

EMISSIONS ACTIVITY CATEGORY FORM YEAST LEAVENED BAKERY OVEN OPERATIONS

This form is to be completed for each yeast leavened bakery oven at commercial operations which produce yeast leavened bakery products. See instructions for definition of a commercial baker. State/Federal regulations which may apply to yeast leavened bakery ovens are listed in the instructions. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

1. Reason this form is being submitted (Check one)

New Permit Renewal or Modification of Air Permit Number(s) (e.g. P001) _____

2. Maximum Operating Schedule: _____ hours per day; _____ days per year

If the schedule is less than 24 hours/day or 365 days/year, what limits the schedule to less than maximum? See instructions for examples. _____

3. Baking oven ID: _____

4. Date installed: _____

5. Oven manufacturer and model number: _____

6. Type of oven: Tunnel Oven Spiral Oven Lap Oven
 Other, specify: _____

7. Type of fuel: Natural gas Distillate Oil Propane

8. Type of firing: Directly fired Indirectly fired (separate burner and oven exhausts)

9. Heat input for oven (million Btu per hour): Maximum Rated _____ Average _____

10. List the emission egress point(s) associated with this oven _____

11. Identify the dough processing equipment associated with this oven: _____

12. Identify the control equipment associated with this oven: _____

13. Indicate the year for items (14) through (18): _____

14. Percent of annual product in each season:
 Winter (Dec.-Feb.): _____% Summer (June-Aug.): _____%
 Spring (Mar.-May): _____% Fall (Sept.-Nov.): _____%
15. Annual fuel consumption for this oven: _____ mcf of natural gas (mcf = 1,000 cubic feet);
 _____ gallons of distillate oil; _____ gallons of propane

If the reported annual fuel consumption includes fuel usage by other equipment, identify the other equipment here: _____.

16. Annual production of yeast leavened products in this oven: _____ pounds for the year.
17. Annual production of other products in this oven: _____ pounds for the year.
18. Annual production of each yeast leavened product (complete items (a) through (g) below; if more than one product is produced, copy the page for each product and enter the requested information):
- (a) Description of Baking Product: _____
 Briefly describe each product (e.g., wheat loaves, white buns, etc.). Each product has specific values for amount of yeast and fermentation time (yeast action time).
- (b) Initial Yeast Baker's %: _____
 The amount of initial yeast is expressed as percent of total flour (baker's %). It is calculated from a specific bakery product formula as the initial pounds of yeast divided by the total pounds of flour times 100. Report to the nearest tenth of a percent.
- (c) Initial Yeast Action Time (hours): _____
 The initial yeast action time is the total time that the initial yeast is actively fermenting. It begins when the yeast is mixed with water and ends when the product enters the oven. Report in hours to the nearest tenth of an hour.
- (d) Spiking Yeast Baker's %: _____
 If no spiking yeast is added, this space is left blank. Report as baker's percent to the nearest tenth of a percent.
- (e) Spiking Yeast Action Time (hours): _____
 If no spiking yeast is added, this space is left blank. Report in hours to the nearest tenth of an hour.
- (f) Hourly Production Rate (pounds/hour): _____
 Report the hourly production rate in pounds per hour of baked product leaving the oven.
- (g) Annual Production (pounds/year): _____
 Report the annual production in pounds per year of baked product leaving the oven.

19. Emission data: Attach calculations of emissions (or test results) for each yeast leavened product, as described in the instructions.
20. Name and telephone number of person completing this form: _____

INSTRUCTIONS FOR COMPLETION OF THE EMISSIONS ACTIVITY CATEGORY FORM FOR A YEAST LEAVENED BAKERY OVEN OPERATION

GENERAL INSTRUCTIONS:

This emissions activity category (EAC) form is a technical information form for a yeast leavened bakery oven operation at a commercial bakery. One form is completed for each oven that bakes bread or other yeast leavened bakery products. A commercial bakery is an establishment that is primarily engaged in manufacturing fresh or frozen bread, bread-type rolls and "dry" bakery products (i.e., biscuits, crackers and cookies). This definition does not include establishments that produce bakery products primarily for direct sale on the premises to household consumers.

Provide complete responses to all applicable questions. If an item does not apply to the emissions unit, write in "Not Applicable" or "NA." If the answer is not known, write in "Not Known" or "NK." If you need assistance in understanding a question after reading the instructions below, contact your Ohio EPA District Office or Local Air Agency for assistance. Submittal of an incomplete application will delay application review and processing. In addition, the application may be returned as incomplete if all applicable questions are not answered appropriately.

APPLICABLE REGULATIONS:

The following State Regulations may be applicable to yeast leavened bakery ovens. Note that there may be other regulations which apply to this emissions unit which are not included in this list.

State: OAC rule 3745-31-02 (Permit to Install)
 OAC rule 3745-35-02 (Permit to Operate)
 OAC rule 3745-17-07 (Control of Visible Particulate Emissions from Stationary Sources)
 OAC rule 3745-17-11 (Restrictions on Particulate Emissions from Industrial Processes)
 OAC rule 3745-77 (Title V Permit Rules)

If you would like a copy of these regulations, contact your Ohio EPA District Office or Local Air Agency. State regulations may also be viewed and downloaded from the Ohio EPA website at <http://www.epa.state.oh.us/dapc/regs/regs.html>. Federal regulations may be viewed and downloaded at <http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-C.htm>.

CALCULATING EMISSIONS:

See specific instructions for item 19 below.

SPECIFIC INSTRUCTIONS:

1. Indicate whether this is an application for a new permit or an application for permit renewal. If applying for a permit renewal, provide the 4-character OEPA emissions unit identification number.
2. Provide the maximum number of hours per day and days per year the bakery oven is expected to operate. The following are examples of why the maximum number of hours per day may be less than 24 or the maximum number of days per year may be less than 365 (this list is not all-inclusive):

- The facility can only operate during daylight hours.
- The process can only operate within a certain range of ambient temperatures.
- The process is limited by another operation (i.e., a bottleneck).

3. Use the facility's baking oven identification or name.
4. Enter the installation date of the oven. If date of installation is not exactly known, estimate the month and year of installation.
5. Identify the manufacturer of the oven and, if appropriate, the make or model number.
6. Mark an "X" for the type of oven. In a tunnel oven, the doughs are conveyed along the length from the front entrance to the rear. In a spiral oven, the conveyor path is spiraled so that doughs circle the oven several times. In a lap oven, the doughs are both loaded and removed at the front of the oven, after travelling the length of the oven and back.
7. Mark an "X" for the type of fuel burned in the oven.
8. Mark an "X" for the type of fuel firing. Most ovens are directly fired in which the oven and burner have the same exhaust(s).
9. For the burners in the oven, indicate the total heat input in million Btu per hour. The maximum rated heat input is generally based on the burner manufacturer's specifications and the average heat input is based on typical operation.
10. Identify the egress point(s) from this oven by listing the appropriate company ID(s) for the egress point(s) which were entered in the emissions unit information section of the application.
11. Identify the dough processing equipment associated with the oven. Such equipment are located before and after the oven and can include mixers, fermentation vessels (vats or tubs) or fermentation rooms, intermediate proofers, proof boxes, cooling boxes, and packaging equipment.
12. If there is a VOC control device(s), identify the company ID(s) for the device(s) which were entered in the emissions unit information section of the application.
13. Indicate the year for which production information is provided in items 14 through 18 (the most recent year for which data is available, unless otherwise instructed).
14. Estimate the percent of annual production for each of the four seasons. The three-month period for each session is indicated. The four seasonal values should total 100.
15. The annual fuel consumption of the oven can be measured or estimated. If the reported annual fuel consumption includes the oven and other fuel burning equipment, identify all other fuel burning equipment.
16. For the production of bread and other yeast leavened products for this oven, report the total annual amount of such baked products in pounds per year.

17. For the production of any products that are not yeast leavened for this oven, report the total annual amount of such baked products in pounds per year.
18. For each yeast leavened product, complete items (a) through (g). Each product has specific values for amount of yeast, expressed as baker's percent, and fermentation time (yeast action time). If a spiking yeast is added, report the baker's percent and the fermentation time for the spiking yeast under items (d) and (e). The hourly production rate of each yeast leavened product is reported in pounds per hour of finished product from the oven, not pounds per hour of ingredients. The same applies to the reporting of annual production in pounds per year of finished product from the oven. A separate sheet can be used for each additional yeast leavened product or for the presentation of the data along with the determination of VOC emissions for each product.
19. The emission of air pollutants from the oven should be determined by testing or emission estimation and included with the submittal of this form. The amount of VOC emissions from the oven can be estimated for each yeast leavened product by using the following equation:

$$VOC_{\text{tons/yr}} = VOC_{\text{EF}} \times BP \times 0.0005 \times (1-F)$$

where

$VOC_{\text{tons/yr}}$ = VOC emissions in tons per year,

VOC_{EF} = emission factor in pounds of uncontrolled VOC emissions per ton of bread or other yeast leavened product produced,

BP = bread or other yeast leavened product production, in tons per year, and

F = fraction of VOC emissions being reduced by a control device (e.g., a 98% efficient control device for VOC has an F value of 0.98).

The value for VOC_{EF} can be estimated for each yeast leavened product by the following equation:

$$VOC_{\text{EF}} = 0.95Y_i + 0.195t_i - 0.51S - 0.86t_s + 1.90$$

where

Y_i = initial baker's percent of yeast to the nearest tenth of a percent,

t_i = total yeast action time (fermentation time) of initial yeast in hours to the nearest tenth of an hour,

S = final (spiking) baker's percent of yeast to the nearest tenth of a percent, and

t_s = spiking yeast action time in hours to the nearest tenth of an hour.

Note: The equation for VOC_{EF} is based on the publication "Alternative Control Technology Document for Bakery Oven Emissions" ([EPA 453/R-92-017](#)) dated December 1992. This publication provides a VOC emission estimation equation that is considered by U.S. EPA to be more representative of uncontrolled VOC emissions than the AIB (American Institute of Baking) formula. An even more representative VOC emission estimate would be based on oven specific testing for the specific yeast leavened product.

In addition to the estimate of VOC emissions from the oven, the emissions of sulfur dioxide (SO_2) and oxides of nitrogen (NO_x) can be estimated from the annual fuel usage based on the following emission factors (source: [EPA 450/4-90-003](#)):

a) natural gas combustion:

0.6 pounds SO_2 per million cubic feet burned

140 pounds NO_x per million cubic feet burned

b) distillate oil combustion:

143.6 x S pounds SO_2 per 1000 gallons burned,

where

S = sulfur content of the oil by weight percent (e.g., if S is 0.5%, there would be 71.8 pounds SO_2 per 1000 gallons burned)

20 pounds NO_x per 1000 gallons burned