

**AP42 Section: 9.5.2 Meat Smokehouses**

**Title: Related information:  
Sorted test data for smokehouses. Color coded for development  
of average emission factors**

**July 1994**

Note: This material is related to a section in *AP42, Compilation of Air Pollutant Emission Factors, Volume I Stationary Point and Area Sources*. AP42 is located on the EPA web site at [www.epa.gov/ttn/chief/ap42/](http://www.epa.gov/ttn/chief/ap42/)

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Note: Filterable PM, Condensable organic PM, and Condensable Inorganic PM emission factors from Ref. 2 are not shown here! Factors have been revised!

KEEP IN FILE.  
USE TO CHECK EMISSION FACTORS. 7/28/94

See attachment A for data combination

SORTED TEST DATA FOR SMOKEHOUSES. COLORCODED FOR DEVELOPMENT OF AVERAGE EMISSION FACTORS

basis using molecular weight ratios.

Avg. EF  
5.51 (11.0)  
9.70 (19.4)  
11.5 (23.0)  
60.2 (120)  
2.27 (4.54)  
1.41 (2.82)  
17.3 (34.5)  
24.2 (48.4)

Source/control	Product	Source of smoke	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton) of wood used	Average emission factor, kg/Mg (lb/ton) of wood used	Ref. No.
Batch smokehouse	Sausage	Sawdust	Condensable inorganic PM	3	A	4.24-7.27 (8.48-14.5)	5.51 (11.0)	3
Batch smokehouse	Sausage	Sawdust	Condensable organic PM	3	A	7.27-10.9 (14.5-21.9)	9.70 (19.4)	3
Batch smokehouse	Sausage	Sawdust	Filterable PM	3	B	6.66-19.1 (13.3-38.3)	11.5 (23.0)	3
Batch smokehouse	Sausage	Sawdust	TOC as propane	3	A	50.5-77.8 (101-156)	60.2 (120)	3
Continuous smokehouse	ND	Chips and sawdust	Acetic acid	3	C	1.95-2.14 (3.90-4.29)	2.05 (4.11)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Acetic acid	3	C	1.15-1.86 (2.30-3.73)	1.52 (3.04)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Acetic acid	3	C	1.25-1.34 (2.49-2.68)	1.30 (2.60)	2
Continuous smokehouse	ND	Chips and sawdust	Acetic acid	3	C	2.41-2.58 (4.83-5.15)	2.49 (4.97)	2
Continuous smokehouse	Bologna	Sawdust	Condensable inorganic PM	3	A	9.69-15.8 (19.4-31.6)	12.4 (24.8)	3
Continuous smokehouse	Beef franks	Sawdust	Condensable inorganic PM	3	AB	16.3-18.4 (32.7-36.8)	17.7 (35.3)	
Continuous smokehouse	Wieners	Sawdust	Condensable inorganic PM	3	A	13.8-18.3 (27.6-36.5)	16.5 (33.0)	3
Continuous smokehouse	Pork wieners	Sawdust	Condensable inorganic PM	3	AB	14.1-18.9 (28.1-37.7)	16.3 (32.6)	4
Continuous smokehouse	Wieners	Sawdust	Condensable inorganic PM	3	B	13.4-30.5 (26.7-61.0)	20.9 (41.9)	
Continuous smokehouse	Turkey wieners	Sawdust	Condensable inorganic PM	3	BB	5.19-38.5 (10.4-76.9)	21.8 (43.6)	4
Continuous smokehouse	Bologna	Sawdust	Condensable organic PM	3	A	12.7-14.9 (25.5-29.7)	13.9 (27.8)	3
Continuous smokehouse	Beef franks	Sawdust	Condensable organic PM	3	AB	16.2-18.8 (32.4-37.5)	17.2 (34.4)	

Same smokehouse! These 2 count as 1 six-run test EF = 19.3 (38.6)

Same smokehouse! These 2 count as 1 six-run test EF = 19.2 (38.4)

Continuous smokehouse	Pork wieners	Sawdust	Condensable organic PM	3	AB	22.5-39.9 (45.0-79.8)	30.4 (60.7)	4
Continuous smokehouse	Wieners	Sawdust	Condensable organic PM	3	A	18.8-22.6 (37.6-45.2)	21.2 (42.5)	3
Continuous smokehouse	Wieners	Sawdust	Condensable organic PM	3	A	15.5-29.1 (31.0-58.2)	22.1 (44.1)	3
Continuous smokehouse	Turkey wieners	Sawdust	Condensable organic PM	3	BB	17.2-55.7 (34.5-111)	35.6 (71.2)	4
Continuous smokehouse	Pork wieners	Sawdust	Filterable PM	3	AB	41.8-50.8 (83.7-102)	45.3 (90.7)	4
Continuous smokehouse	Beef franks	Sawdust	Filterable PM	3	KB	40.0-46.9 (80.0-93.9)	43.9 (87.9)	4
Continuous smokehouse	Bologna	Sawdust	Filterable PM	3	A	10.7-13.7 (21.4-27.5)	12.0 (24.0)	3
Continuous smokehouse	Wieners	Sawdust	Filterable PM	3	A	38.2-44.7 (76.3-89.4)	41.3 (82.6)	3
Continuous smokehouse	Wieners	Sawdust	Filterable PM	3	A	43.1-72.4 (86.3-145)	54.7 (109)	3
Continuous smokehouse	Turkey wieners	Sawdust	Filterable PM	3	B	16.8-34.7 (33.7-69.5)	26.9 (53.8)	4
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Formaldehyde	3	D	0.280-0.376 (0.560-0.753)	0.315 (0.631)	2
Continuous smokehouse	ND	Chips and sawdust	Formaldehyde	3	D	0.618-0.685 (1.24-1.37)	0.647 (1.29)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Formaldehyde	3	D	0.251-0.338 (0.502-0.676)	0.306 (0.611)	2
Continuous smokehouse	ND	Chips and sawdust	Formaldehyde	3	D	0.550-0.685 (1.10-1.37)	0.627 (1.25)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	TOC as acetaldehyde	3	C	5.50-6.37 (11.0-12.7)	6.05 (12.1)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	TOC as acetaldehyde	3	C	5.41-6.95 (10.8-13.9)	6.02 (12.0)	2
Continuous smokehouse	ND	Chips and sawdust	TOC as acetaldehyde	3	C	35.3-42.7 (70.7-85.3)	39.4 (78.8)	2

See note on previous page

Same Smokehouse!  
1. Six-run test  
EF = 42.6 (85.2)

36.3  
(72.5)

0.311  
(0.621)

0.637  
(1.27)

6.04  
(12.1)

VOID.  
HIGHER RATED  
TOC DATA ARE  
AVAILABLE

Continuous smokehouse	ND	Chips and sawdust	TOC as acetaldehyde	3	C	22.6-31.9 (45.2-63.7)	26.7 (53.4)	2
Continuous smokehouse	Bologna	Sawdust	TOC as propane	3	A	19.7-39.4 (39.5-78.8)	28.1 (56.3)	3
Continuous smokehouse	Wieners	Sawdust	TOC as propane	3	A	33.2-50.2 (66.4-100)	43.1 (86.1)	3
Continuous smokehouse	Wieners	Sawdust	TOC as propane	3	B	16.1-37.4 (32.3-74.8)	25.2 (50.5)	3
Continuous smokehouse	Turkey wieners	Sawdust	TOC as propane	3	B	10.2-34.7 (20.4-69.3)	22.1 (44.3)	4
Continuous smokehouse	Beef franks	Sawdust	TOC as propane	3	B	8.58-27.7 (17.2-55.5)	15.9 (31.9)	4
Continuous smokehouse	Pork wieners	Sawdust	TOC as propane	3	B	7.47-26.0 (14.9-51.9)	14.0 (28.0)	4
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Total PM	3	B	14.3-18.9 (28.5-37.8)	16.1 (32.2)	2
Continuous smokehouse with wet scrubber and demister	ND	Chips and sawdust	Total PM	3	B	12.5-13.7 (25.0-27.4)	13.0 (26.1)	2
Continuous smokehouse	ND	Chips and sawdust	Total PM	3	B	48.1-57.4 (96.2-115)	52.7 (105)	2
Continuous smokehouse	ND	Chips and sawdust	Total PM	3	B	46.4-59.1 (92.7-118)	52.2 (104)	2

23.8  
(47.6)

14.6  
(29.2)

52.5  
(105)

VOID.  
HIGHER  
RATED  
TOC DATA  
AVAILABLE  
Same  
Smokehouse!  
1  
Six-run  
test  
EF = 29.5  
(59.0)

ATTACHMENT  
A

TABLE 4-1. SUMMARY OF TEST DATA FOR SMOKEHOUSES

Source/control	Product	Source of smoke	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton) of wood used	Average emission factor, kg/Mg (lb/ton) of wood used	Ref. No.
Continuous smokehouse	ND	Chips and sawdust	Acetic acid	3	C	2.41-2.58 (4.83-5.15)	2.49 (4.97)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Acetic acid	3	C	1.15-1.86 (2.30-3.73)	1.52 (3.04)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Acetic acid	3	C	1.25-1.34 (2.49-2.68)	1.30 (2.60)	2
Continuous smokehouse	ND	Chips and sawdust	Acetic acid	3	C	1.95-2.14 (3.90-4.29)	2.05 (4.11)	2
Batch smokehouse	Sausage	Sawdust	Condensable inorganic PM	3	A	4.24-7.27 (8.48-14.5)	<del>5.51 (11.1)</del>	3
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Condensable inorganic PM	3	B	3.59-6.16 (7.18-12.3)	<del>4.76 (9.5)</del>	2
Continuous smokehouse	ND	Chips and sawdust	Condensable inorganic PM	3	BA	17.6-25.4 (35.1-50.7)	<del>22.4 (44.8)</del>	2
Continuous smokehouse	Wieners	Sawdust	Condensable inorganic PM	3	BA	13.4-30.5 (26.7-61.0)	<del>20.9 (41.9)</del>	3 <sup>a</sup>
Continuous smokehouse	Wieners	Sawdust	Condensable inorganic PM	3	A	13.8-18.3 (27.6-36.5)	<del>16.5 (33.0)</del>	3
Continuous smokehouse	Bologna	Sawdust	Condensable inorganic PM	3	A	9.69-15.8 (19.4-31.6)	<del>12.4 (24.8)</del>	3
Continuous smokehouse	Pork wieners	Sawdust	Condensable inorganic PM	3	B	14.1-18.9 (28.1-37.7)	<del>16.3 (32.6)</del>	4
Continuous smokehouse	ND	Chips and sawdust	Condensable inorganic PM	3	BA	11.3-21.0 (22.6-42.1)	<del>16.0 (31.9)</del>	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Condensable inorganic PM	3	B	4.21-5.54 (8.41-11.1)	<del>5.07 (10.1)</del>	2
Continuous smokehouse	Beef franks	Sawdust	Condensable inorganic PM	3	B	16.3-18.4 (32.7-36.8)	<del>17.7 (35.3)</del>	4

Source/control	Product	Source of smoke	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton) of wood used	Average emission factor, kg/Mg (lb/ton) of wood used	Ref. No.
Continuous smokehouse	Turkey wieners	Sawdust	Condensibile inorganic PM	3	B	5.19-38.5 (10.4-76.9)	<del>21.8</del> <del>(43.6)</del>	4
Batch smokehouse	Sausage	Sawdust	Condensibile organic PM	3	A	7.27-10.9 (14.5-21.9)	9.70 (19.4)	3
Continuous smokehouse	Bologna	Sawdust	Condensibile organic PM	3	A	12.7-14.9 (25.5-29.7)	13.9 (27.8)	3
Continuous smokehouse	Turkey wieners	Sawdust	Condensibile organic PM	3	B	17.2-55.7 (34.5-111)	<del>26.6</del> <del>(71.2)</del>	4
Continuous smokehouse	Wieners	Sawdust	Condensibile organic PM	3	A	18.8-22.6 (37.6-45.2)	21.2 (42.5)	3 <sup>a</sup>
Continuous smokehouse	Pork wieners	Sawdust	Condensibile organic PM	3	B	22.5-39.9 (45.0-79.8)	<del>30.4</del> <del>(60.7)</del>	4
Continuous smokehouse	Beef franks	Sawdust	Condensibile organic PM	3	B	16.2-18.8 (32.4-37.5)	<del>17.2</del> <del>(34.4)</del>	4 <sup>b</sup>
Continuous smokehouse	Wieners	Sawdust	Condensibile organic PM	3	A	15.5-29.1 (31.0-58.2)	<del>22.1</del> <del>(44.1)</del>	3
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Condensibile organic PM	3	B	2.49-3.11 (4.99-6.21)	2.70 (5.41)	2
Continuous smokehouse	ND	Chips and sawdust	Condensibile organic PM	3	<del>B</del> A	7.06-8.78 (14.1-17.6)	<del>7.80</del> <del>(15.6)</del>	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Condensibile organic PM	3	B	2.70-4.06 (5.41-8.12)	3.25 (6.51)	2
Continuous smokehouse	ND	Chips and sawdust	Condensibile organic PM	3	<del>B</del> A	6.14-9.71 (12.3-19.4)	<del>8.09</del> <del>(16.2)</del>	2
Batch smokehouse	Sausage	Sawdust	Filterable PM	3	B	6.66-19.1 (13.3-38.3)	11.5 (23.0)	3
Continuous smokehouse	Beef franks	Sawdust	Filterable PM	3	B	40.0-46.9 (80.0-93.9)	<del>46.0</del> <del>(90.0)</del>	4 <sup>b</sup>
Continuous smokehouse	ND	Chips and sawdust	Filterable PM	3	<del>B</del> A	19.4-26.7 (38.8-53.4)	<del>22.0</del> <del>(44.1)</del>	2
Continuous smokehouse	Bologna	Sawdust	Filterable PM	3	A	10.7-13.7 (21.4-27.5)	<del>12.0</del> <del>(24.0)</del>	3
Continuous smokehouse	Pork wieners	Sawdust	Filterable PM	3	B	41.8-50.8 (83.7-102)	<del>45.0</del> <del>(90.0)</del>	4

Source/control	Product	Source of smoke	Pollutant	No. of test runs	Data rating	Emission factor range, kg/Mg (lb/ton) of wood used	Average emission factor, kg/Mg (lb/ton) of wood used	Ref. No.
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Filterable PM	3	B	5.80-9.32 (11.6-18.6)	7.78 (15.6)	2
Continuous smokehouse	Wieners	Sawdust	Filterable PM	3	A	43.1-72.4 (86.3-145)	54.7 (109)	3
Continuous smokehouse	ND	Chips and sawdust	Filterable PM	3	BA	26.7-30.8 (53.3-61.6)	28.6 (57.2)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Filterable PM	3	B	5.04-6.42 (10.1-12.8)	5.57 (11.1)	2
Continuous smokehouse	Wieners	Sawdust	Filterable PM	3	A	38.2-44.7 (76.3-89.4)	41.3 (82.6)	3*
Continuous smokehouse	Turkey wieners	Sawdust	Filterable PM	3	B	16.8-34.7 (33.7-69.5)	26.9 (53.8)	4
Continuous smokehouse	ND	Chips and sawdust	Formaldehyde	3	D	0.550-0.685 (1.10-1.37)	0.627 (1.25)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Formaldehyde	3	D	0.280-0.376 (0.560-0.753)	0.315 (0.631)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	Formaldehyde	3	D	0.251-0.338 (0.502-0.676)	0.306 (0.611)	2
Continuous smokehouse	ND	Chips and sawdust	Formaldehyde	3	D	0.618-0.685 (1.24-1.37)	0.647 (1.29)	2
Continuous smokehouse	ND	Chips and sawdust	TOC as acetaldehyde	3	C	35.3-42.7 (70.7-85.3)	39.4 (78.8)	2
Continuous smokehouse with vortex wet scrubber and demister	ND	Chips and sawdust	TOC as acetaldehyde	3	C	5.41-6.95 (10.8-13.9)	6.02 (12.0)	2