

35-01

Table 7a
 Panel Gluing VOC Emissions - Emission Unit 4
 Maximum Operating Scenario: Annual and Short-term Emissions
 Columbia Forest Products, Chatham, VA Plywood Plant

Manufacturer	Resin ¹	Ply	Annual Resin Usage (ton/yr) ²	Short-term Resin Usage (lb/hr) ²	% Free Formaldehyde ³	% Methanol ⁷	% Total VOCs ⁶	Formaldehyde Emissions ⁴		Methanol Emissions ⁵		Total VOC Emissions ⁶	
								Annual (TPY)	Short-term (lb/hr)	Annual (TPY)	Short-term (lb/hr)	Annual (TPY)	Short-term (lb/hr)
Various	Resin	3-ply	2,881	1,438	0.34	0.34	0.68	9.80	4.89	9.80	4.89	19.60	9.78

- Notes:
- ¹ Obtained from Columbia Forest Products, Virginia.
 - ² Calculated based on information provided by Columbia Forest Products.
 - ³ Maximum % given this resin usage
 - ⁴ Formaldehyde Emissions = (Resin Usage) X (% Free Formaldehyde)
 - ⁵ Methanol Emissions = (Resin Usage) X (% Methanol)
 - ⁶ Total VOC Emissions = (Resin Usage) X (% VOCs)
 - ⁷ Obtained from North American (Borden)
 - ⁸ Sum of % free formaldehyde and % methanol

Table 1
VOC and HAP Emissions
Maximum Emissions Increase from Addition of 4 Plates to Baldwin Press
Columbia Forest Products, Chatham, Virginia

Component Name	Raw Material		Raw Material Component			Raw Material Usage Increase		Hourly Emissions		Annual Emissions					
	Product Name	Manufacturer Name	Density (lb/gal)	Name	Amount in Product ^(a)	VOC (Y/N)	HAP (Y/N)	Maximum Hourly ^(b)	Maximum Annual ^(b)	VOC ^(c) (lb/hr)	HAP ^(d) (lb/hr)	VOC ^(e) (tons/yr)	HAP ^(e) (tons/yr)		
Resin	CR-593JF	Borden	10.5	Total VOC *	0.048	lb/gal	Y	*	131.2	lbs/hr	0.60	2.63	0.69		
				Formaldehyde	0.12	wt%	Y	Y			0.16			1.09	
				Methanol	0.19	wt%	Y	Y					0.25		0.006
				Diethanolamine	0.001	wt%	Y	Y					0.0013		
Total:									0.60	0.41	2.63	1.78			

* Includes Formaldehyde, Methanol and Diethanolamine.

Notes:

- (a) maximum hourly resin usage increase = (maximum boardly panel increase (panels/yr)) X (panel resin content (lbs-resin/panel))
 maximum hourly panel increase (panels/hr) = 80 (a)
 panel resin content (lbs-resin/panel) = 1.64 (c)
- (b) maximum annual resin usage increase = (maximum panel increase (panels/year)) X (panel resin content (lbs-resin/panel))
 maximum annual panel production increase (panels/yr) = 700,800 (b)
- (c) maximum hourly VOC emissions increase = (maximum hourly usage increase (lb/hr)) / (density (lbs/gal)) X (amount in product (lbs/gal)) OR
 maximum annual VOC emissions increase = (maximum annual usage increase (lb/hr)) X (amount in product (%/100))
 maximum annual HAP emissions increase = (maximum annual usage increase (lb/hr)) X (amount in product (%/100)) OR
 maximum annual HAP emissions increase = (maximum annual usage increase (lb/hr)) / (density (lbs/gal)) X (amount in product (%/100)) OR
 maximum annual HAP emissions increase = (maximum annual usage increase (lb/hr)) X (amount in product (%/100)) OR
 hourly panel production increase = (4 panels/cycle) X (60 minutes/hr) / (cycle time (minutes/cycle))
 cycle time (minutes/cycle) = 3 (d)
- (f) annual panel production increase = (4 panels/cycle) X (60 minutes/hr) X (8,760 hrs/yr) / (cycle time (minutes/cycle))

References:

- (1) Information provided by vendor and/or MSDS.
- (2) Provided by CFP Chatham. These are conservative amounts of maximum resin usage for 3-ply panels produced in the maximum operating scenario.

Summary of VOC and Air Toxics Emissions Resin Adhesive Spreader Columbia Forest Products Chatham, Virginia Facility

Volatile Organic Compound (VOC) and toxic compound emissions were estimated for the new resin adhesive spreader at the Columbia Forest Products Chatham, Virginia facility. These emissions were assumed to be the result of evaporation of volatile chemical species from Casco-Resin CR-595LF used in the adhesive mixture applied by the spreader. This mixture is composed of 52.62% w/w resin, 19.74% w/w water, 1.32% w/w catalyst, and 26.32% w/w inert flour. The weight of the relatively insoluble flour was not included in any of the calculations related to aqueous solutes.

Specifically, the new equipment consists of a 108 inch Globe spreader. It is comprised of two pairs of cylindrical rollers, each 108-inches long. Each pair contains a doctor roller (8.9" in diameter) and an applicator roller (12" in diameter). One pair of rollers is situated above the wood panel passing through the device and one pair is situated below. Adhesive resin is piped into the crevice between the doctor and applicator rollers, such that a small pool of resin forms in between the rollers. This allows both rollers to become coated with the adhesive. It is the larger diameter applicator roller that contacts the wood panel and applies the adhesive. Air emissions from this device come primarily from the evaporation of volatile adhesive components from the coated surfaces of the doctor and applicator rollers.

According to the Certified Product Data Sheet (CPDS) supplied by Borden Chemical, Inc., the supplier of the 595LF resin, total volatiles content of the pure resin is 0.457% by weight. Weight percentages of formaldehyde (0.120%), methanol (0.190%), and diethanolamine (0.001%) are also available. These compounds are considered to be Toxic Pollutants for purposes of regulatory evaluation. The CPDS for the 595LF resin is provided in Attachment A

Maximum potential emissions of formaldehyde and methanol from the resin mixture used in the spreader were calculated based on equations for liquid- and gas-phase mass transfer coefficients. The equations and the kinetic and thermodynamic constants used in the calculations were taken from Chapter 4 Section 3 of the Environmental Protection Agency (EPA) AP-42 document. This section specifically refers to calculating emissions of volatile compounds from wastewater treatment impoundments, but the equations are general enough to apply to emissions from any aqueous solution. These "potential to emit" calculations are expected to be conservative since the liquid mass transfer rates should be lower in the resin mixture (relative to a pure dilute aqueous solution) due to the presence of suspended solids and thickening agents.

After calculation of the appropriate mass transfer coefficients for the resin mixture, total emissions were based on the surface area of the adhesive-coated rollers in the spreader. These calculations for formaldehyde and methanol are provided in Attachment B. Similar kinetic and thermodynamic data were not available for diethanolamine. However, since diethanolamine exhibits a boiling point much higher than formaldehyde (269 °C vs. -19.5 °C), and its concentration in the resin is approximately one hundredth that of formaldehyde, it was conservatively assumed that the emissions of diethanolamine were one percent of those calculated for formaldehyde.

Since the majority of the volatile compounds are accounted for as formaldehyde and methanol, total VOC emissions were estimated by multiplying the combined formaldehyde and methanol emissions by

the ratio of the weight percentage of volatile compounds to the sum of the formaldehyde and methanol weight percentages $(0.457/(0.12+0.19) = 1.47)$. These calculations and assumptions led to the following emissions estimates:

Units	VOC	Formaldehyde	Methanol	Diethanolamine
Lb/hr	0.457	0.257	0.054	0.003 ^a
Ton/yr	2.004	1.126	0.237	0.011 ^a

a. Conservative estimates; see text.

The Toxic Pollutant emission rates were compared to the threshold values for exemption under 9 VAC 5-40-160. These threshold values are given in Attachment C. Only formaldehyde was found to exceed these thresholds.

Attachment D provides the necessary source parameters for performing an ambient air impact assessment using the EPA SCREEN3 dispersion model based on the assumptions and calculations provided. Note that the effects of building downwash would be significantly less than those expected for a solid building since the building containing the spreader equipment has a significant opening (15' x 20') on each side.

TOXIC OR HAZARDOUS OR OTHER REGULATED POLLUTANT EMISSIONS FROM PROPOSED FACILITY:

3F-05

COMPANY NAME Columbia Forest Products, Panel Products Division

DATE 9/13/99

REGISTRATION NUMBER 30120

UNIT REF. NO.	MOD CODE	VENT/STACK NO	MAXIMUM EMISSION RATES TO ATMOSPHERE OF POLLUTANT (Specify pollutant)*				STATE OPERATING PERMITS EMISSION CAP (YES/NO)	BASIS OF ESTIMATES (USE CODE M)
			CONTROLLED		UNCONTROLLED			
			lb/hr	tons/yr	lb/hr	tons/yr		
4	2	N/A	Formaldehyde, #50000	N/A	N/A	4.9 ^{hr}	9.80 ^{hr}	2, Material Balance
4	2	N/A	Methanol, #67561	N/A	N/A	4.9 ^{hr}	9.80 ^{hr}	2, Material Balance
4	2	N/A	Diethanolamine, #111422	N/A	N/A	0.000007	0.03	2, Material Balance

Code M - Emission Estimate Method (provide detailed calculations including assumed control efficiency of control equipment, if applicable)

1. Stack Test (include a copy)
2. Material Balance (include calculations)
3. Emission Factor (identify)
99. Other (describe)

* If you have other regulated pollutants, list as the first CAS number. Toxic Pollutant means on designated list. Particulate matter and volatile organic compounds are not toxic pollutants as generic classes of substances, but individual substances within these classes may be non-criteria toxic pollutants because their toxic properties or because a TLV (Tm) has been established. See toxic pollutant listing in the front of this application. Specify which pollutants are also reported as TSP, PM₁₀, or VOCs.

(a) Facility will operate within the synthetic minor limits set in Permit to Operate registration No. 30120, issued 2/9/99.

Engineering Analysis

38-02

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY
South Central Regional Office

INTRA-AGENCY MEMORANDUM

Permit Writer	David J. Brown			
Memo To	Air Permit File	Date	4/2/03	
Facility Name	Columbia Forest Products			
Registration Number	30120			
County-Plant I.D.	143-00017			
UTM Coordinates (Zone 17)	642163	Easting	4076410	Northing
Elevation (feet)	660			
Distance to Nearest Class I Area (select one)	>10 K	SNP (km)	>10K	JRF (km)
FLM Notification Required if less than 10K (minor), 100K (state major) (Y/N)	N			
NET Classification (A, SM, B)	SM	Before permit action	SM	After permit action
Pollutants for Which the Source is Title V Major	None	Before permit action	None	After permit action
PSD Major Source (Y/N)	N	Before permit action	N	After permit action
Pollutants for Which the Source is PSD Major	N/A	Before permit action	N/A	After permit action

Introduction

Columbia Forest Products (CFP) operates a hardwood panel consolidation plant at 100 Paul Road, 0.5 miles north of Chatham Virginia. The process involves application of glue to components, panel assembly, curing of panels in a hot press, and trimming and sanding of the panels. A sealer is applied to some of the panels on a UV finishing line. A 7 MMbtu/hr input woodwaste-fired boiler provides process heat for the press and space heat. Equipment at this source is covered by a facility-wide State Operating Permit (SOP) issued under Chapter 80, Article 5 of the State Air Pollution Control Board Regulations for the Control and Abatement of Air Pollution.

On February 28, 2003, the Department of Environmental Quality (DEQ), South Central Regional Office (SCRO) received a letter from CFP (date February 21, 2003) advising of the planned installation of an additional roll coater on the UV finishing line. The letter further advised that this additional roll coater will be used to divide the amount of coating currently applied by one of the coaters into two applications and will not result in use of additional sealer. The source does not wish to obtain an increase in any permit limit and did not identify any additional changes as a result of the additional coater. Accordingly, the source does not believe that this change is subject to new source review permitting but they are requesting that the SOP be amended to reflect the additional equipment.

Review of information submitted indicated a discrepancy between file information, including the current permit, and the proposal, with respect to the number of coaters currently on the finishing line. The finishing line was originally constructed with one roll coater and one sander under a 1995 new source review (NSR) permit. The original SOP was issued in 1998 and included an additional roll coater and sander on the UV finishing line. The SOP was subsequently amended in 2000 to provide for modifications including a third roll coater for the finishing line. Therefore, as permitted by the March 17, 2000 SOP, the UV finishing line is approved for a total of three roll coaters. However, the schematic submitted with the February 21, 2003 request for an additional roll coater shows only three roll coaters after the requested change. CFR was contacted concerning this inconsistency and DEQ was advised by email on April 1, 2003 that the line after the proposed modification would have a total of three roll coaters. While not expressly stated in CFP's response, the additional coater approved in March 2000 apparently was never installed.

Emission Unit(s) / Process Description(s)

The proposed modification is for the finishing line used to apply UV cured sealer to some of the panels manufactured at the facility. Panels are feed into the line sanded and cleaned and then passed through a set of 2 UV coaters/curing lamps, sanded again and then receive a final coat of sealer. Emissions are generated as a result of VOC and HAP constituents of the sealer and PM from the sanders. The sanders emissions are controlled by a baghouse. VOC and HAP emissions are limited by use of UV cured finishes.

Regulatory Review

VAC 5 Chapter 80, Part II, Article 6 – Minor New Source Review

The regulatory review process for consideration of NSR applicability was taken from the NSR exemption checklist found on DEQNet.

The exemption review procedures are detailed in the following steps:

1. Identify each emission unit.

The emissions unit affected by the action is the UV finishing line.

2. If the emission unit is part of an existing source, determine whether the emission unit is a new emission unit or a modification to an existing emission unit.

The request is to add an additional UV coater to a previously permitted emissions unit (the UV finishing line). The addition of this roll coater was previously reviewed for NSR applicability and documented in engineering memo dated 3/13/2000. The roll coater was not installed at that time.

- 3. If the request is for an existing emission unit and does not qualify as a modification, check to see if it can be processed as either an administrative (9 VAC 5-80-1270) or minor permit (9 VAC 5-80-1280) amendment.

Because the current permit limits emissions to less than the 5-80-1320 D exemption level and does not involve any increase in HAP emissions, the unit is exempt from permitting as a "modification". The source has requested that the SOP be amended to include the additional UV coater. Because the current SOP already provides for the requested equipment and emissions limits, no permit amendment is needed.

- 4. Identify the emissions from each emission unit.

Pollutants emitted from operation the UV finishing line are VOC, PM, PM-10, xylene, ethyl benzene, 2-butoxyethanol, and diethanolamine. The PM/PM10 emissions are limited by permit to 3.4 tons/yr. PM emissions are from sanding and will not change as a result of the addition of a new coater. Permitted VOC emissions from this line are 3.5 lbs./hr. and 9.0 tons/yr. Since permitted emissions are less than the 5-80-1320 D exemption levels for modification, actual net emissions increase from the change was not calculated. Potential HAP emissions, as calculated from previous application information (based on maximum coating usage of 15.88 gal/hr and 78,642 gal/yr) are:

Xylene	0.980 lbs./hr	2.43 tons/yr.
Ethyl benzene	0.214 lbs./hr	0.53 tons/yr.
2-Butoxyethanol	0.291 lbs./hr	0.72 tons/yr.
Diethanolamine	0.428 lbs./hr	1.06 tons/yr.

3.0872 or 3.09
 1.53
 .72
 1.06

 5.4 tons/yr.

All reported HAP constituents are below their respective state toxic exemption levels.

- 5. Classify the pollutant emissions as follows: Criteria Pollutants and Toxic (HAP) Pollutants.

Criteria pollutants PM, PM10 and VOC are emitted from this emissions unit.

HAP pollutants xylene, ethyl benzene, 2-butoxyethanol and diethanolamine are emitted from this emissions unit.

- 6. Complete emissions calculations.

Emissions calculations for criteria pollutants are not needed since permitted emissions are less than permit exemption levels of 5-80-1320D. HAP emissions calculations are in the attached spreadsheet. To show worst case sealer, there is one spreadsheet for each sealer.

- 7. Check each emission unit to determine whether it is subject to a New Source Performance Standard (NSPS). If the emission unit is subject to an NSPS, it is not exempt and a permit is required with the exception of those units which would be subject only to record-keeping or reporting requirements or both under NSPS. Additionally, if the NSPS emission unit is located at an existing source with similar emission units permitted under the same NSPS subpart with no less stringent requirements, a permit may not be required if the emissions are otherwise exempt.

note that the DEQ incorrectly added the xylene emissions; the correct amount is 3.0872 tons - (2.4259 + .6613)

417-5095 UV Sealer (Chemcraft International, Inc)

Density (lb/gal) = 9.8
 Volatiles (lb/gal) = 0.23
 Gallons/ hour = 15.88
 Gallons/ year = 70642
 Particulate Control Eff = 0
 Transfer Efficiency = 1
 VOC Control Efficiency = 0

Chemical	WT %	TLV TWA (mg/m3)	TLV C/STEL (mg/m3)	Uncont. Emissions (lb/hr)	Uncont. Emissions (T/yr)	Expected Emissions (lb/hr)	Expected Emissions (T/yr)	SAAC (1-hr) (ug/m3)	SAAC (annual) (ug/m3)	Exempt (lb/hr) ?	Exempt (T/yr) ?
VOC				3.652	15.998	3.652	9.044				
Particulate (& PM-10)				0.000	0.000	0.000	0.000				
Xylene	0.1715	434	651	0.267	1.170	0.2671	0.6613	16275.00	860	Y	Y
2-butoxyethanol	0.1872	121		0.291	1.276	0.2913	0.7214	6050.00	242	Y	Y
Diethanolamine	0.2749	13		0.428	1.873	0.4277	1.0589	650.00	26	Y	Y

8112524 Baycon Sealer/Topcoat (PVC Industries Inc.)

Density (lb/gal) = 9.64
 Volatiles (lb/gal) = 0.08
 Gallons/hour = 15.88
 Gallons/year = 78542
 Particulate Control Eff = 0
 Transfer Efficiency = 1
 VOC Control Efficiency = 0

Chemical	wt %	TLV TWA (mg/m ³)	TLV C/STEL (mg/m ³)	Uncont. Emissions (lb/hr)	Uncont. Emissions (T/yr)	Expected Emissions (lb/hr)	Expected Emissions (T/yr)	SAC (lb-kt) (µg/m ³)	SAC (annual) (µg/m ³)	Exempt (lb/hr) ?	Exempt (T/yr) ?
WOC				1.270	5.564	1.270	3.146				
Particulate 16 PM-10				0.000	0.000	0.000	0.000				
Xylene	0.64	434	551	0.989	4.291	0.9797	2.4259	16275.00	868	Y	Y
Ethyl Benzene	0.14	434	543	0.214	0.939	0.2143	8.5307	11575.00	868	Y	Y

Table 9a
 Summary of Annual Emissions
 Maximum Operating Scenario
 Columbia Forest Products, Chatham, VA Plywood Plant

Analyte	Emissions from Each Emission Unit (TPY)						Total Annual Emissions (tons/yr)	Major Source Threshold (tons/yr)
	1 Boiler	2 ⁽²⁾ Sawing & Sanding	3 UV Coating	4 Panel Gluing	5 Diesel Engine	FW Facility Wide VOC		
NO _x	5.77				17.06		22.82	100
CO	52.27				3.67		55.95	100
SO ₂	0.29				1.12		1.41	100
TSP	16.14	6.31			1.20		23.66	100
PM ₁₀	9.99	6.31			1.20		17.51	100
VOC	0.85		6.03	19.60	1.39	0.560	28.42	100
HAPs	0.13			19.60		0.005	19.73	10/25 ¹

Note:

- (1) Major source threshold is 10 tons/yr of any individual HAP or 25 tons/yr for total HAPs.
 No individual HAP exceeds the major source threshold of 10 tons/yr.
- (2) Emission unit 2 includes both sanding and sawing as well as truck loadout.

Table 3
Criteria Pollutant Emissions from Hogged Fuel Combustion - Emission Unit 1
Estimated Emissions for 1995
Columbia Forest Products, Chatham, VA Plywood Plant

Criteria Pollutant	Emission Factor* (lb/ton)		Criteria Pollutant Emissions (a) (tons/yr)
TSP	8.4	(3)	8.11
PM ₁₀	5.2	(3)	5.02
SO ₂	0.15	(4)	0.14
CO	27.2	(4)	26.27
NO _x	3.0	(4)	2.90
VOC	0.44	(5)	0.42
Lead	0.001	(3)	5.99E-04

Notes:

*Emission Factors (EF) in AP-42 are based on 50% moisture content. SECOR corrected these factors to BDT: $EF (BDT) = (EF) / (1 - 0.50)$

(a) calculated emissions = EF X (fuel usage) X (ton/2000 lb)

Fuel Usage (BDT/yr):	1931.4 (1)	
Fuel Moisture Content	10 %	(2)

References:

- (1) Table 2, corrected to bone dry tons (BDT).
 $BDT = (Fuel\ Usage) * (1 - moisture\ content/100)$
A bone dry ton, by definition, has a moisture content of zero.
- (2) Provided by Columbia Forest Products
- (3) AP-42 Table 1.6-1, Wood-fired boiler with a mechanical collector without flyash reinjection.
- (4) AP-42 Table 1.6-2, Stoker boilers
- (5) AP-42 Table 1.6-3, Stoker boilers, TOC

4/1/04 RRB

Date : 01/14/2004 08:29 AM

Commonwealth of Virginia
Department of Environmental Quality

Registrant: 30120
Plant Name: Columbia Forest Products
Physical Location: 100 Paul Rd SW
Mailing Address: PO Drawer F
Chatham, VA 24531

Annual Update for Calendar Year: 2003

Region: SCRO
County: 143 Pittsylvania County
Plant ID: 00017
Contact Person: Cowan, Doane
Telephone: (434)432-2531
Employees: 98
Principal Product: plywood
SIC: 2485 NAICS: 321211
Inspector: Mick, Craig
Classification: Synthetic Milling

Summary Data for Calendar Year: 2003

Silk	PI Seg	Segment Description	SGC	Annual Thruput Units	% Sulfur Ash	Heat Content (mmBtu/ SGC unit)	Primary Control Equip	Secondary Control Equip	% Effic	% Annual Throughput												Stack Parameters		
										Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Dy	Hr	% Space Heat
1	1	1 HOUSTON STAMWOOD&CAMPL	10200905	6,198	0	2	008			35	15	15	35	24	7	6400	30	40	2	400	16.75	650		
20	20	2 SAWING/SANDING PLYWOOD	30703002	2674	0	0	018			25	25	25	25	16	5	6400	30	32	5.59	76	15	650		
21	21	UV ROLL COATER	30703006	319855	0	0	018			25	25	25	25	24	5	7000	0	40	3.57	76	68.77	650		
21	21	UV LINE BAGHOUSE-Prusmifill- report tons of woodwaste	30700799	3424	0	0	017			25	25	25	25	24	5	7000	0	40	3.57	76	68.77	650		
21	21	UV ROLL COATER-report tons of VOC emitted	30700799	2.3	0	0	017			25	25	25	25	24	5	7000	0	40	3.57	76	68.77	650		
22	22	1 PRESS EMISS TONS-VOC	49099999	9.8	0	0				25	25	25	25	24	7	6400	0	30				650		
22	22	2 Press Emissions tons Formaldehyde	49099999	2.6	0	0				25	25	25	25	24	7	6400	0	30				650		
22	22	3 Press Emission tons Methanol	49099999	4.1	0	0				25	25	25	25	24	7	6400	0	30				650		

38-13

Source Name: Columbia Forest Products
 Registration Number: 30120
 Boiler Capacity: 7,000,000 BTU/hr
 Type Fuel: wood (1,2,4,5,6, gas, coal, or wood)

11/25/97

Expected hr. amt burned: 975 lbs
 Annual amount burned: 3,416 tons % Particulate control: 18.4
 (Input user heat content in cell D9, if desired.)
 Heat content: 4,500 BTU/Lb 4,500
 Max. amounts burned: 1555.6 lbs/hr 6,813 tons/yr

Emission rates:

Pollutant	Potential	Potential	Expected	Expected	Actual	Limits	
	Lbs/Hr	Tons/Yr	Lbs/Hr	Tons/Yr		lb/MMBtu	lb/MMBtu
TSP	6.84444	29.98	3.50064	12.2648	0.5001		0.6
PM-10	6.84444	29.98	3.50064	12.2648	0.5001		0.6
Lead	0	0	0	0			
SO ₂	0.12	0.51	0.07	0.2562	0.0104	<lbs/hr>	18.48
NO _x	2.18	9.54	1.37	4.7824			
CO	3.11	13.63	1.95	6.832	Exemption Rates		
VOC	1.09	4.769333	0.68	2.3912	lbs/hr	tons/yr	Exempt?
arsenic	0.00019	0.000818	0.00012	0.00041	0.0132	0.029	Yes
beryllium	n/a	n/a	n/a	n/a	0.00013	0.0003	n/a
cadmium	0.00042	0.00184	0.00111	0.00092	0.0033	0.0073	Yes
chromium	0.00036	0.001567	0.00022	0.00079	0.033	0.0725	Yes
copper	0.00093	0.004088	0.00059	0.00205	0.0132	0.029	Yes
formaldehyde	0.02567	0.11242	0.01609	0.05636	0.0825	0.174	Yes
manganese	0.04044	0.177147	0.02535	0.08882	0.33	0.725	Yes
nickel	0.00451	0.019759	0.00283	0.00991	0.066	0.145	Yes
POM	n/a	n/a	n/a	n/a			
vanadium (V ₂ O ₅)	0.00009	0.000409	0.00006	0.0002	0.0033	0.0073	Yes

Emission factors for fuel:

wood	
TSP	8.8 lbs/ton
PM10	8.8 lbs/ton
Lead	0 lbs/ton
SO ₂	0.15 lbs/ton
NO _x	2.8 lbs/ton
CO	4 lbs/ton
VOC	1.4 lbs/ton
arsenic	0.00024 lbs/ton
beryllium	0 lbs/ton
cadmium	0.00054 lbs/ton
chromium	0.00046 lbs/ton
copper	0.0012 lbs/ton
formaldehyde	0.033 lbs/ton
manganese	0.052 lbs/ton
nickel	0.0058 lbs/ton
POM	0 lbs/ton
vanadium (V ₂ O ₅)	0.00012 lbs/ton

Table 6a

Facility Wide VOC Emissions - Emission Unit FW, and
 UV Coating - Emission Unit 3
 Maximum Operating Scenario
 Columbia Forest Products, Chatham, VA Plywood Plant

Raw Material (1)		Raw Material Component (1)				Raw Material		PTE Emissions				
Component Name	Product Name	Manufacturer Name	CAS #	Density (lb/gal)	Amount in Product (g)	VOC (Y/N)	HAP (Y/N)	Toxic (Y/N)	VOC (b) (TPY)	HAP (TPY)	Toxics (TPY)	
Face Putty	Face Grade Wood Filler- All Colors	Willamette Valley Co.	67-64-1	10.32	33% (wt)	N	N	N	n/a	n/a	n/a	
			67-63-0		1.50% (wt)	Y	N	N	0.4	n/a	n/a	
Solvent	105 Solvent	Safety-Kleen	Total VOC	6.7	100%	Y	N	N	0.2	n/a	n/a	
			Mineral Spirit	64741-41-9		85% (wt)	Y	N	N	n/a	n/a	n/a
			C8 + Aromatics			12% (wt)	Y	N	N	n/a	n/a	n/a
			Xylene	1330-20-7		1.00% (wt)	Y	Y	Y	1.63E-03	1.63E-03	1.63E-03
			Ethylbenzene	100-41-4		0.50% (wt)	Y	Y	Y	8.14E-04	8.14E-04	8.14E-04
			Toluene	108-88-3		0.50% (wt)	Y	Y	Y	8.14E-04	8.14E-04	8.14E-04
UV Sealer	Sadolin #437-5085	Chemcraft Sadolin	71-55-6		0.50% (wt)	Y	Y	Y	8.14E-04	8.14E-04	8.14E-04	
			127-18-4		0.50% (wt)	Y	Y	Y	8.14E-04	8.14E-04	8.14E-04	
			Emission Unit FW, Facility Wide VOC Emissions, TOTAL:						0.568	0.005	0.005	
			Total VOC				Y	N	N	6.0	n/a	n/a
			Emission Unit 3, UV Coating, TOTAL:							6.0	0.00	0.00
			Total VOC				Y	N	N	6.0	n/a	n/a

Notes:

- (a) The sum of the percentages may be greater than 100% because the maximum wt. % of each component was reported.
- (b) VOC emissions were calculated by one of the following equations, depending on available information:

VOC emissions = (VOC content [lb/gal]) X (usage) X (ton/2000 lb)

VOC emissions = (wt %) X (density of material) X (usage) X (ton/2000 lb)

References:

- (1) Vendor MSDSs and phone conversations
- (2) Table 1a

30-15

Table 4a
HAP Emissions from Hugged Fuel Combustion - Emission Unit 1
Maximum Operating Scenario: Annual and Short-term Emissions
Columbia Forest Products, Chatham, VA Plywood Plant

HAP	Emission Factor* (lb/ton-fuel)	Reference	HAP Emissions (a)	
			Annual (TPY)	Short-term (lb/hr)
Acetaldehyde	6.00E-03	3	9.22E-03	2.63E-03
Acrolein	8.00E-06	3	1.23E-05	3.51E-06
Benzene	7.20E-03	3	1.11E-02	3.16E-03
Formaldehyde	1.32E-02	3	2.03E-02	5.79E-03
Naphthalene	4.60E-03	3	7.07E-03	2.02E-03
Phenols	7.80E-04	3	1.20E-03	3.42E-04
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	7.20E-11	3	1.11E-10	3.16E-11
Lead	6.20E-04	4	9.53E-04	2.72E-04
Chlorine	1.56E-02	3	2.40E-02	6.84E-03
Cobalt	2.60E-04	3	4.00E-04	1.14E-04
Arsenic	1.76E-04	3	2.71E-04	7.72E-05
Cadmium	3.40E-05	3	5.23E-05	1.49E-05
Chromium (total)	2.60E-04	3	4.00E-04	1.14E-04
Manganese	1.78E-02	3	2.74E-02	7.81E-03
Mercury	1.30E-05	3	2.00E-05	5.70E-06
Nickel	1.12E-03	3	1.72E-03	4.91E-04
Selenium	3.60E-05	3	5.53E-05	1.58E-05
POM		5	1.46E-03	4.16E-04
TOTAL			1.06E-01	3.01E-02

POM Polycyclic Organic Compounds	Emission Factor* (lb/ton-fuel)	Reference	POM Emissions (a)	
			Annual (TPY)	Short-term (lb/hr)
Acenaphthene	6.80E-06	3	1.05E-05	2.98E-06
Fluorene	1.92E-05	3	2.95E-05	8.42E-06
Phenanthrene	1.14E-04	3	1.75E-04	5.00E-05
Anthracene	7.60E-05	3	1.17E-04	3.33E-05
Fluoranthene	1.80E-04	3	2.77E-04	7.90E-05
Pyrene	3.40E-05	3	5.23E-05	1.49E-05
Benzo(a)anthracene	3.60E-06	3	5.53E-06	1.58E-06
Benzo(b+k)fluoranthene	5.80E-05	3	8.92E-05	2.54E-05
Benzo(a)pyrene	3.80E-07	3	5.84E-07	1.67E-07
Benzo(g,h,i)perylene	2.40E-06	3	3.69E-06	1.05E-06
Chrysene	8.60E-05	3	1.32E-04	3.77E-05
Indeno(1,2,3-c,d)pyrene	6.80E-07	3	1.05E-06	2.98E-07
Polychlorinated dibenzo-p-dioxin	2.40E-08	3	3.69E-08	1.05E-08
Polychlorinated dibenzo-p-furan	5.80E-08	3	8.92E-08	2.54E-08
Acenaphthylene	8.80E-05	3	1.35E-04	3.86E-05
Methyl anthracene	2.80E-04	3	4.30E-04	1.23E-04
Total			1.46E-03	4.16E-04

Notes:

*Emission Factors (EF) in AP-42 are based on 50% moisture content. SECOR corrected these factors to BDT:

(a) calculated emissions = EF X (fuel usage)

Fuel Usage (BDT/yr): 3,074.76 (1)

Fuel Usage (BDT/hr): 0.44 (1)

Fuel Moisture Content: 10 % (2)

References:

(1) Table 1a, corrected to BDT.

$$\text{BDT} = (\text{Fuel Usage}) * (1 - \text{moisture content}/100)$$

(2) Provided by Columbia Forest Products

(3) AP-42 Tables 1.6-5 and 1.6-7.

(4) AP-42 Table 1.6-1, Wood-fired boiler with a mechanical collector without flyash reinjection.

(5) POM emissions are the sum of the specific POM compound emissions listed.

Table 2
1995 Emission Calculations
Option 1: Emission Factor Method
Hogged Fuel-fired Boiler
Columbia Forest Products, Chatham, Virginia

Registration No. : 30120 Point No. : 001 Segment No. : 01 SCC No. : 10300903

HAP	Emission Factor (lb/ton-fuel)	HAP Annual Emission Rate ^(a) (tons/yr)
Acetaldehyde		
Acrolein	1.92E-03	5.88E-03
Benzene	4.00E-06	1.22E-05
2,4-Dinitrophenol	9.95E-03	3.05E-02
Formaldehyde	4.23E-06	1.30E-05
Naphthalene	8.26E-03	2.51E-02
4-Nitrophenol	3.59E-03	1.04E-02
Phenols ⁽²⁾	2.97E-06	9.09E-06
2,3,7,8-Tetrachloro-dibenzo-p-dioxin	1.47E-04	4.50E-04
Cobalt	3.60E-11	1.10E-10
Arsenic	1.30E-04	3.98E-04
Cadmium	8.52E-05	2.61E-04
Chromium (total)	2.12E-05	6.49E-05
Manganese	1.56E-04	4.78E-04
Mercury	1.26E-03	3.86E-02
Nickel	5.15E-06	1.58E-05
Selenium	6.90E-05	2.11E-04
POM ⁽³⁾	4.59E-03	1.41E-04
		9.35E-04
Total HAP Emissions:		0.11

POM Polycyclic Organic Compounds	Emission Factor ⁽¹⁾ (lb/ton-fuel)	POM Annual Emission Rate ^(a) (tons/yr)
Acenaphthene		
Fluorene	4.10E-06	1.26E-05
Phenanthrene	8.22E-06	2.52E-05
Fluoranthene	5.02E-05	1.54E-04
Benzo(a)anthracene	1.83E-05	5.60E-05
Benzofluoranthene	3.27E-06	1.00E-05
Benzo(k)fluoranthene	1.98E-06	6.31E-06
Benzo(b+k)fluoranthene	7.65E-07	2.34E-06
Benzo(a)pyrene	2.90E-05	8.88E-05
Benzo(g,h,i)perylene	6.75E-08	2.07E-07
2-Chlorophenol	1.41E-06	4.32E-06
Chrysene	5.13E-07	1.57E-06
Indeno(1,2,3,c,d)pyrene	4.52E-07	1.38E-06
Acenaphthylene	3.60E-07	1.10E-06
Methyl anthracene	4.76E-05	1.46E-04
	1.40E-04	4.29E-04
Total POM Emissions:		9.35E-04

- Notes:
- (a) annual emissions = [emission factor (lb/ton-fuel)] X [corrected hogged fuel usage (ton-mel/yr)] X (ton/2000 lb)
corrected hogged fuel usage (ton-fuel/yr) = 6,125.6 (b)
 - (b) corrected hogged fuel usage = [hogged fuel usage (tons/yr)] X [(1-MC_a)/(1-MC_f)]
hogged fuel usage (10% MC) [tons/year] = 5,402 (c)
 - (c) actual moisture content (MC_a) [%] = 10% (d)
 - (d) emission factor moisture content (MC) [%] = 30% (e)

- References:
- (1) AP-42 Tables 1.6-4 and 1.6-5, organic compounds from wood waste combustion with PM controls.
 - (2) Emission factor value includes phenol, which is a HAP, plus substance phenols which are not HAPs.
 - (3) POM emission estimates are shown in the lower table.
 - (4) Provided by facility (estimates from Chatham).
 - (5) AP-42 emission factors are based on firing fuel with a moisture content of 30%, so the fuel usage is corrected to account for this.



MATERIAL SAFETY DATA SHEET

Revised: October 7, 2004

Supersedes: May 27, 2004

Number of pages: 4

PART I: PRODUCT IDENTIFICATION

Product: Domestic and imported urea-formaldehyde or phenol formaldehyde bonded unfinished or UV coated hardwood plywood industrial stock panels, melamine on particleboard, raw particleboard, strawboard, hardwood veneer

Synonyms: Hardwood plywood, plywood, melamine, PBC, Wheatboard, hardwood veneer

Trade Names: Classic Core™, Classic Lam™, Classic Core II™, Melawood™, Classic Core II, Europly™, JayCore™, UV Wood™, CFP 60's™, EcoColors™, Multiply™, Woodstalk™, SP Birch™, Imperial Birch™, Russian Birch

Manufacturer: Columbia Forest Products
Corporate Office
222 SW Columbia, Suite 1575
Portland, OR 97201
1-800-547-4261
www.columbiaforestproducts.com

Contact: Ang Schramm, Technical Services Manager
Emergency phone: 334-616-7745

PART II: HAZARDOUS INGREDIENTS

Component: **Wood dust¹** (Generated as waste by-product of further fabrication by user)

CAS No.: None

Exposure limits:	ACGIH TLV Softwoods and most hardwoods (except Beech, and Oak)	<u>PEL</u> 5 mg/m ³ TWA	<u>STEL</u> 10 mg/m ³
	ACGIH TLV Certain Hardwoods (i.e. Beech and Oak)	(15 min) 1 mg /m ³ TWA	N/A
	OSHA All soft and hard woods (except Western Red Cedar)	5 mg/m ³ TWA	10 mg/m ³
	OSHA Western Red Cedar	2.5 mg/m ³ TWA	N/A

Component: **Formaldehyde gas** (emitted in small and diminishing quantities from Urea Formaldehyde resin glue. Phenolic formaldehyde adhesive systems not regulated)

CAS No.: 50-00-0

Exposure limits:	OSHA	0.75 ppm TWA	2 ppm
	ACGIH TLV	0.3 ppm Ceiling	
	HUD	0.3 ppm @ .13 ft ² /ft ³	

Formaldehyde gas emissions from industrial stock panels tested under prescribed conditions for manufactured housing applications.

PART III: PHYSICAL PROPERTIES

Description:	Unfinished and UV Finished multi-ply composite wood panels consisting of various combinations of hardwood or decorative veneer faces, bonded to other wood veneers, particleboard, medium density fiberboard, lumber, or hardboard. Generally used in cabinets, furnishings, laminated block flooring, and in other non-structural applications. Typically provided as 4' X 8' panels, but available in other sizes. Thicknesses range from under 1/8" to over 1".
Specific gravity:	Usually less than 1, but varies depending on wood species and moisture content.
Boiling point:	Not applicable.
Solubility in water:	Insoluble.
Appearance/Odor:	Normal for natural wood. Light to dark in color. Color and odor vary by species and expired time since processing.

PART IV: FIRE AND EXPLOSION DATA

Flash point:	600° F for wood.
Autoignition temp.:	Varies (typically 400° F to 500° F)
Explosive limits in air:	N/A for hardwood plywood. 40 g/m ³ (LEL) for wood dust.
Extinguishing media:	Water, carbon dioxide, sand
Special fire fighting procedures:	Follow established procedures for extinguishing wood source fire.
Unusual fire and explosion hazard:	Hardwood plywood does not present an explosion hazard. Sawing, sanding, or machining of hardwood plywood can produce wood dust as a by-product which may present an explosion hazard if a dust cloud contacts an ignition source. An airborne concentration of 40 grams of wood dust per cubic meter of air is often used as the LEL for wood dust.

PART V: REACTIVITY DATA

Stability:	Stable under normal conditions.
Incompatibility:	Avoid contact with strong oxidizing agents and drying oils. Avoid open flame. Product may ignite at temperatures in excess of 400° F, depending on length of time of exposure.
Hazardous decomposition products:	Thermal and/or thermal oxidative decomposition of wood can produce irritating and toxic fumes and gases, including carbon monoxide, hydrogen cyanide, aldehydes, organic acids, and polynuclear aromatic compounds.
Conditions to avoid:	High temperatures and high relative humidity increase the rate of formaldehyde emissions. Avoid open flames or other ignition source.
Storage:	In a cool, dry place, away from ignition sources. Provide adequate ventilation.
Hazardous polymerization:	Not applicable.

PART VI: HEALTH AND HAZARD DATA:

Eye contact:	Gaseous formaldehyde may cause temporary irritation or a burning sensation. Wood dust can cause mechanical irritation.
Skin contact:	Both formaldehyde and wood dust from various species of wood may evoke allergic contact dermatitis in sensitized individuals.
Ingestion:	Not likely to occur.
Inhalation:	Wood dust and/or formaldehyde may cause nasal dryness and/or irritation. Coughing, sneezing, wheezing, sinusitis, prolonged colds, and headaches have

Chronic effects: also been reported. Both may aggravate preexisting respiratory conditions or allergies. Wood dust may also cause nasal obstruction. Depending on species, wood dust may cause dermatitis on prolonged, repetitive contact. Formaldehyde and/or wood dust may cause respiratory sensitization and/or irritation. Pre-existing respiratory disorders may be aggravated by exposure.

Prolonged exposure to wood dust has been reported by some observers of European furniture workers to be associated with nasal cancer. IARC classifies wood dust as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC did not find sufficient evidence to associate cancers of the oropharynx, lung, lymphatic, and hematopoietic systems, stomach, colon, or rectum with exposure to wood dust. The National Toxicology Program (NTP) has also listed wood dust as a known human carcinogen. Wood dust is not listed as a carcinogen by ACGIH or OSHA. A large case control nasal cancer mortality study in North Carolina, Mississippi, Washington and Oregon (1962-1977) did not demonstrate an association between nasal cancer and occupations normally associated with wood dust.

Formaldehyde is listed by IARC as a human carcinogen. NTP includes formaldehyde in the Annual Report on Carcinogens. Formaldehyde is regulated by OSHA as a potential cancer agent. Some rats exposed under laboratory conditions to 14 ppm formaldehyde (a level far exceeding human tolerance limits, and far exceeding that normally found in the workplace) for two years developed a nasal cancer. The Universities Associated for Research and Education in Pathology (UAREP) has stated in a report, Epidemiology of a Chronic Occupational Exposure to Formaldehyde, (December, 1987,) that: "1: For no malignancy in man is there convincing evidence of a relationship with formaldehyde exposure; and 2: Furthermore, that if a relationship does exist, the excess risk, in absolute terms, must be small."

PART VII: PRECAUTIONS AND SAFE HANDLING

Ventilation: Provide adequate ventilation and exhaust to keep airborne contaminant concentration levels below the OSHA PELs, and to reduce the possible buildup of formaldehyde gas, particularly when high temperatures and relative humidity occur. Avoid dusty conditions, and observe same ventilation for wood dust as indicated for formaldehyde.

Personal protective equipment: Wear goggles or safety glasses when manufacturing or machining any wood product. Wear NIOSH/MSHA approved respirator when the allowable limits may be exceeded. Other protective equipment, such as gloves and outer garments may be needed, depending on dust conditions.

Fire prevention: Avoid open flames or other ignition sources. Keep fire extinguisher readily available.

PART VIII: EMERGENCY AND FIRST AID PROCEDURES

Eyes: Flush with large amounts of water. Remove to fresh air. If irritation persists, seek medical attention.

Skin: Wash affected area with soap and water. If rash, persistent irritation, or dermatitis occurs, seek medical attention.

Inhalation: Remove to fresh air. Get medical advice if persistent irritation, severe coughing, or breathing difficulty occurs.

Ingestion: Not applicable.

PART IX: SPILL, LEAK, STORAGE, AND DISPOSAL

Pick up, vacuum, or sweep spills for recovery and/or disposal. Avoid creating dusty conditions. Provide good ventilation where dust conditions cannot be avoided during cleanup. Place recovered wood dust in a container for proper disposal. Store in well ventilated area as product will emit small amounts of formaldehyde. Dispose in accordance with Federal, State, and Local regulations. Disposal is the responsibility of the generator.

PART X: KEY TO COMMONLY USED ACRONYMS

ACGIH:	American Conference of Government and Industrial Hygienists
EPA:	Environmental Protection Agency
HUD:	US Department of Housing and Urban Development
IARC:	International Agency for Research on Cancer
LEL:	Lowest explosion limit
Mg/m ³ :	Milligrams per cubic meter
MSDS:	Material Safety Data Sheet
NTP:	National Toxicology Program
OSHA:	Occupational Safety and Health Administration
PEL:	Permissible exposure limit
PPM:	Parts per million
STEL:	Short term exposure limit
TLV:	Threshold limit value
TWA:	Time weighted average

PART XI: USER RESPONSIBILITY

Important: This information is offered in good faith. It is believed to be accurate and has been compiled from sources believed to be reliable. It is offered for your consideration, investigation, and verification. Columbia Forest Products makes no warranty of any kind, expressed or implied, concerning the accuracy or completeness of the information and data herein. Furthermore, Columbia Forest Products will not be liable for claims relating to any party's use of, or reliance on information and data contained herein, regardless of whether it is claimed that the information and data are inaccurate, incomplete, or otherwise misleading.

It is the responsibility of the user to comply with local, state, and/or federal regulations concerning the storage, use, processing, and disposal of the product or subsequently generated waste. It is the responsibility of the user to ensure that this MSDS is the most current version.

IMPORTANT FOOTNOTE¹

CONCERNING OSHA PELS FOR WOOD DUST

In AFL-CIO v. OSHA 965 F. 2d 962 (11th Cir. 1992), the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PELS for wood dust that OSHA had established at that time. The 1989 PELS were: TWA - 5 mg/m³; STEL (15 min.) - 10.0 mg/m³ (all soft and hard woods except Western red cedar); Western red cedar TWA-2.5 mg/m³.

Wood dust is now officially regulated as an organic dust under the Particulates Not Otherwise Regulated (PNOR) or Inert or Nuisance Dust categories at PELS noted under PART II of this MSDS. However, a number of states have incorporated provisions of the 1989 standard in their state plans. Additionally, OSHA has announced that it may cite companies under the OSH Act General Duty Clause under appropriate circumstances for non-compliance with the 1989 PELS.

