



State of Ohio Environmental Protection Agency

**RE: FINAL PERMIT TO INSTALL CERTIFIED MAIL
MAHONING 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: 02-15092

DATE: 7/10/2001

Maaco Auto Painting & Collision
Walter Porcelli
8063 Market St
Boardman, OH 44512

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

NEDO



**Permit To Install
Terms and Conditions**

**Issue Date: 7/10/2001
Effective Date: 7/10/2001**

FINAL PERMIT TO INSTALL 02-15092

Application Number: 02-15092
APS Premise Number: 0250001003
Permit Fee: **\$200**
Name of Facility: Maaco Auto Painting & Collision
Person to Contact: Walter Porcelli
Address: 8063 Market St
Boardman, OH 44512

Location of proposed air contaminant source(s) [emissions unit(s)]:
**8063 Market St
Boardman, Ohio**

Description of proposed emissions unit(s):
Paint spray booth.

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.

Maaco Auto Painting & Collision**PTI Application: 02-15092****Issued: 7/10/2001****Facility ID: 0250001003****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	13.95 tpy
PE	2.41 tpy

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>	<u>Applicable Emissions Limitations/Control Measures</u>
Paint Booth used for repainting automobiles	OAC rule 3745-31-05 (A)(3)	OC: 68.2 pounds per day and 12.45 tons per year
		OC: 1.5 tons per year from cleanup
	OAC rule 3745-17-11	PE: 0.551 pound per hour and 2.41 tons per year
	OAC rule 3745-21-09 (U)	See A.2.a.

2. Additional Terms and Conditions

- 2.a The requirements of OAC rule 3745-21-09 (U)(1) shall not apply to the repainting (refinishing) of used automobiles and trailers in accordance with OAC rule 3745-21-09 (U)(2)(c)

B. Operational Restrictions

- 1. The permittee shall operate a dry filtration system and any other filtration system deemed necessary by the Ohio EPA to prevent over spray from the paint spray booth.
- 2. The permittee shall not under any circumstances apply any spray coating(s) to any automobile(s) or its parts outside of the spray paint booth.

C. Monitoring and/or Recordkeeping Requirements

- 1. The permittee shall collect and record the following information daily for the paint spray booth:
 - a. The name and identification number of each coating, as applied.
 - b. The VOC content of each coating, as applied.

- c. The number of gallons of each coating employed.
 - d. The name and identification of each cleanup material employed.
 - e. The VOC content of each cleanup material, in pounds per gallon.
 - f. The number of gallons of each cleanup material employed.
 - g. The total VOC emissions from all coatings and cleanup materials employed, in pounds or tons.
2. The permittee shall maintain daily records that document any time periods when the dry filters were not in service when the emissions unit was in operation.
 3. The permit to install for this emissions unit (K001) was evaluated based on the actual materials (typically coatings and cleanup 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" pollutant(s):

Pollutant: N-Butyl Acetate

TLV (mg/m³): 713

Maximum Hourly Emission Rate (lbs/hr): 0.8

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m³): 68.3

MAGLC (ug/m³): 17,000

Pollutant: Toluene

TLV (mg/m³): 377

Maximum Hourly Emission Rate (lbs/hr): 1.1

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 93.9

MAGLC (ug/m3): 9,000

Pollutant: Xylene

TLV (mg/m3): 434

Maximum Hourly Emission Rate (lbs/hr): 3.1

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 264.7

MAGLC (ug/m3): 10,300

Pollutant: Methyl n-Amyl Ketone

TLV (mg/m3): 233

Maximum Hourly Emission Rate (lbs/hr): 1.6

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 136.6

MAGLC (ug/m3): 5,600

Pollutant: V M &P Naptha

TLV (mg/m3): 1370

Maximum Hourly Emission Rate (lbs/hr): 3.0

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 256.2

MAGLC (ug/m3): 32,600

Maaco Auto Painting & Collision**PTI Application: 02-15002****Issued****Facility ID: 0250001003**Emissions Unit ID:**K001**

