BS1	Point			C	8760	Formaldehyde	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	<0.01	<0.01	<0.01			
								Total HAPs	<0.01	<0.01	<0.01	<0.01			
TK-BS2	Vent	TK- BS2	Point			C	8760	Formaldehyde	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	<0.01	<0.01	<0.01			
								Total HAPs	<0.01	<0.01	<0.01	<0.01			
TK-BS3	Vent	TK- BS3	Point			C	8760	Formaldehyde	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	
								Methanol	<0.01	<0.01	<0.01	<0.01			
								VOC	<0.01	<0.01	<0.01	<0.01			
								Total HAPs	<0.01	<0.01	<0.01	<0.01			
TK-DOD	Vent	TK- DOD	Point			C	8760	VOC	<0.01	<0.01	<0.01	<0.01	Gas/Vapor	Emission Master	

The EMISSION POINTS DATA SUMMARY SHEET provides a summation of emissions by emission unit. Note that uncaptured process emission unit emissions are not typically considered to be fugitive and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET. Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions). Please complete the FUGITIVE EMISSIONS DATA SUMMARY SHEET for fugitive emission activities.

[1] Please add descriptors such as upward vertical stack, downward vertical stack, horizontal stack, relief vent, rain cap, etc.

[2] Indicate by "C" if venting is continuous. Otherwise, specify the average short-term venting rate with units, for intermittent venting (ie., 15 min/hr). Indicate as many rates as needed to clarify frequency of venting (e.g., 5 min/day, 2 days/wk).

[3] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. **LIST** Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. **DO NOT LIST** H_2, H_2O, N_2, O_2, and Noble Gases.

[4] Give maximum potential emission rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[5] Give maximum potential emission rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[6] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

[7] Provide for all pollutant emissions. Typically, the units of parts per million by volume (ppmv) are used. If the emission is a mineral acid (sulfuric, nitric, hydrochloric or phosphoric) use units of milligram per dry cubic meter (mg/m^3) at standard conditions (68 °F and 29.92 inches Hg) (see 45CSR7). If the pollutant is SO_2, use units of ppmv (See 45CSR10).

Attachment J
EMISSION POINTS DATA SUMMARY SHEET

Table 2: Release Parameter Data

Emission Point ID No. *(Must match Emission Units Table)*	Inner Diameter (ft.)	Exit Gas			Emission Point Elevation (ft)		UTM Coordinates (km)	
		Temp. (°F)	Volumetric Flow [1] (acfm) *at operating conditions*	Velocity (fps)	Ground Level *(Height above mean sea level)*	Stack Height [2] *(Release height of emissions above ground level)*	Northing	Easting
Mineral Wool Line								
IMF11	NA	Ambient Temp	NA	NA	581.30	7.19	4362.72065	252.11126
IMF21	0.49	104.00	871.87	29.53	581.30	9.84	4362.6777	252.07332
IMF24	1.15	482.27	3,749.77	54.43	581.30	126.25	4362.61797	252.08677
IMF01	3.28	271.67	13,636.43	69.27	581.30	212.70	4362.64453	252.09348
IMF07	1.00	140.27	280.77	4.66	581.30	100.26	4362.62904	252.10067
IMF10	1.08	145.67	3322.41	51.15	581.30	72.93	4362.60804	252.10817
IMF08	1.08	68.00	594.30	9.15	581.30	72.93	4362.60314	252.10795
IMF09	1.08	145.67	3322.41	51.15	581.30	72.93	4362.59772	252.10768
HE01	12.93	93.02	39,985.01	51.53	581.30	212.66	4362.54558	252.12056
CE01	3.81	104	15,831.58	69.33	581.30	116.14	4362.53451	252.07615
CE02	2.30	104	7,486.47	54.33	581.30	98.42	4362.51457	252.06187
CM10	2.67	70.27	7,161.88	44.76	581.30	51.51	4362.57256	252.09509
CM11	2.67	70.27	7,161.88	44.76	581.30	64.30	4362.57383	252.06922
CM08	1.17	70.27	1,723.22	24.62	581.30	51.51	4362.55726	252.09517
CM09	1.17	70.27	1,723.22	24.62	581.30	51.51	4362.58552	252.09826
Other RAN Facility-Wide Sources								
CM03	1.00	232.07	2,508.25	41.80	581.30	75.62	4362.63842	252.06266
CM04	1.00	232.07	2,508.25	41.80	581.30	75.62	4362.63877	252.05549
EFP1	0.50	847.67	3,859.03	128.97	581.30	13.98	4362.5904	252.18352

[1] Give at operating conditions. Include inerts.
[2] Release height of emissions above ground level.

Attachment K

FUGITIVE EMISSIONS DATA SUMMARY SHEET

The FUGITIVE EMISSIONS SUMMARY SHEET provides a summation of fugitive emissions. Fugitive emissions are those emissions which could not reasonably pass through a stack, chimney, vent or other functionally equivalent opening. Note that uncaptured process emissions are not typically considered to be fugitive, and must be accounted for on the appropriate EMISSIONS UNIT DATA SHEET and on the EMISSION POINTS DATA SUMMARY SHEET.

Please note that total emissions from the source are equal to all vented emissions, all fugitive emissions, plus all other emissions (e.g. uncaptured emissions).

APPLICATION FORMS CHECKLIST - FUGITIVE EMISSIONS
1.) Will there be haul road activities? ☒ Yes ☐ No ☒ If YES, then complete the HAUL ROAD EMISSIONS UNIT DATA SHEET.
2.) Will there be Storage Piles? ☒ Yes ☐ No ☒ If YES, complete Table 1 of the NONMETALLIC MINERALS PROCESSING EMISSIONS UNIT DATASHEET.
3.) Will there be Liquid Loading/Unloading Operations? ☐ Yes ☒ No ☐ If YES, complete the BULK LIQUID TRANSFER OPERATIONS EMISSIONS UNIT DATA SHEET.
4.) Will there be emissions of air pollutants from Wastewater Treatment Evaporation? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
5.) Will there be Equipment Leaks (e.g. leaks from pumps, compressors, in-line process valves, pressure relief devices, open-ended valves, sampling connections, flanges, agitators, cooling towers, etc.)? ☐ Yes ☒ No ☐ If YES, complete the LEAK SOURCE DATA SHEET section of the CHEMICAL PROCESSES EMISSIONS UNIT DATA SHEET.
6.) Will there be General Clean-up VOC Operations? ☐ Yes ☒ No ☐ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET.
7.) Will there be any other activities that generate fugitive emissions? ☒ Yes ☐ No ☒ If YES, complete the GENERAL EMISSIONS UNIT DATA SHEET or the most appropriate form.
If you answered "NO" to all of the items above, it is not necessary to complete the following table, "Fugitive Emissions Summary."

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
		lb/hr	ton/yr	lb/hr	ton/yr	
Haul Road/Road Dust Emissions Paved Haul Roads	PM_{10}	0.83	2.15	0.25	0.54	O – AP42
	$PM_{2.5}$	0.25	0.53	0.05	0.13	
Unpaved Haul Roads	—	—	—	—	—	—
Storage Pile Emissions – **Raw Material Outdoor Stockpile (RMS)**	PM	0.11	0.41	0.02	0.20	EE
	PM_{10}	0.05	0.19	<0.01	0.10	
	$PM_{2.5}$	<0.01	0.03	<0.01	0.015	
Storage Pile Emissions – **Raw Material Outdoor Reject Stockpile (IMF14)**	PM	<0.01	<0.01	<0.01	<0.01	EE
	PM_{10}	<0.01	<0.01	<0.01	<0.01	
	$PM_{2.5}$	<0.01	<0.01	<0.01	<0.01	
Storage Pile Emissions – **Raw Material Storage (B210/211)**	PM	0.13	0.45	0.08	0.28	EE
	PM_{10}	0.06	0.21	0.03	0.13	
	$PM_{2.5}$	<0.01	0.03	<0.01	0.02	
Storage Pile Emissions – **Melting Furnace Portable Crusher & Storage (B170)**	PM	1.12	0.96	0.16	0.37	EE
	PM_{10}	0.51	0.45	0.07	0.17	
	$PM_{2.5}$	0.14	0.09	0.011	0.03	
Loading/Unloading Operations	—	—	—	—	—	—
Wastewater Treatment Evaporation & Operations	—	—	—	—	—	—
Equipment Leaks	—	Does not apply	—	Does not apply	—	—
General Clean-up VOC Emissions	—	—	—	—	—	—
Other – **Raw Material Loading Hopper (B215)**	PM	0.05	0.22	0.013	0.06	EE
	PM_{10}	0.02	0.11	<0.01	0.03	
	$PM_{2.5}$	<0.01	0.02	<0.01	<0.01	

FUGITIVE EMISSIONS SUMMARY	All Regulated Pollutants - Chemical Name/CAS [1]	Maximum Potential Uncontrolled Emissions [2]		Maximum Potential Controlled Emissions [3]		Est. Method Used [4]
Other – **Raw Material Reject Collection Drop (RM_REJ)**	PM	<0.01	<0.01	<0.01	<0.01	EE
	PM_{10}	<0.01	<0.01	<0.01	<0.01	
	$PM_{2.5}$	<0.01	<0.01	<0.01	<0.01	
Other – **B220 Material Handling (IMF17)**	PM	1.68	7.39	0.32	1.39	EE
	PM_{10}	0.62	2.71	0.12	0.51	
	$PM_{2.5}$	0.62	2.71	0.12	0.51	
Other – **Conveyor Transfer Point (B215) (IMF12)**	PM	0.07	0.31	0.014	0.06	EE
	PM_{10}	0.03	0.11	<0.01	0.02	
	$PM_{2.5}$	0.03	0.11	<0.01	0.02	
Other – **Conveyor Transfer Point (B300) (IMF16)**	PM	0.07	0.31	0.014	0.06	EE
	PM_{10}	0.03	0.11	<0.01	0.02	
	$PM_{2.5}$	0.03	0.11	<0.01	0.02	
Other – **Outside B220 Transfer Point (B300) (IMF15)**	PM	0.07	0.31	0.014	0.08	EE
	PM_{10}	0.03	0.11	<0.01	0.03	
	$PM_{2.5}$	0.03	0.11	<0.01	0.03	

[1] List all regulated air pollutants. Speciate VOCs, including all HAPs. Follow chemical name with Chemical Abstracts Service (CAS) number. LIST Acids, CO, CS_2, VOCs, H_2S, Inorganics, Lead, Organics, O_3, NO, NO_2, SO_2, SO_3, all applicable Greenhouse Gases (including CO_2 and methane), etc. DO NOT LIST H_2, H_2O, N_2, O_2, and Noble Gases.

[2] Give rate with no control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[3] Give rate with proposed control equipment operating. If emissions occur for less than 1 hr, then record emissions per batch in minutes (e.g. 5 lb VOC/20 minute batch).

[4] Indicate method used to determine emission rate as follows: MB = material balance; ST = stack test (give date of test); EE = engineering estimate; O = other (specify).

Attachment L

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **IMF01**

1. Name or type and model of proposed affected source:

   Melting Furnace

2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicate the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.

3. Name(s) and maximum amount of proposed process material(s) charged per hour:

   Mineral Inputs (55,116 lb/hr)

4. Name(s) and maximum amount of proposed material(s) produced per hour:

   Melted Mineral – 49,600 lb/hr

5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants:

   The chemical reactions from the Melting Furnace are caused by the combustion of the raw material inputs. These combustion reactions are generally considered well known and for this reason are not included.

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

NA

(c) Theoretical combustion air requirement (ACF/unit of fuel):

21,414 scfm (33,900 Nm^3/hr)	@	**3,000**	°F and	**14.7**	psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

N/A

(g) Proposed maximum design heat input: **128.48** × 10^6 BTU/hr.

7. Projected operating schedule: 8400 hr/yr

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**50**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used:			
@ **271.67** °F and **14.7** psia			
a. NO_x	**37.37**	lb/hr	grains/ACF
b. SO_2	**33.63**	lb/hr	grains/ACF
c. CO	**3.21**	lb/hr	grains/ACF
d. $PM/PM_{10}/PM_{2.5}$	**2.32**	lb/hr	grains/ACF
e. Hydrocarbons	**–**	lb/hr	grains/ACF
f. VOCs	**0.31**	lb/hr	grains/ACF
g. Pb	**<0.01**	lb/hr	grains/ACF
h. Specify other(s)			
Total HAPs	**3.43**	lb/hr	grains/ACF
H_2SO_4	**1.87**	lb/hr	grains/ACF
CO_2e	**18,351.66**	lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Not impacted by updates.	**Not impacted by updates.**
REPORTING	TESTING
Not impacted by updates.	**Not impacted by updates.**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NA

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. must match List Form): **CO**

Control Device ID No. (must match List Form): **CO-AB, HE01**

Equipment Information

1. Manufacturer: **Bromkamp**	2. Model No. **+CO=A1, +CO=A11/12/13** Serial No.
3. Number of units:	4. Use: **Direct-fired unit - Provide heat for the curing process.**
5. Rated Boiler Horsepower: **NA** hp	6. Boiler Serial No.: **NA**
7. Date constructed: **2021**	8. Date of last modification and explain: **NA**
9. Maximum design heat input per unit: **9.86** $\times 10^6$ BTU/hr	10. Peak heat input per unit: **128.48** $\times 10^6$ BTU/hr
11. Steam produced at maximum design output: **NA** LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **50**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☐ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: **3.28** ft.	20. Gas exit temperature: **271** °F
21. Height: **212.70** ft.	22. Stack serves: ☐ This equipment only ☒ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent) **HE01, CO-AB, CO, SPN, and CS**
23. Gas flow rate: **13,636** ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	**9,610** ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	0.0096 $\times 10^6$ ft^3/hr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	**1026** BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture: **TBD**

28. Oil burner manufacture: **NA**

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams: **NA**

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	**No Controls – See Below**			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?
Aggregate limit with HE01

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO				
Hydrocarbons				
NO_x				
Pb				
PM_{Fil}				
PM_{10}				
$PM_{2.5}$				
SO_2				
VOCs				
Other (specify)				

39. How will waste material from the process and control equipment be disposed of?

Wastes are not expected from a natural gas-fired unit.

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? **Yes**

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

Not impacted by updates.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not impacted by updates.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

Not impacted by updates.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not impacted by updates.

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.
NA

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **CS**

1. Name or type and model of proposed affected source: **Cooling Section**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour: **Mineral Wool – 55,116 lb/hr**
4. Name(s) and maximum amount of proposed material(s) produced per hour: **Mineral Wool – 55,116 lb/hr**
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **NA**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable): **NA**

(a) Type and amount in appropriate units of fuel(s) to be burned:

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: × 10^6 BTU/hr.

7. Projected operating schedule: 8400 hr/yr

Hours/Day	**24**	Days/Week	**7**	Weeks/Year	**50**

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: **Aggregate limit with HE01** @ **104** °F and **14.7** psia		
a. NO_x	lb/hr	grains/ACF
b. SO_2	lb/hr	grains/ACF
c. CO	lb/hr	grains/ACF
d. $PM/PM_{10}/PM_{2.5}$	lb/hr	grains/ACF
e. Hydrocarbons	lb/hr	grains/ACF
f. VOCs (Non-HAP)	lb/hr	grains/ACF
g. Pb	lb/hr	grains/ACF
h. Specify other(s)		
	lb/hr	grains/ACF
	lb/hr	grains/ACF
	lb/hr	grains/ACF
	lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Not impacted by updates.	**Not impacted by updates.**
REPORTING	TESTING
Not impacted by updates.	**Not impacted by updates.**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

NA

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. must match List Form): **CM03**

Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **Camus**	2. Model No. **DFNH-5004-NSI** Serial No.
3. Number of units: **1**	4. Use **Provide building heat.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2021**	8. Date of last modification and explain: **NA**
9. Maximum design heat input per unit: **4.99** ×10^6 BTU/hr	10. Peak heat input per unit: **4.99** ×10^6 BTU/hr
11. Steam produced at maximum design output: **TBD** LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: **1.00** ft.	20. Gas exit temperature: **232.07** °F
21. Height: **75.62** ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: **2508.25** ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25. Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
Quantity (at Design Output)	gph@60°F	**4864** ft^3/hr	ft^3/hr	TPH	
Annually	$\times 10^3$ gal	**42.60** $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
Ash (%)				Maximum	
BTU Content	BTU/Gal. Lbs/Gal.@60°F	**1026** BTU/ft^3	BTU/ft^3	BTU/lb	
Source					
Supplier					
Halogens (Yes/No)					
List and Identify Metals					

26. ☒ Gas burner mode of control: ☐ Automatic hi-low ☐ Manual Automatic full modulation Automatic on-off

27. Gas burner manufacture: **TBD**

28. Oil burner manufacture: **NA**

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air Rotary Cup Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:

@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams: **NA**

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur: % of Moisture: % of Volatile Matter: % of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	**No Controls – See Below**			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	**0.41**			
Hydrocarbons				
NO_x	**0.18**			
Pb	**<0.01**			
$PM/PM_{10}/PM_{2.5}$	**0.04**			
SO_2	**<0.01**			
VOCs	**0.03**			
Other (specify)				
Total HAPs	**0.01**			
CO_2e	**584.32**			

39. How will waste material from the process and control equipment be disposed of?

Wastes are not expected from a natural gas-fired boiler.

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? **Yes**

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

Not impacted by updates.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not impacted by updates.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

Not impacted by updates.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not impacted by updates.

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment L
Emission Unit Data Sheet
(INDIRECT HEAT EXCHANGER)

Emission Unit ID No. must match List Form): **CM04**

Control Device ID No. (must match List Form):

Equipment Information

1. Manufacturer: **CAMUS**	2. Model No. **DFNH-5004-NSI** Serial No.
3. Number of units: 1	4. Use **Provide building heat.**
5. Rated Boiler Horsepower: hp	6. Boiler Serial No.:
7. Date constructed: **2021**	8. Date of last modification and explain: **NA**
9. Maximum design heat input per unit: **4.99** ×10^6 BTU/hr	10. Peak heat input per unit: **4.99** ×10^6 BTU/hr
11. Steam produced at maximum design output: **TBD** LB/hr psig	12. Projected Operating Schedule: Hours/Day **24** Days/Week **7** Weeks/Year **52**
13. Type of firing equipment to be used: ☐ Pulverized coal ☐ Spreader stoker ☐ Oil burners ☒ Natural Gas Burner ☐ Others, specify	14. Proposed type of burners and orientation: ☐ Vertical ☐ Front Wall ☐ Opposed ☐ Tangential ☐ Others, specify
15. Type of draft: ☐ Forced ☐ Induced	16. Percent of ash retained in furnace: %
17. Will flyash be reinjected? ☐ Yes ☒ No	18. Percent of carbon in flyash: %

Stack or Vent Data

19. Inside diameter or dimensions: **1.00** ft.	20. Gas exit temperature: **232.07** °F
21. Height: **75.62** ft.	22. Stack serves: ☒ This equipment only ☐ Other equipment also (submit type and rating of all other equipment exhausted through this stack or vent)
23. Gas flow rate: **2,508.25** ft^3/min	
24. Estimated percent of moisture: %	

Fuel Requirements

25.	Type	Fuel Oil No.	Natural Gas	Gas (other, specify)	Coal, Type:	Other:
	Quantity (at Design Output)	gph@60°F	**4864** ft^3/hr	ft^3/hr	TPH	
	Annually	$\times 10^3$ gal	**42.60** $\times 10^6$ ft^3/yr	$\times 10^6$ ft^3/hr	tons	
	Sulfur	Maximum: wt. % Average: wt. %	gr/100 ft^3	gr/100 ft^3	Maximum: wt. %	
	Ash (%)				Maximum	
	BTU Content	BTU/Gal. Lbs/Gal.@60°F	**1026** BTU/ft^3	BTU/ft^3	BTU/lb	
	Source					
	Supplier					
	Halogens (Yes/No)					
	List and Identify Metals					

26. Gas burner mode of control:
☐ Manual ☐ Automatic hi-low
☐ Automatic full modulation ☐ Automatic on-off

27. Gas burner manufacture: **TBD**

28. Oil burner manufacture: **NA**

29. If fuel oil is used, how is it atomized? ☐ Oil Pressure ☐ Steam Pressure ☐ Compressed Air ☐ Rotary Cup ☐ Other, specify

30. Fuel oil preheated: ☐ Yes ☐ No

31. If yes, indicate temperature: °F

32. Specify the calculated theoretical air requirements for combustion of the fuel or mixture of fuels described above actual cubic feet (ACF) per unit of fuel:
@ °F, PSIA, % moisture

33. Emission rate at rated capacity: lb/hr

34. Percent excess air actually required for combustion of the fuel described: %

Coal Characteristics

35. Seams: **NA**

36. Proximate analysis (dry basis): % of Fixed Carbon: % of Sulfur:
% of Moisture: % of Volatile Matter:
% of Ash:

Emissions Stream

37. What quantities of pollutants will be emitted from the boiler before controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	**No Controls – See Below**			
Hydrocarbons				
NO_x				
Pb				
PM_{10}				
SO_2				
VOCs				
Other (specify)				

38. What quantities of pollutants will be emitted from the boiler after controls?

Pollutant	Pounds per Hour lb/hr	grain/ACF	@ °F	PSIA
CO	**0.41**			
Hydrocarbons				
NO_x	**0.18**			
Pb	**<0.01**			
$PM/PM_{10}/PM_{2.5}$	**0.04**			
SO_2	**<0.01**			
VOCs	**0.03**			
Other (specify)				
CO_2e	**584.32**			
Total HAPs	**0.01**			

39. How will waste material from the process and control equipment be disposed of?

Wastes are not expected from a natural gas-fired boiler.

40. Have you completed an *Air Pollution Control Device Sheet(s)* for the control(s) used on this Emission Unit.

41. Have you included the ***air pollution rates*** on the Emissions Points Data Summary Sheet? **Yes**

42. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING PLAN: Please list (1) describe the process parameters and how they were chosen (2) the ranges and how they were established for monitoring to demonstrate compliance with the operation of this process equipment operation or air pollution control device.

Not impacted by updates.

TESTING PLAN: Please describe any proposed emissions testing for this process equipment or air pollution control device.

Not impacted by updates.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

Not impacted by updates.

REPORTING: Please describe the proposed frequency of reporting of the recordkeeping.

Not impacted by updates.

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

NA

Attachment L
EMISSIONS UNIT DATA SHEET
GENERAL

To be used for affected sources other than asphalt plants, foundries, incinerators, indirect heat exchangers, and quarries.

Identification Number (as assigned on *Equipment List Form*): **EFP1**

1. Name or type and model of proposed affected source: **Emergency Fire Pump Engine – 316 hp**
2. On a separate sheet(s), furnish a sketch(es) of this affected source. If a modification is to be made to this source, clearly indicated the change(s). Provide a narrative description of all features of the affected source which may affect the production of air pollutants.
3. Name(s) and maximum amount of proposed process material(s) charged per hour:
4. Name(s) and maximum amount of proposed material(s) produced per hour:
5. Give chemical reactions, if applicable, that will be involved in the generation of air pollutants: **NA**

* The identification number which appears here must correspond to the air pollution control device identification number appearing on the *List Form*.

6. Combustion Data (if applicable):

(a) Type and amount in appropriate units of fuel(s) to be burned:

Diesel

(b) Chemical analysis of proposed fuel(s), excluding coal, including maximum percent sulfur and ash:

(c) Theoretical combustion air requirement (ACF/unit of fuel):

@ °F and psia.

(d) Percent excess air:

(e) Type and BTU/hr of burners and all other firing equipment planned to be used:

(f) If coal is proposed as a source of fuel, identify supplier and seams and give sizing of the coal as it will be fired:

(g) Proposed maximum design heat input: **2.21** $\times 10^6$ BTU/hr.

7. Projected operating schedule: **500 hours per year**

Hours/Day	Days/Week	Weeks/Year

8. Projected amount of pollutants that would be emitted from this affected source if no control devices were used: @ °F and psia			
a. NO_x	**1.80**	lb/hr	grains/ACF
b. SO_2	**<0.01**	lb/hr	grains/ACF
c. CO	**0.40**	lb/hr	grains/ACF
d. $PM/PM_{10}/PM_{2.5}$	**0.08**	lb/hr	grains/ACF
e. Hydrocarbons		lb/hr	grains/ACF
f. VOCs	**0.04**	lb/hr	grains/ACF
g. Pb		lb/hr	grains/ACF
h. Specify other(s)			
CO2e	**362**	lb/hr	grains/ACF
Total HAPs	**<0.01**	lb/hr	grains/ACF
		lb/hr	grains/ACF

NOTE: (1) An Air Pollution Control Device Sheet must be completed for any air pollution device(s) used to control emissions from this affected source.

(2) Complete the Emission Points Data Sheet.

9. Proposed Monitoring, Recordkeeping, Reporting, and Testing
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING	RECORDKEEPING
Not impacted by updates.	**Not impacted by updates.**
REPORTING	TESTING
Not impacted by updates.	**Not impacted by updates.**

MONITORING. PLEASE LIST AND DESCRIBE THE PROCESS PARAMETERS AND RANGES THAT ARE PROPOSED TO BE MONITORED IN ORDER TO DEMONSTRATE COMPLIANCE WITH THE OPERATION OF THIS PROCESS EQUIPMENT OPERATION/AIR POLLUTION CONTROL DEVICE.

RECORDKEEPING. PLEASE DESCRIBE THE PROPOSED RECORDKEEPING THAT WILL ACCOMPANY THE MONITORING.

REPORTING. PLEASE DESCRIBE THE PROPOSED FREQUENCY OF REPORTING OF THE RECORDKEEPING.

TESTING. PLEASE DESCRIBE ANY PROPOSED EMISSIONS TESTING FOR THIS PROCESS EQUIPMENT/AIR POLLUTION CONTROL DEVICE.

10. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty

Unit will comply with NSPS IIII Requirements.

Rating Specific Emissions Data - John Deere Power Systems

JOHN DEERE

Rating Data

Rating	6068HFC48B	
Certified Power(kW)	236	
Rated Speed	2400	
Vehicle Model Number	OEM (Clarke Fire Pump-Emergency)	
Units	g/kW-hr	g/hp-hr
NOx	3.43	2.56
HC	0.09	0.07
NOx + HC	N/A	N/A
Pm	0.11	0.08
CO	0.8	0.6

Certificate Data

Engine Model Year	2019
EPA Family Name	KJDXL13.5103
EPA JD Name	650HAA
EPA Certificate Number	KJDXL13.5103-007
CARB Executive Order	
Parent of Family	6135HF485A
Units	g/kW-hr
NOx	3.31
HC	0.11
NOx + HC	N/A
Pm	0.10
CO	0.6

* The emission data listed is measured from a laboratory test engine according to the test procedures of 40 CFR 89 or 40 CFR 1039, as applicable. The test engine is intended to represent nominal production hardware, and we do not guarantee that every production engine will have identical test results. The family parent data represents multiple ratings and this data may have been collected at a different engine speed and load. Emission results may vary due to engine manufacturing tolerances, engine operating conditions, fuels used, or other conditions beyond our control.

