

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:

012014-009

Project Number: 2013-10-014

Installation Number: 510-0269

Parent Company:

Sensient Technologies

Parent Company Address: 777 East Michigan Avenue, Milwaukee, WI 53201

Installation Name:

Sensient Colors LLC

Installation Address:

2515 North Jefferson Avenue, St. Louis, MO 63106

Location Information:

St. Louis City, LG 03061

Application for Authority to Construct was made for:

Installation of a new spray dryer for the production of dyes. 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.

JAN 22 2014

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. 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."

Sensient Colors LLC
St. Louis City, LG 03061

1. Control Device Requirement-Baghouse
 - A. Sensient Colors LLC shall control emissions from the spray dryer (EU-58) using a baghouse equipped with a filter as specified in the permit application.
 - 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.
 - C. Replacement filters for the baghouse shall be kept on hand at all times. The filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
 - D. Sensient Colors LLC shall monitor and record the operating pressure drop across the baghouse at least once every 24 hours while the equipment is operating. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance warranty.
 - E. Sensient Colors LLC shall maintain a copy of the baghouse manufacturer's performance warranty on site.
 - F. Sensient Colors LLC 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.

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SPECIAL CONDITIONS:

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

2. Control Device Requirement - Impingement Scrubber
 - A. Sensient Colors LLC shall control VOC emissions from the spray dryer (EU-58) using an impingement scrubber (EU-57), as specified in the permit application, at all times that the spray dryer (EU-58) is processing materials that contain VOCs.
 - B. When any VOCs are present within the liquid feed, Sensient Colors shall operate the spray dryer in a closed cycle. The closed cycle of the dryer system will route the exit gas from the dryer to a baghouse followed by an impingement scrubber. The outlet gas from the impingement scrubber shall be recycled into the drying chamber through the heated air supply.
 - C. The scrubber shall be operated and maintained in accordance with the manufacturer's specifications. Each scrubber shall be equipped with a gauge or meter that indicates the pressure drop across the scrubber. Each scrubber shall also be equipped with a flow meter that indicates the flow through the scrubbers. These gauges and meters shall be located in such a way that they may be easily observed by Department of Natural Resources' personnel.
 - D. Sensient Colors LLC shall monitor and record the operating pressure drop across each scrubber at least once every twenty-four (24) hours during the time that the scrubber is operating. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer.
 - E. Sensient Colors LLC shall monitor and record the flow rate through the scrubber at least once every twenty-four (24) hours while the scrubber is operating. The flow rates shall be maintained within the design conditions specified by the manufacturer.
 - F. Sensient Colors LLC shall maintain an operating and maintenance log for the scrubbers 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.

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SPECIAL CONDITIONS:

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

3. **Operational Requirement - Solvent/Ink Cloths**
Sensient Colors LLC shall keep the dye solvents and cleaning solutions in sealed containers whenever the materials are not in use. Sensient Colors LLC shall provide and maintain suitable, easily read, permanent markings on all inks, solvent and cleaning solution containers used with this equipment.
4. **Operating Permit Determination**
Sensient Colors LLC shall submit installation-wide potential to emit calculations for all pollutants with the next operating permit submittal as supporting documentation. A Basic Operating Permit application is required within 30 days of equipment startup, an Intermediate Operating Permit application is required within 90 days of equipment startup, and a Part 70 Operating Permit application is required within 1 year of equipment startup, as applicable.
5. **Record Keeping and Reporting Requirements**
 - A. Sensient Colors LLC 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. Sensient Colors LLC shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 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: 2013-10-014
Installation ID Number: 510-0269
Permit Number:

Sensient Colors LLC
2515 North Jefferson Avenue
St. Louis, MO 63106

Complete: October 15, 2013

Parent Company:
Sensient Technologies
777 East Michigan Avenue
Milwaukee, WI 53201

St. Louis City, LG 03061

REVIEW SUMMARY

- Sensient Colors LLC has applied for authority to install a new spray dryer for the production of dyes.
- HAP emissions are expected from natural gas combustion in the dryer. All HAP emissions are below the respective SMAL.
- None of the New Source Performance Standards (NSPS) apply to the installation.
- None of the NESHAPs apply to this installation. None of the currently promulgated MACT regulations apply to the proposed equipment.
- A baghouse and an impingement scrubber are being used to control the particulate matter and VOCs emissions respectively 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 all pollutants are below de minimis levels.
- This installation is located in St. Louis City, a nonattainment area for the 8-hour ozone standard and the PM_{2.5} standard and an attainment area for all other criteria pollutants. The installation's major source level for NO_x and VOC is 100 tons per year.
- 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, for pollutants other than NO_x and VOC, is 250 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 is not required for the equipment.
- A Basic Operating Permit application is required within 30 days of equipment startup, an Intermediate Operating Permit application is required within 90 days of equipment startup, and a Part 70 Operating Permit application is required within 1 year of equipment startup, as applicable.
- Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

Sensient Colors LLC operates at 2515 North Jefferson Avenue in St. Louis, Missouri. Sensient Colors LLC manufactures colorants and technical dyes. Mass production of colorants and dyes involves the addition of specific chemicals and solvents from storage tanks into a reactor, subsequent removal of solvents and by-products through control devices, and the collection of marketable products following purification and filtration techniques. Sensient Colors LLC is considered a minor source for construction permitting purposes. Sensient Colors LLC received an Intermediate Operating Permit (OP97076) in January 1999. An Intermediate Operating Permit renewal application was submitted in August 2009.

The following New Source Review permits have been issued to Sensient Colors LLC from the Air Pollution Control Program.

Table 1: Permit History

Permit Number	Description
99-05-031	Local CP: Dye Production
99-03-017	Local CP: Purification Plant Synthesis
99-09-068	Local CP: Vacuum Distillation System
99-03-017A	Local CP: Synthesis Reactors
99-05-031A	Local CP: Dye and Color Manufacturing
01-06-020	Local CP: Modification to Purification Bay and Superseding of Permits 99-03-017 and 99-03-017A
01-06-020PM	Local CP: Controls flexibility
02-10-023	Local CP: Vacuum Dryer System
02-12-028	Local CP: Dye Synthesis
03-01-001	Local CP: 16.4 MMBtu/hr Boiler
03-05-008	Local CP: Dye Dispersion Plant
03-08-014	Local CP: Dye Production
03-09-014	Local CP: Spray Dryer
AP2009-03-059	Local CP: Operation Changes
11-04-007	Local CP: Hydrate Expansion Project

PROJECT DESCRIPTION

Sensient Colors LLC has proposed the installation of a GEA Niro SD-40CC Spray Dryer (EP-58) for the production of dyes. Spray drying is a method of producing dry powder from liquid slurry by rapidly drying with a hot gas. The dryer (EP-58), which is fueled by natural gas, will be capable of operating in two different modes; closed and open. The closed cycle will be used when any VOCs are present within the liquid feed. The closed cycle of the dryer system will route the exit gas from the dryer to a baghouse followed by an impingement scrubber, as required by Special Condition 2 of this permit. The outlet gas from the impingement scrubber will be recycled into the drying chamber through the heated air supply. The closed cycle process will also utilize a nitrogen purge cycle to keep the levels of oxygen low. Losses from the nitrogen purge are expected to be well below 0.1%. The open cycle will be used exclusively when the liquid feed to the dryer contains only water as a solvent. In the open cycle, the exit gas from the dryer will be controlled by a baghouse. The closed system process is expected to be utilized less than 50% of the time of operation. However, potential VOC emissions are based on continuous use of the closed cycle system since it results in the worst case potential VOC emissions for the project. The spray dryer is capable of drying up to 20.1 pounds of finished dye per hour. According to information supplied by Sensient Colors LLC, the maximum liquid feed supplied to the dryer is equal to 335 pounds per hour.

EMISSIONS/CONTROLS EVALUATION

The emission factors for natural gas combustion used in this analysis were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.4 Natural Gas Combustion, July 1998. The potential emissions from the dryer were evaluated using a mass balance approach. The potential emissions from the closed cycle process with the use of the impingement scrubber are expected to be very minimal due to the exhaust stream recycling process. For this reason, a control efficiency of potential VOC emissions equal to 99.9%. Potential emissions of particulate matter are based on the open cycle where the only control device utilized is the baghouse. Control efficiency equal to 99% was applied to all potential particulate emissions based on the use of the baghouse.

The following table provides an emissions summary for this project. Existing potential emissions were taken from permit number 01-06-020PM. Existing actual emissions were taken from the installation's 2012 EIQ. Potential emissions of the application represent the potential of the new equipment, assuming continuous operation (8760 hours per year).

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions*	Existing Actual Emissions (2012 EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential*
PM	25.0	N/D	N/D	0.894	N/D
PM ₁₀	15.0	<49.99	0.41	0.934	50.924
PM _{2.5}	10.0	N/D	0.206	0.934	N/D
SOx	40.0	<49.99	0.077	0.004	50.067
NOx	40.0	N/D	2.677	0.71	N/D
VOC	40.0	<49.99	0.149	0.49	50.48
CO	100.0	<49.99	2.226	0.60	50.59
GHG (CO ₂ e)	100,000	N/D	N/D	851.5	N/D
GHG (mass)	0.0 / 250.0	N/D	N/D	856.7	N/D
HAPs	10.0/25.0	6.0/13.49	8.585	0.01	13.5
Hydrogen Chloride	N/A	6.0	8.125	N/A	N/D

N/D = Not Determined

*The existing potential emissions are based on limits taken in permit number 01-06-020PM

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 all pollutants are below de minimis levels.

APPLICABLE REQUIREMENTS

Sensient Colors LLC 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. For a complete list of applicable requirements for your installation, please consult your operating permit.

GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information, 10 CSR 10-6.110*
- *Operating Permits, 10 CSR 10-6.065*
- *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 Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating, 10 CSR 10-6.405*

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.

J Luebbert
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 September 30, 2013, received October 7, 2013, designating Sensient Technologies 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. Keith Zarczynski
EHS Engineer
Sensient Colors LLC
2515 North Jefferson Avenue
St. Louis, MO 63106

RE: New Source Review Permit - Project Number: 2013-10-014

Dear Mr. Zarczynski:

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, if any, 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 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 J Luebbert, 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:jl

Enclosures

c: St. Louis Regional Office
PAMS File: 2013-10-014

Permit Number: