APPENDIX A

EMISSION FACTOR CALCULATION SPREADSHEETS

This appendix presents printouts of the detailed spreadsheets that were constructed in order to calculate emission factors for MDF dryers, presses, and coolers. Table A-1 presents the calculations for MDF dryers. Table A-2 presents the calculations for MDF presses. Table A-3 presents the calculations for MDF board coolers.

As discussed in Section 4.3.1 of this report, the data available for some of the specific emission factors developed included the results of multiple tests on the same emissions source. In such cases, the test-specific emission factors for the same source were averaged first, and that average emission factor then was averaged with the factors for the other sources to yield the candidate emission factors for AP-42. In Table A-1, the emission factor column is divided into two subcolumns, "Test," and "Dryer". The emission factor column labeled "Test" includes the available test-specific emission factors. The emission factor column labeled "Dryer" includes averages of test-specific averages for the same dryer. For dryers where only one test-specific emission factor was available, that emission factor appears in both the "Test" and "Dryer" columns. The AP-42 candidate emission factors were developed by averaging the dryer average emission factors in the "Dryer" column. A parallel structure applies to Table A-2 and Table A-3 for MDF presses and board coolers, respectively.

TABLE A-1. SUMMARY OF MDF DRYER EMISSION FACTOR CALCULATIONS (a)

Test Code	Unit Code	Pollutant	Firing type(b)	Fuel type(c)	Wood species(d) Primary	%	Secondary	%	Moisture content, % Inlet	Outlet	Temperature, degrees F Inlet	Outlet	Emission control device(e)	No. of Runs	Emission factor, lb/ODT Test	Dryer	Data Rating	Comments
227-031192	4D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	3.14	3.1	A	
227-031292	3D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	8.95	9.0	A	
227-031392	2D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	13.7	14	A	
227-031492	1D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	15.8	16	B	
Filterable PM, direct wood-fired, pines															Average	10		
															Minimum	3.1		
															Maximum	16		
227-031192	4D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	3.14	3.1	A	
227-031292	3D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	8.95	9.0	A	
227-031392	2D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	13.7	14	A	
227-031492	1D227	PM	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	15.8	16	B	
121-062889	1D121	PM	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	1.02	1.0	A	
121-062989	2D121	PM	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	5.27	5.3	A	
Filterable PM, direct wood-fired, softwoods					NOT REPORTED IN AP-42										Average	8.0		
															Minimum	1.0		
															Maximum	16		
															Std. dev.	5.4		
192-050492	1D192	PM	IHEAT	NS	PINE SP	100	NA	NA	NS	12.1	NS	130	CYC	3	1.36	1.4	A	
Filterable PM, indirect heat, pines															Average	1.4		
173-092592	1D173	PM	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.9	302	148	CYC	3	1.50	1.5	A	
Filterable PM, indirect heat, mixed wood species															Average	1.5		
227-031192	4D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	0.397	0.40	A	
227-031292	3D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	0.873	0.87	A	
227-031392	2D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	2.71	2.7	A	
227-031492	1D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	2.33	2.3	B	
Filterable PM-10, direct wood-fired, pines															Average	1.6		
															Minimum	0.40		
															Maximum	2.7		
227-031192	4D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	0.397	0.40	A	
227-031292	3D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	0.873	0.87	A	
227-031392	2D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	2.71	2.7	A	
227-031492	1D227	PM10	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	2.33	2.3	B	
121-062889	1D121	PM10	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	0.516	0.52	A	
121-062989	2D121	PM10	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	1.90	1.9	A	
Filterable PM-10, direct wood-fired, softwoods					NOT REPORTED IN AP-42										Average	1.5		
															Minimum	0.40		
															Maximum	2.7		
															Std. dev.	0.90		
173-092592	1D173	PM10	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.9	302	148	CYC	3	0.275	0.28	A	
Filterable PM-10, indirect heat, mixed wood species															Average	0.28		

TABLE A-1. (Continued)

Test Code	Unit Code	Pollutant	Firing type(b)	Fuel type(c)	Wood species(d) Primary	%	Secondary	%	Moisture content, % Inlet	Outlet	Temperature degrees F Inlet	Outlet	Emission control device(e)	No. of Runs	Emission factor, lb/ODT Test	Dryer	Data Rating	Comments
227-031192	4D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	0.340	0.34	A	
227-031292	3D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	0.547	0.55	A	
227-031392	2D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	0.630	0.63	A	
227-031492	1D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	0.860	0.86	B	
Condensible PM, direct wood-fired, pines															Average	0.59		
															Minimum	0.34		
															Maximum	0.86		
227-031192	4D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	32	10.0	150	124	CYC	3	0.340	0.34	A	
227-031292	3D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	26	9.6	160	121	CYC	3	0.547	0.55	A	
227-031392	2D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	46	13.0	169	104	CYC	3	0.630	0.63	A	
227-031492	1D227	CPM	DFIRE	SDUST	PINE SP	100	NA	NA	56	12.5	187	112	CYC	2	0.860	0.86	B	
121-062889	1D121	CPM	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	0.0857	0.086	A	
121-062989	2D121	CPM	DFIRE	TRIM	SWOOD	100	NA	NA	NS	NS	NS	NS	CYC	3	1.21	1.2	A	
Condensible PM, direct wood-fired, softwoods			NOT REPORTED IN AP-42												Average	0.61		
															Minimum	0.086		
															Maximum	1.2		
															Std. dev.	0.36		
173-092592	1D173	CPM	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.9	302	148	CYC	3	0.726	0.73	A	
Condensible PM, indirect heat, mixed wood species															Average	0.73		
227-031992	2D227	CO	DFIRE	SDUST	PINE SP	100	NA	NA	66.3	12.6	214	117	CYC	3	2.06	2.1	A	
227-032192	1D227	CO	DFIRE	SDUST	PINE SP	100	NA	NA	57.15	12.5	163	106	CYC	2	0.875	0.88	B	
227-032092	3D227	CO	DFIRE	NS	HWOOD	100	NA	NA	25	11.0	177	129	CYC	3	6.06	6.1	A	
227-032092	4D227	CO	DFIRE	NS	HWOOD	100	NA	NA	26	11.6	212	129	CYC	3	6.86	6.9	A	
CO, direct wood-fired															Average	4.0		
															Minimum	0.88		
															Maximum	6.9		
227-031992	2D227	VOC	DFIRE	SDUST	PINE SP	100	NA	NA	66.3	12.57	214	117	CYC	3	6.56	6.6	A	
VOC as propane, direct wood-fired, pines															Average	6.6		
227-032092	3D227	VOC	DFIRE	NS	HWOOD	100	NA	NA	25	11.03	177	129	CYC	3	6.67	6.7	A	+FOR(0.8
227-032092	4D227	VOC	DFIRE	NS	HWOOD	100	NA	NA	26	11.63	212	129	CYC	3	6.51	6.5	A	+FOR(0.8
227-032192	1D227	VOC	DFIRE	SDUST	HWOOD	100	NA	NA	57.15	12.5	163	106	CYC	2	6.38	6.4	B	+FOR(0.8
VOC as propane, direct wood-fired, hardwoods, plus formaldehyde (0.86)															Average	6.5		
															Minimum	6.4		
															Maximum	6.7		

TABLE A-1. (Continued)

Test Code	Unit Code	Pollutant	Firing type(b)	Fuel type(c)	Wood species(d) Primary	%	Secondary	%	Moisture content, % Inlet	Outlet	Temperature degrees F Inlet	Outlet	Emission control device(e)	No. of Runs	Emission factor, lb/ODT Test	Dryer	Data Rating	Comments
192-020194	1D192	VOC	IHEAT	NS	HWOOD	100	NA	NA	NS	9.3	199	160	CYC	3	3.62	3.6	A	+FOR(0.2
192-020194	2D192	VOC	IHEAT	NS	HWOOD	100	NA	NA	NS	9.81	235	140	CYC	3	5.77	5.8	A	+FOR(0.2
VOC as propane, indirect heat, hardwoods, plus formaldehyde (0.20)															Average	4.7		
															Minimum	3.6		
															Maximum	5.8		
173-092592	1D173	VOC	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	2.233	2.2	A	
VOC as propane, indirect heat, mixed wood species, plus formaldehyde (1.4), minus acetone (0.0025), minus methylene chloride (0.(															Average	2.2		
173-092692	1D173	2-5-DMBENZ	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00038	######	A	
2,5-dimethyl benzaldehyde, indirect heat, mixed wood species															Average	######		
192-020194	2D192	ACETALD	IHEAT	NS	HWOOD	100	NA	NA	NS	9.81	235	140	CYC	3	0.0188	0.019	A	
192-020194	1D192	ACETALD	IHEAT	NS	HWOOD	100	NA	NA	NS	9.3	199	160	CYC	3	0.00707	0.0071	A	
Acetaldehyde, indirect heat, hardwoods															Average	0.013		
															Minimum	0.0071		
															Maximum	0.019		
173-092692	1D173	ACETALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.0130	0.013	A	
Acetaldehyde, indirect heat, mixed wood species															Average	0.013		
173-092692	1D173	ACETONE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00397		A	
173-092692	1D173	ACETONE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00113	0.0025	A	
Acetone, indirect heat, mixed wood species															Average	0.0025		
															Minimum	0.0011		
															Maximum	0.0040		
173-092692	1D173	ACETPH	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00024	######	A	
Acetophenone, indirect heat, mixed wood species															Average	######		
173-092692	1D173	ACROLEIN	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00220	0.0022	A	
Acrolein, indirect heat, mixed wood species															Average	0.0022		
173-092692	1D173	A-PINENE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00651		A	
173-092692	1D173	A-PINENE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00587	0.0062	A	
Alpha pinene, indirect heat, mixed wood species															Average	0.0062		
															Minimum	0.0059		
															Maximum	0.0065		
173-092692	1D173	A-TERPENE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00225	0.0022	A	
Alpha terpeneol, indirect heat, mixed wood species															Average	0.0022		
173-092692	1D173	BENZALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00258	0.0026	A	
Benzaldehyde, indirect heat, mixed wood species															Average	0.0026		

TABLE A-1. (Continued)

Test Code	Unit Code	Pollutant	Firing type(b)	Fuel type(c)	Wood species(d) Primary	%	Secondary	%	Moisture content, % Inlet	Outlet	Temperature degrees F Inlet	Outlet	Emission control device(e)	No. of Runs	Emission factor, lb/ODT Test	Dryer	Data Rating	Comments
173-092692	1D173	BIS-2EH-PH	IHEAT	SDUST	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00027	######	A	
Bis-(2-ethylhexyl phthalate), indirect heat, mixed wood species															Average	######		
173-092692	1D173	BUTBENPHTH	IHEAT	SDUST	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00024	######	A	
Butylbenzyl phthalate, indirect heat, mixed wood species															Average	######		
173-092692	1D173	BUTYLALDEH	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00282	0.0028	A	
Butylaldehyde, indirect heat, mixed wood species															Average	0.0028		
173-092692	1D173	B-PINENE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00673		A	
173-092692	1D173	B-PINENE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00614	0.0064	A	
Beta pinene, indirect heat, mixed wood species															Average	0.0064		
															Minimum	0.0061		
															Maximum	0.0067		
173-092692	1D173	CHLOROMET	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00151	0.0015	A	
Chloromethane, indirect heat, mixed wood species															Average	0.0015		
173-092692	1D173	CROTONALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00189	0.0019	A	
Crotonaldehyde, indirect heat, mixed wood species															Average	0.0019		
173-092692	1D173	D-N-BUT-PH	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00018	######	A	
Di-n-butyl phthalate, indirect heat, mixed wood species															Average	######		
227-031992	2D227	FOR	DFIRE	NS	HWOOD	100	NA	NA	66	12.57	214	117	CYC	3	1.20	1.2	A	
227-032092	3D227	FOR	DFIRE	NS	HWOOD	100	NA	NA	25	11.03	177	129	CYC	3	0.420	0.42	A	
227-032092	4D227	FOR	DFIRE	NS	HWOOD	100	NA	NA	26	11.63	212	129	CYC	3	0.497	0.50	A	
227-032192	1D227	FOR	DFIRE	NS	HWOOD	100	NA	NA	57	12.5	163	106	CYC	2	1.32	1.3	B	
Formaldehyde, direct-fired, hardwoods															Average	0.86		
															Minimum	0.42		
															Maximum	1.3		
093-063088	1D093	FOR	IHEAT	NS	HWOOD	100	NA	NA	NS	NS	NS	NS	MCLO	3	0.0896	0.090	A	
192-020194	1D192	FOR	IHEAT	NS	HWOOD	100	NA	NA	NS	9.3	199	160	CYC	3	0.253	0.25	A	
192-020194	2D192	FOR	IHEAT	NS	HWOOD	100	NA	NA	NS	9.81	235	140	CYC	3	0.260	0.26	A	
Formaldehyde, indirect heat, hardwoods															Average	0.20		
															Minimum	0.090		
															Maximum	0.26		
173-092692	1D173	FOR	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	1.40	1.4	A	
Formaldehyde, indirect heat, mixed wood species															Average	1.4		
173-092692	1D173	HEXALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00262	0.0026	A	
Hexaldehyde, indirect heat, mixed wood species															Average	0.0026		
173-092692	1D173	ISOOCTANE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00062	######	A	
Isooctane, indirect heat, mixed wood species															Average	######		
173-092692	1D173	ISOVALALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00188	0.0019	A	
Isovaleraldehyde, indirect heat, mixed wood species															Average	0.0019		

TABLE A-1. (Continued)

Test Code	Unit Code	Pollutant	Firing type(b)	Fuel type(c)	Wood species(d) Primary	%	Secondary	%	Moisture content, % Inlet	Outlet	Temperature degrees F Inlet	Outlet	Emission control device(e)	No. of Runs	Emission factor, lb/ODT Test	Dryer	Data Rating	Comments
173-092692	1D173	MEK	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00634	0.0063	A	
Methyl ethyl ketone, indirect heat, mixed wood species															Average	0.0063		
173-092692	1D173	METHENECH	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00287	0.0029	A	
Methylene chloride, indirect heat, mixed wood species															Average	0.0029		
173-092692	1D173	NAPHTHALEN	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	2	0.00066	######	B	
Naphthalene, indirect heat, mixed wood species															Average	######		
173-092692	1D173	N-HEXANE	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00139	0.0014	A	
N-hexane, indirect heat, mixed wood species															Average	0.0014		
173-092692	1D173	O-TOLALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00074	######	A	
o-Tolualdehyde, indirect heat, mixed wood species															Average	######		
173-092692	1D173	PHENOL	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	2	0.00020	######	B	
Phenol, indirect heat, mixed wood species															Average	######		
173-092692	1D173	PROPIONALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00106	0.0011	A	
Propionaldehyde, indirect heat, mixed wood species															Average	0.0011		
173-092692	1D173	P-CYMEME	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	2	0.00024		B	
173-092692	1D173	P-CYMEME	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00014		A	
173-092692	1D173	P-CYMEME	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00018	######	A	
p-Cymene, indirect heat, mixed wood species															Average	######		
															Minimum	######		
															Maximum	######		
173-092692	1D173	P-TOLALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00363	0.0036	A	
p-Tolualdehyde, indirect heat, mixed wood species															Average	0.0036		
173-092692	1D173	T-FL-METH	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00138	0.0014	A	
Trichlorofluoromethane, indirect heat, mixed wood species															Average	0.0014		
173-092692	1D173	VALALD	IHEAT	NS	HWOOD	50	SWOOD	50	100	9.89	302	148	CYC	3	0.00210	0.0021	A	
Valeraldehyde, indirect heat, mixed wood species															Average	0.0021		

(a) Uncontrolled emissions. NS = not specified, NA = not applicable. Factors for VOC on a propane basis. Lb/ODT = pounds of pollutant per oven-dried ton of wood mate

(b) Firing types: DFIRE = direct Firing, IHEAT = indirect heat.

(c) Fuel types: SDUST = sawdust; TRIM = trim.

(d) Wood species: SY PINE = Southern yellow pine; PINE SP = unknown pine species; SWOOD = unspecified softwood; HWOOD = unspecified hardwood.

(e) Emission control devices: CYC = cyclone.

TABLE A-2. SUMMARY OF EMISSION FACTOR CALCULATIONS FOR MDF PRESSES (a)

Test Code	Unit code	Pollutant(b)	Press Temp., deg F	Press Cycle, min	Board Thick., in.	Board Density, lb/ft3	Wood species(c) Primary	%	Second.	%	Adhesive/resin type	Applic. rate	Cat/ Scav.? (d)	Wax applic. rate	Emission factor, lb/MSF 3/4 Test	Press	Data rating	Comment
027-051893	1P027	PM	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.197	0.20	B	
173-091092	1P173	PM	NS	3.13	0.625	48.6	HWOOD	50	SWOOD	50	UF	7.8%	Y	321 lb/hr	0.160	0.16	A	
Filterable PM, UF resin, batch press															Average	0.18		Batch
															Minimum	0.16		
															Maximum	0.20		
4	4-1	PM	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.170	0.17	A	
Filterable PM, UF resin, continuous press															Average	0.17		Continuous
4	4-1	PM	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.040	0.040	A	
RTO-controlled filterable PM, UF resin, continuous press															Average	0.040		Continuous
227-031592	2P227	PM	295	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	Continuous
227-031792	1P227	PM	NS	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	
027-051893	1P027	PM10	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.227	0.23	B	
Filterable PM-10, UF resin, batch press (Not reported in AP-42; PM-10 > PM)															Average	0.23		Batch
173-091092	1P173	PM10	NS	3.13	0.625	48.6	HWOOD	50	SWOOD	50	UF	7.8%	Y	321 lb/hr	0.0748	0.075	A	
Filterable PM-10, UF resin, batch press															Average	0.075		Batch
027-051893	1P027	CPM	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.259	0.26	B	
Condensible PM, UF resin, batch press															Average	0.26		Batch
4	4-1	CPM	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.14	0.14	A	
Condensible PM, UF resin, continuous press															Average	0.14		Continuous
4	4-1	CPM	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.016	0.016	A	
RTO-controlled condensible PM, UF resin, continuous press															Average	0.016		Continuous
227-031592	2P227	CPM	295	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	Continuous
227-031792	1P227	CPM	NS	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	
027-051893	1P027	CO	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.034	0.034	B	
CO, UF resin, batch press															Average	0.034		Batch
4	4-1	CO	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.085	0.085	B	
RTO-controlled CO, UF resin, continuous press															Average	0.085		Continuous
227-031692	2P227	CO	295	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	Continuous
227-031892	1P227	CO	NS	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	
027-051893	1P027	NOX	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.030	0.030	B	
NOx, UF resin, batch press															Average	0.030		Batch
4	4-1	NOX	391	NS	0.25	53.8	NS	NS	NS	NS	UF	10.8 gal/mi	NS	0.5 gal/mi	0.51	0.51	B	
RTO-controlled NOx, UF resin, continuous press															Average	0.51		Continuous

TABLE A-2. (Continued)

Test Code	Unit code	Pollutant(b)	Press Temp. deg F	Press Cycle min	Board Thick., in.	Board Density lb/ft3	Wood species(c) Primary	%	Second.	%	Adhesive/resin type	Applic. rate	Cat/ Scav.? (d)	Wax applic. rate	Emission factor, lb/MSF 3/4 Test	Press	Data rating	Comment
027-051893	1P027	VOC	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.663	0.66	B	
173-091192	1P173	VOC	NS	3.55	0.71	47.6	HWOOD	50	SWOOD	50	UF	7.8%	Y	333 lb/hr	0.721	0.72	A	
VOC as propane, UF resin, batch press, plus formaldehyde (0.26) - acetone (0.0031)															Average	0.69		Batch
															Minimum	0.66		
															Maximum	0.72		
4	4-1	VOC	396	NS	0.375	51.0	NS	NS	NS	NS	UF	11.7 gal/mi	NS	0.5 gal/mi	1.42	1.4	B	
VOC as propane, UF resin, continuous press, plus formaldehyde (1.1)															Average	1.4		Continuous
4	4-1	VOC	396	NS	0.375	51.0	NS	NS	NS	NS	UF	11.7 gal/mi	NS	0.5 gal/mi	0.0323	0.032	B	
RTO-controlled VOC as propane, UF resin, continuous press, plus formaldehyde (0.0091)															Average	0.032		Continuous
227-031692	2P227	VOC	295	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	Continuous
227-031892	1P227	VOC	NS	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	
173-091192	1P173	2-5-DMBENZ	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00247	0.0025	B	
2,5-dimethyl benzaldehyde, UF resin, batch press															Average	0.0025		Batch
173-091192	1P173	ACETALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00508	0.0051	B	
Acetaldehyde, UF resin, batch press															Average	0.0051		Batch
173-091192	1P173	ACETONE	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00314	0.0031	B	
Acetone, UF resin, batch press															Average	0.0031		Batch
173-091192	1P173	ACROLEIN	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.0012	0.0012	B	
Acrolein, UF resin, batch press															Average	0.0012		Batch
173-091192	1P173	BENZALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	#######	######	B	
Benzaldehyde, UF resin, batch press															Average	######		Batch
173-091192	1P173	BUTYLALDI	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00236	0.0024	B	
Butylaldehyde, UF resin, batch press															Average	0.0024		Batch
173-091192	1P173	CROTONALI	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00111	0.0011	B	
Crotonaldehyde, UF resin, batch press															Average	0.0011		Batch
027-052593	1P027	FOR	380	4.5	7/16-1.5	47	PINE SP	100	NA		UF	213 lb/MSI	Y	12 lb/MSF	0.027	0.027	B	
093-063088	1P093	FOR	NS	32.7	3/4	48.9	HWOOD	100	NA		UF	NS	NS	NS	0.310	0.31	A	
(press and unloader: 0.18 + 0.13 = 0.31 lb/MSF 3/4)																		
173-091192	1P173	FOR	NS	3.55	0.71	47.6	HWOOD	50	SWOOD	50	UF	7.8%	Y	329 lb/hr	0.56	0.56	A	
Formaldehyde, UF resin, batch press															Average	0.30		Batch
															Minimum	0.027		
															Maximum	0.56		
4	4-1	FOR	396	NS	0.375	51.0	NS	NS	NS	NS	UF	11.7 gal/mi	NS	0.5 gal/mi	1.1	1.1	B	
Formaldehyde, UF resin, continuous press															Average	1.1		Continuous

TABLE A-2. (Continued)

Test Code	Unit code	Pollutant(b)	Press Temp. deg F	Press Cycle min	Board Thick., in.	Board Density lb/ft3	Wood species(c) Primary	%	Second.	%	Adhesive/resin type	Applic. rate	Cat/ Scav.? (d)	Wax applic. rate	Emission factor, lb/MSF 3/4 Test	Emission factor, lb/MSF 3/4 Press	Data rating	Comment
4	4-1	FOR	396	NS	0.375	51.0	NS	NS	NS	NS	UF	11.7 gal/mi	NS	0.5 gal/mi	0.0091	0.0091	B	
RTO-controlled formaldehyde, UF resin, continuous press															Average	0.0091		Continuous
227-031892/	1P227	FOR	NS	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	
227-031692/	2P227	FOR	295	NS	NS	NS	SY PINE	100	NA		UF	NS	NS	NS			NR	Continuous
173-091192(	1P173	HEXALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00291	0.0029	B	
Hexaldehyde, UF resin, batch press															Average	0.0029		Batch
173-091192(	1P173	ISOVALALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00138	0.0014	B	
Isovaleraldehyde, UF resin, batch press															Average	0.0014		Batch
173-091192(	1P173	MEK	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	#######	######	B	
Methyl ethyl ketone, UF resin, batch press															Average	######		Batch
173-091192(	1P173	O-TOLALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00070	######	B	
o-tolualdehyde, UF resin, batch press															Average	######		Batch
173-091192(	1P173	PROPIONAL	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	#######	######	B	
Propionaldehyde, UF resin, batch press															Average	######		Batch
173-091192(	1P173	P-TOLALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00102	0.0010	B	
p-tolualdehyde, UF resin, batch press															Average	0.0010		Batch
173-091192(	1P173	VALALD	NS	3.44	0.69	47.8	HWOOD	50	SWOOD	50	UF	7.8%	Y	327 lb/hr	0.00238	0.0024	B	
Valeraldehyde, UF resin, batch press															Average	0.0024		Batch

(a) Uncontrolled emissions. NS = not specified; NA = not applicable. UF = urea-formaldehyde. Lb/MSF 3/4 = pounds of pollutant per thousand square feet of 3/4-inch thick

(b) Pollutant codes are identified in Table 4-4. Factors for VOC on a propane basis.

(c) Wood species: SY PINE = Southern yellow pine, PINE SP = unknown pine species; HWOOD = unspecified hardwood; SWOOD = unspecified softwood.

(d) Cat/Scav.? = Y indicates either a catalyst or formaldehyde scavenger was used.

TABLE A-3. SUMMARY OF EMISSION FACTOR CALCULATIONS FOR MDF BOARD COOLERS (a)

Test Code	Unit code	Pollutant(b)	No. of runs	Test method(c)	Wood species				Adhesive/ resin type	Emission rate, Lb/hr	Production rate, MSF 3/4/hr	Emission factor, Lb/MSF 3/4		Data rating	Comments
					Primary	%	Second.	%				Test	Unit		
173-091092	1C173	PM	3	M5	HWOOD	50	SWOOD	50	UF	0.408	11.5	0.0364		A	
173-091192	1C173	PM	2	M5	HWOOD	50	SWOOD	50	UF	0.888	12.5	0.0714	0.054	B	
Filterable PM, UF resin												Average	0.054		Cooler
												Minimum	0.036		
												Maximum	0.071		
173-091092	1C173	PM10	3	M201A	HWOOD	50	SWOOD	50	UF	0.041	11.5	0.00376	0.0038	A	
Filterable PM-10, UF resin												Average	0.0038		Cooler
173-091192	1C173	VOC	3	M25A	HWOOD	50	SWOOD	50	UF	0.889	12.3	0.199	0.20	A	
VOC as propane, UF resin, formaldehyde added (0.11)												Average	0.20		Cooler
173-091192	1C173	2-5-DMBENZ	2	M0011	HWOOD	50	SWOOD	50	UF	0.002	11.9	0.00019	0.00019	B	
2,5-Dimethyl benzaldehyde, UF resin												Average	0.00019		Cooler
173-091192	1C173	ACETALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.012	11.9	0.0010	0.0010	B	
Acetaldehyde, UF resin												Average	0.0010		Cooler
173-091192	1C173	ACETONE	2	M0011	HWOOD	50	SWOOD	50	UF	0.025	11.9	0.0021	0.0021	B	
Acetone, UF resin												Average	0.0021		Cooler
173-091192	1C173	ACROLEIN	2	M0011	HWOOD	50	SWOOD	50	UF	0.003	11.9	0.000221	0.00022	B	
Acrolein, UF resin												Average	0.00022		Cooler
173-091192	1C173	BENZALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.001	11.9	0.000099	0.000099	B	
Benzaldehyde, UF resin												Average	0.000099		Cooler
173-091192	1C173	BUTYLALDE	2	M0011	HWOOD	50	SWOOD	50	UF	0.016	11.9	0.00141	0.0014	B	
Butylaldehyde, UF resin												Average	0.0014		Cooler
173-091192	1C173	CROTONALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.003	11.9	0.000255	0.00026	B	
Crotonaldehyde, UF resin												Average	0.00026		Cooler
173-091192	1C173	FOR	2	M0011	HWOOD	50	SWOOD	50	UF	1.355	11.9	0.1140	0.11	B	
Formaldehyde, UF resin												Average	0.11		Cooler
173-091192	1C173	HEXALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.007	11.9	0.000647	0.00065	B	
Hexaldehyde, UF resin												Average	0.00065		Cooler
173-091192	1C173	ISOVALALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.003	11.9	0.00025	0.00025	B	
Isovaleraldehyde, UF resin												Average	0.00025		Cooler
173-091192	1C173	MEK	2	M0011	HWOOD	50	SWOOD	50	UF	0.001	11.9	0.000110	0.00011	B	
Methyl ethyl ketone, UF resin												Average	0.00011		Cooler
173-091192	1C173	O-TOLALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.001	11.9	0.000065	0.000065	B	
o-tolualdehyde, UF resin												Average	0.000065		Cooler
173-091192	1C173	P-TOLALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.002	11.9	0.000169	0.00017	B	
p-tolualdehyde, UF resin												Average	0.00017		Cooler
173-091192	1C173	VALALD	2	M0011	HWOOD	50	SWOOD	50	UF	0.006	11.9	0.000478	0.00048	B	
Valeraldehyde, UF resin												Average	0.00048		Cooler

(a) Uncontrolled emissions. NS = not specified; NA = not applicable. Lb/MSF 3/4 = pounds of pollutant per thousand square feet of 3/4-inch thick panel.

(b) Pollutant codes are identified in Table 4-4. Factors for VOC on a propane basis.

(c) Test methods: M201A = EPA Method 201A; M202 = EPA Method 202; M25A = EPA Method 25A
M5 = EPA Method 5; M0011 = BIF Method 0011 (aldehydes and ketones)