PERMIT BOOK

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

PERMIT TO CONSTRUCT

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: 102012-014

Project Number: 2012-07-023
Installation Number: 151-0050

Parent Company:	Quaker Window Products Company
Parent Company Address:	P.O. Box 128, Freeburg, MO 65035
Installation Name:	Quaker Window Products Company
Installation Address:	504 Highway 63 South, Freeburg, MO 65035
Location Information:	Osage County, S41, T10N, R9W

Application for Authority to Construct was made for:
Increased production of aluminum windows. This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required.*

☐ Standard Conditions (on reverse) are applicable to this permit.

☒ Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

OCT 24 2012

EFFECTIVE DATE

Kyra L Moore

DIRECTOR OR DESIGNEE
DEPARTMENT OF NATURAL RESOURCES

STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. The permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start up of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' Northeast Regional Office within 15 days after the actual start up of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources, but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060(12)(A)10. "Conditions required by permitting authority."

Quaker Window Products Company
Osage County, S41, T10N, R9W

1. Superseding Condition
   The conditions of this permit supersede all the special conditions found in all construction permits previously issued by the Air Pollution Control Program as listed in Table 2 in the review section.

2. VOC and HAPs Emission Limitations
   A. The permittee shall emit less than 250.0 tons of VOCs in any consecutive 12-month period from the entire installation as listed in Table 3 in the review section.

   B. The permittee shall emit less than 25.0 tons of combined HAPs in any consecutive 12-month period from the entire installation as listed in Table 3 in the review section.

   C. The permittee shall not emit individual HAPs in excess of the values provided in Table 1.

Table 1: Individual HAP Emission Limitations

HAP Name	CAS Number	Emission Limitation (tons per year)
Cumene	98-82-8	10.0
Ethylbenzene	100-41-4	10.0
Ethylene Glycol	107-21-1	10.0
Formaldehyde	50-00-0	2.0
Glycol Ethers	20-10-0	5.0
Hydrogen Fluoride	7664-39-3	0.10
MDI	101-68-8	0.10
Methanol	67-56-1	10.0
MIBK	108-10-1	10.0
Naphthalene	91-20-3	10.0
Toluene	108-88-3	10.0
Xylene	1330-20-7	10.0
Other Individual HAPs		10.0

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

D. Attachments A through I or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Conditions 2.A, 2.B, and 2.C.

3. PM_{10} Emission Limitation

A. The permittee shall emit less than 15.0 tons of PM_{10} in any consecutive 12-month period from the entire installation as listed in Table 3.

B. Attachments A through I or equivalent forms, such as electronic forms, approved by the Air Pollution Control Program shall be used to demonstrate compliance with Special Condition 3.A.

4. EP-47 Haul Roads

A. The permittee shall pave EP-47 Haul Roads with materials such as asphalt, concrete, and/or other material(s) after receiving approval from the program.

B. Maintenance and/or repair of the road surface shall be conducted as necessary to ensure that the physical integrity of the pavement is adequate to achieve control of fugitive emissions from the paved haul road while the plant is operating.

C. The permittee shall periodically water, wash, and/or otherwise clean all of the paved portions of the haul road(s) as necessary to achieve control of fugitive emissions from the paved haul road while the plant is operating.

5. Control Device Requirements – Dust Collectors and Fabric Filters

A. The permittee shall control emissions from the following emission units using dust collectors:
   1) EP-34 Wood Sawing/Routing
   2) EP-35 Special Sized Windows

B. The permittee shall control emissions from the following emission units using fabric filters:
   1) EP-02A Vinyl Paint Booth
   2) EP-17 Phoenix Wood Cutting
   3) EP-36 Packing and Shipping

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

C. The dust collectors and fabric filters shall be operated and maintained in accordance with the manufacturer's specifications. The manufacturer's specifications shall be retained onsite. The dust collectors and fabric filters shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.

D. Replacement filters for the dust collectors and fabric filters shall be kept on hand at all times. The replacement filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).

E. The permittee shall monitor and record the operating pressure drop across the dust collectors and fabric filters at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.

F. The permittee shall maintain an operating and maintenance log for the dust collectors and fabric filters which shall include the following:
   1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
   2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

6. Control Device Requirements – Cyclone with a Fabric Sock

A. The permittee shall control emissions from the following emission units using cyclone fitted with a fabric sock:
   1) EP-32 Existing Debridge
   2) EP-43 New Debridge

B. The cyclone fitted with a fabric sock shall be operated and maintained in accordance with the manufacturer's specifications. The manufacturer's specifications shall be retained onsite.

C. Replacement filters for the fabric sock shall be kept on hand at all times. The replacement filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

D. The permittee shall monitor visible emissions as an indicator of proper operation of the cyclone fitted with a fabric sock. During proper operation, no visible emissions should occur. If visible emissions are observed, the permittee shall perform corrective action.
   1) Visible emission observations shall be made daily using U.S. EPA Method 22-like procedures for a duration of two minutes. Observations shall be made while the emission unit is in operation.

E. The permittee shall maintain an operating and maintenance log for the cyclone fitted with a fabric sock which shall include the following:
   1) Time of daily observation.
   2) Visible emission observation results.
   3) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
   4) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

7. Control Device Requirements – Afterburner

A. EP-40 Pyrolysis Furnace/Paint Hook Burnoff Oven shall be exclusively used to remove powder paint from paint hooks.

B. The permittee shall control emissions from EP-40 Pyrolysis Furnace/Paint Hook Burnoff Oven using an afterburner. The permittee shall not operate EP-40 Pyrolysis Furnace/Paint Hook Burnoff Oven without the afterburner. The afterburner shall be operated between 1,400 and 1,600 degrees Fahrenheit with more than a 0.5 second residence time.

C. The afterburner shall be equipped with an electronic controller, with a digital readout, which is able to monitor and display the temperature in the combustion chamber to an accuracy of plus or minus ten percent.

D. The afterburner shall be operated and maintained according to manufacturer's specifications. The manufacturer's specifications shall be retained onsite.

8. Operational Requirement - Solvent/Paint Cloths

A. The permittee shall keep paints, solvents, and cleaning solutions in sealed containers whenever the materials are not in use. The permittee shall provide and maintain suitable, easily read, permanent markings on all inks, solvent and cleaning solution containers used with this equipment.

SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

9. Record Keeping and Reporting Requirements

A. The permittee shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include MSDS for all materials used.

B. The permittee shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (6) REVIEW
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number:

Quaker Window Products Company
504 Highway 63 South
Freeburg, MO 65035

Complete: October 10, 2012

Parent Company:
Quaker Window Products Company
504 Highway 63 South, P.O. Box 128
Freeburg, MO 65035

Osage County, S41N, T10, R9W

REVIEW SUMMARY

- The permittee has applied for authority to increase their production of aluminum windows.

- HAP emissions are from the proposed equipment. HAPs are expected from liquid coating materials, thermal fill operations, sealant usage, and cleaning chemicals. Individual HAP emissions are limited to less than their respective SMALs; therefore, no HAP modeling is required.

- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment. This installation is an area source of HAPs and is; therefore, not subject to 40 CFR Part 63, Subpart MMMM or 40 CFR Part 63, Subpart QQQQ. The installation will no longer be subject to 40 CFR Part 63, Subpart WWWWWW upon removal of EP-01A Etching Process Heaters.

- Dust collectors, fabric filters, and cyclone fitted with a fabric sock are being used to control PM, PM_{10}, and $PM_{2.5}$ emissions from the equipment in this permit. An afterburner is being used to control paint combustion emissions.

- This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of VOC are above the de minimis level.

- This installation is located in Osage County, an attainment area for all criteria pollutants.

- This installation is not on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 250 tons per year and fugitive emissions are not counted toward major source applicability.

- Ambient air quality modeling was not performed for this review. No model is currently available which can accurately predict ambient ozone concentrations caused by this installation's VOC emissions.

- Emissions testing is not required for the equipment.

- An Intermediate Operating Permit Significant Modification Application or a Part 70 Operating Permit Initial Application is required for this installation within 90 days of equipment startup.

- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Quaker Window Products Company operates a window production facility in Osage County. The installation produces aluminum, vinyl, and wood frames and assembles windows for sale. The installation is currently operating under Intermediate Operating Permit OP2010-026A. The installation is required to significantly modify OP2010-026A within 90 days of equipment startup or to apply for an initial Part 70 Operating Permit. The installation is a major source of VOC with existing potential emissions above 250 tons per year. The installation is a synthetic minor source of HAPs. The following New Source Review permits have been issued to Quaker Window Products Company by the Air Pollution Control Program:

Table 2: Previously Issued Construction Permits

Permit Number	Description
0888-003	New pyrolysis furnace
0894-003	New sources added without permits
0894-003A	Increased paint usage
1197-022	New ventilation system and expansion of operations
0798-015	New painting process
0199-007	Increase in VOC emission limit
0999-012	New paint curing oven
0999-012A	Add installation wide HAP limit
052001-020	Cutting and flushing
072009-021	Replacement of Thermal Fill and Debridge
072009-021A	PTE recalculation of Thermal Fill

The installation is being limited to 250 tons of VOC to avoid major source review. The synthetic minor HAP limits for the installation are being renewed within this permit. The installation is being limited to 15 tons of PM_{10} to avoid particulate modeling.

PROJECT DESCRIPTION

Quaker Window Products Company is proposing to construct a new building for aluminum window production at their existing facility. The new building will contain new and existing equipment. Installation of the new equipment will debottleneck the existing equipment allowing for increased production of aluminum windows; however, the

installation cannot establish the MHDR of the new process. As the new production rate of aluminum windows is unknown, the installation is being limited to 250 tons of VOC, synthetic minor levels of HAPs, and 15 tons of $PM_{10.}$ The installation is being required to track production to ensure compliance with these limits. The tracked data will then be available to calculate the aluminum window production rate in the future.

The installation is also proposing to replace some equipment on their vinyl window production line. Because the vinyl window production line bottleneck could not be identified, it is unclear if the vinyl window production line will be debottlenecked; however, the VOC, HAP, and PM_{10} emission limits ensure vinyl window production does not exceed the existing MHDR.

The installation is relocating equipment for the wood window production line. No new equipment is being installed; therefore, the wood window production rate remains unchanged.

A revised installation-wide equipment list is available in Table 3. The equipment list includes whether the equipment is new, existing, or modified and locational information. MHDRs are provided for the new and existing equipment. MHDRs are not provided for the modified equipment as they are unknown at this time.

Table 3: Installation-wide Equipment List

Existing Equipment			
Emission Unit	**Description**	**MHDR**	**Location[1]**
EP-12A	Gasoline Storage Tank	Unknown	Tank Area
EP-12B	Diesel Storage Tank	Unknown	Tank Area
EP-13A	Boiler #1 (Propane)	3.12 MMBtu/hr	Building 1
EP-13B	Space Heating (Propane)	6.5 MMBtu/hr	Buildings 1 - 6
EP-17	Phoenix Wood Cutting	0.0045 tons/hr	Building 3
EP-19	PVC Cement Usage	0.003 tons/hr	Building 4
EP-22	Maintenance Degreasing	0.71 gal/hr	Various
EP-23	Touchup Paint Area	1.3 cans/hr	Building 1
EP-25	Wood Paint Room Paint Booth	0.6 gal/hr	Building 3
EP-28	Welders & Acetylene/O_2 Metal Cutting	0.001 tons/hr	1 & Garage
EP-29	Wood Cutting	0.02 tons/hr	Building 3
EP-31A	Existing Thermal Fill	19 gal/hr	Building 7
EP-31B	Existing Thermal Fill Flush	0.47 gal/hr	Building 7
EP-32	Existing Debridge	12,900 ft/hr	Building 7
EP-34	Wood Sawing/Routing	150 cuts/hr	Building 3
EP-46	Parts Cleaner	Unknown	Building 1 & Garage

New Equipment			
Emission Unit	**Description**	**MHDR**	**Location[1]**
EP-40	Pyrolysis Furnace/Paint Hook Burnoff Oven	1 MMBtu/hr	Building 7
EP-41A	5-Stage Wash System	2.2 MMBtu/hr	Building 7
EP-41B	Dry Off Oven	2.65 MMBtu/hr	Building 7
EP-41C	Powder Cure Oven with Infrared	5 MMBtu/hr	Building 7
EP-41D	Make-Up Air System	2.1 MMBtu/hr	Building 7
EP-41E	Vinyl Cure Oven	2.65 MMBtu/hr	Building 1
EP-42	New Thermal Fill	105 gal/hr	Building 7
EP-43	New Debridge	12,900 ft/hr	Building 7
EP-44	New Thermal Fill Flush	10 flushes/hr	Building 7
EP-45	5-Stage Wash System	1 gal/hr	Building 7
	Propane Tank		Outside Building 7

Modified Equipment			
Emission Unit	**Description**	**MHDR**	**Location[1]**
EP-02A	Vinyl Paint Booth	11 gal/hr	Building 1
EP-06	Aluminum Cutting	Unknown	Building 6
EP-16	Cold Cleaning of Window Parts	Unknown	Buildings 1, 2, 4, & 6
EP-18	Vinyl Cutting and Welding	Unknown	Buildings 2 & 4
EP-20	Sealant Usage	Unknown	Buildings 1, 2, 3, 4, & 6
EP-21	LPG Unloading	Unknown	Tank Area
EP-27	Drilling/Grinding/Punch Press	Unknown	Buildings 1, 2, 4, & 6
EP-33	Geo Grid Touch Up	Unknown	Building 7
EP-35	Special Sized Windows	Unknown	Building 6
EP-36	Packing and Shipping	Unknown	Building 5
EP-47	Paved Haul Roads	Unknown	All

[1]The location represents where the equipment will be located once this project is complete.

In Building 1 the facility will trim painted aluminum and assemble aluminum windows and doors. The facility will also paint vinyl window frames in this building.

In Buildings 2 and 4 the facility will trim the painted vinyl window frames and assemble the vinyl windows. Additionally the facility will trim aluminum and assemble storm windows and doors in this building. Steel cutting for screen windows will also occur in Building 4.

In Building 3 the facility will trim, paint, and assemble wood windows. Aluminum trimming for the wood windows will also occur in this building.

In Building 5 the facility will construct wooden packing crates, pack windows, and ship products.

In Building 6 the facility will cut painted aluminum pieces that are then sent to Building 4 for screen windows. Aluminum trimming for specialty windows and specialty window assembly will also occur in this building.

In Building 7 the facility washes aluminum in EP-41A/EP-45 5-Stage Wash System. EP-41A accounts for propane combustion emissions from the wash system. EP-45 accounts for VOC and HAP released by the wash chemicals. The washed aluminum is

then dried by EP-41B Dry Off Oven before being powder coated. If the aluminum requires a clear coat, it is heated by an electric infrared gel oven before applying clear powder coat. If the aluminum does not require a clear coat the conveyor still runs through the electric infrared gel oven and clear powder coat booth, but the equipment remains inactive. After powder coating the aluminum is sent to EP-41C Powder Cure Oven with Infrared. The painted aluminum pieces will end up being formed into aluminum windows, used to construct screen windows, used to construct storm doors or windows, or used as decorative pieces on wooden windows. Some painted aluminum pieces will be given a thermal barrier consisting of rigid polyurethane foam. The rigid polyurethane foam will be added by either EP-31A Existing Thermal Fill or EP-42 New Thermal Fill. EP-42 New Thermal Fill is computer operated and can fill two channels at once (necessary for double paned windows) and will handle the bulk of aluminum handled. EP-31A Existing Thermal Fill is manually operated and can only fill one channel at a time. EP-31A will be used for small and/or special orders. The thermal fill nozzles must be flushed between uses. Emissions from the flushing agent are reported under EP-31B Existing Thermal Fill Flush and EP-44 New Thermal Fill Flush. The aluminum filled with rigid polyurethane foam is then sent to EP-32 Existing Debridge or EP-43 New Debridge where a section of the channel(s) is removed to allow the thermal barrier to properly swell and contract.

Building 7 will also contain EP-40 Pyrolysis Furnace/Paint Hook Burnoff Oven to remove powder coating from the conveyor belt hooks and EP-33 Geo Grid Touch Up consisting of spray paint can filling and as needed touching up of the powder coated aluminum pieces.

EMISSIONS/CONTROLS EVALUATION

Existing potential emissions from EP-06 Aluminum Cutting were obtained from Construction Permit 0999-012. This emission unit may be debottlenecked by this project. The hours of operation and production data from Attachment B may be utilized to calculate the MHDR of the modified process for future projects.

Potential emissions from the emission units in Table 4 were taken from the Facility Submitted PTE required by Construction Permit 072009-021. These emission units may be debottlenecked by this project. The hours of operation and production data from Attachments A through I may be utilized to calculate the MHDR of the modified process for future projects.

Table 4: Possibly Debottlenecked Equipment from Facility Submitted PTE

Emission Unit	Description
EP-16	Cold Cleaning of Window Parts
EP-18	Vinyl Cutting and Welding
EP-20	Sealant Usage
EP-27	Drilling/Grinding/Punch Press
EP-33	Geo Grid Touch Up
EP-35	Special Sized Windows
EP-36	Packing and Shipping

Potential emissions from EP-21 LPG Unloading are based upon the volume of the delivery hose. The delivery hose was assumed to be 20 feet long and 3 inches in diameter. A specific gravity of 0.509 was assumed for propane. This emission unit may be debottlenecked by this project. The hours of operation and production data from Attachment F may be utilized to calculate the MHDR of the modified process for future projects.

Potential emissions from the new propane combustion units listed in Table 5 were calculated using emission factors obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.5 "Liquified Petroleum Gas Combustion" (July 2008).

Table 5: New Propane Combustion Units

Emission Unit	Description
EP-40	Pyrolysis Furnace/Paint Hook Burnoff Oven
EP-41A	5-Stage Wash System
EP-41B	Dry Off Oven
EP-41C	Powder Cure Oven with Infrared
EP-41D	Make-Up Air System
EP-41E	Cure Oven

Potential emissions from EP-42 New Thermal Fill were calculated using a mass balance. Azon SU 207-12T resin is the worst-case resin for VOC, HAP, and Ethylene Glycol (107-21-1) based upon a mixing ratio of 79 parts 13-302A Component A ISO to 100 parts resin. Universal No-Tape 304 resin is the worst-case resin for MDI (101-68-8) based upon a mixing ratio of 86 parts 13-302A Component A ISO to 100 parts resin. Each resin contains 3% Ethylene Glycol (107-21-1). A test conducted by the resin manufacturer demonstrated that 95% of the Ethylene Glycol (107-21-1) contained within the resins is retained in the rigid polyurethane foam. 13-302A Component A ISO contains 45% MDI (101-68-8). The American Chemistry Council's MDI Calculator Worksheet M4 Enclosed Process – Cavity Size was used to calculate MDI emissions.

Potential emissions from EP-43 New Debridge were calculated using the emission factor established in Construction Permit 072009-021 multiplied by two to account for the fact that the new equipment can cut two channels at once whereas EP-32 Existing Debridge could only cut one channel at a time.

Potential emissions from EP-44 New Thermal Fill Flush were calculated as double the emissions established for EP-31B Existing Thermal Fill Flush by Construction Permit 072009-021. The emissions were doubled to account for the second nozzle that allows the installation to fill two channels simultaneously.

Potential emissions from EP-45 5-Stage Wash System were calculated using a material balance for the use of cleaning chemicals K655 and K678. K655 contains 5% Glycol Ethers (20-10-0). K678 contains 19% Hydrogen Fluoride (7664-39-3). Stage 1 of the wash system contains a 2,000 gallon heated tank consisting of 3% K655. It was conservatively estimated that 25% of the solution is emitted. Stage 3 of the wash system contains a 1,000 gallon unheated tank consisting of 0.5% K678. It was

conservatively estimated that 10% of the solution is emitted. Each tank was estimated to have three turnovers per year.

Potential emissions from EP-47 Paved Haul Roads were calculated using emission factors obtained from AP-42 Section 13.2.1 “Paved Roads” (January 2011). This emission source may be debottlenecked by this project. The hours of operation and production data from Attachment F may be utilized to calculate the MHDR of the modified process for future projects.

The following table provides an emissions summary for this project.

Table 6: Emissions Summary (tons per year)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2011 EIQ)	New Installation Unconditioned Potential	New Installation Conditioned Potential
PM	25.0	N/D	N/A	109.92	N/A
PM_{10}	15.0	23.20	0.48	60.85	<15.0
$PM_{2.5}$	10.0	N/D	N/A	27.10	N/A
SO_x	40.0	0.10	N/A	0.02	N/A
NO_x	40.0	3.60	N/A	15.69	N/A
VOC	40.0	208.43	14.16	341.56	<250.0
CO	100.0	2.3	N/A	9.05	N/A
GHG (CO_2e)	75,000	N/D	N/A	15,432.55	N/A
GHG (mass)	250.0	N/D	N/A	15,091.98	N/A
HAPs	25.0	<25.0	1.47	180.65	<25.0
Toluene	10.0	<10.0	0.01	102.13	<10.0
Xylene	10.0	<10.0	1.10	72.46	<10.0
MIBK	10.0	<10.0	0.002	49.81	<10.0
Ethylbenzene	10.0	<10.0	0.23	12.34	<10.0
Glycol Ethers	5.0	N/D	N/A	9.52	<5.0
Ethylene Glycol	10.0	<10.0	0.11	3.84	<10.0
Naphthalene	10.0	N/D	0.002	3.04	<10.0
Cumene	10.0	ND	N/A	1.39	<10.0
Formaldehyde	2.0	<2.0	0.001	0.28	<2.0
Methanol	10.0	N/D	0.001	0.16	<10.0
Hydrogen Fluoride	0.10	N/D	N/A	0.07	<0.10
MDI	0.10	N/D	N/A	0.01	<0.10

N/A = Not Applicable; N/D = Not Determined

Existing Potential Emissions were taken from Construction Permit 072009-021.

Existing Actual Emissions were taken from the installation’s 2011 EIQ.

New Installation Unconditioned Potential includes existing equipment and new equipment at MHDR, assuming continuous operation (8,760 hours per year). Modified equipment is included at the existing MHDR as the new MHDR is unknown.

The new installation was conditioned to 250.0 tons per year of VOC by Special Condition 2.A to avoid PSD review. The new installation was also conditioned to 25.0 tons per year of HAP by Special Condition 2.B and given individual HAP limits by Special Condition 2.C to avoid HAP modeling and to remain an area source for MACT applicability.

The new installation was conditioned to 15.0 tons per year of PM_{10} by Special Condition 3.A to avoid modeling. The PM_{10} limit will also result in reduced emissions of PM and $PM_{2.5}$. Based on the ratio of $PM_{2.5}$ to $PM_{10,}$ conditioned $PM_{2.5}$ emissions will be below the de minimis level; therefore, no $PM_{2.5}$ limit was included. New Installation Conditioned Potential includes the following overall control efficiencies (control and capture) for the control devices required by Special Conditions 5 and 6:

Table 7: Control Efficiencies

Emission Unit	Description	Control Device	Overall Control Efficiency
EP-02A	Vinyl Paint Booth	Fabric filter	97%
EP-17	Phoenix Wood Cutting	Fabric filter	88.2%
EP-32	Existing Debridge	Cyclone fitted with a fabric sock	88.2%
EP-34	Wood Sawing/Routing	Dust collector	78.6%
EP-35	Special Sized Windows	Dust collector	89.5%
EP-36	Packing and Shipping	Fabric filter	89.5%
EP-43	New Debridge	Cyclone fitted with a fabric sock	88.2%

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*. Potential emissions of VOC are above the de minimis level.

APPLICABLE REQUIREMENTS

The permittee shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved.

GENERAL REQUIREMENTS

- 10 CSR 10-6.065 *Operating Permits*

- 10 CSR 10-6.110 *Submission of Emission Data, Emission Fees and Process Information*
- 10 CSR 10-6.165 *Restriction of Emission of Odors*
- 10 CSR 10-6.170 *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*
- 10 CSR 10-6.220 *Restriction of Emission of Visible Air Contaminants*

SPECIFIC REQUIREMENTS

- 10 CSR 10-6.400 *Restriction of Emission of Particulate Matter From Industrial Processes*

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (6) of Missouri State Rule 10 CSR 10-6.060 *Construction Permits Required*, I recommend this permit be granted with special conditions.

_____ _____

Alana L. Rugen, EIT Date
New Source Review Unit

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated July 9, 2012, received July 9, 2012, designating Quaker Window Products Company as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.
- American Chemistry Council's MDI Calculator: http://polyurethane.americanchemistry.com/Health-Safety-and-Product-Stewardship/Emissions
- Facility Submitted PTE required by Construction Permit 072009-021.
- Construction Permit 0999-012 emission calculations.
- Construction Permit 072009-021 emission calculations.

