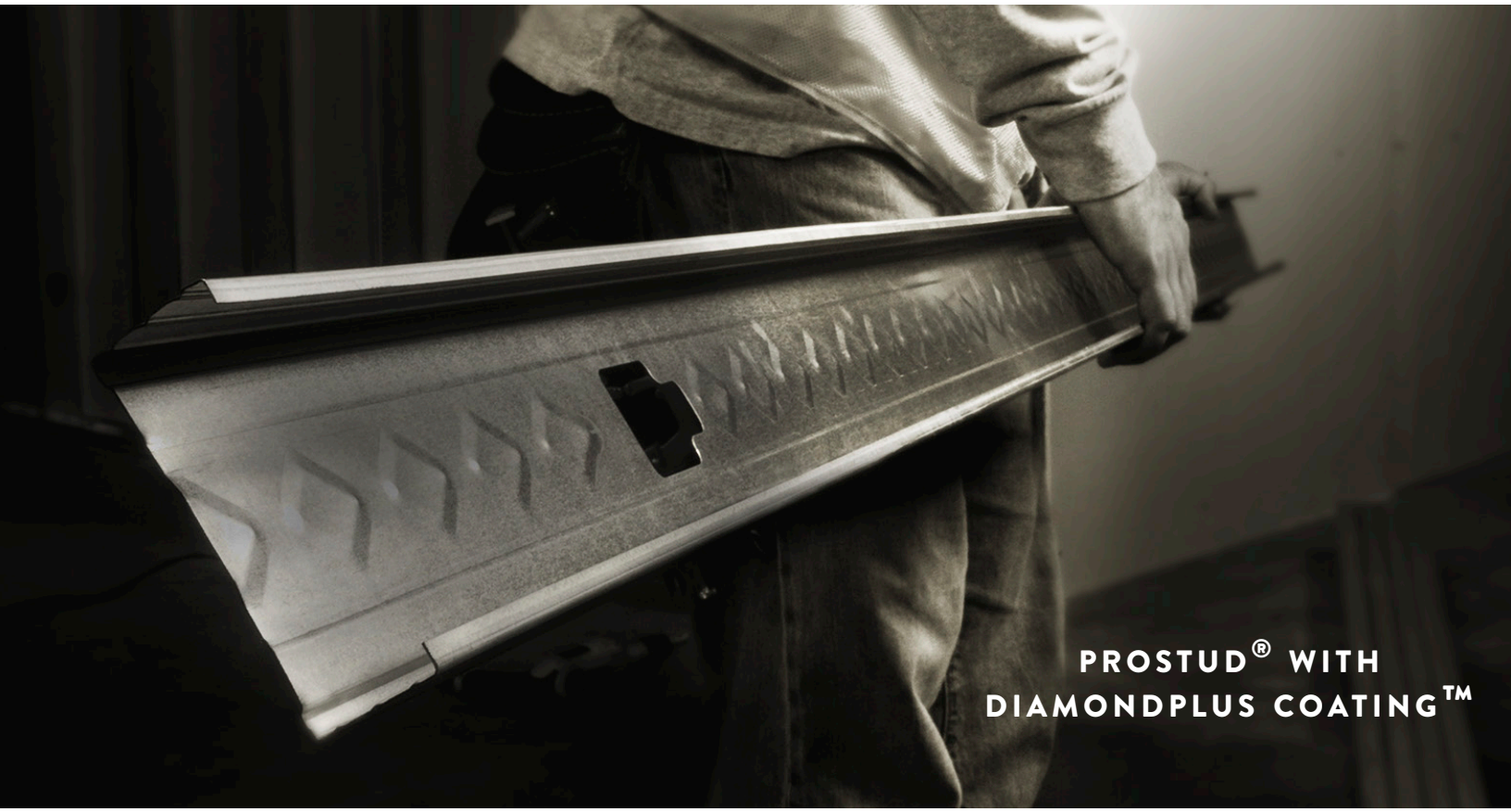
ClarkDietrich
BUILDING SYSTEMS

NSF

Certified
Environmental
Product Declaration
www.nsf.org

ENVIRONMENTAL PRODUCT DECLARATION
PROSTUD® WITH DIAMONDPLUS™ COATING

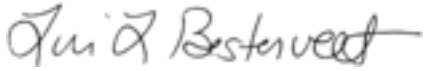
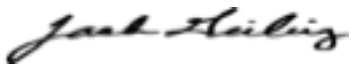


ClarkDietrich Building Systems
9100 Centre Pointe Dr., Ste. 210
West Chester, OH 45069
p. 513-870-1100
www.clarkdietrich.com

STRONGER
THAN STEEL℠

Certification is specific to ClarkDietrich Building Systems due to the declared system boundary of data collection. It is not applicable to the same or similar products produced by other manufacturers.

