

STATE OF MISSOURI

PERMIT BOOK



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: 122012-006 Project Number: 2012-07-080
Installation Number: 510-2456

Parent Company: The Christy Refractories Company, L.L.C.

Parent Company Address: 4641 McRee Avenue, St. Louis, MO 63110

Installation Name: The Christy Refractories Company, L.L.C.

Installation Address: 4641 McRee Avenue, St. Louis, MO 63110

Location Information: City of St. Louis, S46, T45N, R7E

Application for Authority to Construct was made for:
Construction of a new manufacturing line that will bag dry mix concrete. This review was conducted in accordance with Section (5), 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.

DEC 12 2012

EFFECTIVE DATE


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. 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 Regional office responsible for the area within which you are located 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(s), 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.

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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 paragraph (12)(A)10. "Conditions required by permitting authority."

The Christy Refractories Company, L.L.C.
City of St. Louis, S46, T45N, R7E

1. Control Device Requirement-Baghouse
 - A. The Christy Refractories Company, L.L.C. shall control emissions from the equipment listed in the following table using a baghouse as specified in the permit application. Equipment EP-S601, EP-S602, EP-S603, and EP-S604 are equipment associated with this permit. The remaining equipment, EP-S101, EP-S102, EP-S103, EP-S104, SP-S105, EP-S301, EP-S301, and the Eirich R09 Mixer, are existing equipment that is being controlled by existing baghouses.

Table 1: Equipment List

Emission Point	Equipment Description	MHDR
EP-S601	Skip Hoist	6 tph
EP-S602	Mixer – Ball Pan System	6 tph
EP-S603	Surge Hopper	6 tph
EP-S604	Bagging System	6 tph
EP-S101	Batching & Dry Mixing – Ball Pan System	1 tph
EP-S102	Material Transfer – Ball Pan System	1 tph
EP-S103	Metering Device – Ball Pan System	1 tph
EP-S104	Pelletizer – Ball Pan System	1 tph
EP-S105	Screening and Packaging – Ball Pan System	1 tph
EP-S301	Batching – Extruder System	1.6 tph
EP-S302	Dry & Wet Mixing – Extruder System	1.6 tph
Eirich R09 Mixer	No permit Required-Lab/Research Use	0.2 tph

- B. The baghouse shall be operated and maintained in accordance with the manufacturer's specifications. The baghouse 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.

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SPECIAL CONDITIONS:

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

- C. Replacement filters for the baghouse shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance). If replacement filters are not available, the equipment associated with the baghouse shall not be operated.
 - D. The Christy Refractories Company, L.L.C. shall monitor and record the operating pressure drop across the baghouse at least once every 24 hours. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty; the manufacturer's performance warranty shall be kept on site.
 - E. The Christy Refractories Company, L.L.C. shall maintain an operating and maintenance log for the baghouse 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.
2. Record Keeping and Reporting Requirements
- A. The Christy Refractories Company, L.L.C. 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 Christy Refractories Company, L.L.C. 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 (5) REVIEW

Project Number: 2012-07-080
Installation ID Number: 510-2456
Permit Number:

The Christy Refractories Company, L.L.C.
4641 McRee Avenue
St. Louis, MO 63110

Complete: July 23, 2012

Parent Company:
The Christy Refractories Company, L.L.C.
4641 McRee Avenue
St. Louis, MO 63110

City of St. Louis County, S46, T45N, R7E

REVIEW SUMMARY

- The Christy Refractories Company, L.L.C. has applied for authority to construct a new manufacturing line that will bag dry mix concrete.
- HAP emissions are not expected from the proposed equipment.
- None of the New Source Performance Standards (NSPS) apply to the project.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- A baghouse is being used to control the PM, PM₁₀, and PM_{2.5} emissions from the equipment in this permit.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀ are below de minimis levels.
- This installation is located in City of St. Louis, a non-attainment area for Ozone and PM_{2.5} 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 except for Ozone (VOCs and NOx) and PM_{2.5} which is 100 tons per year and fugitive emissions are not counted toward major source applicability.
- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.

- Emissions testing are not required for the equipment.
- No Operating Permit is required for this installation.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

The Christy Refractories Company, L.L.C. at the 4641 McRee Avenue facility manufactures various ceramic finished products including ceramic balls (1/8” to 3” diameter) and precast ceramic fabricated shapes. Ceramic raw material is batched/mixed and then dried/fired. Warehousing for the raw material and finished product along with the corporate offices are also located at this site.

The Christy Refractories Company, L.L.C. was originally under the jurisdiction of the City of St. Louis. The Christy Refractories Company, L.L.C. has not been issued any operating permits, EIQs, or construction permits from the Air Pollution Control Program. The following permit has been issued to The Christy Refractories Company, L.L.C. from the City of St. Louis.

Table 2: Permit History

Permit Number	Description
00-07-034	Belt drier and tunnel kiln (Local City of St. Louis CP)(EX200010094)

The Christy Refractories Company, L.L.C. has requested a 15 ton per year limit of PM₁₀ for the entire facility, however it is not needed because their controlled PTE of PM₁₀ is under the 15.0 tpy threshold. Potential emissions are provided in Table 3. No operating permit will be required.

PROJECT DESCRIPTION

The Christy Refractories Company, L.L.C. is constructing a new manufacturing line. This line will start with different earthen minerals, batch them into a mix (including the addition of a powder or granular binding agent of calcium aluminate), mix the blend in a mixer, and then use bagging equipment to package the final product. The manufacturing line will batch the appropriate amount of each component into a scale on a pallet jack. The batch will then be transferred into the bucket of a skip hoist. The hoist will be raised and the batch will be dumped into a mixer. The batch will then be fed from the surge hopper into the bagging system for the bagging into 50 or 100 pound bags, or supersacks up to 4,410 lbs. The maximum hourly design rate (MHDR) is 6 tons per hour. A baghouse is used to control particulate matter for this process.

The product is very similar to construction concrete, except the material is made for high temperature resistance. The binder in construction concrete is calcium silicate, as opposed to calcium aluminate in this product which has the capability to handle high temperatures. The product is “quickcrete” material in a bag and the end customer puts the material in a mixer, adds water, and pour the mixed castable into its final shape. Calcium aluminates react chemically and harden when mixed with water.

EMISSIONS/CONTROLS EVALUATION

The emission factors and control efficiencies used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Table 11.24-2 (low moisture ore).

Emissions from haul roads areas were calculated using the predictive equation from AP-42 Section 13.2.1 “Paved Roads,” November 2006.

The following table provides an emissions summary for this project. Existing potential emissions were taken from information provided by The Christy Refractories Company, L.L.C. Existing actual emissions were not available because an EIQ had not been submitted. Potential emissions of the application represent the potential of the new equipment assuming continuous operation (8760 hours per year).

Pollutants emitted from each emission unit are captured by a hood providing 50% capture efficiency. The exhaust is vented to a baghouse with 99% control efficiency.

Table 3: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Controlled Existing Potential Emissions	Existing Actual Emissions (2011 EIQ)	Potential Emissions of the Application	Controlled Emissions of Application	New Installation Conditioned Potential
PM	25.0	N/D	N/D	13.63	7.38	N/D
PM ₁₀	15.0	3.48	N/D	6.51	3.39	6.87
PM _{2.5}	10.0	N/D	N/D	3.83	1.96	N/D
SO _x	40.0	1.17	N/D	N/A	N/A	1.17
NO _x	40.0	0.72	N/D	N/A	N/A	0.7
VOC	40.0	0.24	N/D	N/A	N/A	0.24
CO	100.0	2.39	N/D	N/A	N/A	2.39
GHG (CO ₂ e)	75,000 / 100,000	N/D	N/D	N/A	N/A	N/D
GHG (mass)	0.0 / 100.0 / 250.0	N/D	N/D	N/A	N/A	N/D
HAPs	10.0/25.0	N/D	N/D	N/A	N/A	N/D

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

PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of PM₁₀ are below de minimis levels.

APPLICABLE REQUIREMENTS

The Christy Refractories Company, L.L.C. 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

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

SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter from Industrial Processes*, 10 CSR 10-6.400; PM is 0.72 lbs/hr (uncontrolled) and less than 13.619 lbs/hr (Process Weight Rule), therefore it complies.

STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

Kathy Kolb
New Source Review Unit

Date

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated June 28, 2012, received July 23, 2012, designating The Christy Refractories Company, L.L.C. as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.

APPENDIX A

Abbreviations and Acronyms

%	percent	m/s	meters per second
°F	degrees Fahrenheit	Mgal	1,000 gallons
acfm	actual cubic feet per minute	MW	megawatt
BACT	Best Available Control Technology	MHDR	maximum hourly design rate
BMPs	Best Management Practices	MMBtu	Million British thermal units
Btu	British thermal unit	MMCF	million cubic feet
CAM	Compliance Assurance Monitoring	MSDS	Material Safety Data Sheet
CAS	Chemical Abstracts Service	NAAQS ...	National Ambient Air Quality Standards
CEMS	Continuous Emission Monitor System	NESHAPs	
CFR	Code of Federal Regulations	National Emissions Standards for Hazardous Air Pollutants
CO	carbon monoxide	NO_x	nitrogen oxides
CO₂	carbon dioxide	NSPS	New Source Performance Standards
CO_{2e}	carbon dioxide equivalent	NSR	New Source Review
COMS	Continuous Opacity Monitoring System	PM	particulate matter
CSR	Code of State Regulations	PM_{2.5}	particulate matter less than 2.5 microns in aerodynamic diameter
dscf	dry standard cubic feet	PM₁₀	particulate matter less than 10 microns in aerodynamic diameter
EQ	Emission Inventory Questionnaire	ppm	parts per million
EP	Emission Point	PSD	Prevention of Significant Deterioration
EPA	Environmental Protection Agency	PTE	potential to emit
EU	Emission Unit	RACT	Reasonable Available Control Technology
fps	feet per second	RAL	Risk Assessment Level
ft	feet	SCC	Source Classification Code
GACT	Generally Available Control Technology	scfm	standard cubic feet per minute
GHG	Greenhouse Gas	SIC	Standard Industrial Classification
gpm	gallons per minute	SIP	State Implementation Plan
gr	grains	SMAL	Screening Model Action Levels
GWP	Global Warming Potential	SO_x	sulfur oxides
HAP	Hazardous Air Pollutant	SO₂	sulfur dioxide
hr	hour	tph	tons per hour
hp	horsepower	tpy	tons per year
lb	pound	VMT	vehicle miles traveled
lbs/hr	pounds per hour	VOC	Volatile Organic Compound
MACT	Maximum Achievable Control Technology		
µg/m³	micrograms per cubic meter		

Mr. Don Derleth
Plant Manager
The Christy Refractories Company, L.L.C.
4641 McRee Avenue
St. Louis, MO 63110

RE: New Source Review Permit - Project Number: 2012-07-080

Dear Mr. Derleth:

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 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 Kathy Kolb, 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:kk1

Enclosures

c: St. Louis Regional Office
PAMS File: 2012-07-080

Permit Number: