



ISO Clip Thermal Insulation Clip



Northern Facades Limited

ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025:2006 and ISO 21930:2017



ASTM INTERNATIONAL


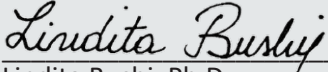
Northern Facades Limited is pleased to present this Environmental Product Declaration (EPD) for their ISO Clip Thermal Insulation Clip. This EPD was developed in compliance with ISO 14025 and ISO 21930 and has been verified by Lindita Bushi, Ph.D., Athena Sustainable Materials Institute.

The LCA and the EPD were prepared by Vertima Inc. The EPD includes cradle-to-gate life cycle assessment (LCA) results.

For more information about Northern Facades Limited, visit www.northernfacades.com.

For any explanatory material regarding this EPD, please contact the program operator.

1. GENERAL INFORMATION

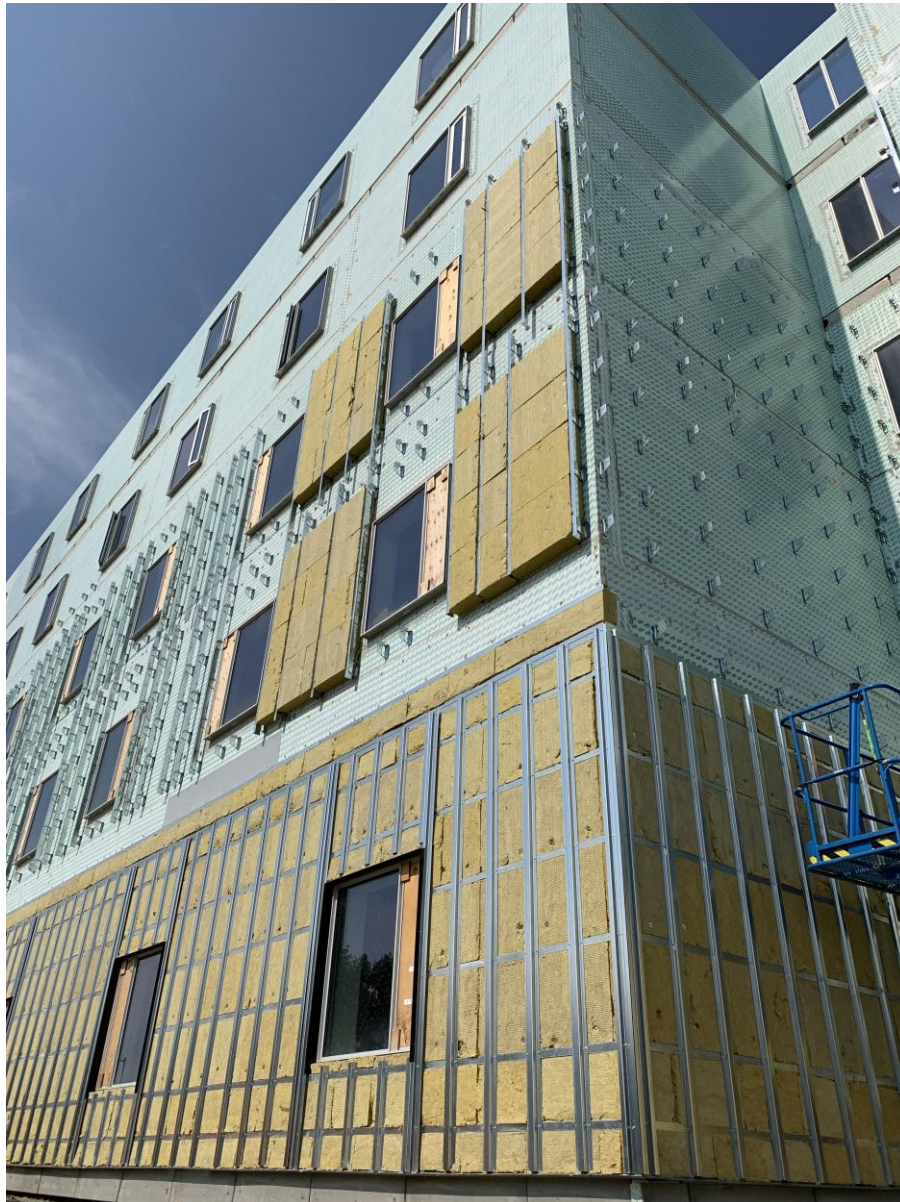
PCR GENERAL INFORMATION			
Reference PCR	SM Part A: LCA calculation rules and report requirements, Version 2023 August 2023 Part B: Product group definition Cladding Support Components and Systems, initiated by Rainscreen Association in North America (RAiNA) December 2022 to December 2027 (validity period) Sustainable Minds® (hereinafter “SM”)		
The PCR review was conducted by:	Sustainable Minds TAB, tab@sustainableminds.com		
EPD GENERAL INFORMATION			
Program Operator	ASTM 100 Barr Harbor Drive, West Conshohocken PA 19428 USA www.astm.org		
Declared Product	ISO Clip		
EPD Registration Number # 1205	EPD Date of Issue June 18, 2026	EPD Period of Validity 5 Years	
EPD Recipient Organization	Northern Facades Limited 6435 Northwest Drive Mississauga (Ontario) L4V 1K2 Canada www.northernfacades.com		
EPD Type/Scope and Declared Unit Product specific cradle-to-gate EPD with a declared unit of one (1) clip per 0.6096 m (24 inches) of cladding support, which is sufficient to accommodate 101.6 mm (4 inches) of insulation plus depth of support components, according to the description above for declared product. In addition, metal rail measuring 0.6096 m (24 inches) is also considered with clip, according to PCR.			Year of Reported Manufacturer Primary Data 2025
Geographical Scope North America	LCA Software OpenLCA v.2.1	LCI Databases Ecoinvent 3.9.1 and US LCI	LCIA Methodology TRACI 2.2 and CED, LHV, v1.0
This LCA and EPD were prepared by:		Vertima Inc. www.vertima.ca	
This EPD and LCA were independently verified in accordance with ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006, as well as SM “Part B: Cladding Support Components and Systems” and SM “Part A: LCA calculation rules and report requirements,” which is based on ISO 21930:2017. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External		 Lindita Bushi, Ph.D. Athena Sustainable Materials Institute	

The owner of the declaration shall be liable for the underlying information and evidence; ASTM, or its affiliates, shall not be liable with respect to manufacturer information, life cycle assessment data, and evidence.



LIMITATIONS

Environmental declarations within the same product category but from different programs may not be comparable [1]. This EPD meets all comparability requirements stated in ISO 14025:2006 [1]. However, differences in certain assumptions, data quality, and variability between LCA datasets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers or programs, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the construction works level per ISO 21930:2017 guidelines [2]. The results of this EPD reflect an average performance by the products and their actual impacts may vary on a case-to-case basis [3].



[Photo Courtesy of Northern Facades]

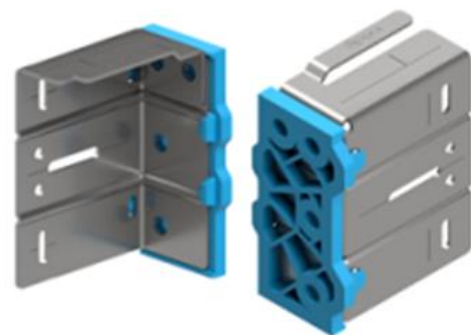
2. PRODUCT SYSTEM DESCRIPTION

Northern Facades Ltd., a division of the Flynn Group of Companies, is a leading supply-only manufacturer of architectural facade systems and ISO Clip thermal attachment brackets. Their expertise brings design assist, engineering, custom systems design, drafting, and manufacturing to their partners and their projects. They work with the building envelope community to deliver designed, code-compliant fabricated systems to building owners, who can enjoy beautiful facades that last for many generations.

2.1. PRODUCT DESCRIPTION

The ISO Clip is available in four design variants: 2.00," 3.25," 4.75" and 7.75." Depending on their respective characteristics, the four ISO Clip models are suitable for insulation depths ranging from 2" to 10". These ISO Clips correspond to CSI MasterFormat code 07 42 03 – Thermal Isolation Mounting Clips for Exterior Wall Panel Assemblies. The ISO Clip systems are fully assembled at the factory (Markam, Ontario), then packaged and shipped to job sites permitting quick installation. A detailed description of the Iso Clip is available on Northern Facades Limited's product website ([Website - ISO Clip: Thermal Isolation Clip](#)).

The ISO Clip system is composed of a metal part (galvanized steel) and a thermal isolator pad made of high-performance glass fiber reinforced polyamide. Although galvalume steel (14 ga ASTM A792) could be used as an alternative to galvanized steel (14 ga ATSM 653), this EPD focuses on the ISO Clip systems, which are made with the most common option: galvanized steel. Galvalume excels in corrosive environments and offers enhanced longevity, while galvanized steel presents a more economical option with easier installation, without compromising industry-standard quality.



ISO Clip 3.25"

[Photo courtesy of Northern Facades Ltd.]

The ISO Clip system is engineered to perform on all substrates including concrete, concrete block, steel studs and wood. At the installation site, the product is mounted to the building structure and does not carry the floor or roof loads of the building. The ISO Clip system is suitable for either vertical or horizontal sub-girts.

2.2. PERFORMANCE STANDARDS

Northern Facades' ISO Clip respects the following standards per product type:

- ASTM A653 – Galvanized steel (or Galvalume™, ASTM A792) for clip fabrication
- NFPA 285 - Standard Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Minor Combustible Components
- CAN/ULC-S134-13 - Standard Test Method for Fire Test of Exterior Wall Assemblies
- ASHRAE 90.1, NECB, and SB-10 - Relevant energy codes for thermal performance, supported by thermal modeling and analysis completed by Morrison Hershfield.

2.3. MATERIAL COMPOSITION

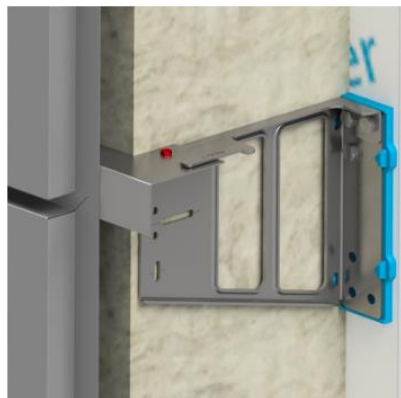
Materials	ISO Clip Percentage in final product (%)			
	Main Product	Clips shown only for illustrative purposes		
	ISO Clip 3.25"	ISO Clip 2.00"	ISO Clip 4.75"	ISO Clip 7.75"
Metal (14 ga Galvanized steel 33Ksi, ASTM A653)	89.15%	85.45%	88.45%	91.38%
High-performance glass fiber reinforced polyamide (Nylon polyamide glass fiber reinforced)	10.85%	14.55%	11.55%	8.62%
TOTAL	100.00%	100.00%	100.00%	100.00%

2.4. MANUFACTURING

The ISO Clip is manufactured in a controlled factory environment to ensure dimensional precision, quality, and performance. The ISO Clip’s modules integrate galvanized steel and high-performance glass fiber reinforced polyamide. The clip fabrication process includes injection moulding of the polyamide glass fiber reinforced thermal pad, and stamping out of the metal parts followed by assembly of the two parts and packaging in recyclable cartons. The completed ISO Clip modules undergo quality control inspections to ensure structural/thermal bridging integrity. Material waste generated during manufacturing, which is mainly galvanized steel, is sent to the recycling centre.

