



Material EPD

9mm, 5mm, and 3mm PET Felt

Environmental Product Declaration

Date of Issue: August 2, 2024

Date of Expiration: August 2, 2029

Product Category Rule

PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022

PCR Guidance for Building-Related Products and Services - Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements, UL Environment, v2, 04/2021

Declared Unit: 1 ft²



About Turf

Since 2016, Turf has collaborated with designers and architects to create acoustic solutions that produce welcoming spaces. Turf's artful acoustic solutions – ranging from ceiling baffles, wall tiles, screens, and more – are effortless to adopt, adapt, and install. From an in-house developed color palette to research-centered product development, each Turf design results in smarter products, processes, and tools so that designers and architects can focus on creating and leave the noise behind.

Turf seeks to design a cleaner, greener built environment with solutions that meet the most intensive sustainability standards, and processes that minimize waste and energy at every step.

The use of 60% pre-consumer recycled PET felt in Turf products and the company's on-demand manufacturing keeps Turf's practices eco-friendly and inventory-associated waste low. At Turf, yesterday's scraps are tomorrow's solutions; it's either recycled into a high-energy-value fuel or experimented with to create new innovative solutions. Headquartered in Chicago, the Turf team is constantly pushing the boundaries of the felt material to produce tools for architects and designers to effortlessly turn their visions into reality.



Program Operator	ASTM International 100 Barr Harbor Dr., West Conshohocken, PA 19428 cert@astm.org
General Program Instructions and Version Number	ASTM Program Operator for Product Category Rules (PCR) and Environmental Product Declarations (EPDs), General Program Instructions, Version: 8.0, Revised 04/29/20
Manufacturer Name and Address	Turf Design, Inc. 41 Prairie Parkway, Gilberts IL 60136
Declaration Number	ASTM-EPD-741
Declared Product and Functional Unit	PET Ceiling and Interior Wall Panels Declared Unit: 0.093 m ² (1 ft ²) of panel (alternative unit of 1 m ² also declared)
Reference PCR and Version Number	ISO 21930:2017 PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022 PCR Guidance for Building-Related Products and Services - Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements, UL Environment, v2, 04/2021
Product's Intended Application and Use	Commercial
Intended Audience	Business-to-Business
Product RSL	N/A
Markets of Applicability	North America
Date of Issue	August 02, 2024
Period of Validity	5 Years from Date of Issue
EPD Type	Manufacturer Specific
EPD Scope	Cradle-to-Gate (A1 to A3 Modules)
Year of Reported Manufacturer Primary Data	2023



LCA Software and Version Number		GaBi 10.7				
LCI Database and Version Number		GaBi Database 2022.2				
LCIA Methodology and Version Number		TRACI 2.1 + IPCC AR5				
LCIA Results Overview per 1 ft ² (A1 to A3 modules)						
	GWP [kg CO ₂ eq]	ODP [kg CFC 11 eq]	AP [kg SO ₂ eq]	EP [kg N eq]	SFP [kg O ₃ eq]	FFD [MJ]
Turf 3mm PET Felt	7.43E-01	2.76E-08	2.93E-03	1.06E-03	5.02E-02	1.31E+00
Turf 5mm PET Felt	1.07E+00	4.93E-08	4.40E-03	1.89E-03	7.36E-02	2.20E+00
Turf 9mm PET Felt	1.67E+00	6.25E-08	6.42E-03	2.43E-03	1.12E-01	2.84E+00
Sub-Category PCR Review conducted by		EPD Review Panel Chair Lindita Bushi <i>Lindita Bushi</i> EPD@ul.com				
External, Independent verification of the declaration and data, according to ISO 21930:2017, UL Part A, ISO 14025:2006, and UL Part B sub-category.		Tim Brooke, ASTM International <i>Tim Brooke</i>				
This Life Cycle Assessment was conducted in accordance with ISO 14044 and the reference PCR by		Armstrong World Industries, Inc.				
This Life Cycle Assessment was independently verified in accordance with ISO 14044 and the reference PCR by		Lindita Bushi, PhD Athena Sustainable Materials Institute <i>Lindita Bushi</i> lindita.bushi@athenaasmi.org				
Limitations: <ul style="list-style-type: none"> • Environmental declarations from different programs (ISO 14025) may not be comparable. • Comparison of the environmental performance of Non-Metal Ceiling and Wall System Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. • Full conformance with this PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared. 						



Product Composition

No substances required to be reported, per RCRA, Subtitle 3, as hazardous are associated with the production of this product.

Table 1: Product Compositions

Mass %	PET Felt
Recycled Content	60%
Turf 3mm PET Felt	100%
Turf 5mm PET Felt	100%
Turf 9mm PET Felt	100%

Technical Requirements

Table 2: Technical Requirements

Name and Standard	Sound Absorbtion Coefficient (ASTM C423)	Surface Burning Characteristics of Building Materials (ASTM E84)		
		Class	Wall	Ceiling
Turf 3mm PET Felt	0.55-0.95	Class A	-	X
Turf 5mm PET Felt	1.0	Class A	-	X
Turf 9mm PET Felt	0.55-0.95	Class A	X	X

LCA Methodology

Declared Unit

Table 3: Declared Unit Details

	Weight [kg/1 ft ²]	Weight [kg/m ²]	Weight [lbs/ft ²]	Thickness [in] Average [Range]	Thickness [cm] Average [Range]
Turf 3mm PET Felt	0.103	1.11	0.228	0.118	.03
Turf 5mm PET Felt	0.187	2.01	0.413	0.197	.05
Turf 9mm PET Felt	0.239	2.57	0.527	0.354	.09



System Boundary

*MND = Not Declared

Table 4: Description of the System Boundary Modules

Production			Construction		Use							End of Life				Benefits & Loads Beyond System Boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw Material Supply	Transport	Manufacturing	Transport to Site	Assembly Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Allocation

General principles of allocation were based on ISO 14040/44. To derive a per-unit value for manufacturing inputs such as electricity, thermal energy and water, allocation based on total production by area was adopted, as this is the basis on which products are processed and sold, regardless of product weight. As a default, secondary GaBi datasets use a physical basis for allocation. This LCA follows the attributional LCA approach. No burdens are allocated across the system boundary with secondary material, secondary fuel, or recovered energy flows arising from waste.

Cut-Off Rules

Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the declared unit. No known flows are deliberately excluded from this EPD.

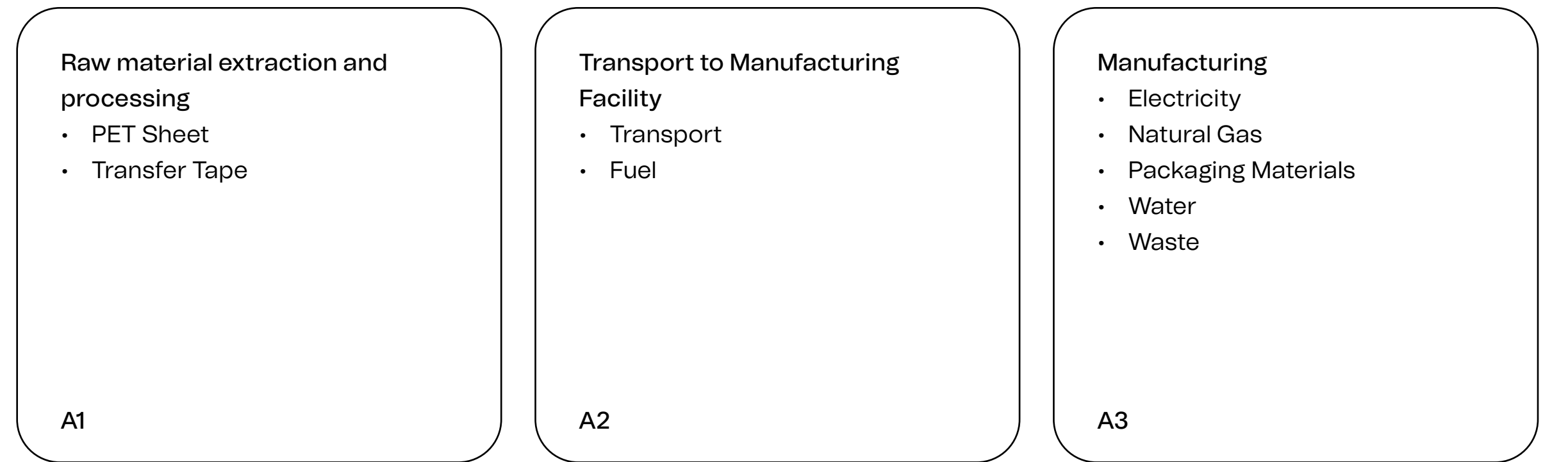
Period Under Review

Data was obtained from Turf for calendar year 2023.

Note that hanger wires, molding, and/or attachment/hold down clips are excluded from the system boundary.

System Boundary

Figure 1: System Boundary Diagram



Technical Information and Scenarios

Manufacturing

Turf's PET-based ceiling and wall products are manufactured from 60% recycled PET (Polyethylene) acoustical boards. PET sheets are cut to shape, labeled, and combined with any necessary structural or framing components. The products are packaged and then shipped and installed.

Packaging

Packaging requirements are presented in Table 5, per declared unit.

Table 5: Packaging per 1 ft²

[kg/1 ft ²]	Packaging Lumber	Packaging Plywood	Packaging Cardboard	Packaging LDPE Film	Packaging paper	Packaging Polystyrene
Turf 3mm PET Felt	2.53269E-02	-	3.44182E-02	3.45628E-03	-	-
Turf 5mm PET Felt	2.53269E-02	-	3.44182E-02	3.45628E-03	-	-
Turf 9mm PET Felt	2.53269E-02	-	3.44182E-02	3.45628E-03	-	-



Results

Environmental impacts were calculated using the GaBi software platform. Impact results have been calculated using ISO 21930 and TRACI 2.1 characterization factors. Results presented in this report are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks. These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. Toxicity impacts shall be reported under Additional Environmental Information.

Acronym [Unit]	Environmental Indicators	Methodology
GWP [kg CO ₂ eq]	Global Warming Potential, excl biogenic carbon	TRACI 2.1
ODP [kg CFC-11 eq]	Ozone Depletion Air	TRACI 2.1
AP [kg SO ₂ eq]	Acidification Potential	TRACI 2.1
EP [kg N eq]	Eutrophication Potential	TRACI 2.1
SFP [kg O ₃ eq]	Smog Formation Potential	TRACI 2.1
FFD [MJ, Surplus Energy]	Fossil Fuel Depletion	TRACI 2.1
Resource Use Indicators		ISO 21930
RPRE [MJ]	Use of renewable primary energy	ISO 21930



Acronym [Unit]	Environmental Indicators	Methodology
RPRM [MJ]	Renewable primary energy resources used as raw materials	ISO 21930
RPRT [MJ]	Total use of renewable primary energy resources	ISO 21930
NRPRE [MJ]	Use of non-renewable primary energy	ISO 21930
NRPRM [MJ]	Non-renewable primary energy resources used as raw materials	ISO 21930
NRPRT [MJ]	Total use of non-renewable primary energy resources	ISO 21930
SM [kg]	Input of secondary material	ISO 21930
RSF [MJ]	Use of renewable secondary fuels	ISO 21930
NRSF [MJ]	Use of non renewable secondary fuels	ISO 21930
RE [MJ]	Recovered energy	ISO 21930
FW [m ³]	Use of net fresh water	ISO 21930



Output Flows and Waste Categories		
Acronym [Unit]	Environmental Indicators	Methodology
HWD [kg]	Hazardous waste disposed	ISO 21930
NHWD [kg]	Non-hazardous waste disposed	ISO 21930
HLRW [kg]	High-level radioactive waste, conditioned, to final repository	ISO 21930
ILLRW [kg]	Intermediate- and low-level radioactive waste, conditioned, to final repository	ISO 21930
CRU [kg]	Components for re-use	ISO 21930
MR [kg]	Materials for Recycling	ISO 21930
MER [kg]	Material for Energy Recovery	ISO 21930
EEE [MJ]	Exported electrical energy	ISO 21930
EET [MJ]	Exported thermal energy	ISO 21930

LCA Results, per Declared Unit (1 ft²)

Table 6: LCA Results, per 1 ft² panels (A1 to A3)

Impact Categories	Turf 3mm PET Felt	Turf 5mm PET Felt	Turf 9mm PET Felt
GWP [kg CO ₂ eq]	7.43E-01	1.07E+00	1.67E+00
ODP [kg CFC 11 eq]	2.76E-08	4.93E-08	6.25E-08
AP [kg SO ₂ eq]	2.93E-03	4.40E-03	6.42E-03
EP [kg N eq]	1.06E-03	1.89E-03	2.43E-03
SFP [kg O ₃ eq]	5.02E-02	7.36E-02	1.12E-01
FFD [MJ]	1.31E+00	2.20E+00	2.84E+00
Resource Use Indicators			
RPRE [MJ]	4.53E-01	4.83E-01	4.68E-01
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.07E+00	1.96E+00	2.53E+00
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00
SM [kg]	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00
NRDF [m3]	0.00E+00	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00
FW [m3]	7.45E-04	5.98E-04	1.14E-03



LCA Results, per Declared Unit (1 ft²), Continued

Table 6: LCA Results, per 1 ft² panels (A1 to A3)

Impact Categories	Turf 3mm PET Felt	Turf 5mm PET Felt	Turf 9mm PET Felt
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	1.13E-03	0.00E+00	1.15E-03
Output Flows and Waste Categories			
HWD [kg]	1.43E-05	2.59E-05	3.30E-05
NHWD [kg]	5.62E-02	8.56E-02	1.35E-01
RWD [kg]	1.45E-04	1.62E-04	1.48E-04
HLRW [kg]	1.74E-07	1.94E-07	1.77E-07
ILLRW [kg]	1.45E-04	1.62E-04	1.48E-04
CRU [kg]	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00
EE [mj]	0.00E+00	0.00E+00	0.00E+00



LCA Results, per Declared Unit (1 m²)

Table 7: LCA Results, per 1 m² panels (A1 to A3)

Impact Categories	Turf 3mm PET Felt	Turf 5mm PET Felt	Turf 9mm PET Felt
GWP [kg CO ₂ eq]	8.00E+00	1.15E+01	1.79E+01
ODP [kg CFC 11 eq]	2.98E-07	5.30E-07	6.73E-07
AP [kg SO ₂ eq]	3.15E-02	4.73E-02	6.91E-02
EP [kg N eq]	1.15E-02	2.03E-02	2.62E-02
SFP [kg O ₃ eq]	5.40E-01	7.93E-01	1.20E+00
FFD [MJ]	1.41E+01	2.37E+01	3.05E+01
Resource Use Indicators			
RPRE [MJ]	4.88E+00	5.20E+00	5.03E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.22E+01	2.11E+01	2.72E+01
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00
SM [kg]	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00
NRDF [m3]	0.00E+00	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00
FW [m3]	8.02E-03	6.43E-03	1.23E-02



LCA Results, per Declared Unit (1 m²), Continued

Table 7: LCA Results, per 1 m² panels (A1 to A3)

Impact Categories	Turf 3mm PET Felt	Turf 5mm PET Felt	Turf 9mm PET Felt
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00
FW [m ³]	8.02E-03	6.43E-03	1.23E-02
Output Flows and Waste Categories			
HWD [kg]	1.54E-04	2.79E-04	3.55E-04
NHWD [kg]	6.05E-01	9.21E-01	1.46E+00
RWD [kg]	1.57E-03	1.75E-03	1.60E-03
HLRW [kg]	1.87E-06	2.09E-06	1.91E-06
ILLRW [kg]	1.56E-03	1.74E-03	1.59E-03
CRU [kg]	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00
EE [mj]	0.00E+00	0.00E+00	0.00E+00



Interpretation

A dominance analysis for Global Warming Potential was conducted for all products. For the majority of panels, upstream production of raw materials is the largest contributor, followed by manufacturing or packaging, depending on the product group. As manufacturing utilites were allocated on a per m2 basis, products with overall lower impacts show a higher contribution from manufacturing.



Additional Environmental Information

Environment and Health During Manufacturing

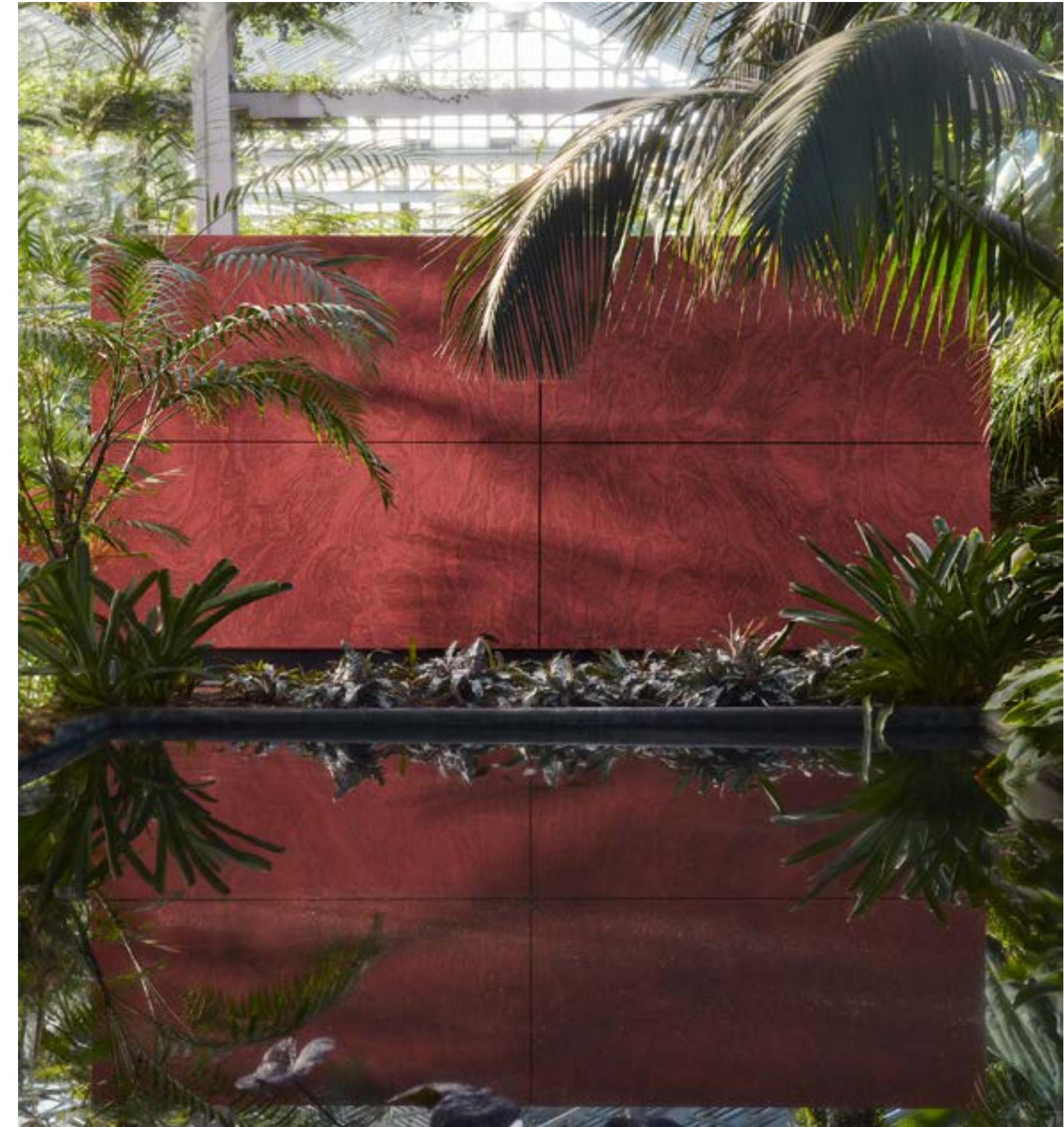
Turf prioritizes environmental sustainability, health, and safety throughout its manufacturing processes. From product design to waste reduction initiatives, Turf integrates responsible practices to minimize environmental impact. The company is committed to ensuring a safe working environment for its employees and strives to optimize energy and water usage while promoting recycling and responsible disposal practices.

Environment and Health During Installation

All recommendations shall be utilized as indicated by SDS and installation guidelines. Specific product SDS and installation instructions can be requested directly from Turf.

Environmental Activities and Certifications

Additional environmental certifications for Turf's products such as Declare Labels, HPD, SDS, VOC Testing, acoustical performance and light reflectance can be requested directly from Turf.



References

ASTM Program Operator Rules. Version: 8.0, Revised 04/29/20.

ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

ISO 14040:2006/Amd1:2020 Environmental management - Life cycle assessment – Principles and framework.

ISO 14044:2006/Amd1:2017/Amd2:2020 Environmental management - Life cycle assessment – Requirements and guidelines.

ISO 21930:2017 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services. Geneva: International Organization for Standardization.

PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022

PCR Guidance for Building-Related Products and Services - Part B: Non-Metal Ceiling and Interior Wall Panel EPD Requirements, UL Environment, v2, 04/2021