Emissions Results by Rating run on Feb-18-2019

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/tnn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/tnn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Thermal Oil Tank - IMF**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-TO3**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-TO3**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Increased tank capacity from 2642 gallons to 5283 gallons.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) Yes No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **N/A**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **N/A**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9. Tank Diameter (ft)	9B. Tank Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal barrels or gallons This is also known as and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **698 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Thermal Oil Expansion Tank - IMF**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-TO4**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-TO4**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Increased tank capacity from 1321 gallons to 1928 gallons.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **698 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Additive Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-AD**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-AD**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating emission calculations to AP42 methodology.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **17,171 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Binder Storage Containers**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-BS1, TK-BS2, and TK-BS3**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-BS1, TK-BS2, and TK-BS3**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating emission calculations to AP42 methodology.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr)	13B. Maximum daily throughput (gal/day)
130,325 gal/yr	

14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)

15. Maximum tank fill rate (gal/min)

16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading

17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply

17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Coupling Agent Storage Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-CA**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-CA**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating emission calculations to AP42 methodology.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **4,227 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof
___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Diesel Fuel Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-DF**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-DF**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating emission calculations to AP42 methodology.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **52,834 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **De-dust Oil Day Tank**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-DOD**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-DOD**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating emission calculations to AP42 methodology.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **52,834 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
EMISSIONS UNIT DATA SHEET
STORAGE TANKS

Provide the following information for each new or modified bulk liquid storage tank as shown on the *Equipment List Form* and other parts of this application. A tank is considered modified if the material to be stored in the tank is different from the existing stored liquid.

IF USING US EPA'S TANKS EMISSION ESTIMATION PROGRAM (AVAILABLE AT www.epa.gov/ttn/tanks.html), APPLICANT MAY ATTACH THE SUMMARY SHEETS IN LIEU OF COMPLETING SECTIONS III, IV, & V OF THIS FORM. HOWEVER, SECTIONS I, II, AND VI OF THIS FORM MUST BE COMPLETED. US EPA'S AP-42, SECTION 7.1, "ORGANIC LIQUID STORAGE TANKS," MAY ALSO BE USED TO ESTIMATE VOC AND HAP EMISSIONS (http://www.epa.gov/ttn/chief/).

I. GENERAL INFORMATION (required)

1. Bulk Storage Area Name	2. Tank Name **Resin Storage Tanks**
3. Tank Equipment Identification No. (as assigned on *Equipment List Form*) **TK-RS1 - TK-RS6**	4. Emission Point Identification No. (as assigned on *Equipment List Form*) **TK-RS1 - TK-RS6**
5. Date of Commencement of Construction (for existing tanks) **2021**	
6. Type of change ☐ New Construction ☐ New Stored Material ☒ Other Tank Modification	
7. Description of Tank Modification (if applicable) **Updating tank sizing.**	
7A. Does the tank have more than one mode of operation? (e.g. Is there more than one product stored in the tank?) ☐ Yes ☒ No	
7B. If YES, explain and identify which mode is covered by this application (Note: A separate form must be completed for each mode). **NA**	
7C. Provide any limitations on source operation affecting emissions, any work practice standards (e.g. production variation, etc.): **NA**	

II. TANK INFORMATION (required) - See Attached Emission Master Report for the following information

8. Design Capacity (specify barrels or gallons). Use the internal cross-sectional area multiplied by internal height.	
9A. Tank Internal Diameter (ft)	9B. Tank Internal Height (or Length) (ft)
10A. Maximum Liquid Height (ft)	10B. Average Liquid Height (ft)
11A. Maximum Vapor Space Height (ft)	11B. Average Vapor Space Height (ft)
12. Nominal Capacity (specify barrels or gallons). This is also known as "working volume" and considers design liquid levels and overflow valve heights.	

13A. Maximum annual throughput (gal/yr) **317,007 gal/yr**	13B. Maximum daily throughput (gal/day)
14. Number of Turnovers per year (annual net throughput/maximum tank liquid volume)	
15. Maximum tank fill rate (gal/min)	
16. Tank fill method ☐ Submerged ☐ Splash ☐ Bottom Loading	
17. Complete 17A and 17B for Variable Vapor Space Tank Systems ☐ Does Not Apply	
17A. Volume Expansion Capacity of System (gal)	17B. Number of transfers into system per year

18. Type of tank (check all that apply):

☐ Fixed Roof ___ vertical ___ horizontal ___ flat roof ___ cone roof ___ dome roof ___ other (describe)

☐ External Floating Roof ___ pontoon roof ___ double deck roof

☐ Domed External (or Covered) Floating Roof

☐ Internal Floating Roof ___ vertical column support ___ self-supporting

☐ Variable Vapor Space ___ lifter roof ___ diaphragm

☐ Pressurized ___ spherical ___ cylindrical

☐ Underground

☐ Other (describe)

Attachment L
FUGITIVE EMISSIONS FROM PAVED HAULROADS

INDUSTRIAL PAVED HAULROADS (including all equipment traffic involved in process, haul trucks, endloaders, etc.)

Item Number	Description	Mean Vehicle Weight (tons)	Miles per Trip	Maximum Trips per Day	Maximum Trips per Year	Control Device ID Number	Control Efficiency (%)
1	Truck - Binder Oil	21.6	0.46	1	52	All roads at the RAN facility will be paved. ROCKWOOL will operate a streetsweeper on an as needed basis to minimize the generation of dusts from road traffic.	75%
2	Truck - Oxygen	11.3	0.46	4	1,144		
3	Truck - Raw Material to 210	25.0	0.46	28	6,656		
4	Truck - DeSOx and Binder	21.6	0.46	2	676		
5	Truck - Waste	21.6	0.46	1	260		
6	Truck – Pallet and Foil	25.0	0.76	5	1,300		
7	Truck – Finished Goods	13.3	0.76	73	20,800		
8	FEL – Diverted Melt from Bldg 300 to Pit Waste (170)	17.8	0.27	67	12,295		
9	FEL – Crushed Melt from 170 to 210	17.8	0.10	67	12,295		
10	FEL – Raw Material from 210 to Feed Hopper	17.8	0.06	85	31,147		
11	FEL – Raw Material from Stockpile to 210	17.8	0.16	115	31,147		
12	Truck – Raw Material from Stockpile to 210	25.0	0.27	30	1,087		

Source: *AP-42 Fifth Edition – 11.2.6 Industrial Paved Roads*

$E = [k \times (sL)^{0.91} \times (W)^{1.02}] \times [1 - P/(4N)]$ = lb/Vehicle Mile Traveled (VMT)

Where:

k =	Particle size multiplier (lb/VMT)	**PM – 0.011** **PM_{10} – 0.0022** **$PM_{2.5}$ – 0.00054**
sL =	Road surface silt loading (g/m^2)	**Finished product road surface silt loading – 0.2** **Raw materials road surface silt loading – 8.2**
P =	Number of "wet" days with at least 0.01 in of precipitation during the averaging period	**148**
N =	Number of days in the averaging period	**365**
W =	Average vehicle weight traveling the road (tons)	**See table above**

For lb/hr: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] = lb/hr

For TPY: [lb ÷ VMT] × [VMT ÷ trip] × [Trips ÷ Hour] × [Ton ÷ 2000 lb] = Tons/year

SUMMARY OF PAVED HAULROAD EMISSIONS

Item No.	Uncontrolled PM_{10}		Controlled PM_{10}	
	lb/hr	ton/yr	lb/hr	ton/yr
1	<0.01	<0.01	<0.01	<0.01
2	0.01	0.04	<0.01	0.01
3	0.13	0.55	0.03	0.14
4	0.01	0.05	<0.01	0.01
5	<0.01	0.02	<0.01	<0.01
6	<0.01	0.01	<0.01	<0.01
7	0.01	0.05	<0.01	0.01
8	0.10	0.42	0.02	0.10
9	0.04	0.16	0.01	0.04
10	0.05	0.24	0.01	0.06
11	0.14	0.63	0.04	0.16
12	<0.01	0.05	<0.01	0.01
TOTALS	**0.49**	**2.21**	**0.12**	**0.55**

Item No.	Uncontrolled $PM_{2.5}$		Controlled $PM_{2.5}$	
	lb/hr	ton/yr	lb/hr	ton/yr
1	<0.01	<0.01	<0.01	<0.01
2	<0.01	0.01	<0.01	<0.01
3	0.03	0.13	0.01	0.03
4	<0.01	0.01	<0.01	<0.01
5	<0.01	<0.01	<0.01	<0.01
6	<0.01	<0.01	<0.01	<0.01
7	<0.01	0.01	<0.01	<0.01
8	0.02	0.10	0.01	0.03
9	0.01	0.04	<0.01	0.01
10	0.01	0.06	<0.01	0.01
11	0.04	0.15	0.01	0.04
12	<0.01	0.01	<0.01	<0.01
TOTALS	**0.12**	**0.54**	**0.03**	**0.14**

Attachment M

Attachment M
Air Pollution Control Device Sheet
(AFTERBURNER SYSTEM)

Control Device ID No. (must match Emission Units Table): **CO-AB – The afterburner is routed through HE01.**

Equipment Information

1. Manufacturer: **Bromkamp** Model No.	2. ☐ Thermal Energy Recovery ☒ Recuperative (Conventional) ☐ Catalytic
3. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.	
4. Combustion chamber dimensions: Length: ft Diameter: ft Cross-sectional area: ft^2	5. Stack Dimensions: Height: **212.66** ft Diameter: **12.93** ft
6. Combustion (destruction) efficiency: Estimated: **95** % Minimum guaranteed: **95** %	7. Retention or residence time of materials in combustion chamber: Maximum: sec Minimum: sec
8. Throat diameter: ft	9. Combustion Chamber Volume: ft^3
10. Fuel used in burners: ☒ Natural Gas ☐ Fuel Oil, Number: ☐ Other, specify:	11. Burners per afterburner: Number of burners: **1** BTU/hr for burner: **9,860,000**
12. Fuel heating value of natural gas: **1026** BTU/scf	13. Flow rate of natural gas: ft^3/min
14. Is a catalyst material used?: ☐ Yes ☒ No If yes, catalyst material used:	15. Expected frequency of catalyst replacement: yr(s) 16. Date catalyst was last replaced: Month/Year:
17. Space Velocity of the catalyst material used: 1/hour	18. Catalyst area: ft^2 19. Volume of catalyst bed: ft^3
20. Minimum loading: Maximum loading:	21. Temperature catalyst bed inlet: °F Temperature catalyst bed outlet: °F
22. Explain degradation or performance indicator criteria determining catalyst replacement:	
23. Heat exchanger used? ☐ Yes ☐ No Describe heat exchanger:	24. Heat exchanger surface area? ft^2 25. Average thermal efficiency: %
26. Temperature of gases: After preheat: °F	Before preheat: °F
27. Dilution air flow rate: ft^3/minute	

28. Describe method of gas mixing used:

Waste Gas (Emission Stream) to be Burned

29.

Name	Quantity Grains of H_2S/100 ft^2	Quantity-Density (LB/hr, ft^3/hr, etc)	Source of Material

30. Estimate total combustibles to afterburner 18,950 scfm (capacity)

31. Estimated total flow rate to afterburner or catalyst including materials to be burned, carrier gases, auxiliary fuel, etc.: lb/hr, ACF/hr, or scfm
Total flow rate = Flue gas flow rate

32. Afterburner operating parameters:	During maximum operation of feeding unit(s)	During typical operation of feeding unit(s)	During minimum operation of feeding unit(s)
Combustion chamber temperature in °F		**1621.22**	
Emission stream gas temperature in °F		**580**	
Combined gas stream entering catalyst bed in			
Flue stream leaving the catalyst bed			
Emission stream flow rate (scfm)		**18,950**	
Efficiency (VOC Reduction)	%	**95 %**	%
Efficiency (Other; specify contaminant)	%	%	%

33. Inlet Emission stream parameters:

	Maximum	Typical
Pressure (mmHg):		
Heat Content (BTU/scf):		
Oxygen Content (%):		
Moisture Content (%):		

Are halogenated organics present? ☐ Yes ☒ No
Are particulates present? ☒ Yes ☐ No
Are metals present? ☐ Yes ☒ No

34. For thermal afterburners, is the combustion chamber temperature continuously monitored and recorded?
☒ Yes ☐ No

35. For catalytic afterburners, is the temperature rise across the catalyst bed continuously monitored and recorded? ☐ Yes ☐ No

36. Is the VOC concentration of exhaust monitored and recorded? ☐ Yes ☒ No

37. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

38. Describe the collection material disposal system:

39. Have you included ***Afterburner Control Device*** in the Emissions Points Data Summary Sheet?

40. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
Not impacted by updates.	**Not impacted by updates.**
REPORTING:	TESTING:
Not impacted by updates.	**Not impacted by updates.**

MONITORING:	Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.
RECORDKEEPING:	Please describe the proposed recordkeeping that will accompany the monitoring.
REPORTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.
TESTING:	Please describe any proposed emissions testing for this process equipment on air pollution control device.

41. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

42. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

95% minimum control efficiency

43. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): **CE01-BH**

Equipment Information and Filter Characteristics

1. Manufacturer: **TBD**

   Model No.

2. Total number of compartments: **8**

3. Number of compartment online for normal operation: **8**

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   - ☐ Open Pressure
   - ☒ Closed Pressure
   - ☐ Closed Suction
   - ☐ Electrostatically Enhanced Fabric
   - ☐ Other, Specify

6. Filter Fabric Bag Material:
   - ☐ Nomex nylon
   - ☐ Wool
   - ☐ Polyester
   - ☒ Polypropylene
   - ☐ Acrylics
   - ☐ Ceramics
   - ☐ Fiber Glass
   - ☐ Cotton Weight oz./sq.yd
   - ☐ Teflon Thickness in
   - ☐ Others, specify

7. Bag Dimension:
   - Diameter **6.30** in.
   - Length **12.55** ft.

8. Total cloth area: **7363** ft^2

9. Number of bags:

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☒ Continuous ☐ Automatic ☐ Intermittent

12. Method used to clean bags:
   - ☐ Mechanical Shaker
   - ☐ Pneumatic Shaker
   - ☐ Bag Collapse
   - ☐ Manual Cleaning
   - ☐ Sonic Cleaning
   - ☐ Reverse Air Flow
   - ☒ Pulse Jet
   - ☐ Reverse Jet
   - ☐ Reverse Air Jet
   - ☐ Other:

13. Cleaning initiated by:
   - ☐ Timer
   - ☒ Expected pressure drop range in. of water
   - ☐ Frequency if timer actuated
   - ☐ Other

14. Operation Hours: Max. per day: **24** Max. per yr: **8400**

15. Collection efficiency: Rating: % Guaranteed minimum: %

Gas Stream Characteristics

16. Gas flow rate into the collector: **44,217** ACFM at **104** °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: **104** °F

19. Fan Requirements: hp
    OR
    ft^3/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. H_2O
    Low in. H_2O

21. Particulate Loading: Inlet: grain/scf Outlet: **PM_{10} - 0.002** grain/scf
    Outlet: **$PM_{2.5}$ - 0.006** grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):
PM_{10}, $PM_{2.5}$, and HAPs

23. Is there any SO_3 in the emission stream? ☒ No ☐ Yes SO_3 content: ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

	IN		OUT	
Pollutant	**lb/hr**	**grains/acf**	**lb/hr**	**grains/acf**
Filterable PM_{10}			**.77**	
Filterable $PM_{2.5}$			**.21**	
Total HAPS			**.77**	

25. Complete the table:

	Particle Size Distribution at Inlet to Collector	**Fraction Efficiency of Collector**
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
    - ☐ Continuous Opacity
    - ☒ Pressure Drop
    - ☒ Alarms-Audible to Process Operator
    - ☐ Visual opacity readings, Frequency:
    - ☐ Other, specify:

27. Describe any recording device and frequency of log entries:

28. Describe any filter seeding being performed:

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

30. Describe the collection material disposal system:

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? **Yes**

32. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
See proposed monitoring plan in Attachment O.	**See proposed recordkeeping plan in Attachment O.**
REPORTING:	TESTING:
See proposed reporting plan in Attachment O.	**See proposed reporting plan in Attachment O.**

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

PM_{10} - >99% efficiency typical
$PM_{2.5}$ - > 99% efficiency typical

35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Attachment M
Air Pollution Control Device Sheet
(BAGHOUSE)

Control Device ID No. (must match Emission Units Table): **CE02-BH**

Equipment Information and Filter Characteristics

1. Manufacturer: **TBD**

   Model No.

2. Total number of compartments: **TBD**

3. Number of compartment online for normal operation: **TBD**

4. Provide diagram(s) of unit describing capture system with duct arrangement and size of duct, air volume, capacity, horsepower of movers. If applicable, state hood face velocity and hood collection efficiency.

5. Baghouse Configuration: (check one)
   - ☐ Open Pressure
   - ☒ Closed Pressure
   - ☐ Closed Suction
   - ☐ Electrostatically Enhanced Fabric
   - ☐ Other, Specify

6. Filter Fabric Bag Material:
   - ☐ Nomex nylon
   - ☐ Wool
   - ☐ Polyester
   - ☐ Polypropylene
   - ☐ Acrylics
   - ☐ Ceramics
   - ☐ Fiber Glass
   - ☐ Cotton Weight oz./sq.yd
   - ☐ Teflon Thickness in
   - ☐ Others, specify

7. Bag Dimension:
   - Diameter **TBD** in.
   - Length **TBD** ft.

8. Total cloth area: **TBD** ft^2

9. Number of bags: **TBD**

10. Operating air to cloth ratio: ft/min

11. Baghouse Operation: ☐ Continuous ☐ Automatic ☒ Intermittent

12. Method used to clean bags:
   - ☐ Mechanical Shaker
   - ☐ Pneumatic Shaker
   - ☐ Bag Collapse
   - ☐ Manual Cleaning
   - ☐ Sonic Cleaning
   - ☐ Reverse Air Flow
   - ☐ Pulse Jet
   - ☐ Reverse Jet
   - ☐ Reverse Air Jet
   - ☐ Other:

13. Cleaning initiated by:
   - ☐ Timer
   - ☐ Expected pressure drop range in. of water
   - ☐ Frequency if timer actuated
   - ☐ Other

14. Operation Hours: Max. per day: **24** Max. per yr: **8400**

15. Collection efficiency: Rating: % Guaranteed minimum: %

Gas Stream Characteristics

16. Gas flow rate into the collector: **12,633** ACFM at **104** °F and PSIA
    ACFM: Design: PSIA Maximum: PSIA Average Expected: PSIA

17. Water Vapor Content of Effluent Stream: lb. Water/lb. Dry Air

18. Gas Stream Temperature: **104** °F

19. Fan Requirements: hp
    OR
    ft^3/min

20. Stabilized static pressure loss across baghouse. Pressure Drop: High in. H_2O
    Low in. H_2O

21. Particulate Loading: Inlet: grain/scf Outlet: **PM_{10} - 0.002** grain/scf
    Outlet: **$PM_{2.5}$ - 0.002** grain/scf

22. Type of Pollutant(s) to be collected (if particulate give specific type):
PM_{10} and $PM_{2.5}$

23. Is there any SO_3 in the emission stream? ☒ No ☐ Yes SO_3 content: ppmv

24. Emission rate of pollutant (specify) into and out of collector at maximum design operating conditions:

	IN		OUT	
Pollutant	**lb/hr**	**grains/acf**	**lb/hr**	**grains/acf**
Filterable PM_{10}			**.22**	
Filterable $PM_{2.5}$			**.22**	

25. Complete the table:

	Particle Size Distribution at Inlet to Collector	**Fraction Efficiency of Collector**
Particulate Size Range (microns)	**Weight % for Size Range**	**Weight % for Size Range**
0 – 2		
2 – 4		
4 – 6		
6 – 8		
8 – 10		
10 – 12		
12 – 16		
16 – 20		
20 – 30		
30 – 40		
40 – 50		
50 – 60		
60 – 70		
70 – 80		
80 – 90		
90 – 100		
>100		

26. How is filter monitored for indications of deterioration (e.g., broken bags)?
- ☐ Continuous Opacity
- ☒ Pressure Drop
- ☒ Alarms-Audible to Process Operator
- ☐ Visual opacity readings, Frequency:
- ☐ Other, specify:

27. Describe any recording device and frequency of log entries:

28. Describe any filter seeding being performed:

29. Describe any air pollution control device inlet and outlet gas conditioning processes (e.g., gas cooling, gas reheating, gas humidification):

30. Describe the collection material disposal system:

31. Have you included ***Baghouse Control Device*** in the Emissions Points Data Summary Sheet? **Yes**

32. **Proposed Monitoring, Recordkeeping, Reporting, and Testing**
Please propose monitoring, recordkeeping, and reporting in order to demonstrate compliance with the proposed operating parameters. Please propose testing in order to demonstrate compliance with the proposed emissions limits.

MONITORING:	RECORDKEEPING:
See proposed monitoring plan in Attachment O.	**See proposed recordkeeping plan in Attachment O.**
REPORTING:	TESTING:
See proposed reporting plan in Attachment O.	**See proposed reporting plan in Attachment O.**

MONITORING: Please list and describe the process parameters and ranges that are proposed to be monitored in order to demonstrate compliance with the operation of this process equipment or air control device.

RECORDKEEPING: Please describe the proposed recordkeeping that will accompany the monitoring.

REPORTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

TESTING: Please describe any proposed emissions testing for this process equipment on air pollution control device.

33. Manufacturer's Guaranteed Capture Efficiency for each air pollutant.

The vacuum cleaning baghouse is a maintenance source that is not capturing emissions from an emission unit. Capture is not applicable to this source

34. Manufacturer's Guaranteed Control Efficiency for each air pollutant.

PM_{10} - >99% efficiency typical
$PM_{2.5}$ - > 99% efficiency typical

35. Describe all operating ranges and maintenance procedures required by Manufacturer to maintain warranty.

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Summary of Facility Emissions

Modified units
New units
Removed units

		US												METRIC									
Source ID	Source Description	NOx (ton/yr)	SO2 (ton/yr)	CO (ton/yr)	VOC (ton/yr)	Total PM (ton/yr)	Filt. PM (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)	CO2e (ton/yr)	H2SO4 (ton/yr)	Lead (ton/yr)	Total HAP (ton/yr)	NOx (tonne/yr)	SO2 (tonne/yr)	CO (tonne/yr)	VOC (tonne/yr)	Total PM (tonne/yr)	Filt. PM (tonne/yr)	PM10 (tonne/yr)	PM2.5 (tonne/yr)	CO2e (tonne/yr)	H2SO4 (tonne/yr)	Lead (tonne/yr)	Total HAP (tonne/yr)
Minwool Line																									
B210/B211	Raw Material Storage (B210)	--	--	--	--	0.28	0.28	0.13	0.02	--	--	--	--	--	--	--	--	0.26	0.26	0.12	0.02	--	--	--	--
B215	Raw Material Loading Hopper (B215)	--	--	--	--	0.06	0.06	0.03	4.03E-03	--	--	--	--	--	--	--	--	5.10E-02	5.10E-02	2.41E-02	3.65E-03	--	--	--	--
IMF11	Conveyor Transition Point (B215 to B220)	--	--	--	--	1.74E-02	1.74E-02	1.74E-02	8.69E-03	--	--	--	--	--	--	--	--	0.02	0.02	0.02	0.01	--	--	--	--
IMF17	B220 Material Handling	--	--	--	--	1.49	1.49	0.61	0.56	--	--	--	--	--	--	--	--	1.35	1.35	0.55	0.51	--	--	--	--
IMF12	Conveyor Transfer Point (B215)	--	--	--	--	6.16E-02	6.16E-02	2.26E-02	2.26E-02	--	--	--	--	--	--	--	--	0.06	0.06	0.02	0.02	--	--	--	--
IMF16	Conveyor Transfer Point (B300)	--	--	--	--	6.16E-02	6.16E-02	2.26E-02	2.26E-02	--	--	--	--	--	--	--	--	0.06	0.06	0.02	0.02	--	--	--	--
IMF15	Outside B220 Transfer Points	--	--	--	--	7.69E-02	7.69E-02	2.82E-02	2.82E-02	--	--	--	--	--	--	--	--	0.07	0.07	0.03	0.03	--	--	--	--
RM_REJ	Raw Material Reject Collection Drop	--	--	--	--	1.12E-03	1.12E-03	5.32E-04	8.05E-05	--	--	--	--	--	--	--	--	1.02E-03	1.02E-03	4.83E-04	7.31E-05	--	--	--	--
IMF21	Charging Building Vacuum Cleaning Filter	--	--	--	--	2.41E-02	2.41E-02	2.41E-02	1.21E-02	--	--	--	--	--	--	--	--	2.19E-02	2.19E-02	2.19E-02	1.10E-02	--	--	--	--
IMF24	Pre-heat Burner	1.52	0.01	1.76	0.12	0.16	0.04	0.16	0.16	2,519.44	--	1.05E-05	0.04	1.38	0.01	1.60	0.10	0.14	0.04	0.14	0.14	2,285.59	--	9.51E-06	0.04
IMF01	Melting Furnace	156.95	141.25	13.48	1.29	9.73	9.73	9.73	9.73	77,076.96	7.85	1.57E-04	14.42	142.38	128.14	12.23	1.17	17.66	8.83	8.83	8.83	69,923.13	7.12	1.42E-04	13.08
IMF07	One (1) Storage Silo (Filter Fines Day)	--	--	--	--	0.01	0.01	0.01	0.01	--	--	--	--	--	--	--	--	0.01	0.01	0.01	0.01	--	--	--	--
IMF10	Filter Fines Recieving Silo	--	--	--	--	0.06	0.06	0.06	0.03	--	--	--	--	--	--	--	--	0.05	0.05	0.05	0.03	--	--	--	--
IMF08	Sorbent Silo	--	--	--	--	0.06	0.06	0.06	0.03	--	--	--	--	--	--	--	--	0.05	0.05	0.05	0.03	--	--	--	--
IMF09	Spent Sorbent Silo	--	--	--	--	0.06	0.06	0.06	0.03	--	--	--	--	--	--	--	--	0.05	0.05	0.05	0.03	--	--	--	--
DI	Dry Ice Cleaning	--	--	--	--	--	--	--	--	1,527.80	--	--	--	--	--	--	--	--	--	--	--	1,386.00	--	--	--
CM12	Fleece Application Vent 1	--	--	--	6.85	--	--	--	--	--	--	--	6.85	--	--	--	6.22	--	--	--	--	--	--	--	6.22
CM13	Fleece Application Vent 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
HE01	WESP	6.60	0.05	41.24	187.55	50.39	50.39	50.39	50.39	35,669.62	--	--	237.95	5.99	0.05	37.41	170.15	91.43	45.72	45.72	45.72	32,358.97	--	--	215.86
CE01	De-dusting Baghouse	--	--	--	--	0.94	0.94	3.24	0.94	--	--	--	3.24	--	--	--	--	0.85	0.85	2.94	0.85	--	--	--	2.94
CE02	Vacuum Cleaning Baghouse	--	--	--	--	1.85	1.85	0.93	0.93	--	--	--	0.93	--	--	--	--	1.68	1.68	0.84	0.84	--	--	--	0.84
P_MARK	Product Marking	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00
CM10	Recycle Plant Building Vent 1	--	--	--	--	2.90	2.90	2.90	1.45	--	--	--	--	--	--	--	--	2.63	2.63	2.63	1.31	--	--	--	--
CM11	Recycle Plant Building Vent 2	--	--	--	--	2.90	2.90	2.90	1.45	--	--	--	--	--	--	--	--	2.63	2.63	2.63	1.31	--	--	--	--
CM08	Recycle Plant Building Vent 3	--	--	--	--	0.24	0.24	0.24	0.12	--	--	--	--	--	--	--	--	0.22	0.22	0.22	0.11	--	--	--	--
CM09	Recycle Plant Building Vent 4	--	--	--	--	0.24	0.24	0.24	0.12	--	--	--	--	--	--	--	--	0.22	0.22	0.22	0.11	--	--	--	--
RMS	Raw Material Outdoor Stockpile	--	--	--	--	0.20	0.20	0.10	1.48E-02	--	--	--	--	--	--	--	--	0.18	0.18	0.09	1.35E-02	--	--	--	--
IMF14	Raw Material Reject Stockpile	--	--	--	--	1.81E-03	1.81E-03	8.51E-04	1.38E-04	--	--	--	--	--	--	--	--	1.64E-03	1.64E-03	7.72E-04	1.23E-04	--	--	--	--
B170	Melting Furnace Portable Crusher & Storage	--	--	--	--	0.59	0.59	0.27	0.06	--	--	--	--	--	--	--	--	0.53	0.53	0.25	0.05	--	--	--	--
Rockfon Line																									
RFNE1	IR Zone																								
RFNE2	Hot Press and Cure																								
RFNE3	High Oven A																								
RFNE9	High Oven B																								
RFNE4	Drying Oven 1																								
RFNE6	Drying Oven 2 & 3																								
RFNE5	Spray Paint Cabin																								
RFNE7	Cooling Zone																								
RFNE8	De-dusting Baghouse																								
Other Facility-wide Sources																									
CM03	Natural Gas Boiler 1	0.77	0.01	1.79	0.12	0.16	0.04	0.16	0.16	2,559.32	--	1.07E-05	0.04	0.70	0.01	1.62	0.11	0.15	0.04	0.15	0.15	2,321.77	--	9.66E-06	0.04
CM04	Natural Gas Boiler 2	0.77	0.01	1.79	0.12	0.16	0.04	0.16	0.16	2,559.32	--	1.07E-05	0.04	0.70	0.01	1.62	0.11	0.15	0.04	0.15	0.15	2,321.77	--	9.66E-06	0.04
RFN10	RFN Building Heat																								
EFP1	Emergency Fire Pump Engine	0.45	8.61E-04	0.10	0.01	0.02	0.01	0.02	0.02	90.50	--	--	2.14E-03	0.40	7.81E-04	0.09	0.01	0.02	0.01	0.02	0.02	82.10	--	--	1.95E-03
Rd_RM	Raw Material Paved Haul Roads	--	--	--	--	2.69	2.69	0.54	0.13	--	--	--	--	--	--	--	--	2.44	2.44	0.49	0.12	--	--	--	--
Rd_FP	Finished Product Paved Haul Road	--	--	--	--	0.07	0.07	0.01	0.00	--	--	--	--	--	--	--	--	0.06	0.06	0.01	0.00	--	--	--	--
Tanks	Facility Storage Tanks	--	--	--	0.12	--	--	--	--	--	--	--	0.11	--	--	--	0.11	--	--	--	--	--	--	--	0.10
	Totals	**167.06**	**141.34**	**60.17**	**196.18**	**75.50**	**75.13**	**73.06**	**66.61**	**122,002.95**	**7.85**	**1.89E-04**	**263.61**	**151.55**	**128.23**	**54.58**	**177.98**	**123.03**	**68.16**	**66.28**	**60.42**	**110,679**	**7.12**	**0.0002**	**239.15**

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Summary of Facility Emissions

		US																METRIC													
Source ID	Source Description	HF (ton/yr)	HCl (ton/yr)	COS (ton/yr)	Formaldehyde (ton/yr)	Arsenic (ton/yr)	Lead (ton/yr)	Mercury (ton/yr)	Phenol (ton/yr)	Mineral Fiber (ton/yr)	Methanol (ton/yr)	Hexane (ton/yr)	Benzene (ton/yr)	Acetaldehyde (ton/yr)	Toluene (ton/yr)	Xylene (ton/yr)	PAH (ton/yr)	HF (tonne/yr)	HCl (tonne/yr)	COS (tonne/yr)	Formaldehyde (tonne/yr)	Arsenic (tonne/yr)	Lead (tonne/yr)	Mercury (tonne/yr)	Phenol (tonne/yr)	Mineral Fiber (tonne/yr)	Methanol (tonne/yr)	Hexane (tonne/yr)	Benzene (tonne/yr)	Acetaldehyde (tonne/yr)	Toluene (tonne/yr)	Xylene (tonne/yr)	PAH (tonne/yr)
Minwool Line																																	
B210/B211	Raw Material Storage (B210)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B215	Raw Material Loading Hopper (B215)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF11	Conveyor Transition Point (B215 to B220)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF17	B220 Material Handling	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF12	Conveyor Transfer Point (B215)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF16	Conveyor Transfer Point (B300)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF15	Outside B220 Transfer Points	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RM_REJ	Raw Material Reject Collection Drop	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF21	Charging Building Vacuum Cleaning Filter	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF24	Pre-heat Burner	--	--	--	--	--	1.05E-05	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	9.51E-06	--	--	--	--	0.03	--	--	--	--	--
IMF01	Melting Furnace	1.55	1.24	1.57	0.02	3.77E-04	1.57E-04	2.45E-03	0.31	9.73	--	--	--	--	--	--	--	1.41	1.12	1.42	0.01	3.42E-04	1.42E-04	2.22E-03	0.28	8.83	--	--	--	--	--	--	--
IMF07	One (1) Storage Silo (Filter Fines Day)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF10	Filter Fines Recieving Silo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF08	Sorbent Silo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF09	Spent Sorbent Silo	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
DI	Dry Ice Cleaning	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CM12	Fleece Application Vent 1	--	--	--	2.78	--	--	--	3.40	--	0.67	--	--	--	--	--	--	--	--	--	2.52	--	--	--	3.08	--	0.61	--	--	--	--	--	--
CM13	Fleece Application Vent 2						--																										
HE01	WESP	--	--	--	13.74	--	--	--	71.61	50.39	102.21	--	--	--	--	--	--	--	--	--	12.46	--	--	--	64.96	45.72	92.72	--	--	--	--	--	--
CE01	De-dusting Baghouse	--	--	--	--	--	--	--	--	3.24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.94	--	--	--	--	--	--	--
CE02	Vacuum Cleaning Baghouse	--	--	--	--	--	--	--	--	0.93	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.84	--	--	--	--	--	--	--
P_MARK	Product Marking	--	--	--	--	--	0.00	--	--	--	--	0.00	--	--	--	--	--	--	--	--	--	--	0.00	--	--	--	--	0.00	--	--	--	--	--
CM10	Recycle Plant Building Vent 1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CM11	Recycle Plant Building Vent 2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CM08	Recycle Plant Building Vent 3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
CM09	Recycle Plant Building Vent 4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
RMS	Raw Material Outdoor Stockpile	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
IMF14	Raw Material Reject Stockpile	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B170	Melting Furnace Portable Crusher & Storage	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rockfon Line																																	
RFNE1	IR Zone																																
RFNE2	Hot Press and Cure																																
RFNE3	High Oven A																																
RFNE9	High Oven B																																
RFNE4	Drying Oven 1																																
RFNE6	Drying Oven 2 & 3																																
RFNE5	Spray Paint Cabin																																
RFNE7	Cooling Zone																																
RFNE8	De-dusting Baghouse																																
Other Facility-wide Sources																																	
CM03	Natural Gas Boiler 1	--	--	--	--	--	1.07E-05	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	9.66E-06	--	--	--	--	0.03	--	--	--	--	--
CM04	Natural Gas Boiler 2	--	--	--	--	--	1.07E-05	--	--	--	--	0.04	--	--	--	--	--	--	--	--	--	--	9.66E-06	--	--	--	--	0.03	--	--	--	--	--
RFN10	RFN Building Heat																																
EFP1	Emergency Fire Pump Engine	--	--	--	6.53E-04	--	--	--	--	--	--	--	5.17E-04	4.25E-04	2.26E-04	1.58E-04	9.30E-05	--	--	--	5.93E-04	--	--	--	--	--	--	--	4.69E-04	3.85E-04	2.05E-04	1.43E-04	8.44E-05
Rd_RM	Raw Material Paved Haul Roads	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Rd_FP	Finished Product Paved Haul Road	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Tanks	Facility Storage Tanks	--	--	--	0.11	--	--	--	--	--	9.30E-04	--	--	--	--	--	--	--	--	--	0.10	--	--	--	--	--	8.44E-04	--	--	--	--	--	--
	Totals	**1.55**	**1.24**	**1.57**	**16.64**	**3.77E-04**	**1.89E-04**	**2.45E-03**	**75.32**	**64.29**	**102.88**	**0.11**	**5.17E-04**	**4.25E-04**	**2.26E-04**	**1.58E-04**	**9.30E-05**	**1.41**	**1.12**	**1.42**	**15.10**	**3.42E-04**	**1.71E-04**	**2.22E-03**	**68.33**	**58.32**	**93.33**	**0.10**	**4.69E-04**	**3.85E-04**	**2.05E-04**	**1.43E-04**	**8.44E-05**

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Mineral Wool Line (L1) Emissions

Modified units
New units
Removed units

Stack ID(s)	Source Description	Concentration		Flow Rate		PTE Hourly Emissions (METRIC)	PTE Annual Emissions (METRIC)	PTE Hourly Emissions (US)	PTE Annual Emissions (US)	Modeled Emission Rate		Notes	Control Device
-	Pollutants	(mg/Nm^3)	(gr/scf)	(Nm^3/h)	(scfm)	(kg/hr)	(tonne/yr)	(lb/hr)	(ton/year)	(g/s)	Averaging Period		
IMF01	**Melting Furnace**												
	Filterable PM	31	0.001	33,900	21,414	1.05	8.83	2.32	9.73	-	-	Note 2 (2)	Baghouse
	Total PM_{10}	31	0.001	33,900	21,414	1.05	8.83	2.32	9.73	2.92E-01	24-hr, Annual	Note 2 (2)	Baghouse
	Total $PM_{2.5}$	31	0.001	33,900	21,414	1.05	8.83	2.32	9.73	2.92E-01	24-hr, Annual	Note 2 (2)	Baghouse
	NOx	500	-	33,900	21,414	16.95	142.38	37.37	156.95	4.71E+00	1-hr (base), Annual	Note 2 (6)	SNCR and Oxy-fuel burners
	CO	150	-	33,900	21,414	1.46	12.23	3.21	13.48	4.05E-01	1-hr (base), 8-hr	Note 2 (6)	-
	SO_2	450	-	33,900	21,414	15.26	128.14	33.63	141.25	4.24E+00	1-hr (base), 3-hr, 24-hr, Annual	Note 2 (1)	Sorbent Injection System
	Total VOC	-	-	33,900	21,414	0.14	1.17	0.31	1.29	-	-	Note 2 (1)	-
	HF	4.9	-	33,900	21,414	0.17	1.41	0.37	1.55	-	-	Note 2 (2)	Sorbent Injection System
	HCl	3.9	-	33,900	21,414	0.13	1.12	0.29	1.24	-	-	Note 2 (2)	Sorbent Injection System
	COS	5	-	33,900	21,414	0.17	1.42	0.37	1.57	-	-	Note 2 (1)	-
	Formaldehyde	0.05	-	33,900	21,414	1.70E-03	0.01	3.74E-03	0.02	-	-	Note 2 (1)	-
	H_2SO_4 Mist	50	-	33,900	21,414	0.85	7.12	1.87	7.85	-	-	Note 2 (1)	Sorbent Injection System
	Fluorides	0.1	-	33,900	21,414	3.39E-03	0.03	0.01	0.03	-	-	Note 2 (5)	Baghouse
	Arsenic	0.0012	-	33,900	21,414	4.07E-05	3.42E-04	8.97E-05	3.77E-04	-	-	Note 2 (5)	Baghouse
	Lead	0.0005	-	33,900	21,414	1.70E-05	1.42E-04	3.74E-05	1.57E-04	-	-	Note 2 (5)	Baghouse
	Mercury	0.0078	-	33,900	21,414	2.64E-04	2.22E-03	5.83E-04	2.45E-03	-	-	Note 2 (5)	Baghouse
	Phenol	1	-	33,900	21,414	0.03	0.28	0.07	0.31	-	-	Note 2 (5)	-
	Mineral Fiber	-	-	33,900	21,414	1.05	8.83	2.32	9.73	-	-	Note 2 (2), Note 3	Baghouse
	Total HAPs	-	-	33,900	21,414	1.56	13.08	3.43	14.42	-	-	-	Sorbent Injection System
	CO_2	245,343	-	33,900	21,414	8,317.14	69,863.99	18,336.14	77,011.77	-	-	Note 2 (6)	-
	CH_4	4	-	33,900	21,414	0.13	1.08	0.28	1.19	-	-	Note 2 (3)	-
	N_2O	0	-	33,900	21,414	0.01	0.11	0.03	0.12	-	-	Note 2 (3)	-
	CO_2e	-	-	33,900	21,414	8,324.18	69,923.13	18,351.66	77,076.96	-	-	-	-
HE01	**WESP**												
	Filterable PM	-	-	585,000	369,529	5.44	45.72	12.00	50.39	-	-	Note 2 (1)	WESP
	Total PM_{10}	-	-	585,000	369,529	5.44	45.72	12.00	50.39	1.51E+00	24-hr, Annual	Note 2 (1)	WESP
	Total $PM_{2.5}$	-	-	585,000	369,529	5.44	45.72	12.00	50.39	1.51E+00	24-hr, Annual	Note 2 (1)	WESP
	NOx	-	-	585,000	369,529	0.59	5.99	1.57	6.60	1.98E-01	1-hr, Annual	Note 2 (1)	-
	CO	-	-	585,000	369,529	4.45	37.41	9.82	41.24	1.24E+00	1-hr, 8-hr	Note 2 (1)	-
	SO_2	-	-	585,000	369,529	0.01	0.05	0.01	0.05	1.58E-03	1-hr, 3-hr, 24-hr, Annual	-	-
	VOC	-	-	585,000	369,529	20.26	170.15	44.66	187.55	-	-	Note 2 (1)	-
	Phenol	-	-	585,000	369,529	7.73	64.96	17.05	71.61	-	-	Note 2 (1)	-
	Formaldehyde	-	-	585,000	369,529	1.48	12.46	3.27	13.74	-	-	Note 2 (1)	-
	Methanol	-	-	585,000	369,529	11.04	92.72	24.34	102.21	-	-	Note 2 (1)	-
	Mineral Fiber	-	-	585,000	369,529	5.44	45.72	12.00	50.39	-	-	Note 2 (1), Note 3	WESP
	Total HAPs	-	-	585,000	369,529	25.70	215.86	56.65	237.95	-	-	-	-
	CO_2	-	-	585,000	369,529	1139.28	9,569.97	2,511.68	10,549.07	-	-	-	-
	CH_4	-	-	585,000	369,529	0.02	0.18	0.05	0.20	-	-	-	-
	N_2O	-	-	585,000	369,529	9.10	76.46	20.07	84.28	-	-	-	-
	CO_2e	-	-	585,000	369,529	3,852.26	32,358.97	8,492.77	35,669.62	-	-	-	-
CE01	**De-dusting Baghouse**												
	Filterable PM	10	0.0006	70,000	44,217	0.10	0.85	0.21	0.94	-	-	Note 1	Baghouse
	Filterable PM_{10}	5	0.0020	70,000	44,217	0.35	2.94	0.77	3.24	9.72E-02	24-hr, Annual	Note 2 (5)	Baghouse
	Filterable $PM_{2.5}$	5	0.0006	70,000	44,217	0.10	0.85	0.21	0.94	2.69E-02	24-hr, Annual	Note 2 (5)	Baghouse
	Mineral Fiber	-	-	70,000	44,217	0.35	2.94	0.77	3.24	-	-	Note 3	Baghouse
	Total HAPs	-	-	70,000	44,217	0.35	2.94	0.77	3.24	-	-	-	-
CE02	**Vacuum Cleaning Baghouse**												
	Filterable PM	10	0.0041	20,000	12,633	0.20	1.68	0.44	1.85	-	-	Note 1	Baghouse
	Filterable PM_{10}	5	0.0020	20,000	12,633	0.10	0.84	0.22	0.93	2.78E-02	24-hr, Annual	Note 2 (5)	Baghouse
	Filterable $PM_{2.5}$	5	0.0020	20,000	12,633	0.10	0.84	0.22	0.93	2.78E-02	24-hr, Annual	Note 2 (5)	Baghouse
	Mineral Fiber	-	-	20,000	12,633	0.10	0.84	0.22	0.93	-	-	Note 3	Baghouse
	Total HAPs	-	-	20,000	12,633	0.10	0.84	0.22	0.93	-	-	-	-

Notes:
1. Where data was not available, speciations of PM were conservatively estimated in accordance with the below: Filterable PM was conservatively assumed to be equal to Total PM10. For CE01 and CE02, Filterable PM assumed double Filterable PM10. For clarity,
   Total PM_{10} = Filterable PM_{10} + Condensable PM.
   Total $PM_{2.5}$ = Filterable $PM_{2.5}$ + Condensable PM
   Filterable PM = Total PM_{10}, with the exception of CE01 and CE02, where Filterable PM = 2X Filterable PM_{10}
   Total PM = Filterable PM + CPM (where CPM = Total $PM_{2.5}$)
2. Calculation Method References:
   1 - Stack testing from RAN Compliance Test with engineering assumptions applied.
   2 - MACT Limit (40 CFR 63 Subpart DDD) emission limit. Note emission limits for formaldehyde, methanol, and phenol combined for spinning (collection) and curing.
   3 - EPA Emission Factor
   4 - Assumed 10% of the mass emissions of the Curing Oven for Cooling.
   5 - Based upon testing from other Rockwool operations.
   6 - Limits have been evaluated against data analysis of CEMS performance.
3. Mineral Fiber emissions were conservatively assumed equal to Filterable PM emissions for sources that may contain rock wool fibers.
   The listed HAP, fine mineral fibers, includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

Sample Calculations:
Hourly Emissions (kg/hr) = Fan Flow Rate (Nm^3/hr) * Exhaust Concentration (mg/Nm^3) * 1,000,000 (mg/kg)
Hourly Emission Rate Filterable PM = Concentration PM (gr/scf) * (1 lb/7,000 grains) * Flow Rate (scfm) * (60 min/hr)
Annual Emissions (ton/yr) = Hourly Emission Rate (lb/hr) * 8,400 (hr/yr) / 2,000 (lb/ton)
Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8,400 (hr/yr) / 1,000 (kg/tonne)
CO_2 Equivalent (CO_{2e}) = CO2 + [GWP_{CH4} * CH_4)] + [GWP_{N2O} * N_2O]

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Material Handling Fugitives

Modified units
New units
Removed units

Material Properties & Calculation Inputs

Raw Material	M-Moisture Content[1] %
Rock/Slag/Minerals	2.7
Reject Raw Material	2.7
Melting Furnace Diverted Melt	2.7

Pollutant	k - Particle Size Multiplier	E - Emission Factor[3]		
		Rock/Slag/ Minerals	Reject Raw Material	Diverted Melt
		(lb/ton)	(lb/ton)	(lb/ton)
PM	0.74	2.19E-03	2.19E-03	2.19E-03
PM_{10}	0.35	1.04E-03	1.04E-03	1.04E-03
$PM_{2.5}$	0.053	1.57E-04	1.57E-04	1.57E-04

Location	U - Wind Speed[2]	
	(mph)	m/s
Outdoor	6.51	2.91

Notes:
1. Moisture content chosen as worst case among various materials handled.
2. Outdoor wind speed was set at 6.51 mph based on 2011-2015 average wind speed data from station ID 13734.
3. Material drops emission factor equation per AP-42 Section 13.2.4.

Sample Calculations:
E (lb/ton) = k (0.0032) [(U/5)^1.3] / [(M/2)^1.4], where
k = Particle Size Multiplier,
U = wind speed, (meters per second [m/s]), (miles per hour [mph]),
M = material moisture content (%)

1 Material Delivery and Front-end Loader Fugitive Emissions[3]

Source ID	Raw Material	Source Description	METRIC Loading Rate (tonne/day)	METRIC Loading Rate (tonne/year)	US Loading Rate (ton/day)	US Loading Rate (ton/year)	Enclosure Description	Control Efficiency[2] (%)	Pollutant	METRIC UNCONTROLLED Emissions (tonne/day)	METRIC UNCONTROLLED Emissions (tonne/year)	METRIC CONTROLLED Emissions (tonne/day)	METRIC CONTROLLED Emissions (tonne/year)	US UNCONTROLLED Emissions (ton/day)	US UNCONTROLLED Emissions (ton/year)	US CONTROLLED Emissions (ton/day)	US CONTROLLED Emissions (ton/year)
RMS	Rock/Slag/Minerals	Raw Material Stockpile - Delivery to Stockpile [from offsite (by truck)]	690	186,150	761	205,193	3-sided	50%	PM	7.56E-04	0.20	3.78E-04	0.10	8.34E-04	0.22	4.17E-04	0.11
									PM_{10}	3.58E-04	0.10	1.79E-04	4.83E-02	3.94E-04	0.11	1.97E-04	5.32E-02
									$PM_{2.5}$	5.42E-05	1.46E-02	2.71E-05	7.31E-03	5.97E-05	1.61E-02	2.99E-05	8.05E-03
B210/B211	Rock/Slag/Minerals	Raw Material Storage - Delivery to 210 [from offsite (by truck) or from stockpile (by FEL)]	650	186,150	716	205,193	none	0%	PM	7.13E-04	0.20	7.13E-04	0.20	7.85E-04	0.22	7.85E-04	0.22
									PM_{10}	3.37E-04	0.10	3.37E-04	0.10	3.71E-04	0.11	3.71E-04	0.11
									$PM_{2.5}$	5.10E-05	0.01	5.10E-05	0.01	5.63E-05	0.02	5.63E-05	0.02
	Rock/Slag/Minerals	Raw Material Storage - Delivery into 210 enclosure	650	186,150	716	205,193	3-sided w/ cover	75%	PM	7.13E-04	0.20	1.78E-04	0.05	7.85E-04	0.22	1.96E-04	0.06
									PM_{10}	3.37E-04	0.10	8.42E-05	0.02	3.71E-04	0.11	9.29E-05	0.03
									$PM_{2.5}$	5.10E-05	0.01	1.28E-05	3.65E-03	5.63E-05	0.02	1.41E-05	4.03E-03
	Total								PM	1.43E-03	0.41	8.91E-04	0.26	1.57E-03	0.45	9.82E-04	0.28
									PM_{10}	6.74E-04	0.19	4.21E-04	0.12	7.43E-04	0.21	4.64E-04	0.13
									$PM_{2.5}$	1.02E-04	0.03	6.38E-05	0.02	1.13E-04	0.03	7.03E-05	0.02
B215	Rock/Slag/Minerals	Raw Material Loading Hopper	510	186,150	562	205,193	3-sided w/ cover	75%	PM	5.59E-04	0.20	1.40E-04	0.05	6.16E-04	0.22	1.54E-04	5.62E-02
									PM_{10}	2.64E-04	0.10	6.61E-05	0.02	2.91E-04	0.11	7.29E-05	2.66E-02
									$PM_{2.5}$	4.00E-05	0.01	1.00E-05	3.65E-03	4.41E-05	0.02	1.10E-05	4.03E-03
RM_REJ	Reject Raw Material	Raw Material Reject Collection Drop	5	3,723	6	4,104	4-sided rubber drop guards	75%	PM	5.48E-06	4.08E-03	1.37E-06	1.02E-03	6.04E-06	4.50E-03	1.51E-06	1.12E-03
									PM_{10}	2.59E-06	1.93E-03	6.48E-07	4.83E-04	2.86E-06	2.13E-03	7.14E-07	5.32E-04
									$PM_{2.5}$	3.93E-07	2.92E-04	9.81E-08	7.31E-05	4.33E-07	3.22E-04	1.08E-07	8.05E-05
B170	Melting Furnace Diverted Melt	Melting Furnace Portable Crusher & Storage - Drop to Pit Waste (170) (from portable crusher)	1,633	73,467	1,800	81,000	3-sided	50%	PM	1.79E-03	0.08	8.95E-04	0.04	1.97E-03	0.09	9.87E-04	0.04
									PM_{10}	8.47E-04	0.04	4.23E-04	0.02	9.33E-04	0.04	4.67E-04	0.02
									$PM_{2.5}$	1.28E-04	5.77E-03	6.41E-05	2.88E-03	1.41E-04	6.36E-03	7.07E-05	3.18E-03

Notes:
FEL = Front End Loader
ton = short tons
tonne = metric tons
1. Loading rate for material storage operations is based on the maximum quantity delivered per day or per year.
2. Assumed a control efficiency of 50% due to offloading locations having 3-sided concrete enclosures and 75% efficiency for 4-sided enclosures (hopper) or 3-sided enclosures with roof. Per Application Instructions and Forms for General Permit G40-C by West Virginia Department of Environmental Protection, Telescopic Chutes have a control efficiency of 75% and Full Enclosures have an 80% control efficiency.
3. Large rocks are delivered to the pit waste area by FEL (before crushing), therefore the emissions from this drop are negligible due to size.
4. Modeled emission rates in gray are not modeled individually, but are added as a total source emission rate.
5. For Q/d screening tool, the annual steady-state-equivalent emission rate (Q) was determined based on maximum daily emissions. For example QPM10 (tpy) = PM10 (ton/day) * 365 (day/yr).

Sample Calculations:
Uncontrolled Emissions (ton/day; ton/year) = E (lb/ton) * Loading Rate (ton/day; ton/year) / 2000 (lb/ton)
Controlled Emissions = Uncontrolled Emissions (ton/day; ton/year) * (1 - Control Efficiency (%))
Uncontrolled/Controlled Emissions (tonne/day; tonne/year) = Uncontrolled/Controlled Emissions (ton/day; ton/year) * 0.9071847 tonne/ton
Modeled 24-hr Emission Rate (g/s) = Daily Emissions (ton/day) / 24 (hr/day) [for 24-hr model averaging period] * 2,000 (lb/ton) * 453.59 (g/lb) / 3,600 (sec/hr)
Modeled Annual Emission Rate (g/s) = Annual Emissions (ton/yr) / 8,760 (hr/yr) [for annual model averaging period] * 2,000 (lb/ton) * 453.59 (g/lb) / 3,600 (sec/hr)

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Ranson, West Virginia
Material Handling Fugitives

Modified units
New units
Removed units

2 Crusher Fugitive Emissions

Source ID	Source Description	Pollutant	Emission Factor[2]	METRIC Processing Rate		US Processing Rate		Hours of Operation		METRIC		US	
										Hourly	Annual	Hourly	Annual
			(lb/ton)	(tonne/hr)	(tonne/yr)	(ton/hr)	(ton/yr)	(hrs/day)	(hrs/yr)	(kg/hr)	(tonne/yr)	(lb/hr)	(ton/yr)
B170	Melting Furnace Diverted Melt Portable Crusher	PM	0.0054	136.1	73,467	150.0	81,000	12	540	0.37	0.20	0.81	0.22
		PM_{10}	0.0024							0.16	0.09	0.36	0.10
		$PM_{2.5}$[1]	0.0008							0.05	0.03	0.12	0.03

Notes:
1. $PM_{2.5}$ is 15% of PM per AP-42 Appendix B, Table B.2.2 for material handling and processing of aggregate and unprocessed ore.
2. Emission factor for crushing of melting furnace diverted melt assumed to be similar to crushing of stones in AP-42 Table 11.19.2-2.
   Uncontrolled PM emission factor of 0.0054 lb/ton and Uncontrolled PM_{10} emission factor of 0.0024 lb/ton for tertiary crushing were conservatively used due to lack of emission factors for primary or secondary crushing.

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/ton) * Processing Rate (ton/hr)
Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * Hours of Operation (hrs/yr) / 2000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) * 0.4535924 kg/lb
Annual Emissions (tonne/yr) = Annual Emissions (ton/yr) * 0.9071847 tonne/ton

3 Wind Erosion Emission from Outdoor Stockpiles

p[2]	# of days per year with precipitation >0.01 inch	148
f[3]	% of time that unobstructed wind speed >12 mph at the mean pile height	9.06

Stockpile Description	S - Silt content[1] %
Raw Material Stockpile	12.7
Pit Waste (B170)	12.7

Pollutant	Emission Factor[4] Raw Material Stockpile	Pit Waste (170) Stockpile
	lb/day/acre	lb/day/acre
PM	8.03	8.03
PM_{10}	3.77	3.77
$PM_{2.5}$[5]	0.60	0.60

Notes:
1. Silt content chosen as worst case among various materials in stockpile.
2. Number of days per year with precipitation greater than 0.01 inch based on Table B - Precipitation Zones in West Virginia in Application Instructions and Forms for General Permit G40-C by West Virginia Department of Environmental Protection.
3. Percentage of time that the unobstructed wind speed exceeds 12 mph at the mean pile height based on AP 42 Ch. 13.2.5.2 Equation (1) and MRBIAD Aermap processed data 2012-2016.
4. Outdoor stockpile emission factor equation per WVDAQ G40-B (Nonmetallic Mineral Processing) Calculation Workbook: Stockpiles.
5. $PM_{2.5}$ particle size multiplier of 0.075 per AP-42 Section 13.2.5-2 for Industrial Wind Erosion.

Sample Calculations:
E (lb PM /day/acre) = 1.7 * [s/1.5] * [(365-p)/235] * [f/15]
E (lb PM_{10}/day/acre) = (0.47) * 1.7 * [s/1.5] * [(365-p)/235] * [f/15]
E (lb $PM_{2.5}$/day/acre) = (0.075) * 1.7 * [s/1.5] * [(365-p)/235] * [f/15], where
s = silt content of material,
p = number of days with >0.01 inch of precipitation per year,
f = percentage of time that the unobstructed wind speed exceeds 12 mph at mean pile height

Stockpile Description	Stockpile Base Area[2] Max sq. m	acre	Enclosure Description	Control Efficiency[1] (%)	Pollutant	METRIC UNCONTROLLED Emissions (kg/hr)	METRIC UNCONTROLLED Emissions (tonne/year)	METRIC CONTROLLED Emissions (kg/hr)	METRIC CONTROLLED Emissions (tonne/year)	US UNCONTROLLED Emissions (lb/hr)	US UNCONTROLLED Emissions (ton/year)	US CONTROLLED Emissions (lb/hr)	US CONTROLLED Emissions (ton/year)
Raw Material Stockpile (RMS)	500	0.12	3-sided	50%	PM	0.02	0.16	0.01	0.08	0.04	0.18	0.02	0.09
					PM10	0.01	0.08	4.40E-03	0.04	0.02	0.09	0.010	0.04
					PM2.5	1.41E-03	0.01	7.03E-04	0.01	0.0031	0.014	0.002	0.01
Melting Furnace Portable Crusher & Storage - Pit Waste (B170) Stockpile	1800	0.44	3-sided	50%	PM	0.07	0.59	0.03	0.30	0.15	0.65	0.07	0.33
					PM10	0.03	0.28	0.02	0.14	0.07	0.31	0.03	0.15
					PM2.5	0.01	0.04	2.53E-03	0.02	0.01	0.05	0.01	0.02
Raw Material Reject Stockpile (IMF14)	10	0.002	3-sided	50%	PM	3.75E-04	3.28E-03	1.87E-04	1.64E-03	8.26E-04	3.62E-03	4.13E-04	1.81E-03
					PM10	1.76E-04	1.54E-03	8.81E-05	7.72E-04	3.88E-04	1.70E-03	1.94E-04	8.51E-04
					PM2.5	2.81E-05	2.46E-04	1.41E-05	1.23E-04	6.20E-05	2.71E-04	3.10E-05	1.36E-04

Notes:
1. Assumed a control efficiency of 50% due to offloading locations having 3-sided concrete enclosures.
2. One half of the pit waste stockpile area occupied by large rocks, therefore wind erosion emissions are negligible due to size.
3. For wind erosion calculation methods, maximum g/s emissions do not vary based on model averaging period (i.e., a source permitted to operate at maximum capacity 24 hr/day, 365 day/year).
4. Modeled emission rates in gray are not modeled individually, but are added as a total source emission rate.

Sample Calculations:
Uncontrolled Hourly Emissions (lb/hr) = E (lb/day/acre) * day/24 hr * Base area of pile (acres)
Uncontrolled Annual Emissions (ton/year) = E (lb/day/acre) * 365 days/yr * ton/2000 lb * Base area of pile (acres)
Controlled Emissions = Uncontrolled Emissions (ton/day; ton/year) * (1 - Control Efficiency (%))
Uncontrolled/Controlled Hourly Emissions (lb/hour) = Uncontrolled/Controlled Emissions (lb/hr) * 0.4535924 kg/lb
Uncontrolled/Controlled Annual Emissions (ton/year) = Uncontrolled/Controlled Emissions (ton/yr) * 0.9071847 tonne/ton

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Ranson, West Virginia
Material Handling Fugitives

Modified units
New units
Removed units

4 Material Handling

Source ID	Source Description	Number of Sources	METRIC Loading Rate (tonne/day)	METRIC Loading Rate (tonne/year)	US Loading Rate (ton/day)	US Loading Rate (ton/year)	Enclosure Description	Control Efficiency[2] (%)	Pollutant	Uncontrolled Emission Factor[3] (lb/ton)	METRIC UNCONTROLLED Emissions (tonne/day)	METRIC UNCONTROLLED Emissions (tonne/year)	METRIC CONTROLLED Emissions (tonne/day)	METRIC CONTROLLED Emissions (tonne/year)	US UNCONTROLLED Emissions (ton/day)	US UNCONTROLLED Emissions (ton/year)	US CONTR Emis (ton/day)
IMF17	19 Conveyor Transfer Points (B220)	19	510	186,150	562	205,193	Full Enclosure	80%	PM	3.00E-03	1.45E-02	5.31E+00	2.91E-03	1.06E+00	1.60E-02	5.85E+00	3.20E-03
			510	186,150	562	205,193			PM10	1.10E-03	5.33E-03	1.95E+00	1.07E-03	3.89E-01	5.87E-03	2.14E+00	1.17E-03
			510	186,150	562	205,193			PM2.5	1.10E-03	5.33E-03	1.95E+00	1.07E-03	3.89E-01	5.87E-03	2.14E+00	1.17E-03
	Transfer Point - Magnet Separator to Iron Container (B220)	1	510	186,150	562	205,193	Telescopic Chute & Full Enclosure	95%	PM	3.00E-03	7.65E-04	2.79E-01	3.82E-05	1.40E-02	8.43E-04	3.08E-01	4.22E-05
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	1.40E-05	5.12E-03	3.09E-04	1.13E-01	1.55E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	1.40E-05	5.12E-03	3.09E-04	1.13E-01	1.55E-05
	2 Transfer Points - Feeder (B220)	2	510	186,150	562	205,193	Full Enclosure	80%	PM	3.00E-03	1.53E-03	5.58E-01	3.06E-04	1.12E-01	1.69E-03	6.16E-01	3.37E-04
			510	186,150	562	205,193			PM10	1.10E-03	5.61E-04	2.05E-01	1.12E-04	4.10E-02	6.18E-04	2.26E-01	1.24E-04
			510	186,150	562	205,193			PM2.5	1.10E-03	5.61E-04	2.05E-01	1.12E-04	4.10E-02	6.18E-04	2.26E-01	1.24E-04
	Transfer Point - Mixing Plant to Bin (B220)	1	510	186,150	562	205,193	Full Enclosure	80%	PM	3.00E-03	7.65E-04	2.79E-01	1.53E-04	5.58E-02	8.43E-04	3.08E-01	1.69E-04
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
	Transfer Point - Seive Separator to Bin (B220)	1	510	186,150	562	205,193	Telescopic Chute & Full Enclosure	95%	PM	3.00E-03	7.65E-04	2.79E-01	3.82E-05	1.40E-02	8.43E-04	3.08E-01	4.22E-05
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	1.40E-05	5.12E-03	3.09E-04	1.13E-01	1.55E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	1.40E-05	5.12E-03	3.09E-04	1.13E-01	1.55E-05
IMF17 Fugitives[4]	B220 Material Handling Fugitives	24	-	-	-	-	-	-	PM	-	1.84E-02	6.70E+00	3.44E-03	1.26E+00	2.02E-02	7.39E+00	3.79E-03
									PM10		6.73E-03	2.46E+00	1.26E-03	4.61E-01	7.42E-03	2.71E+00	1.39E-03
									PM2.5		6.73E-03	2.46E+00	1.26E-03	4.61E-01	7.42E-03	2.71E+00	1.39E-03
IMF12	Conveyor Transfer Point (B215)	1	510	186,150	562	205,193	Full Enclosure	80%	PM	3.00E-03	7.65E-04	2.79E-01	1.53E-04	5.58E-02	8.43E-04	3.08E-01	1.69E-04
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
IMF16	Conveyor Transfer Point (B300)	1	510	186,150	562	205,193	Full Enclosure	80%	PM	3.00E-03	7.65E-04	2.79E-01	1.53E-04	5.58E-02	8.43E-04	3.08E-01	1.69E-04
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	5.61E-05	2.05E-02	3.09E-04	1.13E-01	6.18E-05
IMF15	Transfer Point - Magnet Separator to Iron Container (Outside B220)	1	510	186,150	562	205,193	4-sided rubber drop guards	75%	PM	3.00E-03	7.65E-04	2.79E-01	1.91E-04	6.98E-02	8.43E-04	3.08E-01	2.11E-04
			510	186,150	562	205,193			PM10	1.10E-03	2.80E-04	1.02E-01	7.01E-05	2.56E-02	3.09E-04	1.13E-01	7.73E-05
			510	186,150	562	205,193			PM2.5	1.10E-03	2.80E-04	1.02E-01	7.01E-05	2.56E-02	3.09E-04	1.13E-01	7.73E-05
Total IMF15	Outside B220 Transfer Points	1	-	-	-	-	-	-	PM	-	7.65E-04	2.79E-01	1.91E-04	6.98E-02	8.43E-04	3.08E-01	2.11E-04
									PM10		2.80E-04	1.02E-01	7.01E-05	2.56E-02	3.09E-04	1.13E-01	7.73E-05
									PM2.5		2.80E-04	1.02E-01	7.01E-05	2.56E-02	3.09E-04	1.13E-01	7.73E-05

Notes
1. Loading rates for material transfers are based on the maximum daily or annual input to B215 Raw Material Loading Hopper.
2. Per Application Instructions and Forms for General Permit G40-C by West Virginia Department of Environmental Protection, Telescopic Chutes have a 75% control efficiency.
   Full Enclosures have an 80% control efficiency for dump bin unloading, crushing and screening, transfer and conveying, and loading material onto piles.
3. Transfer Point emission factors were taken from AP-42 Section 11.19.2. The Tertiary Crushing Source was assumed for both Mixing and Crushing.
   The Conveyor Transfer Point (uncontrolled) emission factor was assumed for all transfer points. No emission factor data is available for $PM_{2.5}$, so $PM_{2.5}$ is assumed equal to PM_{10}.
4. IMF17 consists of the B220 Material Handling Fugitives shown on this table, as well as the two Conveyor Transition Points with Fabric Filters (B220 No. 1) and (B220 No. 2) and the Mixer and Crusher with Fabric Filters shown on the Material Handling Vents summary.

Sample Calculations:
Uncontrolled Emissions (ton/day; ton/year) = E (lb/ton) * Loading Rate (ton/day; ton/year) / 2000 (lb/ton)
Controlled Emissions = Uncontrolled Emissions (ton/day; ton/year) * (1 - Control Efficiency (%))
Uncontrolled/Controlled Emissions (tonne/day; tonne/year) = Uncontrolled/Controlled Emissions (ton/day; ton/year) * 0.9071847 tonne/ton

Total Fugitive Emissions Summary

Source ID	Source Description	PM CONTROLLED Total Annual Emissions (short tons/yr)	PM CONTROLLED Total Annual Emissions (tonne/year)	PM_{10} CONTROLLED Total Annual Emissions (short tons/yr)	PM_{10} CONTROLLED Total Annual Emissions (tonne/year)	$PM_{2.5}$ CONTROLLED Total Annual Emissions (short tons/yr)	$PM_{2.5}$ CONTROLLED Total Annual Emissions (tonne/year)
B210/B211	Raw Material Storage - Delivery to 210 [from offsite (by truck) or from stockpile (by FEL)]	0.28	0.26	0.13	0.12	0.02	0.02
B170	Melting Furnace Portable Crusher & Storage - Melting Furnace Slag Portable Crusher + Drop to Pit Waste (170) (from portable crusher) + Wind Erosion from Pit Waste (170) Stockpile	0.59	0.53	0.27	0.25	0.06	0.05
RMS	Raw Material Stockpile - Delivery to Stockpile [from offsite (by truck)] + Wind Erosion from Raw Material Stockpile	0.20	0.18	0.10	0.09	0.015	0.013
B215	Raw Material Loading Hopper	5.62E-02	5.10E-02	2.66E-02	2.41E-02	4.03E-03	1.46E-02
RM_REJ	Raw Material Reject Collection Drop	1.12E-03	1.02E-03	5.32E-04	4.83E-04	8.05E-05	7.31E-05
IMF17	B220 Material Handling Fugitives	1.39	1.26	0.51	0.46	0.51	0.46
IMF12	Conveyor Transfer Point (B215)	6.16E-02	5.58E-02	2.26E-02	2.05E-02	2.26E-02	2.05E-02
IMF16	Conveyor Transfer Point (B300)	6.16E-02	5.58E-02	2.26E-02	2.05E-02	2.26E-02	2.05E-02
IMF15	Outside B220 Transfer Points	7.69E-02	6.98E-02	2.82E-02	2.56E-02	2.82E-02	2.56E-02
IMF14	Raw Material Reject Stockpile	1.81E-03	1.64E-03	8.51E-04	7.72E-04	1.36E-04	1.23E-04

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Material Handling Vents

Modified units
New units
Removed units

Source ID	Source Description[2]	Fan Flow Rate		Exhaust Concentration		METRIC Hourly Emissions	METRIC Annual Emissions	US Hourly Emissions	US Annual Emissions	METRIC Hourly Emissions	METRIC Annual Emissions	US Hourly Emissions	US Annual Emissions
						PM, PM_{10}				$PM_{2.5}$[1]			
		(Nm3/h)	(scfm)	(mg/Nm3)	(gr/scf)	(kg/hr)	(tonne/yr)	(lb/hr)	(ton/yr)	(kg/hr)	(tonne/yr)	(lb/hr)	(ton/yr)
IMF21	Charging Building Vacuum Cleaning Filter	500	316	5	0.002	2.50E-03	0.02	5.51E-03	0.02	1.25E-03	0.01	2.76E-03	0.01
IMF08	Sorbent Silo	1,200	758	5	0.002	6.00E-03	0.05	0.01	0.06	3.00E-03	0.03	6.61E-03	0.03
IMF07	Filter Fines Day Silo	1,250	790	5	0.002	6.25E-03	0.05	0.01	0.06	3.13E-03	0.03	6.89E-03	0.03
	Total Indoor with Settling Factor (80%)[3]	-	-	-	-	1.25E-03	0.01	2.76E-03	0.01	6.25E-04	0.01	1.38E-03	0.01
IMF09	Spent Sorbent Silo	1,200	758	5	0.002	6.00E-03	0.05	0.01	0.06	3.00E-03	0.03	6.61E-03	0.03
IMF10	Filter Fines Receiving Silo	1,200	758	5	0.002	6.00E-03	0.05	0.01	0.06	3.00E-03	0.03	6.61E-03	0.03
IMF11	Conveyor Transition Point (B215 to B220)	1,800	1,137	5	0.002	0.01	0.08	0.02	0.09	4.50E-03	0.04	9.92E-03	0.04
	Total Indoor with Settling Factor (80%)[3]	-	-	-	-	1.80E-03	0.02	3.97E-03	0.02	9.00E-04	0.01	1.98E-03	0.01
B220 Conveyor Transition Points, Mixer, and Crusher with Fabric Filters[4]	Conveyor Transition Point (B220 No. 1)	1,800	1,137	5	0.002	0.01	0.08	0.02	0.09	4.50E-03	0.04	0.01	0.04
	Conveyor Transition Point (B220 No. 2)	1,800	1,137	5	0.002	0.01	0.08	0.02	0.09	4.50E-03	0.04	0.01	0.04
	Mixer	3,500	2,211	5	0.002	0.02	0.15	0.04	0.17	8.75E-03	0.08	0.02	0.08
	Crusher	3,500	2,211	5	0.002	0.02	0.15	0.04	0.17	8.75E-03	0.08	0.02	0.08
	Total Indoor with Settling Factor (80%)[3]	-	-	-	-	1.06E-02	0.09	0.02	0.10	5.30E-03	0.05	1.17E-02	0.05
	Total Conveyor Transition Point (B220 No. 1)	-	-	-	-	1.80E-03	0.02	3.97E-03	0.02	9.00E-04	0.01	1.98E-03	0.01
	Total Conveyor Transition Point (B220 No. 2)	-	-	-	-	1.80E-03	0.02	3.97E-03	0.02	9.00E-04	0.01	1.98E-03	0.01
	Total Mixer	-	-	-	-	3.50E-03	0.03	7.72E-03	0.03	1.75E-03	0.02	3.86E-03	0.02
	Total Crusher	-	-	-	-	3.50E-03	0.03	7.72E-03	0.03	1.75E-03	0.02	3.86E-03	0.02
CM10	Recycle Building Vent 1	30,000	18,950	10	0.004	0.30	2.63	0.66	2.90	0.15	1.31	0.33	1.45
CM11	Recycle Building Vent 2	30,000	18,950	10	0.004	0.30	2.63	0.66	2.90	0.15	1.31	0.33	1.45
CM08	Recycle Building Vent 3	2,500	1,579	10	0.004	0.03	0.22	0.06	0.24	0.01	0.11	0.03	0.12
CM09	Recycle Building Vent 4	2,500	1,579	10	0.004	0.03	0.22	0.06	0.24	0.01	0.11	0.03	0.12

Notes:

ton = short tons

tonne = metric tons

1. $PM_{2.5}$ is conservatively assumed to be 50% of PM for material handling.
2. Material handling vents are equipped with fabric filters or bin vent filters.
3. Per Application Instructions and Forms for General Permit G40-C by West Virginia Department of Environmental Protection, Full Enclosures have an 80% control efficiency for dump bin unloading, crushing and screening, transfer and conveying, and lo
4. Conveyor Transition Points (B220 No. 1) and (B220 No. 2) are accounted for with IMF17, as well as the Mixer and Crusher.

Sample Calculations

Hourly Emissions (kg/hr) = Fan Flow Rate (Nm^3/hr) * Exhaust Concentration (mg/Nm^3) * 1,000,000 (mg/kg)

Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8,400 (hr/yr) / 1,000 (kg/tonne)

Hourly Emissions (lb/hr) = Fan Flow Rate (scfm) * Exhaust Concentration (gr/scf) / 7,000 (gr/lb) * 60 (min/hr)

Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * 8,400 (hr/yr) / 2,000 (lb/ton)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Dry Ice Cleaning

Modified units
New units
Removed units

Operating Parameters, per Source

Dry Ice Production[1]	75	kg/hr
Annual Dry Ice Production	630,000	kg/yr
Operating Hours[2]	8,400	hr/yr
CO_2 Consumed[1]	2.2	(loss factor)

Emission Calculations[4]

Source	US		METRIC	
	Hourly (lb/hr)	Annual (ton/yr)	Hourly (kg/hr)	Annual (tonne/yr)
CO_2 Emitted	363.76	1,527.80	165.00	1,386.00

Notes:
ton = short tons
tonne = metric tons
1. Dry ice production per manufacturer data sheet. CO_2 consumed (loss factor) represents the total quantity of CO_2 consumed to produce 1 kg CO_2 (accounts for CO_2 system loss).

2. For conservatism, emissions from dry ice cleaning station are based on 8,760 hours per year; however, the equipment will traverse from one end of the equipment to the other when cleaning and dry ice pellets are used only when in forward movement.

Sample Calculations:
Dry Ice Production Rate (kg/yr) = Hourly Dry Ice Production Rate (kg/hr) * 8,400 (hrs/yr)
CO_2 Hourly Emission Rate (lb/hr) = Hourly Dry Ice Production Rate (kg/hr) * CO_2 Loss Factor * 2.2046 (lbs/kg)
CO_2 Annual Emission Rate (ton/yr) = CO2 Emission Rate (lb/hr) * 8,400 (hr/yr) / 2,000 (lb/ton)
CO2 Hourly Emission Rate (kg/hr) = Hourly Emission Rate (lb/hr) * 0.45359 (kg/lb)
CO_2 Annual Emission Rate (tonne/yr) = Annual Emission Rate (ton/yr) * 0.90718 (tonne/ton)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Fleece Application (CM12, CM13)

Modified units
New units
Removed units

Operating Parameters, per Source

Binder Applied to Fleece	93	kg/hr
Operating Hours[1]	4,200	hr/yr
Annual Binder Usage at Fleece Station	388,500	kg/yr
Organic HAP Emission Limit[2]	0.016	kg OHAP/kg binder

Emission Calculations[3]

Pollutant	US		METRIC	
	Maximum Emission Rate		Maximum Emission Rate	
	(lb/hr)	(ton/yr)	(kg/hr)	(tonne/yr)
VOC	3.26	6.85	1.48	6.22
Total HAP	3.26	6.85	1.48	6.22

Notes:

ton = short tons

tonne = metric tons

1. Emissions from the fleece application station are based on 4,200 hours per year.

2. The coating material, or in this case binder, regulated by NESHAP Subpart JJJJ is a compliant coating by formulation. The limit of 0.016 kg OHAP/kg coating material is stated in 40 CFR §63.3370(a)(2)(i) for the use of "as-applied" compliant coating materials from new affected sources (per §63.3320(b)(2) which states that HAP emissions must be limited to "no more than 1.6 percent of the mass of coating materials applied for each month at new affected sources"). Roxul may choose to comply with this limit using VOC as a surrogate for organic HAP as allowed by §63.3370(c)(1)(i) and §63.3360(c)(2). Therefore VOC emissions are shown as equal to organic HAP (Total HAP) emissions.

3. The fleece application equipment will be placed just prior to the entrance of the Curing Oven. While a majority of fleece application equipment emissions will be controlled by the Curing Oven afterburner as the fleece is cured onto the wet mineral wool in the Curing Oven, no credit is taken for VOC/organic HAP emission control in this calculation.

Sample Calculations:

Maximum Hourly Emission Rate (lb/hr) = Binder Applied to Fleece (kg/hr) * 0.016 (kg VOC/HAP / kg binder) * 2.2046 (lb/kg)
Maximum Annual Emission Rate (ton/yr) = Maximum Hourly Emission Rate (lb/hr) * 4,200 (hr/yr) / 2,000 (lb/ton)
Maximum Hourly Emission Rate (kg/hr) = Maximum Hourly Emission Rate (lb/hr) * 0.4535924 (kg/lb)
Maximum Annual Emission Rate (tonne/yr) = Maximum Annual Emission Rate (ton/yr) * 0.9071847 (tonne/ton)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Pre-heat Burner (IMF24)

Modified units
New units
Removed units

Operating Parameters, PER BOILER

Maximum Heat Input	1,500	kw
Capacity	5.12	MMBtu/hr
Operating Hours	8,400	hr/yr
Fuel Type	Natural Gas	
Fuel HHV	1,026	MMbtu/MMscf

Maximum Potential Emissions[1,2]

Pollutant	Emission Factor		US		METRIC	
			Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions
	(lb/MMscf)	(lb/MMbtu)	(lb/hr)	(ton/yr)	(kg/hr)	(tonne/yr)
NO_x	72.42	0.0706	0.36	1.52	0.16	1.38
SO_2	0.6	0.0006	3.00E-03	0.01	1.36E-03	0.01
$PM/PM_{10F}/PM_{2.5F}$	1.9	0.0019	0.01	0.04	4.30E-03	0.04
$PM_{10T}/PM_{2.5T}$	7.6	0.0074	0.04	0.16	0.02	0.14
Condensable PM	5.7	0.0056	0.03	0.12	0.01	0.11
CO	84	0.0819	0.42	1.76	0.19	1.60
VOC	5.5	0.0054	0.03	0.12	0.01	0.10
Lead	0.0005	4.87E-07	2.50E-06	1.05E-05	1.13E-06	9.51E-06
Hexane	1.8	0.0018	0.01	0.04	0.00	0.03
Total HAPs	1.89	0.0018	0.01	0.04	4.28E-03	0.04
CO_2	-	116.98	599.25	2516.84	271.81	2,283.24
CH_4	-	2.20E-03	0.01	0.05	5.12E-03	0.04
N_2O	-	2.20E-04	1.13E-03	4.74E-03	5.12E-04	4.30E-03
CO_2e^3	-	-	599.87	2,519.44	272.09	2,285.59

Notes:
ton = short tons
tonne = metric tons
1. Natural Gas emission factor source AP-42 Table 1.4-1, 1.4-2, 1.4-3, and 1.4-4 for SO_2, PM_{10T}, $PM_{2.5T}$, CO, VOC, GHG emission factors per 40 CFR Part 98, Table C-1 and C-2. GWPs per 40 CFR 98, Table A-1. NO_X emission factor based on 60 ppmvd @ 3% O2 per manufacturer specification.
2. PM_{10T} and $PM_{2.5T}$ emission factors include filterable and condensable particulate matter (e.g., Total PM_{10}, $PM_{2.5}$).
3. CO_2 Equivalent (CO_2e) lb/hr, ton/yr = CO_2 + [GWP_{CH4} * CH_4)] + [GWP_{N2O} * N_2O].

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Maximum Heat Input Capacity (MMBtu/hr)
Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * 8400 (hr/yr) / 2,000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) /2.2046 (lb/kg)
Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8400 (hr/yr) / 1,000 (kg/tonne)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Facility-wide Storage Tanks

Modified units
New units
Removed units

													US						METRIC					
													VOC Emissions			Speciated HAP Emissions			VOC Emissions			Speciated HAP Emissions		
Rockwool Source ID[4]	Description	Material Stored	Tank Orientation	Capacity	Height	Diameter	Throughput	Fill Method	Roof Type	Temp. Controlled?	Storage Temperature		Pressurized?	Breathing Loss[2]	Working Loss	Total Loss[3]	Total Formaldehyde	Total Methanol	Total Phenol	Breathing Loss[2]	Working Loss	Total Loss[3]	Total Formaldehyde	Total Methanol	Total Phenol
				(gal)	(ft)	(ft)	(gal/yr)				deg C	deg F	(Y, N)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(tonne/yr)	(tonne/yr)	(tonne/yr)	(tonne/yr)	(tonne/yr)	(tonne/yr)
TK-DF	One (1) Diesel Fuel Horizontal Storage Tank (4.7 m3, 1,242 gal)	Diesel Fuel	Horizontal	1,242	16.4	4.4	52,834	Splash Pump	Flat	No	Ambient	Ambient	No	1.18E-04	4.33E-04	5.51E-04	-	-	-	1.07E-04	3.93E-04	5.00E-04	-	-	-
TK-TO3	One (1) Thermal Oil Horizontal Tank (20 m3, 5,283 gal)	Thermal Oil	Horizontal	5,283	21.0	6.6	698	Splash Pump	Flat	Yes	200	392	No	-	2.18E-03	2.18E-03	-	-	-	-	1.98E-03	1.98E-03	-	-	-
TK-TO4	One (1) Thermal Oil Horizontal Expansion Tank (7.3 m3, 1,928 gal)	Thermal Oil	Horizontal	1,928	13.0	5.2	698	Splash Pump	Flat	Yes	200	392	No	-	2.18E-03	2.18E-03	-	-	-	-	1.98E-03	1.98E-03	-	-	-
TK-RS1	No. 1 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-RS2	No. 2 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-RS3	No. 3 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-RS4	No. 4 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-RS5	No. 5 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-RS6	No. 6 of Six (6) Resin Vertical Storage Tanks (ea. 50 m3, 13,209 gal)	Resin	Vertical	13,209	21.0	13.8	317,007	Splash Air Off or Pump	Cone	Yes	20	68	No	-	0.02	0.02	0.02	1.54E-04	-	-	0.02	0.02	0.02	1.39E-04	-
TK-CA	One (1) Coupling Agent Vertical Storage Tank (1.5 m3, 396 gal)	Coupling Agent Solution	Vertical	396	6.0	3.6	4,227	Splash Pump	Cone	No	Ambient	Ambient	No	2.03E-05	2.29E-05	4.31E-05	-	-	-	1.84E-05	2.07E-05	3.91E-05	-	-	-
TK-AD	One (1) Additive Vertical Storage Tank (1.5 m3, 396 gal)	Binder Additive	Vertical	396	6.0	3.6	17,171	Splash Pump	Cone	No	Ambient	Ambient	No	2.03E-06	7.97E-05	8.17E-05	-	-	-	1.84E-06	7.23E-05	7.41E-05	-	-	-
TK-ADB1	One (1) Vertical Additive Buffer Tank (1.5 m3, 396 gal)	Binder Solution	Vertical	396	6.0	3.6	65,000	Splash Pump	Cone	No	Ambient	Ambient	No	2.03E-05	1.23E-04	1.43E-04	0.00	0.00E+00	-	1.84E-05	0.00	0.00	0.00	0.00E+00	-
TK-ADB2	One (1) Vertical Additive Buffer Tank (0.5 m3, 132 gal)	Binder Solution	Vertical	132	4.0	2.6	21,667	Splash Pump	Cone	No	Ambient	Ambient	No	7.05E-06	0.00	0.00	0.00	0.00E+00	-	6.40E-06	0.00	0.00	0.00	0.00E+00	-
TK-GLY	One (1) Vertical Glycol Storage Tank (1.5 m3, 396 gal)	Glycol	Vertical	396	6.0	3.6	4,752	Splash Pump	Flat	No	Ambient	Ambient	No	2.90E-06	0.00	0.00	0.00	0.00E+00	-	0.00E+00	0.00	0.00	0.00	0.00E+00	-
TK-BS1	No. 1 of Three (3) Binder Storage Containers (ea. 1 m3, 264 gal)	Fleece Coating	Vertical	264	7.8	3.6	130,325	Splash Pump	Flat	No	Ambient	Ambient	No	3.72E-05	2.50E-04	2.87E-04	2.84E-04	2.45E-06	-	3.38E-05	2.26E-04	2.60E-04	2.58E-04	2.22E-06	-
TK-BS2	No. 2 of Three (3) Binder Storage Containers (ea. 1 m3, 264 gal)	Fleece Coating	Vertical	264	7.8	3.6	130,325	Splash Pump	Flat	No	Ambient	Ambient	No	3.72E-05	2.50E-04	2.87E-04	2.84E-04	2.45E-06	-	3.38E-05	2.26E-04	2.60E-04	2.58E-04	2.22E-06	-
TK-BS3	No. 3 of Three (3) Binder Storage Containers (ea. 1 m3, 264 gal)	Fleece Coating	Vertical	264	7.8	3.6	130,325	Splash Pump	Flat	No	Ambient	Ambient	No	3.72E-05	2.50E-04	2.87E-04	2.84E-04	2.45E-06	-	3.38E-05	2.26E-04	2.60E-04	2.58E-04	2.22E-06	-
TK-DOD	One (1) De-dust Oil Vertical Day Tank (1 m3, 264 gal).	De-dust Oil	Vertical	264.172	5.0	3.0	52,834	Splash Pump	Cone	No	Ambient	Ambient	No	1.79E-05	1.61E-04	1.79E-04	-	-	-	1.62E-05	1.46E-04	1.62E-04	-	-	-
TK-PD	One (1) Paint Dilution Storage Tank (3 m3, 793 gal)	Diluted Water-based Paint	Vertical	793	8.6	4.0	266,471	Splash Pump	Flat	No	Ambient	Ambient	No	-	-	0.03	-	-	-	-	-	0.03	-	-	-
TK-PDD	One (1) Paint Dilution Day Tank (1.5 m3, 397 gal)	Diluted Water-based Paint	Vertical	397	5.0	4.2	266,471	Splash Pump	Flat	No	Ambient	Ambient	No	-	-	0.03	-	-	-	-	-	0.03	-	-	-
																0.12	**0.11**	**9.30E-04**	**--**			**0.11**	**0.10**	**0.00**	**--**

Note:
1. Temperature representative of max system operating temperature; these tanks operate at ambient temperature (*i.e.*, max system operating temperature represents worst case emissions).
2. There are no breathing losses for temperature controlled tanks.
3. Formaldehyde, Methanol, and Phenol emissions are included in Total VOC emissions.
4. The following storage containers are either filled with container contents prior to delivery to the site and maintained closed or do not have quantifiable emissions. The number of containers is approximate.
   Ten (10) Coupling Agent Storage Containers (ea. 1 m3, 264 gal)
   Fifty (50) Coupling Agent Storage Drums (ea. 0.2 m3, 53 gal)
   Thirty (30) De-dust Oil Storage Containers (ea. 1 m3, 264 gal)
   Forty (40) Silicone Oil/Resin Storage Containers (ea. 1 m3, 264 gal)
   Rockfon Paint Storage Totes (No. varies)
   Rockfon Paint Waste Storage Totes (No. varies)
   Thermal Oil Storage Containers (No. varies)
   Product Marking Ink Containers, Number Varies (ea. 0.02 m3, 5 gal)
   Product Marking Ink Cleaner Containers, Number Varies (ea. 1 L, 0.26 gal)
5. Emissions from TK-PD and TK-PDD are estimated using AP42 Section 6.4.1 and utilizes a 1 percent estimation of VOC losses.
6. The calculations for all souces in this table, except for TK-PD and TK-PDD, have been updated to current AP-42 methodology using Emission Master. Tank dimensions and capacities for TK-TO3 and TK-TO4 have been updated to reflect construction.

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Facility-wide Fugitive Emissions from Paved Haul Roads

Modified units
New units
Removed units

Emission Estimate For Paved Haulroads[1]

k =	PM particle size multiplier ((lb/VMT))	0.011
k_{10} =	PM10 particle size multiplier ((lb/VMT))	0.0022
$k_{2.5}$=	PM2.5 particle size multiplier ((lb/VMT))	0.00054
$sL_{finishedprod}$[2] =	Finished product road surface silt loading, (g/m^2)	0.2
$sL_{coastal}$[3] =	Raw materials road surface silt loading, (g/m^2)	8.2
W[4] =	Mean Vehicle Weight (tons)	see table
P[4] =	Number of days per year with precipitation >0.01 inch	148
N =	Number of days in averaging period	365
CE[5]	Control Efficiency, %	75%
-	Maximum Weeks of Operation per year:	52
-	Hours of Operation per year:	8,760

Notes:
1. Paved haulroads emission factor equation per AP-42 Ch. 13.2.1.3 Equation 2, January 2011).
2. Finished product road surface silt loading based on AP-42 Table 13.2.1-2 Ubiquitous Silt Loading Default Values with Hot Spot Contributions from Anti-Skid Abrasives, ADT Category 500-5,000.
3. Raw materials road surface silt loading based on AP-42 Table 13.2.1-3 Typical Silt Content and Loading Values for Paved Roads at Industrial Facilities, Quarry Industry.
4. Number of days per year with precipitation greater than 0.01 inch based on Table B - Precipitation Zones in West Virginia in Application Instructions and Forms for General Permit G40-C by West Virginia Department of Environmental Protection.
5. Control Efficiency conservatively estimated due to paved road sweeping.
6. Mean vehicle weight is an average of the empty vehicle weight and loaded vehicle weight.

Samole Calculations:
E (lb/vehicle mile traveled (VMT)) = [k * (sL)^0.91 * (W)^1.02] * (1 - (P/4*N)

US Units

Item No.	Description	Empty Vehicle Weight	Load Carried Weight[2]	Loaded Vehicle Weight[2]	W, Mean Vehicle Weight	Miles per Trip	Maximum Trips Per Day, Per Year[2]	Maximum Trips Per Week	Maximum Trips Per Year	PM					PM-10						PM10	PM-2.5					
										Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Total Modeled Emission Rate[1]		Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Total Modeled Emission Rate[1]
		(tons)	(tons)	(tons)	(tons)					(lb/VMT)	(ton/day)	(ton/year)	(ton/day)	(ton/year)	(lb/VMT)	(ton/day)	(ton/year)	(ton/day)	(ton/year)	24-hr (g/s)	Annual (g/s)	(lb/VMT)	(ton/day)	(ton/year)	(ton/day)	(ton/year)	24-hr (g/s)
1	Truck - Oil	10	23.1	33.1	21.6	0.46	1	1	52	1.54	3.54E-04	0.02	8.85E-05	4.60E-03	0.31	7.08E-05	3.68E-03	1.77E-05	9.20E-04	1.86E-04	2.65E-05	0.08	1.74E-05	9.03E-04	4.34E-06	2.26E-04	4.56E-05
2	Truck - Oxygen	10	2.5	12.5	11.3	0.46	4	22	1,144	0.79	7.29E-04	0.21	1.82E-04	0.05	0.16	1.46E-04	0.04	3.65E-05	0.01	3.83E-04	3.00E-04	0.04	3.58E-05	0.01	8.95E-06	2.56E-03	9.40E-05
3	Truck - Raw Material (Stone) to 210	10	38.6	40.0	25.0	0.46	28	128	6,656	1.79	0.01	2.74	2.91E-03	0.68	0.36	2.32E-03	0.55	5.81E-04	0.14	6.10E-03	3.94E-03	0.09	5.71E-04	0.13	1.43E-04	0.03	1.50E-03
4	Truck - DeSOx and Binder	10	23.1	33.1	21.6	0.46	2	13	676	1.54	8.36E-04	0.24	2.09E-04	0.06	0.31	1.67E-04	0.05	4.18E-05	0.01	4.39E-04	3.44E-04	0.08	4.11E-05	0.01	1.03E-05	2.94E-03	1.08E-04
5	Truck - Waste	10	23.1	33.1	21.6	0.46	1	5	260	1.54	3.22E-04	0.09	8.04E-05	0.02	0.31	6.43E-05	0.02	1.61E-05	4.60E-03	1.69E-04	1.32E-04	0.08	1.58E-05	4.52E-03	3.95E-06	1.13E-03	4.15E-05
6	Truck - Pallet and Foil	10	33.3	40.0	25.0	0.76	5	25	1,300	0.06	1.05E-04	0.03	2.63E-05	0.01	0.01	2.10E-05	0.01	5.26E-06	1.50E-03	5.52E-05	4.33E-05	2.99E-03	5.17E-06	1.48E-03	1.29E-06	3.69E-04	1.36E-05
7	Truck - Finished Goods	10	6.6	16.6	13.3	0.76	73	400	20,800	0.03	8.85E-04	0.25	2.21E-04	0.06	0.01	1.77E-04	0.05	4.43E-05	0.01	4.65E-04	3.64E-04	1.57E-03	4.34E-05	0.01	1.09E-05	3.11E-03	1.14E-04
8[4]	FEL - Diverted Melt from Bldg 300 to Pit Waste (170)	14.5	6.6	21.1	17.8	0.27	67	--	12,295	1.26	0.01	2.10	2.87E-03	0.52	0.25	2.30E-03	0.42	5.74E-04	0.10	6.03E-03	3.01E-03	0.06	5.64E-04	0.10	1.41E-04	0.03	1.48E-03
9[4]	FEL - Crushed Melt from 170 to 210	14.5	6.6	21.1	17.8	0.1	67	--	12,295	1.26	4.25E-03	0.78	1.06E-03	0.19	0.25	8.50E-04	0.16	2.13E-04	0.04	2.23E-03	1.12E-03	0.06	2.09E-04	0.04	5.22E-05	0.01	5.48E-04
10[4]	FEL - Raw Material from 210 to Feed Hopper	14.5	6.6	21.1	17.8	0.06	85	--	31,147	1.26	3.23E-03	1.18	8.08E-04	0.29	0.25	6.46E-04	0.24	1.62E-04	0.06	1.70E-03	1.70E-03	0.06	1.59E-04	0.06	3.97E-05	0.01	4.16E-04
11[4]	FEL - Raw Material from Stockpile to 210	14.5	6.6	21.1	17.8	0.16	115	--	31,147	1.26	0.01	3.15	2.91E-03	0.79	0.25	2.33E-03	0.63	5.83E-04	0.16	0.01	4.52E-03	0.06	5.72E-04	0.15	1.43E-04	0.04	1.50E-03
12	Truck - Raw Material from Stockpile to 210 (add1 miles over Item 3)	10.0	38.6	40.0	25.0	0.27	30	--	1,087	1.79	0.01	0.26	1.81E-03	0.07	0.36	1.45E-03	0.05	3.62E-04	0.01	3.80E-03	3.77E-04	0.09	3.56E-04	0.01	8.89E-05	3.22E-03	9.33E-04
									TOTAL Raw Material (Item 1-5, 8-12)	**0.05**	**10.75**	**0.01**	**2.69**			**2.15**	**0.003**	**0.54**	**0.03**	**0.02**		**0.003**	**0.53**	**6.35E-04**	**0.13**	**6.67E-03**
									TOTAL Finished Products (Items 6-7)	**9.90E-04**	**0.28**	**2.48E-04**	**0.07**		**1.98E-04**	**0.06**	**4.95E-05**	**0.01**	**5.20E-04**	**4.07E-04**		**4.86E-05**	**0.01**	**1.22E-05**	**3.48E-03**	**1.28E-04**

Source	Pollutant	No. of Modeled Segments	PER SEGMENT Modeled Emission Rates[1]	
			24-hr (g/s)	Annual (g/s)
Raw Material Paved Haul Roads	PM-10	31	8.76E-04	4.99E-04
	PM-2.5		2.15E-04	1.22E-04
Finished Products Paved Haul Roads	PM-10	35	1.49E-05	1.16E-05
	PM-2.5		3.65E-06	2.86E-06

Metric Units

Item No.	Description	Empty Vehicle Weight	Load Carried Weight	Loaded Vehicle Weight	W, Mean Vehicle Weight	km per Trip	Maximum Trips Per Week	Maximum Trips Per Year	PM					PM-10						PM-2.5					
									Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Total Modeled Emission Rate		Uncontrolled Emission Factor	Uncontrolled Emissions		Controlled Emissions		Total Modeled Emission Rate	
		(tonnes)	(tonnes)	(tonnes)	(tonnes)				(kg/VMT)	(tonne/day)	(tonne/year)	(tonne/day)	(tonne/year)	(kg/VMT)	(tonne/day)	(tonne/year)	(tonne/day)	(tonne/year)	24-hr (g/s)	Annual (g/s)	(kg/VMT)	(tonne/day)	(tonne/year)	(tonne/day)	(tonne/year)	24-hr (g/s)	Annual (g/s)
1	Truck - Oil	9.07	21.0	30.1	19.6	0.74	1	52	0.70	3.21E-04	0.02	8.03E-05	4.17E-03	0.14	6.42E-05	3.34E-03	1.61E-05	8.35E-04			0.03	1.58E-05	8.20E-04	3.94E-06	2.05E-04		
2	Truck - Oxygen	9.07	2.3	11.4	10.2	0.74	22	1,144	0.36	6.61E-04	0.19	1.65E-04	0.05	0.07	1.32E-04	0.04	3.31E-05	0.01			0.02	3.25E-05	0.01	8.12E-06	2.32E-03		
3	Truck - Raw Material (Stone) to 210 or Stockpile	9.07	35.0	36.3	22.7	0.74	128	6,656	0.81	1.05E-02	2.48	2.64E-03	0.62	0.16	2.11E-03	0.50	5.27E-04	0.12			0.04	5.18E-04	0.12	1.29E-04	0.03		
4	Truck - DeSOx and Binder	9.07	21.0	30.1	19.6	0.74	13	676	0.70	7.59E-04	0.22	1.90E-04	0.05	0.14	1.52E-04	0.04	3.79E-05	0.01			0.03	3.73E-05	0.01	9.31E-06	2.66E-03		
5	Truck - Waste	9.07	21.0	30.1	19.6	0.74	5	260	0.70	2.92E-04	0.08	7.30E-05	0.02	0.14	5.84E-05	0.02	1.46E-05	4.17E-03			0.03	1.43E-05	4.10E-03	3.58E-06	1.02E-03		
6	Truck - Pallet and Foil	9.07	30.2	36.3	22.7	1.22	25	1,300	0.03	9.55E-05	0.03	2.39E-05	0.01	0.01	1.91E-05	0.01	4.77E-06	1.37E-03			1.36E-03	4.69E-06	1.34E-03	1.17E-06	3.35E-04		
7	Truck - Finished Goods	9.07	6.0	15.1	12.1	1.22	400	20,800	0.01	8.03E-04	0.23	2.01E-04	0.06	2.91E-03	1.61E-04	0.05	4.01E-05	0.01			7.13E-04	3.94E-05	0.01	9.85E-06	2.82E-03		
8	FEL - Diverted Melt from Bldg 300 to Pit Waste (170)	13.13	6.0	19.1	16.1	0.43	--	13,553	0.57	1.04E-02	1.90	2.60E-03	0.48	0.11	2.08E-03	0.38	5.21E-04	0.10			0.03	5.11E-04	0.09	1.28E-04	0.02		
9	FEL - Crushed Melt from 170 to 210	13.13	6.0	19.1	16.1	0.16	--	13,553	0.57	3.86E-03	0.70	9.64E-04	0.18	0.11	7.72E-04	0.14	1.93E-04	0.04			0.03	1.89E-04	0.03	4.73E-05	0.01		
10	FEL - Raw Material from 210 to Feed Hooper	13.13	6.0	19.1	16.1	0.10	--	34,333	0.57	2.93E-03	1.07	7.33E-04	0.27	0.11	5.86E-04	0.21	1.47E-04	0.05			0.03	1.44E-04	0.05	3.60E-05	0.01		
11	FEL - Raw Material from Stockpile to 210	13.13	6.0	19.1	16.1	0.26	--	34,333	0.57	0.01	2.85	2.64E-03	0.71	0.11	2.12E-03	0.57	5.29E-04	0.14			0.03	5.19E-04	0.14	1.30E-04	3.50E-02		
12	Truck - Raw Material from Stockpile to 210 (add1 miles over Item 3)	9.07	35.0	36.3	22.7	0.43	--	1,087	0.81	6.57E-03	0.24	1.64E-03	0.06	0.16	1.31E-03	0.05	3.29E-04	0.01			0.04	3.23E-04	0.01	8.06E-05	2.92E-03		
									TOTAL Raw Material (Item 1-5, 8-12)	**0.05**	**9.76**	**0.01**	**2.44**		**9.39E-03**	**1.95**	**0.002**	**0.49**				**0.002**	**0.48**	**5.76E-04**	**0.12**	
									TOTAL Finished Products (Items 6-7)	**8.98E-04**	**0.26**	**2.25E-04**	**0.06**		**1.80E-04**	**0.05**	**4.49E-05**	**0.01**				**4.41E-05**	**0.01**	**1.10E-05**	**3.15E-03**		

Notes:
ton = short tons
tonne = metric tons
FEL = front end loader
1. Modeled emission rates in gray are not modeled as a total, but divided out among the number of segments modeled.
2. Maximum Trips per Day, Maximum Trips per Year, and Load Carried Weight by truck are based on data from a similar Roxul facility.
3. Loaded vehicle weight is a sum of empty vehicle weight and load carried weight, unless the sum is greater than 40 tons, which is the maximum loaded vehicle weight per the Department of Transportation (23 CFR 658.17).
4. FEL empty vehicle weight based on operating weight of a Cat 930K Wheel Loader Standard Lift. FEL load carried weight based on Cat 930K Wheel Loader General Purpose bucket capacity, throughput from a similar Roxul facility, and the approximate weight of basalt rock per cubic yard by Pacific Mountain Masonry.
5. For Qld screening tool, the annual steady-state-equivalent emission rate (Q) was determined based on maximum daily emissions. For example QPM10 (tpy) = PM10 (ton/day) * 365 (day/yr).
Sample Calculations:
Uncontrolled Daily Emissions (ton/day) = E (lb/VMT) * Miles per trip * Max trips per day / 2000 (lb/ton)
Uncontrolled Yearly Emissions (ton/year) = E (lb/VMT) * Miles per trip * Max trips per year / 2000 (lb/ton)
Controlled Daily/Yearly Emissions (ton/day, ton/year) = Uncontrolled Daily/Yearly Emissions (ton/day, ton/year) * (1 - Control Efficiency (%))
Uncontrolled/Controlled Daily/Yearly Emissions (ton/day, ton/year) = Uncontrolled/Controlled Daily/Yearly Emissions (ton/day, ton/year) * 0.9071847 tonne/ton
Modeled 24-hr Emission Rate (g/s) = Daily Emissions (ton/day) / 24 (hr/day) [for 24-hr model averaging period] * 2,000 (lb/ton) * 453.59 (g/lb) / 3,600 (sec/hr)
Modeled Annual Emission Rate (g/s) = Annual Emissions (ton/yr) / 8,760 (hr/yr) [for annual model averaging period] * 2,000 (lb/ton) * 453.59 (g/lb) / 3,600 (sec/hr)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Natural Gas Boilers (CM03, CM04)

Modified units
New units
Removed units

Operating Parameters, PER BOILER

Maximum Heat Input Capacity	1,462	kw
	4.99	MMBtu/hr
Operating Hours	8,760	hr/yr
Fuel Type	Natural Gas	
Fuel HHV	1,026	MMbtu/MMscf

Maximum Potential Emissions[1,2]

EMISSIONS SHOWN FOR AN INDIVIDUAL EMISSION POINT (PER BOILER)

Pollutant	Emission Factor		US		METRIC	
			Hourly Emissions Per Source	Annual Emissions Per Source	Hourly Emissions Per Source	Annual Emissions Per Source
	(lb/MMscf)	(lb/MMbtu)	(lb/hr)	(ton/yr)	(kg/hr)	(tonne/yr)
NO_x	36.21	0.0353	0.18	0.77	0.08	0.70
SO_2	0.6	0.0006	2.92E-03	0.01	1.32E-03	0.01
$PM/PM_{10F}/PM_{2.5F}$	1.9	0.0019	0.01	0.04	4.19E-03	0.04
$PM_{10T}/PM_{2.5T}$	7.6	0.0074	0.04	0.16	0.02	0.15
Condensable PM	5.7	0.0056	0.03	0.12	0.01	0.11
CO	84	0.0819	0.41	1.79	0.19	1.62
VOC	5.5	0.0054	0.03	0.12	0.01	0.11
Lead	0.0005	4.87E-07	2.43E-06	1.07E-05	1.10E-06	9.66E-06
Hexane	1.8	0.0018	0.01	0.04	0.00	0.03
Total HAPs	1.89	0.0018	0.01	0.04	4.17E-03	0.04
CO_2	-	116.98	583.72	2556.68	264.77	2,319.38
CH_4	-	2.20E-03	0.01	0.05	4.99E-03	0.04
N_2O	-	2.20E-04	1.10E-03	4.82E-03	4.99E-04	4.37E-03
CO_2e^3	-	-	584.32	2,559.32	265.04	2,321.77

Notes:
ton = short tons
tonne = metric tons
1. Natural Gas emission factor source AP-42 Table 1.4-1, 1.4-2, 1.4-3, and 1.4-4 for SO_2, PM_{10T}, $PM_{2.5T}$, CO, VOC, Lead, Hexane, Total HAPs, Chromium. GHG emission factors per 40 CFR Part 98, Table C-1 and C-2. GWPs per 40 CFR 98, Table A-1. NO_X emission factor based on 30 ppmvd @ 3% O2 per manufacturer specification.

2. PM_{10T} and $PM_{2.5T}$ emission factors include filterable and condensable particulate matter.
3. CO_2 Equivalent (CO_2e) lb/hr, ton/yr = CO_2 + [GWP_{CH4} * CH_4)] + [GWP_{N2O} * N_2O].

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Maximum Heat Input Capacity (MMBtu/hr)
Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) * 0.4535924 kg/lb
Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8,760 (hr/yr) / 1,000 (kg/tonne)

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Source ID: Emergency Fire Pump Engine (EFP1)

Modified units
New units
Removed units

Operating Parameters, per fire pump engine

Fuel type	Diesel		0.0015% Sulfur
Maximum Firing Rate	316	hp	
	236	kw	
	2.21	MMBtu/hr	
Operating hours	500	hr/yr	

Maximum Potential Emissions

Pollutant	Emission Factor			US		METRIC	
				Hourly Emissions	Annual Emissions	Hourly Emissions	Annual Emissions
	g/kw-hr	lb/hp-hr	Source	(lb/hr)	(ton/yr)	(kg/hr)	(tonne/yr)
Filterable PM/PM_{10}/$PM_{2.5}$[1]	0.11	1.81E-04	Manufacturer Rating Data	0.06	0.01	0.03	0.01
PM_{10T}	-	2.35E-04	Filterable + Condensable	0.07	0.02	0.03	0.02
$PM_{2.5T}$	-	2.35E-04	Filterable + Condensable	0.07	0.02	0.03	0.02
Condensable PM[2]	-	5.39E-05	AP-42, Tbl. 3.4-2	0.02	4.26E-03	7.73E-03	3.87E-03
NO_x[4]	3.43	5.639E-03	Manufacturer Rating Data	1.78	0.45	0.81	0.40
CO	0.8	1.315E-03	Manufacturer Rating Data	0.42	0.10	0.19	0.09
SO_2	-	1.09E-05	Mass Balance	3.44E-03	8.61E-04	1.56E-03	7.81E-04
Combustion VOC[5]	0.11	1.808E-04	Manufacturer Rating Data	0.06	0.01	0.03	0.01
Total HAPs[2]	-	2.71E-05	AP-42, ($3.87x10^{-3}$ lb/MMBtu)	8.58E-03	2.14E-03	3.89E-03	1.95E-03
CO_2	-	1.14	40 CFR 98, Tbl C-1 (73.96 kg/MMBtu)	360.75	90.19	163.64	81.82
CH_4	-	4.63E-05	40 CFR 98, Tbl C-2 (3.0x10-3 kg/MMBtu)	1.46E-02	3.66E-03	6.64E-03	3.32E-03
N_2O	-	9.25E-06	40 CFR 98, Tbl C-2 (6.0x10-4 kg/MMBtu)	2.93E-03	7.32E-04	1.33E-03	6.64E-04
CO_2e[3]	-	-	-	361.99	90.50	164.20	82.10

Notes:
ton = short tons
tonne = metric tons
1. Conservatively assuming PM= PM_{10}, $PM_{2.5.}$
2. Per AP-42, used average brake specific fuel consumption of 7,000 Btu/hp-hr to convert lb/MMBtu emission factors to lb/hp-hr.
3. CO_2 Equivalent (CO_2e) lb/hr, ton/yr = CO_2 + [GWP_{CH4} * CH_4)] + [GWP_{N2O} * N_2O]. GWPs per 40 CFR 98, Table A-1 [CO_2 = 1, CH_4 = 25, N_2O = 298].
4. Conservatively assumed all NSPS NOx + NMHC limit emitted as NO_X.
5. Conservatively assumed total hydrocarbons=TOC=VOC

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/hp-hr) * Maximum Firing Rate (hp)
Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * 500 (hr/yr) / 2,000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) * 0.4535924 kg/lb
Annual Emissions (tonne/year) = Annual Emissions (ton/year) * 0.9071847 tonne/ton

Roxul USA Inc.
Ranson, West Virginia
Source ID: Curing Oven - GHG Emissions

Modified units
New units
Removed units

Operating Parameters, Curing Oven

	Maximum Heat Input Capacity	
	MW	MMBtu/hr
Afterburner	2.9	9.86
Circulation Burner #1	1.7	5.81
Circulation Burner #2	1.7	5.81
Total	**6.3**	**21.47**

Operating Hours	8,400	hr/yr
Fuel Type	Natural Gas	
Fuel HHV	1,026	MMbtu/MMscf

Maximum Potential Emissions[1]

Pollutant	Emission Factor		US		METRIC	
	(lb/MMscf) for SO_2 (kg/MMBtu) for GHG	(lb/MMbtu)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Hourly Emissions (kg/hr)	Annual Emissions (tonne/yr)
SO_2	0.6	0.0006	0.01	0.05	5.70E-03	0.05
Combustion - CO_2	53.06	116.98	2511.69	10,549.09	1139.28	9,569.97
Combustion - CH_4	1.0E-03	2.20E-03	0.05	0.20	0.02	0.18
Combustion - N_2O	1.0E-04	2.20E-04	0.00	0.02	2.15E-03	0.02
Process - N_2O	N/A	N/A	20.06	84.26	9.1	76.44
Total - N_2O	-	-	20.07	84.28	9.10	76.46

Notes:
ton = short tons
tonne = metric tons
1. Natural Gas emission factor source AP-42 Table 1.4-2 for SO_2. GHG emission factors per 40 CFR Part 98, Table C-1 and C-2. GWPs per 40 CFR 98, Table A-1.
2. Maximum g/s emissions do not vary based on model averaging period (i.e., a source permitted to operate at maximum capacity 24 hr/day, 365 day/year).

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Maximum Heat Input Capacity (MMBtu/hr)
Annual Emissions (ton/yr) = Hourly Emissions (lb/hr) * 8,760 (hr/yr) / 2,000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) /2.2046 (lb/kg)
Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8,760 (hr/yr) / 1,000 (kg/tonne)

Operating Parameters, Melting Furnace

Operating Hours	8,400	hr/yr
Fuel Type	Natural Gas	
Maximum Heat Input Capacity	6.8	MW
	128.48	MMBtu/hr
Fuel HHV	1,026	MMbtu/MMscf
Process CO2 Emission Factor	100	kg/tonne line wool
	120,000	tonne/yr line wool

Maximum Potential Emissions[1,2]

Pollutant	Emission Factor		US		METRIC	
	(kg/MMBtu)	(lb/MMbtu)	Hourly Emissions (lb/hr)	Annual Emissions (ton/yr)	Hourly Emissions (kg/hr)	Annual Emissions (tonne/yr)
NG - CO_2	53.06	116.98	15,029.22	63,122.73	6.82E+03	57,263.99
NG - CH_4	0.001	2.20E-03	0.28	1.19	0.13	1.08
NG - N_2O	0.0001	2.20E-04	0.03	0.12	1.28E-02	0.11
Process - CO_2	N/A	N/A	3,306.93	13,227.73	1,500.00	12,000.00
Total - CO_2	-	-	18,336.15	76,350.47	8,317.14	69,263.99
Total - CH_4	-	-	0.28	1.19	0.13	1.08
Total - N_2O	-	-	0.03	0.12	0.01	0.11

tonne = metric tons
1. GHG emission factors per 40 CFR Part 98, Table C-1 and C-2. GWPs per 40 CFR 98, Table A-1.

Sample Calculations:
Hourly Emissions (lb/hr) = Emission Factor (lb/MMBtu) * Maximum Heat Input Capacity (MMBtu/hr)
Annual Emissions (ton/yr) = Fuel HHV (MMBtu/short ton) * Fuel Usage (ton/yr) * Emission Factor (lb/MMBtu) / 2,000 (lb/ton)
Hourly Emissions (kg/hr) = Hourly Emissions (lb/hr) /2.2046 (lb/kg)
Annual Emissions (tonne/yr) = Hourly Emissions (kg/hr) * 8,760 (hr/yr) / 1,000 (kg/tonne)

Attachment O

Roxul USA Inc. dba ROCKWOOL
Ranson, West Virginia
Proposed Compliance Demonstration

Rockwool will maintain compliance with all monitoring, recordkeeping, and reporting (MRR) in the issued permit. Rockwool is also taking a limitation on hours and will monitor the hours of operation to ensure the facility is complying with the permit.

AIR QUALITY PERMIT NOTICE
Notice of Application

Notice is given that Roxul USA, Inc. (dba ROCKWOOL) has applied to the West Virginia Department of Environmental Protection, Division of Air Quality, for a Modification Permit for a mineral wool manufacturing facility located at 665 Northport Avenue, in Ranson, Jefferson County, West Virginia. The latitude and longitude coordinates are: 39.37747, -77.87844.

The applicant estimates the decreased potential to discharge the following Regulated Air Pollutants will be:

Carbon Monoxide (CO): 11.23 tons per year decrease
Nitrogen Oxides (NO_x): 71.90 tons per year decrease
Particulate Matter (PM): 175.37 tons per year decrease
Particulate Matter 10 (PM_{10}): 80.13 tons per year decrease
Particulate Matter 2.5 ($PM_{2.5}$): 66.80 tons per year decrease
Sulfur Dioxide (SO_2): 6.11 tons per year decrease
Volatile Organic Compounds (VOCs): 275.23 tons per year decrease
Total Hazardous Air Pollutants (HAPs): 128.98 tons per year decrease
Greenhouse Gases (as CO_2 equivalents): 30,931.87 tons per year decrease

Startup of operation under the modification permit will commence upon permit issuance. Written comments will be received by the West Virginia Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE, Charleston, WV 25304, for at least 30 calendar days from the date of publication of this notice. Written comments will also be received via email at DEPAirQualityPermitting@WV.gov.

Any questions regarding this permit application should be directed to the DAQ at (304) 926-0499, extension 41281, during normal business hours.
Dated this the 22nd day of May 2023.

By: Roxul USA, Inc. (dba ROCKWOOL)
Mark Graves
Director of Operations
665 Northport Avenue
Ranson, WV 25430

Tank ID	Storage Tank Parameters											Material Stored			Annual Standing Storage Losses (Uncontrolled)						Annual Working Losses (Uncontrolled)								Loading Operation			Annual Emissions		Annual Emissions	
	Vessel Type	Diameter D	Straight Side	Roof Height	Effective Tank Height	Yield Volume	Maximum Working Volume	Isothermal Yes/No	Conservation Vent Low	Conservation Vent High	Paint Solar Absorptance	Material Type	Material Name	Composition Reference	Vapor Space Vv	Vapor Density Wv	Vapor Space Expansion Factor Ke	Vented Vapor Saturation Factor Ks	VOC Standing Losses Ls	Tia	Vapor Molecular Weight Mv	VP at Tia Pva	Throughput Q	Q	Turnover Factor Kn	Crude Oil Factor Kp	Working Losses VOC Lw	Pump-In Rate	VOC Rate Uncontrolled	VOC Rate Controlled	Uncontrolled VOC	Controlled VOC	Uncontrolled VOC	Controlled VOC
		(ft)	(ft)	(ft)	(ft)	(gal)	(gal)		(psig)	(psig)	dimensionless				(lb/gal)	(lb/ft^3)	dimensionless	dimensionless	(lb/hr)	(°F)	(lb/lb-mole)	(psia)	(gal/yr)	(bbl/yr)	dimensionless	dimensionless	(lb/yr)	(gal/h)	(lb/hr)	(lb/hr)	(lb)	(lb)	(tpy)	(tpy)
TK-A9 Additive Storage Tank	Cone Roof Storage	5.8	6	1.208	6.402	487.46	396	Normal	-0.03	0.03	0.25	Mixture	Additive	composition link	31.582	8.61E-04	0.039491667	0.959541667	0.0405	54.95463333	19.10742776	0.25324	57171	408.8393	0.8588	1	0.1569				0.300	0.30	0.000	0.00
TK-A9B1 Additive Baffle Tank	Cone Roof Storage	5.8	6	1.208	6.402	487.46	396	Normal	-0.03	0.03	0.25	Mixture	Additive	composition link	31.582	8.61E-04	0.039491667	0.959541667	0.0405	54.95463333	19.10742776	0.25324	65000	1547.619	0.3485	1	0.2451				0.286	0.29	0.000	0.00
TK-A9B2 Additive Baffle Tank	Cone Roof Storage	3.6	4	0.559	4.186	160.35	130	Normal	-0.03	0.03	0.25	Mixture	Additive	composition link	11.1132	8.61E-04	0.039491667	0.959541667	0.0142	54.95463333	19.10742776	0.25324	21667	515.881	0.3485	1	0.0817				0.096	0.09	0.000	0.00
TK-B3 (1-3) Binder Storage Complex	Dome Roof Storage	3.8	7.8	0.4823	8.047	812.72	264	Normal	-0.03	0.03	0.25	Mixture	Binder Copolyfog	composition link	40.9344	9.22E-04	0.03965	0.946325	0.0741	54.95463333	19.08139819	0.27048	130325	3107.9762	0.2274	1	0.4991				0.573	0.57	0.000	0.00
TK-CA Coupling Agent Storage Tan	Cone Roof Storage	3.8	8	1.208	8.402	487.46	396	Normal	-0.03	0.03	0.25	Mixture	Additive	composition link	31.582	8.61E-04	0.039491667	0.959541667	0.0405	54.95463333	19.10742776	0.25324	4227	100.6429	1	1	0.0431				0.066	0.06	0.000	0.00
TK-DF Diesel Fuel Tank	Horizontal Storage	4.59	16.44	N/A	N/A	1861.45	1704	Normal	-0.03	0.03	0.25	Compound	Distillate Fuel Oil No. 2	composition link	124.4718	1.45E-04	0.0251	0.999416667	0.2361	54.95463333		180	0.00628	52894	1257.8524	0.8304	1	0.8616				1.105	1.10	0.001	0.00
TK-DFD Dedust oil day tank	Cone Roof Storage	5	5	1.005	5.335	292.5	264	Normal	-0.03	0.03	0.25	Compound	Distillate Fuel Oil No. 2	composition link	18.8556	1.45E-04	0.0251	0.999116667	0.0351	54.95463333		180	0.00628	52894	1257.8524	0.5164	1	0.5121				0.316	0.31	0.000	0.00
TK-EGY - Ethyl Tank	Horizontal Storage	3.5	6	N/A	N/A	456.85	396	Normal	-0.03	0.03	0.25	Compound	Ethylene Glycol	composition link	30.5569	1.41E-05	0.032951667	0.999916667	0.0059	54.95463333		62.07	1.38E-03	4752	113.1429	1	1	0.00				0.013	0.01	0.000	0.00
TK-R1 (1-6) Resin Tank	Cone Roof Storage	11.41	23	0	23	17592.22	13314	Isothermal	0	0	0.25	Mixture	Rockwool Resin	composition link	1175.8689	1.50E-03				18.0153	20.08981508	0.8767	1902042	45286.7143	0.8767	1	25.389				35.389	35.38	0.018	0.01
TK-TO1 Thermal Oil Expansion Tan	Horizontal Storage	5	6.5	N/A	N/A	943.7	212	Isothermal	0	0	0.25	Compound	Fenthem Compound Power	composition link	22.979	0.1808				0	194	3.8678	180	4.2857	1	1					0.000	0.00	0.000	0.00
TK-TO2 Thermal Oil Daily Tank	Horizontal Storage	5	6.5	N/A	N/A	943.7	159	Isothermal	0	0	0.25	Fenthem	Compound Power	composition link	22.979	0.1808				0	194	3.8678	180	4.2857	1	1					0.000	0.00	0.000	0.00
TK-TO3 Thermal Oil Tank	Horizontal Storage	6.56	21	N/A	N/A	5809.44	5283	Isothermal	0	0	0.25	Heating Fluid	Compound Power	composition link	354.8844	0.0498				0	194.27	4.3669	698	16.619	1	1					0.000	0.00	0.000	0.00
TK-TO4 Thermal Oil Expansion Tan	Horizontal Storage	5.249	12.96	N/A	N/A	2099.26	1526	Isothermal	0	0	0.25	Heating Fluid		composition link	140.1149	0.0498				0	194.27	4.3669	698	16.619	1	1					0.000	0.00	0.000	0.00

Activity Title	TK-AD Additive Storage Tank From 1/1/2021 to 12/31/2021														
Climate:	Pennsylvania, Harrisburg														
pa	14.5725 psia														
Equipment Tag	TK-AD Additive Storage Tank														
Storage Vessel Style	Cone Roof Storage														
Calculation Type	Normal Storage Tank (11/2019 Rev.) Working and Breathing Loss Calculation														
Void Space Volume	487.46 gal														
Working Volume	396 gal														
Working Volume	52.9375 ft^3														
Shell Diameter	3.6 ft														
Straight Side Height	6 ft														
Hro	0.402 ft														
Paint Solar Absorptance	0.25														
Roof Color / Condition	white / average														
Shell Color / Condition	white / average														
pbp	0.03														
pbv	-0.03														
Equipment Comment															
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.														
PI (constant)	3.1416														
R (constant)	998.9														

Vessel Contents 243.730 gal 68.000 °F 2012.565 lb 109.002 lb-M

Mixture Name: Additive

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*PI*AI (mmHg)
Ethanol	42.925	80.2423	0.039871	1.7417	0.015979	1	0.6859
Water	17.3515	1932.3231	0.960129	107.2599	0.984021	1	17.0742

Kp (product factor) 1

HI 3.201 ft

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	1458.359	1317.2274	1458.359	1411.3151	1458.359	1411.315	1458.359	1458.359	1411.315	1458.359	1411.315	1458.359	17171 (sum)
Vq	(ft^3)	194.9542	176.0877	194.9542	188.6654	194.9542	188.6654	194.9542	194.9542	188.6654	194.9542	188.6654	194.9542	2295.429 (sum)
N (period)	(number)	3.6827	3.3263	3.6827	3.5639	3.6827	3.5639	3.6827	3.6827	3.5639	3.6827	3.5639	3.6827	43.3608 (sum)
N (scaled to annual)	(number)	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	43.3611	
Kn	(number)	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Ethanol	(Mv)	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07 (lb/lb-mole)
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Ethanol	(mmHg)	0.1712	0.1934	0.2871	0.4274	0.616	0.8405	0.978	0.917	0.7019	0.461	0.3121	0.2069	0.509375 (avg)
Water	(mmHg)	3.965	4.5127	6.8494	10.4065	15.2596	21.1045	24.712	23.1091	17.4902	11.2678	7.4783	4.845	12.58334 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.5939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (average)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (average)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (average)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (average)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585	0.8585 (average)
n	(number)	3.6827	3.3263	3.6827	3.5639	3.6827	3.5639	3.6827	3.6827	3.5639	3.6827	3.5639	3.6827	43.3608 (sum)
Compound Vapor Density (vW[i])														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Working Losses (Lw)														
Air	(lb)	13.3804	11.9995	12.9672	12.2191	12.2873	11.5856	11.8061	11.8776	11.766	12.5584	12.4817	13.2323	148.1612 (sum)
Ethanol	(lb)	0.0049	0.0049	0.0079	0.0112	0.0163	0.0211	0.0252	0.0237	0.0178	0.0124	0.0083	0.0058	0.1595 (sum)
Water	(lb)	0.044	0.0449	0.0739	0.1062	0.1577	0.2073	0.2486	0.2335	0.1737	0.1185	0.0778	0.0532	1.5393 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.5939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (avg)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
dPv	(psia)	0.0223	0.029	0.0506	0.0863	0.1291	0.1732	0.1942	0.171	0.1258	0.0794	0.0429	0.0246	0.094033 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (avg)
ks	(number)	0.9866	0.9848	0.9771	0.9657	0.9505	0.9328	0.9223	0.9269	0.9437	0.9629	0.9751	0.9837	0.959342 (avg)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (avg)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (avg)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
plx	(psia)	0.0918	0.1065	0.1654	0.2565	0.3775	0.5187	0.6022	0.557	0.4196	0.2696	0.1735	0.1107	0.304083 (avg)
pln	(psia)	0.0695	0.0776	0.1148	0.1703	0.2484	0.3455	0.408	0.386	0.2938	0.1902	0.1306	0.0861	0.210067 (avg)
Compound Vapor Density (wV[i])														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	2.0021	2.1266	2.8717	3.3184	3.7201	3.7127	3.7954	3.5009	3.0978	2.9042	2.1138	1.8074	34.9711 (sum)
Ethanol	(lb)	7.00E-04	9.00E-04	0.0017	0.0029	0.0047	0.0063	0.0075	0.0065	0.0044	0.0028	0.0014	8.00E-04	4.06E-02 (sum)
Water	(lb)	0.0065	0.0078	0.016	0.0279	0.0454	0.062	0.0737	0.0638	0.0432	0.0264	0.0128	0.0072	0.3927 (sum)
Total Losses (Lt)														
Air	(lb)	15.3826	14.1261	15.8389	15.5375	16.0074	15.2983	15.6015	15.3785	14.8638	15.4626	14.5955	15.0398	183.1325 (sum)
Ethanol	(lb)	0.0056	0.0058	0.0096	0.0141	0.021	0.0274	0.0326	0.0302	0.0223	0.0152	0.0097	0.0066	0.2001 (sum)
Water	(lb)	0.0505	0.0528	0.0899	0.1341	0.2031	0.2693	0.3224	0.2972	0.2169	0.1448	0.0906	0.0604	1.932 (sum)
														2.1321

Activity Title	TK-ADB1 Additive Buffer Tank From 1/1/2021 to 12/31/2021														
Climate:	Pennsylvania, Harrisburg														
pa	14.5725 psia														
Equipment Tag	TK-ADB1 Additive Buffer Tank														
Storage Vessel Style	Cone Roof Storage														
Calculation Type	Normal Storage Tank (11/2019 Rev.)														
	Working and Breathing Loss Calculation														
Void Space Volume	487.46 gal														
Working Volume	396 gal														
Working Volume	52.9375 ft^3														
Shell Diameter	3.6 ft														
Straight Side Height	6 ft														
Hro	0.402 ft														
Paint Solar Absorptance	0.25														
Roof Color / Condition	white / average														
Shell Color / Condition	white / average														
pbp	0.03														
pbv	-0.03														
Equipment Comment															
Activity Comment	Imported from Excel on 2:55:57 PM, 5/19/2022.														
PI (constant)	3.1416														
R (constant)	998.9														
Vessel Contents	243.730 gal	68.000 °F	2012.565 lb		109.002 lb-M										
Mixture Name:	Additive														
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*PI*AI (mmHg)							
	Ethanol	42.925	80.2423	0.039871	1.7417	0.015979	1	0.6859							
	Water	17.3515	1932.3231	0.960129	107.2599	0.984021	1	17.0742							
Kp (product factor)	1														
HI	3.201 ft														

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	5520.548	4986.3014	5520.548	5342.4658	5520.548	5342.466	5520.548	5520.548	5342.466	5520.548	5342.466	5520.548	65000 (sum)
Vq	(ft^3)	737.9899	666.5715	737.9899	714.1838	737.9899	714.1838	737.9899	737.9899	714.1838	737.9899	714.1838	737.9899	8689.236 (sum)
N (period)	(number)	13.9408	12.5917	13.9408	13.4911	13.9408	13.4911	13.9408	13.9408	13.4911	13.9408	13.4911	13.9408	164.1417 (sum)
N (scaled to annual)	(number)	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	164.1414	
Kn	(number)	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Ethanol	(Mv)	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07 (lb/lb-mole)
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Ethanol	(mmHg)	0.1712	0.1934	0.2871	0.4274	0.616	0.8405	0.978	0.917	0.7019	0.461	0.3121	0.2069	0.509375 (avg)
Water	(mmHg)	3.965	4.5127	6.8494	10.4065	15.2596	21.1045	24.712	23.1091	17.4902	11.2678	7.4783	4.845	12.58334 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (average)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (average)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (average)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (average)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494 (average)
n	(number)	13.9408	12.5917	13.9408	13.4911	13.9408	13.4911	13.9408	13.9408	13.4911	13.9408	13.4911	13.9408	164.1417 (sum)
Compound Vapor Density (vW(i))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Working Losses (Lw)														
Air	(lb)	20.6158	18.4882	19.9791	18.8265	18.9315	17.8504	18.1902	18.3003	18.1284	19.3493	19.231	20.3875	228.2782 (sum)
Ethanol	(lb)	0.0075	0.0076	0.0122	0.0172	0.0251	0.0325	0.0388	0.0365	0.0275	0.0191	0.0128	0.009	0.2458 (sum)
Water	(lb)	0.0678	0.0692	0.1138	0.1637	0.2429	0.3194	0.3831	0.3597	0.2677	0.1825	0.1198	0.082	2.3716 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (avg)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
dPv	(psia)	0.0223	0.029	0.0506	0.0863	0.1291	0.1732	0.1942	0.171	0.1258	0.0794	0.0429	0.0246	0.094033 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (avg)
ks	(number)	0.9866	0.9848	0.9771	0.9657	0.9505	0.9328	0.9223	0.9269	0.9437	0.9629	0.9751	0.9837	0.959342 (avg)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (avg)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (avg)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
plx	(psia)	0.0918	0.1065	0.1654	0.2565	0.3775	0.5187	0.6022	0.557	0.4196	0.2696	0.1735	0.1107	0.304083 (avg)
pln	(psia)	0.0695	0.0776	0.1148	0.1703	0.2484	0.3455	0.408	0.386	0.2938	0.1902	0.1306	0.0861	0.210067 (avg)
Compound Vapor Density (wV(i))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	2.0021	2.1266	2.8717	3.3184	3.7201	3.7127	3.7954	3.5009	3.0978	2.9042	2.1138	1.8074	34.9711 (sum)
Ethanol	(lb)	7.00E-04	9.00E-04	0.0017	0.0029	0.0047	0.0063	0.0075	0.0065	0.0044	0.0028	0.0014	8.00E-04	4.06E-02 (sum)
Water	(lb)	0.0065	0.0078	0.016	0.0279	0.0454	0.062	0.0737	0.0638	0.0432	0.0264	0.0128	0.0072	0.3927 (sum)
Total Losses (Lt)														
Air	(lb)	22.6179	20.6148	22.8508	22.1449	22.6516	21.5631	21.9856	21.8012	21.2261	22.2534	21.3448	22.195	263.2492 (sum)
Ethanol	(lb)	0.0082	0.0084	0.0139	0.0201	0.0298	0.0388	0.0462	0.043	0.0319	0.0219	0.0142	0.0097	0.2861 (sum)
Water	(lb)	0.0743	0.077	0.1298	0.1916	0.2883	0.3813	0.4568	0.4235	0.3108	0.2089	0.1327	0.0892	2.7642 (sum)
														3.0503

Activity Title	TK-ADB2 Additive Buffer Tank From 1/1/2021 to 12/31/2021														
Climate:	Pennsylvania, Harrisburg														
pa	14.5725 psia														
Equipment Tag	TK-ADB2 Additive Buffer Tank														
Storage Vessel Style	Cone Roof Storage														
Calculation Type	Normal Storage Tank (11/2019 Rev.)														
	Working and Breathing Loss Calculation														
Void Space Volume	166.25 gal														
Working Volume	132 gal														
Working Volume	17.6458 ft^3														
Shell Diameter	2.6 ft														
Straight Side Height	4 ft														
Hro	0.186 ft														
Paint Solar Absorptance	0.25														
Roof Color / Condition	white / average														
Shell Color / Condition	white / average														
pbp	0.03														
pbv	-0.03														
Equipment Comment															
Activity Comment	Imported from Excel on 2:55:57 PM, 5/19/2022.														
PI (constant)	3.1416														
R (constant)	998.9														
Vessel Contents	83.125 gal	68.000 °F	686.393 lb		37.175 lb-M										
Mixture Name:	Additive														
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*PI*AI (mmHg)							
	Ethanol	42.925	27.3669	0.039871	0.594	0.015979	1	0.6859							
	Water	17.3515	659.0258	0.960129	36.5814	0.984021	1	17.0742							
Kp (product factor)	1														
HI	2.0932 ft														

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	1840.211	1662.126	1840.211	1780.8493	1840.211	1780.849	1840.211	1840.211	1780.849	1840.211	1780.849	1840.211	21667 (sum)
Vq	(ft^3)	246.0004	222.1939	246.0004	238.0649	246.0004	238.0649	246.0004	246.0004	238.0649	246.0004	238.0649	246.0004	2896.456 (sum)
N (period)	(number)	13.941	12.5919	13.941	13.4913	13.941	13.4913	13.941	13.941	13.4913	13.941	13.4913	13.941	164.1441 (sum)
N (scaled to annual)	(number)	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	164.1439	
Kn	(number)	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Ethanol	(Mv)	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07 (lb/lb-mole)
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Ethanol	(mmHg)	0.1712	0.1934	0.2871	0.4274	0.616	0.8405	0.978	0.917	0.7019	0.461	0.3121	0.2069	0.509375 (avg)
Water	(mmHg)	3.965	4.5127	6.8494	10.4065	15.2596	21.1045	24.712	23.1091	17.4902	11.2678	7.4783	4.845	12.58334 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (average)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
hVo	(ft)	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932 (average)
Vv	(ft^3)	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122 (average)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (average)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494	0.3494 (average)
n	(number)	13.941	12.5919	13.941	13.4913	13.941	13.4913	13.941	13.941	13.4913	13.941	13.4913	13.941	164.1441 (sum)
Compound Vapor Density (vW(i))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Working Losses (Lw)														
Air	(lb)	6.872	6.1628	6.6597	6.2755	6.3106	5.9502	6.0634	6.1001	6.0428	6.4498	6.4104	6.7959	76.0932 (sum)
Ethanol	(lb)	0.0025	0.0025	0.0041	0.0057	0.0084	0.0108	0.0129	0.0122	0.0092	0.0064	0.0043	0.003	0.082 (sum)
Water	(lb)	0.0226	0.0231	0.0379	0.0546	0.081	0.1065	0.1277	0.1199	0.0892	0.0608	0.0399	0.0273	0.7905 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (avg)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
dPv	(psia)	0.0223	0.029	0.0506	0.0863	0.1291	0.1732	0.1942	0.171	0.1258	0.0794	0.0429	0.0246	0.094033 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932	2.0932 (avg)
ks	(number)	0.9912	0.99	0.9849	0.9773	0.9671	0.955	0.9478	0.951	0.9624	0.9755	0.9836	0.9893	0.972925 (avg)
Vv	(ft^3)	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122	11.1122 (avg)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (avg)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
pix	(psia)	0.0918	0.1065	0.1654	0.2565	0.3775	0.5187	0.6022	0.557	0.4196	0.2696	0.1735	0.1107	0.304083 (avg)
pin	(psia)	0.0695	0.0776	0.1148	0.1703	0.2484	0.3455	0.408	0.386	0.2938	0.1902	0.1306	0.0861	0.210067 (avg)
Compound Vapor Density (wV(i))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	0.6828	0.7253	0.9794	1.1317	1.2687	1.2662	1.2944	1.194	1.0565	0.9905	0.7209	0.6164	11.9268 (sum)
Ethanol	(lb)	2.00E-04	3.00E-04	6.00E-04	0.001	0.0016	0.0022	0.0026	0.0023	0.0015	0.001	5.00E-04	3.00E-04	1.41E-02 (sum)
Water	(lb)	0.0022	0.0027	0.0055	0.0096	0.0157	0.0216	0.0258	0.0223	0.015	0.0091	0.0044	0.0025	0.1354 (sum)
Total Losses (Lt)														
Air	(lb)	7.5548	6.8881	7.6391	7.4073	7.5793	7.2164	7.3579	7.2941	7.0993	7.4403	7.1313	7.4123	88.0202 (sum)
Ethanol	(lb)	0.0027	0.0028	0.0047	0.0067	0.01	0.013	0.0155	0.0144	0.0107	0.0073	0.0047	0.0033	0.0958 (sum)
Water	(lb)	0.0248	0.0258	0.0434	0.0642	0.0967	0.1281	0.1535	0.1422	0.1042	0.07	0.0444	0.0298	0.9271 (sum)
														1.0229

Activity Title	TK-BS (1-3) Binder Storage Container From 1/1/2021 to 12/31/2021
Climate:	Pennsylvania, Harrisburg
pa	14.5725 psia
Equipment Tag	TK-BS (1-3) Binder Storage Container
Storage Vessel Style	Dome Roof Storage
Calculation Type	Normal Storage Tank (11/2019 Rev.) Working and Breathing Loss Calculation
Void Space Volume	612.72 gal
Working Volume	264 gal
Working Volume	35.2917 ft^3
Shell Diameter	3.6 ft
Straight Side Height	7.8 ft
Hro	0.247 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0.03
pbv	-0.03
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:57 PM, 5/19/2022.
PI (constant)	3.1416
R (constant)	998.9

Vessel Contents	306.360 gal	68.000 °F	2556.013 lb		141.660 lb-M		
Mixture Name:	Binder Circulating						
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
	Formaldehyde	3003.344	2.0558	0.000804	0.0685	0.000483	1	1.4514
	Methanol	93.743	0.6071	0.000238	0.0189	0.000134	1	0.0125
	Phenol	0	3.5564	0.001391	0.0378	0.000267	1	0
	Water	17.3515	2549.7937	0.997567	141.5346	0.999116	1	17.3361
Kp (product factor)		1						
Hl		4.0216 ft						

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	11068.7	9997.5342	11068.7	10711.6488	11068.7	10711.64	11068.7	11068.7	10711.64	11068.7	10711.64	11068.7	130325 (sum)
Vq	(ft^3)	1479.67	1336.4759	1479.67	1431.9385	1479.67	1431.939	1479.67	1479.67	1431.939	1479.67	1431.939	1479.67	17421.92 (sum)
N (period)	(number)	41.9269	37.8694	41.9269	40.5744	41.9269	40.5744	41.9269	41.9269	40.5744	41.9269	40.5744	41.9269	493.6553 (sum)
N (scaled to annual)	(number)	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	493.6553	
Kn	(number)	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Formaldehyde	(Mv)	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03 (lb/lb-mole)
Methanol	(Mv)	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04 (lb/lb-mole)
Phenol	(Mv)	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128 (lb/lb-mole)
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Formaldehyde	(mmHg)	0.7188	0.7644	0.9329	1.141	1.374	1.6101	1.7398	1.6834	1.4686	1.1858	0.9731	0.7907	1.19855 (avg)
Methanol	(mmHg)	0.0036	0.004	0.0057	0.0082	0.0114	0.0151	0.0173	0.0163	0.0128	0.0088	0.0062	0.0043	0.009475 (avg)
Phenol	(mmHg)	0	0	0	0	0	0	0	0	0	0	0	0	0 (avg)
Water	(mmHg)	4.0258	4.582	6.9544	10.5661	15.4937	21.4282	25.0911	23.4636	17.7585	11.4407	7.593	4.9193	12.77637 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.445	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.0918	0.1035	0.1527	0.2266	0.3265	0.4459	0.5193	0.4867	0.3721	0.2444	0.1658	0.1105	0.270483 (average)
pNc	(psia)	14.4807	14.469	14.4198	14.3459	14.246	14.1266	14.0532	14.0858	14.2004	14.3281	14.4067	14.462	14.30202 (average)
pVa	(psia)	0.0918	0.1035	0.1527	0.2266	0.3265	0.4459	0.5193	0.4867	0.3721	0.2444	0.1658	0.1105	0.270483 (average)
hVo	(ft)	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216 (average)
Vv	(ft^3)	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544 (average)
wVnc	(number)	0.0799	0.0793	0.0774	0.0753	0.0733	0.0714	0.0704	0.0709	0.0725	0.0749	0.077	0.079	0.075108 (average)
kE	(number)	0.0249	0.0295	0.0368	0.0452	0.0504	0.0533	0.0535	0.049	0.0438	0.0385	0.0282	0.0227	0.03965 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274	0.2274 (average)
n	(number)	41.9269	37.8694	41.9269	40.5744	41.9269	40.5744	41.9269	41.9269	40.5744	41.9269	40.5744	41.9269	493.6553 (sum)
Compound Vapor Density (vW[i])														
Formaldehyde	(lb/ft^3)	7.94E-05	8.39E-05	1.00E-04	1.00E-04	1.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	1.00E-04	1.00E-04	8.65E-05	1.29E-04 (avg)
Methanol	(lb/ft^3)	4.26E-07	4.71E-07	6.57E-07	9.18E-07	1.25E-06	1.62E-06	1.85E-06	1.75E-06	1.40E-06	9.79E-07	7.05E-07	4.99E-07	1.04E-06 (avg)
Phenol	(lb/ft^3)	0	0	0	0	0	0	0	0	0	0	0	0	0 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	0.001	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.92E-04 (avg)
Working Losses (Lw)														
Air	(lb)	26.6816	24.1063	26.0462	24.5393	24.672	23.2594	23.7004	23.8446	23.6237	25.2199	25.0701	26.5821	297.5456 (sum)
Formaldehyde	(lb)	0.0267	0.0255	0.0337	0.039	0.0476	0.053	0.0587	0.057	0.0489	0.0418	0.0339	0.0291	0.4949 (sum)
Methanol	(lb)	1.00E-04	1.00E-04	2.00E-04	3.00E-04	4.00E-04	5.00E-04	6.00E-04	6.00E-04	5.00E-04	3.00E-04	2.00E-04	2.00E-04	4.00E-03 (sum)
Phenol	(lb)	0	0	0	0	0	0	0	0	0	0	0	0	0 (sum)
Water	(lb)	0.0858	0.0917	0.1508	0.2169	0.3219	0.4232	0.5076	0.4766	0.3546	0.2419	0.1588	0.1087	3.1425 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.67	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.445	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
I	(Btu/ft^2day)	622.801	877.3515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1348.349	1001.304	644.6925	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.0918	0.1035	0.1527	0.2266	0.3265	0.4459	0.5193	0.4867	0.3721	0.2444	0.1658	0.1105	0.270483 (avg)
pNc	(psia)	14.4807	14.469	14.4198	14.3459	14.246	14.1266	14.0532	14.0858	14.2004	14.3281	14.4067	14.462	14.30202 (avg)
pVa	(psia)	0.0918	0.1035	0.1527	0.2266	0.3265	0.4459	0.5193	0.4867	0.3721	0.2444	0.1658	0.1105	0.270483 (avg)
dPv	(psia)	0.0236	0.0305	0.0526	0.0887	0.1317	0.1757	0.1965	0.1732	0.128	0.0815	0.0445	0.0259	0.096033 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216	4.0216 (avg)
ks	(number)	0.9808	0.9784	0.9685	0.9539	0.9349	0.9132	0.9003	0.906	0.9265	0.9505	0.9659	0.977	0.946325 (avg)
Vv	(ft^3)	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544	40.9544 (avg)
wVnc	(number)	0.0799	0.0793	0.0774	0.0753	0.0733	0.0714	0.0704	0.0709	0.0725	0.0749	0.077	0.079	0.075108 (avg)
kE	(number)	0.0249	0.0295	0.0368	0.0452	0.0504	0.0533	0.0535	0.049	0.0438	0.0385	0.0282	0.0227	0.03965 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
pix	(psia)	0.1043	0.1198	0.181	0.2748	0.3982	0.5413	0.6257	0.5801	0.441	0.2882	0.1894	0.1241	0.322325 (avg)
pin	(psia)	0.0807	0.0892	0.1284	0.1861	0.2665	0.3656	0.4252	0.4069	0.313	0.2066	0.1449	0.0983	0.226283 (avg)
Compound Vapor Density (wV[i])														
Formaldehyde	(lb/ft^3)	7.94E-05	8.39E-05	1.00E-04	1.00E-04	1.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	1.00E-04	1.00E-04	8.65E-05	1.29E-04 (avg)
Methanol	(lb/ft^3)	4.26E-07	4.71E-07	6.57E-07	9.18E-07	1.25E-06	1.62E-06	1.85E-06	1.75E-06	1.40E-06	9.79E-07	7.05E-07	4.99E-07	1.04E-06 (avg)
Phenol	(lb/ft^3)	0	0	0	0	0	0	0	0	0	0	0	0	0 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	0.001	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.92E-04 (avg)
Breathing Losses (Lb)														
Air	(lb)	2.5235	2.5804	3.6196	4.1822	4.6874	4.6763	4.7792	4.409	3.9028	3.5603	2.6646	2.2784	44.0637 (sum)
Formaldehyde	(lb)	0.0025	0.0028	0.0045	0.0063	0.0085	0.0097	0.0107	0.0095	0.0075	0.0058	0.0035	0.0024	0.0737 (sum)
Methanol	(lb)	1.32E-05	1.56E-05	2.97E-05	4.86E-05	7.47E-05	9.71E-05	1.00E-04	9.86E-05	6.96E-05	4.55E-05	2.36E-05	1.41E-05	6.30E-04 (sum)
Phenol	(lb)	0	0	0	0	0	0	0	0	0	0	0	0	0 (sum)
Water	(lb)	0.0083	0.01	0.0203	0.0353	0.0572	0.0777	0.0922	0.0798	0.0543	0.0334	0.0163	0.0091	0.4939 (sum)
Total Losses (Lt)														
Air	(lb)	29.4051	26.7866	29.6658	28.7216	29.3594	27.9357	28.4796	28.2536	27.5266	28.8801	27.7347	28.8605	341.6093 (sum)
Formaldehyde	(lb)	0.0292	0.0283	0.0383	0.0454	0.056	0.0627	0.0693	0.0665	0.0564	0.0475	0.0374	0.0316	0.5686 (sum)
Methanol	(lb)	2.00E-04	2.00E-04	3.00E-04	3.00E-04	5.00E-04	6.00E-04	7.00E-04	7.00E-04	5.00E-04	4.00E-04	3.00E-04	2.00E-04	4.90E-03 (sum)
Phenol	(lb)	0	0	0	0	0	0	0	0	0	0	0	0	0 (sum)
Water	(lb)	0.0981	0.1017	0.1711	0.2522	0.3791	0.5009	0.5998	0.5564	0.4089	0.2752	0.1751	0.1178	3.6363 (sum)
														4.2098

Activity Title	TK-CA Coupling Agent Storage Tank From 1/1/2021 to 12/31/2021							
Climate:	Pennsylvania, Harrisburg							
pa	14.5725 psia							
Equipment Tag	TK-CA Coupling Agent Storage Tank							
Storage Vessel Style	Cone Roof Storage							
Calculation Type	Normal Storage Tank (11/2019 Rev.)							
	Working and Breathing Loss Calculation							
Void Space Volume	487.46 gal							
Working Volume	396 gal							
Working Volume	52.9375 ft^3							
Shell Diameter	3.6 ft							
Straight Side Height	6 ft							
Hro	0.402 ft							
Paint Solar Absorptance	0.25							
Roof Color / Condition	white / average							
Shell Color / Condition	white / average							
pbp	0.03							
pbv	-0.03							
Equipment Comment								
Activity Comment	Imported from Excel on 2:55:57 PM, 5/19/2022.							
PI (constant)	3.1416							
R (constant)	998.9							
Vessel Contents	243.730 gal	68.000 °F	2012.565 lb		109.002 lb-M			
Mixture Name:	Additive							
	[Liquid]	mmHg	lb	W[I]	lb-M	X[I]	A[I]	X*PI*AI (mmHg)
	Ethanol	42.925	80.2423	0.039871	1.7417	0.015979	1	0.6859
	Water	17.3515	1932.3231	0.960129	107.2599	0.984021	1	17.0742
Kp (product factor)	1							
Hl	3.201 ft							

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	359.0055	324.263	359.0055	347.4247	359.0055	347.4247	359.0055	359.0055	347.4247	359.0055	347.4247	359.0055	4227 (sum)
Vq	(ft^3)	47.9921	43.3477	47.9921	46.4439	47.9921	46.4439	47.9921	47.9921	46.4439	47.9921	46.4439	47.9921	565.068 (sum)
N (period)	(number)	0.9066	0.8188	0.9066	0.8773	0.9066	0.8773	0.9066	0.9066	0.8773	0.9066	0.8773	0.9066	10.6742 (sum)
N (scaled to annual)	(number)	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	10.6742	
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Ethanol	(Mv)	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07	46.07 (lb/lb-mole)
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Ethanol	(mmHg)	0.1712	0.1934	0.2871	0.4274	0.616	0.8405	0.978	0.917	0.7019	0.461	0.3121	0.2069	0.509375 (avg)
Water	(mmHg)	3.965	4.5127	6.8494	10.4065	15.2596	21.1045	24.712	23.1091	17.4902	11.2678	7.4783	4.845	12.58334 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (average)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (average)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (average)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (average)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (average)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
n	(number)	0.9066	0.8188	0.9066	0.8773	0.9066	0.8773	0.9066	0.9066	0.8773	0.9066	0.8773	0.9066	10.6742 (sum)
Compound Vapor Density (vW(I))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Working Losses (Lw)														
Air	(lb)	3.8366	3.4407	3.7181	3.5036	3.5232	3.322	3.3852	3.4057	3.3737	3.6009	3.5789	3.7942	42.4828 (sum)
Ethanol	(lb)	0.0014	0.0014	0.0023	0.0032	0.0047	0.0061	0.0072	0.0068	0.0051	0.0036	0.0024	0.0017	0.0459 (sum)
Water	(lb)	0.0126	0.0129	0.0212	0.0305	0.0452	0.0594	0.0713	0.0669	0.0498	0.034	0.0223	0.0153	0.4414 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
pNc	(psia)	14.4925	14.4815	14.4345	14.363	14.2654	14.148	14.0756	14.1078	14.2206	14.3456	14.4218	14.4748	14.31926 (avg)
pVa	(psia)	0.08	0.091	0.138	0.2095	0.3071	0.4245	0.4969	0.4647	0.3519	0.2269	0.1507	0.0977	0.253242 (avg)
dPv	(psia)	0.0223	0.029	0.0506	0.0863	0.1291	0.1732	0.1942	0.171	0.1258	0.0794	0.0429	0.0246	0.094033 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201	3.201 (avg)
ks	(number)	0.9866	0.9848	0.9771	0.9657	0.9505	0.9328	0.9223	0.9269	0.9437	0.9629	0.9751	0.9837	0.959342 (avg)
Vv	(ft^3)	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582	32.582 (avg)
wVnc	(number)	0.0799	0.0794	0.0775	0.0754	0.0734	0.0715	0.0705	0.071	0.0726	0.075	0.0771	0.0791	0.0752 (avg)
kE	(number)	0.0248	0.0294	0.0367	0.045	0.0502	0.0531	0.0533	0.0488	0.0436	0.0383	0.0281	0.0226	0.039492 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
plx	(psia)	0.0918	0.1065	0.1654	0.2565	0.3775	0.5187	0.6022	0.557	0.4196	0.2696	0.1735	0.1107	0.304083 (avg)
pln	(psia)	0.0695	0.0776	0.1148	0.1703	0.2484	0.3455	0.408	0.386	0.2938	0.1902	0.1306	0.0861	0.210067 (avg)
Compound Vapor Density (wV(I))														
Ethanol	(lb/ft^3)	2.90E-05	3.26E-05	4.73E-05	6.89E-05	9.72E-05	1.00E-04	2.00E-04	1.00E-04	1.00E-04	7.41E-05	5.12E-05	3.47E-05	7.79E-05 (avg)
Water	(lb/ft^3)	3.00E-04	3.00E-04	4.00E-04	7.00E-04	9.00E-04	0.0013	0.0015	0.0014	0.0011	7.00E-04	5.00E-04	3.00E-04	7.83E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	2.0021	2.1266	2.8717	3.3184	3.7201	3.7127	3.7954	3.5009	3.0978	2.9042	2.1138	1.8074	34.9711 (sum)
Ethanol	(lb)	7.00E-04	9.00E-04	0.0017	0.0029	0.0047	0.0063	0.0075	0.0065	0.0044	0.0028	0.0014	8.00E-04	4.06E-02 (sum)
Water	(lb)	0.0065	0.0078	0.016	0.0279	0.0454	0.062	0.0737	0.0638	0.0432	0.0264	0.0128	0.0072	0.3927 (sum)
Total Losses (Lt)														
Air	(lb)	5.8387	5.5673	6.5899	6.822	7.2433	7.0347	7.1806	6.9066	6.4715	6.5051	5.6928	5.6016	77.4541 (sum)
Ethanol	(lb)	0.0021	0.0023	0.004	0.0061	0.0094	0.0124	0.0147	0.0133	0.0095	0.0063	0.0038	0.0024	0.0863 (sum)
Water	(lb)	0.0191	0.0207	0.0372	0.0583	0.0906	0.1214	0.145	0.1307	0.093	0.0603	0.0351	0.0224	0.8338 (sum)
														0.9201

Activity Title	TK-DF Diesel Fuel Tank From 1/1/2021 to 12/31/2021														
Climate:	Pennsylvania, Harrisburg														
pa	14.5725 psia														
Equipment Tag	TK-DF Diesel Fuel Tank														
Storage Vessel Style	Horizontal Storage														
Calculation Type	Normal Storage Tank (11/2019 Rev.)														
	Working and Breathing Loss Calculation														
Void Space Volume	1861.45 gal														
Working Volume	1204 gal														
Working Volume	160.9514 ft^3														
Shell Diameter	4.39 ft														
Straight Side Height	16.44 ft														
Paint Solar Absorptance	0.25														
Roof Color / Condition	white / average														
Shell Color / Condition	white / average														
pbp	0.03														
pbv	-0.03														
Equipment Comment															
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.														
Pi (constant)	3.1416														
R (constant)	998.9														

Vessel Contents	930.725 gal	68.000 °F	6608.144 lb		50.832 lb-M										
Mixture Name:	Mixture														
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)							
	Distillate Fuel Oil No	0.4359	6608.144	1	50.8319	1	1	0.4359							
Kp (product factor)	1														

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	4487.271	4053.0192	4487.271	4342.5205	4487.271	4342.521	4487.271	4487.271	4342.521	4487.271	4342.521	4487.271	52834 (sum)
Vq	(ft^3)	599.8609	541.8099	599.8609	580.5106	599.8609	580.5106	599.8609	599.8609	580.5106	599.8609	580.5106	599.8609	7062.879 (sum)
N (period)	(number)	3.727	3.3663	3.727	3.6067	3.727	3.6067	3.727	3.727	3.6067	3.727	3.6067	3.727	43.8821 (sum)
N (scaled to annual)	(number)	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	43.8821	
Kn	(number)	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Distillate Fuel Oil No. 2	(Mv)	130	130	130	130	130	130	130	130	130	130	130	130	130 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Distillate Fuel Oil No. 2	(mmHg)	0.1054	0.12	0.1812	0.2719	0.392	0.532	0.6164	0.5791	0.4459	0.2935	0.1974	0.1288	0.321967 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (average)
pNc	(psia)	14.5705	14.5702	14.569	14.5672	14.5649	14.5622	14.5606	14.5613	14.5639	14.5668	14.5687	14.57	14.56628 (average)
pVa	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (average)
hVo	(ft)	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239 (average)
Vv	(ft^3)	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716 (average)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0736	0.073	0.0732	0.0744	0.0762	0.0778	0.0796	0.076483 (average)
kE	(number)	0.0233	0.0274	0.0333	0.0392	0.0414	0.0413	0.0399	0.0371	0.0351	0.033	0.0252	0.021	0.0331 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503	0.8503 (average)
n	(number)	3.727	3.3663	3.727	3.6067	3.727	3.6067	3.727	3.727	3.6067	3.727	3.6067	3.727	43.8821 (sum)
Compound Vapor Density (vW(i))														
Distillate Fuel Oil No. 2	(lb/ft^3)	5.04E-05	5.70E-05	8.42E-05	1.00E-04	2.00E-04	2.00E-04	3.00E-04	3.00E-04	2.00E-04	1.00E-04	9.15E-05	6.10E-05	1.45E-04 (avg)
Working Losses (Lw)														
Air	(lb)	40.9962	36.7926	39.8858	37.7674	38.2316	36.3406	37.2188	37.3606	36.7223	38.8618	38.4251	40.5907	459.1935 (sum)
Distillate Fuel Oil No. 2	(lb)	0.0257	0.0263	0.043	0.0611	0.0891	0.1149	0.1364	0.1286	0.0974	0.0679	0.0451	0.0311	0.8666 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (avg)
pNc	(psia)	14.5705	14.5702	14.569	14.5672	14.5649	14.5622	14.5606	14.5613	14.5639	14.5668	14.5687	14.57	14.56628 (avg)
pVa	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (avg)
dPv	(psia)	6.00E-04	7.00E-04	0.0013	0.0021	0.003	0.0039	0.0043	0.0038	0.0029	0.0019	0.0011	6.00E-04	2.18E-03 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239	1.7239 (avg)
ks	(number)	0.9998	0.9998	0.9997	0.9995	0.9993	0.9991	0.9989	0.999	0.9992	0.9995	0.9997	0.9998	0.999442 (avg)
Vv	(ft^3)	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716	124.4716 (avg)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0736	0.073	0.0732	0.0744	0.0762	0.0778	0.0796	0.076483 (avg)
kE	(number)	0.0233	0.0274	0.0333	0.0392	0.0414	0.0413	0.0399	0.0371	0.0351	0.033	0.0252	0.021	0.0331 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
plx	(psia)	0.0023	0.0027	0.0042	0.0064	0.0092	0.0124	0.0142	0.0133	0.0102	0.0067	0.0044	0.0028	0.0074 (avg)
pln	(psia)	0.0018	0.002	0.0029	0.0043	0.0062	0.0085	0.0099	0.0094	0.0073	0.0048	0.0033	0.0022	0.005217 (avg)
Compound Vapor Density (wV(i))														
Distillate Fuel Oil No. 2	(lb/ft^3)	5.04E-05	5.70E-05	8.42E-05	1.00E-04	2.00E-04	2.00E-04	3.00E-04	3.00E-04	2.00E-04	1.00E-04	9.15E-05	6.10E-05	1.45E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	7.2312	7.6383	10.0528	11.1992	11.9784	11.3404	11.2377	10.4912	9.7455	9.6957	7.3258	6.45	114.3862 (sum)
Distillate Fuel Oil No. 2	(lb)	0.0045	0.0055	0.0108	0.0181	0.0279	0.0358	0.0411	0.0361	0.0258	0.0169	0.0086	0.0049	0.236 (sum)
Total Losses (Lt)														
Air	(lb)	48.2274	44.4309	49.9386	48.9665	50.2101	47.681	48.4565	47.8517	46.4678	48.5576	45.7509	47.0407	573.5797 (sum)
Distillate Fuel Oil No. 2	(lb)	0.0303	0.0317	0.0538	0.0791	0.117	0.1507	0.1775	0.1647	0.1232	0.0848	0.0538	0.0361	1.1027 (sum)
														1.1027

Activity Title	TK-DOD De-dust oil day tank From 1/1/2021 to 12/31/2021
Climate:	Pennsylvania, Harrisburg
pa	14.5725 psia
Equipment Tag	TK-DOD De-dust oil day tank
Storage Vessel Style	Cone Roof Storage
Calculation Type	Normal Storage Tank (11/2019 Rev.) Working and Breathing Loss Calculation
Void Space Volume	282.1 gal
Working Volume	264 gal
Working Volume	35.2917 ft^3
Shell Diameter	3 ft
Straight Side Height	5 ft
Hro	0.335 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0.03
pbv	-0.03
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:57 PM, 5/19/2022.
PI (constant)	3.1416
R (constant)	998.9

Vessel Contents 141.050 gal 68.000 °F 1001.454 lb 7.703 lb-M

Mixture Name: Mixture

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*PI*Ai (mmHg)
Distillate Fuel Oil No	0.4359	1001.4545	1	7.7035	1	1	0.4359

Kp (product factor) 1

Hl 2.6675 ft

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	4487.271	4053.0192	4487.271	4342.5205	4487.271	4342.521	4487.271	4487.271	4342.521	4487.271	4342.521	4487.271	52834 (sum)
Vq	(ft^3)	599.8609	541.8099	599.8609	580.5106	599.8609	580.5106	599.8609	599.8609	580.5106	599.8609	580.5106	599.8609	7062.879 (sum)
N (period)	(number)	16.9972	15.3523	16.9972	16.4489	16.9972	16.4489	16.9972	16.9972	16.4489	16.9972	16.4489	16.9972	200.1283 (sum)
N (scaled to annual)	(number)	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	200.1288	
Kn	(number)	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Distillate Fuel Oil No. 2	(Mv)	130	130	130	130	130	130	130	130	130	130	130	130	130 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Distillate Fuel Oil No. 2	(mmHg)	0.1054	0.12	0.1812	0.2719	0.392	0.532	0.6164	0.5791	0.4459	0.2935	0.1974	0.1288	0.321967 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (average)
pNc	(psia)	14.5705	14.5702	14.569	14.5672	14.5649	14.5622	14.5606	14.5613	14.5639	14.5668	14.5687	14.57	14.56628 (average)
pVa	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (average)
hVo	(ft)	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675 (average)
Vv	(ft^3)	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556 (average)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0736	0.073	0.0732	0.0744	0.0762	0.0778	0.0796	0.076483 (average)
kE	(number)	0.0233	0.0274	0.0333	0.0392	0.0414	0.0413	0.0399	0.0371	0.0351	0.033	0.0252	0.021	0.0331 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166	0.3166 (average)
n	(number)	16.9972	15.3523	16.9972	16.4489	16.9972	16.4489	16.9972	16.9972	16.4489	16.9972	16.4489	16.9972	200.1283 (sum)
Compound Vapor Density (vW(i))														
Distillate Fuel Oil No. 2	(lb/ft^3)	5.04E-05	5.70E-05	8.42E-05	1.00E-04	2.00E-04	2.00E-04	3.00E-04	3.00E-04	2.00E-04	1.00E-04	9.15E-05	6.10E-05	1.45E-04 (avg)
Working Losses (Lw)														
Air	(lb)	15.2627	13.6977	14.8493	14.0607	14.2335	13.5295	13.8564	13.9092	13.6716	14.4681	14.3055	15.1118	170.956 (sum)
Distillate Fuel Oil No. 2	(lb)	0.0096	0.0098	0.016	0.0227	0.0332	0.0428	0.0508	0.0479	0.0363	0.0253	0.0168	0.0116	0.3228 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
I	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (avg)
pNc	(psia)	14.5705	14.5702	14.569	14.5672	14.5649	14.5622	14.5606	14.5613	14.5639	14.5668	14.5687	14.57	14.56628 (avg)
pVa	(psia)	0.002	0.0023	0.0035	0.0053	0.0076	0.0103	0.0119	0.0112	0.0086	0.0057	0.0038	0.0025	0.006225 (avg)
dPv	(psia)	6.00E-04	7.00E-04	0.0013	0.0021	0.003	0.0039	0.0043	0.0038	0.0029	0.0019	0.0011	6.00E-04	2.18E-03 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675	2.6675 (avg)
ks	(number)	0.9997	0.9997	0.9995	0.9993	0.9989	0.9985	0.9983	0.9984	0.9988	0.9992	0.9995	0.9996	0.999117 (avg)
Vv	(ft^3)	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556	18.8556 (avg)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0736	0.073	0.0732	0.0744	0.0762	0.0778	0.0796	0.076483 (avg)
kE	(number)	0.0233	0.0274	0.0333	0.0392	0.0414	0.0413	0.0399	0.0371	0.0351	0.033	0.0252	0.021	0.0331 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
pix	(psia)	0.0023	0.0027	0.0042	0.0064	0.0092	0.0124	0.0142	0.0133	0.0102	0.0067	0.0044	0.0028	0.0074 (avg)
pin	(psia)	0.0018	0.002	0.0029	0.0043	0.0062	0.0085	0.0099	0.0094	0.0073	0.0048	0.0033	0.0022	0.005217 (avg)
Compound Vapor Density (wV(i))														
Distillate Fuel Oil No. 2	(lb/ft^3)	5.04E-05	5.70E-05	8.42E-05	1.00E-04	2.00E-04	2.00E-04	3.00E-04	3.00E-04	2.00E-04	1.00E-04	9.15E-05	6.10E-05	1.45E-04 (avg)
Breathing Losses (Ls)														
Air	(lb)	1.0954	1.1571	1.5229	1.6965	1.8146	1.7179	1.7023	1.5893	1.4763	1.4688	1.1098	0.9771	17.328 (sum)
Distillate Fuel Oil No. 2	(lb)	7.00E-04	8.00E-04	0.0016	0.0027	0.0042	0.0054	0.0062	0.0055	0.0039	0.0026	0.0013	7.00E-04	3.56E-02 (sum)
Total Losses (Lt)														
Air	(lb)	16.3582	14.8548	16.3722	15.7572	16.0481	15.2474	15.5588	15.4985	15.1479	15.9369	15.4153	16.0888	188.2841 (sum)
Distillate Fuel Oil No. 2	(lb)	0.0103	0.0106	0.0176	0.0255	0.0374	0.0482	0.057	0.0534	0.0402	0.0278	0.0181	0.0123	0.3584 (sum)

0.3584

Activity Title	TK-GLY - Glycol Tank From 1/1/2021 to 12/31/2021														
Climate:	Pennsylvania, Harrisburg														
pa	14.5725 psia														
Equipment Tag	TK-GLY - Glycol Tank														
Storage Vessel Style	Horizontal Storage														
Calculation Type	Normal Storage Tank (11/2019 Rev.)														
	Working and Breathing Loss Calculation														
Void Space Volume	456.85 gal														
Working Volume	396 gal														
Working Volume	52.9375 ft^3														
Shell Diameter	3.6 ft														
Straight Side Height	6 ft														
Paint Solar Absorptance	0.25														
Roof Color / Condition	white / average														
Shell Color / Condition	white / average														
pbp	0.03														
pbv	-0.03														
Equipment Comment															
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.														
Pi (constant)	3.1416														
R (constant)	998.9														
Vessel Contents	228.425 gal	68.000 °F	2122.663 lb		34.198 lb-M										
Mixture Name:	Mixture														
	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)							
	Ethylene Glycol	0.0925	2122.6628	1	34.1979	1	1	0.0925							
Kp (product factor)	1														

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	403.5945	364.537	403.5945	390.5753	403.5945	390.5753	403.5945	403.5945	390.5753	403.5945	390.5753	403.5945	4752 (sum)
Vq	(ft^3)	53.9527	48.7315	53.9527	52.2123	53.9527	52.2123	53.9527	53.9527	52.2123	53.9527	52.2123	53.9527	635.2496 (sum)
N (period)	(number)	1.0192	0.9205	1.0192	0.9863	1.0192	0.9863	1.0192	1.0192	0.9863	1.0192	0.9863	1.0192	12.0001 (sum)
N (scaled to annual)	(number)	12	12	12	12	12	12	12	12	12	12	12	12	
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Ethylene Glycol	(Mv)	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07	62.07 (lb/lb-mole)
Compound Vapor Pressures (Pva)														
Ethylene Glycol	(mmHg)	0.0149	0.0174	0.0292	0.0494	0.0801	0.1213	0.1485	0.1362	0.0953	0.0546	0.0326	0.019	0.066542 (avg)
Working Loss Calculations (Uncontrolled)														
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (average)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (average)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (average)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (average)
pC	(psia)	3.00E-04	3.00E-04	6.00E-04	0.001	0.0015	0.0023	0.0029	0.0026	0.0018	0.0011	6.00E-04	4.00E-04	1.28E-03 (average)
pNc	(psia)	14.5722	14.5722	14.5719	14.5715	14.571	14.5702	14.5696	14.5699	14.5707	14.5714	14.5719	14.5721	14.57122 (average)
pVa	(psia)	3.00E-04	3.00E-04	6.00E-04	0.001	0.0015	0.0023	0.0029	0.0026	0.0018	0.0011	6.00E-04	4.00E-04	1.28E-03 (average)
hVo	(ft)	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137 (average)
Vv	(ft^3)	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569 (average)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0737	0.073	0.0733	0.0744	0.0762	0.0779	0.0796	0.076508 (average)
kE	(number)	0.0233	0.0274	0.0332	0.0391	0.0413	0.0411	0.0397	0.0369	0.0349	0.0329	0.0251	0.021	0.032992 (average)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (average)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (average)
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
n	(number)	1.0192	0.9205	1.0192	0.9863	1.0192	0.9863	1.0192	1.0192	0.9863	1.0192	0.9863	1.0192	12.0001 (sum)
Compound Vapor Density (vW(i))														
Ethylene Glycol	(lb/ft^3)	3.40E-06	3.96E-06	6.49E-06	1.07E-05	1.70E-05	2.53E-05	3.08E-05	2.83E-05	2.01E-05	1.18E-05	7.22E-06	4.30E-06	1.41E-05 (avg)
Working Losses (Lw)														
Air	(lb)	4.3369	3.8923	4.2198	3.996	4.0456	3.846	3.9393	3.9541	3.8861	4.1119	4.0653	4.2941	48.5874 (sum)
Ethylene Glycol	(lb)	2.00E-04	2.00E-04	4.00E-04	6.00E-04	9.00E-04	0.0013	0.0017	0.0015	0.0011	6.00E-04	4.00E-04	2.00E-04	9.10E-03 (sum)
Breathing Loss Calculations (Uncontrolled)														
tan	(°R)	480.87	482.97	491.67	500.87	510.77	520.27	525.27	523.97	516.17	504.27	495.77	486.27	503.2617 (avg)
taa	(°R)	488.22	490.92	500.82	511.27	521.47	530.57	535.37	533.72	526.07	514.32	504.02	493.27	512.5033 (avg)
tax	(°R)	495.57	498.87	509.97	521.67	532.17	540.87	545.47	543.47	535.97	524.37	512.27	500.27	521.745 (avg)
tLn	(°F)	26.2578	28.8623	38.4849	48.6463	58.8464	68.1642	73.0123	71.3878	63.5422	51.5831	41.7526	31.3834	50.16028 (avg)
tLa	(°F)	29.6088	32.7413	43.1801	54.1927	64.7897	74.1836	78.9011	76.8843	68.6939	56.3522	45.446	34.4819	54.95463 (avg)
tLx	(°F)	32.9598	36.6204	47.8754	59.7391	70.733	80.203	84.7898	82.3809	73.8456	61.1213	49.1393	37.5803	59.74899 (avg)
i	(Btu/ft²day)	622.801	877.2515	1194.204	1525.1169	1758.628	1931.54	1882.997	1667.254	1349.349	1001.304	644.6926	518.7364	1247.823 (avg)
tb	(°R)	488.6871	491.5779	501.7157	512.4138	522.789	532.0187	536.7822	534.9704	527.082	515.071	504.5035	493.6591	513.4392 (avg)
pC	(psia)	3.00E-04	3.00E-04	6.00E-04	0.001	0.0015	0.0023	0.0029	0.0026	0.0018	0.0011	6.00E-04	4.00E-04	1.28E-03 (avg)
pNc	(psia)	14.5722	14.5722	14.5719	14.5715	14.571	14.5702	14.5696	14.5699	14.5707	14.5714	14.5719	14.5721	14.57122 (avg)
pVa	(psia)	3.00E-04	3.00E-04	6.00E-04	0.001	0.0015	0.0023	0.0029	0.0026	0.0018	0.0011	6.00E-04	4.00E-04	1.28E-03 (avg)
dPv	(psia)	9.89E-05	1.00E-04	3.00E-04	5.00E-04	8.00E-04	0.0012	0.0015	0.0013	8.00E-04	5.00E-04	2.00E-04	1.00E-04	6.17E-04 (avg)
dPb	(psia)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06 (avg)
dTv	(°R)	13.404	15.5163	18.781	22.1856	23.7731	24.0777	23.555	21.9863	20.6067	19.0765	14.7735	12.3937	19.17745 (avg)
hVo	(ft)	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137	1.4137 (avg)
ks	(number)	1	1	1	0.9999	0.9999	0.9998	0.9998	0.9998	0.9999	0.9999	1	1	0.999917 (avg)
Vv	(ft^3)	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569	30.5569 (avg)
wVnc	(number)	0.0804	0.0799	0.0782	0.0765	0.075	0.0737	0.073	0.0733	0.0744	0.0762	0.0779	0.0796	0.076508 (avg)
kE	(number)	0.0233	0.0274	0.0332	0.0391	0.0413	0.0411	0.0397	0.0369	0.0349	0.0329	0.0251	0.021	0.032992 (avg)
tv	(°R)	489.7614	493.0912	503.7757	515.0447	525.8226	535.3506	540.0304	537.8465	529.4096	516.7982	505.6156	494.5539	515.5917 (avg)
pix	(psia)	3.00E-04	4.00E-04	7.00E-04	0.0012	0.002	0.003	0.0037	0.0033	0.0023	0.0013	8.00E-04	4.00E-04	1.62E-03 (avg)
pin	(psia)	2.00E-04	3.00E-04	4.00E-04	7.00E-04	0.0012	0.0018	0.0022	0.0021	0.0015	8.00E-04	5.00E-04	3.00E-04	1.00E-03 (avg)
Compound Vapor Density (wV(i))														
Ethylene Glycol	(lb/ft^3)	3.40E-06	3.96E-06	6.49E-06	1.07E-05	1.70E-05	2.53E-05	3.08E-05	2.83E-05	2.01E-05	1.18E-05	7.22E-06	4.30E-06	1.41E-05 (avg)
Breathing Losses (Ls)														
Air	(lb)	1.773	1.8726	2.4634	2.7426	2.9313	2.7732	2.747	2.5648	2.384	2.3739	1.7948	1.5811	28.0017 (sum)
Ethylene Glycol	(lb)	7.49E-05	9.27E-05	2.00E-04	4.00E-04	7.00E-04	0.001	0.0012	0.001	6.00E-04	4.00E-04	2.00E-04	8.55E-05	5.95E-03 (sum)
Total Losses (Lt)														
Air	(lb)	6.1099	5.7649	6.6831	6.7386	6.9769	6.6192	6.6862	6.519	6.2701	6.4858	5.8601	5.8752	76.589 (sum)
Ethylene Glycol	(lb)	3.00E-04	3.00E-04	6.00E-04	9.00E-04	0.0016	0.0023	0.0028	0.0025	0.0017	0.001	5.00E-04	3.00E-04	1.48E-02 (sum)
														1.48E-02

Activity Title	TK-RS (1-6) Resin Tank From 1/1/2021 to 12/31/2021
Climate:	Pennsylvania, Harrisburg
pa	14.5725 psia
Equipment Tag	TK-RS (1-6) Resin Tank
Storage Vessel Style	Cone Roof Storage
Calculation Type	Isothermal Storage Tank (11/2019 Rev.) Working Loss Calculation
Void Space Volume	17592.22 gal
Working Volume	13314 gal
Working Volume	1779.8229 ft^3
Shell Diameter	11.41 ft
Straight Side Height	23 ft
Hro	0 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0
pbv	0
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents 8796.110 gal 68.000 °F 73359.990 lb 4056.247 lb-M

Mixture Name: Rockwool Resin

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
Formaldehyde	3003.344	144.869	0.001975	4.8241	0.001189	1	3.5719
Methanol	93.743	40.6671	0.000554	1.2693	0.000313	1	0.0293
Phenol	0	259.1744	0.003533	2.7539	0.000679	1	0
Water	17.3515	72915.279	0.993938	4047.3995	0.997819	1	17.3136

Kp (product factor)	1	
Hl	11.5 ft	

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	161543.3	145910.071	161543.3	156332.2192	161543.3	156332.2	161543.3	161543.3	156332.2	161543.3	156332.2	161543.3	1902042 (sum)
Vq	(ft^3)	21595.2	19505.3393	21595.2	20898.5778	21595.2	20898.58	21595.2	21595.2	20898.58	21595.2	20898.58	21595.2	254266 (sum)
N (period)	(number)	12.1333	10.9591	12.1333	11.7419	12.1333	11.7419	12.1333	12.1333	11.7419	12.1333	11.7419	12.1333	142.8598 (sum)
N (scaled to annual)	(number)	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	142.8603	
Kn	(number)	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Formaldehyde	(Mv)	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03	30.03 (lb/lb-mol
Methanol	(Mv)	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04	32.04 (lb/lb-mol
Phenol	(Mv)	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128	94.1128 (lb/lb-mol
Water	(Mv)	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153	18.0153 (lb/lb-mol
Working Loss Calculations (Uncontrolled)														
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767	0.3767 (average)
n	(number)	12.1333	10.9591	12.1333	11.7419	12.1333	11.7419	12.1333	12.1333	11.7419	12.1333	11.7419	12.1333	142.8598 (sum)
Compound Vapor Density (vW(i))														
Formaldehyde	(lb/ft^3)	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04	4.00E-04 (avg)
Methanol	(lb/ft^3)	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06	3.21E-06 (avg)
Phenol	(lb/ft^3)	0	0	0	0	0	0	0	0	0	0	0	0	0 (avg)
Water	(lb/ft^3)	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011 (avg)
Working Losses (Lw)														
Air	(lb)	589.4531	532.4092	589.4531	570.4385	589.4531	570.4385	589.4531	589.4531	570.4385	589.4531	570.4385	589.4531	6940.335 (sum)
Formaldehyde	(lb)	2.9796	2.6912	2.9796	2.8835	2.9796	2.8835	2.9796	2.9796	2.8835	2.9796	2.8835	2.9796	35.0824 (sum)
Methanol	(lb)	0.0261	0.0236	0.0261	0.0253	0.0261	0.0253	0.0261	0.0261	0.0253	0.0261	0.0253	0.0261	0.3075 (sum)
Phenol	(lb)	0	0	0	0	0	0	0	0	0	0	0	0	0 (sum)
Water	(lb)	8.6642	7.8257	8.6642	8.3847	8.6642	8.3847	8.6642	8.6642	8.3847	8.6642	8.3847	8.6642	102.0139 (sum)
Total Losses (Lt)														
Air	(lb)	589.4531	532.4092	589.4531	570.4385	589.4531	570.4385	589.4531	589.4531	570.4385	589.4531	570.4385	589.4531	6940.335 (sum)
Formaldehyde	(lb)	2.9796	2.6912	2.9796	2.8835	2.9796	2.8835	2.9796	2.9796	2.8835	2.9796	2.8835	2.9796	35.0824 (sum)
Methanol	(lb)	0.0261	0.0236	0.0261	0.0253	0.0261	0.0253	0.0261	0.0261	0.0253	0.0261	0.0253	0.0261	0.3075 (sum)
Phenol	(lb)	0	0	0	0	0	0	0	0	0	0	0	0	0 (sum)
Water	(lb)	8.6642	7.8257	8.6642	8.3847	8.6642	8.3847	8.6642	8.6642	8.3847	8.6642	8.3847	8.6642	102.0139 (sum)
														137.4038

Activity Title	TK-TO1 Thermal Oil Expansion Tank From 1/1/2021 to 12/31/2021
Climate:	N/A
pa	N/A
Equipment Tag	TK-TO1 Thermal Oil Expansion Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Isothermal Storage Tank (11/2019 Rev.) Working Loss Calculation
Void Space Volume	343.7 gal
Working Volume	212 gal
Working Volume	28.3403 ft^3
Shell Diameter	3 ft
Straight Side Height	6.5 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0
pbv	0
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents 171.850 gal 572.000 °F 1266.361 lb 6.528 lb-M

Mixture Name: Mixture

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
Paratherm	474.4084	1266.3606	1	6.5276	1	1	474.4084

Kp (product factor) 1

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	15.2877	13.8082	15.2877	14.7945	15.2877	14.7945	15.2877	15.2877	14.7945	15.2877	14.7945	15.2877	180.0001 (sum)
Vq	(ft^3)	2.0437	1.8459	2.0437	1.9777	2.0437	1.9777	2.0437	2.0437	1.9777	2.0437	1.9777	2.0437	24.0626 (sum)
N (period)	(number)	0.0721	0.0651	0.0721	0.0698	0.0721	0.0698	0.0721	0.0721	0.0698	0.0721	0.0698	0.0721	0.849 (sum)
N (scaled to annual)	(number)	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	0.8491	
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Paratherm	(Mv)	194	194	194	194	194	194	194	194	194	194	194	194	194 (lb/lb-mol
Working Loss Calculations (Uncontrolled)														
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
n	(number)	0.0721	0.0651	0.0721	0.0698	0.0721	0.0698	0.0721	0.0721	0.0698	0.0721	0.0698	0.0721	0.849 (sum)
Compound Vapor Density (vW(i))														
Paratherm	(lb/ft^3)	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608 (avg)
Working Losses (Lw)														
Air	(lb)	0.0295	0.0267	0.0295	0.0286	0.0295	0.0286	0.0295	0.0295	0.0286	0.0295	0.0286	0.0295	0.3476 (sum)
Paratherm	(lb)	0.3285	0.2967	0.3285	0.3179	0.3285	0.3179	0.3285	0.3285	0.3179	0.3285	0.3179	0.3285	3.8678 (sum)
Total Losses (Lt)														
Air	(lb)	0.0295	0.0267	0.0295	0.0286	0.0295	0.0286	0.0295	0.0295	0.0286	0.0295	0.0286	0.0295	0.3476 (sum)
Paratherm	(lb)	0.3285	0.2967	0.3285	0.3179	0.3285	0.3179	0.3285	0.3285	0.3179	0.3285	0.3179	0.3285	3.8678 (sum)
														3.8678

Activity Title	TK-TO2 Thermal Oil Drain Tank From 1/1/2021 to 12/31/2021
Climate:	N/A
pa	N/A
Equipment Tag	TK-TO2 Thermal Oil Drain Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Isothermal Storage Tank (11/2019 Rev.)
	Working Loss Calculation
Void Space Volume	343.7 gal
Working Volume	159 gal
Working Volume	21.2552 ft^3
Shell Diameter	3 ft
Straight Side Height	6.5 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0
pbv	0
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.
Pi (constant)	3.1416
R (constant)	998.9

Vessel Contents 171.850 gal 572.000 °F 1266.361 lb 6.528 lb-M

Mixture Name: Mixture

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
Paratherm	474.4084	1266.3606	1	6.5276	1	1	474.4084

Kp (product factor) 1

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Q	(gal)	15.2877	13.8082	15.2877	14.7945	15.2877	14.7945	15.2877	15.2877	14.7945	15.2877	14.7945	15.2877	180.0001	(sum)
Vq	(ft^3)	2.0437	1.8459	2.0437	1.9777	2.0437	1.9777	2.0437	2.0437	1.9777	2.0437	1.9777	2.0437	24.0626	(sum)
N (period)	(number)	0.0961	0.0868	0.0961	0.093	0.0961	0.093	0.0961	0.0961	0.093	0.0961	0.093	0.0961	1.1315	(sum)
N (scaled to annual)	(number)	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321	1.1321		
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365	(sum)
Compound Molecular Weights (lb/lb-M)															
Paratherm	(Mv)	194	194	194	194	194	194	194	194	194	194	194	194	194	(lb/lb-mol
Working Loss Calculations (Uncontrolled)															
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1	(average)
n	(number)	0.0961	0.0868	0.0961	0.093	0.0961	0.093	0.0961	0.0961	0.093	0.0961	0.093	0.0961	1.1315	(sum)
Compound Vapor Density (vW(i))															
Paratherm	(lb/ft^3)	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	0.1608	(avg)
Working Losses (Lw)															
Air	(lb)	0.0295	0.0267	0.0295	0.0286	0.0295	0.0286	0.0295	0.0295	0.0286	0.0295	0.0286	0.0295	0.3476	(sum)
Paratherm	(lb)	0.3285	0.2967	0.3285	0.3179	0.3285	0.3179	0.3285	0.3285	0.3179	0.3285	0.3179	0.3285	3.8678	(sum)
Total Losses (Lt)															
Air	(lb)	0.0295	0.0267	0.0295	0.0286	0.0295	0.0286	0.0295	0.0295	0.0286	0.0295	0.0286	0.0295	0.3476	(sum)
Paratherm	(lb)	0.3285	0.2967	0.3285	0.3179	0.3285	0.3179	0.3285	0.3285	0.3179	0.3285	0.3179	0.3285	3.8678	(sum)
														3.8678	

Activity Title	TK-TO3 Thermal Oil Tank From 1/1/2021 to 12/31/2021
Climate:	N/A
pa	N/A
Equipment Tag	TK-TO3 Thermal Oil Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Isothermal Storage Tank (11/2019 Rev.) Working Loss Calculation
Void Space Volume	5309.44 gal
Working Volume	5283 gal
Working Volume	706.2344 ft^3
Shell Diameter	6.56 ft
Straight Side Height	21 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0
pbv	0
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.
PI (constant)	3.1416
R (constant)	998.9

Vessel Contents 2654.720 gal 392.000 °F 19562.601 lb 100.698 lb-M

Mixture Name: Mixture

	[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
	Power Steering Flui	113.8539	19562.6005	1	100.698	1	1	113.8539

Kp (product factor) 1

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	59.2822	53.5452	59.2822	57.3699	59.2822	57.3699	59.2822	59.2822	57.3699	59.2822	57.3699	59.2822	698.0002 (sum)
Vq	(ft^3)	7.9249	7.158	7.9249	7.6692	7.9249	7.6692	7.9249	7.9249	7.6692	7.9249	7.6692	7.9249	93.3091 (sum)
N (period)	(number)	0.0112	0.0101	0.0112	0.0109	0.0112	0.0109	0.0112	0.0112	0.0109	0.0112	0.0109	0.0112	0.1321 (sum)
N (scaled to annual)	(number)	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	0.1321	
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Power Steering Fluid	(Mv)	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27 (lb/lb-mol
Working Loss Calculations (Uncontrolled)														
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
n	(number)	0.0112	0.0101	0.0112	0.0109	0.0112	0.0109	0.0112	0.0112	0.0109	0.0112	0.0109	0.0112	0.1321 (sum)
Compound Vapor Density (vW(i))														
Power Steering Fluid	(lb/ft^3)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468 (avg)
Working Losses (Lw)														
Air	(lb)	0.3139	0.2835	0.3139	0.3037	0.3139	0.3037	0.3139	0.3139	0.3037	0.3139	0.3037	0.3139	3.6956 (sum)
Power Steering Fluid	(lb)	0.3709	0.335	0.3709	0.3589	0.3709	0.3589	0.3709	0.3709	0.3589	0.3709	0.3589	0.3709	4.3669 (sum)
Total Losses (Lt)														
Air	(lb)	0.3139	0.2835	0.3139	0.3037	0.3139	0.3037	0.3139	0.3139	0.3037	0.3139	0.3037	0.3139	3.6956 (sum)
Power Steering Fluid	(lb)	0.3709	0.335	0.3709	0.3589	0.3709	0.3589	0.3709	0.3709	0.3589	0.3709	0.3589	0.3709	4.3669 (sum)
														4.3669

Activity Title	TK-TO4 Thermal Oil Expansion Tank From 1/1/2021 to 12/31/2021
Climate:	N/A
pa	N/A
Equipment Tag	TK-TO4 Thermal Oil Expansion Tank
Storage Vessel Style	Horizontal Storage
Calculation Type	Isothermal Storage Tank (11/2019 Rev.) Working Loss Calculation
Void Space Volume	2096.26 gal
Working Volume	1928 gal
Working Volume	257.7361 ft^3
Shell Diameter	5.249 ft
Straight Side Height	12.95 ft
Paint Solar Absorptance	0.25
Roof Color / Condition	white / average
Shell Color / Condition	white / average
pbp	0
pbv	0
Equipment Comment	
Activity Comment	Imported from Excel on 2:55:56 PM, 5/19/2022.
PI (constant)	3.1416
R (constant)	998.9

Vessel Contents 1048.130 gal 392.000 °F 7723.658 lb 39.757 lb-M

Mixture Name: Mixture

[Liquid]	mmHg	lb	W[i]	lb-M	X[i]	A[i]	X*Pi*Ai (mmHg)
Power Steering Flui	113.8539	7723.6577	1	39.7573	1	1	113.8539

Kp (product factor) 1

Month		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Q	(gal)	59.2822	53.5452	59.2822	57.3699	59.2822	57.3699	59.2822	59.2822	57.3699	59.2822	57.3699	59.2822	698.0002 (sum)
Vq	(ft^3)	7.9249	7.158	7.9249	7.6692	7.9249	7.6692	7.9249	7.9249	7.6692	7.9249	7.6692	7.9249	93.3091 (sum)
N (period)	(number)	0.0307	0.0278	0.0307	0.0298	0.0307	0.0298	0.0307	0.0307	0.0298	0.0307	0.0298	0.0307	0.3619 (sum)
N (scaled to annual)	(number)	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	0.362	
Kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (avg)
Days	(number)	31	28	31	30	31	30	31	31	30	31	30	31	365 (sum)
Compound Molecular Weights (lb/lb-M)														
Power Steering Fluid	(Mv)	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27	194.27 (lb/lb-mol
Working Loss Calculations (Uncontrolled)														
kb	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
kn	(number)	1	1	1	1	1	1	1	1	1	1	1	1	1 (average)
n	(number)	0.0307	0.0278	0.0307	0.0298	0.0307	0.0298	0.0307	0.0307	0.0298	0.0307	0.0298	0.0307	0.3619 (sum)
Compound Vapor Density (vW(i))														
Power Steering Fluid	(lb/ft^3)	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468	0.0468 (avg)
Working Losses (Lw)														
Air	(lb)	0.3139	0.2835	0.3139	0.3037	0.3139	0.3037	0.3139	0.3139	0.3037	0.3139	0.3037	0.3139	3.6956 (sum)
Power Steering Fluid	(lb)	0.3709	0.335	0.3709	0.3589	0.3709	0.3589	0.3709	0.3709	0.3589	0.3709	0.3589	0.3709	4.3669 (sum)
Total Losses (Lt)														
Air	(lb)	0.3139	0.2835	0.3139	0.3037	0.3139	0.3037	0.3139	0.3139	0.3037	0.3139	0.3037	0.3139	3.6956 (sum)
Power Steering Fluid	(lb)	0.3709	0.335	0.3709	0.3589	0.3709	0.3589	0.3709	0.3709	0.3589	0.3709	0.3589	0.3709	4.3669 (sum)
														4.3669