TOTAL Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

MEL-1

MELAMINE

Project: Arlington Community High School

Project Number: 1877

Manufacturer: PANOLAM
Name: WHITE MELAMINE

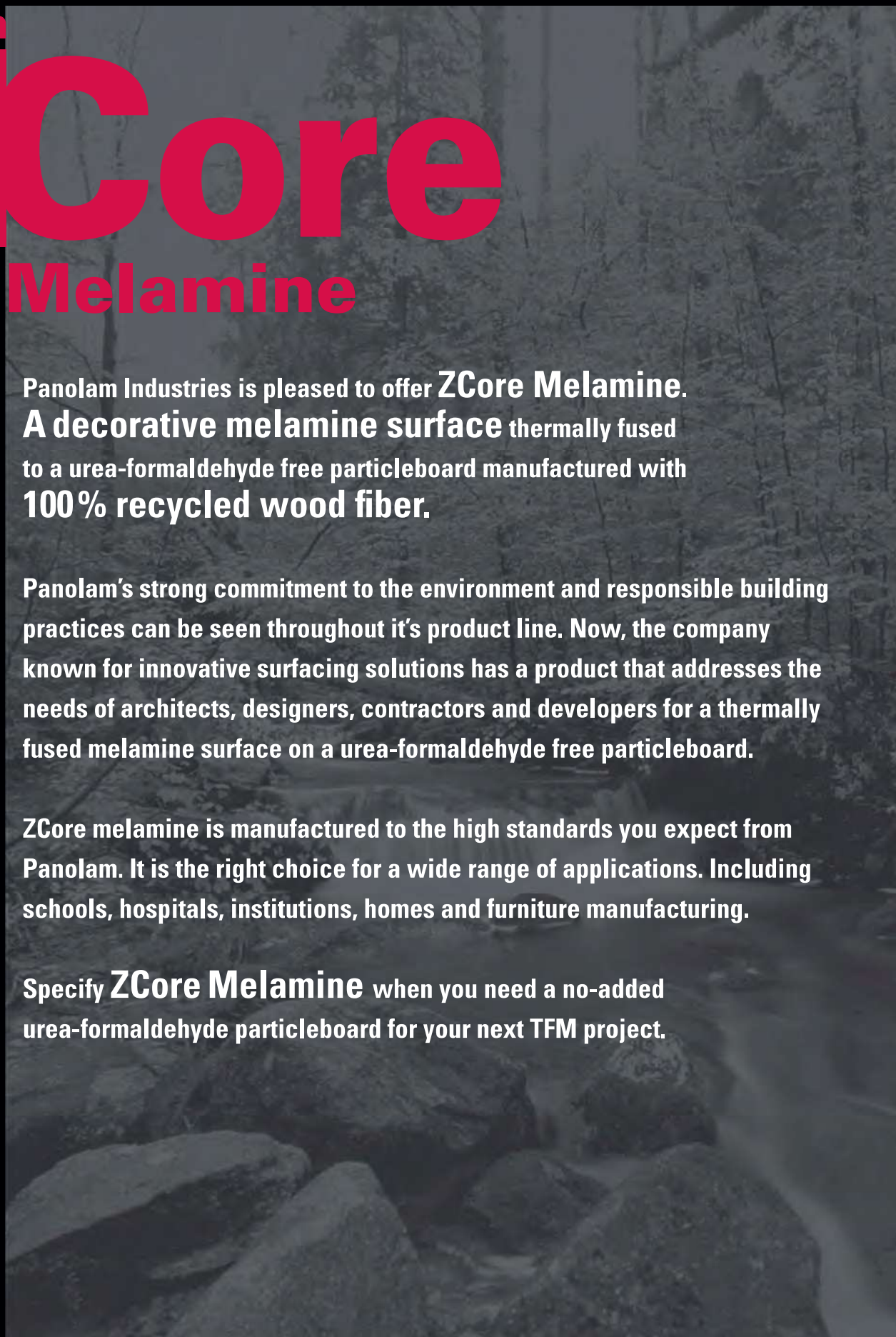
ITEM DETAILS:
DECORATIVE MELAMINE SURFACE THERMALLY FUSED TO ULEF PARTICLEBOARD CORE WITH PVC EDGEBANDING.

THICKNESS:
¾" FOR CABINET BODY
¼" FOR CABINETS BACK
REFER TO DRAWINGS FOR MATERIAL THICKNESS

Panolam

ZCore

Melamine



Panolam Industries is pleased to offer ZCore Melamine. A decorative melamine surface thermally fused to a urea-formaldehyde free particleboard manufactured with 100% recycled wood fiber.

Panolam's strong commitment to the environment and responsible building practices can be seen throughout it's product line. Now, the company known for innovative surfacing solutions has a product that addresses the needs of architects, designers, contractors and developers for a thermally fused melamine surface on a urea-formaldehyde free particleboard.

ZCore melamine is manufactured to the high standards you expect from Panolam. It is the right choice for a wide range of applications. Including schools, hospitals, institutions, homes and furniture manufacturing.

Specify ZCore Melamine when you need a no-added urea-formaldehyde particleboard for your next TFM project.

ZCore Melamine

MEL-1

Particleboard Information and Technical Data

- Urea-formaldehyde free
- Manufactured with 100 percent recycled wood fiber
- CARB Phase II compliant
- LEED credit support

Technical Data

Density	45 – 47 lb/ft^3
Internal bond	65 – 80 lb/in^2
Modulus of rupture	1950 – 2300 lb/in^2
Modulus of elasticity	326,300 – 398,900 lb/in^2
Screw holding, face	225 – 260 lb
Screw holding, edge	202 – 225 lb
Thickness tolerance	± .005 in
Length/width tolerance	± 1/8 in
Squareness tolerance	± 1/8 in
Flame spread rating	UL class C
Moisture content	< 8%
Formaldehyde emissions	as low as 0.01 ppm

This product is produced at:

Panolam Industries International Inc.
Muskoka Road 3
Huntsville, Ontario PIH2J7

6300 Atlantic Blvd.
Norcross, Georgia 30071

3030 Calapooia St. SW
Albany, Oregon 97322

2750 Vinland Rd.
Oshkosh, Wisconsin 54903

Panolam Industries understands that when a company is dedicated to doing things right, we also have a responsibility to do the right things. We've opened our doors to regulators, our neighboring communities, and our customers, because we want to let you know that we're as proud of our environmental initiatives as we are of the quality of our products.

Panolam Industries International Inc. • 20 Progress Drive • Shelton, Connecticut 06484
203 925 1556 • www.panolam.com

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Fill out the following information for EACH compliant product:

Subcontractor	Total Millwork LLC
Product Name	Pionite Laminates
Manufacturer Name	Panolam Surface System
Manufacturer Location	Auburn ME
Extraction/Harvest Location	
Materials Cost (All costs associated with getting material to site. Exclude installation costs.)	45,668.00

MRc2 Environmental Product Declarations (EPDs):

Option 1: EPD	EPD Program Operator	EPD/LCA Type: Choose an Item
Option 2: Embodied Carbon/LCA Optimization	Type of Report/Reference Document/ Verification	Choose an Item

MRc3 Sourcing of Raw Materials:

Leadership Extraction Practices:	Percent Meeting Criteria (%):
Extended Producer Responsibility Program Name	
Bio-based material (SAN standard) %	
Wood Products % FSC Certified (incl. certificate)	
Materials Reuse %	60%
Recycled Content	Post-Consumer: 20%
	Pre-Consumer:
Does the entire product meet local criteria?	Choose an Item

MRc4 Material Ingredient Reporting:

Option 1: Material Ingredient Reporting	Type of Reporting: Declare	3rd Party Verification: Choose an Item
Option 2: Type of Optimization Report	Certification Program: Choose an Item	Does the entire product meet local criteria? Choose an Item

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Fill out the following information for EACH compliant product:

IEQc2 Low Emitting Materials:

Product (Check One, Enter Name) Paint and Coating ☐ Adhesive and Sealant ☐	Interior/ Exterior?	Wet-AppliedOn-Site?	General Emissions Evaluations
	Choose an Item	Choose an Item	Choose an Item

Wet-Applied Products Volume Used (L)	**VOC Content (g/l):**	**Wet-Applied Products Surface Area Used** (sq ft)

Flooring Product (Enter Name)	General Emissions Evaluations	
	Choose an Item	
Ceilings (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	Choose an Item	Choose an Item
Insulation (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	Choose an Item	Choose an Item
Wall Panels (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	Choose an Item	Choose an Item
Composite Wood (Enter Name)	Composite Wood Evaluation	
	Choose an Item	
Furniture (Enter Name)	Furniture Evaluation	
	Choose an Item	

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Additional REQUIREMENTS:

The following items have material ingredients restricted substance requirements per product **specification part 2.1A – Performance Requirements:** Aluminum Extrusions, Cold-formed Metal Framing, Resilient Flooring, Batt Insulation, Interior Paint, Drywall, Carpet Tile, Wood Doors, MDF/Plywood, ACT, Drapery/Window Treatment.

☐ **Product complies with restricted substance requirements and backup documentation provided**

Embodied Carbon Information REQUIRED for:

Concrete; steel, including structural steel, plates, decking, rebar, cold-formed metal framing; aluminum extrusions; wood; composite wood; wood doors; interior paint; gypsum board; insulation; flat glass; acoustical ceiling panels and tiles; resilient flooring; carpet; and drapery. **Bolded** items have additional requirements per specification section 018113.

☐ **Environmental Product Declaration (EPD) has been provided**
(Product specific type III are preferred, Industry wide EPDs, and product specific declarations are acceptable.)

Total Quantity of Product

Quantity Units: m3 used for concrete and wood. kg used for structural steel (all), flat glass, and aluminum. m2 used for gypsum board; acoustical ceiling panels and tiles; resilient flooring and carpet. m2 RSI used for insulation.

I, Daniel Rivera a duly authorized representative

Total Millwork LLC of hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction.

Furthermore, I understand that any change in such qualifications during the purchasing period will require will prior written approval from **Clark Construction Group, LLC**.

Signature:	**Date:**
Daniel Rivera Digitally signed by Daniel Rivera DN: C=UM, E=drivera@totalmillwork.com, O="Total Millwork LLC ", CN="Daniel Rivera " Date: 2025.11.21 13:54:47-05'00'	11/21/25

TOTAL
Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

ARLINGTON COMMUNITY HIGH SCHOOL

JOB #: 1877

510 14th St S
Arlington VA 22202

CERTIFICATE

PIONITE LAMINATES

SECTION 06 41 16

11/5/2025

CERTIFICATE
OF COMPLIANCE

Panolam Industries International Inc.

Pionite® High Pressure Laminates

1954-410
Certificate Number

04 Apr 2005 - 06 Apr 2026
Certificate Period

Certified
Status

UL 2818 - 2022 Standard for Chemical Emissions for Building Materials, Finishes and Furnishings

Commercial furniture and furnishings are tested in accordance with ANSI/BIFMA M7.1-2011(R2016) and determined to comply with ANSI/BIFMA X7.1-2011(R2016) and ANSI/BIFMA e3-2019 Credit 7.6.1 in a Private Office environment.

Products tested in accordance with UL 2821 test method to show compliance to emission limits in UL 2818, Section 7.1.

GREENGUARD Certification Criteria for Building Products and Interior Finishes

Criteria	CAS Number	Maximum Allowable Predicted Concentration	Units
TVOC(A)	-	0.50	mg/m³
Formaldehyde	50-00-0	61.3 (50 ppb)	µg/m³
Total Aldehydes (B)	-	0.10	ppm
Particle Matter less than 10 µm (C)	-	50	µg/m³
4-Phenylcyclohexene	4994-16-5	6.5	µg/m³
Individual VOCs (D)	-	1/10th TLV	-

(A) Defined to be the total response of measured VOCs falling within the $C_6 - C_{16}$ range, with responses calibrated to a toluene surrogate. Maximum allowable predicted TVOC concentrations for GREENGUARD (0.50 mg/m³) fall in the range of 0.5 mg/m³ or less, as specified in CDPH Standard Method v1.2.

(B) The sum of all measured normal aldehydes from formaldehyde through nonanal, plus benzaldehyde, individually calibrated to a compound specific standard. Heptanal through nonanal are measured via TD/GC/MS analysis and the remaining aldehydes are measured using HPLC/UV analysis.

(C) Particle emission requirement only applicable to HVAC Duct Products with exposed surface area in air streams (a forced air test with specific test method) and for wood finishing (sanding) systems.

(D) Allowable levels for chemicals not listed are derived from 1/10th of the Threshold Limit Value (TLV) industrial work place standard (Reference: American Conference of Government Industrial Hygienists, 6500 Glenway, Building D-7, and Cincinnati, OH 45211-4438).

Decla

Panolam HPL (Pionite, N Matte)
Panolam Surface System

Final Assembly: Auburn, Maine, USA
Life Expectancy: 25+ Year(s)
End of Life Options: Landfill (100%)
EU CoC Screened: Does Not Contain

Ingredients:

Preferred by Nature hereby certifies that

Panolam Surface Systems

2 Corporate Drive Suite 946
Shelton CT, Connecticut 06484
United States

conform with the following standards:

FSC-STD-40-003 V2-1
FSC-STD-40-004 V3-1
FSC-STD-40-005 V3-1
FSC-STD-40-007 V2-0
FSC-STD-50-001 V2-1 EN

The certificate is valid from 28 April 2024 to 27 April 2029
Certificate version date: 02 June 2025

Certification scope

Multisite Chain of Custody and Controlled Wood

Certificate registration code

PBN-COC-004037
PBN-CW-004037

FSC® license code

FSC-C015851

Justinas Janulaitis
Management board member
Filosoofi 31, Tartu, Estonia

Specific information regarding products and/or sites is listed in the appendix(es) of this certificate. The validity and exact scope covered by this certificate shall always be verified at www.info.fsc.org. This certificate itself does not constitute evidence that a particular product supplied by the certificate holder is FSC certified [or FSC Controlled Wood]. Products offered, shipped or sold by the certificate holder can only be considered covered by the scope of this certificate when the required FSC claim is clearly stated on sales and delivery documents. The physical printed certificate remains the property of Preferred by Nature OÜ and shall be returned upon request.

Appendix A: Scope of Panolam Surface Systems
FSC Chain of Custody and Controlled Wood Certificate
PBN-COC-004037 PBN-CW-004037

(The list below shows products handled by the network of Participating Sites)

Product type	Trade name	Output FSC claims
P2.4	Resin Treated/Raw Paper	FSC Mix; FSC Mix x%; FSC Mix Credit; FSC Controlled Wood
P3.4	High Pressure Laminate (Pionite, Nevamar, Panolam) (HPL), Panolam FRL Laminate	FSC Mix; FSC Mix x%; FSC Mix Credit; FSC Controlled Wood
W8.2	Z-Core Particleboard	FSC Mix; FSC Mix x%; FSC Mix Credit; FSC Controlled Wood
W8.2	Particleboard	FSC Mix; FSC Mix x%; FSC Mix Credit; FSC Controlled Wood
W8.2.1	Thermofused Melamine Panels (TFL)	FSC Mix; FSC Mix x%; FSC Mix Credit; FSC Controlled Wood

Appendix B: Scope of Panolam Surface Systems
FSC Chain of Custody and Controlled Wood Certificate
PBN-COC-004037 PBN-CW-004037

No	Site name	Address	Sub-code
1	Panolam Distribution Center – Shelton	710 Bridgeport Ave Shelton Connecticut 06484 United States	PBN-COC-004037-11
2	Pioneer Plastics Corporation	1 Pionite Road Auburn Maine 04210 United States	PBN-COC-004037-5
3	Panolam Distribution Center – Rancho Cucamonga	8535 Oakwood Pl., Ste A Rancho Cucamonga California 91730 United States	PBN-COC-004037-9
4	Panolam Distribution Center - Elkhart	25603 Borg Road Elkhart Indiana 46514 United States	PBN-COC-004037-E
5	Panolam Distribution Center – Carrollton, TX	1145 Crowley Drive Carrollton Texas 75006 United States	PBN-COC-004037-F

panolam.
SURFACE SYSTEMS
One Corporate Drive, Suite 725, Shelton, CT 06484 | 203.925.1556 | www.panolam.com

Policy Statement: Compliance with FSC® Core Labor Requirements

Panolam Industries International Inc and its subsidiaries Panolam Industries Ltd. and Pioneer Plastics Corporation are committed to adopt and implement the FSC® Core Labor Requirements in accordance with FSC-STD-40-004 V3-1.