Attachment A
EP-02A Vinyl Paint Booth Emissions Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):															
Hours of Operation (hours per month):															
Material Used[1]	**Amount Used (gallons)**	**Density (lb/gal)**	**VOC Content (%)**	**VOC Emissions[2] (tons)**	**Solids Content (%)**	**PM_{10} Emissions[3] (tons)**	**HAP Name: CAS No.:**		**HAP Name: CAS No.:**		**HAP Name: CAS No.:**		**Combined HAP**	
							Content (%)	**Emissions[2] (tons)**	**Content (%)**	**Emissions[2] (tons)**	**Content (%)**	**Emissions[2] (tons)**	**Content (%)**	**Emissions[2] (tons)**
			Emissions[4]:		**Emissions[4]:**		**Emissions[4]:**		**Emissions[4]:**		**Emissions[4]:**		**Emissions[4]:**	

[1]All of the material used in EP-02 Vinyl Paint Booth shall be reported on this worksheet. The permittee shall not split any of the material usage onto EP-41E Cure Oven. If additional columns are needed for individual HAPs, the facility may either add additional columns (if using an excel spreadsheet) or copy additional pages and only fill out the individual HAP columns on the additional pages (if using paper worksheets). If additional rows are needed for materials, the facility may either add additional rows (if using an excel spreadsheet) or copy additional pages (if using paper worksheets).
[2]Emissions (tons per month) =Amount Used (gallons) x Density (lb/gal) x Content (%) x 0.0005 (tons/lb).
[3]Emissions (tons per month) =Amount Used (gallons) x Density (lb/gal) x Solids Content (%) x 0.0005 (tons/lb) x (1 – 0.97). Note: This equation includes the 97% overall control for fabric filter usage required by Special Condition 5.B.
[4]Emissions (tons per month) = The sum of each material's individual emissions (tons per month).

Attachment B
Emissions Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):							
Emission Unit	**Description**	**Hours of Operation**	**Amount Used/ Processed (tons)**	**PM_{10}**		**VOC**	
				Emission Factor (lb/ton)	**Emissions[4] (tons)**	**Emission Factor (lb/ton)**	**Emissions[4] (tons)**
EP-06	Aluminum Cutting			0.1		0.05	
EP-17	Phoenix Wood Cutting			33.04[1]			
EP-18	Vinyl Cutting and Welding			0.027			
EP-27	Drilling/Grinding/Punch Press			0.35			
EP-28	Welding & Acetylene/O_2 Metal Cutting			20.17			
EP-29	Wood Cutting			0.35			
EP-35	Special Sized Windows			13.13[2]			
EP-36	Packing and Shipping			11.33[3]			
				Emissions[5]:			

[1]The emission factor includes 88.2% overall control for fabric filter usage as required by Special Condition 5.B.
[2]The emission factor includes 89.5% overall control for dust collector usage as required by Special Condition 5.A.
[3]The emission factor includes 89.5% overall control for fabric filter usage as required by Special Condition 5.B.
[4]Emissions (tons per month) = Amount Used/Processed (tons) x Emission Factor (lb/ton) x 0.0005 (tons/lb).
[5]Emissions (tons per month) = The sum of each emission unit's individual emissions.

Attachment C
Fuel Combustion Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):						
Emission Unit	**Description**	**Amount of Propane Combusted (1000 gallons)**	**PM_{10}**		**VOC**	
			Emission Factor (lb/1000 gallons)	**Emissions[1] (tons)**	**Emission Factor (lb/1000 gallons)**	**Emissions[1] (tons)**
EP-13A	Boiler #1		0.7		1.0	
EP-13B	Space Heating					
EP-40	Pyrolysis Furnace/Paint Hook Burnoff Oven					
EP-41A	5 Stage Aluminum Wash System					
EP-41B	Aluminum Dry Off Oven					
EP-41C	Aluminum Powder Cure Oven with Infrared					
EP-41D	Make-up Air System					
EP-41E	Vinyl Cure Oven					

[1]Emissions (tons per month) =Amount of Propane Combusted (1000 gallons) x Emission Factor (lb/1000 gallons) x 0.0005 (tons/lb).

Attachment D
Tank Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):					
Emission Unit	**Description**	**Emission Type**	**Amount Used (1000 gallons)**	**VOC Emission Factor (lb/1000 gallons)**	**VOC Emissions[1] (tons)**
EP-12A	Gasoline Storage Tank	Working Loss		8.2	
EP-12B	Diesel Storage Tank			0.02	
Emission Unit	**Description**	**Emission Type**	**Size (1000 gallons)**	**VOC Emission Factor (lb/1000 gallons-year)**	**VOC Emissions[2] (tons)**
EP-12A	Gasoline Storage Tank	Breathing Loss		23.4	
EP-12B	Diesel Storage Tank			0.04	
				Emissions[3]:	

[1]Emissions (tons per month) = Amount Used (1000 gallons) x VOC Emission Factor (lb/1000 gallons) x 0.0005 (tons/lb).
[2]Emissions (tons per month) = Size (1000 gallons) x VOC Emission Factor (lb/1000 gallons-year) x 0.0005 (tons/lb) x 0.083 (years/month).
[3]Emissions (tons per month) = The sum of each emission unit's individual emissions.

Attachment E
Mass Balance Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):																
Emission Unit	Description	Hours of Operation	Material Used[1]	Amount Used (gallons)	Density (lb/gal)	VOC Content (%)	VOC Emissions[2] (tons)	Solids Content (%)	PM_{10} Emissions[2] (tons)	HAP Name: CAS No.:		HAP Name: CAS No.:		Combined HAP	
										Content (%)	Emissions[2] (tons)	Content (%)	Emissions[2] (tons)	Content (%)	Emissions[2] (tons)
EP-16	Cold Cleaning of Window Parts														
EP-19	PVC Cement Usage														
EP-20	Sealant Usage														
EP-22	Maintenance Degreasing														
EP-23	Touchup Paint Area														
EP-25	Wood Paint Booth														
EP-33	Geo Grid Touch Up														
EP-45	5 Stage Wash System														
EP-46	Parts Cleaner														
						Emissions[3]:		Emissions[3]:		Emissions[3]:		Emissions[3]:		Emissions[3]:	

[1]All of the materials used by these emission units shall be reported on this worksheet. If additional columns are needed for individual HAPs, the facility may either add additional columns (if using an excel spreadsheet) or copy additional pages and only fill out the individual HAP columns on the additional pages (if using paper worksheets). If additional rows are needed for materials, the facility may either add additional rows (if using an excel spreadsheet) or copy additional pages (if using paper worksheets).
[2]Emissions (tons per month) =Amount Used (gallons) x Density (lb/gal) x Content (%) x 0.0005 (tons/lb).
[3]Emissions (tons per month) = The sum of each material's individual emissions.

Attachment F
Miscellaneous Equipment Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):				
Emission Unit	**Description**	**Number of Deliveries**	**VOC Emission Factor (lb/delivery)**	**VOC Emissions[1] (tons)**
EP-21	LPG Unloading		41.61	
Emission Unit	**Description**	**Number of Flushes**	**VOC Emission Factor (lb/flush)**	**VOC Emissions[2] (tons)**
EP-31B	Existing Thermal Fill Flush		0.86	
EP-44	New Thermal Fill Flush			
			VOC Emissions[3]:	

[1]Emissions (tons per month) = Number of Deliveries x VOC Emission Factor (lb/delivery) x 0.0005 (ton/lb).
[2]Emissions (tons per month) = Number of Flushes x VOC Emission Factor (lb/flush) x 0.0005 (ton/lb).
[3]VOC Emissions (tons per month) = The sum of each emission unit's individual emissions.

Date (Month and Year):					
Emission Unit	**Description**	**Hours of Operation**	**Number of Cuts**	**PM_{10} Emission Factor (lb/cut)**	**PM_{10} Emissions[4] (tons)**
EP-34	Wood Sawing/Routing			0.0022[5]	
Emission Unit	**Description**	**Vehicle Miles Traveled (VMT)**		**PM_{10} Emission Factor (lb/VMT)**	**PM_{10} Emissions[6] (tons)**
EP-47	Haul Roads			0.05	
Emission Unit	**Description**	**Hours of Operation**	**Amount Processed (ft)**	**PM_{10} Emission Factor (lb/ft)**	**PM_{10} Emissions[7] (tons)**
EP-32	Existing Debridge			0.034	
EP-43	New Debridge				
				PM_{10} Emissions[8]:	

[4]Emissions (tons per month) = Number of Cuts x PM_{10} Emission Factor (lb/cut) x 0.0005 (ton/lb).
[5]The emission factor includes 78.6% control for dust collector usage as required by Special Condition 5.A.
[6]Emissions (tons per month) = Vehicle Miles Traveled (VMT) x PM_{10} Emission Factor (lb/VMT) x 0.0005 (ton/lb).
[7]Emissions (tons per month) = Amount Processed (ft) x PM_{10} Emission Factor (lb/ft) x 0.0005 (ton/lb).
[8]PM_{10} Emissions (tons per month) = The sum of each emission unit's individual emissions.

Attachment G
Thermal Fill Worksheet

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):											
Emission Unit	**Description**	**Hours of Operation**	**Amount Used (gallons)**	**VOC**		**Ethylene Glycol (107-21-1)**		**MDI (101-68-8)**		**Combined HAP**	
				Emission Factor (lb/gal)	**Emissions[1] (tons)**	**Emission Factor (lb/gal)**	**Emissions[1] (tons)**	**Emission Factor (lb/gal)**	**Emissions[1] (tons)**	**Emission Factor (lb/gal)**	**Emissions[1] (tons)**
EP-31A	Existing Thermal Fill			0.008		0.008		5.33×10^{-10}		0.008	
EP-42	New Thermal Fill										
				Emissions[2]:		**Emissions[2]:**		**Emissions[2]:**		**Emissions[2]:**	

[1]Emissions (tons per month) = Amount Used (gallons) x Emission Factor (lb/gal) x 0.0005 (ton/lb).
[2]Emissions (tons per month) = The sum of each emission unit's individual emissions.

Attachment H
Installation-wide Monthly Emissions

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Date (Month and Year):																	
Attachment	**VOC**	**PM_{10}**	**Combined HAP**	**Toluene (108-88-3)**	**Xylene (1330-20-7)**	**MIBK (108-10-1)**	**Ethylbenzene (100-41-4)**	**Glycol Ethers (20-10-0)**	**Ethylene Glycol (107-21-1)**	**Naphthalene (91-20-3)**	**Cumene (98-82-8)**	**Formaldehyde (50-00-0)**	**Methanol (67-56-1)**	**Hydrogen Fluoride (7664-39-3)**	**MDI (101-68-8)**	**HAP Name: CAS No.:**	**HAP Name: CAS No.:**
A																	
B																	
C																	
D																	
E																	
F																	
G																	
Installation-wide Emissions (tons per month):																	

Fill out the appropriate cells with the emissions from each attachment for the date (month and year).

Attachment I
Installation-wide 12-Month Rolling Totals

Quaker Window Products Company
Osage County, S41, T10N, R9W
Project Number: 2012-07-023
Installation ID Number: 151-0050
Permit Number: _____

Month	Year	VOC	PM_{10}	Combined HAP	Toluene (108-88-3)	Xylene (1330-20-7)	MIBK (108-10-1)	Ethylbenzene (100-41-4)	Glycol Ethers (20-10-0)	Ethylene Glycol (107-21-1)	Naphthalene (91-20-3)	Cumene (98-82-8)	Formaldehyde (50-00-0)	Methanol (67-56-1)	Hydrogen Fluoride (7664-39-3)	MDI (101-68-8)	HAP Name: CAS No.:	HAP Name: CAS No.:
January																		
February																		
March																		
April																		
May																		
June																		
July																		
August																		
September																		
October																		
November																		
December																		
Installation-wide Emissions (tons per year):																		

Each month complete this worksheet with the data for this month and the previous 11 months.

APPENDIX A

Abbreviations and Acronyms

% ..... percent
ºF ..... degrees Fahrenheit
acfm ..... actual cubic feet per minute
BACT ..... Best Available Control Technology
BMPs ..... Best Management Practices
Btu..... British thermal unit
CAM ..... Compliance Assurance Monitoring
CAS..... Chemical Abstracts Service
CEMS ..... Continuous Emission Monitor System
CFR ..... Code of Federal Regulations
CO ..... carbon monoxide
CO_2..... carbon dioxide
CO_2e..... carbon dioxide equivalent
COMS..... Continuous Opacity Monitoring System
CSR..... Code of State Regulations
dscf ..... dry standard cubic feet
EIQ ..... Emission Inventory Questionnaire
EP..... Emission Point
EPA ..... Environmental Protection Agency
EU..... Emission Unit
fps ..... feet per second
ft ..... feet
GACT ..... Generally Available Control Technology
GHG ..... Greenhouse Gas
gpm..... gallons per minute
gr..... grains
GWP..... Global Warming Potential
HAP..... Hazardous Air Pollutant
hr..... hour
hp ..... horsepower
lb ..... pound
lbs/hr..... pounds per hour
MACT ..... Maximum Achievable Control Technology
µg/m^3..... micrograms per cubic meter
m/s ..... meters per second
Mgal ..... 1,000 gallons
MW ..... megawatt
MHDR..... maximum hourly design rate
MMBtu.... Million British thermal units
MMCF..... million cubic feet
MSDS ..... Material Safety Data Sheet
NAAQS... National Ambient Air Quality Standards
NESHAPs ..... National Emissions Standards for Hazardous Air Pollutants
NO_x..... nitrogen oxides
NSPS..... New Source Performance Standards
NSR..... New Source Review
PM ..... particulate matter
$PM_{2.5}$..... particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}..... particulate matter less than 10 microns in aerodynamic diameter
ppm ..... parts per million
PSD ..... Prevention of Significant Deterioration
PTE..... potential to emit
RACT..... Reasonable Available Control Technology
RAL ..... Risk Assessment Level
SCC..... Source Classification Code
scfm ..... standard cubic feet per minute
SIC..... Standard Industrial Classification
SIP..... State Implementation Plan
SMAL ..... Screening Model Action Levels
SO_x..... sulfur oxides
SO_2..... sulfur dioxide
tph..... tons per hour
tpy..... tons per year
VMT..... vehicle miles traveled
VOC..... Volatile Organic Compound

Mr. Michael H. Knoll
Executive Vice President
Quaker Window Products Company
504 Highway 63 South, P.O. Box 128
Freeburg, MO 65035

RE: New Source Review Permit - Project Number: 2012-07-023

Dear Mr. Knoll:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your New Source Review Permit application and with your Amended Intermediate Operating Permit (or new Part 70 Operating Permit) is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you have any questions regarding this permit, please do not hesitate to contact Alana Rugen at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

SH:arl

Enclosures

c: Northeast Regional Office
PAMS File: 2012-07-023

Permit Number: