

AP-42
Section 1.9
Ref. #6

Note: This is a reference cited in AP 42, *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/

The file name refers to the reference number, the AP42 chapter and section. The file name "ref02_c01s02.pdf" would mean the reference is from AP42 chapter 1 section 2. The reference may be from a previous version of the section and no longer cited. The primary source should always be checked.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR AND ENERGY ENGINEERING RESEARCH LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

MEMORANDUM

DATE: November 19, 1985

SUBJECT: Fireplace Emissions

FROM: Robert C. McCrillis (h)
Combustion Research Br

TO: Neil Jacquay
EPA Region 9

OPTIONAL FORM 99 (7-90)

FAX TRANSMITTAL

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TO <i>Paula Fields</i>	From <i>Bob McCrillis</i>
Dept./Agency <i>E.H. Peckham</i>	Phone # <i>919-54-2233</i>
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5099-101

GENERAL SERVICES ADMINISTRATION

more to come tomorrow

As per our phone conversation yesterday, please find enclosed a print out of my fireplace emissions data base. Also enclosed is a copy of a recently published report (EPA-600/2-85-047) summarizing emissions from wood stoves. The fireplace data is organized in the same manner as Table 3-1 in the report. The Study Code and Reference list for the fireplace data is as follows:

Study Code

Reference

GM2-81	Dasch, Jean M., "Particulate and Gaseous Emissions from Wood-Burning Fireplaces", Environmental Science and Technology, Vol. 16, No. 10, 1982. (See also reference 6, EPA-600/2-85-047)
GM3-84	Lipari, Frank, J.M. Dasch, and W.F. Scruggs, "Aldehyde Emissions from Wood-Burning Fireplaces", Environmental Science and Technology, Vol. 18, No. 5, 1984.
PEI-77	"Source Testing for Fireplaces, Stoves, and Restaurant Grills in Vail, Colorado", Prepared by PEDCo-Environmental, Inc. for US EPA under contract 68-01-1999, December, 1977 (published January 1979).
VT1-75	Source Sampling Residential Fireplaces for Emission Factor Development, EPA Report EPA-450/3-76-010, November, 1975.
VT2-00, VT3-00	Results of other tests also reported in EPA-450/3-76-010.

I also invented some new codes for STOVE TYPE, PART(ICULATE) TEST METHOD and TYPE OF BURN:

STOVE TYPE

FSF	Free-standing fireplace.
CONDO	Fireplace installed in a condominium (no further description given in reference).
CONDO(GB)	Same installation as above, fitted with glass doors
CONDO(OSA)	Same installation as above, fitted with draft vent bringing in outside air.
CONDO(ESP)	Same installation as above, fitted with an ESP in the stack.
BRICK	Brick fireplace (no further description given in reference).
SYM	Simulated fireplace (no further description given in reference).

PART TEST METHOD

M5/A	Standard EPA Method 5 train with a second aldehydes train.
M5/7	Standard Method 5 train with an additional unheated filter between second and third impingers. Very similar to Oregon Method 7.
MMS	Standard Method 5 train with an adsorbant cartridge filled with Tenax between filter and first impinger. (We now use XAD-2 adsorbant instead of Tenax.)

TYPE OF BURN

E	Start-up.
F	Burn down.

If you have any questions, please call me (FTS 629-2733).

11/19/85

FIREPLACE EMISSIONS

STUDY CODE	STOVE TYPE	PART TEST METHOD	WOOD SPECIES	WOOD MOISTURE %	BURN RATE kg/hr	STACK TEMP DEG.F	TYPE OF BURN	SAMPLE TIME MIN.	EMISSIONS						COMMENTS	
									PART.	CO	NOX	HC	PM	BAP		ALD'S
012-81-01	FSF	MS	ES					13.00								EASTERN SPRUCE
012-81-02	FSF	MS	ES					9.60								EASTERN SPRUCE
012-81-03	FSF	MS	ES					15.00								EASTERN SPRUCE
012-81-04	FSF	MS	ES													EASTERN SPRUCE
012-81-05	FSF	MS	ES							58	0.80	1.1				EASTERN SPRUCE
012-81-06	FSF	MS	JP(G)													GREEN JACK PINE
012-81-07	FSF	MS	JP(G)					10.00								GREEN JACK PINE
012-81-08	FSF	MS	JP					14.00		160		1.0				SEASONED JACK PINE
012-81-09	FSF	MS	JP					10.00								SEASONED JACK PINE
012-81-10	FSF	MS	SM					24.00								SOFT MAPLE
012-81-11	FSF	MS	SM					9.00			1.00					SOFT MAPLE
012-81-12	FSF	MS	SM					9.60		120	1.00	2.7				SOFT MAPLE
012-81-13	FSF	MS	B(D)					15.00		71		1.0				DRY BIRCH
012-81-14	FSF	MS	B(G)		3.3			9.60		180	0.70	1.4				GREEN BIRCH
012-81-15	FSF	MS	HM					10.00								HARD MAPLE
012-81-16	FSF	MS	WA					14.00								WHITE ASH
012-81-17	FSF	MS	WA					9.10								WHITE ASH
012-81-18	FSF	MS	RO					8.00								RED OAK
012-81-19	FSF	MS	RO					8.20								RED OAK
012-81-20	FSF	MS	RO					12.00								RED OAK
012-81-21	FSF	MS	RO					8.90		90	1.00	1.6				RED OAK
012-81-22	FSF	MS	RO					11.00								RED OAK
012-81-23	FSF	MS	RO					29.00								RED OAK
012-81-24	FSF	MS	SL					19.00		200	1.00	5.1				COMPRESSED WOOD LOG
012-81-25	FSF	MS	SL					226		120	1.00	9.7				COMPRESSED WOOD LOG
013-84-1	FSF	MS/A	JP	5	8.4	183	B	30	5.60							0.952 JACK PINE
013-84-2	FSF	MS/A	CE	5	3.0	106	B	37	12.70							2.260 CEDAR
013-84-3	FSF	MS/A	RO	5	6.6	181	B	31	6.90							0.951 RED OAK
013-84-4	FSF	MS/A	RO	5	6.6	182	B	36	6.60							0.917 RED OAK
013-84-5	FSF	MS/A	RO	5	10.2	237	B	26	4.50							0.611 RED OAK
013-84-6	FSF	MS/A	RO	5	3.6	178	B	40	12.90							1.075 RED OAK
013-84-7	FSF	MS/A	WA(G)	20	5.4	153	B	33	4.60							0.937 GREEN WHITE ASH
013-84-8	FSF	MS/A	WA(G)	20	1.8	71	B	77	19.80							1.862 GREEN WHITE ASH
PE1-77-1	CONDO	MS/7	PINE	7	4.8	68	E	21.00		43		13.6				
PE1-77-2	CONDO	MS/7	PINE	7	8.2	119	C	16.60		28		13.1				
PE1-77-3	CONDO	MS/7	PINE	7	3.9	66	F	9.80		102		22.4				
PE1-77-4	CONDO (SD)	MS/7	PINE	7	11.5	160	C	9.80		74		83.3				
PE1-77-5	CONDO (OSA)	MS/7	PINE	7	10.1	124	C	16.70		84		57.7				
PE1-77-6	CONDO	MS/7	COAL	6	3.6	123	C	14.40		106		138.0				
PE1-77-7	CONDO	MS/7	PINE	7	11.4	157	C	9.50		53		34.9				
PE1-77-8	CONDO	MS/7	ASPIG	20	7.1	112	C	19.10		144		296.9				
PE1-77-9	CONDO	MS/7	ASPEN	7	4.8	119	E	34.50		78		73.0				GREEN ASPEN
PE1-77-10	CONDO	MS/7	ASPEN	7	8.1	98	C	15.80		70		62.8				
PE1-77-11	CONDO	MS/7	ASPEN	7	2.0	87	F	27.00		168		400.1				
PE1-77-12	CONDO	MS/7	PINE	8	3.6	72	E	22.20		125		625.2				
PE1-77-13	CONDO	MS/7	PINE	8	7.1	108	C	20.00		108		54.9				
PE1-77-14	CONDO	MS/7	PINE	8	4.8	74	F	19.40		115		219.7				
PE1-77-15	CONDO (ESP)	MS/7	PINE	7	15.2	188	C	8.70		55		6.7				
PE1-77-16	BRICK	MS/7	PINE	7	3.2	101	C	20.80		105		385.0				

(CONTINUED)

FIREPLACE EMISSIONS

STUDY CODE	STOVE TYPE	PART TEST METHOD	WOOD SPECIES	WOOD MOISTURE %	BURN RATE kg/hr	STACK TEMP DEG.F	TYPE OF BURN	SAMPLE TIME MIN.	EMISSIONS						COMMENTS	
									PART. g/kg	CO wood burned	NOX	HC	POM mg/kg	BaP wood burned		ALD'S wood burned
PE1-77-17	BRICK	M5/7	PINE	7	3.2	126	C		23.10	110		141.3				
PE1-77-18	BRICK	M5/7	PINE	8	4.6	103	C		26.30	104		26.7				
VT1-75-1	BRICK	M7	ALDER	12	4.8	83	E	40	16.00							
VT1-75-2	BRICK	M7	ALDER	12	7.8	108	C	60	5.90							
VT1-75-3	BRICK	M7	ALDER	12	1.9	67	F	40	22.20							
VT1-75-4	BRICK	M7	ALDER	12	10.8	114	E	40	12.50							
VT1-75-5	BRICK	M7	ALDER	12	9.1	92	C	20								
VT1-75-6	BRICK	MMS	ALDER	12	6.2	99	C	60		263		12.7	0.71			TENAX CARTRIDGE
VT1-75-7	BRICK	M7	DF	11	5.7	79	C	60	11.50							DOUGLAS FIR
VT1-75-8	BRICK	M7	DF	11	4.1	88	C	60	14.40	349		12.1				DOUGLAS FIR
VT1-75-9	BRICK	M7	DF	11	8.3	83	E	60	8.80							DOUGLAS FIR
VT1-75-10	BRICK	M7	DF	11	6.7	110	C	60	13.50							DOUGLAS FIR
VT1-75-11	BRICK	MMS	DF	11	4.3	88	C	60					1.22			DOUGLAS FIR/TENAX
VT1-75-12	BRICK	M7	COAL	0	2.3	80	E	60	30.30							
VT1-75-13	BRICK	M7	COAL	0	2.7	74	C	60	14.40							
VT1-75-14	BRICK	M7	LOCUS	12	9.0	86	E	60	9.50							
VT1-75-15	BRICK	M7	LOCUS	12	6.2	92	C	60	12.70	369		13.3				
VT1-75-16	BRICK	M7	LOCUS	12	5.2	82	E	60	11.60							
VT1-75-17	BRICK	M7	LOCUS	12	4.5	91	C	30								
VT1-75-18	BRICK	M7	LOCUS	12	5.5	91	C	60	15.30							
VT1-75-19	BRICK	M7	PINE	15	11.2	125	E	60	7.20							
VT1-75-20	BRICK	M7	PINE	15	14.0	109	C	40	6.50							
VT1-75-21	BRICK	MMS	PINE	15	10.0	104	C	50					0.48			TENAX CARTRIDGE
VT1-75-22	BRICK	M7	PINE	15	11.1	136	E	60	13.60							
VT1-75-23	BRICK	M7	PINE	15	9.1	105	C	50	8.10							
VT1-75-24	BRICK	M7	PINE	15	13.6	97	C	30								
VT2-00-1	SYM	M7	SL	0	8.0	54			2.40							COMPRESSED WOOD LOG
VT3-00-1	BRICK	M7	ALDER	0	19.8	107			6.50							