ENVIRONMENTAL PRODUCT DECLARATION VERIFICATION

EPD INFORMATION			
Program Operator		NSF International	
Declaration Holder		ClarkDietrich Building Systems	
Product ProSTUD® with DiamondPlus™ Coating	Approved June 30, 2015	Valid Until February 26, 2021	Declaration # EPD10057
Independent verification of the declaration and data, according to ISO 14025:2006 and ISO 21930:2007.			
☐ Internal	☒ External	Lori Bestervelt Bestervelt@nsf.org	
This life cycle assessment was independently verified by in accordance with ISO 14044 and the reference PCR:		 Jack Geibig jgeibig@ecoform.com	

LCA INFORMATION	
Basis LCA	ProSTUD® Drywall Framing System & Cold-Formed Steel Products, May 15, 2015
LCA Preparer	thinkstep Takuma Ono takuma.ono@thinkstep.com
This life cycle assessment was critically reviewed in accordance with ISO 14044 by:	Jack Geibig EcoForm jgeibig@ecoform.com

PCR INFORMATION	
Program Operator	SCS Global Services
Reference PCR	North American Product Category Rule for Designated Steel Construction Products
Date of Issue	May 5, 2015
PCR review was conducted by:	Dr. Thomas Gloria, Ph. D. (Chair) Industrial Ecology Consultants t.gloria@industrial-ecology.com

ABOUT US

ClarkDietrich Building Systems offers a comprehensive lineup of steel construction products and services across the United States and abroad. Using cold-formed steel, we manufacture innovative products for interior framing, interior finishing, exterior framing and floor framing, as well as clips, connectors, metal lath and accessories.

Within our facilities we actively recycle 100% of steel waste from all aspects of our processing, beginning with the slitting of the master coil and continuing through to the final roll-forming of our product. Every day at every plant. Steel is fully recyclable and we have always been diligent in this effort.

Product development is focused on labor savings systems, which incorporates optimal utilization of all raw materials. From concept to launch, our product offering consciously engages optimal use of material as well as ease of construction.

Formed in 2011 through the combination of two established market leaders—ClarkWestern Building Systems and Dietrich Metal Framing—ClarkDietrich is in an unprecedented position to help you bring change to the built environment.

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Manufacturing Sites:

Baltimore, MD
Baytown, TX
Bristol, CT
Dade City, FL
Dallas, TX
Kapolei, HI
McDonough, GA
Riverside, CA
Rochelle, IL
Sacramento, CA
Warren, OH East
Warren, OH West

PRODUCT

Product Description and Application

This declaration covers ProSTUD® Drywall Framing with DiamondPlus™ Coating. ClarkDietrich offers ProSTUD with DiamondPlus coating—the next generation of high-performance, code-compliant steel framing systems. The corrosion resistance of DiamondPlus Coating is superior to that of G40 Hot Dipped Galvanized. DiamondPlus Coating isn't a paint, barrier or mere surface treatment. It attaches to the base substrate of the steel through a chemical reaction. The result? A permanently bonded coating that provides unparalleled corrosion protection. ProSTUD with DiamondPlus coating doesn't just meet code, it surpasses it. DiamondPlus coated steel products have bare steel thicknesses in the range of 0.0150 inches to 0.0329 inches.

Common interior framing applications of the ProSTUD Drywall Framing system with DiamondPlus Coating:

- Fire Rated Partitions - Nonstructural
- Non Fire Rated Partitions - Nonstructural
- Ceilings
- Soffits
- Bulkheads

Technical Data

The following table lists metal thicknesses and strengths for ProSTUD Drywall Framing system with DiamondPlus Coating products.

Product	Gauge	Mils	Bare Steel Thickness (inches)	Design Thickness (inches)	Yield Strength (ksi)
ProSTUD	25 to 20	15 to 33	0.0150 to 0.0329	0.0158 to 0.0346	33 to 65
ProTRAK	25 to 20	15 to 33	0.0150 to 0.0329	0.0158 to 0.0346	33 to 50

NOTE: For more detailed product line information go to http://www.clarkdietrich.com/products

Constructional Data

Placing on the market / Application rules

Most commonly used and referred to codes in the steel framing industry. List is not intended to be all-inclusive or comprehensive.

Manufacturing Codes

- ASTM C645, Specification for Nonstructural Steel Framing Members
  - Interior Framing – Nonstructural

Construction and Building Codes

- International Building Code (IBC)
  - Chapter 25, Section 2506, Gypsum Board and Gypsum Panel Product Materials
- International Residential Code (IRC)
  - Section R603: Cold-Formed Steel Wall Framing

American Iron and Steel Institute (AISI) Standards

- AISI S220: North American Standard for Cold-Formed Steel Framing – Nonstructural Members

Delivery status / Packaging

ProSTUD Drywall Framing with DiamondPlus Coating is packaged and shipped in skids. Products are generally nested together in pairs, then stacked with other sets of nested pairs and are held together using banding and wood dunnage (See Figure 1).

Figure 1: Skid of Nonstructural Framing

Base Materials / Ancillary Materials

DiamondPlus Coating treatment bonds chemically to the steel substrate, forming a superior anti-corrosion protection compared to an industry standard G40 grade steel. Primary product components as follows:

ProSTUD with DiamondPlus Coating *Based on 3.625" ProSTUD 20*	
Component Name	**Mass by % of total**
Base Metal	> 98.0 %
Metallic Coating	< 1.9 %
DiamondPlus Coating	< 0.1 %

Manufacture

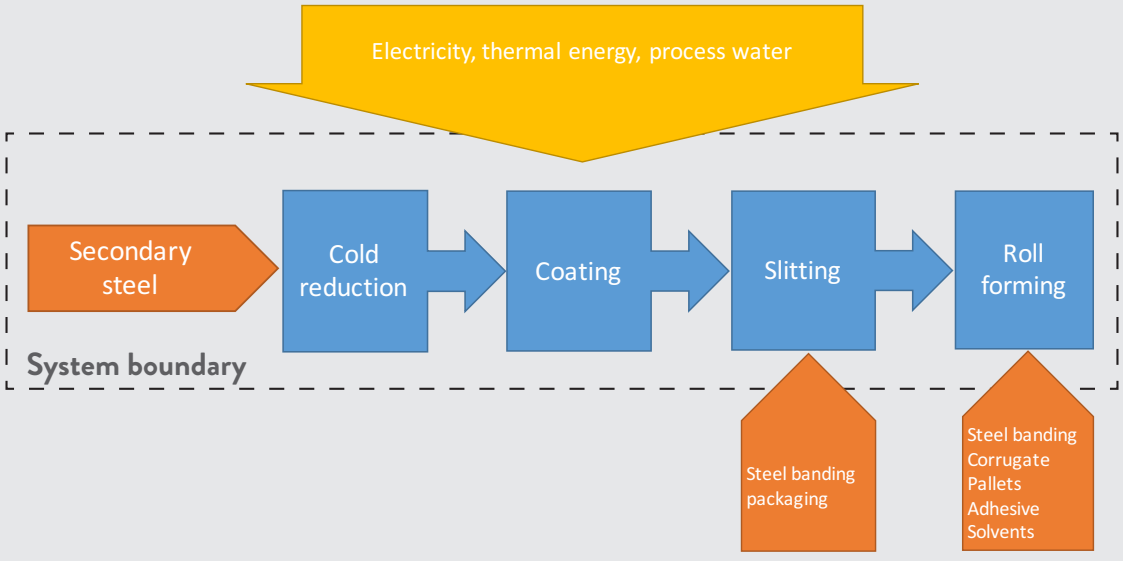
Definitions:

- Secondary Steel Coils
  - Steel coils that are purchased on the secondary market that may or may not match exact specifications needed but can be roll reduced and coated to meet desired specifications.
  - Steel coil production took place at either a domestic or foreign steel mill located in United States (77.5%), Canada (8.6%), Mexico (5.7%), India (3.1%), China (2.9%), or Italy (2.2%).

Process for Secondary Steel

Secondary Steel Coils are received into the warehouse. Where necessary secondary steel coils are cold reduced to the appropriate thickness. When the Secondary Steel Coils are cold reduced, then they have an additional anti-corrosion coating added called DiamondPlus. The Secondary Steel Coils are slit into narrow coils, then the narrow coils are loaded into the roll forming machinery where they are roll formed into finished products. The finished products are packaged into skids, and the skids are loaded onto a truck where they will be shipped to the customer.

The diagram below shows the flow of ProSTUD with DiamondPlus Coating products through major processes. The arrows between processes indicate transportation of intermediate products. Material input flow has associated inbound transportation.



