



State of Ohio Environmental Protection Agency

**RE: FINAL PERMIT TO INSTALL CERTIFIED MAIL
FRANKLIN COUNTY**

Street Address:

122 S. Front Street

Lazarus Gov. Center TELE: (614) 644-3020 FAX: (614) 644-2329

Mailing Address:

Lazarus Gov. Center
P.O. Box 1049

Application No: 01-08401

DATE: 6/26/2001

Franklin International Inc
Michael Desgranges
2020 Bruck St
Columbus, OH 43207

Enclosed please find an Ohio EPA Permit to Install which will allow you to install the described source(s) in a manner indicated in the permit. Because this permit contains several conditions and restrictions, I urge you to read it carefully.

The Ohio EPA is urging 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 Pollution Prevention at (614) 644-3469.

You are hereby notified that this action by the Director is final and may be appealed to the Ohio Environmental Review Appeals Commission pursuant to Chapter 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. It must be filed within thirty (30) days after the notice of the Directors action. A copy of the appeal must be served on the Director of the Ohio Environmental Protection Agency within three (3) days of filing with the Commission. An appeal may be filed with the Environmental Review Appeals Commission at the following address:

Environmental Review Appeals Commission
236 East Town Street, Room 300
Columbus, Ohio 43215

Very truly yours,

Thomas G. Rigo, Manager
Field Operations and Permit Section
Division of Air Pollution Control

cc: USEPA

CDO



Permit To Install

STATE OF OHIO ENVIRONMENTAL PROTECTION AGENCY

FINAL PERMIT TO INSTALL 01-08401

Application Number: 01-08401
APS Premise Number: 0125040070
Permit Fee: **\$800**
Name of Facility: Franklin International Inc
Person to Contact: Michael Desgranges
Address: 2020 Bruck St
Columbus, OH 43207

Location of proposed air contaminant source(s) [emissions unit(s)]:
2020 Bruck St
Columbus, Ohio

Description of proposed emissions unit(s):
Four mixers.

The above named entity is hereby granted a Permit to Install for the above described emissions unit(s) 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 above described emissions unit(s) of environmental pollutants will operate in compliance with applicable State and Federal laws and regulations, and does not constitute expressed or implied assurance that if constructed or modified in accordance with those plans and specifications, the above described emissions unit(s) of pollutants will be granted the necessary permits to operate (air) or NPDES permits as applicable.

This permit is granted subject to the conditions attached hereto.

Ohio Environmental Protection Agency



Director

Part I - GENERAL TERMS AND CONDITIONS

A. Permit to Install General Terms and Conditions

1. Compliance Requirements

The emissions unit(s) identified in this Permit to Install shall remain in full compliance with all applicable State laws and regulations and the terms and conditions of this permit.

2. Reporting Requirements Related to Monitoring and Recordkeeping Requirements

The permittee shall submit required reports in the following manner:

- a. Reports of any required monitoring and/or recordkeeping information shall be submitted to the appropriate Ohio EPA District Office or local air agency.
- b. Except as otherwise may be provided in the terms and conditions for a specific emissions unit, quarterly written reports of (a) any deviations (excursions) from emission limitations, operational restrictions, and control device operating parameter limitations that have been detected by the testing, monitoring, and recordkeeping requirements specified in this permit, (b) the probable cause of such deviations, and (c) any corrective actions or preventive measures which have been or will be taken, shall be submitted to the appropriate Ohio EPA District Office or local air agency. If no deviations occurred during a calendar quarter, the permittee shall submit a quarterly report, which states that no deviations occurred during that quarter. The reports shall be submitted quarterly, i.e., by January 31, April 30, July 31, and October 31 of each year and shall cover the previous calendar quarters. (These quarterly reports shall exclude deviations resulting from malfunctions reported in accordance with OAC rule 3745-15-06.)

3. Records Retention Requirements

Each record of any monitoring data, testing data, and support information required pursuant to this permit shall be retained for a period of five years from the date the record was created. Support information shall include, but not be limited to, all calibration and maintenance records and all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit. Such records may be maintained in computerized form.

4. Inspections and Information Requests

The Director of the Ohio EPA, or an authorized representative of the Director, may, subject to the safety requirements of the permittee and without undue delay, enter upon the premises of this source at any reasonable time for purposes of making inspections, conducting tests, examining records or reports pertaining to any emission of air contaminants, and determining compliance with any applicable State air pollution laws and regulations and the terms and conditions of this permit. The permittee shall furnish to the Director of the Ohio EPA, or an authorized

representative of the Director, upon receipt of a written request and within a reasonable time, any information that may be requested to determine whether cause exists for modifying, reopening or revoking this permit or to determine compliance with this permit. Upon verbal or written request, the permittee shall also furnish to the Director of the Ohio EPA, or an authorized representative of the Director, copies of records required to be kept by this permit.

5. Scheduled Maintenance/Malfunction Reporting

Any scheduled maintenance of air pollution control equipment shall be performed in accordance with paragraph (A) of OAC rule 3745-15-06. The malfunction of any emissions units or any associated air pollution control system(s) shall be reported to the appropriate Ohio EPA District Office or local air agency in accordance with paragraph (B) of OAC rule 3745-15-06. Except as provided in that rule, any scheduled maintenance or malfunction necessitating the shutdown or bypassing of any air pollution control system(s) shall be accompanied by the shutdown of the emissions unit(s) that is (are) served by such control system(s).

6. Permit Transfers

Any transferee of this permit shall assume the responsibilities of the prior permit holder. The appropriate Ohio EPA District Office or local air agency must be notified in writing of any transfer of this permit.

7. Air Pollution Nuisance

The air contaminants emitted by the emissions units covered by this permit shall not cause a public nuisance, in violation of OAC rule 3745-15-07.

8. Termination of Permit to Install

This Permit to Install shall terminate within eighteen months of the effective date of the Permit to Install if the owner or operator has not undertaken a continuing program of installation or modification or has not entered into a binding contractual obligation to undertake and complete within a reasonable time a continuing program of installation or modification. This deadline may be extended by up to 12 months if application is made to the Director within a reasonable time before the termination date and the party shows good cause for any such extension.

9. Construction of New Sources(s)

The proposed emissions unit(s) shall be constructed in strict accordance with the plans and application submitted for this permit to the Director of the Ohio Environmental Protection Agency. There may be no deviation from the approved plans without the express, written approval of the Agency. Any deviations from the approved plans or the above conditions may lead to such sanctions and penalties as provided under Ohio law. Approval of these plans does not constitute an assurance that the proposed facilities will operate in compliance with all Ohio laws and regulations. Additional facilities shall be installed upon orders of the Ohio

Environmental Protection Agency if the proposed sources cannot meet the requirements of this permit or cannot meet applicable standards.

