



John R. Kasich, Governor  
 Mary Taylor, Lt. Governor  
 Craig W. Butler, Director

11/16/2015

Richard Cutrell  
 FRANKLIN INTERNATIONAL  
 2020 Bruck Street  
 Columbus, OH 43207

Certified Mail

No	TOXIC REVIEW
No	SYNTHETIC MINOR TO AVOID MAJOR NSR
No	CEMS
No	MACT/GACT
No	NSPS
No	NESHAPS
No	NETTING
No	MODELING SUBMITTED
Yes	SYNTHETIC MINOR TO AVOID TITLE V
Yes	FEDERALLY ENFORCABLE PTIO (FEPTIO)
No	SYNTHETIC MINOR TO AVOID MAJOR GHG

RE: FINALAIR POLLUTION PERMIT-TO-INSTALL AND OPERATE

Facility ID: 0125040070  
 Permit Number: P0118183  
 Permit Type: Renewal  
 County: Franklin

Dear Permit Holder:

Enclosed please find a final Ohio Environmental Protection Agency (EPA) Air Pollution Permit-to-Install and Operate (PTIO) which will allow you to install, modify, and/or operate the described emissions unit(s) in the manner indicated in the permit. Because this permit contains conditions and restrictions, please read it very carefully. In this letter you will find the information on the following topics:

- **How to appeal this permit**
- **How to save money, reduce pollution and reduce energy consumption**
- **How to give us feedback on your permitting experience**
- **How to get an electronic copy of your permit**

**How to appeal this permit**

The issuance of this PTIO is a final action of the Director and may be appealed to the Environmental Review Appeals Commission pursuant to Section 3745.04 of the Ohio Revised Code. The appeal must be in writing and set forth the action complained of and the grounds upon which the appeal is based. The appeal must be filed with the Commission within thirty (30) days after notice of the Director's action. The appeal must be accompanied by a filing fee of \$70.00, made payable to "Ohio Treasurer Josh Mandel," which the Commission, in its discretion, may reduce if by affidavit you demonstrate that payment of the full amount of the fee would cause extreme hardship. Notice of the filing of the appeal shall be filed with the Director within three (3) days of filing with the Commission. Ohio EPA requests that a copy of the appeal be served upon the Ohio Attorney General's Office, Environmental Enforcement Section. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission  
 77 South High Street, 17th Floor  
 Columbus, OH 43215

## **How to save money, reduce pollution and reduce energy consumption**

The Ohio EPA is encouraging companies to investigate pollution prevention and energy conservation. Not only will this reduce pollution and energy consumption, but it can also save you money. If you would like to learn ways you can save money while protecting the environment, please contact our Office of Compliance Assistance and Pollution Prevention at (614) 644-3469. Additionally, all or a portion of the capital expenditures related to installing air pollution control equipment under this permit may be eligible for financing and State tax exemptions through the Ohio Air Quality Development Authority (OAQDA) under Ohio Revised Code Section 3706. For more information, see the OAQDA website: [www.ohioairquality.org/clean\\_air](http://www.ohioairquality.org/clean_air)

## **How to give us feedback on your permitting experience**

Please complete a survey at [www.epa.ohio.gov/survey.aspx](http://www.epa.ohio.gov/survey.aspx) and give us feedback on your permitting experience. We value your opinion.

## **How to get an electronic copy of your permit**

This permit can be accessed electronically via the eBusiness Center: Air Services in Microsoft Word format or in Adobe PDF on the Division of Air Pollution Control (DAPC) Web page, [www.epa.ohio.gov/dapc](http://www.epa.ohio.gov/dapc) by clicking the "Search for Permits" link under the Permitting topic on the Programs tab.

If you have any questions, please contact Ohio EPA DAPC, Central District Office at (614)728-3778 or the Office of Compliance Assistance and Pollution Prevention at (614) 644-3469.

Sincerely,



Michael E. Hopkins, P.E.  
Assistant Chief, Permitting Section, DAPC

Cc: Ohio EPA-CDO



**FINAL**

**Division of Air Pollution Control  
Permit-to-Install and Operate  
for  
FRANKLIN INTERNATIONAL**

Facility ID:	0125040070
Permit Number:	P0118183
Permit Type:	Renewal
Issued:	11/16/2015
Effective:	11/16/2015
Expiration:	11/16/2020





**Division of Air Pollution Control**  
**Permit-to-Install and Operate**  
for  
FRANKLIN INTERNATIONAL

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**Final Permit-to-Install and Operate**  
FRANKLIN INTERNATIONAL  
**Permit Number:** P0118183  
**Facility ID:** 0125040070  
**Effective Date:** 11/16/2015

## Authorization

Facility ID: 0125040070  
Application Number(s): A0052140  
Permit Number: P0118183  
Permit Description: Renewal FEPTIO permit for reactors and mixers with restrictions for OC/VOC & HAP emissions below Title V and MACT thresholds.  
Permit Type: Renewal  
Permit Fee: \$0.00  
Issue Date: 11/16/2015  
Effective Date: 11/16/2015  
Expiration Date: 11/16/2020  
Permit Evaluation Report (PER) Annual Date: July 1 - June 30, Due Aug 15

This document constitutes issuance to:

FRANKLIN INTERNATIONAL  
2020 Bruck Street  
Columbus, OH 43207

of a Permit-to-Install and Operate for the emissions unit(s) identified on the following page.

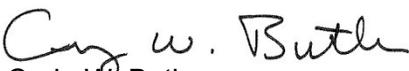
Ohio Environmental Protection Agency (EPA) District Office or local air agency responsible for processing and administering your permit:

Ohio EPA DAPC, Central District Office  
50 West Town Street, 6th Floor  
P.O. Box 1049  
Columbus, OH 43216-1049  
(614)728-3778

The above named entity is hereby granted this Permit-to-Install and Operate for the air contaminant source(s) (emissions unit(s)) listed in this section pursuant to Chapter 3745-31 of the Ohio Administrative Code. Issuance of this permit does not constitute expressed or implied approval or agreement that, if constructed or modified in accordance with the plans included in the application, the described emissions unit(s) will operate in compliance with applicable State and federal laws and regulations.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency

  
Craig W. Butler  
Director



## Authorization (continued)

Permit Number: P0118183

Permit Description: Renewal FEPTIO permit for reactors and mixers with restrictions for OC/VOC & HAP emissions below Title V and MACT thresholds.

Permits for the following Emissions Unit(s) or groups of Emissions Units are in this document as indicated below:

- |                                   |                                  |
|-----------------------------------|----------------------------------|
| <b>Emissions Unit ID:</b>         | <b>P028</b>                      |
| Company Equipment ID:             | Mixer 12                         |
| Superseded Permit Number:         | P0104738                         |
| General Permit Category and Type: | Not Applicable                   |
| <b>Emissions Unit ID:</b>         | <b>P114</b>                      |
| Company Equipment ID:             | Reactor 5 System                 |
| Superseded Permit Number:         | P0115352                         |
| General Permit Category and Type: | Not Applicable                   |
| <b>Emissions Unit ID:</b>         | <b>P126</b>                      |
| Company Equipment ID:             | Polyurethane Prepolymer Reactor  |
| Superseded Permit Number:         | P0104737                         |
| General Permit Category and Type: | Not Applicable                   |
| <b>Emissions Unit ID:</b>         | <b>P128</b>                      |
| Company Equipment ID:             | Pilot Reactor - Polymer Division |
| Superseded Permit Number:         | P0115352                         |
| General Permit Category and Type: | Not Applicable                   |

**Group Name: Mixers**

<b>Emissions Unit ID:</b>	<b>P022</b>
Company Equipment ID:	Mixer 1
Superseded Permit Number:	P0104738
General Permit Category and Type:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P023</b>
Company Equipment ID:	Mixer 2
Superseded Permit Number:	P0104738
General Permit Category and Type:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P024</b>
Company Equipment ID:	Mixer 3
Superseded Permit Number:	P0104738
General Permit Category and Type:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P026</b>
Company Equipment ID:	Mixer 5
Superseded Permit Number:	P0104738
General Permit Category and Type:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P027</b>
Company Equipment ID:	Mixer 11
Superseded Permit Number:	P0104738
General Permit Category and Type:	Not Applicable



**Group Name: Mixers w/condensers**

<b>Emissions Unit ID:</b>	<b>P005</b>
Company Equipment ID:	Littleford # 1 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P006</b>
Company Equipment ID:	Ross # 3 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P007</b>
Company Equipment ID:	Littleford # 4 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P029</b>
Company Equipment ID:	Myers 1
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P030</b>
Company Equipment ID:	Myers 2
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P031</b>
Company Equipment ID:	Ross # 1 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable

**Group Name: Mixers w/condensers and bag dump**

<b>Emissions Unit ID:</b>	<b>P004</b>
Company Equipment ID:	Ross # 2 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P039</b>
Company Equipment ID:	Littleford # 2 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P040</b>
Company Equipment ID:	Littleford # 3 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable

**Group Name: Nauta Mixers**

<b>Emissions Unit ID:</b>	<b>P002</b>
Company Equipment ID:	Nauta 1 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P003</b>
Company Equipment ID:	Nauta 2 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P020</b>
Company Equipment ID:	Nauta 3 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable



<b>Emissions Unit ID:</b>	<b>P021</b>
Company Equipment ID:	Nauta 5 Mixer
Superseded Permit Number:	P0104738
General Permit Category andType:	Not Applicable

**Group Name: Reactor systems w/pre-emulsion**

<b>Emissions Unit ID:</b>	<b>P103</b>
Company Equipment ID:	Continuous Reactor System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P113</b>
Company Equipment ID:	Reactor 4 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable

**Group Name: Reactor systems w/pre-emulsion**

<b>Emissions Unit ID:</b>	<b>P106</b>
Company Equipment ID:	Reactor 10 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P107</b>
Company Equipment ID:	Reactor 9 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P115</b>
Company Equipment ID:	Reactor 7 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P116</b>
Company Equipment ID:	Reactor 8 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P127</b>
Company Equipment ID:	Reactor 2 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable

**Group Name: Reactors with pre-emulsion**

<b>Emissions Unit ID:</b>	<b>P124</b>
Company Equipment ID:	Reactor 6 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable
<b>Emissions Unit ID:</b>	<b>P125</b>
Company Equipment ID:	Reactor 11 System
Superseded Permit Number:	P0104737
General Permit Category andType:	Not Applicable



**Final Permit-to-Install and Operate**  
FRANKLIN INTERNATIONAL  
**Permit Number:** P0118183  
**Facility ID:** 0125040070  
**Effective Date:** 11/16/2015

## **A. Standard Terms and Conditions**

**1. What does this permit-to-install and operate ("PTIO") allow me to do?**

This permit allows you to install and operate the emissions unit(s) identified in this PTIO. You must install and operate the unit(s) in accordance with the application you submitted and all the terms and conditions contained in this PTIO, including emission limits and those terms that ensure compliance with the emission limits (for example, operating, recordkeeping and monitoring requirements).

**2. Who is responsible for complying with this permit?**

The person identified on the "Authorization" page, above, is responsible for complying with this permit until the permit is revoked, terminated, or transferred. "Person" means a person, firm, corporation, association, or partnership. The words "you," "your," or "permittee" refer to the "person" identified on the "Authorization" page above.

The permit applies only to the emissions unit(s) identified in the permit. If you install or modify any other equipment that requires an air permit, you must apply for an additional PTIO(s) for these sources.

**3. What records must I keep under this permit?**

You must keep all records required by this permit, including monitoring data, test results, strip-chart recordings, calibration data, maintenance records, and any other record required by this permit for five years from the date the record was created. You can keep these records electronically, provided they can be made available to Ohio EPA during an inspection at the facility. Failure to make requested records available to Ohio EPA upon request is a violation of this permit requirement.

**4. What are my permit fees and when do I pay them?**

There are two fees associated with permitted air contaminant sources in Ohio:

PTIO fee. This one-time fee is based on a fee schedule in accordance with Ohio Revised Code (ORC) section 3745.11, or based on a time and materials charge for permit application review and permit processing if required by the Director.

You will be sent an invoice for this fee after you receive this PTIO and payment is due within 30 days of the invoice date. You are required to pay the fee for this PTIO even if you do not install or modify your operations as authorized by this permit.

Annual emissions fee. Ohio EPA will assess a separate fee based on the total annual emissions from your facility. You self-report your emissions in accordance with Ohio Administrative Code (OAC) Chapter 3745-78. This fee assessed is based on a fee schedule in ORC section 3745.11 and funds Ohio EPA's permit compliance oversight activities. For facilities that are permitted as synthetic minor sources, the fee schedule is adjusted annually for inflation. Ohio EPA will notify you when it is time to report your emissions and to pay your annual emission fees.

**5. When does my PTIO expire, and when do I need to submit my renewal application?**

This permit expires on the date identified at the beginning of this permit document (see "Authorization" page above) and you must submit a renewal application to renew the permit. Ohio EPA will send a renewal notice to you approximately six months prior to the expiration date of this permit. However, it is

very important that you submit a complete renewal permit application (postmarked prior to expiration of this permit) even if you do not receive the renewal notice.

If a complete renewal application is submitted before the expiration date, Ohio EPA considers this a timely application for purposes of ORC section 119.06, and you are authorized to continue operating the emissions unit(s) covered by this permit beyond the expiration date of this permit until final action is taken by Ohio EPA on the renewal application.

**6. What happens to this permit if my project is delayed or I do not install or modify my source?**

This PTIO expires 18 months after the issue date identified on the "Authorization" page above unless otherwise specified if you have not (1) started constructing the new or modified emission sources identified in this permit, or (2) entered into a binding contract to undertake such construction. This deadline can be extended by up to 12 months, provided you apply to Ohio EPA for this extension within a reasonable time before the 18-month period has ended and you can show good cause for any such extension.

**7. What reports must I submit under this permit?**

An annual permit evaluation report (PER) is required in addition to any malfunction reporting required by OAC rule 3745-15-06 or other specific rule-based reporting requirement identified in this permit. Your PER due date is identified in the Authorization section of this permit.

**8. If I am required to obtain a Title V operating permit in the future, what happens to the operating provisions and PER obligations under this permit?**

If you are required to obtain a Title V permit under OAC Chapter 3745-77 in the future, the permit-to-operate portion of this permit will be superseded by the issued Title V permit. From the effective date of the Title V permit forward, this PTIO will effectively become a PTI (permit-to-install) in accordance with OAC rule 3745-31-02(B). The following terms and conditions of this permit will no longer be applicable after issuance of the Title V permit: Section B, Term 1.b) and Section C, for each emissions unit, Term a)(2).

The PER requirements in this permit remain effective until the date the Title V permit is issued and is effective, and cease to apply after the effective date of the Title V permit. The final PER obligation will cover operations up to the effective date of the Title V permit and must be submitted on or before the submission deadline identified in this permit on the last day prior to the effective date of the Title V permit.

**9. What are my obligations when I perform scheduled maintenance on air pollution control equipment?**

You must perform scheduled maintenance of air pollution control equipment in accordance with OAC rule 3745-15-06(A). If scheduled maintenance requires shutting down or bypassing any air pollution control equipment, you must also shut down the emissions unit(s) served by the air pollution control equipment during maintenance, unless the conditions of OAC rule 3745-15-06(A)(3) are met. Any emissions that exceed permitted amount(s) under this permit (unless specifically exempted by rule) must be reported as deviations in the annual permit evaluation report (PER), including nonexempt excess emissions that occur during approved scheduled maintenance.

**10. Do I have to report malfunctions of emissions units or air pollution control equipment? If so, how must I report?**

If you have a reportable malfunction of any emissions unit(s) or any associated air pollution control system, you must report this to the [DO/LAA] in accordance with OAC rule 3745-15-06(B). Malfunctions that must be reported are those that result in emissions that exceed permitted emission levels. It is your responsibility to evaluate control equipment breakdowns and operational upsets to determine if a reportable malfunction has occurred.

If you have a malfunction, but determine that it is not a reportable malfunction under OAC rule 3745-15-06(B), it is recommended that you maintain records associated with control equipment breakdown or process upsets. Although it is not a requirement of this permit, Ohio EPA recommends that you maintain records for non-reportable malfunctions.

**11. Can Ohio EPA or my local air agency inspect the facility where the emission unit(s) is/are located?**

Yes. Under Ohio law, the Director or his authorized representative may inspect the facility, conduct tests, examine records or reports to determine compliance with air pollution laws and regulations and the terms and conditions of this permit. You must provide, within a reasonable time, any information Ohio EPA requests either verbally or in writing.

**12. What happens if one or more emissions units operated under this permit is/are shut down permanently?**

Ohio EPA can terminate the permit terms associated with any permanently shut down emissions unit. "Shut down" means the emissions unit has been physically removed from service or has been altered in such a way that it can no longer operate without a subsequent "modification" or "installation" as defined in OAC Chapter 3745-31.

You should notify Ohio EPA of any emissions unit that is permanently shut down by submitting a certification that identifies the date on which the emissions unit was permanently shut down. The certification must be submitted by an authorized official from the facility. You cannot continue to operate an emission unit once the certification has been submitted to Ohio EPA by the authorized official.

You must comply with all recordkeeping and reporting for any permanently shut down emissions unit in accordance with the provisions of the permit, regulations or laws that were enforceable during the period of operation, such as the requirement to submit a PER, air fee emission report, or malfunction report. You must also keep all records relating to any permanently shutdown emissions unit, generated while the emissions unit was in operation, for at least five years from the date the record was generated.

Again, you cannot resume operation of any emissions unit certified by the authorized official as being permanently shut down without first applying for and obtaining a permit pursuant to OAC Chapter 3745-31.

**13. Can I transfer this permit to a new owner or operator?**

You can transfer this permit to a new owner or operator. If you transfer the permit, you must follow the procedures in OAC Chapter 3745-31, including notifying Ohio EPA or the local air agency of the change in ownership or operator. Any transferee of this permit must assume the responsibilities of the transferor permit holder.

**14. Does compliance with this permit constitute compliance with OAC rule 3745-15-07, "air pollution nuisance"?**

This permit and OAC rule 3745-15-07 prohibit operation of the air contaminant source(s) regulated under this permit in a manner that causes a nuisance. Ohio EPA can require additional controls or modification of the requirements of this permit through enforcement orders or judicial enforcement action if, upon investigation, Ohio EPA determines existing operations are causing a nuisance.

**15. What happens if a portion of this permit is determined to be invalid?**

If a portion of this permit is determined to be invalid, the remainder of the terms and conditions remain valid and enforceable. The exception is where the enforceability of terms and conditions are dependent on the term or condition that was declared invalid.



**Final Permit-to-Install and Operate**  
FRANKLIN INTERNATIONAL  
**Permit Number:** P0118183  
**Facility ID:** 0125040070  
**Effective Date:** 11/16/2015

## **B. Facility-Wide Terms and Conditions**

1. This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).
  - a) For the purpose of a permit-to-install document, the facility-wide terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

- (1) None.

2. **Applicable Emission Limitations and/or Control Requirements**

- a) For the purpose of a permit-to-operate document, the facility-wide terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V for HAPs)	See b)(1).

- b) **Additional Terms and Conditions**

- (1) This permit establishes the following federally enforceable limitations on emissions of hazardous air pollutants (HAPs), as identified in Section 112(b) of Title III of the Clean Air Act, for the purpose of avoiding Maximum Achievable Control Technology (MACT) regulations and Title V permitting requirements:

- a. The actual emissions from emission units P002, P003, P004, P005, P006, P007, P020, P021, P022, P023, P024, P026, P027, P028, P029, P030, P031, P039, P040, P103, P106, P107, P113, P114, P115, P116, P124, P125, P126, P127 and P128, and all other emission sources at the facility, including but not limited to any de minimis emission units as defined in OAC rule 3745-15-05, or any registration status and/or permit exempt/permit-by-rule emission units pursuant to OAC rule 3745-31-03, combined, shall not exceed 9.9 tons for any single HAP, based upon a rolling, 12-month summation.
      - b. The actual emissions from emission units P002, P003, P004, P005, P006, P007, P020, P021, P022, P023, P024, P026, P027, P028, P029, P030, P031, P039, P040, P103, P106, P107, P113, P114, P115, P116, P124, P125, P126, P127 and P128 and all other emission sources at the facility, including but not limited to any de minimis emission units as defined in OAC rule 3745-15-05, or any registration status and/or permit exempt/permit-by-rule emission units pursuant to OAC rule 3745-31-03, combined, shall not exceed 24.9 tons for any combination of HAPs, based upon a rolling, 12-month summation.

Therefore, the provisions for Title V permitting, the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Miscellaneous Organic Chemical

Manufacturing in 40 CFR Part 63 Subpart FFFF, and for the Miscellaneous Coating Manufacturing in 40 CFR Part 63 Subpart HHHHH are not applicable.

A listing of HAPs can be found in Section 112(b) of the Clean Air Act or can be obtained by contacting your Ohio EPA field office or local air agency contact.

c) Operational Restrictions

(1) The operational restriction on the facility-wide potential to emit for VOC, individual HAP and combined HAP that establish federally enforceable limitations on emission units P103, P106, P107, P113, P114, P115, P116, P124, P125, P126, P127 and P128 are as follows:

- a. the permittee shall equip each pre-emulsion tank with a hatch cover that must be closed at all times when the unit is in operation, except for solids addition and/or material sampling. The captured VOC emissions shall be vented to a condenser to achieve a minimum 50% reduction of VOC emissions; and
- b. the permittee shall equip each reactor with a tightly fitting cover that must be closed at all times when the unit is in operation except for non-solvent material addition and/or material sampling. The captured VOC emissions shall be vented to a reflux condenser that achieves a minimum 90% reduction of VOC emissions.

(2) The operational restriction on the facility-wide potential to emit for VOC, individual HAP and combined HAP that establish federally enforceable limitations on emission units P002, P003, P004, P005, P006, P007, P020, P021, P022, P023, P024, P026, P027, P028, P029, P030, P031, P039 and P040 are as follows:

- a. the permittee shall equip each mixer with a tightly fitting cover that must be closed at all times when the unit is in operation except for material addition and/or material sampling; and
- b. the captured OC emissions from P004, P005, P006, P007, P029, P030, P031, P039 and P040 shall be vented to a water-cooled condenser that achieves a 90% reduction of OC emissions.

d) Monitoring and/or Recordkeeping Requirements

(1) The permittee shall collect and record the following information each month for the purpose of calculating the rolling, 12-month summation of HAP emissions:

- a. the total uncontrolled emissions of each individual HAP from any de minimis emission units as defined in OAC rule 3745-15-05, any registration status and/or permit exempt/permit-by-rule emission units pursuant to OAC rule 3745-31-03, in tons, calculated in accordance with the engineering analysis submitted with the permit application and the requirements established in B.2.d)(1);
- b. the total uncontrolled emissions of combined HAPs from any de minimis emission units as defined in OAC rule 3745-15-05, any registration status and/or permit exempt/permit-by-rule emission units pursuant to OAC rule 3745-31-03, in

tons, calculated in accordance with the engineering analysis submitted with the permit application and the requirements established in B.2.d)(1);

- c. the total uncontrolled emissions of each individual HAP from emission units not taking credit for use of the condensers due to temperature exceedances;
- d. the total uncontrolled emissions of combined HAPs from emission units not taking credit for use of the condensers due to temperature exceedances;
- e. the total controlled emissions of individual HAPs from emission units being controlled by the condensers;
- f. the total controlled emissions of combined HAPs from emission units being controlled by the condensers;
- g. the rolling, 12-month summation of the individual HAP emissions from all emission units operating at the facility, in tons; and
- h. the rolling, 12-month summation of the total combined HAP emissions from all emission units operating at the facility, in tons.

e) Reporting Requirements

- (1) All applications, notifications or reports required by terms and conditions in this permit to be submitted or "reported in writing" are to be submitted to Ohio EPA through the Ohio EPA's eBusiness Center: Air Services web service ("Air Services"). Ohio EPA will accept hard copy submittals on an as-needed basis if the permittee cannot submit the required documents through the Ohio EPA eBusiness Center. In the event of an alternative hard copy submission in lieu of the eBusiness Center, the post-marked date or the date the document is delivered in person will be recognized as the date submitted. Electronic submission of applications, notifications, or reports required to be submitted to Ohio EPA fulfills the requirement to submit the required information to the Director, the District Office or Local Air Agency, and/or any other individual or organization specifically identified as an additional recipient identified in this permit unless otherwise specified. Consistent with OAC rule 3745-15-03, the required application, notification or report is considered to be "submitted" on the date the submission is successful using a valid electronic signature. Signature by the signatory authority may be represented as provided through procedures established in Air Services.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any exceedance of the rolling, 12-month individual HAP emission limitation for each HAP; and
    - ii. any exceedance of the rolling, 12-month total combined HAPs emission limitation.

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted, electronically through Ohio EPA Air Services, each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director (Central District Office).

f) Testing Requirements

(1) Emissions Limitations:

Emissions of any single HAP shall not exceed 9.9 tons per rolling, 12-month period.

Emissions of total combined HAPS shall not exceed 24.9 tons per rolling, 12-month period.

Applicable Compliance Method:

- a. For any de minimis emissions units as defined in OAC rule 3745-15-05, any registration status and/or permit exempt/permit-by-rule emissions units pursuant to OAC rule 3745-31-03, the permittee shall calculate HAP emissions consistent with the information presented in the installation and/or operating permit application using U.S. EPA approved emissions factors or emissions factors otherwise approved by Central District Office.
- b. For all non-insignificant emission units, the permittee shall calculate HAP emissions consistent with the engineering analysis presented in the installation and/or operating permit application using approved emission factors, stack test results or other factors otherwise approved by Central District Office.
- c. For emission units P103, P106, P107, P113, P115, P116, P124, P125, P126 and P127 single HAP and total combined HAPs shall be determined as follows:
  - i. If the reactor contents are heated up to and/or above the boiling point of the chemicals with the lowest boiling point in the batch, the Ideal Gas Law no longer applies. In this case, use the appropriate emission factor derived from stack testing already conducted, in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling pint to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling chemicals' emissions, calculated in this way, shall be added to the emission calculated for the chemical that's boiling point was exceeded, to

document a conservative estimate of HAP emissions for the time period under these conditions.

The total uncontrolled HAP emission rate from each method of loss for each batch shall be calculated by summing all hazardous components to equal the total pounds of HAPs emitted per batch from the reactor.

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated using the worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- ii. the total actual HAP emissions for each month of operation (lbs/month), from all batches produced each day, and calculated using one of the following methods:
  - (a) the sum of the actual HAP emissions calculated from all batches run for each day of operation; or
  - (b) the sum of the actual HAP emission from all batches run each day, calculated by multiplying the conservatively calculated, or worst-case emissions, for one batch of each product or product group multiplied by the number of batches of each product or product group run, and adding the resultant HAP emissions for all products made in this emission unit each day, including those calculated individually for abnormal operations or for new products; and
- iii. the HAP emissions from these emission units, summed per month, for a rolling, 12-month period.
- d. For emission units P004, P005, P006, P007, P029, P030, P031, P039, P040, P114 and P128 single HAP and total combined HAPs shall be determined as follows:
  - i. Antione's Equation (Equation 3-8 from the U.S. EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes"), with the constants (A, B, &C) found in "Lange's Handbook of Chemistry", shall be used to calculate the vapor pressure\* of each liquid/hazardous component:

$$P_i = A - B / (C + T)$$

Where:

$P_i$  = vapor pressure of component "i" (mmHg)

A, B, C = component specific constants

T = temperature of liquid (deg C)

\*Component vapor pressures may also be derived from a reliable source of vapor pressure/temperature tables such as "Lange's Handbook of Chemistry" or "Perry's Chemical Engineering Handbook".

- ii. Equation 3-9 from the U.S. EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes" (Raoul's Law), shall be used to calculate the mole fraction of a hazardous component in the vapor:

$$Y_i = P_i / P_t = X_i P_i^* / P_t$$

- iii. The following equation, which is derived by substituting for  $Y_i$  from Raoul's Law in Equation 3-7 from the U.S. EPA Guideline Series "Control of Volatile Organic Emissions from Batch Processes", shall be used to calculate emissions from breathing losses for each liquid hazardous component:

$$E_r = [(X_i)(V_r)(P_i^*)(MW) / (R)(T) \times \% \text{saturation}^*]$$

- iv. Equation 3-7 from the U.S. EPA Guideline Series "Control of Volatile Organic Emissions from Batch Processes", shall be used to calculate the mass emission rate of each hazardous component in the displaced gasses from each batch:

$$E_r = [(Y_i)(V_r)(P_t)(MW) / (R)(T) \times \% \text{saturation}^*]$$

- v. Equation 3-15 from the U.S. EPA Guideline Series "Control of Volatile Organic Emissions from Batch Processes", shall be used to calculate the number of moles of gas displaced due to temperature increases from mixing (friction). The number of moles shall then be multiplied by the molecular weight and the mole fraction of each hazardous component in the mix, to get pounds of each hazardous component in the gas displaced from each batch due to mixing heat:

$$E_r = [V\{P_{a1} / T_1 - P_{a2} / T_2\} (Y_i)(MW)] / R$$

Where:

$E_r$  = mass emission rate (lbs/batch)

$Y_i$  = mole fraction of component "i" in vapor

$X_i$  = mole fraction of component "i" in liquid

$V_r$  = volumetric gas displacement rate (ft<sup>3</sup>/batch)

V = volume of vapor in head space (ft<sup>3</sup>/batch)

R = Ideal Gas Law constant (10.73 ft<sup>3</sup>psia/lb mole deg R)  
T = operating temperature (deg R)  
T1 = initial temperature in vessel (deg R)  
T2 = final temperature in vessel (deg R)  
Pi = partial pressure of component "i" (psia)  
Pi\* = vapor pressure of component "i" at temperature T (psia)  
Pt = total pressure in the vessel vapor space (psia)  
Pa1 = initial gas pressure in vessel (psia)  
Pa2 = final gas pressure in vessel (psia)  
MW = molecular weight (lb/lb mole)

\*The % saturation shall never be less than 60% and/or shall be adjusted with the most current and worst-case testing results, by product group and highest concentration of the hazardous components. The % saturation shall not be used if a nitrogen purge is applied; and 80% saturation (worst case) shall be used for all product groups not tested for the saturation level of the compound in the vapor space, unless it can be demonstrated that the saturation point is lower.

- vi. If the condenser's control efficiency is used in the calculation of emissions or in the demonstration of compliance with the individual HAP and combined HAP limits contained in this permit, the condenser control efficiency shall be determined in accordance with the method below:

**Method for Determining Condenser Control Efficiency:**

The following equation represents the mass balance around the condenser and calculates the mole fraction of HAPs in the feed and in the vapor leaving the condenser. If records of these calculations are maintained in the facility records, they need only be performed once for each variation in the inlet temperature (measured as the average operating temperature of each product batch) and condenser outlet water temperature (measured after the mix tanks, prior to the chiller) for each product, or worst-case product. It shall be assumed that the vapor outlet temperature is 2.5 degrees (Celsius) higher than the outlet water temperatures of the condenser, as measured by the continuous temperature monitor installed following the mixer(s), prior to the chiller. The efficiency, calculated using the following assumptions and formula, shall be subtracted from 100% to calculate the fractional control efficiency of the condenser. If the controlled emission rate is to be calculated, the fractional control efficiency of the condenser shall be multiplied by the total uncontrolled emission rates calculated in f)(1)d., above.

**Mass balance assumptions:**

F = liquid/gas feed to condenser (lb mole)  
D = gas leaving the condenser (lb mole)  
W = liquid leaving the condenser (lb mole)  
z = mole fraction of HAPs in feed  
y = mole fraction of HAPs in vapor leaving the condenser

$x$  = mole fraction of HAPs in liquid leaving the condenser  
 $x = 1$  (assumes that all the liquid condensed is HAP)  
 $F = 100$  lb. moles (arbitrarily set to calculate the pound moles of  $D$  and  $W$ )  
 $F = D + W$ ; and therefore  $W = F - D$ ; and substituting for value of " $F$ ";  
 $W = 100 - D$   
Substituting for  $W$  in  $F(z) = D(y) + W(x)$ :  
 $100z = Dy + (100 - D)x$   
 $100z = Dy + 100x - Dx$   
 $100z - 100x = Dy - Dx$   
 $100(z - x) = D(y - x)$   
 $D = 100(z - x) / (y - x)$

The vapor pressures shall be determined using Antoine's Equation of vapor pressure/temperature tables ("Lange's Handbook of Chemistry" or "Perry's Chemical Engineer's Handbook"), at the appropriate inlet and outlet vapor temperatures.

The mole fractions, " $y$ " and " $z$ ", can be determined using Raoul's Law, if the liquid is assumed to be 100% of the pollutant for which the efficiency is being calculated:

$z$  = vapor pressure of pollutant at the vapor inlet temperature\* / 760  
 $y$  = vapor pressure of pollutant at the vapor outlet temperature\*\* / 760

efficiency (EF) =  $(in - out) / in$ , or  
 $EF = Fz - Dy / Fz$ , or  
 $EF = 100z - [100(z - x) / (y - x)]y / 100z$

\*Vapor inlet temperature shall be measured as the average operating temperature of each product batch.

\*\*Vapor outlet temperature of the condenser shall be measured from the returning chilled water, after the mixers, but before the chiller, with 2.5 degrees Celsius added to adjust for the water to vapor temperatures.

For the purpose of calculating long term emissions, the control efficiency for each product or product type mixed during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the mixer, prior to the chiller (to deliver the outlet vapor temperature), and the efficiency calculated as per the method above.



**Final Permit-to-Install and Operate**  
FRANKLIN INTERNATIONAL  
**Permit Number:** P0118183  
**Facility ID:** 0125040070  
**Effective Date:** 11/16/2015

## **C. Emissions Unit Terms and Conditions**

**1. P028, Mixer 12**

**Operations, Property and/or Equipment Description:**

Mixer 12 w/condenser

- a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).
  - (1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.
    - a. b)(1)f., d)(6)
  - (2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.
    - a. b)(1)a., b)(2)a.
- b) Applicable Emissions Limitations and/or Control Requirements
  - (1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V and MACT)	Emissions shall not exceed:  Volatile organic compounds (VOC) emissions shall not exceed 6.0 tons per rolling, 12-month period.  Hazardous air pollutant (HAP) emissions shall not exceed 0.9 tons per rolling, 12-month period.  See B.2.b)(1)a., B.2.b)(1)b. above, and b)(2)a., below.
b.	OAC rule 3745-31-05(A)(3) June 30, 2008	BAT for VOC has been determined to be equivalent to the requirements established pursuant to OAC 3745-31-05(D) above.  See b)(2)b.



	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
c.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)c.
d.	OAC rule 3745-17-07(B)(1)	Visible emissions of fugitive dust from these emissions units shall not exceed twenty percent opacity as a three-minute average.
e.	OAC rule 3745-17-08(B)	Reasonable available control measures (RACM) that are sufficient to minimize or eliminate visible emissions of fugitive dust.  The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases <b>or</b> there shall be no visible emissions from the exhaust stack.  See b)(2)d., b)(2)e.
f.	ORC rule 3704.03(F)	See g)(1)

(2) Additional Terms and Conditions

- a. All of the VOC emissions from this emissions unit shall be vented to a condenser that shall meet the operational, monitoring, and record keeping requirements of this permit, when the emissions unit is in operation. Emissions from water based adhesives are not required to be vented to a condenser.
- b. The permittee has satisfied the Best Available Technology (BAT) requirements pursuant to Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3), as effective November 30, 2001, in this permit. On December 1, 2006, paragraph (A)(3) of OAC rule 3745-31-05 was revised to conform to the Ohio Revised Code (ORC) changes effective August 3, 2006 (Senate Bill 265 changes), such that BAT is no longer required by State regulations for National Ambient Air Quality Standards (NAAQS) pollutant(s) less than ten tons per year. However, that rule revision has not yet been approved by U.S. EPA as a revision to Ohio's State Implementation Plan (SIP). Therefore, until the SIP revision occurs and the U.S. EPA approves the revisions to OAC rule 3745-31-05, the requirement to satisfy BAT still exists as part of the federally-approved SIP for Ohio. Once U.S. EPA approves the December 1, 2006 version of OAC rule 3745-31-05, then these emission limitations/control measures no longer apply.
- c. This rule paragraph applies once U.S. EPA approves the December 1, 2006 version of OAC rule 3745-31-05 as part of the State Implementation Plan.

The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the VOC emissions from this emissions unit because the

controlled emission rate for VOC is less than 10 tons per year based on the limitations established by OAC rule 3745-31-05(D).

- d. The permittee shall employ RACM to minimize or eliminate visible emissions of fugitive dust when handling dry raw materials or charging dry raw materials into the mixer and/or bag dump, including but not limited to:
    - i. appropriate house-keeping measures to prevent fugitive dust from becoming airborne; and
    - ii. immediately closing the lid(s) to the mixer and/or bag dump at the completion of adding all dry batch mix materials.
  - e. The installation and use of hoods, fans, and/or other equipment to adequately enclose, contain, capture, vent, and control fugitive dust from this emissions unit shall meet the following requirements:
    - i. the collection efficiency shall be sufficient to minimize or eliminate visible emissions of fugitive dust at the point(s) of capture to the extent possible with good engineering design; and
    - ii. the control equipment for this emissions unit shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases or there shall be no visible particulate emissions (whichever is less stringent) from the exhaust stack of this emissions unit.
  - f. For the purpose of verifying compliance with the visible emission limitation for fugitive dust, the visible emissions shall be observed at the closest egress points to the mixer(s) from the building housing the emission unit. These egress points shall include, but not be limited to: mixer room exhaust vents, doorways, and windows.
  - g. The temperature of the chilled water from the condenser shall not exceed 18 degrees Celsius.
- c) Operational Restrictions
- (1) None.
- d) Monitoring and/or Recordkeeping Requirements
- (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emission unit:
    - a. the company name, code, and/or identification number for each batch of adhesive, caulk, syrup, or other product processed; the date of production; and the number of batches of each product processed;
    - b. the amount, in pounds, of each organic material added to the mixer;

- c. the highest operating temperature reached during the batch run;
- d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hours/batch) and the total hour of operation for this emission unit (hours/day) can be determined;
- e. if emissions from any product batch are calculated using conservatively estimated and/or worst-case variables\* for an individual product, product type, or product group\*\*, the following information may be maintained on file in the facility records to document such product batch's emissions, in lieu of maintaining daily emissions calculations for each individual batch:
  - i. the company name, code, and/or identification number for each individual product and each product group (if used), for which conservatively estimated and/or worst-case emission calculations shall be documented; and to be used to identify the products and product groups maintained in these records;
  - ii. a record of the mole fraction of each organic chemical contained in each product processed and in each representative batch product group, if used (which shall demonstrate that each organic chemical contained in a product batch is less than or equal to the mole fraction of the same organic chemical in the representative product group);
  - iii. records to document the value of each conservatively estimated and/or worst-case variable for each product or product group;
  - iv. the uncontrolled and controlled (if applicable) emission calculations for each product and product group (if used), in which the conservatively estimated and/or worst case variables are applied and calculated as required (if controlled) for each organic chemical component at each method of loss (pounds of each VOC/HAP per batch);
  - v. the product batch's and product batch group's (if used) total uncontrolled and controlled (if applicable) VOC and HAP emissions, which shall equal the sum of all of the organic chemical components' emissions for this emissions unit or an emission unit with a greater volume; and
  - vi. a record of the maximum number of batches of each product or product group that could be processed in any day without exceeding the limitations contained in this permit.
- f. the actual number of batches of each product processed each day;
- g. if not documented as required for each product, the calculated mole fraction of each organic chemical component in each product batch;
- h. if a control efficiency is applied and if the condenser was operating properly through the batch run and if emissions are not documented for the product of product group, a record of the conservative average operating temperature of

each such product batch made in the mixer, to be used as the vapor inlet temperature; and a record of the conservative average condenser water outlet temperature, measured after the mixer, prior to the chiller, to be used to calculate the vapor outlet temperature in the control efficiency calculation, where it is assumed that the vapor outlet temperature is 2.5 degrees Celsius higher than the chiller water temperature leaving the mixer;

- i. the total controlled (if condenser operating properly and used for compliance) and uncontrolled VOC and HAP emissions (lbs/batch), and the emission calculations for each organic chemical component in each batch that was not processed under normal operating parameters (temperature, pressure, or mole fraction) due to mistakes made in the batch recipe formulation, faulty operation of the unit, malfunction of the condenser, or other changes made to the normal operating parameters that would affect the emission rate for a specific product batch; and
- j. the total actual or conservatively estimated/worst-case VOC and HAP emissions (lbs/batch) and the emission calculations for each organic chemical component in each batch processed in this emission unit, for which a record of the calculations documenting the conservatively estimated and/or worst-case emission for the product batch or product batch group, representing the product, are not maintained as requested.

\* Conservatively estimated and/or worst case variable conditions (of temperatures, pressures, and volume of vapor space) and equivalent or worst-case concentrations, which result in conservative/worst-case emissions for the batch, may be maintained in a single record (as opposed to daily) for each product or product group to which they could be applied.

\*\* Products may be grouped by similar product types (same chemical components and having similar concentrations) for hourly and daily emission estimates, if the variables of temperature, pressure, volume of vapor head space, and concentration (mole fraction), applied in the provided equations, calculated at each method of loss, are conservative and/or worst-case for each variable. If the mixer condenser is used to demonstrate compliance, the control efficiency shall be calculated as required and shall be dependent on the conservative average vapor inlet and outlet temperatures of the condenser. Products may also be grouped by the seasons of the year, in order to segregate and lessen the effects of ambient temperatures. The highest concentrations of the organic chemical components, represented in the product group, shall be used in the calculations of daily emissions, unless products are calculated individually.

- (2) The permittee shall calculate and record the following daily information at the end of each month, from the previous month:
  - a. the total number of batches of each individual adhesive, caulk, syrup, or other product processed in these emission units during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated each day, showing each batch using one of the following methods:

- i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and all required records;
    - ii. product batch(s) is/are individually calculated because an existing record does not exist;
    - iii. product batch(s) deviate(s) from the normal operating parameters and are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
  - c. the total actual (controlled\* and/or uncontrolled) VOC and HAP emission for each day of operation (lbs/day), from all product batches produced each day, calculated using one of the following methods:
    - i. the sum of the actual VOC and HAP emissions calculated from all batches run during each day of operation; or
    - ii. the sum of the actual VOC and HAP emissions from all batches run each day, calculated by multiplying the worst-case emissions for one batch of product or product group, multiplied by the number of batches run and adding the resultant VOC and HAP emissions from all products made in this unit, each day, including emissions from abnormal operations or new products; and
  - d. the monthly VOC and HAP emissions from this unit for each month as a rolling, 12-month average.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the uncontrolled emissions for each organic chemical component of the product batch or product batch group, multiplied by the percent control efficiency and subtracting the result (the condensed VOC and HAP component) from the total uncontrolled emissions of each organic chemical component. The controlled and uncontrolled emissions (lbs/batch) may be added for each day to satisfy this requirement.

  - (3) Whenever the monitored temperature of the chilled water from the condenser deviates from the limit established in accordance with this permit, the permittee shall promptly investigate the cause of the deviation. The permittee shall maintain records of the following information for each investigation:
    - a. the date and time the deviation began;
    - b. the magnitude of the deviation at that time;
    - c. the date the investigation was conducted;

- d. the name(s) of the personnel who conducted the investigation; and
- e. the findings and recommendations.

In response to each required investigation to determine the cause of a deviation, the permittee shall take prompt corrective action to bring the operation of the control equipment within the acceptable range/limit specified in this permit, unless the permittee determines that corrective action is not necessary and documents the reasons for that determination and the date and time the deviation ended. The permittee shall maintain records of the following information for each corrective action taken:

- f. a description of the corrective action;
- g. the date corrective action was completed;
- h. the date and time the deviation ended;
- i. the total period of time (in minutes) during which there was deviation;
- j. the temperature readings of the exhaust gas from condenser immediately after the corrective action was implemented; and
- k. the name(s) of the personnel who performed the work.

Investigation and records required by this paragraph do not eliminate the need to comply with the requirements of OAC rule 3745-15-06 if it is determined that a malfunction has occurred.

- (4) The chilled water temperature limit is effective for the duration of this permit, unless revisions are requested by the permittee and approved in writing by Ohio EPA Central District Office. The permittee may request revisions to the permitted chilled water exit temperature limit based upon information obtained during future performance tests that demonstrate compliance with the allowable VOC emission rate for the controlled emissions unit(s). In addition, approved revisions to the chilled water temperature limit will not constitute a relaxation of the monitoring requirements of this permit and may be incorporated into this permit by means of an administrative modification.
- (5) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
  - a. the location and color of the emissions;
  - b. whether the emissions are representative of normal operations;
  - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;

- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations, or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions, or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (6) Modeling to demonstrate compliance with, the "Toxic Air Contaminant Statute", ORC 3704.03(F)(4)(b), was not necessary because the emissions unit's maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.
- (7) If the condenser is used to demonstrate compliance with the allowable limits, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water leaving the condenser serving this emission unit when the unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within +/- 1 percent of the temperature being measured or +/- 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.
- (8) The permittee shall collect and maintain the following information for each product batch;
  - a. the computer record of the continuous temperature monitor which shall document the temperature of the chilled water leaving the condenser serving this emission unit;
  - b. a record (continuous temperature monitor graph or equivalent) of the operating time for the condenser, its temperature control device, monitoring equipment, and the mix tank, for each product batch; and
  - c. for any batch in which the temperature of the chilled water leaving the condenser serving this emission unit exceeded 18 degrees Celsius at any time, a record of the adjusted, calculated control efficiency.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. each period of time (start time and date, and end time and date) when the temperature of the chilled water from the condenser was greater than 18 degrees Celsius; and
    - ii. any period of time (start time and date, and end time and date) when the emissions unit(s) was/were in operation and the process emissions were not vented to the condenser.

These quarterly reports shall be submitted by April 30, July 31, October 31, and January 31, and shall cover the records for the previous calendar quarters and shall include:

- b. the probable cause of each deviation (excursion);
- c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
- d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

- (3) The permittee shall identify the following information in the annual permit evaluation report in accordance with the monitoring requirements for visible emissions in term number d)(3) above:
  - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;
  - b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
  - c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation: 6.0 tons of VOC per rolling, 12-month period and 0.9 ton of hazardous air pollutant (HAP) per rolling, 12-month period.

Applicable Compliance Method: Compliance with this emission limitation is demonstrated by the engineering analysis submitted with the permit application and the requirements established in d)(1), d)(2), and d)(7). The emission limitations calculations are based upon U.S. EPA Guidance (February 1994) and the Synthetic Organic Chemical Manufacturer's Association's (SOCMA) methodology (August 29, 1996) approved by U.S. EPA.

i. Compliance with the short-term and long-term VOC emission limitations, as well as the long-term HAP emission limitation shall be demonstrated based on the record keeping requirements in d)(1), d)(2) and d)(7), above.

ii. Emissions from each batch shall be calculated as follows:

- (a) Antione's Equation (Equation 3-8 from the US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes"), with the constants (A, B, &C) found in "Lange's Handbook of Chemistry", shall be used to calculate the vapor pressure\* of each liquid/volatile component:

$$P_i = A - B / (C+T)$$

Where:

$P_i$  = vapor pressure of component i (mmHg)

A, B, C = component specific constants

T = temperature of liquid (deg C)

\*Component vapor pressures may also be derived from a reliable source of vapor pressure/temperature tables such as "Lange's Handbook of Chemistry" or "Perry's Chemical Engineers' Handbook".

- (b) Equation 3-9 from the US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes" (Raoul's Law), shall be used to calculate the mole fraction of a component in the vapor:

$$Y_i = P_i / P_t = X_i P_i^* / P_t$$

- (c) The following equation, which is derived by substituting for  $Y_i$  from Raoul's Law in Equation 3-7 from the US EPA Guideline Series

“Control of Volatile Organic Emissions from Batch Processes”, shall be used to calculate emissions from breathing losses for each liquid volatile component:

$$Er = [(Xi)(Vr)(Pi^*)(MW) / (R)(T)] \times \% \text{ saturation}^*$$

- (d) Equation 3-7 from the US EPA Guideline Series “Control of Volatile Organic Emissions from Batch Processes”, shall be used to calculate the mass emission rate of each volatile component in the displaced gasses from each batch:

$$Er = [(Yi)(Vr)(Pt)(MW) / (R)(T)] \times \% \text{ saturation}^*$$

- (e) Equation 3-15 from the US EPA Guideline Series “Control of Volatile Organic Compound Emissions from Batch Processes”, shall be used to calculate the number of moles of gas displaced due to temperature increases from mixing (friction). The number of moles shall then be multiplied by the molecular weight and the mole fraction of each volatile component in the mix, to get pounds of each component in the gas displaced from each batch due to mixing heat:

$$Er = [V \{Pa1/T1 - Pa2/T2\} (Yi)(MW)] / R$$

Where:

Er = mass emission rate (lbs./batch)  
 Yi = mole fraction of component i in vapor  
 Xi = mole fraction of component i in liquid  
 Vr = volumetric gas displacement rate (ft<sup>3</sup>/batch)  
 V = volume of vapor in head space (ft<sup>3</sup>/batch)  
 R = ideal gas law constant (10.73 ft<sup>3</sup>psia/lb. mole deg R)  
 T = operating temperature (deg R)  
 T1 = initial temperature in vessel (deg R)  
 T2 = final temperature in vessel (deg R)  
 Pi = partial pressure of component i (psia)  
 Pi\* = vapor pressure of component i at temperature T (psia)  
 Pt = total pressure in the vessel vapor space (psia)  
 Pa1 = initial gas pressure in vessel (psia)  
 Pa2 = final gas pressure in vessel (psia)  
 MW = molecular weight (lb./lb. mole)

\*The % saturation shall never be less than 60% and/or shall be adjusted with the most current and worst-case testing results, by product group and highest concentration of the volatile components. The % saturation shall not be used if a nitrogen purge is applied; and 80% saturation (worst case) shall be used for all product groups not tested for the saturation level of the compound in the vapor space, unless it can be demonstrated that the saturation point is lower.

- (f) The total uncontrolled VOC and HAP emission rate for each method of loss for each batch shall be calculated as:

$f)(1)a.ii.(c) + f)(1)a.ii.(d) + f)(1)a.ii.(e)$  (summed for all volatile components) = total pounds of VOC per batch

If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 18, 25 or 25A of 40 CFR Part 60, Appendix A. The capture efficiency of the vapor collection system is assumed to be 100% because the headspace of the mixer is routed to the condenser.

- b. Emission Limitation: Visible emissions from fugitive dust shall not exceed 20 percent opacity as a three-minute average.

Applicable Compliance Method: Compliance with the fugitive visible particulate emissions limitation shall be determined through visible emissions observations performed in accordance with U.S. EPA Method 22 and OAC 3745-17-03(B)(4).

- c. Emission Limitation: The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases **or** there shall be no visible emissions from the exhaust stack.

Applicable Compliance Method: Compliance with the requirement for no visible particulate emissions from the exhaust stack, identified in this permit, shall be determined in accordance with U.S. EPA Method 22. If opting to comply with the outlet particulate emissions rate, compliance with the 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases from the stack, compliance shall be determined in accordance with U.S. EPA Methods 1 through 5, as appropriate.

- g) Miscellaneous Requirements

- (1) None.

**2. P114, Reactor 5 System**

**Operations, Property and/or Equipment Description:**

Reactor 5 System w/pre-emulsion tank venting to condenser and conservation vent and w/reactor venting to reflux condenser

- a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).
  - (1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.
    - a. b)(1)e., d)(9)
  - (2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.
    - a. b)(1)d and b)(2)d.
- b) Applicable Emissions Limitations and/or Control Requirements
  - (1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	BAT has been determined to be venting all emissions from this emissions unit to a condenser with a 90% capture and control efficiency, whenever this emissions unit is in operation.  See b)(2)a., b)(2)c., below.
b.	OAC rule 3745-31-05(A)(3)(a)(ii) June 30, 2008	See b)(2)b. below.
c.	OAC rule 3745-21-07(M)(3)(d)(v)(e)	Emissions of volatile organic compounds (VOC) shall not exceed 8 pounds per hour and 40 pounds per day.
d.	OAC rule 3745-31-05(D) (Synthetic Minor to avoid Title V and MACT)	See B.2.b)(1)a. and B.2.b)(1)b., above.  See b)(2)d., below.
e.	ORC 3704.03(F)	See d)(9), below.

(2) Additional Terms and Conditions

- a. The permittee has satisfied the Best Available Technology (BAT) requirements pursuant to Ohio Administrative Code (OAC) paragraph 3745-31-05(A)(3), as effective November 30, 2001, in this permit. On December 1, 2006, paragraph (A)(3) of OAC rule 3745-31-05 was revised to conform to the Ohio Revised Code (ORC) changes effective August 3, 2006 (Senate Bill 265 changes), such that BAT is no longer required by State regulations for National Ambient Air Quality Standards (NAAQS) pollutant(s) less than ten tons per year. However, that rule revision has not yet been approved by U.S. EPA as a revision to Ohio's State Implementation Plan (SIP). Therefore, until the SIP revision occurs and the U.S. EPA approves the revisions to OAC rule 3745-31-05, the requirement to satisfy BAT still exists as part of the federally-approved SIP for Ohio. Once U.S. EPA approves the December 1, 2006 version of OAC rule 3745-31-05, then these emission limitations/control measures no longer apply.

- b. This rule paragraph applies once U.S. EPA approves the December 1, 2006 version of OAC rule 3745-31-05 as part of the State Implementation Plan.

The Best Available Technology (BAT) requirements under OAC rule 3745-31-05(A)(3) do not apply to the VOC emissions from this air contaminant source since the calculated annual emission rate for this pollutant is less than 10 tons per year.

- c. The chilled water and/or refrigerated condensers on the pre-emulsion tank and reactor for this emissions unit shall be operated and maintained in accordance with federally enforceable restrictions as required by this permit.
- d. All of the VOC emissions from these emission units shall be vented to the condenser that shall meet the operational, monitoring, and record keeping requirements of this permit, when these emission units are in operation in accordance with OAC rule 3745-31-05(A)(3) above.

c) Operational Restrictions

- (1) The pressure setting of the conservation vent, if used on the pre-emulsion tank vent, shall be set by the manufacturer at a minimum of 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
- (2) The permittee shall maintain an emergency containment system capable of preventing the release of any liquid or solid materials from these emissions units. The purpose of the emergency containment system is public safety and the design shall be adequate to prevent any release of liquid or solid materials.

d) Monitoring and/or Recordkeeping Requirements

- (1) The maximum temperature of the exhaust gases from the reactor's condenser shall not exceed 42 degrees Celsius during any hour in which the average temperature is 35 degrees Celsius or above, when the condenser is used to demonstrate compliance with allowable VOC emission limitations. If these conditions are exceeded, the control

efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used.

- (2) The maximum temperature of the chilled water and/or refrigerant entering the condenser serving the pre-emulsion tank(s) shall not exceed 17 degrees Celsius at any time, or that temperature established during the most recent emissions test that demonstrated that the condenser achieved a 50% reduction of VOC emissions vented to it, if a pre-emulsion tank's condenser is used to demonstrate compliance with allowable VOC limitations. This temperature shall be monitored at the point the chilled water enters the building containing the reactor. If this temperature is exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used.
- (3) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
  - a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;
  - b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor (this may be maintained on the batch sheet);
  - c. the highest operating temperature reached during the batch run;
  - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined;
  - e. the actual number of batches of each product processed each day; if the temperature of the chilled water and or refrigerant entering the pre-emulsion tank's condenser does not exceed 5 degrees Celsius, a batch emission rate (see table below) in lbs of vinyl acetate/VOC from the pre-emulsion tank condenser (from emission test data) may be applied in the calculation of emissions contributed to the reactor system by the pre-emulsion tank. This calculation and record may also be maintained in the facility records and may be adjusted upward depending in the recorded highest temperature of the refrigerated coolant temperature entering the condenser serving the reactor pre-emulsion tank;

Average Temp (C)	Condenser Emissions (Vinyl acetate in pounds per batch)
-2.5	0.759
-1.0	1.09
0.0	1.31
1.0	1.53



2.0	1.8
3.0	2.02
4.0	2.24
5.0	2.52

- (4) At the end of each calendar month the permittee shall calculate and record the following information for each day of the preceding month:
- a. the total number of batches of each individual product processed in this emissions unit during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
    - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained;
    - ii. product batch(s) is/are individually calculated;
    - iii. product batch(s) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied;
  - c. the total actual VOC emissions for each day of operation (lbs/day), from all product batches produced each day, and calculated using one of the following methods:
    - i. the sum of the actual VOC emissions calculated from all batches run for each day of operation; or
    - ii. the sum of the actual VOC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant VOC emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products; and
  - d. the VOC emissions from this emissions unit for each month of operation, calculated by summing the emissions recorded, for each day .
- \* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the emissions for each product batch

or product batch group. The calculated controlled emissions of each organic chemical component shall be added to get the total VOC/batch. The controlled emissions, in pounds/batch, for each product or product batch group, may be added for each day to satisfy this requirement.

- (5) When the reactor's condenser is used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the exhaust gases from the condenser serving the reactor, when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor, which shall document the average temperature of the exhaust gases from the condenser serving the reactor, during each one-hour period of operation when the maximum temperature exceeded 42 degrees Celsius;
  - b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the reactor and its associated condenser, temperature control device, and monitoring equipment for each product batch; and
  - c. for any batch in which the peak temperature of the exhaust gases from the condenser serving the reactor exceeded 42 degrees Celsius in any hour in which the average temperature was 35 degrees Celsius or above.
- (6) When the pre-emulsion tanks' condenser are used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water entering the condenser serving the pre-emulsion tank(s) when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals, and may be monitored at the point the chilled water enters the building containing the reactor.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor which shall document the peak temperature of the chilled water entering the condenser serving the pre-emulsion tank(s);

- b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the pre-emulsion tank(s) and its/their associated condenser, temperature control device, and monitoring equipment for each product batch\*; and
  - c. for any batch in which the peak temperature of the chilled-water entering the condenser serving the pre-emulsion tank(s) exceeded 17 degrees Celsius at any time or that temperature established during the most recent emissions test that demonstrated that the condenser effectively limited VOC emissions.  
  
\* If the pre-emulsion tank(s) has/have operated in association with the reactor in the production of any batch, and during the same period of time, the log for the reactor may so indicate this, to alleviate the second record for the pre-emulsion tank(s).
- (7) Whenever the monitored temperature of the exhaust gases from the condenser deviates from the range/limit established in accordance with this permit, the permittee shall promptly investigate the cause of the deviation. The permittee shall maintain records of the following information for each investigation:
- a. the date and time the deviation began;
  - b. the magnitude of the deviation at that time;
  - c. the date the investigation was conducted;
  - d. the name(s) of the personnel who conducted the investigation; and
  - e. the findings and recommendations.
- (8) In response to each required investigation to determine the cause of a deviation, the permittee shall take prompt corrective action to bring the operation of the control equipment within the acceptable range/limit specified in this permit, unless the permittee determines that corrective action is not necessary and documents the reasons for that determination and the date and time the deviation ended. The permittee shall maintain records of the following information for each corrective action taken:
- a. a description of the corrective action;
  - b. the date corrective action was completed;
  - c. the date and time the deviation ended;
  - d. the total period of time (in minutes) during which there was deviation;
  - e. the temperature readings of the exhaust gas from condenser immediately after the corrective action was implemented; and
  - f. the name(s) of the personnel who performed the work.

Investigation and records required by this paragraph do not eliminate the need to comply with the requirements of OAC rule 3745-15-06 if it is determined that a malfunction has occurred.

- (9) Modeling to demonstrate compliance with, the “Toxic Air Contaminant Statute”, ORC 3704.03(F)(4)(b), was not necessary because the emissions unit’s maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires permittees to apply for and obtain a new or modified federally enforceable permit-to-install and operate (FEPTIO) prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be completed electronically and submitted via the Ohio EPA e-Business Center: Air Services by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
- a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. an identification of any time during which the maximum temperature of the exhaust gases from the condenser serving the reactor exceeded 42 degrees Celsius during any hour in which the average temperature was 35 degrees Celsius or above, and for which the control efficiency and estimated emissions were not adjusted for the temperature deviation from normal conditions, for any batch in which the reactor's condenser is used to demonstrate compliance;
    - ii. an identification of all periods of time during which the maximum temperature of the chilled water entering the condenser serving the pre-emulsion tank(s) (or chilled water entering the building containing the reactor) exceeded 17 degrees Celsius, and for which the control efficiency and estimated emissions were not adjusted for the temperature deviation from normal conditions, for any batch in which the pre-emulsion tank(s) condenser(s) is/are used to demonstrate compliance; and
    - iii. the operational restriction on the pre-emulsion tank chilled water or refrigerated condenser.
  - b. the probable cause of each deviation (excursion);

- c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
- d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director of Ohio EPA, Central District Office.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation: Emissions of VOC shall not exceed 8 pounds per hour, 40 pounds per day.

- i. Applicable Compliance Method: Compliance with this emission limitation has been demonstrated by the engineering analysis submitted with the permit application. Future compliance shall be determined based upon any revised engineering analysis established pursuant to the requirements of this permit and the records required pursuant to the Monitoring and Record Keeping Requirements in d). The emission limitations calculations are based upon U.S. EPA Guideline Series "Control of Volatile Organic Compounds Emissions from Batch Processes" and are based upon the ideal gas law, Raoult's law and Antoine's equation.

- ii. Applicable Compliance Method: If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 2D, and Method 25 and/or 25A or Method 18 of 40 CFR Part 60, Appendix A or Method 320 of 40 CFR, Part 63.

- b. Emission Limitations: Condenser shall achieve and operate at 90% capture and control efficiency.

- Applicable Compliance Method: If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 2D, and Method 25 and/or 25A or Method 18 of 40 CFR Part 60, Appendix A or Method 320 of 40 CFR, Part 63.

g) Miscellaneous Requirements

- (1) None.

**3. P126, Polyurethane Prepolymer Reactor**

**Operations, Property and/or Equipment Description:**

Pilot reactor (200 gallon w/agitator)

- a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).
  - (1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.
    - a. b)(1)d., d)(3) – d)(6), e)(3)
  - (2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.
    - a. b)(1)c., c)(1), d)(1)
- b) Applicable Emissions Limitations and/or Control Requirements
  - (1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	Organic compound (OC) emissions from this emissions unit shall not exceed 2.74 tons per year.  See c)(1)  The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(D).
b.	OAC rule 3745-21-07(M)(4)	Organic compound (OC) emissions from this emissions unit shall not exceed 3 lbs/hr and 15 lbs/day.
c.	OAC rule 3745-31-05(D) (synthetic minor to avoid Title V permitting and MACT)	See B.2.b)(1)a., B.2.b)(1)b., c)(1) and d)(1)
d.	ORC 3704.03(F)	See d)(3) – d)(6)

- (2) Additional Terms and Conditions
  - a. None.
- c) Operational Restrictions
  - (1) The maximum daily production for this emissions unit shall not exceed 3 batches.
- d) Monitoring and/or Recordkeeping Requirements
  - (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
    - a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;
    - b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor(this may be maintained on the batch sheet);
    - c. the highest operating temperature reached during the batch run;
    - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined; and
    - e. the actual number of batches of each product processed each day.
  - (2) At the end of each calendar month the permittee shall calculate and record the following information for each day of the preceding month:
    - a. the total number of batches of each individual product (identified as required in d)(2)e processed in this emissions unit during the calendar quarter, for each day of operation;
    - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
      - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained;
      - ii. product batch(s) is/are individually calculated because an existing record, does not exist;
      - iii. product batch(s) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or

- iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
- c. the total actual OC emissions for each day of operation (lbs/day), from all product batches produced each day, calculated as specified in f)(1)a, and calculated using one of the following methods:
  - i. the sum of the actual OC emissions calculated from all batches run for each day of operation; or
  - ii. the sum of the actual OC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant VOC emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products; and
  - iii. the OC emissions from this emissions unit for each month of operation, calculated by summing the emissions recorded in d)(3)c for each day.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the emissions for each product batch or product batch group, calculated under f)(1)a. The calculated controlled VOC emissions of each organic chemical component shall be added to get the total VOC/batch. The controlled emissions, in pounds/batch, maintained in f)(1)a for each product or product batch group, may be added for each day to satisfy this requirement.

