MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

March 3, 2022

PERMIT TO INSTALL
132-19B

ISSUED TO
Knauf Insulation, Inc.

LOCATED AT
1000 East North Street
Albion, Michigan 49224

IN THE COUNTY OF
Calhoun

STATE REGISTRATION NUMBER
B7205

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **February 8, 2022**	
DATE PERMIT TO INSTALL APPROVED: **March 3, 2022**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig.

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H_2S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO_x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal condition or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EU-WBW3ALBFORMING	Non-resinated fiberglass forming and collection process fed by EU-FURNACE#1 consisting of natural gas-fired dual module forming section with one forming/fan zone, and three product fiberizers in each module. The process is equipped with a wet scrubber for each module followed by a shared wet electrostatic precipitator for control. Fluids, including de-dusting agent, are applied at various locations in the process. The product bagging process is controlled by two dust collectors that exhaust inside the building. The process includes cooling towers #2 and #3 which are equipped with drift eliminators. (PTI No. 132-19B)	11/18/2021	NA
EU-COOLTOWER	1,600 gallon per minute cooling tower equipped with drift eliminators. (PTI Nos. 26-15D and 132-19B)	01/01/2016	FGCOOLTOWERS
EU-COOLTOWER2	975 gallon per minute cooling tower equipped with drift eliminators. (PTI No. 132-19B)	11/18/2021	FG-COOLTOWERS
EU-COOLTOWER3	975 gallon per minute cooling tower equipped with drift eliminators. (PTI No. 132-19B)	11/18/2021	FG-COOLTOWERS

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

EU-WBW3ALBFORMING
EMISSION UNIT CONDITIONS

DESCRIPTION

Non-resinated fiberglass forming and collection process fed by EU-FURNACE#1 consisting of natural gas-fired dual module forming section with one forming/fan zone and three product fiberizers in each module. The process is equipped with a wet scrubber for each module followed by a shared wet electrostatic precipitator for control. Fluids, including de-dusting agent, are applied at various locations in the process. The product bagging process is controlled by two dust collectors that exhaust inside the building. (PTI No. 132-19B)

Flexible Group ID: NA

POLLUTION CONTROL EQUIPMENT

Two wet scrubbers in parallel followed by a wet electrostatic precipitator. The product bagging process is controlled by two dust collectors that exhaust inside the building.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. PM2.5	2.34 lb/ton of glass pulled	Hourly	EU-WBW3ALBFORMING	SC V.2, VI.1, VI.3, VI.4	40 CFR 52.21(c) & (d)
2. PM10	2.34 lb/ton of glass pulled	Hourly	EU-WBW3ALBFORMING	SC V.2, VI.1, VI.3, VI.4	40 CFR 52.21(c) & (d)
3. PM[a]	2.34 lb/ton glass pulled	Hourly	EU-WBW3ALBFORMING	SC V.2, VI.1, VI.3, VI.4	R 336.1331
4. PM[a]	11.00 lb/ton glass pulled	2-hour average	EU-WBW3ALBFORMING	SC V.2, VI.1, VI.3, VI.4	40 CFR 60 Subpart PPP
5. VOC	43.74 tpy	12-month rolling time period as determined at the end of each calendar month	EU-WBW3ALBFORMING	SC V.1, VI.1, VI.2, VI.3, VI.4	R 336.1702(a)

[a] Compliance with R 336.1331 and 40 CFR 60 Subpart PPP will be evaluated using PM10 as a surrogate for total particulate and on a dry gas basis.

II. MATERIAL LIMIT(S)

1. The permittee shall not use more than 0.17 pounds of de-dusting agent per pound of glass pulled in EU-WBW3ALBFORMING based on a calendar day average. **(R336.1702(a))**

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall not pull more than 110 tons of glass in EU-WBW3ALBFORMING per calendar day. The amount of glass pulled shall be determined in accordance with the methodology set forth in Appendix 7. **(R 336.1225, R 336.1702(a), 40 CFR 52.21(a) & (d))**

2. The permittee shall not pull more than 40,150 tons of glass in EU-WBW3ALBFORMING per 12-month rolling time period as determined at the end of each calendar month. The amount of glass pulled shall be determined in accordance with the methodology set forth in Appendix 7. **(R 336.1225, R 336.1702(a), 40 CFR 52.21(a) & (d))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The permittee shall not operate EU-WBW3ALBFORMING unless the wet scrubber control systems are installed, maintained, and operated in a satisfactory manner. Satisfactory operation of each wet scrubber control system is demonstrated by maintaining the pressure drop and liquid flow rate within 70 percent or more of the lowest value and 130 percent or less of the highest value of each monitored operating parameter recorded during the most recent applicable performance test. **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

2. The permittee shall install, calibrate, maintain and operate in a satisfactory manner, devices to monitor and record the following operating parameters of each EU-WBW3ALBFORMING wet scrubber control system on a continuous basis: **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d) , 40 CFR 60 Subpart PPP)**
   a) Differential pressure, certified to monitor within +/- one inch of water gauge over its operating range.
   b) Scrubber liquid flow, certified to monitor within +/- 5 percent over its operating range.

3. The permittee shall not operate EU-WBW3ALBFORMING unless the wet electrostatic precipitator control system is installed, maintained, and operated in a satisfactory manner. Satisfactory operation of the wet electrostatic precipitator control system is demonstrated by maintaining the primary and secondary current and voltage in each electrical field and the inlet water flow rate within 70 percent or more of the lowest value and 130 percent or less of the highest value of each monitored operating parameter recorded during the most recent applicable performance test, and the total solids content of the water entering the control device no greater than 2 percent by weight. If the USEPA approves maintaining the secondary voltage, rather than the primary and secondary current and the voltage, as an alternative under 40 CFR Part 60 Subpart PPP, the permittee shall maintain the secondary volts (kV) and the water flow rate within 70 percent or more of the lowest value and 130 percent or less of the highest value of each monitored operating parameter recorded during the most recent applicable performance test, and the total solids content of the water entering the control device no greater than 2 percent by weight. **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

4. The permittee shall install, calibrate, maintain and operate in a satisfactory manner, devices to monitor and record the following operating parameters of the EU-WBW3ALBFORMING wet electrostatic precipitator control system on a continuous basis: **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**
   a) Primary current (amperes) in each electrical field, certified to monitor within +/- 5 percent over its operating range.
   b) Secondary current (amperes) in each electrical field, certified to monitor within +/- 5 percent over its operating range.
   c) Voltage in each electrical field, certified to monitor within +/- 5 percent over its operating range.
   d) Inlet water flow rate, certified to monitor within +/- 5 percent over its operating range.

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The VOC content and density of any raw material used in EU-WBW3ALBFORMING shall be determined using federal Reference Test Method 24, manufacturer's formulation data, or alternative test methodology approved by the AQD District Supervisor. **(R 336.1225, R 336.1702(a), R 336.2001, R 336.2003, R 336.2004, R 336.2040(5))**

2. Within 180 days after commencement of trial operation, the permittee shall verify PM, PM10, and PM2.5 emission rates from EU-WBW3ALBFORMING by testing at owner's expense, in accordance with Department requirements. Testing shall be performed using an approved EPA Method listed in

Pollutant	Test Method Reference
PM	40 CFR Part 60, Appendix A; Part 10 of the Michigan Air Pollution Control Rules
PM10 / PM2.5	40 CFR Part 51, Appendix M

The emission rate during testing shall be determined by the average of the acceptable test runs performed in accordance with the method requirements. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD-approved Test Protocol. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21 (c) & (d), 40 CFR 60 Subpart PPP)**

3. The permittee shall determine the total residue (total solids) content of the water entering the electrostatic precipitator control system once per day using Method 209A, "Total Residue Dried at 103-105 °C," in *Standard Methods for the Examination of Water and Wastewater,* 15th Edition, 1980 (incorporated by reference—see 40 CFR 60.17). Total residue shall be reported as percent by weight. **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall keep, in a satisfactory manner, the following records and emission calculations for EU-WBW3ALBFORMING on file at the facility and make them available to the Department upon request: **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**
   a) Within 30 days of the end of each calendar month, daily weight of glass pulled by EU-WBW3ALBFORMING in tons, as defined in Appendix 7.
   b) Within 30 days of the end of each calendar month, annual weight of glass pulled by EU-WBW3ALBFORMING, as defined in Appendix 7, in tons per 12-month rolling time period as determined at the end of each calendar month.
   c) Within 30 days of the end of each calendar month, weight of de-dusting oil used during each calendar month.
   d) Within 30 days of the end of each calendar month, emission calculations showing the mass VOC emission rate in tons per 12-month rolling time period as determined at the end of each calendar month. Calculations shall be performed based on the methodology outlined in Appendix 7.
   e) Log of wet scrubber control system alarms. At a minimum, the log shall identify the control device and include the time, date, duration, probable causes or reasons for the system alarm, and a description of any corrective measures taken. For purposes of this condition, alarms are defined as any operating parameter monitoring data less than 70 percent of the lowest value or greater than 130 percent of the highest value of each parameter recorded during the most recent performance test.
   f) Records of the wet scrubber control system operating parameters, specified in SC IV.2, at 30-minute intervals during each 2-hour test run of each performance test and at least once every 4 hours thereafter.
   g) Log of wet electrostatic precipitator control system alarms. At a minimum, the log shall identify the control device and include the time, date, duration, probable causes or reasons for the system alarm, and a description of any corrective measures taken. For purposes of this condition, alarms are defined as any operating parameter monitoring data less than 70 percent of the lowest value or greater than 130 percent of the highest value of each parameter recorded during the most recent performance test.
   h) Records of the wet electrostatic precipitator control system operating parameters, specified in SC IV.4, at 30-minute intervals during each 2-hour test run of each performance test of the wet electrostatic precipitator control system and at least once every 4 hours thereafter, as defined in 40 CFR 60 Subpart PPP, with the exception of water solids content which shall be recorded during each performance test and once per day thereafter.

2. The permittee shall maintain a current listing from the manufacturer of the chemical composition of each raw material used on EU-WBW3ALBFORMING, including the weight percent of each component. The data may consist of Safety Data Sheets, manufacturer's formulation data, or both. The permittee shall keep all records on file at the facility and make them available to the Department upon request. **(R 336.1225, R 336.1702(a))**

3. The permittee shall continuously monitor the pressure drop and liquid flow rate of each EU-WBW3ALBFORMING scrubber and shall record the pressure drop and liquid flow rate of each scrubber every four hours during process operation. Each monitor shall be calibrated once per calendar quarter. **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

4. The permittee shall continuously monitor the primary and secondary current and the voltage in each electrical field and the inlet water flow rate of the wet electrostatic precipitator control system and shall record each of these parameters every four hours during process operation. If the USEPA approves monitoring the secondary voltage, rather than monitoring the primary and secondary current and the voltage, as an alternative under 40 CFR Part 60 Subpart PPP, the permittee shall continuously monitor the secondary voltage in each electrical field and the inlet water flow rate of the wet electrostatic precipitator control system and shall record each of these parameters every four hours during process operation. Each monitor shall be calibrated once per calendar quarter. If the USEPA approves less frequent calibration as an alternative under 40 CFR Part 60 Subpart PPP, the monitor shall be calibrated in accord with the USEPA approval, but no less frequently than annually. **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

5. The permittee shall keep, in a satisfactory manner, records of the concentration of total residue in the water entering the electrostatic precipitator control system once during each performance test and once per day thereafter. The permittee shall keep all records on file at the facility and make them available to the Department upon request: **(R 336.1331, R 336.1702(a), R 336.1910, 40 CFR 52.21(c) & (d), 40 CFR 60 Subpart PPP)**

6. The permittee shall calculate and keep records of the annual emissions of PM2.5 and PM10 from EU-WBW3ALBFORMING described in Appendix A, in tons per calendar year. Calculations and record keeping shall begin upon issuance of Permit to Install 132-19B and shall continue for five (5) years. **(R 336.2818, 40 CFR 52.21(r)(6)(c)(iii))**

See Appendix 7

VII. REPORTING

1. The permittee shall submit semi-annual reports of exceedances of control device operating parameters required to be monitored in SC IV.2, per 40 CFR 60.684(d). For purposes of these reports, exceedances are defined as any monitoring data that are less than 70 percent of the lowest value or greater than 130 percent of the highest value of each parameter recorded during the most recent performance test on a 4-hour average, with the exception of water solids content for which exceedances are defined as any monitoring data that are greater than 2 percent by weight. **(40 CFR Part 60 Subpart PPP)**

2. Within 30 days after completion of the installation, construction, reconstruction, relocation, or modification authorized by this Permit to Install, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the completion of the activity. Completion of the installation, construction, reconstruction, relocation, or modification is considered to occur not later than commencement of trial operation of EU-WBW3ALBFORMING. **(R 336.1201(7)(a))**

3. The permittee shall submit records of the annual emission of PM2.5 and PM10 from EU-WBW3ALBFORMING described in Appendix A, in tons per calendar year, to the AQD Permit Section Supervisor within 75 days following the end of each reporting year if both the following occur:

a) The calendar year actual emissions of PM10 and PM2.5 exceed the baseline actual emissions (BAE) by a significant amount, and

b) The calendar year actual emissions differ from the pre-construction projection. The report shall contain the name, address, and telephone number of the facility (major stationary source); the annual emissions as calculated pursuant to SC VI.5, and any other information the owner or operator wishes to include (i.e., an explanation why emissions differ from the pre-construction projection). **(R 336.2818, 40 CFR 52.21(r)(6)(c)(iii))**

4. The permittee shall submit, within 30 days of receipt, all USEPA approvals of alternative monitoring and calibration requirements under 40 CFR Part 60 Subpart PPP. **(40 CFR Part 60 Subpart PPP)**

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-WBW3ALBFORMING	72	170	R 336.1225, 40 CFR 52.21 (c) & (d)

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with all provisions of the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60 Subparts A and PPP, as they apply to EU-WBW3ALBFORMING. **(40 CFR Part 60 Subparts A & PPP)**

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

FLEXIBLE GROUP SPECIAL CONDITIONS

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FG-COOLTOWERS	Three cooling towers, each equipped with drift eliminators. (PTI Nos. 26-15D and 132-19B)	EU-COOLTOWER EU-COOLTOWER2 EU-COOLTOWER3

FG-COOLTOWERS
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

Three cooling towers. (PTI Nos. 26-15D and 132-19B)

Emission Unit: EU-COOLTOWER, EU-COOLTOWER2, EU-COOLTOWER3

POLLUTION CONTROL EQUIPMENT

Drift eliminators.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period/Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. PM	0.39 tpy	12-month rolling time period as determined at the end of each calendar month.	EU-COOLTOWER	SC VI.6	R 336.1331(c) R 336.2810
2. PM10	0.39 tpy	12-month rolling time period as determined at the end of each calendar month.	EU-COOLTOWER	SC VI.6	R 336.2803 R 336.2804 R 336.2810
3. PM2.5	0.39 tpy	12-month rolling time period as determined at the end of each calendar month.	EU-COOLTOWER	SC VI.6	R 336.2803 R 336.2804 R 336.2810
4. PM	0.019 pph	Hourly	EU-COOLTOWER2	SC V.2	40 CFR 52.21(c) & (d)
5. PM10	0.019 pph	Hourly	EU-COOLTOWER2	SC V.2	40 CFR 52.21(c) & (d)
6. PM2.5	0.019 pph	Hourly	EU-COOLTOWER2	SC V.2	40 CFR 52.21(c) & (d)
7. PM	0.019 pph	Hourly	EU-COOLTOWER3	SC V.2	40 CFR 52.21(c) & (d)
8. PM10	0.019 pph	Hourly	EU-COOLTOWER3	SC V.2	40 CFR 52.21(c) & (d)
9. PM2.5	0.019 pph	Hourly	EU-COOLTOWER3	SC V.2	40 CFR 52.21(c) & (d)

II. MATERIAL LIMIT(S)

Material	Limit	Time Period/Operating Scenario	Equipment	Monitoring/ Testing Method	Underlying Applicable Requirements
1. Total Dissolved Solids (TDS) Content of the Circulating Water	2,200 ppmw[2]	Monthly as determined based upon monthly parameter monitoring.	EU-COOLTOWER	SC VI.4, SC VI.5	R 336.2810
2. TDS Content of the Circulating Water	1,980 ppmw	Monthly as determined based upon monthly parameter monitoring.	EU-COOLTOWER2	SC VI.4, SC VI.5	40 CFR 52.21(c) & (d)
3. TDS Content of the Circulating Water	1,980 ppmw	Monthly as determined based upon monthly parameter monitoring.	EU-COOLTOWER3	SC VI.4, SC VI.5	40 CFR 52.21(c) & (d)

III. PROCESS/OPERATIONAL RESTRICTION(S)

1. The permittee shall comply with the submitted inspection and maintenance program for EU-COOLTOWER submitted on April 2, 2019. At any time, the permittee may submit a modified program to the AQD District Supervisor for review and approval. **(R 336.1910, R 336.2810)**

2. The permittee shall submit an inspection and maintenance program for EU-COOLTOWER2 and EU-COOLTOWER3 to the AQD District Supervisor within 60 days of permit issuance. After submittal, the permittee shall comply with the inspection and maintenance program for EU-COOLTOWER2 and EU-COOLTOWER3. At any time, the permittee may submit a modified program to the AQD District Supervisor for review and approval. **(40 CFR 52.21(a) & (d))**

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The permittee shall equip and maintain EU-COOLTOWER with mist/drift eliminators with a vendor-certified maximum drift rate of 0.005 percent or less. **(R 336.1910, R 336.2810)**

2. The permittee shall equip and maintain EU-COOLTOWER2 and EU-COOLTOWER3 with mist/drift eliminators with a vendor-certified maximum drift rate of 0.002 percent or less. **(R 336.1910, 40 CFR 52.21(c) & (d))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee may be required to verify drift loss from EU-COOLTOWER by testing, at owner's expense, in accordance with Department requirements. Testing shall be performed using the 2011 version of the Cooling Technology Institute's Acceptable Test Code (ATC) 140, unless the AQD approves use of an alternate method. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1910, R 336.2001, R 336.2003, R 336.2004, R 336.2810)**

2. The permittee may be required to verify drift loss from EU-COOLTOWER2 and/or EU-COOLTOWER3 by testing, at owner's expense, in accordance with Department requirements. Testing shall be performed using the 2011 version of the Cooling Technology Institute's Acceptable Test Code (ATC) 140, unless the AQD approves use of an alternate method. No less than 30 days prior to testing, the permittee shall submit a

complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.1910, R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.1910, R 336.2810, 40 CFR 52.21(c) & (d))**

2. The permittee shall maintain a record of the vendor's certification required in SC IV.1, for the life of EU-COOLTOWER. **(R 336.1910, R 336.2810)**

3. The permittee shall maintain a record of the vendor's certification required in SC IV.2, for the life of EU-COOLTOWER2 and EU-COOLTOWER3. **(R 336.1910, 40 CFR 52.21(c) & (d))**

4. The permittee shall separately monitor and record the following for EU-COOLTOWER, EU-COOLTOWER2 and EU-COOLTOWER3: **(R 336.1910, R 336.2810, 40 CFR 52.21(c) & (d))**

   a) On a monthly basis, parameters needed to determine the TDS content of the circulating water.

   b) On a monthly basis, parameters needed to determine the water recirculation rate.

5. The permittee shall separately calculate and keep records of the TDS in the circulating water for EU-COOLTOWER, EU-COOLTOWER2 and EU-COOLTOWER3on a monthly basis. **(R 336.1910, R 336.2810, 40 CFR 52.21(c) & (d))**

6. The permittee shall calculate and keep records of the PM, PM10, and PM2.5 emission rates from EU-COOLTOWER monthly, for each calendar month and each 12-month rolling time period, as determined at the end of each calendar month, using a method acceptable to the AQD District Supervisor. **(R 336.1331(c), R 336.2803, R 336.2804, R 336.2810)**

7. The permittee shall maintain a record of any maintenance conducted for EU-COOLTOWER, EU-COOLTOWER2, and EU-COOLTOWER3. **(R 336.1910, R 336.2810, 40 CFR 52.21(c) & (d))**

8. The permittee shall keep, in a satisfactory manner, all test reports for EU-COOLTOWER, EU-COOLTOWER2, and EU-COOLTOWER3, as required by SC V.1 and SC V.2, on file at the facility and make them available to the Department upon request. **(R 336.1910, R 336.2001, R 336.2003, R 336.2004, R 336.2810, 40 CFR 52.21(c) & (d))**

VII. REPORTING

NA

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
1. SV-COOLTOWER	126	20	R 336.2803 R 336.2804

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
2. SV-COOLTWR2	120	45.5	40 CFR 52.21 (c) & (d)
3. SV-COOLTWR3	120	45.5	40 CFR 52.21 (c) & (d)

IX. OTHER REQUIREMENT(S)

NA

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).

APPENDIX A Project Emissions

All information in this Appendix shall be maintained pursuant to R 336.2818(3) for 5 years after the emission units identified in Table C resume normal operation.

A. Project Description

Knauf proposes to replace the existing wool fiberglass fiberization technology on line 1 with a modified fiberization technology. This includes installation of EU-COOLTOWER2 and EU-COOLTOWER3.

B. Applicability Test Description

Knauf has demonstrated that the proposed project will not cause a significant emissions increase to the source using a hybrid test. The Project Emissions Change equals the Projected Actual Emissions (PAE) plus the Potential to Emit (PTE) minus the existing units Baseline Actual Emissions (BAE minus the exclude emissions)

C. Emissions Table

Emission Projections				
Pollutant	**Projected Actual Emissions + Potential to Emit (TPY)**	**Baseline Actual Emissions (TPY)***	**Excluded**	
PM2.5	48.97	39.82	0.26	
PM10	54.64	44.35	1.16	
* This includes BAE emissions for the Line 1 emission units that are being removed as part of the project and are included in the Project Emission Accounting analysis.				

D. Netting Calculations and Discussion:

NA

APPENDIX 7

A. The permittee shall use the following calculations in conjunction with monitoring, testing, or recordkeeping data to determine compliance with the applicable requirements referenced in EU-WBW3ALBFORMING.

Glass Pull Rate Calculation Methodology

The glass pull rate shall be calculated as the total rate of molten glass exiting the forehearth minus the glass that is reclaimed as cullet, in terms of pounds per hour.

Pull Rate (lb/hr) = Melt Rate at Forehearth Exit (lb/hr) - Cullet Rate (lb/hr)

B. The permittee shall use the following calculations in conjunction with monitoring, testing, or recordkeeping data to determine compliance with the applicable requirements referenced in EU-WBW3ALBFORMING.

VOC Mass Emission Calculation Methodology for EU-WBW3ALBFORMING

VOC mass emissions from EU-WBW3ALBFORMING shall be calculated as the total mass of VOC entering the process minus the total mass of VOC retained in the final product. The total mass of VOC entering the process shall be determined by multiplying the VOC content (lb/gal) of each raw material used by the quantity (gallons) of raw material used.

VOC Emissions = Mass VOC Entering - Mass VOC Retained

Mass VOC Entering = Mass VOC in Raw Materials*
*Determined consistent with SC V.1 of EU-WBW3ALBFORMING