If the construction of the proposed emissions unit(s) has already begun or has been completed prior to the date the Director of the Environmental Protection Agency approves the permit application and plans, the approval does not constitute expressed or implied assurance that the proposed facility has been constructed in accordance with the approved plans. The action of beginning and/or completing construction prior to obtaining the Director's approval constitutes a violation of OAC rule 3745-31-02. Furthermore, issuance of the Permit to Install does not constitute an assurance that the proposed source will operate in compliance with all Ohio laws and regulations. Approval of the plans in any case is not to be construed as an approval of the facility as constructed and/or completed. Moreover, issuance of the Permit to Install is not to be construed as a waiver of any rights that the Ohio Environmental Protection Agency (or other persons) may have against the applicant for starting construction prior to the effective date of the permit. Additional facilities shall be installed upon orders of the Ohio Environmental Protection Agency if the proposed facilities cannot meet the requirements of this permit or cannot meet applicable standards.

10. Public Disclosure

The facility is hereby notified that this permit, and all agency records concerning the operation of this permitted source, are subject to public disclosure in accordance with OAC rule 3745-49-03.

11. Applicability

This Permit to Install is applicable only to the emissions unit(s) identified in the Permit to Install. Separate application must be made to the Director for the installation or modification of any other emissions unit(s).

12. Best Available Technology

As specified in OAC Rule 3745-31-05, all new sources must employ Best Available Technology (BAT). Compliance with the terms and conditions of this permit will fulfill this requirement.

13. Source Operation and Operating Permit Requirements After Completion of Construction

This facility is permitted to operate each source described by this Permit to Install for a period of up to one year from the date the source commenced operation. This permission to operate is granted only if the facility complies with all requirements contained in this permit and all applicable air pollution laws, regulations, and policies. Pursuant to OAC Chapter 3745-35, the permittee shall submit a complete operating permit application within thirty (30) days after commencing operation of the emissions unit(s) covered by this permit.

Franklin International Inc
 PTI Application: 01-08401
 Issued: 6/26/2001

Facility ID: 0125040070

14. Construction Compliance Certification

The applicant shall provide Ohio EPA with a written certification (see enclosed form) that the facility has been constructed in accordance with the Permit to Install application and the terms and conditions of the Permit to Install. The certification shall be provided to Ohio EPA upon completion of construction but prior to startup of the source.

15. Fees

The permittee shall pay fees to the Director of the Ohio EPA in accordance with ORC section 3745.11 and OAC Chapter 3745-78. The permittee shall pay all applicable Permit to Install fees within 30 days after the issuance of this Permit to Install.

B. Permit to Install Summary of Allowable Emissions

The following information summarizes the total allowable emissions, by pollutant, based on the individual allowable emissions of each air contaminant source identified in this permit.

SUMMARY (for informational purposes only)
TOTAL PERMIT TO INSTALL ALLOWABLE EMISSIONS

<u>Pollutant</u>	<u>Tons Per Year</u>
OC	29.2

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

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

Operations, Property,
and/or Equipment

Applicable Rules/Requirements

OAC rule 3745-17-08(B)

P006 - Ross 3 mixer, adhesive mixing (**modification**) OAC rule 3745-31-05(A)(3)

OAC rule 3745-31-03(A)(1)(f)

OAC rule 3745-21-07(G)(2)

OAC rule 3745-17-07(B)(1)

Applicable Emissions
Limitations/Control Measures

Organic compound (OC) emissions shall not exceed 7.3 tons/yr and see Section A.2.a below.

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

The requirements of this rule also include compliance with the requirements of OAC rule 3745-21-07(G)(2) and 3745-17-08(B).

See Section A.2.b below.

Organic compound (OC) emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent.

The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

Reasonable available control measures that are sufficient to minimize or eliminate visible emissions of fugitive dust.

2. Additional Terms and Conditions

- 2.a** The permittee shall not operate the mix tank without the use of the condenser serving this emission unit, except when mixing water-borne materials as per Section A.2.b below.

- 2.b The control requirements of the condenser shall not be required when mixing water-borne adhesives and/or binders at ambient temperatures.

B. Operational Restrictions

1. The pressure setting of the conservation vents shall be maintained at 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
2. 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.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall document the following information each day:
 - a. the total number of batches of each adhesive product produced;
 - b. the calculated daily and average hourly organic compound emission rate, in pounds per day and pounds per hour, summed for all the liquid/volatile components, by applying the following equations:

Equations 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:

$$E_r = (Y_i)(V_r)(P_t)(MW) / (R)(T)$$

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

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

Substituting for Y_i from Raoult's Law in Equation 3-7, emissions shall be calculated and summed for each liquid/volatile component as follows:

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

Equation 3-15 from US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes", to calculate the moles of gas displaced; and this

multiplied by the molecular weight and the mole fraction of each liquid/volatile component in the mix, to get pounds of each compound in the gas displaced in each batch:

$$E_r = [V \{Pa_1/T_1 - Pa_2/T_2\} (Y_i)(MW)] / R$$

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 (ft³/batch)

V = volume of vapor in head space (ft³/batch)

R = ideal gas law constant (10.73 ft³ psia/lbmole 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)

Pa_1 = initial gas pressure in vessel (psia)

Pa_2 = final gas pressure in vessel (psia)

MW = molecular weight (lb/lbmole)

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_i = 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; and

The control efficiency calculated as per Part II, Section E.1, using vapor pressures

Emissions Unit ID: P006

calculated at the condenser vapor inlet and outlet temperatures of record; and

- c. daily recordkeeping of the calculated daily and average hourly OC emissions rates shall not be required if documentation is maintained of calculations, performed as required in (b), demonstrate worst-case OC emissions* could not exceed 8 pounds of OC per hour and 40 pounds of OC per day, or documentation that worst-case OC emissions* have been reduced by 85%, calculating the condenser efficiency as required in Part II, Section E.1.

* Worst-case OC emissions (lbs/hr) shall be calculated using temperatures that would produce the highest emissions (for the time of year of the record) and product having the highest or higher vapor pressure than the adhesive product of record; and daily emissions calculated using the maximum number of batches that could be run in any such day, at the worst-case emissions rate.

2. The permittee shall collect and record the following information on an annual basis for the mixer, for the purpose of documenting and reporting annual emissions:
 - a. the total number of batches of each adhesive product or product group produced; and
 - b. the organic compound emissions, in pounds or tons per year, calculated as in Section C.1 above*.

* Products may be grouped by similar product types for the calculations of annual emissions, for compliance demonstration and emissions reports. If the condensers are used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1, and shall be dependent on the average vapor inlet and outlet temperatures of the condenser. Products may be grouped by the seasons of the year in order to segregate and lessen the effects of average annual temperatures; and the highest vapor pressure, representative of the group, shall be used in the calculations of annual emissions.

3. The permit to install for this emissions unit (Ross 3 mixer) was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust system, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC). The following summarizes the results of the modeling for the "worst case" pollutants:

Pollutant: Acetone

TLV: 1,188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 4,103 ug/m³

MAGLC: 28,286 ug/m³

Pollutant: Hexane

TLV: 176 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 4,103 ug/m³

MAGLC: 4,190 ug/m³

Pollutant: Toluene

TLV: 188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 4,103 ug/m³

MAGLC: 4,476 ug/m³

4. Physical changes to or changes in the method of operation of the emissions unit after its installation or modification could affect the parameters used to determine whether or not the "Air Toxic Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be still satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in applying the "Air Toxic Policy" include the following:
 - a. changes in the composition of the materials used (typically for coatings or cleanup

Emissions Unit ID: **P006**

materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value 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 pollutant with a listed TLV that was proposed in the application and modeled; and
- c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" 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(VV)(1)(a)(ii), and a modification of the existing permit to install will not be required. If the change(s) is (are) defined as a modification under other provisions of the modification definition (other than (VV)(1)(a)(ii)), then the permittee shall obtain a final permit to install prior to the change.

5. The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will still satisfy the "Air Toxic Policy":
 - a. a description of the parameters changed (composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);
 - b. documentation of its evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and
 - c. where computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports which include the following information:
 - a. an identification of each day during which the calculated average hourly organic compound emissions exceeded 8 pounds per hour, and the actual organic compound emissions for each such hour; and
 - b. an identification of each day during which the organic compound emissions exceeded 40

pounds per day, and the actual organic compound emissions for each such day.

If the condenser is used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1; and these reports shall be submitted as required in Part I, Section A.2.b.

2. The permittee shall submit quarterly reports that identify any period of time during which the emissions unit is operated without the condenser control serving the mix tank. These reports shall be submitted as required in Part I, Section A.2.b.
3. The permittee shall submit annual reports which specify the total organic compound emissions from this emissions unit for the previous calendar year. This reporting requirement may be satisfied by including and identifying the specific emissions data for this emissions unit in the annual Fee Emission Report.

E. Testing Requirements

Compliance with the emission limitations in Part II, Section A.1 of the terms and conditions of this permit shall be determined in accordance with the following methods:

1. Emission Limitation:

Organic compound emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.1. The emission unit shall not be operated without the condenser control system, except when mixing waterborne adhesives and/or binders at ambient temperatures; and the permittee may demonstrate compliance through the control of the condensers, by using the following equation, which 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 condenser inlet and outlet water temperatures for each product, or worst-case product. It shall be assumed that the vapor temperature is 2.5 degrees (Celsius) higher than the outlet water temperature of the condenser.

Mass balance assumptions:

F = liquid/gas feed to the condenser, lbmol

D = gas leaving the condenser, lbmol

W = liquid leaving the condenser, lbmol

z = mole fraction of OC in feed

y = mole fraction of OC in vapor leaving the condenser

x = mole fraction of OC in liquid leaving the condenser

$x = 1$ (assumes that all the liquid condensed is OC)

F = 100 lbmol (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 chemical vapor pressure tables, at the appropriate condenser inlet and outlet vapor temperatures.

If the liquid is assumed to be 100% OC (condensed), then the mole fractions of OC in the inlet (z) and outlet (y) vapor may be calculated using Raoult's Law, and the efficiency determined for compliance as follows:

efficiency (EF) = in - out / in, or:

$$EF = Fz - Dy / Fz, \text{ or:}$$

$$EF = 100z - [100(z-x)/(y-x)]y / 100z$$

$$z = P1 / 760$$

$$y = P2 / 760$$

P1= vapor pressure of OC, at vapor inlet temperature of condenser

P2= vapor pressure of OC, at vapor outlet temperature of the condenser

If required, the permittee shall demonstrate compliance with the above organic compound emission limitation in accordance with the procedures and methods specified in Method 25 or 25A.

2. Emission Limitation:

Organic compound emissions shall not exceed 7.3 tons/yr.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.2. The emission unit shall not be operated without the condenser control system, except when mixing waterborne adhesives and/or binders at ambient temperatures; and the permittee may demonstrate compliance through the use of the condenser control by applying the estimated efficiency, calculated as required in Part II, Section E.1.

3. Emission Limitation:

There shall be no visible emissions from any stack or outside vent associated with this emission

unit or from the room containing the unit, during the addition of solids.

Applicable Compliance Method:

If required compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 9 and the procedures specified in OAC rule 3745-17-03(B)(1).

F. Miscellaneous Requirements

None

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

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

<u>Operations, Property, and/or Equipment</u>	<u>Applicable Rules/Requirements</u>	
P029 - Myers 1 mixer, adhesive mixing	OAC rule 3745-31-05(A)(3)	OAC rule 3745-21-07(G)(2)
		OAC rule 3745-17-07(B)(1)
		OAC rule 3745-17-08(B)
	OAC rule 3745-31-03(A)(1)(f)	

Applicable Emissions
Limitations/Control Measures

Organic compound (OC) emissions shall not exceed 7.3 tons/yr.

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

The requirements of this rule also include compliance with the requirements of OAC rule 3745-21-07(G)(2) and 3745-17-08(B).

See Section A.2.b below.

Organic compound (OC) emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent; see Section A.2.a.

The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

Reasonable available control measures that are sufficient to minimize or eliminate visible emissions of fugitive dust.

2. Additional Terms and Conditions

- 2.a** The permittee may demonstrate compliance with OAC rule 3745-21-07(G)(2) by use of a condenser. If these emissions are to exceed the limit from 3745-21-07(G)(2), the condensers shall reduce organic compound emissions by at least 85%. If a condenser is

used to demonstrate compliance, the mixer shall not be operated without it, except as per A.2.b below.

- 2.b** The control requirements of the condenser shall not be required when mixing water-borne adhesives and/or binders at ambient temperatures.

B. Operational Restrictions

1. The pressure setting of the conservation vents shall be maintained at 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
2. 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.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall document the following information each day:
 - a. the total number of batches of each adhesive product produced;
 - b. the calculated daily and average hourly organic compound emission rate, in pounds per day and pounds per hour, summed for all the liquid/volatile components, by applying the following equations:

Equations 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:

$$E_r = (Y_i)(V_r)(P_t)(MW) / (R)(T)$$

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

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

Substituting for Y_i from Raoult's Law in Equation 3-7, emissions shall be calculated and summed for each liquid/volatile component as follows:

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

Equation 3-15 from US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes", to calculate the moles of gas displaced; and this multiplied by the molecular weight and the mole fraction of each liquid/volatile component in the mix, to get pounds of each compound in the gas displaced in each batch:

$$E_r = [V \{Pa_1/T_1 - Pa_2/T_2\} (Y_i)(MW)] / R$$

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 (ft³/batch)
 V = volume of vapor in head space (ft³/batch)
 R = ideal gas law constant (10.73 ft³ psia/lbmole 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/lbmole)

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_i = 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; and

The control efficiency calculated as per Part II, Section E.1, using vapor pressures calculated at the condenser vapor inlet and outlet temperatures of record; and

- c. daily recordkeeping of the calculated daily and average hourly OC emissions rates shall not be required if documentation is maintained of calculations, performed as required in (b), demonstrate worst-case OC emissions* could not exceed 8 pounds of OC per hour and 40 pounds of OC per day, or documentation that worst-case OC emissions* have been reduced by 85%, calculating the condenser efficiency as required in Part II, Section E.1.

* Worst-case OC emissions (lbs/hr) shall be calculated using temperatures that would produce the highest emissions (for the time of year of the record) and product having the highest or higher vapor pressure than the adhesive product of record; and daily emissions calculated using the maximum number of batches that could be run in any such day, at the worst-case emissions rate.

2. The permittee shall collect and record the following information on an annual basis for the mixer, for the purpose of documenting and reporting annual emissions:
 - a. the total number of batches of each adhesive product or product group produced; and
 - b. the organic compound emissions, in pounds or tons per year, calculated as in Section C.1 above*.

* Products may be grouped by similar product types for the calculations of annual emissions, for compliance demonstration and emissions reports. If the condensers are used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1, and shall be dependent on the average vapor inlet and outlet temperatures of the condenser. Products may be grouped by the seasons of the year in order to segregate and lessen the effects of average annual temperatures; and the highest vapor pressure, representative of the group, shall be used in the calculations of annual emissions.

3. The permit to install for this emissions unit (Myers 1 mixer) was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust system, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration

from the use of the SCREEN 3.0 model was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC). The following summarizes the results of the modeling for the "worst case" pollutants:

Pollutant: Acetone

TLV: 1,188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 3,284 ug/m³

MAGLC: 28,286 ug/m³

Pollutant: Hexane

TLV: 176 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 3,284 ug/m³

MAGLC: 4,190 ug/m³

Pollutant: Toluene

TLV: 188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 3,284 ug/m³

MAGLC: 4,476 ug/m³

4. Physical changes to or changes in the method of operation of the emissions unit after its installation or modification could affect the parameters used to determine whether or not the "Air Toxic Policy" is satisfied. Consequently, prior to making a change that could impact such parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will

still be still satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in applying the "Air Toxic Policy" include the following:

- a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value 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 pollutant with a listed TLV that was proposed in the application and modeled; and
- c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" 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(VV)(1)(a)(ii), and a modification of the existing permit to install will not be required. If the change(s) is (are) defined as a modification under other provisions of the modification definition (other than (VV)(1)(a)(ii)), then the permittee shall obtain a final permit to install prior to the change.

5. The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will still satisfy the "Air Toxic Policy:"
 - a. a description of the parameters changed (composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);
 - b. documentation of its evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and
 - c. where computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports which include the following information:

- a. an identification of each day during which the calculated average hourly organic compound emissions exceeded 8 pounds per hour, without reducing these emissions by 85%, and the actual organic compound emissions for each such hour; and
- b. an identification of each day during which the organic compound emissions exceeded 40 pounds per day, without reducing these emissions by 85%, and the actual organic compound emissions for each such day.

If the condenser is used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1; and these reports shall be submitted as required in Part I, Section A.2.b.

2. The permittee shall submit annual reports which specify the total organic compound emissions from this emissions unit for the previous calendar year. This reporting requirement may be satisfied by including and identifying the specific emissions data for this emissions unit in the annual Fee Emission Report.

E. Testing Requirements

Compliance with the emission limitations in Part II, Section A.1 of the terms and conditions of this permit shall be determined in accordance with the following methods:

1. Emission Limitation:

Organic compound emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.1. The permittee may demonstrate compliance through the control of the condensers, by using the following equation, which 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 condenser inlet and outlet water temperatures for each product, or worst-case product. It shall be assumed that the vapor temperature is 2.5 degrees (Celsius) higher than the outlet water temperature of the condenser.

Mass balance assumptions:

F = liquid/gas feed to the condenser, lbmol
 D = gas leaving the condenser, lbmol
 W = liquid leaving the condenser, lbmol
 z = mole fraction of OC in feed
 y = mole fraction of OC in vapor leaving the condenser
 x = mole fraction of OC in liquid leaving the condenser

x = 1 (assumes that all the liquid condensed is OC)
 F = 100 lbmol (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 $F(z) = D(y) + W(x)$:

$$\begin{aligned} 100z &= Dy + (100 - D)x \\ 100z &= Dy + 100x - Dx \\ 100z - 100x &= Dy - Dx \\ 100(z - x) &= D(y - x) \\ D &= 100(z - x) / (y - x) \end{aligned}$$

The vapor pressures shall be determined using Antoine's equation or chemical vapor pressure tables, at the appropriate condenser inlet and outlet vapor temperatures.

If the liquid is assumed to be 100% OC (condensed), then the mole fractions of OC in the inlet (z) and outlet (y) vapor may be calculated using Raoult's Law, and the efficiency determined for compliance as follows:

efficiency (EF) = in - out / in, or:

$$EF = Fz - Dy / Fz, \text{ or:}$$

$$EF = 100z - [100(z - x) / (y - x)]y / 100z$$

$$z = P1 / 760$$

$$y = P2 / 760$$

P1 = vapor pressure of OC, at vapor inlet temperature of condenser

P2 = vapor pressure of OC, at vapor outlet temperature of the condenser

If required, the permittee shall demonstrate compliance with the above organic compound emission limitation in accordance with the procedures and methods specified in Method 25 or 25A.

2. Emission Limitation:

Organic compound emissions shall not exceed 7.3 tons/yr.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.2. The permittee may demonstrate compliance through the use of the condenser control by applying the estimated efficiency, calculated as required in Part II, Section E.1.

3. Emission Limitation:

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

Applicable Compliance Method:

If required compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 9 and the procedures specified in OAC rule 3745-17-03(B)(1).

F. Miscellaneous Requirements

None

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

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

<u>Operations, Property, and/or Equipment</u>	<u>Applicable Rules/Requirements</u>	
P030 - Myers 2 mixer, adhesive mixing	OAC rule 3745-31-05(A)(3)	OAC rule 3745-17-08(B)
	OAC rule 3745-31-03(A)(1)(f)	
	OAC rule 3745-21-07(G)(2)	
	OAC rule 3745-17-07(B)(1)	

Applicable Emissions
Limitations/Control Measures

Organic compound (OC) emissions shall not exceed 7.3 tons/yr.

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

The requirements of this rule also include compliance with the requirements of OAC rule 3745-21-07(G)(2) and 3745-17-08(B).

See Section A.2.b below.

Organic compound (OC) emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent; see Section A.2.a.

The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

Reasonable available control measures that are sufficient to minimize or eliminate visible emissions of fugitive dust.

2. Additional Terms and Conditions

2.a The permittee may demonstrate compliance with OAC rule 3745-21-07(G)(2) by use of a

condenser. If these emissions are to exceed the limit from 3745-21-07(G)(2), the condensers shall reduce organic compound emissions by at least 85%. If a condenser is used to demonstrate compliance, the mixer shall not be operated without it, except as per Section A.2.b below.

- 2.b** The control requirements of the condenser shall not be required when mixing water-borne adhesives and/or binders at ambient temperatures.

B. Operational Restrictions

1. The pressure setting of the conservation vents shall be maintained at 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
2. 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.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall document the following information each day:
 - a. the total number of batches of each adhesive product produced;
 - b. the calculated daily and average hourly organic compound emission rate, in pounds per day and pounds per hour, summed for all the liquid/volatile components, by applying the following equations:

Equations 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:

$$E_r = (Y_i)(V_r)(P_t)(M_W) / (R)(T)$$

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

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

Substituting for Y_i from Raoult's Law in Equation 3-7, emissions shall be calculated and summed for each liquid/volatile component as follows:

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

Equation 3-15 from US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes", to calculate the moles of gas displaced; and this multiplied by the molecular weight and the mole fraction of each liquid/volatile component in the mix, to get pounds of each compound in the gas displaced in each batch:

$$E_r = [V \{Pa_1/T_1 - Pa_2/T_2\} (Y_i)(MW)] / R$$

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 (ft³/batch)

V = volume of vapor in head space (ft³/batch)

R = ideal gas law constant (10.73 ft³ psia/lbmole 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)

Pa_1 = initial gas pressure in vessel (psia)

Pa_2 = final gas pressure in vessel (psia)

MW = molecular weight (lb/lbmole)

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_i = 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; and

The control efficiency calculated as per Part II, Section E.1, using vapor pressures calculated at the condenser vapor inlet and outlet temperatures of record; and

- c. daily recordkeeping of the calculated daily and average hourly OC emissions rates shall not be required if documentation is maintained of calculations, performed as required in (b), demonstrate worst-case OC emissions* could not exceed 8 pounds of OC per hour and 40 pounds of OC per day, or documentation that worst-case OC emissions* have been reduced by 85%, calculating the condenser efficiency as required in Part II, Section E.1.

* Worst-case OC emissions (lbs/hr) shall be calculated using temperatures that would produce the highest emissions (for the time of year of the record) and product having the highest or higher vapor pressure than the adhesive product of record; and daily emissions calculated using the maximum number of batches that could be run in any such day, at the worst-case emissions rate.

2. The permittee shall collect and record the following information on an annual basis for the mixer, for the purpose of documenting and reporting annual emissions:
 - a. the total number of batches of each adhesive product or product group produced; and
 - b. the organic compound emissions, in pounds or tons per year, calculated as in Section C.1 above*.

* Products may be grouped by similar product types for the calculations of annual emissions, for compliance demonstration and emissions reports. If the condensers are used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1, and shall be dependent on the average vapor inlet and outlet temperatures of the condenser. Products may be grouped by the seasons of the year in order to segregate and lessen the effects of average annual temperatures; and the highest vapor pressure, representative of the group, shall be used in the calculations of annual emissions.

3. The permit to install for this emissions unit (Myers 2 mixer) was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust system, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this

Emissions Unit ID: P030

emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC). The following summarizes the results of the modeling for the "worst case" pollutants:

Pollutant: Acetone

TLV: 1,188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 28,286 ug/m³

Pollutant: Hexane

TLV: 176 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 4,190 ug/m³

Pollutant: Toluene

TLV: 188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 4,476 ug/m³

4. Physical changes to or changes in the method of operation of the emissions unit after its installation or modification could affect the parameters used to determine whether or not the "Air Toxic Policy" is satisfied. Consequently, prior to making a change that could impact such

parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be still satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in applying the "Air Toxic Policy" include the following:

- a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value 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 pollutant with a listed TLV that was proposed in the application and modeled; and
- c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" 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(VV)(1)(a)(ii), and a modification of the existing permit to install will not be required. If the change(s) is (are) defined as a modification under other provisions of the modification definition (other than (VV)(1)(a)(ii)), then the permittee shall obtain a final permit to install prior to the change.

5. The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will still satisfy the "Air Toxic Policy":
 - a. a description of the parameters changed (composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);
 - b. documentation of its evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and
 - c. where computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

Emissions Unit ID: **P030**

1. The permittee shall submit quarterly deviation (excursion) reports which include the following information:
 - a. an identification of each day during which the calculated average hourly organic compound emissions exceeded 8 pounds per hour, without reducing these emissions by 85%, and the actual organic compound emissions for each such hour; and
 - b. an identification of each day during which the organic compound emissions exceeded 40 pounds per day, without reducing these emissions by 85%, and the actual organic compound emissions for each such day.

If the condenser is used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1; and these reports shall be submitted as required in Part I, Section A.2.b.

2. The permittee shall submit annual reports which specify the total organic compound emissions from this emissions unit for the previous calendar year. This reporting requirement may be satisfied by including and identifying the specific emissions data for this emissions unit in the annual Fee Emission Report.

E. Testing Requirements

Compliance with the emission limitations in Part II, Section A.1 of the terms and conditions of this permit shall be determined in accordance with the following methods:

1. Emission Limitation:

Organic compound emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.1. The permittee may demonstrate compliance through the control of the condensers, by using the following equation, which 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 condenser inlet and outlet water temperatures for each product, or worst-case product. It shall be assumed that the vapor temperature is 2.5 degrees (Celsius) higher than the outlet water temperature of the condenser.