- (3) The FEPTIO application for this/these emissions unit(s), P126, was evaluated based on the actual materials and the design parameters of the emissions unit's(s') exhaust system, as specified by the permittee. The "Toxic Air Contaminant Statute", ORC 3704.03(F), was applied to this/these emissions unit(s) for each toxic air contaminant listed in OAC rule 3745-114-01, using data from the permit application; and modeling was performed for each toxic air contaminant(s) emitted at over one ton per year using an air dispersion model such as SCREEN3, AERMOD, or ISCST3, or other Ohio EPA approved model. The predicted 1-hour maximum ground-level concentration result(s) from the approved air dispersion model, was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC), calculated as described in the Ohio EPA guidance document entitled "Review of New Sources of Air Toxic Emissions, Option A", as follows:
  - a. the exposure limit, expressed as a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, for each toxic compound(s) emitted from the emissions unit(s), (as determined from the raw materials processed and/or coatings or other materials applied) has been documented from one of the following sources and in the following order of preference (TLV was and shall be used, if the chemical is listed):

- i. threshold limit value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; or
- ii. STEL (short term exposure limit) or the ceiling value from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; the STEL or ceiling value is multiplied by 0.737 to convert the 15-minute exposure limit to an equivalent 8-hour TLV.

- b. The TLV is divided by ten to adjust the standard from the working population to the general public (TLV/10).
- c. This standard is/was then adjusted to account for the duration of the exposure or the operating hours of the emissions unit(s), i.e., "X" hours per day and "Y" days per week, from that of 8 hours per day and 5 days per week. The resulting calculation was (and shall be) used to determine the Maximum Acceptable Ground-Level Concentration (MAGLC):

$$\text{TLV}/10 \times 8/X \times 5/Y = 4 \text{ TLV}/XY = \text{MAGLC}$$

- d. The following summarizes the results of dispersion modeling for the significant toxic contaminants (emitted at 1 or more tons/year) or "worst case" toxic contaminant(s):

Toxic Contaminant: n-butyl acetate.

TLV (mg/m<sup>3</sup>): 713

Maximum Hourly Emission Rate (lbs/hr): 13.5

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 3,297

MAGLC (ug/m<sup>3</sup>): 16,976

The permittee, has demonstrated that emissions of n-butyl acetate, from emissions unit P126, is calculated to be less than eighty per cent of the maximum acceptable ground level concentration (MAGLC); any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

- (4) Prior to making any physical changes to or changes in the method of operation of the emissions unit(s), that could impact the parameters or values that were used in the predicted 1-hour maximum ground-level concentration, the permittee shall re-model the change(s) to demonstrate that the MAGLC has not been exceeded. Changes that can affect the parameters/values used in determining the 1-hour maximum ground-level concentration include, but are not limited to, the following:
  - a. changes in the composition of the materials used or the use of new materials, that would result in the emission of a new toxic air contaminant with a lower Threshold Limit Value (TLV) than the lowest TLV previously modeled;

- b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any toxic air contaminant listed in OAC rule 3745-114-01, that was modeled from the initial (or last) application; and
- c. physical changes to the emissions unit(s) or its/their exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Toxic Air Contaminant Statute" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to a non-restrictive change to a parameter or process operation, where compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), has been documented. If the change(s) meet(s) the definition of a "modification", the permittee shall apply for and obtain a final FEPTIO prior to the change. The Director may consider any significant departure from the operations of the emissions unit, described in the permit application, as a modification that results in greater emissions than the emissions rate modeled to determine the ground level concentration; and he/she may require the permittee to submit a permit application for the increased emissions.

- (5) The permittee shall collect, record, and retain the following information for each toxic evaluation conducted to determine compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F):
  - a. a description of the parameters/values used in each compliance demonstration and the parameters or values changed for any re-evaluation of the toxic(s) modeled (the composition of materials, new toxic contaminants emitted, change in stack/exhaust parameters, etc.);
  - b. the Maximum Acceptable Ground-Level Concentration (MAGLC) for each significant toxic contaminant or worst-case contaminant, calculated in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F);
  - c. a copy of the computer model run(s), that established the predicted 1-hour maximum ground-level concentration that demonstrated the emissions unit(s) to be in compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), initially and for each change that requires re-evaluation of the toxic air contaminant emissions; and
  - d. the documentation of the initial evaluation of compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), and documentation of any determination that was conducted to re-evaluate compliance due to a change made to the emissions unit(s) or the materials applied.
- (6) The permittee shall maintain a record of any change made to a parameter or value used in the dispersion model, used to demonstrate compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. The record shall include the date and reason(s) for the change and if the change would increase the ground-level concentration.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any exceedance of the emission limitations established in b)(1)a. or b)(1)b.; and
    - ii. any exceedance of the operational limitation established in c)(1);
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director of Ohio EPA, Central District Office.

- (3) The permittee shall include any changes made to a parameter or value used in the dispersion model, that was used to demonstrate compliance with the Toxic Air Contaminant Statute, ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration, in the annual Permit Evaluation Report (PER). If no changes to the emissions, emissions unit(s), or the exhaust stack have been made, then the report shall include a statement to this effect.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
  - a. Emission Limitation: OC emissions from this emissions unit shall not exceed 3 lbs/hr and 15 lbs/day.

Applicable Compliance Method: Compliance with the daily emission limitation demonstrated based on the record keeping requirements in d)(1) and d)(2).

If the reactor contents are heated up to and/or above the boiling point of the chemical with the lowest boiling point in the batch, the ideal gas law no longer applies. In this case, emissions shall be calculated using an emission factor of 1.27 pounds of OC per hour, derived from the stack test conducted on 5/12/94, for Reactor 9 (P107), in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling point to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling point chemicals' emissions, calculated in this way, shall be added to the emissions calculated for the chemical that's boiling point was exceeded, to document a conservative estimate of OC emissions for the time period operating under these conditions.

The total uncontrolled OC emission rate from each method of loss for each batch shall be calculated by summing all volatile components to equal the total pounds VOC emitted per batch from the reactor.

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- b. Emissions Limitation: OC emissions from this emissions unit shall not exceed 2.74 tons per year.

Applicable Compliance Method: Compliance with the annual OC emission limitation for this emissions unit shall be demonstrated by the record keeping requirements in section d)(2) by summing the monthly OC emissions required by d)(2) for each calendar year.

- g) Miscellaneous Requirements  
(1) None.

**4. P128, Pilot Reactor - Polymer Division**

**Operations, Property and/or Equipment Description:**

Pilot reactor (58 gallon) with condenser and 2 pre-emulsion tanks

- a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).
  - (1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.
    - a. b)(1)d., d)(3)
  - (2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.
    - a. b)(1)c, b)(2)b. and d)(1)
- b) Applicable Emissions Limitations and/or Control Requirements
  - (1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	BAT has been determined to be venting all emissions from this emissions unit to a condenser with a 90% capture and control efficiency, whenever this emissions unit is in operation.  See b)(2)a., c)(1) below.
b.	OAC rule 3745-21-07(M)(4)	Emissions of volatile organic compounds (VOC) shall not exceed 3 pounds per hour and 15 pounds per day.
c.	OAC rule 3745-31-05(D) (Synthetic Minor to avoid Title V and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.
d.	ORC 3704.03(F)	See d)(3), below.

- (2) Additional Terms and Conditions
  - a. The chilled water and/or refrigerated condensers on the pre-emulsion tank and reactor for this emissions unit shall be operated and maintained in accordance with federally enforceable restrictions as required by this permit.
  - b. All of the VOC emissions from these emission units shall be vented to the condenser that shall meet the operational, monitoring, and record keeping requirements of this permit, when these emission units are in operation in accordance with OAC rule 3745-31-05(A)(3) above.
- c) Operational Restrictions
  - (1) None.
- d) Monitoring and/or Recordkeeping Requirements
  - (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
    - a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;
    - b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor(this may be maintained on the batch sheet);
    - c. the highest operating temperature reached during the batch run;
    - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined; and
    - e. the actual number of batches of each product processed each day.
  - (2) At the end of each calendar month the permittee shall calculate and record the following information for each day of the preceding month:
    - a. the total number of batches of each individual product processed in this emissions unit during the calendar quarter, for each day of operation;
    - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
      - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained;
      - ii. product batch(s) is/are individually calculated because an existing record, does not exist;

- iii. product batch(s) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
  - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
- c. the total actual VOC emissions for each day of operation (lbs/day), from all product batches produced each day, and calculated using one of the following methods:
- i. the sum of the actual VOC emissions calculated from all batches run for each day of operation; or
  - ii. the sum of the actual VOC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant VOC emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products; and
  - iii. the VOC emissions from this emissions unit for each month of operation, calculated by summing the emissions for each day.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the emissions for each product batch or product batch group. The calculated controlled VOC emissions of each organic chemical component shall be added to get the total VOC/batch. The controlled emissions, in pounds/batch, maintained for each product or product batch group, may be added for each day to satisfy this requirement.

- (3) Modeling to demonstrate compliance with, the "Toxic Air Contaminant Statute", ORC 3704.03(F)(4)(b), was not necessary because the emissions unit's maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.

- (2) The permittee shall submit quarterly deviation (excursion) reports that identify;
- a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any times when this emission unit was in operation and the OC emissions were not vented to the condenser;
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director of Ohio EPA, Central District Office.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
- a. Emissions Limitation: VOC emissions shall not exceed 3 pounds per hour, 15 pounds per day.
    - i. Applicable Compliance Method: Compliance with this emission limitation has been demonstrated by the engineering analysis submitted with the permit application. Future compliance shall be determined based upon any revised engineering analysis established pursuant to the requirements of this permit and the records required pursuant to the Monitoring and Record Keeping Requirements in d). The emission limitations calculations are based upon U.S. EPA Guideline Series "Control of Volatile Organic Compounds Emissions from Batch Processes" and are based upon the ideal gas law, Raoult's law and Antoine's equation.
    - ii. Applicable Compliance Method: If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 2D, and Method 25 and/or 25A or Method 18 of 40 CFR Part 60, Appendix A or Method 320 of 40 CFR, Part 63.



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**Effective Date:** 11/16/2015

b. Emissions Limitation: Condenser shall achieve and operate at 90% capture and control efficiency.

Applicable Compliance Method: If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 2D, and Method 25 and/or 25A or Method 18 of 40 CFR Part 60, Appendix A or Method 320 of 40 CFR, Part 63.

g) Miscellaneous Requirements

(1) None.

**5. Emissions Unit Group -Mixers: P022,P023,P024,P026,P027,**

<b>EU ID</b>	<b>Operations, Property and/or Equipment Description</b>
P022	Mixer 1 w/condenser
P023	Mixer 2 w/condenser
P024	Mixer 3 w/condenser
P026	Mixer 5 w/condenser
P027	Mixer 11 w/condenser

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)d. and d)(3)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)a.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	<b>Applicable Rules/Requirements</b>	<b>Applicable Emissions Limitations/Control Measures</b>
a.	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.
b.	OAC rule 3745-17-08(B)	Reasonable available control measures (RACM) that are sufficient to minimize or eliminate visible emissions of fugitive dust. The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases <b>or</b> there shall be no visible emissions from the exhaust stack.  See b)(2)b. and b)(2)c.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
c.	OAC rule 3745-17-07(B)(1)	Visible emissions of fugitive dust from these emissions units shall not exceed twenty percent opacity as a three-minute average.
d.	ORC 3704.03(F)	See d)(3)

(2) Additional Terms and Conditions

- a. These emission units shall be employed only for the mixing of raw materials, where no chemical reactions occur between any of the raw materials.
- b. The permittee shall employ RACM to minimize or eliminate visible emissions of fugitive dust when handling dry raw materials or charging dry raw materials into the mixer and/or bag dump, including but not limited to:
  - i. appropriate house-keeping measures to prevent fugitive dust from becoming airborne; and
  - ii. immediately closing the lid(s) to the mixer and/or bag dump at the completion of adding all dry batch mix materials.
- c. The installation and use of hoods, fans, and/or other equipment to adequately enclose, contain, capture, vent, and control fugitive dust from this emissions unit shall meet the following requirements:
  - i. the collection efficiency shall be sufficient to minimize or eliminate visible emissions of fugitive dust at the point(s) of capture to the extent possible with good engineering design; and
  - ii. the control equipment for this emissions unit shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases or there shall be no visible particulate emissions (whichever is less stringent) from the exhaust stack of this emissions unit.
- d. For the purpose of verifying compliance with the visible emission limitation for fugitive dust, the visible emissions shall be observed at the closest egress points to the mixer(s) from the building housing the emission unit. These egress points shall include, but not be limited to: mixer room exhaust vents, doorways, and windows.

c) Operational Restrictions

- (1) None.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
  - a. the location and color of the emissions;
  - b. whether the emissions are representative of normal operations;
  - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
  - d. the total duration of any visible emissions incident; and
  - e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations, or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions, or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (2) If the condenser is used to demonstrate compliance with the allowable limits, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water leaving the condenser serving the mix tank when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within +/- 1 percent of the temperature being measures or +/- 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.
- (3) Modeling to demonstrate compliance with, the "Toxic Air Contaminant Statute", ORC 3704.03(F)(4)(b), was not necessary because the emissions unit's maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall identify the following information in the annual permit evaluation report in accordance with the monitoring requirements for visible emissions in term number d)(1) above:
  - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;
  - b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and
  - c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
  - a. Emission Limitation: Visible emissions from fugitive dust shall not exceed 20 percent opacity as a three-minute average.  
  
Applicable Compliance Method: Compliance with the fugitive visible particulate emissions limitation shall be determined through visible emissions observations performed in accordance with U.S. EPA Method 22 and OAC 3745-17-03(B)(4).
  - b. Emission Limitation: The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases **or** there shall be no visible emissions from the exhaust stack.  
  
Applicable Compliance Method: Compliance with the requirement for no visible particulate emissions from the exhaust stack, identified in this permit, shall be determined in accordance with U.S. EPA Method 22. If opting to comply with the outlet particulate emissions rate, compliance with the 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases from the stack, compliance shall be determined in accordance with U.S. EPA Methods 1 through 5, as appropriate.

g) Miscellaneous Requirements

- (1) None.

**6. Emissions Unit Group -Mixers w/condensers: P005,P006,P007,P029,P030,P031,**

<b>EU ID</b>	<b>Operations, Property and/or Equipment Description</b>
P005	Littleford 1 mixer w/condenser
P006	Ross 3 mixer w/condenser
P007	Littleford 4 mixer w/condenser
P029	Myers 1 mixer w/condenser
P030	Myers 2 mixer w/condenser
P031	Ross 1 mixer w/condenser

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)e. and d)(6)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	<p><u>Emissions for <b>P005</b> shall not exceed:</u> 6.4 pounds per hour and 31.9 pounds per day VOC.</p> <p><u>Emissions for <b>P006, P029, P030 and P031</b>, individually, shall not exceed:</u> 7.3 tons per year VOC.</p> <p><u>Emissions for <b>P007</b> shall not exceed:</u> 7.7 pounds per hour, 38.5 pounds per day and 7.0 tons per year VOC.</p> <p>See b)(2)a., b)(2)b., and b)(2)c.</p>

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
b.	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V and MACT)	See B.2.b)(1)a. and B.2.b)(1)b., above.
c.	OAC rule 3745-17-07(B)(1)	The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).
d.	OAC rule 3745-17-08(B)	The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).
e.	ORC 3704.03(F)	See d)(6)

(2) Additional Terms and Conditions

- a. There shall be no visible emissions of fugitive dust from any building opening or outside vent associated with these emissions units or from the room(s) containing the unit(s), during the addition of solids.
- b. The permittee shall employ best available control measures to eliminate visible emissions of fugitive dust when handling dry raw materials or charging dry raw materials into the mixer and/or bag dump, including but not limited to:
  - i. appropriate house-keeping measures to prevent fugitive dust from becoming airborne; and
  - ii. immediately closing the lid(s) to the mixer and/or bag dump at the completion of adding all dry batch mix materials.
- c. These emission units shall be employed only for the mixing of raw materials, where no chemical reactions occur between any of the raw materials.
- d. For the purpose of verifying compliance with the visible emission limitation for fugitive dust, the visible emissions shall be observed at the closest egress points to the mixer(s) from the building housing the emission unit. These egress points shall include, but not be limited to: mixer room exhaust vents, doorways, and windows.
- e. If the permittee applies the condenser's control efficiency to calculate emissions from the product batches, the condenser shall be maintained and operated as required.
- f. The chilled water leaving the condenser serving these emission units (P005, P006, P007, P029, P030, and P031) shall not exceed 18 degrees C at any time during use of the mix tank.

c) Operational Restrictions

- (1) The permittee shall install and maintain temperature monitoring devices to continuously monitor and record the peak chilled temperature leaving the mix tank condenser vent on the emission unit. This device shall have an accuracy of (+/-) one percent of the temperature being monitored.
- (2) The pressure setting of the conservation vents shall be maintained at two (2) inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
- (3) The permittee shall not allow any volatile or hazardous material to be stored in open containers and/or handled in a manner that would result in any unnecessary evaporation of the materials.

d) Monitoring and/or Recordkeeping Requirements

- (1) For those batches in which the condenser is used to demonstrate compliance with the allowable limits above, the permittee shall operate and maintain a continuous temperature monitor and recorder (CEM) which measures and records the temperature of the outlet water from the condenser when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within +/- 1 (one) percent of the temperature being measured or +/- 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.
- (2) The permittee shall perform daily checks, when the emissions units are in operation and when the weather conditions allow, for any visible particulate emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving these emissions units. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
  - a. the location and color of the emissions;
  - b. whether the emissions are representative of normal operations;
  - c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
  - d. the total duration of any visible emissions incident; and
  - e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit).

With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations, or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions, or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (3) For batches in which the condenser is used to demonstrate compliance with the allowable emission limitations, the following conditions must be met:
  - a. the average temperature of the chilled water leaving the condenser serving the mix tank shall not exceed 18 degrees Celsius, for any one-hour block of time, during each of the 24 one-hour blocks of time during the day; and
  - b. the permittee shall maintain a continuous temperature monitor at a point where the chilled water is returned from the mixer, and prior to the chiller, to document the outlet temperature of the condenser for the efficiency calculation.
  
- (4) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
  - a. the company name, code, and/or identification number for each batch of adhesive, caulk, syrup, or other product processed; the date of production; and the number of batches of each product processed;
  - b. the amount, in pounds, of each organic material added to the mixer (maintained on batch sheet);
  - c. the highest operating temperature reached during the batch run;
  - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined;
  - e. if emissions from any product batch are calculated using conservatively estimated and/or worst-case variables\* for an individual product, product type, or product group\*\*, the following information may be maintained on file in the facility records to document such product batch's emissions, in lieu of maintaining daily emission calculations for each individual batch;
  - f. the company name, code, and/or identification number for each individual product and each product group (if used), for which conservatively estimated and/or worst-case emission calculations shall be documented; and to be used to identify the products and product groups maintained in these records;
    - i. a record of the mole fraction of each organic chemical contained in each product processed and in each representative batch product group, if used (which shall demonstrate that each organic chemical contained in a product batch is less than or equal to the mole fraction of the same organic chemical in the representative product group);

- ii. records to document the value of each conservatively estimated and/or worst-case variable for each product or product group;
- iii. the uncontrolled and controlled (if applicable) emission calculations for each product and product group (if used), in which the conservatively estimated and/or worst case variables are applied and calculated as required f)(1)a.ii., below (if controlled) for each organic chemical component at each method of loss (pounds of each chemical component/batch);
- iv. the product batch's and product batch group's (if used) total uncontrolled and controlled (if applicable) VOC emissions, which shall equal the sum of all of the organic chemical components' emissions calculated in f)(1)a.ii. for this emission unit or group; and
- v. a record of the maximum number of batches of each product or product group that could be processed in any day without exceeding the limitations contained in this permit.

These records of conservatively estimated and/or worst-case variables and emissions may be updated by the permittee as new products are formulated or may be developed to include existing products and/or new product groups.)

- g. the actual number of batches of each product processed each day;
- h. the calculated mole fraction of each organic chemical component in each product batch;
- i. if a control efficiency is applied and if the condenser was operating properly throughout the batch run, a record of the conservative average operating temperature of each such product made in the mixer, to be used as the vapor inlet temperature; and a record of the conservative average condenser water outlet temperature, measured after the mixer, prior to the chiller, to be used to calculate the vapor outlet temperature in the control efficiency calculation, where it shall be assumed that the vapor outlet temperature is 2.5 degrees Celsius higher than the chilled water temperature leaving the mixer;
- j. the total controlled (if condenser fully operational and used for compliance) and uncontrolled VOC emissions (lbs./batch), and the emission calculation for each organic chemical component in each batch that was not processed under normal operating parameters (of temperature, pressure, or mole fraction of a component) due to mistakes made in the batch recipe formulation, misoperation of the unit, malfunction of the condenser, or other changes made to the normal operating parameters that would affect the emission rate for a specific product batch; and
- k. the total actual or conservatively estimated/worst-case VOC emissions (lbs./batch) and the emission calculations for each organic chemical component in each batch processed in this emission unit, for which a record of the calculations documenting the conservatively estimated and/or worst-case

emissions of the product batch or product group batch, representing the product, are not maintained.

\*Conservatively estimated and/or worst-case variable conditions (of temperature, pressures, and volume of vapor space) and equivalent or worst-case concentrations, which result in conservative/worst-case emissions for the batch, may be maintained in a single record for each product or product group to which that could be applied.

\*\*Products may be grouped by similar product types (same chemical components and having similar concentrations) for hourly and daily emission estimates, if the variables of temperature, pressure, volume of vapor head space, and concentration (mole fraction), calculated at each method of loss in f)(1)a.ii., are conservative and/or worst-case for each variable. If the mixer condenser is used to demonstrate compliance, the control efficiency shall be calculated as required and shall be dependent on the conservative average vapor inlet and outlet temperatures of the condenser. Products may also be grouped by the seasons of the year, in order to segregate and lessen the effects of average temperatures. The highest concentrations of the VOC components, represented in the product group, shall be used in the calculations of daily emissions, unless products are calculated individually.

- (5) The permittee shall document the following information each day:
- a. the total number of batches of each adhesive product produced; and
  - b. the calculated daily and average hourly VOC emission rate, in pounds per day and pounds per hour, summed for all the liquid/volatile components, at each method of loss, by applying the following equations, where each is applicable:
    - i. Equation 3-7 from US EPA Guideline Series “Control of Volatile Organic Compound Emissions from Batch Processes”, used to calculate the mass emission rate from the displaced gas due to breathing losses:
 
$$Er = (Y_i)(V_r)(P_t)(MW) / (R)(T)$$
    - ii. Antoine’s Equation or Equation 3-8 from US EPA Guideline Series “Control of Volatile Organic Compound Emissions from Batch Processes”, with the constants (A, B, & C) found in “Lange’s Handbook of Chemistry”, to calculate the vapor pressure of each liquid/volatile component:
 
$$\ln P_i = A - B / (C+T)$$

Where:

P<sub>i</sub> = vapor pressure of component i (mmHg)  
 A, B, C = component specific constants  
 T = temperature of liquid (deg K)

Vapor pressure may also be derived from a reliable source of vapor pressure/temperature tables.

- iii. Equation 3-9 from US EPA Guideline Series “Control of Volatile Organic Compound Emissions from Batch Processes” or Raoul’s Law, used to calculate the mole fraction of a component in the vapor:

$$Y_i = P_i / P_t = X_i P_i^* / P_t$$

- iv. Substituting for  $Y_i$  from Raoul’s Law in Equation 3-7, emissions for each liquid/volatile component in a batch:

$$E_r = (X_i)(V_r)(P_i^*)(MW) / (R)(T)$$

- v. Equation 3-15 (also Equation 3-16, derived from Equation 3-15) from US EPA Guideline Series “Control of Volatile Organic Compound Emissions from Batch Processes”, to calculate the moles of gas displaced from temperature increases due to friction; and this multiplied by the molecular weight and the mole fraction of each liquid/volatile component in the mix, to get the pounds of each compound in the gas, displaced in each batch due to heat:

$$E_r = [V \{P_{a1}/T_1 - P_{a2}/T_2\} (Y_i)(MW)] / R$$

Where:

$E_r$  = mass emission rate (lbs./batch)  
 $Y_i$  = mole fraction of component  $i$  in vapor  
 $X_i$  = mole fraction of component  $i$  in liquid  
 $V_r$  = volumetric gas displacement rate (ft<sup>3</sup>/batch)  
 $V$  = volume of vapor in head space (ft<sup>3</sup>/batch)  
 $R$  = ideal gas law constant (10.73 ft<sup>3</sup>psia/lb. mole deg R)  
 $T$  = operating temperature (deg R)  
 $T_1$  = initial temperature in vessel (deg R)  
 $T_2$  = final temperature in vessel (deg R)  
 $P_i$  = partial pressure of component  $i$  (psia)  
 $P_i^*$  = vapor pressure of component  $i$  at temperature  $T$  (psia)  
 $P_t$  = total pressure in the vessel vapor space (psia)  
 $P_{a1}$  = initial gas pressure in vessel (psia)  
 $P_{a2}$  = final gas pressure in vessel (psia)  
 $MW$  = molecular weight (lb./lb. mole)

- vi. The control efficiency, when used to demonstrate compliance, calculated as per f)(1)a., using vapor pressures calculated at the condenser vapor inlet and outlet temperatures of record and records required in B.1.c)(2) and B.1.c)(3), above.

- (6) Modeling to demonstrate compliance with, the “Toxic Air Contaminant Statute”, ORC 3704.03(F)(4)(b), was not necessary because the emissions unit’s maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be

less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. each period of time (start time and date, and end time and date) when the temperature of the chilled water from the condenser was greater than 18 degrees Celsius;
    - ii. any period of time (start time and date, and end time and date) when the emissions unit(s) was/were in operation and the process emissions were not vented to the condenser; and
    - iii. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit.
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director of Ohio EPA, Central District Office.

f) Testing Requirements

(1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

a. Emission Limitation for P005: 6.4 pounds per hour, 31.9 pounds per day VOC

Applicable Compliance Method:

i. Compliance with the daily and hourly VOC emission limitations shall be demonstrated based on the record keeping requirements in d)(4) and d)(5), above.

ii. Emissions from each batch shall be calculated as follows:

(a) Antoine's Equation (Equation 3-8 from the US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes"), with the constants (A, B, &C) found in "Lange's Handbook of Chemistry", shall be used to calculate the vapor pressure\* of each liquid/volatile component:

$$P_i = A - B / (C+T)$$

Where:

P<sub>i</sub> = vapor pressure of component i (mmHg)

A, B, C = component specific constants

T = temperature of liquid (deg C)

\*Component vapor pressures may also be derived from a reliable source of vapor pressure/temperature tables such as "Lange's Handbook of Chemistry" or "Perry's Chemical Engineers' Handbook".

(b) Equation 3-9 from the US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes" (Raoul's Law), shall be used to calculate the mole fraction of a component in the vapor:

$$Y_i = P_i / P_t = X_i P_i^* / P_t$$

(c) The following equation, which is derived by substituting for Y<sub>i</sub> from Raoul's Law in Equation 3-7 from the US EPA Guideline Series "Control of Volatile Organic Emissions from Batch Processes", shall be used to calculate emissions from breathing losses for each liquid volatile component:

$$E_r = [(X_i)(V_r)(P_i^*)(MW)] / (R)(T) \times \% \text{ saturation}^*$$

(d) Equation 3-7 from the US EPA Guideline Series "Control of Volatile Organic Emissions from Batch Processes", shall be used

to calculate the mass emission rate of each volatile component in the displaced gasses from each batch:

$$Er = [(Yi)(Vr)(Pt)(MW) / (R)(T)] \times \% \text{ saturation}^*$$

- (e) Equation 3-15 from the US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes", shall be used to calculate the number of moles of gas displaced due to temperature increases from mixing (friction). The number of moles shall then be multiplied by the molecular weight and the mole fraction of each volatile component in the mix, to get pounds of each component in the gas displaced from each batch due to mixing heat:

$$Er = [V \{Pa1/T1 - Pa2/T2\} (Yi)(MW)] / R$$

Where:

- Er = mass emission rate (lbs./batch)
- Yi = mole fraction of component i in vapor
- Xi = mole fraction of component i in liquid
- Vr = volumetric gas displacement rate (ft<sup>3</sup>/batch)
- V = volume of vapor in head space (ft<sup>3</sup>/batch)
- R = ideal gas law constant (10.73 ft<sup>3</sup>psia/lb. mole deg R)
- T = operating temperature (deg R)
- T1 = initial temperature in vessel (deg R)
- T2 = final temperature in vessel (deg R)
- Pi = partial pressure of component i (psia)
- Pi\* = vapor pressure of component i at temperature T (psia)
- Pt = total pressure in the vessel vapor space (psia)
- Pa1 = initial gas pressure in vessel (psia)
- Pa2 = final gas pressure in vessel (psia)
- MW = molecular weight (lb./lb. mole)

\*The % saturation shall never be less than 60% and/or shall be adjusted with the most current and worst-case testing results, by product group and highest concentration of the volatile components. The % saturation shall not be used if a nitrogen purge is applied; and 80% saturation (worst case) shall be used for all product groups not tested for the saturation level of the compound in the vapor space, unless it can be demonstrated that the saturation point is lower.

- (f) The total uncontrolled VOC emission rate for each method of loss for each batch shall be calculated as:

$$f)(1)a.ii.(C) + f)(1)a.ii.(d) + f)(1)a.ii.(e) \text{ (summed for all volatile components)} = \text{total pounds of VOC per batch}$$

If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 18, 25 or 25A of 40 CFR Part 60, Appendix A. The capture efficiency of the vapor collection system is assumed to be 100% because the headspace of the mixer is routed to the condenser.

- b. Emission Limitation for P006, P029, P030 and P031: 7.3 tons per year VOC

Applicable Compliance Method: Compliance with the long-term VOC emission limitation shall be demonstrated based on the record keeping requirements in d)(4) and d)(5), above, and the methods described in f)(1), above.

- c. Emission Limitation for P007: 7.7 pounds per hour, 38.5 pounds per day and 7.0 tons per year VOC

Applicable Compliance Method: Compliance with the hourly, daily and annual VOC emission limitations shall be demonstrated based on the record keeping requirements in d)(4) and d)(5), and the methods described in f)(1), above.

Compliance with the annual VOC emission limitation shall be demonstrated based on the record keeping requirements in d)(4) and d)(5), above, and the methods described in f)(1), above and summing the resultant daily VOC totals for the entire calendar year.

If required, the permittee shall conduct, or have conducted, emission testing to demonstrate compliance with the hourly emission rates and/or control efficiency of the condenser, using Methods 1 through 4 and 18, 25 or 25A of 40 CFR Part 60, Appendix A. The capture efficiency of the vapor collection system is assumed to be 100% because the headspace of the mixer is routed to the condenser.

- d. Emission Limitation: There shall be no visible emissions of fugitive dust from any building opening or outside vent associated with these emissions units or from the room containing these units, during the addition of solids.

Applicable Compliance Method: Compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 22.

- (2) If the condenser's control efficiency is used in the calculation of emissions or in the demonstration of compliance with the limits contained in this permit, the condenser control efficiency shall be determined in accordance with the method below:

Method for Determining Condenser Control Efficiency:

The following equation represents the mass balance around the condenser and calculates the mole fraction of VOC in the feed and in the vapor leaving the condenser. If records of these calculations are maintained in the facility records, they need only be performed once for each variation in the inlet temperature (measured as the average operating temperature of each product batch) and condenser outlet water temperature

(measured after the mix tanks, prior to the chiller) for each product, or worst-case product. It shall be assumed that the vapor outlet temperature is 2.5 degrees (Celsius) higher than the outlet water temperatures of the condenser, as measured by the continuous temperature monitor installed following the mixer(s), prior to the chiller. The efficiency, calculated using the following assumptions and formula, shall be subtracted from 100% to calculate the fractional control efficiency of the condenser. If the controlled emission rate is to be calculated, the fractional control efficiency of the condenser shall be multiplied by the total uncontrolled emission rates calculated in f)(1)a.ii., above.

Mass balance assumptions:

F = liquid/gas feed to the condenser (lb. mole)  
D = gas leaving the condenser (lb. mole)  
W = liquid leaving the condenser (lb. mole)  
z = mole fraction of the VOC in feed  
y = mole fraction of the VOC in vapor leaving the condenser  
x = mole fraction of the VOC in liquid leaving the condenser  
x = 1 (assumes that all the liquid condensed is VOC)  
F = 100 lb. moles (arbitrarily set to calculate the pound moles of D and W)  
F = D+W; and therefore W = F-D; and substituting for value of "F";  
W = 100 – D  
Substituting for W in F(z) = D(y) + W(x):  
100z = Dy + (100 –D)x  
100z = Dy + 100x – Dx  
100z – 100x = Dy-Dx  
100(z-x) = D(y-x)  
D = 100(z-x) / (y-x)

The vapor pressures shall be determined using Antoine's Equation or vapor pressure/temperature tables ("Lange's Handbook of Chemistry" or Perry's Chemical Engineer's Handbook"), at the appropriate inlet and outlet vapor temperatures.

The mole fractions, y and z, can be determined using Raoul's Law, if the liquid is assumed to be 100% of the pollutant for which the efficiency is being calculated:

z = vapor pressure of pollutant at the vapor inlet temperature\* / 760  
y = vapor pressure of pollutant at the vapor outlet temperature\*\* / 760

efficiency (EF) = in – out / in, or  
EF = Fz-Dy / Fz or  
EF = 100z – [100(z-x) / (y-x)]y / 100z

\*Vapor inlet temperature shall be measured as the average operating temperature of each product batch.

\*\*Vapor outlet temperature of the condenser shall be measured from the returning chilled water, after the mixers, but before the chiller, with 2.5 degrees Celsius added to adjust for the water to vapor temperatures.

For the purpose of calculating annual emissions, the control efficiency for each product or product type mixed during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the mixer, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

g) Miscellaneous Requirements

- (1) None.

7. Emissions Unit Group -Mixers w/condensers and bag dump: P004,P039,P040,

EU ID	Operations, Property and/or Equipment Description
P004	Ross 2 mixer w/condenser and baghouse
P039	Littleford 2 mixer,w/condenser and bagdump
P040	Littleford 3 mixer w/condenser and bagdump

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)e., d)(9), d)(10), d)(11), d)(13), e)(3)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	<u>Emissions from P004 shall not exceed:</u>  6.5 pounds per hour and 32.6 pounds per day VOC  <u>Emissions from P039 and P040, individually, shall not exceed:</u>  40 pounds per day and 7.3 tons per year VOC  See b)(2)a., and b)(2)b.
b.	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
c.	OAC rule 3745-17-07(B)(1)	The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).
d.	OAC rule 3745-17-08(B)	The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).
e.	ORC rule 3704.03(F)	See d)(9), d)(10), d)(11), d)(13) and e)(3)

(2) Additional Terms and Conditions

- a. There shall be no visible emissions of fugitive dust from any building opening or outside vent associated with these emissions units or from the room(s) containing the unit(s), during the addition of solids.
- b. The permittee shall employ best available control measures to eliminate visible emissions of fugitive dust when handling dry raw materials or charging dry raw materials into the mixer and/or bag dump, including but not limited to:
  - i. appropriate house-keeping measures to prevent fugitive dust from becoming airborne; and
  - ii. immediately closing the lid(s) to the mixer and/or bag dump at the completion of adding all dry batch mix materials.
- c. For the purpose of verifying compliance with the visible emission limitation for fugitive dust, the visible emissions shall be observed at the closest egress points to the mixer(s) from the building housing the emission unit. These egress points shall include, but not be limited to: mixer room exhaust vents, doorways, and windows.
- d. These emission units shall be employed only for the mixing of raw materials, where no chemical reactions occur between any of the raw materials.
- e. All of the VOC emissions from these emission units shall be vented to a condenser that shall meet the operational, monitoring, and record keeping requirements of this permit, when the emissions unit is in operation.
- f. If the permittee applies the condenser's control efficiency to calculate emissions from the product batches, the condenser shall be maintained and operated as required or the batch emissions must be calculated as defined in f)(3), below.
- g. These emission units shall be employed only for the mixing of raw materials, where no chemical reactions occur between any of the raw materials.



- ii. a record of the mole fraction of each organic chemical contained in each product processed and in each representative batch product group, if used (which shall demonstrate that each organic chemical contained in a product batch is less than or equal to the mole fraction of the same organic chemical in the representative product group);
  - iii. records to document the value of each conservatively estimated and/or worst-case variable for each product or product group;
  - iv. the uncontrolled and controlled (if applicable) emission calculations for each product and product group (if used), in which the conservatively estimated and/or worst case variables are applied and calculated as required (if controlled) for each organic chemical component at each method of loss (pounds of each VOC/HAP per batch)
  - v. the product batch's and product batch group's (if used) total uncontrolled and controlled (if applicable) VOC emissions, which shall equal the sum of all of the organic chemical components' emissions for this emissions unit or an emissions unit with a greater volume; and
  - vi. a record of the maximum number of batches of each product or product group that could be processed in any day without exceeding the limitations contained in this permit.
- f. the actual number of batches of each product processed each day;
  - g. if not documented as required for each product, the calculated mole fraction of each organic chemical component in each product batch;
  - h. if a control efficiency is applied and if the condenser was operating properly though the batch run and if emissions are not documented for the product or product group, a record of the conservative average operating temperature of each such product batch made in the mixer, to be used as the vapor inlet temperature; and a record of the conservative average condenser water outlet temperature, measured after the mixer, prior to the chiller, to be used to calculate the vapor outlet temperature in the control efficiency calculation, where it is assumed that the vapor outlet temperature is 2.5 degrees Celsius higher than the chiller water temperature leaving the mixer;
  - i. the total controlled (if condenser operating properly and used for compliance) and uncontrolled VOC emissions (lbs./batch), and the emission calculations for each organic chemical component in each batch that was not processed under normal operating parameters (temperature, pressure, or mole fraction) due to mistakes made in the batch recipe formulation, faulty operation of the unit, malfunction of the condenser, or other changes made to the normal operating parameters that would affect the emission rate for a specific product batch; and
  - j. the total actual or conservatively estimated/worst-case VOC emissions (lbs./batch) and the emission calculations for each organic chemical component in each batch processed in this emissions unit, for which a record of the

calculations documenting the conservatively estimated and/or worst-case emissions of the product batch or product batch group, representing the product, are not maintained as requested.

\* Conservatively estimated and/or worst case variable conditions (of temperatures, pressures, and volume of vapor space) and equivalent or worst-case concentrations, which result in conservative/worst-case emissions for the batch, may be maintained in a single record (as opposed to daily) for each product or product group to which they could be applied.

\*\* Products may be grouped by similar product types (same chemical components and having similar concentrations) for hourly and daily emission estimates, if the variables of temperature, pressure, volume of vapor head space, and concentration (mole fraction), applied in the provided equations, calculated at each method of loss, are conservative and/or worst-case for each variable. If the mixer condenser is used to demonstrate compliance, the control efficiency shall be calculated as required and shall be dependent on the conservative average vapor inlet and outlet temperatures of the condenser. Products may also be grouped by the seasons of the year, in order to segregate and lessen the effects of average temperatures. The highest concentrations of the organic chemical components, represented in the product group, shall be used in the calculations of daily emissions, unless products are calculated individually.

- (3) Whenever the monitored temperature of the chilled water from the condenser deviates from the limit established in accordance with this permit, the permittee shall promptly investigate the cause of the deviation. The permittee shall maintain records of the following information for each investigation:
- a. the date and time the deviation began;
  - b. the magnitude of the deviation at that time;
  - c. the date the investigation was conducted;
  - d. the name(s) of the personnel who conducted the investigation; and
  - e. the findings and recommendations.

In response to each required investigation to determine the cause of a deviation, the permittee shall take prompt corrective action to bring the operation of the control equipment within the acceptable range/limit specified in this permit, unless the permittee determines that corrective action is not necessary and documents the reasons for that determination and the date and time the deviation ended. The permittee shall maintain records of the following information for each corrective action taken:

- f. a description of the corrective action;
- g. the date corrective action was completed;
- h. the date and time the deviation ended;
- i. the total period of time (in minutes) during which there was deviation;

- j. the temperature readings of the exhaust gas from condenser immediately after the corrective action was implemented; and
- k. the name(s) of the personnel who performed the work.

Investigation and records required by this paragraph do not eliminate the need to comply with the requirements of OAC rule 3745-15-06 if it is determined that a malfunction has occurred.

The chilled water temperature limit is effective for the duration of this permit, unless revisions are requested by the permittee and approved in writing by Ohio EPA Central District Office. The permittee may request revisions to the permitted chilled water exit temperature limit based upon information obtained during future performance tests that demonstrate compliance with the allowable VOC emission rate for the controlled emissions unit(s). In addition, approved revisions to the chilled water temperature limit will not constitute a relaxation of the monitoring requirements of this permit and may be incorporated into this permit by means of an administrative modification.

- (4) The permittee shall calculate and record the following daily information at the end of each quarter, from the previous quarter:
  - a. the total number of batches of each individual adhesive, caulk, syrup, or other product processed in these emissions units during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated each day, showing each batch using one of the following methods:
    - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and all required records;
    - ii. product batch(s) is/are individually calculated because an existing record does not exist;
    - iii. product batch(s) deviate(s) from the normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
  - c. the total actual (controlled\* and/or uncontrolled) VOC emissions for each day of operation (lbs./day), from all product batches produced each day, calculated using one of the following methods:
    - i. the sum of the actual VOC emissions calculated from all batches run for during each day of operation; or

- ii. the sum of the actual VOC emissions from all batches run each day, calculated by multiplying the worst-case emissions for one batch of product or product group, multiplied by the number of batches run and adding the resultant VOC emissions from all products made in these units each day, including emissions from abnormal operations or new products; and
- d. the average hourly VOC emissions from these emission units for each day of operation during the calendar quarter.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the uncontrolled emissions for each organic chemical component of the product batch or product batch group, multiplied by the percent control efficiency and subtracting the result (the condensed volatile component) from the total uncontrolled emissions of each organic chemical component. The controlled and uncontrolled emissions, in pounds/batch may be added for each day to satisfy this requirement.

- (5) If the condenser is used to demonstrate compliance with the allowable limits, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water leaving the condenser serving the mix tank when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within +/- 1 percent of the temperature being measured or +/- 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be calibrated, operated and maintained in accordance with the manufacturer's recommendations, instructions and operating manuals.
- (6) The permittee shall collect and maintain the following information for each product batch;
  - a. the computer record of the continuous temperature monitor which shall document the temperature of the chilled water leaving the condenser serving the mix tank;
  - b. a record (continuous temperature monitor graph or equivalent) of the operating time for the condenser, its temperature control device, monitoring equipment, and the mix tank, for each product batch; and
  - c. for any batch in which the temperature of the chilled water leaving the condenser serving the mix tank exceeded 18 degrees Celsius at any time, a record of the adjusted, calculated control efficiency.
- (7) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:
  - a. the location and color of the emissions;

- b. whether the emissions are representative of normal operations;
- c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations, or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions, or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (8) The permittee shall maintain records of the annual inspections of the conservation vents which document the date of the inspection, findings, corrective actions, and the inspector's name if the condenser's control efficiency is used for the purpose of calculating annual emissions.
- (9) The FEPTIO application for these emissions unit(s), P004, P039 and P040, was evaluated based on the actual materials and the design parameters of the emissions unit's(s') exhaust system, as specified by the permittee. The "Toxic Air Contaminant Statute", ORC 3704.03(F), was applied to this/these emissions unit(s) for each toxic air contaminant listed in OAC rule 3745-114-01, using data from the permit application; and modeling was performed for each toxic air contaminant(s) emitted at over one ton per year using an air dispersion model such as SCREEN3, AERMOD, or ISCST3, or other Ohio EPA approved model. The predicted 1-hour maximum ground-level concentration result(s) from the approved air dispersion model, was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC), calculated as described in the Ohio EPA guidance document entitled "Review of New Sources of Air Toxic Emissions, Option A", as follows:
  - a. the exposure limit, expressed as a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, for each toxic compound(s) emitted from the emissions unit(s), (as determined from the raw materials processed and/or coatings or other materials applied) has been documented from one of the following sources and in the following order of preference (TLV was and shall be used, if the chemical is listed):
    - i. threshold limit value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices";  
or

- ii. STEL (short term exposure limit) or the ceiling value from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; the STEL or ceiling value is multiplied by 0.737 to convert the 15-minute exposure limit to an equivalent 8-hour TLV.
- b. The TLV is divided by ten to adjust the standard from the working population to the general public (TLV/10).
- c. This standard is/was then adjusted to account for the duration of the exposure or the operating hours of the emissions unit(s), i.e., "X" hours per day and "Y" days per week, from that of 8 hours per day and 5 days per week. The resulting calculation was (and shall be) used to determine the Maximum Acceptable Ground-Level Concentration (MAGLC):

$$TLV/10 \times 8/X \times 5/Y = 4 TLV/XY = MAGLC$$

- d. The following summarizes the results of dispersion modeling for the significant toxic contaminants (emitted at 1 or more tons/year) or "worst case" toxic contaminant(s):

**P004:**

Pollutant: Acetone  
TLV: 1,188 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 6.5 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,193 ug/m<sup>3</sup>  
MAGLC: 28,286 ug/m<sup>3</sup>

Pollutant: Hexane  
TLV: 176 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 6.5 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,193 ug/m<sup>3</sup>  
MAGLC: 4,190 ug/m<sup>3</sup>

Pollutant: Toluene  
TLV: 188 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 6.5 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,193 ug/m<sup>3</sup>  
MAGLC: 4,476 ug/m<sup>3</sup>

**P039:**

Pollutant: 1,1,1-Trichloroethane  
TLV: 1,910 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 8.0 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,068 ug/m<sup>3</sup>  
MAGLC: 45,476 ug/m<sup>3</sup>

**P040:**

Pollutant: Acetone  
TLV: 1,188 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 8.0 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,068 ug/m<sup>3</sup>  
MAGLC: 28,286 ug/m<sup>3</sup>

Pollutant: Hexane  
TLV: 176 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 8.0 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,068 ug/m<sup>3</sup>  
MAGLC: 4,190 ug/m<sup>3</sup>

Pollutant: Toluene  
TLV: 188 mg/m<sup>3</sup>  
Maximum Hourly Emission Rate: 8.0 lbs./hr  
Predicted 1-Hour Maximum Ground-Level Concentration: 3,068 ug/m<sup>3</sup>  
MAGLC: 4,476 ug/m<sup>3</sup>

The permittee, has demonstrated that emissions of Acetone, Hexane, Toluene, and 1,1,1-Trichloroethane, from emissions unit(s) P004, P039 and P040, are calculated to be less than eighty per cent of the maximum acceptable ground level concentration (MAGLC); any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

- (10) Prior to making any physical changes to or changes in the method of operation of the emissions unit(s), that could impact the parameters or values that were used in the predicted 1-hour maximum ground level concentration, the permittee shall re-model the change(s) to demonstrate that the MAGLC has not been exceeded. Changes that can affect the parameters/values used in determining the 1-hour maximum ground-level concentration include, but are not limited to, the following:
- a. changes in the composition of the materials used or the use of new materials, that would result in the emission of a new toxic air contaminant with a lower Threshold Limit Value (TLV) than the lowest TLV previously modeled;
  - b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any toxic air contaminant listed in OAC rule 3745-114-01, that was modeled from the initial (or last) application; and
  - c. physical changes to the emissions unit(s) or its/their exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Toxic Air Contaminant Statute" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745 31 01 solely due to a non-restrictive change to a parameter or

process operation, where compliance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F), has been documented. If the change(s) meet(s) the definition of a “modification”, the permittee shall apply for and obtain a final FEPTIO prior to the change. The Director may consider any significant departure from the operations of the emissions unit, described in the permit application, as a modification that results in greater emissions than the emissions rate modeled to determine the ground level concentration; and he/she may require the permittee to submit a permit application for the increased emissions.

- (11) The permittee shall collect, record, and retain the following information for each toxic evaluation conducted to determine compliance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F):
    - a. a description of the parameters/values used in each compliance demonstration and the parameters or values changed for any re-evaluation of the toxic(s) modeled (the composition of materials, new toxic contaminants emitted, change in stack/exhaust parameters, etc.);
    - b. the Maximum Acceptable Ground-Level Concentration (MAGLC) for each significant toxic contaminant or worst-case contaminant, calculated in accordance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F);
    - c. a copy of the computer model run(s), that established the predicted 1-hour maximum ground-level concentration that demonstrated the emissions unit(s) to be in compliance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F), initially and for each change that requires re-evaluation of the toxic air contaminant emissions; and
    - d. the documentation of the initial evaluation of compliance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F), and documentation of any determination that was conducted to re-evaluate compliance due to a change made to the emissions unit(s) or the materials applied.
  - (12) When the permittee applies the condenser’s control efficiency for the purpose of calculating annual emissions, the permittee shall perform annual inspections to ensure that the conservation vents are clean and unobstructed.
  - (13) The permittee shall maintain a record of any change made to a parameter or value used in the dispersion model, used to demonstrate compliance with the “Toxic Air Contaminant Statute”, ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. The record shall include the date and reason(s) for the change and if the change would increase the ground-level concentration.
- e) Reporting Requirements
- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.

- (2) The permittee shall submit quarterly deviation (excursion) reports that identify:
- a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the potential to emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit;
    - ii. each period of time (start time and date, and end time and date) when the temperature of the chilled water from the condenser was greater than 18 degrees Celsius; and
    - iii. any period of time (start time and date, and end time and date) when the emissions unit(s) was/were in operation and the process emissions were not vented to the condenser.
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted each year by January 31 (covering October to December), April 30 (covering January to March), July 31 (covering April to June), and October 31 (covering July to September), unless an alternative schedule has been established and approved by the Director of Ohio EPA, Central District Office.

- (3) The permittee shall include any changes made to a parameter or value used in the dispersion model, that was used to demonstrate compliance with the Toxic Air Contaminant Statute, ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration, in the annual Permit Evaluation Report (PER). If no changes to the emissions, emissions unit(s), or the exhaust stack have been made, then the report shall include a statement to this effect.
- f) Testing Requirements
- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:
- a. Emission Limitation for P004: 6.5 pounds per hour and 32.6 pounds per 24 hour period VOC

Applicable Compliance Method: Compliance with this emission limitation can be demonstrated by the engineering analysis submitted with the permit application and the requirements established in d)(1),d)(2), d)(4), and d)(5). The emission limitations calculations are based upon U.S. EPA Guidance (February 1994) and the Synthetic Organic Chemical Manufacturer's Association's (SOCMA) methodology (August 29, 1996) approved by U.S. EPA.

- b. Emission Limitation for P039 and P040: 40 pounds per day and 7.3 tons per year VOC

Applicable Compliance Method: Compliance with this emission limitation can be demonstrated by the engineering analysis submitted with the permit application and the requirements established in d)(1), d)(2), d)(4), and d)(5). The emission limitations calculations are based upon U.S. EPA Guidance (February 1994) and the Synthetic Organic Chemical Manufacturer's Association's (SOCMA) methodology (August 29, 1996) approved by U.S. EPA.

- c. Emission Limitation: There shall be no visible emissions of fugitive dust from any building opening or outside vent associated with these emissions units or from the room containing these units, during the addition of solids.

Applicable Compliance Method: Compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 22.

- (2) If required, the permittee shall conduct, or have conducted, emission testing for these emissions units to demonstrate compliance with the hourly emission rates and/or the control efficiency of the condenser, using Methods 1 through 4 and 18, 25, or 25A of 40 CFR Part 60, Appendix A. Alternative U.S. EPA-approved test methods may be used with prior approval from the Ohio EPA. The capture efficiency of the vapor collection system is assumed to be 100% because the headspace of the mixer is routed to the condenser.
- (3) If the condenser's control efficiency is used in the calculation of emissions or in the demonstration of compliance with the limits contained in this permit, the condenser control efficiency shall be determined in accordance with the method below:

**Method for Determining Condenser Control Efficiency:**

The following equation represents the mass balance around the condenser and calculates the mole fraction of VOC in the feed and in the vapor leaving the condenser. If records of these calculations are maintained in the facility records, they need only be performed once for each variation in the inlet temperature (measured as the average operating temperature of each product batch) and condenser outlet water temperature (measured after the mix tanks, prior to the chiller) for each product, or worst-case product. It shall be assumed that the vapor outlet temperature is 2.5 degrees (Celsius) higher than the outlet water temperatures of the condenser, as measured by the continuous temperature monitor installed following the mixer(s), prior to the chiller. The efficiency, calculated using the following assumptions and formula, shall be subtracted from 100% to calculate the fractional control efficiency of the condenser. If the controlled emission rate is to be calculated, the fractional control efficiency of the

condenser shall be multiplied by the total uncontrolled emission rates calculated in f)(1)a., above.

Mass balance assumptions:

F = liquid/gas feed to the condenser (lb. mole)  
D = gas leaving the condenser (lb. mole)  
W = liquid leaving the condenser (lb. mole)  
z = mole fraction of the VOC in feed  
y = mole fraction of the VOC in vapor leaving the condenser  
x = mole fraction of the VOC in liquid leaving the condenser  
x = 1 (assumes that all the liquid condensed is VOC)  
F = 100 lb. moles (arbitrarily set to calculate the pound moles of D and W)  
F = D+W; and therefore W = F-D; and substituting for value of "F";  
W = 100 - D  
Substituting for W in F(z) = D(y) + W(x):  
100z = Dy + (100 - D)x  
100z = Dy + 100x - Dx  
100z - 100x = Dy - Dx  
100(z-x) = D(y-x)  
D = 100(z-x) / (y-x)

The vapor pressures shall be determined using Antoine's Equation or vapor pressure/temperature tables ("Lange's Handbook of Chemistry" or Perry's Chemical Engineer's Handbook"), at the appropriate inlet and outlet vapor temperatures.

The mole fractions, y and z, can be determined using Raoul's Law, if the liquid is assumed to be 100% of the pollutant for which the efficiency is being calculated:

z = vapor pressure of pollutant at the vapor inlet temperature\* / 760  
y = vapor pressure of pollutant at the vapor outlet temperature\*\* / 760

efficiency (EF) = in - out / in, or  
EF = Fz-Dy / Fz or  
EF = 100z - [100(z-x) / (y-x)]y / 100z

\*Vapor inlet temperature shall be measured as the average operating temperature of each product batch.

\*\*Vapor outlet temperature of the condenser shall be measured from the returning chilled water, after the mixers, but before the chiller, with 2.5 degrees Celsius added to adjust for the water to vapor temperatures.

For the purpose of calculating annual emissions, the control efficiency for each product or product type mixed during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be



derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the mixer, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- g) Miscellaneous Requirements
  - (1) None.

**8. Emissions Unit Group -Nauta Mixers: P002,P003,P020,P021,**

<b>EU ID</b>	<b>Operations, Property and/or Equipment Description</b>
P002	Nauta 1 mixer
P003	Nauta 2 mixer
P020	Nauta 3 system
P021	Nauta 5 mixer

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)d. and d)(2)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)a.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	<b>Applicable Rules/Requirements</b>	<b>Applicable Emissions Limitations/Control Measures</b>
a.	OAC rule 3745-31-05(D) (Synthetic minor to avoid Title V and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.
b.	OAC rule 3745-17-07(B)(1)	Visible emissions of fugitive dust shall not exceed twenty percent opacity as a three-minute average.
c.	OAC rule 3745-17-08(B)	Reasonable available control measures (RACM) that are sufficient to minimize or eliminate visible emissions of fugitive dust. The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases or there shall be no visible emissions from the exhaust stack.



	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
d.	ORC 3704.03(F)	See d)(2)

(2) Additional Terms and Conditions

- a. These emission units shall be employed only for the mixing of raw materials, where no chemical reactions occur between any of the raw materials.
- b. The permittee shall employ RACM to minimize or eliminate visible emissions of fugitive dust when handling dry materials or charging dry materials into the mixer and/or bag dump, including but not limited to:
  - i. appropriate house-keeping measures to prevent fugitive dust from becoming airborne; and
  - ii. immediately closing the lid(s) to the mixer and/or bag dump at the completion of adding all dry batch mix materials.
- c. The installation and use of hoods, fans, and/or other equipment to adequately enclose, contain, capture, vent, and control fugitive dust from this emissions unit shall meet the following requirements:
  - i. the collection efficiency shall be sufficient to minimize or eliminate visible emissions of fugitive dust at the point(s) of capture to the extent possible with good engineering design; and
  - ii. the control equipment for this emissions unit shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases or there shall be no visible particulate emissions (whichever is less stringent) from the exhaust stack of this emissions unit.
- d. For the purpose of verifying compliance with the visible emission limitation for fugitive dust, the visible emissions shall be observed at the closest egress points to the mixer(s) from the building housing the emission unit. These egress points shall include, but not be limited to: mixer room exhaust vents, doorways, and windows.

c) Operational Restrictions

- (1) None.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall perform daily checks, when the emissions unit is in operation and when the weather conditions allow, for any visible particulate emissions from the stack and for any visible emissions of fugitive dust from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit. The presence or

absence of any visible emissions shall be noted in an operations log. If visible emissions are observed, the permittee shall also note the following in the operations log:

- a. the location and color of the emissions;
- b. whether the emissions are representative of normal operations;
- c. if the emissions are not representative of normal operations, the cause of the abnormal emissions;
- d. the total duration of any visible emissions incident; and
- e. any corrective actions taken to minimize or eliminate the visible emissions.

If visible emissions are present, a visible emissions incident has occurred. The observer does not have to document the exact start and end times for the visible emissions incident under item (d) above or continue the daily check until the incident has ended. The observer may indicate that the visible emissions incident was continuous during the observation period (or, if known, continuous during the operation of the emissions unit). With respect to the documentation of corrective actions, the observer may indicate that no corrective actions were taken if the visible emissions were representative of normal operations, or specify the minor corrective actions that were taken to ensure that the emissions unit continued to operate under normal conditions, or specify the corrective actions that were taken to eliminate abnormal visible emissions.

- (2) Modeling to demonstrate compliance with, the "Toxic Air Contaminant Statute", ORC 3704.03(F)(4)(b), was not necessary because the emissions unit's maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The PER shall identify:
  - a. all days during which any visible particulate emissions were observed from the stack serving this emissions unit;
  - b. all days during which any visible emissions of fugitive dust were observed from the egress points (i.e., building windows, doors, roof monitors, etc.) serving this emissions unit; and

- c. any corrective actions taken to minimize or eliminate the visible particulate emissions from the stack and/or visible emissions of fugitive dust.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation: Visible emissions of fugitive dust shall not exceed 20 percent opacity as a three-minute average.

Applicable Compliance Method: Compliance with the fugitive visible particulate emissions limitation shall be determined through visible emissions observations performed in accordance with U.S. EPA Method 22 and OAC 3745-17-03(B)(4).

- b. Emission Limitation: The controlled emissions from the stack shall achieve an outlet emission rate of not greater than 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases or there shall be no visible emissions from the exhaust stack.

Applicable Compliance Method: Compliance with the requirement for no visible particulate emissions from the exhaust stack, identified in this permit, shall be determined in accordance with U.S. EPA Method 22. If opting to comply with the outlet particulate emissions rate, compliance with the 0.030 grain of particulate emissions per dry standard cubic foot of exhaust gases from the stack, compliance shall be determined in accordance with U.S. EPA Methods 1 through 5, as appropriate.

g) Miscellaneous Requirements

- (1) None.

**9. Emissions Unit Group -Reactor systems w/pre-emulsion: P103,P113,**

<b>EU ID</b>	<b>Operations, Property and/or Equipment Description</b>
P103	Continuous Reactor System w/alcohol cook, weigh tanks and 2 pre-emulsion tanks w/condensers and 2 reactor pots w/condensers
P113	Reactor 4 System w/pre-emulsion tank

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)e., d)(5)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b.

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	<b>Applicable Rules/Requirements</b>	<b>Applicable Emissions Limitations/Control Measures</b>
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	Organic compound (OC) emissions shall not exceed 6.5 lbs/hr, 32.3lbs/day and 6.0 tons per year.  See b)(2)a., c)(1), and c)(2) below.  The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(D) and OAC rule 3745-21-07(M).
b.	OAC rule 3745-31-05(D) (synthetic minor to avoid Title V permitting and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.
c.	OAC rule 3745-21-07(M)(3)(d)(v)(a), (d), (e).	The emission limitation specified by this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
d.	OAC rule 3745-15-07(A)	See c)(3) and c)(4).
e.	ORC 3704.03(F)(4)(c)	See d)(5)

(2) Additional Terms and Conditions

- a. The chilled water and/or refrigerated condensers on the pre-emulsion tank and reactor for this emissions unit shall be operated and maintained in accordance with federally enforceable restrictions as required by this permit.

c) Operational Restrictions

- (1) The maximum temperature of the exhaust gases from the reactor's condenser shall not exceed 42 degrees Celsius during any hour in which the average temperature is 35 degrees Celsius or above, if the condenser is used to demonstrate compliance with allowable OC emission limitations. If these conditions are exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used;
- (2) The maximum temperature of the chilled water and or refrigerant entering the condenser serving the pre-emulsion tank(s) shall not exceed 17 degrees Celsius at any time, or that temperature established during the most recent emissions test that demonstrated that the condenser achieved a 50% reduction of OC emissions vented to it, if a pre-emulsion tank's condenser is used to demonstrate compliance with allowable OC limitations. This temperature shall be monitored at the point the chilled water enters the building containing the reactor. If this temperature is exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used;
- (3) The pressure setting of the conservation vent, if used on the pre-emulsion tank vent, shall be set by the manufacturer at a minimum of 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
- (4) The permittee shall maintain an emergency containment system capable of preventing the release of any liquid or solid materials from these emissions units. The purpose of the emergency containment system is public safety and the design shall be adequate to prevent any release of liquid or solid materials.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
  - a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;

- b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor(this may be maintained on the batch sheet);
- c. the highest operating temperature reached during the batch run;
- d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined;
- e. the actual number of batches of each product processed each day;
- f. the OC emission rates for each batch to be calculated by summing the emissions from the pre-emulsion tank (if applicable) with those from the reactor, plus the general exhaust of fugitives, as determined during the most recent emission test .

If the reactor contents are not heated above the boiling point of the chemical with the lowest boiling point in the batch, the reactor emissions may be calculated using ideal gas law equations. The maximum control efficiency applied for the condenser shall not exceed the 97% or that determined during the most recent emission testing.

If the pre-emulsion tank's condenser operates at 6 degrees Celsius or greater, the pre-emulsion tank emissions shall be calculated with a control efficiency of no greater than 70 percent, or that percentage determined during the most recent emission testing. At chilled water temperatures of less than 6 degrees Celsius, a batch emission rate (see table below) in lbs of vinyl acetate (OC) from the pre-emulsion tank condenser (from emission test data) may be applied in the calculation of OC emissions contributed to the reactor system by the pre-emulsion tank.

This calculation and record may be maintained in the facility records and may be adjusted downward depending in the recorded highest temperature of the refrigerated coolant temperature entering the condenser serving the reactor pre-emulsion tank.

Avg. Condenser Emission Temp. (C)	OC lb/batch (vinyl acetate)
-2.5	0.759
-1	1.09
0	1.31
1	1.53
2	1.8



3	2.02
4	2.24
5	2.52

- (2) At the end of each calendar month the permittee shall calculate and record the following information for each day of the preceding month:
- a. the total number of batches of each individual product [identified as required in d)(1)e.] processed in each emissions unit during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
    - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained per d)(1)f.;
    - ii. product batch(s) is/are individually calculated because an existing record, maintained as required in d)(1)f., does not exist;
    - iii. product batch(s) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
  - c. the total actual OC emissions for each day of operation (lbs/day), from all product batches produced each day, calculated as specified in f)(1), and calculated using one of the following methods:
    - i. the sum of the actual OC emissions calculated from all batches run for each day of operation; or
    - ii. the sum of the actual OC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant OC and HAP emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products.
  - d. the OC emissions from this emissions unit for each month of operation, calculated by summing the emissions recorded in d)(2)c for each day; and

- e. the rolling, 12-month summation of OC emissions from this emissions unit, calculated by summing the emissions recorded in d)(2)d for each month.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the emissions for each product batch or product batch group, calculated under f)(1). The calculated controlled OC emissions of each organic chemical component shall be added to get the total OC/batch. The controlled emissions, in pounds/batch, maintained in d)(2) for each product or product batch group, may be added for each day to satisfy this requirement.

- (3) If the reactor's condenser is used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the exhaust gases from the condenser serving the reactor, when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor, which shall document the average temperature of the exhaust gases from the condenser serving the reactor, during each one-hour period of operation when the maximum temperature exceeded 42 degrees Celsius;
- b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the reactor and its associated condenser, temperature control device, and monitoring equipment for each product batch; and
- c. for any batch in which the peak temperature of the exhaust gases from the condenser serving the reactor exceeded 42 degrees Celsius in any hour in which the average temperature was 35 degrees Celsius or above.

- (4) If the pre-emulsion tanks' condenser are used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s) when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals, and may be monitored at the point the chilled water enters the building containing the reactor.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor which shall document the peak temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s);
- b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the pre-emulsion tank(s) and its/their associated condenser, temperature control device, and monitoring equipment for each product batch\*;  
and
- c. for any batch in which the peak temperature of the chilled-water entering the condenser serving the pre-emulsion tank(s) exceeded 17 degrees Celsius at any time or that temperature established during the most recent emissions test that demonstrated that the condenser effectively limited OC emissions.

\* If the pre-emulsion tank(s) has/have operated in association with the reactor in the production of any batch, and during the same period of time, the log for the reactor may so indicate this, to alleviate the second record for the pre-emulsion tank(s).

- (5) Modeling to demonstrate compliance with, the "Toxic Air Contaminant Statute", ORC 3704.03(F)(4)(b), was not necessary because the emissions unit's maximum annual emissions for each toxic air contaminant, as defined in OAC rule 3745-114-01, will be less than 1.0 ton per year. OAC Chapter 3745-31 requires a permittee to apply for and obtain a new or modified FEPTIO prior to making a "modification" as defined by OAC rule 3745-31-01. The permittee is hereby advised that changes in the composition of the materials, or use of new materials, that would cause the emissions of any toxic air contaminant to increase to above 1.0 ton per year may require the permittee to apply for and obtain a new FEPTIO.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports for the following emissions unit(s) that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the Potential to Emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any exceedance of the operational limitations established in b)(2)a.;

- ii. any deviation from the temperature requirements established in c)(1) and c)(2);
- iii. any deviation from the pressure setting requirements established in c)(3).
- b. the probable cause of each deviation (excursion);
- c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
- d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted (postmarked) each year by the thirty-first of January (covering October to December), the thirtieth of April (covering January to March), the thirty-first of July (covering April to June), and the thirty-first of October (covering July to September), unless an alternative schedule has been established and approved by the director (the appropriate district office or local air agency).

- (3) The permittee shall include any changes made to a parameter or value used in the dispersion model, that would be used to demonstrate compliance with the Toxic Air Contaminant Statute, ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration, in the quarterly deviation (excursion) reports. If no changes to the emissions, emissions unit(s), or the exhaust stack have been made, then the report shall include a statement to this effect.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation: OC emissions from each emissions unit shall not exceed 6.5 lbs/hr and/or 32.3 lbs/day.

Applicable Compliance Method: Compliance with the hourly emission limitation was demonstrated during emission testing in November 2004 and 2005 for vinyl acetate production. If required, the permittee shall demonstrate compliance with this emission limitation through emission tests performed in accordance with 40 CFR Part 60, Appendix A, Methods 1 through 4 and 18. Compliance with the daily OC emission limitations shall be demonstrated based on the record keeping requirements in d)(2) and d)(3).

Emissions from each batch shall be calculated as follows:

If the reactor contents are heated up to and/or above the boiling point of the chemical with the lowest boiling point in the batch, the ideal gas law no longer applies. In this case, emissions shall be calculated using an emission factor of 1.27 pounds of VOC per hour, derived from the stack test conducted on 5/12/94,

for Reactor 9 (P107), in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling point to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling point chemicals' emissions, calculated in this way, shall be added to the emissions calculated for the chemical that's boiling point was exceeded, to document a conservative estimate of OC emissions for the time period operating under these conditions.

The total uncontrolled OC emission rate from each method of loss for each batch shall be calculated as summed for all volatile components = total pounds VOC emitted per batch

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- b. Emission Limitation: OC emissions from this emissions unit shall not exceed 6.0 tons per year.

Applicable Compliance Method: Compliance with the annual OC emission limitation for this emissions unit shall be demonstrated based on the record keeping requirements in d)(2) by summing/totaling each daily record for the calendar year.

- g) Miscellaneous Requirements
  - a. None.



**10. Emissions Unit Group -Reactor systems w/pre-emulsion: P106,P107,P115,P116,P127,**

EU ID	Operations, Property and/or Equipment Description
P106	Reactor 10 System
P107	Reactor 9 System
P115	Reactor R07 System
P116	Reactor 8 System
P127	Reactor R02, production of poly vinyl acetate emulsions and polymers

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)g., d)(5) – d)(8) and e)(3)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b., c)(1), and d)(1)

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	Organic Compound (OC) emissions from each emissions unit shall not exceed 5.9 tons per year.  See b)(2)a., c)(1), and c)(2) below.  The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(D) and OAC rule 3745-21-07(M).
b.	OAC rule 3745-31-05(D) (synthetic minor to avoid Title V permitting and MACT)	See B.2.b)(1)a., and B.2.b)(1)b., above.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
c.	OAC rule 3745-21-07(M)(3)(d)(v)(b), (c) & (g)	Organic Compound (OC) emissions from emissions unit <b>P106</b> , <b>P107</b> and <b>P116</b> shall not exceed 6.5 lbs/hr and 32.3 lbs/day.
d.	OAC rule 3745-21-07(M)(3)(d)(v)(j)	Organic Compound (OC) emissions from emissions unit <b>P127</b> , shall not exceed 6.92 lbs/hr and 32.3 lbs/day.
e.	OAC rule 3745-21-07(M)(3)(d)(v)(f),	Organic Compound (OC) emissions from emissions unit <b>P115</b> shall not exceed 7.3 lbs/hr and 32.3 lbs/day.
f.	OAC rule 3745-15-07(A)	See c)(3) and c)(4).
g.	ORC 3704.03(F)(4)(c)	See d)(5) – d)(8) and e)(3)

(2) Additional Terms and Conditions

- a. The chilled water and/or refrigerated condensers on the pre-emulsion tank and reactor for this emissions unit shall be operated and maintained in accordance with federally enforceable restrictions as required by this permit.
- b. In order to demonstrate compliance with the “Toxic Air Contaminant Statute”, the Director has established, per ORC 3704.03(F)(4)(c), a limit for P106, P107, P116 and P127, which shall not exceed 32.3 pound(s) per day. This daily allowable emissions rate was calculated by multiplying the approved daily operating schedule submitted in the permit application, by the emission rate modeled (to determine the ground level concentration).

c) Operational Restrictions

- (1) The maximum temperature of the exhaust gases from the reactor's condenser shall not exceed 42 degrees Celsius during any hour in which the average temperature is 35 degrees Celsius or above, if the condenser is used to demonstrate compliance with allowable OC emission limitations. If these conditions are exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used;
- (2) The maximum temperature of the chilled water and or refrigerant entering the condenser serving the pre-emulsion tank(s) shall not exceed 17 degrees Celsius at any time, or that temperature established during the most recent emissions test that demonstrated that the condenser achieved a 50% reduction of OC emissions vented to it, if a pre-emulsion tank's condenser is used to demonstrate compliance with allowable OC limitations. This temperature shall be monitored at the point the chilled water enters the building containing the reactor. If this temperature is exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used;

- (3) The pressure setting of the conservation vent, if used on the pre-emulsion tank vent, shall be set by the manufacturer at a minimum of 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
- (4) The permittee shall maintain an emergency containment system capable of preventing the release of any liquid or solid materials from these emissions units. The purpose of the emergency containment system is public safety and the design shall be adequate to prevent any release of liquid or solid materials.

d) **Monitoring and/or Recordkeeping Requirements**

- (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
  - a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;
  - b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor(this may be maintained on the batch sheet);
  - c. the highest operating temperature reached during the batch run;
  - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined;
  - e. the actual number of batches of each product processed each day;
  - f. the OC emission rates for each batch to be calculated by summing the emissions from the pre-emulsion tank (if applicable) with those from the reactor, plus the general exhaust of fugitives, as determined during the most recent emission test .

If the reactor contents are not heated above the boiling point of the chemical with the lowest boiling point in the batch, the reactor emissions may be calculated using ideal gas law equations. The maximum control efficiency applied for the condenser shall not exceed the 97% or that determined during the most recent emission testing.

If the pre-emulsion tank's condenser operates at 6 degrees Celsius or greater, the pre-emulsion tank emissions shall be calculated with a control efficiency of no greater than 70 percent, or that percentage determined during the most recent emission testing. At chilled water temperatures of less than 6 degrees Celsius, a batch emission rate (see table below) in lbs of vinyl acetate (OC) from the pre-emulsion tank condenser (from emission test data) may be applied in the calculation of OC emissions contributed to the reactor system by the pre-emulsion tank.

This calculation and record may be maintained in the facility records and may be adjusted downward depending in the recorded highest temperature of the

refrigerated coolant temperature entering the condenser serving the reactor pre-emulsion tank.

Avg. Condenser Emission Temp. (C)	OC lb/batch (vinyl acetate)
-2.5	0.759
-1	1.09
0	1.31
1	1.53
2	1.8
3	2.02
4	2.24
5	2.52

- (2) At the end of each calendar month the permittee shall calculate and record the following information for each day of the preceding month:
- a. the total number of batches of each individual product [identified as required in d)(1)e.] processed in each emissions unit during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
    - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained;
    - ii. product batch(s) is/are individually calculated because an existing record, maintained as required in d)(1)f., does not exist;
    - iii. product batch(s) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(s) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied.
  - c. the total actual OC emissions for each day of operation (lbs/day), from all product batches produced each day, calculated as specified in f)(1), and calculated using one of the following methods:

- i. the sum of the actual OC emissions calculated from all batches run for each day of operation; or
  - ii. the sum of the actual OC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant OC emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products.
- d. the OC emissions from this emissions unit for each month of operation, calculated by summing the emissions recorded in d)(2)c for each day.

\* The controlled emissions from each batch produced under normal operating conditions shall be calculated by multiplying the emissions for each product batch or product batch group, calculated under f)(1). The calculated controlled VOC emissions of each organic chemical component shall be added to get the total VOC/batch. The controlled emissions, in pounds/batch, maintained in d)(1)f for each product or product batch group, may be added for each day to satisfy this requirement.

- (3) If the reactor's condenser is used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the exhaust gases from the condenser serving the reactor, when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor, which shall document the average temperature of the exhaust gases from the condenser serving the reactor, during each one-hour period of operation when the maximum temperature exceeded 42 degrees Celsius;
  - b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the reactor and its associated condenser, temperature control device, and monitoring equipment for each product batch; and
  - c. for any batch in which the peak temperature of the exhaust gases from the condenser serving the reactor exceeded 42 degrees Celsius in any hour in which the average temperature was 35 degrees Celsius or above.
- (4) If the pre-emulsion tanks condensers are used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water and/or glycol refrigerant

entering the condenser serving the pre-emulsion tank(s) when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals, and may be monitored at the point the chilled water enters the building containing the reactor.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor which shall document the peak temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s);
- b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the pre-emulsion tank(s) and its/their associated condenser, temperature control device, and monitoring equipment for each product batch\*; and
- c. for any batch in which the peak temperature of the chilled-water entering the condenser serving the pre-emulsion tank(s) exceeded 17 degrees Celsius at any time or that temperature established during the most recent emissions test that demonstrated that the condenser effectively limited OC emissions.

\* If the pre-emulsion tank(s) has/have operated in association with the reactor in the production of any batch, and during the same period of time, the log for the reactor may so indicate this, to alleviate the second record for the pre-emulsion tank(s).

- (5) The PTIO application for these emissions units, P106, P107, P115, P116, and P127, was evaluated based on the actual materials and the design parameters of the emissions unit's(s') exhaust system, as specified by the permittee. The "Toxic Air Contaminant Statute", ORC 3704.03(F), was applied to this/these emissions unit(s) for each toxic air contaminant listed in OAC rule 3745-114-01, using data from the permit application; and modeling was performed for each toxic air contaminant(s) emitted using an air dispersion model such as SCREEN3, AERMOD, or ISCST3, or other Ohio EPA approved model. The predicted 1-hour maximum ground-level concentration result(s) from the approved air dispersion model, was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC), calculated as described in the Ohio EPA guidance document entitled "Review of New Sources of Air Toxic Emissions, Option A", as follows:
  - a. the exposure limit, expressed as a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, for each toxic compound(s) emitted from the emissions unit(s), (as determined from the raw materials processed and/or coatings or other materials applied) has been documented from one of the following sources and in the following order of preference (TLV was and shall be used, if the chemical is listed):

- i. threshold limit value (TLV) from the American Conference of Governmental Industrial Hygienists' (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; or
  - ii. STEL (short term exposure limit) or the ceiling value from the American Conference of Governmental Industrial Hygienists' (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; the STEL or ceiling value is multiplied by 0.737 to convert the 15-minute exposure limit to an equivalent 8-hour TLV.
- b. The TLV is divided by ten to adjust the standard from the working population to the general public (TLV/10).
  - c. This standard is/was then adjusted to account for the duration of the exposure or the operating hours of the emissions unit(s), i.e., "X" hours per day and "Y" days per week, from that of 8 hours per day and 5 days per week. The resulting calculation was (and shall be) used to determine the Maximum Acceptable Ground-Level Concentration (MAGLC):

$$\text{TLV}/10 \times 8/\text{X} \times 5/\text{Y} = 4 \text{ TLV}/\text{XY} = \text{MAGLC}$$

- d. The following summarizes the results of dispersion modeling for the significant toxic contaminants or "worst case" toxic contaminant(s):

**P106, P107, P116**

Toxic Contaminant: vinyl acetate

TLV (mg/m<sup>3</sup>): 35

Maximum Hourly Emission Rate (lbs/hr): 6.5

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 770

MAGLC (ug/m<sup>3</sup>): 833

The permittee, having demonstrated that emissions of vinyl acetate, from emissions units P106, P107, P116, is estimated to be equal or greater than eighty per cent, but less than 100 per cent of the maximum acceptable ground level concentration (MAGLC), shall not operate the emissions units at a rate that would exceed the daily emissions rate, process weight rate, and/or restricted hours of operations, as allowed in this permit; and any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

- e. The following summarizes the results of dispersion modeling for the significant toxic contaminants or "worst case" toxic contaminant(s):

**P115**

Toxic Contaminant: N-butyl acrylate

TLV (mg/m<sup>3</sup>): 10.5

Maximum Hourly Emission Rate (lbs/hr): 1.05

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 166

MAGLC (ug/m<sup>3</sup>): 250

The permittee, has demonstrated that emissions of N-butyl acrylate, from emissions unit P115, is calculated to be less than eighty per cent of the maximum acceptable ground level concentration (MAGLC); any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

- f. The following summarizes the results of dispersion modeling for the significant toxic contaminants or "worst case" toxic contaminant(s):

**P127**

Toxic Contaminant: vinyl acetate

TLV (mg/m<sup>3</sup>): 35

Maximum Hourly Emission Rate (lbs/hr): 6.9

Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 791

MAGLC (ug/m<sup>3</sup>): 833

The permittee, has demonstrated that emissions of vinyl acetate, from emissions unit P127, is estimated to be equal or greater than eighty per cent, but less than 100 per cent of the maximum acceptable ground level concentration (MAGLC), shall not operate the emissions units at a rate that would exceed the daily emissions rate, process weight rate, and/or restricted hours of operations, as allowed in this permit; and any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F)..

- (6) Prior to making any physical changes to or changes in the method of operation of the emissions unit(s), that could impact the parameters or values that were used in the predicted 1-hour maximum ground-level concentration, the permittee shall re-model the change(s) to demonstrate that the MAGLC has not been exceeded. Changes that can affect the parameters/values used in determining the 1-hour maximum ground-level concentration include, but are not limited to, the following:
- a. changes in the composition of the materials used or the use of new materials, that would result in the emission of a new toxic air contaminant with a lower Threshold Limit Value (TLV) than the lowest TLV previously modeled;
  - b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any toxic air contaminant listed in OAC rule 3745-114-01, that was modeled from the initial (or last) application; and

- c. physical changes to the emissions unit(s) or its/their exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Toxic Air Contaminant Statute", ORC 3704.03(F), will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to a non-restrictive change to a parameter or process operation, where compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), has been documented. If the change(s) meet(s) the definition of a "modification", the permittee shall apply for and obtain a final FEPTIO prior to the change. The Director may consider any significant departure from the operations of the emissions unit, described in the permit application, as a modification that results in greater emissions than the emissions rate modeled to determine the ground level concentration; and he/she may require the permittee to submit a permit application for the increased emissions.

- (7) The permittee shall collect, record, and retain the following information for each toxic evaluation conducted to determine compliance with the "Toxic Air Contaminant Statute":
  - a. a description of the parameters/values used in each compliance demonstration and the parameters or values changed for any re-evaluation of the toxic(s) modeled (the composition of materials, new toxic contaminants emitted, change in stack/exhaust parameters, etc.);
  - b. the Maximum Acceptable Ground-Level Concentration (MAGLC) for each significant toxic contaminant or worst-case contaminant, calculated in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F);
  - c. a copy of the computer model run(s), that established the predicted 1-hour maximum ground-level concentration that demonstrated the emissions unit(s) to be in compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), initially and for each change that requires re-evaluation of the toxic air contaminant emissions; and
  - d. the documentation of the initial evaluation of compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), and documentation of any determination that was conducted to re-evaluate compliance due to a change made to the emissions unit(s) or the materials applied.
- (8) The permittee shall maintain a record of any change made to a parameter or value used in the dispersion model, used to demonstrate compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. The record shall include the date and reason(s) for the change and if the change would increase the ground-level concentration.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this

permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.

- (2) The permittee shall submit quarterly deviation (excursion) reports for the following emissions unit(s) that identify:
  - a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the Potential to Emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any exceedance of the operational limitations established in b)(2)a.;
    - ii. any deviation from the temperature requirements established in c)(1) and c)(2);
    - iii. any deviation from the pressure setting requirements established in c)(3).
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted (postmarked) each year by the thirty-first of January (covering October to December), the thirtieth of April (covering January to March), the thirty-first of July (covering April to June), and the thirty-first of October (covering July to September), unless an alternative schedule has been established and approved by the director (the appropriate district office or local air agency).

- (3) The permittee shall include in the annual Permit Evaluation Report (PER) any exceedance of the daily limitation on toxic air emissions or any deviation from a restriction on the process or hours of operation, as established by the Director, in order to maintain any toxic air contaminant below its MAGLC. The permittee shall also include in the PER any changes made, during the calendar year, to a parameter or value entered into the dispersion model that was used to maintain compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. If no changes to the emissions, emissions unit(s), or the exhaust stack have been made, then the report shall include a statement to this effect.
  - f) Testing Requirements
    - (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation: OC emissions from **P106, P107 and P116** shall not exceed 6.5 lbs/hr and/or 32.3 lbs/day.

Applicable Compliance Method: Compliance with the hourly emission limitation was demonstrated during emission testing in November 2004 and 2005 for vinyl acetate production. If required, the permittee shall demonstrate compliance with this emission limitation through emission tests performed in accordance with 40 CFR Part 60, Appendix A, Methods 1 through 4 and 18. Compliance with the daily OC emission limitations shall be demonstrated based on the record keeping requirements in d)(2) and d)(3).

Emissions from each batch shall be calculated as follows:

If the reactor contents are heated up to and/or above the boiling point of the chemical with the lowest boiling point in the batch, the ideal gas law no longer applies. In this case, emissions shall be calculated using an emission factor of 1.27 pounds of VOC per hour, derived from the stack test conducted on 5/12/94, for Reactor 9 (P107), in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling point to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling point chemicals' emissions, calculated in this way, shall be added to the emissions calculated for the chemical that's boiling point was exceeded, to document a conservative estimate of OC emissions for the time period operating under these conditions.

The total uncontrolled OC emission rate from each method of loss for each batch shall be calculated as summed for all volatile components = total pounds VOC emitted per batch

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.



- b. Emission Limitation: OC emissions from each emissions unit shall not exceed 5.9 tons per year.

Applicable Compliance Method: Compliance with the annual OC emission limitation for this emission unit shall be demonstrated based on the record keeping requirements in d)(2) and d)(3) by summing/totaling the monthly emissions for the calendar year.

- c. Emission Limitation: Organic Compound (OC) emissions from emissions unit **P127**, shall not exceed 6.92 lbs/hr and 32.3 lbs/day.

Applicable Compliance Method: Compliance with the hourly and daily OC emission limitation for this emission unit shall be demonstrated based on the record keeping requirements in d)(2) and d)(3).

