Emissions Inventory Help Sheet for Bakeries

What do I need to report?

Bakeries must report air pollution emissions from the burning of fuels in ovens and boilers, as well as from the production of baked yeast products, which emit ethanol, a volatile organic compound (VOC). Burning fuel emits carbon monoxide, nitrogen oxides, particulate matter (dust and smoke), sulfur oxides, and VOCs. See the AQD Online Portal Emissions Inventory Instructions for more information.

- For bakery products, use a separate Bakery Emission Unit for each oven which bakes yeast products.

- Use the Emission Unit type 'Heater/Chiller' for ovens that do not bake yeast products and water heaters.

- Use the Emission Unit type 'Boiler' for boilers.

How do I determine the emission factors for my baked yeast products?

The emission factor is the number used to calculate pounds of pollutant (VOC) emitted from tons of yeast product baked. See the Baked Yeast Products Emission Factor Calculation Sheet below for complete instructions. Attach the calculation sheet or a spreadsheet equivalent as a calculation attachment in the AQD Online Portal.

To calculate emissions from baking:

Option 1:

If you choose 'Throughput-based factor' for Method Used, calculate the uncontrolled emission factor (in column F) with the variables you provide in the calculation sheet.

Option 2:

If you choose 'Emissions' for Method Used, use the calculation sheet to calculate an aggregate uncontrolled total emissions (total of Column H), and report the tons of uncontrolled fugitive emissions and/or controlled emissions in the stack amount (if applicable).

How do I determine the emission factors for my natural gas oven or boiler?

The table below shows the Source Classification Codes (SCC) and emission factors for the most common external combustion equipment, which includes ovens, water heaters, and boilers. The figures below assume that only natural gas is used. If you use another fuel, please call 602-506-6790 for further guidance.

Natural Gas Equipment Rating	SCC	Pollutant and Emission Factor (in lbs/MMCF)				
		CO	NO$_x$	PM$_{10}$	SO$_x$	VOC
10–100 MM Btu/Hr	10200602	84	100	7.6	0.6	5.5
<10 MM Btu/Hr	10200603	84	100	7.6	0.6	5.5

To calculate emissions from natural gas ovens and boilers:

At the process level, the **Throughput** is reported in million cubic feet (MMCF) of natural gas. If your usage records are in therms, multiply that value by the conversion factor of 0.0000971 to get the correct units of MMCF. In the **Variable** field, enter 1036 for the **Gas Heat Content**.

Include a copy of this completed form with your emissions inventory. Make additional copies of this form as necessary.

Business Name: _____ Year: _____ Facility ID: _____

Provide a unique product name for each product in column (A).

Column (F) = VOC emission factor (EF) (*pounds of ethanol emitted per ton of bread produced*)

VOC EF = [0.95(B) + 0.195(C) − 0.51(D) − 0.86(E) + 1.90]   When no final yeast is added, the VOC EF = [0.95(B) + 0.195(C) + 1.90]

Example: VOC EF   = [(0.95 × 2.4% initial yeast) + (0.195 × 3 total hrs) − (0.51 × 1% spike yeast) − (0.86 × 1.2 spike hrs) + 1.90]
          = [2.28 + 0.585 − 0.51 − 1.032 + 1.9]
          = [3.223] pounds of VOC per ton of bread produced

Reference:
U.S. EPA, 1997. *Compilation of Air Pollutant Emission Factors AP-42*, Section 9.9.6, Bread Baking. Available at: http://www.epa.gov/ttn/chief/ap42/ch09/final/c9s09-6.pdf

YEAST-LEAVENED PRODUCTS ONLY

(A) Product, Formula or Recipe Name	(B) Initial Yeast as Percent of Flour (nearest 1/10th of a percent)	(C) Total Ferment Time (in hours) (begins with first mixing of yeast with water, nearest 1/10th of an hour)	(D) Yeast Spike as Percent of Flour (nearest 1/10th of a percent)	(E) Spike Time (in hours) (nearest 1/10th of an hour)	(F) VOC Uncontrolled Emisson Factor (lb/ton) (see formula above)	(G) Bread Baked (tons)	(H) Estimated Uncontrolled Emissions (tons)