Mass balance assumptions:

F = liquid/gas feed to the condenser, lbmol

D = gas leaving the condenser, lbmol

W = liquid leaving the condenser, lbmol

z = mole fraction of OC in feed

y = mole fraction of OC in vapor leaving the condenser

x = mole fraction of OC in liquid leaving the condenser

x = 1 (assumes that all the liquid condensed is OC)

F = 100 lbmol (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 chemical vapor pressure tables, at the appropriate condenser inlet and outlet vapor temperatures.

If the liquid is assumed to be 100% OC (condensed), then the mole fractions of OC in the inlet (z) and outlet (y) vapor may be calculated using Raoult's Law, and the efficiency determined for compliance as follows:

efficiency (EF) = in - out / in, or:

$$EF = Fz - Dy / Fz, \text{ or:}$$

$$EF = 100z - [100(z - x) / (y - x)]y / 100z$$

$$z = P1 / 760$$

$$y = P2 / 760$$

P1= vapor pressure of OC, at vapor inlet temperature of condenser
P2= vapor pressure of OC, at vapor outlet temperature of the condenser

If required, the permittee shall demonstrate compliance with the above organic compound emission limitation in accordance with the procedures and methods specified in Method 25 or 25A.

2. Emission Limitation:

Organic compound emissions shall not exceed 7.3 tons/yr.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.2. The permittee may demonstrate compliance through the use of the condenser control by applying the estimated efficiency, calculated as required in Part II, Section E.1.

3. Emission Limitation:

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

Applicable Compliance Method:

If required compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 9 and the procedures specified in OAC rule 3745-17-03(B)(1).

F. Miscellaneous Requirements

None

PART II - SPECIAL TERMS AND CONDITIONS FOR SPECIFIC EMISSIONS UNIT(S)

A. Applicable Emissions Limitations and/or Control Requirements

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

<u>Operations, Property, and/or Equipment</u>	<u>Applicable Rules/Requirements</u>	OAC rule 3745-17-08(B)
P031 - Ross 1 mixer, adhesive mixing	OAC rule 3745-31-05(A)(3)	
	OAC rule 3745-31-03(A)(1)(f)	
	OAC rule 3745-21-07(G)(2)	
	OAC rule 3745-17-07(B)(1)	

Applicable Emissions
Limitations/Control Measures

Organic compound (OC) emissions shall not exceed 7.3 tons/yr.

There shall be no visible emissions from any stack or outside vent associated with this emission unit or from the room containing the unit, during the addition of solids.

The requirements of this rule also include compliance with the requirements of OAC rule 3745-21-07(G)(2) and 3745-17-08(B).

See Section A.2.b below.

Organic compound (OC) emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent; see Section A.2.a.

The emission limitation specified in this rule is less stringent than the emission limitation established pursuant to OAC rule 3745-31-05(A)(3).

Reasonable available control measures that are sufficient to minimize or eliminate visible emissions of fugitive dust.

2. Additional Terms and Conditions

2.a The permittee may demonstrate compliance with OAC rule 3745-21-07(G)(2) by use of a

condenser. If these emissions are to exceed the limit from 3745-21-07(G)(2), the condensers shall reduce organic compound emissions by at least 85%. If a condenser is used to demonstrate compliance, the mixer shall not be operated without it, except as per Section A.2.b below.

- 2.b** The control requirements of the condenser shall not be required when mixing water-borne adhesives and/or binders at ambient temperatures.

B. Operational Restrictions

1. The pressure setting of the conservation vents shall be maintained at 2 inches of water, and the permittee shall perform annual inspections to ensure that the vents are clean and unobstructed.
2. 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.

C. Monitoring and/or Recordkeeping Requirements

1. The permittee shall document the following information each day:
 - a. the total number of batches of each adhesive product produced;
 - b. the calculated daily and average hourly organic compound emission rate, in pounds per day and pounds per hour, summed for all the liquid/volatile components, by applying the following equations:

Equations 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:

$$E_r = (Y_i)(V_r)(P_t)(M_W) / (R)(T)$$

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

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

Substituting for Y_i from Raoult's Law in Equation 3-7, emissions shall be calculated and summed for each liquid/volatile component as follows:

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

Equation 3-15 from US EPA Guideline Series "Control of Volatile Organic Compound Emissions from Batch Processes", to calculate the moles of gas displaced; and this multiplied by the molecular weight and the mole fraction of each liquid/volatile component in the mix, to get pounds of each compound in the gas displaced in each batch:

$$E_r = [V \{Pa_1/T_1 - Pa_2/T_2\} (Y_i)(MW)] / R$$

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 (ft³/batch)
 V = volume of vapor in head space (ft³/batch)
 R = ideal gas law constant (10.73 ft³ psia/lbmole 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)
 Pa_1 = initial gas pressure in vessel (psia)
 Pa_2 = final gas pressure in vessel (psia)
 MW = molecular weight (lb/lbmole)

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_i = 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; and

The control efficiency calculated as per Part II, Section E.1, using vapor pressures calculated at the condenser vapor inlet and outlet temperatures of record; and

- c. daily recordkeeping of the calculated daily and average hourly OC emissions rates shall not be required if documentation is maintained of calculations, performed as required in (b), demonstrate worst-case OC emissions* could not exceed 8 pounds of OC per hour and 40 pounds of OC per day, or documentation that worst-case OC emissions* have been reduced by 85%, calculating the condenser efficiency as required in Part II, Section E.1.

* Worst-case OC emissions (lbs/hr) shall be calculated using temperatures that would produce the highest emissions (for the time of year of the record) and product having the highest or higher vapor pressure than the adhesive product of record; and daily emissions calculated using the maximum number of batches that could be run in any such day, at the worst-case emissions rate.

2. The permittee shall collect and record the following information on an annual basis for the mixer, for the purpose of documenting and reporting annual emissions:
 - a. the total number of batches of each adhesive product or product group produced; and
 - b. the organic compound emissions, in pounds or tons per year, calculated as in Section C.1 above*.

* Products may be grouped by similar product types for the calculations of annual emissions, for compliance demonstration and emissions reports. If the condensers are used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1, and shall be dependent on the average vapor inlet and outlet temperatures of the condenser. Products may be grouped by the seasons of the year in order to segregate and lessen the effects of average annual temperatures; and the highest vapor pressure, representative of the group, shall be used in the calculations of annual emissions.

3. The permit to install for this emissions unit (Ross 1 mixer) was evaluated based on the actual materials and the design parameters of the emissions unit's exhaust system, as specified by the permittee in the permit to install application. The Ohio EPA's "Review of New Sources of Air Toxic Emissions" policy ("Air Toxic Policy") was applied for each pollutant emitted by this

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emissions unit using data from the permit to install application and the SCREEN 3.0 model (or other Ohio EPA approved model). The predicted 1-hour maximum ground-level concentration from the use of the SCREEN 3.0 model was compared to the Maximum Acceptable Ground-Level Concentration (MAGLC). The following summarizes the results of the modeling for the "worst case" pollutants:

Pollutant: Acetone

TLV: 1,188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 28,286 ug/m³

Pollutant: Hexane

TLV: 176 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 4,190 ug/m³

Pollutant: Toluene

TLV: 188 mg/m³

Maximum Hourly Emission Rate: 8.0 lbs/hr

Predicted 1-Hour Maximum Ground-Level Concentration: 2,908 ug/m³MAGLC: 4,476 ug/m³

4. Physical changes to or changes in the method of operation of the emissions unit after its installation or modification could affect the parameters used to determine whether or not the "Air Toxic Policy" is satisfied. Consequently, prior to making a change that could impact such

parameters, the permittee shall conduct an evaluation to determine that the "Air Toxic Policy" will still be still satisfied. If, upon evaluation, the permittee determines that the "Air Toxic Policy" will not be satisfied, the permittee will not make the change. Changes that can affect the parameters used in applying the "Air Toxic Policy" include the following:

- a. changes in the composition of the materials used (typically for coatings or cleanup materials), or the use of new materials, that would result in the emission of a compound with a lower Threshold Limit Value (TLV), as indicated in the most recent version of the handbook entitled "American Conference of Governmental Industrial Hygienists (ACGIH)," than the lowest TLV value 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 pollutant with a listed TLV that was proposed in the application and modeled; and
- c. physical changes to the emissions unit or its exhaust parameters (e.g., increased/ decreased exhaust flow, changes in stack height, changes in stack diameter, etc.).

If the permittee determines that the "Air Toxic Policy" 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(VV)(1)(a)(ii), and a modification of the existing permit to install will not be required. If the change(s) is (are) defined as a modification under other provisions of the modification definition (other than (VV)(1)(a)(ii)), then the permittee shall obtain a final permit to install prior to the change.

5. The permittee shall collect, record, and retain the following information when it conducts evaluations to determine that the changed emissions unit will still satisfy the "Air Toxic Policy:"
 - a. a description of the parameters changed (composition of materials, new pollutants emitted, change in stack/exhaust parameters, etc.);
 - b. documentation of its evaluation and determination that the changed emissions unit still satisfies the "Air Toxic Policy"; and
 - c. where computer modeling is performed, a copy of the resulting computer model runs that show the results of the application of the "Air Toxic Policy" for the change.

D. Reporting Requirements

1. The permittee shall submit quarterly deviation (excursion) reports which include the following information:
 - a. an identification of each day during which the calculated average hourly organic compound emissions exceeded 8 pounds per hour, without reducing these emissions by 85%, and the actual organic compound emissions for each such hour; and
 - b. an identification of each day during which the organic compound emissions exceeded 40 pounds per day, without reducing these emissions by 85%, and the actual organic compound emissions for each such day.

If the condenser is used to demonstrate compliance, the control efficiency shall be calculated as required in Part II, Section E.1; and these reports shall be submitted as required in Part I, Section A.2.b.

2. The permittee shall submit annual reports which specify the total organic compound emissions from this emissions unit for the previous calendar year. This reporting requirement may be satisfied by including and identifying the specific emissions data for this emissions unit in the annual Fee Emission Report.

E. Testing Requirements

Compliance with the emission limitations in Part II, Section A.1 of the terms and conditions of this permit shall be determined in accordance with the following methods:

1. Emission Limitation:

Organic compound emissions shall not exceed 8 lbs/hr and 40 lbs/day, unless said discharge has been reduced by at least 85 percent.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.1. The permittee may demonstrate compliance through the control of the condensers, by using the following equation, which 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 condenser inlet and outlet water temperatures for each product, or worst-case product. It shall be assumed that the vapor temperature is 2.5 degrees (Celsius) higher than the outlet water temperature of the condenser.

Mass balance assumptions:

F = liquid/gas feed to the condenser, lbmol

D = gas leaving the condenser, lbmol

W = liquid leaving the condenser, lbmol

z = mole fraction of OC in feed

y = mole fraction of OC in vapor leaving the condenser

x = mole fraction of OC in liquid leaving the condenser

$x = 1$ (assumes that all the liquid condensed is OC)

F = 100 lbmol (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 chemical vapor pressure tables, at the appropriate condenser inlet and outlet vapor temperatures.

If the liquid is assumed to be 100% OC (condensed), then the mole fractions of OC in the inlet (z) and outlet (y) vapor may be calculated using Raoult's Law, and the efficiency determined for compliance as follows:

efficiency (EF) = in - out / in, or:

$EF = Fz - Dy / Fz$, or:

$$EF = 100z - [100(z - x) / (y - x)]y / 100z$$

$$z = P1 / 760$$

$$y = P2 / 760$$

P1 = vapor pressure of OC, at vapor inlet temperature of condenser
 P2 = vapor pressure of OC, at vapor outlet temperature of the condenser

If required, the permittee shall demonstrate compliance with the above organic compound emission limitation in accordance with the procedures and methods specified in Method 25 or 25A.

2. Emission Limitation:

Organic compound emissions shall not exceed 7.3 tons/yr.

Applicable Compliance Method:

Compliance shall be demonstrated through the calculations and recordkeeping found in Part II, Section C.2. The permittee may demonstrate compliance through the use of the condenser control by applying the estimated efficiency, calculated as required in Part II, Section E.1.

3. Emission Limitation:

There shall be no visible emissions from any stack or outside vent associated with this emission

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unit or from the room containing the unit, during the addition of solids.

Applicable Compliance Method:

If required compliance shall be determined through visible emissions observations performed in accordance with 40 CFR Part 60, Appendix A, Method 9 and the procedures specified in OAC rule 3745-17-03(B)(1).

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F. Miscellaneous Requirements

None

NEW SOURCE REVIEW FORM B

PTI Number: 01-08401 Facility ID: 0125040070

FACILITY NAME Franklin International Inc

FACILITY DESCRIPTION adhesive production CITY/TWP Columbus

Emissions Unit ID: P031

SIC CODE 2891 SCC CODE 3-01-050-01 EMISSIONS UNIT ID P006

EMISSIONS UNIT DESCRIPTION Ross 3 mixer, adhesive mixing

DATE INSTALLED 6/88

EMISSIONS: (Click on bubble help for Air Quality Descriptions)

Pollutants	Air Quality Description	Actual Emissions Rate		PTI Allowable	
		Short Term Rate	Tons Per Year	Short Term Rate	Tons Per Year
Particulate Matter					
PM ₁₀					
Sulfur Dioxide					
Organic Compounds	Attainment	8.0	7.3	8.0	7.3
Nitrogen Oxides					
Carbon Monoxide					
Lead					
Other: Air Toxics					

APPLICABLE FEDERAL RULES:

NSPS? NESHAP? PSD? OFFSET POLICY?

WHAT IS THE BAT DETERMINATION, AND WHAT IS THE BASIS FOR THE DETERMINATION?

Enter Determination

IS THIS SOURCE SUBJECT TO THE AIR TOXICS POLICY? yes

OPTIONAL: WHAT IS THE CAPITAL COST OF CONTROL EQUIPMENT? \$

TOXIC AIR CONTAMINANTS

Ohio EPA's air toxics policy applies to containinants for which the American Conference of Governmental Industrial Hygienists (ACGIH) has a listed threshold limit value.

AIR TOXICS MODELING PERFORMED*? X YES NO

IDENTIFY THE AIR CONTAMINANTS: hexane, acetone, toluene

NEW SOURCE REVIEW FORM B

PTI Number: 01-08401 Facility ID: 0125040070

FACILITY NAME Franklin International Inc

FACILITY DESCRIPTION adhesive production CITY/TWP Columbus

Emissions Unit ID: P031

SIC CODE 2891 SCC CODE 3-01-050-01 EMISSIONS UNIT ID P029

EMISSIONS UNIT DESCRIPTION Myers 1 mixer, adhesive mixing

DATE INSTALLED 6/74

EMISSIONS: (Click on bubble help for Air Quality Descriptions)

Pollutants	Air Quality Description	Actual Emissions Rate		PTI Allowable	
		Short Term Rate	Tons Per Year	Short Term Rate	Tons Per Year
Particulate Matter					
PM ₁₀					
Sulfur Dioxide					
Organic Compounds	Attainment	8.0	7.3	8.0	7.3
Nitrogen Oxides					
Carbon Monoxide					
Lead					
Other: Air Toxics					

APPLICABLE FEDERAL RULES:

NSPS? NESHAP? PSD? OFFSET POLICY?

WHAT IS THE BAT DETERMINATION, AND WHAT IS THE BASIS FOR THE DETERMINATION?

Enter Determination

IS THIS SOURCE SUBJECT TO THE AIR TOXICS POLICY? yes
OPTIONAL: WHAT IS THE CAPITAL COST OF CONTROL EQUIPMENT? \$

TOXIC AIR CONTAMINANTS

Ohio EPA's air toxics policy applies to containinants for which the American Conference of Governmental Industrial Hygienists (ACGIH) has a listed threshold limit value.

AIR TOXICS MODELING PERFORMED*? X YES NO

IDENTIFY THE AIR CONTAMINANTS: hexane, acetone, toluene

NEW SOURCE REVIEW FORM B

PTI Number: 01-08401

Facility ID: 0125040070

FACILITY NAME Franklin International Inc

FACILITY DESCRIPTION adhesive production

CITY/TWP Columbus

Emissions Unit ID: **P031**

SIC CODE 2891

SCC CODE 3-01-050-01

EMISSIONS UNIT ID P030

EMISSIONS UNIT DESCRIPTION Myers 2 mixer, adhesive mixing

DATE INSTALLED 6/77

EMISSIONS: (Click on bubble help for Air Quality Descriptions)

Pollutants	Air Quality Description	Actual Emissions Rate		PTI Allowable	
		Short Term Rate	Tons Per Year	Short Term Rate	Tons Per Year
Particulate Matter					
PM ₁₀					
Sulfur Dioxide					
Organic Compounds	Attainment	8.0	7.3	8.0	7.3
Nitrogen Oxides					
Carbon Monoxide					
Lead					
Other: Air Toxics					

APPLICABLE FEDERAL RULES:

NSPS?

NESHAP?

PSD?

OFFSET POLICY?

WHAT IS THE BAT DETERMINATION, AND WHAT IS THE BASIS FOR THE DETERMINATION?

Enter Determination

IS THIS SOURCE SUBJECT TO THE AIR TOXICS POLICY? yes

OPTIONAL: WHAT IS THE CAPITAL COST OF CONTROL EQUIPMENT?

\$

TOXIC AIR CONTAMINANTS

Ohio EPA's air toxics policy applies to contaminants for which the American Conference of Governmental Industrial Hygienists (ACGIH) has a listed threshold limit value.

AIR TOXICS MODELING PERFORMED*? X YES NOIDENTIFY THE AIR CONTAMINANTS: hexane, acetone, toluene

NEW SOURCE REVIEW FORM B

PTI Number: 01-08401 Facility ID: 0125040070

FACILITY NAME Franklin International Inc

FACILITY DESCRIPTION adhesive production CITY/TWP Columbus

Emissions Unit ID: P031

SIC CODE 2891 SCC CODE 3-01-050-01 EMISSIONS UNIT ID P031

EMISSIONS UNIT DESCRIPTION Ross 1 mixer, adhesive mixing

DATE INSTALLED 6/77

EMISSIONS: (Click on bubble help for Air Quality Descriptions)

Pollutants	Air Quality Description	Actual Emissions Rate		PTI Allowable	
		Short Term Rate	Tons Per Year	Short Term Rate	Tons Per Year
Particulate Matter					
PM ₁₀					
Sulfur Dioxide					
Organic Compounds	Attainment	8.0	7.3	8.0	7.3
Nitrogen Oxides					
Carbon Monoxide					
Lead					
Other: Air Toxics					

APPLICABLE FEDERAL RULES:

NSPS? NESHAP? PSD? OFFSET POLICY?

WHAT IS THE BAT DETERMINATION, AND WHAT IS THE BASIS FOR THE DETERMINATION?

Enter Determination

IS THIS SOURCE SUBJECT TO THE AIR TOXICS POLICY? yes
OPTIONAL: WHAT IS THE CAPITAL COST OF CONTROL EQUIPMENT? \$

TOXIC AIR CONTAMINANTS

Ohio EPA's air toxics policy applies to containinants for which the American Conference of Governmental Industrial Hygienists (ACGIH) has a listed threshold limit value.

AIR TOXICS MODELING PERFORMED*? X YES NO

IDENTIFY THE AIR CONTAMINANTS: hexane, acetone, toluene