- d. Emission Limitation: Organic Compound (OC) emissions from emissions unit **P115** shall not exceed 7.3 lbs/hr and 32.3 lbs/day.

Applicable Compliance Method: Compliance with the hourly and daily OC emission limitation for this emission unit shall be demonstrated based on the record keeping requirements in d)(2) and d)(3).

g) Miscellaneous Requirements

- (1) None.



11. Emissions Unit Group -Reactors with pre-emulsion: P124, P125,

EU ID	Operations, Property and/or Equipment Description
P124	Reactor 6 System
P125	Reactor 11 System

a) This permit document constitutes a permit-to-install issued in accordance with ORC 3704.03(F) and a permit-to-operate issued in accordance with ORC 3704.03(G).

(1) For the purpose of a permit-to-install document, the emissions unit terms and conditions identified below are federally enforceable with the exception of those listed below which are enforceable under state law only.

a. b)(1)f., d)(6) – d)(9) and e)(3)

(2) For the purpose of a permit-to-operate document, the emissions unit terms and conditions identified below are enforceable under state law only with the exception of those listed below which are federally enforceable.

a. b)(1)b., c)(1) and d)(1)

b) Applicable Emissions Limitations and/or Control Requirements

(1) The specific operation(s), property, and/or equipment that constitute each emissions unit along with the applicable rules and/or requirements and with the applicable emissions limitations and/or control measures are identified below. Emissions from each unit shall not exceed the listed limitations, and the listed control measures shall be specified in narrative form following the table.

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
a.	OAC rule 3745-31-05(A)(3) June 30, 2008	<u>Emissions from P124 shall not exceed:</u>  4.0 tons per year of organic compound (OC) emissions  <u>Emissions from P125 shall not exceed:</u>  7.1 tons per year of organic compound (OC) emissions  The requirements of this rule also include compliance with the requirements of OAC rule 3745-31-05(D) and OAC rule 3745-21-07(M).  See b)(2)a.,c)(1), and c)(2)

	Applicable Rules/Requirements	Applicable Emissions Limitations/Control Measures
b.	OAC rule 3745-31-05(D) (synthetic minor to avoid Title V permitting and MACT)	See B.2.b)(1)a. and B.2.b)(1)b., above.
c.	OAC rule 3745-21-07(M)(3)(d)(v)(i)	<u>Emissions from P124 shall not exceed:</u> 4.38 pounds per hour and 21.92 pounds per day of organic compound (OC) emissions
d.	OAC rule 3745-21-07(M)(3)(d)(v)(i)	<u>Emissions from P125 shall not exceed:</u> 7.8 pounds per hour and 39.0 pounds per day of organic compound (OC) emissions
e.	OAC rule 3745-15-07(A)	See c)(3) and c)(4).
f.	ORC 3704.03(F)(4)(c)	See d)(6) – d)(9) and e)(3)

(2) Additional Terms and Conditions

- a. The chilled water and/or refrigerated condensers on the pre-emulsion tank and reactor for this emissions unit shall be operated and maintained in accordance with federally enforceable restrictions as required by this permit.

c) Operational Restrictions

- (1) The maximum temperature of the exhaust gases from the reactor's condenser shall not exceed 42 degrees Celsius during any hour in which the average temperature is 35 degrees Celsius or above, if the condenser is used to demonstrate compliance with allowable OC emission limitations. If these conditions are exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used.
- (2) The maximum temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s) shall not exceed 17 degrees Celsius at any time, or that temperature established during the most recent emissions test that demonstrated that the condenser achieved a 50% reduction of OC emissions vented to it, if a pre-emulsion tank's condenser is used to demonstrate compliance with allowable VOC limitations. This temperature shall be monitored at the point the chilled water enters the building containing the reactor. If this temperature is exceeded, the control efficiency shall be calculated for the batch and the record of representative emissions maintained for the product batch shall not be used.
- (3) The pressure setting of the conservation vent, if used on the pre-emulsion tank vent, shall be set by the manufacturer at a minimum of 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.

- (4) The permittee shall maintain an emergency containment system capable of preventing the release of any liquid or solid materials from these emissions units. The purpose of the emergency containment system is public safety and the design shall be adequate to prevent any release of liquid or solid materials.

d) Monitoring and/or Recordkeeping Requirements

- (1) The permittee shall collect and record the following information for each day for each batch of product processed in this emissions unit:
- a. the company name, code, and/or identification number for each batch of product processed; the date of production; and the number of batches of each product processed;
  - b. the amount, in pounds, of each organic material added to pre-emulsion tank(s) and the reactor (this may be maintained on the batch sheet);
  - c. the highest operating temperature reached during the batch run;
  - d. the start and stop time for each batch run, recorded on each batch sheet, from which the duration of each batch run (hrs/batch) and the total hours of operation for this emissions unit (hrs/day) can be determined;
  - e. the actual number of batches of each product processed each day;
  - f. the OC emission rates for each batch to be calculated by summing the emissions from the pre-emulsion tank (if applicable) with those from the reactor, plus the general exhaust of fugitives, as determined during the most recent emission test .

If the reactor contents are not heated above the boiling point of the chemical with the lowest boiling point in the batch, the reactor emissions may be calculated using ideal gas law equations. The maximum control efficiency applied for the condenser shall not exceed the 97% or that determined during the most recent emission testing.

If the pre-emulsion tank's condenser operates at 6 degrees Celsius or greater, the pre-emulsion tank emissions shall be calculated with a control efficiency of no greater than 70 percent, or that percentage determined during the most recent emission testing. At chilled water temperatures of less than 6 degrees Celsius, a batch emission rate (see table below) in lbs of vinyl acetate (VOC) from the pre-emulsion tank condenser (from emission test data) may be applied in the calculation of OC emissions contributed to the reactor system by the pre-emulsion tank.

This calculation and record may be maintained in the facility records and may be adjusted downward depending in the recorded highest temperature of the refrigerated coolant temperature entering the condenser serving the reactor pre-emulsion tank.

Avg. Condenser Emission Temp. (C)	OC lb/batch (vinyl acetate)
-2.5	0.759
-1	1.09
0	1.31
1	1.53
2	1.8
3	2.02
4	2.24
5	2.52

- (2) At the end of each calendar month, the permittee shall calculate and record the following information for each day of the preceding month:
- a. the total number of batches of each individual product (identified as required in d)(2)a) processed in this emissions unit during the calendar quarter, for each day of operation;
  - b. an identification of how the emissions were calculated for each day, showing each batch or all batches calculated using one of the following methods:
    - i. product batches are representative of normal operations and the estimated emissions are calculated by using existing documented, conservative and/or worst-case variables for each product batch or product batch group, and records maintained under d)(2)f;
    - ii. product batch(es) is/are individually calculated because an existing record, maintained as required in d)(2)f, does not exist;
    - iii. product batch(es) deviate(s) from normal operating parameters and is/are individually calculated, including adjustments to the efficiency due to condenser temperature deviations; and/or
    - iv. product batch(es) is/are made without the condenser control or during a malfunction of the condenser and the control efficiency is not applied;
  - c. the total actual OC emissions for each day of operation (lbs/day), from all product batches produced each day, calculated as specified in d)(1)f, and calculated using one of the following methods:
    - i. the sum of the actual OC emissions calculated from all batches run for each day of operation; or

- ii. the sum of the actual OC emissions from all batches run each day, calculated by multiplying the conservatively calculated or worst-case emissions for one batch of each product or product group times the number of batches of each product run, and adding the resultant OC emissions for all products made in this emissions unit each day, including those calculated individually for abnormal operations or for new products.
- d. the OC emissions from this emissions unit for each month of operation, calculated by summing the emissions recorded in d)(2)c. for each day.
  - \* The controlled emissions from each batch produced under normal operating conditions shall be calculated for each product batch or product batch group, calculated under f)(1)a. The calculated controlled OC emissions of each organic chemical component shall be added to get the total VOC/batch. The controlled emissions, in pounds/batch, maintained in d)(1)f for each product or product batch group, may be added for each day to satisfy this requirement.
- (3) If the reactor's condenser is used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the exhaust gases from the condenser serving the reactor, when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1 percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals.
- (4) The permittee shall collect and maintain the following information each day for each batch:
  - a. the computer record of the continuous temperature monitor, which shall document the average temperature of the exhaust gases from the condenser serving the reactor, during each one-hour period of operation when the maximum temperature exceeded 42 degrees Celsius;
  - b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the reactor and its associated condenser, temperature control device, and monitoring equipment for each product batch; and
  - c. for any batch in which the peak temperature of the exhaust gases from the condenser serving the reactor exceeded 42 degrees Celsius in any hour in which the average temperature was 35 degrees Celsius or above.
- (5) If the pre-emulsion tanks' condenser are used to demonstrate compliance, the permittee shall operate and maintain a continuous temperature monitor and recorder which measures and records the temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s) when the emissions unit is in operation. Units shall be in degrees Celsius. The accuracy for each thermocouple, monitor, and recorder shall be guaranteed by the manufacturer to be within + or - 1

percent of the temperature being measured or + or - 2.8 degrees Celsius, whichever is greater. The temperature monitor and recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals, and may be monitored at the point the chilled water enters the building containing the reactor.

The permittee shall collect and maintain the following information each day for each batch:

- a. the computer record of the continuous temperature monitor which shall document the peak temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s);
- b. a record (continuous temperature monitoring graph or equivalent) of the operating time for the pre-emulsion tank(s) and its/their associated condenser, temperature control device, and monitoring equipment for each product batch\*; and
- c. for any batch in which the peak temperature of the chilled water and/or glycol refrigerant entering the condenser serving the pre-emulsion tank(s) exceeded 17 degrees Celsius at any time or that temperature established during the most recent emissions test that demonstrated that the condenser effectively limited VOC emissions.

\* If the pre-emulsion tank(s) has/have operated in association with the reactor in the production of any batch, and during the same period of time, the log for the reactor may so indicate this, to alleviate the second record for the pre-emulsion tank(s).

- (6) The FEPTIO application for this/these emissions unit(s), P124, P125, was evaluated based on the actual materials and the design parameters of the emissions unit's(s') exhaust system, as specified by the permittee. The "Toxic Air Contaminant Statute", ORC 3704.03(F), was applied to this/these emissions unit(s) for each toxic air contaminant listed in OAC rule 3745-114-01, using data from the permit application; and modeling was performed for each toxic air contaminant(s) emitted at over one ton per year using an air dispersion model such as SCREEN3, AERMOD, or ISCST3, or other Ohio EPA approved model. The predicted 1-hour maximum ground-level concentration result(s) from the approved air dispersion model, was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC), calculated as described in the Ohio EPA guidance document entitled "Review of New Sources of Air Toxic Emissions, Option A", as follows:

- a. the exposure limit, expressed as a time-weighted average concentration for a conventional 8-hour workday and a 40-hour workweek, for each toxic compound(s) emitted from the emissions unit(s), (as determined from the raw materials processed and/or coatings or other materials applied) has been documented from one of the following sources and in the following order of preference (TLV was and shall be used, if the chemical is listed):

- i. threshold limit value (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; or
  - ii. STEL (short term exposure limit) or the ceiling value from the American Conference of Governmental Industrial Hygienists (ACGIH) "Threshold Limit Values for Chemical Substances and Physical Agents Biological Exposure Indices"; the STEL or ceiling value is multiplied by 0.737 to convert the 15-minute exposure limit to an equivalent 8-hour TLV.
- b. The TLV is divided by ten to adjust the standard from the working population to the general public (TLV/10).
  - c. This standard is/was then adjusted to account for the duration of the exposure or the operating hours of the emissions unit(s), i.e., "X" hours per day and "Y" days per week, from that of 8 hours per day and 5 days per week. The resulting calculation was (and shall be) used to determine the Maximum Acceptable Ground-Level Concentration (MAGLC):

$$\text{TLV}/10 \times 8/\text{X} \times 5/\text{Y} = 4 \text{ TLV}/\text{XY} = \text{MAGLC}$$

- d. The following summarizes the results of dispersion modeling for the significant toxic contaminants (emitted at 1 or more tons/year) or "worst case" toxic contaminant(s):

**P124**

Toxic Contaminant: butyl acrylate (product code 2099)  
TLV (mg/m<sup>3</sup>): 10.4  
Maximum Hourly Emission Rate (lb/hr): 1.0 (reactor condenser vent)  
Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 184  
MAGLC (ug/m<sup>3</sup>): 347

**P125**

Toxic Contaminant: Vinyl Acetate.  
TLV (mg/m<sup>3</sup>): 35.2  
Maximum Hourly Emission Rate (lbs/hr): 6.02  
Predicted 1-Hour Maximum Ground-Level Concentration (ug/m<sup>3</sup>): 619  
MAGLC (ug/m<sup>3</sup>): 838

The permittee, has demonstrated that emissions of butyl acetate from emissions unit(s) P124, and vinyl acetate from emissions unit(s) P125 is calculated to be less than eighty per cent of the maximum acceptable ground level concentration (MAGLC); any new raw material or processing agent shall not be applied without evaluating each component toxic air contaminant in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F).

- (7) Prior to making any physical changes to or changes in the method of operation of the emissions unit(s), that could impact the parameters or values that were used in the predicted 1-hour maximum ground-level concentration, the permittee shall re-model the

change(s) to demonstrate that the MAGLC has not been exceeded. Changes that can affect the parameters/values used in determining the 1-hour maximum ground-level concentration include, but are not limited to, the following:

- a. changes in the composition of the materials used or the use of new materials, that would result in the emission of a new toxic air contaminant with a lower Threshold Limit Value (TLV) than the lowest TLV previously modeled;
- b. changes in the composition of the materials, or use of new materials, that would result in an increase in emissions of any toxic air contaminant listed in OAC rule 3745-114-01, that was modeled from the initial (or last) application; and
- c. physical changes to the emissions unit(s) or its/their exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Toxic Air Contaminant Statute" will be satisfied for the above changes, the Ohio EPA will not consider the change(s) to be a "modification" under OAC rule 3745-31-01 solely due to a non-restrictive change to a parameter or process operation, where compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), has been documented. If the change(s) meet(s) the definition of a "modification", the permittee shall apply for and obtain a final FEPTIO prior to the change. The Director may consider any significant departure from the operations of the emissions unit, described in the permit application, as a modification that results in greater emissions than the emissions rate modeled to determine the ground level concentration; and he/she may require the permittee to submit a permit application for the increased emissions.

- (8) The permittee shall collect, record, and retain the following information for each toxic evaluation conducted to determine compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F):
  - a. a description of the parameters/values used in each compliance demonstration and the parameters or values changed for any re-evaluation of the toxic(s) modeled (the composition of materials, new toxic contaminants emitted, change in stack/exhaust parameters, etc.);
  - b. the Maximum Acceptable Ground-Level Concentration (MAGLC) for each significant toxic contaminant or worst-case contaminant, calculated in accordance with the "Toxic Air Contaminant Statute", ORC 3704.03(F);
  - c. a copy of the computer model run(s), that established the predicted 1-hour maximum ground-level concentration that demonstrated the emissions unit(s) to be in compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), initially and for each change that requires re-evaluation of the toxic air contaminant emissions; and
  - d. the documentation of the initial evaluation of compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), and documentation of any determination

that was conducted to re-evaluate compliance due to a change made to the emissions unit(s) or the materials applied.

- (9) The permittee shall maintain a record of any change made to a parameter or value used in the dispersion model, used to demonstrate compliance with the "Toxic Air Contaminant Statute", ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration. The record shall include the date and reason(s) for the change and if the change would increase the ground-level concentration.

e) Reporting Requirements

- (1) The permittee shall submit an annual Permit Evaluation Report (PER) to the Ohio EPA. The PER must be submitted by the due date identified in the Authorization section of this permit. The permit evaluation report shall cover a reporting period of no more than twelve months for each air contaminant source identified in this permit.
- (2) The permittee shall submit quarterly deviation (excursion) reports for the following emissions unit that identify:
- a. all deviations (excursions) of the following emission limitations, operational restrictions and/or control device operating parameter limitations that restrict the Potential to Emit (PTE) of any regulated air pollutant and have been detected by the monitoring, record keeping and/or testing requirements in this permit:
    - i. any exceedance of the emission limitations established in b)(1)a.;
    - ii. any exceedance of the operational limitations established in b)(2)a.;
    - iii. any deviation from the temperature requirements established in c)(1) and c)(2);
    - iv. any deviation from the pressure setting requirements established in c)(3); and
    - v. any deviation from the containment system requirements established in c)(4).
  - b. the probable cause of each deviation (excursion);
  - c. any corrective actions that were taken to remedy the deviations (excursions) or prevent future deviations (excursions); and
  - d. the magnitude and duration of each deviation (excursion).

If no deviations (excursions) occurred during a calendar quarter, the permittee shall submit a report that states that no deviations (excursions) occurred during the quarter.

The quarterly reports shall be submitted (postmarked) each year by the thirty-first of January (covering October to December), the thirtieth of April (covering January to March), the thirty-first of July (covering April to June), and the thirty-first of October

(covering July to September), unless an alternative schedule has been established and approved by the director (the appropriate district office or local air agency).

- (3) The permittee shall include any changes made to a parameter or value used in the dispersion model, that was used to demonstrate compliance with the Toxic Air Contaminant Statute, ORC 3704.03(F), through the predicted 1-hour maximum ground-level concentration, in the annual Permit Evaluation Report (PER). If no changes to the emissions, emissions unit(s), or the exhaust stack have been made, then the report shall include a statement to this effect.

f) Testing Requirements

- (1) Compliance with the Emissions Limitations and/or Control Requirements specified in section b) of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation for P124: OC emissions from this emissions unit shall not exceed 4.38 lbs/hr and/or 21.92 lbs/day.

Applicable Compliance Method: Compliance with the hourly emission limitation was demonstrated during emission testing in November 2004 and 2005 during poly vinyl acetate production. If required, the permittee shall demonstrate compliance with these emission limitations through emission tests performed in accordance with 40 CFR Part 60, Appendix A, Methods 1 through 4 and 18. Compliance with the daily VOC emission limitations shall be demonstrated based on the record keeping requirements in d)(1) and d)(2).

If the reactor contents are heated up to and/or above the boiling point of the chemical with the lowest boiling point in the batch, the ideal gas law no longer applies. In this case, emissions shall be calculated using an emission factor of 1.27 pounds of OC per hour, derived from the stack test conducted on 5/12/94, for Reactor 9 (P107), in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling point to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling point chemicals' emissions, calculated in this way, shall be added to the emissions calculated for the chemical that's boiling point was exceeded, to document a conservative estimate of OC emissions for the time period operating under these conditions.

The total uncontrolled OC emission rate from each method of loss for each batch shall be calculated by summing all volatile components to equal the total pounds OC emitted per batch from the reactor.

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- b. Emission Limitation for P124: OC from this emissions unit shall not exceed 4.0 tons per year.

Applicable Compliance Method: Compliance with the annual OC emission limitation for this emissions unit shall be demonstrated based on the record keeping requirements in d)(2).

- c. Emission Limitation for P125: OC emissions from each emissions unit shall not exceed 7.8 lbs/hr and 39.0 lbs/day.

Applicable Compliance Method: Compliance with the hourly emission limitation was demonstrated during emission testing in November 2004 and 2005 for vinyl acetate production. If required, the permittee shall demonstrate compliance with this emission limitation through emission tests performed in accordance with 40 CFR Part 60, Appendix A, Methods 1 through 4 and 18.

Compliance with the daily OC emission limitations shall be demonstrated based on the record keeping requirements in d)(2) and d)(3).

Emissions from each batch shall be calculated as follows:

If the reactor contents are heated up to and/or above the boiling point of the chemical with the lowest boiling point in the batch, the ideal gas law no longer applies. In this case, emissions shall be calculated using an emission factor of 1.27 pounds of OC per hour, derived from the stack test conducted on 5/12/94, for Reactor 9 (P107), in which the batch exceeded this temperature. This emission factor shall be multiplied by the time (hours) the chemical was above its boiling point to calculate the pounds of the lower boiling point chemical emitted during this time period. To calculate emissions for chemicals with higher boiling points than the batch temperature during this period of time, the emissions calculated using the emission factor above (lbs) shall be multiplied by the ratio of the weight (lbs) of each higher boiling point chemical, to the weight of the lower boiling point chemical in the batch. Each fraction of the higher boiling point chemicals' emissions, calculated in this way, shall be added to the emissions calculated for the chemical that's boiling point was exceeded, to document a conservative estimate of OC emissions for the time period operating under these conditions.



The total uncontrolled OC emission rate from each method of loss for each batch shall be calculated by summing all volatile components to equal the total pounds OC emitted per batch from the reactor.

Alternative methods to the emission calculations above may be used with prior approval from the Ohio EPA, Central District Office.

For the purpose of calculating annual emissions, the control efficiency for each product or product type made during the year may be calculated by using the average temperatures from the four calendar quarters or the average of all batches made during the year of record; or may be calculated using the average temperatures by season, if batch records are so segregated; or may be calculated by using worst-case temperatures, causing the highest emissions. The average temperatures shall be derived from the records of each product batch (to derive the inlet vapor temperature), and from the continuous temperature monitor installed after the reactor, prior to the chiller (to derive the outlet vapor temperature), and the efficiency calculated as per the method above.

- d. Emission Limitation for P125: OC emissions from this emissions unit shall not exceed 7.1 tons per year

Applicable Compliance Method: Compliance with the annual OC emission limitation for this emissions unit shall be demonstrated based on the record keeping requirements in B.1.b)(3), above.

- g) Miscellaneous Requirements

- (1) None.