Pollutant: Mineral Spirits

TLV (mg/m3): 1370

Maximum Hourly Emission Rate (lbs/hr): 3.8

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 324.5

MAGLC (ug/m3): 32,600

Pollutant: 1,3,5 Trimethylbenzene

TLV (mg/m3): 123

Maximum Hourly Emission Rate (lbs/hr): 0.2

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 17.1

MAGLC (ug/m3): 3,000

Pollutant: 1,2,4 Trimethylbenzene

TLV (mg/m3): 123

Maximum Hourly Emission Rate (lbs/hr): 0.3

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 25.6

MAGLC (ug/m3): 3,000

Pollutant: Ethylbenzene

TLV (mg/m3): 434

Maximum Hourly Emission Rate (lbs/hr): 0.5

Predicted 1-Hour Maximum Ground-Level
Concentration (ug/m3): 42.7

MAGLC (ug/m3): 10,300

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 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.).
5. 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.
6. 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 notify the Director (Ohio EPA, Northeast District Office) in writing of any daily record showing that the dry filters were not in service when the emissions unit was in operation. The notification shall include a copy of such record and shall be sent to the Director (Ohio EPA, Northeast District Office) within 30 days after the event occurs.
2. The permittee shall submit deviation (excursion) reports which include the following information:
 - a. An identification of each day during which the organic compound emissions from the coatings and photochemically reactive cleanup materials exceeded 68.2 pounds per day, and the actual organic compound emissions for each such day.
3. The permittee shall also submit annual reports which specify the total organic compound emissions from this emissions unit for the previous calendar year. These reports shall be submitted to the Ohio EPA, Northeast District Office by January 31 of each year.

E. Testing Requirements

1. Compliance with the emission limitations specified in section A.1. and the operational restriction in section B. of these terms and conditions shall be determined in accordance with the following methods:

- a. Emission Limitation:
 OC: 68.2 pounds per day

Applicable Compliance Method:

Compliance shall be determined according to the monitoring and/or record keeping specified in C. Formulation data or USEPA Method 24 shall be used to determine the organic compound contents of the coatings and cleanup materials.

- b. Emissions Limitation:
 OC: 13.95 tons per year

Applicable Compliance Method:

Compliance shall be determined according to the monitoring and/or record keeping specified in C. Formulation data or USEPA Method 24 shall be used to determine the organic compound contents of the coatings and cleanup materials.

- c. Emission Limitation:
 PE: 0.551 pound per hour

Applicable Compliance Method:

To determine the worst case emission rate for particulate emissions, the following equation shall be used:

$$E(\text{lb/hr}) = [(\text{maximum coating solids usage rate})(\text{lb/hr})] [(1-\text{TE})] [(1-\text{CE})]$$

where,

E = particulate emissions rate, in pounds per hour

TE = transfer efficiency, which is the ratio of the amount of coating solids deposited on the coated part to the amount of the coating solids used

CE = control efficiency of the control equipment

- d. Emission Limitation:
 PE: 2.41 tons per year

Applicable Compliance Method:

To determine the annual emission rate for particulate emissions, the following equation shall be used for each coating:

$$E(\text{ton/yr}) = [(\text{annual usage rate})] [(\text{coating density})] [(\text{percent solids})] [(1-TE)] [(1-CE)]/2000 \text{ pounds per ton}$$

where,

E = particulate emissions rate, in pounds per hour

Annual usage rate of each coating, in gallons per year

Coating density of each coating, in pounds per gallon

Percent solids = weight percent of solids contained in each coating

TE = transfer efficiency, which is the ratio of the amount of coating solids deposited on the coated part to the amount of the coating solids used