The organization shall:

- not use child labor.
- eliminate all forms of forced and compulsory labor.
- ensure that there is no discrimination in employment and occupation.
- respect freedom of association and the effective right to collective bargaining.

panolam.
SURFACE SYSTEMS
One Corporate Drive, Suite 725, Shelton, CT 06484 | 203.925.1556 | www.panolam.com

Policy Statement: Compliance with FSC® Core Labor Requirements

Panolam Industries International Inc and its subsidiaries Panolam Industries Ltd. and Pioneer Plastics Corporation are committed to adopt and implement the FSC® Core Labor Requirements in accordance with FSC-STD-40-004 V3-1.

The organization shall:

- not use child labor.
- eliminate all forms of forced and compulsory labor.
- ensure that there is no discrimination in employment and occupation.
- respect freedom of association and the effective right to collective bargaining.

Panolam® TFL

THERMOFUSED LAMINATES

White Melamine

Technical Bulletin

Panolam® Thermofused Laminate (TFL) product line features a wide selection of solids, woodgrains and abstract patterns selected to meet your most varied design needs. Our expansive color line gives access to hundreds of decorative papers that can be used in both high pressure laminate (HPL) and Panolam® TFL.

You can choose from a wide range of panel sizes, core thicknesses and grades to meet virtually any design, performance or budget challenge.

Product Description

Panolam® Thermofused Laminate (TFL) panels consist of a melamine resin-impregnated decorative paper thermally fused to a substrate such as industrial-grade particleboard or medium-density fiberboard (MDF). Thermal fusion takes place under heat and pressure and permanently bonds the impregnated paper to the substrate.

This process results in melamine panels with extraordinary strength and durability. Panolam® Thermofused Laminate panels are resistant to scuffs, stains, moisture, light and heat.

Panolam® TFL has a hard, long-lasting, water-resistant surface which means lower reject rates throughout your operations:

- less damage occurs at the edgebander
- the panel is more resistant to scratches and abrasions in the shop processes
- the possibility of burnishing is eliminated

Because Panolam® TFL is easy to work with:

- edges are cleaner when trimming panels and machining dadoes
- the overspray of edge glues or finishes is easily removed with solvents
- both sides of panels have finished decorative surface

Typical Uses

Panolam® TFL panels can be used for a variety of applications where design and practicality are a must. They are ideal for virtually all vertical applications and many horizontal applications, including desktop and office work surfaces. Both Panolam® TFL and Pionite® HPL combined, offer over 300 colors, which allows for the two materials to mix and match perfectly.

There are hundreds of applications for Panolam® TFL:

- Kitchen and bath cabinetry
- Office furniture
- Hospital and medical casegoods
- Restaurant furniture
- Hotel and motel furniture
- Ready-to-assemble furniture
- Casegoods and built-ins
- Euro design furniture and cabinetry
- Store displays
- Closet storage systems
- Computer Furniture

Thermofused laminate panels can be used for most applications where high-pressure laminates would be specified, including horizontal surfaces. Exceptions: high-wear surfaces (i.e. kitchen countertops and checkout counters) or applications where temperatures may exceed 275 ˚F (135 ˚C).

White Melamine

Panolam® TFL Conformance with Standards for Particleboard and MDF Substrates

The table below presents the average performance standards for particleboard and medium density fiberboard (MDF) as specified by the American National Standards Institute (ANSI).

Property	Particleboard Requirements ANSI/ A208.1-2016 (Specification Average)				Medium Density Fiberboard Requirements ANSI/ A208.2-2016 (Specification Average)			
	M-3i Board		M-2 Board		≤ 15mm or 0.591" MDF		> 15mm or 0.591" MDF	
	Imperial	Metric	Imperial	Metric	Imperial	Metric	Imperial	Metric
Thickness tolerance								
panel average from specified	± 0.008"	± 0.20mm	± 0.008"	± 0.20mm	± 0.005"	± 0.125mm	± 0.005"	+_ 0.125mm
Variance from panel average	± 0.004"	± 0.10mm	± 0.004"	± 0.10mm	± 0.005"	± 0.125mm	± 0.005"	+_ 0.125mm
Modules of rupture (MOR)	2,176 psi	15.0 N/mm²	1,885 psi	13.0 N/mm²	3,130 psi	21.6 N/mm²	3,130 psi	21.6 N/mm²
Modules of elasticity (MOE)	362,600 psi	2500 N/mm²	290,100 psi	2,000 N/mm²	313,000 psi	2,160 N/mm²	313,000 psi	2,400 N/mm²
Internal bond	73 psi	0.50 N/mm²	58 psi	0.40 N/mm²	78 psi	0.54 N/mm²	78 psi	0.54 N/mm²
Hardness	500 lbs.	2,225 N	500 lbs.	2,225 N	-	-	-	-
Linear expansion	0.40% max	0.40% max	0.40% max	0.40% max	0.33% max	0.33% max	0.33% max	0.33% max
Screwholding - face	225 lbs.	1000 N	202 lbs.	900 N	222 lbs.	988 N	222 lbs.	988 N
Screwholding - edge	202 lbs.	900 N	180 lbs.	800 N	177 lbs.	787 N	177 lbs.	787 N
Formaldehyde max. emissions*	0.09 ppm	0.09 ppm	0.09 ppm	0.09 ppm	0.11 ppm**	0.11 ppm**	0.11 ppm	0.11 ppm

*CARB Phase 2 compliant or better
**Formaldehyde emissions for MDF with thickness ≤ 8mm (0.315") are maximum 0.13 ppm
Grade M-3i has an "i" for industrial to differentiate it from Grade M-3

Typical substrate performance shall equal or exceed standards set by the American National Standards Institute (ANSI) for type M-3i or M-2 board. Panolam® TFL thermally fused to western pine substrate may achieve slightly lower impact results.

Panel Sizes and Substrates

Thickness: 1/4" to 1 3/8"
Widths: 49" and 61"
Lengths: 73" to 145"

Substrates: Industrial Grade Particleboard, Medium Density Fiberboard. Fire-retardant panels and moisture-resistant panels are available. ZCore urea-formaldehyde-free particleboard with 100% recycled wood fiber is also available.

Please contact your customer service representative for details on custom sizes, thicknesses and substrates.

How to Specify

Surface shall be Panolam® Thermofused Laminate Panels.

Color Name: _____
Color Number: _____

Panel Texture: _____
Substrate Type: _____

Length: _____
Width: _____

Thickness: _____

Finish Options

Finish	Description
Cathedral	Vertical woodgrain finish with cathedrals spaced across width of sheet.
Chamois	Smooth finish.
Crystal	Fine pebble grained finish with a medium reflective value.
High Gloss	Smooth finish, with high reflective value.
Medium Gloss	Smooth finish with medium reflective value.
Natural Grain	Natural-appearing, linear woodgrain finish with low reflective value.
Polished Cathedral	Vertical woodgrain finish with cathedrals spaced across width of sheet with higher reflective value.
Satin	Smooth finish with low reflective value.
Straight Grain	Vertical woodgrain finish.
Suede	Textured finish with low reflective value.
Super Matte	Smooth, non-reflective finish.
Textural	Fine pebble grained finish with a low reflective value.
Timberline	Deeply embossed, linear woodgrain finish.
Wood Essence	Natural-appearing, linear woodgrain finish with low reflective finish.

Confirmed
-ZGF

White Melamine

Panolam® Thermofused Decorative Panels Surface Properties

Test for resistance to:	Description	Panolam® TFL Typical Performance	
	A measure of the ability of a decorative overlaid surface	Solid colors	Printed patterns
Wear	To maintain its design or color when subject to prolonged abrasive wear	700-900 cycles	125-200 cycles
Stain	To resist staining by prolonged contact with 15 common household substances	Tests 1-10: no effect Tests 11-15: no effect to slight effect	Tests 1-10: no effect Tests 11-15: no effect to slight effect
Cleanability	To be cleaned following prolonged contact with 15 common household substances (a lower value indicates better cleanability)	10	10
Light	To retain its color after prolonged exposure to a light source having a frequency range approximating sunlight through window glass	No effect to slight effect	No effect to slight effect
High Temperature	To maintain its color and surface texture when submitted to a high temperature	No effect to slight effect	No effect to slight effect
Radient Heat	To resist any damage when subjected to a radiant heat source of exposure	No effect after 80 seconds of exposure	No effect after 80 second of exposure
Boiling Water	To maintain its color and surface texture when subjected to boiling water	No effect*	No effect*

*Dark colors may show a slight effect.

Care and Maintenance

Panolam® TFL panels should be cleaned with warm water and mild soaps. Do not use bleach or cleansers, which contain abrasives, acids or alkalis. Remove stubborn stains with a non-abrasive liquid cleanser such as Soft-Scrub® or Vim® followed by a clean water rinse. Dry the melamine surface after rinsing.

Technical Specifications

Fire Test Data

Based on the Steiner Tunnel Test Method of the American Society for Testing and Materials (ASTM-E-84-97) Standard, typical results are:

Flame spread 90

Smoke developed..... 90

Formaldehyde Emissions Test Data

Panolam® TFL is manufactured using particleboard substrate panels conforming to the formaldehyde emission requirements for particleboard of the U.S.

Fabrication Standards

Cabinets constructed with Panolam® TFL panels will conform to the relevant sections of standards set by:

- Kitchen Cabinet Manufacturers Association (KCMA) (ANSI A161.1-2012). Recommended Performance and Construction Standards for Kitchens and Vanity Cabinets.
- Woodworkers Institute of California (WIC) Standards for exposed and semi-exposed surfaces of cabinet bodies.

Certifications

Panolam® TFL is manufactured using particleboard substrate panels compliant with the following standards:

- CARB Composite Wood ATCM:
  - Standard Core: CARB Phase 2
  - ZCore: CARB ULEF
- U.S. Department of Housing and Urban Development (HUD): 24CFR 3280

Soft Scrub® is a registered trademark for the Henkel Corporation of Rocky Hill, CT. Vim® is a registered trademark for Unilever Canada of Saint John, New Brunswick, E2L 3X1, Canada.

White Melamine

Delivery, Storage & Handling

- Products must be unloaded under shelter. If the unloading process is performed outdoors, products must be stored under shelter as soon as possible.
- Never store the products outdoors.
- Store panels in a dry and well ventilated area, away from production lines.
- Do not place panels directly on the floor.
- Avoid extreme temperature during the storage and at the time of use of panels.
- Control the ambient air at 21 °C (70 °F) and relative humidity between 35% and 45%.
- Allow time for panels to reach site temperature before use (minimum 1 to 2 weeks).

Limited Warranty

Subject to the limitations set forth below, Panolam expressly warrants that our products are reasonably free of defects in material and workmanship, and when properly handled and fabricated will conform, within accepted tolerances, to applicable manufacturing specifications as set forth in our technical brochure. This warranty shall extend to the original buyer for a period of twelve (12) months from the date of shipment of this product by Panolam, and shall not be assignable by the original buyer.

This warranty does not cover damage resulting from accident, misuse, alteration, abuse or lack of reasonable care. Due to the variety of uses and applications to which this product may be put, and because the manufacturer has no control over the end products fabricated, the warranty set forth above is exclusive and in lieu of all warranties, expressed or implied, in fact or by operation of law or otherwise, or arising by course of dealing or performance, custom or usage in the trade, including, without limitation, the implied warranties of fitness for a particular purpose and merchantability, and Panolam shall have no obligation or liability to any person or entity in connection with or arising from the furnishing, sale, installation or repair, use or subsequent sale of any product supplied by it.

Our maximum liability arising out of the sale of the products or their use, whether based upon warranty, contract, tort or otherwise, shall not exceed the actual payments received by us in connection therewith. In no event shall we be liable for special, incidental or consequential damages, including, but not limited to, arising hereunder or from the loss of profits, or loss of use damages, sales of the products.

Headquarters

Panolam® Industries International, Inc.
20 Progress Drive
Shelton, CT 06484
1-877-726-6526
www.panolam.com

3/2017

TOTAL Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

MDF

SUBSTRATE

Project: Arlington Community High School

Project Number: 1877

Manufacturer: ARAUCO
Name: ULEF MDF CORE

ITEM DETAILS:
USED AS PLASTIC AND METAL LAMINATES CORE, AND FOR PLAM CABINETS SUBSTRATES.

THICKNESS:
¾" FOR CABINET BODY
¼" FOR CABINETS BACK
REFER TO DRAWINGS FOR MATERIAL THICKNESS

MDF

arauco

Standard TRUPAN

na.arauco.com

SPECIFICATION SHEET

For Detail and EXCEPTIONAL FINISHINGS

TRUPAN Standard MDF is a versatile product that will fit most general industrial uses including cabinets, fixtures and furniture components. An advanced refining process ensures a homogenous panel that is ideal for deep detailed profiling and finishing with exceptional performance results.

Trupan Standard MDF is manufactured in the United States, Canada and Brazil providing supply chain redundancy with ARAUCO's ability to supply these panels from multiple locations while maintaining the same high quality and consistency.

Our mills are FSC® Chain of Custody Certified (FSC-C019364 for North America and FSC-C010928 for Brazil), assuring wood used in manufacturing is derived from ethical sources. In Moncure, NC, Malvern, AR, and Sault Ste. Marie, ON, we manufacture Trupan MDF using recycled and recovered wood content from various North American pine and fir species. Our Pien plant, located in the Paraná region of southern Brazil, uses Taeda and Elliott pine fiber derived from residual wood from ARAUCO's sustainably managed forests in South America.

TRUPAN STANDARD MDF

		Moncure, NC		Sault Ste. Marie, ON					
Thickness Range	(in.) (mm)	5.5 mm - 15 mm	5/8" - 1-1/4"	7.5 mm	6 mm, 8 mm, 1/4"	9 mm - 15 mm	5/8" - 7/8"	25 mm - 30 mm	1-1/4"
Average MOR	(psi)	3,200	3,200	4,729	4,300	3,200	3,200	3,200	3,200
Average MOE	(psi)	333,587	333,587	459,000	447,000	404,000	404,000	404,000	404,000
Average Internal Bond	(psi)	109	109	189	161	109	109	109	109
Face Screw Hold	(lb)	-	222	-	-	250	250	250	250
Edge Screw Hold*	(lb.)	-	177	-	-	-	225	225	225
Thickness Tolerance	(in.)	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"
Length and Width	(in.)	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"
Squareness	(in.)	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"	1/8"

		Malvern, AR				Pien do Brazil					
Thickness Range	(in.) (mm)	3/8"- 1/2"	15 mm - 11/16"	18 mm - 28 mm	1-1/8" - 1-1/2"	7 mm - 9 mm	10 mm - 11.5 mm	12 mm	15 mm - 19 mm	20 mm - 22 mm	25 mm
Average MOR	(psi)	3,500	3,500	3,500	3,500	4,800 - 5,300		4,000 - 4,600			
Average MOE	(psi)	350,000	350,000	350,000	350,000	377,000 - 435,000		348,000 - 406,000			
Average Internal Bond	(psi)	100	95	90	85	100 -130	100 -130	100 -130	100 -130	100 -130	100 -130
Face Screw Hold	(lb)	300	300	285	275	-	-	-	236	236	236
Edge Screw Hold*	(lb.)	-	225	225	225	-	-	-	191	191	191
Thickness Tolerance	(in.)	+/-0.005"	+/-0.005"	+/-0.005"	+/-0.005"	Swelling 24 Hr. %					
Length and Width	(in.)	+/- 1/16"	+/- 1/16"	+/- 1/16"	+/- 1/16"	≤ 15	≤ 13	≤ 13	≤ 11	≤ 10	≤ 10
Squareness	(in.)	1/8"	1/8"	1/8"	1/8"						

- The above physical properties are based on minimum allowable averages of individual production lots. Testing for conformance to the above specifications must be done in accordance with procedures described in the American National Standard for Medium Density Fiberboard. (ANSI 208.2 - 2022 section 6.2 Sampling for Acceptance).
- EPA recognized and CARB approved Third Party Certifier TPC-1.
- EPA TSCA Title VI certified. Complies with CARB ATCM 93120, ANSI 208.2 - 2022, for formaldehyde emissions.
- All panels are approved for interior, non-structural application.
- Contains 100% Recycled/Recovered wood content.

Note: *Edge Screw test is not performed on products less than 5/8" thick (per the ANSI standard).

Storage and Handling

TRUPAN MDF products should never be stored or used outdoors. The indoor storage area should be clean, dry, well ventilated, and free of dust, dirt or particles that could contaminate the MDF. Store flat on stickers on a level, hard, dry surface. Constant relative humidity and temperature should be maintained. Before use, allow to stabilize to the same conditions as are expected after the panel is installed. Condition 48 to 72 hours prior to lamination. For more information, see Composite Panels Association Technical Bulletin: Storage and Handling of Particleboard and MDF.

Safety Data Sheets available online.

6227 JANUARY 23

renewables for a better life

arauco

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Fill out the following information for EACH compliant product:

Subcontractor	Total Millwork
Product Name	MDF
Manufacturer Name	Arauco North America
Manufacturer Location	Eugene, OR/Bennettsville, SC/Malvern, AR/Moncure, NC/St. Stephen/NB
Extraction/Harvest Location	USA and Canada
Materials Cost (All costs associated with getting material to site. Exclude installation costs.)	$3,356.04

MRc2 Environmental Product Declarations (EPDs):

Option 1: EPD	EPD Program Operator	EPD/LCA Type
	EPD International AB	Product Specific Type III External EPI
Option 2: Embodied Carbon/LCA Optimization	Type of Report/Reference Document/ Verification	Choose an Item

MRc3 Sourcing of Raw Materials:

Leadership Extraction Practices:	Percent Meeting Criteria (%):
Extended Producer Responsibility Program Name	N/A
Bio-based material (SAN standard) %	0%
Wood Products % FSC Certified (incl. certificate)	100%, certificate available upon request
Materials Reuse %	
Recycled Content	Post-Consumer: 0-5%
	Pre-Consumer: 95-100%
Does the entire product meet local criteria?	Yes

MRc4 Material Ingredient Reporting:

Option 1: Material Ingredient Reporting	Type of Reporting	3rd Party Verification
	Health Product Declaration	Yes
Option 2: Type of Optimization Report	Certification Program	Does the entire product meet local criteria?
	Material Ingredient Optimisation	Choose an Item

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Fill out the following information for EACH compliant product:

IEQc2 Low Emitting Materials:

Product (Check One, Enter Name) Paint and Coating ☐ Adhesive and Sealant ☐	Interior/ Exterior?	Wet-AppliedOn-Site?	General Emissions Evaluations
	Choose an Item	Choose an Item	Choose an Item

Wet-Applied Products Volume Used (L)	**VOC Content (g/l):**	**Wet-Applied Products Surface Area Used** (sq ft)

Flooring Product (Enter Name)	General Emissions Evaluations	
	Choose an Item	
Ceilings (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	Choose an Item	Choose an Item
Insulation (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	Choose an Item	Choose an Item
Wall Panels (Enter Name)	VOC Emissions Evaluation	**Healthcare/Schools ONLY:** Meets Additional Insulation Requirements
	CDPH Standard Method v1.2 2	Yes
Composite Wood (Enter Name)	Composite Wood Evaluation	
	Choose an Item	
Furniture (Enter Name)	Furniture Evaluation	
	CDPH Standard Method v1.2 2017	

PROJECT SPECIFIC EMBODIED CARBON & LEEDv4.1 PRODUCT DATA SUBMITTAL FORM

Project Name: Arlington Community High School

Additional REQUIREMENTS:

The following items have material ingredients restricted substance requirements per product **specification part 2.1A – Performance Requirements:** Aluminum Extrusions, Cold-formed Metal Framing, Resilient Flooring, Batt Insulation, Interior Paint, Drywall, Carpet Tile, Wood Doors, MDF/Plywood, ACT, Drapery/Window Treatment.

☐ **Product complies with restricted substance requirements and backup documentation provided**

Embodied Carbon Information REQUIRED for:

Concrete; steel, including structural steel, plates, decking, rebar, cold-formed metal framing; aluminum extrusions; wood; composite wood; wood doors; interior paint; gypsum board; insulation; flat glass; acoustical ceiling panels and tiles; resilient flooring; carpet; and drapery. **Bolded** items have additional requirements per specification section 018113.

☐ **Environmental Product Declaration (EPD) has been provided**
(Product specific type III are preferred, Industry wide EPDs, and product specific declarations are acceptable.)

Total Quantity of Product

Quantity Units: m3 used for concrete and wood. kg used for structural steel (all), flat glass, and aluminum. m2 used for gypsum board; acoustical ceiling panels and tiles; resilient flooring and carpet. m2 RSI used for insulation.

I, Daniel Rivera a duly authorized representative

Total Millwork LLC of hereby certify that the material information contained herein is an accurate representation of the material qualifications to be provided by us, as components of the final building construction.

Furthermore, I understand that any change in such qualifications during the purchasing period will require will prior written approval from **Clark Construction Group, LLC**.

Signature:	**Date:**
Daniel Rivera Digitally signed by Daniel Rivera DN: C=UM, E=drivera@totalmillwork.com, O="Total Millwork LLC ", CN="Daniel Rivera " Date: 2025.11.21 13:55:21-05'00'	11/21/25

TOTAL
Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

ARLINGTON COMMUNITY HIGH SCHOOL

JOB #: 1877

510 14th St S
Arlington VA 22202

CERTIFICATE

ARAUCO MDF

SECTION 06 41 16.00

RECYCLED CONTENT FOR MDF

11/5/2025

Recycled Content Declaration

ARAUCO North America domestic composite panel products are manufactured with recycled and/or recovered wood fiber and may help achieve credit in several programs where use of materials containing recycled content is recognized.

The table below details recycle and recovered data by mill for wood raw materials and composite panel products. Values are calculated on a dry weight basis.

Mill	% Wood Raw Materials	% Other Components - Resin Solids, Other Additives	% Pre-consumer (Post-industrial) Recycle[1] in Wood Raw Materials	% Pre-consumer (Post-industrial) Recycle[1] in Panels	% Post-consumer Recycle[1] in Wood Raw Materials	% Post-consumer Recycle[1] in Panels	% Recovered[2] in Wood Raw Materials	% Recovered[2] in Panels	% Recycled/Recovered in Wood Raw Materials
Sault Ste. Marie, ONT (MDF)	87%	13%	100%	87%	0%	0%	0%	0%	100%
St. Stephen, NB (Fibrex®)	87%	13%	21.08%	18.34%	0%	0%	78.92%	68.66%	100%
Bennettsville SC (PB)	85%	15%	89.42%	76.01%	0%	0%	10.58%	8.99%	100%
Malvern AR (MDF, Moulding)	85%	15%	100%	85%	0%	0%	0%	0%	100%
Albany, OR (PB)	87%	13%	94.66%	82.35%	5.34%	4.65%	0%	0%	100%
Moncure, NC (MDF, Moulding)	88%	18%	72.89%	64.14%	0.06%	0.05%	27.05%	23.80%	100%
Grayling, MI (PB)	84%	16%	49.10%	41.24%	0%	0%	50.90%	42.76%	100%

1. Recycled content meets definitions prescribed in International Organization of Standards document, ISO 14021 — Environmental labels and declarations — Self-declared environmental claims (Type II environmental labeling) as well as definitions prescribed in the Composite Panel Association's Eco-certified Composite (ECC) Sustainability Standard CPA 4-19
2. Recovered content meets definitions prescribed in the Composite Panel Association's Eco-Certified Composite (ECC) Sustainability Standard CPA 4-19

Arauco Canada Limited, Arauco North America, Inc.
March 6, 2025.

TOTAL
Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

ARLINGTON COMMUNITY HIGH SCHOOL

JOB #: 1877

510 14th St S
Arlington VA 22202

CERTIFICATE

ARAUCO MDF

SECTION 06 41 16.00

EPD FOR MDF

11/5/2025

COMPOSITE PANEL ASSOCIATION

Environmental Product Declaration

North American Medium Density Fiberboard

Composite Panel Association

ASTM INTERNATIONAL
Helping our world work better

ASTM CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION

PROGRAM OPERATOR	ASTM International 100 Barr Harbor Drive PO Box C700 West Conshohocken, PA, 19428-2959 USA www.astm.org
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20
DECLARATION OWNER	Composite Panel Association 19465 Deerfield Ave. Suite 303 Leesburg, Virginia 20176
DECLARATION NUMBER	EPD 639
DECLARED PRODUCT	North American Medium Density Fiberboard
DECLARED UNIT	1 m^3 of medium density fiberboard at facilities in North America and in use for 75 years
REFERENCE PCR AND VERSION NUMBER	ISO 21930:2017 Sustainability in Building and Civil Engineering works – Core Rules for environmental Product Declaration of Construction Products and Services. [10] UL Environment: Product Category Rules for Building-Related Products and Services Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report, v3.2 2018 [14] Part B: Structural and Architectural Wood Products EPD Requirements, v1.0 2020 [15]
DESCRIPTION OF PRODUCT'S INTENDED APPLICATION AND USE	Medium density fiberboard is wood composite panel used for making furniture, cabinets, flooring, door components, trim moulding, and millwork
MARKETS OF APPLICABILITY	Construction Sector, non-structural, laminators,
DATE OF ISSUE	April 2, 2024
PERIOD OF VALIDITY	5 years
EPD TYPE	Product-specific EPD
EPD SCOPE	Cradle to Grave
YEAR OF REPORTED MANUFACTURER PRIMARY DATA	2021
LCA SOFTWARE	SimaPro v9.5
LCI DATABASES	USLCI [12], Ecoinvent 3.9.1 [16], Datasmart [11]
LCIA METHODOLOGY	TRACI 2.1 v1.08 [3], CML-IA Baseline V3.08, CED, LHV 1.0

THE SUB-CATEGORY PCR REVIEW WAS CONDUCTED BY:	Dr. Thomas Gloria (chair) t.gloria@industrial-ecology.com
LCA AND EPD DEVELOPER This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	The Consortium for Research on Renewable Industrial Materials (CORRIM) PO Box 2432 Corvallis, OR 97330 541-231-2627 www.corrim.org

This declaration was independently verified in accordance with ISO 14025:2006.
The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR,
with additional considerations from the USGBC/UL Environment Part A Enhancement (2017). Tim Brooke, ASTM International

☐ Internal ☒ External

INDEPENDENT VERIFIER This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	Lindita Bushi, PhD, Athena Sustainable Materials Institute

LIMITATIONS

- Environmental declarations from different programs (ISO 14025) may not be comparable.
- Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building.
- This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

DESCRIPTION OF INDUSTRY AND PRODUCT

DESCRIPTION OF NORTH AMERICAN MEDIUM DENSITY FIBERBOARD INDUSTRY

The North American composite panel industry is a major contributor to both the United States and Canada economies. Medium density fiberboard (MDF) is a composite panel that is valued for its consistency and ability to be engineered for specific applications. These properties have caused MDF to be widely used to manufacture door components, laminate flooring, cabinets, trim moulding, and furniture. MDF is also widely regarded as a sustainable material because it utilizes wood residues from other manufacturing processes that might otherwise be wasted. In 2021, total North American production capacity of MDF was over 5.00 million m^3, with 3.68 million m^3 from United States facilities and Canada producing an additional 1.32 million m^3.

The Composite Panel Association (CPA), Leesburg, Virginia, represents manufacturers of MDF in North America. Thirteen MDF facilities contributed production data from the United States and Canada (Table 1) for this EPD with a combined production capacity of 3.47 million m^3, or 69% of total industry production.

This EPD represents the cradle-to-grave energy and materials required for manufacturing MDF produced in the United States (U.S.) and Canada. MDF manufacturers represented in this EPD are in Arkansas, Montana, North Carolina, Oregon, Pennsylvania, of the U.S, and British Columbia, New Brunswick, Ontario, and Quebec in Canada. The 2021/2022 production data used in this EPD considers all MDF produced during these reporting years and is weighted based on material output.

TABLE 1 PARTICIPATING FACILITIES

Manufacturer	City, State/Province	Country
Arauco North America	St. Stephen, New Brunswick	Canada
Arauco North America	Sault Ste. Marie, Ontario	Canada
Arauco North America	Malvern, Arkansas	United States
Arauco North America	Moncure, North Carolina	United States
Georgia Pacific	Mt. Jewett, Pennsylvania	United States
Roseburg Forest Products	El Dorado, Arkansas	United States
Roseburg Forest Products	Pembroke, Ontario	Canada
Roseburg Forest Products	Medford, Oregon	United States
Uniboard Canada Inc	Mont-Laurier, Quebec	Canada
Unilin-US MDF	Mt Gilead, North Carolina	United States
West Fraser	Quesnel, British Columbia	Canada
West Fraser	Blue Ridge, Alberta	Canada
Weyerhaeuser	Columbia Fall, Montana	United States

MDF manufacturers, as members of CPA, can participate in the CPA 4-19 Eco-Certified Composite™ (ECC) Sustainability Standard. The (ECC) sustainability standard is a voluntary industry certification developed and administered by the CPA for manufacturers of composite wood or agrifiber-based panels, including particleboard, medium density fiberboard (MDF), hardboard, engineered wood siding, and engineered wood trim. ECC certified plants must comply with CARB and EPA formaldehyde emissions requirements for 100% of their panels 100% of the time, and meet at least three of the additional requirements below:

- **Carbon Footprint**

  Using CPA's proprietary Carbon Calculator, the plant must demonstrate that the panels they produce act as carbon sinks—that is, that they store enough carbon to offset their cradle-to-gate carbon footprint, as determined in kg-CO2 equivalents of greenhouse gas (GHG) emissions.

- **Use of Local and Renewable Resources**

At least 85 percent of the total wood fiber used annually must be sourced within 250 miles (402 km) of the manufacturing plant.

- **Made from Recycled/Recovered Materials**

Products must contain either:

1. A minimum of 75 percent recycled or recovered fiber; OR
2. At least 50 percent recycled or recovered fiber AND a minimum of 5 percent post-consumer fiber.

Percentages shall be calculated by weight, as measured in bone dry ton.

- **Sustainability**

The plant must have documentation to show that more than 97 percent of fiber furnish brought on-site is either converted into composite panels or other non-waste products.

- **Wood Sourcing**

The plant shall hold a valid certificate from a certifying agency recognized by CPA such as the Forest Stewardship Council® (FSC—Controlled Wood Standard or Chain of Custody Standard) or the Sustainable Forestry Initiative (SFI—Fiber Sourcing Standard).

DESCRIPTION OF MEDIUM DENSITY FIBERBOARD PRODUCT

The product profile presented in this EPD is for a declared unit of 1 cubic meter(1 m^3) of MDF. MDF is manufactured from wood residues that are generated as a coproduct of lumber milling, and/or recovered fibers remaining after harvesting operations. One cubic meter of average North American MDF weighs 727.10 kg, excluding the variable moisture content (Table 2). MDF composition is presented in Table 2 and represents the weighted average of the various resin types that are used by different manufacturers.

TABLE 2 AVERAGE PRODUCT COMPOSITION FOR 1 M^3 MEDIUM DENSITY FIBERBOARD

Average Product Composition	Unit	Weighted Avg.	Representation
Mass, oven dry	kg	727.10	
Thickness	mm	19.05	
Density, oven dry	kg/m3	727.10	
Moisture Content	%	5.40%	
Wood Component	kg	654.37	
Resin Component	kg	72.63	
Wood portion	kg	654.37	90.01%
Urea Formaldehyde resin*	kg	45.77	6.30%
Melamine urea formaldehyde (MUF) resin*	kg	12.63	1.74%
Polymeric methylene diphenyl di-isocyanate (pMDI) resin*	kg	4.60	0.63%
Urea	kg	5.04	0.69%
Catalyst	kg	0.02	0.00%
Wax	kg	4.17	0.57%
Polybor, zinc borate, fire retardant	kg	0.41	0.06%

**Average MDF product. See underlying LCA report for high and low*

This EPD is based on LCA studies that considered the entire range of MDF product sizes and functions. The results are presented for the metric unit of measure, 1 cubic meter, 19.05 mm basis, which is equal to 565 square feet (3/4" thickness).

MDF is categorized as an engineered wood product under United Nations Standard Products and Services Code (UNSPSC) and Construction Specification Institute (CSI) for interior carpentry, architectural woodwork, and millwork (Table 3).

TABLE 3 UNITED NATIONS STANDARD PRODUCTS AND SERVICES CODE (UNSPSC) AND CONSTRUCTION SPECIFICATION INSTITUTE (CSI) MASTERFORMAT CODE FOR MEDIUM DENSITY FIBERBOARD

CLASSIFICATION STANDARD	CATEGORY	PRODUCT CODE
UNSPSC	Engineered Wood Products	11122002
CSI/CSC	Finish Carpentry	06 20 00
	Millwork	06 22 00
	Interior Architectural Woodwork	06 40 23
	Architectural Woodwork Casework	06 41 00

Wood residues used in MDF production are comprised of a very wide variety of species common to the western, Midwest, and southern US regions and western, central, and eastern Canada. Hardwood and softwood species were reported representing but not limited to Douglas-fir, hemlock, spruces, balsam fir, northern and southern pines, and a large variety of mixed hardwoods from the north, south, and western US, and central and eastern Canada.

MEDIUM DENSITY FIBERBOARD PRODUCTION

The MDF manufacturing process is a highly automated, process-controlled, and linear production process. Wood residue is delivered to the mill by truck; the residue, referred to in the industry as furnish, consists of shavings, sawdust, panel trim, and chips of various moisture contents; the residue is stored under cover; the moisture content of the residue can range from 10 to 100% on an oven-dry weight-basis. Sometimes a hog is used to reduce residue size. Sorted residue enter a digester where they are "cooked" under pressure then refined to separate the wood fibers. The fibers are blended with resins and then dried prior to distributed into a mat prior to pressing. The final steps are sanding, trimming, and sawing pressed panels to size before packaging and shipping (Figure 1).

Panels are protected during shipping with a waterproof wrapping material made from 100% recycled materials. Other packaging materials include plastic strapping, cardboard shrouds and corner protectors, and wood stickers. Packaging materials represent less than 1 percent (0.89%) of the mass of the main product.

Wood residue for MDF production can come from lumber and plywood facilities. The wood residue are coproducts generated and represent a mix of green or dry chips, sawdust, shavings, or trim. Data for these residues was generated in previous published LCA reports (www.corrim.org).

Wood residue attributes vary across the major production centers of the U.S and Canada. Wood residues include softwoods from the Southeast, Pacific Northwest, Northeast regions, and Inland Northwest and in western, central, and eastern Canada. A small quantity of hardwoods from the Midwest and southeast U.S. and Canada. Green residues represent 67% with the majority being green chips and sawdust. Other residues representing whole logs (19%), green shavings (1%), dry shavings (12%), and recycled MDF at 2%.

MDF was reported for this EPD to have densities ranging from 640-916 kg/m^3, consistent with the material standards listed in the American National Standard ANSI A208.2-2022 (ANSI 2022). Weighted average product moisture content is 5.40 percent (oven dry basis) at a density of 727.01 kg/m^3.

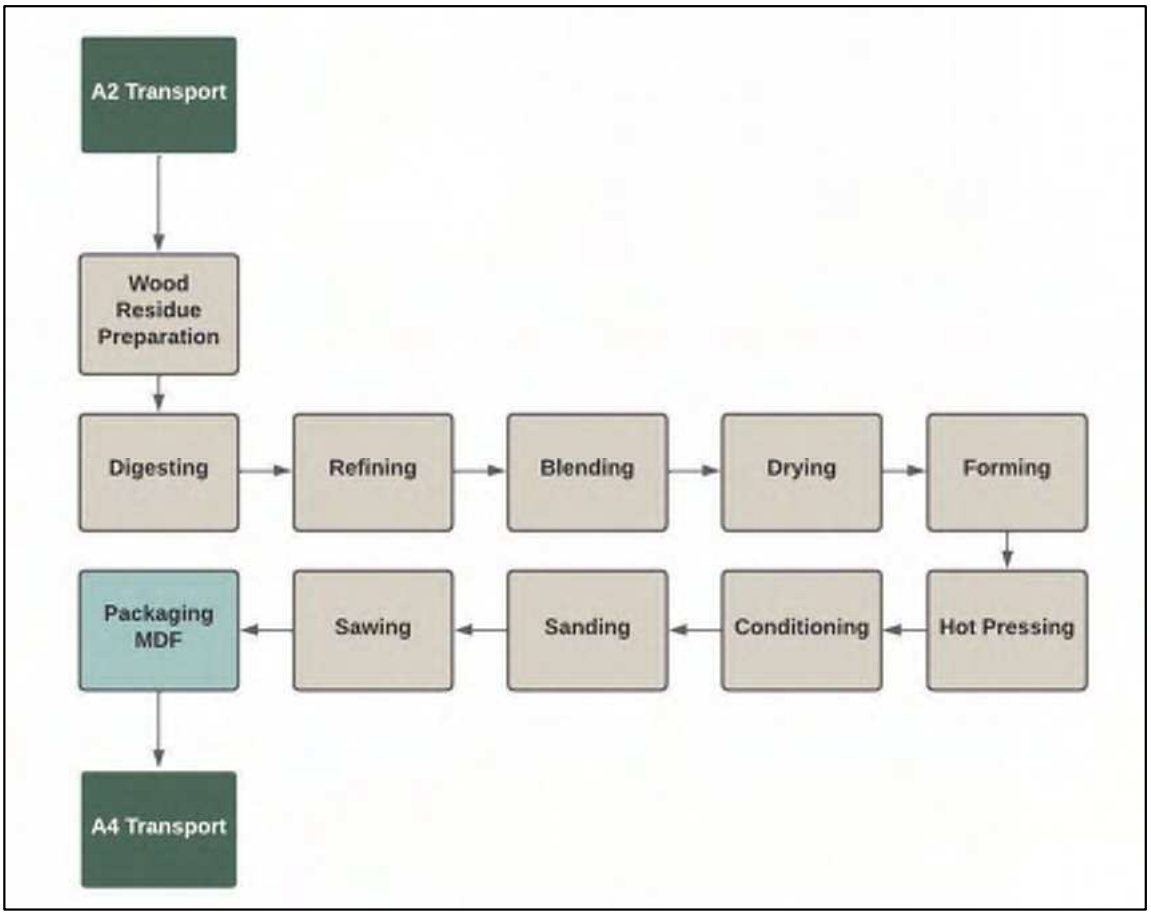


FIGURE 1 PROCESS FLOW FOR MEDIUM DENSITY FIBERBOARD MANUFACTURING

METHODOLOGICAL FRAMEWORK

TYPE OF EPD AND LIFE CYCLE STAGES

This EPD is intended to represent an industry wide life cycle assessment (LCA) for MDF. Thirteen CPA member facilities contributed production data, resource use, energy and fuel use, transportation distances, and onsite processing emissions. These data were weighted average based on production to produce the life cycle inventory data for the life cycle impact assessment (LCIA). The underlying LCA [4] investigates MDF production from cradle-to-grave. Information modules included in the LCA are shown in Table 4. This EPD includes mandatory modules A1-A3 for a cradle-to-gate analysis. Additional declared Modules include A4-Transportation to building site and A5 – Installation, Module B – Use, and End-of-Life (EoL) stages (C1 – C4) and additional benefits or reuse, energy recovery and recycling potential in Module D to complete a cradle-to-grave analysis (ISO 21090 5.2.2). Due to data gaps, the impact of deconstruction/demolition and waste processing (Module C1 and C3) are considered null for this LCA as well as Module B1 – B7 (Table 4).

TABLE 4 LIFE CYCLE STAGES & INFORMATION MODULES PER ISO 21930

	PRODUCTION STAGE			CONSTRUCTION STAGE		USE STAGE							END-OF-LIFE STAGE				OPTIONAL BENEFITS
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Extraction and up-stream production	Transport to factory	Manufacturing	Transport to site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste	Disposal	Reuse, Recycle, & Recovery benefits
Module Included	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

SYSTEM BOUNDARIES AND PRODUCT FLOW DIAGRAM

The product system described in Figure 2 includes the following information modules and unit processes:

A1 - RAW MATERIAL EXTRACTION	A1 includes the cradle-to-gate production of wood residues and resins for MDF. A1 would include all upstream processes for from resource extraction including removal of raw materials and processing.
A2 - RAW MATERIAL TRANSPORT	Average or specific transportation of raw materials (including secondary materials and fuels) from extraction site or source to manufacturing site (including any recovered materials from source to be recycled in the process).
A3 - MANUFACTURING	Manufacturing of MDF including energy consumption and fuel use, resource use, water use, emissions to air and water, waste disposal, and packaging. Packaging materials represent less than one percent (0.89%) of the mass of the main product. Common packaging materials are wrapping material, plastic strapping, steel strapping, wood stickers, corner protectors, and shrouds. The packaging is allocated 100 percent to MDF.
A4 - PRODUCT TRANSPORTATION	Average or specific transportation of product from manufacturing facility to construction site. This LCA product system includes actual product shipping distance to customers, secondary manufacturers retail, and distribution centers. Road and rail transportation modes were utilized.
A5 - CONSTRUCTION	The installation module covers installation of the construction product into any type of constructions and includes waste of construction product, waste from packaging material, energy for construction, and waste management at the site.
B1 – B7 - USE	Considered null for this EPD
C1- DEMOLITION	Considered null for this EPD
C2 - TRANSPORTATION TO EOL TREATMENT	Average or specific transportation of product from construction site to EoL processes.
C3 – WASTE	Considered null for this EPD
C4 - PROCESSING & DISPOSAL	Final deposition of wastes to be landfilled, incinerated, or reused/recycled.
D - BENEFITS BEYOND THE SYSTEM BOUNDARY	Optional information about the potential net benefits from reuse, recycling, and energy recovery.

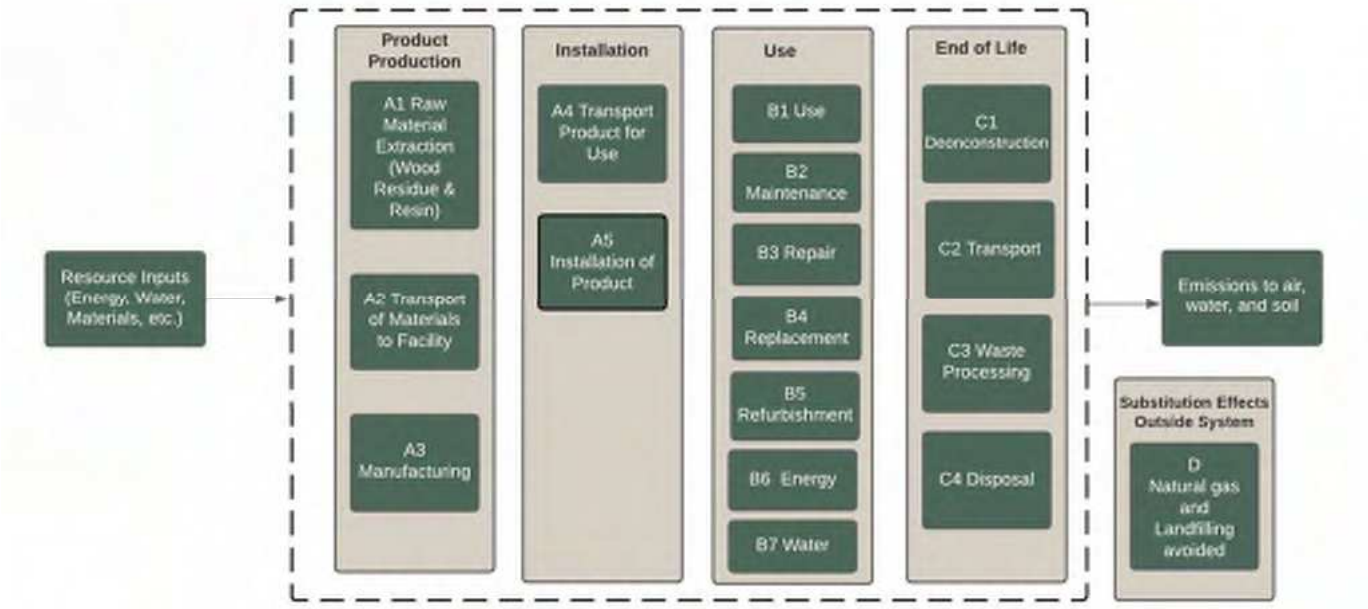


FIGURE 2 CRADLE TO GRAVE SYSTEM BOUNDARY FOR MEDIUM DENSITY FIBERBOARD PRODUCTION

DECLARED UNIT

Table 2 shows the declared unit and additional product information. In accordance with the PCR, the declared unit for MDF is one cubic meter (m^3), which represents the area of the panel multiplied by its thickness and installed in a building for 75 years [14]. This value is presented as 1.0 m^3, 19.05 mm basis.

ALLOCATION METHODS

Allocation is the method used to partition the environmental load of a process when several products or functions share the same process. Production of MDF produces no co-products that leave the system boundary, although some facilities reported production of other primary products that are sold; therefore, input materials, energy, and fuel use are allocated using a mass allocation. Allocation decisions are in accordance with UL PCR 2020 and ISO 21930:2017.

CUT-OFF CRITERIA

The cut-off criteria for all activity stage flows considered within the system boundary conform with ISO 21930: 2017 Section 7.1.8. Specifically, the cut-off criteria were applied as follows:

- All inputs and outputs for which data are available are included in the calculated effects and no collected core process data are excluded.
- A one percent cut-off is considered for renewable and non-renewable primary energy consumption and the total mass of inputs within a unit process. The sum of the total neglected flows does not exceed 5% of all energy consumption and mass of inputs.
- All flows known to contribute a significant impact or to uncertainty are included.
- The cut-off rules are not applied to hazardous and toxic material flows – all of which are included in the life cycle inventory.

No material or energy input or output was knowingly excluded from the system boundary.

DATA SOURCES

Primary and secondary data sources, as well as the respective data quality assessment are documented in the underlying LCA project report in accordance with UL PCR 2020.

Third party verified ISO [7,8,9] secondary LCI data sets contribute 78-100% of total impact to any of the required impact categories identified by the applicable PCR [14,15].

TREATMENT OF BIOGENIC CARBON

Biogenic carbon emissions and removals are reported in accordance with ISO 21930 7.2.7. and 7.2.12. Detailed information is provided in the underlying LCA in Section 3.3.

ISO 21930 requires a demonstration of forest sustainability to characterize carbon removals with a factor of -1 kg CO_2eq/kg CO_2. ISO 21930 Section 7.2.11 Note 2 states the following regarding demonstrating forest sustainability: "Other evidence such as national reporting under the United Nations Framework Convention on Climate Change (UNFCCC) can be used to identify forests with stable or increasing forest carbon stocks." The United States UNFCCC annual report Table 6-1 provides annual NET GHG Flux Estimates for different land use categories. This reporting indicates non-decreasing forest carbon stocks and thus the source forests meet the conditions for characterization of removals with a factor of -1 kg CO_2eq/kg CO_2.

ENVIRONMENTAL PARAMETERS DERIVED FROM LCA

The impact categories and characterization factors for the LCIA were derived from the U.S. EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts - TRACI 2.1 v1.08 [3]. The total primary energy consumption is tabulated from the LCI results based on the Cumulative Energy Demand Method (CED, LHV, V1.0) published by ecoinvent [16]. Lower heating value of primary energy carriers is used to calculate the primary energy values reported in the study.

Other inventory parameters concerning material use, waste, water use, and biogenic carbon were drawn from the LCI results. We followed the ACLCA's Guidance to Calculating non-LCIA Inventory Metrics in accordance with ISO 21930:2017 [1]. SimaPro 9.5 [13] was used to organize and accumulate the LCI data, and to calculate the LCIA results. The reporting of landfill emission factors used are 0.0035 metric tons of methane (CH_4) / metric ton of product and 0.2060 metric tons of carbon dioxide, CO_2 / metric ton of product.

To consider the biogenic carbon dynamics that occur in landfills, UL Environment published an Appendix to the reference PCR that estimates the emissions from landfilling of wood products. The landfill modeling for biogenic carbon is based on the United States EPA WARM model [5] and aligns with the biogenic accounting rules in ISO 21930 Section 7.2.7 and Section 7.2.12. The WARM model is documented by the EPA at https://www.epa.gov/warm/documentation-waste-reduction-model-warm. These background accounting assumptions (Appendix A of the PCR) [14] form the basis for landfill modeling that adjusts the carbon storage as a portion of the initial carbon while accounting for remaining carbon converted to landfill gas. It does not assign the percentage of the wood product sent to the landfill. In 2017, the average U.S. EoL treatments for durable wood products were estimated to be 0% recycling, 0% composting, 18% combustion with energy recovery and 82% landfilling as a percentage of wood material generated by weight. In this EPD it is reported as the "Average" EoL Scenario. Other scenarios adjusted the allocation for 100% landfill and 100% reuse.

BIOGENIC CARBON RESULTS

Table 5 shows additional inventory parameters related to biogenic carbon removal and emissions. The carbon dioxide flows are presented unallocated to consider any coproducts leaving the product system in information Module A3 (242 kg CO_2eq). The biogenic CO_2 component for MDF shows that the landfill scenario causes a net removal of biogenic carbon from the atmosphere equivalent to 846.68 kg CO_2eq. This is caused by the permanent storage of 84% of the biogenic carbon that enters the landfill; only 16% of the wood decomposes as estimated by the US EPA [5]. The net incineration and reuse are zero because of the assumption 100% of product is either completely combusted or reused. The net average uses the U.S. EPA Materials Management Fact Sheet for durable wood products assuming 0% recycling, 0% composting, 18% incineration, and 82% landfilling [6].

TABLE 5 BIOGENIC CARBON INVENTORY PARAMETERS FOR MEDIUM DENSITY FIBERBOARD

Additional Inventory Parameters		A1 All Scenarios	A3 All Scenarios	C4 Landfill Scenario	C4 Incineration Scenario	C4 Reuse Scenario	C4 AVG
Biogenic Carbon Removal from Product	kg CO_2	-1,447.69	-	-	-		
Biogenic Carbon Emission from Product	kg CO_2	-	51.00	353.01	1,199.69	1,199.69	507.10
Biogenic Carbon Removal from Packaging	kg CO_2	-	-	-	-		
Biogenic Carbon Emission from Packaging	kg CO_2	-	-	-	-		
Biogenic Carbon Emission from Combustion of Waste from Ren. Sources Used in Production	kg CO_2	-	197.00	-	-		
Total Biogenic CO_2 Removals & Emissions							
Net biogenic carbon emission landfill scenario	kg CO_2	-846.68					
Net biogenic carbon emission incineration scenario	kg CO_2	0.00					
Net biogenic carbon emission recycling scenario	kg CO_2	0.00					
Average end-of-life treatment	**kg CO_2**	**-692.59**					

LCIA RESULTS

A1 – A3 -PRODUCT MANUFACTURING

Table 6 presents the cradle-to-gate (A1-A3) LCIA and LCI parameter results for the functional unit of 1 m^3 of MDF. No permanent carbon storage is included in the cradle-to-gate (A1-A3) results. As a result, the biogenic carbon balance for the cradle-to-gate portion of the life cycle is net neutral. Cradle-to-gate results for MDF on a relative basis are presented in Figure 4.

TABLE 6 LCIA RESULTS SUMMARY FOR 1 M3 OF MEDIUM DENSITY FIBERBOARD – CRADLE-TO-GATE SCOPE

Core Mandatory Impact Indicator	Indicator	Unit	A1-A3	A1	A2	A3
Global warming potential – Total	GWP_{TOTAL}	kg CO_2eq	469.36	-1,290.94	15.78	1,744.51
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO_2eq	0.00	-1,447.69	0.00	1,447.69
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO_2eq	469.36	156.76	15.78	296.82
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11eq	2.03E-05	0.00	0.00	0.00
Acidification potential of soil and water sources	AP	kg SO_2eq	3.69	0.85	0.10	2.75
Eutrophication potential	EP	kg Neq	0.61	0.19	0.01	0.41
Formation potential of tropospheric ozone	SFP	kg O_3eq	62.13	16.76	2.76	42.61
Abiotic depletion potential (ADP_{FOSSIL}) for fossil resources	ADPf	MJ, NCV	7,593.05	3,264.61	197.76	4,130.68
Fossil fuel depletion	FFD	MJ Surplus	962.06	499.39	29.71	432.96
Use of Primary Resources						
Renewable primary energy used as energy	RPRE	MJ, NCV	3,485.60	512.00	0.43	2,973.18
Renewable primary energy used as material	RPRM	MJ, NCV	16,188.71	16,188.71	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	8,472.96	3,436.59	200.61	4,835.76
Non-renewable primary energy used as material	NRPRM	MJ, NCV	2,577.90	2,577.90	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy						
Secondary material	SM	kg	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters						
Consumption of freshwater resources	FW	m3	2.67	0.72	0.00	1.95
Indicators Describing Waste						
Hazardous waste disposed	HWD	kg	0.00	6.05E-04	0.00	1.42E-03
Non-hazardous waste disposed	NHWD	kg	48.55	0.00E+00	0.00	4.85E+01
High-level radioactive waste, conditioned, to final repository	HLRW	m3	2.52E-06	1.10E-07	1.47E-09	2.40E-06
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3	4.37E-06	1.13E-06	2.62E-08	3.22E-06
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00

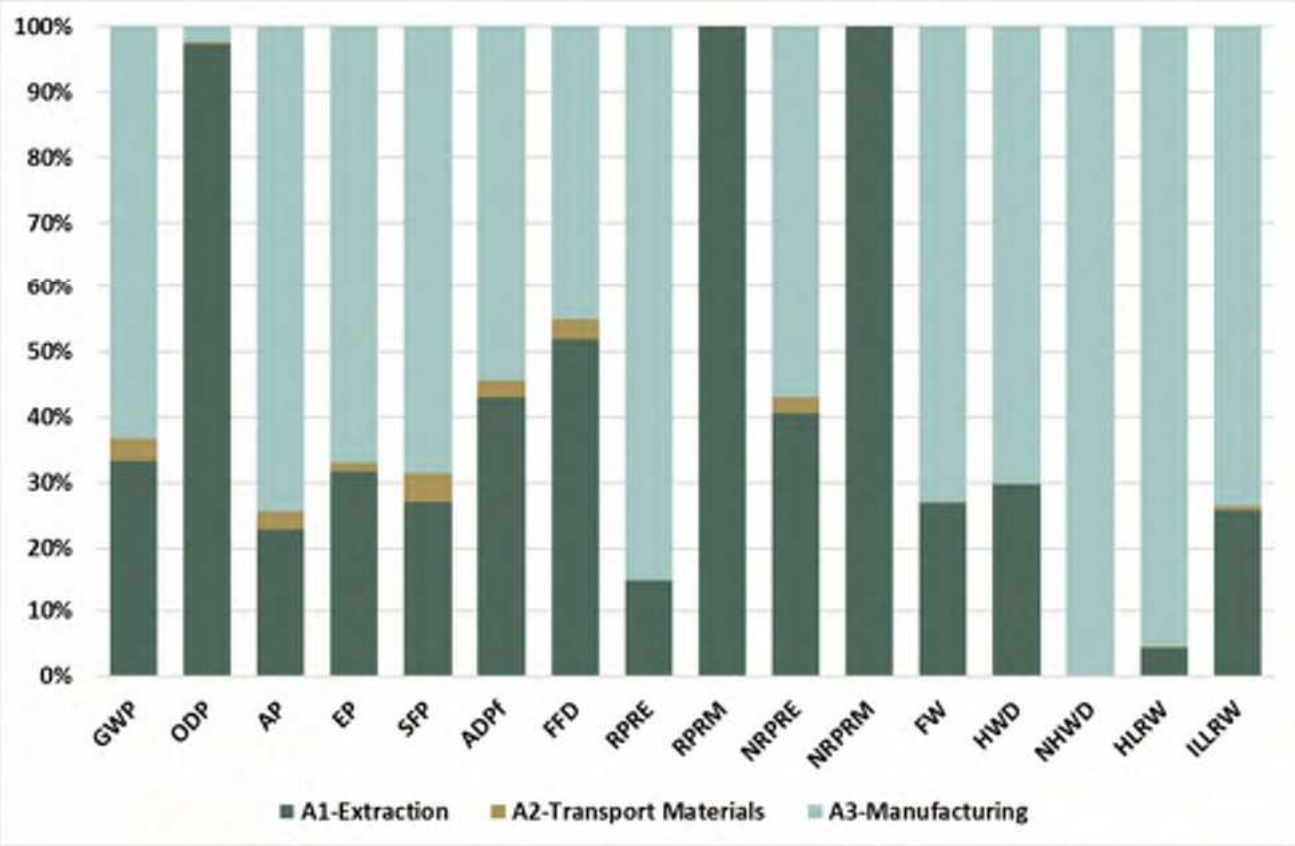


FIGURE 3 CRADLE-TO-GATE LCIA RESULTS FOR THE PRODUCTION MEDIUM DENSITY FIBERBOARD–RELATIVE BASIS

GWP	Global warming potential
ODP	Depletion potential of the stratospheric ozone layer
AP	Acidification potential of soil and water sources
EP	Eutrophication potential
SFP	Formation potential of tropospheric ozone
ADPf	Abiotic depletion potential (ADP fossil) for fossil resource
FFD	Fossil fuel depletion
RPRM	Renewable primary energy carrier used as energy
RPRM	Renewable primary energy carrier used as material
NRPE	Non-renewable primary energy carrier used as energy
NRPRM	Renewable primary energy carrier used as material
FW	Consumption of freshwater resources
HWD	Hazardous waste disposed
NHWD	Non-hazardous waste disposed
HLRW	High-level radioactive waste, conditioned, to final repository
ILLRW	Intermediate- and low-level radioactive waste, conditioned, to final repository

A4 -PRODUCT TRANSPORTATION

The A4 module includes transportation of the final product to customers or distribution center/resale center). MDF was transported mostly by road (61%) and 39 percent by rail. MDF is shipped throughout the United States and Canada to secondary manufactures, e.g., laminators)(3%), retail (6%), distribution centers (30%), or direct to customers (61%) (CPA 2021). Product shipping distances were distributed over a weighted average of 1,044 km by road and 1,874 km by rail.

A5 – INSTALLATION

The installation module A5 covers installation of the construction product into any type of constructions and includes waste of construction product, waste from packaging material, energy for construction, and waste management at the site. For this LCA, Module A5 was calculated using the ACLA ISO 21930 Guidance by calculating 5% of the A1-A4 burden and adding the waste disposal from packaging. The reference service life (RSL) for the product is 75 years which is the default specified by the UL Part B PCR (UL 2020). Total non-renewable energy use for A5 is conservatively estimated at 456 MJ/m^3 of MDF.

B1-B7 – USE

The use phase of a product includes seven information modules, B1 - B7. This product does not require any inputs including energy and water during the use phases (B1-B7) and is declared null.

C2 TO C4 – END OF LIFE

This product system includes the end-of-life (EoL) modules C1-C4. For the purpose of this LCA, C1 and C3 are null. For EoL processing, we applied the weighted average of the typical waste treatment in the United States for durable wood products: 82% landfill and 18% incineration (EPA 2019). As per the PCR, the results for each of the individual options are also separately reported, as required by ISO 21930 Section 7.1.7. Table 7 lists the assumptions for C1-C4 and the net values.

TABLE 7 MEDIUM DENSITY FIBERBOARD END OF LIFE (C1-C4) ASSUMPTIONS FOR SCENARIO DEVELOPMENT (DESCRIPTION OF DECONSTRUCTION, COLLECTION, RECOVERY, DISPOSAL METHOD, AND TRANSPORTATION)

C1-C4 Description of Processes	Description	Value	Unit
Collection Process	Collected separately	NA	Dry kg
Collection Process	Collected with mixed construction waste	654.37	Dry kg
Recovery	Reuse	-	Dry kg
Recovery	Recycling	-	Dry kg
Recovery	Landfill	535.28	Dry kg
Recovery	Incineration		Dry kg
Recovery	Incineration with energy recovery/	119.10	Dry kg
Recovery	Product or material for final deposition	535.28	Dry kg
Removal of biogenic carbon (excluding packaging)		(692.59)	kg CO_2eq

Note: C1 - Building demolition is considered null

[1/] Waste was collected as construction waste using dump truck to the disposal site with 81% of the total product mass was landfilled

[3/]Remaining 19% of the product mass was incinerated with energy recovery

D – SUBSTITUTION EFFECTS OUTSIDE SYSTEM

Per ISO 21930 Section 7.1.7.6, the net output flow for all products for reuse, secondary materials, secondary fuels and/or recovered energy leaving a product system is calculated by adding all output flows of the secondary material or fuel or recovered energy and subtracting any input flows of this secondary material or fuel or recovered energy from each information module (A1 to A5, B1 to B7, C1 to C4) thus arriving at the net output flow of secondary material or fuel or re-covered energy from the product system. Table 8 lists the assumptions for module D substitution benefits and the net values.

Incineration with energy recovery causes the potential displacement of fossil fuels with an equivalent heat content. To estimate the natural gas displacement, we first calculated the potential fuel heating value of MDF on a lower heating value (LHV) of 20.9 MJ/kg (oven dry) and 35.7 MJ/kg for resin, which equates to 16,254 MJ/m^3. The energy equivalent amount of natural gas was calculated based on a lower heating value of 36.6 MJ/m^3.

Wood Panel energy content = (20.9MJ/kg x 654.37 kg/m^3) + (35.7 MJ/kg x 72.21 kg/m^3) = 16,254 MJ/m^3

Substitution with Natural gas = $\frac{16{,}254\ MJ/m3}{36.6\frac{MJ}{m3}} = 444.11\ m3/m3$

Displacing 444.11 cubic meters of natural gas for every cubic meter of MDF combusted for energy.

TABLE 8 USE, RECOVERY AND/OR RECYCLING POTENTIALS (D), RELEVANT SCENARIO INFORMATION

C1-C4 DESCRIPTION OF PROCESSES	VALUE	UNIT
Net energy benefit from energy recovery from waste treatment declared as exported energy in C3 (R>0.6)	NA	MJ
Net energy benefit from thermal energy due to treatment of waste declared as exported energy in C4 (R <0.6)	13,816.2	MJ
Net energy benefit from material flow declared in C3 for energy recovery	NA	MJ
Process and conversion efficiencies (thermal efficiency)	85.0	%
Further assumptions for scenario development (e.g., further processing technologies, assumptions on correction factors)	NA	

Tables 5 and 6 show the mandatory cradle-to-gate results (A1-A3) for 1 cubic meter MDF. Tables 9 to 12 present the cradle-to-grave results includes the delivery of the product to the construction site (A4), construction (A5), the use phase (B1-B7) and the EoL (C1-C4). Table 9 presents the weighted average results for the average waste treatment in the United States for durable wood products, 82% landfill and 18% incineration [5]. As per the PCR and ISO 21930 Section 7.1.7, the results for each of the individual options are also separately reported and include 100% landfilling (Table 10), 100% incineration (Table 11) and 100% reuse (Table 12).

TABLE 9 LCIA RESULTS SUMMARY FOR 1 M3 OF MEDIUM DENSITY FIBERBOARD – AVERAGE END-OF-LIFE, TREATMENT, 82% LANDFILL/18% COMBUSTION WITH ENERGY RECOVERY – CRADLE-TO-GRAVE SCOPE

Core Mandatory Impact Indicator	Indicator	Unit	A1-C4	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential – Total	GWP_{TOTAL}	kg CO_2eq	-123.28	-730.33	51.23	26.03	0.00	0.00	8.55	0.00	521.23	-196.32
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO_2eq	-692.59	-1,199.69	0.00	0.00	0.00	0.00	0.00	0.00	507.10	0.00
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO_2eq	569.31	469.36	51.23	26.03	0.00	0.00	8.55	0.00	14.13	-196.32
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11eq	2.22E-05	2.03E-05	8.55E-08	1.02E-06	0.00	0.00	3.61E-10	0.00	8.65E-07	-4.44E-12
Acidification potential of soil and water sources	AP	kg SO_2eq	4.72	3.69	0.52	0.21	0.00	0.00	0.10	0.00	0.20	-0.05
Eutrophication potential	EP	kg Neq	0.70	0.61	0.04	0.03	0.00	0.00	0.01	0.00	0.02	0.00
Formation potential of tropospheric ozone	SFP	kg O_3eq	89.54	62.13	16.35	3.92	0.00	0.00	2.53	0.00	4.61	-0.12
Abiotic depletion potential (ADP_{FOSSIL}) for fossil resources	ADPf	MJ, NCV	11,312.40	7,593.05	641.75	411.74	1.00	0.00	62.06	1.00	194.92	-2,857.72
Fossil fuel depletion	FFD	MJ Surplus	1,527.73	962.06	96.39	52.92	2.00	0.00	9.32	2.00	27.24	-474.20
Use of Primary Resources												
Renewable primary energy used as energy	RPRE	MJ, NCV	6,048.86	3,485.60	1.39	174.35	0.00	0.00	0.00	0.00	2,387.53	0.00
Renewable primary energy used as material	RPRM	MJ, NCV	16,188.71	16,188.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	9,902.44	8,472.96	651.08	456.20	0.00	0.00	130.10	0.00	192.10	-97.56
Non-renewable primary energy used as material	NRPRM	MJ, NCV	2,706.79	2,577.90	0.00	128.89	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy												
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters												
Consumption of freshwater resources	FW	m3	3.51	2.67	0.72	0.00	0.00	0.00	0.00	0.00	0.12	0.00
Indicators Describing Waste												
Hazardous waste disposed	HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	5.84E+02	4.85E+01	0.00	0.00	1.00	0.00	0.00	1.00	5.35E+02	0.00E+00
High-level radioactive waste, conditioned, to final repository	HLRW	m3	8.18E-01	2.52E-06	1.10E-07	1.47E-09	1.00E+00	0.00	0.00	8.18E-01	1.00E-09	0.00E+00
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3	1.64E+00	4.37E-06	1.13E-06	2.62E-08	2.00E+00	0.00E+00	0.00E+00	1.64E+00	1.46E-07	0.00E+00
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 10 LCIA RESULTS SUMMARY FOR 1 M³ OF MEDIUM DENSITY FIBERBOARD – 100% LANDFILLING AT END-OF-LIFE – CRADLE-TO-GRAVE SCOPE

Core Mandatory Impact Indicator	Indicator	Unit	A1-C4	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential – Total	GWP_{TOTAL}	kg CO_2eq	-284.56	-730.33	51.23	26.03	0.00	0.00	8.55	0.00	359.95	0.00
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO_2eq	-846.68	-1,199.69	0.00	0.00	0.00	0.00	0.00	0.00	353.01	0.00
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO_2eq	562.12	469.36	51.23	26.03	0.00	0.00	8.55	0.00	6.94	0.00
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11eq	2.24E-05	2.03E-05	8.55E-08	1.02E-06	0.00	0.00	3.61E-10	0.00	1.06E-06	0.00E+00
Acidification potential of soil and water sources	AP	kg SO_2eq	4.54	3.69	0.52	0.21	0.00	0.00	0.10	0.00	0.02	0.00
Eutrophication potential	EP	kg Neq	0.69	0.61	0.04	0.03	0.00	0.00	0.01	0.00	0.01	0.00
Formation potential of tropospheric ozone	SFP	kg O_3eq	85.50	62.13	16.35	3.92	0.00	0.00	2.53	0.00	0.57	0.00
Abiotic depletion potential (ADP_{FOSSIL}) for fossil resources	ADPf	MJ, NCV	11,355.77	7,593.05	3,264.61	197.76	0.00	0.00	62.06	0.00	238.29	0.00
Fossil fuel depletion	FFD	MJ Surplus	1,533.79	962.06	499.39	29.71	0.00	0.00	9.32	0.00	33.31	0.00
Use of Primary Resources												
Renewable primary energy used as energy	RPRE	MJ, NCV	3,663.59	3,485.60	1.39	174.35	0.00	0.00	0.00	0.00	2.26	0.00
Renewable primary energy used as material	RPRM	MJ, NCV	16,188.71	16,188.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	9,791.07	8,472.96	651.08	456.20	0.00	0.00	130.10	0.00	80.73	0.00
Non-renewable primary energy used as material	NRPRM	MJ, NCV	2,706.79	2,577.90	0.00	128.89	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy												
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters												
Consumption of freshwater resources	FW	m3	3.47	2.67	0.72	0.00	0.00	0.00	0.00	0.00	0.08	0.00
Indicators Describing Waste												
Hazardous waste disposed	HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	702.92	48.55	0.00	0.00	0.00	0.00	0.00	0.00	654.37	0.00
High-level radioactive waste, conditioned, to final repository	HLRW	m3	1.00E+00	2.52E-06	1.10E-07	1.47E-09	0.00	0.00	0.00	1.00	1.23E-09	0.00
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3	2.00E+00	4.37E-06	1.13E-06	2.62E-08	0.00	0.00	0.00	2.00	1.78E-07	0.00
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 11 LCIA RESULTS SUMMARY FOR 1 M3 OF MEDIUM DENSITY FIBERBOARD – 100% INCINERATION WITH ENERGY RECOVERY AT END-OF-LIFE – CRADLE-TO-GRAVE

Core Mandatory Impact Indicator	Indicator	Unit	A1-C4	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential – Total	GWP_{TOTAL}	kg CO_2eq	601.60	-730.33	51.23	26.03	0.00	0.00	8.55	0.00	1,246.11	-1,078.65
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO_2eq	0.00	-1,199.69	0.00	0.00	0.00	0.00	0.00	0.00	1,199.69	0.00
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO_2eq	601.60	469.36	51.23	26.03	0.00	0.00	8.55	0.00	46.43	-1,078.65
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11eq	2.14E-05	2.03E-05	8.55E-08	1.02E-06	0.00	0.00	3.61E-10	0.00	7.64E-10	-2.44E-11
Acidification potential of soil and water sources	AP	kg SO_2eq	5.49	3.69	0.52	0.21	0.00	0.00	0.10	0.00	0.97	-0.26
Eutrophication potential	EP	kg Neq	0.72	0.61	0.04	0.03	0.00	0.00	0.01	0.00	0.04	0.00
Formation potential of tropospheric ozone	SFP	kg O_3eq	107.71	62.13	16.35	3.92	0.00	0.00	2.53	0.00	22.78	-0.65
Abiotic depletion potential (ADP_{FOSSIL}) for fossil resources	ADPf	MJ, NCV	11,117.49	7,593.05	3,,264.61	197.76	0.00	0.00	62.06	0.00	0.00	-15701.75
Fossil fuel depletion	FFD	MJ Surplus	1,500.48	962.06	499.39	29.71	0.00	0.00	9.32	0.00	0.00	-2,605.52
Use of Primary Resources												
Renewable primary energy used as energy	RPRE	MJ, NCV	16,769.48	3,485.60	1.39	174.35	0.00	0.00	0.00	0.00	13,108.15	0.00
Renewable primary energy used as material	RPRM	MJ, NCV	16,188.71	16,188.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	10,403.00	8,472.96	651.08	456.20	0.00	0.00	130.10	0.00	692.65	-536.02
Non-renewable primary energy used as material	NRPRM	MJ, NCV	2,706.79	2,577.90	0.00	128.89	0.00	0.00	0.00	0.00	0.00	0.00
Secondary Material, Secondary Fuel and Recovered Energy												
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters												
Consumption of freshwater resources	FW	m3	3.70	2.67	0.72	0.00	0.00	0.00	0.00	0.00	0.31	0.00
Indicators Describing Waste												
Hazardous waste disposed	HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	48.55	48.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
High-level radioactive waste, conditioned, to final repository	HLRW	m3	2.63E-06	2.52E-06	1.10E-07	1.47E-09	0.00	0.00	0.00	0.00	0.00	0.00
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3	5.52E-06	4.37E-06	1.13E-06	2.62E-08	0.00	0.00	0.00	0.00	0.00	0.00
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 12 LCIA RESULTS SUMMARY FOR 1 M3 OF MEDIUM DENSITY FIBERBOARD – 100% REUSE AT END-OF-LIFE – CRADLE-TO-GRAVE

Core Mandatory Impact Indicator	Indicator	Unit	A1-C4	A1-A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Global warming potential – Total	GWP_{TOTAL}	kg CO_2eq	555.17	-730.33	51.23	26.03	0.00	0.00	8.55	0.00	1,199.69	-469.36
Global warming potential - Biogenic	$GWP_{BIOGENIC}$	kg CO_2eq	0.00	-1,199.69	0.00	0.00	0.00	0.00	0.00	0.00	1,199.69	0.00
Global warming potential - Fossil	GWP_{FOSSIL}	kg CO_2eq	555.18	469.36	51.23	26.03	0.00	0.00	8.55	0.00	0.00	-469.36
Depletion potential of the stratospheric ozone layer	ODP	kg CFC11eq	2.14E-05	2.03E-05	0.00	0.00	0.00	0.00	3.61E-10	0.00	0.00	-2.03E-05
Acidification potential of soil and water sources	AP	kg SO_2eq	4.52	3.69	0.52	0.21	0.00	0.00	0.10	0.00	0.00	-3.69
Eutrophication potential	EP	kg Neq	0.68	0.61	0.04	0.03	0.00	0.00	0.01	0.00	0.00	-0.61
Formation potential of tropospheric ozone	SFP	kg O_3eq	84.93	62.13	16.35	3.92	0.00	0.00	2.53	0.00	0.00	-62.13
Abiotic depletion potential (ADP_{FOSSIL}) for fossil resources	ADPf	MJ, NCV	11,117.49	7,593.05	3,264.61	197.76	0.00	0.00	62.06	0.00	0.00	-7,593.05
Fossil fuel depletion	FFD	MJ Surplus	1,500.48	962.06	499.39	29.71	0.00	0.00	9.32	0.00	0.00	-962.06
Use of Primary Resources												
Renewable primary energy used as energy	RPRE	MJ, NCV	3,661.33	3,485.60	1.39	174.35	0.00	0.00	0.00	0.00	0.00	-3,661.33
Renewable primary energy used as material	RPRM	MJ, NCV	16,188.71	16,188.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-16,188.71
Non-renewable primary energy used as energy	NRPRE	MJ, NCV	9,710.35	8,472.96	651.08	456.20	0.00	0.00	130.10	0.00	0.00	-9,580.25
Non-renewable primary energy used as material	NRPRM	MJ, NCV	2,706.79	2,577.90	0.00	128.89	0.00	0.00	0.00	0.00	0.00	-2,706.79
Secondary Material, Secondary Fuel and Recovered Energy												
Secondary material	SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Renewable secondary fuel	RSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-renewable secondary fuel	NRSF	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy	RE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mandatory Inventory Parameters												
Consumption of freshwater resources	FW	m3	3.39	2.67	0.72	0.00	0.00	0.00	0.00	0.00	0.00	-2.67
Indicators Describing Waste												
Hazardous waste disposed	HWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Non-hazardous waste disposed	NHWD	kg	48.55	48.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-51.31
High-level radioactive waste, conditioned, to final repository	HLRW	m3	2.63E-06	2.52E-06	1.10E-07	1.47E-09	0.00	0.00	0.00	0.00	0.00	-2.64E-06
Intermediate- and low-level radioactive waste, conditioned, to final repository	ILLRW	m3	5.52E-06	4.37E-06	1.13E-06	2.62E-08	0.00	0.00	0.00	0.00	0.00	-4.71E-06
Components for re-use	CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for recycling	MR	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Materials for energy recovery	MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Recovered energy exported	EE	MJ, NCV	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

INTERPRETATION

The primary sources of impacts across the life cycle are the manufacturing of MDF (Modules A1-A3) and the net flows of biogenic carbon. Table 5 shows the flows of biogenic carbon out of the system in Module A3 from the combustion of biomass and the export of coproducts out of the system boundary. In Module C4, landfill gas and incineration emissions are significantly less than the flows of biogenic carbon into the system in Module A1 (removal of biomass from a net neutral sustainable forest). The permanent biogenic carbon storage is so significant (847 kg CO_2eq.) (Table 5) that this net benefit is larger than the total fossil emissions from all other modules and causes the total global warming potential to be negative. The total global warming potential (GWP_{TOTAL}) of -123.28 kg CO_2eq. (Table 9 (A1-C4)) means the product system removes more greenhouse gases from the atmosphere than are emitted in its production and disposal combined.

BIOGENIC CARBON NOT DECLARED (A1-C4):

Table 9 - Cradle-to-grave GWP_{FOSSIL} = 569.31, average EoL treatment assuming 82% landfill and 18% incineration with energy recovery

Table 10 - Cradle-to-grave GWP_{FOSSIL} = 562.12, EoL treatment assumed to be 100% landfill

Table 11 - Cradle-to-grave GWP_{FOSSIL} = 601.60, EoL treatment assumed to be 100% incineration with energy recovery

Table 12 - Cradle-to-grave GWP_{FOSSIL} = 555.18, EoL treatment assumed to be 100% reuse

BIOGENIC CARBON DECLARED (A1-C4):

Table 9 – Cradle-to-grave GWP_{TOTAL} = -123.28 average EoL treatment assuming 82% landfill and 18% incineration with energy recovery

Table 10 - Cradle-to-grave GWP_{TOTAL} = -284.56 EoL treatment assumed to be 100% landfill

Table 11 - Cradle-to-grave GWP_{TOTAL} = 601.60, EoL treatment assumed to be 100% incineration with energy recovery

Table 12 - Cradle-to-grave GWP_{TOTAL} = 555.18 EoL treatment assumed to be 100% reuse

Summarizing the GWP_{FOSSIL} from Table 9, the most common representation of EoL treatment for wood products, the cradle-to-gate 469.36 kg CO_2eq/m^3 increases to 569.31 kg CO_2eq/m^3 when EoL modules are added without biogenic carbon or substitution effects. When biogenic carbon is added, there is a dramatic drop in GWP_{TOTAL} to -123.28 kg CO_2eq/m^3. This further drops to -196 kg CO_2eq/m^3 when substitution effects are included.

The lowest GWP_{TOTAL} occurs in the EoL 100% landfill treatment where the result is -284.56 kg CO_2eq/m^3 when biogenic carbon is added (A1-C4, Table 10). This scenario maximizes the permanent carbon storage in the landfill which, ***strictly in terms of the GWP only***, is the most beneficial treatment for wood at EoL.

The highest GWP_{TOTAL} (601 kg CO_2eq/m^3) is in the 100% incineration EoL treatment which excludes the substitution benefits of fossil fuel (A1-C4, Table 11). This scenario assumes the worst-case carbon storage and fossil fuel combustion. When the substitution effects are added, there is a significant reduction in the GWP (-1,078 kg CO_2eq/m^3) meaning that the potential energy value of the product is greater than fossil fuels combusted from cradle-to-grave.

In this cradle-to-grave EPD there is a wide range of GWP_{TOTAL} results 601.60 to -123.28 kg CO_2eq/m^3 illustrating the importance of making correct assumptions for the LCA and the intended use. CPA offers this information in this EPD to help users make informed decisions. The user is responsible for determining the intended use of the product.

LIMITATIONS

Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance using EPD information shall consider all relevant information modules over the full life cycle of the products within the building. This PCR allows EPD comparability only when the same functional requirements between products are ensured and the requirements of ISO 21930:2017 §5.5 are met. In addition, to be compared EPDs must comply with the same core and sub-category PCRs (Part A and B) and include all relevant information modules. It should be noted that different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

This LCA was created using manufacturer average data for upstream materials. Variation can result from differences in supplier locations, manufacturing processes, manufacturing efficiency and fuel type used. This LCA does not report all of the environmental impacts due to manufacturing of the product, but rather reports the environmental impacts for those categories with established LCA-based methods to track and report. Unreported environmental impacts include (but are not limited to) factors attributable to human health, land use change, and habitat destruction. In order to assess the local impacts of product manufacturing, additional analysis is required.

Although this LCA is cradle-to-grave in scope, it assumes the use and maintenance stages of the products are null (B1-B7). The RSL refers to the declared technical and functional performance of the product within a construction works. RSL is indicated by the manufacturer. RSL is dependent on the properties of the product and reference in-use conditions [14]. This LCA acknowledges the limitation making the use phase null as one could conclude that a shorter lifespan is just as good as a life span of 75 plus years. The functional unit declared in this LCA assumes the default RSL of 75 years [14].

ADDITIONAL ENVIRONMENTAL INFORMATION

Pressing and drying processes contribute the most emissions in wood production facilities. These are caused by the thermal energy production and by the use of emission control devices. All facilities reported the use of ECDs throughout their facility. Types of ECDs include electrostatic precipitators (ESP), wet electrostatic precipitators (WESP), regenerative thermal oxidizers (RTO), regenerative catalytic oxidizers (RCO), cyclones, and baghouses. Most ECDs use electricity or natural gas. Hence, the additional energy requirement for ECDs can potentially result in an overall increase of other greenhouse gases such as CO_2, SO_2, NOx, and CH_4. The pMDI emission from using pMDI resin is listed on the US Environmental Agency (EPA) Toxics Release Inventory.

For CPA member facilities producing MDF, 81.9% of producers in North America reported having their panel products “Certified for Formaldehyde Emissions,” 18.1% were ”Exempt” (NAF or ULEF) and none were classified as “Not certified for Formaldehyde Emissions.”

FOREST MANAGEMENT

While this EPD does not address landscape level forest management impacts, potential impacts may be addressed through requirements put forth in regional regulatory frameworks, ASTM 7612-15 guidance, and ISO 21930 Section 7.2.11 including notes therein. These documents, combined with this EPD, may provide a more complete picture of environmental and social performance of wood products.

While this EPD does not address all forest management activities that influence forest carbon, wildlife habitat, endangered species, and soil and water quality, these potential impacts may be addressed through other mechanisms such as regulatory frameworks and/or forest certification systems which, combined with this EPD, will give a more complete picture of environmental and social performance of wood products.

SCOPE OF THE EPD

EPDs can complement but cannot replace tools and certifications that are designed to address environmental impacts and/or set performance thresholds – e.g., Type 1 certifications, health assessments and declarations, etc.

DATA

National or regional life cycle averaged data for raw material extraction does not distinguish between extraction practices at specific sites and can greatly affect the resulting impacts.

ACCURACY OF RESULTS

EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any product line and reported impact when averaging data.

TOTAL
Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

ARLINGTON COMMUNITY HIGH SCHOOL

JOB #: 1877

510 14th St S
Arlington VA 22202

CERTIFICATE

ARAUCO MDF

SECTION 06 41 16.00

MATERIAL INGREDIENT REPORT FOR MDF

11/5/2025

ARAUCO NA Medium Density Fiberboard (MDF) by Arauco North America

Health Product Declaration v2.1

CLASSIFICATION: 06 00 00 Wood, Plastics, and Composites

created via: HPDC Online Builder

PRODUCT DESCRIPTION: Trupan Standard MDF is a versatile product that will fit most general industrial uses including cabinets, fixtures and furniture components. An advanced refining process ensures a homogenous panel that is ideal for deep detailed profiling and finishing with exceptional performance results per the American National Standard for Medium Density Fiberboard (ANSI 208.2-2016).

Section 1: Summary

Basic Method / Product Threshold

CONTENT INVENTORY

Inventory Reporting Format
- ○ Nested Materials Method
- ◉ Basic Method

Threshold Disclosed Per
- ○ Material
- ◉ Product

Threshold level
- ◉ 100 ppm
- ○ 1,000 ppm
- ○ Per GHS SDS
- ○ Per OSHA MSDS
- ○ Other

Residuals/Impurities
- ◉ Considered
- ○ Partially Considered
- ○ Not Considered

Explanation(s) provided for Residuals/Impurities?
- ◉ Yes ○ No

Are All Substances Above the Threshold Indicated:

Characterized *Percent Weight and Role Provided?* ◉ Yes ○ No

Screened *Using Priority Hazard Lists with Results Disclosed?* ◉ Yes ○ No

Identified *Name and Identifier Provided?* ○ Yes ◉ No

CONTENT IN DESCENDING ORDER OF QUANTITY

Summary of product contents and results from screening individual chemical substances against HPD Priority Hazard Lists and the GreenScreen for Safer Chemicals®. The HPD does not assess whether using or handling this product will expose individuals to its chemical substances or any health risk. Refer to Section 2 for further details.

MATERIAL | **SUBSTANCE** | *RESIDUAL OR IMPURITY*
GREENSCREEN SCORE | HAZARD TYPE

ARAUCO NA MEDIUM DENSITY FIBERBOARD (MDF) [CELLULOSE, MICROCRYSTALLINE NoGS UNDISCLOSED CHEMICAL #1 BM-4 UNDISCLOSED CHEMICAL #2 LT-1 | CAN | MUL UREA LT-UNK UNDISCLOSED CHEMICAL #3 NoGS UNDISCLOSED CHEMICAL #4 LT-P1 | MAM | SKI | RES | END MELAMINE-UREA-FORMALDEHYDE (MUF) LT-UNK UREA FORMALDEHYDE LT-P1 | RES AMMONIUM SULFATE LT-P1 | END AMMONIUM CHLORIDE LT-P1 | MAM | EYE | END]

Number of Greenscreen BM-4/BM3 contents..... 1
Contents highest concern GreenScreen Benchmark or List translator Score..... LT-1
Nanomaterial..... No

INVENTORY AND SCREENING NOTES:

This HPD includes the following substrates: Trupan Standard MDF, Trupan High Density MDF, Trupan Lite MDF, Trupan Plus MDF, Trupan Custom, Fibrex Standard, Fibrex Plus. Ingredient names undisclosed on HPD are considered proprietary.

VOLATILE ORGANIC COMPOUND (VOC) CONTENT

VOC Content data is not applicable for this product category.

CERTIFICATIONS AND COMPLIANCE

See Section 3 for additional listings.

Formaldehyde emissions: Formaldehyde Emissions Grademark Certification Program - Eugene, OR
Formaldehyde emissions: Formaldehyde Emissions Grademark Certification Program - Malvern, AR
Formaldehyde emissions: Formaldehyde Emissions Grademark Certification Program - Bennettsville, SC (MDF)
Formaldehyde emissions: Formaldehyde Emissions Grademark Certification Program - Moncure, NC (MDF)

CONSISTENCY WITH OTHER PROGRAMS

No pre-checks completed or disclosed

Third Party Verified?
- ◉ Yes
- ○ No

PREPARER: Self-Prepared
VERIFIER: SCS Global Services
VERIFICATION #: qGE-3353

SCREENING DATE: 2017-08-18
PUBLISHED DATE: 2018-01-29
EXPIRY DATE: 2020-08-18

Section 2: Content in Descending Order of Quantity

This section lists contents in a product based on specific threshold(s) and reports detailed health information including hazards. This HPD uses the inventory method indicated above, which is one of three possible methods:

- *Basic Inventory method with Product-level threshold.*
- *Nested Material Inventory method with Product-level threshold*
- *Nested Material Inventory method with individual Material-level thresholds*

Definitions and requirements for the three inventory methods and requirements for each data field can be found in the HPD Open Standard version 2.1, available on the HPDC website at: www.hpd-collaborative.org/hpd-2-1-standard

ARAUCO NA MEDIUM DENSITY FIBERBOARD (MDF)

PRODUCT THRESHOLD: 100 ppm

RESIDUALS AND IMPURITIES CONSIDERED: Yes

RESIDUALS AND IMPURITIES NOTES: ARAUCO NA worked with an HPD Third Party Preparer to confirm that all residual and impurities have been considered during the preparation of this HPD.

OTHER PRODUCT NOTES:

CELLULOSE, MICROCRYSTALLINE

ID: **9004-34-6**

%: **76.0000 - 93.0000** GS: **NoGS** RC: **None** NANO: **No** ROLE: **Structural Component**

HAZARDS:	AGENCY(IES) WITH WARNINGS:
None Found	No warnings found on HPD Priority lists

SUBSTANCE NOTES:

UNDISCLOSED CHEMICAL #1

ID: **Undisclosed**

%: **0.1250 - 1.2000** GS: **BM-4** RC: **None** NANO: **No** ROLE: **Water Repellent**

HAZARDS:	AGENCY(IES) WITH WARNINGS:
None Found	No warnings found on HPD Priority lists

SUBSTANCE NOTES: This chemical has been identified and screened by Arauco's HPD Third Party Preparer. Due to its propriety nature, this chemical and its CAS# were not able to be disclosed on this HPD. The GreenScreen Benchmark® assessment score of BM-4 was provided through the HPD 2.1 Builder Tool.

UNDISCLOSED CHEMICAL #2

ID: **Undisclosed**

%: **0.1000 - 1.0000** GS: **LT-1** RC: **None** NANO: **No** ROLE: **Water Repellent**

HAZARDS:	AGENCY(IES) WITH WARNINGS:	
CANCER	EU - R-phrases	R45 - May cause cancer
CANCER	EU - GHS (H-Statements)	H350 - May cause cancer
CANCER	EU - REACH Annex XVII CMRs	Carcinogen Category 2 - Substances which should be regarded as if they are Carcinogenic to man

RESTRICTED LIST	German FEA - Substances Hazardous to Waters	Class 3 - Severe Hazard to Waters
CANCER	EU - Annex VI CMRs	Carcinogen Category 1B - Presumed Carcinogen based on animal evidence
CANCER	Australia - GHS	H350 - May cause cancer

SUBSTANCE NOTES: This chemical has been identified and screened by Arauco's HPD Third Party Preparer. Due to its propriety nature, this chemical and its CAS# were not able to be disclosed on this HPD.

UREA

ID: **57-13-6**

%: **0.0900 - 4.0000** GS: **LT-UNK** RC: **None** NANO: **No** ROLE: **Scavenger**

HAZARDS:	AGENCY(IES) WITH WARNINGS:
None Found	No warnings found on HPD Priority lists

SUBSTANCE NOTES:

UNDISCLOSED CHEMICAL #3

ID: **Undisclosed**

%: **0.0013 - 0.1000** GS: **NoGS** RC: **None** NANO: **No** ROLE: **Water Repellent**

HAZARDS:	AGENCY(IES) WITH WARNINGS:
None Found	No warnings found on HPD Priority lists

SUBSTANCE NOTES: This chemical has been identified and screened by Arauco's HPD Third Party Preparer. Due to its propriety nature, this chemical and its CAS# were not able to be disclosed on this HPD.

UNDISCLOSED CHEMICAL #4

ID: **Undisclosed**

%: **0.0005 - 0.0300** GS: **LT-P1** RC: **None** NANO: **No** ROLE: **Water Repellent**

HAZARDS:	AGENCY(IES) WITH WARNINGS:	
MAMMALIAN	EU - R-phrases	R20 - Harmful by Inhalation (gas or vapor or dust/mist)
MAMMALIAN	EU - R-phrases	R21 - Harmful in Contact with Skin
MAMMALIAN	EU - R-phrases	R22 - Harmful if Swallowed
SKIN IRRITATION	EU - R-phrases	R34 - Causes burns
RESPIRATORY	AOEC - Asthmagens	Asthmagen (Rs) - sensitizer-induced
SKIN IRRITATION	EU - GHS (H-Statements)	H314 - Causes severe skin burns and eye damage
ENDOCRINE	TEDX - Potential Endocrine Disruptors	Potential Endocrine Disruptor
SKIN SENSITIZE	MAK	Sensitizing Substance Sh - Danger of skin sensitization

and its CAS# were not able to be disclosed on this HPD.

MELAMINE-UREA-FORMALDEHYDE (MUF)

ID: **25036-13-9**

%: **0.0000 - 18.0000** GS: **LT-UNK** RC: **None** NANO: **No** ROLE: **Resin**

HAZARDS:	AGENCY(IES) WITH WARNINGS:
None Found	No warnings found on HPD Priority lists

SUBSTANCE NOTES:

UREA FORMALDEHYDE

ID: **9011-05-6**

%: **0.0000 - 15.0000** GS: **LT-P1** RC: **None** NANO: **No** ROLE: **Resin**

HAZARDS:	AGENCY(IES) WITH WARNINGS:	
RESPIRATORY	AOEC - Asthmagens	Asthmagen (Rs) - sensitizer-induced

SUBSTANCE NOTES:

AMMONIUM SULFATE

ID: **7783-20-2**

%: **0.0000 - 0.3000** GS: **LT-P1** RC: **None** NANO: **No** ROLE: **Catalyst**

HAZARDS:	AGENCY(IES) WITH WARNINGS:	
ENDOCRINE	TEDX - Potential Endocrine Disruptors	Potential Endocrine Disruptor

SUBSTANCE NOTES:

AMMONIUM CHLORIDE

ID: **12125-02-9**

%: **0.0000 - 0.4000** GS: **LT-P1** RC: **None** NANO: **No** ROLE: **Catalyst**

HAZARDS:	AGENCY(IES) WITH WARNINGS:	
MAMMALIAN	EU - R-phrases	R22 - Harmful if Swallowed
EYE IRRITATION	EU - R-phrases	R36 - Irritating to eyes
EYE IRRITATION	EU - GHS (H-Statements)	H319 - Causes serious eye irritation
ENDOCRINE	TEDX - Potential Endocrine Disruptors	Potential Endocrine Disruptor

SUBSTANCE NOTES:

Section 3: Certifications and Compliance

This section lists applicable certification and standards compliance information for VOC emissions and VOC content. Other types of health or environmental performance testing or certifications completed for the product may be provided.

