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Publisher's version / Version de l'éditeur:

<https://doi.org/10.4224/20375933>

Internal Report (National Research Council Canada. Institute for Research in Construction); no. IRC-IR-635, 1992-11

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1992



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NRC-CNRC

**Results of Cone Calorimeter
Tests Conducted at the
NFL/IRC**

Internal report : Institute
--Bev Creighton ANALYSE

Robert Onno and Andrew Kim

ANALYZED

Internal Report No. 635

Date of issue: November 1992

CISTI/ICIST NRC/CNRC
IRC Ser
Received on: 08-23-92
Internal report : Institute
for Research in
Construction Canada

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RESULTS OF CONE CALORIMETER TESTS CONDUCTED AT THE NFL/IRC

by

Robert Onno and Andrew Kim

ABSTRACT

This report summarizes the National Fire Laboratory's results from cone calorimeter tests undertaken in 1991 and 1992. Twenty-seven materials were tested, with the emphasis on interior wood lining materials, but also included: foams, furniture, wallpaper and some composite materials.

A description of the detailed test method and apparatus is presented as well as observations and results of the tests. Any noteworthy behavior of materials is also presented. Two such comments involve peak heat release rates and testing with grids.

Most wood products showed an initial peak heat release at ignition which decreased as the surface charred. This was followed by a second peak heat release due to the edges of the material igniting and burning, and eventually the virgin material below the char depth becoming involved in the pyrolysis and burning.

The effect of testing with a grid cover compared to an edge frame is most apparent in the rate of heat release, ignition time, smoke production and flameout time. Using a grid cover, the rate of heat release was noticeably less while the other variables were increased.

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INTRODUCTION

The National Fire Laboratory (NFL) of the Institute for Research in Construction (IRC), National Research Council of Canada (NRCC) has performed fire tests on various lining materials over a period of two years using a cone calorimeter apparatus.

Over the past few years, various small-scale test apparatuses have been proposed as bench-scale fire test methods to determine the flammability of materials. In recent years, researchers and regulators have been accepting the cone calorimeter as a standard test device for materials flammability. Much research has taken place in the NFL, using the cone calorimeter, to determine relationships with the results of full-scale tests.

This report provides a brief description of the test method, instruments, calibration, as well as the detailed test results.

DESCRIPTION OF CONE CALORIMETER TEST

Test Method

The objective of this small-scale fire test is to determine the flammability of materials when exposed to radiant heat.

The ASTM standard¹ uses a test sample size of 100 mm × 100 mm. A conical shape heater operates at the desired heat flux level ranging from 0 to 100 kW/m². Ignition of the sample is accomplished by using a sparker.

The following parameters are obtained from the test: a visual observation of the sample behaviour, the rate of heat release by the oxygen depletion method (RHR), mass loss rate, heat of combustion, specific extinction area, cumulative smoke volume through the stack, ignition time and flameout time.

A detailed description of the apparatus and specifications can be found in Ref. 1.

Instruments

A conical heater is installed on a stand above a sample holder containing the material. The sample holder rests on a scale which continuously measures the sample mass. A hood is located above the cone and draws the smoke and gas emitted from the sample. Ignition of the test sample is carried out by a sparker located halfway between the cone and the top of the sample. A laser, located within the exhaust duct, is used to measure optical obscuration of the smoke in the duct.

The rate of heat release was determined by the oxygen depletion method [Ref. 2]. The smoke analysis was performed using the values obtained from the laser. Additional

parameters were evaluated through the use of these results, combined with the change in mass of the sample and visual observations.

Procedure

Three samples of each material were prepared as per Ref. 1 and tested at 25 kW/m² and 50 kW/m². Sample preparation included an aluminum foil wrapping below and around the sides, but not on top, of the sample. Ceramic fibre insulation was placed in the bottom of the sample holder upon which the sample was positioned.

The orientation of the sample was horizontal, although it is possible to test materials vertically. Two types of covers are available for the sample holder, a grid frame and an edge frame. If, at any point in a test, the material swelled up into the plane of the cone base, the test was considered invalid, and the material re-tested with a grid. The test was terminated when the flame extinguished or when the mass loss rate reached 2.5 g/(m²s). The sampling system operated for an additional two minutes following extinguishment or termination to allow for the O₂ response time.

The principal calibration test was as follows: a piece of 25mm thick PMMA was placed in the sample holder without insulation below the sample. Since the holder was exactly 25 mm deep, the surface of the sample was flush with the top of the tray. Neither the grid nor the edge frame was placed on the sample holder. The material was tested at 50 kW/m² as per the standard.

The test commenced with an initial baseline (background) reading for a few minutes during which the operating system was checked. The sample was then placed on the scale and the sparker was positioned above the sample. The time required for the material to burn continuously, without interruption, was defined as the ignition time. This time should not be confused with the first initial flame from the sample which often was not self-sustaining.

TEST MATERIALS

Twenty-six materials were tested, as listed in Table 1. The bulk of these materials were wood-based, interior lining materials. Some composites and furniture materials were also tested. Materials were received over a three-year period, including three different batches of some samples.

RESULTS AND DISCUSSION

Results

The results are presented in separate appendices, each one devoted to a particular material. Each Appendix contains a table with a summary of results as explained in Table 2. These tables contain the results of three experiments on each material followed by averages and % deviations of each particular variable. Individual experiment sheets are included in the Appendices and contain observations as well as other important information.

At the end of each Appendix, figures present graphs of the following variable, plotted versus time: rate of heat release, rate of mass loss, effective heat of combustion, smoke specific extinction area in exhaust stack, and cumulative smoke volume through exhaust stack.

Some materials were not tested at both heat fluxes. Tests were also not repeated three times for some materials. Any materials which were obviously non-combustible were tested only at the higher heat flux and no repeat test was conducted. If review of the data indicated that some were considered to be unrepresentative, these data were dropped from the results.

Discussion

The data were analyzed as per Ref. 1 and deviations were noted as follows:

- The delay time for the oxygen analyzer was found to be 40 s by performing a calibration test. This was carried out by burning a 25 mm thick sample of PMMA and determining the time to synchronize the rate of heat release and the rate of mass loss by trial and error. This delay time was then used to adjust the O₂ depletion readings to correspond to the correct time. When this number was entered into the data acquisition system it adjusted the O₂ readings accordingly.
- Some materials curled upwards towards the cone while burning, causing the tests to be invalid. This was particularly true of woodpanel materials. These samples were re-tested with a grid, however, the following potential problems were observed as a result of this: using a grid cover noticeably decreased the RHR values and greatly increased the ignition time, smoke production and flameout time. As seen in Ref. 3, this fact created difficulties when comparing these results with other labs.
- An interesting burning pattern was observed with some of the wood materials. There was an initial high RHR followed by a dip in the RHR as the top face charred which was followed by another similar peak RHR due to the materials' edges igniting with the fire involvement of the virgin material below the char depth. The second peak was usually higher than the first, however, for some materials this was reversed. This produced considerably different results for some tests in calculating the total heat released at peak heat release (THR@PHR) values.
- Based on a comparison of the NFL's results with the ASTM round-robin results, reproducibility of the cone data was observed to be excellent, especially with homogeneous materials such as particle board. Differences in materials such as fire-retarded plywood and chipboard produced slightly different results. A detailed lab comparison can be found in Ref. 3 and a comparison is shown in Table 3. This comparison shows that the NFL's results were well within the range of the results in the ASTM round robin⁴. The particleboard results demonstrate that the apparatus is functioning well and that any deviations in the results are due to the materials.
- Some test results were more repeatable than others. Most cumulative variables were quite repeatable, while most peak values were not. The total heat released during the tests was usually the same for the same material. The peak heat release rate and peak extinction coefficient typically had the greatest percent deviation.
- Some furniture samples were tested in 1992 and problems arose in dealing with this type of material. The preparation of the sample from the furniture itself was challenging. Since furniture is rarely homogeneous, one section of material may not be similar to the adjoining section. The size of the sample is also difficult to manage. Since some material is extremely thick, fitting the sample in the holder was difficult or impossible. The results included in this report were obtained without using any backing in the bottom of the sample holder because there was not enough room. Some samples could not easily fit in the holder and were compressed to fit in.

SUMMARY

Twenty seven materials were tested using the National Fire Laboratory's cone calorimeter. The results of these experiments, as well as observations and test methods, have been presented.

Sample preparation played an important role in this test method. Methods of wrapping the material with tinfoil, composition of material below the sample and type of cover create different test scenarios and affect results.

REFERENCES

1. "Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products using an Oxygen Consumption Calorimeter" (ASTM E-1354), American Society for Testing and Materials, Philadelphia, PA, 1990.
2. Janssens, M, "Measuring Rate of Heat Release by Oxygen Consumption", Fire Technology, August 1991, pp. 234-249.
3. Kim, A. and Onno, R., "Evaluating the Fire Hazard of Lining Materials Using the OSU, Cone Calorimeter and Full-Scale Fire Test Methods", IRC Internal Report No. 625, March 1992.
4. "ASTM Cone Calorimeter Inter-Laboratory Trials", ASTM Task Group E5.21, TG 60, January 3, 1990.

TABLE 1. TEST MATERIALS

Sample Material	Thickness (mm)	Year Received	Batch No.	Year Tested
Plywood	6.0	1990	1	1991
Gypsumboard	13.4	1990	1	1991
Plywood	12.3	1990	1	1991
Fire Retarded Plywood	12.3	1990	1	1991
Expanded Polystyrene	26.1	1990	1	1991
Rigid Polyurethan	25.1	1990	1	1991
Woodpanel	6.0	1991	1	1991
Particleboard	12.3	1991	1	1991
Plywood	6.0	1991	2	1991
Plywood	12.3	1991	2	1991
Polyurethane with Foil	40.0	1991	1	1991
Woodpanel	3.0	1991	1	1991
Chipboard	6.0	1991	2	1991
Woodpanel	5.0	1991	1	1991
Woodpanel	3.0	1992	2	1992
Woodpanel	6.0	1992	2	1992
Plywood	12.3	1992	3	1992
Fire Retarded Plywood	6.0	1992	2	1992
Chair Seat	40.0	1992	1	1992
Chair Back	30.0	1992	1	1992
Polyisocyanurate w/Foil	25.0	1992	1	1992
Wallpaper	1.0	1992	1	1992
Particleboard	12.3	1992	2	1992
Particleboard	12.3	1992	3	1992
Chair Seat	150.0	1992	2	1992
Chipboard	6.0	1992	3	1992

TABLE 2. LEGEND FOR DATA SUMMARY SHEETS

MATERIAL :		Material description
YEAR RECEIVED :		Year the material was received
GRID / FRAME / NEITHER:		Which cover used with the holder
FLUX LEVEL (kW/m ²) :		Cone heater flux level
THICKNESS (mm) :		Sample thickness

		UNITS	
DETAILS OF TEST	Test Ref.		Filename under which the test is saved
	Date Tested	(D/M/Y)	Date of test
	Temperature	(Deg C)	The temperature of the room during test
	Initial Mass	(g)	Initial mass of the sample

TEST RESULTS	Ignition Time	(s)	Time at which the sample ignited
	Flameout Time	(s)	Time that the sample terminated flaming
	Time PHR	(s)	Time of Peak Heat Release
	Peak RHR	(kW/m ²)	Value of Peak Heat Release
	Peak Mass Lost	(g/s*m ²)	Value of Peak Mass Loss
	Peak Ext. Area	(m ² /kg)	Value of Peak Extinction area
	Total Heat Rel.	(MJ/m ²)	Total Heat Released during test duration
	THR @ PHR	(MJ/m ²)	Total Heat Released at Peak Heat Release
	TM HEAT COMB	(MJ/kg)	Test Mean of Heat of Combustion
	TM RHR	(kW/m ²)	Test Mean Rate of Heat Release
	TM MLR	(g/s*m ²)	Mass Loss Rate
	TM S. Ext. Area	(m ² /kg)	Specific Extinction Area
	Mass Final	(g)	Final mass of sample

SUPPLEM -ENTARY DATA	60s RHR	(kW/m ²)	60 second mean	Rate of Heat Release
	60s MLR	(g/s*m ²)		Mass Loss Rate
	60s HEAT COMB	(MJ/kg)		Heat Of Combustion
	60s S. Ext. Area	(m ² /kg)		Specific Extinction Area
	180s RHR	(kW/m ²)	180 second mean	Rate of Heat Release
	180s MLR	(g/s*m ²)		Mass Loss Rate
	180s HEAT COM	(MJ/kg)		Heat Of Combustion
	180s S. Ext. Area	(m ² /kg)		Specific Extinction Area
	300s RHR	(kW/m ²)	300 second mean	Rate of Heat Release
	300s MLR	(g/s*m ²)		Mass Loss Rate
	300s HEAT COM	(MJ/kg)		Heat Of Combustion
	300s S. Ext. Area	(m ² /kg)		Specific Extinction Area

TABLE 3. COMPARISON OF ASTM vs. NFL PARTICLEBOARD RESULTS

Laboratory	Year Tested	Flux Level (kW/m ²)	Time to Ignition (s)	PHR (kW/m ²)	HRR @180 s (kW/m ²)	THR (MJ/m ²)
ASTM		25	110	174	106	72
NFL	1991	25	130	143	95	75
NFL	1992	25	109	141	96	72
ASTM		50	24	256	153	89
NFL	1991	50	35	224	127	74
NFL	1992	50	28	230	136	77

LIST OF APPENDICES

APPENDIX A:	6.0 mm Plywood
APPENDIX B:	13.4 mm Gypsumboard
APPENDIX C:	12.3 mm Plywood
APPENDIX D:	12.3 mm Fire Retarded Plywood
APPENDIX E:	26.1 mm Expanded Polystyrene
APPENDIX F:	25.1 mm Rigid Polyurethane
APPENDIX G:	6.0 mm Woodpanel
APPENDIX H:	12.3 mm Particleboard
APPENDIX I:	6.0 mm Plywood
APPENDIX J:	12.3 mm Plywood
APPENDIX K:	40.0 mm Polyurethane with Foil
APPENDIX L:	3.0 mm Woodpanel
APPENDIX M:	6.0 mm Chipboard
APPENDIX N:	5.0 mm Woodpanel
APPENDIX O:	3.0 mm Woodpanel
APPENDIX P:	6.0 mm Woodpanel
APPENDIX Q:	12.3 mm Plywood
APPENDIX R:	12.3 mm Fire Retarded Plywood
APPENDIX S:	40.0 mm Seat
APPENDIX T:	30.0 mm Back
APPENDIX U:	25.0 mm Polyisocyanurate with Foil
APPENDIX V:	1.0 mm Wallpaper
APPENDIX W:	12.3 mm Particleboard
APPENDIX X:	12.3 mm Particleboard
APPENDIX Y:	150.0 mm Seat
APPENDIX Z:	6.0 mm Chipboard

APPENDIX A: 6 mm PLYWOOD



CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1160	NRC1171	NRC1197		DEV %
	Date Tested	(D/M/Y)	7/3/91	7/5/91	7/22/91		
	Temperature	(Deg C)	28	27	30	28	6
	Initial Mass	(g)	31	32	30	31	3

TEST RESULTS						AVG.	MAX
	UNITS		NRC1160	NRC1171	NRC1197		DEV %
	Ignition Time	(s)	124	220	90	145	52
	Flameout Time	(s)	519	645	508	557	16
	Time PHR	(s)	135	295	105	178	65
	Peak RHR	(kW/m ²)	137	135	138	137	1
	Peak Mass Loss	(g/s*m ²)	12.0	11.5	10.9	11	5
	Peak Ext. Area	(m ² /kg)	55.1	106.9	91.5	84	35
	Total Heat Rel.	(MJ/m ²)	27.5	27.9	27.1	27	2
	THR @ PHR	(MJ/m ²)	N / A	9.6	N / A	10	N/A
	TM HEAT COMB.	(MJ/kg)	10.2	8.9	10.3	10	9
	TM RHR	(kW/m ²)	70.6	66.4	66.0	68	4
	TM MLR	(g/s*m ²)	7.3	5.7	6.6	7	13
	TM S. Ext. Area	(m ² /kg)	16.3	19.1	13.3	16	18
	Mass Final	(g)	7	8	8	8	4

SUPPLEMENTARY DATA						AVG.	MAX
	UNITS		NRC1160	NRC1171	NRC1197		DEV %
	60s RHR	(kW/m ²)	122.8	132.4	117.5	124	7
	60s MLR	(g/s*m ²)	10.0	9.7	8.7	9	8
	60s HEAT COMB.	(MJ/kg)	11.5	12.6	12.7	12	6
	60s S. Ext. Area	(m ² /kg)	33.2	56.6	6.8	32	79
	180s RHR	(kW/m ²)	107.1	108.4	104.4	107	2
	180s MLR	(g/s*m ²)	9.0	8.5	8.4	9	5
	180s HEAT COMB.	(MJ/kg)	11.6	12.5	12.2	12	4
	180s S. Ext. Area	(m ² /kg)	34.9	42.0	28.7	35	19
	300s RHR	(kW/m ²)	82.6	80.1	79.1	81	2
	300s MLR	(g/s*m ²)	6.7	6.0	6.3	6	6
	300s HEAT COMB.	(MJ/kg)	12.1	13.2	12.3	13	5
	300s S. Ext. Area	(m ² /kg)	21.0	25.2	18.0	21	18

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1006	NRC1133	NRC1140		DEV %
	Date Tested	(D/M/Y)	6/18/91	6/19/91	6/21/91		
	Temperature	(Deg C)	29	28	27	28	4
	Initial Mass	(g)	28	32	33	31	8

TEST RESULTS	Parameter	UNITS				AVG.	MAX
			NRC1006	NRC1133	NRC1140		DEV %
	Ignition Time	(s)	20	13	20	18	26
	Flameout Time	(s)	400	445	380	408	9
	Time PHR	(s)	165	25	160	117	79
	Peak RHR	(kW/m2)	137	161	170	156	12
	Peak Mass Loss	(g/s*m2)	11.2	13.2	14.8	13	14
	Peak Ext. Area	(m2/kg)	99.6	153.3	174.7	143	30
	Total Heat Rel.	(MJ/m2)	28.7	31.0	33.0	31	7
	THR @ PHR	(MJ/m2)	15.8	N/A	18.9	17	9
	TM HEAT COMB.	(MJ/kg)	10.5	10.8	11.4	11	5
	TM RHR	(kW/m2)	76.5	72.1	92.8	80	15
	TM MLR	(g/s*m2)	7.8	7.4	9.2	8	14
	TM S. Ext. Area	(m2/kg)	22.5	28.0	64.9	38	69
	Mass Final	(g)	5	6	7	6	14

SUPPLEMENTARY DATA	Parameter	UNITS				AVG.	MAX
			NRC1006	NRC1133	NRC1140		DEV %
	60s RHR	(kW/m2)	106.3	143.9	140.3	130	18
	60s MLR	(g/s*m2)	8.9	10.9	10.4	10	12
	60s HEAT COMB.	(MJ/kg)	11.0	12.4	12.5	12	8
	60s S. Ext. Area	(m2/kg)	26.3	50.6	67.7	48	45
	180s RHR	(kW/m2)	108.1	120.6	133.6	121	11
	180s MLR	(g/s*m2)	9.0	10.2	10.8	10	10
	180s HEAT COMB.	(MJ/kg)	11.7	11.6	12.1	12	2
	180s S. Ext. Area	(m2/kg)	45.3	66.1	108.4	73	48
	300s RHR	(kW/m2)	85.0	89.5	100.9	92	10
	300s MLR	(g/s*m2)	6.8	7.5	7.9	7	8
	300s HEAT COMB.	(MJ/kg)	12.3	11.7	12.6	12	4
	300s S. Ext. Area	(m2/kg)	27.2	39.6	76.1	48	60

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1160

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 27.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 30.9 g
Final Mass : 7.4 g
Mass Lost : 2.36 kg/m²
Ignition Time : 124 s
Flameout Time : 519 s

Time of Peak RHR : 135 s
Peak RHR : 136.5 kW/m²
Peak Mass Loss : 11.96 g/s*m²
Peak Extinction Area: 55.10 m²/kg
Total Heat Released : 27.52 MJ/m²

Summary Data From Ignition

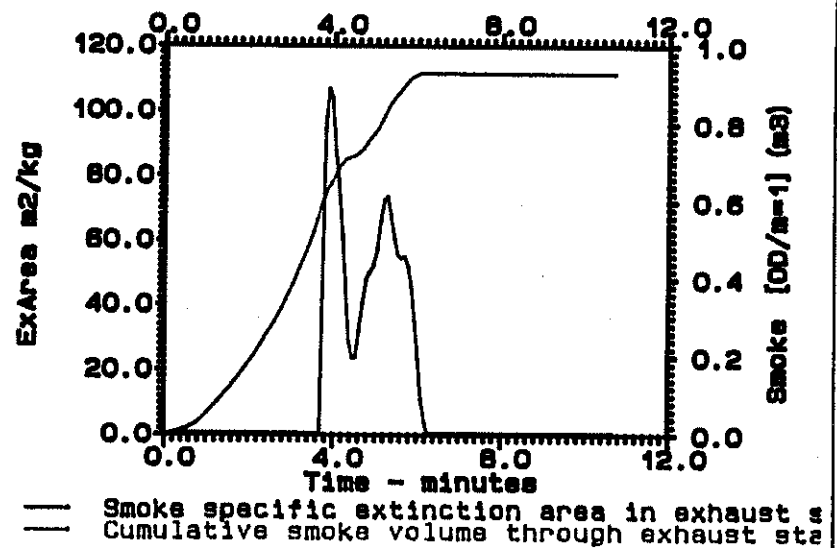
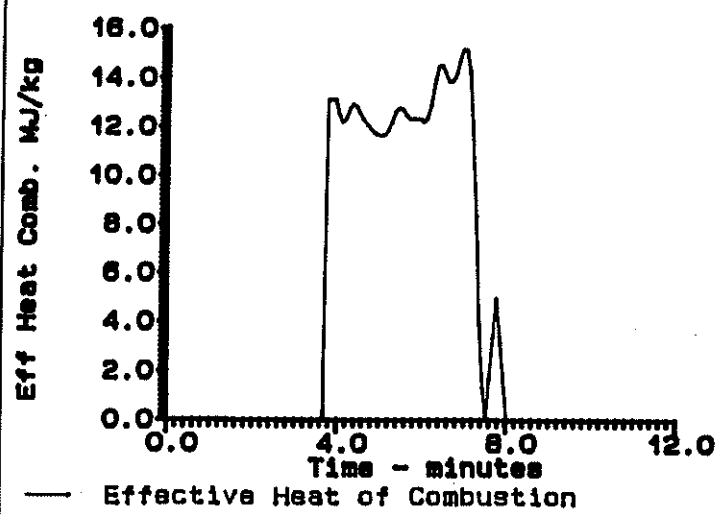
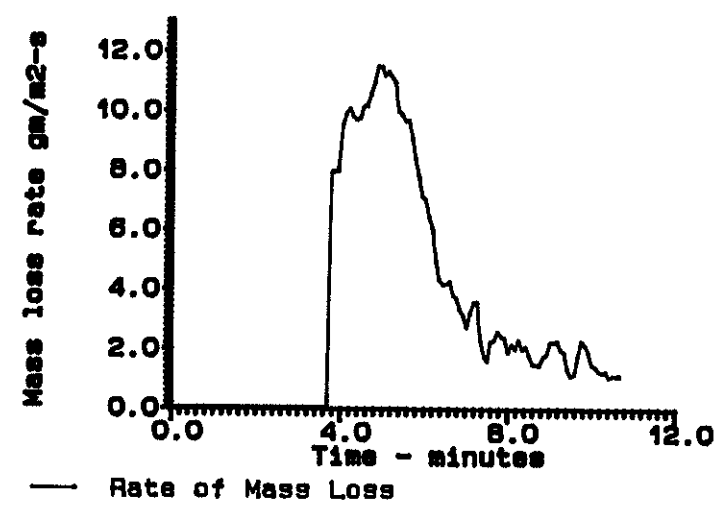
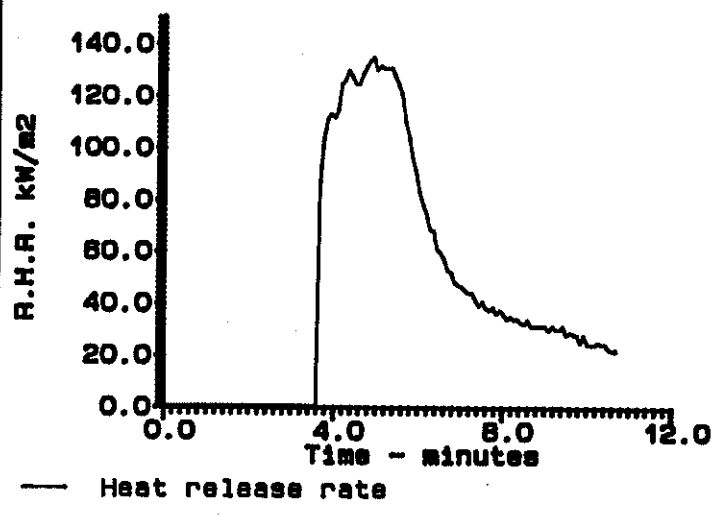
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	70.57	122.77	107.11	82.55
Mass Loss Rate	g/s*m ²	7.33	9.96	9.00	6.73
Heat of Combustion	MJ/kg	10.17	11.46	11.63	12.09
Specific Ext. Area	m ² /kg	16.27	33.20	34.85	21.04
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Plywood 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1171

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 27.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 31.7 g
Final Mass : 7.8 g
Mass Lost : 2.39 kg/m²
Ignition Time : 220 s
Flameout Time : 645 s

Time of Peak RHR : 295 s
Peak RHR : 135.2 kW/m²
Peak Mass Loss : 11.51 g/s*m²
Peak Extinction Area: 106.88 m²/kg
Total Heat Released : 27.87 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	66.36	132.36	108.37	80.14
Mass Loss Rate	g/s*m ²	5.74	9.72	8.47	6.01
Heat of Combustion	MJ/kg	8.87	12.60	12.55	13.15
Specific Ext. Area	m ² /kg	19.11	56.63	41.98	25.19
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

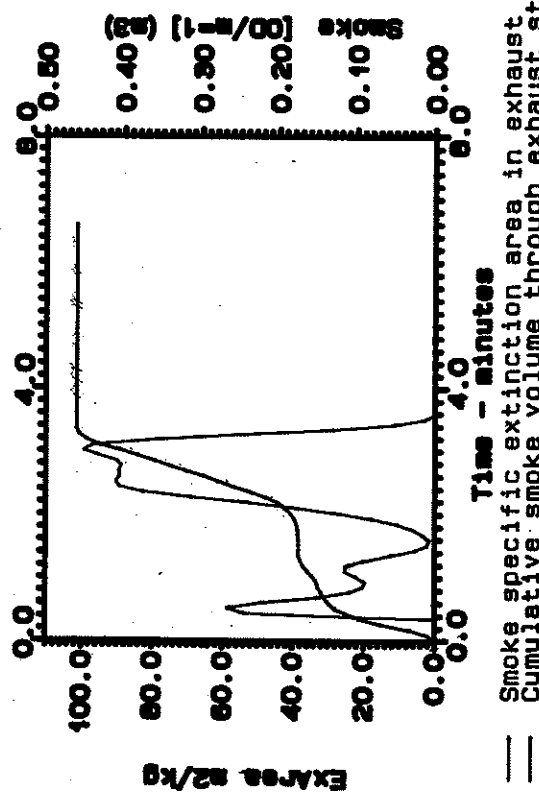
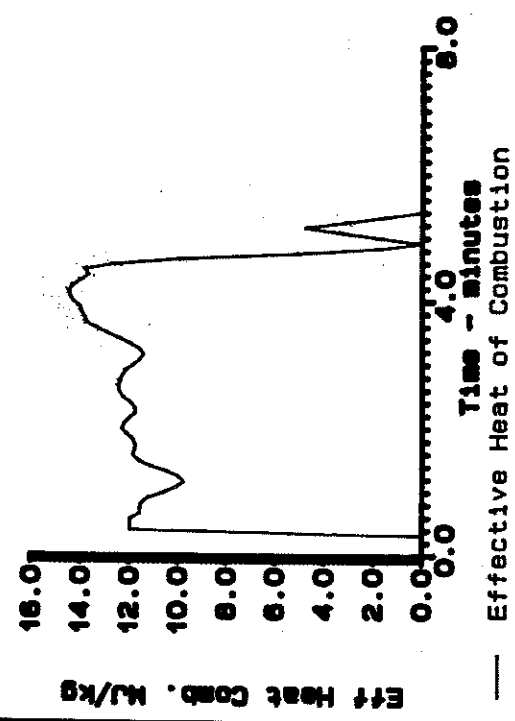
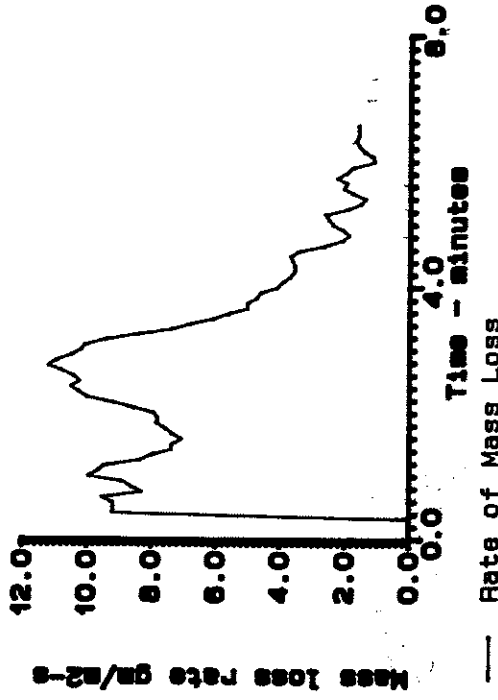
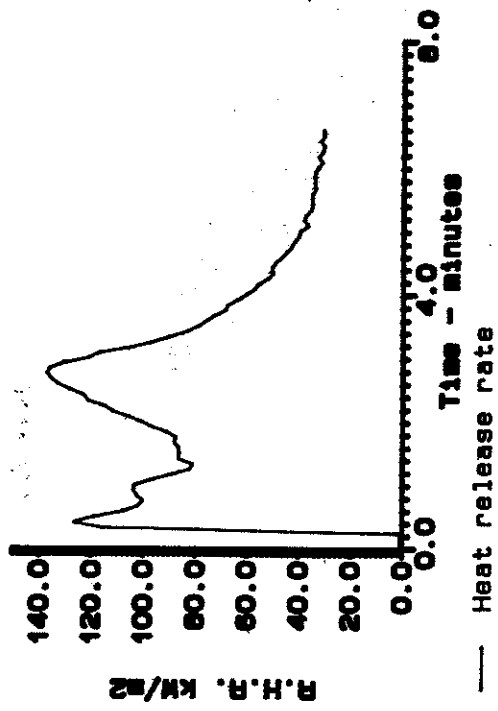
OBSERVATIONS AND COMMENTS

Uneventful.

The entire face seemed to ignite at once, perhaps the reason why there is not a distinct peak rhr.

Tested by : Dnno Robert
Officer : Kim Andrew

1/4" Plywood



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1197

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 30.0 g
Final Mass : 7.8 g
Mass Lost : 2.22 kg/m²
Ignition Time : 90 s
Flameout Time : 508 s

Time of Peak RHR : 105 s
Peak RHR : 138.5 kW/m²
Peak Mass Loss : 10.86 g/s*m²
Peak Extinction Area: 91.47 m²/kg
Total Heat Released : 27.06 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	66.01	117.50	104.36	79.13
Mass Loss Rate	g/s*m ²	6.64	8.67	8.37	6.32
Heat of Combustion	MJ/kg	10.33	12.66	12.15	12.32
Specific Ext. Area	m ² /kg	13.27	6.80	28.73	18.02
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

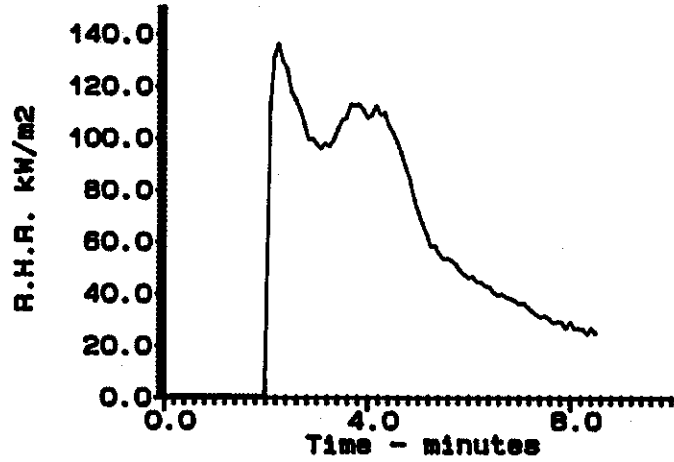
OBSERVATIONS AND COMMENTS

Uneventful.

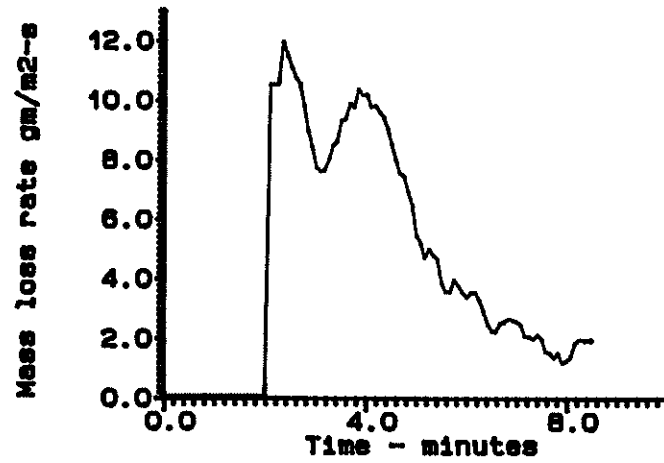
Maintains most of its shape and area.

Tested by : Donno Robert
Officer : Kim Andrew

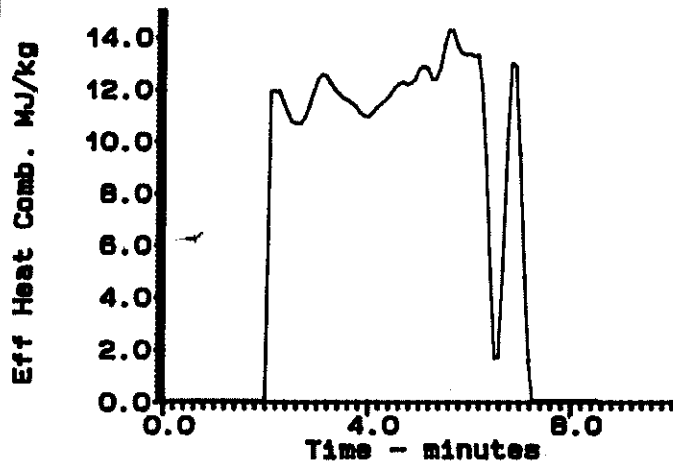
1/4" Plywood 90 Flux = 25



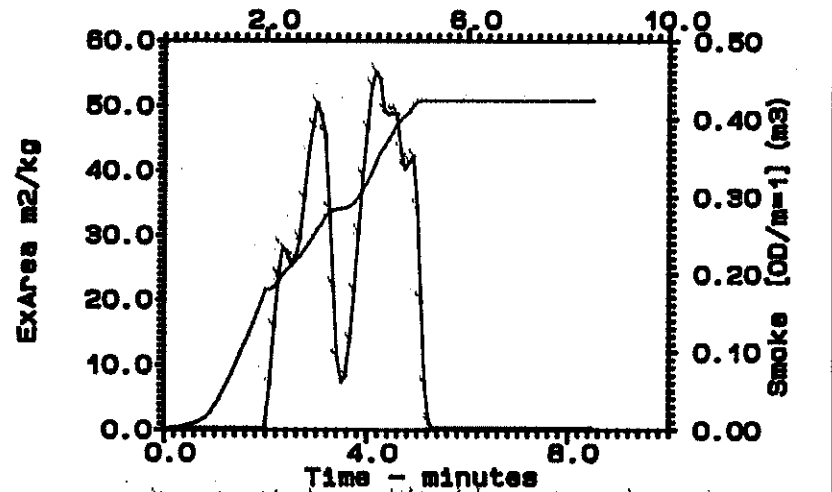
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
- - - Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1006

Test Date: 06-18-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043299
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 28.3 g
Final Mass : 5.3 g
Mass Lost : 2.30 kg/m²
Ignition Time : 20 s
Flameout Time : 400 s

Time of Peak RHR : 165 s
Peak RHR : 136.9 kW/m²
Peak Mass Loss : 11.22 g/s*m²
Peak Extinction Area: 99.58 m²/kg
Total Heat Released : 28.69 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	76.52	106.35	108.13	84.96
Mass Loss Rate	g/s*m ²	7.77	8.89	9.02	6.77
Heat of Combustion	MJ/kg	10.54	10.97	11.67	12.35
Specific Ext. Area	m ² /kg	22.49	26.34	45.29	27.22
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

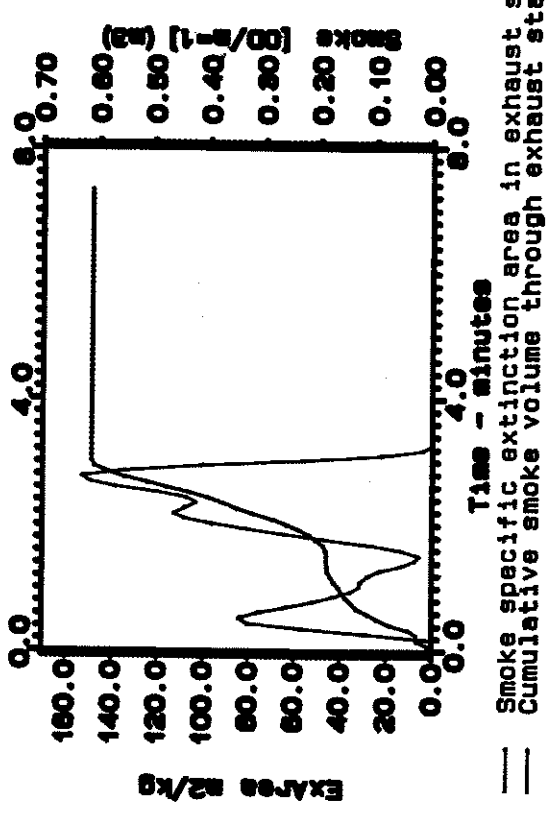
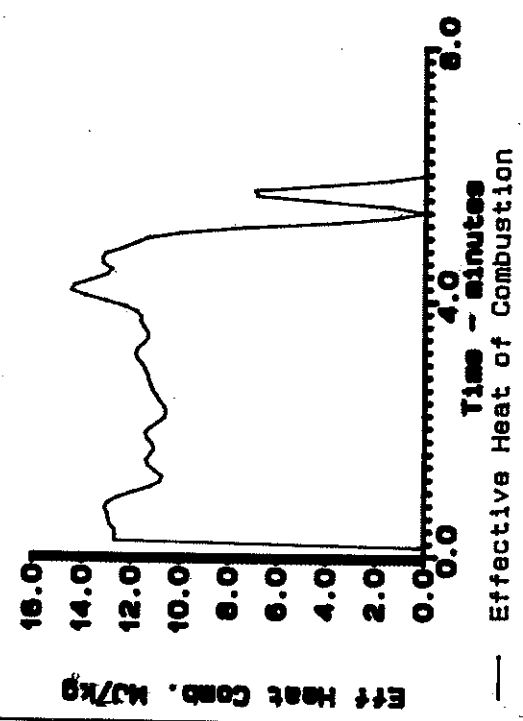
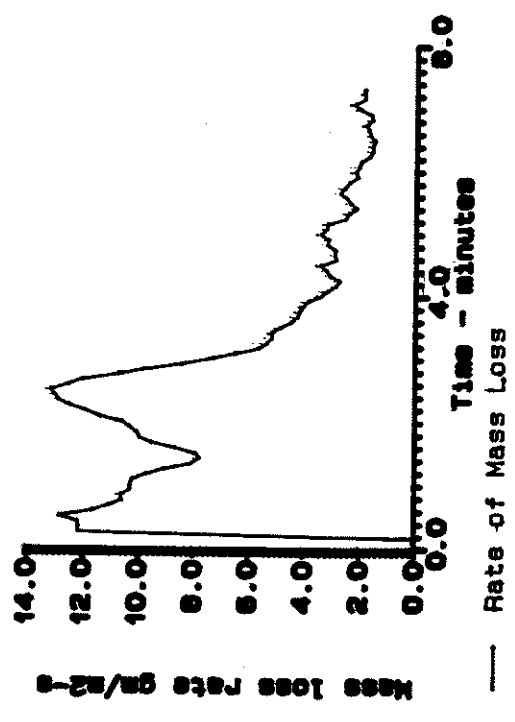
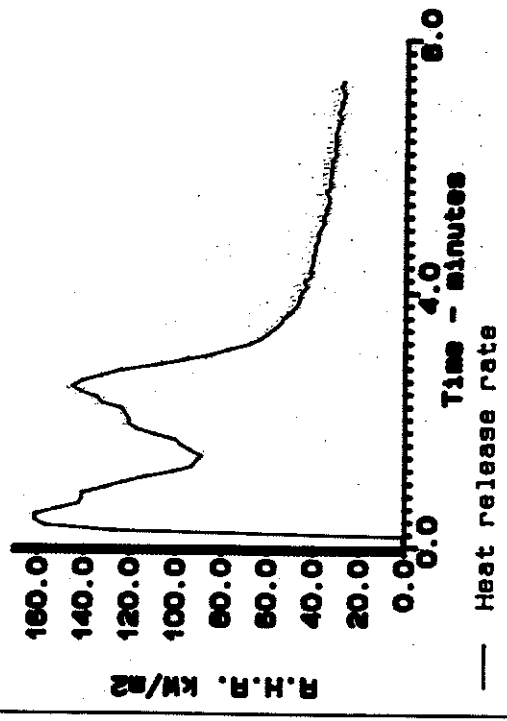
OBSERVATIONS AND COMMENTS

Typical of sample.

The sample remained horizontal until the end of the test, when it curled up somewhat, turning into a thin wafer.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Plywood 90



— Smoke specific extinction area in exhaust stream
= Cumulative smoke volume through exhaust stream

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRD1133

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 27.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 31.5 g
Final Mass : 6.2 g
Mass Lost : 2.53 kg/m²
Ignition Time : 13 s
Flameout Time : 445 s

Time of Peak RHR : 25 s
Peak RHR : 161.4 kW/m²
Peak Mass Loss : 13.16 g/s*m²
Peak Extinction Area: 153.29 m²/kg
Total Heat Released : 31.01 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	72.12	143.86	120.62	89.48
Mass Loss Rate	g/s*m ²	7.41	10.88	10.17	7.51
Heat of Combustion	MJ/kg	10.77	12.40	11.61	11.74
Specific Ext. Area	m ² /kg	27.98	50.57	66.06	39.63
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

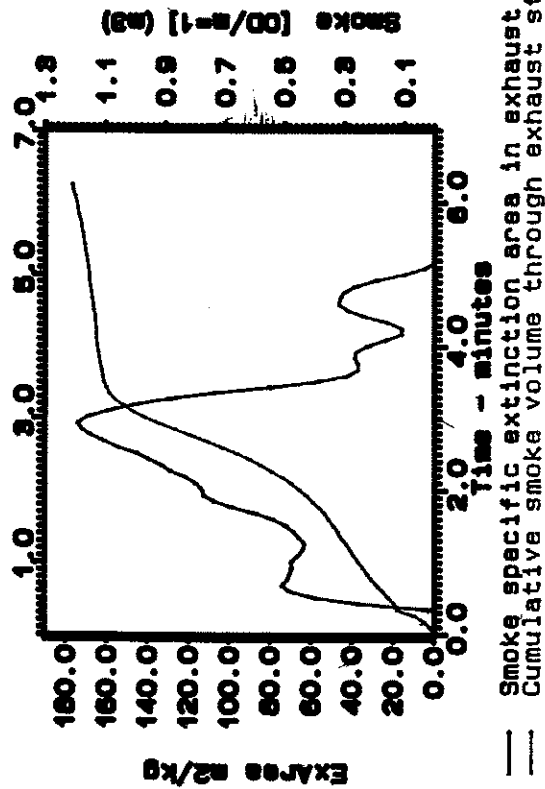
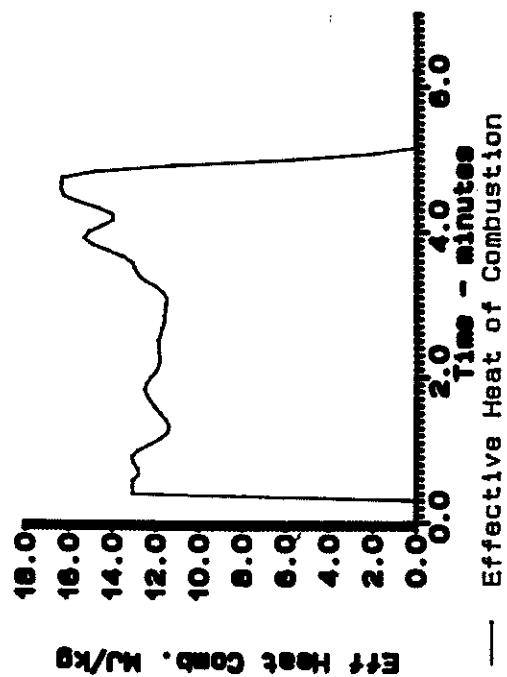
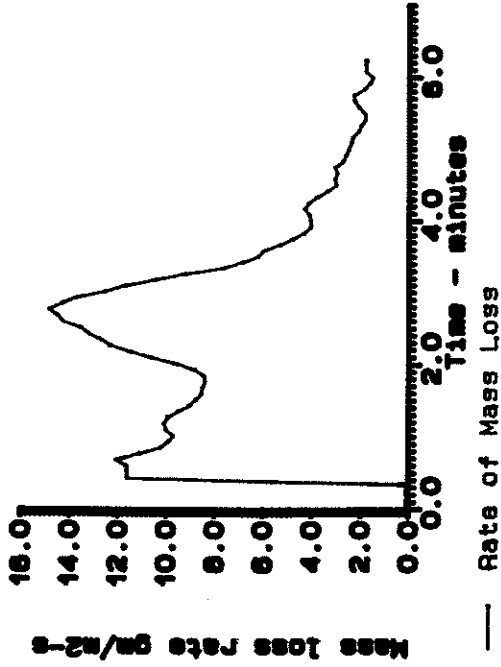
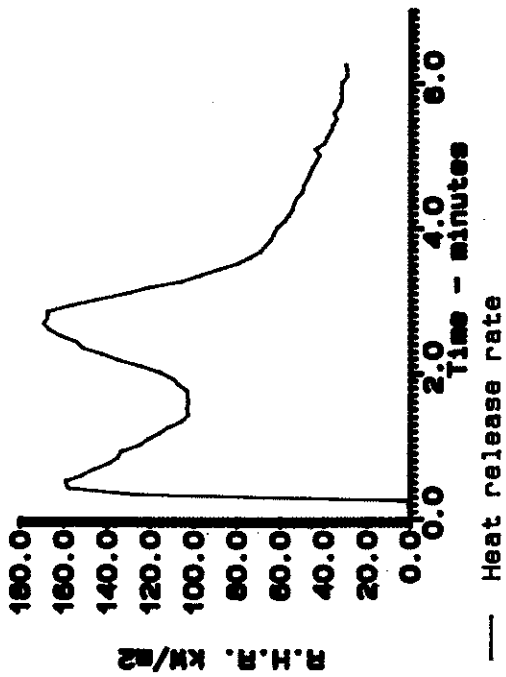
Typical to previous test of material.

At the end, there are small pieces of waferlike material, charred.

Tested by : Onno Robert

Officer : Kim Andrew

1/4" Plywood 90



Smoke specific extinction area in exhaust gas
Cumulative smoke volume through exhaust system

APPENDIX B: 13.4 mm GYPSUMBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Gyproc
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	13

DETAILS OF TEST	Test Reference	UNITS	NRC1151	NRC1181	NRC1186	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/24/91	7/8/91	7/8/91		
	Temperature	(Deg C)	30	28	28	29	3
	Initial Mass	(g)	106	106	108	107	1

TEST RESULTS	Parameter	UNITS	NRC1151	NRC1181	NRC1186	AVG.	MAX
							DEV %
	Ignition Time	(s)	DNI	DNI	DNI	DNI	0
	Flameout Time	(s)	420	420	419	420	0
	Time PHR	(s)	225	235	200	220	9
	Peak RHR	(kW/m ²)	19	14	16	16	20
	Peak Mass Loss	(g/s*m ²)	8.0	3.0	4.1	5	59
	Peak Ext. Area	(m ² /kg)	97.4	117.0	122.0	112	13
	Total Heat Rel.	(MJ/m ²)	2.9	1.1	1.5	2	59
	THR @ PHR	(MJ/m ²)	N / A	N / A	0.5	0	0
	TM HEAT COMB.	(MJ/kg)	1.2	0.7	1.0	1	25
	TM RHR	(kW/m ²)	7.0	2.6	3.6	4	59
	TM MLR	(g/s*m ²)	1.7	1.9	1.9	2	9
	TM S. Ext. Area	(m ² /kg)	6.8	11.8	12.4	10	34
	Mass Final	(g)	99	99	101	100	2

SUPPLEMENTARY DATA	Parameter	UNITS	NRC1151	NRC1181	NRC1186	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	2.6	0.1	0.2	1	0
	60s MLR	(g/s*m ²)	1.7	0.7	0.7	1	0
	60s HEAT COMB.	(MJ/kg)	1.5	0.0	0.2	1	0
	60s S. Ext. Area	(m ² /kg)	5.4	0.0	0.0	2	0
	180s RHR	(kW/m ²)	4.6	1.0	1.8	2	0
	180s MLR	(g/s*m ²)	1.8	1.4	1.6	2	0
	180s HEAT COMB.	(MJ/kg)	1.5	0.6	1.0	1	0
	180s S. Ext. Area	(m ² /kg)	15.4	20.5	27.5	21	30
	300s RHR	(kW/m ²)	7.6	3.5	4.2	5	49
	300s MLR	(g/s*m ²)	1.9	1.8	1.8	2	4
	300s HEAT COMB.	(MJ/kg)	4.0	2.0	2.4	3	43
	300s S. Ext. Area	(m ² /kg)	9.4	16.3	17.0	14	34

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Gyproc
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	13

DETAILS OF TEST	Test Reference	UNITS	NRC1019	NRC1021	NRC1020	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/7/91	6/19/91	6/21/91		
	Temperature	(Deg C)	32	29	29	30	6
	Initial Mass	(g)	108	107	107	107	1

TEST RESULTS	Parameter	UNITS	NRC1019	NRC1021	NRC1020	AVG.	MAX
							DEV %
	Ignition Time	(s)	33	28	30	30	9
	Flameout Time	(s)	45	49	45	46	6
	Time PHR	(s)	35	30	30	32	11
	Peak RHR	(kW/m ²)	48	63	64	58	18
	Peak Mass Loss	(g/s*m ²)	6.2	6.1	7.8	7	16
	Peak Ext. Area	(m ² /kg)	212.0	122.0	37.0	124	71
	Total Heat Rel.	(MJ/m ²)	0.9	0.9	1.3	1	25
	THR @ PHR	(MJ/m ²)	0.2	0.3	0.3	0	18
	TM HEAT COMB.	(MJ/kg)	3.0	3.0	4.9	4	34
	TM RHR	(kW/m ²)	46.3	47.1	66.3	53	25
	TM MLR	(g/s*m ²)	3.6	5.0	5.0	5	20
	TM S. Ext. Area	(m ² /kg)	114.4	68.4	9.2	64	86
	Mass Final	(g)	105	104	104	105	1

SUPPLEMENTARY DATA	Parameter	UNITS	NRC1019	NRC1021	NRC1020	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	13.5	13.1	14.2	14	5
	60s MLR	(g/s*m ²)	0.9	1.3	1.7	1	30
	60s HEAT COMB.	(MJ/kg)	6.0	5.9	7.7	7	18
	60s S. Ext. Area	(m ² /kg)	20.4	12.6	0.0	11	100
	180s RHR	(kW/m ²)	4.5	4.4	4.7	5	5
	180s MLR	(g/s*m ²)	0.3	0.5	0.6	0	30
	180s HEAT COMB.	(MJ/kg)	6.0	5.9	7.7	7	18
	180s S. Ext. Area	(m ² /kg)	6.8	4.2	0.0	4	100
	300s RHR	(kW/m ²)	2.7	2.6	2.8	3	5
	300s MLR	(g/s*m ²)	0.2	0.3	0.3	0	30
	300s HEAT COMB.	(MJ/kg)	6.0	5.9	7.7	7	18
	300s S. Ext. Area	(m ² /kg)	4.1	2.5	0.0	2	100

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1151

Test Date: 06-24-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/8' Gyproc 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043192
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.016000m

Test Conditions : 50.0 RH @ 29.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 106.0 g
Final Mass : 98.5 g
Mass Lost : 0.75 kg/m²
Ignition Time : 0 s
Flameout Time : 420 s

Time of Peak RHR : 225 s
Peak RHR : 19.5 kW/m²
Peak Mass Loss : 8.02 g/s*m²
Peak Extinction Area: 97.38 m²/kg
Total Heat Released : 2.91 MJ/m²

Summary Data From Ignition

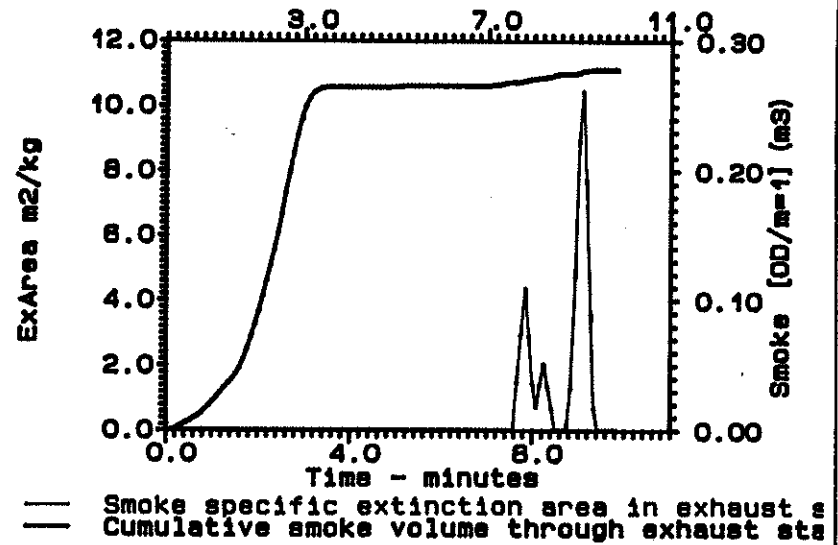
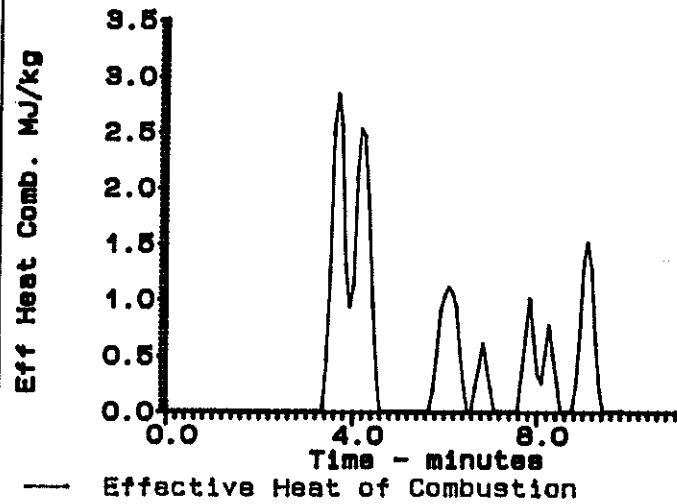
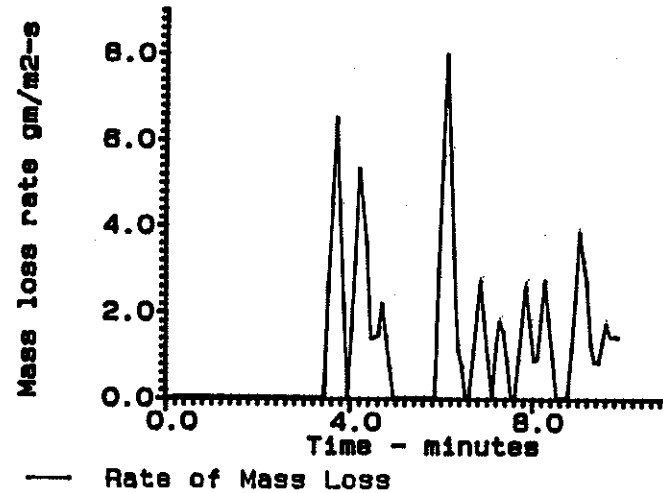
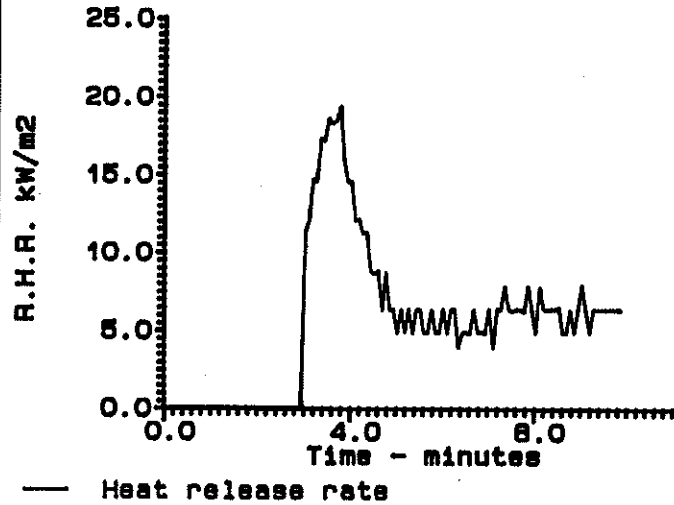
	Test Mean	60S	180S	300s
Heat Release kW/m ²	7.00	2.60	4.55	7.59
Mass Loss Rate g/s*m ²	1.68	1.66	1.80	1.88
Heat of Combustion MJ/kg	1.19	1.45	2.40	4.00
Specific Ext. Area m ² /kg	6.84	5.35	15.35	9.42
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

There was no actual flame in this experiment. However at around the three minute mark, the same characteristics that when it ignited in the 50 tests were displayed. The test was run until 10 minutes as per standard.

Tested by : Dnno Robert
Officer : Kim Andrew

5/8" Gyproc 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1181

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/8" Gyproc 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.016000m

Test Conditions : 50.0 RH @ 28.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 106.2 g
Final Mass : 99.1 g
Mass Lost : 0.71 kg/m²
Ignition Time : 0 s
Flameout Time : 420 s

Time of Peak RHR : 235 s
Peak RHR : 13.7 kW/m²
Peak Mass Loss : 3.21 g/s*m²
Peak Extinction Area: 116.99 m²/kg
Total Heat Released : 1.10 MJ/m²

Summary Data From Ignition

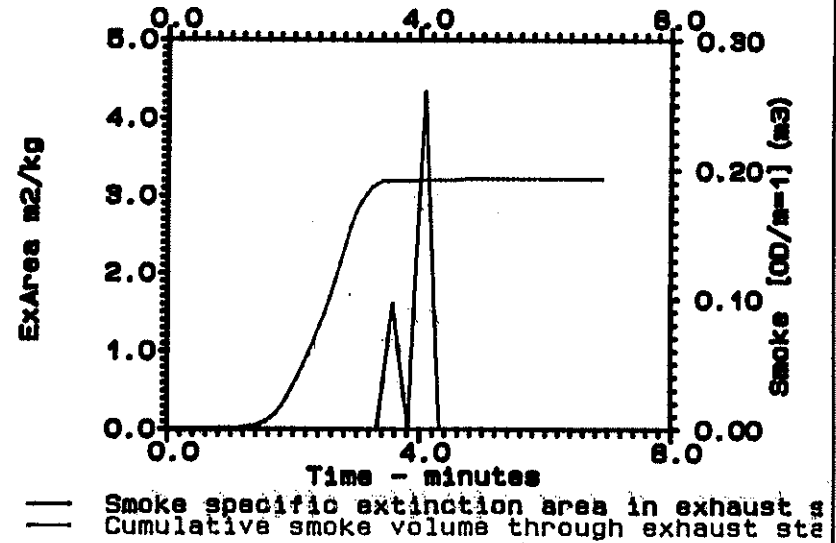
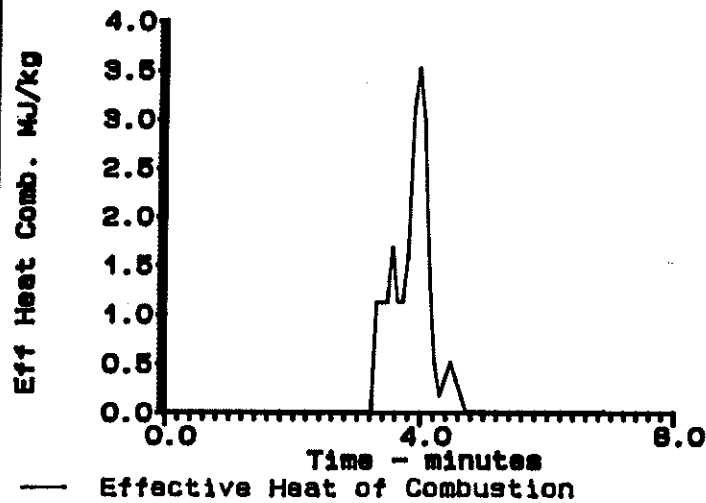
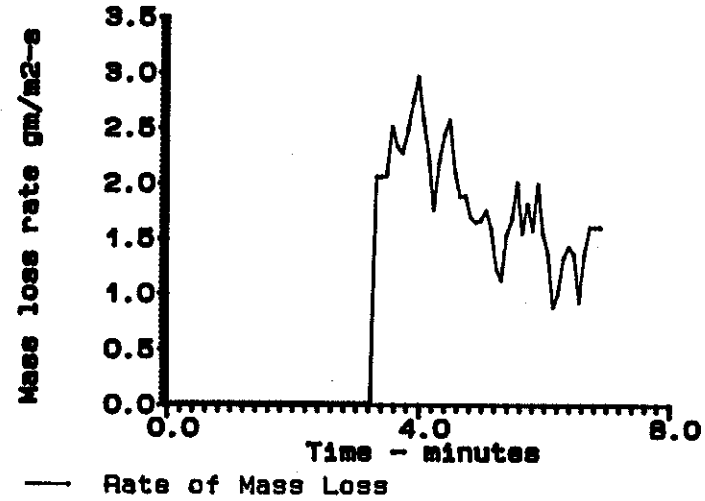
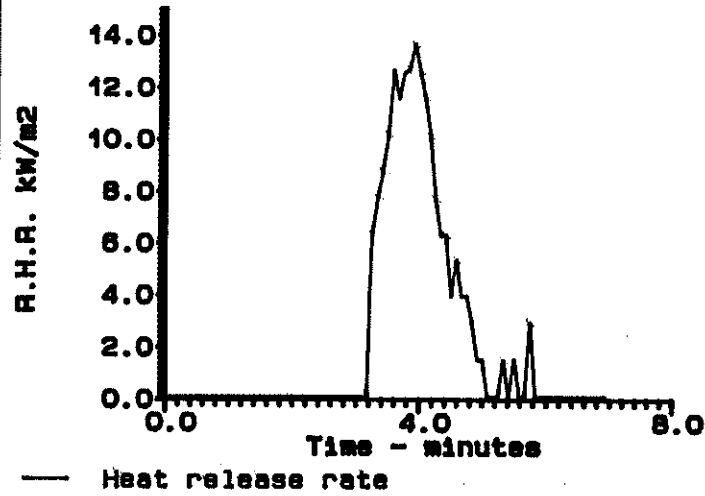
	Test Mean	60S	180S	300s
Heat Release kW/m ²	2.64	0.06	0.97	3.52
Mass Loss Rate g/s*m ²	1.94	0.72	1.40	1.75
Heat of Combustion MJ/kg	0.72	0.00	0.62	2.01
Specific Ext. Area m ² /kg	11.77	0.00	20.49	16.28
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample produced smoke at the beginning, up to .3 sp. ex and then after it peaked the paper rolled up on the face similar to what happens when it ignites at 50. This was deemed ignition time. The test was then terminated at the 7 minute mark.

Tested by : Onno Robert
Officer : Kim Andrew

5/8" Gyroc 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1186

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/8' Gyproc 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.016000m

Test Conditions : 50.0 RH @ 28.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 108.3 g
Final Mass : 101.4 g
Mass Lost : 0.69 kg/m²
Ignition Time : 0 s
Flameout Time : 419 s

Time of Peak RHR : 200 s
Peak RHR : 15.6 kW/m²
Peak Mass Loss : 4.12 g/s*m²
Peak Extinction Area: 122.03 m²/kg
Total Heat Released : 1.47 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	3.59	0.16	1.78	4.21
Mass Loss Rate g/s*m ²	1.93	0.74	1.56	1.77
Heat of Combustion MJ/kg	0.97	0.22	1.03	2.36
Specific Ext. Area m ² /kg	12.42	0.00	27.46	16.98
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The paper started lifting at the 3 minute mark.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1019

Test Date: 06-07-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/8" Gyproc 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043467
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.013400m

Test Conditions : 50.0 RH @ 31.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 107.7 g
Final Mass : 105.1 g
Mass Lost : 0.26 kg/m²
Ignition Time : 33 s
Flameout Time : 45 s

Time of Peak RHR : 35 s
Peak RHR : 47.5 kW/m²
Peak Mass Loss : 6.25 g/s*m²
Peak Extinction Area: 212.05 m²/kg
Total Heat Released : 0.93 MJ/m²

Summary Data From Ignition

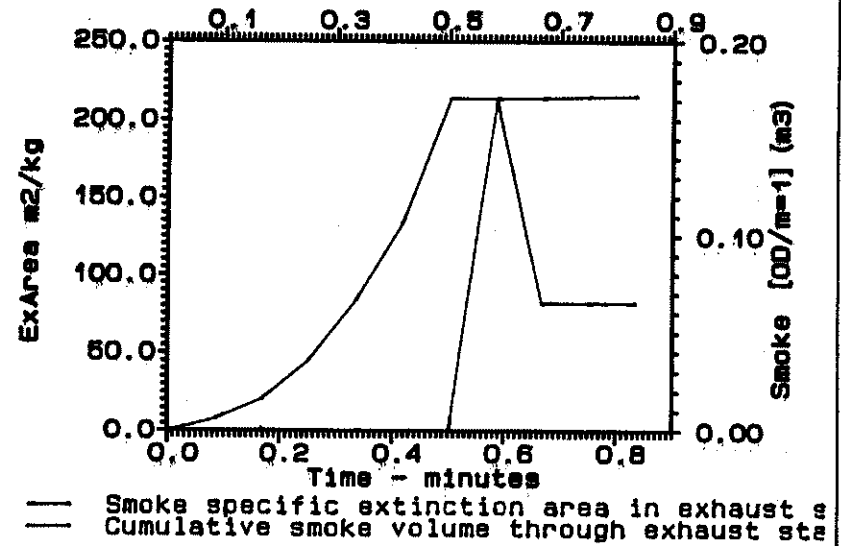
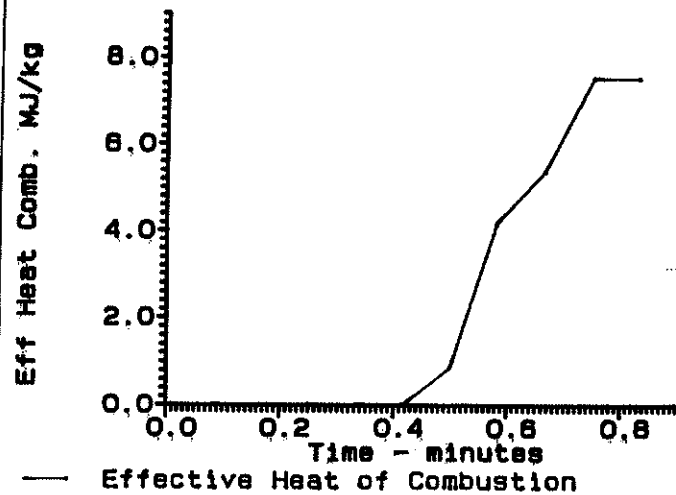
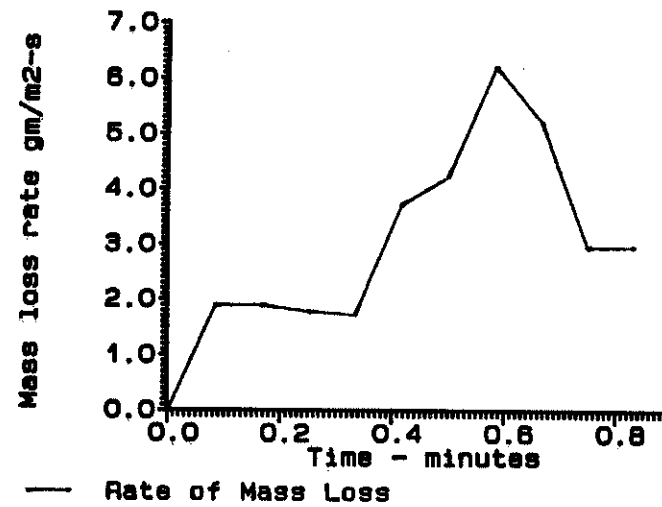
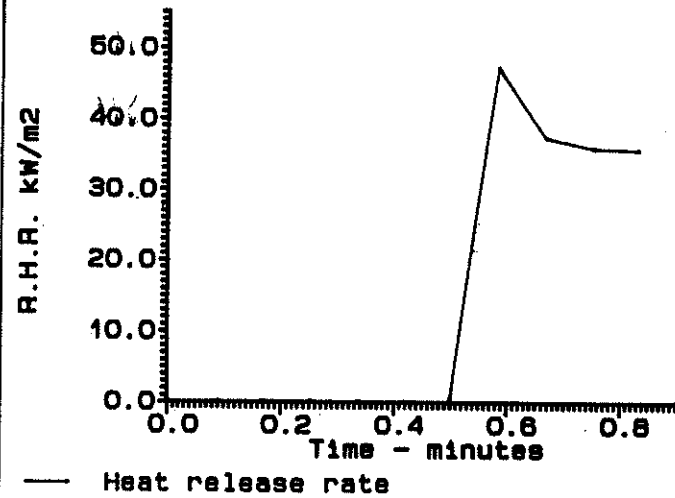
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	46.29	13.45	4.48	2.69
Mass Loss Rate	g/s*m ²	3.61	0.93	0.31	0.19
Heat of Combustion	MJ/kg	2.98	6.02	6.02	6.02
Specific Ext. Area	m ² /kg	114.36	20.45	6.82	4.09
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

uneventful

Tested by : Onno Robert
Officer : Kim Andrew

5/8 Gyproc 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1020

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/B' Gyproc 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043842
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.016000m

Test Conditions : 50.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 106.7 g
Final Mass : 104.3 g
Mass Lost : 0.24 kg/m²
Ignition Time : 30 s
Flameout Time : 45 s

Time of Peak RHR : 30 s
Peak RHR : 63.7 kW/m²
Peak Mass Loss : 7.75 g/s*m²
Peak Extinction Area: 36.99 m²/kg
Total Heat Released : 1.33 MJ/m²

Summary Data From Ignition

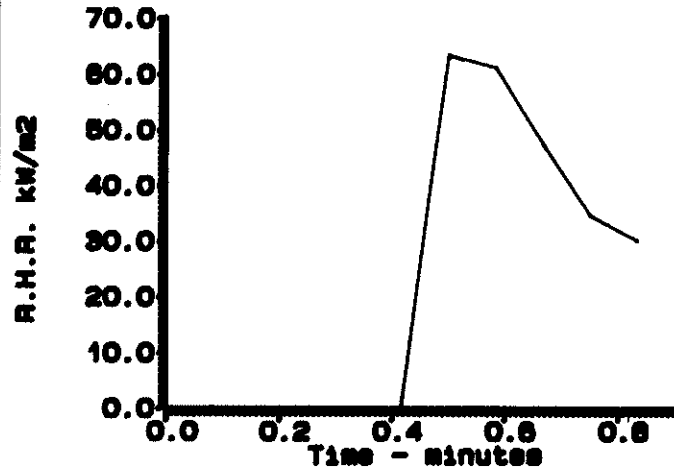
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	66.33	14.24	4.75	2.85
Mass Loss Rate	g/s*m ²	4.95	1.71	0.57	0.34
Heat of Combustion	MJ/kg	4.89	7.70	7.70	7.70
Specific Ext. Area	m ² /kg	9.25	0.00	0.00	0.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

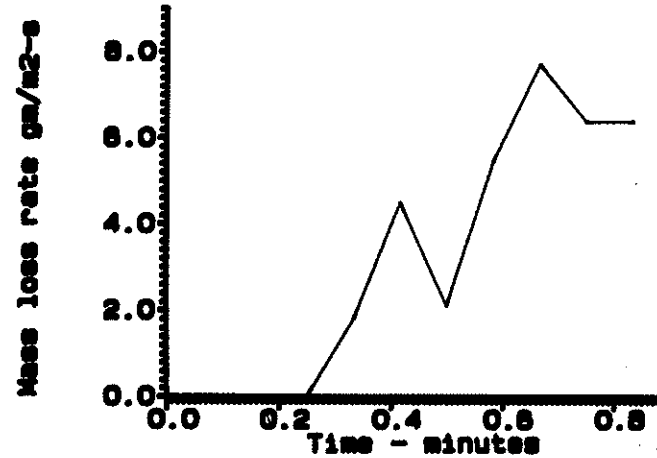
The sample ignites quickly and once the entire surface is lit, it burns through the paper and the flame dies. The surface paper then folds up in little strips across entire surface.

Tested by : Onno Robert
Officer : Kim Andrew

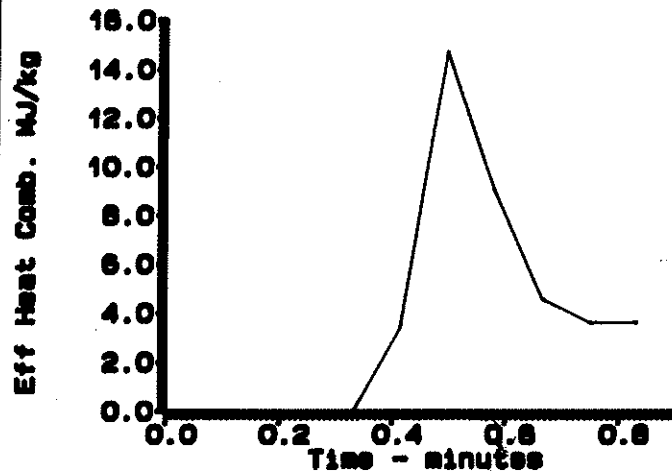
5/8" Gyroc 90



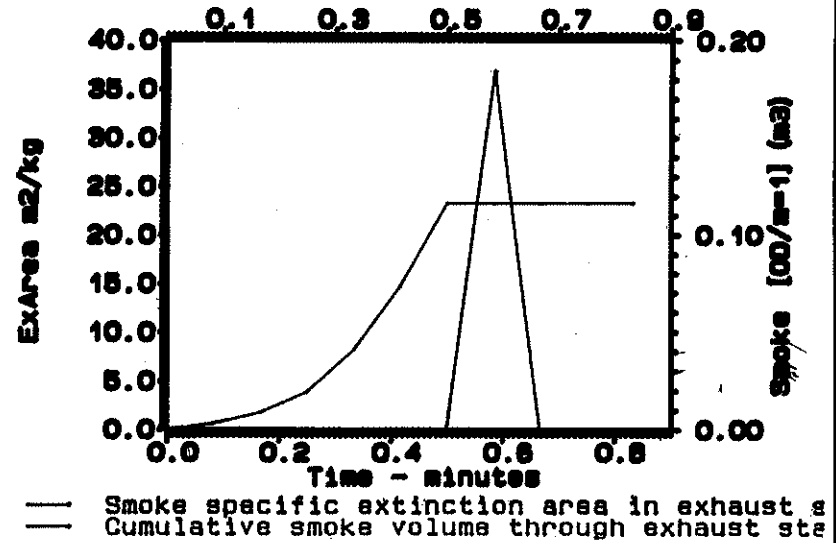
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust stream
 - - - Cumulative smoke volume through exhaust stream

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1021

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 5/8' Gyproc 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.016000m

Test Conditions : 50.0 RH @ 29.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

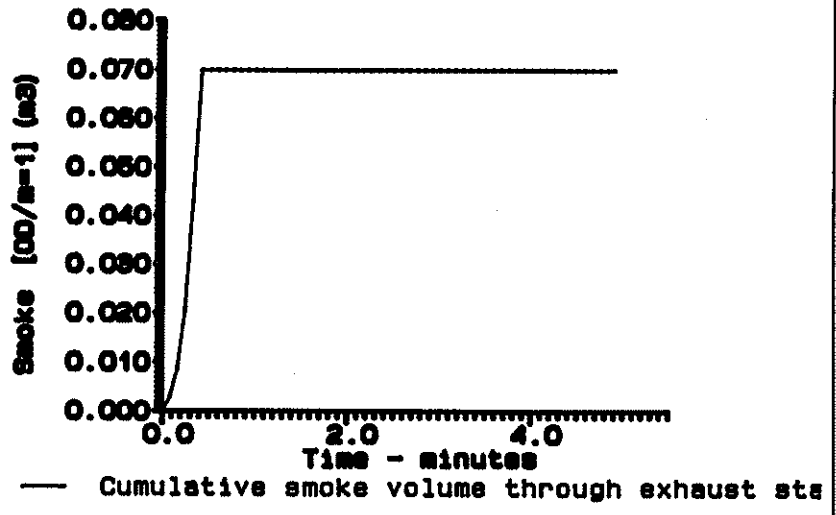
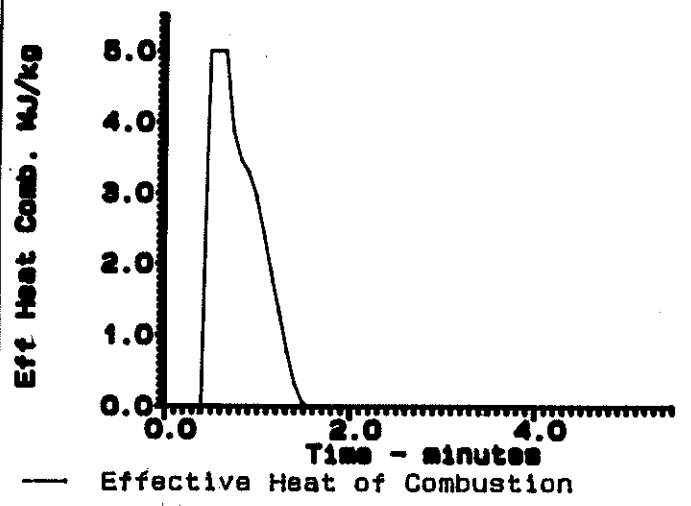
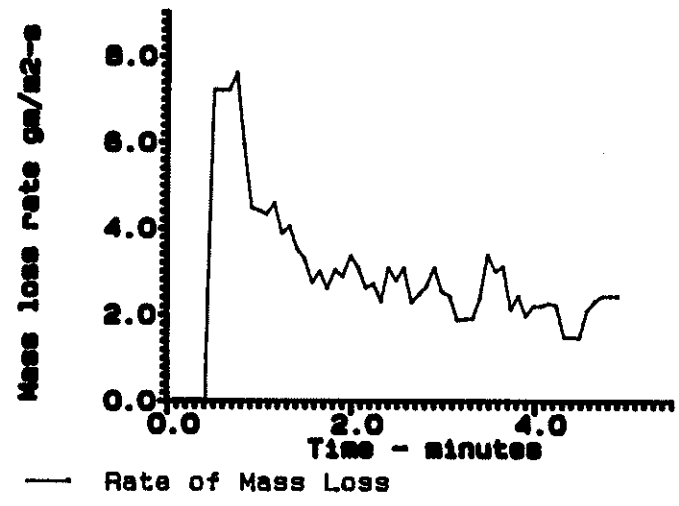
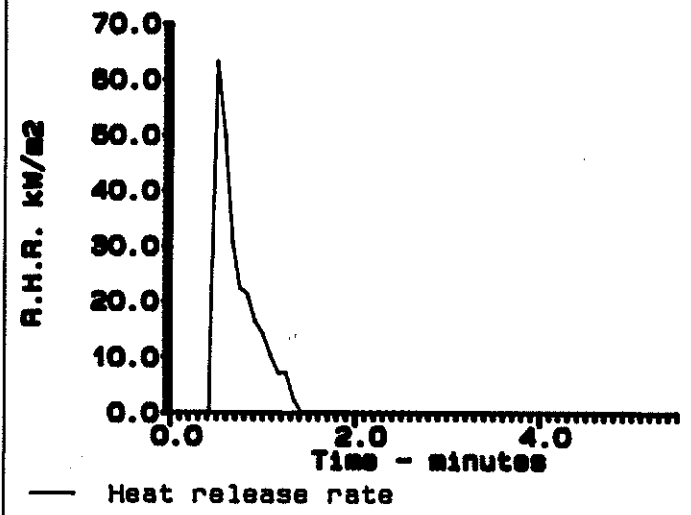
Initial Mass : 106.9 g
Final Mass : 104.2 g
Mass Lost : 0.27 kg/m²
Ignition Time : 28 s
Flameout Time : 49 s

Time of Peak RHR : 30 s
Peak RHR : 63.4 kW/m²
Peak Mass Loss : 6.12 g/s*m²
Peak Extinction Area: 122.04 m²/kg
Total Heat Released : 0.94 MJ/m²

Summary Data From Ignition

		Test Mean	60S	180S	300s
Heat Release	kW/m ²	47.08	13.05	4.35	2.61
Mass Loss Rate	g/s*m ²	4.97	1.34	0.45	0.27
Heat of Combustion	MJ/kg	3.04	5.94	5.94	5.94
Specific Ext. Area	m ² /kg	68.41	12.63	4.21	2.53
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

5/8" Gyproc 90



APPENDIX C: 12.3 mm PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1147	NRC1159	NRC1169		DEV %
	Date Tested	(D/M/Y)	6/24/91	7/3/91	7/5/91		
	Temperature	(Deg C)	29	28	27	28	5
	Initial Mass	(g)	62	64	58	62	5

TEST RESULTS		UNITS				AVG.	MAX
			NRC1147	NRC1159	NRC1169		DEV %
	Ignition Time	(s)	105	229	280	205	49
	Flameout Time	(s)	1175	1225	1230	1210	3
	Time PHR	(s)	115	240	290	215	47
	Peak RHR	(kW/m ²)	128	93	81	101	27
	Peak Mass Loss	(g/s*m ²)	10.7	9.6	7.3	9	21
	Peak Ext. Area	(m ² /kg)	N / A	74.7	53.0	64	17
	Total Heat Rel.	(MJ/m ²)	59.0	49.3	45.3	51	15
	THR @ PHR	(MJ/m ²)	1.7	1.4	1.1	1	23
	TM HEAT COMB.	(MJ/kg)	11.1	9.3	9.5	10	11
	TM RHR	(kW/m ²)	55.4	49.6	48.0	51	9
	TM MLR	(g/s*m ²)	4.6	4.9	4.7	5	4
	TM S. Ext. Area	(m ² /kg)	N / A	1.7	0.9	1	31
	Mass Final	(g)	16	18	16	17	6

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1147	NRC1159	NRC1169		DEV %
	60s RHR	(kW/m ²)	99.9	79.1	64.8	81	23
	60s MLR	(g/s*m ²)	7.5	6.6	5.8	7	13
	60s HEAT COMB.	(MJ/kg)	12.4	11.1	10.4	11	10
	60s S. Ext. Area	(m ² /kg)	N / A	16.2	9.4	13	27
	180s RHR	(kW/m ²)	56.7	49.6	45.7	51	12
	180s MLR	(g/s*m ²)	4.7	4.9	4.5	5	5
	180s HEAT COMB.	(MJ/kg)	11.6	9.8	9.8	10	12
	180s S. Ext. Area	(m ² /kg)	N / A	5.7	3.1	4	29
	300s RHR	(kW/m ²)	46.8	42.9	43.4	44	5
	300s MLR	(g/s*m ²)	4.1	4.5	4.2	4	6
	300s HEAT COMB.	(MJ/kg)	11.1	9.3	10.2	10	9
	300s S. Ext. Area	(m ² /kg)	N / A	4.1	1.9	3	38

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1134	NRC1146	NRC1191		DEV %
	Date Tested	(D/M/Y)	6/19/91	6/21/91	7/8/91		
	Temperature	(Deg C)	29	30	29	29	2
	Initial Mass	(g)	57	56	55	56	1

TEST RESULTS	Parameter	UNITS				AVG.	MAX
			NRC1134	NRC1146	NRC1191		DEV %
	Ignition Time	(s)	25	23	24	24	4
	Flameout Time	(s)	694	710	640	681	6
	Time PHR	(s)	450	30	420	300	90
	Peak RHR	(kW/m2)	133	150	140	141	7
	Peak Mass Loss	(g/s*m2)	11.4	11.2	13.4	12	12
	Peak Ext. Area	(m2/kg)	143.7	131.3	160.2	145	10
	Total Heat Rel.	(MJ/m2)	48.3	49.1	44.0	47	7
	THR @ PHR	(MJ/m2)	31.8	N / A	28.9	30	5
	TM HEAT COMB.	(MJ/kg)	10.5	10.5	9.9	10	4
	TM RHR	(kW/m2)	73.2	71.7	71.5	72	1
	TM MLR	(g/s*m2)	7.3	7.4	7.7	8	3
	TM S. Ext. Area	(m2/kg)	17.5	24.4	30.0	24	27
	Mass Final	(g)	14	12	12	13	7

SUPPLEMENTARY DATA	Parameter	UNITS				AVG.	MAX
			NRC1134	NRC1146	NRC1191		DEV %
	60s RHR	(kW/m2)	106.6	120.4	113.0	113	6
	60s MLR	(g/s*m2)	8.0	9.4	9.1	9	9
	60s HEAT COMB.	(MJ/kg)	12.2	11.9	11.5	12	3
	60s S. Ext. Area	(m2/kg)	3.1	24.5	20.2	16	80
	180s RHR	(kW/m2)	75.7	79.1	76.4	77	3
	180s MLR	(g/s*m2)	6.7	7.2	7.3	7	5
	180s HEAT COMB.	(MJ/kg)	11.0	10.6	10.2	11	4
	180s S. Ext. Area	(m2/kg)	1.2	8.7	8.0	6	79
	300s RHR	(kW/m2)	64.6	68.2	64.8	66	4
	300s MLR	(g/s*m2)	6.2	6.5	6.6	6	4
	300s HEAT COMB.	(MJ/kg)	10.2	10.2	9.6	10	4
	300s S. Ext. Area	(m2/kg)	0.7	5.3	4.8	4	80

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1147

Test Date: 06-24-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043192
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 29.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 62.5 g
Final Mass : 16.4 g
Mass Lost : 4.61 kg/m²
Ignition Time : 105 s
Flameout Time : 1,175 s

Time of Peak RHR : 115 s
Peak RHR : 127.7 kW/m²
Peak Mass Loss : 10.70 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 59.01 MJ/m²

Summary Data From Ignition

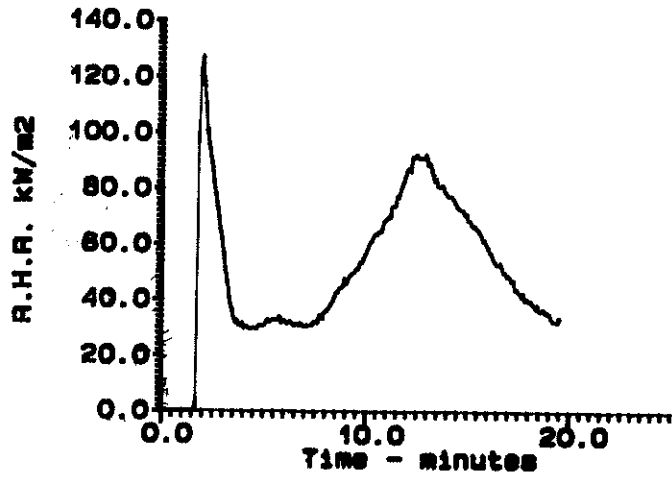
	Test Mean	60S	180S	300s
Heat Release kW/m ²	55.41	99.93	56.72	46.80
Mass Loss Rate g/s*m ²	4.57	7.46	4.70	4.11
Heat of Combustion MJ/kg	11.11	12.37	11.62	11.08
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

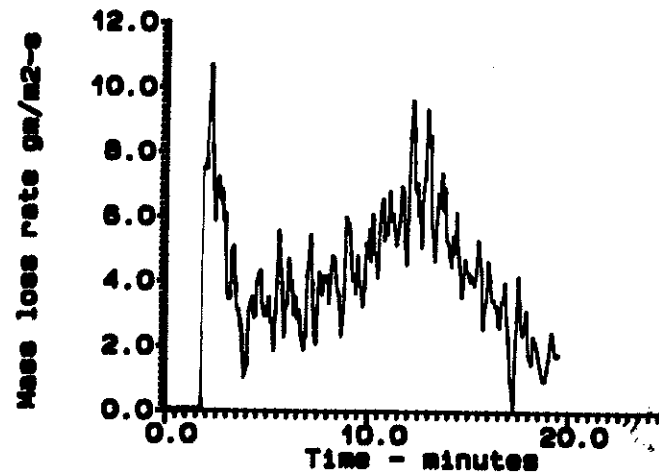
This sample burned similar to the one at 50 with of course a slower burn rate. The sample did not swell as much as the others had either.

Tested by : Onno Robert
Officer : Kim Andrew

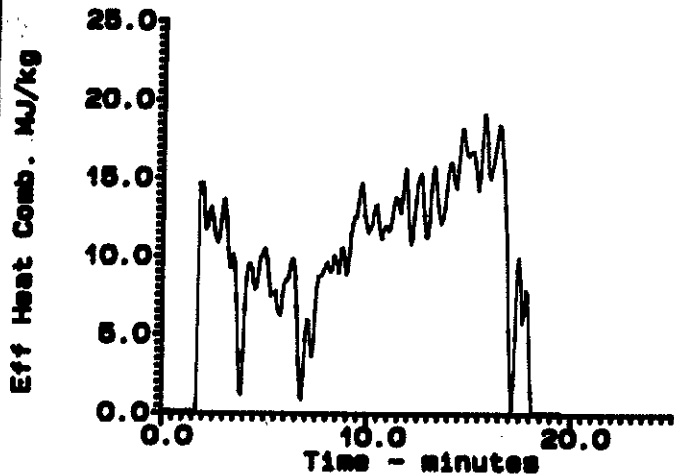
1.2" Plywood 90



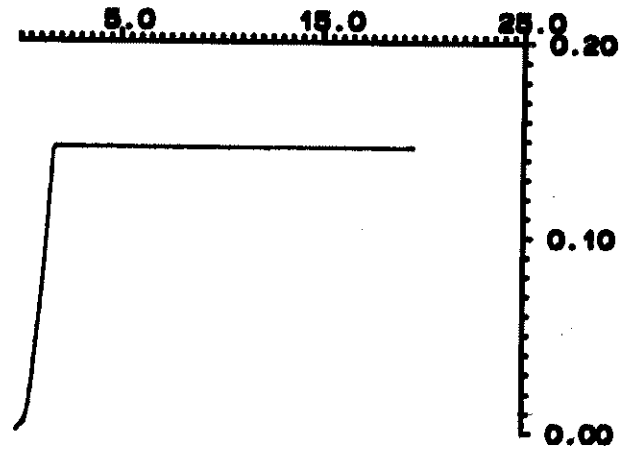
Heat release rate



Rate of Mass Loss



Effective Heat of Combustion



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1159

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 63.8 g
Final Mass : 17.7 g
Mass Lost : 4.61 kg/m²
Ignition Time : 229 s
Flameout Time : 1,225 s

Time of Peak RHR : 240 s
Peak RHR : 93.1 kW/m²
Peak Mass Loss : 9.58 g/s*m²
Peak Extinction Area: 74.73 m²/kg
Total Heat Released : 49.34 MJ/m²

Summary Data From Ignition

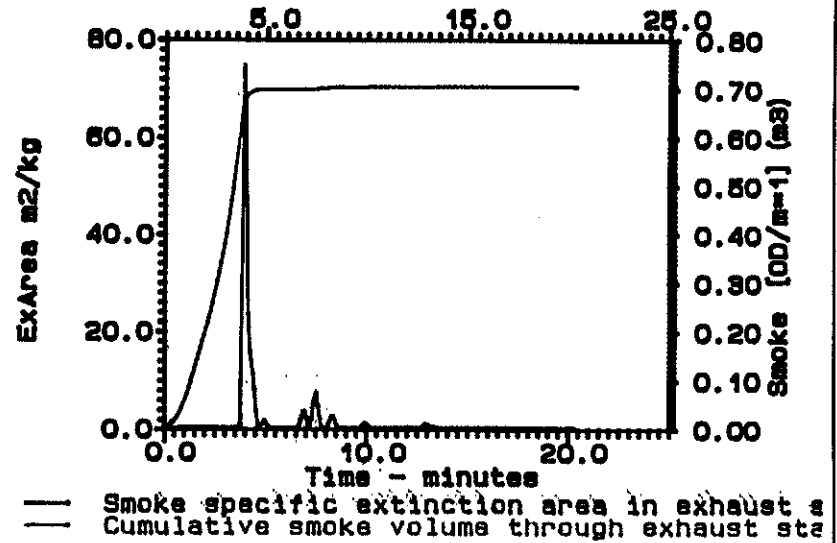
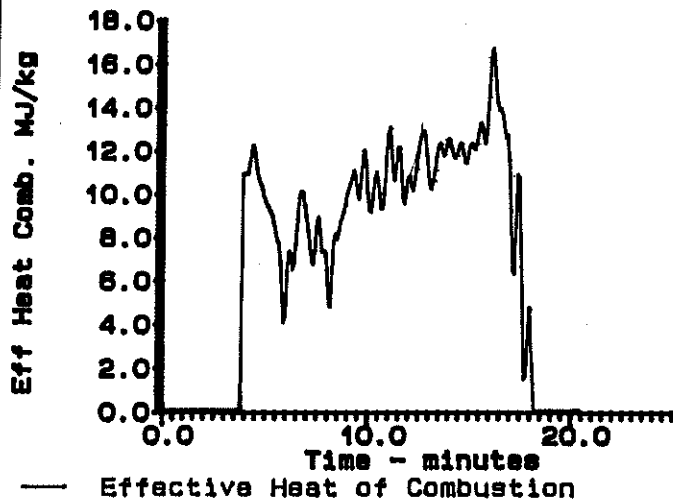
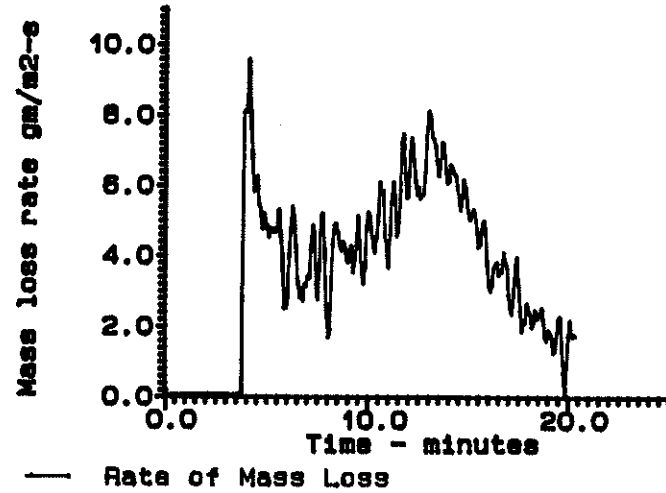
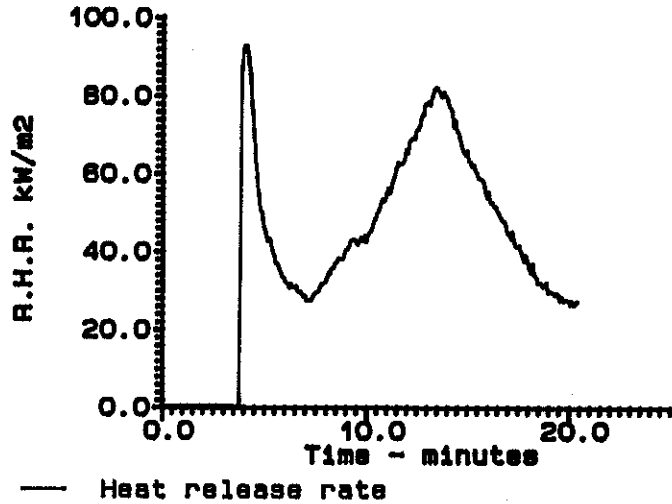
	Test Mean	60S	180S	300s
Heat Release kW/m ²	49.58	79.13	49.65	42.94
Mass Loss Rate g/s*m ²	4.91	6.64	4.92	4.49
Heat of Combustion MJ/kg	9.32	11.10	9.76	9.33
Specific Ext. Area m ² /kg	1.65	16.22	5.66	4.13
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1169

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 27.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 58.3 g
Final Mass : 16.2 g
Mass Lost : 4.22 kg/m²
Ignition Time : 280 s
Flameout Time : 1,230 s

Time of Peak RHR : 290 s
Peak RHR : 81.4 kW/m²
Peak Mass Loss : 7.29 g/s*m²
Peak Extinction Area: 53.00 m²/kg
Total Heat Released : 45.34 MJ/m²

Summary Data From Ignition

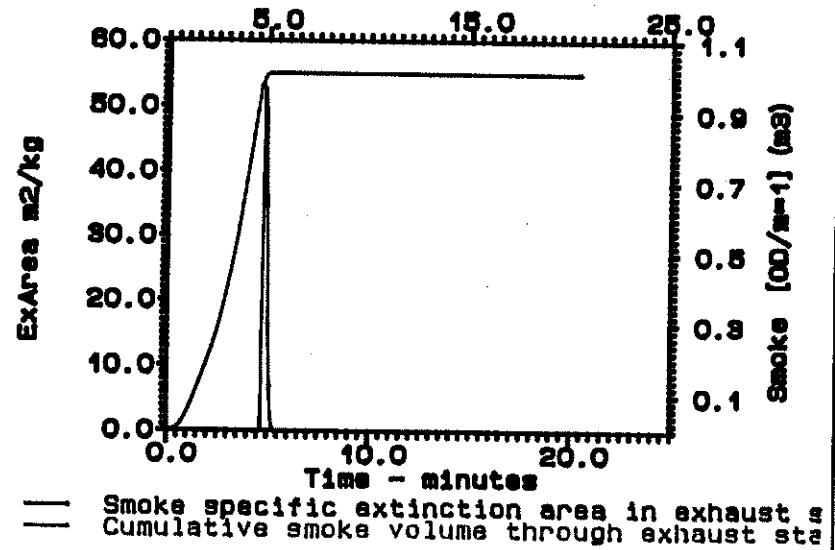
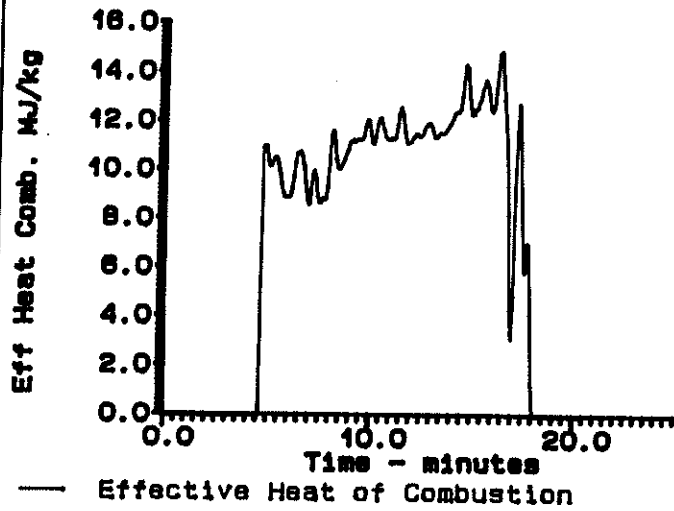
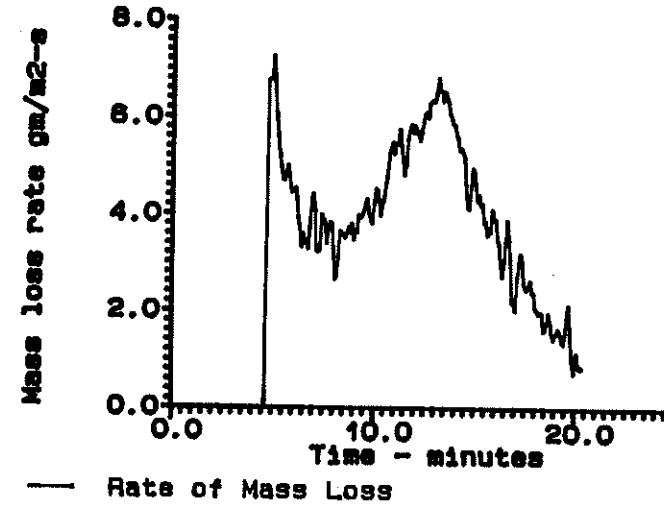
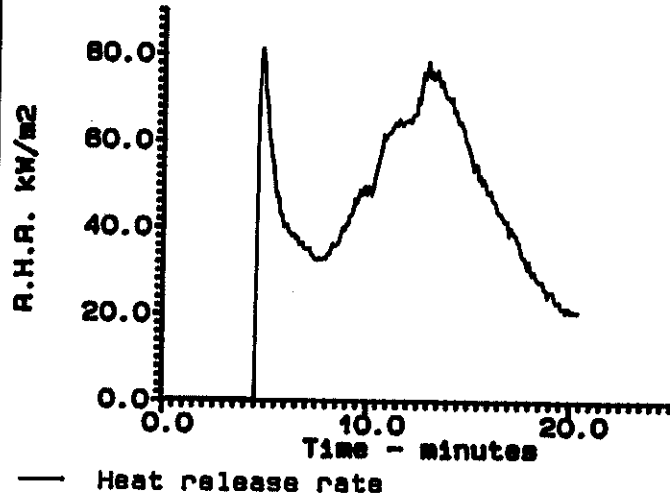
	Test Mean	60S	180S	300s
Heat Release kW/m ²	47.98	64.76	45.70	43.36
Mass Loss Rate g/s*m ²	4.66	5.75	4.49	4.16
Heat of Combustion MJ/kg	9.52	10.38	9.83	10.16
Specific Ext. Area m ² /kg	0.88	9.37	3.12	1.87
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1134

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 29.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 56.6 g
Final Mass : 13.6 g
Mass Lost : 4.30 kg/m²
Ignition Time : 25 s
Flameout Time : 694 s

Time of Peak RHR : 450 s
Peak RHR : 132.5 kW/m²
Peak Mass Loss : 11.35 g/s*m²
Peak Extinction Area: 143.72 m²/kg
Total Heat Released : 48.29 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	73.16	106.57	75.70	64.63
Mass Loss Rate g/s*m ²	7.34	8.02	6.66	6.19
Heat of Combustion MJ/kg	10.46	12.24	11.00	10.20
Specific Ext. Area m ² /kg	17.46	3.13	1.23	0.74
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

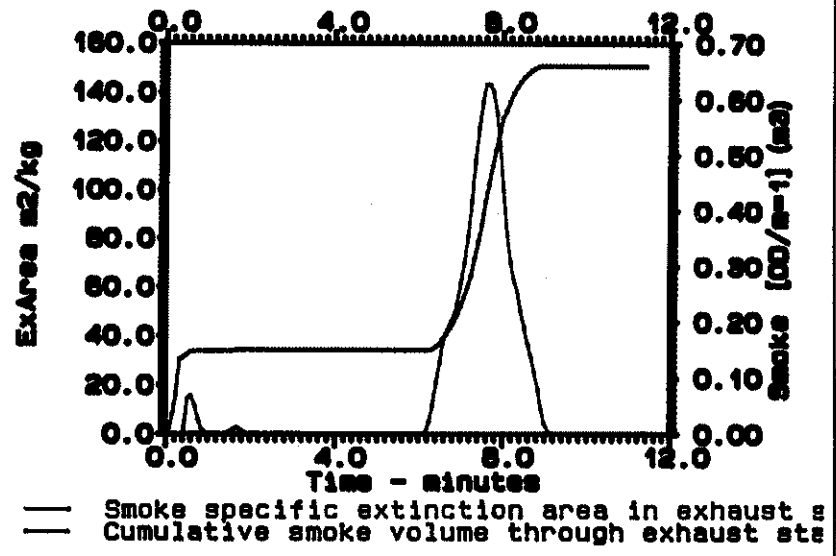
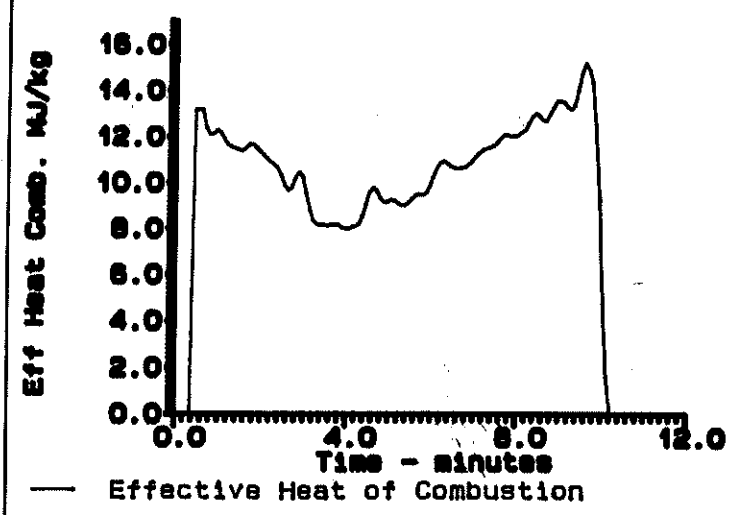
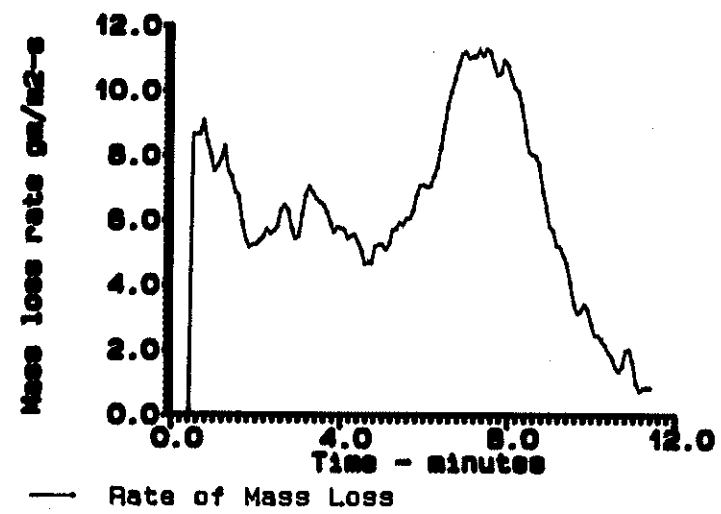
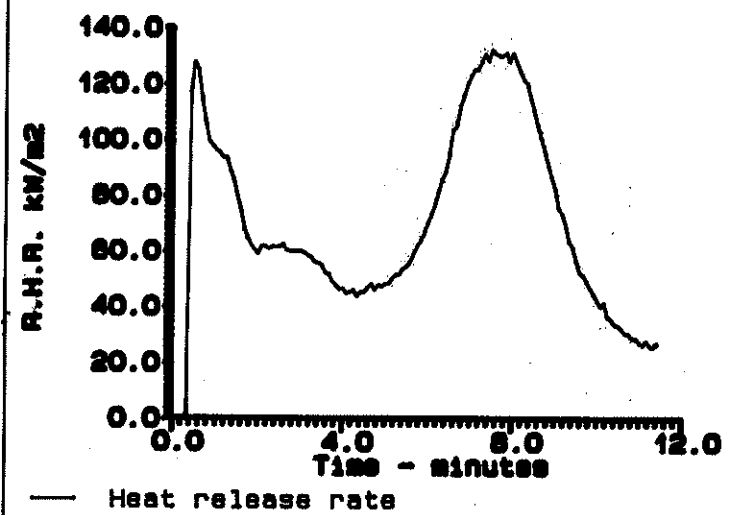
Typical to previous test of material.

The sample rose at the end of the second peak rhr, not before

This test was done testing the proper side for sure.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1146

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifice Constant : 0.043842
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 30.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 55.6 g
Final Mass : 12.3 g
Mass Lost : 4.33 kg/m²
Ignition Time : 23 s
Flameout Time : 710 s

Time of Peak RHR : 30 s
Peak RHR : 150.1 kW/m²
Peak Mass Loss : 11.24 g/s*m²
Peak Extinction Area: 131.31 m²/kg
Total Heat Released : 49.11 MJ/m²

Summary Data From Ignition

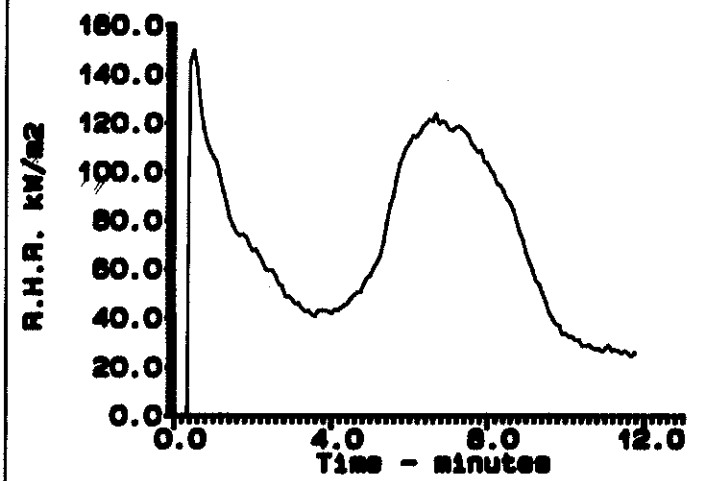
	Test Mean	60S	180S	300s
Heat Release kW/m ²	71.70	120.37	79.09	68.23
Mass Loss Rate g/s*m ²	7.44	9.35	7.18	6.49
Heat of Combustion MJ/kg	10.53	11.88	10.65	10.21
Specific Ext. Area m ² /kg	24.42	24.46	8.71	5.25
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

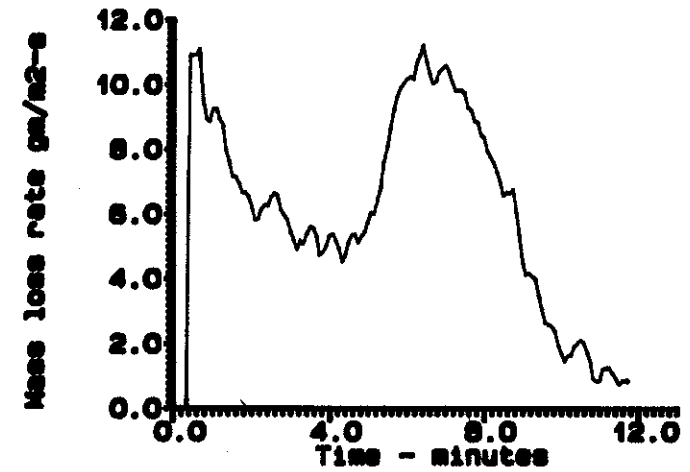
Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

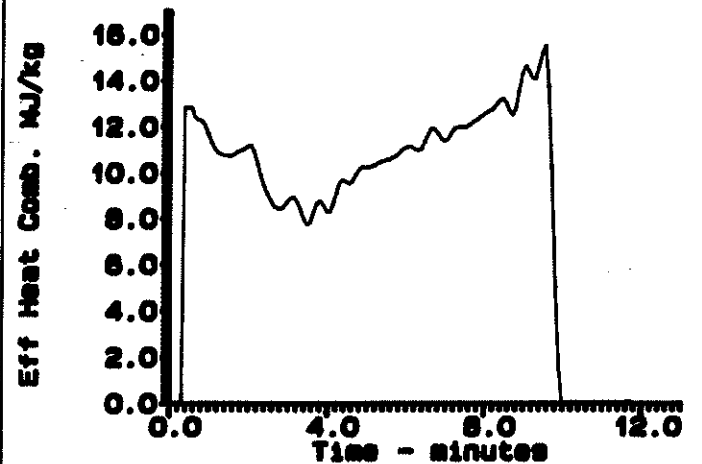
1/2" Plywood 90



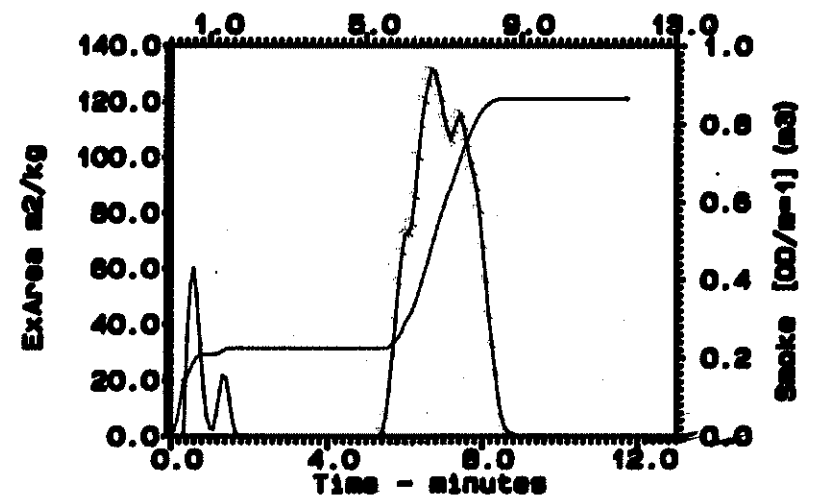
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
— Cumulative smoke volume through exhaust sta

APPENDIX D: 12.3 mm FIRE RETARDED PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	FR Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1161	NRC1172	NRC1183		DEV %
	Date Tested	(D/M/Y)	7/4/91	7/5/91	7/8/91		
	Temperature	(Deg C)	28	27	29	28	3
	Initial Mass	(g)	70	70	70	70	1

TEST RESULTS							
	Ignition Time	(s)	710	755	810	758	7
	Flameout Time	(s)	1200	1095	1140	1145	5
	Time PHR	(s)	795	845	900	847	6
	Peak RHR	(kW/m ²)	49	41	41	44	13
	Peak Mass Loss	(g/s*m ²)	7.8	7.8	7.2	8	5
	Peak Ext. Area	(m ² /kg)	2.2	0.0	0.6	1	100
	Total Heat Rel.	(MJ/m ²)	13.9	9.5	8.9	11	29
	THR @ PHR	(MJ/m ²)	3.3	2.6	3.5	3	16
	TM HEAT COMB.	(MJ/kg)	4.0	2.6	2.3	3	37
	TM RHR	(kW/m ²)	28.7	28.5	27.4	28	3
	TM MLR	(g/s*m ²)	1.2	1.8	1.5	2	19
	TM S. Ext. Area	(m ² /kg)	0.2	0.0	0.0	0	163
	Mass Final	(g)	31	33	32	32	4

SUPPLEMENTARY DATA							
	60s RHR	(kW/m ²)	38.4	27.5	39.2	35	21
	60s MLR	(g/s*m ²)	5.5	5.4	6.6	6	13
	60s HEAT COMB.	(MJ/kg)	6.4	4.7	5.5	6	15
	60s S. Ext. Area	(m ² /kg)	0.9	0.0	0.0	0	200
	180s RHR	(kW/m ²)	41.2	33.6	36.7	37	11
	180s MLR	(g/s*m ²)	6.1	6.0	6.1	6	1
	180s HEAT COMB.	(MJ/kg)	6.6	5.5	5.9	6	10
	180s S. Ext. Area	(m ² /kg)	0.3	0.0	0.0	0	200
	300s RHR	(kW/m ²)	36.7	29.7	28.7	32	16
	300s MLR	(g/s*m ²)	5.4	5.3	5.1	5	3
	300s HEAT COMB.	(MJ/kg)	6.8	5.5	5.6	6	14
	300s S. Ext. Area	(m ² /kg)	0.2	0.0	0.0	0	162

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	FR Plywood
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS	NRC1055	NRC1057	NRC1058	AVG.	MAX
						DEV %	
	Date Tested	(D/M/Y)	6/10/91	6/10/91	6/18/91		
	Temperature	(Deg C)	31	32	30	31	4
	Initial Mass	(g)	65	67	73	68	8

TEST RESULTS							
	Ignition Time	(s)	39	55	90	61	47
	Flameout Time	(s)	605	595	705	635	11
	Time PHR	(s)	450	420	460	443	5
	Peak RHR	(kW/m2)	76	77	79	77	3
	Peak Mass Loss	(g/s*m2)	11.8	10.1	11.0	11	8
	Peak Ext. Area	(m2/kg)	0.0	0.0	0.0	0	0
	Total Heat Rel.	(MJ/m2)	26.6	27.6	31.8	29	11
	THR @ PHR	(MJ/m2)	18.4	17.5	18.6	18	4
	TM HEAT COMB.	(MJ/kg)	6.8	7.0	6.8	7	2
	TM RHR	(kW/m2)	47.0	51.7	52.2	50	7
	TM MLR	(g/s*m2)	6.7	7.2	7.5	7	6
	TM S. Ext. Area	(m2/kg)	0.0	0.0	0.0	0	0
	Mass Final	(g)	27	28	29	28	3

SUPPLEMENTARY DATA							
	60s RHR	(kW/m2)	37.9	42.0	56.9	46	25
	60s MLR	(g/s*m2)	5.1	6.9	7.4	6	21
	60s HEAT COMB.	(MJ/kg)	6.7	5.6	7.1	6	14
	60s S. Ext. Area	(m2/kg)	0.0	0.0	0.0	0	0
	180s RHR	(kW/m2)	39.2	42.8	52.8	45	18
	180s MLR	(g/s*m2)	5.9	6.9	7.4	7	13
	180s HEAT COMB.	(MJ/kg)	6.4	6.0	7.0	6	7
	180s S. Ext. Area	(m2/kg)	0.0	0.0	0.0	0	0
	300s RHR	(kW/m2)	38.7	44.0	48.3	44	11
	300s MLR	(g/s*m2)	5.8	6.7	6.8	6	10
	300s HEAT COMB.	(MJ/kg)	6.5	6.5	6.9	7	5
	300s S. Ext. Area	(m2/kg)	0.0	0.0	0.0	0	0

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1161

Test Date: 07-04-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 28.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 30.9 g
Final Mass : 0.0 g
Mass Lost : 3.09 kg/m²
Ignition Time : 710 s
Flameout Time : 1,200 s

Time of Peak RHR : 795 s
Peak RHR : 49.2 kW/m²
Peak Mass Loss : 7.84 g/s*m²
Peak Extinction Area: 2.24 m²/kg
Total Heat Released : 13.91 MJ/m²

Summary Data From Ignition

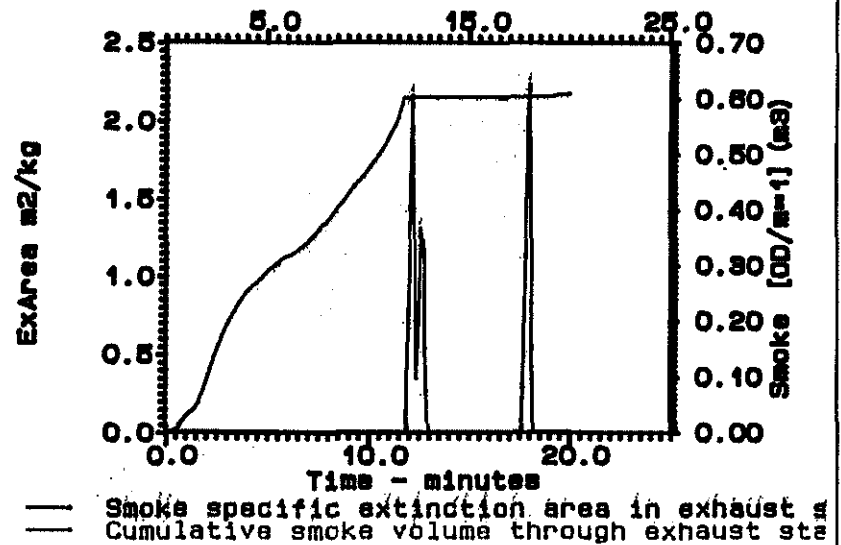
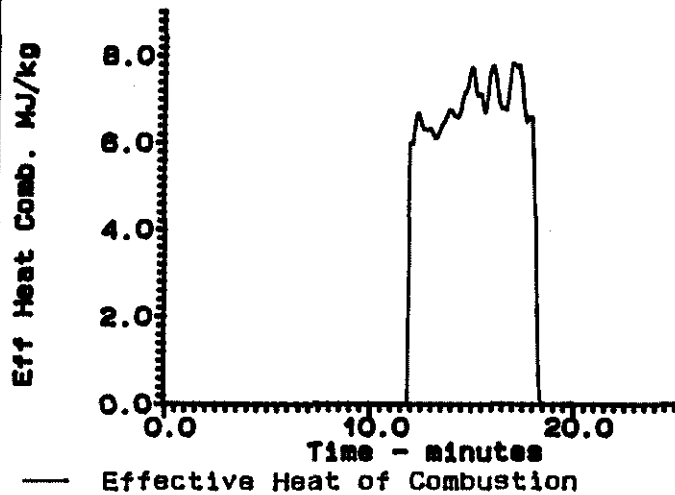
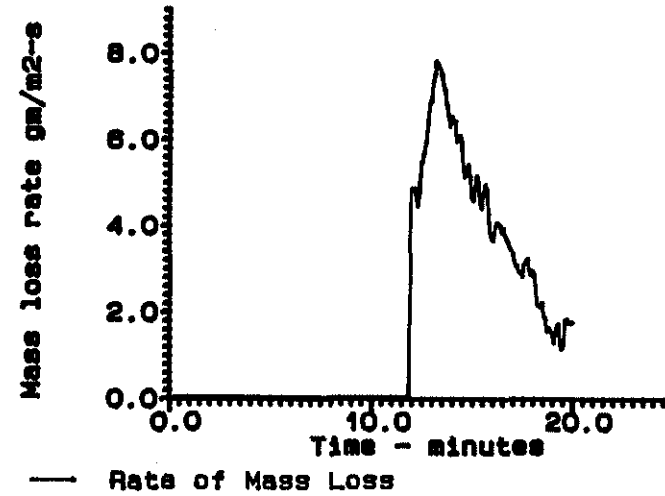
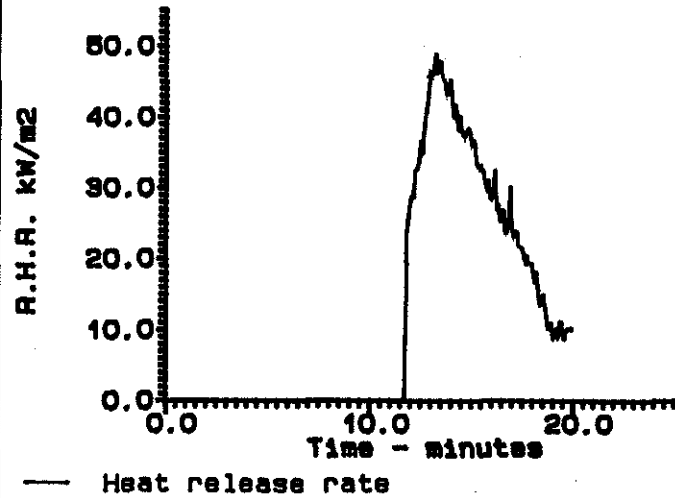
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	28.68	38.36	41.22	36.72
Mass Loss Rate	g/s*m ²	1.24	5.55	6.14	5.36
Heat of Combustion	MJ/kg	4.04	6.37	6.57	6.78
Specific Ext. Area	m ² /kg	0.20	0.95	0.32	0.19
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

This test was run slightly longer just to see what would happen. In reality the test ended shortly after 17minutes.

Tested by : Dnno Robert
Officer : Kim Andrew

1/2" Fire Retarded Plywood 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1172

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 27.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 70.1 g
Final Mass : 33.4 g
Mass Lost : 3.67 kg/m²
Ignition Time : 755 s
Flameout Time : 1,095 s

Time of Peak RHR : 845 s
Peak RHR : 40.6 kW/m²
Peak Mass Loss : 7.83 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 9.55 MJ/m²

Summary Data From Ignition

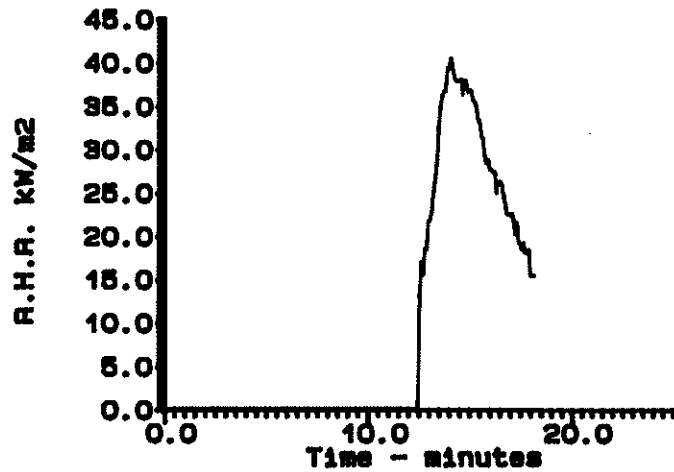
	Test Mean	60S	180S	300s
Heat Release kW/m ²	28.50	27.48	33.58	29.71
Mass Loss Rate g/s*m ²	1.79	5.40	6.01	5.31
Heat of Combustion MJ/kg	2.56	4.68	5.48	5.54
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

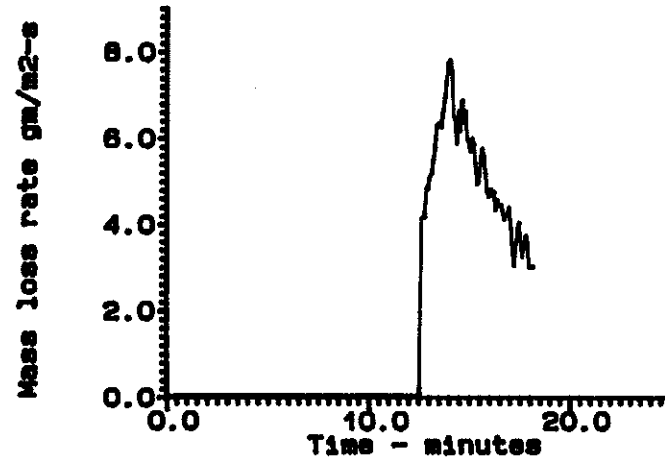
Uneventful.
Hard to distinguish ending.

Tested by : Onno Robert
Officer : Kim Andrew

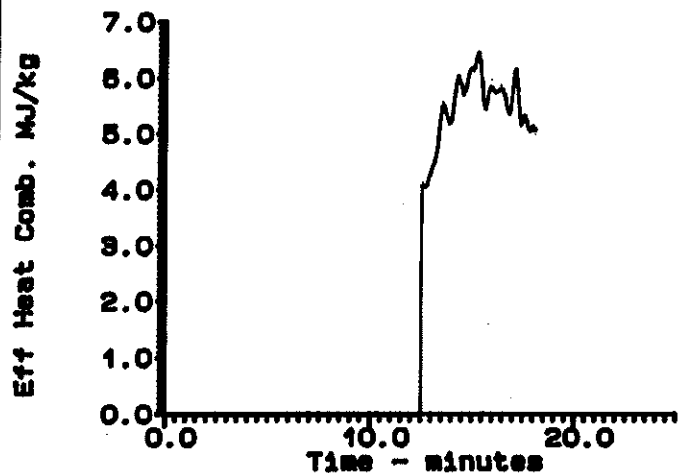
1/2" Fire Retarded Plywood 90 Flux = 25



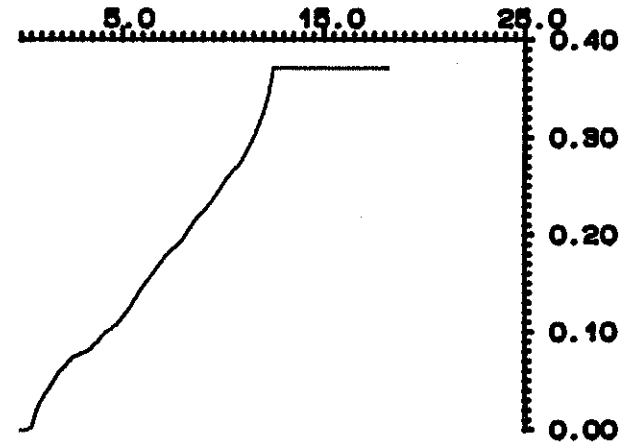
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1183

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 70.4 g
Final Mass : 32.2 g
Mass Lost : 3.83 kg/m²
Ignition Time : 810 s
Flameout Time : 1,140 s

Time of Peak RHR : 900 s
Peak RHR : 41.0 kW/m²
Peak Mass Loss : 7.21 g/s*m²
Peak Extinction Area: 0.62 m²/kg
Total Heat Released : 8.91 MJ/m²

Summary Data From Ignition

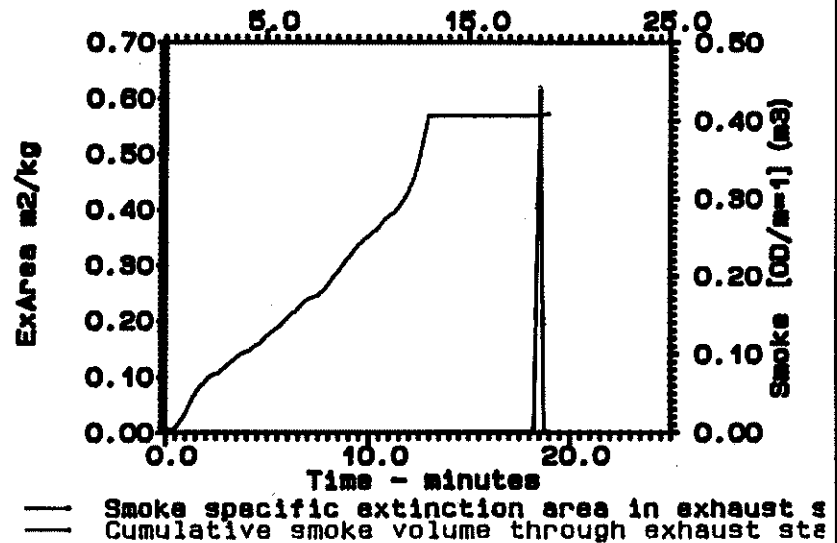
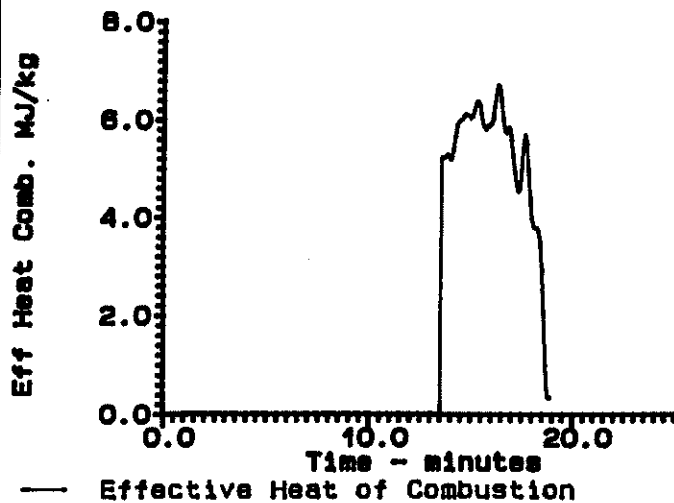
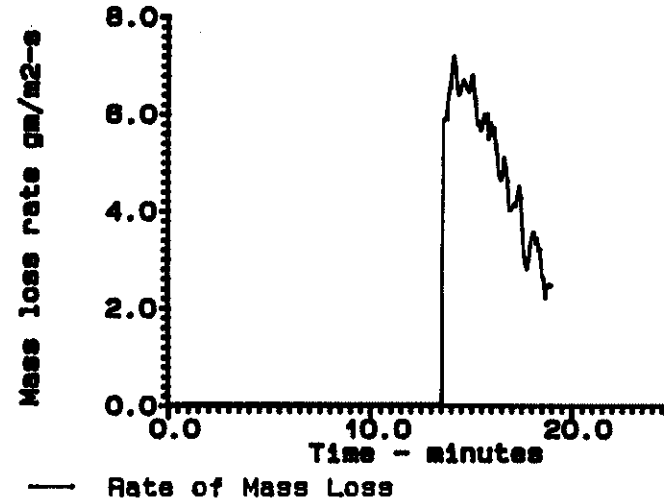
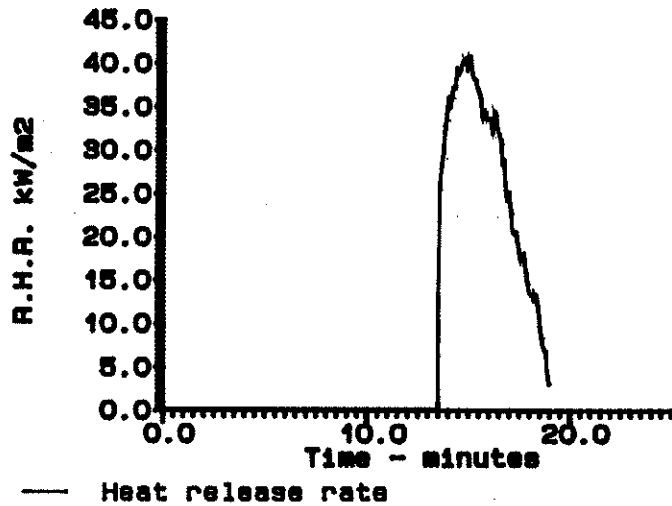
	Test Mean	60S	180S	300s
Heat Release kW/m ²	27.41	39.16	36.66	28.73
Mass Loss Rate g/s*m ²	1.55	6.57	6.06	5.09
Heat of Combustion MJ/kg	2.27	5.53	5.92	5.59
Specific Ext. Area m ² /kg	0.03	0.00	0.00	0.03
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
Ran till 19 minutes.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Fire Retarded Plywod 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1055

Test Date: 06-10-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifice Constant : 0.045052
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 31.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 64.8 g
Final Mass : 27.2 g
Mass Lost : 3.76 kg/m²
Ignition Time : 39 s
Flameout Time : 605 s

Time of Peak RHR : 450 s
Peak RHR : 75.6 kW/m²
Peak Mass Loss : 11.80 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 26.55 MJ/m²

Summary Data From Ignition

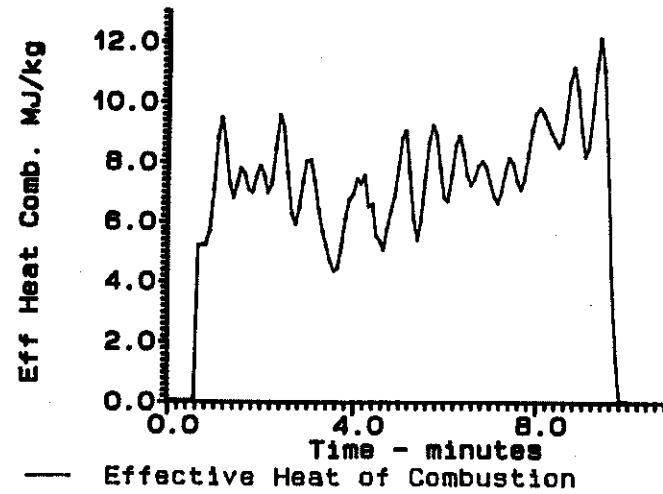
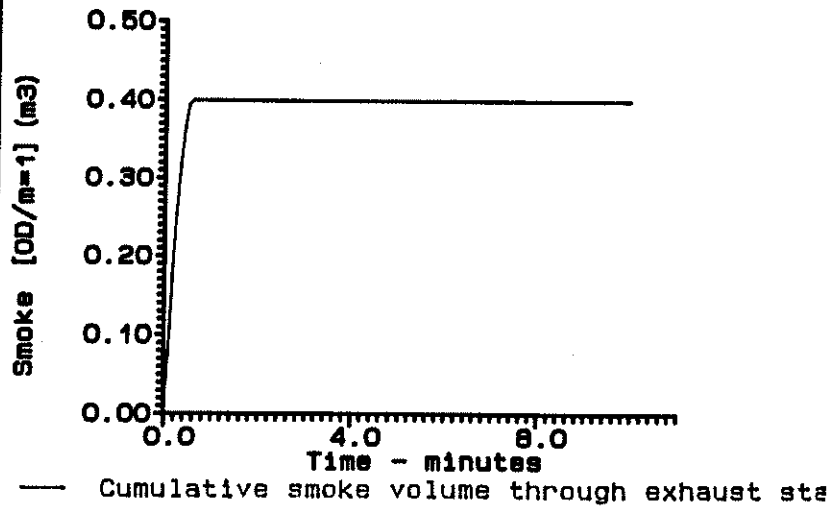
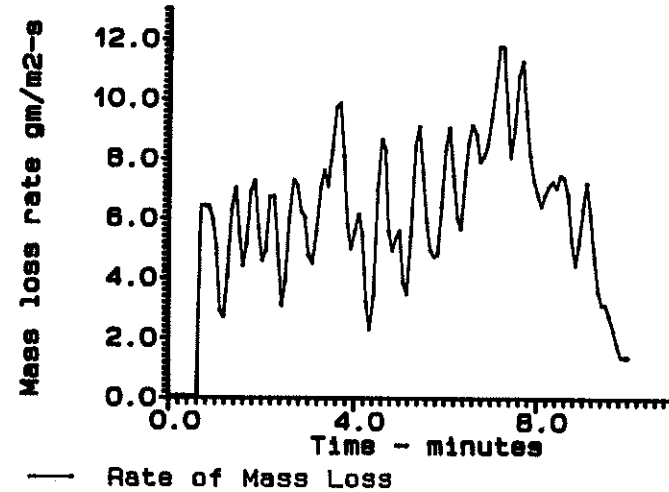
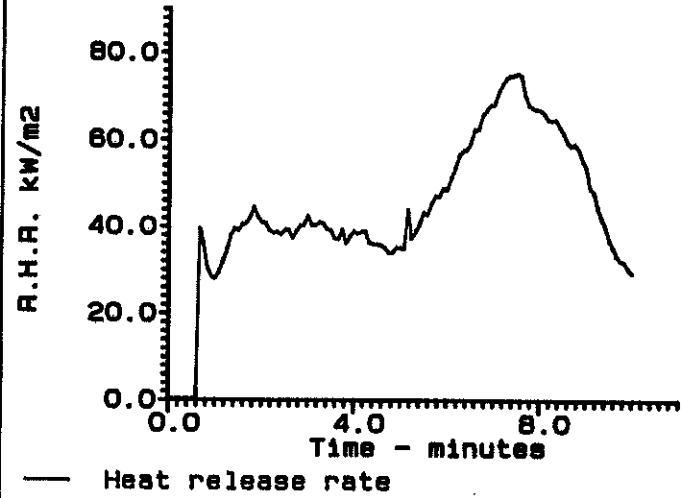
	Test Mean	60S	180S	300s
Heat Release kW/m ²	46.99	37.91	39.15	38.70
Mass Loss Rate g/s*m ²	6.68	5.12	5.90	5.85
Heat of Combustion MJ/kg	6.77	6.74	6.45	6.50
Specific Ext. Area mJ/kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample burned similar to the last one.
The second peak in rhr is associated with the sample rising towards the cone.

Tested by : Onno Robert
Officer : Kim Andrew

1/2' FR Plywood 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1057

Test Date: 06-10-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.045052
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 31.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 66.5 g
Final Mass : 28.1 g
Mass Lost : 3.84 kg/m²
Ignition Time : 55 s
Flameout Time : 595 s

Time of Peak RHR : 420 s
Peak RHR : 76.8 kW/m²
Peak Mass Loss : 10.10 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 27.64 MJ/m²

Summary Data From Ignition

		Test Mean	60s	180s	300s
Heat Release	kW/m ²	51.66	41.98	42.81	44.04
Mass Loss Rate	g/s*m ²	7.16	6.92	6.93	6.69
Heat of Combustion	MJ/kg	6.96	5.56	6.01	6.45
Specific Ext. Area	m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

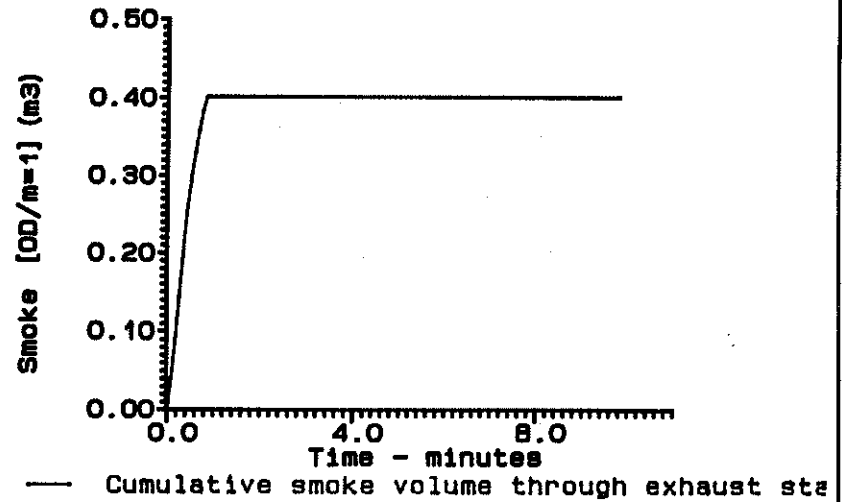
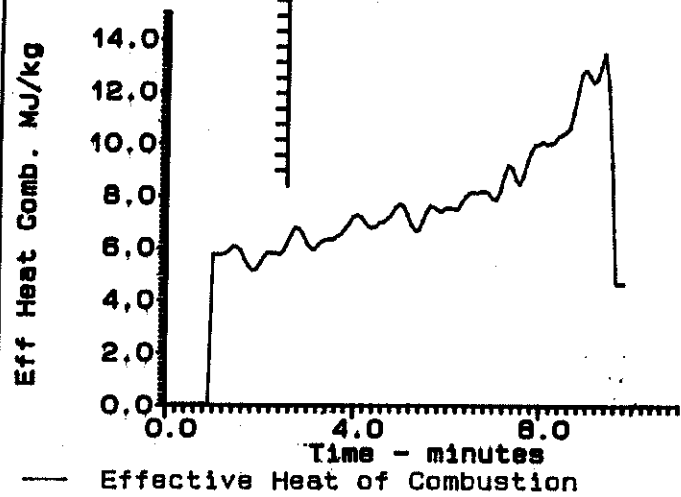
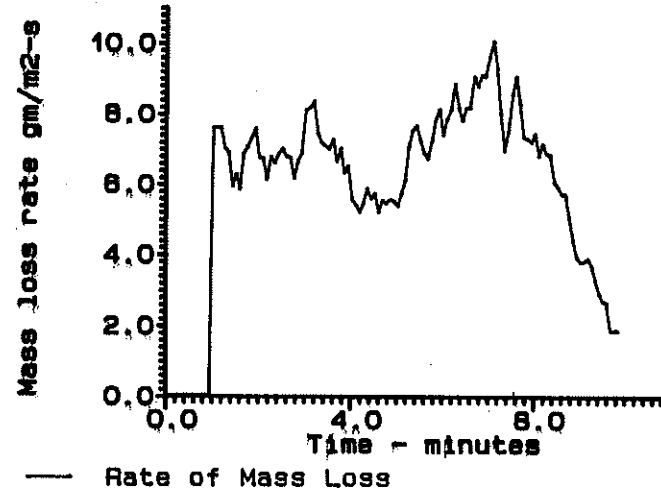
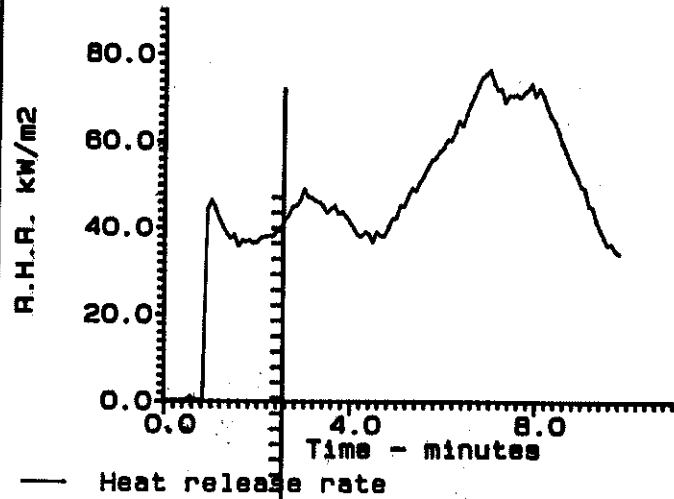
OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/2' FB Plywood 90

Exp 57 06/10/91
1/2 FR Ply 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1058

Test Date: 06-18-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' FR Plywood 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043299
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012000m

Test Conditions : 50.0 RH @ 29.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 73.4 g
Final Mass : 28.6 g
Mass Lost : 4.48 kg/m²
Ignition Time : 90 s
Flameout Time : 705 s

Time of Peak RHR : 460 s
Peak RHR : 79.1 kW/m²
Peak Mass Loss : 10.98 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 31.85 MJ/m²

Summary Data From Ignition

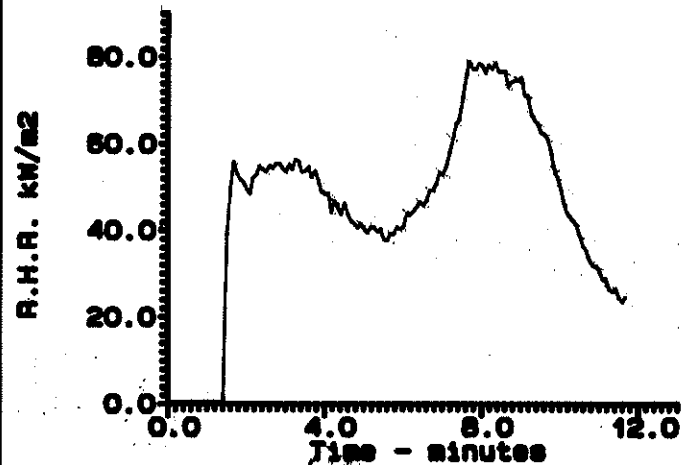
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	52.21	56.85	52.83	48.33
Mass Loss Rate	g/s*m ²	7.54	7.44	7.42	6.85
Heat of Combustion	MJ/kg	6.81	7.07	6.95	6.94
Specific Ext. Area	m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

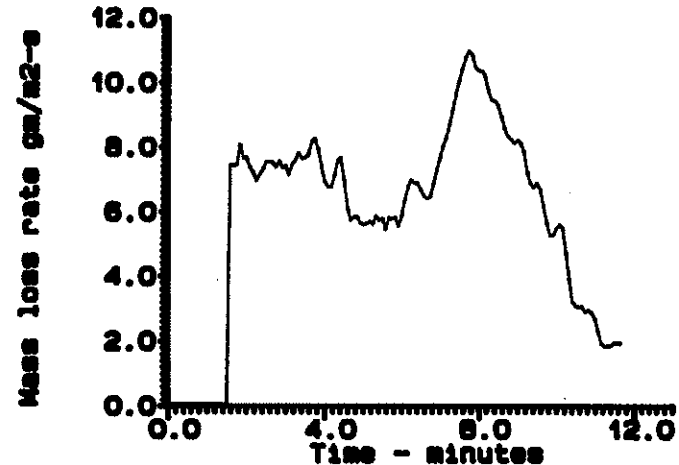
Very little rising from the center.
Some of previous 90 FR Ply might have been tested on wrong side seeing this result of long ignition and low rhr.

Tested by : Dnno Robert
Officer : Kim Andrew

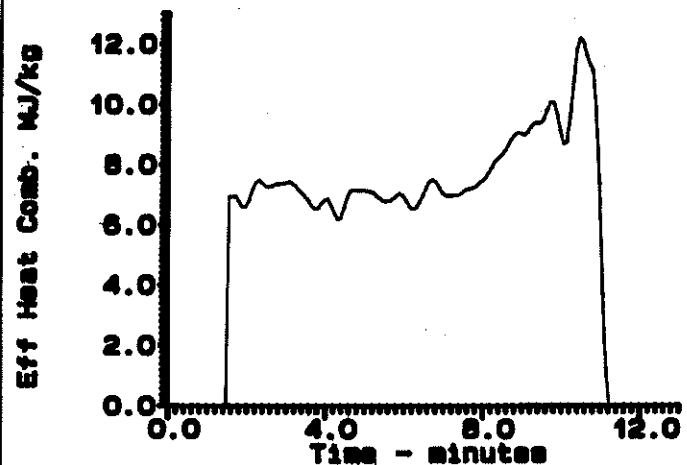
1/2" FR Plywood 90



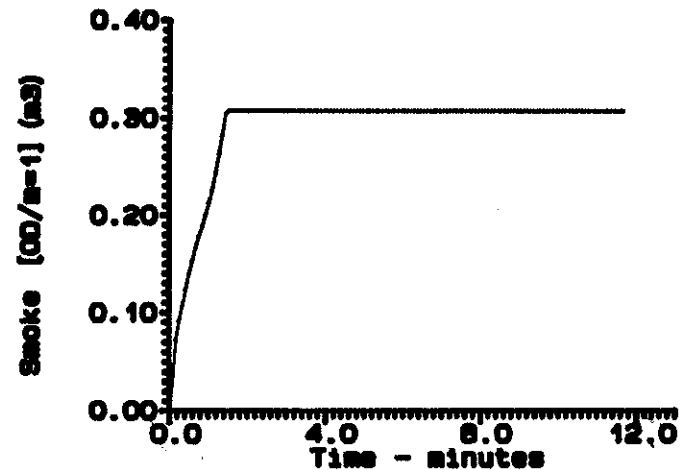
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Cumulative smoke volume through exhaust sta

APPENDIX E: 26.1 mm EXPANDED POLYSTYRENE



CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polystyrene
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	26.1

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1148	NRC1174	NRC1188		DEV %
	Date Tested	(D/M/Y)	6/24/91	7/5/91	7/8/91		
	Temperature	(Deg C)	29	28	28	28	4
	Initial Mass	(g)	6	6	7	6	2

TEST RESULTS		UNITS				AVG.	MAX
			NRC1148	NRC1174	NRC1188		DEV %
	Ignition Time	(s)	124	0	0	41	200
	Flameout Time	(s)	294	1200	595	696	72
	Time PHR	(s)	155	0	0	52	200
	Peak RHR	(kW/m ²)	219	0	1	74	198
	Peak Mass Loss	(g/s*m ²)	8.9	2.1	2.7	5	94
	Peak Ext. Area	(m ² /kg)	3379.9	0.0	59.0	1146	195
	Total Heat Rel.	(MJ/m ²)	17.0	0.0	0.0	6	200
	THR @ PHR	(MJ/m ²)	6.6	0.0	0.0	2	200
	TM HEAT COMB.	(MJ/kg)	22.0	0.0	0.0	7	200
	TM RHR	(kW/m ²)	102.8	0.0	0.0	34	200
	TM MLR	(g/s*m ²)	3.4	0.2	0.3	1	160
	TM S. Ext. Area	(m ² /kg)	893.4	0.0	1.5	298	199
	Mass Final	(g)	0	2	4	2	100

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1148	NRC1174	NRC1188		DEV %
	60s RHR	(kW/m ²)	201.6	0.0	0.0	67	200
	60s MLR	(g/s*m ²)	6.7	0.3	0.2	2	180
	60s HEAT COMB.	(MJ/kg)	28.3	0.0	0.0	9	200
	60s S. Ext. Area	(m ² /kg)	1876.3	0.0	0.0	625	200
	180s RHR	(kW/m ²)	92.1	0.0	0.0	31	200
	180s MLR	(g/s*m ²)	3.0	0.3	0.3	1	146
	180s HEAT COMB.	(MJ/kg)	29.6	0.0	0.0	10	200
	180s S. Ext. Area	(m ² /kg)	745.0	0.0	3.3	249	199
	300s RHR	(kW/m ²)	55.3	0.0	0.0	18	200
	300s MLR	(g/s*m ²)	1.8	0.3	0.3	1	124
	300s HEAT COMB.	(MJ/kg)	29.6	0.0	0.0	10	200
	300s S. Ext. Area	(m ² /kg)	447.0	0.0	3.0	150	198

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polystyrene
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	26.1

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1143	NRC1195	NRC1214		DEV %
	Date Tested	(D/M/Y)	6/21/91	7/8/91	7/22/91		
	Temperature	(Deg C)	29	29	31	30	4
	Initial Mass	(g)	6	6	6	6	3

TEST RESULTS						AVG.	MAX
		UNITS	NRC1143	NRC1195	NRC1214		DEV %
	Ignition Time	(s)	30	30	25	28	12
	Flameout Time	(s)	120	150	200	157	28
	Time PHR	(s)	45	45	40	43	8
	Peak RHR	(kW/m ²)	342	264	266	290	18
	Peak Mass Loss	(g/s*m ²)	11.4	10.2	13.7	12	16
	Peak Ext. Area	(m ² /kg)	2193.1	1921.7	1899.9	2005	9
	Total Heat Rel.	(MJ/m ²)	16.6	14.5	16.3	16	8
	THR @ PHR	(MJ/m ²)	5.6	4.7	4.7	5	12
	TM HEAT COMB.	(MJ/kg)	23.1	20.0	19.8	21	10
	TM RHR	(kW/m ²)	195.8	126.1	95.9	139	41
	TM MLR	(g/s*m ²)	9.2	7.5	6.4	8	20
	TM S. Ext. Area	(m ² /kg)	1364.2	858.3	855.5	1026	33
	Mass Final	(g)	0	0	0	0	101

SUPPLEMENTARY DATA						AVG.	MAX
		UNITS	NRC1143	NRC1195	NRC1214		DEV %
	60s RHR	(kW/m ²)	238.7	187.7	186.7	204	17
	60s MLR	(g/s*m ²)	8.0	6.6	7.0	7	11
	60s HEAT COMB.	(MJ/kg)	28.1	26.6	24.8	27	6
	60s S. Ext. Area	(m ² /kg)	1743.1	1499.5	1558.5	1600	9
	180s RHR	(kW/m ²)	83.1	71.8	82.6	79	9
	180s MLR	(g/s*m ²)	2.9	2.5	3.2	3	13
	180s HEAT COMB.	(MJ/kg)	27.3	27.5	24.9	27	6
	180s S. Ext. Area	(m ² /kg)	605.0	511.4	768.2	628	22
	300s RHR	(kW/m ²)	49.8	43.1	49.6	48	9
	300s MLR	(g/s*m ²)	1.7	1.5	1.9	2	13
	300s HEAT COMB.	(MJ/kg)	27.3	27.5	24.9	27	6
	300s S. Ext. Area	(m ² /kg)	363.0	306.8	460.9	377	22

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1148

Test Date: 06-24-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043192
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.026000m

Test Conditions : 50.0 RH @ 29.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.3 g
Final Mass : 0.0 g
Mass Lost : 0.63 kg/m²
Ignition Time : 124 s
Flameout Time : 294 s

Time of Peak RHR : 155 s
Peak RHR : 219.4 kW/m²
Peak Mass Loss : 8.86 g/s*m²
Peak Extinction Area: 3,379.88 m²/kg
Total Heat Released : 16.96 MJ/m²

Summary Data From Ignition

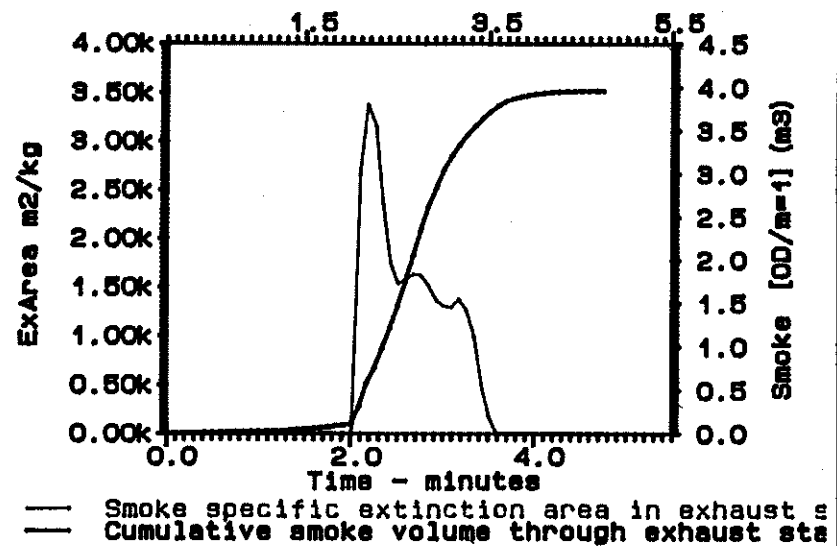
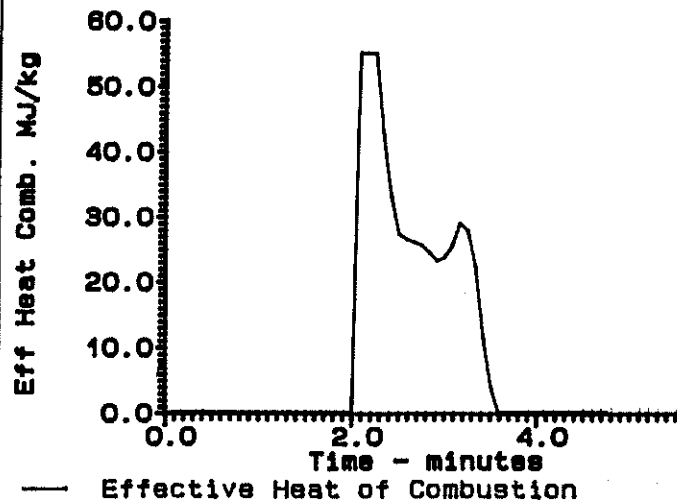
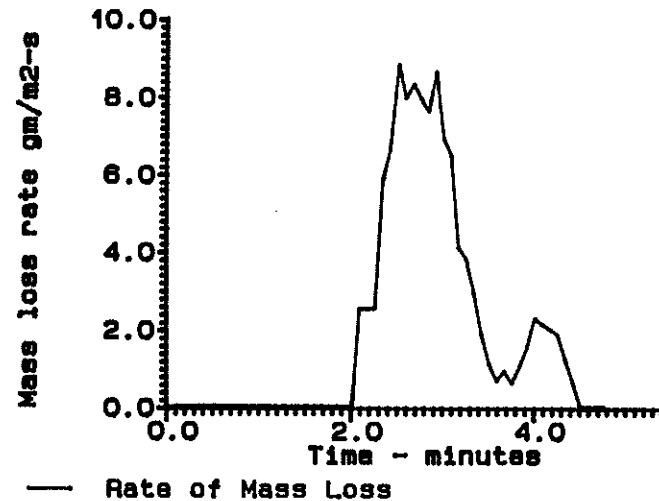
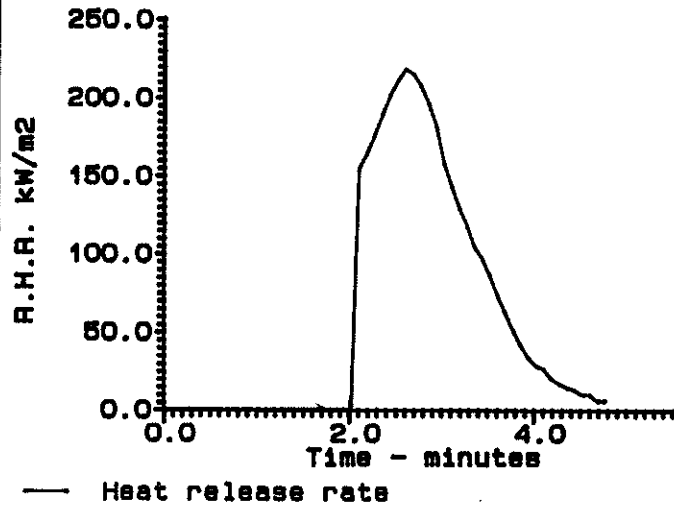
	Test Mean	60S	180S	300s
Heat Release kW/m ²	102.81	201.59	92.09	55.26
Mass Loss Rate g/s*m ²	3.39	6.71	3.04	1.82
Heat of Combustion MJ/kg	22.01	28.29	29.61	29.61
Specific Ext. Area m ² /kg	893.39	1,876.26	744.96	446.98
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample melted and then rolled itself up towards the center almost immediately. Then after time it ignited, burning similar to tests at 50.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polystyrene 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1174

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.4 g
Final Mass : 2.0 g
Mass Lost : 0.44 kg/m²
Ignition Time : 0 s
Flameout Time : 1,200 s

Time of Peak RHR : 0 s
Peak RHR : 0.0 kW/m²
Peak Mass Loss : 2.13 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.00 MJ/m²

Summary Data From Ignition

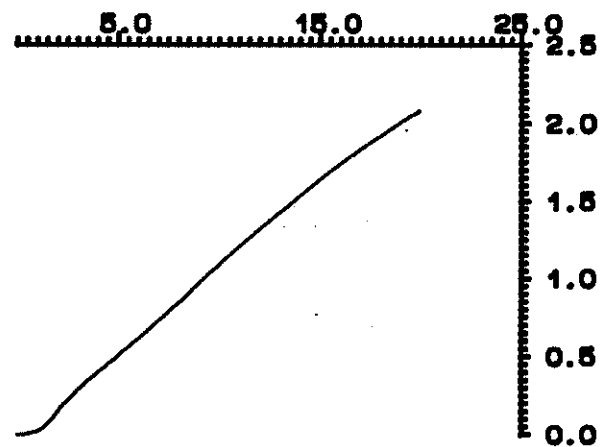
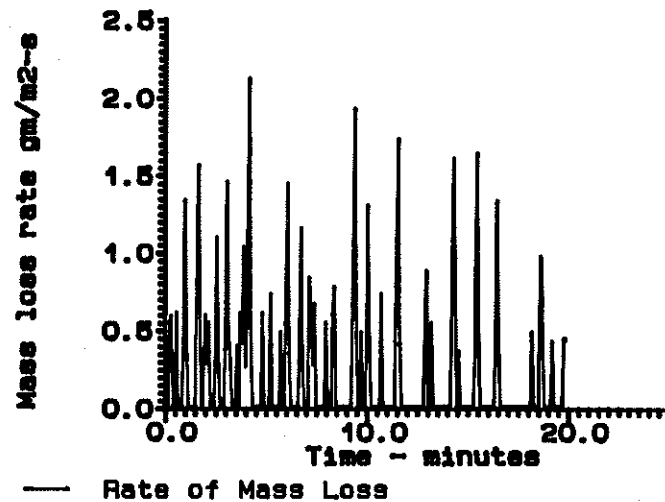
	Test Mean	60S	180S	300s
Heat Release kW/m ²	0.00	0.00	0.00	0.00
Mass Loss Rate g/s*m ²	0.23	0.31	0.32	0.32
Heat of Combustion MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

A most unusual experiment. The sample immediately shrunk down to the bottom and formed some sort of a ball, while emitting smoke. The sample then melted into a liquid and continued smoking. The test was terminated at 20 minutes but there was still liquid there, but never ignited.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polystyrene 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1188

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.026000m

Test Conditions : 50.0 RH @ 28.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.6 g
Final Mass : 4.0 g
Mass Lost : 0.25 kg/m²
Ignition Time : 0 s
Flameout Time : 595 s

Time of Peak RHR : 0 s
Peak RHR : 1.5 kW/m²
Peak Mass Loss : 2.68 g/s*m²
Peak Extinction Area: 59.03 m²/kg
Total Heat Released : 0.01 MJ/m²

Summary Data From Ignition

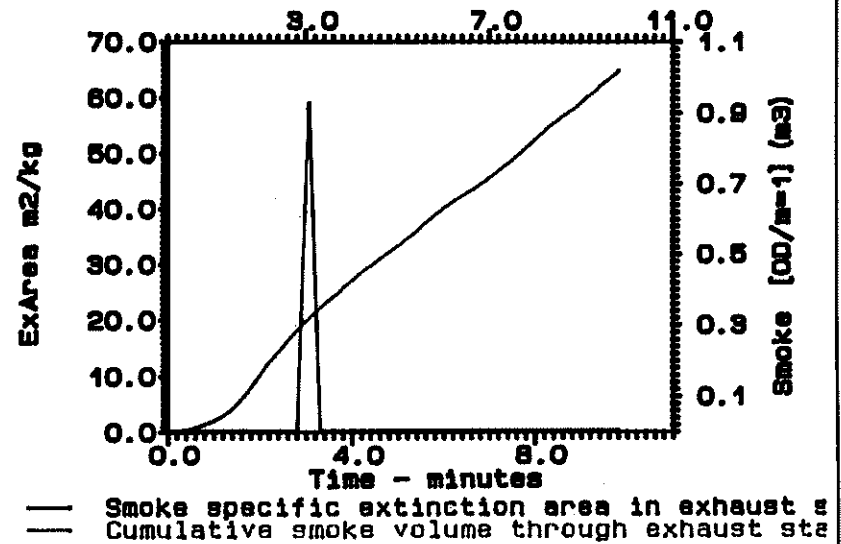
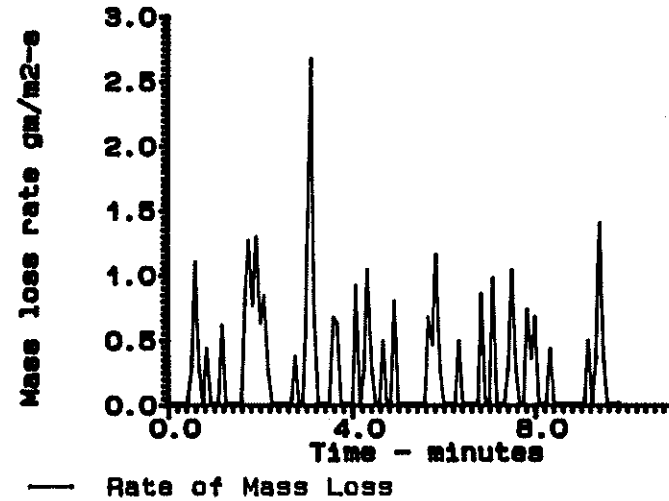
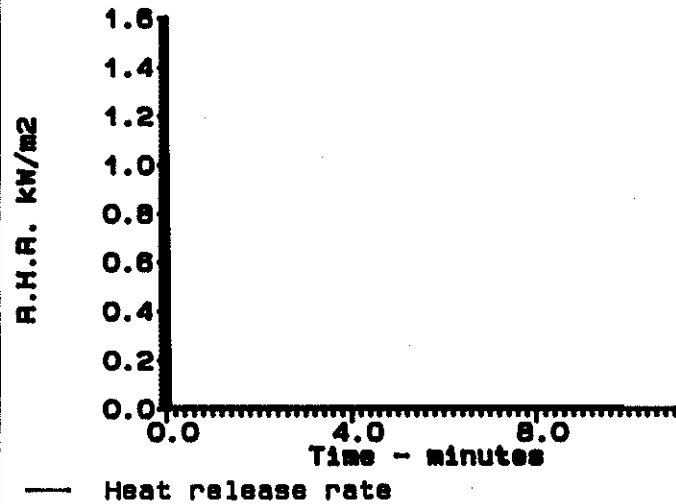
		Test Mean	60S	180S	300s
Heat Release	kW/m ²	0.01	0.00	0.00	0.00
Mass Loss Rate	g/s*m ²	0.29	0.17	0.34	0.30
Heat of Combustion	MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area	m ² /kg	1.50	0.00	3.28	2.95
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Ran till 10 minutes.
Still liquid left.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polystyrene 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1143

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043842
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.02500m

Test Conditions : 50.0 RH @ 29.2°C
Specimen Area : 0.009700 m²

TEST RESULTS

Initial Mass : 6.4 g
Final Mass : 0.2 g
Mass Lost : 0.64 kg/m²
Ignition Time : 30 s
Flameout Time : 120 s

Time of Peak RHR : 45 s
Peak RHR : 341.5 kW/m²
Peak Mass Loss : 11.40 g/s*m²
Peak Extinction Area: 2,193.12 m²/kg
Total Heat Released : 16.64 MJ/m²

Summary Data From Ignition

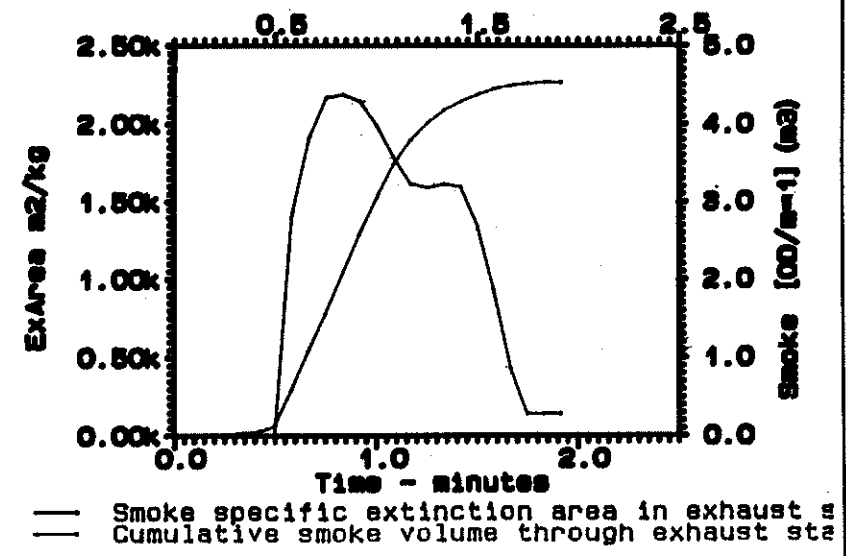
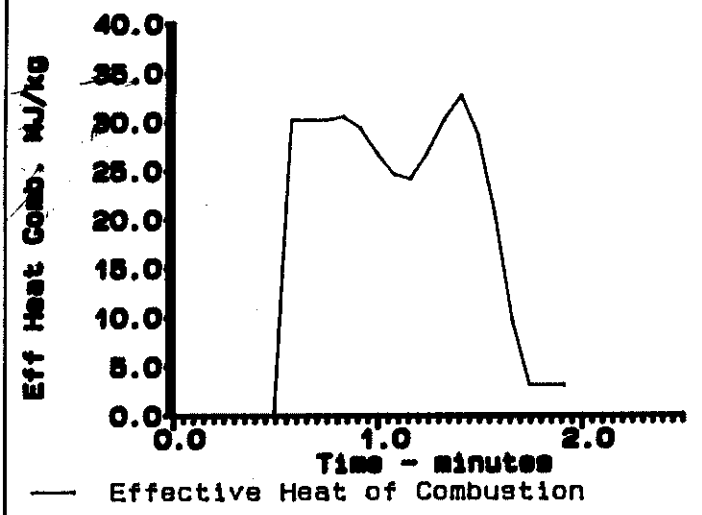
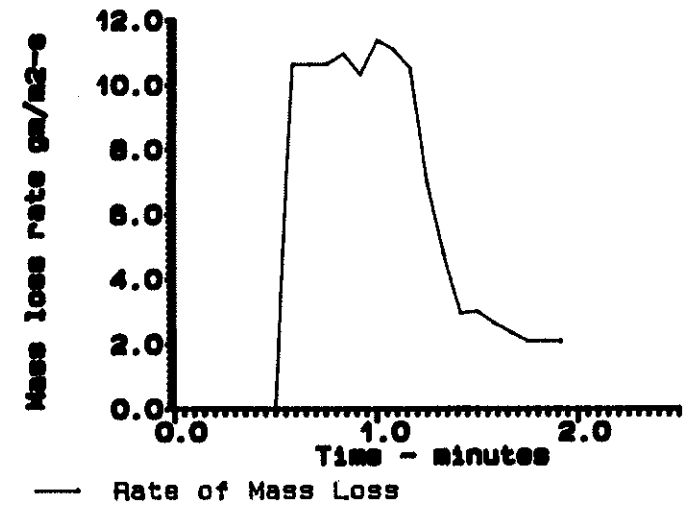
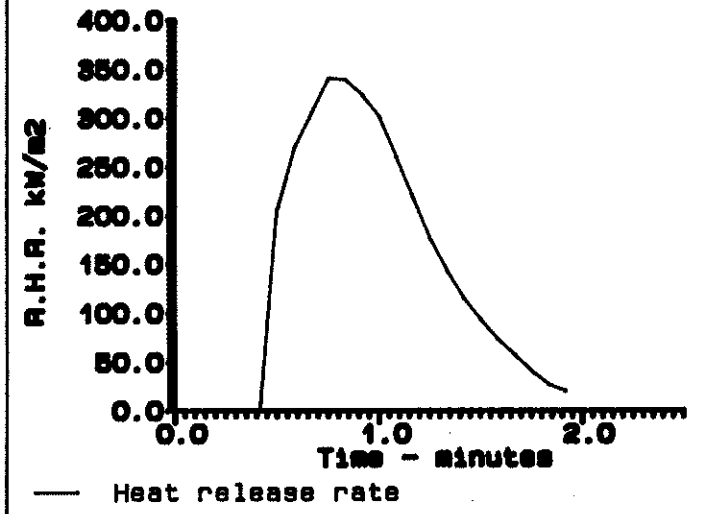
	Test Mean	60S	180S	300s
Heat Release kW/m ²	195.78	238.71	83.06	49.83
Mass Loss Rate g/s*m ²	9.19	8.01	2.91	1.74
Heat of Combustion MJ/kg	23.13	28.11	27.29	27.29
Specific Ext. Area m ² /kg	1,364.18	1,743.13	605.03	363.02
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample melted immediately, and then after a couple of seconds ignited. Following was very smoky, and smelly.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polystyrene 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1195

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : ⁵⁰~~25.0~~ kW/m² Nominal Flow : 24.0 l/s
Drifice Constant : 0.042183 Heat per Unit Mole : 13.10000 kJ/gO₂
Heater Orientation : Horizontal Spark Ignitor Used : Y
Grid Used : N Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C Test Conditions : 50.0 RH @ 28.7°C
Specimen Thickness: 0.026000m Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.2 g Time of Peak RHR : 45 s
Final Mass : 0.4 g Peak RHR : 263.8 kW/m²
Mass Lost : 0.58 kg/m² Peak Mass Loss : 10.15 g/s*m²
Ignition Time : 30 s Peak Extinction Area: 1,921.66 m²/kg
Flameout Time : 150 s Total Heat Released : 14.50 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	126.07	187.74	71.84	43.10
Mass Loss Rate g/s*m ²	7.47	6.57	2.49	1.50
Heat of Combustion MJ/kg	20.00	26.61	27.50	27.50
Specific Ext. Area m ² /kg	858.34	1,499.49	511.38	306.83
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1214

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polystyrene

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.024000m

Test Conditions : 50.0 RH @ 30.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.5 g
Final Mass : 0.0 g
Mass Lost : 0.65 kg/m²
Ignition Time : 25 s
Flameout Time : 200 s

Time of Peak RHR : 40 s
Peak RHR : 266.1 kW/m²
Peak Mass Loss : 13.66 g/s*m²
Peak Extinction Area: 1,899.95 m²/kg
Total Heat Released : 16.31 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	95.93	186.68	82.61	49.56
Mass Loss Rate g/s*m ²	6.39	6.98	3.19	1.91
Heat of Combustion MJ/kg	19.84	24.84	24.90	24.90
Specific Ext. Area m ² /kg	855.55	1,558.45	768.23	460.94
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Tested by : Onno Robert
Officer : Kim Andrew

APPENDIX F: 25.1 mm RIGID POLYURETHANE

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polyurethane
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	25.1

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1173	NRC1185	NRC1189		DEV %
	Date Tested	(D/M/Y)	7/5/91	7/8/91	7/8/91		
	Temperature	(Deg C)	28	29	28	28	2
	Initial Mass	(g)	7	7	7	7	0

TEST RESULTS		UNITS				AVG.	MAX
			NRC1173	NRC1185	NRC1189		DEV %
	Ignition Time	(s)	DNI	DNI	DNI	DNI	N / A
	Flameout Time	(s)	600	310	420	443	35
	Time PHR	(s)	495	10	355	287	97
	Peak RHR	(kW/m2)	5	5	7	6	25
	Peak Mass Loss	(g/s*m2)	2.3	2.6	2.6	3	8
	Peak Ext. Area	(m2/kg)	N / A	26.3	82.2	54	52
	Total Heat Rel.	(MJ/m2)	0.9	0.6	2.3	1	84
	THR @ PHR	(MJ/m2)	0.8	0.1	1.9	1	110
	TM HEAT COMB.	(MJ/kg)	0.7	1.5	2.0	1	47
	TM RHR	(kW/m2)	1.4	2.0	5.6	3	85
	TM MLR	(g/s*m2)	0.3	0.4	0.4	0	23
	TM S. Ext. Area	(m2/kg)	N / A	1.3	3.0	2	39
	Mass Final	(g)	5	5	5	5	4

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1173	NRC1185	NRC1189		DEV %
	60s RHR	(kW/m2)	1.7	3.9	4.4	3	50
	60s MLR	(g/s*m2)	0.9	1.0	0.9	1	7
	60s HEAT COMB.	(MJ/kg)	1.8	3.5	4.5	3	46
	60s S. Ext. Area	(m2/kg)	N / A	0.0	20.6	10	100
	180s RHR	(kW/m2)	1.5	2.7	4.6	3	57
	180s MLR	(g/s*m2)	0.6	0.6	0.6	1	2
	180s HEAT COMB.	(MJ/kg)	2.5	4.3	7.3	5	55
	180s S. Ext. Area	(m2/kg)	N / A	2.2	6.9	5	52
	300s RHR	(kW/m2)	1.6	2.0	5.2	3	79
	300s MLR	(g/s*m2)	0.4	0.4	0.4	0	6
	300s HEAT COMB.	(MJ/kg)	3.9	4.7	11.8	7	73
	300s S. Ext. Area	(m2/kg)	N / A	1.3	4.1	3	52

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polyurethane
YEAR RECEIVED :	1990
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	25.1

DETAILS OF TEST	Test Reference	UNITS			AVG.	MAX
			NRC1040	NRC1212		DEV %
	Date Tested	(D/M/Y)	6/13/91	7/22/91		
	Temperature	(Deg C)	29	31	30	3
	Initial Mass	(g)	7	6	7	5

TEST RESULTS	Parameter	UNITS			AVG.	MAX
			NRC1040	NRC1212		DEV %
	Ignition Time	(s)	DNI	DNI	0	N/A
	Flameout Time	(s)	215	165	190	13
	Time PHR	(s)	140	40	90	56
	Peak RHR	(kW/m2)	10	53	31	69
	Peak Mass Loss	(g/s*m2)	4.9	6.6	6	15
	Peak Ext. Area	(m2/kg)	730.3	617.5	674	8
	Total Heat Rel.	(MJ/m2)	1.6	5.0	3	52
	THR @ PHR	(MJ/m2)	0.9	1.0	1	2
	TM HEAT COMB.	(MJ/kg)	0.8	4.8	3	71
	TM RHR	(kW/m2)	8.2	37.1	23	64
	TM MLR	(g/s*m2)	2.0	2.5	2	12
	TM S. Ext. Area	(m2/kg)	154.1	136.8	145	6
	Mass Final	(g)	3	2	2	29

SUPPLEMENTARY DATA	Parameter	UNITS			AVG.	MAX
			NRC1040	NRC1212		DEV %
	60s RHR	(kW/m2)	7.3	49.7	28	74
	60s MLR	(g/s*m2)	3.2	3.1	3	3
	60s HEAT COMB.	(MJ/kg)	2.1	15.1	9	76
	60s S. Ext. Area	(m2/kg)	420.6	254.1	337	25
	180s RHR	(kW/m2)	8.1	26.0	17	53
	180s MLR	(g/s*m2)	1.9	1.4	2	14
	180s HEAT COMB.	(MJ/kg)	4.2	17.9	11	62
	180s S. Ext. Area	(m2/kg)	148.2	90.3	119	24
	300s RHR	(kW/m2)	5.1	15.6	10	51
	300s MLR	(g/s*m2)	1.1	0.8	1	15
	300s HEAT COMB.	(MJ/kg)	4.4	17.9	11	61
	300s S. Ext. Area	(m2/kg)	88.9	54.2	72	24

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1173

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 7.1 g
Final Mass : 4.9 g
Mass Lost : 0.23 kg/m²
Ignition Time : 0 s
Flameout Time : 600 s

Time of Peak RHR : 495 s
Peak RHR : 4.9 kW/m²
Peak Mass Loss : 2.31 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.86 MJ/m²

Summary Data From Ignition

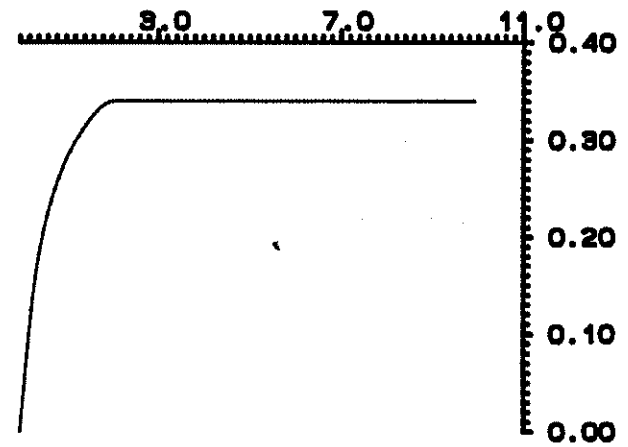
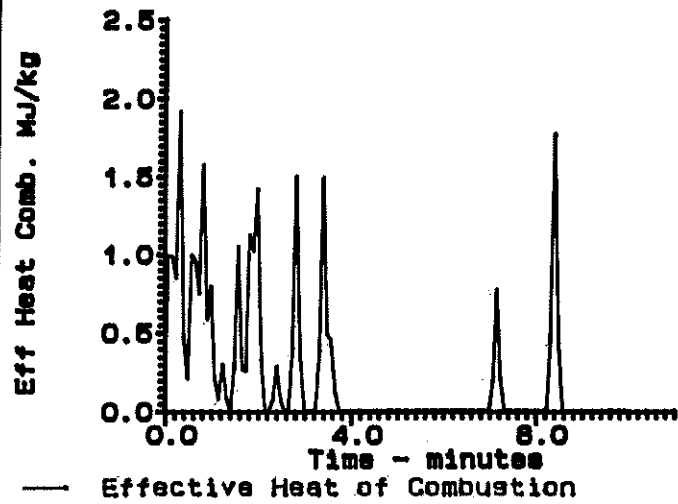
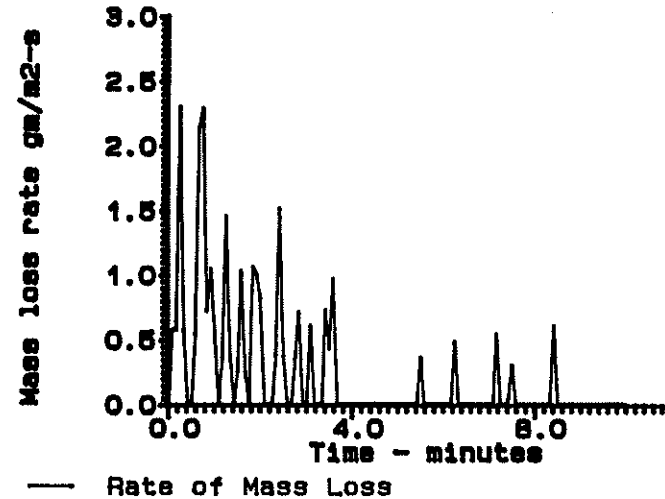
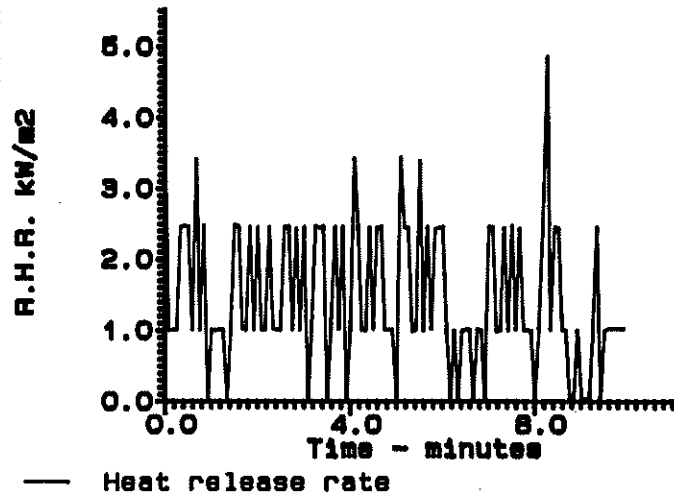
	Test Mean	60S	180S	300s
Heat Release kW/m ²	1.44	1.67	1.52	1.57
Mass Loss Rate g/s*m ²	0.29	0.90	0.59	0.39
Heat of Combustion MJ/kg	0.74	1.77	2.52	3.93
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Similar to previous exp. the sample swelled downwards
not igniting, or heating

Tested by : Dnno Robert
Officer : Kim Andrew

1" Polyurethane 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1185

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 50.0 RH @ 28.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 7.1 g
Final Mass : 5.1 g
Mass Lost : 0.20 kg/m²
Ignition Time : 0 s
Flameout Time : 310 s

Time of Peak RHR : 10 s
Peak RHR : 5.4 kW/m²
Peak Mass Loss : 2.65 g/s*m²
Peak Extinction Area: 26.29 m²/kg
Total Heat Released : 0.62 MJ/m²

Summary Data From Ignition

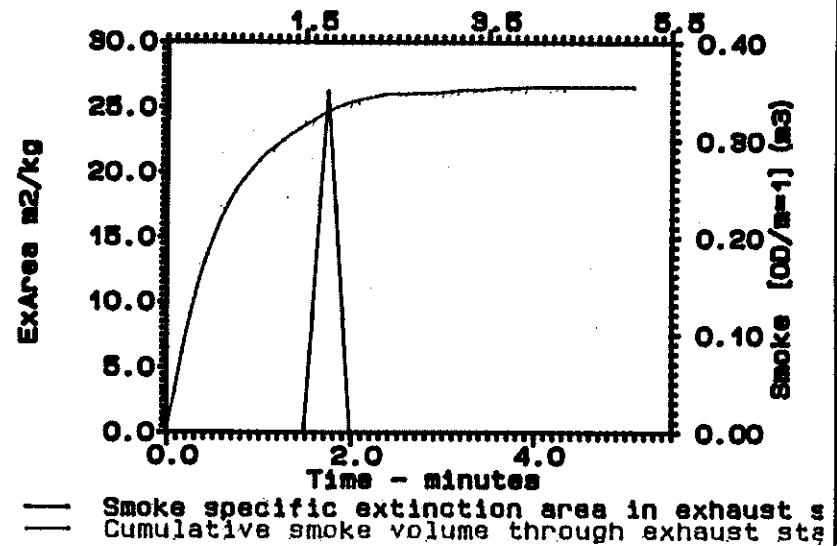
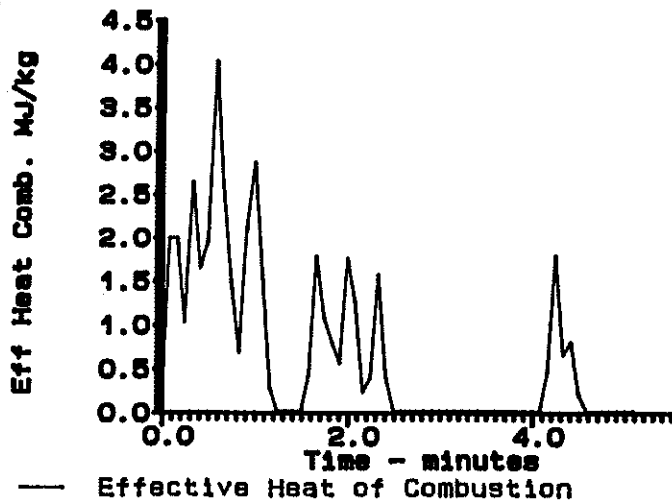
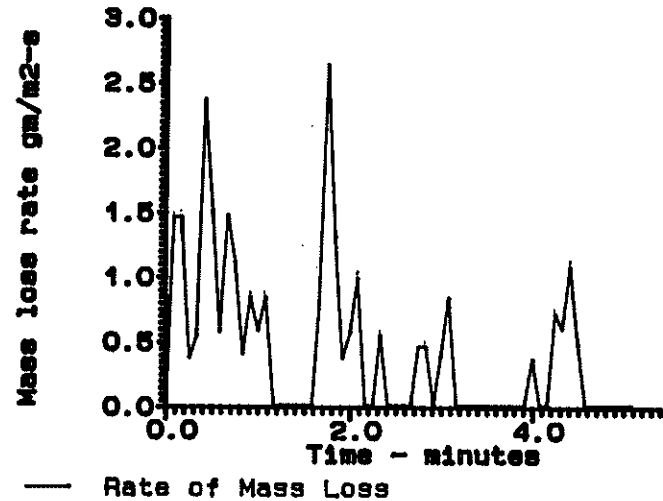
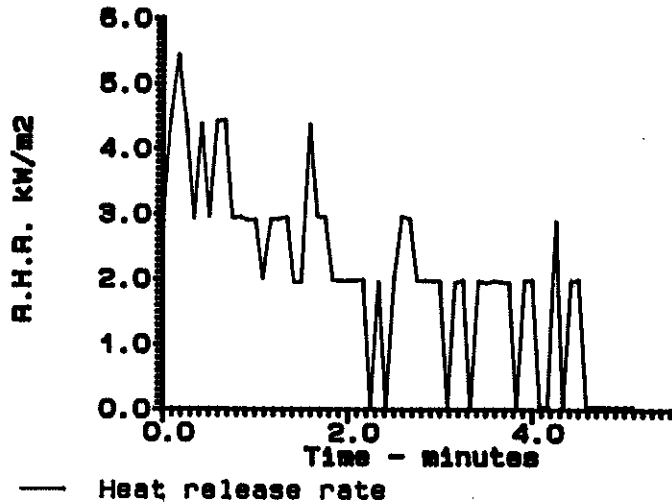
	Test Mean	60S	180S	300s
Heat Release kW/m ²	2.04	3.85	2.66	1.99
Mass Loss Rate g/s*m ²	0.42	1.00	0.59	0.41
Heat of Combustion MJ/kg	1.46	3.53	4.33	4.75
Specific Ext. Area m ² /kg	1.29	0.00	2.19	1.31
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polyurethane 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1189

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 50.0 RH @ 28.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 7.1 g
Final Mass : 4.8 g
Mass Lost : 0.23 kg/m²
Ignition Time : 0 s
Flameout Time : 420 s

Time of Peak RHR : 355 s
Peak RHR : 7.4 kW/m²
Peak Mass Loss : 2.57 g/s*m²
Peak Extinction Area: 82.24 m²/kg
Total Heat Released : 2.34 MJ/m²

Summary Data From Ignition

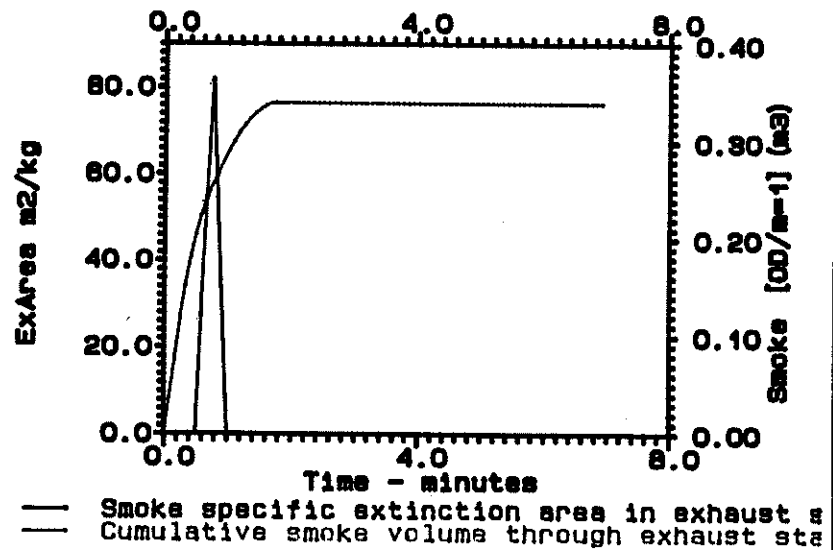
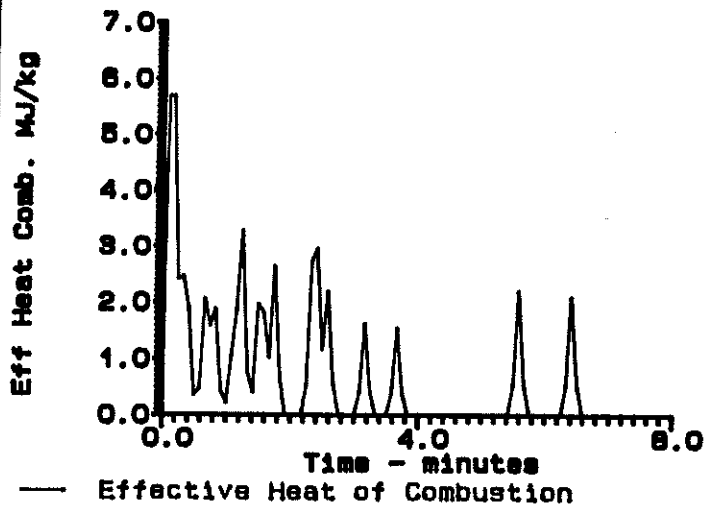
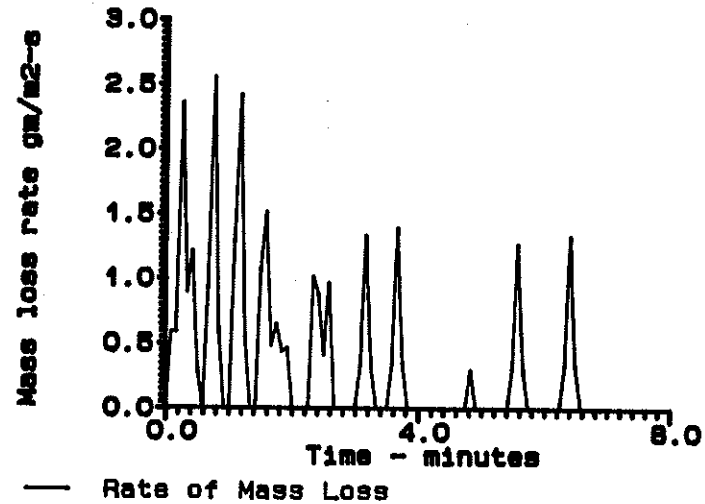
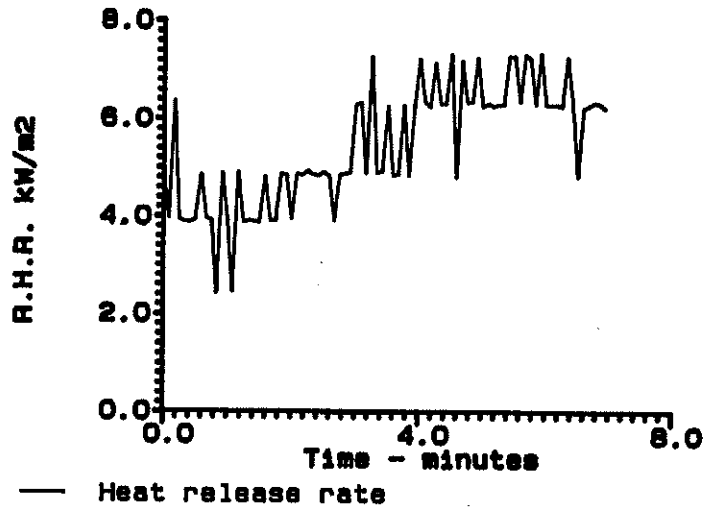
	Test Mean	60S	180S	300s
Heat Release kW/m ²	5.63	4.41	4.59	5.22
Mass Loss Rate g/s*m ²	0.40	0.90	0.61	0.44
Heat of Combustion MJ/kg	1.99	4.49	7.28	11.79
Specific Ext. Area m ² /kg	2.97	20.56	6.85	4.11
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1" Polyurethane 90 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1040

Test Date: 06-13-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.044168
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 50.0 RH @ 29.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 7.1 g
Final Mass : 3.1 g
Mass Lost : 0.40 kg/m²
Ignition Time : 20 s
Flameout Time : 215 s

Time of Peak RHR : 140 s
Peak RHR : 9.8 kW/m²
Peak Mass Loss : 4.89 g/s*m²
Peak Extinction Area: 730.35 m²/kg
Total Heat Released : 1.56 MJ/m²

Summary Data From Ignition

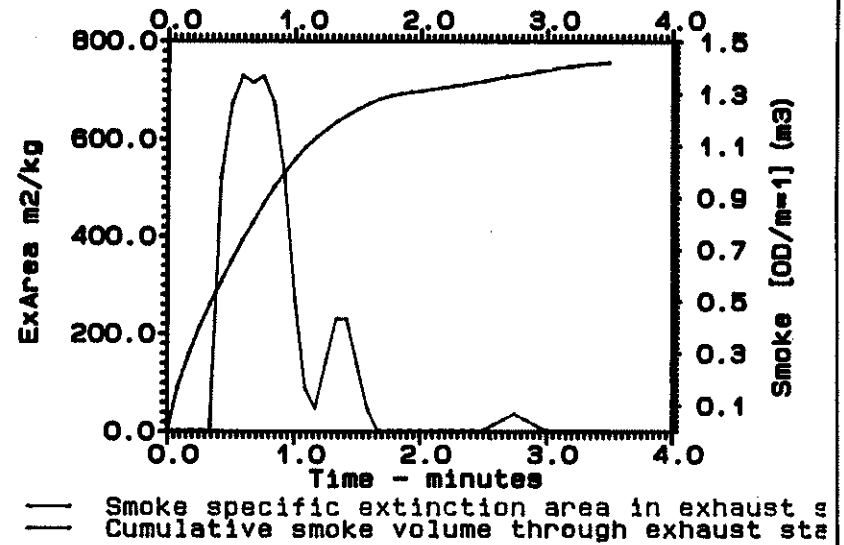
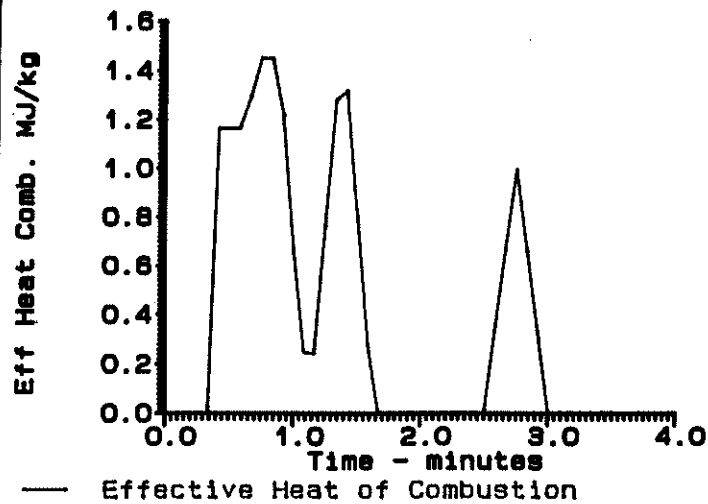
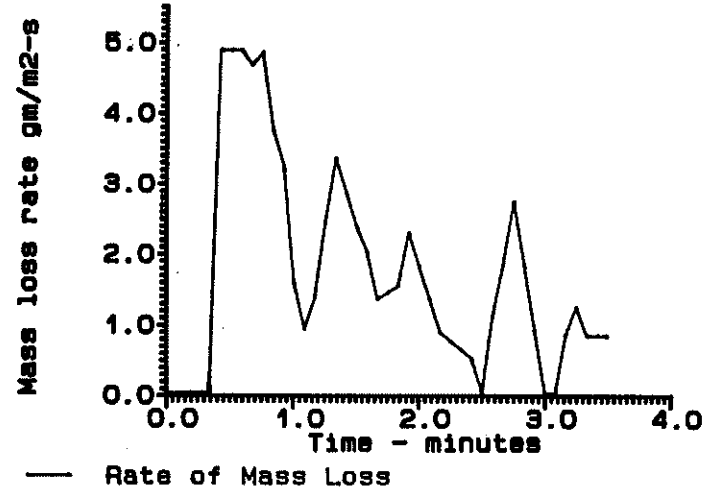
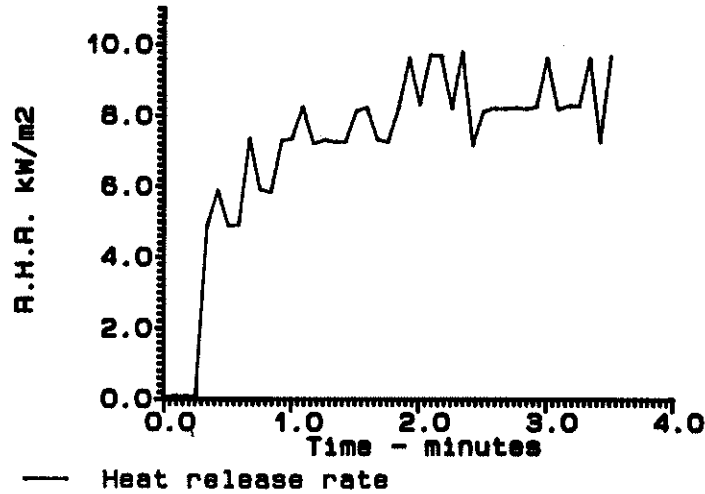
	Test Mean	60S	180S	300s
Heat Release kW/m ²	8.21	7.28	8.05	5.07
Mass Loss Rate g/s*m ²	1.96	3.23	1.88	1.14
Heat of Combustion MJ/kg	0.81	2.07	4.17	4.40
Specific Ext. Area m ² /kg	154.08	420.55	148.21	88.92
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Nothing happend. The sample did not ignite, however, it did evolve some heat

Tested by : Onno Robert
Officer : Kim Andrew

1" Polyurethane 90



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1212

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.020000m

Test Conditions : 50.0 RH @ 31.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.5 g
Final Mass : 1.7 g
Mass Lost : 0.48 kg/m²
Ignition Time : 25 s
Flameout Time : 165 s

Time of Peak RHR : 40 s
Peak RHR : 53.1 kW/m²
Peak Mass Loss : 6.58 g/s*m²
Peak Extinction Area: 617.45 m²/kg
Total Heat Released : 5.01 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	37.10	49.67	26.04	15.63
Mass Loss Rate	g/s*m ²	2.51	3.07	1.42	0.85
Heat of Combustion	MJ/kg	4.76	15.05	17.93	17.93
Specific Ext. Area	m ² /kg	136.82	254.06	90.28	54.17
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1213

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1' Polyurethane 90

Date Received: 5 /01/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.020000m

Test Conditions : 50.0 RH @ 31.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 6.5 g
Final Mass : 2.0 g
Mass Lost : 0.44 kg/m²
Ignition Time : 60 s
Flameout Time : 175 s

Time of Peak RHR : 70 s
Peak RHR : 34.5 kW/m²
Peak Mass Loss : 3.01 g/s*m²
Peak Extinction Area: 96.70 m²/kg
Total Heat Released : 2.96 MJ/m²

Summary Data From Ignition

	Test Mean	60s	180s	300s	
Heat Release	kW/m ²	26.95	30.24	15.20	9.12
Mass Loss Rate	g/s*m ²	1.11	1.96	0.99	0.60
Heat of Combustion	MJ/kg	0.67	14.18	14.81	14.81
Specific Ext. Area	m ² /kg	15.00	27.51	9.17	5.50
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Tested by : Onno Robert
Officer : Kim Andrew

APPENDIX G: 6.0 mm WOODPANEL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS	NRC1200	NRC1202	NRC1204	AVG.	MAX
						DEV %	
	Date Tested	(D/M/Y)	7/22/91	7/22/91	7/22/91		
	Temperature	(Deg C)	30	30	30	30	0
	Initial Mass	(g)	46	47	44	46	3

TEST RESULTS		UNITS	NRC1200	NRC1202	NRC1204	AVG.	MAX
	Ignition Time	(s)	255	245	245	248	3
	Flameout Time	(s)	685	645	585	638	8
	Time PHR	(s)	380	380	350	370	5
	Peak RHR	(kW/m ²)	164	179	201	181	11
	Peak Mass Loss	(g/s*m ²)	14.3	14.5	16.2	15	8
	Peak Ext. Area	(m ² /kg)	129.7	159.6	161.1	150	14
	Total Heat Rel.	(MJ/m ²)	37.7	40.8	38.0	39	5
	THR @ PHR	(MJ/m ²)	17.1	20.2	18.5	19	9
	TM HEAT COMB.	(MJ/kg)	10.3	10.8	11.0	11	4
	TM RHR	(kW/m ²)	88.7	103.3	113.6	102	13
	TM MLR	(g/s*m ²)	9.5	9.8	10.9	10	9
	TM S. Ext. Area	(m ² /kg)	41.3	45.7	40.2	42	8
	Mass Final	(g)	11	12	11	12	3

SUPPLEMENTARY DATA		UNITS	NRC1200	NRC1202	NRC1204	AVG.	MAX
	60s RHR	(kW/m ²)	131.4	144.1	178.0	151	18
	60s MLR	(g/s*m ²)	11.1	11.3	13.0	12	10
	60s HEAT COMB.	(MJ/kg)	11.1	12.0	12.8	12	7
	60s S. Ext. Area	(m ² /kg)	74.5	42.7	40.6	53	42
	180s RHR	(kW/m ²)	136.8	152.3	161.5	150	9
	180s MLR	(g/s*m ²)	11.3	12.1	12.5	12	5
	180s HEAT COMB.	(MJ/kg)	11.9	12.4	12.7	12	4
	180s S. Ext. Area	(m ² /kg)	91.1	87.4	73.5	84	12
	300s RHR	(kW/m ²)	112.6	124.5	121.8	120	6
	300s MLR	(g/s*m ²)	9.3	9.7	9.4	9	3
	300s HEAT COMB.	(MJ/kg)	12.0	12.7	12.8	12	4
	300s S. Ext. Area	(m ² /kg)	58.3	60.1	44.9	54	18

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woopanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS	NRC1207	NRC1209	NRC1211	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	7/22/91	7/22/91	7/22/91		
	Temperature	(Deg C)	31	31	31	31	1
	Initial Mass	(g)	46	46	47	46	1

TEST RESULTS	Parameter	UNITS	NRC1207	NRC1209	NRC1211	AVG.	MAX
							DEV %
	Ignition Time	(s)	54	65	60	60	9
	Flameout Time	(s)	395	405	425	408	4
	Time PHR	(s)	200	200	200	200	0
	Peak RHR	(kW/m ²)	272	268	274	271	1
	Peak Mass Loss	(g/s*m ²)	21.3	20.6	21.3	21	2
	Peak Ext. Area	(m ² /kg)	171.9	197.9	228.4	199	15
	Total Heat Rel.	(MJ/m ²)	44.1	43.2	44.8	44	2
	THR @ PHR	(MJ/m ²)	24.5	24.1	24.5	24	1
	TM HEAT COMB.	(MJ/kg)	11.7	11.2	11.5	11	2
	TM RHR	(kW/m ²)	129.6	128.9	124.5	128	2
	TM MLR	(g/s*m ²)	14.0	14.1	14.0	14	0
	TM S. Ext. Area	(m ² /kg)	85.6	77.3	82.3	82	5
	Mass Final	(g)	10	10	10	10	3

SUPPLEMENTARY DATA	Parameter	UNITS	NRC1207	NRC1209	NRC1211	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	131.1	148.1	145.6	142	7
	60s MLR	(g/s*m ²)	12.0	12.3	13.1	12	5
	60s HEAT COMB.	(MJ/kg)	10.3	11.1	10.3	11	5
	60s S. Ext. Area	(m ² /kg)	60.0	53.8	59.1	58	7
	180s RHR	(kW/m ²)	177.4	185.5	183.8	182	3
	180s MLR	(g/s*m ²)	14.6	14.8	15.1	15	2
	180s HEAT COMB.	(MJ/kg)	12.0	12.3	11.9	12	2
	180s S. Ext. Area	(m ² /kg)	109.4	114.0	117.2	114	4
	300s RHR	(kW/m ²)	142.8	138.9	142.3	141	2
	300s MLR	(g/s*m ²)	11.5	11.1	11.5	11	2
	300s HEAT COMB.	(MJ/kg)	12.3	12.5	12.3	12	1
	300s S. Ext. Area	(m ² /kg)	96.9	86.1	98.7	94	8

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1200

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.0 g
Final Mass : 11.4 g
Mass Lost : 3.45 kg/m²
Ignition Time : 255 s
Flameout Time : 685 s

Time of Peak RHR : 380 s
Peak RHR : 163.8 kW/m²
Peak Mass Loss : 14.30 g/s*m²
Peak Extinction Area: 129.66 m²/kg
Total Heat Released : 37.71 MJ/m²

Summary Data From Ignition

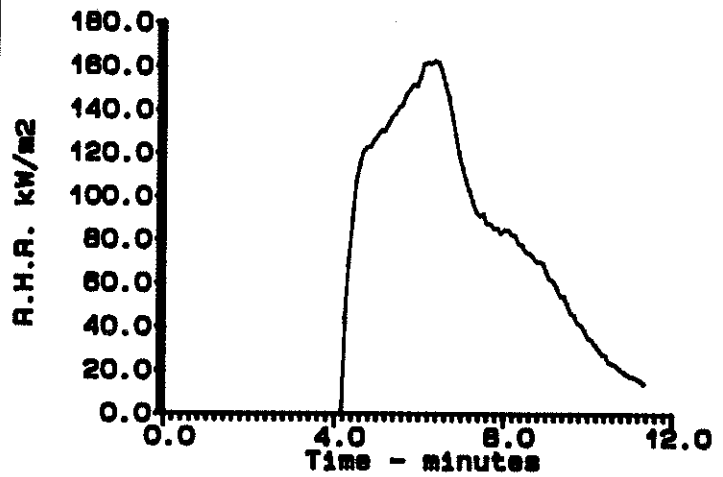
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	88.72	131.41	136.76	112.61
Mass Loss Rate	g/s*m ²	9.48	11.08	11.34	9.28
Heat of Combustion	MJ/kg	10.27	11.08	11.87	12.03
Specific Ext. Area	m ² /kg	41.29	74.51	91.15	58.30
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

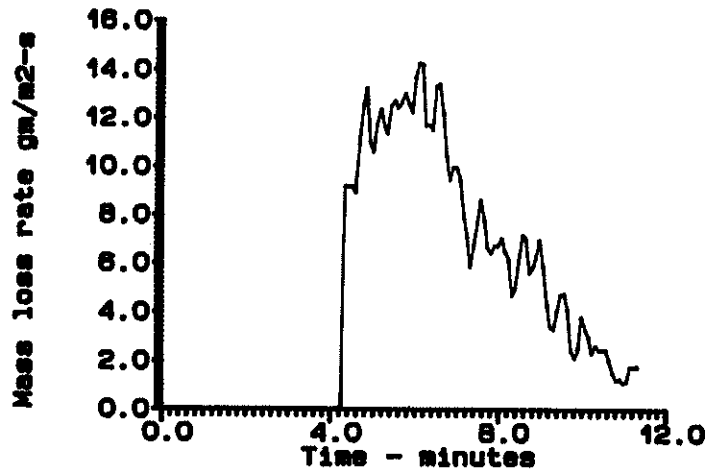
No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

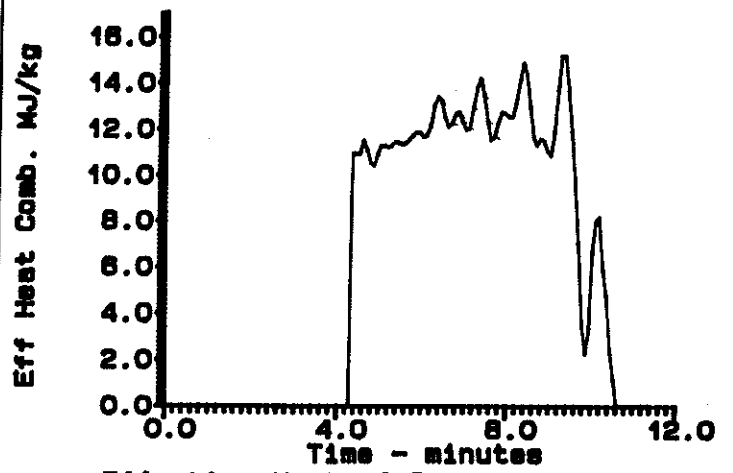
1/4" Wood Panelling Flux = 25



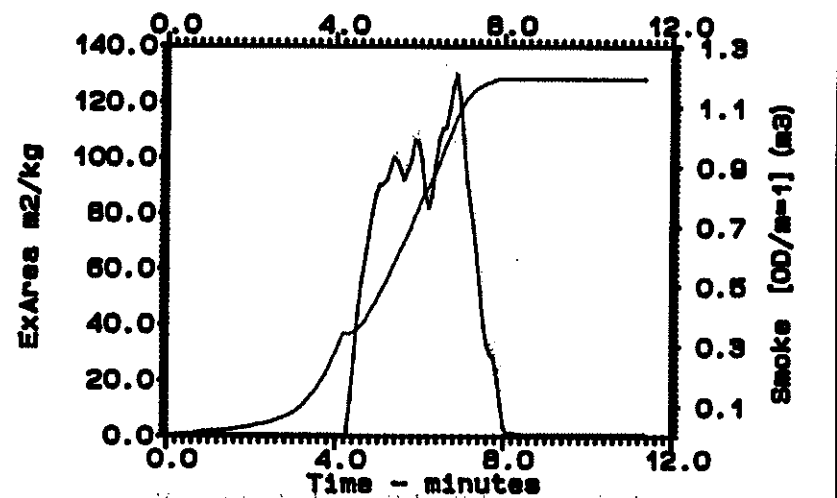
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
— Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRD1202

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 47.3 g
Final Mass : 11.8 g
Mass Lost : 3.55 kg/m²
Ignition Time : 245 s
Flameout Time : 645 s

Time of Peak RHR : 380 s
Peak RHR : 178.7 kW/m²
Peak Mass Loss : 14.49 g/s*m²
Peak Extinction Area: 159.56 m²/kg
Total Heat Released : 40.80 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	103.28	144.05	152.31	124.54
Mass Loss Rate g/s*m ²	9.81	11.30	12.07	9.75
Heat of Combustion MJ/kg	10.84	11.98	12.42	12.68
Specific Ext. Area m ² /kg	45.68	42.66	87.36	60.14
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.
Sagged slightly, like previous ones.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1204

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 44.4 g
Final Mass : 11.2 g
Mass Lost : 3.32 kg/m²
Ignition Time : 245 s
Flameout Time : 585 s

Time of Peak RHR : 350 s
Peak RHR : 201.0 kW/m²
Peak Mass Loss : 16.22 g/s*m²
Peak Extinction Area: 161.07 m²/kg
Total Heat Released : 38.04 MJ/m²

Summary Data From Ignition

		Test Mean	60S	180S	300s
Heat Release	kW/m ²	113.56	178.00	161.53	121.85
Mass Loss Rate	g/s*m ²	10.94	12.97	12.45	9.43
Heat of Combustion	MJ/kg	11.02	12.77	12.73	12.79
Specific Ext. Area	m ² /kg	40.23	40.57	73.54	44.90
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Dnno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1207

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : ~~25.0~~⁵⁰ kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.2 g
Final Mass : 9.9 g
Mass Lost : 3.64 kg/m²
Ignition Time : 54 s
Flameout Time : 395 s

Time of Peak RHR : 200 s
Peak RHR : 272.2 kW/m²
Peak Mass Loss : 21.33 g/s*m²
Peak Extinction Area: 171.91 m²/kg
Total Heat Released : 44.05 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	129.56	131.11	177.38	142.83
Mass Loss Rate g/s*m ²	13.96	11.96	14.56	11.50
Heat of Combustion MJ/kg	11.66	10.26	11.97	12.34
Specific Ext. Area m ² /kg	85.56	59.99	109.38	96.90
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1209

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : ⁵⁰~~25.0~~ kW/m²
Drifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.2 g
Final Mass : 9.5 g
Mass Lost : 3.67 kg/m²
Ignition Time : 65 s
Flameout Time : 405 s

Time of Peak RHR : 200 s
Peak RHR : 268.0 kW/m²
Peak Mass Loss : 20.59 g/s*m²
Peak Extinction Area: 197.94 m²/kg
Total Heat Released : 43.18 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	128.91	148.05	185.52	138.93
Mass Loss Rate	g/s*m ²	14.07	12.30	14.84	11.06
Heat of Combustion	MJ/kg	11.20	11.11	12.26	12.46
Specific Ext. Area	m ² /kg	77.27	53.77	114.04	86.10
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1211

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Wood Panelling 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.9 g
Final Mass : 10.0 g
Mass Lost : 3.68 kg/m²
Ignition Time : 60 s
Flameout Time : 425 s

Time of Peak RHR : 200 s
Peak RHR : 273.8 kW/m²
Peak Mass Loss : 21.35 g/s*m²
Peak Extinction Area: 228.35 m²/kg
Total Heat Released : 44.81 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	124.47	145.57	183.81	142.32
Mass Loss Rate g/s*m ²	14.00	13.13	15.12	11.46
Heat of Combustion MJ/kg	11.54	10.29	11.91	12.32
Specific Ext. Area m ² /kg	82.32	59.13	117.20	98.66
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

APPENDIX H: 12.3 mm PARTICLEBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1157	NRC1167	NRC1175		DEV %
	Date Tested	(D/M/Y)	7/3/91	7/4/91	7/5/91		
	Temperature	(Deg C)	28	28	27	28	2
	Initial Mass	(g)	89	86	88	88	2

TEST RESULTS		UNITS				AVG.	MAX
			NRC1157	NRC1167	NRC1175		DEV %
	Ignition Time	(s)	129	125	135	130	4
	Flameout Time	(s)	1110	1150	1200	1153	4
	Time PHR	(s)	885	145	155	395	124
	Peak RHR	(kW/m2)	144	150	136	143	5
	Peak Mass Loss	(g/s*m2)	12.2	12.8	12.8	13	3
	Peak Ext. Area	(m2/kg)	88.5	75.5	111.4	92	21
	Total Heat Rel.	(MJ/m2)	75.2	78.8	70.2	75	6
	THR @ PHR	(MJ/m2)	N / A	N / A	N / A	N / A	N / A
	TM HEAT COMB.	(MJ/kg)	11.2	11.8	10.3	11	7
	TM RHR	(kW/m2)	76.8	77.2	66.2	73	10
	TM MLR	(g/s*m2)	6.9	6.4	6.6	7	4
	TM S. Ext. Area	(m2/kg)	14.3	10.8	12.9	13	15
	Mass Final	(g)	23	23	23	23	1

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1157	NRC1167	NRC1175		DEV %
	60s RHR	(kW/m2)	133.7	146.2	132.0	137	7
	60s MLR	(g/s*m2)	10.9	11.4	11.3	11	3
	60s HEAT COMB.	(MJ/kg)	11.5	11.9	10.9	11	5
	60s S. Ext. Area	(m2/kg)	46.5	62.3	47.3	52	20
	180s RHR	(kW/m2)	95.6	98.4	89.4	94	5
	180s MLR	(g/s*m2)	8.8	8.5	8.5	9	2
	180s HEAT COMB.	(MJ/kg)	10.6	11.2	10.3	11	5
	180s S. Ext. Area	(m2/kg)	19.4	27.1	21.2	23	20
	300s RHR	(kW/m2)	79.2	81.6	72.0	78	7
	300s MLR	(g/s*m2)	7.5	7.2	7.2	7	2
	300s HEAT COMB.	(MJ/kg)	10.4	11.1	9.9	10	6
	300s S. Ext. Area	(m2/kg)	11.7	16.2	12.7	14	20

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1120	NRC1129	NRC1139		DEV %
	Date Tested	(D/M/Y)	6/13/91	6/14/91	6/19/91		
	Temperature	(Deg C)	28	26	29	28	6
	Initial Mass	(g)	86	79	85	83	6

TEST RESULTS		UNITS				AVG.	MAX
			NRC1120	NRC1129	NRC1139		DEV %
	Ignition Time	(s)	40	30	34	35	15
	Flameout Time	(s)	823	844	800	822	3
	Time PHR	(s)	595	50	50	232	157
	Peak RHR	(kW/m ²)	253	207	212	224	13
	Peak Mass Loss	(g/s*m ²)	19.8	17.0	17.8	18	9
	Peak Ext. Area	(m ² /kg)	219.5	147.2	215.2	194	24
	Total Heat Rel.	(MJ/m ²)	78.0	71.1	71.4	73	6
	THR @ PHR	(MJ/m ²)	N / A	N / A	N / A	N / A	N / A
	TM HEAT COMB.	(MJ/kg)	11.0	10.6	10.7	11	2
	TM RHR	(kW/m ²)	100.6	88.3	93.3	94	7
	TM MLR	(g/s*m ²)	9.4	9.0	9.1	9	3
	TM S. Ext. Area	(m ² /kg)	34.9	27.2	33.7	32	15
	Mass Final	(g)	20	18	20	19	8

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1120	NRC1129	NRC1139		DEV %
	60s RHR	(kW/m ²)	182.1	189.5	192.0	188	3
	60s MLR	(g/s*m ²)	14.3	13.9	14.8	14	3
	60s HEAT COMB.	(MJ/kg)	11.8	12.7	12.3	12	4
	60s S. Ext. Area	(m ² /kg)	127.7	135.8	127.8	130	4
	180s RHR	(kW/m ²)	124.7	129.5	127.8	127	2
	180s MLR	(g/s*m ²)	10.9	10.9	11.2	11	2
	180s HEAT COMB.	(MJ/kg)	11.0	11.6	11.2	11	3
	180s S. Ext. Area	(m ² /kg)	54.2	60.1	57.2	57	5
	300s RHR	(kW/m ²)	103.7	108.2	104.0	105	3
	300s MLR	(g/s*m ²)	9.6	9.5	9.7	10	1
	300s HEAT COMB.	(MJ/kg)	10.6	11.2	10.5	11	4
	300s S. Ext. Area	(m ² /kg)	32.5	36.1	34.3	34	5

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1157

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.041968
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 28.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 88.7 g
Final Mass : 23.1 g
Mass Lost : 6.56 g/m²
Ignition Time : 129 s
Flameout Time : 1,110 s

Time of Peak RHR : 885 s
Peak RHR : 144.1 kW/m²
Peak Mass Loss : 12.15 g/s*m²
Peak Extinction Area: 88.52 m²/kg
Total Heat Released : 75.22 MJ/m²

Summary Data From Ignition

	Test Mean	60s	180s	300s	
Heat Release	kW/m ²	76.76	133.65	95.61	79.18
Mass Loss Rate	g/s*m ²	6.94	10.87	8.80	7.46
Heat of Combustion	MJ/kg	11.17	11.48	10.59	10.43
Specific Ext. Area	m ² /kg	14.28	46.48	19.42	11.65
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1167

Test Date: 07-04-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 28.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 86.4 g
Final Mass : 22.5 g
Mass Lost : 6.40 kg/m²
Ignition Time : 125 s
Flameout Time : 1,150 s

Time of Peak RHR : 145 s
Peak RHR : 150.2 kW/m²
Peak Mass Loss : 12.76 g/s*m²
Peak Extinction Area: 75.48 m²/kg
Total Heat Released : 78.75 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	77.21	146.24	98.36	81.63
Mass Loss Rate g/s*m ²	6.44	11.43	8.52	7.23
Heat of Combustion MJ/kg	11.76	11.94	11.24	11.09
Specific Ext. Area m ² /kg	10.81	62.30	27.06	16.24
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1175

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 27.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 88.2 g
Final Mass : 22.8 g
Mass Lost : 6.54 kg/m²
Ignition Time : 135 s
Flameout Time : 1,200 s

Time of Peak RHR : 155 s
Peak RHR : 135.9 kW/m²
Peak Mass Loss : 12.82 g/s*m²
Peak Extinction Area: 111.36 m²/kg
Total Heat Released : 70.15 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	66.18	131.98	89.40	72.02
Mass Loss Rate g/s*m ²	6.57	11.28	8.48	7.16
Heat of Combustion MJ/kg	10.30	10.91	10.27	9.87
Specific Ext. Area m ² /kg	12.86	47.31	21.22	12.73
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Dnno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1120

Test Date: 06-13-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.044168
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 27.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 86.1 g
Final Mass : 20.3 g
Mass Lost : 6.59 kg/m²
Ignition Time : 40 s
Flameout Time : 823 s

Time of Peak RHR : 595 s
Peak RHR : 253.3 kW/m²
Peak Mass Loss : 19.82 g/s*m²
Peak Extinction Area: 219.49 m²/kg
Total Heat Released : 77.98 MJ/m²

Summary Data From Ignition

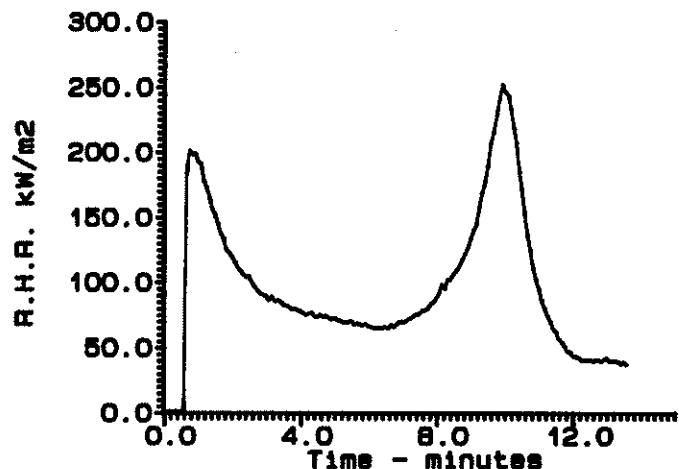
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	100.61	182.07	124.70	103.74
Mass Loss Rate	g/s*m ²	9.44	14.29	10.94	9.57
Heat of Combustion	MJ/kg	10.99	11.79	11.04	10.61
Specific Ext. Area	m ² /kg	34.92	127.73	54.18	32.51
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

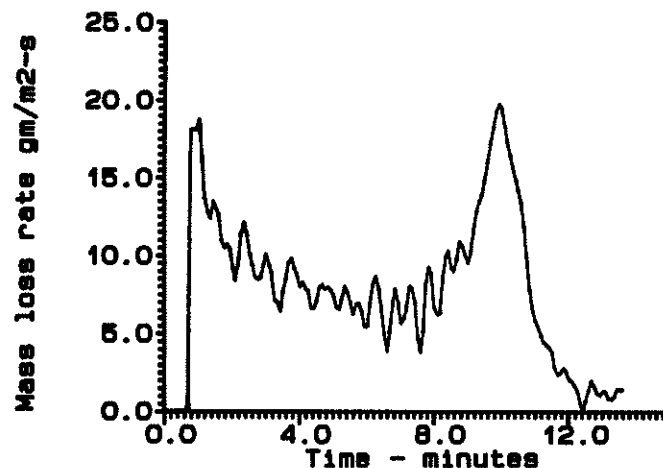
This is the first test with the frame fully fastened down.
This will be the method to test all future materials.
The samples' second peak is associated with the sample ballooning up towards the cone, and burning the underside of the material.

Tested by : Dnno Robert
Officer : Kim Andrew

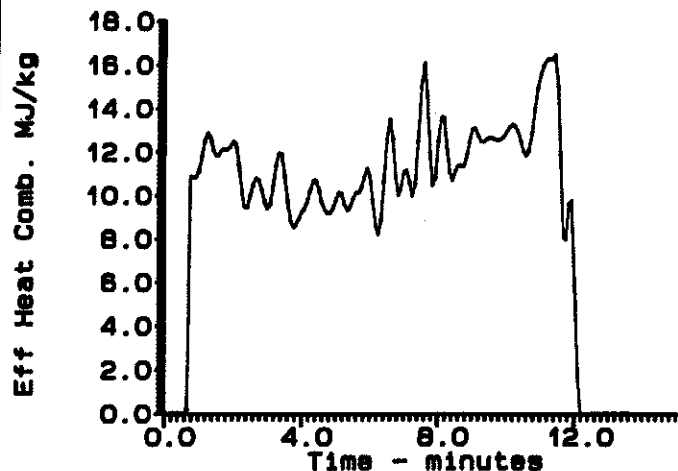
1/2" Particle Board 90



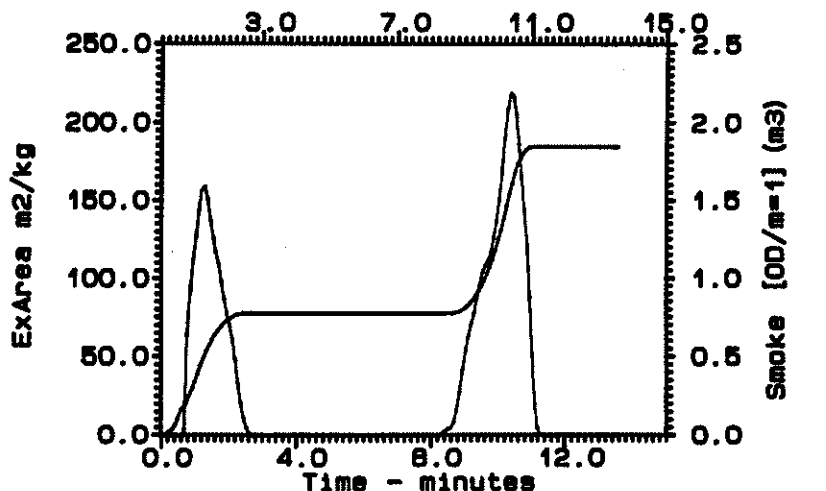
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 - - - Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1129

Test Date: 06-14-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifice Constant : 0.042404
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 25.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 78.7 g
Final Mass : 17.9 g
Mass Lost : 6.08 kg/m²
Ignition Time : 30 s
Flameout Time : 844 s

Time of Peak RHR : 50 s
Peak RHR : 206.8 kW/m²
Peak Mass Loss : 16.97 g/s*m²
Peak Extinction Area: 147.16 m²/kg
Total Heat Released : 71.08 MJ/m²

Summary Data From Ignition

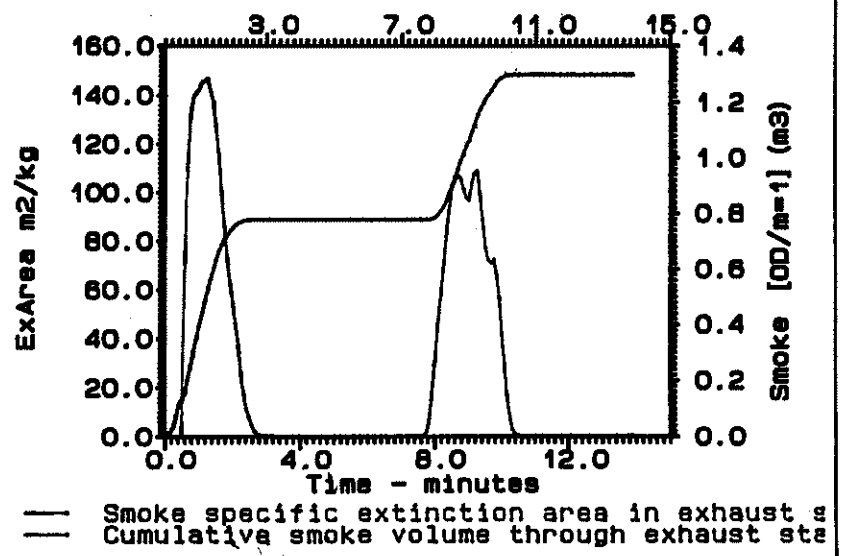
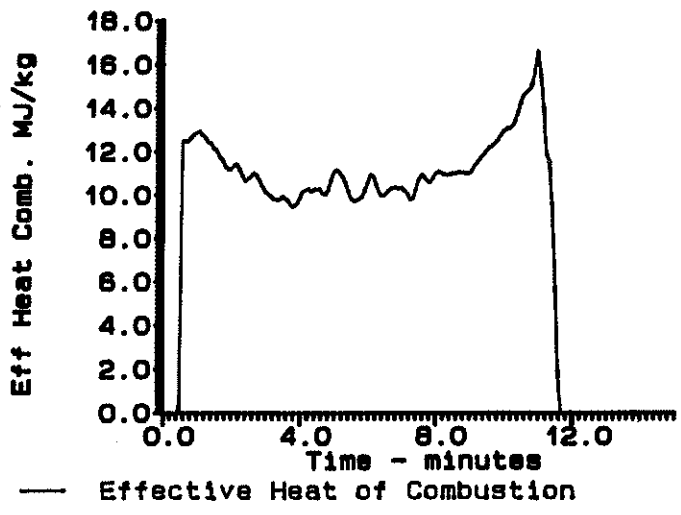
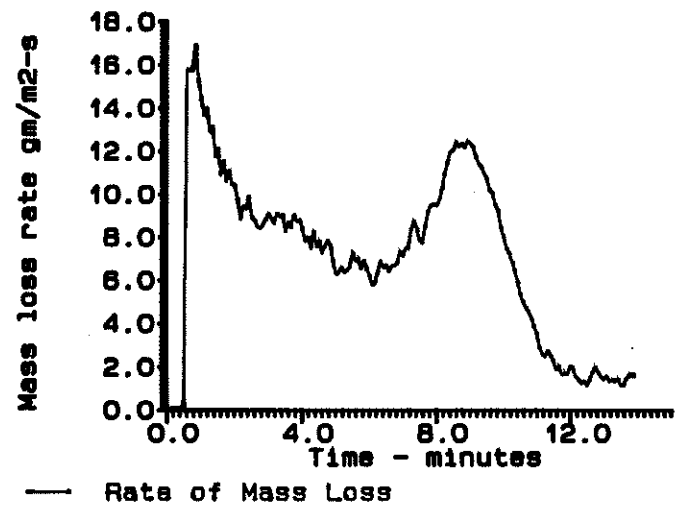
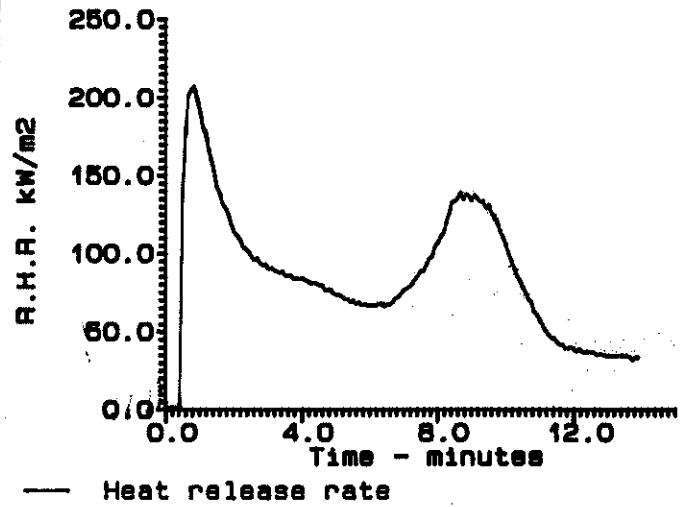
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	88.30	189.46	129.49	108.24
Mass Loss Rate	g/s*m ²	9.00	13.92	10.86	9.52
Heat of Combustion	MJ/kg	10.63	12.69	11.59	11.15
Specific Ext. Area	m ² /kg	27.21	135.76	60.09	36.05
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The frame screw loosened and the frame lifted up slightly. Otherwise, same burn, the center ballooning up towards the cone.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particle Board 91



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1139

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2" Particle Board 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012500m

Test Conditions : 50.0 RH @ 28.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 85.3 g
Final Mass : 20.2 g
Mass Lost : 6.51 kg/m²
Ignition Time : 34 s
Flameout Time : 800 s

Time of Peak RHR : 50 s
Peak RHR : 211.9 kW/m²
Peak Mass Loss : 17.76 g/s*m²
Peak Extinction Area: 215.20 m²/kg
Total Heat Released : 71.37 MJ/m²

Summary Data From Ignition

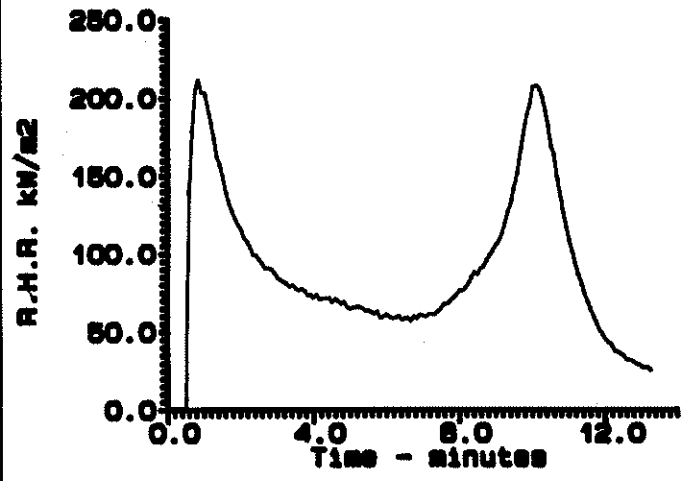
	Test Mean	60S	180S	300s
Heat Release kW/m ²	93.29	191.97	127.77	103.96
Mass Loss Rate g/s*m ²	9.11	14.75	11.19	9.74
Heat of Combustion MJ/kg	10.66	12.25	11.16	10.51
Specific Ext. Area m ² /kg	33.68	127.77	57.23	34.34
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

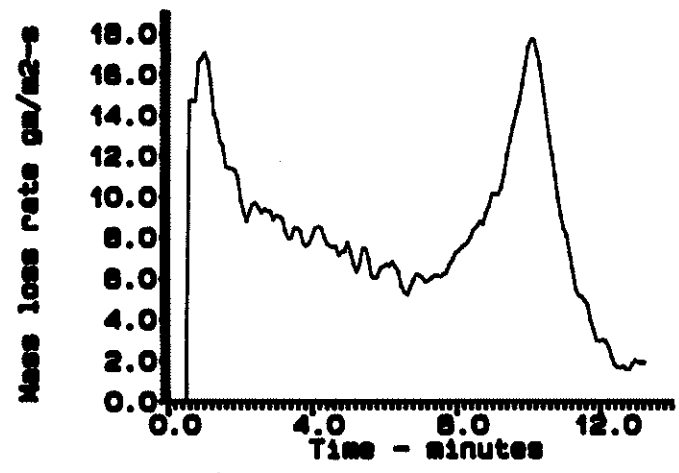
Uneventful

Tested by : Onno Robert

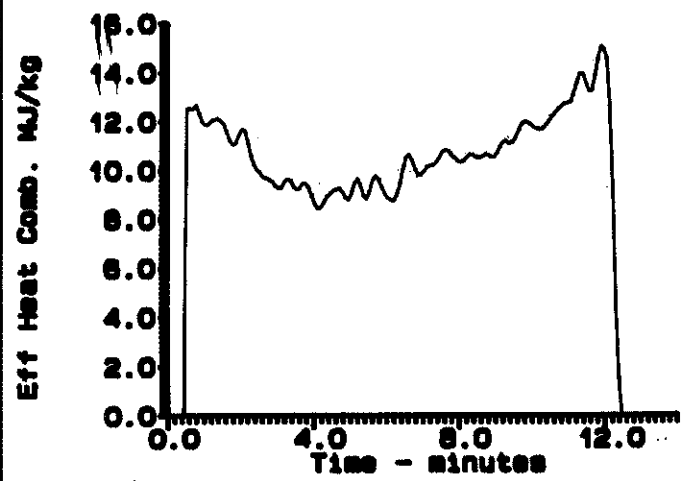
1/2" Particle Board 91



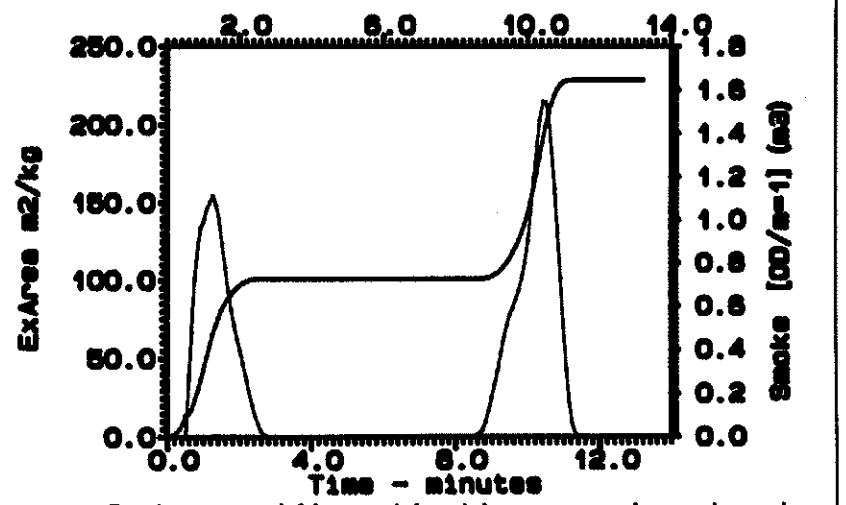
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
- - - Cumulative smoke volume through exhaust sta

APPENDIX I: 6.0 mm PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1164	NRC1179	NRC1153		DEV %
	Date Tested	(D/M/Y)	7/4/91	7/5/91	7/3/91		
	Temperature	(Deg C)	28	28	28	28	1
	Initial Mass	(g)	35	35	36	35	2

TEST RESULTS		UNITS				AVG.	MAX
			NRC1164	NRC1179	NRC1153		DEV %
	Ignition Time	(s)	100	120	115	112	10
	Flameout Time	(s)	670	585	645	633	8
	Time PHR	(s)	110	140	130	127	13
	Peak RHR	(kW/m2)	124	115	122	120	5
	Peak Mass Loss	(g/s*m2)	9.1	11.3	9.6	10	13
	Peak Ext. Area	(m2/kg)	86.2	28.8	30.3	48	78
	Total Heat Rel.	(MJ/m2)	37.5	33.0	29.0	33	13
	THR @ PHR	(MJ/m2)	1.8	2.4	2.2	2	16
	TM HEAT COMB.	(MJ/kg)	11.1	10.6	9.3	10	10
	TM RHR	(kW/m2)	66.4	71.6	55.2	64	14
	TM MLR	(g/s*m2)	5.4	7.1	5.4	6	19
	TM S. Ext. Area	(m2/kg)	4.6	2.9	2.9	3	32
	Mass Final	(g)	8	8	10	9	19

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1164	NRC1179	NRC1153		DEV %
	60s RHR	(kW/m2)	99.8	106.1	96.8	101	5
	60s MLR	(g/s*m2)	7.5	9.2	7.8	8	12
	60s HEAT COMB.	(MJ/kg)	12.2	10.8	11.5	11	6
	60s S. Ext. Area	(m2/kg)	2.9	1.5	0.0	1	100
	180s RHR	(kW/m2)	90.7	96.7	85.9	91	6
	180s MLR	(g/s*m2)	7.0	8.2	7.3	7	9
	180s HEAT COMB.	(MJ/kg)	12.5	11.5	11.5	12	6
	180s S. Ext. Area	(m2/kg)	1.0	2.7	5.6	3	80
	300s RHR	(kW/m2)	86.0	89.2	74.8	83	10
	300s MLR	(g/s*m2)	6.5	7.3	6.4	7	8
	300s HEAT COMB.	(MJ/kg)	13.0	12.0	11.5	12	7
	300s S. Ext. Area	(m2/kg)	8.3	4.4	5.1	6	40

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS	NRC1109	NRC1108	NRC1142	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/18/91	6/19/91	6/21/91		
	Temperature	(Deg C)	29	30	29	29	1
	Initial Mass	(g)	35	34	35	35	1

TEST RESULTS		UNITS	NRC1109	NRC1108	NRC1142	AVG.	MAX
							DEV %
	Ignition Time	(s)	20	25	15	20	25
	Flameout Time	(s)	480	425	430	445	8
	Time PHR	(s)	205	195	25	142	82
	Peak RHR	(kW/m ²)	136	156	147	146	7
	Peak Mass Loss	(g/s*m ²)	10.7	13.3	13.0	12	13
	Peak Ext. Area	(m ² /kg)	95.6	126.6	110.3	111	14
	Total Heat Rel.	(MJ/m ²)	35.4	32.4	33.1	34	5
	THR @ PHR	(MJ/m ²)	20.5	19.0	N / A	20	4
	TM HEAT COMB.	(MJ/kg)	11.3	10.9	10.8	11	3
	TM RHR	(kW/m ²)	77.8	82.1	80.7	80	3
	TM MLR	(g/s*m ²)	7.4	8.6	8.4	8	9
	TM S. Ext. Area	(m ² /kg)	19.4	23.0	23.8	22	12
	Mass Final	(g)	7	7	7	7	0

SUPPLEMENTARY DATA		UNITS	NRC1109	NRC1108	NRC1142	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	129.0	123.1	127.3	126	3
	60s MLR	(g/s*m ²)	9.7	10.0	10.2	10	2
	60s HEAT COMB.	(MJ/kg)	12.3	11.4	11.6	12	5
	60s S. Ext. Area	(m ² /kg)	40.5	24.9	38.7	35	28
	180s RHR	(kW/m ²)	111.0	114.3	114.8	113	2
	180s MLR	(g/s*m ²)	9.0	9.7	9.8	9	5
	180s HEAT COMB.	(MJ/kg)	11.9	11.4	11.4	12	3
	180s S. Ext. Area	(m ² /kg)	32.9	34.2	40.0	36	12
	300s RHR	(kW/m ²)	96.6	96.3	96.5	96	0
	300s MLR	(g/s*m ²)	7.7	8.1	8.2	8	3
	300s HEAT COMB.	(MJ/kg)	12.3	11.8	11.7	12	3
	300s S. Ext. Area	(m ² /kg)	28.8	29.7	31.7	30	5

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1164

Test Date: 07-04-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 28.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.9 g
Final Mass : 8.0 g
Mass Lost : 2.69 kg/m²
Ignition Time : 100 s
Flameout Time : 670 s

Time of Peak RHR : 110 s
Peak RHR : 124.2 kW/m²
Peak Mass Loss : 9.08 g/s*m²
Peak Extinction Area: 86.20 m²/kg
Total Heat Released : 37.51 MJ/m²

Summary Data From Ignition

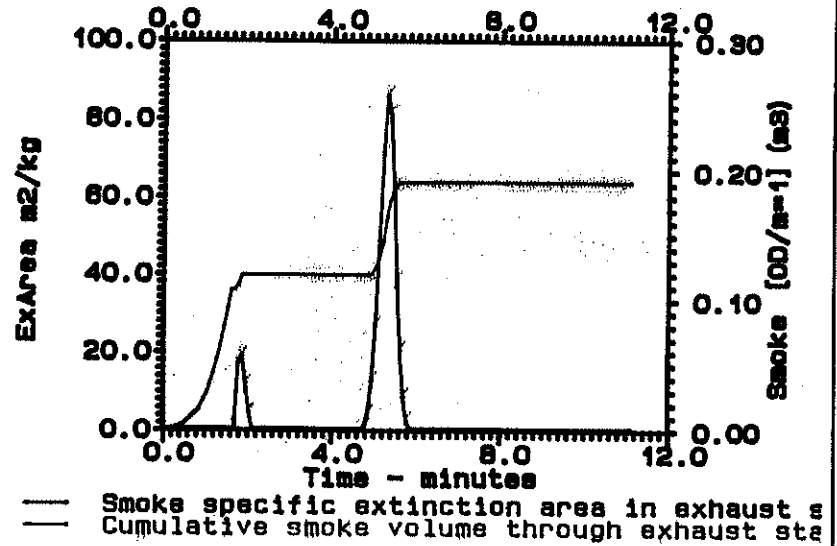
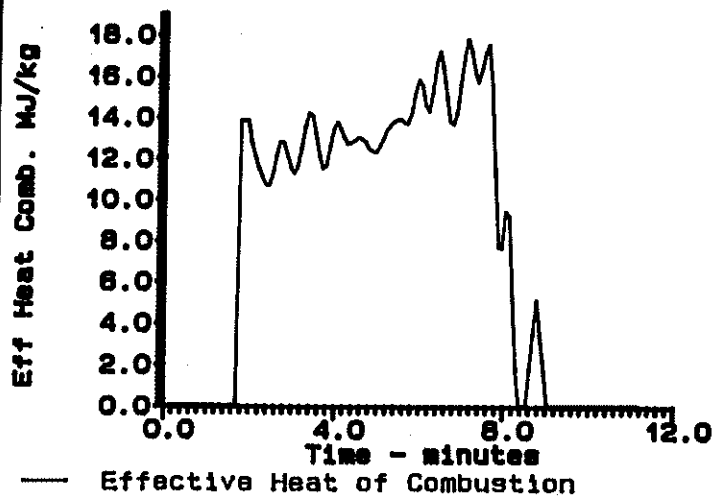
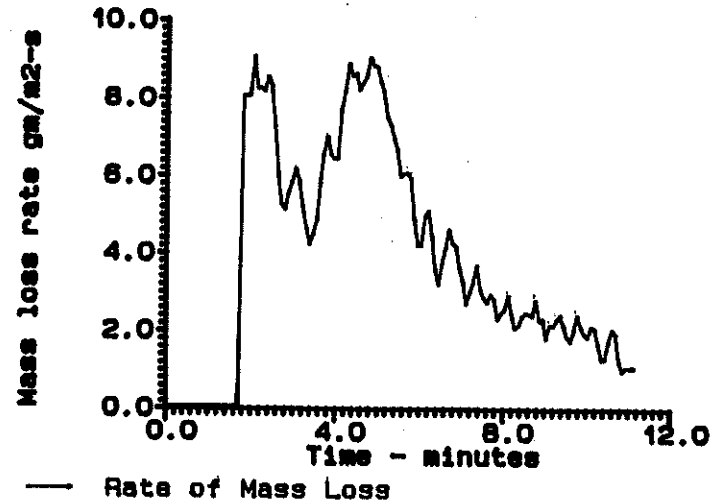
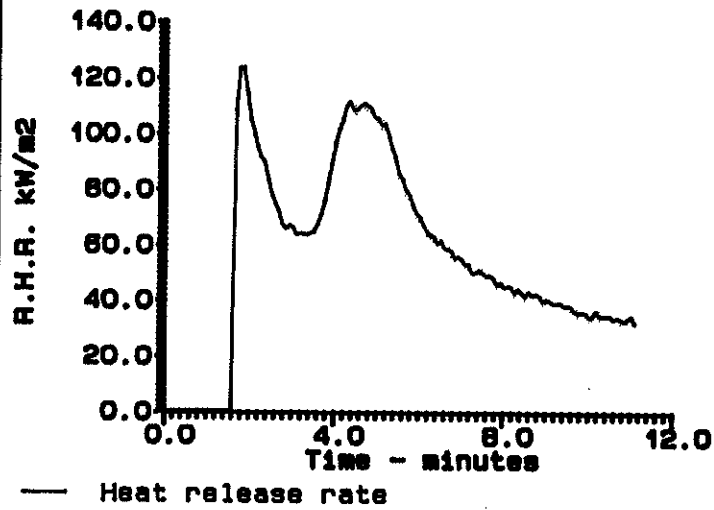
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	66.40	99.79	90.69	85.96
Mass Loss Rate	g/s*m ²	5.36	7.54	7.00	6.50
Heat of Combustion	MJ/kg	11.05	12.18	12.49	13.00
Specific Ext. Area	m ² /kg	4.57	2.93	0.99	8.32
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample rose slightly. Formed thin layers

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Plywood 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1179

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.8 g
Final Mass : 7.8 g
Mass Lost : 2.70 kg/m²
Ignition Time : 120 s
Flameout Time : 585 s

Time of Peak RHR : 140 s
Peak RHR : 114.5 kW/m²
Peak Mass Loss : 11.25 g/s*m²
Peak Extinction Area: 28.75 m²/kg
Total Heat Released : 32.95 MJ/m²

Summary Data From Ignition

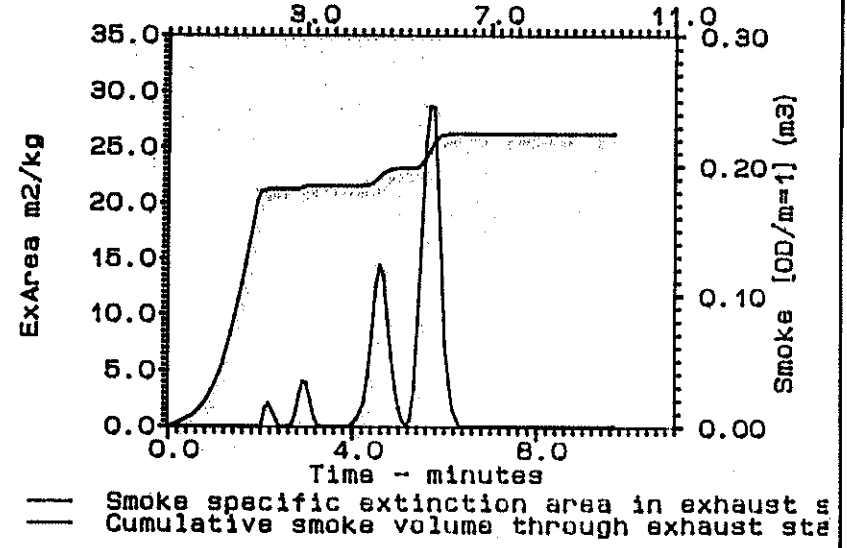
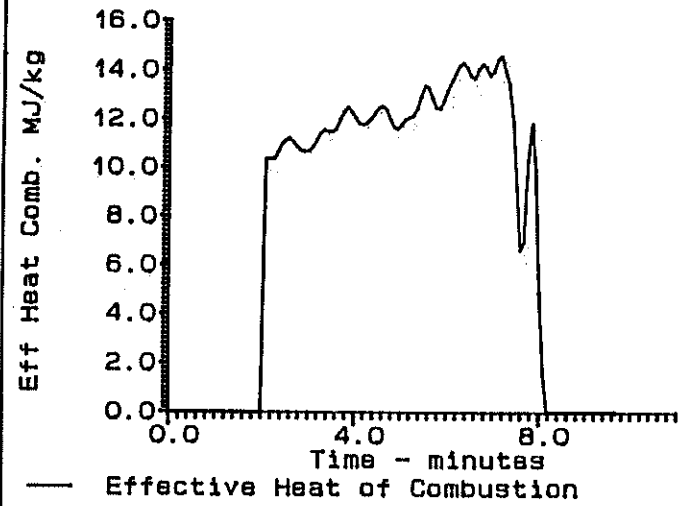
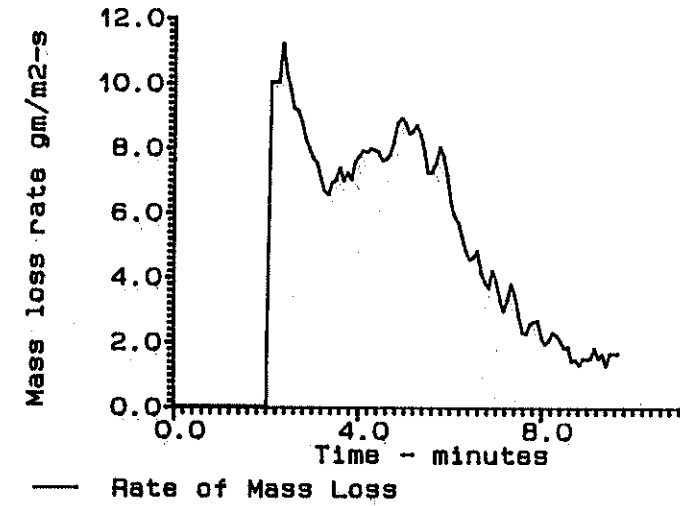
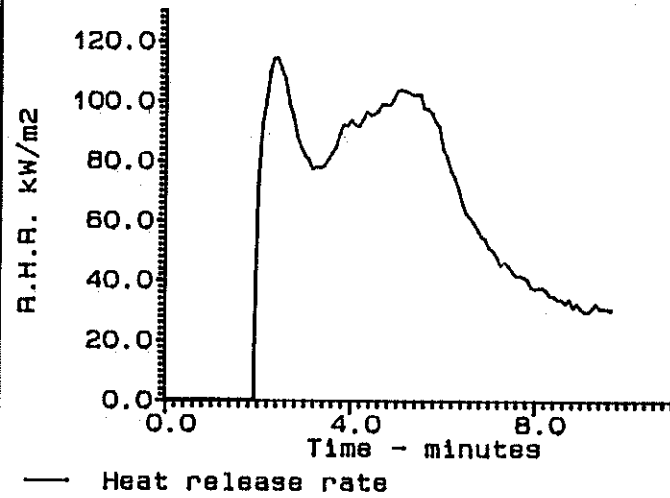
	Test Mean	60S	180S	300s
Heat Release kW/m ²	71.64	106.14	96.74	89.15
Mass Loss Rate g/s*m ²	7.07	9.20	8.18	7.30
Heat of Combustion MJ/kg	10.60	10.77	11.49	12.05
Specific Ext. Area mJ/kg	2.88	1.52	2.74	4.40
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Plywood 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1153

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.041968
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 27.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 36.0 g
Final Mass : 10.5 g
Mass Lost : 2.55 kg/m²
Ignition Time : 115 s
Flameout Time : 645 s

Time of Peak RHR : 130 s
Peak RHR : 122.0 kW/m²
Peak Mass Loss : 9.61 g/s*m²
Peak Extinction Area: 30.27 m²/kg
Total Heat Released : 28.96 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	55.17	96.85	85.86	74.83
Mass Loss Rate g/s*m ²	5.42	7.82	7.27	6.43
Heat of Combustion MJ/kg	9.26	11.47	11.45	11.46
Specific Ext. Area m ² /kg	2.94	0.00	5.61	5.14
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1152

Test Date: 06-24-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.043192
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.1 g
Final Mass : 9.0 g
Mass Lost : 2.50 kg/m²
Ignition Time : 155 s
Flameout Time : 705 s

Time of Peak RHR : 175 s
Peak RHR : 128.8 kW/m²
Peak Mass Loss : 11.56 g/s*m²
Peak Extinction Area: 57.31 m²/kg
Total Heat Released : 30.10 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	55.23	114.28	94.85	76.04
Mass Loss Rate g/s*m ²	5.16	9.08	7.64	6.17
Heat of Combustion MJ/kg	9.12	11.74	12.07	12.14
Specific Ext. Area m ² /kg	4.73	16.70	12.66	8.55
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

As expected, but the end was difficult to tell. Possibly want to run it longer.

Tested by : Dnno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC110B

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.0427B0
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.2 g
Final Mass : 6.9 g
Mass Lost : 2.73 kg/m²
Ignition Time : 25 s
Flameout Time : 425 s

Time of Peak RHR : 195 s
Peak RHR : 156.4 kW/m²
Peak Mass Loss : 13.32 g/s*m²
Peak Extinction Area: 126.61 m²/kg
Total Heat Released : 32.42 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	82.08	123.09	114.27	96.27
Mass Loss Rate	g/s*m ²	8.59	10.02	9.68	8.06
Heat of Combustion	MJ/kg	10.91	11.39	11.43	11.76
Specific Ext. Area	m ² /kg	22.98	24.88	34.25	29.71
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

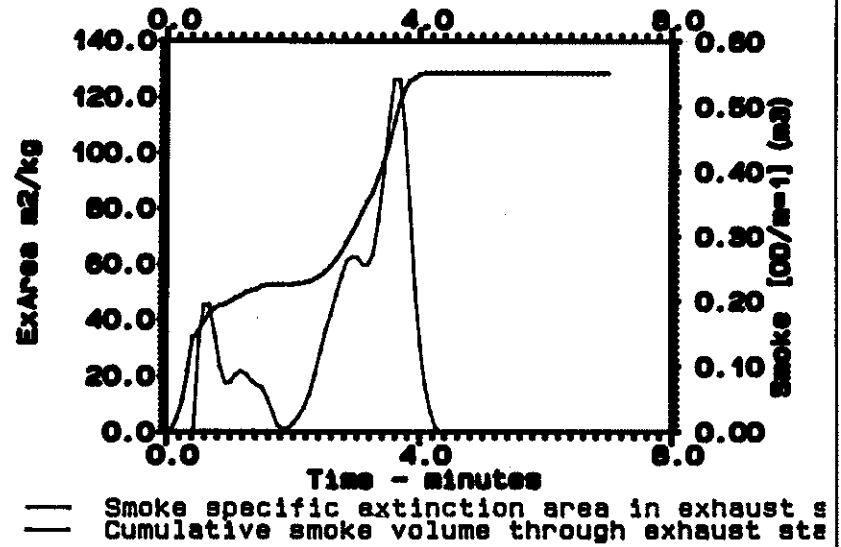
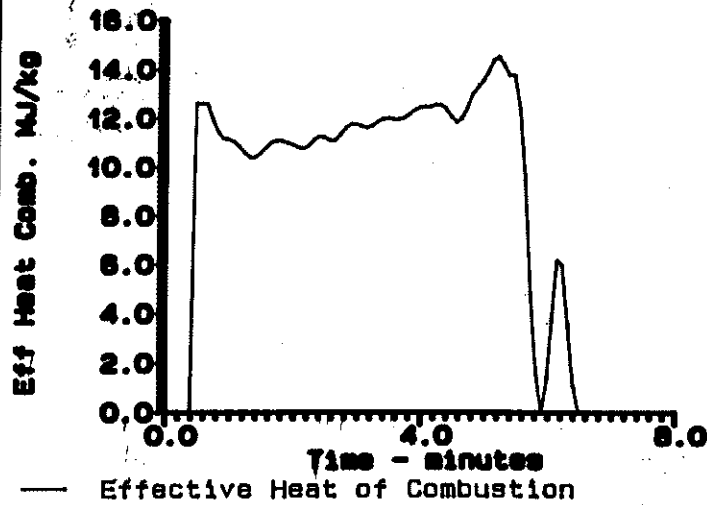
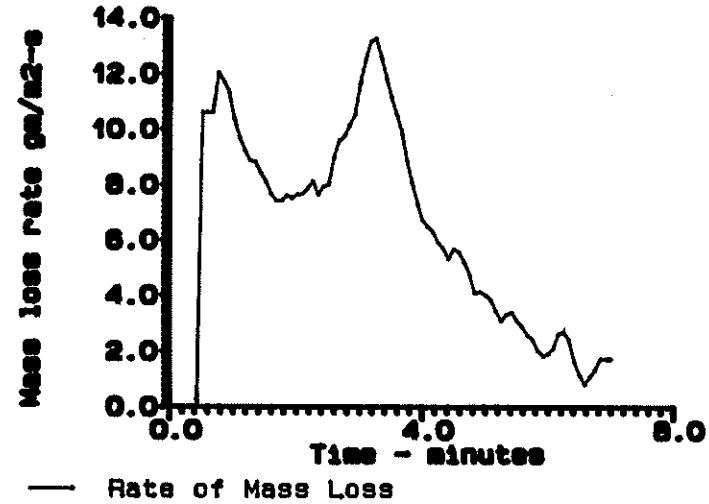
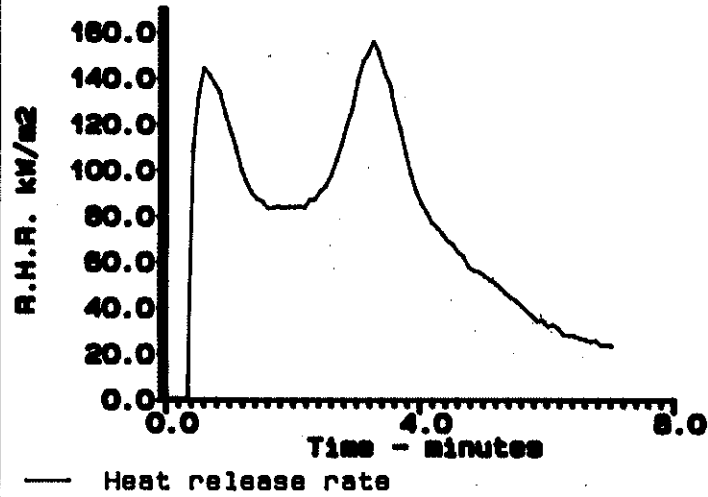
Typical characteristics of material.

The sample rose at the end of the second peak rhr, not before

Tested by : Onno Robert

Officer : Kim Andrew

1/4" Plywood 91



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1109

Test Date: 06-18-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.043299
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.8 g
Final Mass : 7.0 g
Mass Lost : 2.79 kg/m²
Ignition Time : 20 s
Flameout Time : 480 s

Time of Peak RHR : 205 s
Peak RHR : 135.6 kW/m²
Peak Mass Loss : 10.73 g/s*m²
Peak Extinction Area: 95.56 m²/kg
Total Heat Released : 35.41 MJ/m²

Summary Data From Ignition

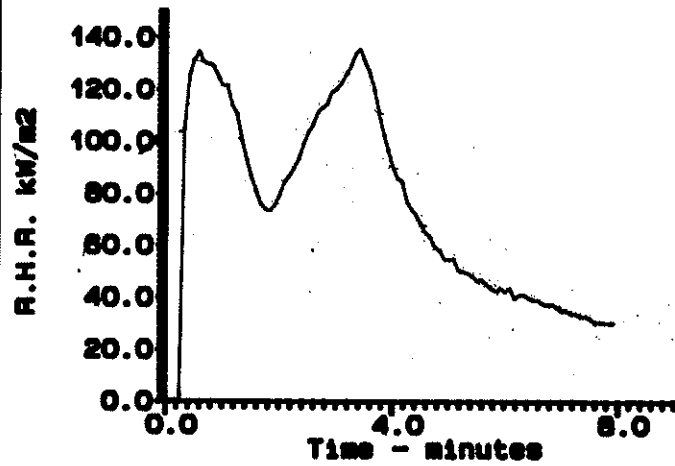
	Test Mean	60S	180S	300s
Heat Release kW/m ²	77.82	128.95	110.99	96.55
Mass Loss Rate g/s*m ²	7.42	9.74	9.02	7.73
Heat of Combustion MJ/kg	11.31	12.34	11.92	12.30
Specific Ext. Area m ² /kg	19.43	40.49	32.86	28.79
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

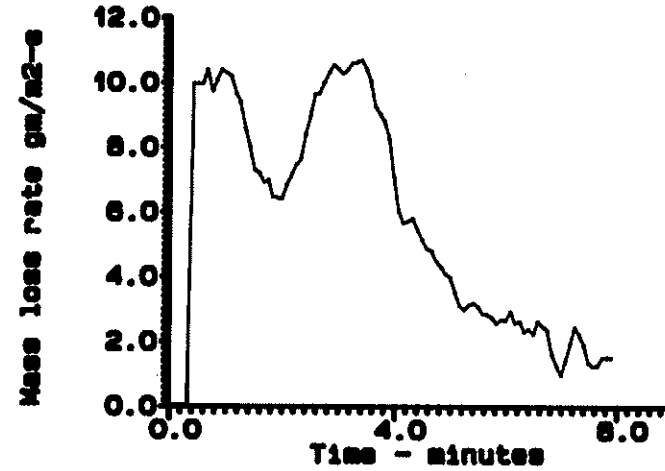
Typical of sample.
Some curling, waferlike at end.

Tested by : Onno Robert
Officer : Kim Andrew

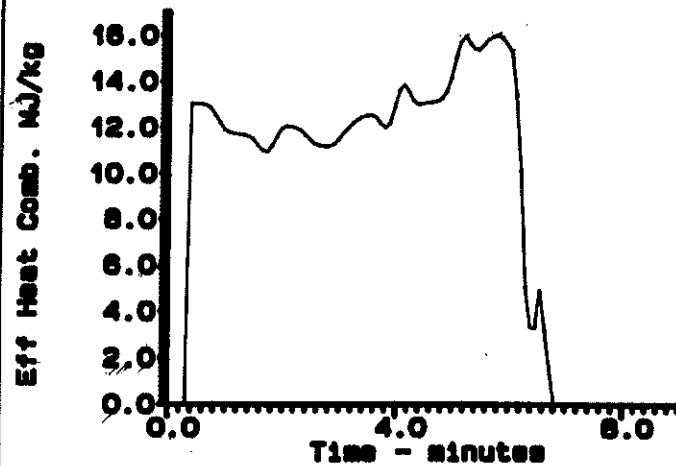
1/4" Plywood 91



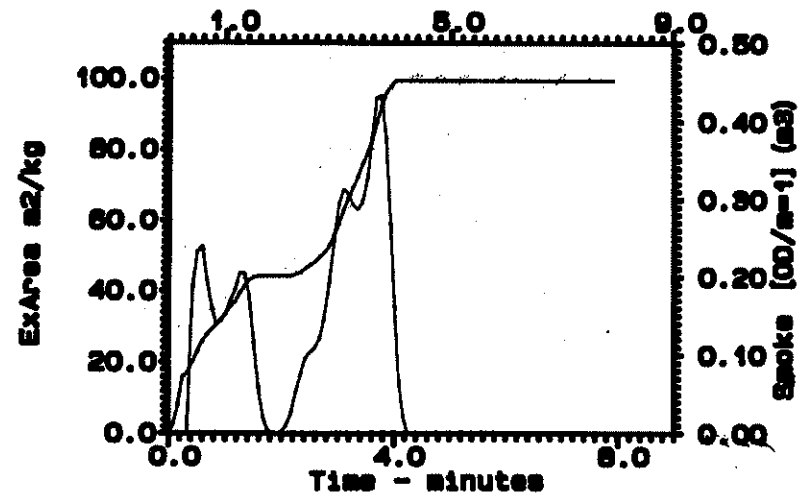
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 — Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1142

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043842
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.7 g
Final Mass : 7.0 g
Mass Lost : 2.77 kg/m²
Ignition Time : 15 s
Flameout Time : 430 s

Time of Peak RHR : 25 s
Peak RHR : 146.7 kW/m²
Peak Mass Loss : 12.97 g/s*m²
Peak Extinction Area: 110.30 m²/kg
Total Heat Released : 33.07 MJ/m²

Summary Data From Ignition

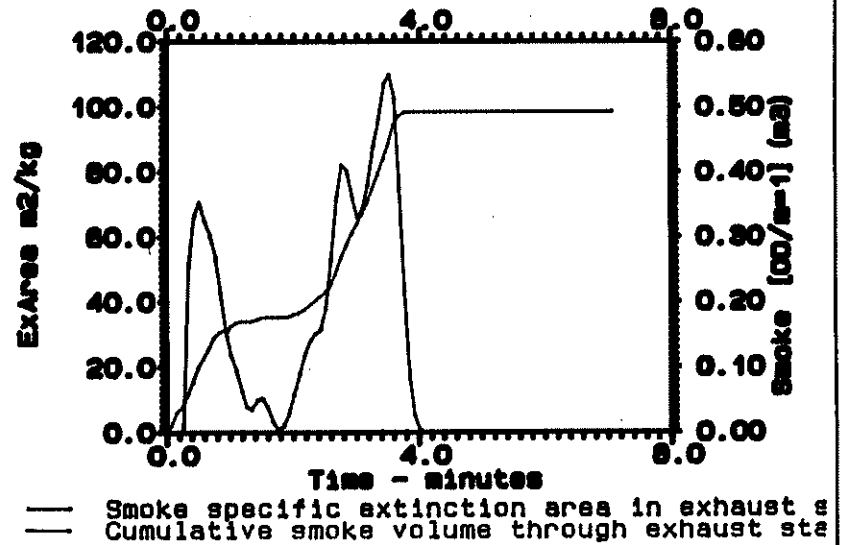
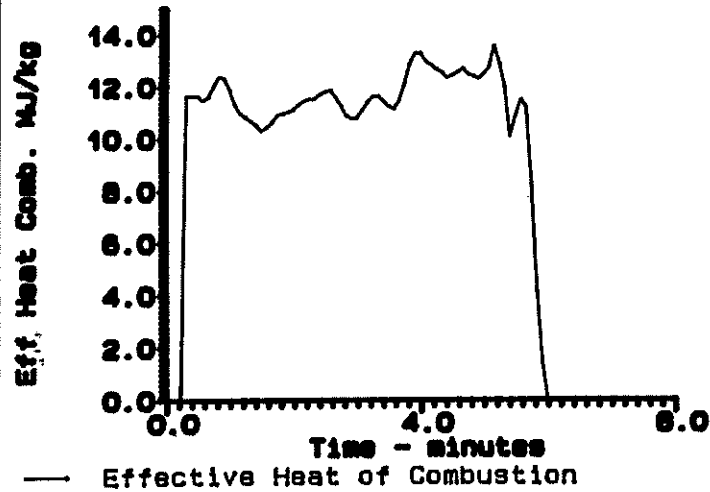
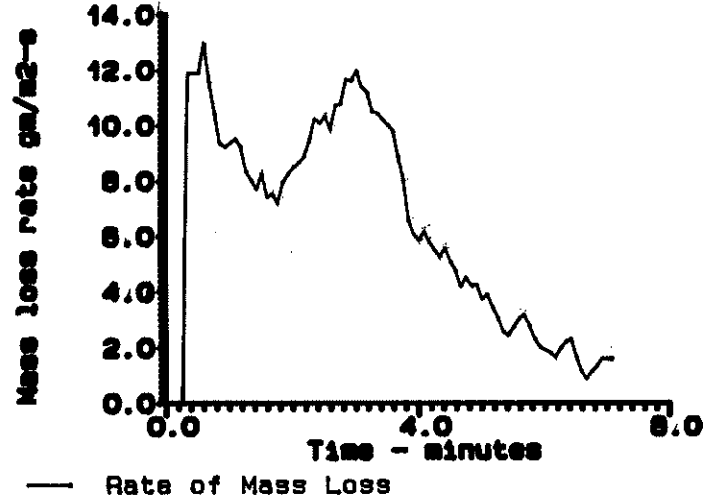
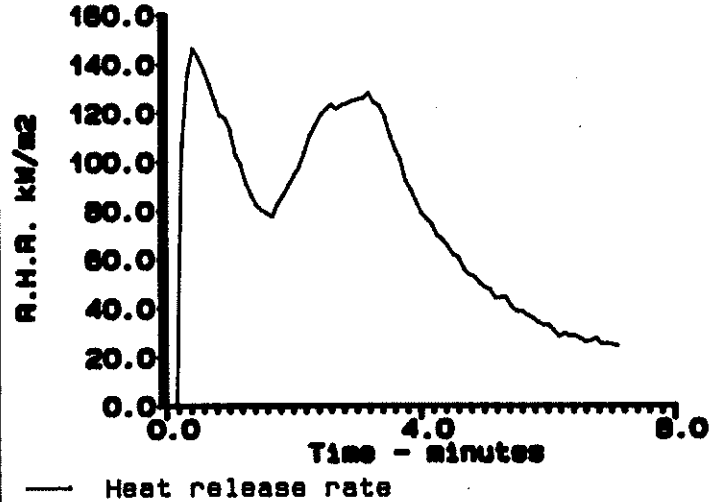
	Test Mean	60S	180S	300s
Heat Release kW/m ²	80.65	127.28	114.76	96.53
Mass Loss Rate g/s*m ²	8.38	10.16	9.79	8.16
Heat of Combustion MJ/kg	10.81	11.63	11.36	11.65
Specific Ext. Area m ² /kg	23.81	38.68	39.96	31.71
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful, burned smoothly.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Plywood 91



APPENDIX J: 12.3 mm PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1154	NRC1166	NRC1177		DEV %
	Date Tested	(D/M/Y)	7/3/91	7/4/91	7/5/91		
	Temperature	(Deg C)	28	28	28	28	1
	Initial Mass	(g)	64	69	62	65	6

TEST RESULTS						AVG.	MAX
	UNITS		NRC1154	NRC1166	NRC1177		DEV %
	Ignition Time	(s)	145	130	108	128	15
	Flameout Time	(s)	1070	1305	1120	1165	12
	Time PHR	(s)	155	140	120	138	13
	Peak RHR	(kW/m ²)	132	121	132	129	6
	Peak Mass Loss	(g/s*m ²)	11.1	9.5	10.3	10	8
	Peak Ext. Area	(m ² /kg)	7.3	29.7	42.5	26	73
	Total Heat Rel.	(MJ/m ²)	61.7	66.7	54.7	61	10
	THR @ PHR	(MJ/m ²)	1.8	1.6	1.8	2	7
	TM HEAT COMB.	(MJ/kg)	12.2	11.3	10.7	11	7
	TM RHR	(kW/m ²)	67.0	57.0	54.2	59	13
	TM MLR	(g/s*m ²)	5.5	4.8	5.1	5	7
	TM S. Ext. Area	(m ² /kg)	0.3	1.3	4.5	2	124
	Mass Final	(g)	17	21	16	18	16

SUPPLEM -ENTARY DATA						AVG.	MAX
	UNITS		NRC1154	NRC1166	NRC1177		DEV %
	60s RHR	(kW/m ²)	112.1	96.6	102.1	104	8
	60s MLR	(g/s*m ²)	8.4	7.5	8.1	8	7
	60s HEAT COMB.	(MJ/kg)	12.3	12.0	11.7	12	2
	60s S. Ext. Area	(m ² /kg)	3.1	4.9	18.9	9	111
	180s RHR	(kW/m ²)	71.3	59.8	62.3	64	11
	180s MLR	(g/s*m ²)	5.8	5.4	5.7	6	4
	180s HEAT COMB.	(MJ/kg)	11.9	10.7	10.6	11	8
	180s S. Ext. Area	(m ² /kg)	1.0	1.6	6.3	3	111
	300s RHR	(kW/m ²)	65.9	55.4	53.1	58	13
	300s MLR	(g/s*m ²)	5.2	5.0	5.0	5	3
	300s HEAT COMB.	(MJ/kg)	12.3	10.8	10.5	11	10
	300s S. Ext. Area	(m ² /kg)	0.6	1.0	3.8	2	111

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	UNITS	NRC1130	NRC1138	NRC1141	AVG.	MAX
						DEV %
Test Reference						
Date Tested	(D/M/Y)	6/14/91	6/19/91	6/21/91		
Temperature	(Deg C)	27	29	28	28	3
Initial Mass	(g)	67	69	65	67	3

TEST RESULTS	UNITS	NRC1130	NRC1138	NRC1141	AVG.	MAX
Ignition Time	(s)	24	25	20	23	13
Flameout Time	(s)	860	720	890	823	13
Time PHR	(s)	480	35	30	182	164
Peak RHR	(kW/m ²)	170	169	141	160	12
Peak Mass Loss	(g/s*m ²)	13.8	14.5	11.7	13	12
Peak Ext. Area	(m ² /kg)	149.4	219.3	106.0	158	39
Total Heat Rel.	(MJ/m ²)	71.2	61.8	63.6	66	9
THR @ PHR	(MJ/m ²)	47.3	N/A	N/A	47	N/A
TM HEAT COMB.	(MJ/kg)	11.6	11.2	11.5	11	2
TM RHR	(kW/m ²)	85.2	89.6	73.6	83	11
TM MLR	(g/s*m ²)	8.4	8.3	6.9	8	13
TM S. Ext. Area	(m ² /kg)	23.2	99.3	20.8	48	108
Mass Final	(g)	14	15	17	15	10

SUPPLEMENTARY DATA	UNITS	NRC1130	NRC1138	NRC1141	AVG.	MAX
60s RHR	(kW/m ²)	137.2	121.0	126.8	128	7
60s MLR	(g/s*m ²)	10.6	10.0	9.4	10	6
60s HEAT COMB.	(MJ/kg)	12.1	11.1	12.4	12	7
60s S. Ext. Area	(m ² /kg)	55.9	47.1	40.4	48	17
180s RHR	(kW/m ²)	89.4	83.2	100.8	91	11
180s MLR	(g/s*m ²)	7.8	7.5	8.1	8	4
180s HEAT COMB.	(MJ/kg)	11.1	10.7	12.0	11	7
180s S. Ext. Area	(m ² /kg)	18.6	19.3	18.2	19	3
300s RHR	(kW/m ²)	90.6	82.3	84.7	86	6
300s MLR	(g/s*m ²)	7.7	7.3	7.3	7	4
300s HEAT COMB.	(MJ/kg)	11.5	10.9	11.4	11	3
300s S. Ext. Area	(m ² /kg)	14.0	61.2	11.4	29	112

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1154

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.041968
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 27.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 64.1 g
Final Mass : 16.9 g
Mass Lost : 4.72 kg/m²
Ignition Time : 145 s
Flameout Time : 1,070 s

Time of Peak RHR : 155 s
Peak RHR : 132.5 kW/m²
Peak Mass Loss : 11.10 g/s*m²
Peak Extinction Area: 7.26 m²/kg
Total Heat Released : 61.68 MJ/m²

Summary Data From Ignition

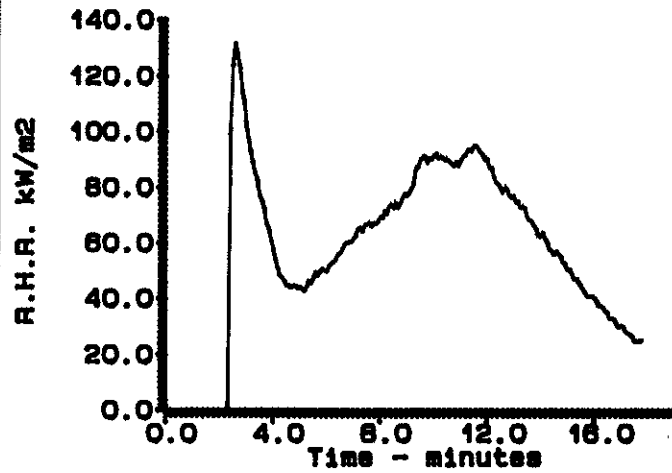
		Test Mean	60S	180S	300s
Heat Release	kW/m ²	67.05	112.11	71.28	65.88
Mass Loss Rate	g/s*m ²	5.48	8.44	5.76	5.24
Heat of Combustion	MJ/kg	12.19	12.29	11.95	12.26
Specific Ext. Area	m ² /kg	0.27	3.07	1.02	0.61
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

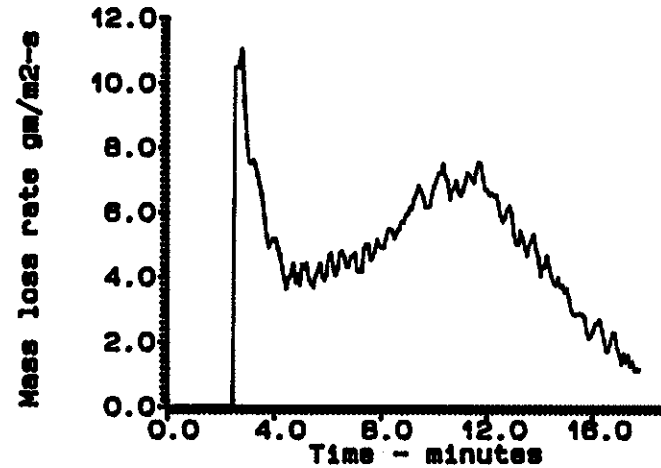
Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

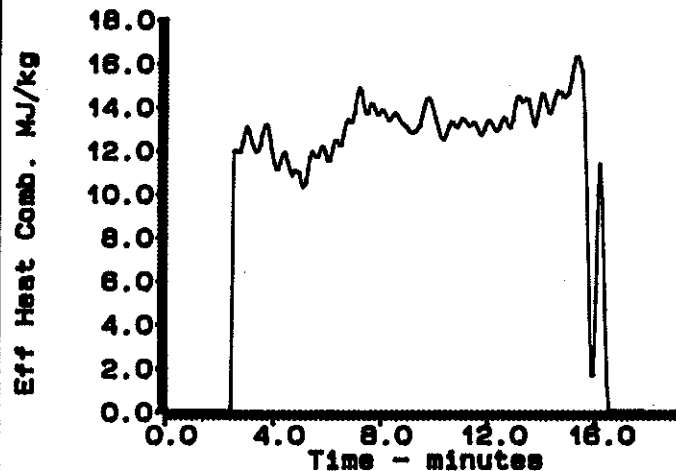
1/2 Plywood 91 Flux = 25



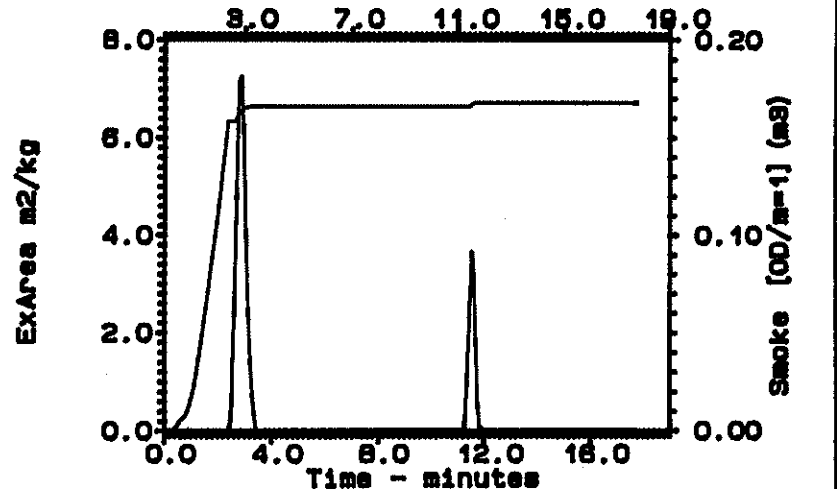
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 --- Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1166

Test Date: 07-04-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 28.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 68.7 g
Final Mass : 20.6 g
Mass Lost : 4.81 kg/m²
Ignition Time : 130 s
Flameout Time : 1,305 s

Time of Peak RHR : 140 s
Peak RHR : 121.3 kW/m²
Peak Mass Loss : 9.46 g/s*m²
Peak Extinction Area: 29.68 m²/kg
Total Heat Released : 66.65 MJ/m²

Summary Data From Ignition

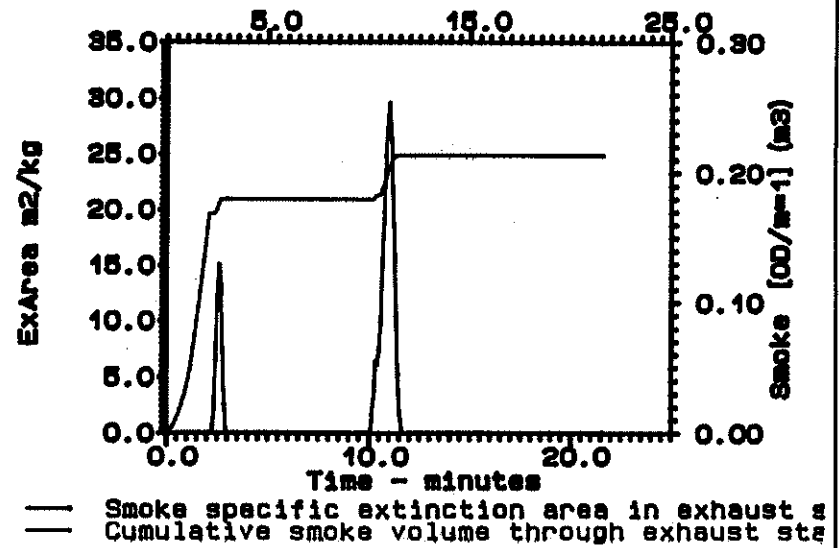
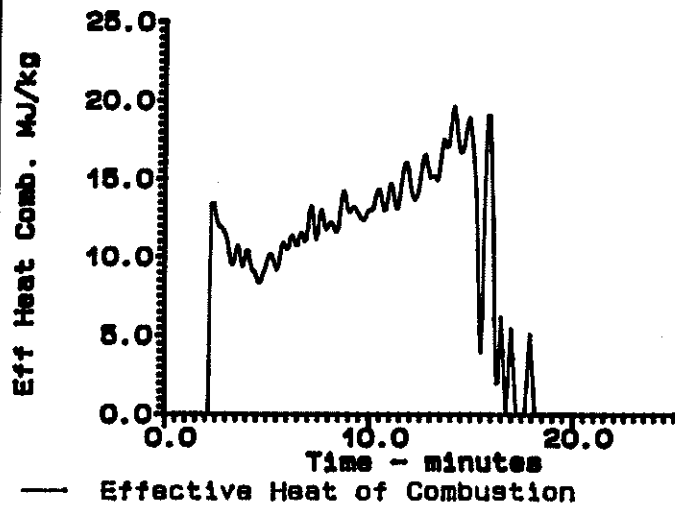
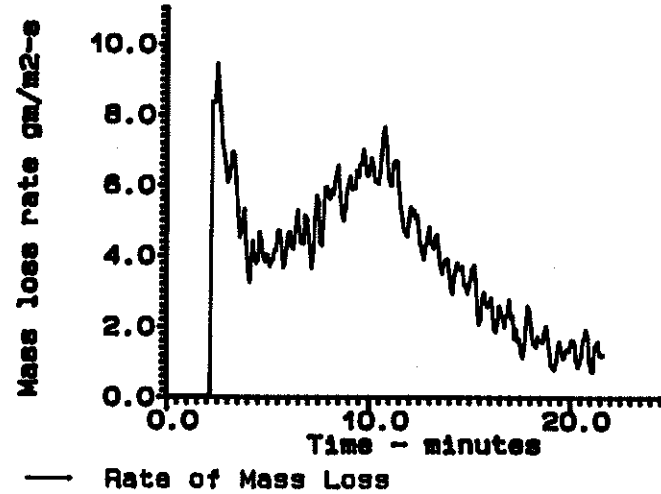
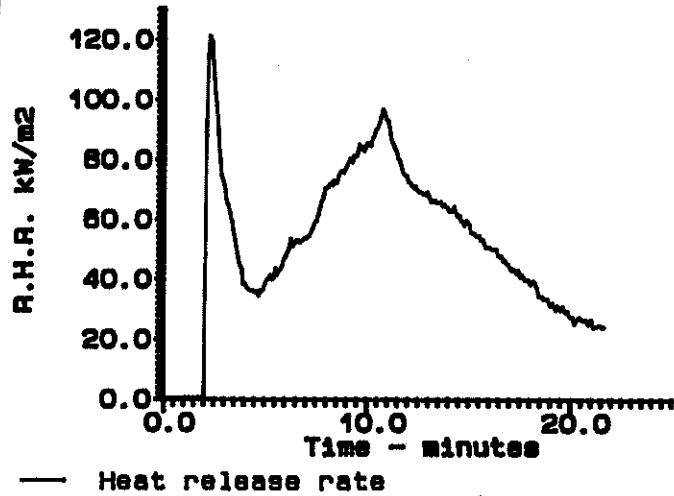
	Test Mean	60S	180S	300s
Heat Release kW/m ²	56.97	96.57	59.81	55.41
Mass Loss Rate g/s*m ²	4.76	7.46	5.41	5.01
Heat of Combustion MJ/kg	11.29	11.96	10.66	10.77
Specific Ext. Area mJ/kg	1.26	4.93	1.64	0.99
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1177

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 62.0 g
Final Mass : 15.7 g
Mass Lost : 4.64 kg/m²
Ignition Time : 108 s
Flameout Time : 1,120 s

Time of Peak RHR : 120 s
Peak RHR : 132.0 kW/m²
Peak Mass Loss : 10.26 g/s*m²
Peak Extinction Area: 42.55 m²/kg
Total Heat Released : 54.70 MJ/m²

Summary Data From Ignition

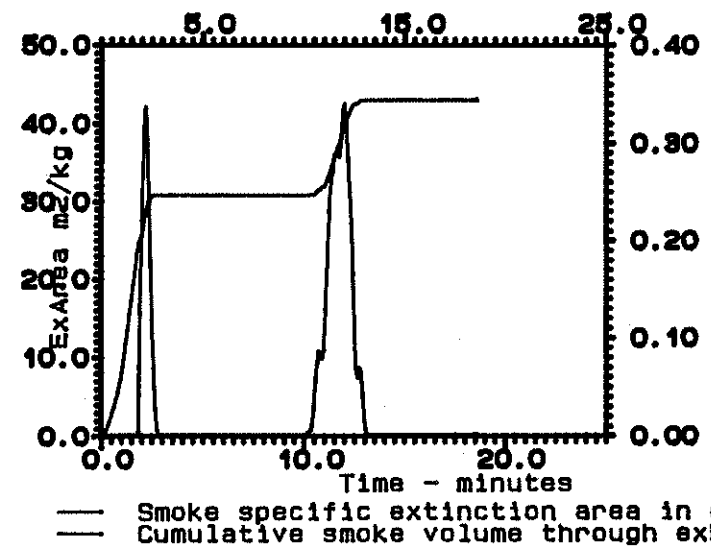
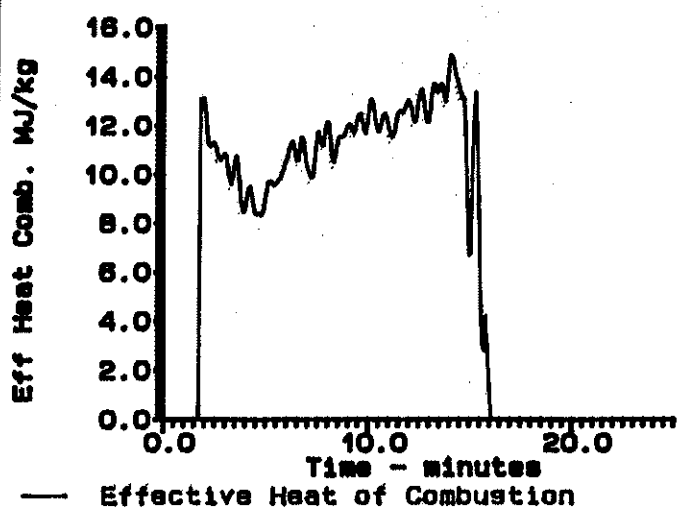
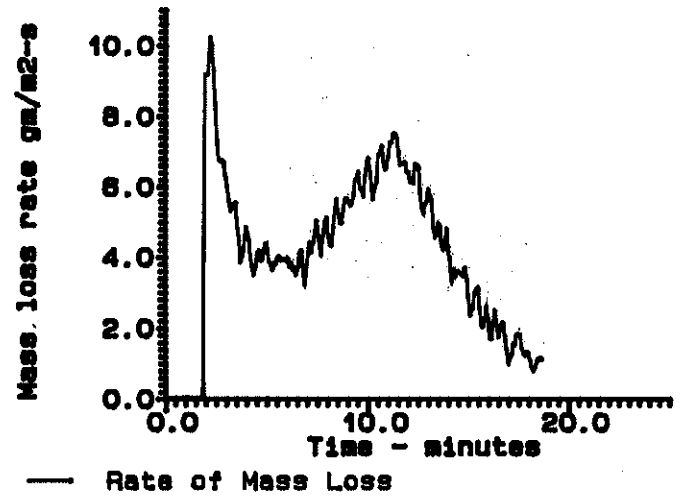
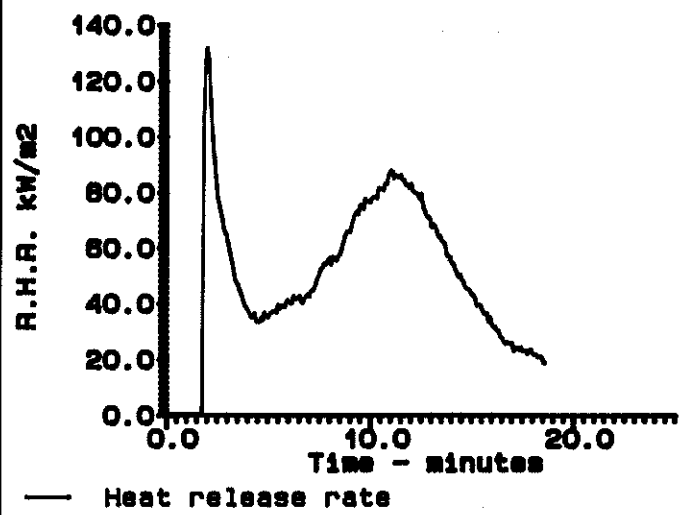
	Test Mean	60S	180S	300s
Heat Release kW/m ²	54.15	102.12	62.28	53.09
Mass Loss Rate g/s*m ²	5.12	8.09	5.71	4.95
Heat of Combustion MJ/kg	10.69	11.75	10.57	10.47
Specific Ext. Area m ² /kg	4.54	18.90	6.30	3.78
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 91 Flux = 25



Smoke [OD/m=1] (m3)

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1130

Test Date: 06-14-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042404
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 27.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 67.5 g
Final Mass : 13.8 g
Mass Lost : 5.37 kg/m²
Ignition Time : 24 s
Flameout Time : 860 s

Time of Peak RHR : 480 s
Peak RHR : 169.7 kW/m²
Peak Mass Loss : 13.79 g/s*m²
Peak Extinction Area: 149.40 m²/kg
Total Heat Released : 71.17 MJ/m²

Summary Data From Ignition

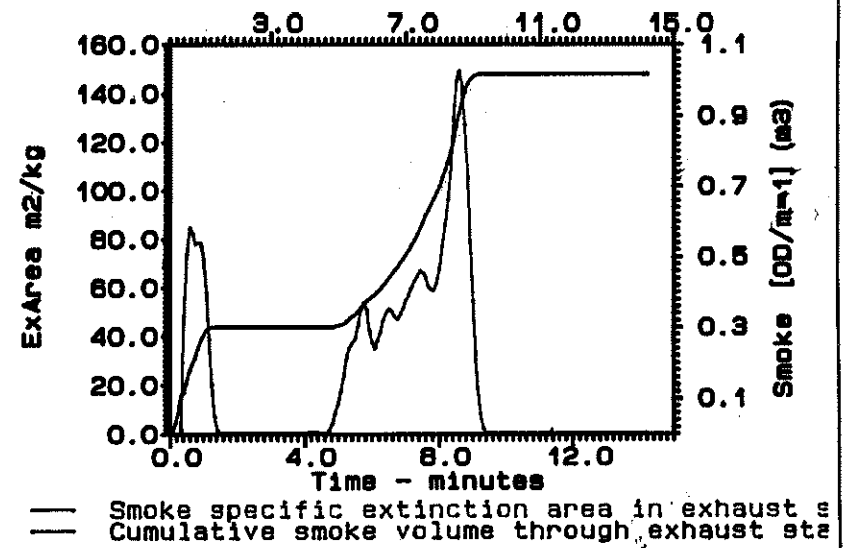
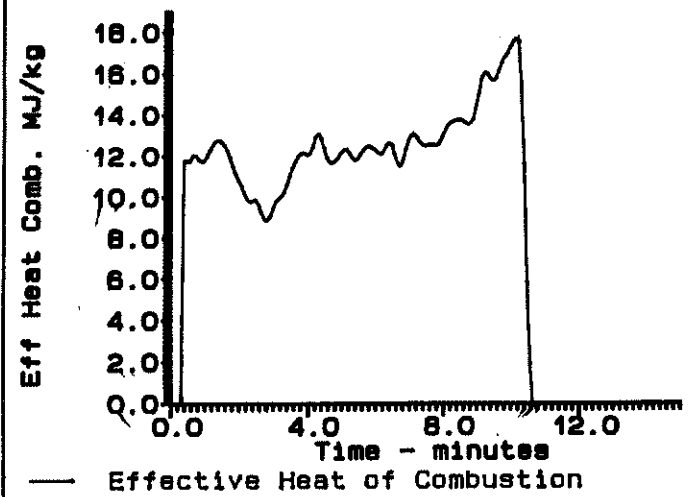
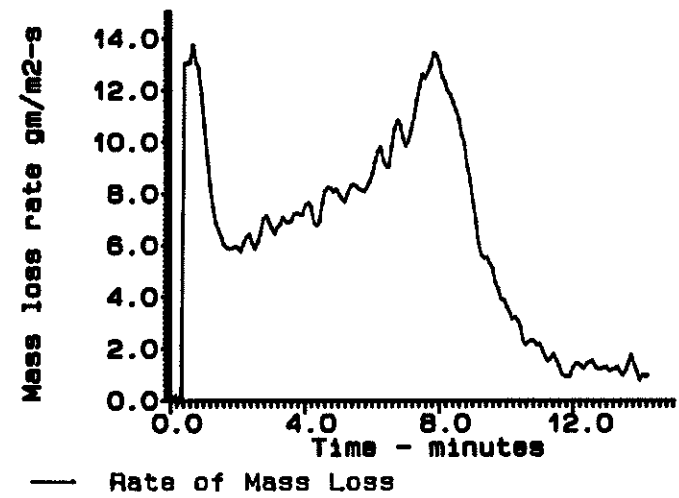
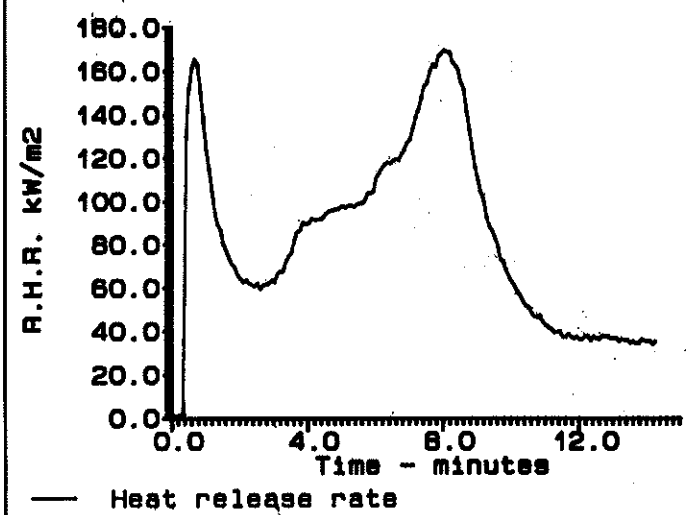
		Test Mean	60S	180S	300s
Heat Release	kW/m ²	85.24	137.17	89.42	90.63
Mass Loss Rate	g/s*m ²	8.42	10.62	7.77	7.70
Heat of Combustion	MJ/kg	11.62	12.10	11.14	11.53
Specific Ext. Area	m ² /kg	23.19	55.90	18.63	14.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The ignition arm didn't go in right away, but the time should be very close. The sample burned typically, and at the end the sample curled up and the center burned slowly for some time.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 91



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1138

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 29.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 68.8 g
Final Mass : 15.5 g
Mass Lost : 5.34 kg/m²
Ignition Time : 25 s
Flameout Time : 720 s

Time of Peak RHR : 35 s
Peak RHR : 169.1 kW/m²
Peak Mass Loss : 14.47 g/s*m²
Peak Extinction Area: 219.30 m²/kg
Total Heat Released : 61.81 MJ/m²

Summary Data From Ignition

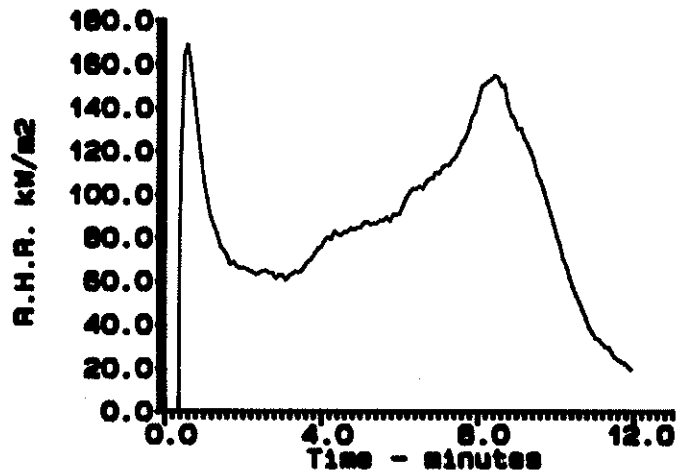
	Test Mean	60S	180S	300s
Heat Release kW/m ²	89.58	121.04	83.19	82.31
Mass Loss Rate g/s*m ²	8.29	10.05	7.46	7.33
Heat of Combustion MJ/kg	11.19	11.07	10.72	10.94
Specific Ext. Area m ² /kg	99.26	47.11	19.33	61.20
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

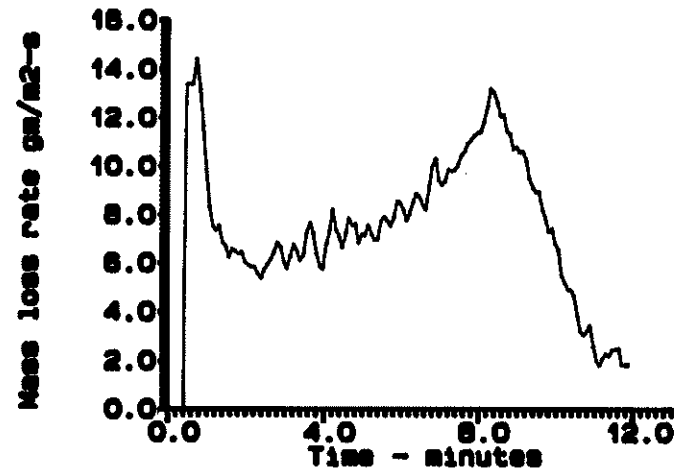
The sample rippled in a spot almost immediately, because there was a knot under it.

Tested by : Dnno Robert
Officer : Kim Andrew

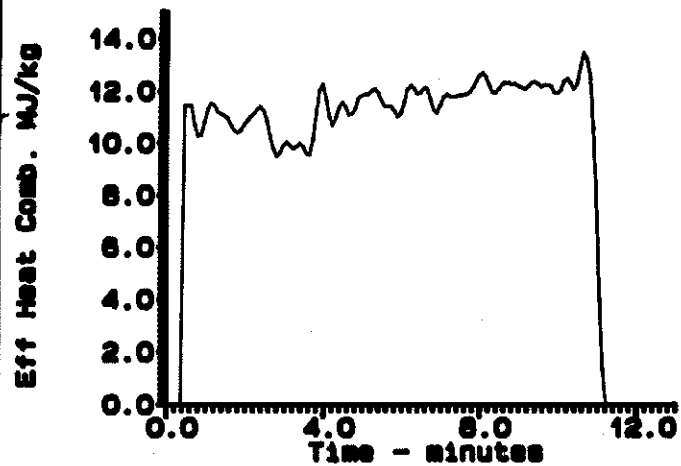
1/2" Plywood 91



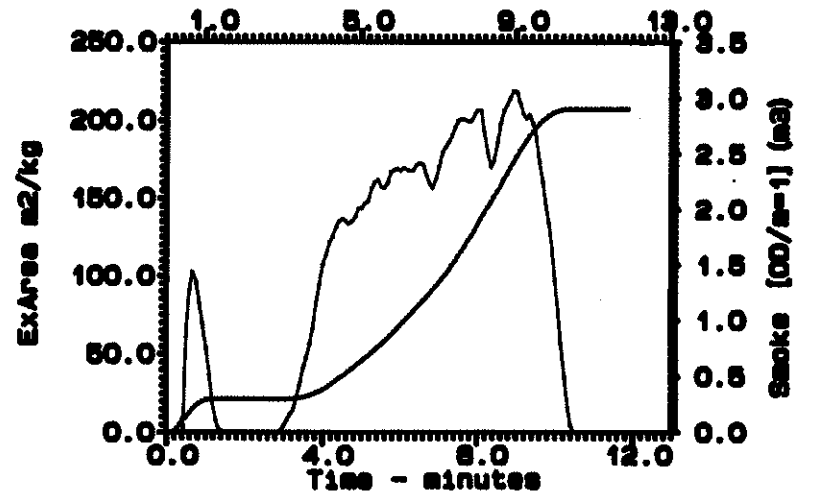
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 - - - Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1141

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifrice Constant : 0.043B42
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.011000m

Test Conditions : 50.0 RH @ 28.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 64.9 g
Final Mass : 16.8 g
Mass Lost : 4.81 kg/m²
Ignition Time : 20 s
Flameout Time : 890 s

Time of Peak RHR : 30 s
Peak RHR : 141.0 kW/m²
Peak Mass Loss : 11.69 g/s*m²
Peak Extinction Area: 106.01 m²/kg
Total Heat Released : 63.62 MJ/m²

Summary Data From Ignition

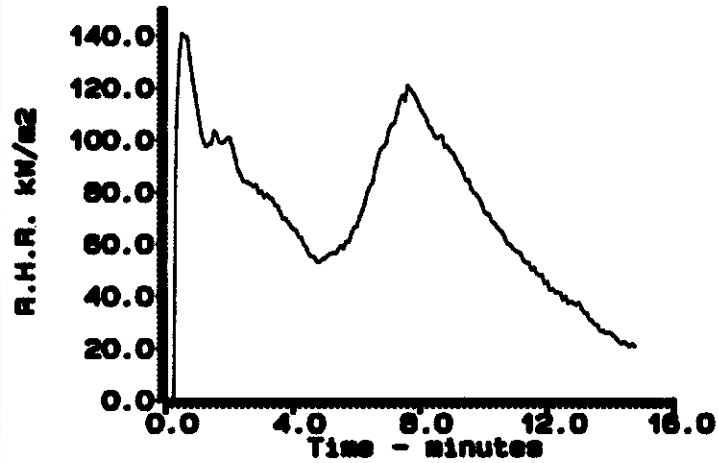
	Test Mean	60S	180S	300s
Heat Release kW/m ²	73.55	126.79	100.80	84.66
Mass Loss Rate g/s*m ²	6.86	9.44	8.14	7.27
Heat of Combustion MJ/kg	11.46	12.39	12.03	11.43
Specific Ext. Area m ² /kg	20.81	40.44	18.24	11.39
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

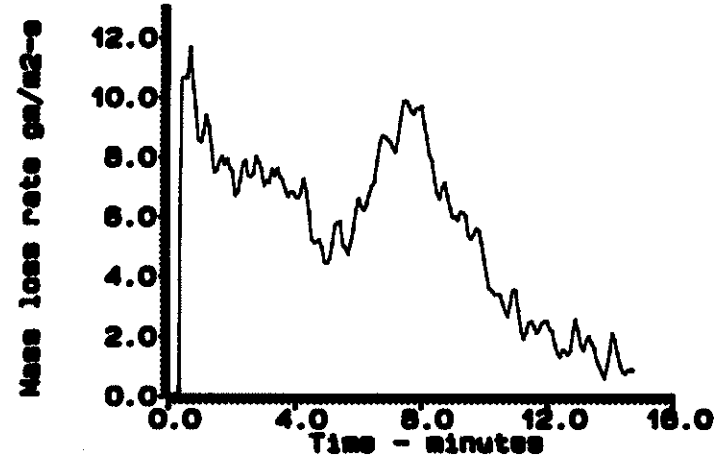
Uneventful, burned smoothly.

Tested by : Onno Robert
Officer : Kim Andrew

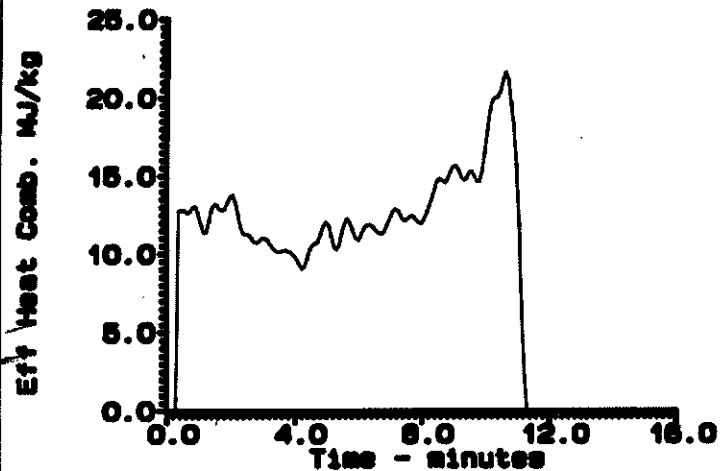
1/2" Plywood 91



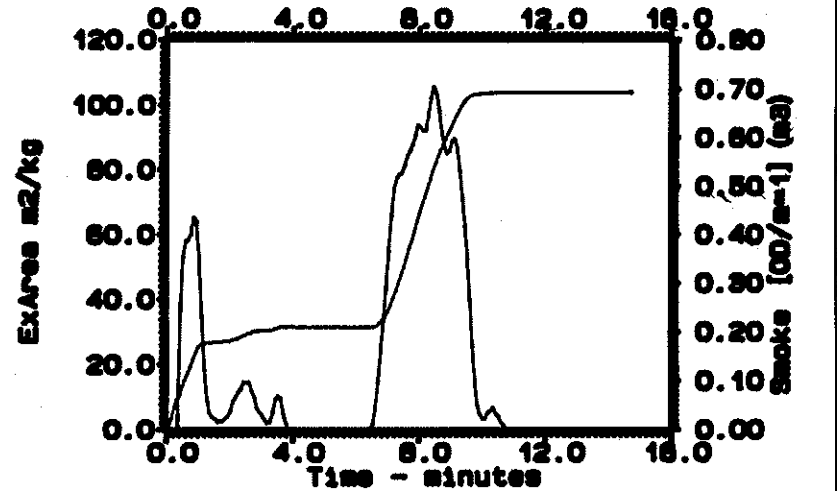
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 — Cumulative smoke volume through exhaust sta

APPENDIX K: 40.0 mm POLYURETHANE WITH FOIL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polyurethane w/ foil
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	40

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1163	NRC1168	NRC1170		DEV %
	Date Tested	(D/M/Y)	7/3/91	7/5/91	7/5/91		
	Temperature	(Deg C)	28	27	27	27	3
	Initial Mass	(g)	13	13	13	13	1

TEST RESULTS	Parameter	UNITS					N / A
			DNI	DNI	DNI	DNI	
	Ignition Time	(s)					
	Flameout Time	(s)	790	600	600	663	19
	Time PHR	(s)	330	595	260	395	51
	Peak RHR	(kW/m ²)	6	12	3	7	67
	Peak Mass Loss	(g/s*m ²)	N / A	0.7	0.4	0	83
	Peak Ext. Area	(m ² /kg)	0.3	0.0	0.0	0	200
	Total Heat Rel.	(MJ/m ²)	2.0	0.4	0.8	1	89
	THR @ PHR	(MJ/m ²)	0.5	0.3	0.3	0	24
	TM HEAT COMB.	(MJ/kg)	0.0	0.0	0.0	0	200
	TM RHR	(kW/m ²)	3.0	0.6	1.4	2	79
	TM MLR	(g/s*m ²)	N / A	0.0	0.0	0	122
	TM S. Ext. Area	(m ² /kg)	0.0	0.0	0.0	0	200
	Mass Final	(g)	0	13	13	8	100

SUPPLEMENTARY DATA	Parameter	UNITS					
	60s RHR	(kW/m ²)	0.7	0.0	1.1	1	100
	60s MLR	(g/s*m ²)	0.0	0.1	0.0	0	200
	60s HEAT COMB.	(MJ/kg)	0.0	0.0	0.0	0	0
	60s S. Ext. Area	(m ² /kg)	0.0	0.0	0.0	0	0
	180s RHR	(kW/m ²)	1.8	0.0	1.2	1	100
	180s MLR	(g/s*m ²)	0.0	0.0	0.0	0	200
	180s HEAT COMB.	(MJ/kg)	0.0	0.0	0.0	0	0
	180s S. Ext. Area	(m ² /kg)	0.0	0.0	0.0	0	0
	300s RHR	(kW/m ²)	2.5	0.0	1.4	1	100
	300s MLR	(g/s*m ²)	0.0	0.0	0.0	0	200
	300s HEAT COMB.	(MJ/kg)	0.0	0.0	0.0	0	0
	300s S. Ext. Area	(m ² /kg)	0.0	0.0	0.0	0	0

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Polyurethane w/ foil
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	40

DETAILS OF TEST	UNITS				AVG.	MAX
		NRC1145	NRC1190	NRC1192		DEV %
Test Reference						
Date Tested	(D/M/Y)	6/21/91	7/8/91	7/8/91		
Temperature	(Deg C)	30	29	29	29	1
Initial Mass	(g)	13	13	13	13	N/A

TEST RESULTS			DNI	DNI	DNI	DNI	N/A
Ignition Time	(s)						N/A
Flameout Time	(s)		600	605	599	601	N/A
Time PHR	(s)		0	395	420	272	N/A
Peak RHR	(kW/m2)		0	7	0	2	N/A
Peak Mass Loss	(g/s*m2)		0.0	1.0	1.3	1	N/A
Peak Ext. Area	(m2/kg)		0.0	0.0	0.0	0	N/A
Total Heat Rel.	(MJ/m2)		0.0	2.0	0.0	1	N/A
THR @ PHR	(MJ/m2)		0.0	1.3	28.9	10	N/A
TM HEAT COMB.	(MJ/kg)		0.0	1.7	0.0	1	N/A
TM RHR	(kW/m2)		0.0	3.3	0.0	1	N/A
TM MLR	(g/s*m2)		0.0	0.1	0.1	0	N/A
TM S. Ext. Area	(m2/kg)		0.0	0.0	0.0	0	N/A
Mass Final	(g)		12	12	13	12	N/A

SUPPLEMENTARY DATA							N/A
60s RHR	(kW/m2)		0.0	1.1	0.0	0	N/A
60s MLR	(g/s*m2)		0.0	0.0	0.0	0	N/A
60s HEAT COMB.	(MJ/kg)		0.0	0.0	0.0	0	N/A
60s S. Ext. Area	(m2/kg)		0.0	0.0	0.0	0	N/A
180s RHR	(kW/m2)		0.0	1.8	0.0	1	N/A
180s MLR	(g/s*m2)		0.0	0.0	0.0	0	N/A
180s HEAT COMB.	(MJ/kg)		0.0	N/A	0.0	0	N/A
180s S. Ext. Area	(m2/kg)		0.0	0.0	0.0	0	N/A
300s RHR	(kW/m2)		0.0	2.9	0.0	1	N/A
300s MLR	(g/s*m2)		0.0	0.1	0.0	0	N/A
300s HEAT COMB.	(MJ/kg)		0.0	N/A	0.0	0	N/A
300s S. Ext. Area	(m2/kg)		0.0	0.0	0.0	0	N/A

Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1163

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2' Foil Covered Foam 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042203
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.040000m

Test Conditions : 50.0 RH @ 28.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 12.6 g
Final Mass : 0.0 g
Mass Lost : 1.26 kg/m²
Ignition Time : 0 s
Flameout Time : 790 s

Time of Peak RHR : 330 s
Peak RHR : 6.4 kW/m²
Peak Mass Loss : 143.89 g/s*m²
Peak Extinction Area: 0.31 m²/kg
Total Heat Released : 2.12 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	2.70	0.74	0.82	1.49
Mass Loss Rate g/s*m ²	82.49	0.00	0.00	0.00
Heat of Combustion MJ/kg	0.03	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.01	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

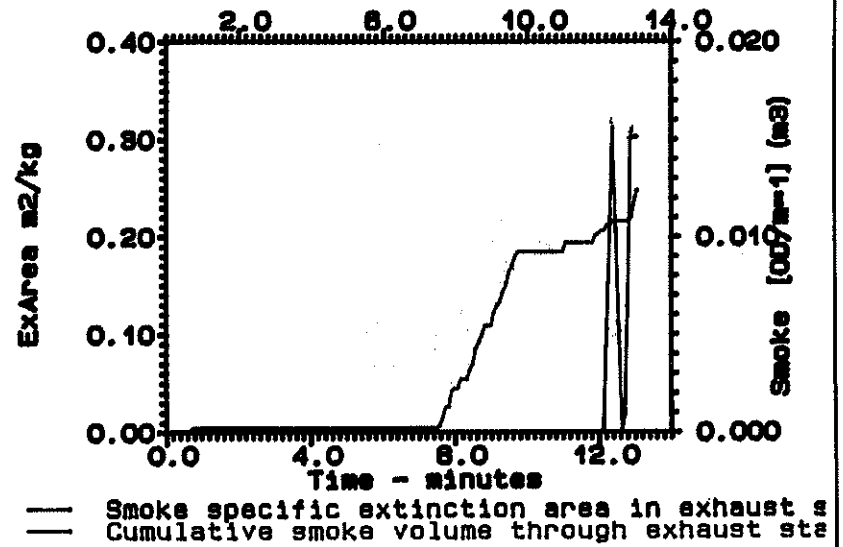
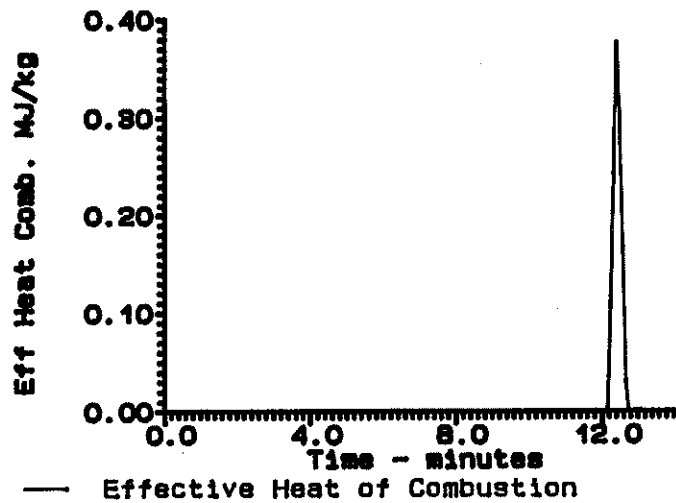
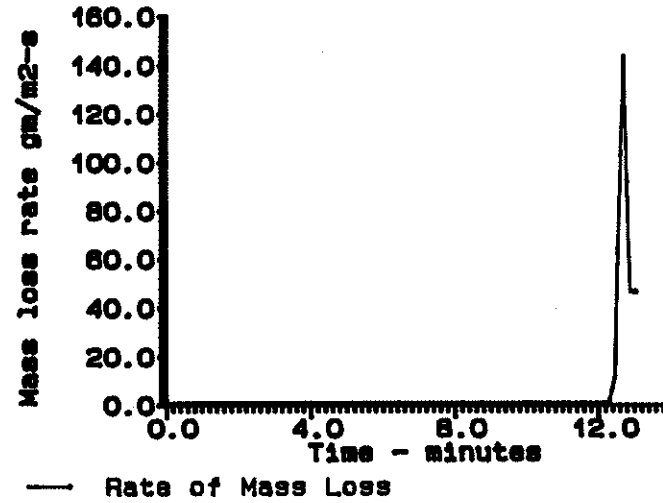
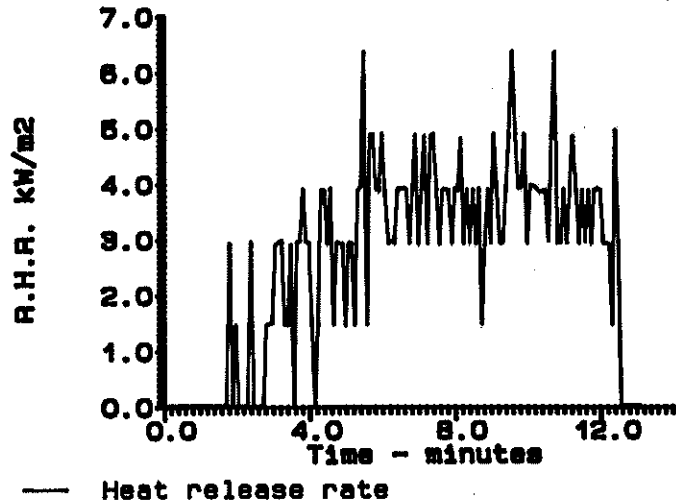
OBSERVATIONS AND COMMENTS

Nothing happened as usual.

At the end of the test, I pushed the tray around trying to get a mass loss, so the sheet would print out.

Tested by : Donn Robert

3/2" Foam Covered With Foil 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1168

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2' Foil Covered Foam 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.040500m

Test Conditions : 50.0 RH @ 26.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 12.8 g
Final Mass : 12.6 g
Mass Lost : 0.03 kg/m²
Ignition Time : 0 s
Flameout Time : 600 s

Time of Peak RHR : 595 s
Peak RHR : 12.3 kW/m²
Peak Mass Loss : 0.67 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.37 MJ/m²

Summary Data From Ignition

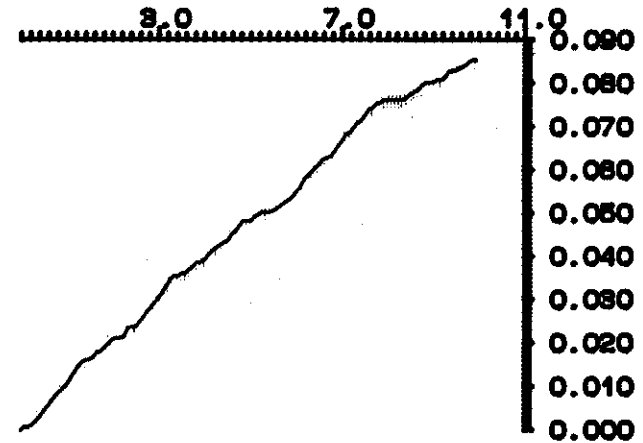
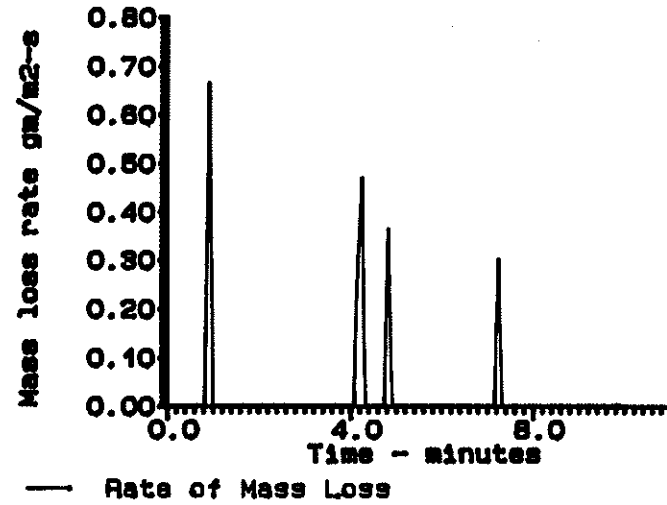
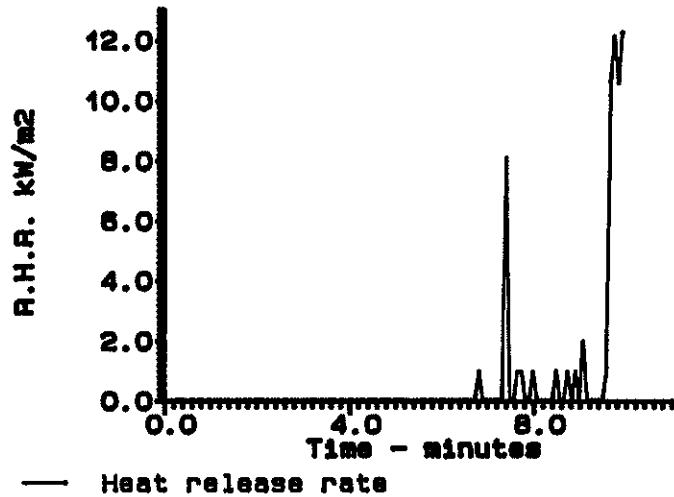
	Test Mean	60S	180S	300s
Heat Release kW/m ²	0.63	0.00	0.00	0.00
Mass Loss Rate g/s*m ²	0.02	0.06	0.02	0.03
Heat of Combustion MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
Nothing happened as usual

Tested by : Onno Robert
Officer : Kim Andrew

3/2" Foam Covered w/ Foam 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1192

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2' Foil Covered Foam 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : ~~25.0~~⁵⁰ kW/m²
Drifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.040000m

Test Conditions : 50.0 RH @ 28.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 13.0 g
Final Mass : 12.7 g
Mass Lost : 0.02 kg/m²
Ignition Time : 0 s
Flameout Time : 599 s

Time of Peak RHR : 420 s
Peak RHR : 0.0 kW/m²
Peak Mass Loss : 1.34 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.00 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	0.00	0.00	0.00	0.00
Mass Loss Rate g/s*m ²	0.07	0.00	0.00	0.00
Heat of Combustion MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
Some swelling.

Tested by : Onno Robert
Officer : Kim Andrew

APPENDIX L: 3.0 mm WOODPANEL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1198	NRC1201	NRC1203		DEV %
	Date Tested	(D/M/Y)	7/22/91	7/22/91	7/22/91		
	Temperature	(Deg C)	30	30	30	30	0
	Initial Mass	(g)	18	19	18	18	3

TEST RESULTS		UNITS	NRC1198	NRC1201	NRC1203	AVG.	MAX
	Ignition Time	(s)	140	119	105	121	15
	Flameout Time	(s)	315	304	275	298	8
	Time PHR	(s)	150	145	130	142	8
	Peak RHR	(kW/m2)	173	164	164	167	4
	Peak Mass Loss	(g/s*m2)	5.1	14.4	14.2	11	55
	Peak Ext. Area	(m2/kg)	N / A	125.1	99.4	112	11
	Total Heat Rel.	(MJ/m2)	11.5	12.2	11.7	12	4
	THR @ PHR	(MJ/m2)	2.3	4.5	4.3	4	37
	TM HEAT COMB.	(MJ/kg)	1.3	9.0	9.0	6	80
	TM RHR	(kW/m2)	67.8	68.0	70.8	69	3
	TM MLR	(g/s*m2)	2.4	6.8	7.9	6	58
	TM S. Ext. Area	(m2/kg)	N / A	22.4	22.3	22	0
	Mass Final	(g)	N / A	6	6	6	1

SUPPLEMENTARY DATA		UNITS	NRC1198	NRC1201	NRC1203	AVG.	MAX
	60s RHR	(kW/m2)	126.5	139.4	136.8	134	6
	60s MLR	(g/s*m2)	N / A	10.9	10.9	11	0
	60s HEAT COMB.	(MJ/kg)	N / A	12.1	11.8	12	1
	60s S. Ext. Area	(m2/kg)	N / A	66.7	59.2	63	6
	180s RHR	(kW/m2)	58.2	66.4	60.4	62	8
	180s MLR	(g/s*m2)	N / A	5.4	5.3	5	2
	180s HEAT COMB.	(MJ/kg)	43.6	11.9	11.1	22	96
	180s S. Ext. Area	(m2/kg)	N / A	22.2	20.0	21	5
	300s RHR	(kW/m2)	34.9	39.8	36.3	37	8
	300s MLR	(g/s*m2)	N / A	3.3	3.2	3	2
	300s HEAT COMB.	(MJ/kg)	69.4	11.9	11.1	31	125
	300s S. Ext. Area	(m2/kg)	N / A	13.3	12.0	13	5

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1206	NRC1208	NRC1210		DEV %
	Date Tested	(D/M/Y)	7/22/91	7/22/91	7/22/91		
	Temperature	(Deg C)	30	31	31	31	1
	Initial Mass	(g)	19	19	17	18	4

TEST RESULTS						AVG.	MAX
	UNITS		NRC1206	NRC1208	NRC1210		DEV %
	Ignition Time	(s)	43	45	40	43	6
	Flameout Time	(s)	210	203	214	209	3
	Time PHR	(s)	80	85	70	78	11
	Peak RHR	(kW/m ²)	194	191	187	191	2
	Peak Mass Loss	(g/s*m ²)	17.5	17.7	15.3	17	9
	Peak Ext. Area	(m ² /kg)	150.2	142.8	149.2	147	3
	Total Heat Rel.	(MJ/m ²)	12.9	13.3	14.8	14	8
	THR @ PHR	(MJ/m ²)	5.9	6.4	5.0	6	13
	TM HEAT COMB.	(MJ/kg)	8.9	9.1	10.0	9	7
	TM RHR	(kW/m ²)	78.2	88.8	89.6	86	9
	TM MLR	(g/s*m ²)	11.4	10.5	10.2	11	7
	TM S. Ext. Area	(m ² /kg)	48.9	49.7	47.2	49	3
	Mass Final	(g)	5	5	4	5	11

SUPPLEMENTARY DATA						AVG.	MAX
	UNITS		NRC1206	NRC1208	NRC1210		DEV %
	60s RHR	(kW/m ²)	155.7	155.6	159.0	157	1
	60s MLR	(g/s*m ²)	13.9	13.4	13.1	13	3
	60s HEAT COMB.	(MJ/kg)	10.7	11.0	11.5	11	4
	60s S. Ext. Area	(m ² /kg)	113.5	109.0	112.8	112	2
	180s RHR	(kW/m ²)	70.4	69.9	77.8	73	7
	180s MLR	(g/s*m ²)	6.9	6.4	6.3	7	5
	180s HEAT COMB.	(MJ/kg)	10.1	10.7	12.1	11	10
	180s S. Ext. Area	(m ² /kg)	44.0	40.1	42.2	42	5
	300s RHR	(kW/m ²)	42.2	41.9	46.7	44	7
	300s MLR	(g/s*m ²)	4.1	3.8	3.8	4	5
	300s HEAT COMB.	(MJ/kg)	10.1	10.7	12.1	11	10
	300s S. Ext. Area	(m ² /kg)	26.4	24.1	25.3	25	5

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC119B

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panel Board 90

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 50.0 RH @ 30.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 18.0 g
Final Mass : 0.0 g
Mass Lost : 1.80 kg/m²
Ignition Time : 140 s
Flameout Time : 315 s

Time of Peak RHR : 150 s
Peak RHR : 173.4 kW/m²
Peak Mass Loss : 5.09 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 11.52 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	67.76	126.49	58.20	34.92
Mass Loss Rate	g/s*m ²	2.38	0.13	0.04	0.03
Heat of Combustion	MJ/kg	1.28	0.00	43.58	69.45
Specific Ext. Area	m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

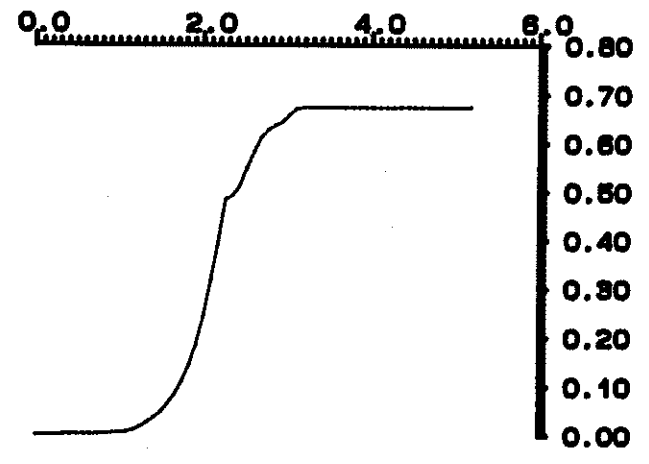
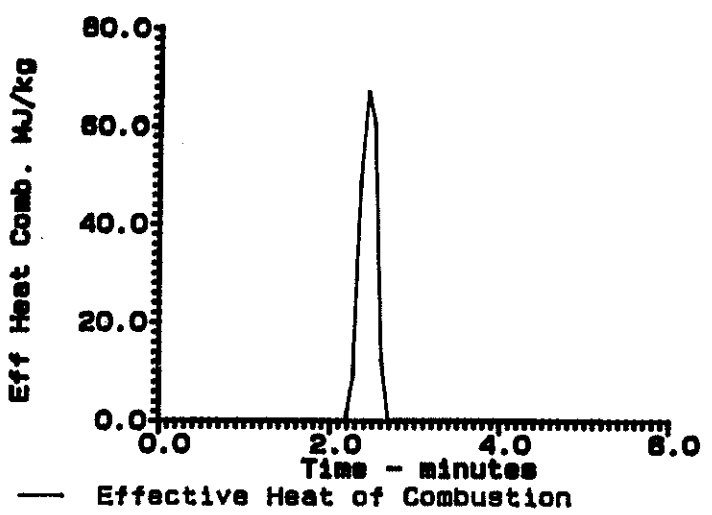
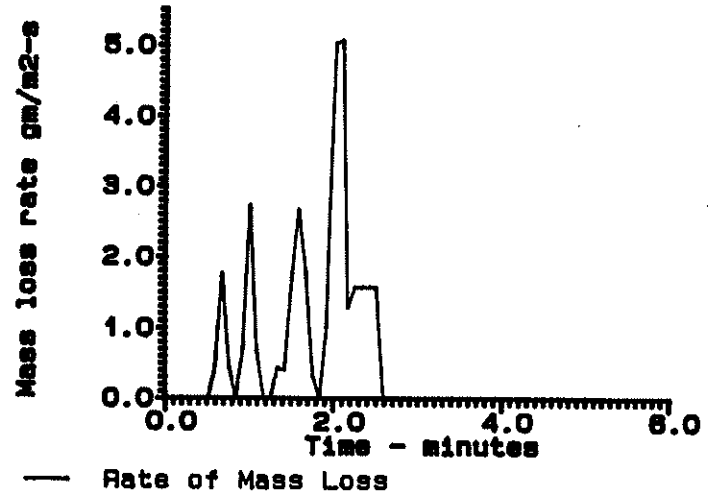
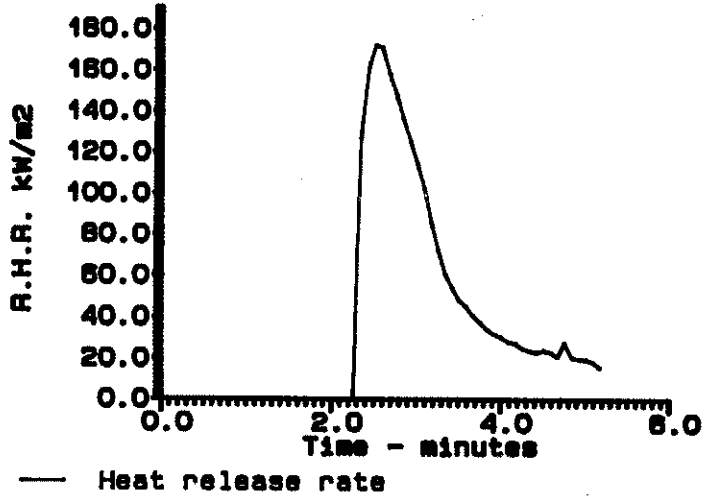
OBSERVATIONS AND COMMENTS

Uneventful.

Used a grid to maintain its' shape.
this is 91 panelboard not 90

Tested by : Onno Robert
Officer : Kim Andrew

1/8" Wood Panelling 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1201

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8" Panel Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 50.0 RH @ 30.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 18.5 g
Final Mass : 6.4 g
Mass Lost : 1.22 kg/m²
Ignition Time : 119 s
Flameout Time : 304 s

Time of Peak RHR : 145 s
Peak RHR : 163.9 kW/m²
Peak Mass Loss : 14.37 g/s*m²
Peak Extinction Area: 125.10 m²/kg
Total Heat Released : 12.25 MJ/m²

Summary Data From Ignition

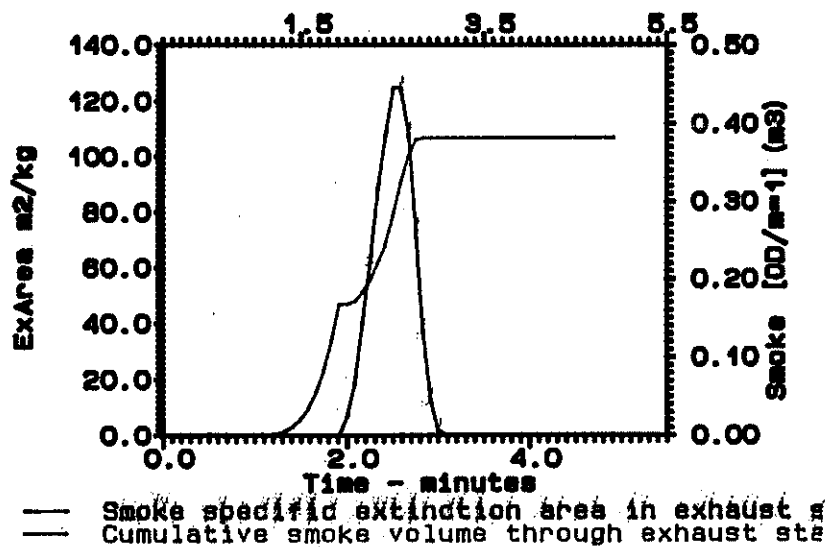
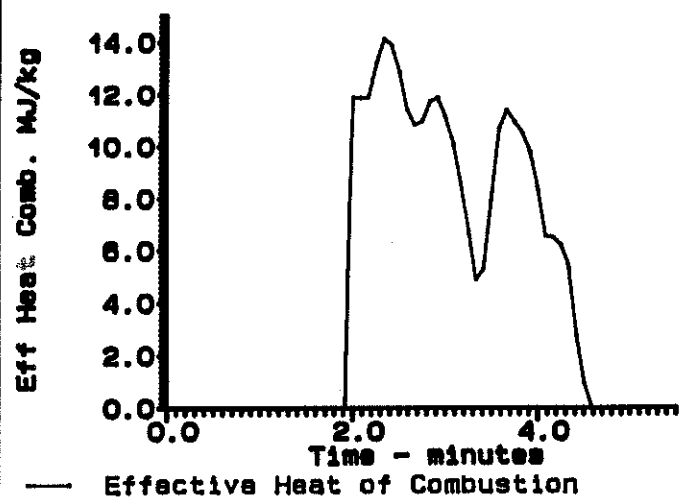
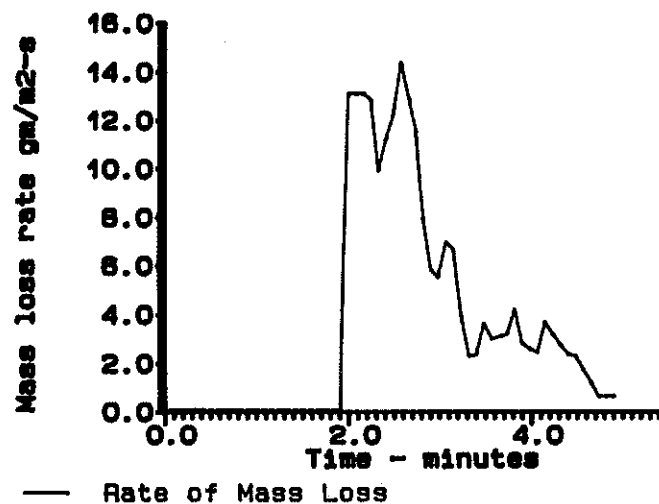
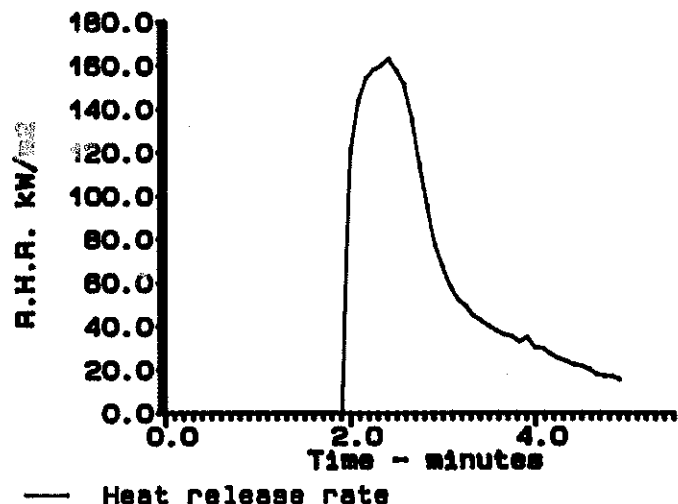
	Test Mean	60S	180S	300s
Heat Release kW/m ²	68.04	139.43	66.38	39.83
Mass Loss Rate g/s*m ²	6.79	10.87	5.44	3.26
Heat of Combustion MJ/kg	8.98	12.15	11.90	11.90
Specific Ext. Area m ² /kg	22.41	66.69	22.23	13.34
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

1/8" Wood Panelling Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1203

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panel Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 50.0 RH @ 30.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 17.6 g
Final Mass : 6.5 g
Mass Lost : 1.11 kg/m²
Ignition Time : 105 s
Flameout Time : 275 s

Time of Peak RHR : 130 s
Peak RHR : 164.2 kW/m²
Peak Mass Loss : 14.19 g/s*m²
Peak Extinction Area: 99.42 m²/kg
Total Heat Released : 11.69 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	70.85	136.77	60.43	36.26
Mass Loss Rate	g/s*m ²	7.87	10.88	5.27	3.16
Heat of Combustion	MJ/kg	8.99	11.83	11.11	11.11
Specific Ext. Area	m ² /kg	22.31	59.22	20.04	12.02
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1206

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panel Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : ⁵⁰~~25.0~~ kW/m²
Drifce Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 30.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 18.5 g
Final Mass : 4.7 g
Mass Lost : 1.38 kg/m²
Ignition Time : 43 s
Flameout Time : 210 s

Time of Peak RHR : 80 s
Peak RHR : 194.1 kW/m²
Peak Mass Loss : 17.52 g/s*m²
Peak Extinction Area: 150.25 m²/kg
Total Heat Released : 12.90 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	78.17	155.72	70.40	42.24
Mass Loss Rate	g/s*m ²	11.42	13.89	6.86	4.12
Heat of Combustion	MJ/kg	8.95	10.68	10.07	10.07
Specific Ext. Area	m ² /kg	48.94	113.46	44.00	26.40
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1208

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panel Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux	: ⁵⁰ 25.0 kW/m ²	Nominal Flow	: 24.0 l/s
Orifice Constant	: 0.043767	Heat per Unit Mole	: 13.10000 kJ/gO ₂
Heater Orientation	: Horizontal	Spark Ignitor Used	: Y
Grid Used	: Y	Frame Used	: Y
Conditioning	: 50.0 RH @ 24.0°C	Test Conditions	: 50.0 RH @ 30.6°C
Specimen Thickness	: 0.003000m	Specimen Area	: 0.010000 m ²

TEST RESULTS

Initial Mass	: 18.7 g	Time of Peak RHR	: 85 s
Final Mass	: 5.0 g	Peak RHR	: 191.0 kW/m ²
Mass Lost	: 1.36 kg/m ²	Peak Mass Loss	: 17.68 g/s*m ²
Ignition Time	: 45 s	Peak Extinction Area	: 142.76 m ² /kg
Flameout Time	: 203 s	Total Heat Released	: 13.32 MJ/m ²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	88.77	155.64	69.88	41.93
Mass Loss Rate	g/s*m ²	10.53	13.39	6.39	3.83
Heat of Combustion	MJ/kg	9.06	10.99	10.69	10.69
Specific Ext. Area	mJ/kg	49.69	109.03	40.09	24.05
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1210

Test Date: 07-22-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panel Board 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043767
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 50.0 RH @ 30.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 17.5 g
Final Mass : 4.1 g
Mass Lost : 1.34 kg/m²
Ignition Time : 40 s
Flameout Time : 214 s

Time of Peak RHR : 70 s
Peak RHR : 187.2 kW/m²
Peak Mass Loss : 15.27 g/s*m²
Peak Extinction Area: 149.20 m²/kg
Total Heat Released : 14.79 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	89.61	158.99	77.83	46.70
Mass Loss Rate	g/s*m ²	10.21	13.07	6.29	3.77
Heat of Combustion	MJ/kg	9.97	11.50	12.10	12.10
Specific Ext. Area	m ² /kg	47.23	112.81	42.19	25.31
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

No problems with the grid.

Tested by : Onno Robert
Officer : Kim Andrew

APPENDIX M: 6 mm CHIPBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chipboard
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1158	NRC1182	NRC1187		DEV %
	Date Tested	(D/M/Y)	7/3/91	7/8/91	7/8/91		
	Temperature	(Deg C)	28	29	28	28	1
	Initial Mass	(g)	48	45	49	47	6

TEST RESULTS						AVG.	MAX
	UNITS		NRC1158	NRC1182	NRC1187		DEV %
	Ignition Time	(s)	154	119	145	139	15
	Flameout Time	(s)	620	775	670	688	13
	Time PHR	(s)	170	350	160	227	54
	Peak RHR	(kW/m ²)	155	131	149	145	9
	Peak Mass Loss	(g/s*m ²)	13.7	11.3	N / A	12	10
	Peak Ext. Area	(m ² /kg)	44.2	77.2	78.2	67	34
	Total Heat Rel.	(MJ/m ²)	47.1	49.8	46.1	48	4
	THR @ PHR	(MJ/m ²)	N / A	26.4	N / A	13	0
	TM HEAT COMB.	(MJ/kg)	11.7	11.1	8.6	10	18
	TM RHR	(kW/m ²)	101.2	76.0	88.7	89	14
	TM MLR	(g/s*m ²)	9.3	7.5	N / A	8	11
	TM S. Ext. Area	(m ² /kg)	16.9	15.9	17.4	17	5
	Mass Final	(g)	10	7	N / A	9	18

SUPPLEM -ENTARY DATA						AVG.	MAX
	UNITS		NRC1158	NRC1182	NRC1187		DEV %
	60s RHR	(kW/m ²)	148.2	124.8	135.9	136	9
	60s MLR	(g/s*m ²)	11.9	10.0	10.5	11	10
	60s HEAT COMB.	(MJ/kg)	11.6	11.7	12.0	12	2
	60s S. Ext. Area	(m ² /kg)	30.6	20.4	16.6	23	36
	180s RHR	(kW/m ²)	130.9	111.0	113.7	119	10
	180s MLR	(g/s*m ²)	10.4	9.1	9.4	10	8
	180s HEAT COMB.	(MJ/kg)	12.2	11.9	11.7	12	2
	180s S. Ext. Area	(m ² /kg)	28.8	23.1	15.9	23	30
	300s RHR	(kW/m ²)	124.2	115.4	121.3	120	4
	300s MLR	(g/s*m ²)	9.8	9.2	10.0	10	5
	300s HEAT COMB.	(MJ/kg)	12.5	12.4	11.9	12	3
	300s S. Ext. Area	(m ² /kg)	25.8	34.4	29.8	30	15

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chipboard
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			NRC1126	NRC1132	NRC1137		DEV %
	Date Tested	(D/M/Y)	6/13/91	6/18/91	6/19/91		
	Temperature	(Deg C)	29	31	29	30	5
	Initial Mass	(g)	49	47	56	51	11

TEST RESULTS	Ignition Time	(s)	23	18	23	21	16
	Flameout Time	(s)	455	475	500	477	5
	Time PHR	(s)	255	30	280	188	84
	Peak RHR	(kW/m2)	231	187	213	210	11
	Peak Mass Loss	(g/s*m2)	17.7	13.7	16.8	16	15
	Peak Ext. Area	(m2/kg)	118.0	93.3	117.0	109	15
	Total Heat Rel.	(MJ/m2)	55.1	47.5	60.8	54	13
	THR @ PHR	(MJ/m2)	35.4	N / A	40.0	25	59
	TM HEAT COMB.	(MJ/kg)	12.9	11.9	12.3	12	4
	TM RHR	(kW/m2)	128.2	104.5	128.0	120	13
	TM MLR	(g/s*m2)	11.8	10.3	12.5	12	11
	TM S. Ext. Area	(m2/kg)	41.8	44.7	39.1	42	7
	Mass Final	(g)	8	9	10	9	12

SUPPLEMENTARY DATA	60s RHR	(kW/m2)	173.7	161.6	178.5	171.3	6
	60s MLR	(g/s*m2)	12.3	12.0	13.6	13	7
	60s HEAT COMB.	(MJ/kg)	13.1	12.5	12.3	13	4
	60s S. Ext. Area	(m2/kg)	73.2	68.6	51.2	64	20
	180s RHR	(kW/m2)	140.1	136.9	145.5	141	3
	180s MLR	(g/s*m2)	10.8	11.1	11.8	11	5
	180s HEAT COMB.	(MJ/kg)	12.6	12.0	12.0	12	3
	180s S. Ext. Area	(m2/kg)	48.1	69.9	39.0	52	34
	300s RHR	(kW/m2)	155.3	132.7	162.2	150	12
	300s MLR	(g/s*m2)	11.7	10.8	12.9	12	9
	300s HEAT COMB.	(MJ/kg)	13.1	12.1	12.4	13	4
	300s S. Ext. Area	(m2/kg)	59.1	66.9	56.7	61	10

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1158

Test Date: 07-03-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.041968
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 28.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 48.1 g
Final Mass : 10.1 g
Mass Lost : 3.80 kg/m²
Ignition Time : 154 s
Flameout Time : 620 s

Time of Peak RHR : 170 s
Peak RHR : 154.8 kW/m²
Peak Mass Loss : 13.69 g/s*m²
Peak Extinction Area: 44.23 m²/kg
Total Heat Released : 47.06 MJ/m²

Summary Data From Ignition

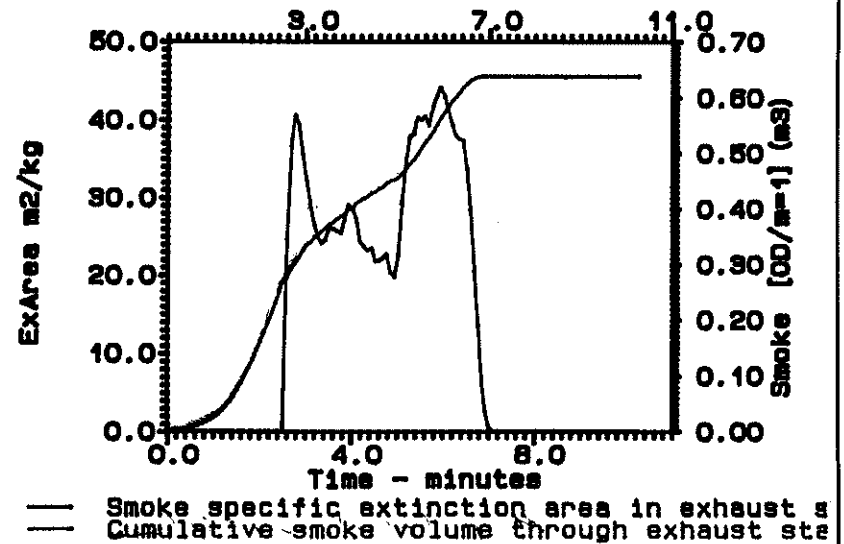
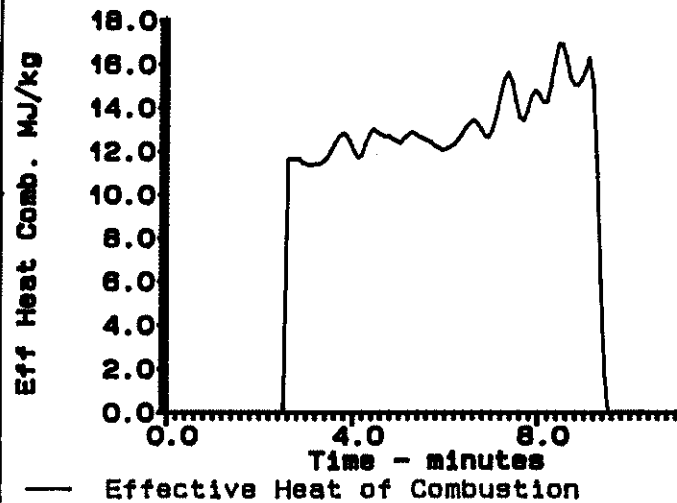
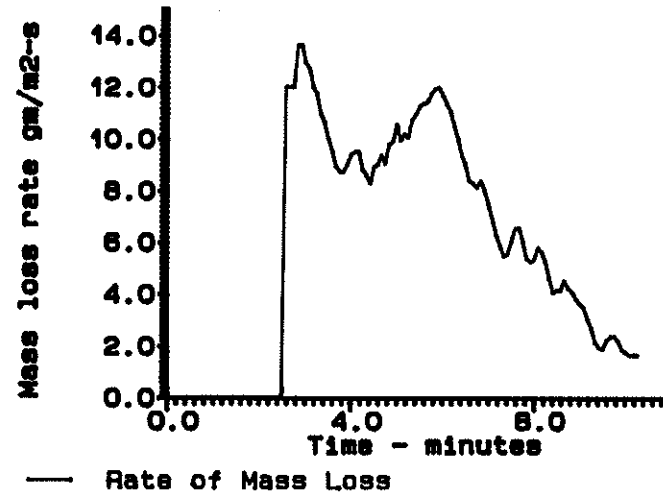
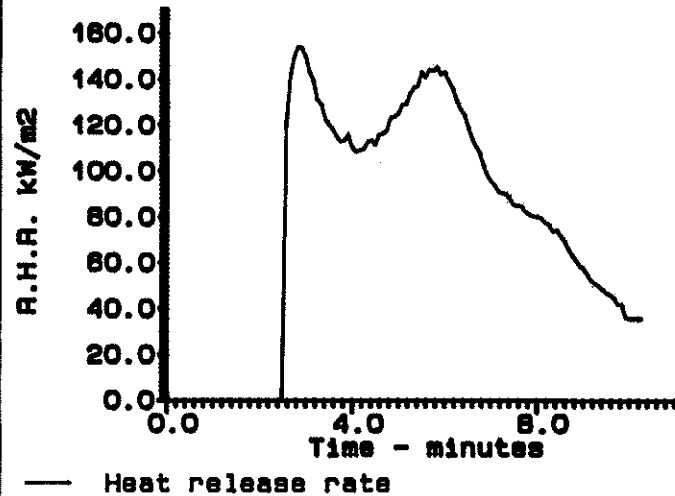
	Test Mean	60S	180S	300s
Heat Release kW/m ²	101.21	148.24	130.92	124.21
Mass Loss Rate g/s*m ²	9.32	11.89	10.40	9.78
Heat of Combustion MJ/kg	11.68	11.64	12.23	12.52
Specific Ext. Area m ² /kg	16.94	30.56	28.83	25.85
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The sample turned very white at the end of the test, rising slightly.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1182

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 28.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 44.5 g
Final Mass : 7.0 g
Mass Lost : 3.75 kg/m²
Ignition Time : 119 s
Flameout Time : 775 s

Time of Peak RHR : 350 s
Peak RHR : 131.4 kW/m²
Peak Mass Loss : 11.31 g/s*m²
Peak Extinction Area: 77.25 m²/kg
Total Heat Released : 49.80 MJ/m²

Summary Data From Ignition

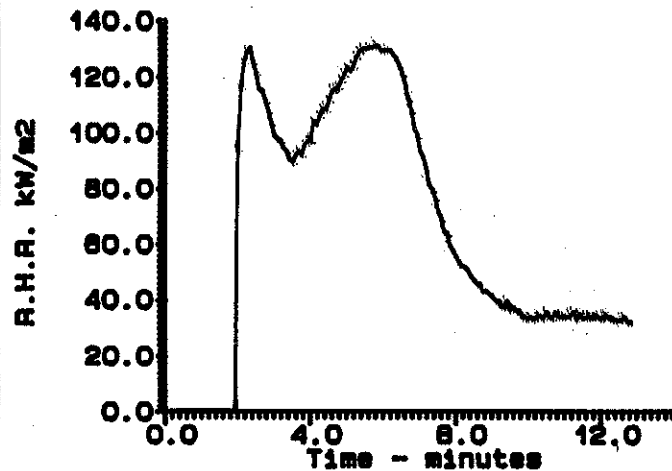
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	76.03	124.85	111.03	115.39
Mass Loss Rate	g/s*m ²	7.51	10.02	9.05	9.15
Heat of Combustion	MJ/kg	11.05	11.66	11.94	12.44
Specific Ext. Area	m ² /kg	15.88	20.41	23.08	34.40
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

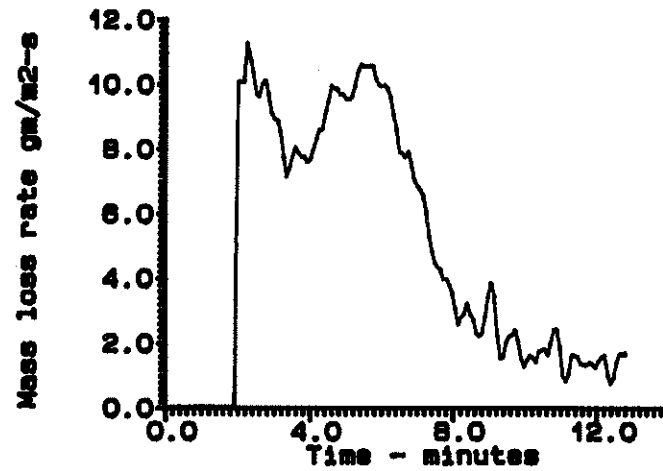
One corner rose upwards, and the sample swelled upwards from the center, breaking into smaller pieces towards the end.

Tested by : Onno Robert
Officer : Kim Andrew

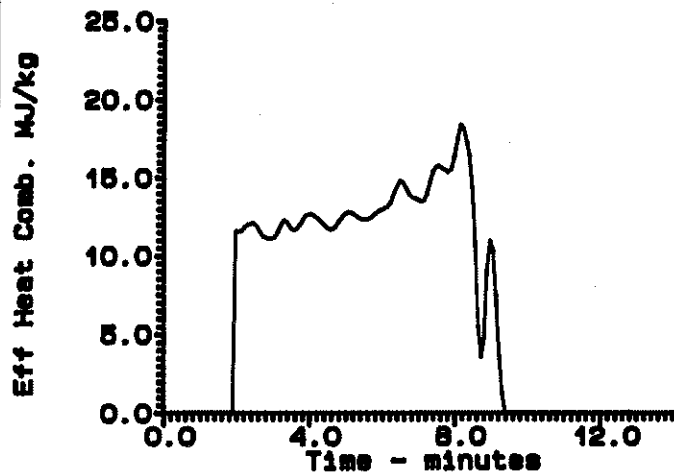
1/4" Chipboard 91 Flux = 25



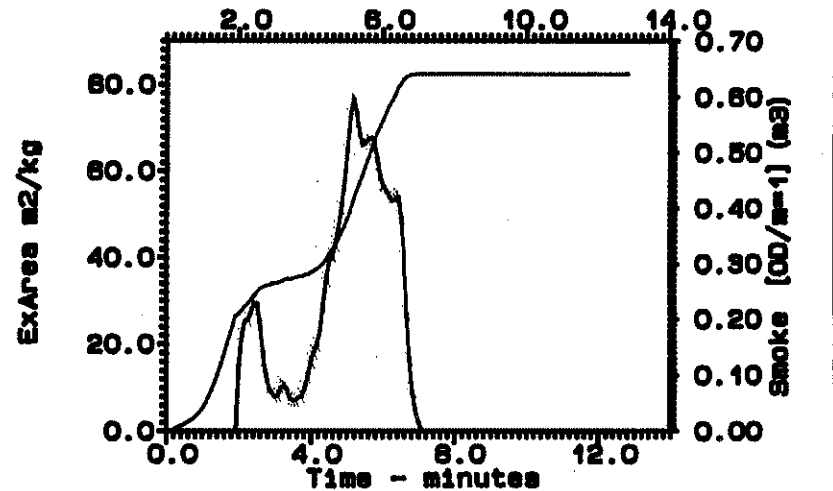
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 — Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1187

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 28.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 48.8 g
Final Mass : 0.0 g
Mass Lost : 4.88 kg/m²
Ignition Time : 145 s
Flameout Time : 670 s

Time of Peak RHR : 160 s
Peak RHR : 148.9 kW/m²
Peak Mass Loss : 796.44 g/s*m²
Peak Extinction Area: 78.17 m²/kg
Total Heat Released : 46.14 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	88.73	135.90	113.68	121.32
Mass Loss Rate g/s*m ²	32.50	10.51	9.39	10.01
Heat of Combustion MJ/kg	8.58	12.01	11.72	11.93
Specific Ext. Area m ² /kg	17.44	16.58	15.93	29.83
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

This experiment should be very reliable.
The sample burned very consistently and evenly, as shown in the burn curve.

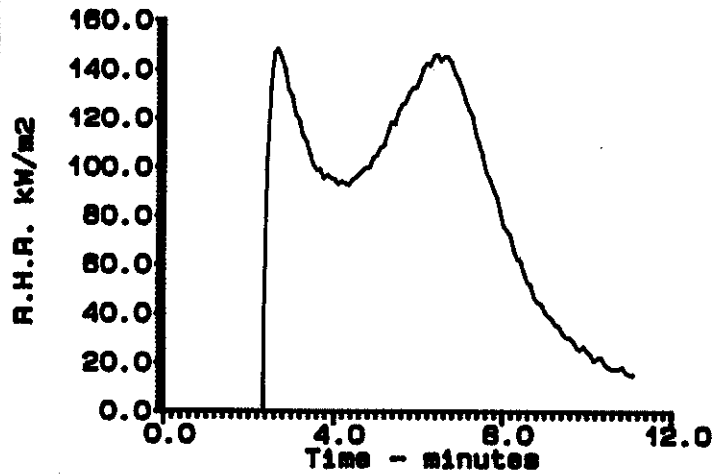
Tested by : Onno Robert
Officer : Kim Andrew

5/8"

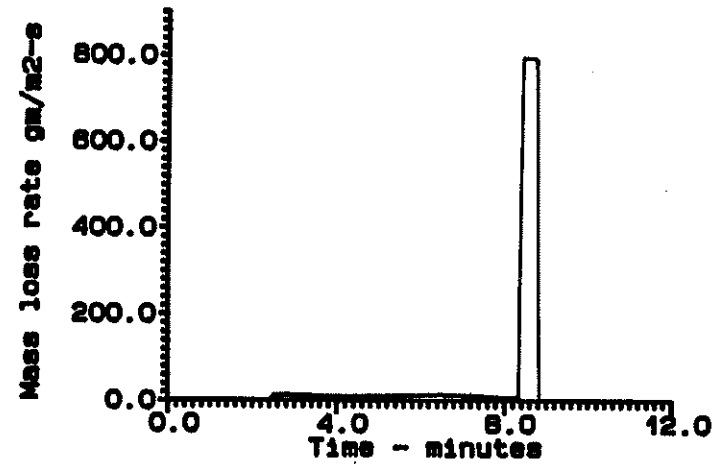
Chipboard

Exp 187 7/8/91

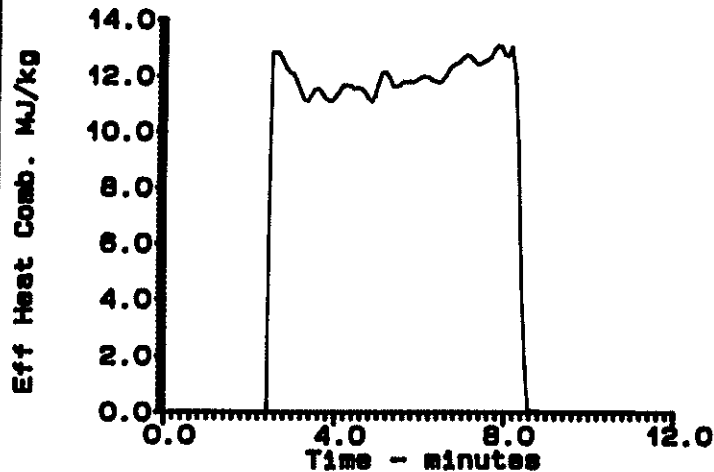
90 Flux = 25



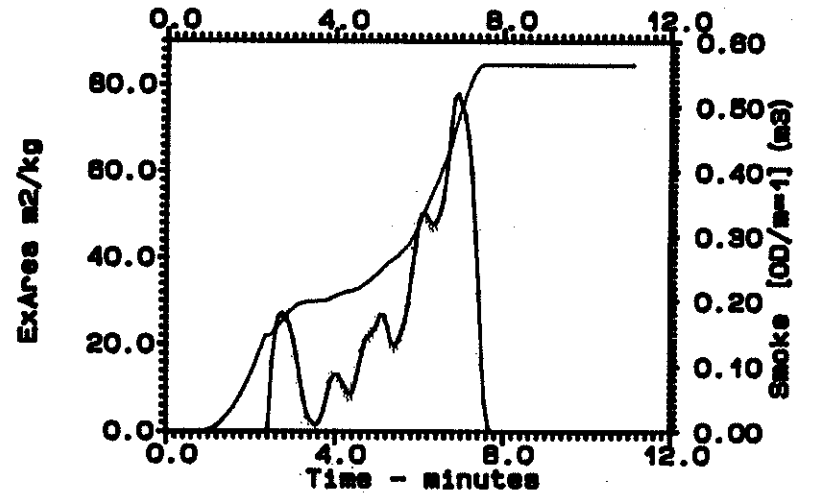
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust
- - - Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1126

Test Date: 06-13-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.044168
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.008000m

Test Conditions : 50.0 RH @ 28.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 49.0 g
Final Mass : 8.4 g
Mass Lost : 4.06 kg/m²
Ignition Time : 23 s
Flameout Time : 455 s

Time of Peak RHR : 255 s
Peak RHR : 231.2 kW/m²
Peak Mass Loss : 17.70 g/s*m²
Peak Extinction Area: 118.05 m²/kg
Total Heat Released : 55.14 MJ/m²

Summary Data From Ignition

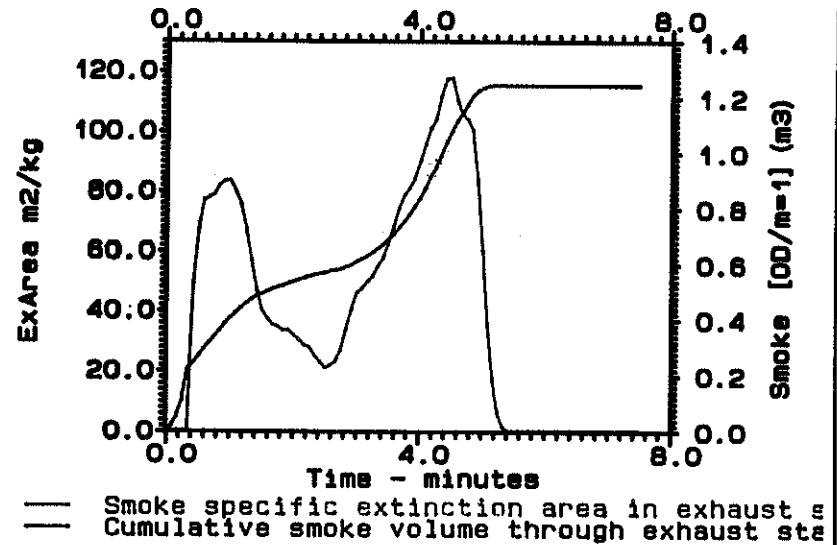
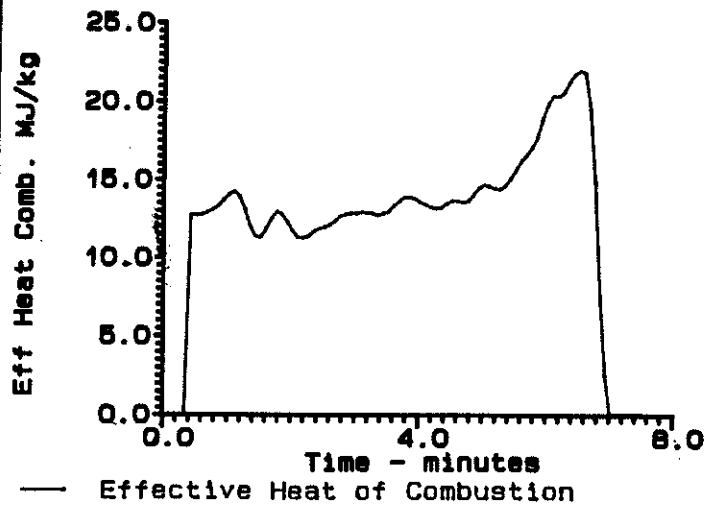
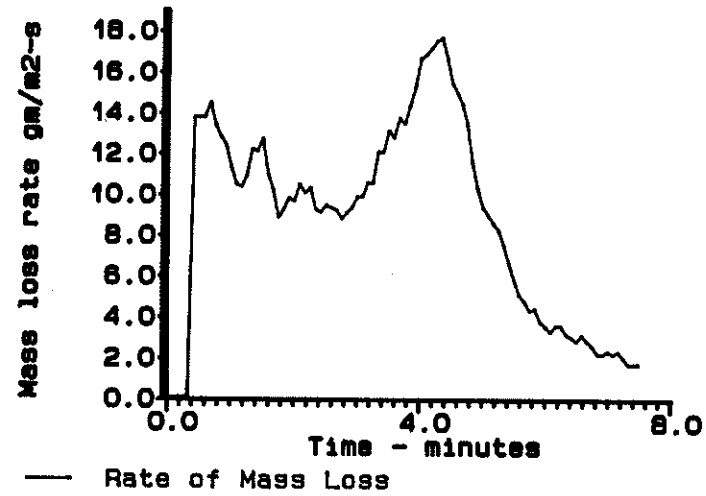
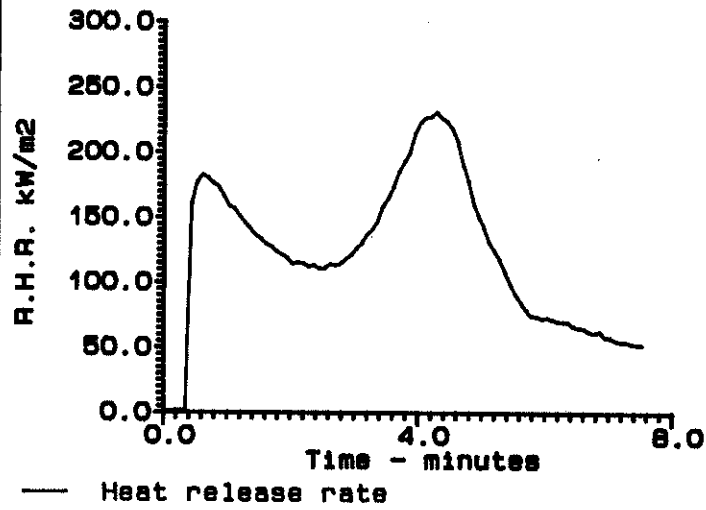
	Test Mean	60S	180S	300s
Heat Release kW/m ²	128.24	173.71	140.09	155.29
Mass Loss Rate g/s*m ²	11.77	12.34	10.80	11.73
Heat of Combustion MJ/kg	12.92	13.09	12.55	13.06
Specific Ext. Area m ² /kg	41.83	73.17	48.13	59.14
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Typical burn for sample.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chip Board 91



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1132

Test Date: 06-18-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4 Chipboard 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043299
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005500m

Test Conditions : 50.0 RH @ 30.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.6 g
Final Mass : 8.5 g
Mass Lost : 3.81 kg/m²
Ignition Time : 18 s
Flameout Time : 475 s

Time of Peak RHR : 30 s
Peak RHR : 168.6 kW/m²
Peak Mass Loss : 13.70 g/s*m²
Peak Extinction Area: 93.32 m²/kg
Total Heat Released : 47.53 MJ/m²

Summary Data From Ignition

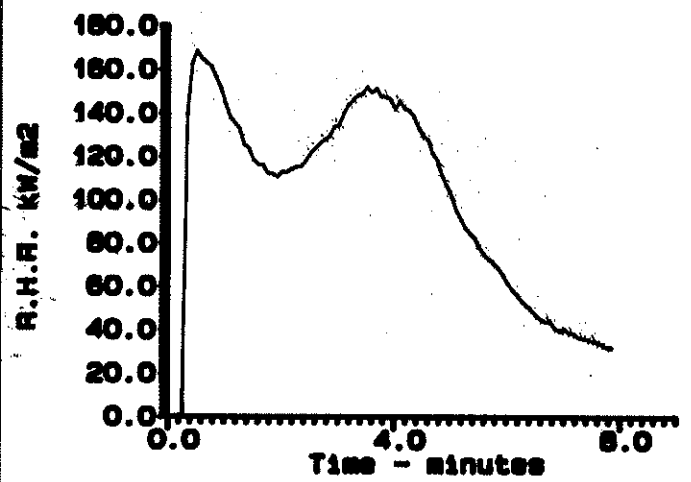
	Test Mean	60S	180S	300s
Heat Release kW/m ²	104.47	161.62	136.86	132.65
Mass Loss Rate g/s*m ²	10.31	12.03	11.08	10.78
Heat of Combustion MJ/kg	11.86	12.52	11.99	12.13
Specific Ext. Area m ² /kg	44.65	68.60	69.90	66.85
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

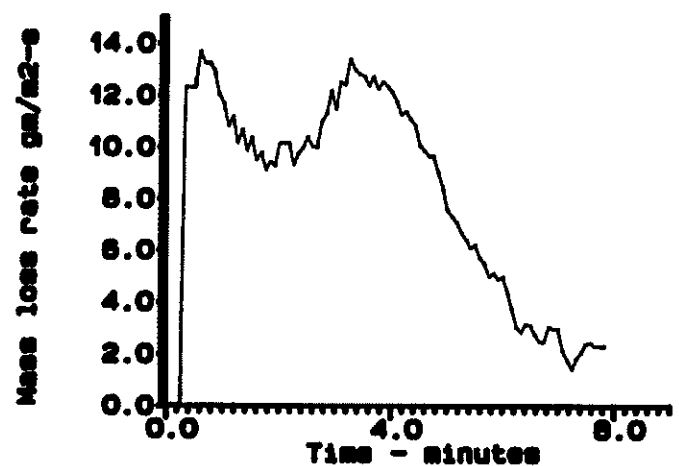
Typical to previous test of material.
Flames, Smoke, Liquid leaked out between the frame and the tray. This might affect mass loss
there might be some confusion with this exp and 32

Tested by : Onno Robert
Officer : Kim Andrew

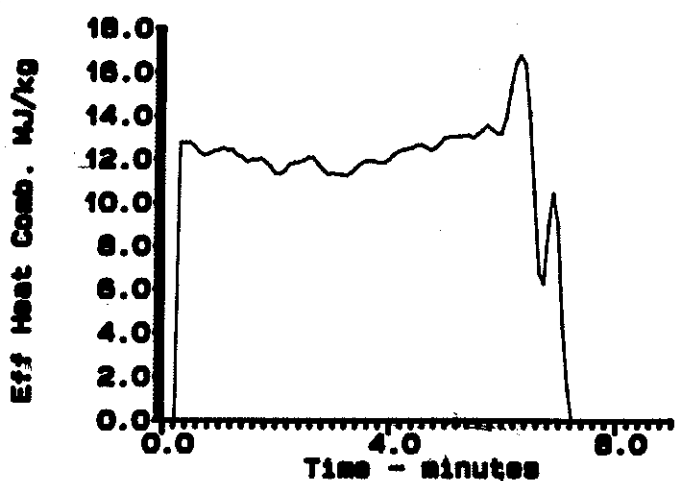
1/4" Chip Board 91



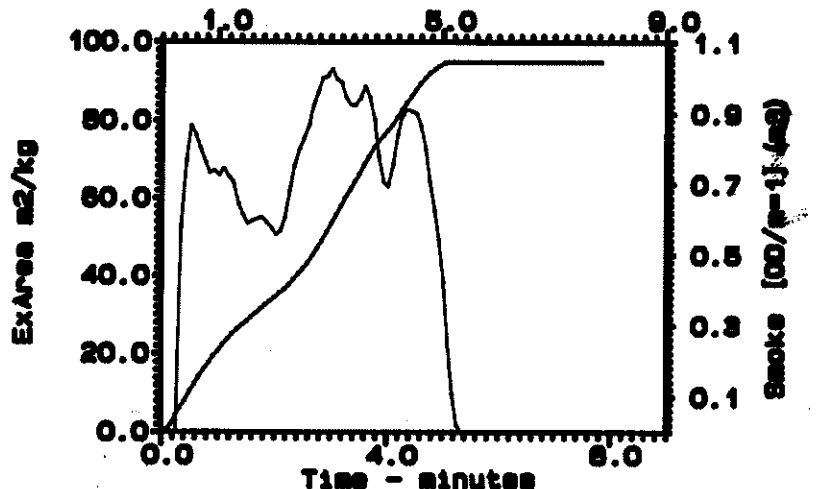
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
— Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1137

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 50.0 RH @ 29.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 56.4 g
Final Mass : 10.0 g
Mass Lost : 4.64 kg/m²
Ignition Time : 23 s
Flameout Time : 500 s

Time of Peak RHR : 280 s
Peak RHR : 213.3 kW/m²
Peak Mass Loss : 16.76 g/s*m²
Peak Extinction Area: 116.97 m²/kg
Total Heat Released : 60.80 MJ/m²

Summary Data From Ignition

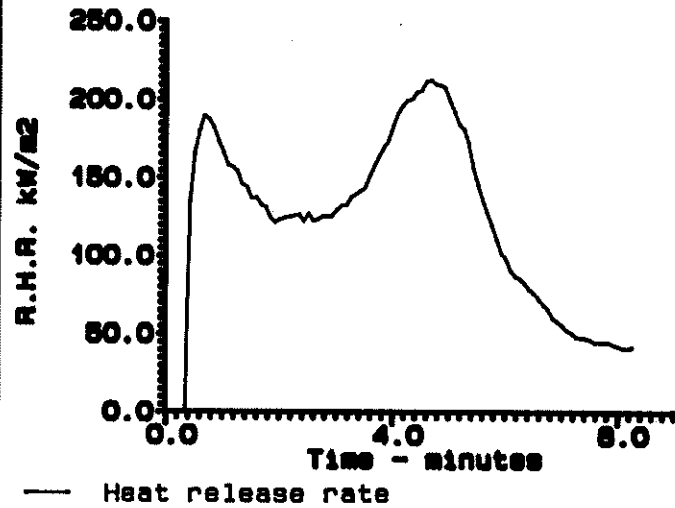
	Test Mean	60S	180S	300s
Heat Release kW/m ²	127.99	178.52	145.52	162.18
Mass Loss Rate g/s*m ²	12.48	13.56	11.82	12.91
Heat of Combustion MJ/kg	12.34	12.33	11.98	12.38
Specific Ext. Area m ² /kg	39.14	51.20	38.99	56.73
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

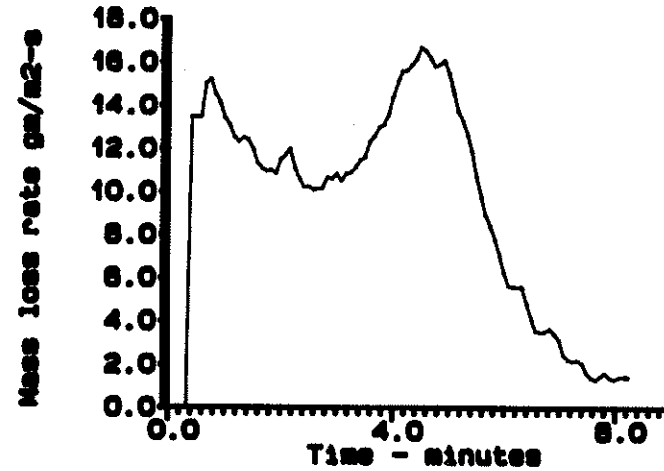
The sample became thin and waferlike, and then arched itself upwards about 20mm

Tested by : Onno Robert
Officer : Kim Andrew

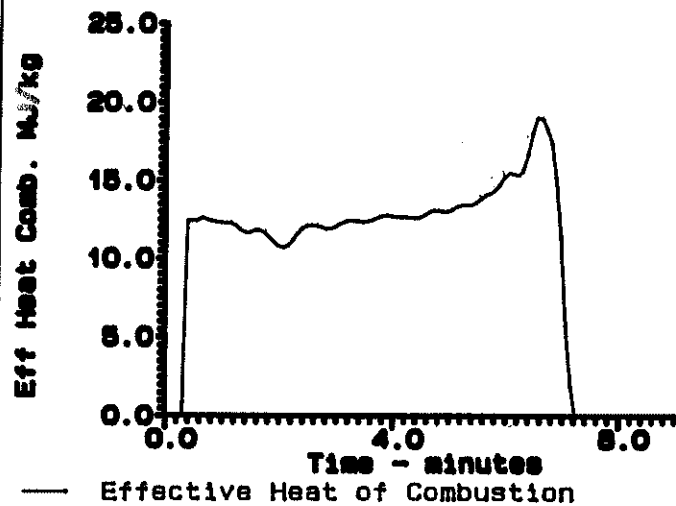
1/4" Chipboard 91



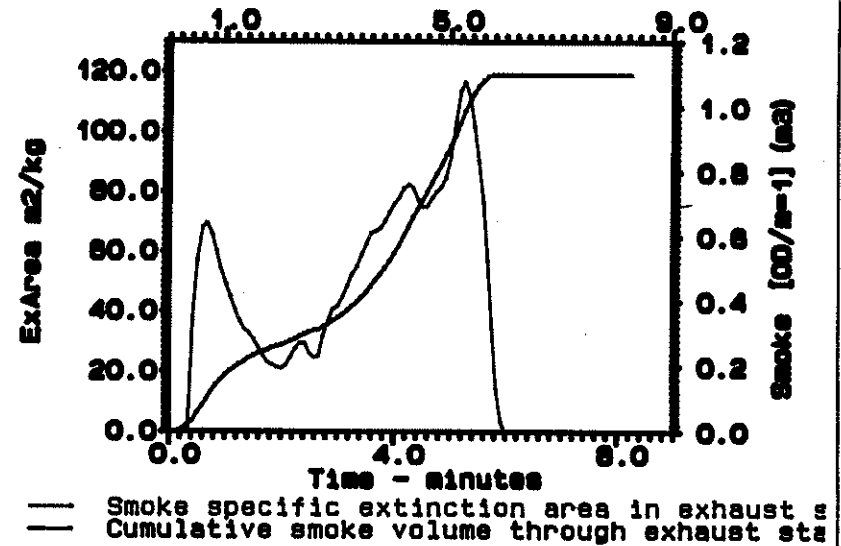
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 - - - Cumulative smoke volume through exhaust sta

APPENDIX N: 5.0 mm WOODPANEL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	5

DETAILS OF TEST	UNITS				AVG.	MAX
		NRC1165	NRC1180	NRC1184		DEV %
Test Reference						
Date Tested	(D/M/Y)	7/5/91	7/8/91	7/8/91		
Temperature	(Deg C)	28	28	29	28	2
Initial Mass	(g)	44	44	43	43	1

TEST RESULTS		UNITS				AVG.	MAX
			NRC1165	NRC1180	NRC1184		DEV %
	Ignition Time	(s)	275	260	283	273	5
	Flameout Time	(s)	699	660	693	684	4
	Time PHR	(s)	350	360	365	358	2
	Peak RHR	(kW/m2)	196	170	184	183	7
	Peak Mass Loss	(g/s*m2)	15.4	14.5	16.1	15	5
	Peak Ext. Area	(m2/kg)	122.4	104.8	104.6	111	11
	Total Heat Rel.	(MJ/m2)	38.0	36.1	38.2	37	4
	THR @ PHR	(MJ/m2)	14.0	14.2	13.0	14	5
	TM HEAT COMB.	(MJ/kg)	10.4	10.3	10.6	10	2
	TM RHR	(kW/m2)	91.7	91.4	94.2	92	2
	TM MLR	(g/s*m2)	9.2	9.8	9.7	10	4
	TM S. Ext. Area	(m2/kg)	24.8	39.2	33.1	32	23
	Mass Final	(g)	11	10	10	10	6

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			NRC1165	NRC1180	NRC1184		DEV %
	60s RHR	(kW/m2)	192.6	139.9	160.4	164	17
	60s MLR	(g/s*m2)	13.9	11.4	12.5	13	10
	60s HEAT COMB.	(MJ/kg)	12.8	11.3	11.9	12	7
	60s S. Ext. Area	(m2/kg)	62.2	54.4	36.8	51	28
	180s RHR	(kW/m2)	149.4	137.1	149.9	145	6
	180s MLR	(g/s*m2)	11.5	11.3	11.8	12	2
	180s HEAT COMB.	(MJ/kg)	12.7	11.9	12.5	12	4
	180s S. Ext. Area	(m2/kg)	56.9	71.1	62.8	64	12
	300s RHR	(kW/m2)	112.9	112.1	118.0	114	3
	300s MLR	(g/s*m2)	8.6	9.2	9.1	9	4
	300s HEAT COMB.	(MJ/kg)	12.9	12.1	12.9	13	4
	300s S. Ext. Area	(m2/kg)	34.1	51.2	44.6	43	21

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1991
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	5

DETAILS OF TEST	Test Reference	UNITS	NRC1128	NRC1131	NRC1135	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/14/91	6/18/91	6/19/91		
	Temperature	(Deg C)	26	30	30	29	8
	Initial Mass	(g)	41	43	41	42	4

TEST RESULTS	Parameter	UNITS	NRC1128	NRC1131	NRC1135	AVG.	MAX
							DEV %
	Ignition Time	(s)	35	30	45	37	23
	Flameout Time	(s)	405	365	285	352	19
	Time PHR	(s)	165	170	165	167	2
	Peak RHR	(kW/m ²)	271	280	335	295	14
	Peak Mass Loss	(g/s*m ²)	21.3	22.8	25.1	23	9
	Peak Ext. Area	(m ² /kg)	117.9	146.2	133.5	133	11
	Total Heat Rel.	(MJ/m ²)	44.4	46.5	38.8	43	10
	THR @ PHR	(MJ/m ²)	23.7	24.2	23.6	24	2
	TM HEAT COMB.	(MJ/kg)	11.6	12.2	11.3	12	4
	TM RHR	(kW/m ²)	121.7	141.0	165.2	143	16
	TM MLR	(g/s*m ²)	12.9	13.8	16.7	14	15
	TM S. Ext. Area	(m ² /kg)	54.0	67.1	82.7	68	22
	Mass Final	(g)	7	8	9	8	12

SUPPLEMENTARY DATA	Parameter	UNITS	NRC1128	NRC1131	NRC1135	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	158.0	152.6	156.5	156	2
	60s MLR	(g/s*m ²)	12.7	13.0	13.5	13	3
	60s HEAT COMB.	(MJ/kg)	11.4	10.8	10.6	11	4
	60s S. Ext. Area	(m ² /kg)	95.3	72.9	95.8	88	17
	180s RHR	(kW/m ²)	178.7	184.1	195.2	186	5
	180s MLR	(g/s*m ²)	14.4	14.9	15.6	15	4
	180s HEAT COMB.	(MJ/kg)	12.1	12.1	12.3	12	1
	180s S. Ext. Area	(m ² /kg)	105.3	109.0	106.2	107	2
	300s RHR	(kW/m ²)	135.0	146.7	125.6	136	8
	300s MLR	(g/s*m ²)	10.3	11.1	9.8	10	7
	300s HEAT COMB.	(MJ/kg)	12.9	13.0	12.6	13	2
	300s S. Ext. Area	(m ² /kg)	64.7	73.4	64.1	67	9

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1165

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16' Wall Panelling Masonite 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : ~~N~~)

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.004500m

Test Conditions : 50.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 43.8 g
Final Mass : 10.9 g
Mass Lost : 3.29 kg/m²
Ignition Time : 275 s
Flameout Time : 699 s

Time of Peak RHR : 350 s
Peak RHR : 195.9 kW/m²
Peak Mass Loss : 15.44 g/s*m²
Peak Extinction Area: 122.37 m²/kg
Total Heat Released : 38.04 MJ/m²

Summary Data From Ignition

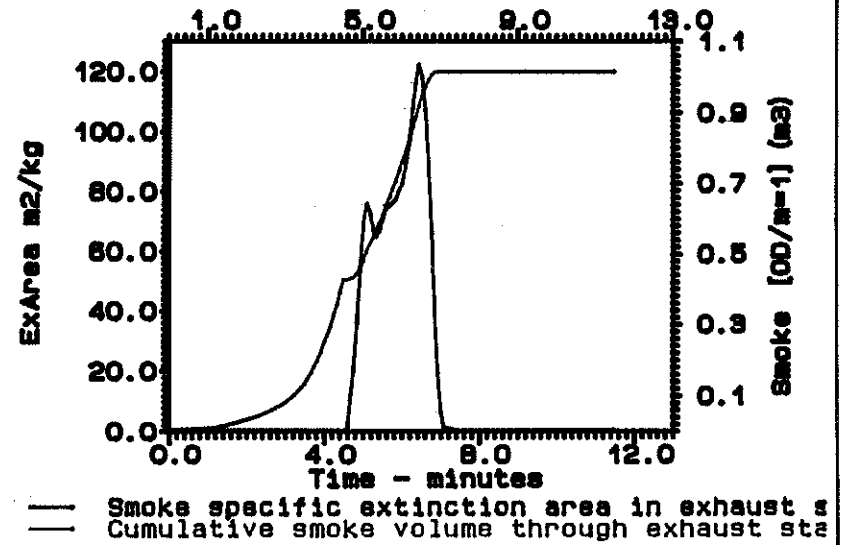
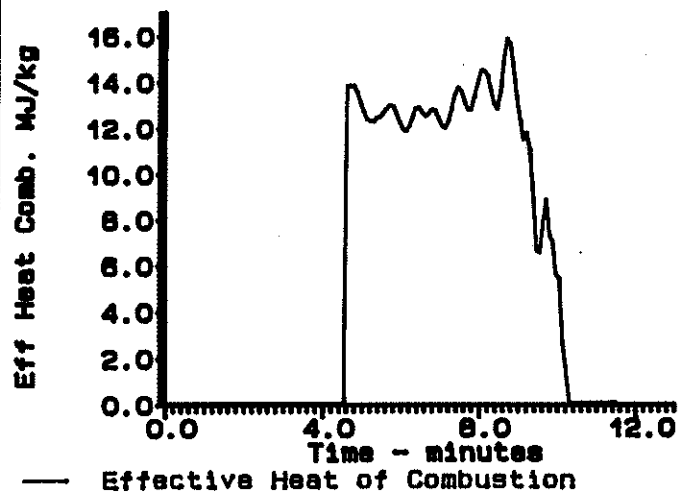
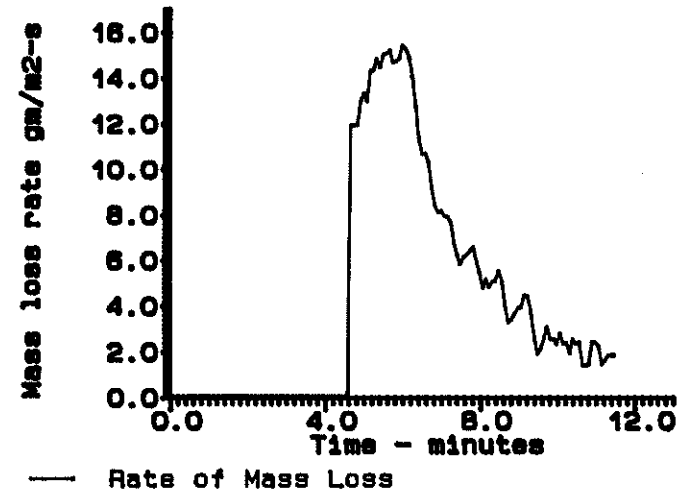
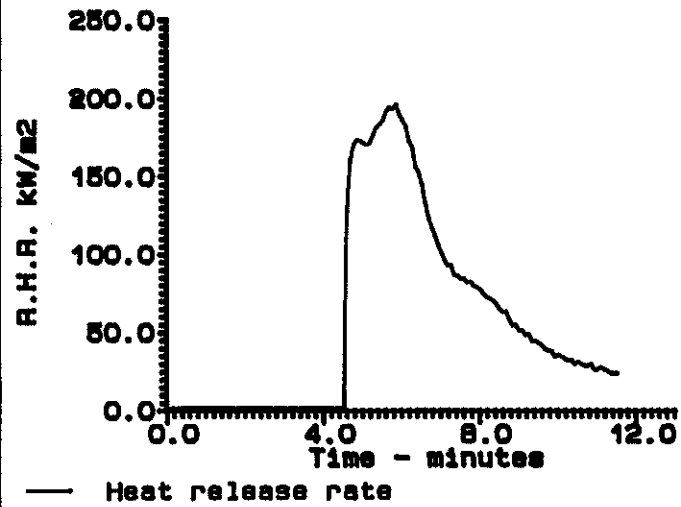
	Test Mean	60s	180s	300s
Heat Release kW/m ²	91.65	192.58	149.42	112.91
Mass Loss Rate g/s*m ²	9.24	13.87	11.52	8.63
Heat of Combustion MJ/kg	10.41	12.83	12.68	12.90
Specific Ext. Area m ² /kg	24.79	62.18	56.85	34.11
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

This sample WAS tested with a grid.
The frame did not rise off the tray this time, so the
exp should be good

Tested by : Onno Robert
Officer : Kim Andrew

3/16" Masonite Panelling 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1180

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16' Wall Panelling Masonite 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 28.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 43.7 g
Final Mass : 10.2 g
Mass Lost : 3.34 kg/m²
Ignition Time : 260 s
Flameout Time : 660 s

Time of Peak RHR : 360 s
Peak RHR : 169.8 kW/m²
Peak Mass Loss : 14.55 g/s*m²
Peak Extinction Area: 104.76 m²/kg
Total Heat Released : 36.11 MJ/m²

Summary Data From Ignition

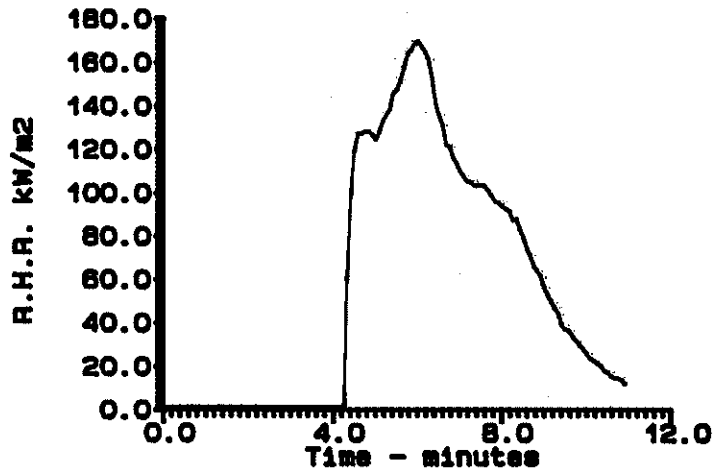
		Test Mean	60S	180S	300s
Heat Release	kW/m ²	91.42	139.95	137.14	112.11
Mass Loss Rate	g/s*m ²	9.83	11.44	11.30	9.21
Heat of Combustion	MJ/kg	10.34	11.34	11.89	12.05
Specific Ext. Area	m ² /kg	39.25	54.37	71.09	51.16
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

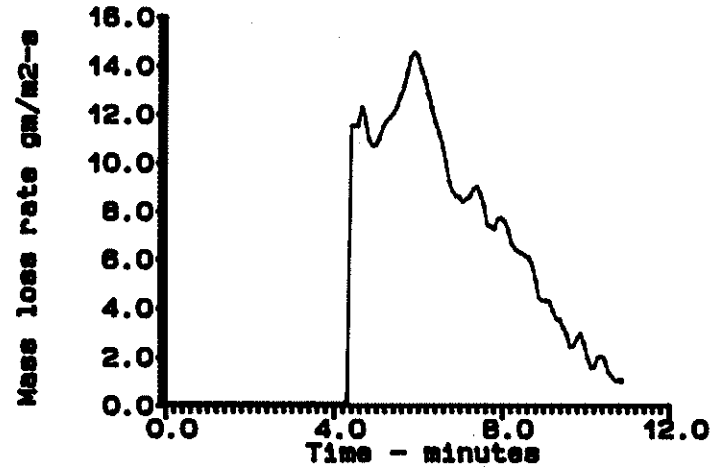
This sample WAS tested with a grid.
The frame did not rise off the tray this time, so the
exp should be good

Tested by : Onno Robert
Officer : Kim Andrew

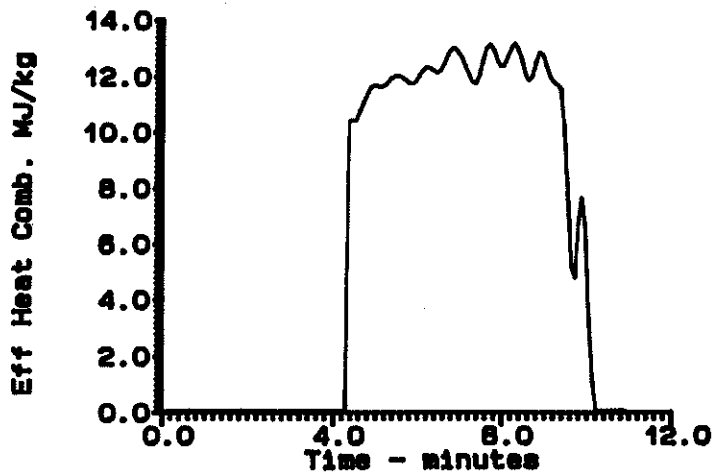
3/16" Masonite Panelling 91 Flux = 25



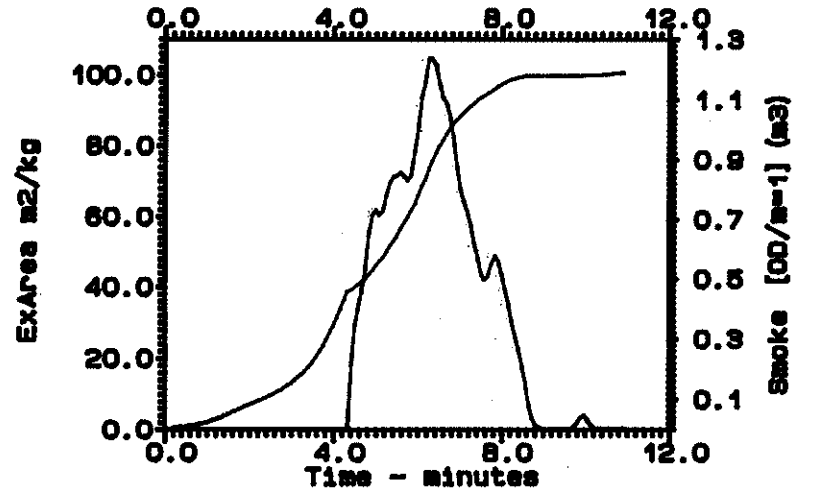
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
— Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1184

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16' Wall Panelling Masonite 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.042183
Heater Orientation : Horizontal
Grid Used :

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 42.9 g
Final Mass : 9.7 g
Mass Lost : 3.32 kg/m²
Ignition Time : 283 s
Flameout Time : 693 s

Time of Peak RHR : 365 s
Peak RHR : 184.1 kW/m²
Peak Mass Loss : 16.06 g/s*m²
Peak Extinction Area: 104.63 m²/kg
Total Heat Released : 38.16 MJ/m²

Summary Data From Ignition

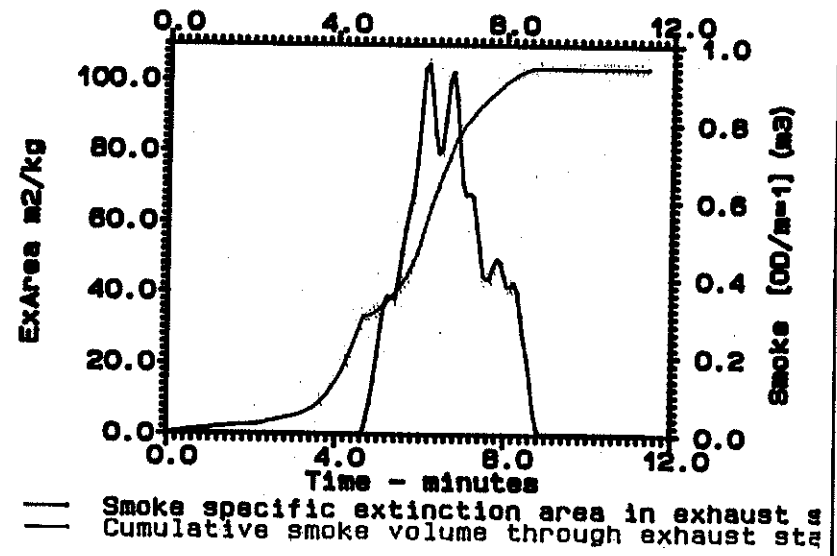
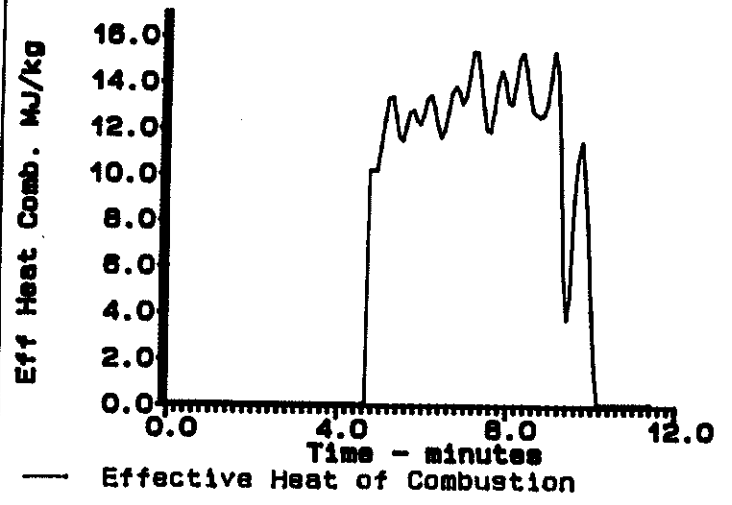
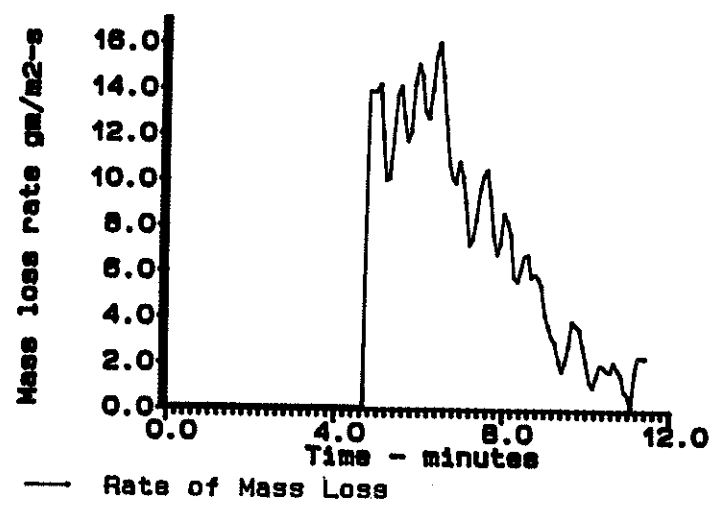
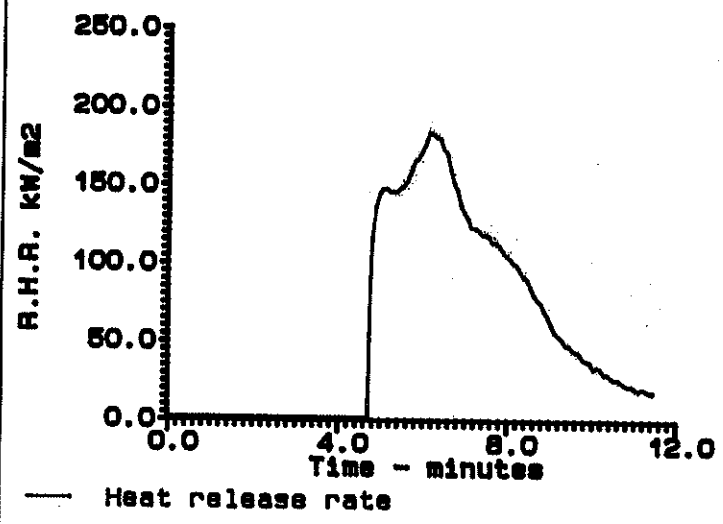
	Test Mean	60S	180S	300s
Heat Release kW/m ²	94.23	160.39	149.91	117.98
Mass Loss Rate g/s*m ²	9.69	12.52	11.76	9.08
Heat of Combustion MJ/kg	10.62	11.88	12.49	12.86
Specific Ext. Area m ² /kg	33.09	36.77	62.84	44.61
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

3/16" Masonite Panelling 91 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1128

Test Date: 06-14-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16" Wood Panelling 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.042404
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.004500m

Test Conditions : 50.0 RH @ 26.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 40.5 g
Final Mass : 6.8 g
Mass Lost : 3.37 kg/m²
Ignition Time : 35 s
Flameout Time : 405 s

Time of Peak RHR : 165 s
Peak RHR : 270.7 kW/m²
Peak Mass Loss : 21.26 g/s*m²
Peak Extinction Area: 117.94 m²/kg
Total Heat Released : 44.42 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	121.71	157.96	178.71	135.04
Mass Loss Rate g/s*m ²	12.94	12.67	14.44	10.32
Heat of Combustion MJ/kg	11.55	11.41	12.10	12.91
Specific Ext. Area m ² /kg	53.98	95.31	105.30	64.75
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

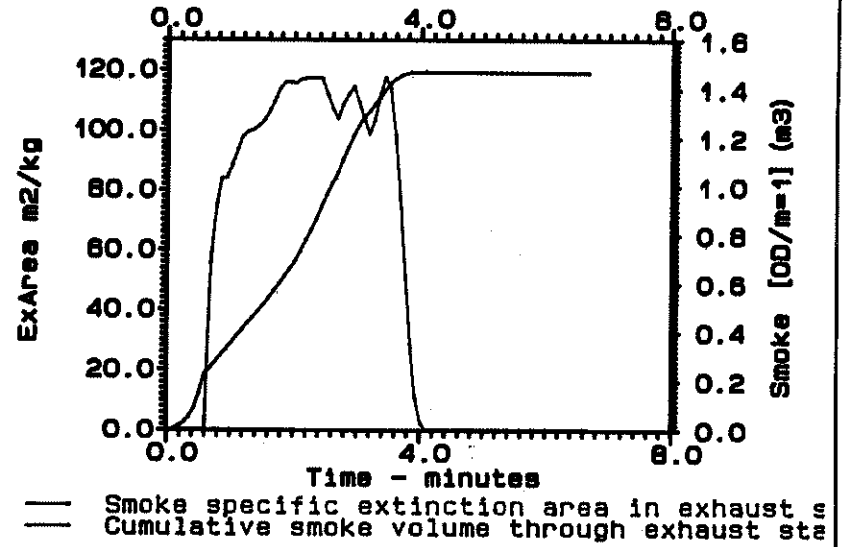
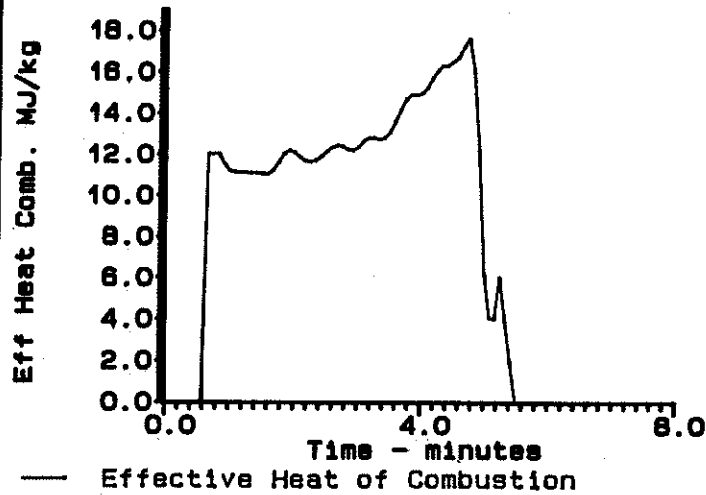
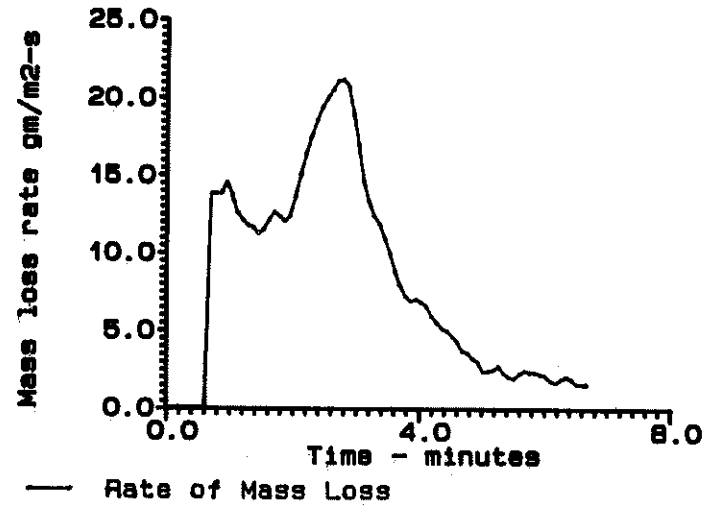
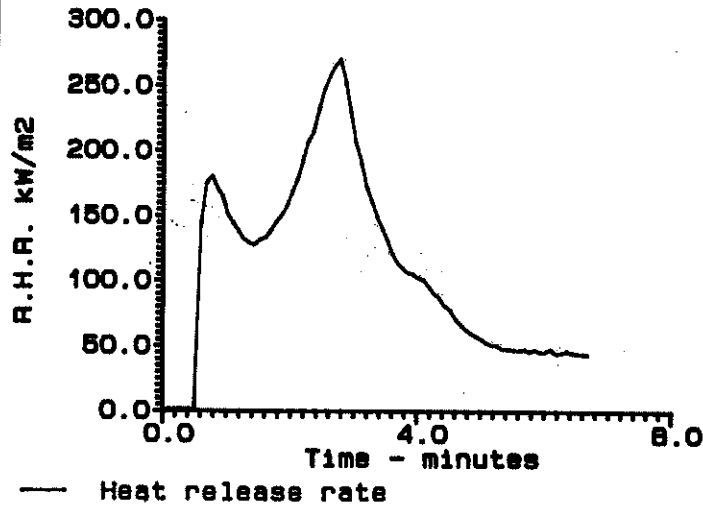
At the start the top surface started to peel in places, and then after time the sample ignited. At the start of the second peak, flames, smoke, and liquid came around the bottom of the frame. The sample then caught on fire on the underside, and burned to a thin fragile like structure.

Tested by : Onno Robert
Officer : Kim Andrew

3/16"

Exp 128 6/14/91

Panel Board 91



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1131

Test Date: 06-18-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16" Wood Panelling 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043299
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.004500m

Test Conditions : 50.0 RH @ 29.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 43.3 g
Final Mass : 8.0 g
Mass Lost : 3.53 kg/m²
Ignition Time : 30 s
Flameout Time : 365 s

Time of Peak RHR : 170 s
Peak RHR : 279.9 kW/m²
Peak Mass Loss : 22.79 g/s*m²
Peak Extinction Area: 146.22 m²/kg
Total Heat Released : 46.52 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	140.96	152.59	184.06	146.73
Mass Loss Rate g/s*m ²	13.78	13.01	14.88	11.13
Heat of Combustion MJ/kg	12.21	10.77	12.06	13.01
Specific Ext. Area m ² /kg	67.09	72.90	108.99	73.37
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

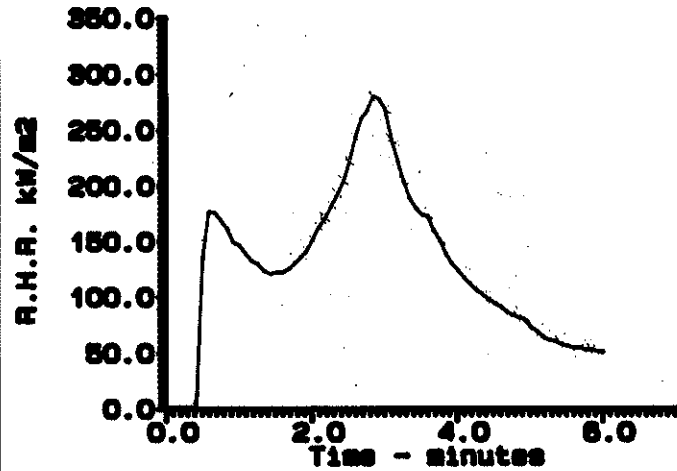
Typical to previous test of material.

Tested by : Onno Robert
Officer : Kim Andrew

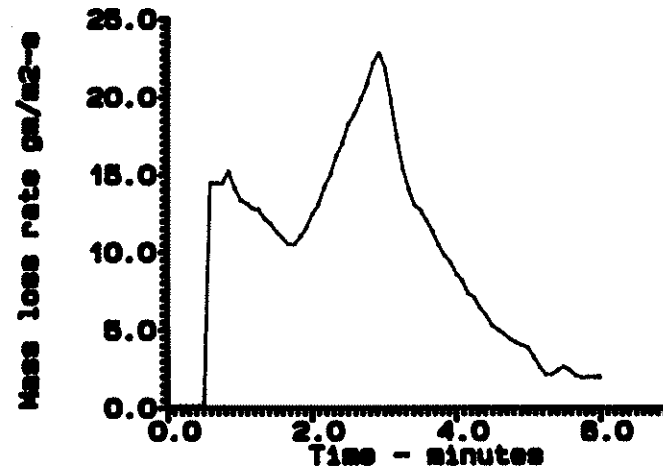
3/16"

Exp 131 6/18/91

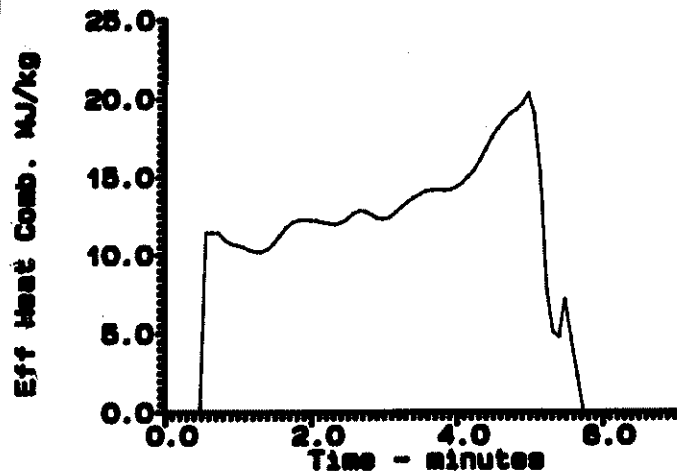
Wood Panelling 91



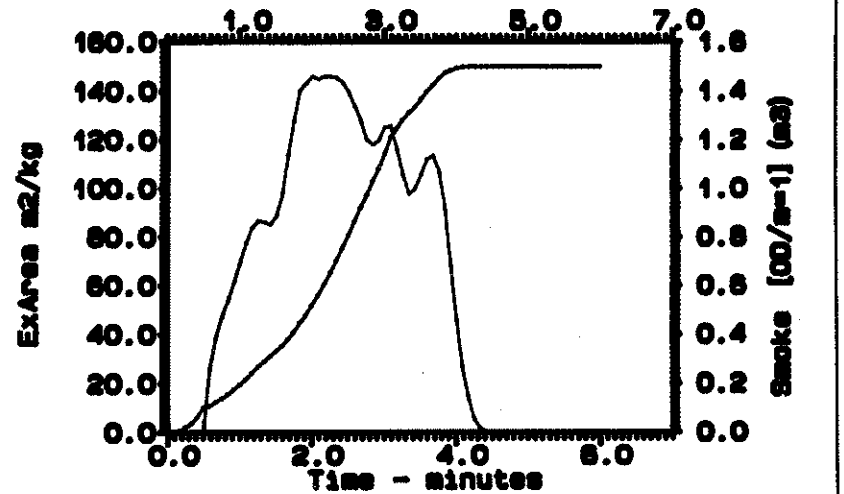
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
- - - Cumulative smoke volume through exhaust sta

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1135

Test Date: 06-19-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/16" Wood Panelling 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.042780
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.005000m

Test Conditions : 50.0 RH @ 29.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 41.3 g
Final Mass : 8.6 g
Mass Lost : 3.27 kg/m²
Ignition Time : 45 s
Flameout Time : 285 s

Time of Peak RHR : 165 s
Peak RHR : 335.3 kW/m²
Peak Mass Loss : 25.09 g/s*m²
Peak Extinction Area: 133.55 m²/kg
Total Heat Released : 38.82 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	165.20	156.54	195.25	125.62
Mass Loss Rate g/s*m ²	16.69	13.49	15.59	9.82
Heat of Combustion MJ/kg	11.30	10.60	12.30	12.65
Specific Ext. Area m ² /kg	82.71	95.79	106.24	64.05
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

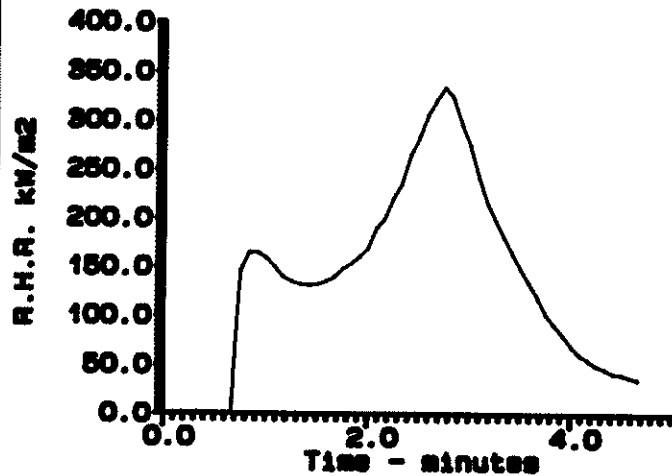
At the second peak, the sample formed two longitudinal ridges, which rose upward, leaving a space in the center.

Tested by : Onno Robert
Officer : Kim Andrew

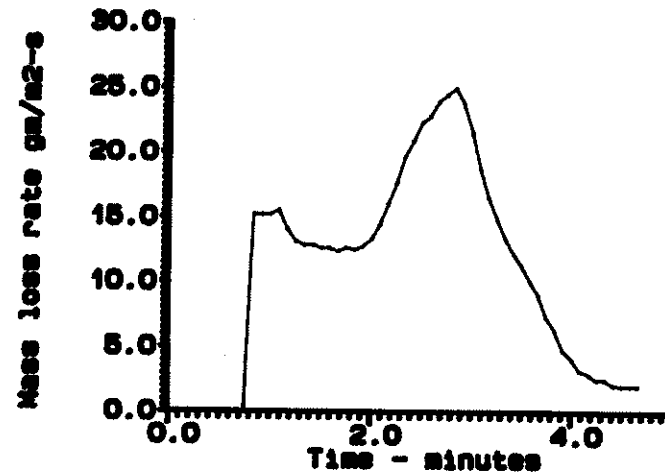
3/16"

Exp 195 6/19/91

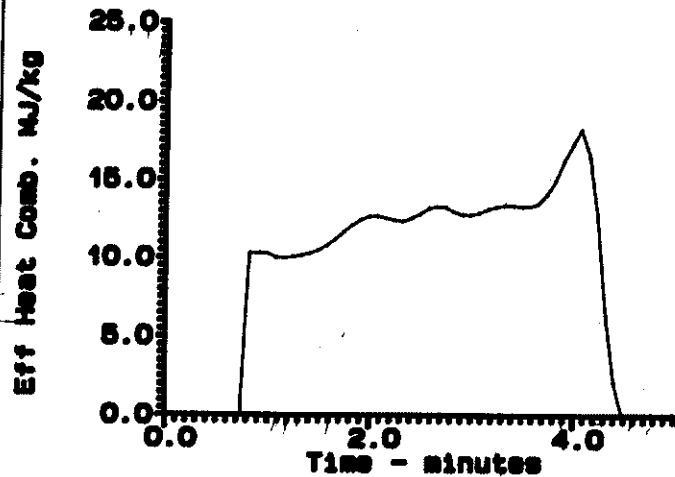
Panel Board 91



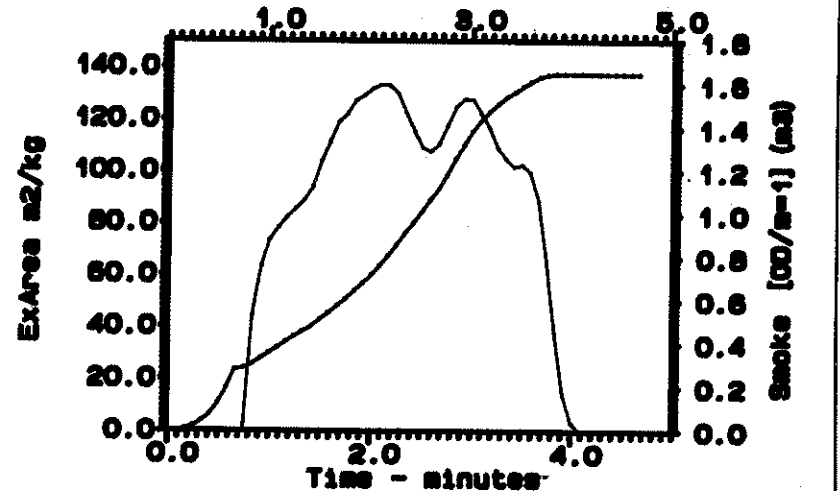
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust stream
— Cumulative smoke volume through exhaust stream

APPENDIX O: 3.0 mm WOODPANEL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	3

DETAILS OF TEST	UNITS				AVG.	MAX
		AKK0022	AKK0024	AKK0033		DEV %
Test Reference		AKK0022	AKK0024	AKK0033		
Date Tested	(D/M/Y)	6/17/92	6/17/92	6/25/92		
Temperature	(Deg C)	28	28	27	27	2
Initial Mass	(g)	34	35	35	34	2

TEST RESULTS	UNITS				AVG.	MAX
		AKK0022	AKK0024	AKK0033		DEV %
Ignition Time	(s)	180	175	190	182	5
Flameout Time	(s)	524	535	545	535	2
Time PHR	(s)	230	230	205	222	8
Peak RHR	(kW/m2)	212	218	239	223	7
Peak Mass Loss	(g/s*m2)	15.5	16.2	17.2	16	5
Peak Ext. Area	(m2/kg)	192.1	95.0	106.7	131	46
Total Heat Rel.	(MJ/m2)	35.6	35.2	33.9	35	3
THR @ PHR	(MJ/m2)	10.1	11.3	N / A	11	5
TM HEAT COMB.	(MJ/kg)	12.8	12.2	8.9	11	21
TM RHR	(kW/m2)	106.4	99.1	97.0	101	6
TM MLR	(g/s*m2)	9.5	10.4	8.2	9	12
TM S. Ext. Area	(m2/kg)	34.4	30.2	27.4	31	12
Mass Final	(g)	8	8	N / A	8	4

SUPPLEMENTARY DATA	UNITS				AVG.	MAX
		AKK0022	AKK0024	AKK0033		DEV %
60s RHR	(kW/m2)	216.8	219.9	235.0	224	5
60s MLR	(g/s*m2)	15.0	15.6	15.9	15	3
60s HEAT COMB.	(MJ/kg)	13.6	13.2	13.7	14	2
60s S. Ext. Area	(m2/kg)	71.8	64.5	71.0	69	7
180s RHR	(kW/m2)	153.3	159.9	150.2	154	4
180s MLR	(g/s*m2)	10.5	11.4	11.0	11	4
180s HEAT COMB.	(MJ/kg)	14.4	13.8	13.3	14	4
180s S. Ext. Area	(m2/kg)	60.8	55.7	52.3	56	8
300s RHR	(kW/m2)	113.4	112.1	106.1	111	4
300s MLR	(g/s*m2)	7.5	8.0	7.8	8	3
300s HEAT COMB.	(MJ/kg)	14.9	13.9	13.4	14	6
300s S. Ext. Area	(m2/kg)	38.0	35.3	31.6	35	10

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	3

DETAILS OF TEST	Test Reference	UNITS	AKK0009	AKK0016	AKK0018	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/15/92	6/17/92	6/17/92		
	Temperature	(Deg C)	27	28	27	27	2
	Initial Mass	(g)	34	34	33	34	1

TEST RESULTS	Parameter	UNITS	AKK0009	AKK0016	AKK0018	AVG.	MAX
							DEV %
	Ignition Time	(s)	59	50	60	56	11
	Flameout Time	(s)	283	355	335	324	13
	Time PHR	(s)	115	115	115	115	0
	Peak RHR	(kW/m2)	294	276	274	281	5
	Peak Mass Loss	(g/s*m2)	22.1	21.2	21.0	21	3
	Peak Ext. Area	(m2/kg)	162.1	126.8	136.2	142	14
	Total Heat Rel.	(MJ/m2)	34.9	37.3	35.2	36	4
	THR @ PHR	(MJ/m2)	12.9	14.4	12.3	13	9
	TM HEAT COMB.	(MJ/kg)	13.2	13.0	12.4	13	3
	TM RHR	(kW/m2)	158.8	124.4	130.3	138	15
	TM MLR	(g/s*m2)	15.1	12.7	13.3	14	10
	TM S. Ext. Area	(m2/kg)	84.4	55.5	62.8	68	25
	Mass Final	(g)	8	7	6	7	14

SUPPLEMENTARY DATA	Parameter	UNITS	AKK0009	AKK0016	AKK0018	AVG.	MAX
							DEV %
	60s RHR	(kW/m2)	248.1	240.4	249.3	246	2
	60s MLR	(g/s*m2)	17.8	16.6	17.9	17	5
	60s HEAT COMB.	(MJ/kg)	13.1	13.5	13.1	13	2
	60s S. Ext. Area	(m2/kg)	124.4	104.3	99.3	109	14
	180s RHR	(kW/m2)	184.2	177.7	174.6	179	3
	180s MLR	(g/s*m2)	13.1	12.7	12.7	13	2
	180s HEAT COMB.	(MJ/kg)	14.0	13.8	13.6	14	1
	180s S. Ext. Area	(m2/kg)	102.1	87.2	91.5	94	9
	300s RHR	(kW/m2)	115.8	122.2	115.0	118	4
	300s MLR	(g/s*m2)	8.1	8.5	8.3	8	3
	300s HEAT COMB.	(MJ/kg)	14.2	14.2	13.8	14	2
	300s S. Ext. Area	(m2/kg)	61.5	54.7	55.7	57	7

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0022

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 0.0 RH @ 27.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 33.7 g
Final Mass : 8.4 g
Mass Lost : 2.53 kg/m²
Ignition Time : 180 s
Flameout Time : 524 s

Time of Peak RHR : 230 s
Peak RHR : 211.5 kW/m²
Peak Mass Loss : 15.53 g/s*m²
Peak Extinction Area: 192.13 m²/kg
Total Heat Released : 35.64 MJ/m²

Summary Data From Ignition

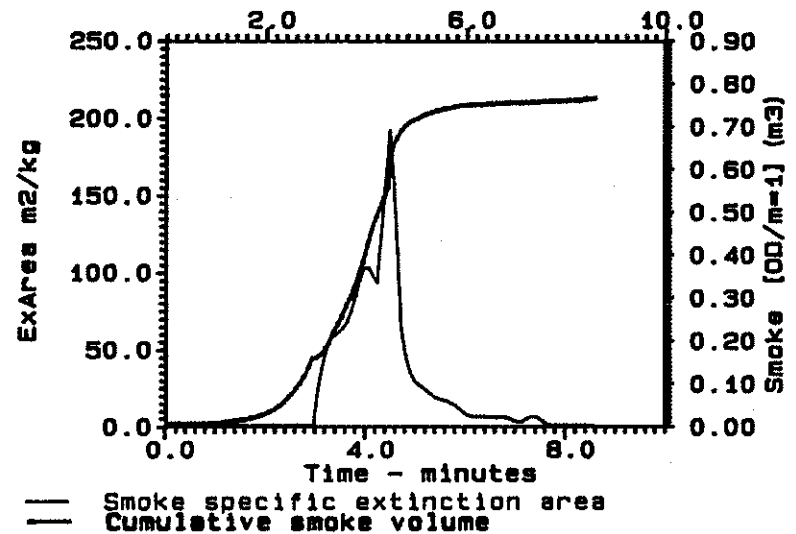
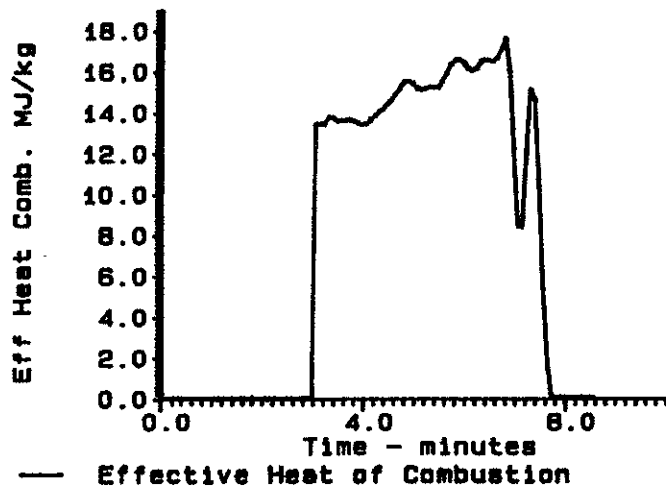
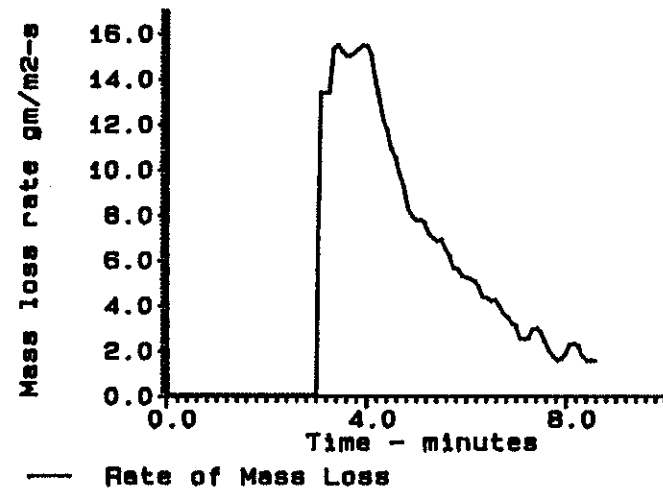
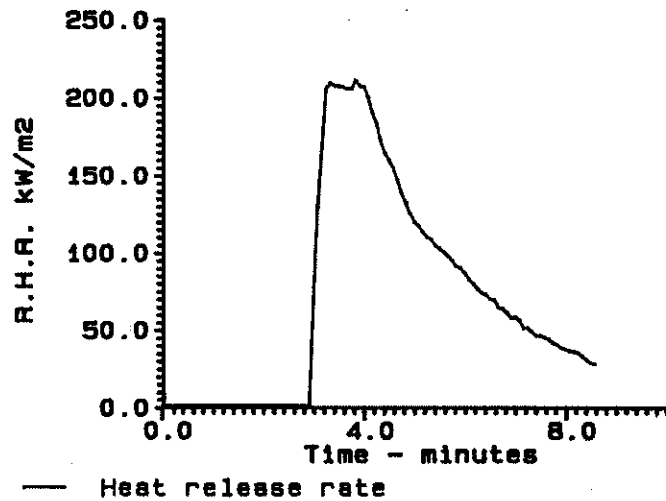
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	106.38	216.80	153.31	113.36
Mass Loss Rate	g/s*m ²	9.48	14.97	10.47	7.50
Heat of Combustion	MJ/kg	12.78	13.59	14.36	14.93
Specific Ext. Area	m ² /kg	34.36	71.78	60.79	37.97
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Some liquid ran down frame.

Tested by : Onno Robert
Officer : Kim Andrew

1/8" Woodpanel 92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0024

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 0.0 RH @ 27.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.5 g
Final Mass : 7.8 g
Mass Lost : 2.67 kg/m²
Ignition Time : 175 s
Flameout Time : 535 s

Time of Peak RHR : 230 s
Peak RHR : 218.1 kW/m²
Peak Mass Loss : 16.16 g/s*m²
Peak Extinction Area: 94.95 m²/kg
Total Heat Released : 35.18 MJ/m²

Summary Data From Ignition

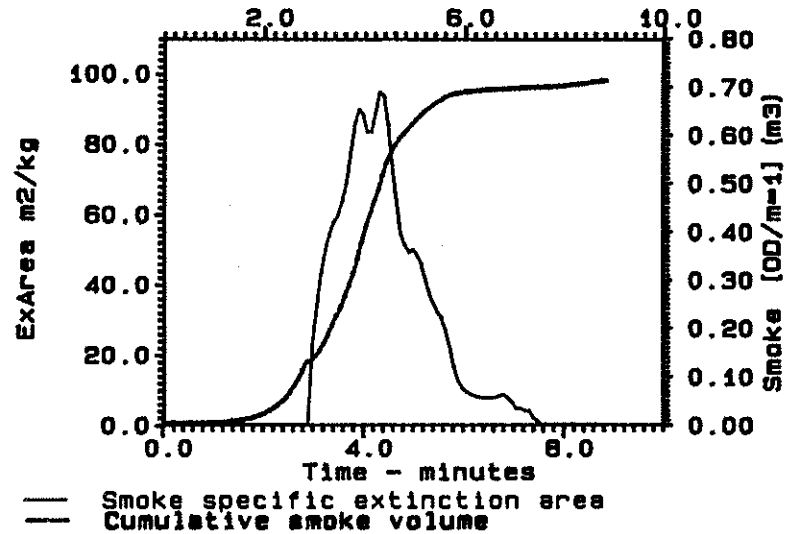
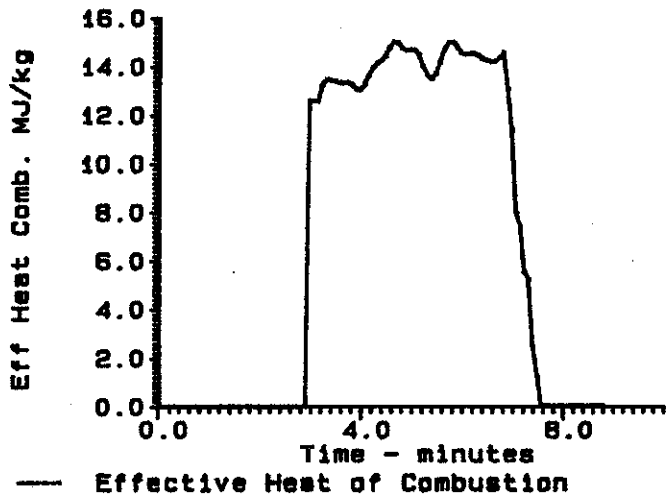
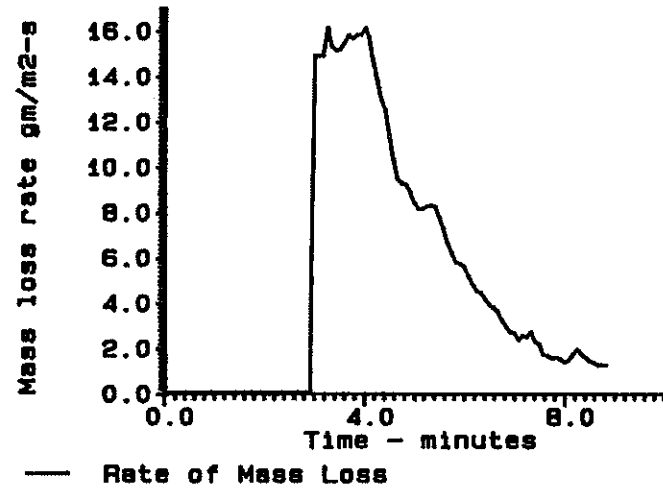
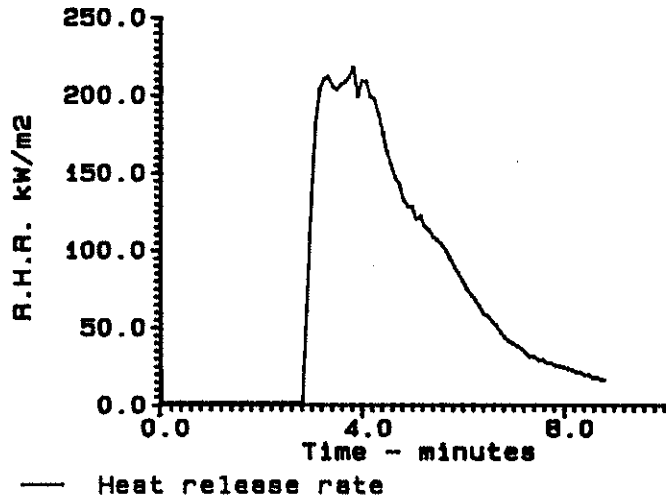
	Test Mean	60S	180S	300s
Heat Release kW/m ²	99.11	219.86	159.93	112.12
Mass Loss Rate g/s*m ²	10.37	15.55	11.36	7.96
Heat of Combustion MJ/kg	12.16	13.23	13.83	13.94
Specific Ext. Area m ² /kg	30.17	64.52	55.70	35.33
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Unevenful.

Tested by : Dnno Robert
Officer : Kim Andrew

1/8" Woodpanel 92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0033

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 0.0 RH @ 26.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.8 g
Final Mass : 0.0 g
Mass Lost : 3.48 kg/m²
Ignition Time : 190 s
Flameout Time : 545 s

Time of Peak RHR : 205 s
Peak RHR : 238.9 kW/m²
Peak Mass Loss : 17.17 g/s*m²
Peak Extinction Area: 106.74 m²/kg
Total Heat Released : 33.94 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	96.97	234.99	150.21	106.14
Mass Loss Rate g/s*m ²	8.22	15.94	10.96	7.78
Heat of Combustion MJ/kg	8.94	13.72	13.35	13.39
Specific Ext. Area m ² /kg	27.38	71.01	52.35	31.58
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

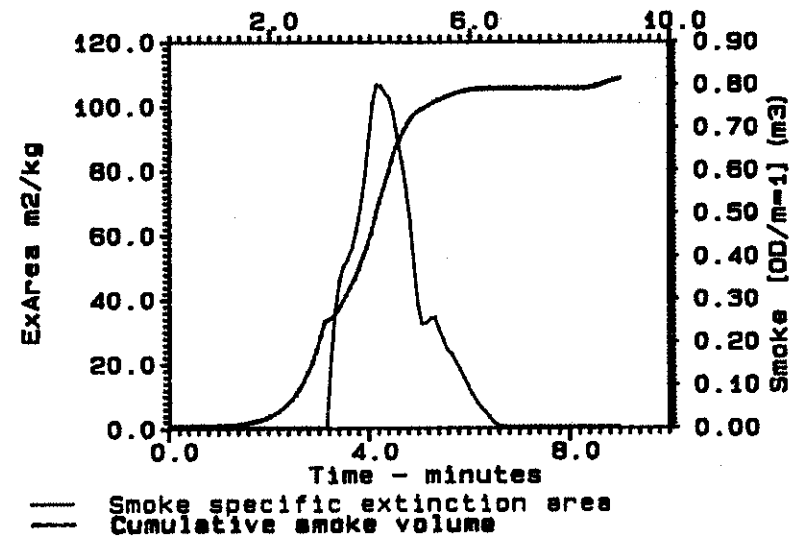
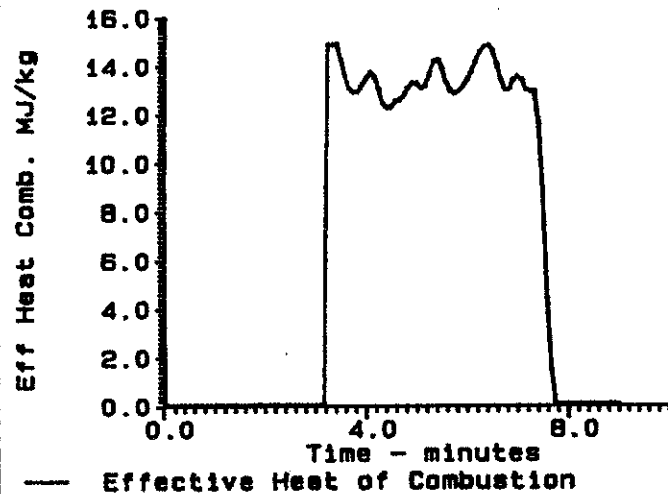
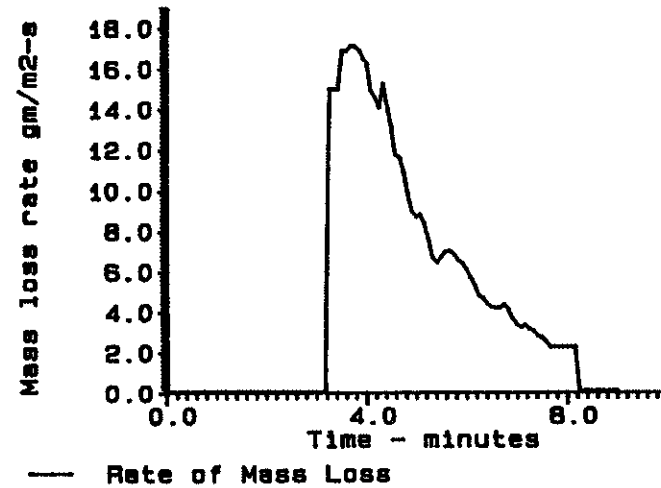
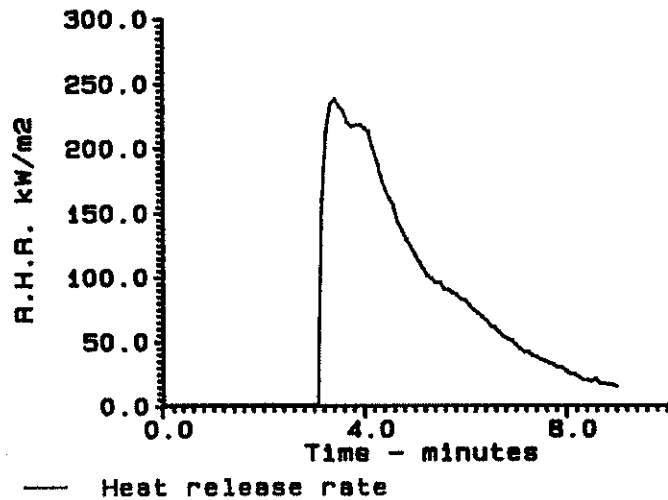
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped.

Tested by : Dnno Robert
Officer : Kim Andrew

1/8" Woodpanel

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0009

Test Date: 06-15-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048566
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 33.7 g
Final Mass : 8.3 g
Mass Lost : 2.54 kg/m²
Ignition Time : 59 s
Flameout Time : 283 s

Time of Peak RHR : 115 s
Peak RHR : 294.2 kW/m²
Peak Mass Loss : 22.12 g/s*m²
Peak Extinction Area: 162.13 m²/kg
Total Heat Released : 34.94 MJ/m²

Summary Data From Ignition

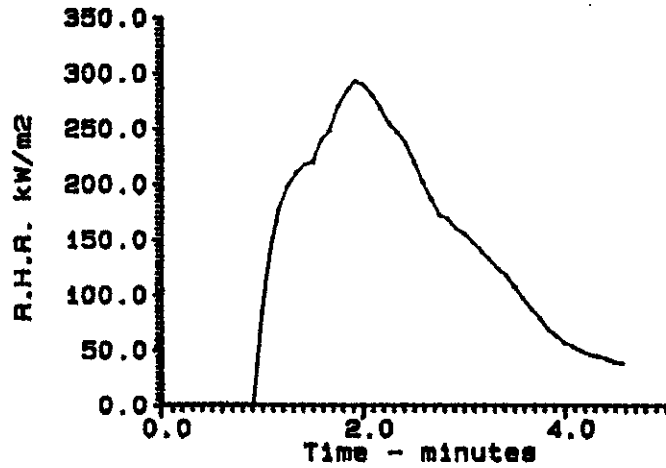
	Test Mean	60S	180S	300s
Heat Release kW/m ²	158.82	248.15	184.22	115.76
Mass Loss Rate g/s*m ²	15.11	17.83	13.06	8.10
Heat of Combustion MJ/kg	13.18	13.06	13.96	14.20
Specific Ext. Area m ² /kg	84.44	124.41	102.12	61.48
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

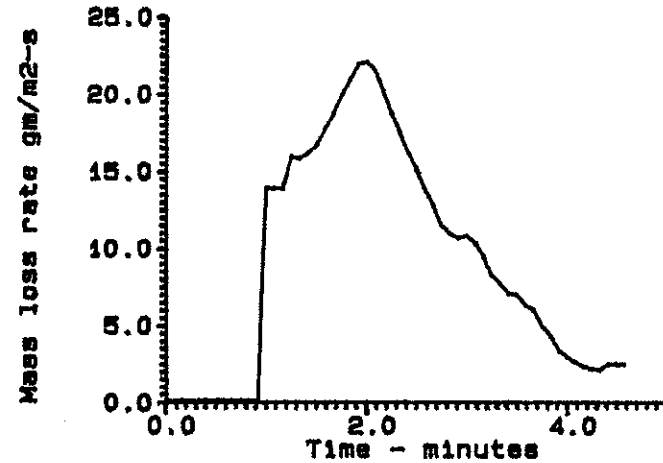
no problems with the grid

Tested by : Onno Robert
Officer : Kim Andrew

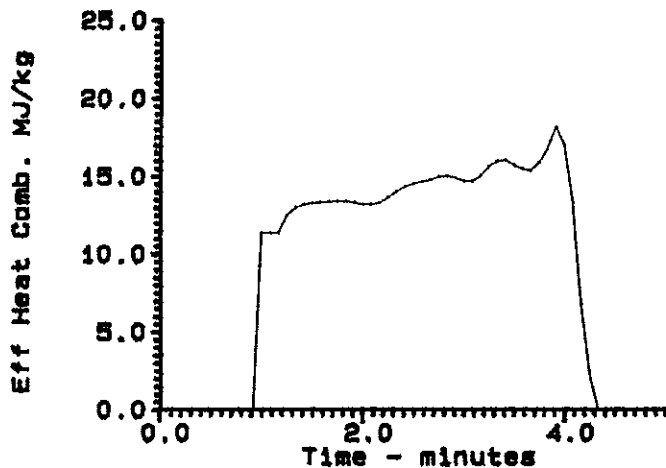
1/8" Panelboard 92



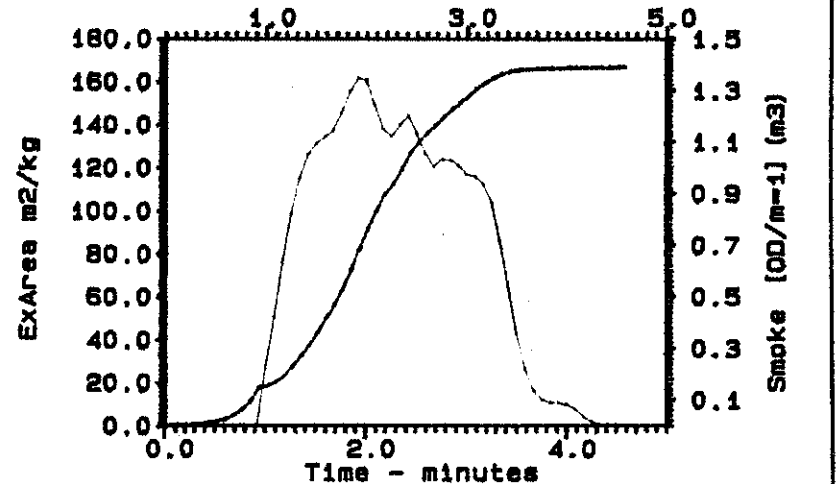
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust s
 — Cumulative smoke volume through exhaust etc

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0016

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 0.0 RH @ 27.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 34.0 g
Final Mass : 7.0 g
Mass Lost : 2.70 kg/m²
Ignition Time : 50 s
Flameout Time : 355 s

Time of Peak RHR : 115 s
Peak RHR : 275.6 kW/m²
Peak Mass Loss : 21.19 g/s*m²
Peak Extinction Area: 126.77 m²/kg
Total Heat Released : 37.32 MJ/m²

Summary Data From Ignition

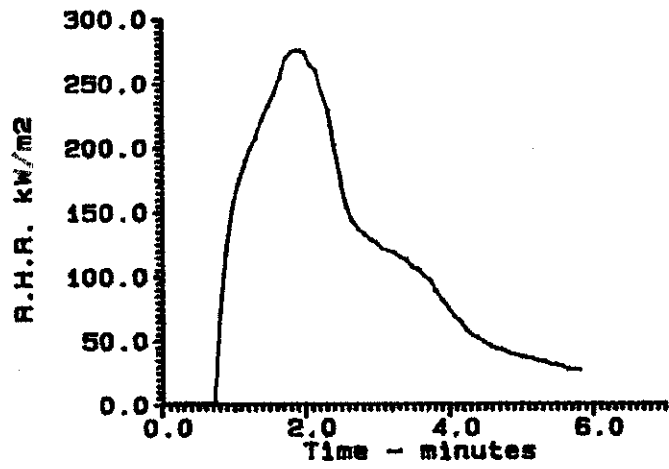
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	124.39	240.36	177.74	122.19
Mass Loss Rate	g/s*m ²	12.67	16.64	12.66	8.53
Heat of Combustion	MJ/kg	12.97	13.46	13.82	14.20
Specific Ext. Area	m ² /kg	55.48	104.29	87.20	54.67
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

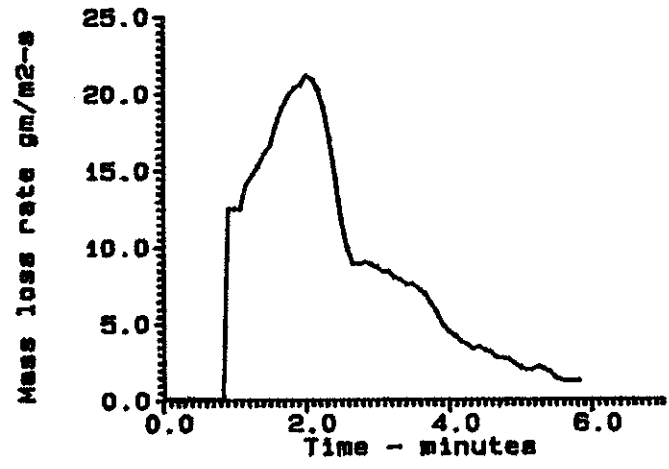
Test seemed to be fine.
O₂ conc seems to be working.

Tested by : Onno Robert
Officer : Kim Andrew

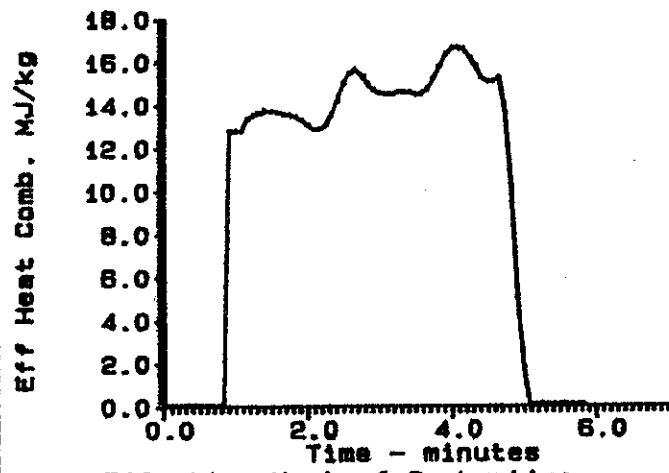
1/8" Woodpanel 92



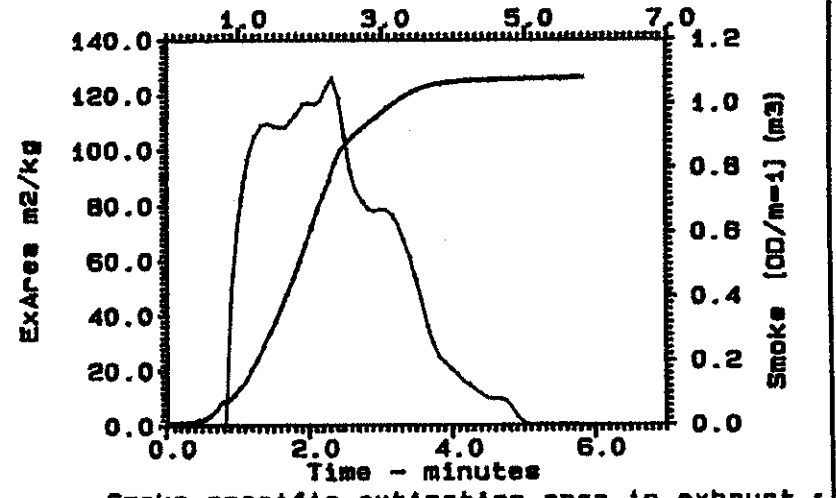
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust
- - - Cumulative smoke volume through exhaust etc

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0018

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/8" Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.003000m

Test Conditions : 0.0 RH @ 27.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 33.1 g
Final Mass : 6.4 g
Mass Lost : 2.67 kg/m²
Ignition Time : 60 s
Flameout Time : 335 s

Time of Peak RHR : 115 s
Peak RHR : 274.2 kW/m²
Peak Mass Loss : 21.05 g/s*m²
Peak Extinction Area: 136.17 m²/kg
Total Heat Released : 35.17 MJ/m²

Summary Data From Ignition

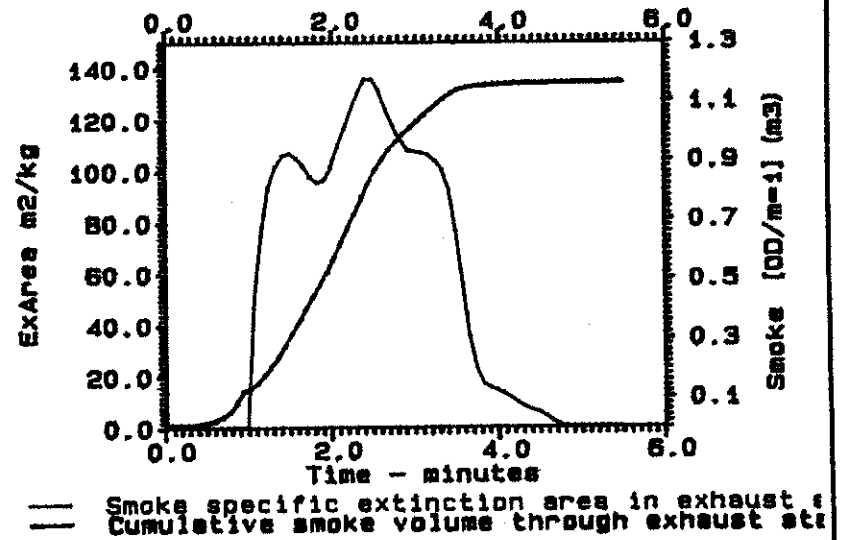
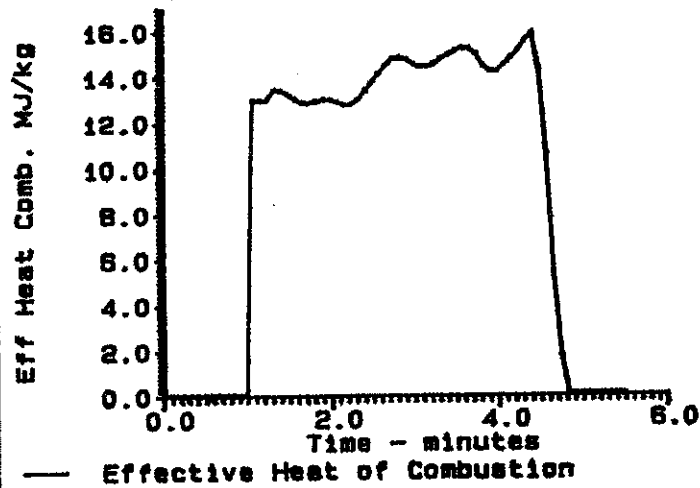
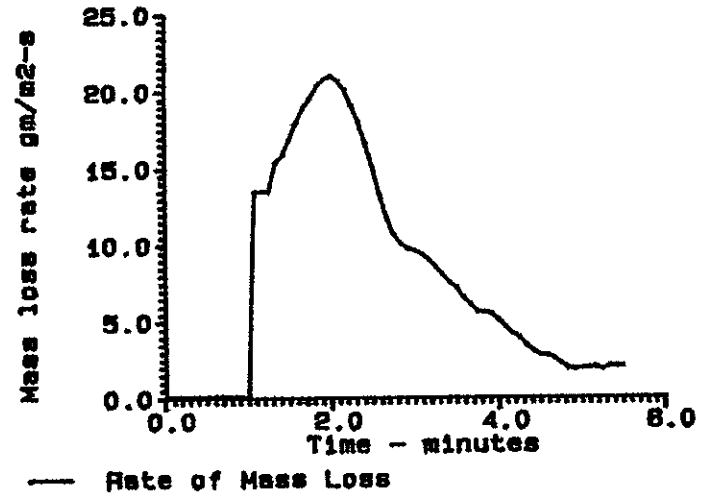
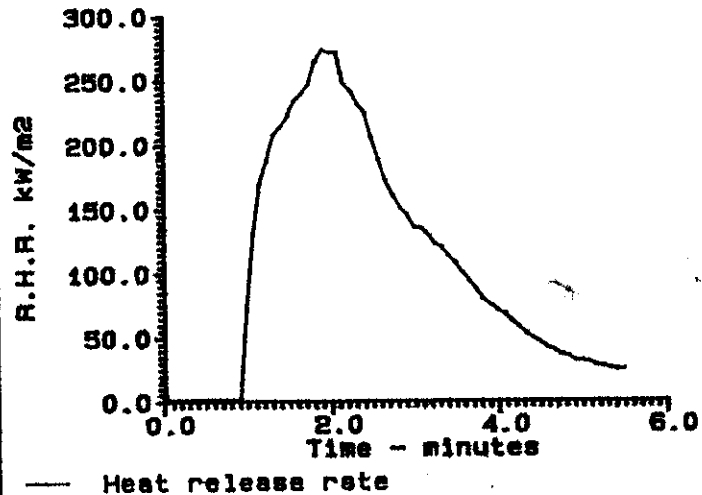
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	130.26	249.33	174.60	115.00
Mass Loss Rate	g/s*m ²	13.35	17.86	12.65	8.28
Heat of Combustion	MJ/kg	12.43	13.08	13.59	13.76
Specific Ext. Area	m ² /kg	62.81	99.33	91.52	55.69
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Test seemed to be fine.
O2 conc seems to be working.

Tested by : Onno Robert
Officer : Kim Andrew

1/8" Panelboard 92



APPENDIX P: 6.0 mm WOODPANEL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	6

		UNITS				AVG.	MAX
DETAILS OF TEST	Test Reference		AKK0028	AKK0030	AKK0034		DEV %
	Date Tested	(D/M/Y)	6/25/92	6/25/92	6/25/92		
	Temperature	(Deg C)	25	26	27	26	5
	Initial Mass	(g)	48	46	45	46	3

TEST RESULTS	Ignition Time	(s)	189	165	170	175	8
	Flameout Time	(s)	705	680	665	683	3
	Time PHR	(s)	380	355	390	375	5
	Peak RHR	(kW/m ²)	128	136	122	129	6
	Peak Mass Loss	(g/s*m ²)	10.9	10.9	9.6	10	8
	Peak Ext. Area	(m ² /kg)	130.5	142.1	95.8	123	22
	Total Heat Rel.	(MJ/m ²)	39.6	41.8	36.7	39	7
	THR @ PHR	(MJ/m ²)	19.2	20.3	19.0	20	4
	TM HEAT COMB.	(MJ/kg)	10.8	11.6	10.8	11	5
	TM RHR	(kW/m ²)	76.8	81.9	74.8	78	5
	TM MLR	(g/s*m ²)	8.0	8.1	7.5	8	5
	TM S. Ext. Area	(m ² /kg)	47.8	53.3	39.8	47	15
	Mass Final	(g)	13	12	12	12	4

SUPPLEMENTARY DATA	60s RHR	(kW/m ²)	95.3	98.2	89.2	94	5
	60s MLR	(g/s*m ²)	7.8	7.6	8.2	8	4
	60s HEAT COMB.	(MJ/kg)	11.3	12.2	10.2	11	9
	60s S. Ext. Area	(m ² /kg)	56.3	49.4	70.9	59	20
	180s RHR	(kW/m ²)	100.3	109.6	83.1	98	15
	180s MLR	(g/s*m ²)	8.6	8.8	7.6	8	8
	180s HEAT COMB.	(MJ/kg)	11.4	12.1	10.6	11	7
	180s S. Ext. Area	(m ² /kg)	48.2	62.8	46.5	53	20
	300s RHR	(kW/m ²)	104.2	110.0	92.0	102	10
	300s MLR	(g/s*m ²)	8.7	8.6	7.9	8	6
	300s HEAT COMB.	(MJ/kg)	11.9	12.6	11.5	12	5
	300s S. Ext. Area	(m ² /kg)	69.5	80.2	55.9	69	18

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Woodpanel
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS	AKK0038	AKK0037	AKK0048	AVG.	MAX
						DEV %	
	Date Tested	(D/M/Y)	6/30/92	6/30/92	7/20/92		
	Temperature	(Deg C)	27	27	31	28	10
	Initial Mass	(g)	44	49	49	47	6

TEST RESULTS	Parameter	UNITS	AKK0038	AKK0037	AKK0048	AVG.	MAX
						DEV %	
	Ignition Time	(s)	35	44	40	40	12
	Flameout Time	(s)	425	503	425	451	12
	Time PHR	(s)	240	255	210	235	11
	Peak RHR	(kW/m2)	233	227	211	224	6
	Peak Mass Loss	(g/s*m2)	16.2	16.2	18.4	17	9
	Peak Ext. Area	(m2/kg)	239.9	191.2	181.8	204	17
	Total Heat Rel.	(MJ/m2)	46.3	51.4	39.1	46	14
	THR @ PHR	(MJ/m2)	30.5	30.3	N / A	30	0
	TM HEAT COMB.	(MJ/kg)	12.7	12.6	9.8	12	16
	TM RHR	(kW/m2)	120.1	112.9	102.8	112	8
	TM MLR	(g/s*m2)	11.5	11.4	13.6	12	12
	TM S. Ext. Area	(m2/kg)	85.9	69.9	85.5	80	13
	Mass Final	(g)	10	10	10	10	3

SUPPLEMENTARY DATA	Parameter	UNITS	AKK0038	AKK0037	AKK0048	AVG.	MAX
						DEV %	
	60s RHR	(kW/m2)	166.4	155.2	109.7	144	24
	60s MLR	(g/s*m2)	13.0	12.2	11.3	12	7
	60s HEAT COMB.	(MJ/kg)	11.9	11.8	9.0	11	18
	60s S. Ext. Area	(m2/kg)	71.1	71.3	61.6	68	9
	180s RHR	(kW/m2)	142.1	133.1	137.0	137	3
	180s MLR	(g/s*m2)	11.1	10.7	12.8	12	11
	180s HEAT COMB.	(MJ/kg)	12.3	12.0	10.3	12	11
	180s S. Ext. Area	(m2/kg)	81.6	58.5	94.5	78	25
	300s RHR	(kW/m2)	141.7	148.8	125.3	139	10
	300s MLR	(g/s*m2)	10.8	11.4	12.3	11	7
	300s HEAT COMB.	(MJ/kg)	13.0	12.8	10.1	12	16
	300s S. Ext. Area	(m2/kg)	109.5	99.4	107.6	105	6

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0028

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 24.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 47.5 g
Final Mass : 12.6 g
Mass Lost : 3.49 kg/m²
Ignition Time : 189 s
Flameout Time : 705 s

Time of Peak RHR : 380 s
Peak RHR : 128.2 kW/m²
Peak Mass Loss : 10.91 g/s*m²
Peak Extinction Area: 130.48 m²/kg
Total Heat Released : 39.57 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	76.83	95.30	100.33	104.15
Mass Loss Rate	g/s*m ²	8.05	7.83	8.58	8.65
Heat of Combustion	MJ/kg	10.85	11.33	11.39	11.89
Specific Ext. Area	m ² /kg	47.76	56.29	48.18	69.47
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

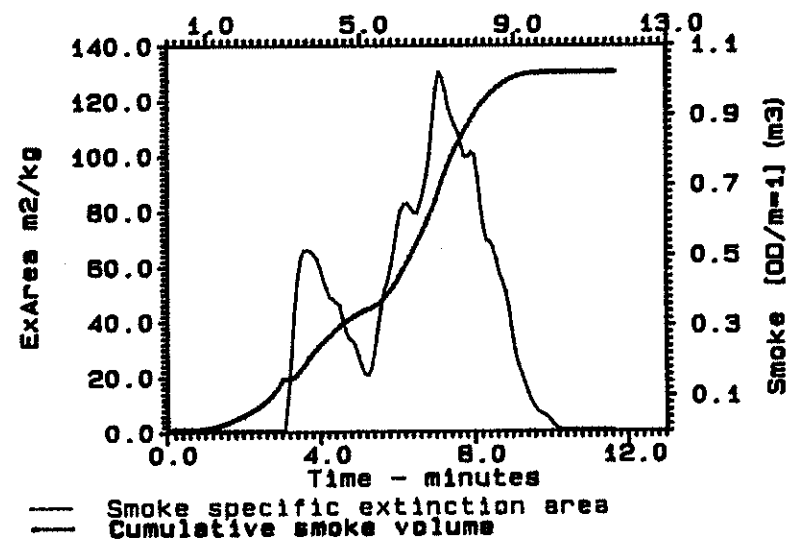
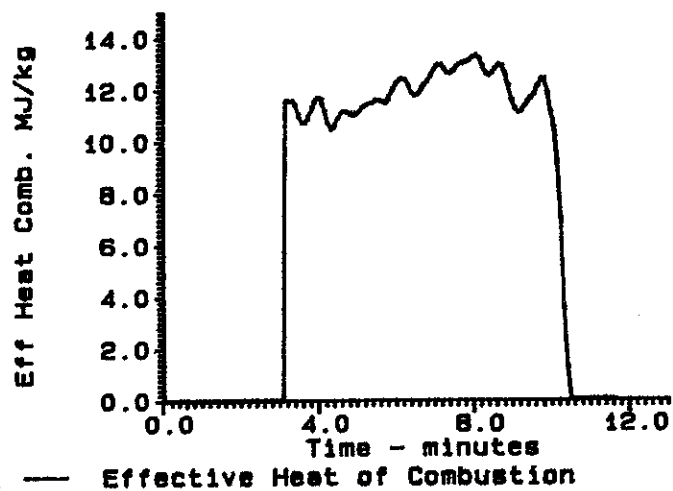
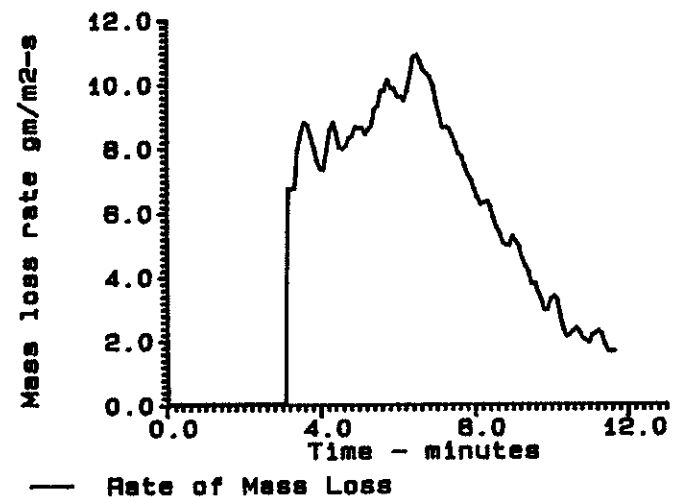
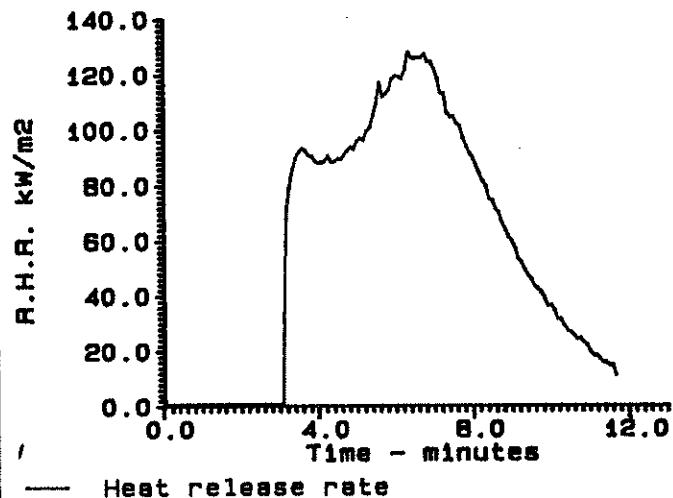
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped
Actual ignition time was 3:09

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Panelboard

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0030

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 25.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 45.6 g
Final Mass : 11.7 g
Mass Lost : 3.39 kg/m²
Ignition Time : 165 s
Flameout Time : 680 s

Time of Peak RHR : 355 s
Peak RHR : 136.0 kW/m²
Peak Mass Loss : 10.88 g/s*m²
Peak Extinction Area: 142.12 m²/kg
Total Heat Released : 41.79 MJ/m²

Summary Data From Ignition

		Test Mean	60S	180S	300s
Heat Release	kW/m ²	81.94	98.21	109.58	109.95
Mass Loss Rate	g/s*m ²	8.13	7.57	8.81	8.64
Heat of Combustion	MJ/kg	11.60	12.16	12.15	12.60
Specific Ext. Area	m ² /kg	53.33	49.39	62.83	80.21
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

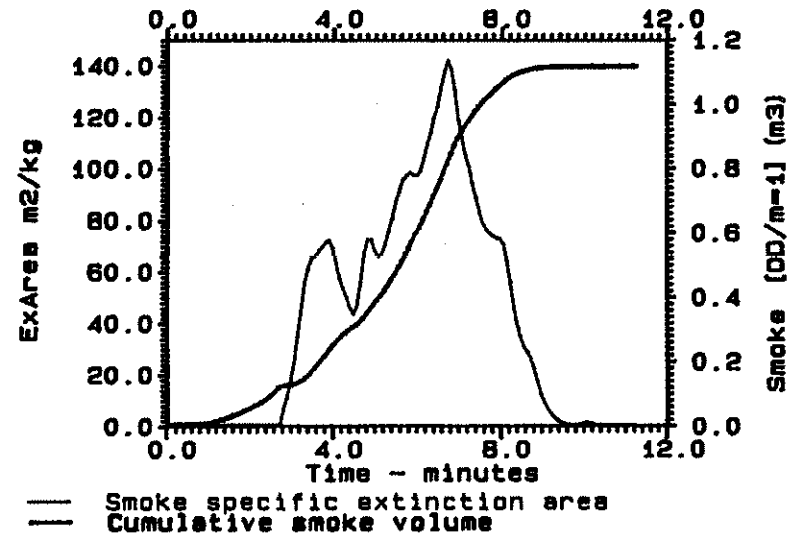
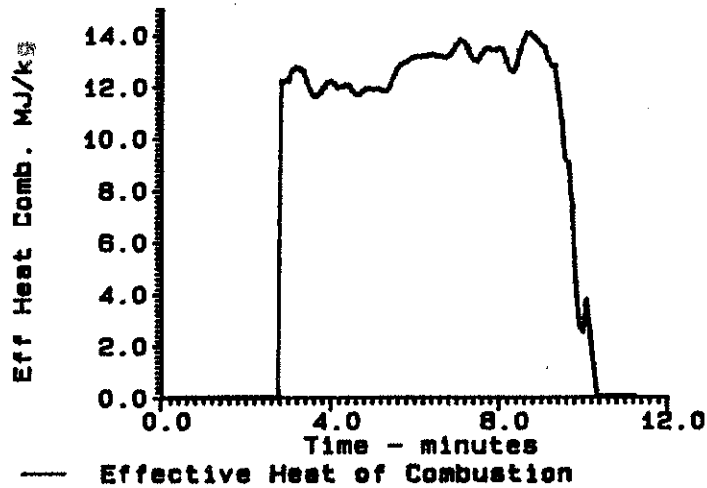
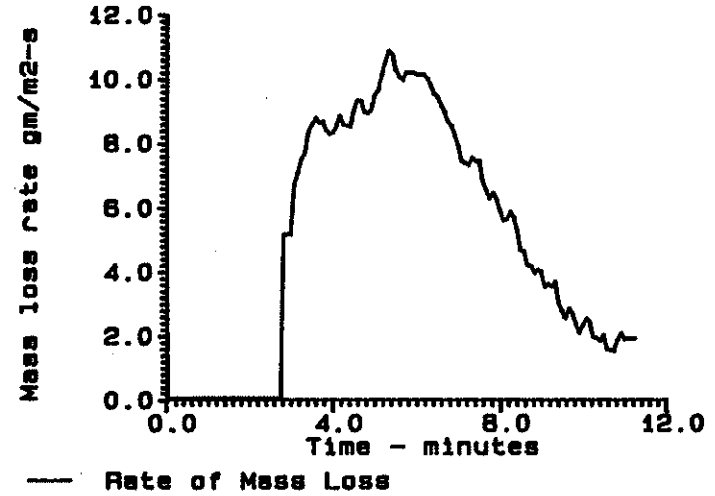
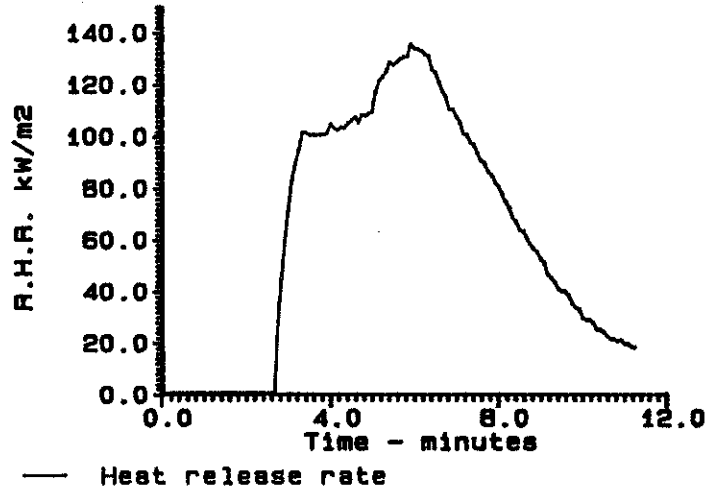
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Woodpanel

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0034

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 27.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 44.6 g
Final Mass : 11.9 g
Mass Lost : 3.27 kg/m²
Ignition Time : 170 s
Flameout Time : 665 s

Time of Peak RHR : 390 s
Peak RHR : 122.0 kW/m²
Peak Mass Loss : 9.64 g/s*m²
Peak Extinction Area: 95.75 m²/kg
Total Heat Released : 36.67 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	74.83	89.21	83.13	92.01
Mass Loss Rate g/s*m ²	7.55	8.15	7.64	7.87
Heat of Combustion MJ/kg	10.79	10.23	10.57	11.54
Specific Ext. Area m ² /kg	39.78	70.91	46.49	55.87
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

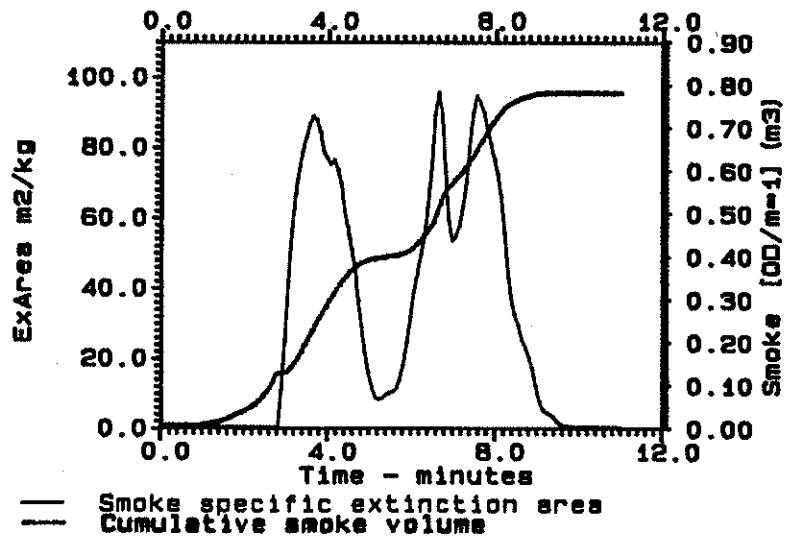
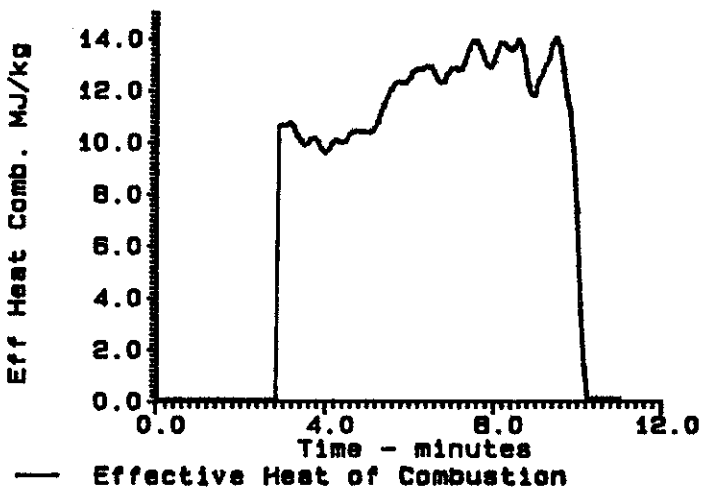
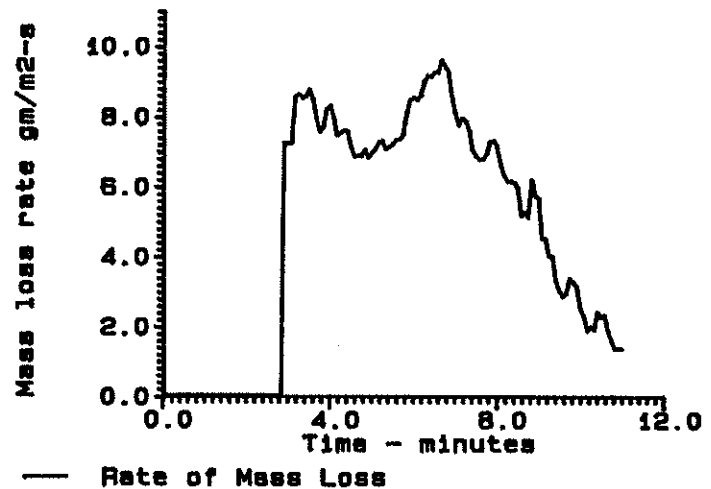
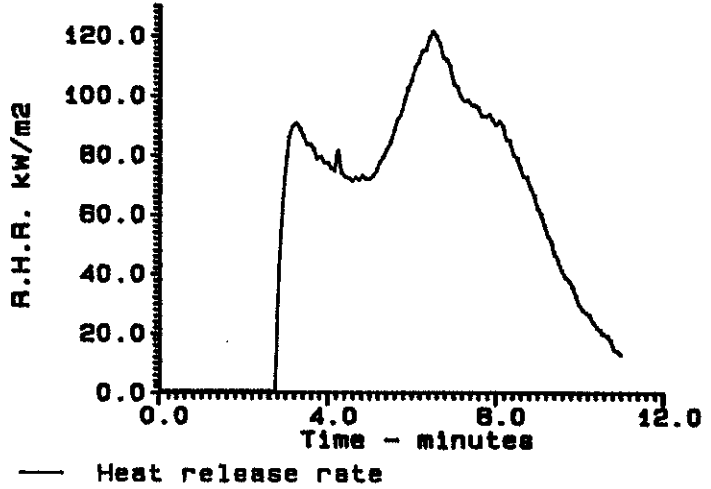
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped.

Tested by : D. J. ...
Office :

1/4" Woodpanel

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0037

Test Date: 06-30-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.047670
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 26.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 48.8 g
Final Mass : 10.4 g
Mass Lost : 3.84 kg/m²
Ignition Time : 44 s
Flameout Time : 503 s

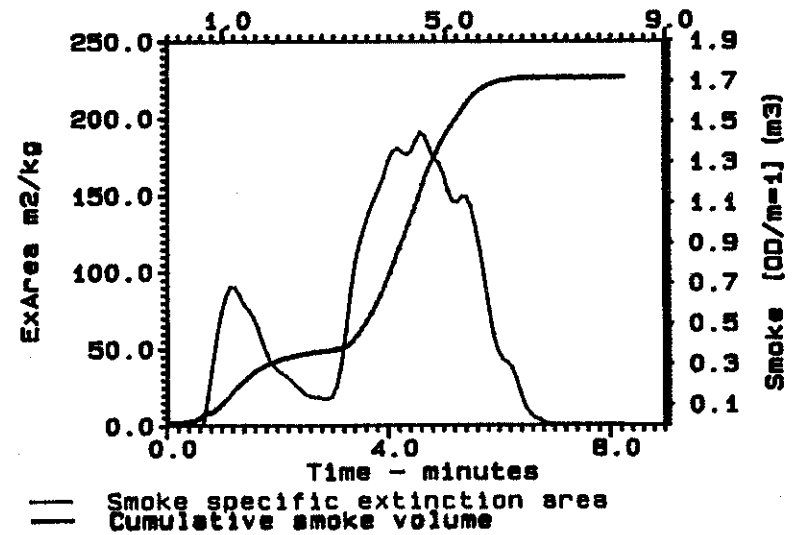
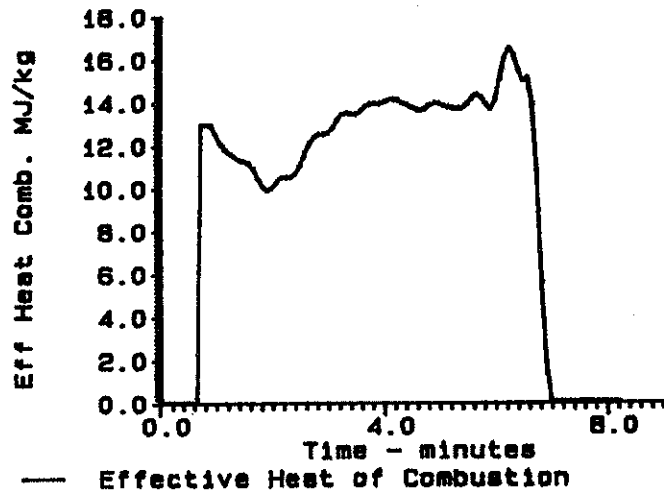
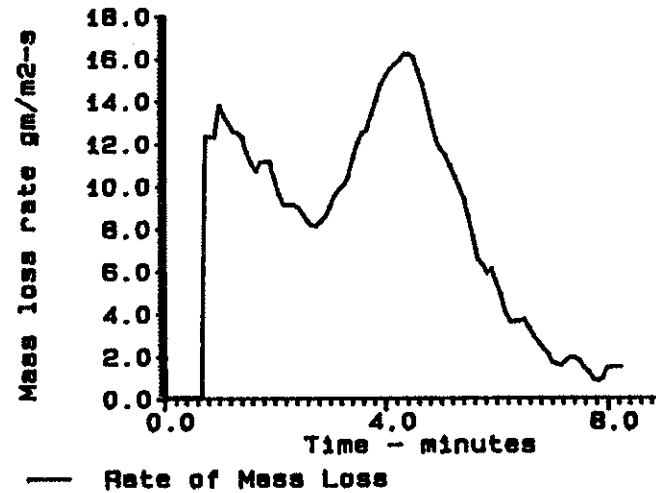
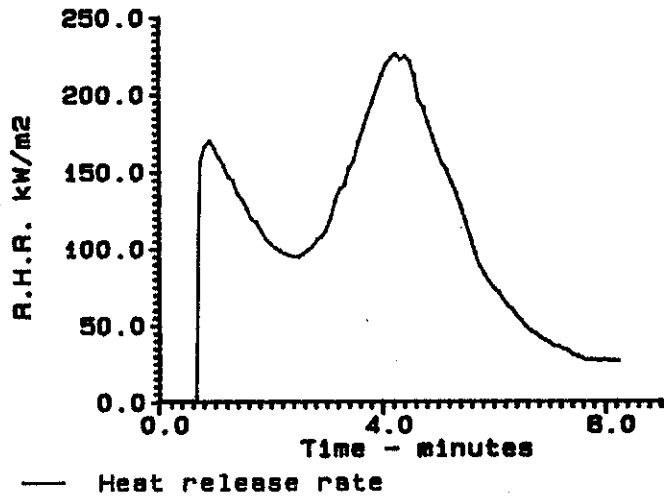
Time of Peak RHR : 255 s
Peak RHR : 227.2 kW/m²
Peak Mass Loss : 16.20 g/s*m²
Peak Extinction Area: 191.16 m²/kg
Total Heat Released : 51.36 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300S
Heat Release	kW/m ²	112.67	115.18	117.69
Mass Loss Rate	g/s*m ²			
Heat of Combustion				
Specimen Area				

Officer : Kim Andrew

1/4" Woodpanel 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK003B

Test Date: 06-30-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.047670
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 26.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 44.2 g
Final Mass : 10.0 g
Mass Lost : 3.42 g/m²
Ignition Time : 35 s
Flameout Time : 425 s

Time of Peak RHR : 240 s
Peak RHR : 232.6 kW/m²
Peak Mass Loss : 16.23 g/s*m²
Peak Extinction Area: 239.94 m²/kg
Total Heat Released : 46.26 MJ/m²

Summary Data From Ignition

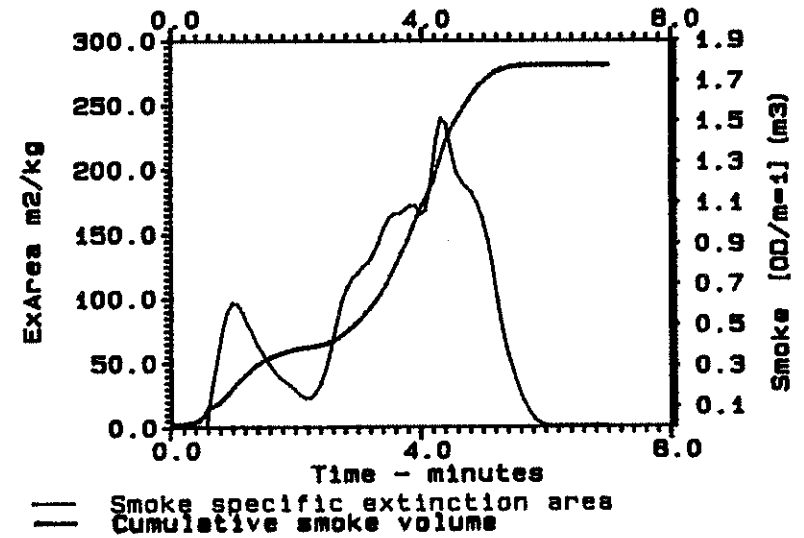
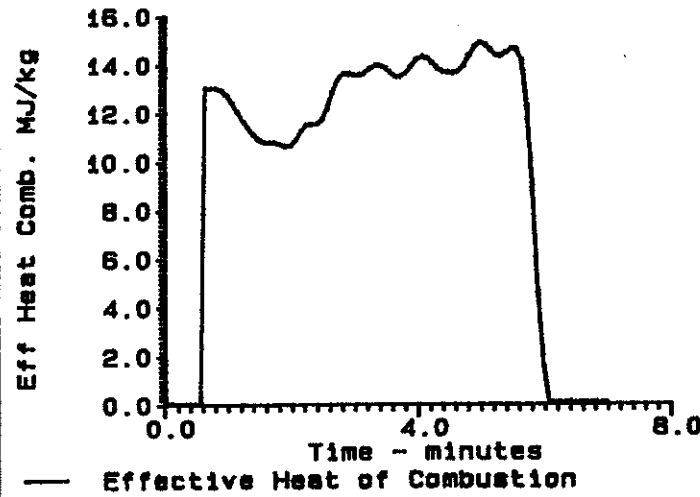
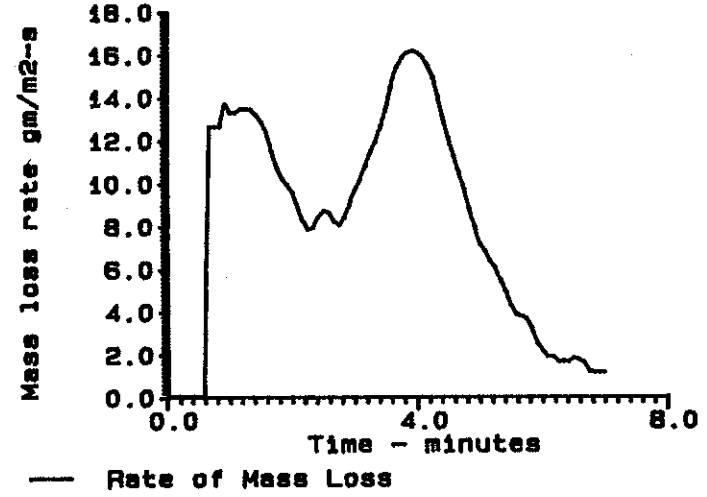
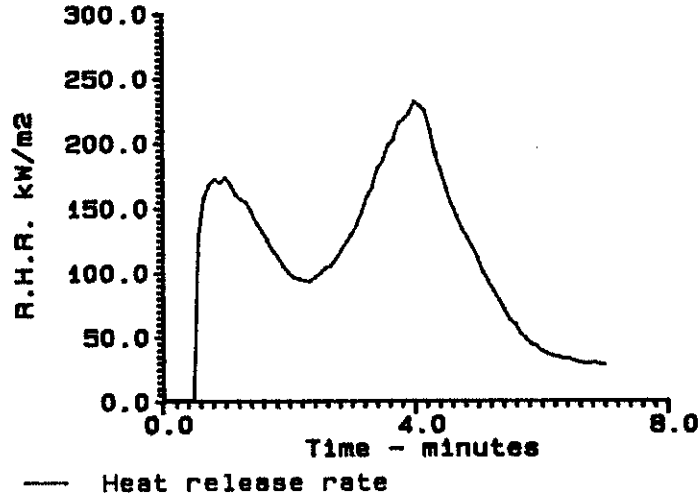
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	120.15	166.42	142.10	141.71
Mass Loss Rate	g/s*m ²	11.50	13.01	11.09	10.76
Heat of Combustion	MJ/kg	12.65	11.91	12.35	13.01
Specific Ext. Area	m ² /kg	85.93	71.15	81.60	109.47
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Woodpanel 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0048

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Panelboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048590
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 31.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 48.7 g
Final Mass : 9.9 g
Mass Lost : 3.88 kg/m²
Ignition Time : 40 s
Flameout Time : 425 s

Time of Peak RHR : 210 s
Peak RHR : 211.0 kW/m²
Peak Mass Loss : 18.43 g/s*m²
Peak Extinction Area: 181.78 m²/kg
Total Heat Released : 39.05 MJ/m²

Summary Data From Ignition

	Test Mean	60s	180s	300s	
Heat Release	kW/m ²	102.77	109.67	136.98	125.30
Mass Loss Rate	g/s*m ²	13.62	11.31	12.82	12.28
Heat of Combustion	MJ/kg	9.77	8.95	10.34	10.12
Specific Ext. Area	m ² /kg	85.46	61.59	94.51	107.60
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

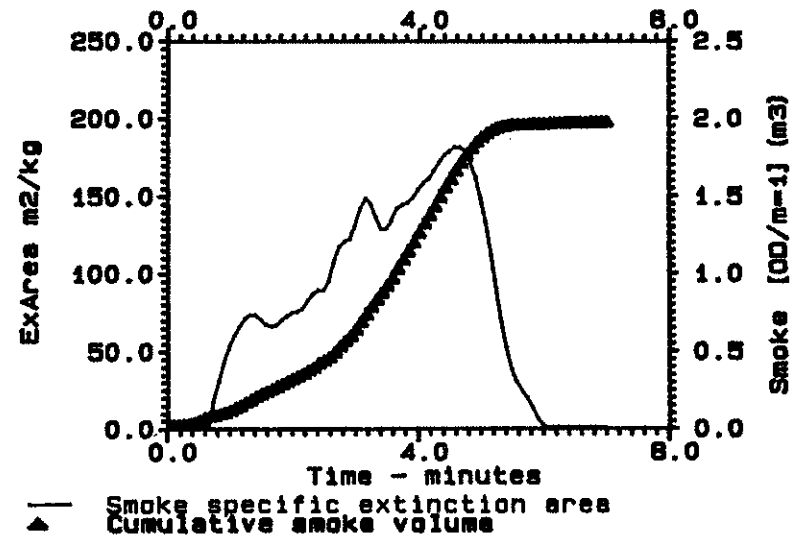
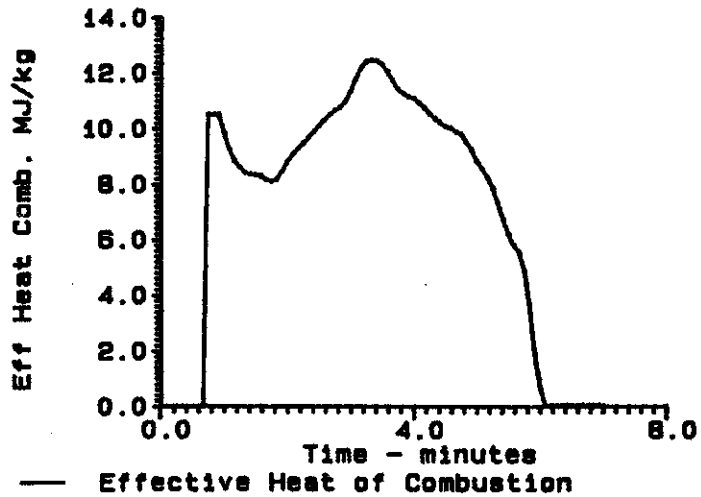
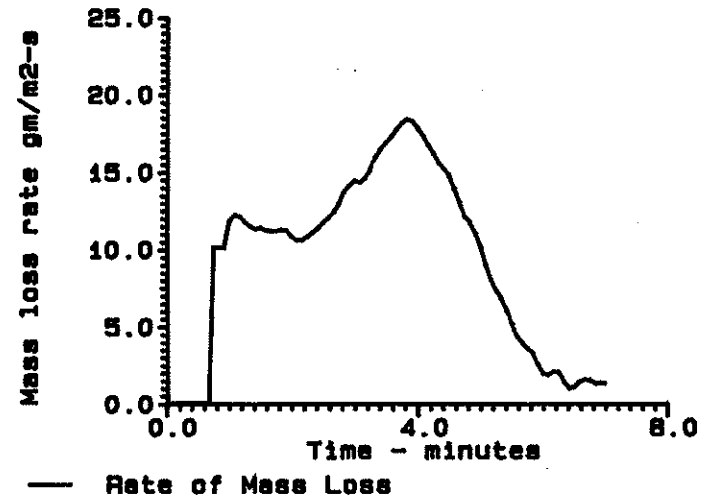
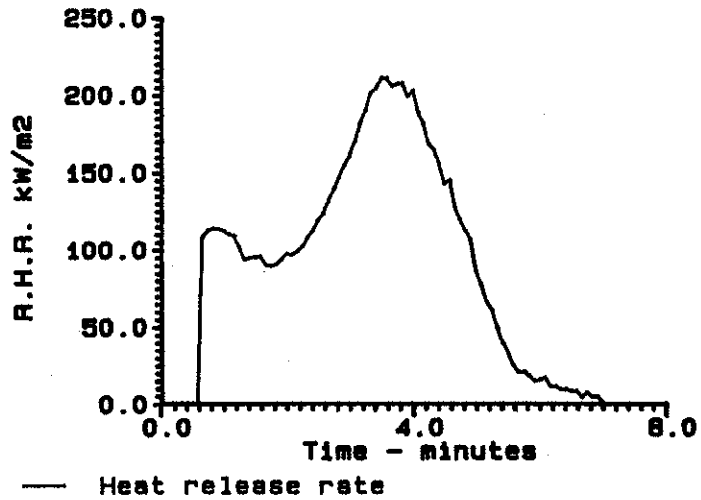
OBSERVATIONS AND COMMENTS

Frame rose slightly.

Similar to previous test.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Panelboard 92



APPENDIX Q: 12.3 mm PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	12.3

		UNITS				AVG.	MAX
DETAILS OF TEST	Test Reference		AKK0023	AKK0027	AKK0031		DEV %
	Date Tested	(D/M/Y)	6/17/92	6/25/92	6/25/92		
	Temperature	(Deg C)	28	24	26	26	7
	Initial Mass	(g)	68	69	70	69	2

TEST RESULTS						AVG.	MAX
	Ignition Time	(s)	95	85	84	88	8
Flameout Time	(s)	1300	1265	1383	1316	5	
Time PHR	(s)	105	90	85	93	13	
Peak RHR	(kW/m ²)	121	125	129	125	3	
Peak Mass Loss	(g/s*m ²)	8.8	N / A	10.3	10	8	
Peak Ext. Area	(m ² /kg)	65.3	86.6	93.7	82	20	
Total Heat Rel.	(MJ/m ²)	45.1	58.2	51.7	52	13	
THR @ PHR	(MJ/m ²)	1.4	1.2	0.6	1	40	
TM HEAT COMB.	(MJ/kg)	8.5	N / A	9.2	9	4	
TM RHR	(kW/m ²)	37.6	49.5	39.9	42	17	
TM MLR	(g/s*m ²)	4.3	N / A	4.3	4	1	
TM S. Ext. Area	(m ² /kg)	17.0	N / A	10.6	14	23	
Mass Final	(g)	19	N / A	19	19	1	

SUPPLEMENTARY DATA						AVG.	MAX
	60s RHR	(kW/m ²)	101.0	91.4	112.2	102	11
60s MLR	(g/s*m ²)	7.1	6.9	8.2	7	11	
60s HEAT COMB.	(MJ/kg)	13.2	12.2	12.6	13	5	
60s S. Ext. Area	(m ² /kg)	30.4	34.4	45.7	37	24	
180s RHR	(kW/m ²)	64.3	63.7	70.8	66	7	
180s MLR	(g/s*m ²)	5.3	5.2	5.7	5	5	
180s HEAT COMB.	(MJ/kg)	11.6	11.7	12.1	12	2	
180s S. Ext. Area	(m ² /kg)	17.1	15.2	17.6	17	8	
300s RHR	(kW/m ²)	50.9	53.6	54.4	53	4	
300s MLR	(g/s*m ²)	4.9	4.8	4.9	5	1	
300s HEAT COMB.	(MJ/kg)	10.3	11.0	10.9	11	4	
300s S. Ext. Area	(m ² /kg)	13.8	11.6	11.3	12	13	

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Plywood
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS	AKK0008	AKK0012	AKK0013	AVG.	MAX
						DEV %	
	Date Tested	(D/M/Y)	6/15/92	6/17/92	6/17/92		
	Temperature	(Deg C)	27	26	27	27	1
	Initial Mass	(g)	68	67	68	68	1

TEST RESULTS	Parameter	UNITS	AKK0008	AKK0012	AKK0013	AVG.	MAX
						DEV %	
	Ignition Time	(s)	10	10	10	10	0
	Flameout Time	(s)	885	905	920	903	2
	Time PHR	(s)	30	30	25	28	12
	Peak RHR	(kW/m2)	145	142	140	142	2
	Peak Mass Loss	(g/s*m2)	12.5	12.8	10.4	12	13
	Peak Ext. Area	(m2/kg)	154.8	136.9	163.9	152	10
	Total Heat Rel.	(MJ/m2)	64.6	62.4	70.1	66	7
	THR @ PHR	(MJ/m2)	2.7	2.6	2.1	2	15
	TM HEAT COMB.	(MJ/kg)	11.6	11.2	12.4	12	6
	TM RHR	(kW/m2)	74.3	70.2	77.4	74	5
	TM MLR	(g/s*m2)	6.6	6.4	6.4	6	2
	TM S. Ext. Area	(m2/kg)	43.0	48.5	52.1	48	10
	Mass Final	(g)	16	15	16	16	2

SUPPLEMENTARY DATA	Parameter	UNITS	AKK0008	AKK0012	AKK0013	AVG.	MAX
						DEV %	
	60s RHR	(kW/m2)	134.4	132.4	123.4	130	5
	60s MLR	(g/s*m2)	9.8	10.2	8.4	9	12
	60s HEAT COMB.	(MJ/kg)	12.8	12.2	13.8	13	6
	60s S. Ext. Area	(m2/kg)	57.0	80.2	72.9	70	19
	180s RHR	(kW/m2)	96.5	94.6	91.0	94	3
	180s MLR	(g/s*m2)	7.4	7.8	6.6	7	9
	180s HEAT COMB.	(MJ/kg)	12.8	11.8	13.3	13	6
	180s S. Ext. Area	(m2/kg)	38.1	61.0	45.2	48	27
	300s RHR	(kW/m2)	81.5	77.9	78.8	79	3
	300s MLR	(g/s*m2)	6.6	6.7	6.2	7	5
	300s HEAT COMB.	(MJ/kg)	12.1	11.4	12.4	12	5
	300s S. Ext. Area	(m2/kg)	27.3	43.5	31.6	34	27

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0023

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.7°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 68.1 g
Final Mass : 19.0 g
Mass Lost : 4.91 kg/m²
Ignition Time : 95 s
Flameout Time : 1,300 s

Time of Peak RHR : 105 s
Peak RHR : 121.3 kW/m²
Peak Mass Loss : 8.80 g/s*m²
Peak Extinction Area: 65.28 m²/kg
Total Heat Released : 45.10 MJ/m²

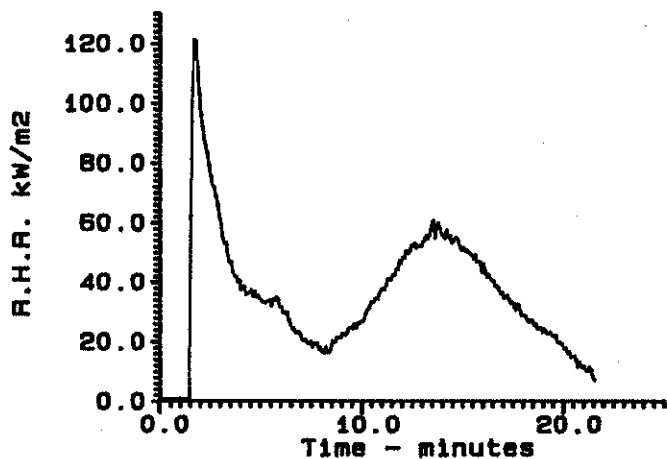
Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	37.58	100.98	64.26	50.91
Mass Loss Rate g/s*m ²	4.28	7.08	5.35	4.86
Heat of Combustion MJ/kg	8.47	13.23	11.65	10.26
Specific Ext. Area m ² /kg	17.01	30.41	17.12	13.80
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

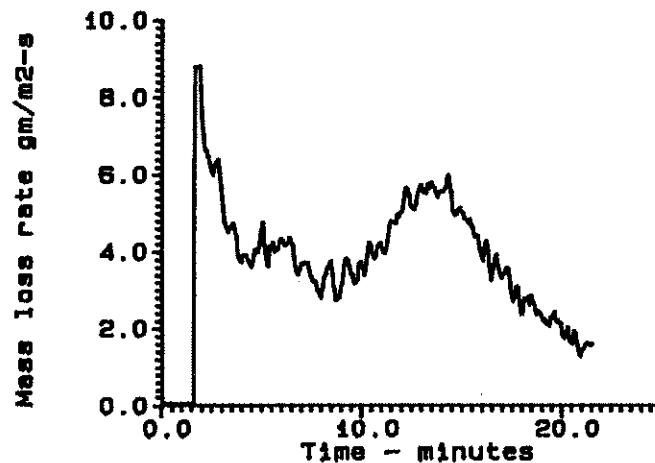
OBSERVATIONS AND COMMENTS

Tested by : Onno Robert
Officer : Kim Andrew

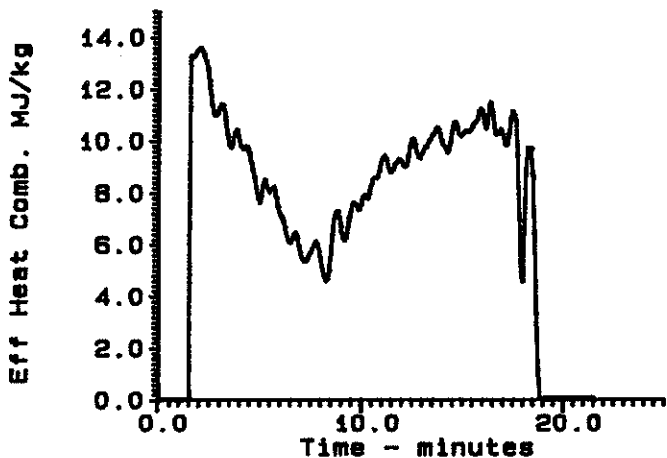
1/2" Plywood 92 Flux = 25



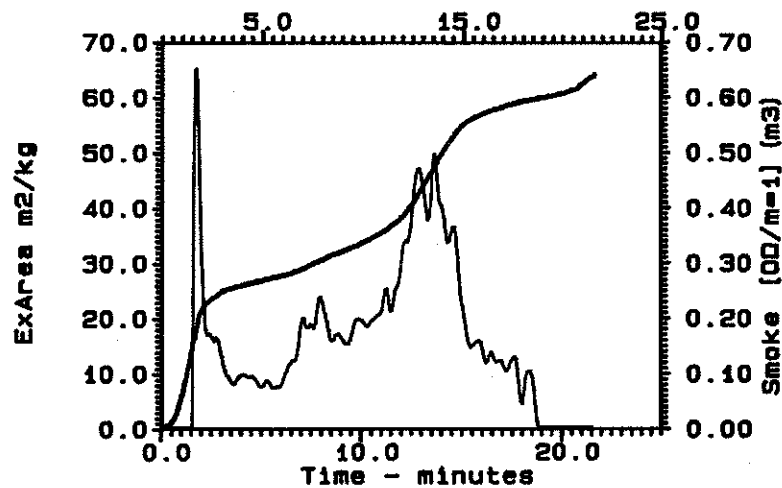
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
- - - Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0027

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 24.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 69.1 g
Final Mass : 0.0 g
Mass Lost : 6.91 kg/m²
Ignition Time : 85 s
Flameout Time : 1,265 s

Time of Peak RHR : 90 s
Peak RHR : 124.7 kW/m²
Peak Mass Loss : 705.89 g/s*m²
Peak Extinction Area: 86.57 m²/kg
Total Heat Released : 58.21 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	49.54	91.42	63.67	53.57
Mass Loss Rate	g/s*m ²	27.86	6.86	5.25	4.76
Heat of Combustion	MJ/kg	2.81	12.18	11.70	10.97
Specific Ext. Area	m ² /kg	4.11	34.40	15.23	11.57
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

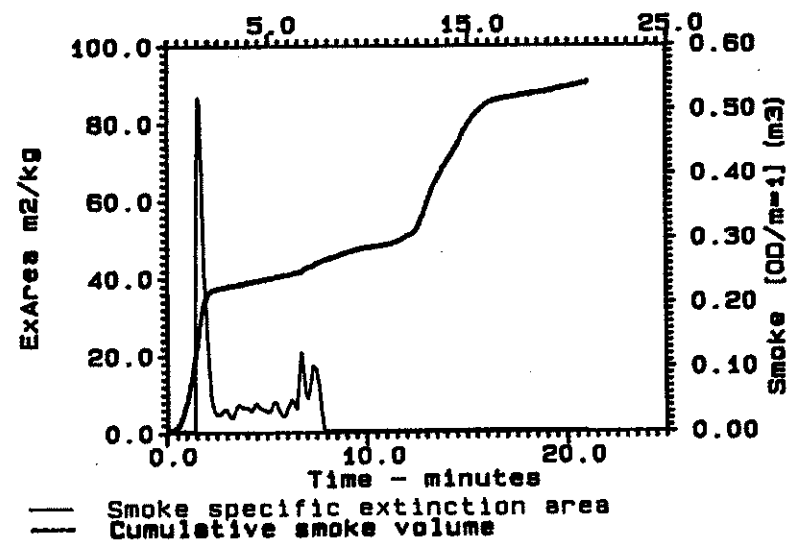
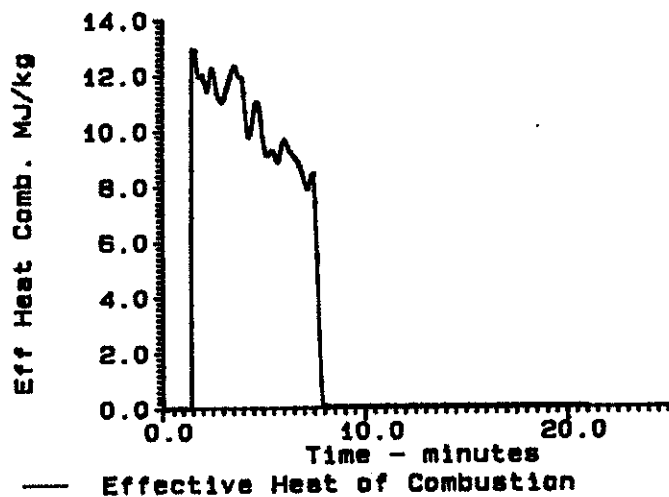
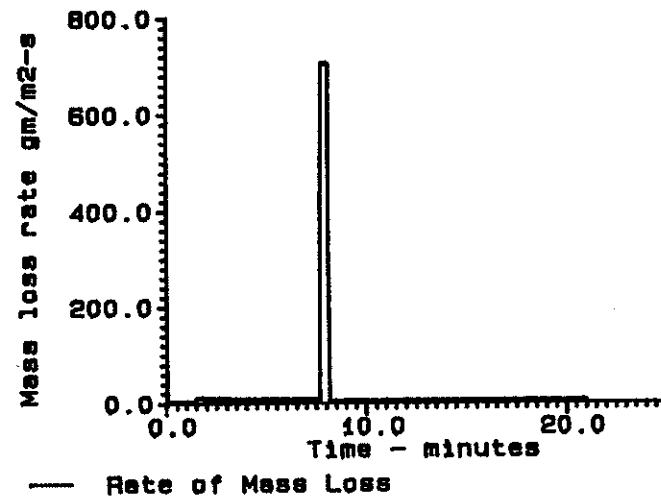
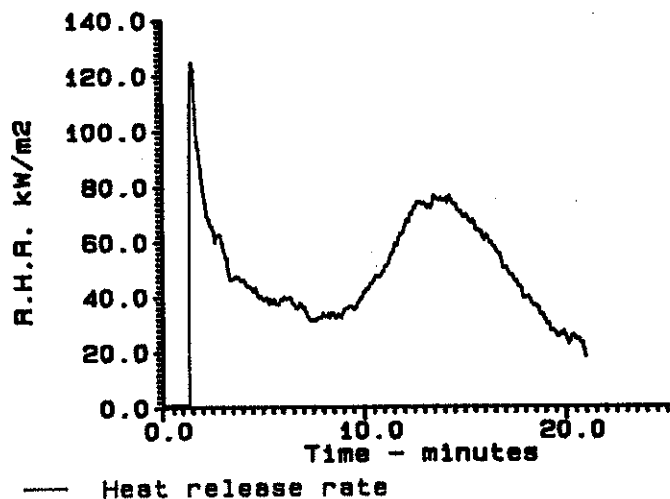
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped

Tested by : Dnno Robert
Officer : Kim Andrew

1/2" Plywood

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0031

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 70.3 g
Final Mass : 18.6 g
Mass Lost : 5.17 kg/m²
Ignition Time : 84 s
Flameout Time : 1,383 s

Time of Peak RHR : 85 s
Peak RHR : 129.5 kW/m²
Peak Mass Loss : 10.26 g/s*m²
Peak Extinction Area: 93.71 m²/kg
Total Heat Released : 51.67 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	39.90	112.25	70.80	54.38
Mass Loss Rate g/s*m ²	4.34	8.24	5.67	4.85
Heat of Combustion MJ/kg	9.16	12.55	12.08	10.94
Specific Ext. Area m ² /kg	10.56	45.68	17.55	11.34
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

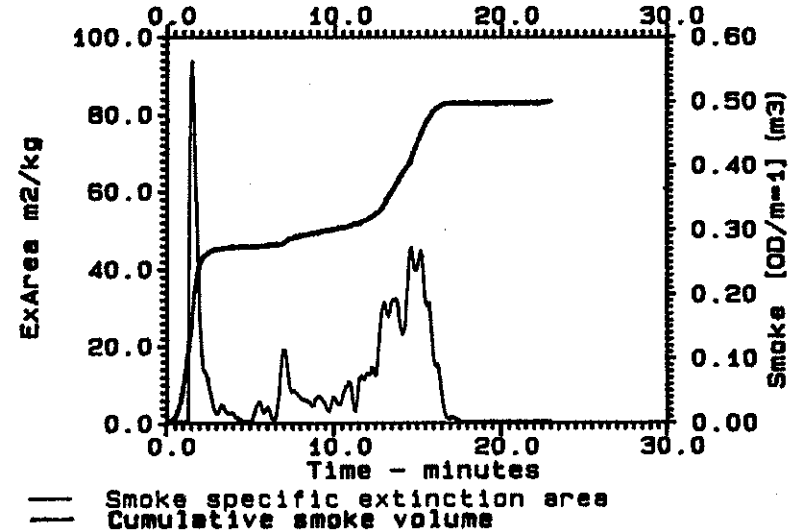
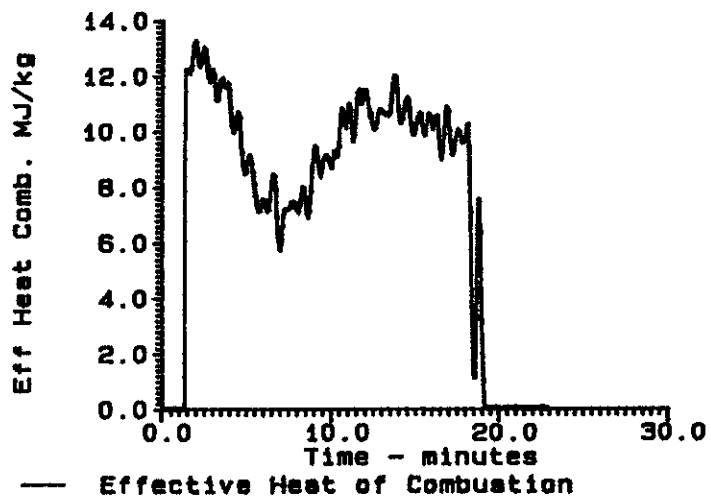
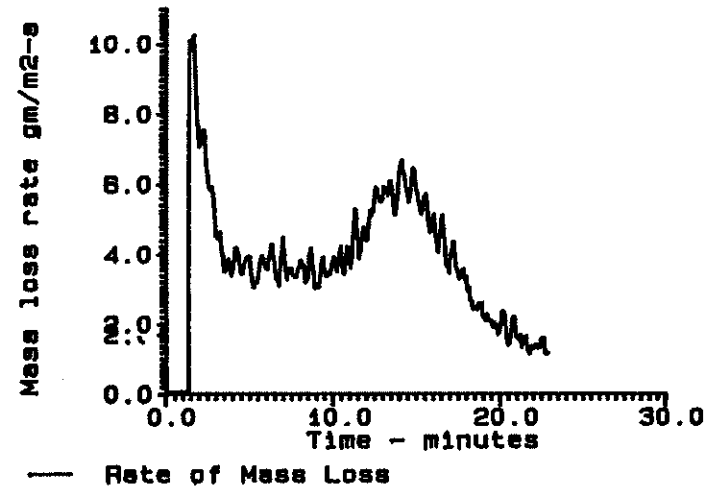
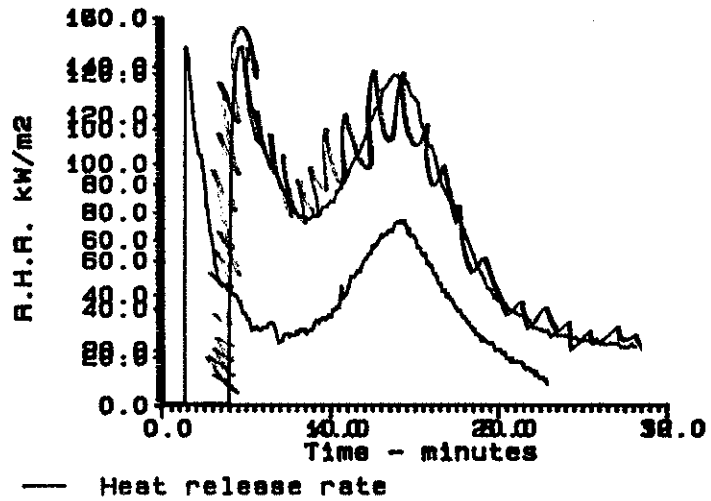
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped

Tested by : Onno Robert
Officer : Kim Andrew

1/2 Plywood

92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0008

Test Date: 06-15-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048566
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 67.5 g
Final Mass : 15.7 g
Mass Lost : 5.18 kg/m²
Ignition Time : 10 s
Flameout Time : 885 s

Time of Peak RHR : 30 s
Peak RHR : 145.3 kW/m²
Peak Mass Loss : 12.45 g/s*m²
Peak Extinction Area: 154.77 m²/kg
Total Heat Released : 64.64 MJ/m²

Summary Data From Ignition

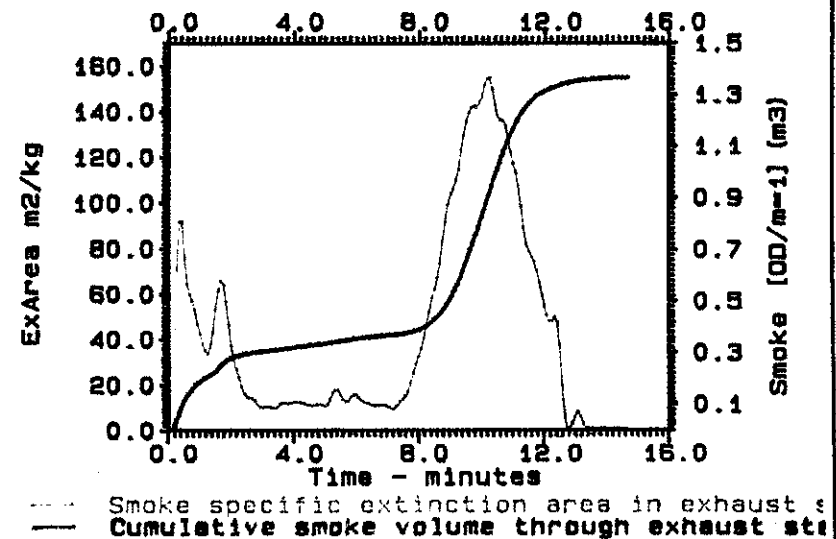
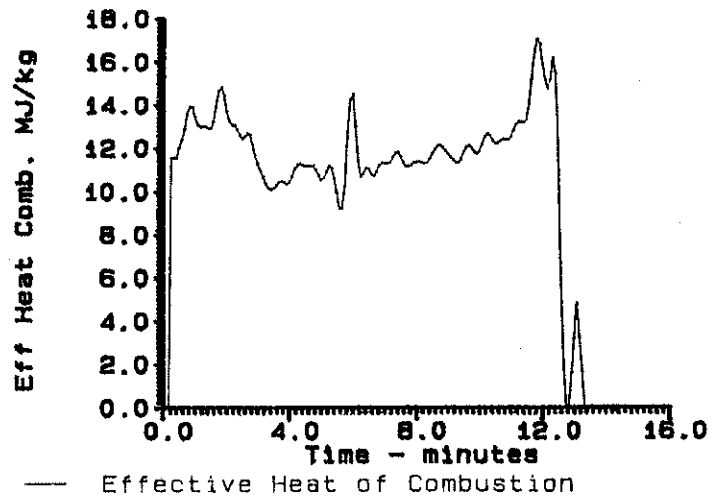
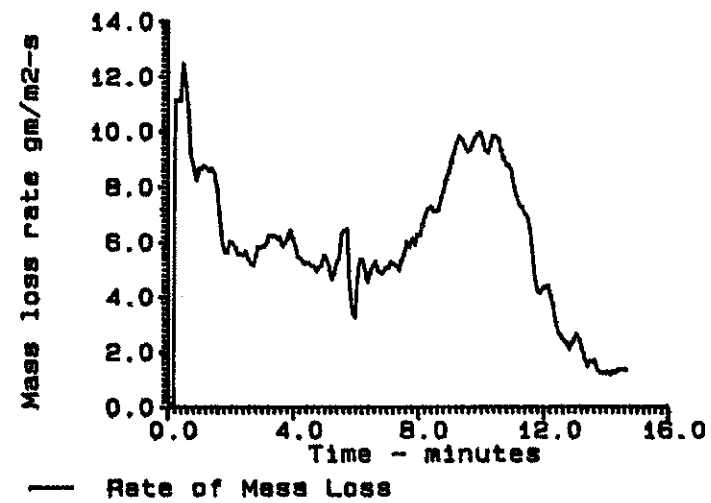
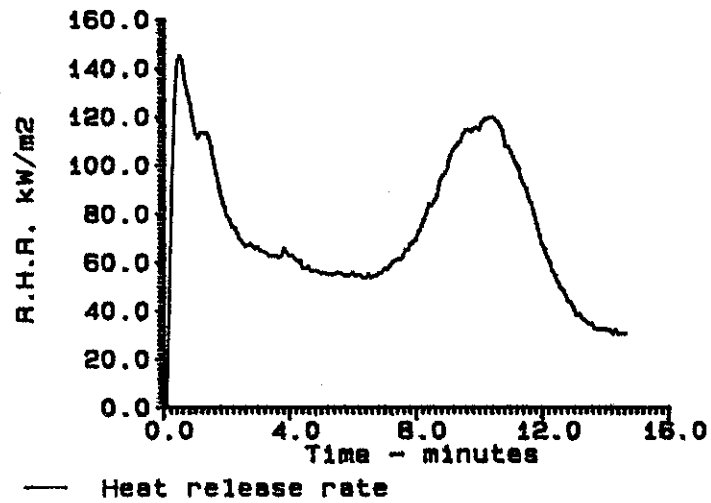
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	74.30	134.39	96.48	81.50
Mass Loss Rate	g/s*m ²	6.64	9.83	7.39	6.64
Heat of Combustion	MJ/kg	11.57	12.82	12.78	12.09
Specific Ext. Area	m ² /kg	43.05	56.97	38.06	27.27
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

this test was o.k., the analyzer seemed to be functioning
the sparkler may be somewhat off because of ignition time

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Plywood 92



SUMMARY TEST

05-23-1992

National Research Council of Canada

Material: 1/2" Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux	: 50.0 kW/m ²	Nominal Flow	: 24.1 l/s
Orifice Constant	: 0.048850	Heat per Unit Mole	: 13.10000 kJ/gO ₂
Heater Orientation	: Horizontal	Spark Ignitor Used	: Y
Grid Used	: N	Frame Used	: Y
Conditioning	: 50.0 RH @ 24.0°C	Test Conditions	: 0.0 RH @ 26.4°C
Specimen Thickness	: 0.012300m	Specimen Area	: 0.010000 m ²

TEST RESULTS

Initial Mass	: 66.7 g	Time of Peak RHR	: 30 s
Final Mass	: 15.4 g	Peak RHR	: 142.3 kW/m ²
Mass Lost	: 5.13 kg/m ²	Peak Mass Loss	: 12.83 g/s*m ²
Ignition Time	: 10 s	Peak Extinction Area	: 136.85 m ² /kg
Flameout Time	: 905 s	Total Heat Released	: 62.45 MJ/m ²

Summary Data From Ignition

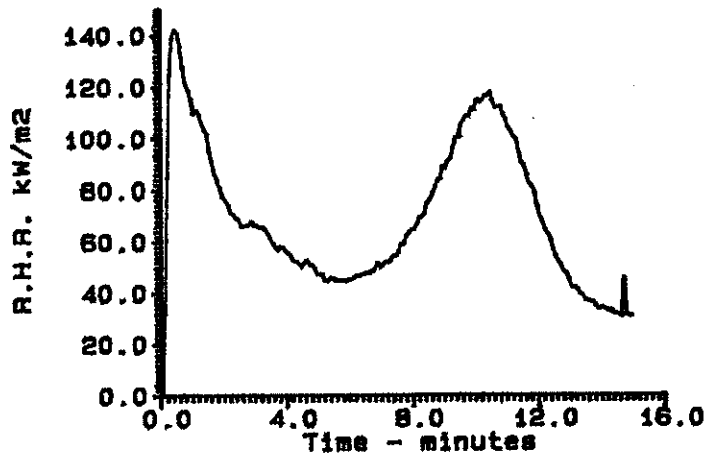
	Test Mean	60S	180S	300s
Heat Release kW/m ²	70.17	132.40	94.64	77.94
Mass Loss Rate g/s*m ²	6.40	10.20	7.82	6.73
Heat of Combustion MJ/kg	11.15	12.20	11.84	11.42
Specific Ext. Area m ² /kg	48.51	80.21	60.99	43.49
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

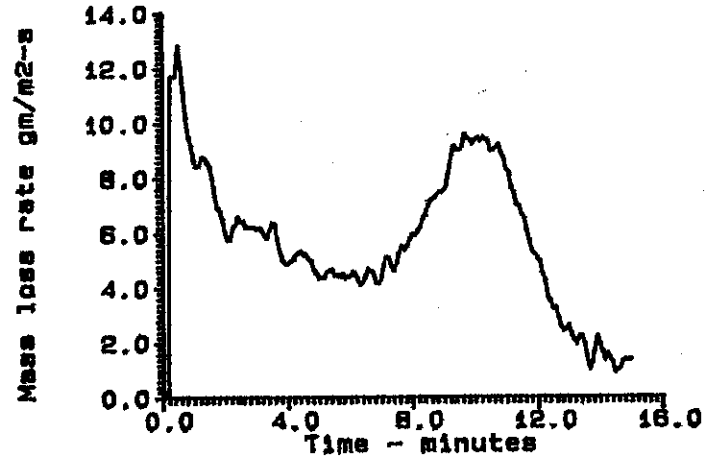
Test seemed to be fine.
O2 conc seems to be working.

Tested by : Donno Robert
Officer : Kim Andrew

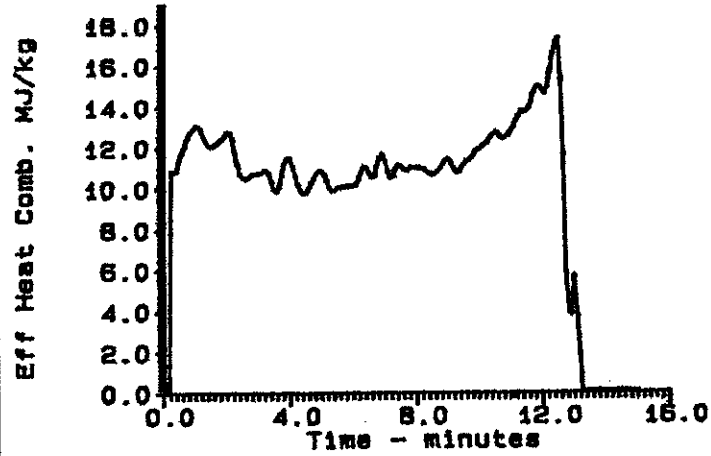
1/2" Plywood 92



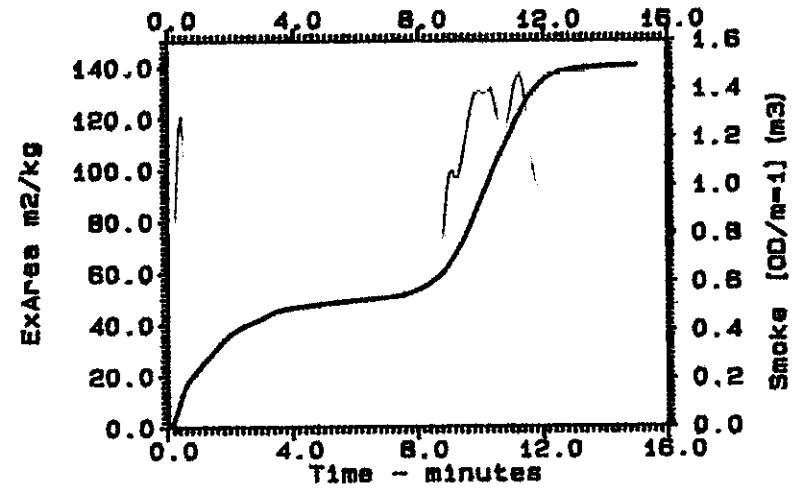
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Cumulative smoke volume through exhaust etc
 — specific extinction area in exhaust etc

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0013

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2" Plywood 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used :

Conditioning : 50.0 RH @ 24.0°C
specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 68.3 g
Final Mass : 16.0 g
Mass Lost : 5.23 kg/m²
Ignition Time : 10 s
Flameout Time : 920 s

Time of Peak RHR : 25 s
Peak RHR : 139.8 kW/m²
Peak Mass Loss : 10.38 g/s*m²
Peak Extinction Area: 163.85 m²/kg
Total Heat Released : 70.05 MJ/m²

Summary Data From Ignition

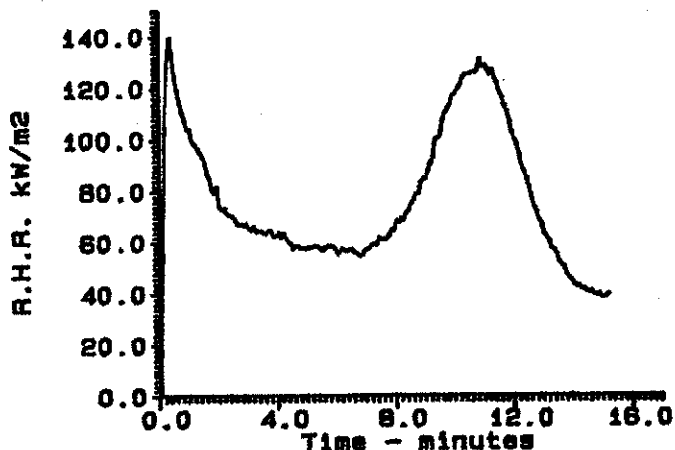
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	77.41	123.42	90.99	78.78
Mass Loss Rate	g/s*m ²	6.40	8.36	6.65	6.22
Heat of Combustion	MJ/kg	12.39	13.77	13.34	12.44
Specific Ext. Area	m ² /kg	52.12	72.94	45.22	31.64
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

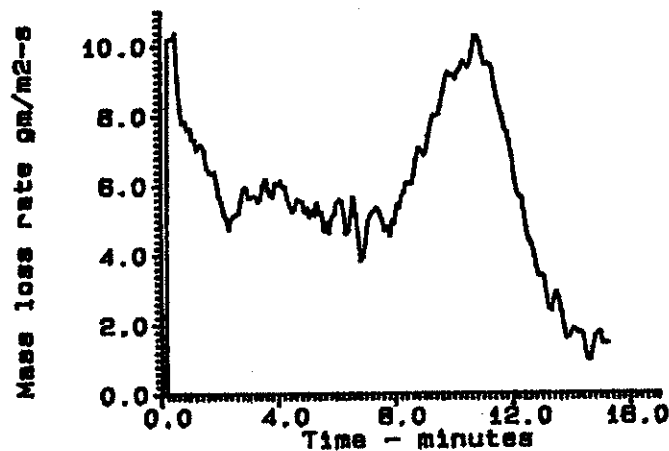
Test seemed to be fine.
O2 conc seems to be working.

Tested by : Onno Robert
Officer : Kim Andrew

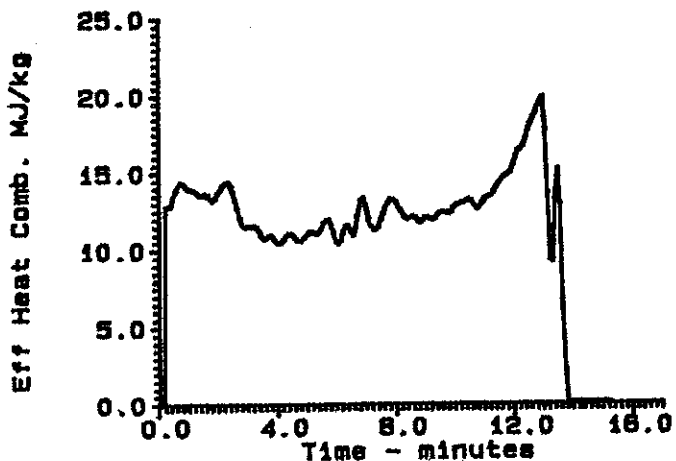
1/2" Plywood 92



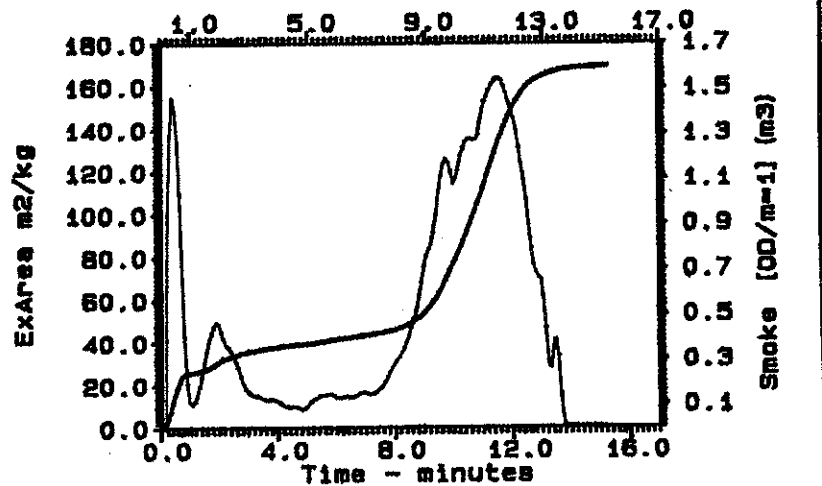
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust
 — Cumulative smoke volume through exhaust

APPENDIX R: 12.3 mm FIRE RETARDED PLYWOOD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	FR Plywood
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS			AVG.	MAX
			AKK0044	AKK0045		DEV %
	Date Tested	(D/M/Y)	7/8/92	7/8/92		
	Temperature	(Deg C)	27	28	27	1
	Initial Mass	(g)	74	74	74	0

TEST RESULTS	Parameter	UNITS			AVG.	MAX
			AKK0044	AKK0045		DEV %
	Ignition Time	(s)	654	704	679	4
	Flameout Time	(s)	1219	1235	1227	1
	Time PHR	(s)	865	860	863	0
	Peak RHR	(kW/m2)	58	60	59	1
	Peak Mass Loss	(g/s*m2)	7.8	8.9	8	6
	Peak Ext. Area	(m2/kg)	3.0	8.0	5	46
	Total Heat Rel.	(MJ/m2)	20.7	19.2	20	4
	THR @ PHR	(MJ/m2)	7.7	6.3	7	10
	TM HEAT COMB.	(MJ/kg)	4.4	3.9	4	6
	TM RHR	(kW/m2)	37.0	36.3	37	1
	TM MLR	(g/s*m2)	2.8	2.7	3	1
	TM S. Ext. Area	(m2/kg)	0.4	0.9	1	35
	Mass Final	(g)	30	29	29	3

SUPPLEMENTARY DATA	Parameter	UNITS			AVG.	MAX
			AKK0044	AKK0045		DEV %
	60s RHR	(kW/m2)	26.7	32.5	30	10
	60s MLR	(g/s*m2)	3.9	4.9	4	12
	60s HEAT COMB.	(MJ/kg)	6.4	6.1	6	2
	60s S. Ext. Area	(m2/kg)	0.3	0.7	1	37
	180s RHR	(kW/m2)	33.9	43.9	39	13
	180s MLR	(g/s*m2)	4.8	6.4	6	15
	180s HEAT COMB.	(MJ/kg)	6.9	6.6	7	2
	180s S. Ext. Area	(m2/kg)	0.2	2.2	1	87
	300s RHR	(kW/m2)	42.1	46.7	44	5
	300s MLR	(g/s*m2)	5.7	6.6	6	7
	300s HEAT COMB.	(MJ/kg)	7.3	7.0	7	2
	300s S. Ext. Area	(m2/kg)	0.7	1.6	1	43

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	FR Plywood
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS	AKK0046	AKK0047	AVG.	MAX
					DEV %	
	Date Tested	(D/M/Y)	7/20/92	7/20/92		
	Temperature	(Deg C)	31	31	31	1
	Initial Mass	(g)	74	77	75	2

TEST RESULTS	Parameter	UNITS	AKK0046	AKK0047	AVG.	MAX
	Ignition Time	(s)	15	15	15	0
	Flameout Time	(s)	745	750	748	0
	Time PHR	(s)	560	565	563	0
	Peak RHR	(kW/m ²)	84	103	94	10
	Peak Mass Loss	(g/s*m ²)	12.5	17.0	15	15
	Peak Ext. Area	(m ² /kg)	54.3	43.0	49	12
	Total Heat Rel.	(MJ/m ²)	23.2	16.8	20	16
	THR @ PHR	(MJ/m ²)	17.3	11.4	14	21
	TM HEAT COMB.	(MJ/kg)	4.6	3.3	4	17
	TM RHR	(kW/m ²)	32.0	23.0	28	16
	TM MLR	(g/s*m ²)	7.1	7.2	7	1
	TM S. Ext. Area	(m ² /kg)	15.9	6.5	11	42
	Mass Final	(g)	26	26	26	1

SUPPLEMENTARY DATA	Parameter	UNITS	AKK0046	AKK0047	AVG.	MAX
	60s RHR	(kW/m ²)	40.5	45.0	43	5
	60s MLR	(g/s*m ²)	8.0	7.9	8	0
	60s HEAT COMB.	(MJ/kg)	4.7	5.2	5	6
	60s S. Ext. Area	(m ² /kg)	3.6	3.8	4	2
	180s RHR	(kW/m ²)	25.8	26.9	26	2
	180s MLR	(g/s*m ²)	6.8	6.5	7	2
	180s HEAT COMB.	(MJ/kg)	3.7	4.0	4	4
	180s S. Ext. Area	(m ² /kg)	4.3	4.0	4	4
	300s RHR	(kW/m ²)	18.5	19.0	19	1
	300s MLR	(g/s*m ²)	6.2	6.2	6	0
	300s HEAT COMB.	(MJ/kg)	2.9	3.0	3	2
	300s S. Ext. Area	(m ² /kg)	4.4	3.5	4	11

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0043

Test Date: 07-08-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992 1/2' FR PLYWOOD

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifc Constant : 0.047761
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.6°C
Specimen

TEST RESULTS

Initial Mass :
Final Mass : 60.2 g
Ignition Time : 420 s
Flameout Time : 540 s

Time of Peak RHR :
Peak Mass Loss : 4.10 g/s*m²
Peak Extinction Area: 6.42 m²/kg
Total Heat Released : 2.67 MJ/m²

Summary Data From Ignition

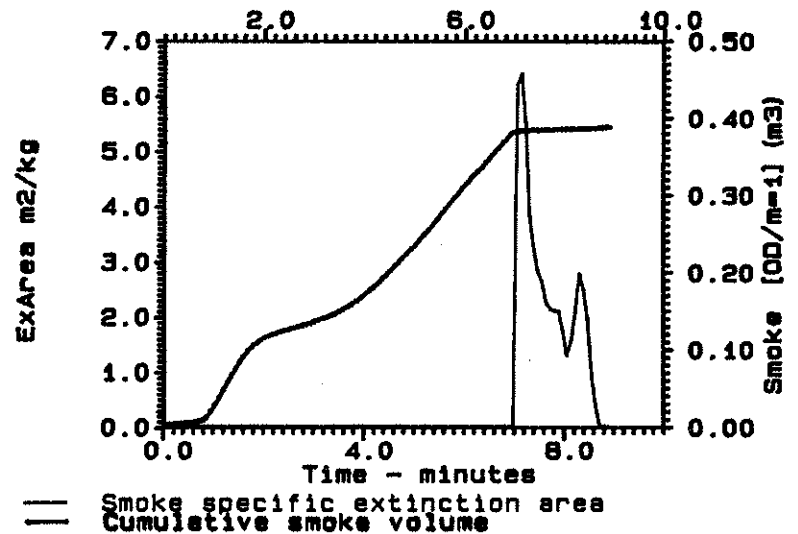
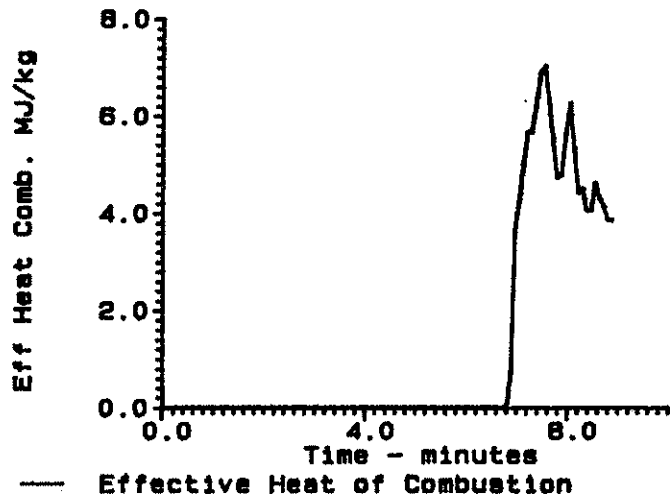
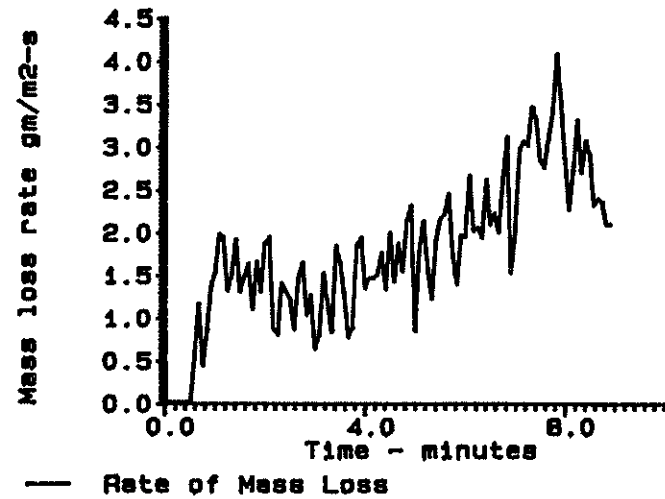
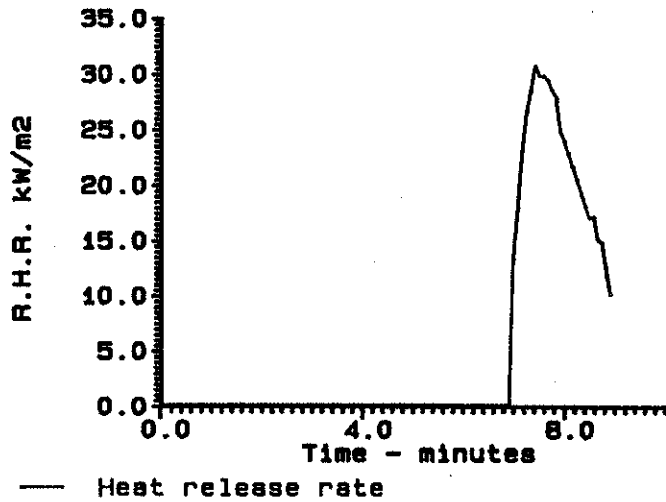
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	23.19	28.93	14.19	8.51
Mass Loss Rate	g/s*m ²	1.93	3.15	1.77	1.06
Heat of Combustion	MJ/kg	1.81	0.00	0.00	0.00
Specific Ext. Area	m ² /kg	2.36	3.00	1.34	0.80
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The material flickered on and off at first until a sustained flame was present. A flame remained present for a little while, burning lightly, and then went out shortly after.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" FR Plywood 92 FLUX = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0044

Test Date: 07-08-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992 1/2' FR PLYWOOD

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047761
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 73.9 g
Final Mass : 30.2 g
Mass Lost : 4.37 kg/m²
Ignition Time : 654 s
Flameout Time : 1,219 s

Time of Peak RHR : 865 s
Peak RHR : 58.4 kW/m²
Peak Mass Loss : 7.84 g/s*m²
Peak Extinction Area: 2.98 m²/kg
Total Heat Released : 20.72 MJ/m²

Summary Data From Ignition

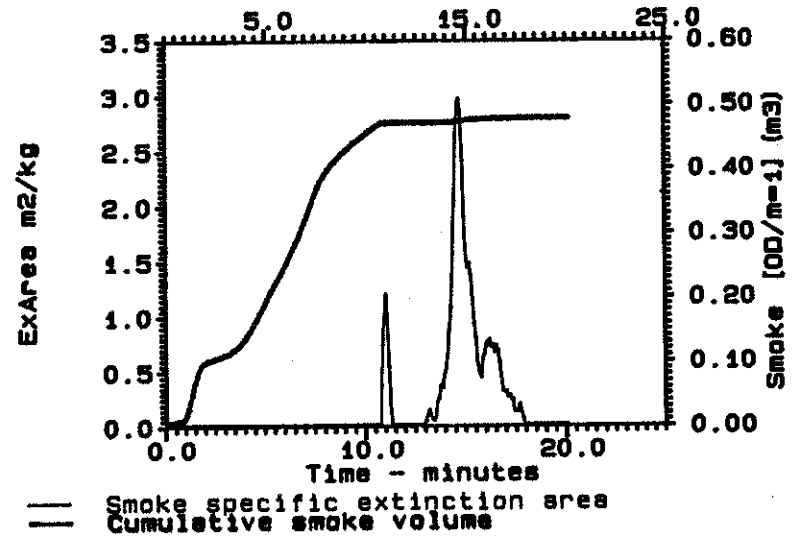
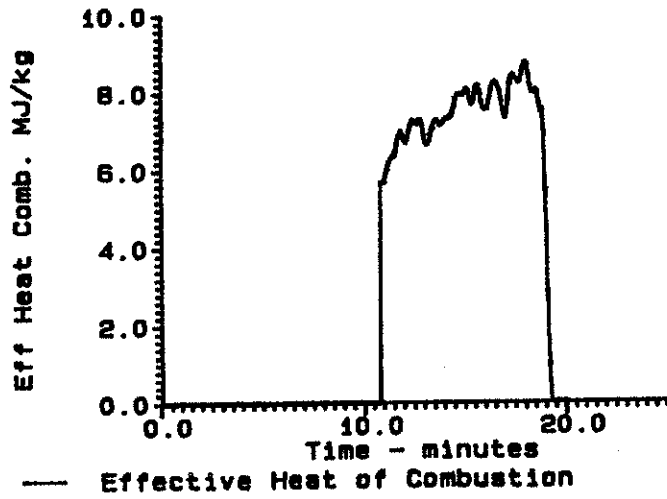
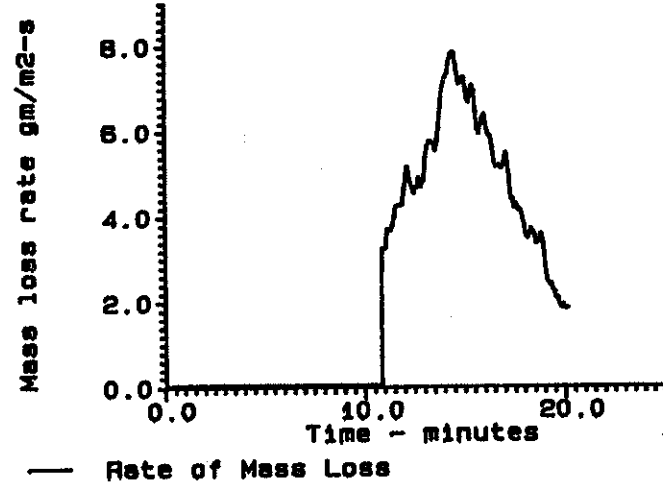
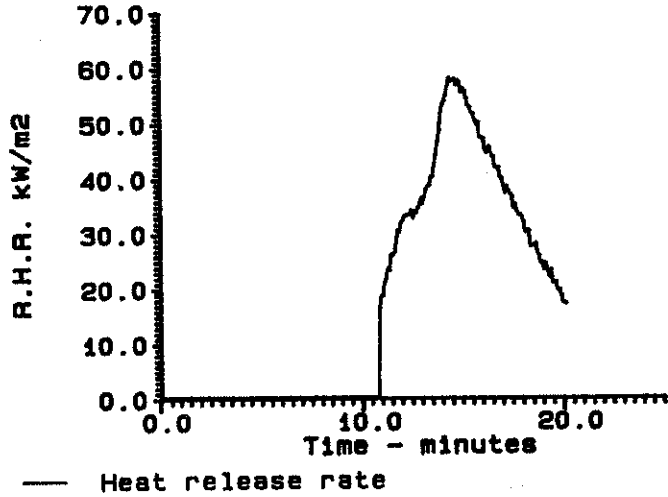
	Test Mean	60S	180S	300s
Heat Release kW/m ²	36.99	26.66	33.91	42.07
Mass Loss Rate g/s*m ²	2.82	3.87	4.81	5.69
Heat of Combustion MJ/kg	4.42	6.36	6.85	7.30
Specific Ext. Area m ² /kg	0.45	0.31	0.15	0.65
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Similar to previous test, however a much later ignition time, and a prolonged burning period. The last test smoked for a while after the flame had gone out, this one did not.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" FR Plywood 92 FLUX = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0045

Test Date: 07-08-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992 1/2' FR PLYWOOD

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047761
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 73.7 g
Final Mass : 28.5 g
Mass Lost : 4.52 kg/m²
Ignition Time : 704 s
Flameout Time : 1,235 s

Time of Peak RHR : 860 s
Peak RHR : 59.9 kW/m²
Peak Mass Loss : 8.92 g/s*m²
Peak Extinction Area: 8.01 m²/kg
Total Heat Released : 19.25 MJ/m²

Summary Data From Ignition

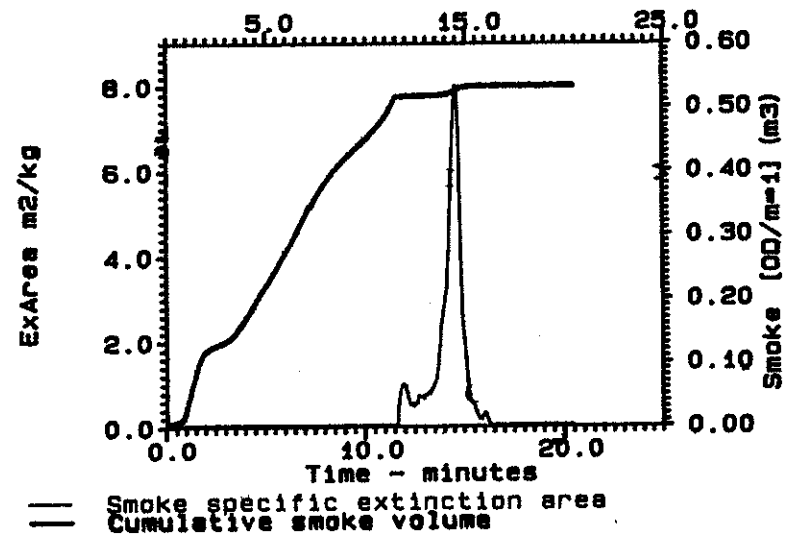
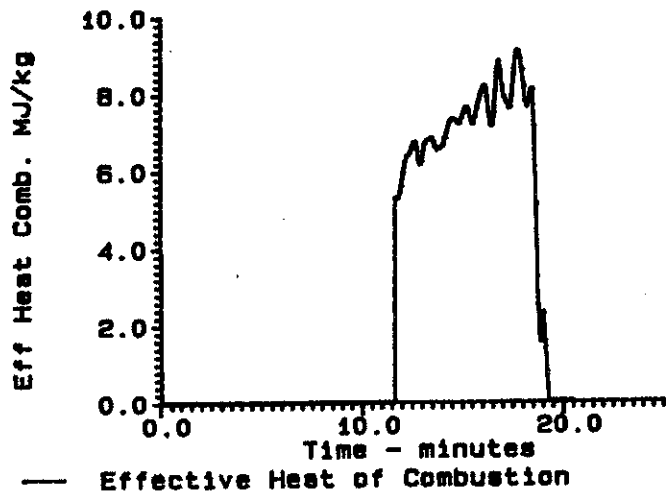
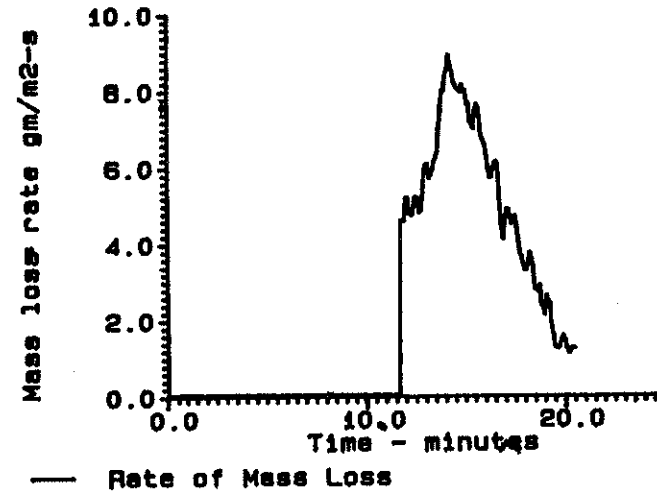
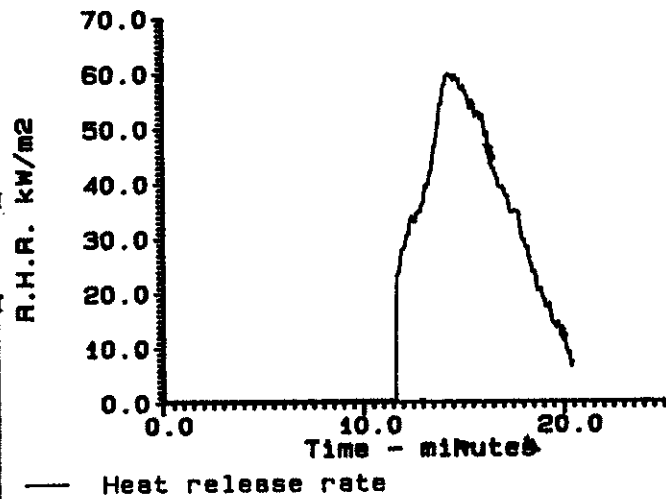
	Test Mean	.60S	180S	300s	
Heat Release	kW/m ²	36.31	32.53	43.90	46.65
Mass Loss Rate	g/s*m ²	2.74	4.91	6.44	6.58
Heat of Combustion	MJ/kg	3.95	6.13	6.64	7.01
Specific Ext. Area	m ² /kg	0.93	0.69	2.18	1.64
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Similar to previous tests

Tested by : Onno Robert
Officer : Kim Andrew

1/2" FR Plywood 92 FLUX = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0046

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992 1/2' FR PLYWOOD

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048590
Heater Orientation : Horizontal
Grid Used :

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.100
Spark :

Conditions : 0.0 RH @ 30.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 74.2 g
Final Mass : 26.1 g
Mass Lost : 4.81 kg/m²
Ignition Time : 15 s
Flameout Time : 745 s

Time of Peak RHR : 560 s
Peak RHR : 84.3 kW/m²
Peak Mass Loss : 12.46 g/s*m²
Peak Extinction Area: 54.29 m²/kg
Total Heat Released : 23.20 MJ/m²

Summary Data From Ignition

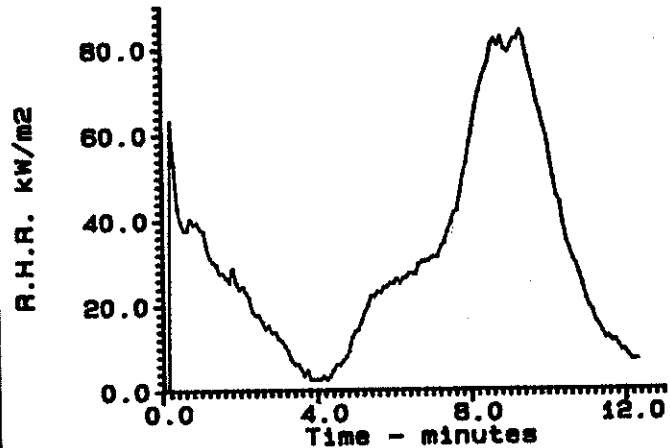
	Test Mean	60S	180S	300s
Heat Release kW/m ²	32.00	40.51	25.81	18.54
Mass Loss Rate g/s*m ²	7.10	7.97	6.80	6.22
Heat of Combustion MJ/kg	4.63	4.65	3.67	2.88
Specific Ext. Area m ² /kg	15.93	3.64	4.30	4.43
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

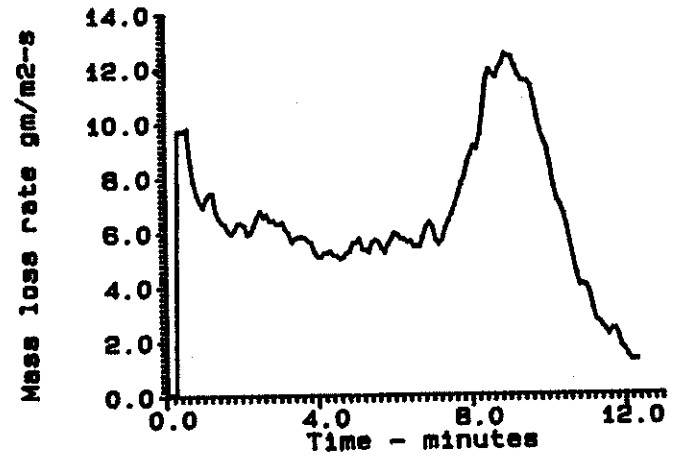
A quick ignition followed by a moderate HRR reducing to a nominal HRR within a few minutes. After a couple of minutes edgeframe effects took place, sample swelled up slightly and released a considerable amount of heat.

Tested by : Onno Robert
Officer : Kim Andrew

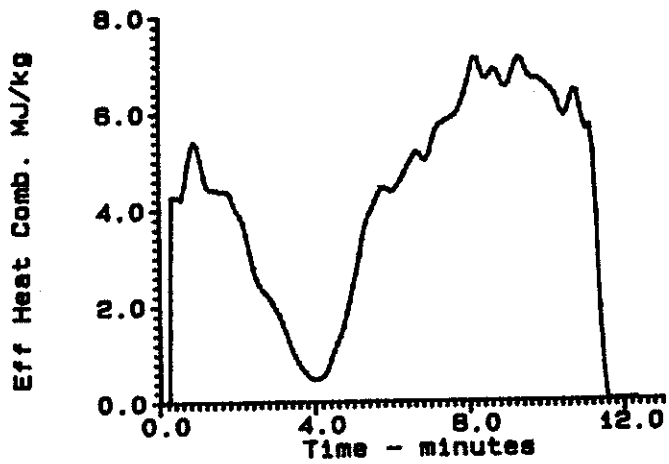
1/2" FR Plywood 92 FLUX = 250



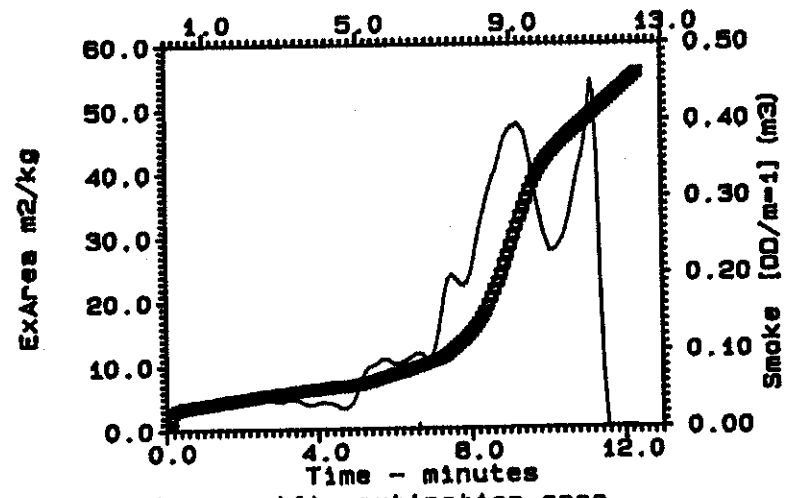
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
 □ Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0047

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992 1/2' FR PLYWOOD

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.048590
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 31.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 76.6 g
Final Mass : 26.4 g
Mass Lost : 5.02 kg/m²
Ignition Time : 15 s
Flameout Time : 750 s

Time of Peak RHR : 565 s
Peak RHR : 102.8 kW/m²
Peak Mass Loss : 16.96 g/s*m²
Peak Extinction Area: 43.00 m²/kg
Total Heat Released : 16.83 MJ/m²

Summary Data From Ignition

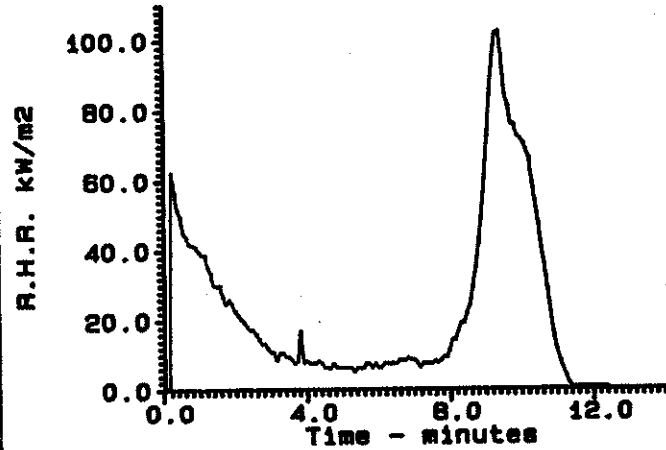
	Test Mean	60S	180S	300s
Heat Release kW/m ²	23.05	44.95	10.91	15.07
Mass Loss rate g/s*m ²	7.24	7.93	6.52	6.17
Heat of Combustion MJ/kg	3.29	5.22	3.99	3.00
Specific Ext. Area m ² /kg	6.49	3.76	3.98	3.52
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

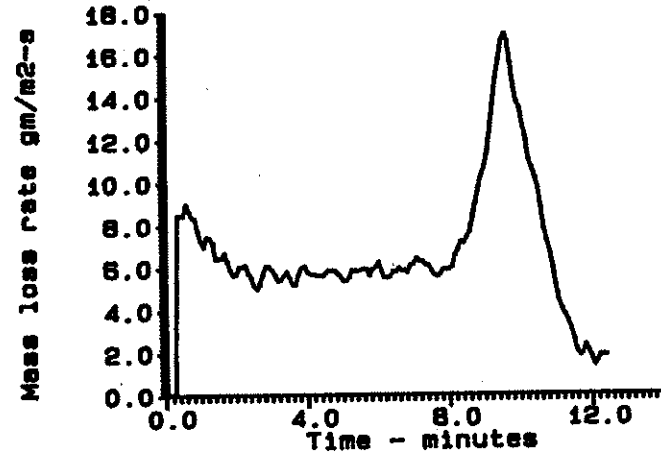
A quick ignition followed by a moderate HRR reducing to a nominal HRR within a few minutes. After a couple of minutes edgeframe effects took place, sample swelled up slightly and released a considerable amount of heat. Similar to previous test.

Tested by : Onno Robert
Officer : Kim Andrew

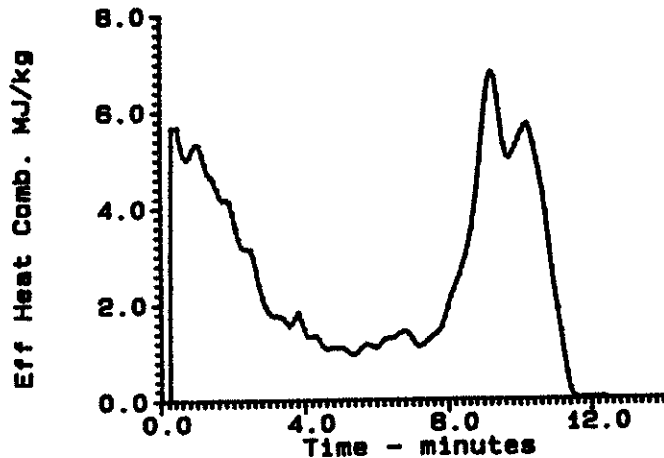
1/2" FR Plywood 92



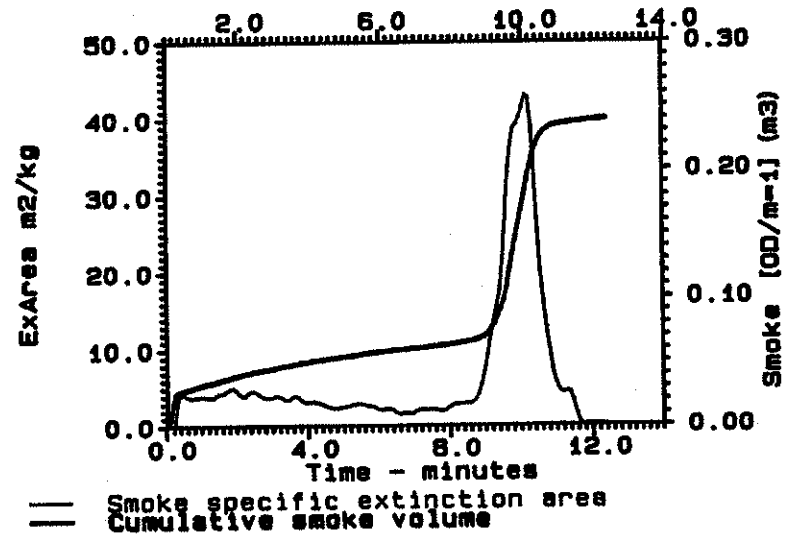
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
- - - Cumulative smoke volume

APPENDIX S: 40.0 mm SEAT

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chair 1 Seat
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	125

DETAILS OF TEST	Test Reference	UNITS			AVG.	MAX
			AKK0041	AKK0042		DEV %
	Date Tested	(D/M/Y)	7/6/92	7/6/92		
	Temperature	(Deg C)	27	28	27	1
	Initial Mass	(g)	35	35	35	0

TEST RESULTS		UNITS			AVG.	MAX
			AKK0041	AKK0042		DEV %
	Ignition Time	(s)	15	10	13	20
	Flameout Time	(s)	740	690	715	3
	Time PHR	(s)	20	20	20	0
	Peak RHR	(kW/m ²)	446	379	413	8
	Peak Mass Loss	(g/s*m ²)	N / A	13.7	14	0
	Peak Ext. Area	(m ² /kg)	388.2	461.1	425	9
	Total Heat Rel.	(MJ/m ²)	71.5	69.4	70	2
	THR @ PHR	(MJ/m ²)	4.4	5.4	5	10
	TM HEAT COMB.	(MJ/kg)	15.8	20.0	18	12
	TM RHR	(kW/m ²)	99.3	102.7	101	2
	TM MLR	(g/s*m ²)	N / A	5.8	6	0
	TM S. Ext. Area	(m ² /kg)	65.9	121.7	94	30
	Mass Final	(g)	0	5	2	100

SUPPLEMENTARY DATA		UNITS			AVG.	MAX
			AKK0041	AKK0042		DEV %
	60s RHR	(kW/m ²)	394.3	314.3	354	11
	60s MLR	(g/s*m ²)	13.8	10.8	12	12
	60s HEAT COMB.	(MJ/kg)	26.5	27.0	27	1
	60s S. Ext. Area	(m ² /kg)	328.0	372.2	350	6
	180s RHR	(kW/m ²)	217.3	175.4	196	11
	180s MLR	(g/s*m ²)	9.2	7.3	8	12
	180s HEAT COMB.	(MJ/kg)	22.8	23.1	23	1
	180s S. Ext. Area	(m ² /kg)	136.9	133.9	135	1
	300s RHR	(kW/m ²)	168.5	155.8	162	4
	300s MLR	(g/s*m ²)	7.2	6.8	7	3
	300s HEAT COMB.	(MJ/kg)	22.9	22.5	23	1
	300s S. Ext. Area	(m ² /kg)	143.4	134.3	139	3

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0041

Test Date: 07-06-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 1 SEAT

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.047679
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.125000m

Test Conditions : 0.0 RH @ 27.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 35.0 g
Final Mass : 0.0 g
Mass Lost : 3.50 kg/m²
Ignition Time : 15 s
Flameout Time : 740 s

Time of Peak RHR : 20 s
Peak RHR : 446.1 kW/m²
Peak Mass Loss : 526.33 g/s*m²
Peak Extinction Area: 388.18 m²/kg
Total Heat Released : 71.48 MJ/m²

Summary Data From Ignition

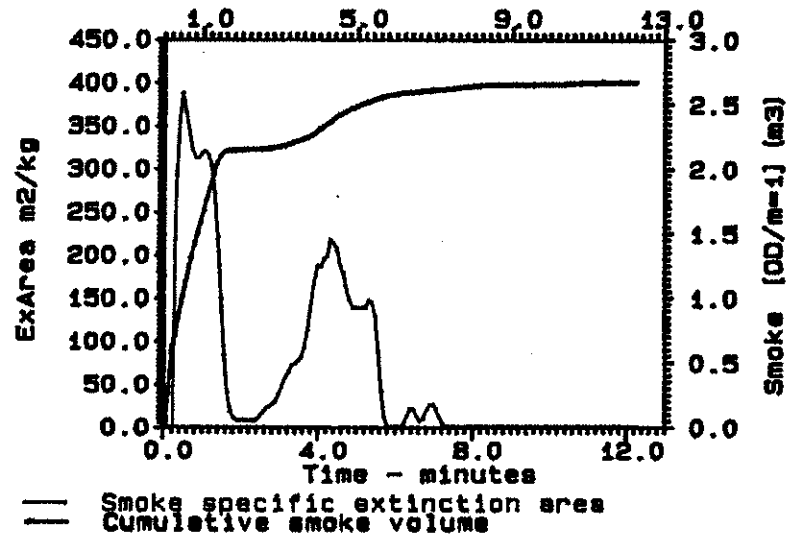
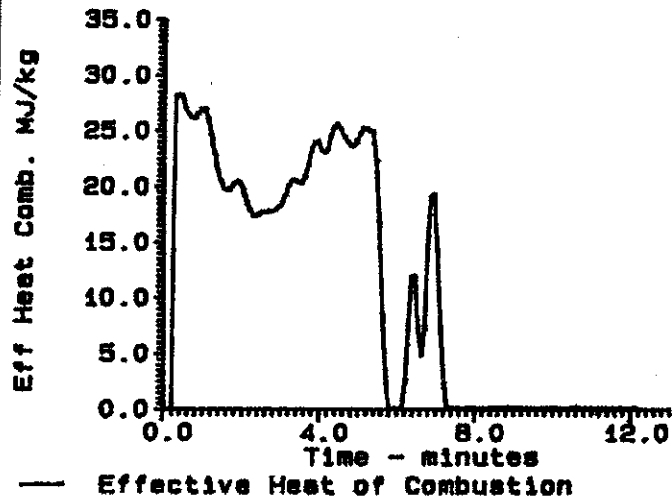
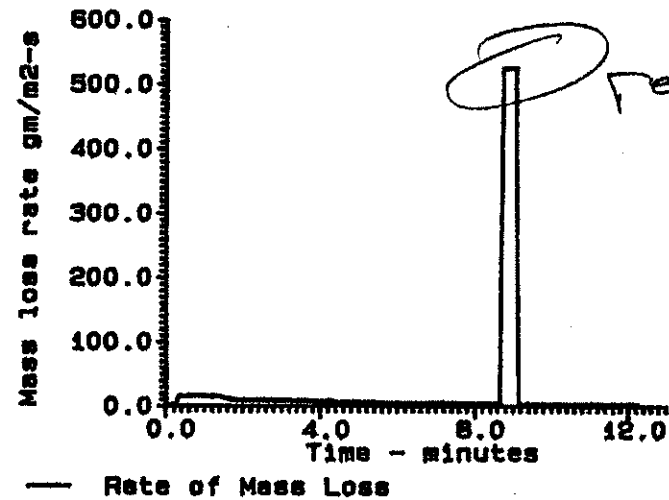
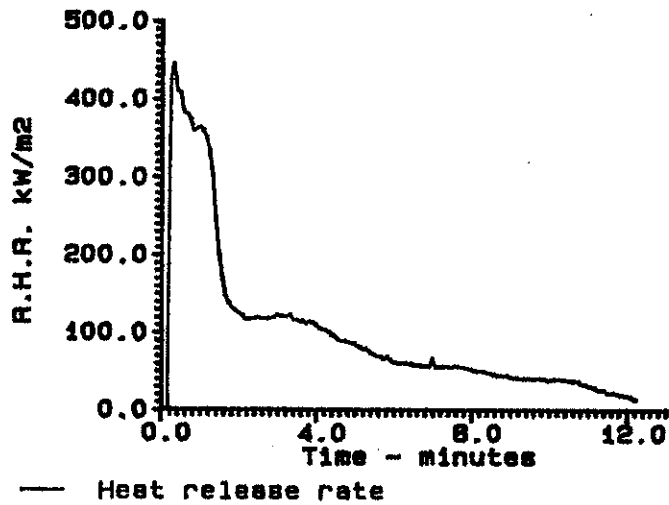
	Test Mean	60S	180S	300s
Heat Release kW/m ²	99.28	394.25	217.27	168.49
Mass Loss Rate g/s*m ²	15.35	13.78	9.20	7.17
Heat of Combustion MJ/kg	15.79	26.52	22.78	22.89
Specific Ext. Area m ² /kg	65.90	327.98	136.88	143.43
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The material ignited without the sparker, almost imm.
A large initial heat peak is followed by a smaller plateau.
The polyurethane burns completely, however the bottom elastic portion does not.

Tested by : Dnno Robert
Officer : Kim Andrew

CHAIR 1 SEAT SECTION



APPENDIX T: 30.0 mm BACK



CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chair 1 Back
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	30

		UNITS				AVG.	MAX
DETAILS OF TEST	Test Reference		AKK0039	AKK0040			DEV %
	Date Tested	(D/M/Y)	6/30/92	7/6/92			
	Temperature	(Deg C)	28	26		27	3
	Initial Mass	(g)	74	71		73	2

TEST RESULTS	Ignition Time	(s)	5	5		5	0
	Flameout Time	(s)	1329	1390		1360	2
	Time PHR	(s)	35	40		38	7
	Peak RHR	(kW/m ²)	313	321		317	1
	Peak Mass Loss	(g/s*m ²)	15.8	18.0		17	7
	Peak Ext. Area	(m ² /kg)	298.8	296.8		298	0
	Total Heat Rel.	(MJ/m ²)	122.5	123.2		123	0
	THR @ PHR	(MJ/m ²)	7.6	9.5		9	11
	TM HEAT COMB.	(MJ/kg)	13.6	14.3		14	3
	TM RHR	(kW/m ²)	93.2	89.3		91	2
	TM MLR	(g/s*m ²)	5.9	5.7		6	1
	TM S. Ext. Area	(m ² /kg)	28.2	27.6		28	1
	Mass Final	(g)	0	3		2	100

SUPPLEMENTARY DATA	60s RHR	(kW/m ²)	256.2	252.2		254.2	1
	60s MLR	(g/s*m ²)	12.1	12.1		12	0
	60s HEAT COMB.	(MJ/kg)	20.1	19.9		20	1
	60s S. Ext. Area	(m ² /kg)	258.6	236.2		247	5
	180s RHR	(kW/m ²)	178.8	177.0		178	1
	180s MLR	(g/s*m ²)	11.8	11.7		12	0
	180s HEAT COMB.	(MJ/kg)	14.7	14.7		15	0
	180s S. Ext. Area	(m ² /kg)	106.5	97.4		102	4
	300s RHR	(kW/m ²)	167.2	169.1		168	1
	300s MLR	(g/s*m ²)	12.0	12.1		12	0
	300s HEAT COMB.	(MJ/kg)	13.7	13.7		14	0
	300s S. Ext. Area	(m ² /kg)	91.4	82.3		87	5

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0042

Test Date: 07-06-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 1 SEAT

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.047679
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.125000m

Test Conditions : 0.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 35.2 g
Final Mass : 4.8 g
Mass Lost : 3.04 kg/m²
Ignition Time : 10 s
Flameout Time : 690 s

Time of Peak RHR : 20 s
Peak RHR : 379.3 kW/m²
Peak Mass Loss : 13.69 g/s*m²
Peak Extinction Area: 461.12 m²/kg
Total Heat Released : 69.36 MJ/m²

Summary Data From Ignition

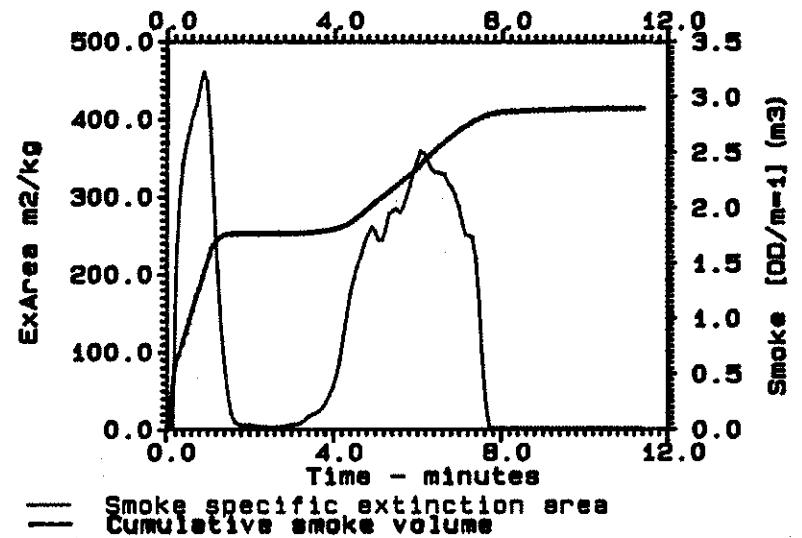
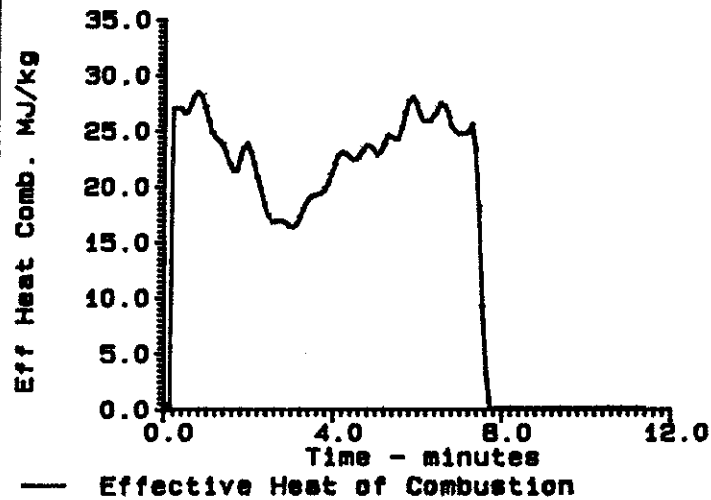
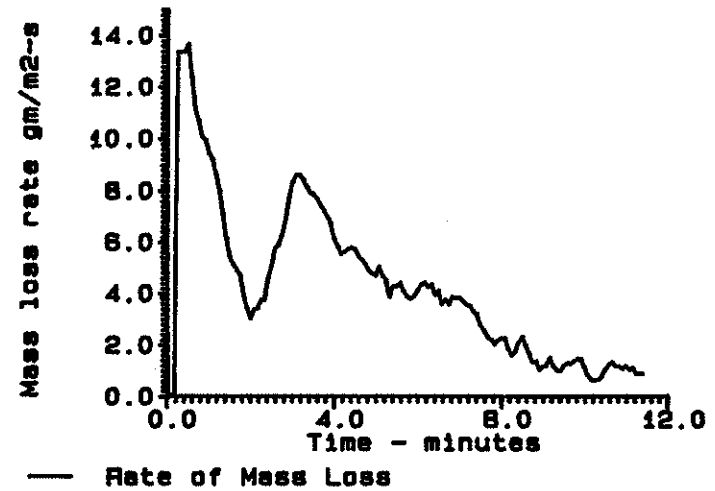
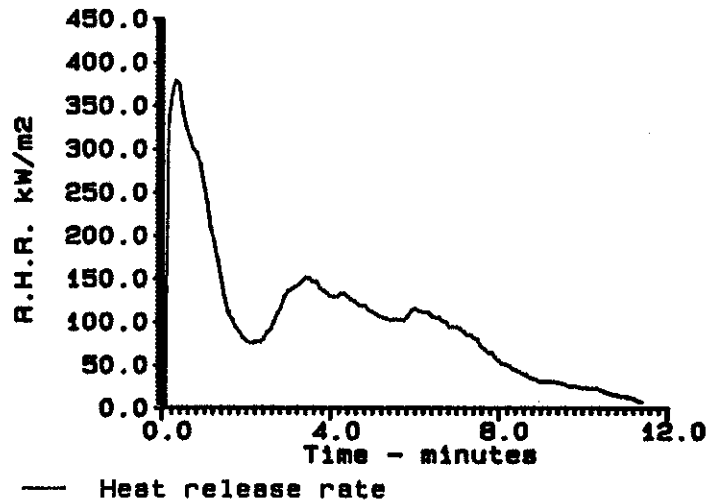
	Test Mean	60s	180s	300s	
Heat Release	kW/m ²	102.75	314.33	175.44	155.79
Mass Loss Rate	g/s*m ²	5.75	10.80	7.29	6.76
Heat of Combustion	MJ/kg	19.99	27.05	23.10	22.48
Specific Ext. Area	mJ/kg	121.66	372.20	133.92	134.32
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The material ignited without the sparker, almost imm.
A large initial heat peak is followed by a smaller plateau.
The polyurethane burns completely, however the bottom elastic portion does not. Similarly to last test.

Tested by : Onno Robert
Officer : Kim Andrew

CHAIR 1 SEAT SECTION



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0039

Test Date: 06-30-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 1 BACK

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant :
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.030000m

Test Conditions : 0.0 RH @ 28.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 74.4 g
Final Mass : 0.0 g
Mass Lost : 7.44 kg/m²
Ignition Time : 5 s
Flameout Time : 1,329 s

Time of Peak RHR : 35 s
Peak RHR : 313.3 kW/m²
Peak Mass Loss : 15.77 g/s*m²
Peak Extinction Area: 298.78 m²/kg
Total Heat Released : 122.55 MJ/m²

Summary Data From Ignition

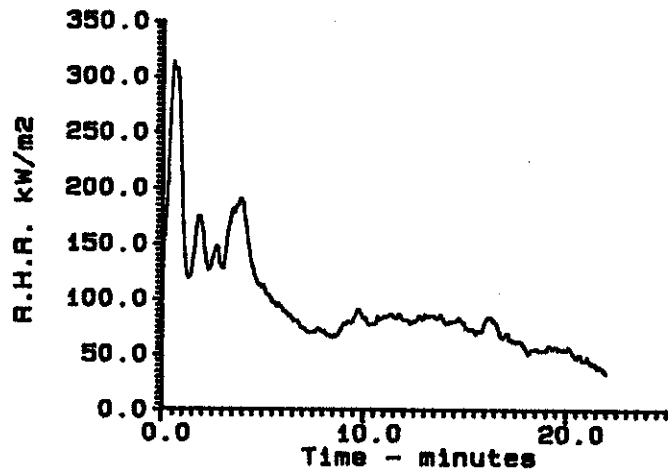
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	93.19	256.17	178.81	167.17
Mass Loss Rate	g/s*m ²	5.92	12.15	11.85	12.05
Heat of Combustion	MJ/kg	13.58	20.13	14.73	13.70
Specific Ext. Area	m ² /kg	28.25	258.58	106.50	91.37
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

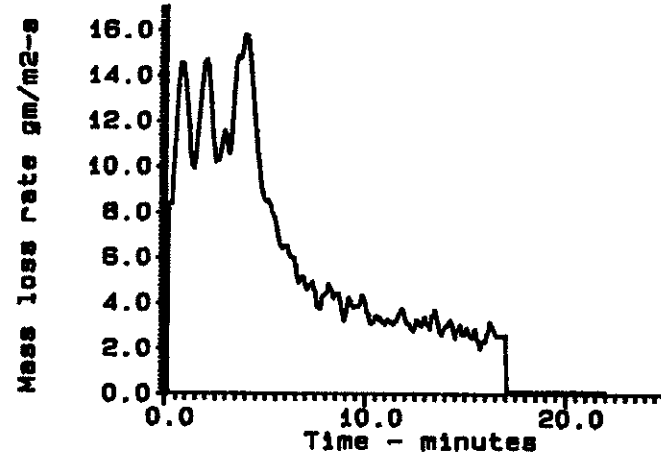
A number of peaks can be seen. 1-top fabric, 2-wood (big)
3- a number of peaks from Polyurethane, lastly the bottom fabric.

Tested by : Dnno Robert
Officer : Kim Andrew

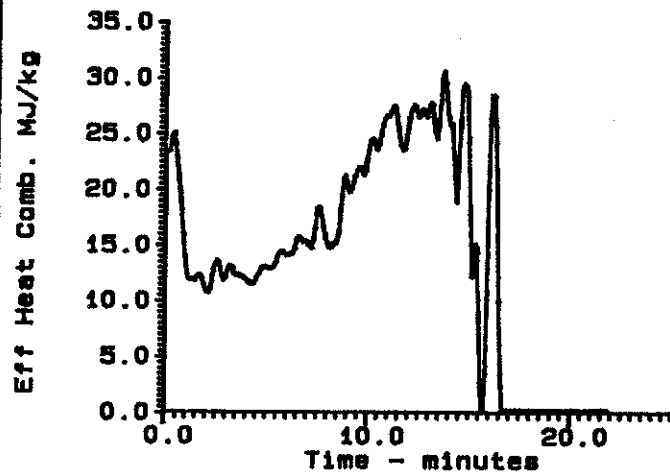
CHAIR 1 BACK SECTION



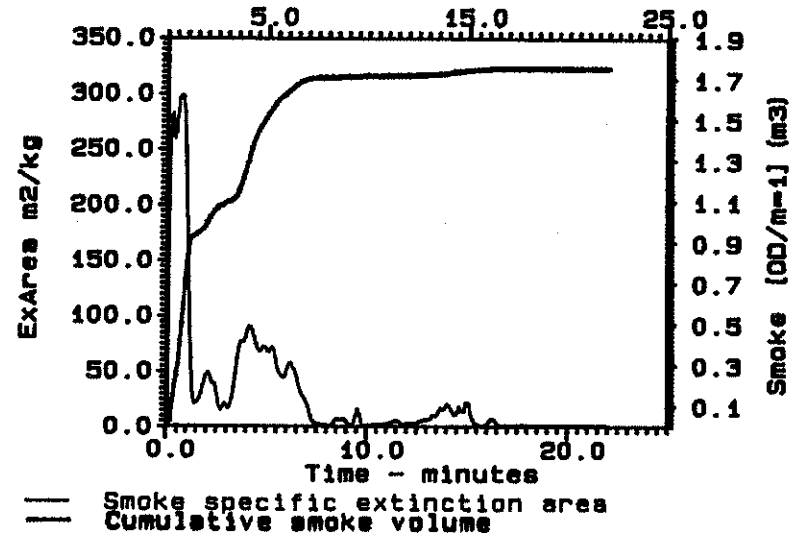
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
 - - - Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0040

Test Date: 07-06-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 1 BACK

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.047679
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.030000m

Test Conditions : 0.0 RH @ 26.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 71.1 g
Final Mass : 3.1 g
Mass Lost : 6.80 kg/m²
Ignition Time : 5 s
Flameout Time : 1,390 s

Time of Peak RHR : 40 s
Peak RHR : 321.2 kW/m²
Peak Mass Loss : 18.04 g/s*m²
Peak Extinction Area: 296.79 m²/kg
Total Heat Released : 123.20 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	89.27	252.22	177.03	169.10
Mass Loss Rate g/s*m ²	5.74	12.07	11.74	12.14
Heat of Combustion MJ/kg	14.28	19.92	14.68	13.74
Specific Ext. Area m ² /kg	27.60	236.19	97.39	82.32
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

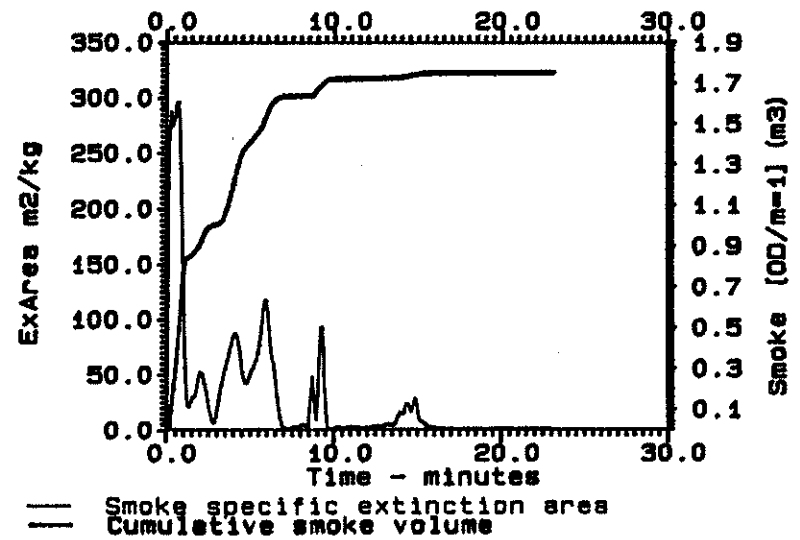
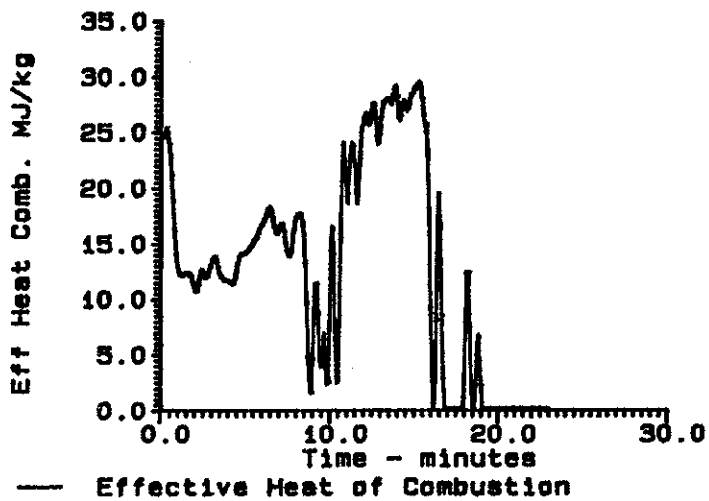
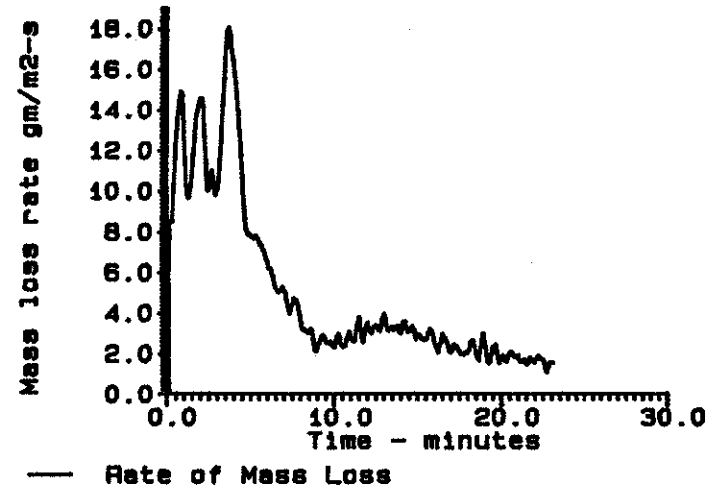
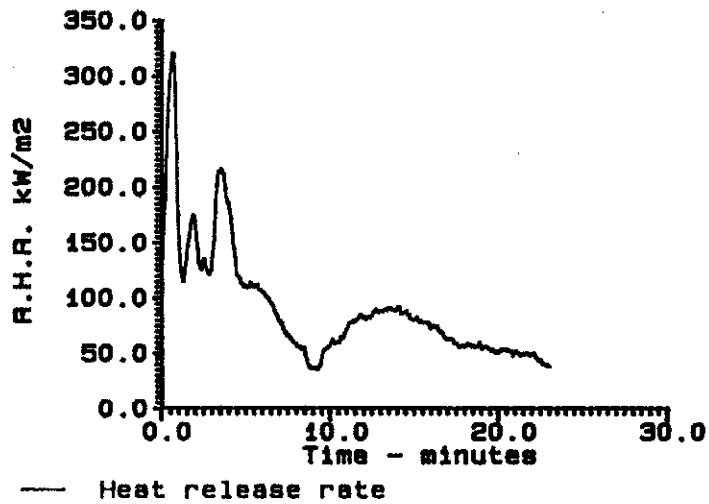
OBSERVATIONS AND COMMENTS

A number of peaks can be seen. 1-top fabric, 2-wood (big)
3- a number of peaks from Polyurethane, lastly the bottom
fabric. Similar to previous. Flame went out for a brief
period of time, and then re-ignited for the rest.
A brief dip is seen in RHR from this.

Tested by : Onno Robert

Officer : Kim Andrew

CHAIR 1 BACK SECTION



APPENDIX U: 25.0 mm POLYISOCYANURATE WITH FOIL

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Foam w/ foil
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	25

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			AKK0051				DEV %
	Date Tested	(D/M/Y)	7/20/92				
	Temperature	(Deg C)	31			31	N/A
	Initial Mass	(g)	10			10	N/A

TEST RESULTS	TEST	UNITS				AVG.	MAX
							DEV %
	Ignition Time	(s)	0			0	N/A
	Flameout Time	(s)	1204			1204	N/A
	Time PHR	(s)	0			0	N/A
	Peak RHR	(kW/m2)	0			0	N/A
	Peak Mass Loss	(g/s*m2)	0.7			1	N/A
	Peak Ext. Area	(m2/kg)	0.0			0	N/A
	Total Heat Rel.	(MJ/m2)	0.0			0	N/A
	THR @ PHR	(MJ/m2)	0.0			0	N/A
	TM HEAT COMB.	(MJ/kg)	0.0			0	N/A
	TM RHR	(kW/m2)	0.0			0	N/A
	TM MLR	(g/s*m2)	0.0			0	N/A
	TM S. Ext. Area	(m2/kg)	0.0			0	N/A
	Mass Final	(g)	9			9	N/A

SUPPLEMENTARY DATA	TEST	UNITS				AVG.	MAX
							DEV %
	60s RHR	(kW/m2)	0.0			0.0	N/A
	60s MLR	(g/s*m2)	0.0			0	N/A
	60s HEAT COMB.	(MJ/kg)	0.0			0	N/A
	60s S. Ext. Area	(m2/kg)	0.0			0	N/A
	180s RHR	(kW/m2)	0.0			0	N/A
	180s MLR	(g/s*m2)	0.0			0	N/A
	180s HEAT COMB.	(MJ/kg)	0.0			0	N/A
	180s S. Ext. Area	(m2/kg)	0.0			0	N/A
	300s RHR	(kW/m2)	0.0			0	N/A
	300s MLR	(g/s*m2)	0.0			0	N/A
	300s HEAT COMB.	(MJ/kg)	0.0			0	N/A
	300s S. Ext. Area	(m2/kg)	0.0			0	N/A

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0051

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 25mm Foam w/ Foil 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048590
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.025000m

Test Conditions : 0.0 RH @ 31.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 10.2 g
Final Mass : 9.0 g
Mass Lost : 0.12 kg/m²
Ignition Time : 0 s
Flameout Time : 1,204 s

Time of Peak RHR : 0 s
Peak RHR : 0.0 kW/m²
Peak Mass Loss : 0.67 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.00 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	0.00	0.00	0.00	0.00
Mass Loss Rate g/s*m ²	0.04	0.00	0.00	0.02
Heat of Combustion MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

After five minutes the sample swelled up slightly.
Ignition remained on for 10 minutes after which since there was no ignition it was turned off.
The test was run until 20 minutes to see if there would be any change, but nothing happened.

Tested by : Onno Robert
Officer : Kim

APPENDIX V: 1.0 mm WALLPAPER

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Wallpaper
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	1

		UNITS				AVG.	MAX
DETAILS OF TEST	Test Reference		AKK0054				DEV %
	Date Tested	(D/M/Y)	7/21/92				
	Temperature	(Deg C)	29			29	N/A
	Initial Mass	(g)	3			3	N/A

TEST RESULTS	Ignition Time	(s)	10			10	N/A
	Flameout Time	(s)	60			60	N/A
	Time PHR	(s)	10			10	N/A
	Peak RHR	(kW/m ²)	86			86	N/A
	Peak Mass Loss	(g/s*m ²)	4.7			4.7	N/A
	Peak Ext. Area	(m ² /kg)	807.7			807.7	N/A
	Total Heat Rel.	(MJ/m ²)	1.4			1.4	N/A
	THR @ PHR	(MJ/m ²)	0.4			0.4	N/A
	TM HEAT COMB.	(MJ/kg)	6.0			6.0	N/A
	TM RHR	(kW/m ²)	30.3			30.3	N/A
	TM MLR	(g/s*m ²)	3.9			3.9	N/A
	TM S. Ext. Area	(m ² /kg)	313.6			313.6	N/A
	Mass Final	(g)	2			2	N/A

SUPPLEMENTARY DATA	60s RHR	(kW/m ²)	12.8			12.8	N/A
	60s MLR	(g/s*m ²)	2.0			2.0	N/A
	60s HEAT COMB.	(MJ/kg)	5.0			5.0	N/A
	60s S. Ext. Area	(m ² /kg)	177.7			177.7	N/A
	180s RHR	(kW/m ²)	4.3			4.3	N/A
	180s MLR	(g/s*m ²)	0.7			0.7	N/A
	180s HEAT COMB.	(MJ/kg)	5.0			5.0	N/A
	180s S. Ext. Area	(m ² /kg)	59.2			59.2	N/A
	300s RHR	(kW/m ²)	2.6			2.6	N/A
	300s MLR	(g/s*m ²)	0.4			0.4	N/A
	300s HEAT COMB.	(MJ/kg)	5.0			5.0	N/A
	300s S. Ext. Area	(m ² /kg)	35.5			35.5	N/A

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Wallpaper
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	1

DETAILS OF TEST	Test Reference	UNITS	AKK0050			AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	7/20/92				
	Temperature	(Deg C)	31			31	N/A
	Initial Mass	(g)	3			3	N/A

TEST RESULTS	Parameter	UNITS	5			5	N/A
	Ignition Time	(s)	5			5	N/A
	Flameout Time	(s)	39			39	N/A
	Time PHR	(s)	5			5	N/A
	Peak RHR	(kW/m ²)	80			80	N/A
	Peak Mass Loss	(g/s*m ²)	4.9			4.9	N/A
	Peak Ext. Area	(m ² /kg)	872.9			872.9	N/A
	Total Heat Rel.	(MJ/m ²)	1.0			1.0	N/A
	THR @ PHR	(MJ/m ²)	0.4			0.4	N/A
	TM HEAT COMB.	(MJ/kg)	3.3			3.3	N/A
	TM RHR	(kW/m ²)	38.7			38.7	N/A
	TM MLR	(g/s*m ²)	4.9			4.9	N/A
	TM S. Ext. Area	(m ² /kg)	680.3			680.3	N/A
	Mass Final	(g)	2			2	N/A

SUPPLEMENTARY DATA	Parameter	UNITS	7.3			7.3	N/A
	60s RHR	(kW/m ²)	7.3			7.3	N/A
	60s MLR	(g/s*m ²)	1.6			1.6	N/A
	60s HEAT COMB.	(MJ/kg)	3.2			3.2	N/A
	60s S. Ext. Area	(m ² /kg)	210.7			210.7	N/A
	180s RHR	(kW/m ²)	2.4			2.4	N/A
	180s MLR	(g/s*m ²)	0.5			0.5	N/A
	180s HEAT COMB.	(MJ/kg)	3.2			3.2	N/A
	180s S. Ext. Area	(m ² /kg)	70.2			70.2	N/A
	300s RHR	(kW/m ²)	1.5			1.5	N/A
	300s MLR	(g/s*m ²)	0.3			0.3	N/A
	300s HEAT COMB.	(MJ/kg)	3.2			3.2	N/A
	300s S. Ext. Area	(m ² /kg)	42.1			42.1	N/A

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0054

Test Date: 07-21-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1mm Wallpaper 1 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drift Constant : 0.052820
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.001000m

Test Conditions : 0.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 3.2 g
Final Mass : 1.7 g
Mass Lost : 0.15 kg/m²
Ignition Time : 10 s
Flameout Time : 60 s

Time of Peak RHR : 10 s
Peak RHR : 85.9 kW/m²
Peak Mass Loss : 4.73 g/s*m²
Peak Extinction Area: 807.74 m²/kg
Total Heat Released :

Summary Data From Ignition

Test Mean : 85.9

Heat Release : 85.9
Mass Loss :

0.00000 0.00000

COMMENTS

A smoke is emitted at the beginning of the test, the sample ignites almost immediately and burns for one minute. Similar to higher heat flux.

Tested by : Onno Robert
Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0050

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1mm Wallpaper 1 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Drifce Constant : 0.048590
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.001000m

Test Conditions : 0.0 RH @ 31.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 3.2 g
Final Mass : 1.5 g
Mass Lost : 0.17 kg/m²
Ignition Time : 5 s
Flameout Time : 39 s

Time of Peak RHR : 5 s
Peak RHR : 80.0 kW/m²
Peak Mass Loss : 4.92 g/s*m²
Peak Extinction Area: 872.91 m²/kg
Total Heat Released : 0.97 MJ/m²

Summary Data From Ignition

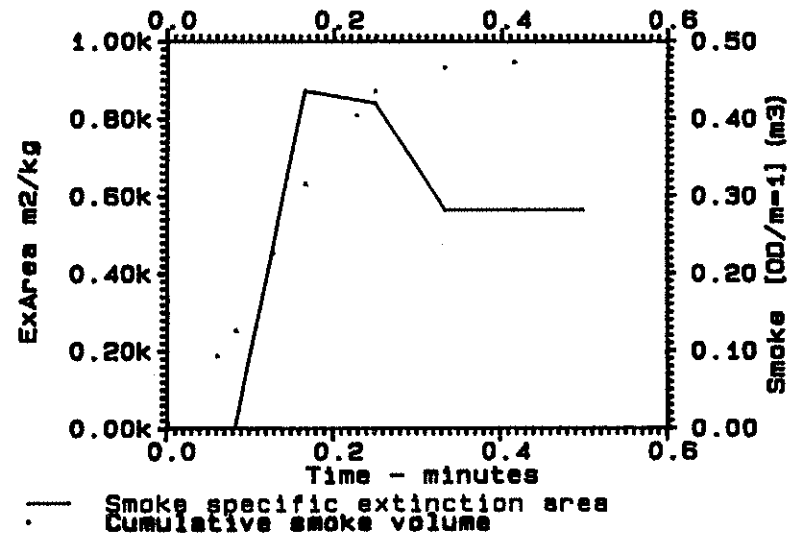
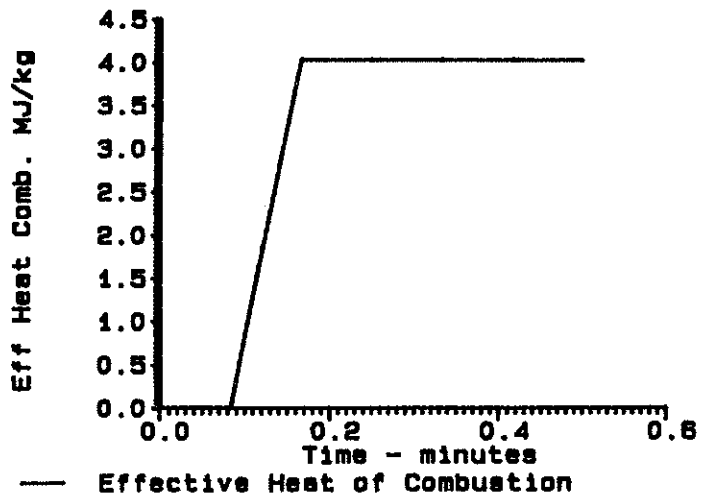
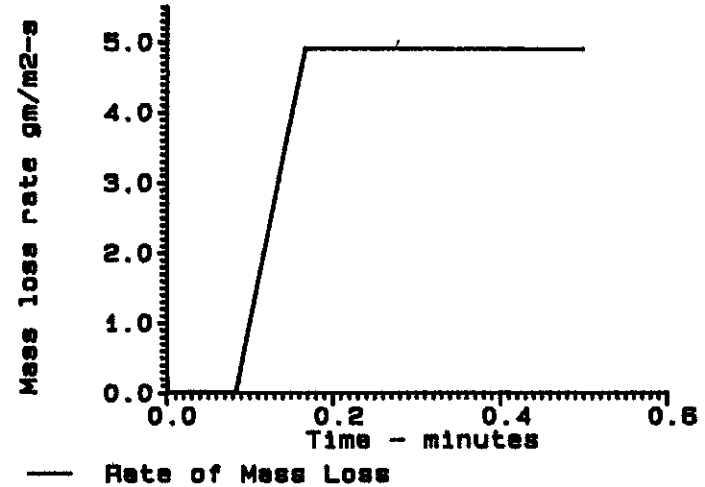
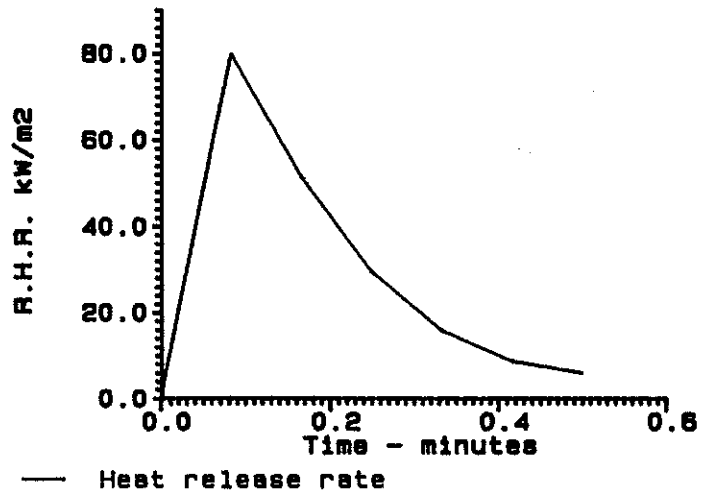
	Test Mean	60S	180S	300s
Heat Release kW/m ²	38.69	7.32	2.44	1.46
Mass Loss Rate g/s*m ²	4.92	1.64	0.55	0.33
Heat of Combustion MJ/kg	3.26	3.16	3.16	3.16
Specific Ext. Area m ² /kg	680.35	210.74	70.25	42.15
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Material ignites almost immediately. After 30s the entire face burns out and the flame is extinguished. Not all of the material is burned, a thin charred section remains.

Tested by : Onno Robert
Officer : Kim Andrew

1mm Wallpaper 92



APPENDIX W: 12.3 mm PARTICLEBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	UNITS				AVG.	MAX
		AKK0025	AKK0029	AKK0035		DEV %
Test Reference		AKK0025	AKK0029	AKK0035		
Date Tested	(D/M/Y)	6/17/92	6/25/92	6/25/92		
Temperature	(Deg C)	28	25	27	27	6
Initial Mass	(g)	83	88	89	87	4

TEST RESULTS		(s)					
Ignition Time		(s)	110	120	104	111	8
Flameout Time		(s)	1160	1133	1275	1189	7
Time PHR		(s)	875	135	940	650	79
Peak RHR		(kW/m2)	136	140	241	172	40
Peak Mass Loss		(g/s*m2)	11.7	12.6	11.4	12	6
Peak Ext. Area		(m2/kg)	182.4	176.3	160.5	173	7
Total Heat Rel.		(MJ/m2)	74.9	70.7	69.7	72	4
THR @ PHR		(MJ/m2)	57.9	N / A	53.9	56	4
TM HEAT COMB.		(MJ/kg)	11.1	10.4	10.0	10	6
TM RHR		(kW/m2)	71.7	70.4	59.6	67	11
TM MLR		(g/s*m2)	6.6	6.5	6.3	6	3
TM S. Ext. Area		(m2/kg)	30.8	32.6	26.4	30	12
Mass Final		(g)	20	23	22	22	6

SUPPLEMENTARY DATA		(kW/m2)					
60s RHR		(kW/m2)	130.9	131.5	131.4	131	0
60s MLR		(g/s*m2)	10.9	11.2	10.6	11	3
60s HEAT COMB.		(MJ/kg)	11.3	10.9	11.6	11	3
60s S. Ext. Area		(m2/kg)	103.5	94.7	114.8	104	10
180s RHR		(kW/m2)	95.9	93.3	95.1	95	2
180s MLR		(g/s*m2)	8.6	8.7	8.5	9	1
180s HEAT COMB.		(MJ/kg)	10.9	10.5	11.0	11	3
180s S. Ext. Area		(m2/kg)	54.2	46.8	58.1	53	12
300s RHR		(kW/m2)	80.8	78.2	78.3	79	2
300s MLR		(g/s*m2)	7.4	7.5	7.3	7	1
300s HEAT COMB.		(MJ/kg)	10.7	10.2	10.5	10	3
300s S. Ext. Area		(m2/kg)	35.8	28.2	35.2	33	15

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	UNITS	AKK0010	AKK0015	AKK0019	AVG.	MAX
Test Reference		AKK0010	AKK0015	AKK0019		
Date Tested	(D/M/Y)	6/15/92	6/17/92	6/17/92		
Temperature	(Deg C)	27	27	28	27	1
Initial Mass	(g)	82	78	83	81	4

TEST RESULTS		AKK0010	AKK0015	AKK0019	AVG.	MAX
Ignition Time	(s)	25	30	25	27	13
Flameout Time	(s)	790	713	835	779	9
Time PHR	(s)	595	580	645	607	6
Peak RHR	(kW/m ²)	175	257	203	212	21
Peak Mass Loss	(g/s*m ²)	15.6	19.5	16.3	17	14
Peak Ext. Area	(m ² /kg)	219.7	350.9	270.9	280	25
Total Heat Rel.	(MJ/m ²)	68.8	75.4	79.1	74	8
THR @ PHR	(MJ/m ²)	51.3	62.6	63.6	59	13
TM HEAT COMB.	(MJ/kg)	10.1	12.0	11.7	11	11
TM RHR	(kW/m ²)	90.5	111.7	98.3	100	12
TM MLR	(g/s*m ²)	9.1	9.1	8.6	9	4
TM S. Ext. Area	(m ² /kg)	64.3	64.1	64.2	64	0
Mass Final	(g)	18	19	19	19	4

SUPPLEMENTARY DATA		AKK0010	AKK0015	AKK0019	AVG.	MAX
60s RHR	(kW/m ²)	165.9	178.7	181.4	175	5
60s MLR	(g/s*m ²)	14.1	14.0	13.0	14	5
60s HEAT COMB.	(MJ/kg)	11.1	12.0	13.2	12	9
60s S. Ext. Area	(m ² /kg)	160.2	157.7	156.8	158	1
180s RHR	(kW/m ²)	121.6	138.3	134.0	131	7
180s MLR	(g/s*m ²)	11.4	11.4	10.8	11	4
180s HEAT COMB.	(MJ/kg)	10.5	11.9	12.1	11	9
180s S. Ext. Area	(m ² /kg)	99.5	91.0	101.0	97	6
300s RHR	(kW/m ²)	98.1	115.7	113.5	109	10
300s MLR	(g/s*m ²)	9.7	9.7	9.6	10	1
300s HEAT COMB.	(MJ/kg)	9.9	11.8	11.6	11	11
300s S. Ext. Area	(m ² /kg)	63.9	58.3	65.0	62	7

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0025

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 82.9 g
Final Mass : 20.2 g
Mass Lost : 6.27 kg/m²
Ignition Time : 110 s
Flameout Time : 1,160 s

Time of Peak RHR : 875 s
Peak RHR : 136.4 kW/m²
Peak Mass Loss : 11.73 g/s*m²
Peak Extinction Area: 182.36 m²/kg
Total Heat Released : 74.92 MJ/m²

Summary Data From Ignition

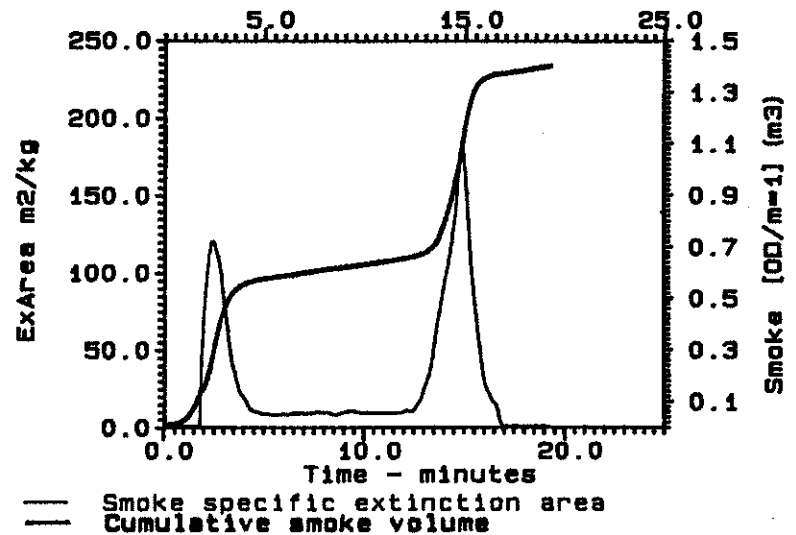
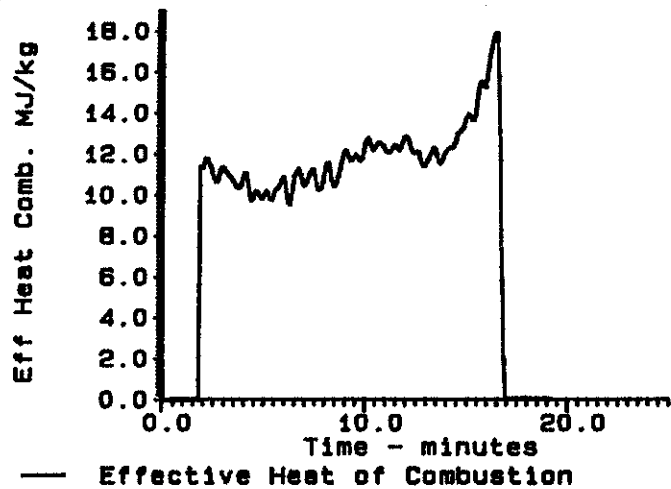
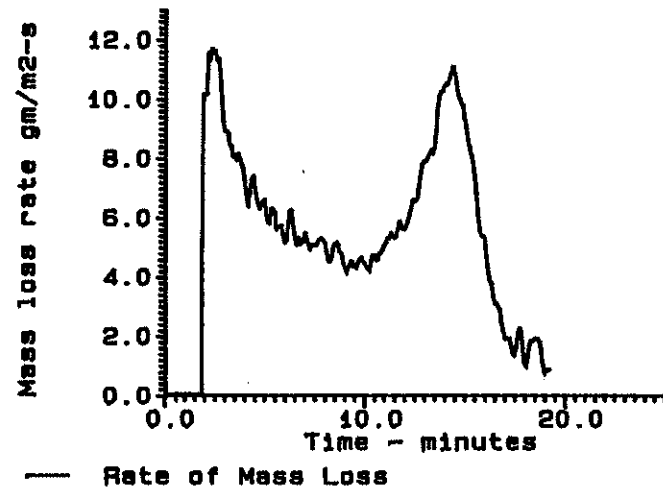
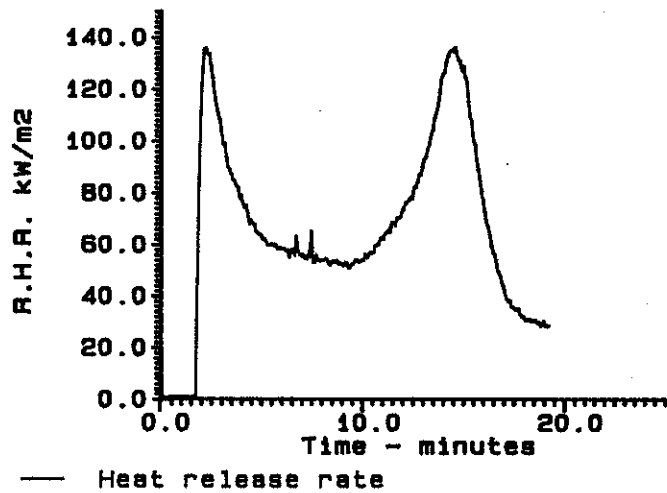
	Test Mean	60S	180S	300s
Heat Release kW/m ²	71.69	130.87	95.87	80.82
Mass Loss Rate g/s*m ²	6.55	10.92	8.64	7.45
Heat of Combustion MJ/kg	11.10	11.27	10.87	10.70
Specific Ext. Area m ² /kg	30.83	103.53	54.23	35.77
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

The frame did not rise at all.
The sample rose only slightly above the frame, less than previous tests.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0029

Test Date: 11-01-1990

DETAILS OF MATERIAL TESTED

Sponsor : *Kim Andrew*

Material:

Orifice Constant	: 0.047799	Nominal Flow	: 24.1 l/s
Heater Orientation	: Horizontal	Heat per Unit Mole	: 13.10000 kJ/gO ₂
Grid Used	: N	Spark Ignitor Used	: Y
		Frame Used	: Y
Conditioning	: 50.0 RH @ 24.0°C	Test Conditions	: 0.0 RH @ 25.1°C
Specimen Thickness	: 0.012300m	Specimen Area	: 0.010000 m ²

TEST RESULTS

Initial Mass	: 88.0 g	Time of Peak RHR	: 135 s
Final Mass	: 22.7 g	Peak RHR	: 139.8 kW/m ²
Mass Lost	: 6.53 kg/m ²	Peak Mass Loss	: 12.62 g/s*m ²
Ignition Time	: 120 s	Peak Extinction Area	: 176.31 m ² /kg
Flameout Time	: 1,133 s	Total Heat Released	: 70.74 MJ/m ²

Summary Data From Ignition

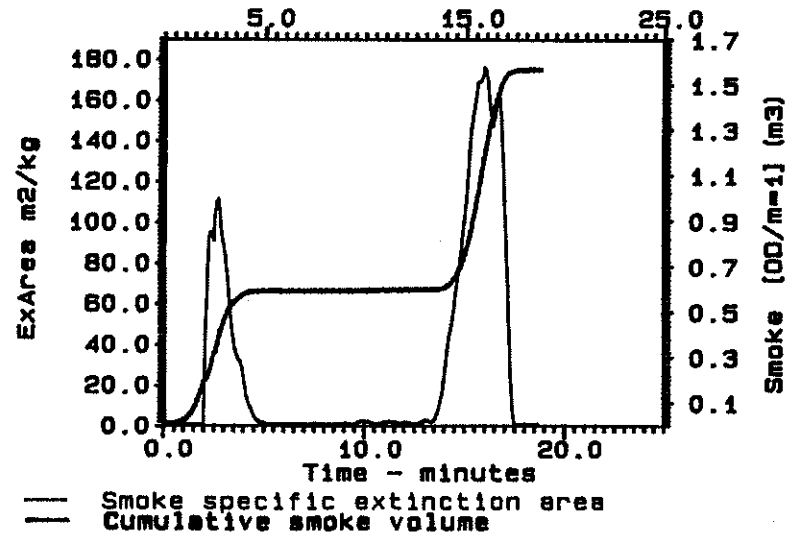
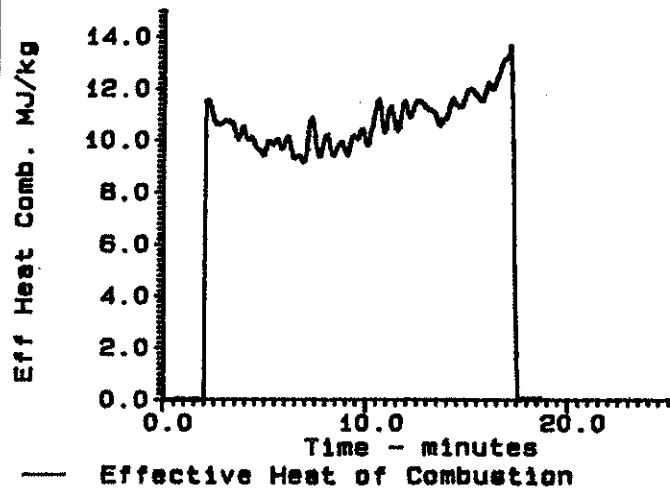
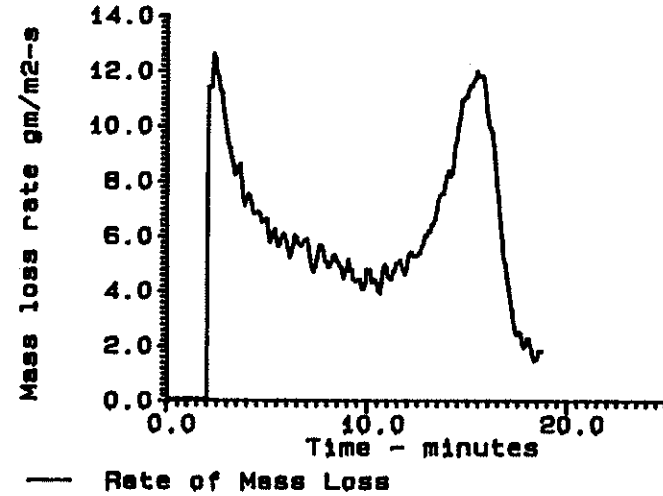
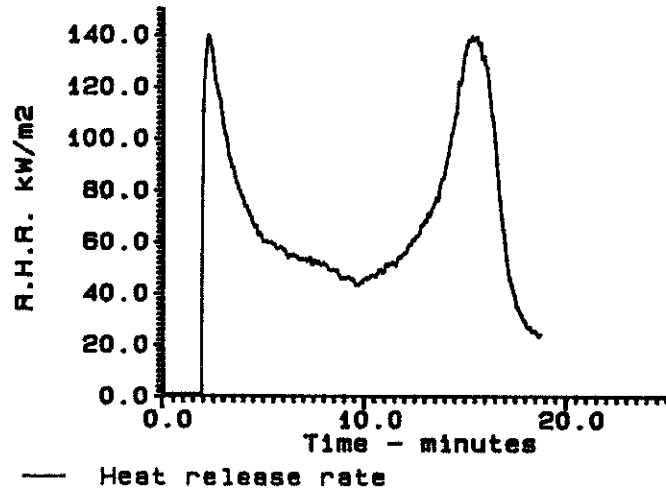
	Test Mean	60S	180S	300s
Heat Release kW/m ²	70.38	131.51	93.27	78.17
Mass Loss Rate g/s*m ²	6.54	11.15	8.67	7.50
Heat of Combustion MJ/kg	10.35	10.94	10.46	10.22
Specific Ext. Area m ² /kg	32.60	94.68	46.78	28.19
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped
Sample billowed up slightly

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92 Flux = 25



SUMMARY TEST REPORT

Test Ref:

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 89.3 g
Final Mass : 22.0 g
Mass Lost : 6.73 kg/m²
Ignition Time : 104 s
Flameout Time : 1,275 s

Time of Peak RHR : 940 s
Peak RHR : 241.1 kW/m²
Peak Mass Loss : 11.40 g/s*m²
Peak Extinction Area: 160.47 m²/kg
Total Heat Released : 69.71 MJ/m²

Summary Data From Ignition

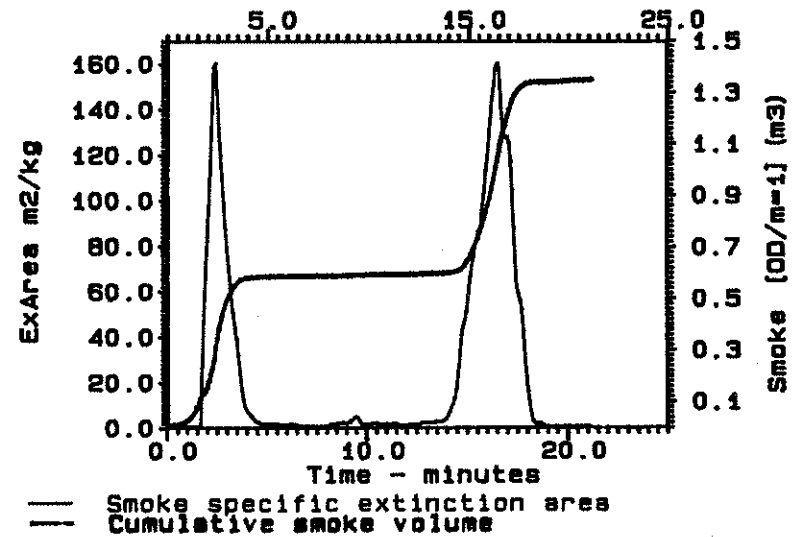
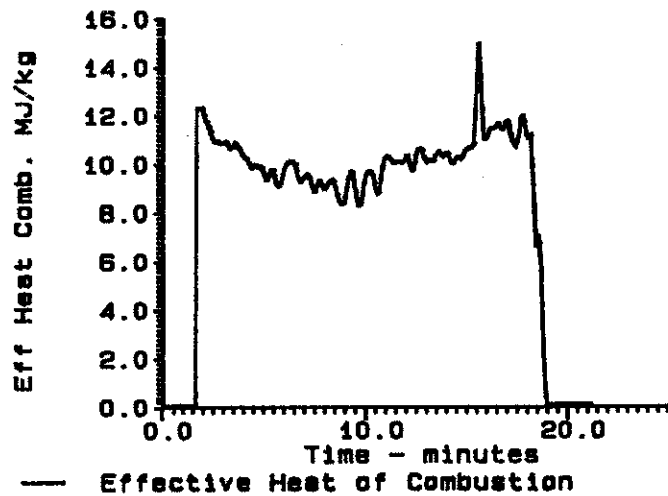
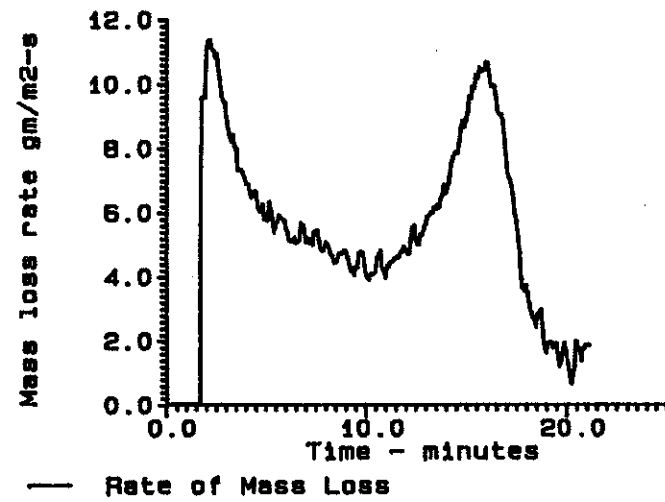
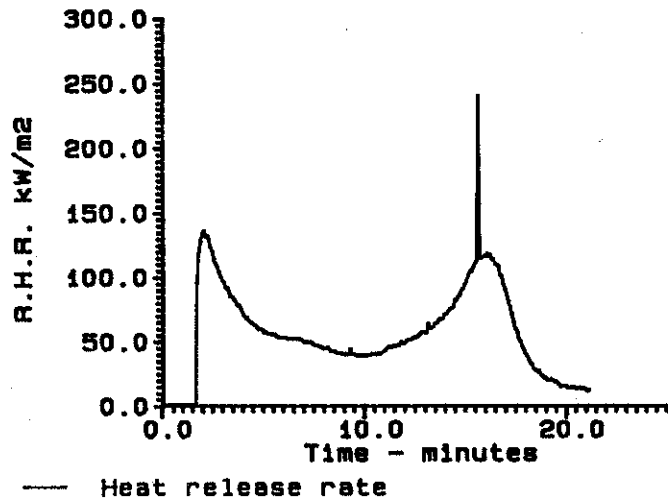
	Test Mean	60S	180S	300s
Heat Release kW/m ²	59.58	131.41	95.09	78.34
Mass Loss Rate g/s*m ²	6.26	10.61	8.48	7.32
Heat of Combustion MJ/kg	10.00	11.61	10.96	10.54
Specific Ext. Area m ² /kg	26.42	114.81	58.08	35.24
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0010

Test Date: 06-15-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Rese.

Material:

06-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 0.048566
Heater Orientation : Horizontal
Grid Used : N

Gas Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 26.9°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 81.7 g
Final Mass : 17.7 g
Mass Lost : 6.40 kg/m²
Ignition Time : 25 s
Flameout Time : 790 s

Time of Peak RHR : 595 s
Peak RHR : 175.2 kW/m²
Peak Mass Loss : 15.62 g/s*m²
Peak Extinction Area: 219.68 m²/kg
Total Heat Released : 68.81 MJ/m²

Summary Data From Ignition

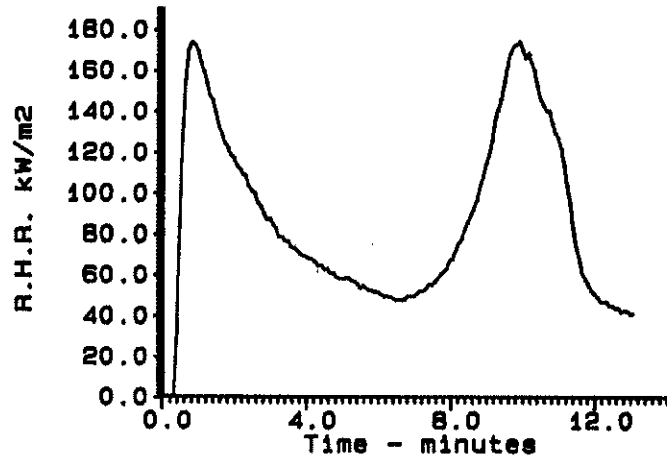
	Test Mean	60S	180S	300s
Heat Release kW/m ²	90.54	165.85	121.65	98.06
Mass Loss Rate g/s*m ²	9.11	14.14	11.39	9.74
Heat of Combustion MJ/kg	10.08	11.09	10.49	9.95
Specific Ext. Area m ² /kg	64.34	160.15	99.51	63.91
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

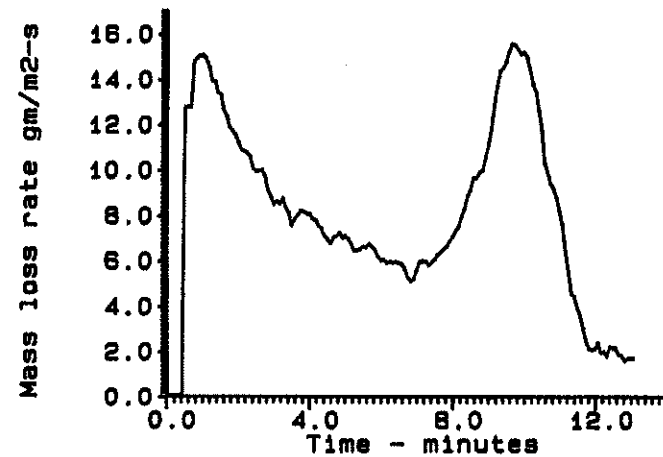
the material rose up from the frame a fair amount
initially there were problems with the o2 conc being
around 20.97 hard to say if the test was o.k. or not

Tested by : Onno Robert
Officer : Kim Andrew

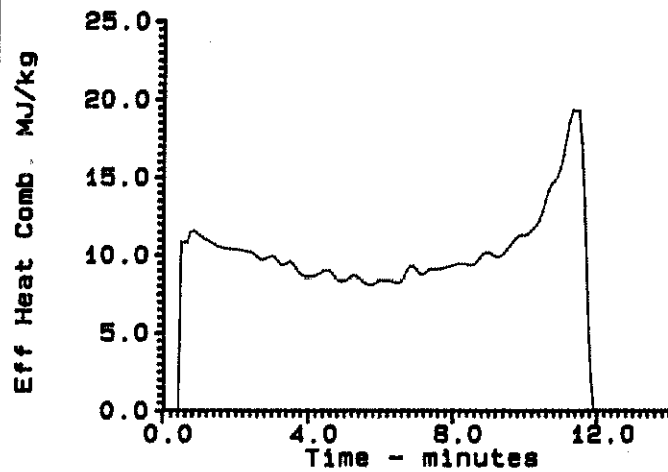
1/2" Particle board 92



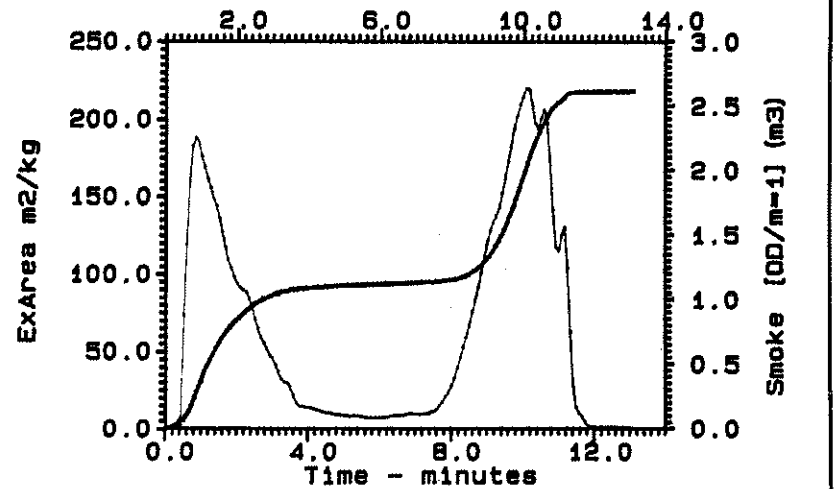
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust stream
 - - - Cumulative smoke volume through exhaust stream

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0015

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gD₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 77.8 g
Final Mass : 18.7 g
Mass Lost : 5.91 kg/m²
Ignition Time : 30 s
Flameout Time : 713 s

Time of Peak RHR : 580 s
Peak RHR : 257.0 kW/m²
Peak Mass Loss : 19.49 g/s*m²
Peak Extinction Area: 350.87 m²/kg
Total Heat Released : 75.40 MJ/m²

Summary Data From Ignition

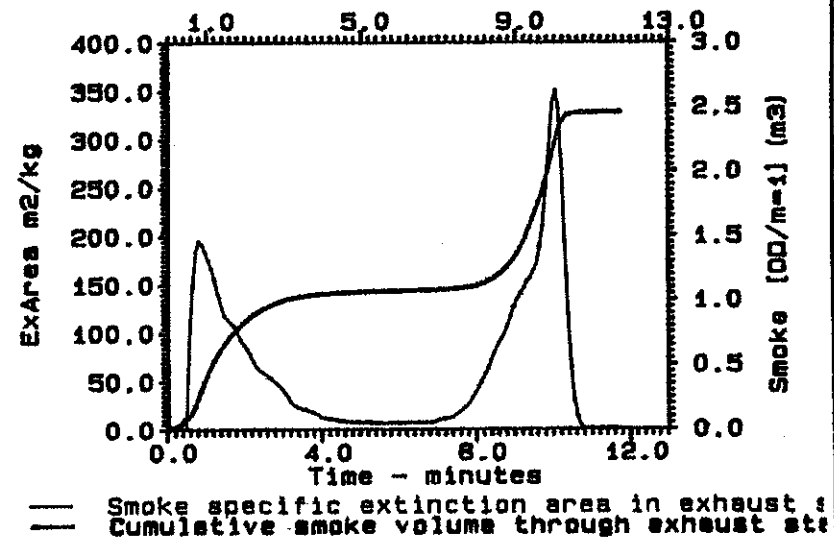
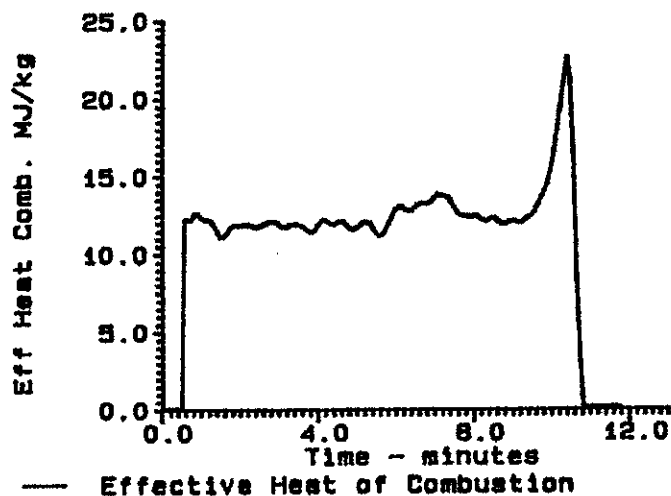
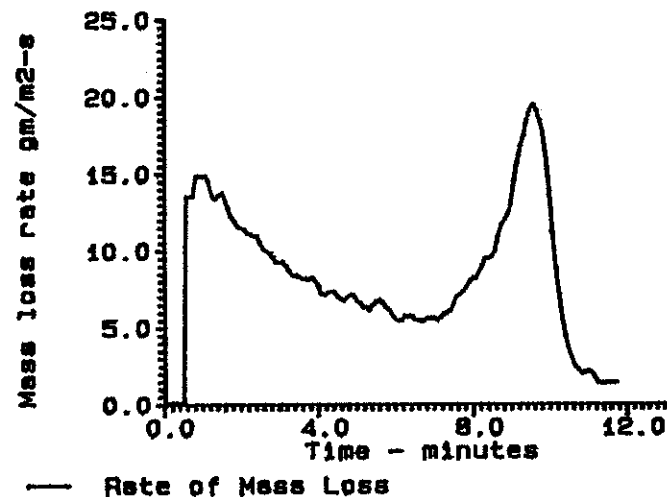
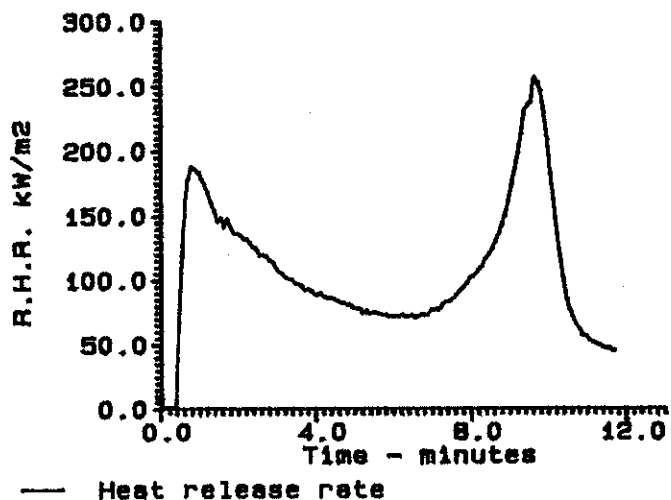
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	111.70	178.74	138.34	115.73
Mass Loss Rate	g/s*m ²	9.06	14.03	11.41	9.65
Heat of Combustion	MJ/kg	12.04	11.97	11.87	11.83
Specific Ext. Area	m ² /kg	64.11	157.75	91.01	58.30
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Test seemed to be fine.
O₂ conc seems to be working.
Sample rose above the frame again.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0019

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 27.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 83.1 g
Final Mass : 19.2 g
Mass Lost : 6.39 kg/m²
Ignition Time : 25 s
Flameout Time : 835 s

Time of Peak RHR : 645 s
Peak RHR : 202.6 kW/m²
Peak Mass Loss : 16.26 g/s*m²
Peak Extinction Area: 270.91 m²/kg
Total Heat Released : 79.12 MJ/m²

Summary Data From Ignition

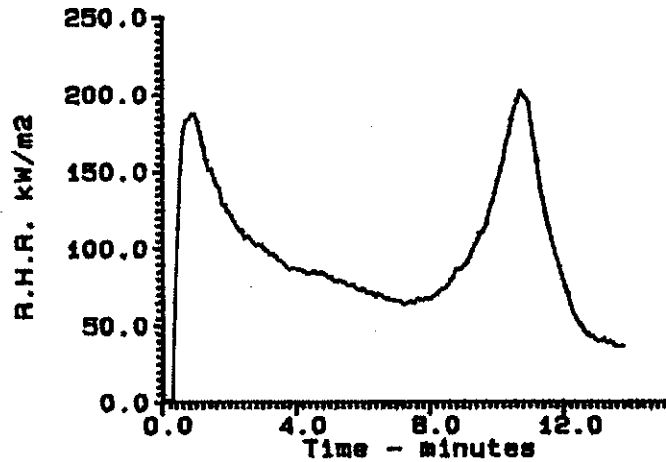
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	98.29	181.43	133.96	113.48
Mass Loss Rate	g/s*m ²	8.60	12.96	10.81	9.61
Heat of Combustion	MJ/kg	11.68	13.17	12.14	11.65
Specific Ext. Area	m ² /kg	64.23	156.77	101.00	65.02
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

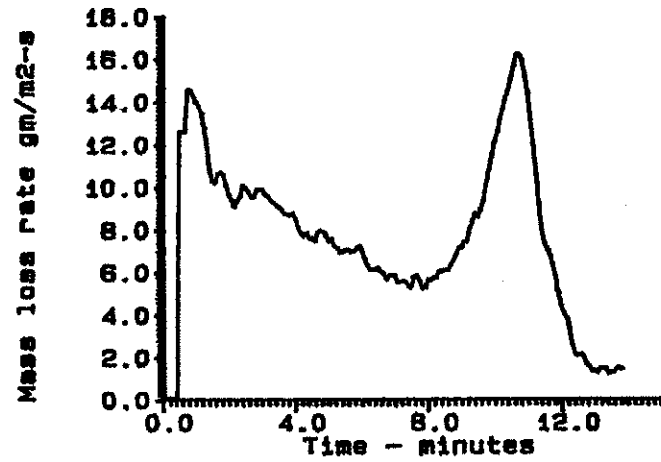
Test seemed to be fine.
D2 conc seems to be working.
Frame rose up slightly.
Some liquid ran down sides of holder.

Tested by : Onno Robert
Officer : Kim Andrew

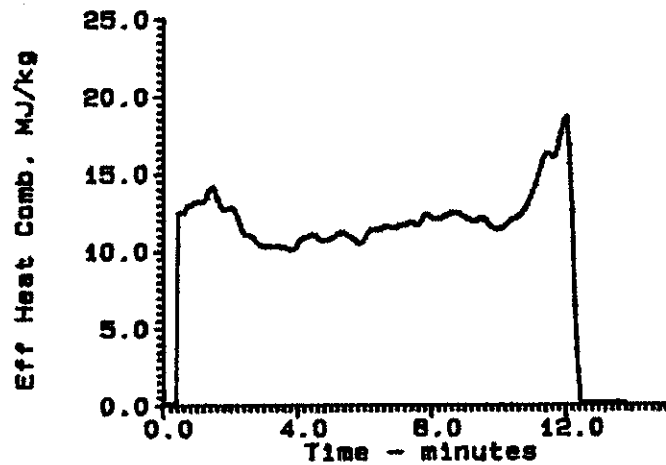
1/2" Particleboard 92



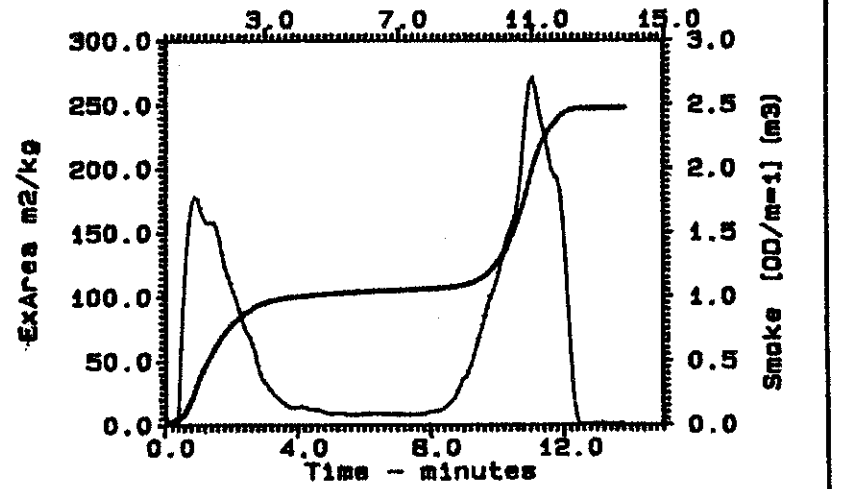
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust
 - - - Cumulative smoke volume through exhaust str

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0007

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/2' Particle Board 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 25.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 83.2 g
Final Mass : 20.3 g
Mass Lost : 6.29 kg/m²
Ignition Time : 25 s
Flameout Time : 765 s

Time of Peak RHR : 640 s
Peak RHR : 139.2 kW/m²
Peak Mass Loss : 16.03 g/s*m²
Peak Extinction Area: 245.97 m²/kg
Total Heat Released : 30.52 MJ/m²

Summary Data From Ignition

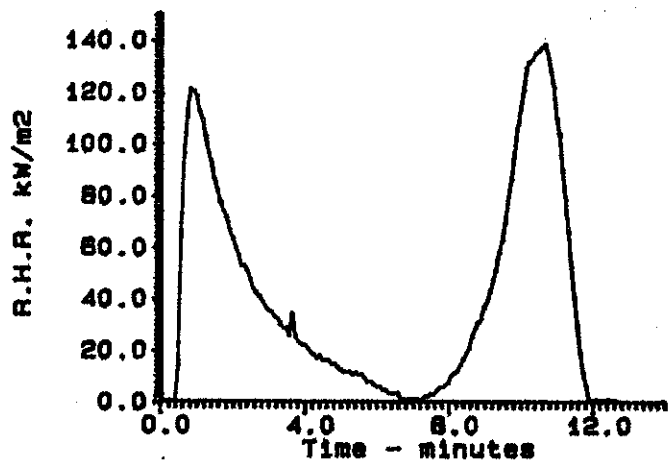
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	41.53	106.58	67.37	47.05
Mass Loss Rate	g/s*m ²	8.74	13.80	11.20	9.69
Heat of Combustion	MJ/kg	4.85	7.43	5.97	4.83
Specific Ext. Area	m ² /kg	67.09	156.51	98.90	64.83
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

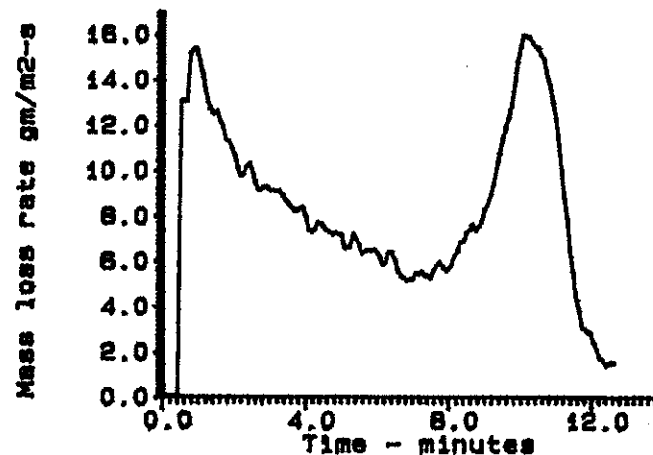
the material rose up from the frame a fair amount
initially there were problems with the o2 conc being
around 21.11 this test should not be used

Tested by : Onno Robert
Officer : Kim Andrew

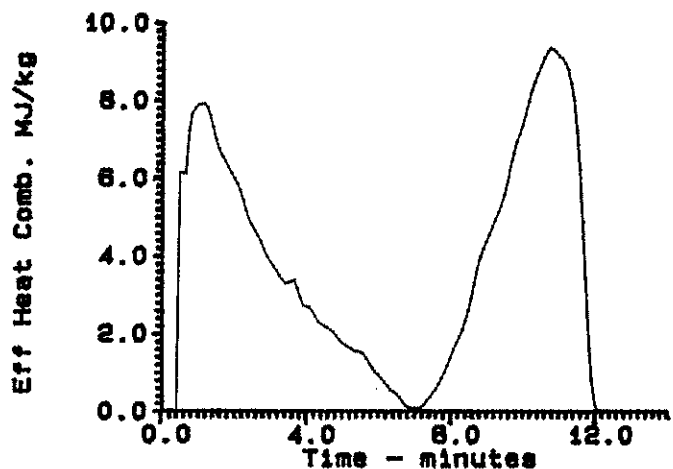
1/2" Particle board 92



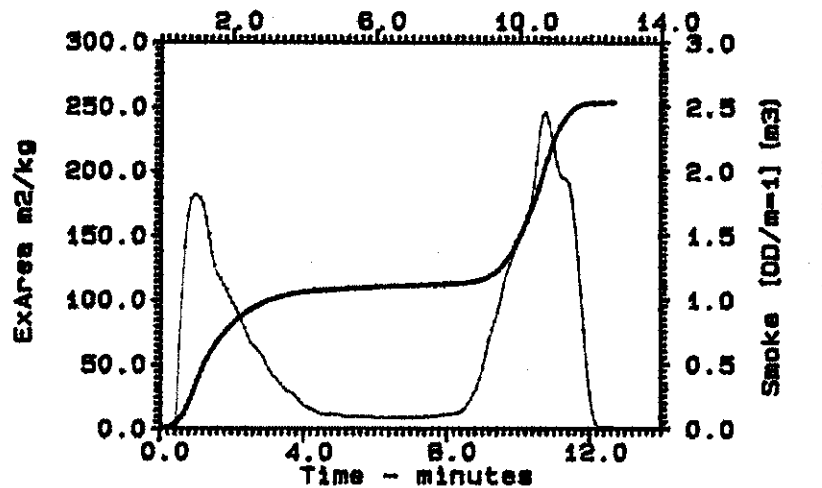
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area in exhaust
- - - Cumulative smoke volume through exhaust etc

APPENDIX X: 12.3 mm PARTICLEBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard 2
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			AKK0053	AKK0056	AKK0057		DEV %
	Date Tested	(D/M/Y)	7/21/92	7/28/92	7/28/92		
	Temperature	(Deg C)	29	28	28	28	2
	Initial Mass	(g)	82	82	83	82	1

TEST RESULTS		UNITS	AKK0053	AKK0056	AKK0057	AVG.	MAX
	Ignition Time	(s)	100	100	105	102	3
	Flameout Time	(s)	1180	1140	1125	1148	3
	Time PHR	(s)	110	135	135	127	13
	Peak RHR	(kW/m ²)	122	130	132	128	5
	Peak Mass Loss	(g/s*m ²)	11.0	N / A	10.8	11	1
	Peak Ext. Area	(m ² /kg)	150.0	108.3	114.8	124	21
	Total Heat Rel.	(MJ/m ²)	39.7	63.3	68.6	57	31
	THR @ PHR	(MJ/m ²)	N / A	N / A	N / A	N / A	N / A
	TM HEAT COMB.	(MJ/kg)	6.4	5.7	10.5	8	40
	TM RHR	(kW/m ²)	36.9	61.1	67.6	55	33
	TM MLR	(g/s*m ²)	6.0	N / A	6.5	6	4
	TM S. Ext. Area	(m ² /kg)	24.2	N / A	18.7	21	13
	Mass Final	(g)	21	N / A	21	21	1

SUPPLEM -ENTARY DATA		UNITS	AKK0053	AKK0056	AKK0057	AVG.	MAX
	60s RHR	(kW/m ²)	104.9	126.4	128.5	120	13
	60s MLR	(g/s*m ²)	9.9	9.9	9.8	10	0
	60s HEAT COMB.	(MJ/kg)	9.8	12.1	12.3	11	14
	60s S. Ext. Area	(m ² /kg)	105.2	79.6	93.7	93	14
	180s RHR	(kW/m ²)	70.1	94.6	94.3	86	19
	180s MLR	(g/s*m ²)	8.1	8.2	8.3	8	2
	180s HEAT COMB.	(MJ/kg)	8.4	11.4	11.1	10	18
	180s S. Ext. Area	(m ² /kg)	68.1	53.9	52.7	58	17
	300s RHR	(kW/m ²)	54.9	76.3	77.2	69	21
	300s MLR	(g/s*m ²)	7.2	7.9	7.4	7	5
	300s HEAT COMB.	(MJ/kg)	7.4	9.6	10.3	9	18
	300s S. Ext. Area	(m ² /kg)	44.8	32.4	31.6	36	24

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Particleboard 2
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m2) :	50
THICKNESS (mm) :	12.3

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			AKK0049	AKK0058	AKK0059		DEV %
	Date Tested	(D/M/Y)	7/20/92	7/28/92	7/28/92		
	Temperature	(Deg C)	31	29	29	29	5
	Initial Mass	(g)	81	82	78	80	3

TEST RESULTS						AVG.	MAX
		UNITS	AKK0049	AKK0058	AKK0059		DEV %
	Ignition Time	(s)	20	20	20	20	0
	Flameout Time	(s)	780	824	745	783	5
	Time PHR	(s)	30	660	45	245	169
	Peak RHR	(kW/m2)	159	190	178	176	10
	Peak Mass Loss	(g/s*m2)	13.9	15.8	14.7	15	7
	Peak Ext. Area	(m2/kg)	205.8	246.8	210.7	221	12
	Total Heat Rel.	(MJ/m2)	44.2	72.0	67.4	61	28
	THR @ PHR	(MJ/m2)	N / A	60.5	N / A	60	N / A
	TM HEAT COMB.	(MJ/kg)	7.1	11.0	11.0	10	27
	TM RHR	(kW/m2)	58.5	90.6	93.6	81	28
	TM MLR	(g/s*m2)	8.3	8.3	8.5	8	2
	TM S. Ext. Area	(m2/kg)	58.1	46.7	51.9	52	11
	Mass Final	(g)	21	19	19	20	7

SUPPLEMENTARY DATA						AVG.	MAX
		UNITS	AKK0049	AKK0058	AKK0059		DEV %
	60s RHR	(kW/m2)	140.1	169.7	167.0	159	12
	60s MLR	(g/s*m2)	12.6	12.2	12.7	13	2
	60s HEAT COMB.	(MJ/kg)	10.3	13.0	12.4	12	13
	60s S. Ext. Area	(m2/kg)	147.1	153.6	142.6	148	4
	180s RHR	(kW/m2)	96.2	126.3	123.4	115	17
	180s MLR	(g/s*m2)	11.0	10.5	10.6	11	3
	180s HEAT COMB.	(MJ/kg)	8.5	11.8	11.4	11	20
	180s S. Ext. Area	(m2/kg)	97.3	97.1	85.8	93	8
	300s RHR	(kW/m2)	76.1	105.3	104.0	95	20
	300s MLR	(g/s*m2)	9.7	9.3	9.4	9	2
	300s HEAT COMB.	(MJ/kg)	7.7	11.1	10.9	10	22
	300s S. Ext. Area	(m2/kg)	63.9	59.1	52.2	58	11

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0053

Test Date: 07-21-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.052B20
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 28.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 82.3 g
Final Mass : 20.7 g
Mass Lost : 6.16 kg/m²
Ignition Time : 100 s
Flameout Time : 1,180 s

Time of Peak RHR : 110 s
Peak RHR : 122.0 kW/m²
Peak Mass Loss : 11.02 g/s*m²
Peak Extinction Area: 149.96 m²/kg
Total Heat Released : 39.68 MJ/m²

Summary Data From Ignition

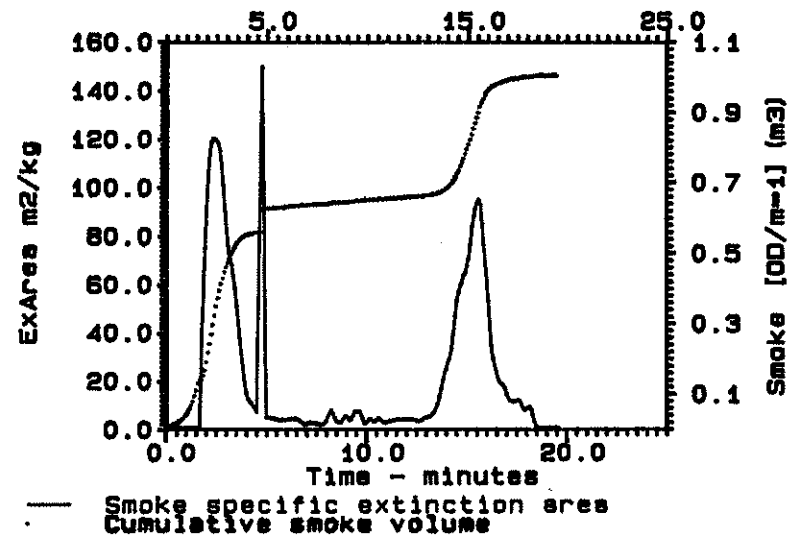
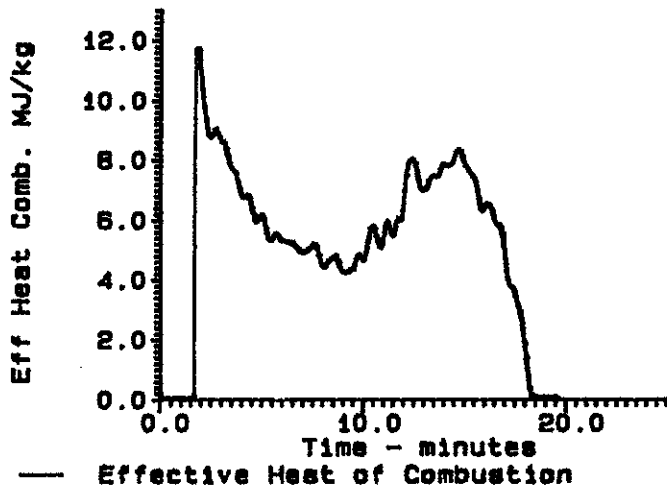
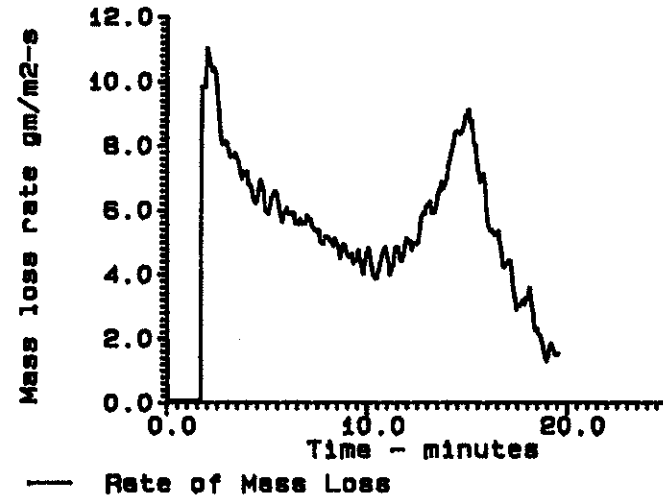
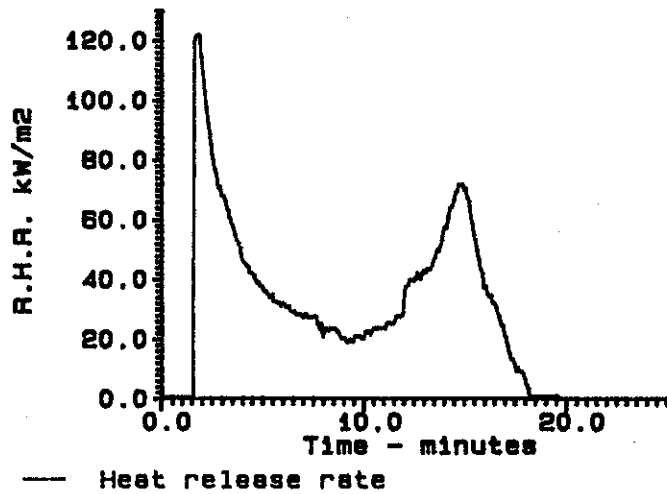
	Test Mean	60S	180S	300s
Heat Release kW/m ²	36.91	104.94	70.08	54.91
Mass Loss Rate g/s*m ²	6.00	9.86	8.07	7.22
Heat of Combustion MJ/kg	6.35	9.83	8.41	7.43
Specific Ext. Area m ² /kg	24.17	105.22	68.13	44.82
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Orifice constant quite high today.
At end of test O2 rose to 98%, may be a problem.
Sample burned as expected.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92.2 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0056

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Brid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 28.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 81.5 g
Final Mass : 0.0 g
Mass Lost : 8.15 kg/m²
Ignition Time : 100 s
Flameout Time : 1,140 s

Time of Peak RHR : 135 s
Peak RHR : 130.3 kW/m²
Peak Mass Loss : 649.37 g/s*m²
Peak Extinction Area: 108.25 m²/kg
Total Heat Released : 63.26 MJ/m²

Summary Data From Ignition

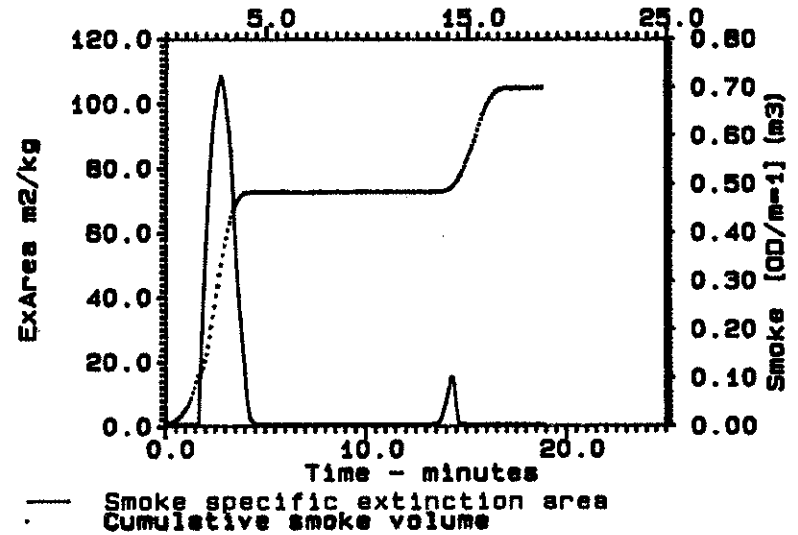
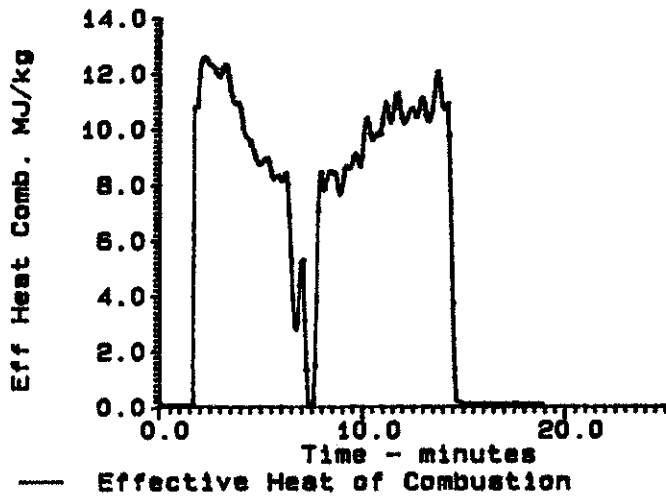
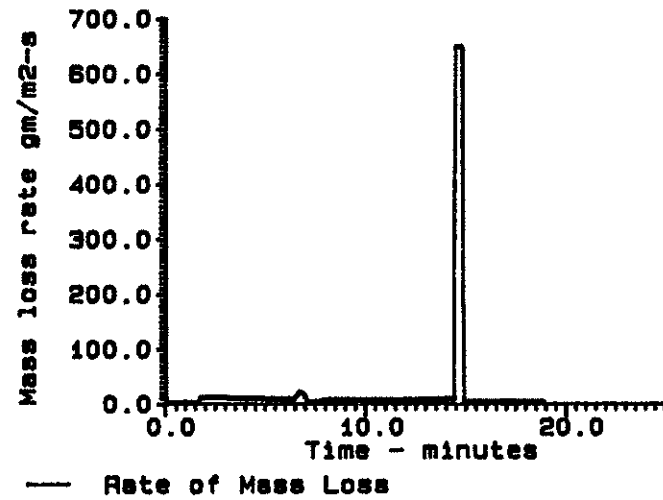
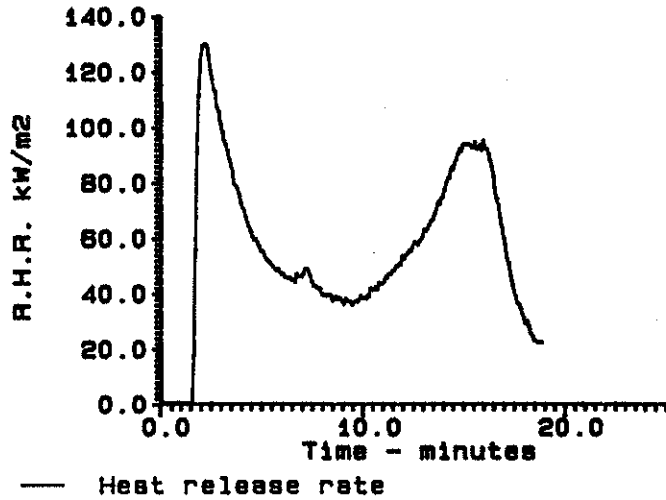
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	61.12	126.38	94.62	76.34
Mass Loss Rate	g/s*m ²	14.91	9.89	8.18	7.88
Heat of Combustion	MJ/kg	5.66	12.10	11.38	9.58
Specific Ext. Area	m ² /kg	9.92	79.60	53.94	32.37
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Typical.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" ROOMBURN PARTICLEBOARD 92 Flux = 25



SUMMARY TEST REPORT

Cono Calorimeter

Test Ref: AKK0057

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 28.3°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 83.3 g
Final Mass : 21.1 g
Mass Lost : 6.22 kg/m²
Ignition Time : 105 s
Flameout Time : 1,125 s

Time of Peak RHR : 135 s
Peak RHR : 131.9 kW/m²
Peak Mass Loss : 10.81 g/s*m²
Peak Extinction Area: 114.79 m²/kg
Total Heat Released : 68.64 MJ/m²

Summary Data From Ignition

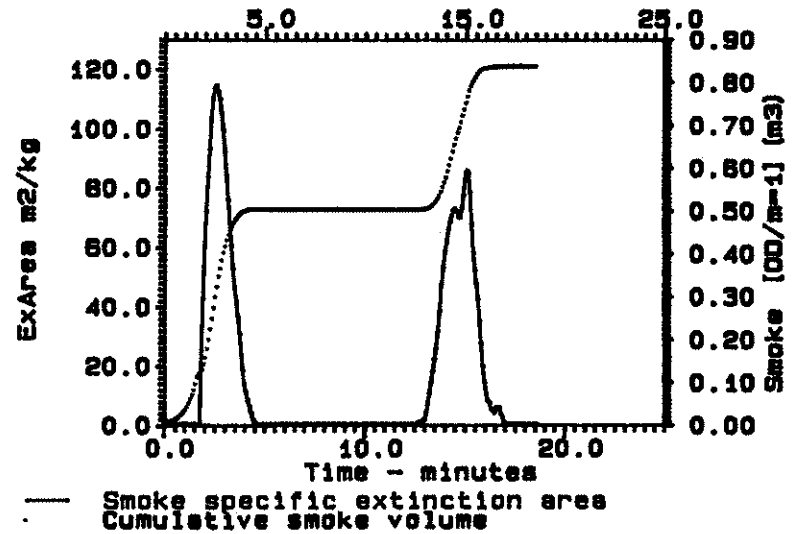
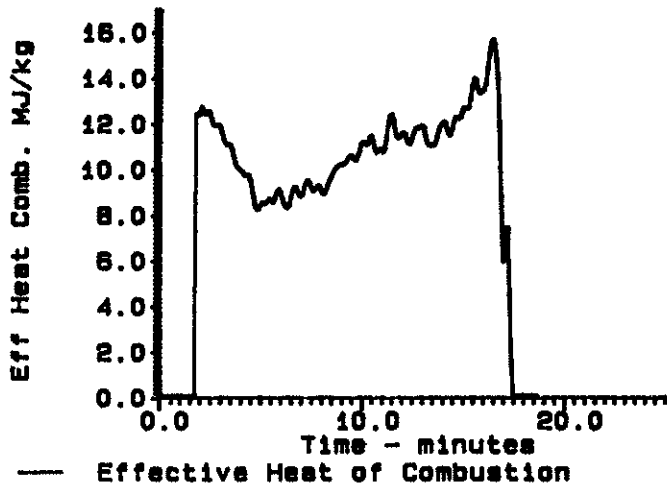
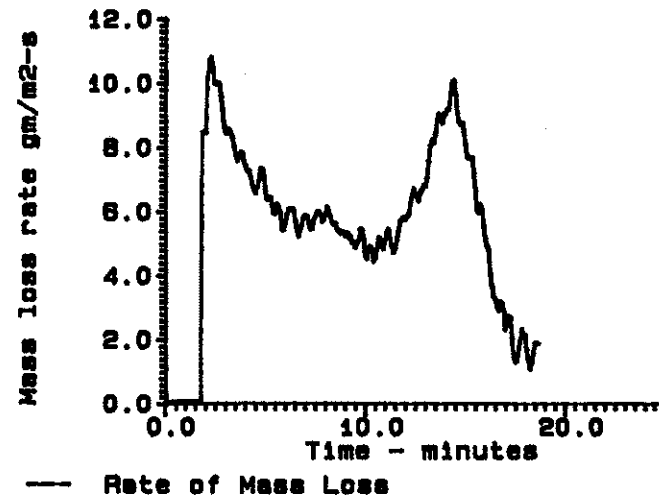
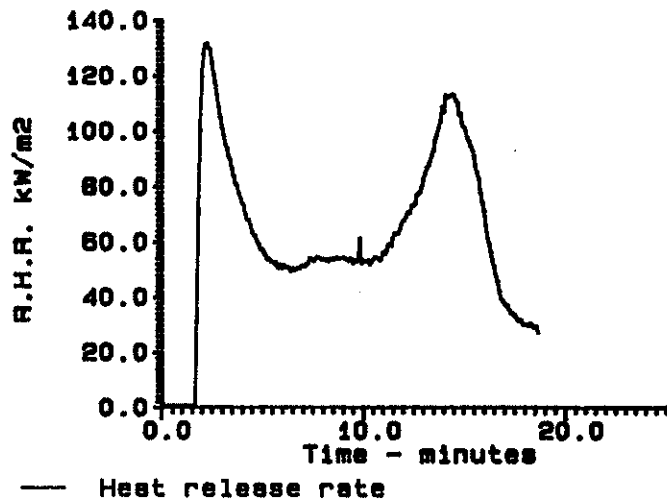
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	67.63	128.51	94.26	77.18
Mass Loss Rate	g/s*m ²	6.54	9.82	8.34	7.39
Heat of Combustion	MJ/kg	10.51	12.34	11.09	10.31
Specific Ext. Area	m ² /kg	18.73	93.73	52.72	31.63
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Typical.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" ROOMBURN PARTICLEBOARD 92 Flux = 25



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0049

Test Date: 07-20-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048590
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 31.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 81.0 g
Final Mass : 19.4 g
Mass Lost : 6.16 kg/m²
Ignition Time : 20 s
Flameout Time : 780 s

Time of Peak RHR : 30 s
Peak RHR : 158.9 kW/m²
Peak Mass Loss : 13.92 g/s*m²
Peak Extinction Area: 205.79 m²/kg
Total Heat Released : 44.15 MJ/m²

Summary Data From Ignition

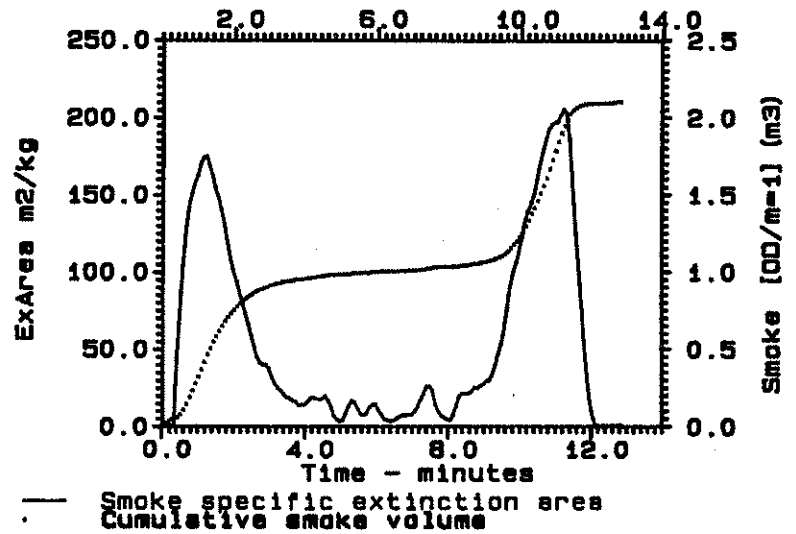
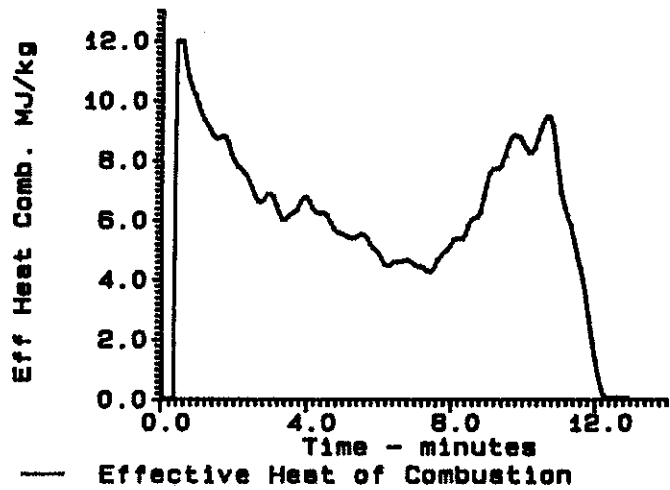
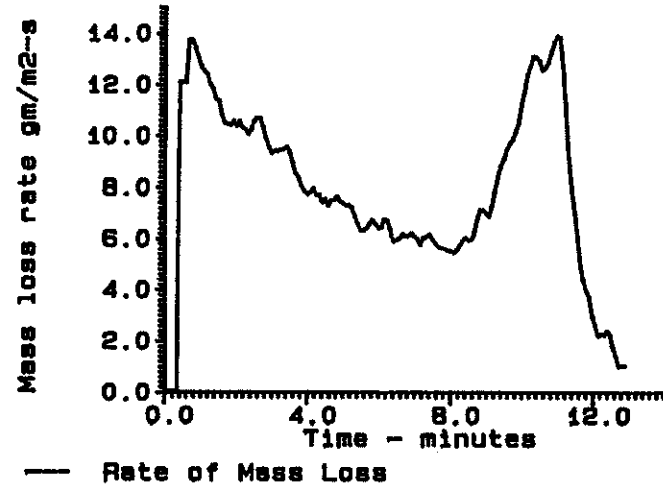
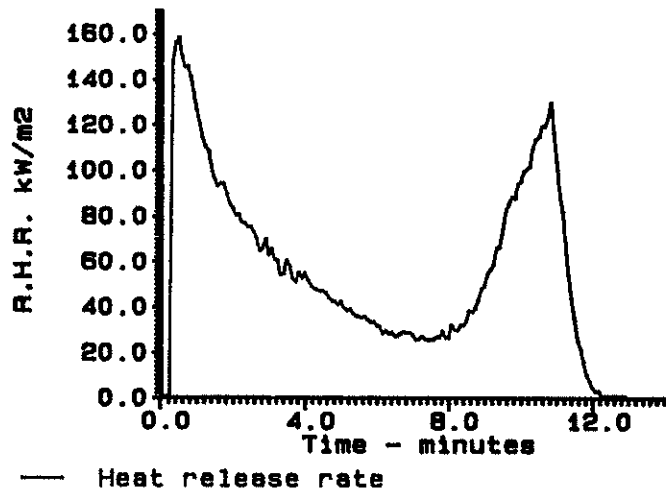
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	58.48	140.07	96.15	76.08
Mass Loss Rate	g/s*m ²	8.33	12.58	10.97	9.65
Heat of Combustion	MJ/kg	7.05	10.30	8.49	7.72
Specific Ext. Area	m ² /kg	58.05	147.13	97.34	63.93
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Similar to previous particleboard tests.

Tested by : Onno Robert
Officer : Kim Andrew

1/2" Particleboard 92.2



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0058

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 28.6°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 81.7 g
Final Mass : 19.4 g
Mass Lost : 6.23 kg/m²
Ignition Time : 20 s
Flameout Time : 824 s

Time of Peak RHR : 660 s
Peak RHR : 190.4 kW/m²
Peak Mass Loss : 15.84 g/s*m²
Peak Extinction Area: 246.82 m²/kg
Total Heat Released : 71.99 MJ/m²

Summary Data From Ignition

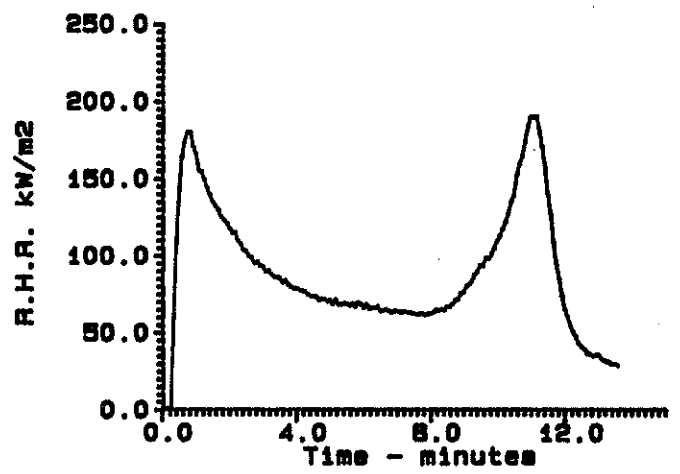
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	90.55	169.70	126.28	105.26
Mass Loss Rate	g/s*m ²	8.25	12.24	10.48	9.32
Heat of Combustion	MJ/kg	11.04	13.04	11.80	11.14
Specific Ext. Area	m ² /kg	46.75	153.62	97.09	59.13
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

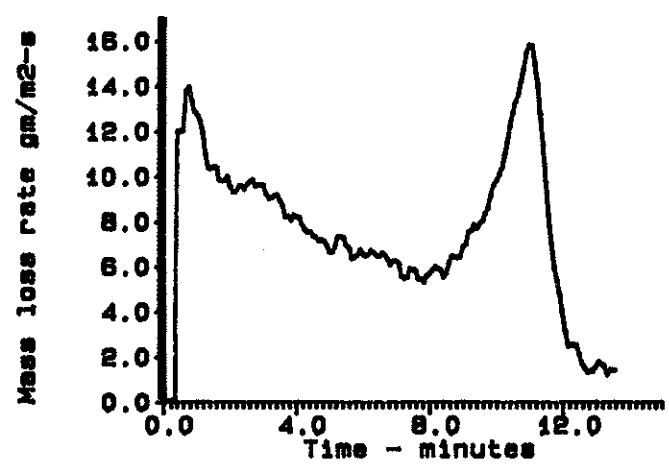
Typical.

Tested by : Onno Robert
Officer : Kim Andrew

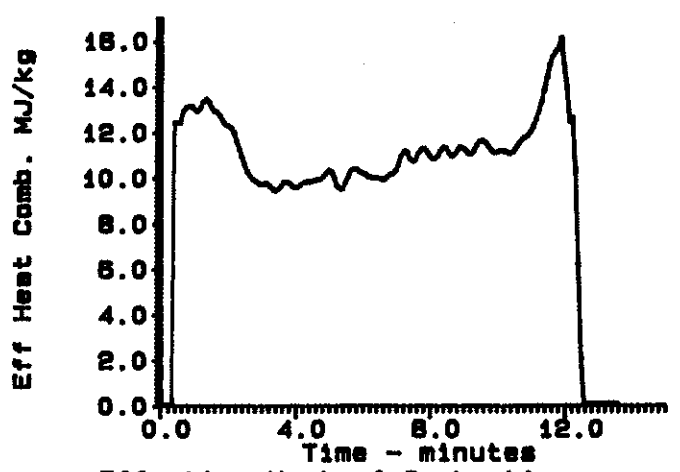
1/2" ROOMBURN PARTICLEBOARD 92



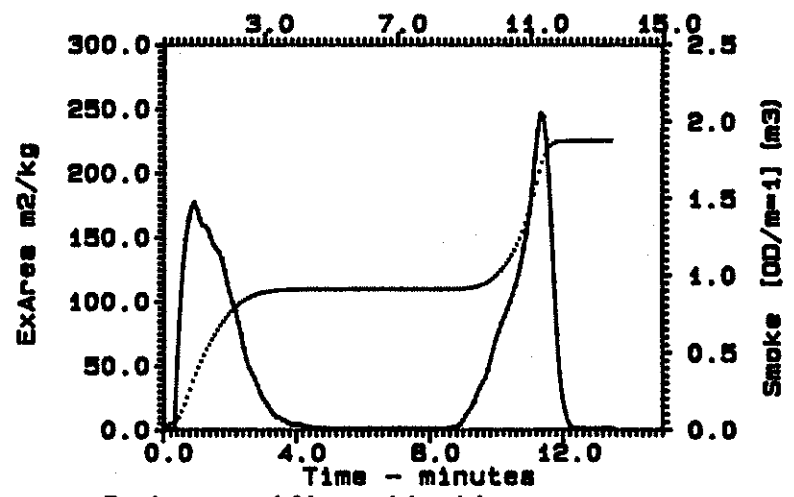
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
— Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0059

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1992.2 1/2' Particleboard

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Brid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.012300m

Test Conditions : 0.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 77.6 g
Final Mass : 18.6 g
Mass Lost : 5.90 kg/m²
Ignition Time : 20 s
Flameout Time : 745 s

Time of Peak RHR : 45 s
Peak RHR : 177.8 kW/m²
Peak Mass Loss : 14.71 g/s*m²
Peak Extinction Area: 210.70 m²/kg
Total Heat Released : 67.42 MJ/m²

Summary Data From Ignition

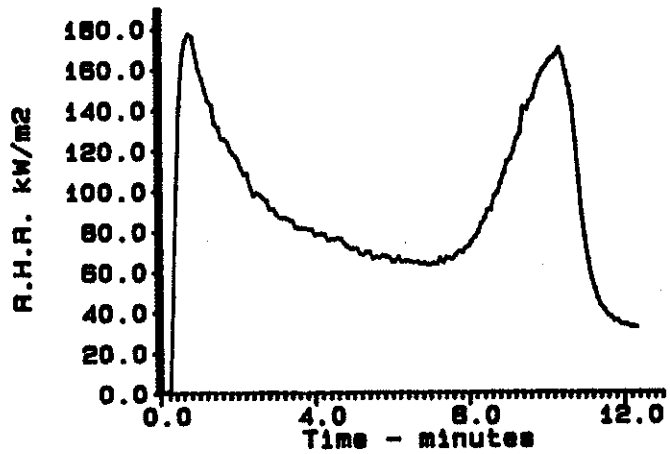
	Test Mean	60S	180S	300s
Heat Release kW/m ²	93.64	167.04	123.45	104.00
Mass Loss Rate g/s*m ²	8.53	12.73	10.60	9.38
Heat of Combustion MJ/kg	10.98	12.36	11.41	10.94
Specific Ext. Area m ² /kg	51.90	142.61	85.79	52.25
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

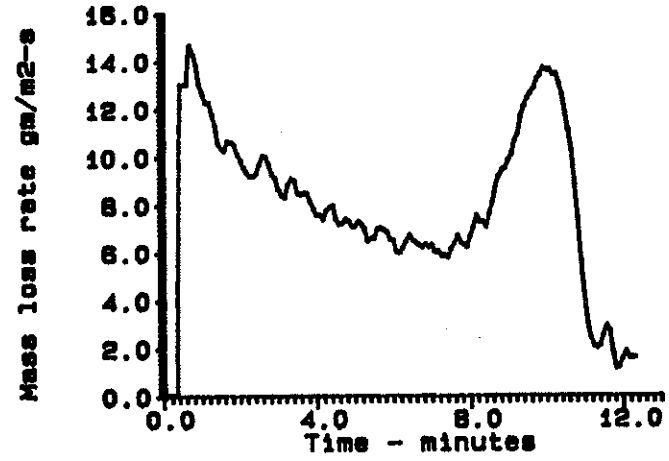
Typical.

Tested by : Onno Robert
Officer : Kim Andrew

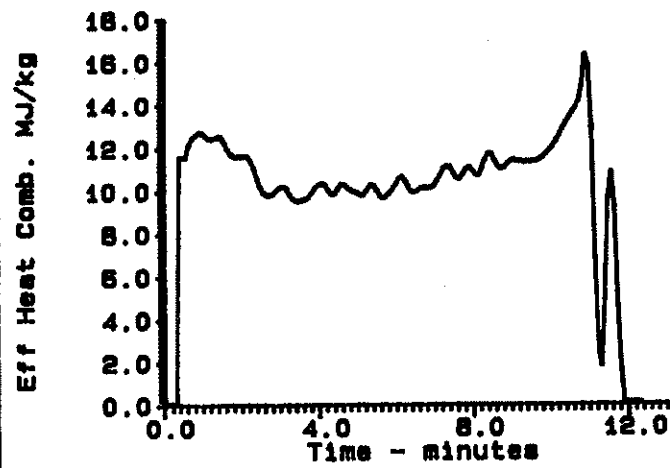
1/2" ROOMBURN PARTICLEBOARD 92



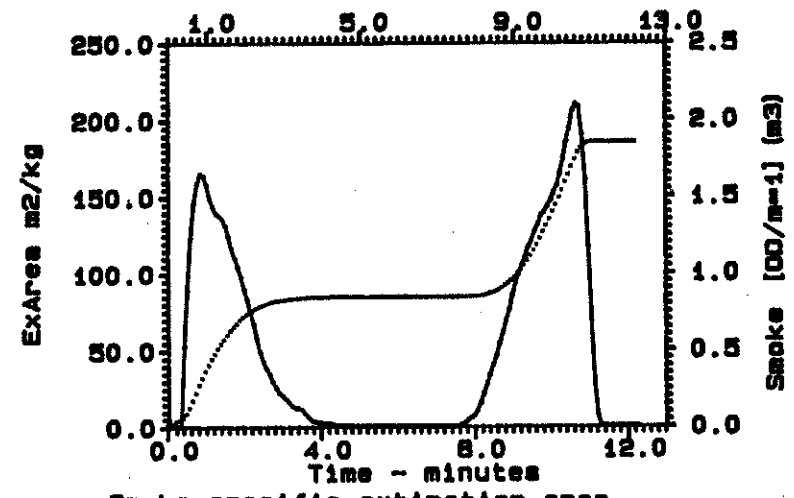
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
..... Cumulative smoke volume

APPENDIX Y: 150.0 mm SEAT

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	CHAIR 2
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	GRID
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	150

		UNITS				AVG.	MAX
DETAILS OF TEST	Test Reference		AKK0060	AKK0062			DEV %
	Date Tested	(D/M/Y)	7/28/92	7/28/92			
	Temperature	(Deg C)	29	30		30	1
	Initial Mass	(g)	125	137		131	5

TEST RESULTS						AVG.	MAX
	Ignition Time	(s)	10	10		10	0
Flameout Time	(s)	2020	3014		2517	20	
Time PHR	(s)	50	55		53	5	
Peak RHR	(kW/m ²)	668	716		692	3	
Peak Mass Loss	(g/s*m ²)	22.7	21.5		22	3	
Peak Ext. Area	(m ² /kg)	1615.3	1724.7		1670	3	
Total Heat Rel.	(MJ/m ²)	300.3	377.8		339	11	
THR @ PHR	(MJ/m ²)	17.1	21.0		19	10	
TM HEAT COMB.	(MJ/kg)	24.3	22.9		24	3	
TM RHR	(kW/m ²)	149.8	126.1		138	9	
TM MLR	(g/s*m ²)	6.1	4.4		5	16	
TM S. Ext. Area	(m ² /kg)	541.6	426.4		484	12	
Mass Final	(g)	28	20		24	18	

SUPPLEMENTARY DATA						AVG.	MAX
	60s RHR	(kW/m ²)	540.7	570.9		556	3
60s MLR	(g/s*m ²)	18.5	18.3		18	1	
60s HEAT COMB.	(MJ/kg)	27.9	29.5		29	3	
60s S. Ext. Area	(m ² /kg)	892.2	947.5		920	3	
180s RHR	(kW/m ²)	515.8	546.3		531	3	
180s MLR	(g/s*m ²)	16.6	16.9		17	1	
180s HEAT COMB.	(MJ/kg)	30.5	31.8		31	2	
180s S. Ext. Area	(m ² /kg)	1231.6	1229.3		1230	0	
300s RHR	(kW/m ²)	485.2	501.6		493	2	
300s MLR	(g/s*m ²)	15.7	15.5		16	1	
300s HEAT COMB.	(MJ/kg)	30.7	32.0		31	2	
300s S. Ext. Area	(m ² /kg)	1293.3	1326.6		1310	1	

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0060

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 2 SEAT

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Grid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.150000m

Test Conditions : 0.0 RH @ 29.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 124.5 g
Final Mass : 28.4 g
Mass Lost : 9.61 kg/m²
Ignition Time : 10 s
Flamout Time : 2,020 s

Time of Peak RHR : 50 s
Peak RHR : 667.9 kW/m²
Peak Mass Loss : 22.70 g/s*m²
Peak Extinction Area: 1,615.31 m²/kg
Total Heat Released : 300.25 MJ/m²

Summary Data From Ignition

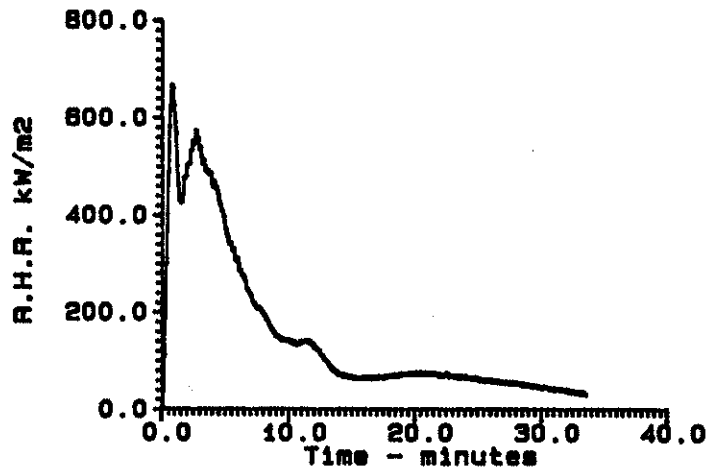
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	149.75	540.67	515.84	485.16
Mass Loss Rate	g/s*m ²	6.09	18.53	16.64	15.70
Heat of Combustion	MJ/kg	24.31	27.89	30.48	30.66
Specific Ext. Area	m ² /kg	541.61	892.15	1,231.58	1,293.27
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

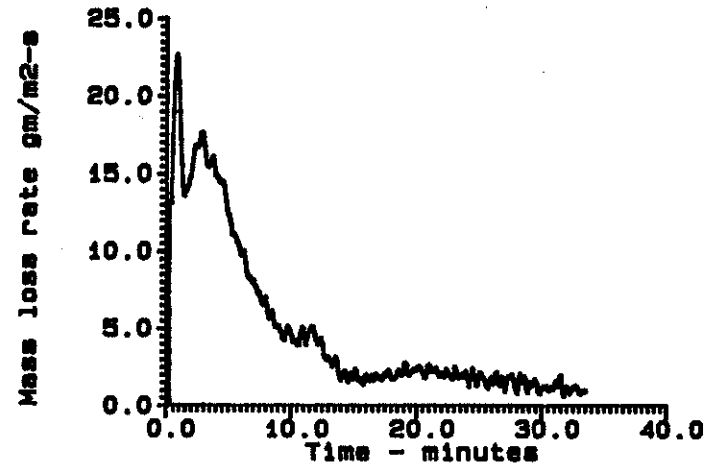
No backing board, compressed down into tray. Grid used. Ignited almost immediately, a large peak in HRR and Smoke at beginning is followed by a decline and then another increase in production. Followed by a gentle decline and steady low burning for remainder.

Tested by : Onno Robert
Officer : Kim Andrew

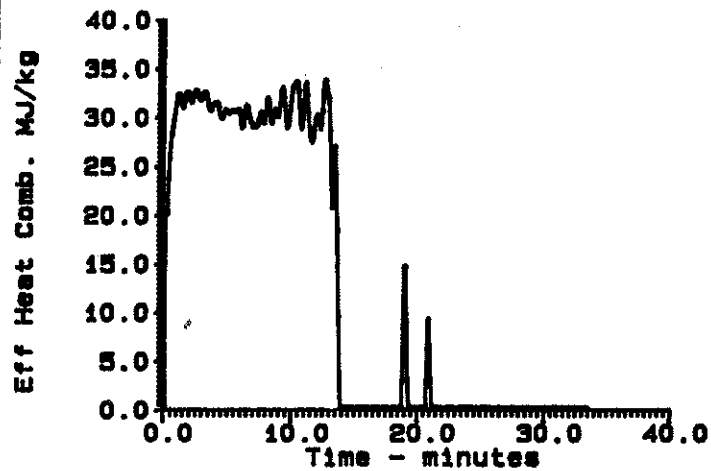
CHAIR 2 SEAT 92



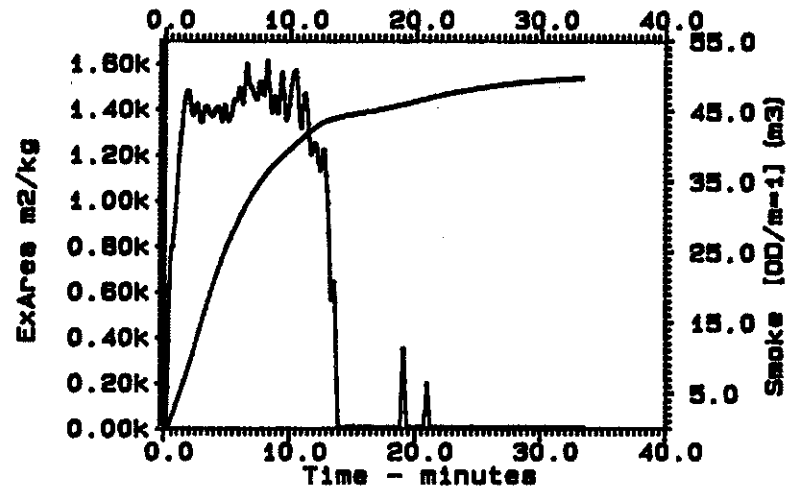
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0062

Test Date: 07-28-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: CHAIR 2 SEAT

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.046311
Heater Orientation : Horizontal
Brid Used : Y

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : N

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.150000m

Test Conditions : 0.0 RH @ 30.2°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 136.6 g
Final Mass : 19.7 g
Mass Lost : 11.69 kg/m²
Ignition Time : 10 s
Flameout Time : 3,014 s

Time of Peak RHR : 55 s
Peak RHR : 716.0 kW/m²
Peak Mass Loss : 21.47 g/s*m²
Peak Extinction Area: 1,724.69 m²/kg
Total Heat Released : 377.80 MJ/m²

Summary Data From Ignition

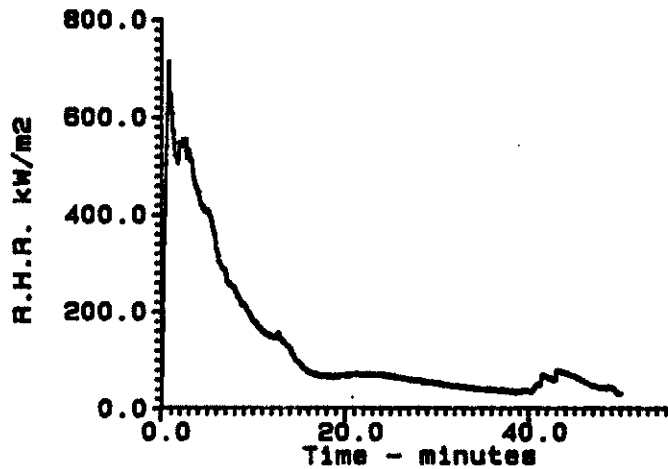
	Test Mean	60S	180S	300s
Heat Release kW/m ²	126.14	570.95	546.29	501.63
Mass Loss Rate g/s*m ²	4.43	18.33	16.87	15.53
Heat of Combustion MJ/kg	22.93	29.48	31.83	31.99
Specific Ext. Area m ² /kg	426.41	947.53	1,229.28	1,326.57
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

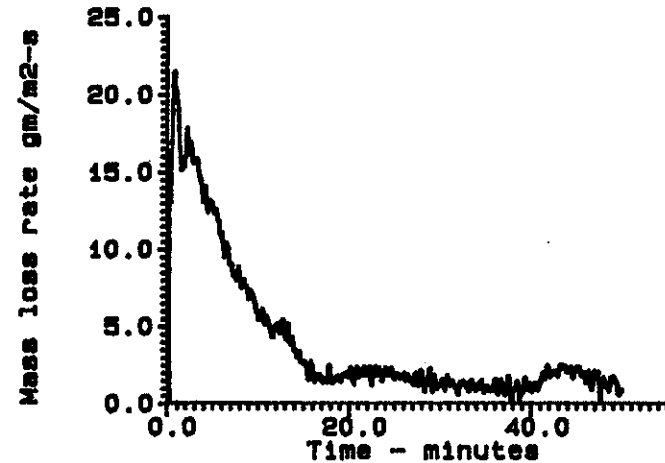
Similar to previous test. At end a small bump in RHR occurred, perhaps from this sample burning more extensively. Last test did not burn all of sample. Burned much longer than last one. Test terminated upon flame extinguishing.

Tested by : Onno Robert
Officer : Kim Andrew

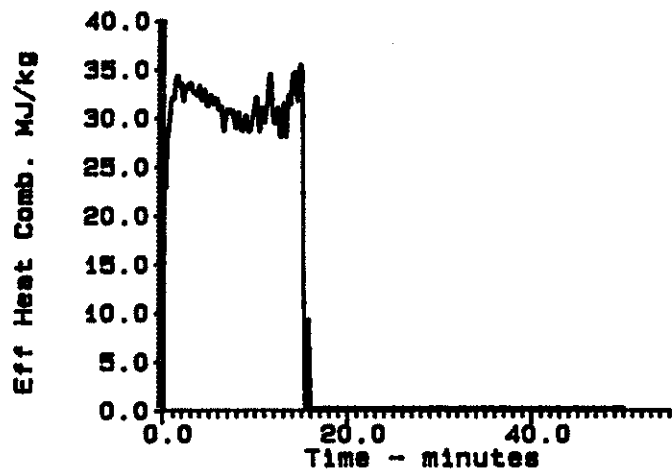
CHAIR 2 SEAT 92



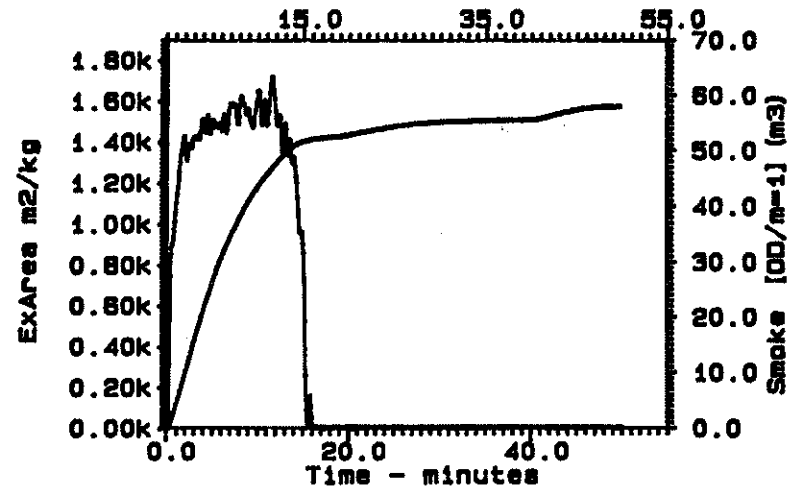
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1170

Test Date: 07-05-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2' Foil Covered Foam 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Drifce Constant : 0.042210
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.040500m

Test Conditions : 50.0 RH @ 27.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 12.7 g
Final Mass : 12.5 g
Mass Lost : 0.01 kg/m²
Ignition Time : 0 s
Flameout Time : 600 s

Time of Peak RHR : 260 s
Peak RHR : 3.5 kW/m²
Peak Mass Loss : 0.43 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.82 MJ/m²

Summary Data From Ignition

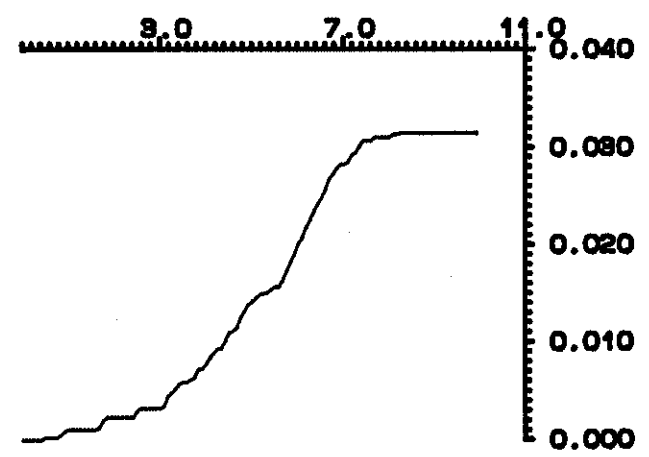
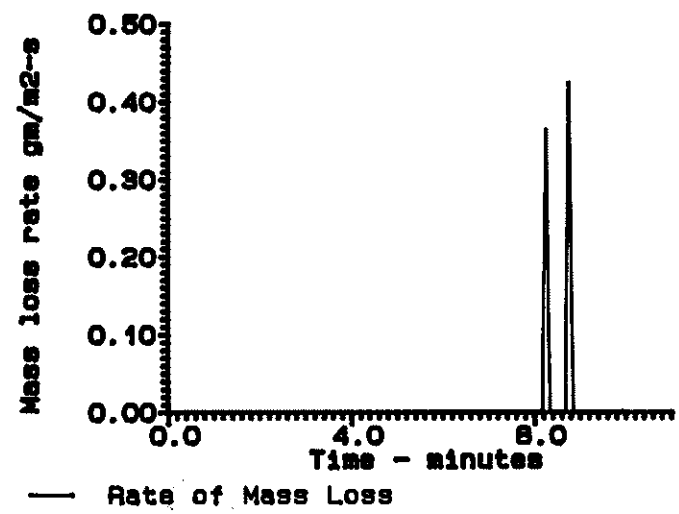
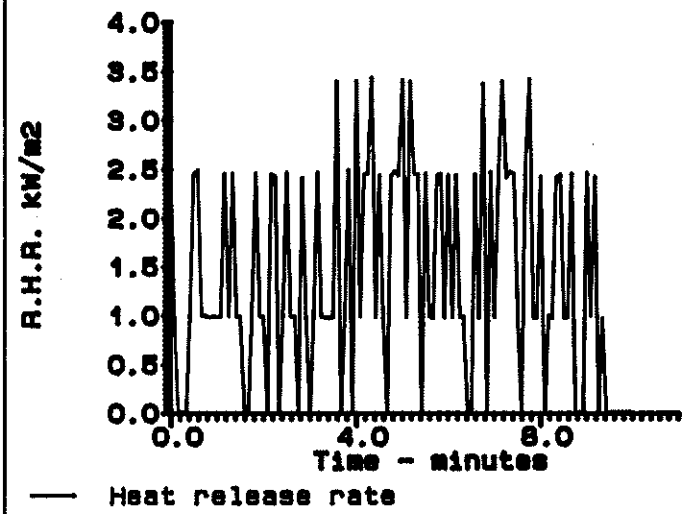
	Test Mean	60S	180S	300s
Heat Release kW/m ²	1.39	1.13	1.15	1.40
Mass Loss Rate g/s*m ²	0.01	0.00	0.00	0.00
Heat of Combustion MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful.
Nothing happened.

Tested by : Onno Robert
Officer : Kim Andrew

3/2" Foam w/ Foil 91 Flux = 25



Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1145

Test Date: 06-21-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2" Foil Covered Foam 91

Date Received: 5 /23/1990

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.043842
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.039000m

Test Conditions : 50.0 RH @ 29.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 12.5 g
Final Mass : 12.4 g
Mass Lost : 0.01 kg/m²
Ignition Time : 0 s
Flameout Time : 600 s

Time of Peak RHR : 0 s
Peak RHR : 0.0 kW/m²
Peak Mass Loss : 0.00 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 0.00 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	0.00	0.00	0.00	0.00
Mass Loss Rate	g/s*m ²	0.00	0.00	0.00	0.00
Heat of Combustion	MJ/kg	0.00	0.00	0.00	0.00
Specific Ext. Area	m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

AS usual, no flame, no smoke, no heat, for ten minutes.
There were some small rises on the surface of the material,
and a few snap crackle and pops.

Tested by : Onno Robert

Officer : Kim Andrew

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: NRC1190

Test Date: 07-08-1991

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 3/2' Foil Covered Foam 91

Date Received: 5 /01/1991

DETAILS OF TEST PROCEDURE USED

Heat Flux : ⁵⁰~~25.0~~ kW/m²
Drifce Constant : 0.042183
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.0 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.040000m

Test Conditions : 50.0 RH @ 28.8°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 12.8 g
Final Mass : 12.3 g
Mass Lost : 0.05 kg/m²
Ignition Time : 0 s
Flameout Time : 605 s

Time of Peak RHR : 395 s
Peak RHR : 7.1 kW/m²
Peak Mass Loss : 0.97 g/s*m²
Peak Extinction Area: 0.00 m²/kg
Total Heat Released : 1.96 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	3.27	1.06	1.84	2.85
Mass Loss Rate g/s*m ²	0.05	0.00	0.02	0.05
Heat of Combustion MJ/kg	1.67	0.00	96.38	52.48
Specific Ext. Area m ² /kg	0.00	0.00	0.00	0.00
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Uneventful as usual, the top swelled up slightly.

Tested by : Onno Robert

APPENDIX Z: 6 mm CHIPBOARD

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chipboard
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	25
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS				AVG.	MAX
			AKK0020	AKK0026	AKK0032		DEV %
	Date Tested	(D/M/Y)	6/17/92	6/17/92	6/25/92		
	Temperature	(Deg C)	28	28	26	27	3
	Initial Mass	(g)	46	47	44	46	3

TEST RESULTS		UNITS				AVG.	MAX
			AKK0020	AKK0026	AKK0032		DEV %
	Ignition Time	(s)	84	80	100	88	14
	Flameout Time	(s)	600	710	684	665	10
	Time PHR	(s)	340	345	115	267	57
	Peak RHR	(kW/m ²)	144	127	148	140	9
	Peak Mass Loss	(g/s*m ²)	11.5	11.4	11.8	12	2
	Peak Ext. Area	(m ² /kg)	102.2	95.0	98.0	98	4
	Total Heat Rel.	(MJ/m ²)	43.6	39.9	43.6	42	6
	THR @ PHR	(MJ/m ²)	27.2	23.9	N / A	26	6
	TM HEAT COMB.	(MJ/kg)	11.9	9.9	10.9	11	9
	TM RHR	(kW/m ²)	84.7	63.9	75.7	75	15
	TM MLR	(g/s*m ²)	7.9	7.5	7.6	8	3
	TM S. Ext. Area	(m ² /kg)	39.0	32.0	31.5	34	14
	Mass Final	(g)	11	10	10	10	9

SUPPLEMENTARY DATA		UNITS				AVG.	MAX
			AKK0020	AKK0026	AKK0032		DEV %
	60s RHR	(kW/m ²)	130.3	110.0	127.2	123	10
	60s MLR	(g/s*m ²)	10.0	9.7	9.6	10	2
	60s HEAT COMB.	(MJ/kg)	12.4	10.7	12.3	12	9
	60s S. Ext. Area	(m ² /kg)	40.1	39.5	52.8	44	20
	180s RHR	(kW/m ²)	102.2	84.6	100.5	96	12
	180s MLR	(g/s*m ²)	8.1	7.9	8.1	8	2
	180s HEAT COMB.	(MJ/kg)	12.4	10.5	12.0	12	10
	180s S. Ext. Area	(m ² /kg)	32.2	32.2	39.3	35	14
	300s RHR	(kW/m ²)	108.7	94.6	107.8	104	9
	300s MLR	(g/s*m ²)	8.7	8.7	8.7	9	0
	300s HEAT COMB.	(MJ/kg)	12.3	10.7	12.2	12	9
	300s S. Ext. Area	(m ² /kg)	50.6	52.5	56.9	53	7

CONE CALORIMETER DATA SUMMARY SHEET

MATERIAL :	Chipboard
YEAR RECEIVED :	1992
GRID / FRAME / NEITHER:	FRAME
FLUX LEVEL (kW/m²) :	50
THICKNESS (mm) :	6

DETAILS OF TEST	Test Reference	UNITS	AKK0011	AKK0014	AKK0017	AVG.	MAX
							DEV %
	Date Tested	(D/M/Y)	6/17/92	6/17/92	6/17/92		
	Temperature	(Deg C)	26	27	27	27	2
	Initial Mass	(g)	47	42	47	45	6

TEST RESULTS	Parameter	UNITS	AKK0011	AKK0014	AKK0017	AVG.	MAX
							DEV %
	Ignition Time	(s)	19	13	14	15	24
	Flameout Time	(s)	374	414	415	401	7
	Time PHR	(s)	250	205	220	225	11
	Peak RHR	(kW/m ²)	244	214	235	231	7
	Peak Mass Loss	(g/s*m ²)	N / A	17.3	18.7	18	4
	Peak Ext. Area	(m ² /kg)	113.1	168.3	194.1	159	29
	Total Heat Rel.	(MJ/m ²)	46.8	45.5	49.0	47	4
	THR @ PHR	(MJ/m ²)	34.1	28.1	31.2	31	10
	TM HEAT COMB.	(MJ/kg)	N / A	12.1	12.1	12	0
	TM RHR	(kW/m ²)	133.7	115.3	122.6	124	8
	TM MLR	(g/s*m ²)	N / A	11.4	12.3	12	4
	TM S. Ext. Area	(m ² /kg)	39.4	88.1	84.9	71	44
	Mass Final	(g)	N / A	8	9	8	5

SUPPLEMENTARY DATA	Parameter	UNITS	AKK0011	AKK0014	AKK0017	AVG.	MAX
							DEV %
	60s RHR	(kW/m ²)	162.7	165.6	164.6	164	1
	60s MLR	(g/s*m ²)	12.7	12.6	13.1	13	2
	60s HEAT COMB.	(MJ/kg)	12.1	12.4	11.9	12	2
	60s S. Ext. Area	(m ² /kg)	95.2	94.2	105.2	98	7
	180s RHR	(kW/m ²)	133.5	146.2	144.2	141	6
	180s MLR	(g/s*m ²)	N / A	11.8	11.9	12	0
	180s HEAT COMB.	(MJ/kg)	N / A	12.0	11.8	12	1
	180s S. Ext. Area	(m ² /kg)	75.2	115.0	109.5	100	25
	300s RHR	(kW/m ²)	146.7	136.7	147.9	144	5
	300s MLR	(g/s*m ²)	N / A	10.6	11.7	11	5
	300s HEAT COMB.	(MJ/kg)	2.1	12.8	12.6	9	77
	300s S. Ext. Area	(m ² /kg)	N / A	114.8	110.8	113	2

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0011

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 26.0°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.5 g
Final Mass : 0.0 g
Mass Lost : 4.65 kg/m²
Ignition Time : 19 s
Flameout Time : 374 s

Time of Peak RHR : 250 s
Peak RHR : 243.7 kW/m²
Peak Mass Loss : 786.26 g/s*m²
Peak Extinction Area: 113.15 m²/kg
Total Heat Released : 46.80 MJ/m²

Summary Data From Ignition

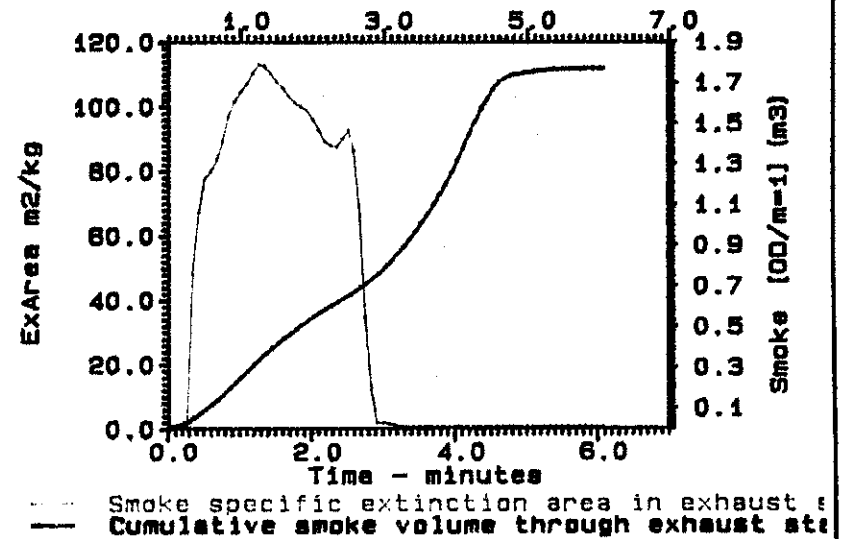
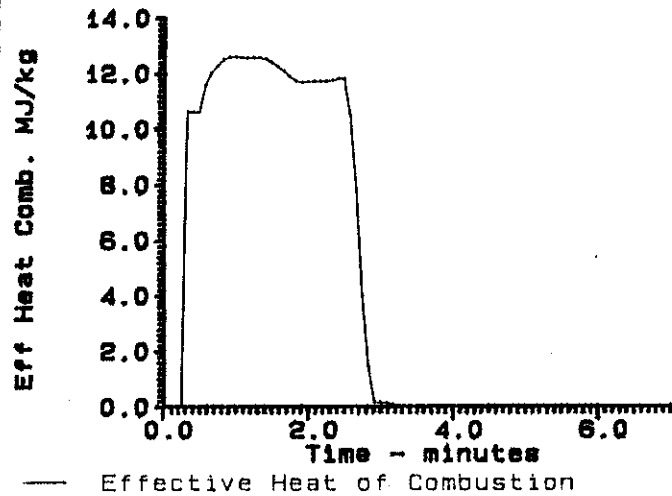
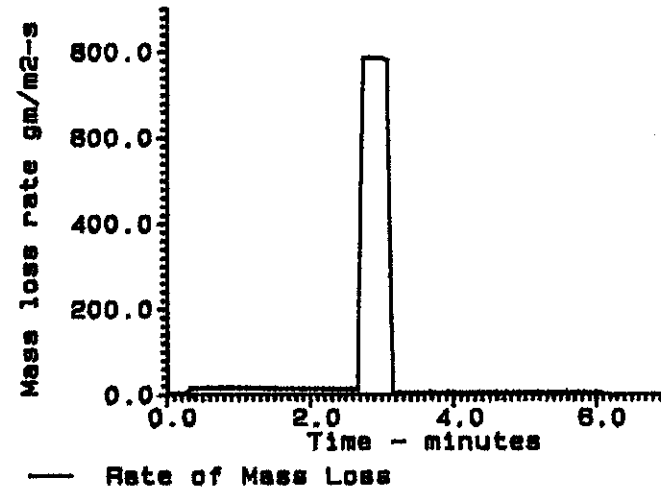
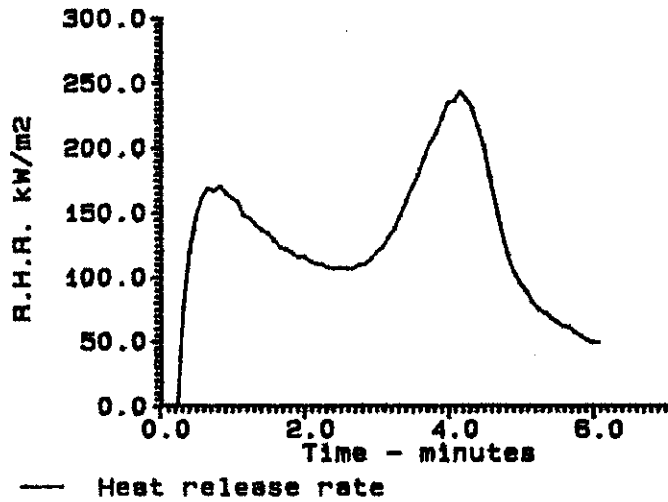
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	133.70	162.73	133.53	146.67
Mass Loss Rate	g/s*m ²	72.55	12.67	117.51	70.51
Heat of Combustion	MJ/kg	4.68	12.15	1.11	2.06
Specific Ext. Area	m ² /kg	39.36	95.21	75.21	45.13
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

the material rose above the frame slightly
this test was o.k., the O₂ values were alright

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0014

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048850
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 27.1°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 42.2 g
Final Mass : 7.9 g
Mass Lost : 3.43 kg/m²
Ignition Time : 13 s
Flameout Time : 414 s

Time of Peak RHR : 205 s
Peak RHR : 214.4 kW/m²
Peak Mass Loss : 17.31 g/s*m²
Peak Extinction Area: 168.30 m²/kg
Total Heat Released : 45.53 MJ/m²

Summary Data From Ignition

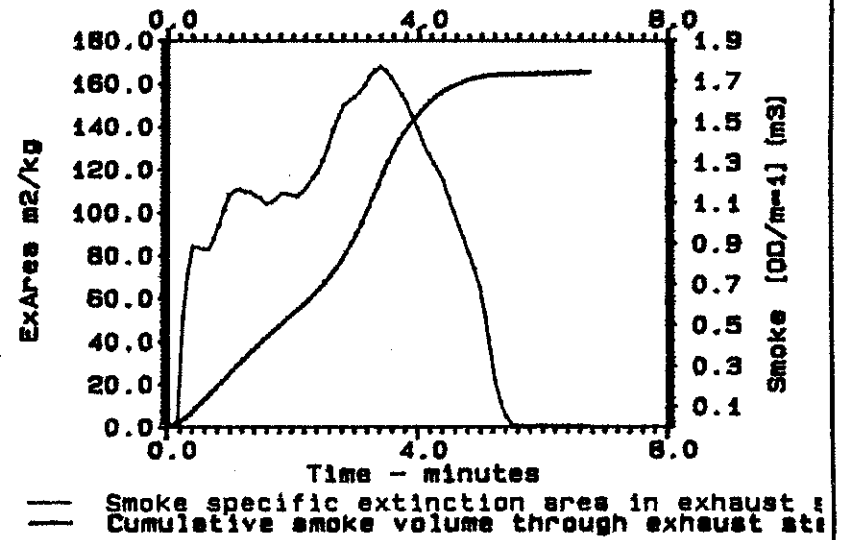
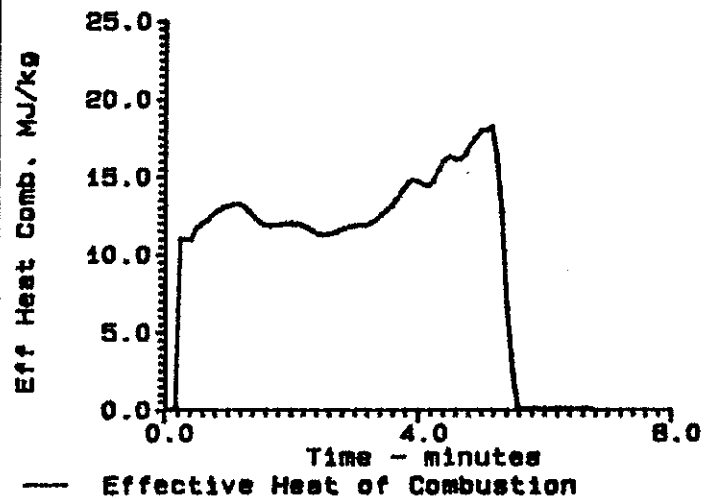
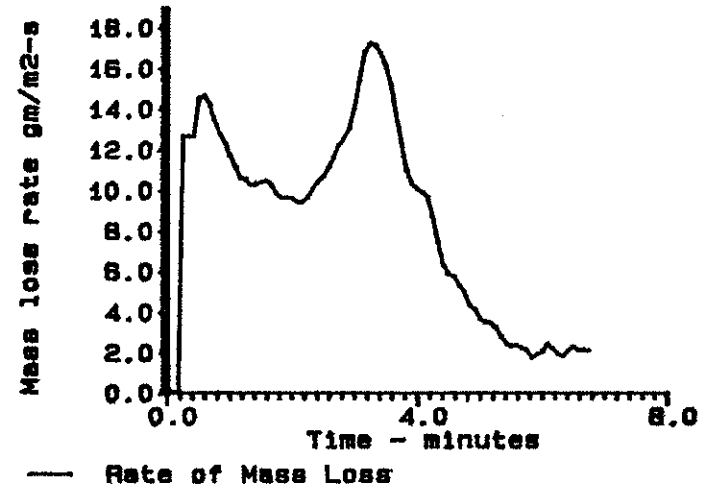
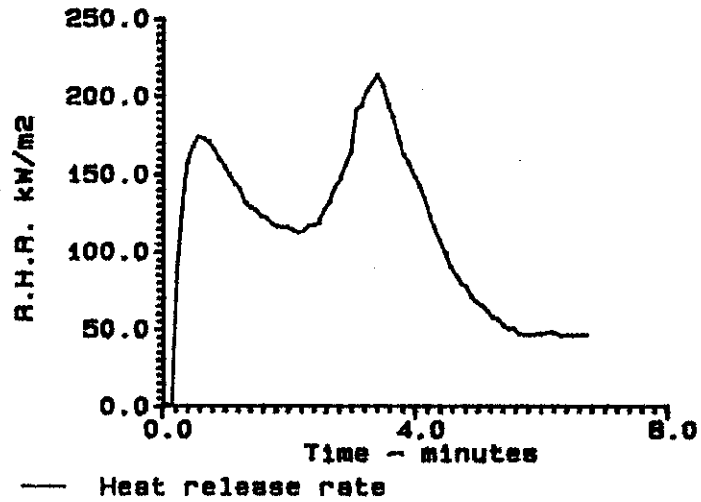
	Test Mean	60S	180S	300s
Heat Release kW/m ²	115.28	165.56	146.21	136.72
Mass Loss Rate g/s*m ²	11.41	12.63	11.85	10.58
Heat of Combustion MJ/kg	12.05	12.39	12.00	12.81
Specific Ext. Area m ² /kg	88.06	94.18	115.01	114.82
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Test seemed to be fine.
O₂ conc seems to be working.
Uneventful.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0017

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 50.0 kW/m²
Orifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions :
Specimen Area : 0.010000 m²

Initial mass : 46.7 g
Final Mass : 34.8 g
Mass Loss : 3.79 kg/m²
Ignition Time : 14 s
Flameout Time : 415 s

Time of Peak RHR :
Peak RHR : 235.2 kW/m²
Peak Mass Loss : 18.70 g/s*m²
Peak Extinction Area: 194.12 m²/kg
Total Heat Released : 49.02 MJ/m²

Summary Data From Ignition

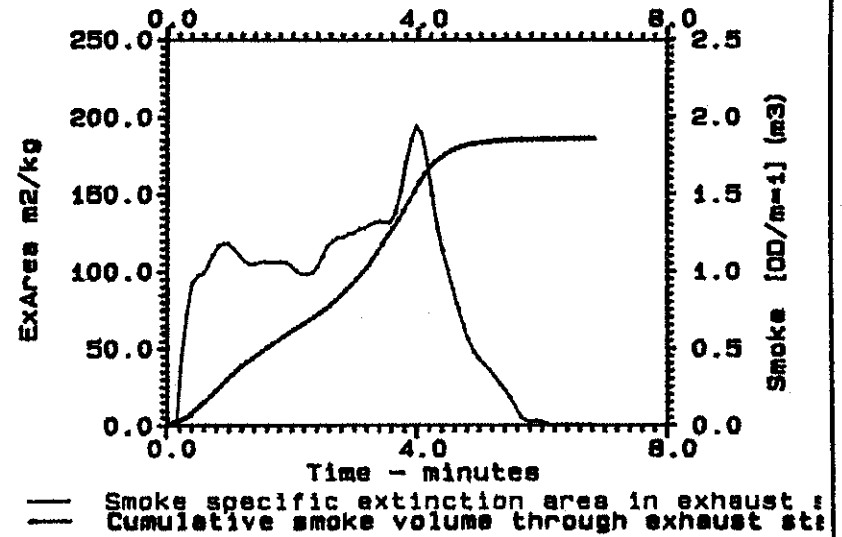
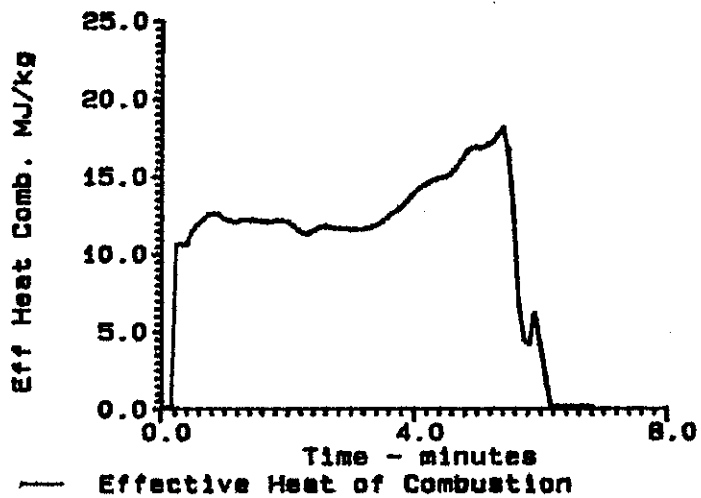
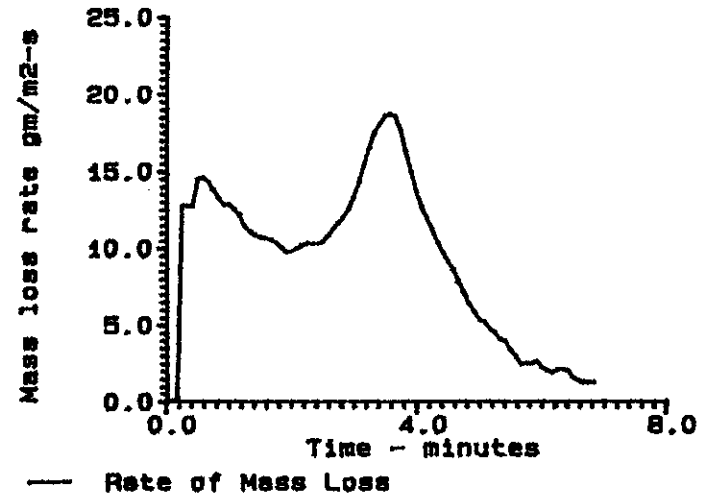
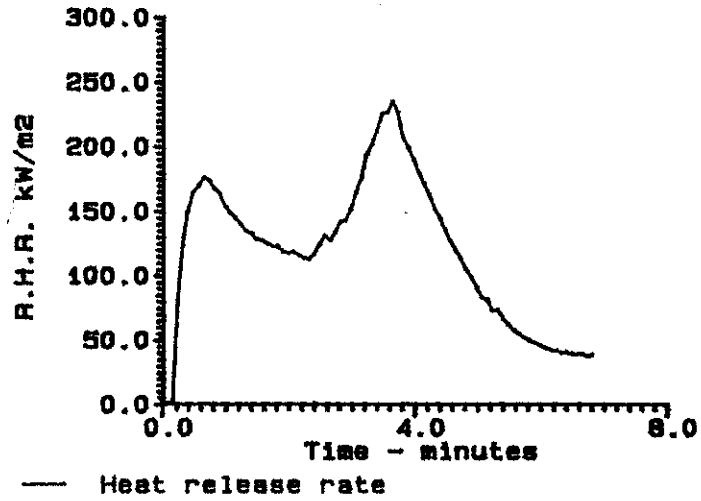
	Test Mean	60S	180S	300s
Heat Release kW/m ²	122.56	164.61	144.17	147.93
Mass Loss Rate g/s*m ²	12.30	13.08	11.90	11.68
Heat of Combustion MJ/kg	12.11	11.91	11.79	12.56
Specific Ext. Area m ² /kg	84.85	105.25	109.47	110.77
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Test seemed to be fine.
O₂ conc seems to be working.
Sample rose above the frame

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0020

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.048041
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used :

Conditioning : 50.0 PH

Exposure Area : 0.010000 m²

Initial Mass : 46.0 g
Final Mass : 11.0 g
Mass Lost : 3.50 g/m²
Ignition Time : 84 s
Flameout Time : 600 s

Time of Peak RHR : 340 s
Peak RHR : 143.7 kW/m²
Peak Mass Loss : 11.45 g/s*m²
Peak Extinction Area: 102.20 m²/kg
Total Heat Released : 43.64 MJ/m²

Summary Data From Ignition

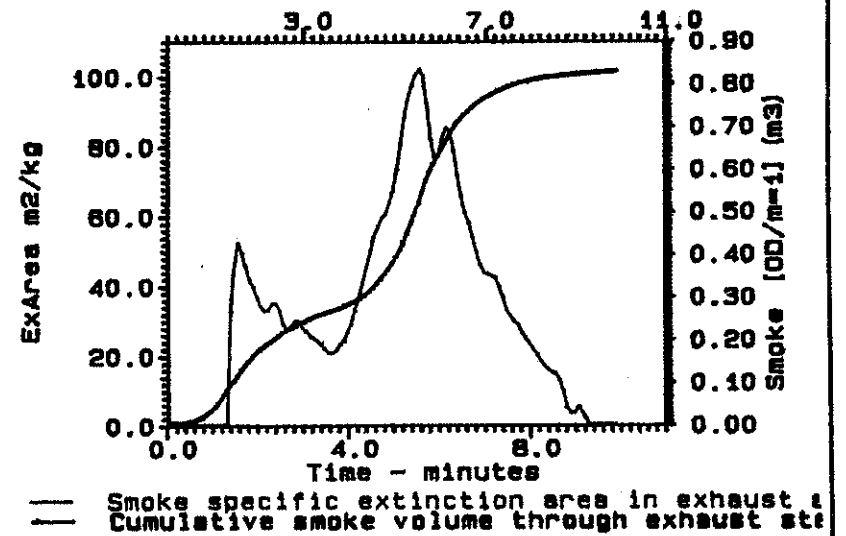
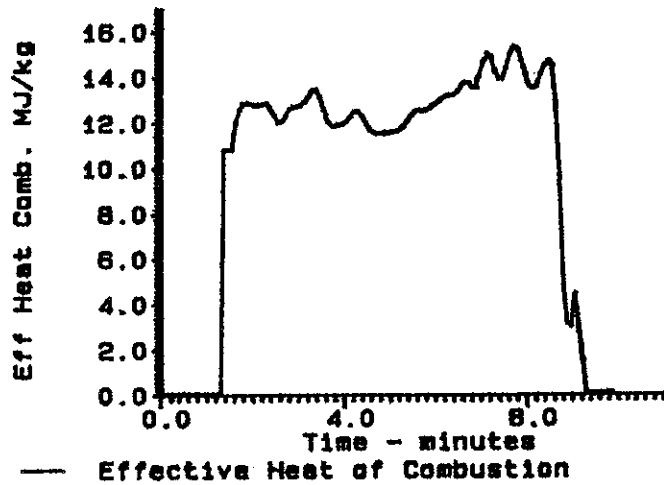
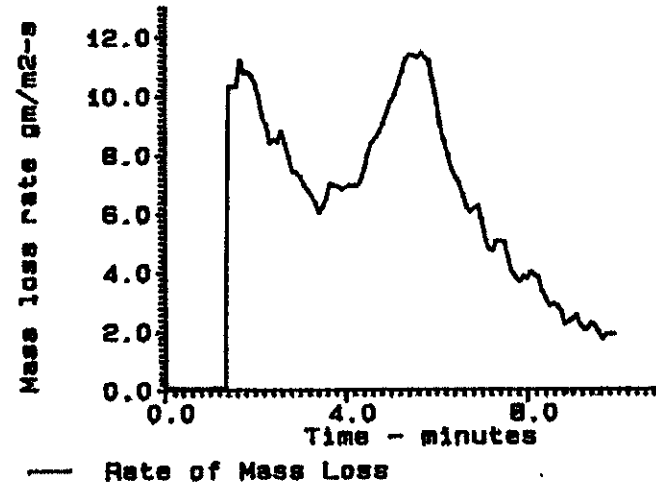
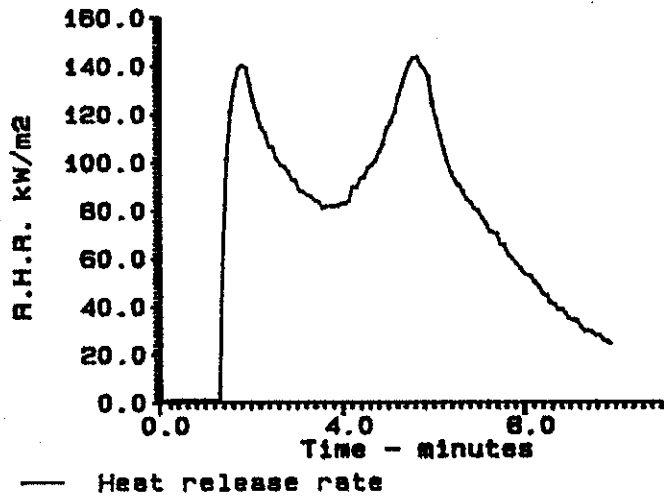
	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	84.74	130.34	102.21	108.70
Mass Loss Rate	g/s*m ²	7.87	9.97	8.06	8.72
Heat of Combustion	MJ/kg	11.88	12.37	12.41	12.32
Specific Ext. Area	m ² /kg	39.00	40.14	32.17	50.62
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

OBSERVATIONS AND COMMENTS

Ignition time quite fast.

Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard 92



SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0026

Test Date: 06-17-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m
Heater Orientation : N

Vertical Flow : 24.1 l/s
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 27.5°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 46.6 g
Final Mass : 9.9 g
Mass Lost : 3.67 g/m²
Ignition Time : 80 s
Flameout Time : 710 s

Time of Peak RHR : 345 s
Peak RHR : 126.7 kW/m²
Peak Mass Loss : 11.41 g/s*m²
Peak Extinction Area: 95.05 m²/kg
Total Heat Released : 39.91 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s
Heat Release kW/m ²	63.85	110.01	84.63	94.63
Mass Loss Rate g/s*m ²	7.50	9.67	7.88	8.70
Heat of Combustion MJ/kg	9.91	10.74	10.48	10.73
Specific Ext. Area m ² /kg	31.97	39.47	32.24	52.52
Carbon Dioxide kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide kg/kg	0.00000	0.00000	0.00000	0.00000

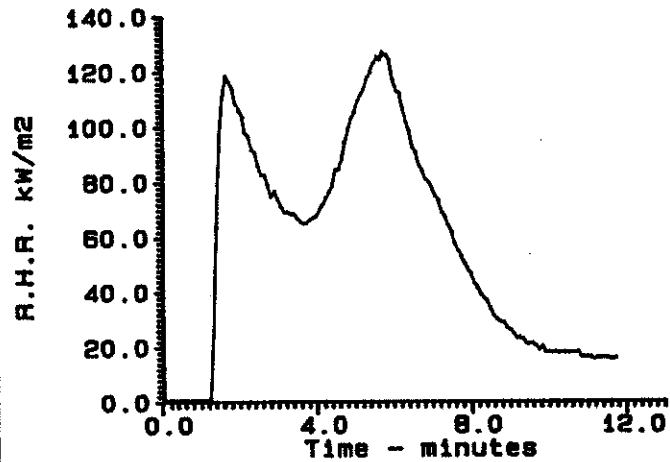
OBSERVATIONS AND COMMENTS

The frame did not rise, but the sample did slightly towards the end of the test.

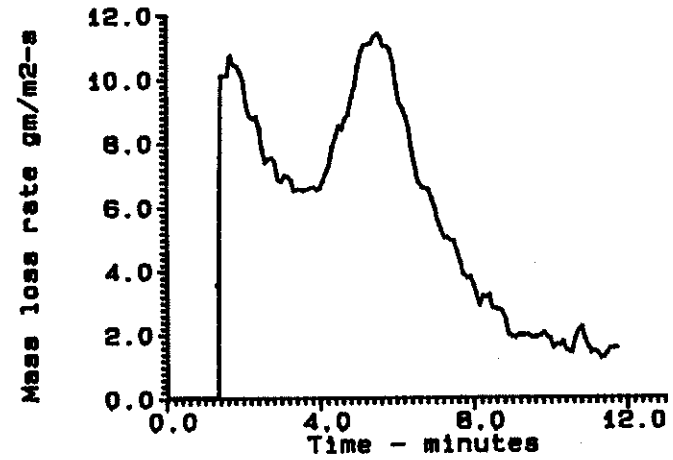
Tested by : Onno Robert
Officer : Kim Andrew J.

1/4" Chipboard

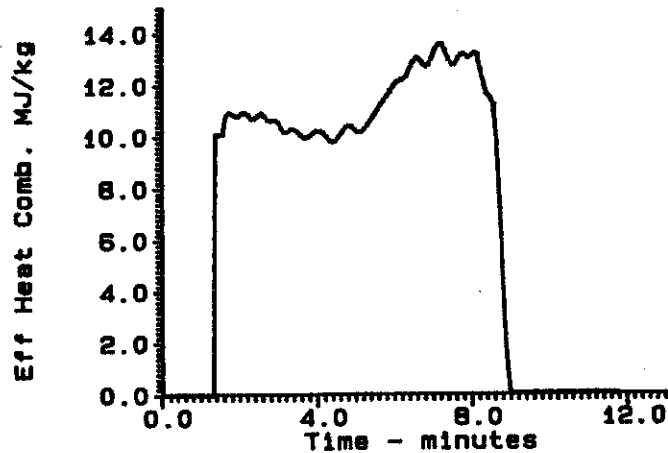
92 Flux = 25



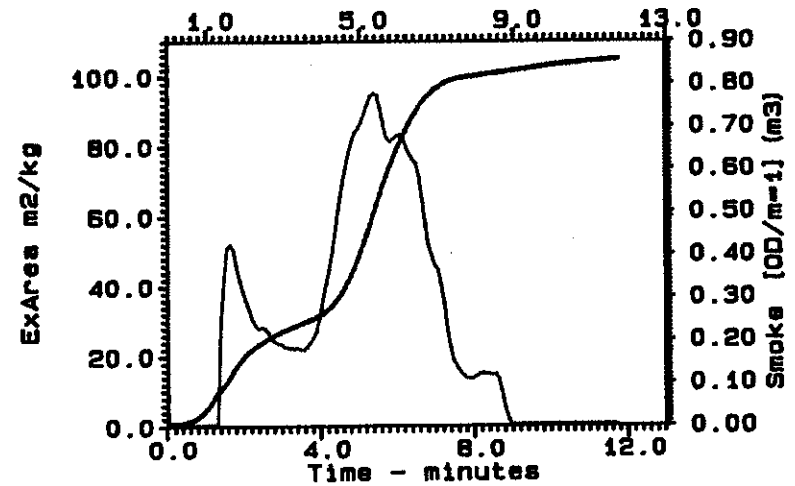
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
 — Cumulative smoke volume

SUMMARY TEST REPORT

Cone Calorimeter

Test Ref: AKK0032

Test Date: 06-25-1992

DETAILS OF MATERIAL TESTED

Sponsor : National Research Council of Canada

Material: 1/4' Chipboard 92

Date Received: 05-23-1992

DETAILS OF TEST PROCEDURE USED

Heat Flux : 25.0 kW/m²
Orifice Constant : 0.047799
Heater Orientation : Horizontal
Grid Used : N

Nominal Flow : 24.1 l/s
Heat per Unit Mole : 13.10000 kJ/gO₂
Spark Ignitor Used : Y
Frame Used : Y

Conditioning : 50.0 RH @ 24.0°C
Specimen Thickness: 0.006000m

Test Conditions : 0.0 RH @ 26.4°C
Specimen Area : 0.010000 m²

TEST RESULTS

Initial Mass : 44.3 g
Final Mass : 9.5 g
Mass Lost : 3.48 kg/m²
Ignition Time : 100 s
Flameout Time : 684 s

Time of Peak RHR : 115 s
Peak RHR : 148.3 kW/m²
Peak Mass Loss : 11.83 g/s*m²
Peak Extinction Area: 98.02 m²/kg
Total Heat Released : 43.55 MJ/m²

Summary Data From Ignition

	Test Mean	60S	180S	300s	
Heat Release	kW/m ²	75.74	127.20	100.48	107.81
Mass Loss Rate	g/s*m ²	7.55	9.58	8.09	8.69
Heat of Combustion	MJ/kg	10.85	12.28	11.99	12.19
Specific Ext. Area	m ² /kg	31.51	52.84	39.35	56.92
Carbon Dioxide	kg/kg	0.00000	0.00000	0.00000	0.00000
Carbon Monoxide	kg/kg	0.00000	0.00000	0.00000	0.00000

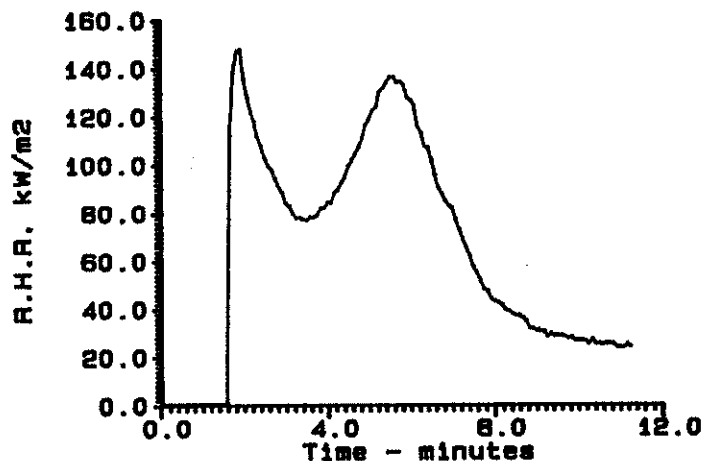
OBSERVATIONS AND COMMENTS

Uneventful.
This test is taped.
Material rose slightly

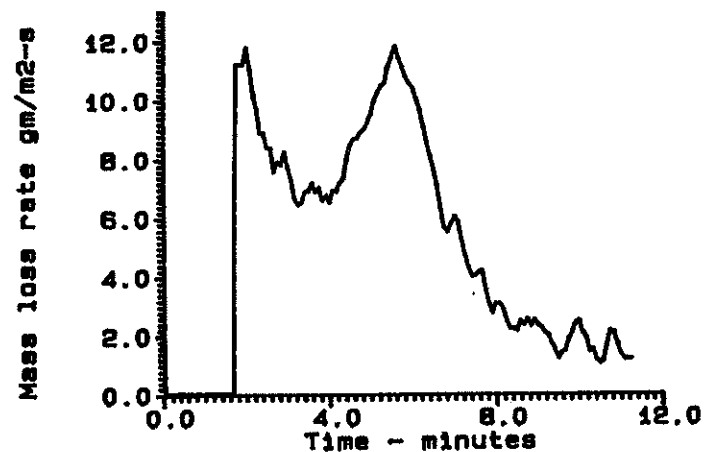
Tested by : Onno Robert
Officer : Kim Andrew

1/4" Chipboard

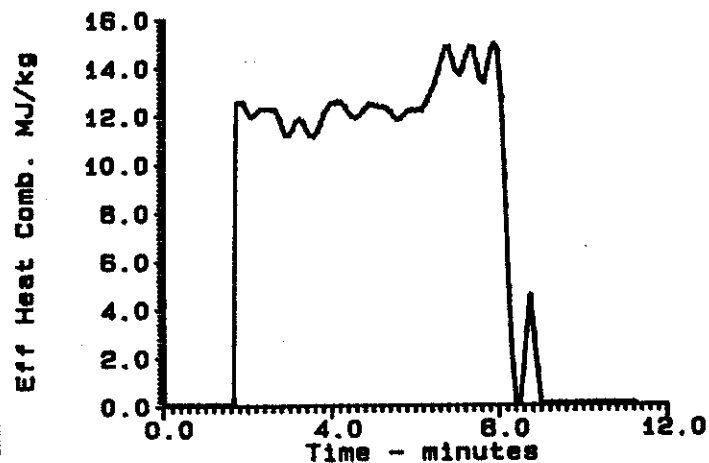
92 Flux = 25



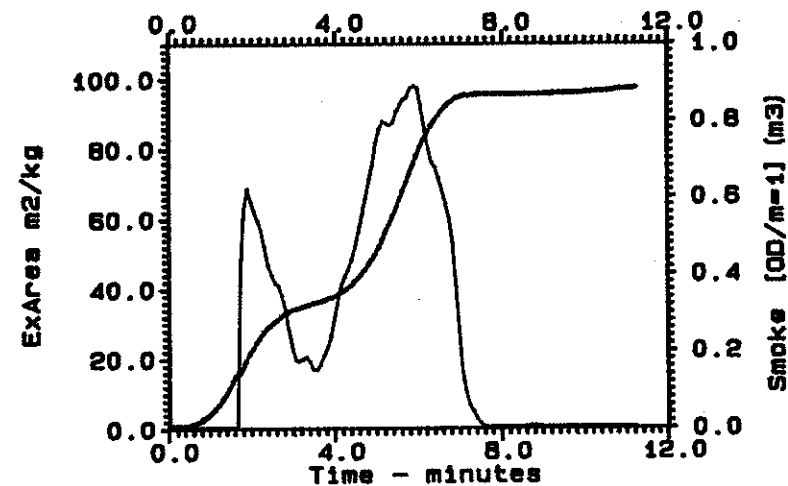
— Heat release rate



— Rate of Mass Loss



— Effective Heat of Combustion



— Smoke specific extinction area
 — Cumulative smoke volume