MATERIAL SAFETY DATA SHEET

September 5, 2003

Number of pages: 4

PART I: PRODUCT IDENTIFICATION

Product: No-Added-Formaldehyde (NAF-PVA) bonded plywood, strawboard bonded with NAF-PVA, hardwood veneer lay-ons, solid-strip flooring

Synonyms: Technical Hardwood plywood, wheatboard core plywood, decorative, rotary hardwood veneer skins or hardwood veneer lay-ons

Trade Names: JayCore™ NAF-PVA KayCore™ NAF-PVA, CFP 60's™ NAF-PVA, EcoColors™ on Woodstalk™, Multiply™, Appalachian Traditions™ rotary veneer lay-ons

Manufacturer: Columbia Forest Products
Corporate Office
222 SW Columbia, Suite 1575
Portland, OR 97201
1-800-547-4261
www.columbiaforestproducts.com

Contact: Ang Schramm, Technical Services Manager
Emergency phone: 334-616-7745

PART II: HAZARDOUS INGREDIENTS

Component:	Wood dust¹ (Generated as waste by-product of further fabrication by user)		
CAS No.:	None		
Exposure limits:	ACGIH TLV Softwoods and most hardwoods (except Beech, and Oak)	<u>PEL</u> 5 mg/m ³ TWA	<u>STEL</u> 10 mg/m ³
	ACGIH TLV Certain Hardwoods (i.e. Beech and Oak)	(15 min) 1 mg/m ³ TWA	N/A
	OSHA All soft and hard woods (except Western Red Cedar)	5 mg/m ³ TWA	10 mg/m ³
	OSHA Western Red Cedar	2.5 mg/m ³ TWA	N/A

PART III: PHYSICAL PROPERTIES

Description: Solid wood flooring and hardwood veneers, unfinished and UV Finished multi-ply composite wood panels consisting of various combinations of hardwood or decorative veneer faces, bonded to other wood veneers or strawboard using adhesives containing no added formaldehyde. Generally used in cabinets, furnishings, flooring, and in other non-structural applications. Typically provided as solid wood strip flooring, 50"X100" lay-on hardwood veneers, and 4' X 8' hardwood panels. Other dimensions of hardwood plywood and veneers are available. Thickness of products range from 1/42" of an inch to over 1".

Specific gravity: Usually less than 1, but varies depending on wood species and moisture content.

Boiling point: Not applicable.

Solubility in water: Insoluble.

Appearance/Odor: Normal for natural wood. Light to dark in color. Color and odor vary by species and expired time since processing.

PART IV: FIRE AND EXPLOSION DATA

Flash point:	600° F for wood.
Autoignition temp.:	Varies (typically 400° F to 500° F)
Explosive limits in air:	N/A for hardwood plywood. 40 g/m ³ (LEL) for wood dust.
Extinguishing media:	Water, carbon dioxide, sand
Special fire fighting procedures:	Follow established procedures for extinguishing wood source fire.
Unusual fire and explosion hazard:	Hardwood plywood does not present an explosion hazard. Sawing, sanding, or machining of hardwood plywood can produce wood dust as a by-product which may present an explosion hazard if a dust cloud contacts an ignition source. An airborne concentration of 40 grams of wood dust per cubic meter of air is often used as the LEL for wood dust.

PART V: REACTIVITY DATA

Stability:	Stable under normal conditions.
Incompatibility:	Avoid contact with strong oxidizing agents and drying oils. Avoid open flame. Product may ignite at temperatures in excess of 400° F, depending on length of time of exposure.
Hazardous decomposition products:	Thermal and/or thermal oxidative decomposition of wood can produce irritating and toxic fumes and gases, including carbon monoxide, hydrogen cyanide, aldehydes, organic acids, and polynuclear aromatic compounds.
Conditions to avoid:	Avoid open flames or other ignition source.
Storage:	In a cool, dry place, away from ignition sources. Provide adequate ventilation.

PART VI: HEALTH AND HAZARD DATA:

Eye contact:	Wood dust can cause mechanical irritation.
Skin contact:	Wood dust from various species of wood may evoke allergic contact dermatitis in sensitized individuals.
Ingestion:	Not likely to occur.
Inhalation:	Wood dust may cause nasal dryness and/or irritation. Coughing, sneezing, wheezing, sinusitis, prolonged colds, and headaches have also been reported. May aggravate preexisting respiratory conditions or allergies. Wood dust may cause nasal obstruction.
Chronic effects:	Depending on species, wood dust may cause dermatitis on prolonged, repetitive contact. Wood dust may cause respiratory sensitization and/or irritation. Pre-existing respiratory disorders may be aggravated by exposure.

Prolonged exposure to wood dust has been reported by some observers of European furniture workers to be associated with nasal cancer. IARC classifies wood dust as a carcinogen to humans (Group 1). This classification is based primarily on IARC's evaluation of increased risk in the occurrence of adenocarcinomas of the nasal cavities and paranasal sinuses associated with exposure to wood dust. IARC did not find sufficient evidence to associate cancers of the oropharynx, lung, lymphatic, and hematopoietic systems, stomach, colon, or rectum with exposure to wood dust. The National Toxicology Program (NTP) has also listed wood dust as a known human carcinogen. Wood dust is not listed as a carcinogen by ACGIH or OSHA. A large case control nasal cancer mortality study in North Carolina, Mississippi, Washington and Oregon (1962-1977) did not demonstrate an association between nasal cancer and occupations normally associated with wood dust.

PART VII: PRECAUTIONS AND SAFE HANDLING

- Ventilation: Provide adequate ventilation and exhaust to keep airborne contaminant concentration levels below the OSHA PELs.
- Personal protective equipment: Wear goggles or safety glasses when manufacturing or machining any wood product. Wear NIOSH/MSHA approved respirator when the allowable limits may be exceeded. Other protective equipment, such as gloves and outer garments may be needed, depending on dust conditions.
- Fire prevention: Avoid open flames or other ignition sources. Keep fire extinguisher readily available.

PART VIII: EMERGENCY AND FIRST AID PROCEDURES

- Eyes: Flush with large amounts of water. Remove to fresh air. If irritation persists, seek medical attention.
- Skin: Wash affected area with soap and water. If rash, persistent irritation, or dermatitis occurs, seek medical attention.
- Inhalation: Remove to fresh air. Get medical advice if persistent irritation, severe coughing, or breathing difficulty occurs.
- Ingestion: Not applicable.

PART IX: SPILL, LEAK, STORAGE, AND DISPOSAL

Pick up, vacuum, or sweep spills for recovery and/or disposal. Avoid creating dusty conditions. Provide good ventilation where dust conditions cannot be avoided during cleanup. Place recovered wood dust in a container for proper disposal. Dispose in accordance with Federal, State, and Local regulations. Disposal is the responsibility of the generator.

PART X: KEY TO COMMONLY USED ACRONYMS

- ACGIH: American Conference of Government and Industrial Hygienists
- EPA: Environmental Protection Agency
- HUD: US Department of Housing and Urban Development
- IARC: International Agency for Research on Cancer
- LEL: Lowest explosion limit
- Mg/m³: Milligrams per cubic meter
- MSDS: Material Safety Data Sheet
- NTP: National Toxicology Program
- OSHA: Occupational Safety and Health Administration
- PEL: Permissible exposure limit
- PPM: Parts per million
- STEL: Short term exposure limit
- TLV: Threshold limit value
- TWA: Time weighted average

PART XI: USER RESPONSIBILITY

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It is the responsibility of the user to comply with local, state, and/or federal regulations concerning the storage, use, processing, and disposal of the product or subsequently generated waste. It is the responsibility of the user to ensure that this MSDS is the most current version.

IMPORTANT FOOTNOTE¹

CONCERNING OSHA PELs FOR WOOD DUST

In AFL-CIO v. OSHA 965 F. 2d 962 (11th Cir. 1992), the court overturned OSHA's 1989 Air Contaminants Rule, including the specific PELs for wood dust that OSHA had established at that time. The 1989 PELs were: TWA - 5 mg/m³; STEL (15 min.) - 10.0 mg/m³ (all soft and hard woods except Western red cedar); Western red cedar TWA-2.5 mg/m³.

Wood dust is now officially regulated as an organic dust under the Particulates Not Otherwise Regulated (PNOR) or Inert or Nuisance Dust categories at PELs noted under PART II of this MSDS. However, a number of states have incorporated provisions of the 1989 standard in their state plans. Additionally, OSHA has announced that it may cite companies under the OSH Act General Duty Clause under appropriate circumstances for non-compliance with the 1989 PELs.

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT & COMPANY IDENTIFICATION

24-HOUR EMERGENCY PHONE NUMBER: 989-636-4400

Product: WOODSTALK(TM) ZS 100 ENGINEERED FIBERBOARD

Product Code: 53974

Effective Date: 07/11/02 Date Printed: 03/18/04 MSD: 006975

The Dow Chemical Company, Midland, MI 48674

Customer Information Center: 800-258-2436

2. COMPOSITION/INFORMATION ON INGREDIENTS

Wheat straw board containing polyurea resin 100%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

* Solid straw board. Mild characteristic odor. Toxic fumes may be *
* released in fire situations. *

POTENTIAL HEALTH EFFECTS (See Section 11 for toxicological data.)

EYE: Dust generated in processing may cause irritation or corneal injury due to mechanical action.

SKIN: Solid or dusts may cause skin irritation due to mechanical abrasion. No adverse effects anticipated by skin absorption.

INGESTION: Swallowing is unlikely because of the physical state.

INHALATION: Dust generated by mechanical handling may cause irritation of the upper respiratory tract (nose and throat).

SYSTEMIC (OTHER TARGET ORGAN) EFFECTS: No relevant information found.

CANCER INFORMATION: No relevant information found.

TERATOLOGY (BIRTH DEFECTS): No relevant information found.

REPRODUCTIVE EFFECTS: No relevant information found.

4. FIRST AID

EYE: Flush eyes with plenty of water; remove contact lenses after the first 1-2 minutes then continue flushing for several minutes. Only mechanical effects expected.

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4. FIRST AID (CONTINUED)

SKIN: Wash skin with plenty of water.

INGESTION: No emergency medical treatment necessary.

INHALATION: Move person to fresh air; if effects occur, consult a physician.

NOTE TO PHYSICIAN: No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT: Not applicable.

METHOD USED: Not applicable.

AUTOIGNITION TEMPERATURE: >392F, >200C

FLAMMABILITY LIMITS

LFL: Not applicable.

UFL: Not applicable.

HAZARDOUS COMBUSTION PRODUCTS: During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds. Hazardous combustion products may include and are not limited to phenolics, carbon monoxide, carbon dioxide and polycyclic aromatic compounds. Hazardous combustion products may include trace amounts of nitrogen oxides and hydrogen cyanide.

OTHER FLAMMABILITY INFORMATION: Mechanical cutting, grinding or sawing can cause formation of dusts. To reduce the potential for dust explosion, do not permit dust to accumulate.

EXTINGUISHING MEDIA: Water, carbon dioxide, dry chemical.

FIRE FIGHTING INSTRUCTIONS: Keep people away. Isolate fire area and deny unnecessary entry. Soak thoroughly with water to cool and prevent re-ignition. Cool surroundings with water to localize fire zone. Hand held carbon dioxide or dry chemical extinguishers may be used for small fires.

PROTECTIVE EQUIPMENT FOR FIRE FIGHTERS: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire

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5. FIRE FIGHTING MEASURES (CONTINUED)

fighting equipment (includes fire fighting helmet, coat, pants, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

6. ACCIDENTAL RELEASE MEASURES (See Section 15 for Regulatory Information)

PROTECT PEOPLE: See MSDS Section 10 for information on stability and reactivity.

PROTECT THE ENVIRONMENT: For additional information see Regulatory Information, MSDS Section 15.

CLEANUP: Sweep up. Place in properly labeled containers.

7. HANDLING AND STORAGE

HANDLING: This product is combustible and may constitute a fire hazard if improperly used or installed. When installed, this product should be adequately protected as directed by national building regulations or instructions in the specific application brochure. No smoking, open flame or sources of ignition in handling and storage area.

Mechanical handling equipment can cause formation of dusts. Maintain good housekeeping. Layers of flammable dusts should not be permitted to accumulate. Keep dust away from ignition sources. Provide adequate local ventilation and appropriate dust handling systems.

STORAGE: Store flat with adequate support. Store in a dry place. Keep away from possible ignition sources. Keep away from open flames and spark producing equipment. Store in a cool, well ventilated area, away from sources of ignition. Proper ventilation is recommended to control dust formation.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Good general ventilation should be sufficient for most conditions. Local exhaust ventilation may be necessary for some operations.

PERSONAL PROTECTIVE EQUIPMENT

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION (CONTINUED)

EYE/FACE PROTECTION: Use safety glasses. If there is a potential for exposure to particles which could cause mechanical injury to the eye, wear chemical goggles.

SKIN PROTECTION: No precautions other than clean body-covering clothing should be needed.

RESPIRATORY PROTECTION: In dusty atmospheres, use an approved particulate respirator.

EXPOSURE GUIDELINE(S): ACGIH TLV is 10 mg/m3 inhalable, 3 mg/m3 respirable for Particulates (insoluble) Not Otherwise Classified (PNOC). OSHA PEL is 15 mg/m3 total, 5 mg/m3 respirable for PNOC.

9. PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Solid, straw board
ODOR: Mild characteristic odor
VAPOR PRESSURE: Not applicable
VAPOR DENSITY: Not applicable
BOILING POINT: Not applicable
SOLUBILITY IN WATER: Not applicable
SPECIFIC GRAVITY: Not applicable

10. STABILITY AND REACTIVITY

CHEMICAL STABILITY: Thermally stable at typical use temperatures.

CONDITIONS TO AVOID: Avoid temperatures above 200C (392F). Product can decompose at elevated temperatures.

INCOMPATIBILITY WITH OTHER MATERIALS: Avoid contact with drying oils and oxidizing materials.

HAZARDOUS DECOMPOSITION PRODUCTS: Hazardous decomposition products depend upon temperature, air supply and the presence of other materials.

HAZARDOUS POLYMERIZATION: Will not occur.

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11. TOXICOLOGICAL INFORMATION (See Section 3 for Potential Health Effects. For detailed toxicological data, write or call the address or non-emergency number shown in Section 1)

MUTAGENICITY: No relevant information found.

12. ECOLOGICAL INFORMATION (For detailed Ecological data, write or call the address or non-emergency number shown in Section 1)

ENVIRONMENTAL FATE

MOVEMENT & PARTITIONING: No bioconcentration is expected because of the relatively high molecular weight (MW >1000). In the terrestrial environment, material is expected to remain in the soil.

DEGRADATION & PERSISTENCE: No appreciable biodegradation is expected.

ECOTOXICITY: Not expected to be acutely toxic to aquatic organisms.

13. DISPOSAL CONSIDERATIONS (See Section 15 for Regulatory Information)

DISPOSAL: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. THE DOW CHEMICAL COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/Information On Ingredients).

FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: recycler, reclaimer, incinerator, landfill.

As a service to its customers, Dow can provide lists of companies which recycle, reprocess or manage chemicals or plastics, and companies that manage used drums. Telephone Dow's Customer Information Center at 800-258-2436 or 989-832-1556 for further details.

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14. TRANSPORT INFORMATION

DEPARTMENT OF TRANSPORTATION (D.O.T.): This product is not regulated by D.O.T. when shipped domestically by land.

15. REGULATORY INFORMATION (Not meant to be all-inclusive--selected regulations represented)

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations. See other sections for health and safety information.

U.S. REGULATIONS

SARA 313 INFORMATION: To the best of our knowledge, this product contains no chemical subject to SARA Title III Section 313 supplier notification requirements.

SARA HAZARD CATEGORY: This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Not to have met any hazard category

CALIFORNIA PROPOSITION 65: The following statement is made in order to comply with the California Safe Drinking Water and Toxic Enforcement Act of 1986:

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

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REGULATORY INFORMATION: (CONTINUED)

TOXIC SUBSTANCES CONTROL ACT (TSCA):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

STATE RIGHT-TO-KNOW: This product is not known to contain any substances subject to the disclosure requirements of

New Jersey
Pennsylvania

OSHA HAZARD COMMUNICATION STANDARD:

This product is not a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

CANADIAN REGULATIONS

WHMIS INFORMATION: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

This product is exempt under WHMIS.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA):

All substances in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

16. OTHER INFORMATION

MSDS STATUS: Revised Section 15 (added Canadian regulatory information).

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