FORMALDEHYDE EMISSIONS — **Formaldehyde Emissions Grademark Certification Program - Eugene, OR**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America- Eugene, Oregon
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/
ISSUE DATE: 2016-06-07
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) 93120 SCOPE OF CERTIFICATION: Medium Density Fiberboard (MD2 and MD4) (CARB Phase 2 – 0.11 ppm)

FORMALDEHYDE EMISSIONS — **Formaldehyde Emissions Grademark Certification Program - Malvern, AR**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Malvern, Arkansas
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/
ISSUE DATE: 2016-06-07
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) 93120 SCOPE OF CERTIFICATION: Medium Density Fiberboard (M5T and MDT) (CARB Phase 2 – 0.11 ppm)

FORMALDEHYDE EMISSIONS — **Formaldehyde Emissions Grademark Certification Program - Bennettsville, SC (MDF)**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Bennettsville, South Carolina (MDF)
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/
ISSUE DATE: 2016-05-26
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) 93120 SCOPE OF CERTIFICATION: Medium Density Fiberboard (M4T, M5T and MDT) (CARB Phase 2 – 0.11 ppm)

FORMALDEHYDE EMISSIONS — **Formaldehyde Emissions Grademark Certification Program - Moncure, NC (MDF)**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Moncure, North Carolina (MDF)
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/
ISSUE DATE: 2016-05-25
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne

(CARB Phase 2 - 0.11 ppm) Thin MDF (TM2) (CARB Phase 2 - 0.13 ppm)

FORMALDEHYDE EMISSIONS | **Formaldehyde Emissions Grademark Certification Program - Sault Ste. Marie, ON**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Sault Ste. Marie, Ontario
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE:2016-06-09

EXPIRY DATE:

CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) 93120 SCOPE OF CERTIFICATION: Medium Density Fiberboard (M24, M25 and M2F) (CARB Phase 2 – 0.11 ppm)

FORMALDEHYDE EMISSIONS | **Formaldehyde Emissions Grademark Certification Program - St. Stephen, NB (MDF)**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - St. Stephen, New Brunswick (MDF)
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE:2016-06-09

EXPIRY DATE:

CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Fulfilled The Requirements of: California Air Resources Board (CARB) Airborne Toxic Control Measures (ATCM) 93120 SCOPE OF CERTIFICATION: Thin Medium Density Fiberboard (MD2 and MD3) (CARB Phase 2 – 0.13 ppm)

COMPOSITE WOOD | **ECC - Eco-certified Composite Grademark Program - Eugene, OR**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Eugene, Oregon
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE:2016-06-07

EXPIRY DATE:

CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 SCOPE OF CERTIFICATION: MDF. Eco-attributes: Carbon Footprint; Locally Sourced Fiber; Recycled, Recovered or Post-Consumer Fiber Content.

COMPOSITE WOOD | **ECC - Eco-certified Composite Grademark Program - Malvern, AR**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Malvern, Arkansas
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE:2016-05-08

EXPIRY DATE:

CERTIFIER OR LAB: Composite Panel Association

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 SCOPE OF CERTIFICATION: MDF. Eco-attributes: Carbon Footprint; Locally Sourced Fiber; Recycled, Recovered or Post-Consumer Fiber Content,Responsible Wood Sourcing.

COMPOSITE WOOD | **ECC - Eco-certified Composite Grademark Program - Bennettsville,**

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Bennettsville, South Carolina (MDF)
ISSUE DATE: 2016-05-18
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120. SCOPE OF CERTIFICATION: MDF.ECO-ATTRIBUTES: Carbon Footprint; Locally Sourced Fiber; Recycled, Recovered or Post-Consumer Fiber Content, Responsible Wood Sourcing.

COMPOSITE WOOD

ECC - Eco-certified Composite Grademark Program - Moncure, NC (MDF)

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Moncure, North Carolina (MDF)
ISSUE DATE: 2016-05-18
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 SCOPE OF CERTIFICATION: MDF, Thin MDF. ECO-ATTRIBUTES: Carbon Footprint; Locally Sourced Fiber; Recycled, Recovered or Post-Consumer Fiber Content, Sustainable Use of Wood Fiber, Responsible Wood Sourcing.

COMPOSITE WOOD

ECC - Eco-certified Composite Grademark Program - Sault Ste. Marie, ON

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - Sault Ste. Marie, Ontario
ISSUE DATE: 2016-05-19
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 SCOPE OF CERTIFICATION: MDF. ECO-ATTRIBUTES: Carbon Footprint; Recycled, Recovered or Post-Consumer Fiber Content; Responsible Wood Sourcing.

COMPOSITE WOOD

ECC - Eco-certified Composite Grademark Program - St. Stephen, NB (MDF)

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: ARAUCO North America - St. Stephen, New Brunswick (MDF)
ISSUE DATE: 2016-05-19
EXPIRY DATE:
CERTIFIER OR LAB: Composite Panel Association
CERTIFICATE URL:
https://www.arauco.cl/na/sostenibilidad/certificaciones/

CERTIFICATION AND COMPLIANCE NOTES: Has Completed and Fulfilled the Requirements of: CPA 4-11 Eco-Certified Composites (ECC) Sustainability Standard and California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 SCOPE OF CERTIFICATION: Thin MDF. ECO-ATTRIBUTES: Locally Sourced Fiber; Recycled, Recovered or Post-Consumer Fiber Content; Responsible Wood Sourcing.

MANAGEMENT

ISO 14001 – Environmental Management System and OHSAS 18001 – Safety Management System

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: Bennettsville, SC; Fort Mill, SC; Eugene, OR; Albany, OR; Malvern, AR; Sault Ste. Marie, ON; St. Stephen, NB; Moncure, NC, Biscoe, NC
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE: 2017-12-21

EXPIRY DATE: 2020-12-20

CERTIFIER OR LAB: Lloyd's Register Quality Assurance

CERTIFICATION AND COMPLIANCE NOTES: Lloyd's Register Quality Assurance approved the above facilities to the ISO 14001:2004 and OHSAS 18001:2007 Management Systems. These Management Systems are applicable to the manufacturer of a diverse line of composite panel products.

OTHER

Forest Stewardship Council® - FSC Chain of Custody and Controlled Wood

CERTIFYING PARTY: Third Party
APPLICABLE FACILITIES: As a multi-site certificate, the activities and products included in the scope of this certificate are performed by a network of participating sites (all ARAUCO NA manufacturing facilities). Products offered, shipped or sold by the certificate holder can only be considered covered by the scope of this certificate when the required FSC claim is clearly stated on invoices and shipping documents and must be stated on the customer PO in order to receive as such.
CERTIFICATE URL: https://www.arauco.cl/na/sostenibilidad/certificaciones/

ISSUE DATE: 2013-09-23

EXPIRY DATE: 2018-09-22

CERTIFIER OR LAB: Rainforest Alliance

CERTIFICATION AND COMPLIANCE NOTES: Certificate Type: Multi-site Chain of Custody and Controlled Wood; Standard(s): FSC-STD-40-003 V1-0; FSC-STD-40-004 V2-1;FSC-STD-40-005 V2-1; Product group(s): MDF, MDF with laminate; Particleboard, particleboard with laminate; Valid from 23 September 2013 to 22 September 2018; Certificate Registration Code: RA-COC-000444, RA-CW-000444; FSC License Code: FSC-C019364; Certificate Issue Number: IN-2015-1

Section 4: Accessories

This section lists related products or materials that the manufacturer requires or recommends for installation (such as adhesives or fasteners), maintenance, cleaning, or operations. For information relating to the contents of these related products, refer to their applicable Health Product Declarations, if available.

No accessories are required for this product.

Section 5: General Notes

Ingredient percentages are expressed in terms of dry weight basis and represent average production values across multiple mills. Safety Data Sheets (SDS) in GHS format can be found at www.arauco.cl/na/. ToxServices LLC considered all residuals and impurities identified for the ingredients of this product. Models covered under HPD: Trupan Standard MDF, Trupan High Density MDF, Trupan Lite MDF, Trupan Plus MDF, Trupan Custom, Fibrex Standard, Fibrex Plus Variations within group: These products are offered in a variety of thickness and panel sizes. Variations in dosing percentages for wood, resin and

performance properties of the panels.

Section 6: References

MANUFACTURER INFORMATION

MANUFACTURER: **Arauco North America**
ADDRESS: **400 Perimeter Center Terrace, Suite 750**
Atlanta GA 30346, USA
WEBSITE: **https://www.arauco.cl/na/**

CONTACT NAME: **Kerry Little**
TITLE: **Corporate Sustainability Manager**
PHONE: **506-465-2975**
EMAIL: **kerry.little@arauco-na.com**

KEY

OSHA MSDS Occupational Safety and Health Administration Material Safety Data Sheet
GHS SDS Globally Harmonized System of Classi cation and Labeling of Chemicals Safety Data Sheet

Hazard Types

AQU Aquatic toxicity
CAN Cancer
DEV Developmental toxicity
END Endocrine activity
EYE Eye irritation/corrosivity
GEN Gene mutation
GLO Global warming
MAM Mammalian/systemic/organ toxicity
MUL Multiple hazards
NEU Neurotoxicity
OZO Ozone depletion
PBT Persistent Bioaccumulative Toxic
PHY Physical Hazard (reactive)
REP Reproductive toxicity
RES Respiratory sensitization
SKI Skin sensitization/irritation/corrosivity
LAN Land Toxicity
NF Not found on Priority Hazard Lists

GreenScreen (GS)

BM-4 Benchmark 4 (prefer-safer chemical)
BM-3 Benchmark 3 (use but still opportunity for improvement)
BM-2 Benchmark 2 (use but search for safer substitutes)
BM-1 Benchmark 1 (avoid - chemical of high concern)
BM-U Benchmark Unspeci ed (insu cient data to benchmark)
LT-P1 List Translator Possible Benchmark 1
LT-1 List Translator Likely Benchmark 1
LT-UNK List Translator Benchmark Unknown (insufficient information from List Translator lists to benchmark)
NoGS Unknown (no data on List Translator Lists)

Recycled Types

PreC Preconsumer (Post-Industrial)
PostC Postconsumer
Both Both Preconsumer and Postconsumer
Unk Inclusion of recycled content is unknown
None Does not include recycled content

Other Terms

Inventory Methods:

Nested Method / **Material Threshold** Substances listed within each material per threshold indicated per material
Nested Method / **Product Threshold** Substances listed within each material per threshold indicated per product
Basic Method / **Product Threshold** Substances listed individually per threshold indicated per produc

Nano Composed of nano scale particles or nanotechnology
Third Party Verified Verification by independent certifier approved by HPDC
Preparer Third party preparer, if not self-prepared by manufacturer
Applicable facilities Manufacturing sites to which testing applies

environmental health hazards. Hazard associations are based on the HPD Priority Hazard Lists, the GreenScreen List Translator™, and when available, full GreenScreen® assessments. The HPD Open Standard v2.1 is not:

- *a method for the assessment of exposure or risk associated with product handling or use,*
- *a method for assessing potential health impacts of: (i) substances used or created during the manufacturing process or (ii) substances created after the product is delivered for end use.*

Information about life cycle, exposure and/or risk assessments performed on the product may be reported by the manufacturer in appropriate Notes sections, and/or, where applicable, in the Certifications section.

The HPD Open Standard was created and is supported by the Health Product Declaration Collaborative (the HPD Collaborative), a customer-led organization composed of stakeholders throughout the building industry that is committed to the continuous improvement of building products through transparency, openness, and innovation throughout the product supply chain.

The product manufacturer and any applicable independent verifier are solely responsible for the accuracy of statements and claims made in this HPD and for compliance with the HPD standard noted.

TOTAL
Millwork
7700 Wellingford Drive Manassas, VA 20109
Phone:571-379-5500

ARLINGTON COMMUNITY HIGH SCHOOL

JOB #: 1877

510 14th St S
Arlington VA 22202

CERTIFICATE

ARAUCO MDF

SECTION 06 41 16.00

INDOOR AIR QUALITY FOR MDF

11/5/2025

Formaldehyde Emissions Grademark Certification Program

CERTIFICATE OF COMPLIANCE

Composite Panel Association (TPC-1)
19465 Deerfield Ave, Suite 306, Leesburg, VA 20176; (703)-724-1128

Hereby Affirms That

ARAUCO NORTH AMERICA

657 BASELINE, SAULT STE MARIE, ONTARIO, CANADA P6A 5K6

Fulfills the Requirements of:
U.S. EPA TSCA Title VI (40 CFR Part 770)
Formaldehyde Emission Standards for Composite Wood Products
(EPA TSCA Title VI certified products comply with CARB 93120 ATCM and CEPA SOR/2021-148)

SCOPE OF CERTIFICATION
Medium Density Fiberboard (MDF) and Thin MDF
(CPA Product Type Designations: M24, M25, M2F and TM2)

Mill 217
Renewed: February 23, 2024; Expires: February 23, 2026
To verify continued certification, visit www.CertifiedbyCPA.org
Email: certification@cpamail.org

Brian T. Sause
Director – Certification and Industry Affairs

400 Perimeter Center Terrace
Suite 750
Atlanta, GA 30346 USA

Phone: (770) 350 1659
Phone: (800) 261 4890
www.arauco-na.com

arauco

Indoor Volatile Organic Compounds (VOCs)

This letter is intended to share information regarding Volatile Organic Compounds (VOCs), indoor air quality programs, and provide information about ARAUCO North America products in the context of these programs.

VOCs are generally defined as chemicals that vaporize at room temperature. Indoor VOCs may come from a variety of sources such as paints, adhesives, flooring, furniture and other wood products, textiles, electrical appliances, aerosols, pesticides, and cleaning products, to name a few. The extent and nature of the health effects of VOCs will depend on factors such as level of exposure, length of time exposed, and particular organic compound, or groups of compounds.

Building codes and certification schemes may endorse standards programs for measuring and assigning limits to VOCs that have been commonly present in indoor air (non-industrial settings). Some of these certification programs include Clean Air Silver and Clean Air Gold, Indoor Advantage and Indoor Advantage Gold, GREENGUARD and GREENGUARD Gold, to name a few. These and similar programs are designed to measure VOCs in products and materials that are in their finished assembled state, intended to best represent and assess potential for exposure in indoor scenarios.

ARAUCO North America manufactures component panels in raw and semi-finished formats. As such, these VOC testing protocols inherently do not apply, for the reasons noted above. Under these programs, once raw material components are machined, combined with other raw materials, and finished with a decorative coating, the assembly is tested in its finished state to ensure all elements impacting VOC generation are accounted for. Customers incorporating ARAUCO North America particleboard, MDF and TFL in the manufacturing or fabrication of products intended for certification to an indoor air quality program are responsible for engineering designs and choosing surface finishes in a manner such that the specification will be met.

It should be noted that there are regulations and certification programs that specifically address the VOC formaldehyde in composite wood panels. All ARAUCO North America composite panel products are third party certified to the CPA 4-19 Eco- Certified Composites (ECC) Sustainability Standard, California Air Resources Board (CARB) Airborne Toxic Control Measure (ATCM) 93120 regulation, and the US EPA TSCA VI Formaldehyde Emission Standards for Composite Wood Products 40 C.F.R. Part 770.

If you have any questions or require further information, please feel free to contact your Sales Representative for assistance.

Regards,

DocuSigned by:
John Atkinson
34C725986DBED4D9...

John Atkinson
Vice President of Sales
ARAUCO North America

Arauco Canada Limited, Arauco North America, Inc.
April 23, 2024.