2.5. PACKAGING

The ISO Clip modules are carefully packaged to protect them during transportation and on-site handling. Packaging consists of wooden pallets, shrink wrap and cardboard. All packaging materials are selected to balance protection with environmental considerations, and efforts are made to maximize recyclability and reuse.



ISO Clip 7.75" - application
[Photo courtesy of Northern Facades Ltd.]

3. LCA CALCULATION RULES

3.1. DECLARED UNIT AND REFERENCE FLOWS

The declared unit (DU) is 0.6096 m (24 linear inches) of cladding support system, consisting of a single clip unit spaced at one per 24 inches. The exterior cavity depth is sufficient to accommodate 101.6 mm (4 inches) of insulation plus depth of support components outboard of the insulation layer to which the cladding is attached. Fasteners are excluded [3]. To facilitate the consistent reporting of results across the product category, the ISO Clip system is presented with an associated metal rail measuring 0.6096 m (24 linear inches) in length, in accordance with the applicable PCR. The DU assumes that the ISO Clip is installed at 24" on centre (OC), one clip per 24 linear inches. This assumption is only for the basis calculation of the DU, while the actual installation spacing should be determined by the project engineer based on structural and load requirements.

The ISO Clip 3.25", which is suitable for use with 4" - 6" insulation thicknesses, is consistent with the DU and the PCR. Based on these insulation requirements, the mass of the metal rail ranges from 898 to 1,222 grams [4]. Table 1 presents only ISO Clip 3.25" for the declared unit. Other clips are shown for illustrative purposes.

Table 1: Declared unit (DU) and reference flow for ISO Clip 3.25"

Item	Unit	Product used for DU	Clips shown only for illustrative purposes		
		ISO Clip 3.25"	ISO Clip 2.00"	ISO Clip 4.75"	ISO Clip 7.75"
Mass of 1 unit clip	kg	2.30E-01	1.71E-01	3.30E-01	4.42E-01
Suitable use for insulation thickness	mm	101.6 - 152.4	50.8 - 88.9	127 - 203.2	203.2 - 254
	inches	4" - 6"	2" - 3.5"	5" - 8"	8" - 10"

3.2. SYSTEM BOUNDARIES

According to the Sustainable Minds PCR [3], the system boundaries are **cradle-to-gate**, i.e., only cover the production life cycle module as illustrated in the table below. Within this life cycle stage, three (3) modules are considered, namely A1) Extraction and Upstream Production, A2) Transport to Factory and A3) Manufacturing. Construction (A4; A5), Use (B1 to B7) and End-of-life (C1 to C4) stages are not included in this study. Figure 1 presents the process flow diagram. Neither green power nor CO₂ credits are used in the framework of this project.

Table 2: Description of the system boundary life cycle stages and related information modules

PRODUCTION STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END-OF-LIFE STAGE			
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Extraction and Upstream Production	Transport to Factory	Manufacturing	Transport to Site	Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction / Demolition	Transport to Waste Processing or Disposal	Waste Processing	Disposal of Waste
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Key: X = included; MND = module not declared (excluded)

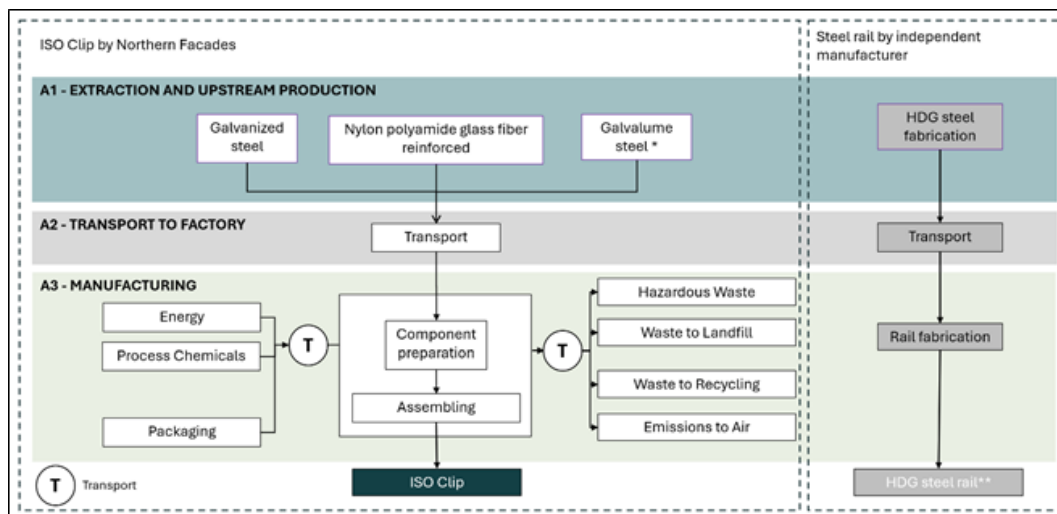


Figure 1: System boundaries of Cradle-to-Gate LCA of the ISO Clip. “T” refers to transport. Metal rail (HDG steel rail **) is included in the system boundaries.

Extraction and upstream production (A1): This module includes the extraction and processing of raw materials used in the manufacturing of the ISO Clip system.

Transport to factory (A2): This module includes the transportation of raw materials from the suppliers to Northern Facades’ manufacturing facility.

Manufacturing (A3): This module covers the manufacturing processes of the ISO Clip system at Markam’s facility, including cutting, machining, assembling, and packaging. Energy use, water consumption, as well as production waste which is recycled or sent to a local landfill are included. No direct emissions to air (excepted carbon dioxide emissions from the tow motors) or to water from the manufacturing facility have been reported.

Finally, packaging materials to make products ready for shipment, as well as their transport to Northern Facades’ manufacturing facility, are also covered by this module.

To facilitate consistent reporting of results across the product category, as recommended by the PCR, the metal rail manufacturing from HDG steel is included in the system boundaries of ISO CLIP (only for ISO Clip3.25").

3.3. CUT-OFF CRITERIA

According to the PCR [4], cut-off rules shall not be applied in order to hide data. In cases of insufficient input data or data gaps for a unit process, the cut-off criteria shall be 1% of renewable primary resource (energy), 1% non-renewable primary resource (energy) usage, 1% of the total mass input of that unit process and 1% of environmental impacts. The total of neglected input flows per module shall be a maximum of 5% of energy usage, mass and environmental impacts [3]. The only exceptions to these criteria are substances with hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion of 1% of the total mass.

No known flows are deliberately excluded from this EPD.

For this study, no data on the construction, maintenance or dismantling of the capital assets, daily transport of the employees, office work, business trips and other activity from Northern Facades’ employees was included in the model. The model only takes into account the processes associated with infrastructures that are already included in the *ecoinvent* unit processes.

3.4. ALLOCATION

As stated by the PCR, in cases where allocation cannot be avoided, the following hierarchy of allocation methods is preferred:

- mass, or other biophysical relationship; and
- economic value.

Allocation was performed based on the yearly production mass of each product under study.

Energy data were provided for the entire manufacturing plant; therefore, **mass allocation** was applied to assign the corresponding share of factory energy consumption to the product under study.

Waste processing of material flows undergoing recycling is included up to the system boundary defined by the end-of-waste state. In other words, a cut-off approach was applied since further processing of the recycled material is considered part of the raw material preparation of another product system (open-loop recycling).

No burdens are allocated across the system boundary with secondary material, secondary fuel or recovered energy flows arising from waste.



[Photo Courtesy of Northern Facades]

3.5. DATA SOURCES AND QUALITY REQUIREMENTS

Data Quality Parameter	Data Quality Discussion
Source of manufacturing data:	Manufacturing data was collected from Northern Facades’ manufacturing plant located in Markam (Ontario) and represents annual average values for the year 2025 (January 2025 to December 2025). This data included: total annual mass of products produced at the manufacturing plant; specific product composition; raw materials and fuels entering the product production process; transport distance of materials and fuels; electricity consumption; water consumption; waste treatment; and packaging.
Source of secondary data:	Background data was taken from ecoinvent 3.9.1 “cut-off” datasets representative of Ontario, Canada, the United States or North America. When appropriate, the grid mix was changed for the grid mix of the province or country where production takes place. Otherwise, ecoinvent data representative of the global market or the “rest-of-the-world” was selected as proxies. Wood data was taken from the US LCI Database, which is specific to a North American context.
Geographical representativeness	Northern Facades’ manufacturing facility is based in the province of Ontario (Canada); hence electricity consumption is based on the Ontario grid mix, while natural gas consumption reflects the Canadian supply mix. Geographical correlation of the material supply and the selected datasets are largely representative of the same area. When this was not possible, datasets representing a larger geographical area were used.
Temporal representativeness	Primary data was collected to be representative of the full production year based on the annual average values for year 2025 (January 2025 to December 2025). Datasets selected from ecoinvent and US LCI were not always published within the last ten years. Nevertheless, ecoinvent and US LCI remain the primary reference LCI databases.
Technological representativeness	Primary data, obtained from the manufacturer, is representative of the current technologies and materials used by this company.
Completeness	All relevant process steps were considered and modelled to satisfy the goal and scope. No known flows were cut-off.

4. LIFE CYCLE ASSESSMENT RESULTS

4.1. RESULTS TABLES

It should be noted that Life Cycle Impact Assessment (LCIA) results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins, or risks.

Results are presented for the total of the system (product) per declared unit, then for the unit item (one Iso Clip item).

LCI and LCIA Indicator acronyms

<p>TRACI 2.2 CML potential impact indicators</p> <p>GWP: Global Warming Potential; ADP-ff: Abiotic Resource Depletion Potential of Non-Renewable (Fossil) Energy Resources; AP: Acidification Potential; EP: Eutrophication Potential; SFP: Smog Formation Potential; ODP: Ozone Layer Depletion Potential.</p> <p>Resource use</p> <p>RPR_E: Renewable Primary Resources Used as Energy Carrier (Fuel); RPR_M: Renewable Primary Resources with Energy Content Used as Material; RPR_T: Renewable Primary Resources Total; NRPR_E: Non-Renewable Primary Resources Used as Energy Carrier (Fuel); NRPR_M: Non-Renewable Primary Resources with Energy Content Used as Material; NRPR_T: Non-Renewable Primary Resources Total; SM: Secondary Materials; RSF: Renewable Secondary Fuels; NRSF: Non-Renewable Secondary Fuels; RE: Recovered Energy; FW: Use of Net Fresh Water Resources.</p> <p>Output flows and waste categories</p> <p>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; CRU: Components for Re-Use; MFR: Materials for Recycling; MER: Materials for Energy Recovery; EE: Exported Energy.</p>
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Table Notes

- (1): GWP 100, excludes biogenic CO₂ removals and emissions associated with biobased products and packaging; 100-year time horizon. GWP factors are provided by the IPCC 2007 Fourth Assessment Report (AR4).
- (2): GWP 100, excludes biogenic CO₂ removals and emissions associated with biobased products and packaging; 100-year time horizon. GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5).
- (3): ADP_{FossilFuel}, in MJ, CML methodology is not to be mixed with FFD (fossil fuel depletion) TRACI v2.1 indicator.
- (4): $RPR_E = RPR_T - RPR_M$, where RPR_T is equal to the value for renewable energy obtained using the CED methodology (LHV).
- (5): Calculated as per ACLCA ISO 21930 Guidance, 6.2 Renewable primary resources with energy content used as a material, RPR_M .
- (6): $NRPR_E = NRPR_T - NRPR_M$, where $NRPR_T$ is equal to the value for non-renewable energy obtained using the CED methodology (LHV).
- (7): Calculated as per ACLCA ISO 21930 Guidance, 6.4 Non-renewable primary resources with energy content used as a material, $NRPR_M$.
- (8): Represents the use of net fresh water calculated from life cycle inventory results, i.e., water consumption using ReCiPe Midpoint (E) 2016.
- (9): Significant data limitations currently exist within the LCI data used to generate waste metrics for Life Cycle Assessments and Environmental Product Declarations. The waste metrics were calculated in conformity with the requirements of ISO 21930:2017, but these values represent rough estimates and are for informational purposes only. As such, no decisions regarding actual cradle-gate waste performance between products should be derived from these reported values.
- (10): Calculated from life cycle inventory results, based on datasets classified under "treatment and disposal of hazardous waste." The manufacturer does not generate hazardous waste during the manufacturing process.
- (11): Calculated from life cycle inventory results, based on waste that is neither "hazardous" nor "radioactive."
- (12): Calculated from life cycle inventory results, based on ecoinvent waste flow "high-level radioactive waste for final repository." The manufacturer does not generate HLRW.
- (13): Calculated from life cycle inventory results, based on ecoinvent waste flow "low-level radioactive waste for final repository." The manufacturer does not generate ILLRW.

Results for ISO Clip 3.25" (clip only) per declared unit (DU)

Environmental Indicator		Unit	ISO Clip 3.25" – LCIA per Declared Unit (DU) 2.30E-01 kg			
			A1	A2	A3	A1 - A3
			(per DU)	(per DU)	(per DU)	(per DU)
TRACI 2.2 and CML	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	1.02E+00	1.90E-04	3.04E-02	1.05E+00
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	1.02E+00	1.90E-04	3.09E-02	1.05E+00
	AP	kg SO ₂ eq.	2.38E-03	4.52E-07	9.75E-05	2.48E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	1.12E+01	2.61E-03	1.44E-01	1.13E+01
	EP _{FreshWater}	Kg P eq.	2.65E-05	1.50E-08	5.37E-06	3.19E-05
	EP _{Marine}	kg N eq.	4.30E-04	3.35E-07	8.67E-05	5.17E-04
	SFP	kg O ₃ eq.	3.68E-02	8.08E-06	1.95E-03	3.87E-02
	ODP	kg CFC-11 eq	9.17E-10	3.46E-12	6.36E-10	1.56E-09
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	6.14E-01	3.63E-05	3.78E-01	9.91E-01
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	6.14E-01	3.63E-05	3.78E-01	9.91E-01
	NRPR _E ⁽⁶⁾	MJ, LHV	1.15E+01	2.64E-03	1.74E+00	1.33E+01
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	1.15E+01	2.64E-03	1.74E+00	1.33E+01
	SM	MJ, LHV	3.11E-01	0.00E+00	0.00E+00	3.11E-01
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	FW ⁽⁸⁾	m ³	9.00E-03	4.10E-07	5.17E-03	1.42E-02
Output flows and waste	HWD ^(9,10)	kg	7.57E-02	8.18E-05	2.24E-02	9.81E-02
	NHWD ^(9,11)	kg	1.25E-02	2.50E-04	5.85E-03	1.86E-02
	HLRW ^(9,12)	m ³	5.93E-11	3.37E-14	6.29E-09	6.35E-09
	ILLRW ^(9,13)	m ³	3.62E-10	1.77E-13	4.48E-09	4.84E-09
	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	1.86E-02	0.00E+00	1.57E-01	1.76E-01
	MER	kg	0.00E+00	0.00E+00	3.00E-04	3.00E-04
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Results for ISO Clip 3.25" (clip with 24-inch metal rail) per declared unit (DU)

Environmental Indicator		Unit	ISO Clip 3.25" (2.30E-01 kg) with Metal Rail (1.22E+00 kg) LCIA per Declared Unit (DU)		
			ISO Clip 3.25"	HDG Metal Rail 24"	Clip and Rail
			A1 - A3	A1 - A3	A1 - A3
			(per DU)	(per DU)	(per DU)
TRACI 2.2 and CML	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	1.05E+00	2.96E+00	4.01E+00
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	1.05E+00	2.96E+00	4.01E+00
	AP	kg SO ₂ eq.	2.48E-03	6.50E-03	8.98E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	1.13E+01	3.61E+01	4.74E+01
	EP _{FreshWater}	Kg P eq.	3.19E-05	5.44E-05	8.62E-05
	EP _{Marine}	kg N eq.	5.17E-04	2.58E-04	7.75E-04
	SFP	kg O ₃ eq.	3.87E-02	1.13E-01	1.52E-01
	ODP	kg CFC-11 eq	1.56E-09	1.36E-08	1.52E-08
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	9.91E-01	5.80E+00	6.79E+00
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	9.91E-01	5.80E+00	6.79E+00
	NRPR _E ⁽⁶⁾	MJ, LHV	1.33E+01	3.63E+01	4.96E+01
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	1.33E+01	3.63E+01	4.96E+01
	SM	MJ, LHV	3.11E-01	1.05E+00	1.36E+00
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00
	FW ⁽⁸⁾	m ³	1.42E-02	3.29E+00	3.30E+00
Output flows and waste	HWD ^(9,10)	kg	9.81E-02	4.04E-02	1.38E-01
	NHWD ^(9,11)	kg	1.86E-02	1.22E-01	1.41E-01
	HLRW ^(9,12)	m ³	6.35E-09	1.29E-10	6.48E-09
	ILLRW ^(9,13)	m ³	4.84E-09	6.15E-10	5.45E-09
	CRU	kg	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	1.76E-01	4.88E-01	6.64E-01
	MER	kg	3.00E-04	1.27E-02	1.30E-02
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00

Results for metal rail (12-inch)

Environmental Indicator		Unit	HDG Steel Metal Rail 12" – LCIA per 6.11E-01 kg			
			A1	A2	A3	A1 - A3
			(per 12-inch)	(per 12-inch)	(per 12-inch)	(per 12-inch)
TRACI 2.2 and CML	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	1.35E+00	4.74E-02	7.95E-02	1.48E+00
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	1.35E+00	4.80E-02	7.95E-02	1.48E+00
	AP	kg SO ₂ eq.	2.70E-03	1.28E-04	4.28E-04	3.25E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	1.64E+01	6.58E-01	9.51E-01	1.81E+01
	EP _{FreshWater}	Kg P eq.	1.72E-05	3.70E-06	6.29E-06	2.72E-05
	EP _{Marine}	kg N eq.	1.38E-05	1.10E-04	5.05E-06	1.29E-04
	SFP	kg O ₃ eq.	4.65E-02	2.65E-03	7.39E-03	5.65E-02
	ODP	kg CFC-11 eq	0.00E+00	8.55E-10	5.95E-09	6.81E-09
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	8.61E-01	8.97E-03	2.03E+00	2.90E+00
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	8.61E-01	8.97E-03	2.03E+00	2.90E+00
	NRPR _E ⁽⁶⁾	MJ, LHV	1.64E+01	6.64E-01	1.03E+00	1.81E+01
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	1.64E+01	6.64E-01	1.03E+00	1.81E+01
	SM	MJ, LHV	5.26E-01	0.00E+00	0.00E+00	5.26E-01
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	FW ⁽⁸⁾	m ³	6.42E-03	1.04E-04	1.64E+00	1.64E+00
Output flows and waste	HWD ^(9,10)	kg	0.00E+00	2.02E-02	0.00E+00	2.02E-02
	NHWD ^(9,11)	kg	0.00E+00	6.11E-02	0.00E+00	6.11E-02
	HLRW ^(9,12)	m ³	0.00E+00	8.32E-12	5.63E-11	6.46E-11
	ILLRW ^(9,13)	m ³	0.00E+00	4.37E-11	2.64E-10	3.08E-10
	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	3.13E-02	0.00E+00	2.13E-01	2.44E-01
	MER	kg	0.00E+00	0.00E+00	6.35E-03	6.35E-03
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Results for the 2.00" ISO Clip product shown for illustrative purposes only (no consideration of DU)

Environmental Indicator		Unit	ISO Clip 2.00" – 1.71E-01 kg per Clip – No consideration of DU			
			A1	A2	A3	A1 - A3
			(per Clip)	(per Clip)	(per Clip)	(per Clip)
TRACI 2.2 and CML	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	7.34E-01	1.40E-04	2.18E-02	7.56E-01
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	7.39E-01	1.40E-04	2.22E-02	7.61E-01
	AP	kg SO ₂ eq.	1.81E-03	3.42E-07	6.83E-05	1.88E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	7.70E+00	1.98E-03	9.68E-02	7.80E+00
	EP _{FreshWater}	Kg P eq.	2.29E-05	1.14E-08	3.99E-06	2.69E-05
	EP _{Marine}	kg N eq.	4.30E-04	2.53E-07	5.93E-05	4.90E-04
	SFP	kg O ₃ eq.	2.70E-02	6.11E-06	1.32E-03	2.83E-02
	ODP	kg CFC-11 eq	9.17E-10	2.61E-12	4.60E-10	1.38E-09
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	4.32E-01	2.75E-05	2.81E-01	7.13E-01
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	4.32E-01	2.75E-05	2.81E-01	7.13E-01
	NRPR _E ⁽⁶⁾	MJ, LHV	8.07E+00	1.99E-03	1.28E+00	9.36E+00
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	8.07E+00	1.99E-03	1.28E+00	9.36E+00
	SM	MJ, LHV	2.00E-01	0.00E+00	0.00E+00	2.00E-01
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW ⁽⁸⁾	m ³	7.64E-03	3.10E-07	3.84E-03	1.15E-02	
Output flows and waste	HWD ^(9,10)	kg	7.57E-02	6.19E-05	1.66E-02	9.23E-02
	NHWD ^(9,11)	kg	1.25E-02	1.90E-04	4.30E-03	1.70E-02
	HLRW ^(9,12)	m ³	5.93E-11	2.55E-14	4.68E-09	4.74E-09
	ILLRW ^(9,13)	m ³	3.62E-10	1.34E-13	3.33E-09	3.69E-09
	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	1.20E-02	0.00E+00	8.72E-02	9.92E-02
	MER	kg	0.00E+00	0.00E+00	2.20E-04	2.20E-04
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Results for the 4.75" ISO Clip product shown for illustrative purposes only (no consideration of DU)

Environmental Indicator		Unit	ISO Clip 4.75" – 3.30E-01 kg per Clip – No consideration of DU			
			A1	A2	A3	A1 - A3
			(per Clip)	(per Clip)	(per Clip)	(per Clip)
TRACI 2.2 and CML	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	1.50E+00	2.80E-04	4.39E-02	1.54E+00
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	1.51E+00	2.80E-04	4.46E-02	1.55E+00
	AP	kg SO ₂ eq.	3.52E-03	6.67E-07	1.40E-04	3.66E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	1.64E+01	3.86E-03	2.10E-01	1.66E+01
	EP _{FreshWater}	Kg P eq.	3.96E-05	2.22E-08	7.71E-06	4.74E-05
	EP _{Marine}	kg N eq.	6.60E-04	4.94E-07	1.30E-04	7.90E-04
	SFP	kg O ₃ eq.	5.42E-02	1.19E-05	2.84E-03	5.70E-02
	ODP	kg CFC-11 eq	1.39E-09	5.10E-12	9.18E-10	2.32E-09
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	9.01E-01	5.36E-05	5.41E-01	1.44E+00
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	9.01E-01	5.36E-05	5.41E-01	1.44E+00
	NRPR _E ⁽⁶⁾	MJ, LHV	1.69E+01	3.89E-03	2.49E+00	1.94E+01
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	1.69E+01	3.89E-03	2.49E+00	1.94E+01
	SM	MJ, LHV	4.54E-01	0.00E+00	0.00E+00	4.54E-01
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW ⁽⁸⁾	m ³	1.34E-02	6.06E-07	7.39E-03	2.08E-02	
Output flows and waste	HWD ^(9,10)	kg	1.15E-01	1.20E-04	3.21E-02	1.47E-01
	NHWD ^(9,11)	kg	1.90E-02	3.70E-04	8.40E-03	2.78E-02
	HLRW ^(9,12)	m ³	9.02E-11	4.98E-14	9.00E-09	9.09E-09
	ILLRW ^(9,13)	m ³	5.50E-10	2.62E-13	6.40E-09	6.95E-09
	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	2.71E-02	0.00E+00	2.36E-01	2.63E-01
	MER	kg	0.00E+00	0.00E+00	4.30E-04	4.30E-04
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

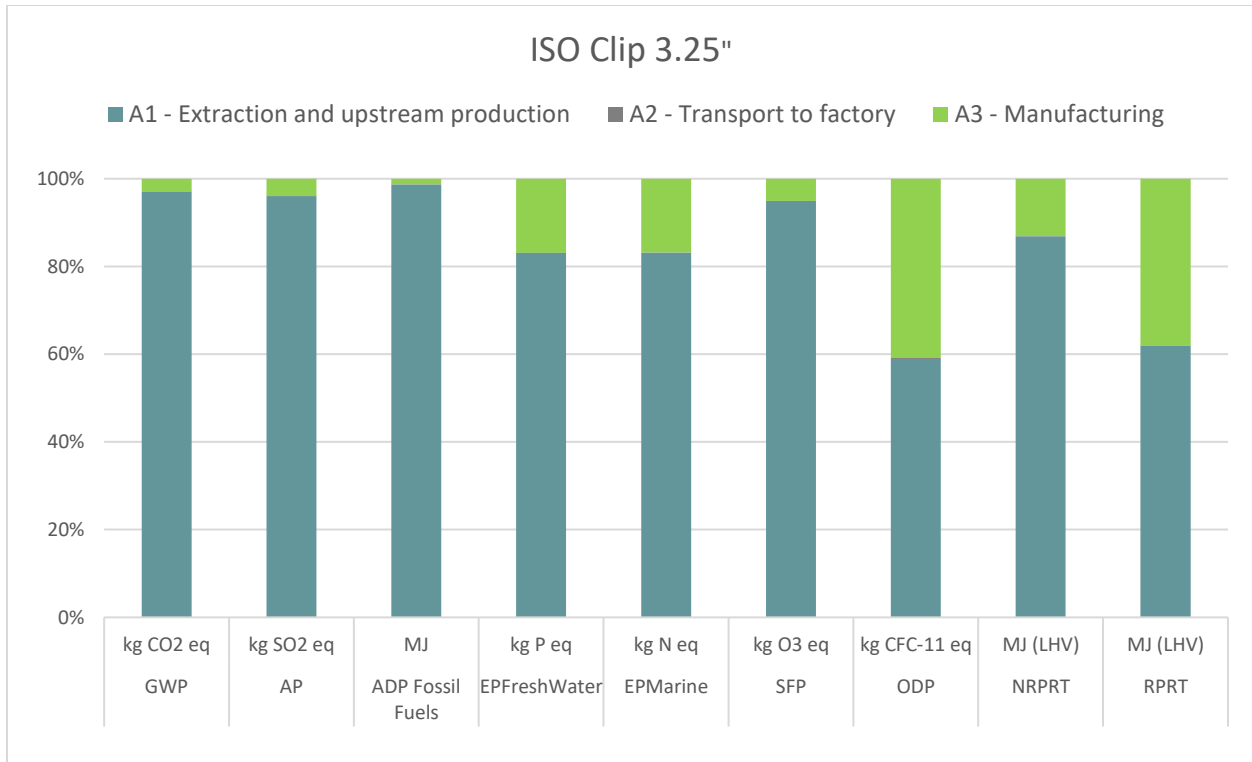
Results for the 7.75" ISO Clip product shown for illustrative purposes only (no consideration of DU)

Environmental Indicator		Unit	ISO Clip 7.75" – 4.42E-01 kg per Clip – No consideration of DU			
			A1	A2	A3	A1 - A3
			(per Clip)	(per Clip)	(per Clip)	(per Clip)
TRACI 2.2	GWP ₁₀₀ -AR4 ⁽¹⁾	kg CO ₂ eq.	2.18E+00	3.90E-04	6.43E-02	2.25E+00
	GWP ₁₀₀ -AR5 ⁽²⁾	kg CO ₂ eq.	2.19E+00	3.90E-04	6.54E-02	2.25E+00
	AP	kg SO ₂ eq.	4.88E-03	9.28E-07	2.10E-04	5.09E-03
	ADP _{FossilFuel} ⁽³⁾	MJ	2.47E+01	5.37E-03	3.58E-01	2.50E+01
	EP _{FreshWater}	Kg P eq.	4.83E-05	3.09E-08	1.10E-05	5.93E-05
	EP _{Marine}	kg N eq.	6.70E-04	6.87E-07	1.90E-04	8.61E-04
	SFP	kg O ₃ eq.	7.76E-02	1.66E-05	4.44E-03	8.21E-02
	ODP	kg CFC-11 eq	1.39E-09	7.10E-12	1.30E-09	2.70E-09
Resource Use	RPR _E ⁽⁴⁾	MJ, LHV	1.34E+00	7.46E-05	7.29E-01	2.06E+00
	RPR _M ⁽⁵⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RPR _T	MJ, LHV	1.34E+00	7.46E-05	7.29E-01	2.06E+00
	NRPR _E ⁽⁶⁾	MJ, LHV	2.52E+01	5.42E-03	3.42E+00	2.87E+01
	NRPR _M ⁽⁷⁾	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRPR _T	MJ, LHV	2.52E+01	5.42E-03	3.42E+00	2.87E+01
	SM	MJ, LHV	7.19E-01	0.00E+00	0.00E+00	7.19E-01
	RSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	RE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW ⁽⁸⁾	m ³	1.67E-02	8.43E-07	9.94E-03	2.66E-02	
Output flows and waste	HWD ^(9,10)	kg	1.15E-01	1.70E-04	4.63E-02	1.62E-01
	NHWD ^(9,11)	kg	1.90E-02	5.10E-04	1.16E-02	3.11E-02
	HLRW ^(9,12)	m ³	9.02E-11	6.93E-14	1.21E-08	1.22E-08
	ILLRW ^(9,13)	m ³	5.50E-10	3.64E-13	8.60E-09	9.15E-09
	CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	MFR	kg	4.29E-02	0.00E+00	4.33E-01	4.76E-01
	MER	kg	0.00E+00	0.00E+00	5.70E-04	5.70E-04
	EE	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00

4.2. CONTRIBUTION ANALYSIS FOR ISO CLIP 3.25"

This section details the contribution to the potential environmental impacts and resource use of the different production life cycle modules. As illustrated by the contribution graphs, the extraction and upstream production module (A1) is the main contributor to the majority of the assessed environmental impact categories, as well as to the consumption of both renewable and non-renewable primary energy resources.

Contribution analysis for ISO Clip 3.25" (clip only) per declared unit (DU)



GWP: Global Warming Potential; **AP:** Acidification Potential; **EP:** Eutrophication Potential; **SFP:** Smog Formation Potential; **ODP:** Ozone Layer Depletion Potential; **NRPRT:** Non-Renewable Primary Resources – Total; **RPRT:** Renewable Primary Resources - Total.

5. ADDITIONAL ENVIRONMENTAL INFORMATION

5.1. CONTENT OF REGULATED HAZARDOUS SUBSTANCES

To our knowledge, products are not known to contain hazardous substances.

5.2. RELEASE OF DANGEROUS SUBSTANCES FROM THE CONSTRUCTION PRODUCT

The product is not known to release dangerous substances.

The ISO Clip systems are composed of durable materials such as galvanized steel and high-performance glass fiber reinforced polyamide. The product is also compliant with Living Building Challenge (LBC) compliance requirements for the “LBC Red List Approved” category. Please consult the following link: [Declare Label - ISO Clip](#).

5.3. THERMAL EFFICIENCY

The ISO Clip system provides high thermal efficiencies, with tested values in accordance with ASHRAE 90.1, NECB, SB-10.

5.4. OTHER ADDITIONAL INFORMATION

Northern Facades is fully committed to the diligent protection of both the environment and the health and safety of its workers and its customers’ workers. Its manufacturing process includes state-of-the-art environmental control equipment and workers are equipped with the highest quality personal protection gear. Northern Facades’ research and development process strives to create architectural products that have a sustainable impact on buildings and their occupants.

6. RÉFÉRENCES

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