CE = control efficiency of the control equipment

F. Miscellaneous Requirements

None

NEW SOURCE REVIEW FORM B

PTI Number: 02-15092 Facility ID: 0250001003

FACILITY NAME Maaco Auto Painting & Collision

FACILITY DESCRIPTION Paint spray booth CITY/TWP Boardman

SIC CODE 7532 SCC CODE 4-02-016-99 EMISSIONS UNIT ID K001

EMISSIONS UNIT DESCRIPTION Paint Booth used for repainting automobiles

DATE INSTALLED 1/78

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	Attainment	0.551 lb/hr	0.57 tpy	0.551 lb/hr	2.41 tpy
PM ₁₀					
Sulfur Dioxide					
Organic Compounds	Attainment(coating) Attainment(cleanup)	68.2 lb/day	8.9 tpy	68.2 lb/day	12.45 tpy 1.5 tpy
Nitrogen Oxides					
Carbon Monoxide					
Lead					
Other: Air Toxics					

APPLICABLE FEDERAL RULES: N/A

NSPS? NESHAP? PSD? OFFSET POLICY?

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

Enter Determination: The permittee shall operate a dry filtration system and any other filtration system deemed necessary by the Ohio EPA to prevent over spray from the paint spray booth and compliance with the air toxics policy.

IS THIS SOURCE SUBJECT TO THE AIR TOXICS POLICY? Yes

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

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: V M &P Naptha, Mineral spirits, Toluene, Xylene, Methyl N Amyl Ketone, n Butyl Acetate, 1,3,5 Trimethylbenzene, 1,2,4 Trimethylbenzene, and Ethylbenzene.

NEW SOURCE REVIEW FORM B

PTI Number: 02-15092 Facility ID: 0250001003

FACILITY NAME Maaco Auto Painting & Collision

FACILITY DESCRIPTION Paint spray booth CITY/TWP Boardman

Ohio EPA Permit to Install Information Form Please describe below any documentation which is being submitted with this recommendation (must be sent the same day). Electronic items should be submitted with the e-mail transmitting the PTI terms, and in software that CO can utilize. If mailing any hard copy, this section must be printed as a cover page. All items must be clearly labeled indicating the PTI name and number. Submit **hard copy items to Pam McGraner**, AQM&P, DAPC, Central Office, and electronic files to **airpti@epa.state.oh.us**

Please fill out the following. If the checkbox does not work, replace it with an 'X'

	<u>Electronic</u>	<u>Additional information File Name Convention (your PTI # plus this letter)</u>	<u>Hard Copy</u>	<u>None</u>
<u>Calculations (required)</u>	<input type="checkbox"/>	0000000c.wpd	<input checked="" type="checkbox"/>	
<u>Modeling form/results</u>	<input type="checkbox"/>	0000000s.wpd	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<u>PTI Application (complete or partial)*</u>	<input type="checkbox"/>	0000000a.wpd	<input type="checkbox"/>	<input type="checkbox"/>
<u>BAT Study</u>	<input type="checkbox"/>	0000000b.wpd	<input type="checkbox"/>	<input type="checkbox"/>
<u>Other/misc.</u>	<input type="checkbox"/>	0000000t.wpd	<input type="checkbox"/>	<input type="checkbox"/>

* Mandatory for netting, PSD, nonattainment NSR, 112(g), 21-07(G)(9)(g) and 21-09(U)(2)(f) - 2 complete copies.

Please complete (see comment bubble to the left for additional instructions):

NSR Discussion

NONE

Please complete for these type permits (For PSD/NSR Permit, place mouse over this text):

Synthetic Minor Determination and/or **Netting Determination**
Permit To Install ENTER PTI NUMBER HERE

- A. Source Description
- B. Facility Emissions and Attainment Status
- C. Source Emissions
- D. Conclusion

PLEASE PROVIDE ADDITIONAL NOTES OR COMMENTS AS NECESSARY:

NONE

Please complete:

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

<u>Pollutant</u>	<u>Tons Per Year</u>
OC	13.95 tpy
PE	2.41 tpy