LCA CALCULATION RULES

Declared Unit
The declared unit of calculation is one metric ton of steel construction product (1000 kg).

Name	Required Unit	Value
Declared Unit	Metric Ton	1
Density	kg/m^3	7,850

System Boundary
The declared system boundary is cradle-to-gate. Cradle-to-gate includes the PCR life cycle modules A1, A2, and A3. The declared system boundaries are shown below:

Production			Installation		Use Stage							End-Of-Life				Next Product System
Raw material supply (extraction, processing, recycled material)	Transport to manufacturer	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction / demolition	Transport to EoL	Waste processing for reuse, recovery or recycling	Disposal	Reuse, recovery or recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

Reference Service Life
Due to a cradle-to-gate declaration, a reference service life for steel products is not declared.

Scope

Temporal
All primary data were collected specific to the US. Where country / region specific secondary data were unavailable, proxy data were used but this is more an exception than the norm. Geographical representativeness is thus considered to be good.

Geographic
All primary data were collected for the year 2013. All secondary data come from the GaBi 2013 databases and are representative of the years 2009-2013. As the study intended to compare the product systems for the reference year 2013, temporal representativeness is good.

Data Quality Assessment

To ensure consistency, all primary data were collected with the same level of detail, while all background data were sourced from the GaBi databases. Allocation and other methodological choices were made consistently throughout the model.

Background Data

Most of the necessary life cycle inventories for the basic materials are available in the GaBi database. The last update of the database was 2013. Further LCIs for materials of the supply chain of the basic materials are approximated with LCIs of similar materials or estimated by the combination of available LCIs as documented in the background report. All datasets used in the major unit processes are provided in later sections of this report along with the description of the individual unit processes.

There is limited regional background data for steel that is specific to the US. We have there used the "NA: Steel hot dip galvanized" from worldsteel as the best available dataset for steel inputs. It must be noted that the worldsteel data set does not report waste and net water consumption flows as required by PCR. However, as the worldsteel methodology is in line with ISO 14044 allocation rules and is the best publicly available dataset for US steel, the use of this data set is justified. Water and waste indicators shall not be reported as explained in the background report.

Foreground Data

The foreground data collected by the manufacturer are based on yearly production amounts and extrapolations of measurements on specific machines and plants. The production data refer to an average of the year 2013.

Primary data for the production of DiamondPlus Coated products were collected by ClarkDietrich using a specifically developed spreadsheet provided by thinkstep. Cross-checks concerning the plausibility of mass and energy flows were carried out by thinkstep on the data received via email, telephone consultation and teleconferencing.

Statement of Comparability

Any comparison of EPD's shall be subject to the requirements of ISO 21930. For comparison of EPD's which report different module scopes, such that one EPD includes Module D and the other does not, the comparison shall only be made on the basis of Modules A1, A2, and A3. Additionally, when Module D is included in the EPD's being compared, all EPD's must use the same methodology for calculation of Module D values.

Declaration of Environmental Impact Derived from LCA

Disclaimer: This Environmental Product Declaration (EPD) conforms to ISO 14025, ISO 14040, ISO 14044, and ISO 21930.

Scope of Results Reported: The PCR requires the reporting of a limited set of LCA metrics; therefore, there may be relevant environmental impacts beyond those disclosed by this EPD. The EPD does not indicate that any environmental or social performance benchmarks are met nor thresholds exceeded.

Accuracy of Results: This EPD has been developed in accordance with the PCR applicable for the identified product following the principles, requirements and guidelines of the ISO 14040, ISO 14044, ISO 14025 and ISO 21930 standards. The results in this EPD are estimations of potential impacts. The accuracy of results in different EPD's may vary as a result of value choices, background data assumptions and quality of data collected.

Comparability: EPD's are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. Such comparisons can be inaccurate, and could lead to the erroneous selection of materials or products which are higher - impact, at least in some impact categories. Any comparison of EPD's shall be subject to the requirements of ISO 21930. For comparison of EPD's which report different

module scopes, such that one EPD includes Module D and the other does not, the comparison shall only be made on the basis of Modules A1, A2, and A3. Additionally, when Module D is included in the EPD's being compared, all EPD's must use the same methodology for calculation of Module D values.

Parameters Describing Environmental Impacts

In accordance to the guiding PCR, the characterization method will be based on TRACI March 2012 v2.1 and CML 2012 v4.1.

Environmental impact: 1 metric ton of DiamondPlus coated product

Parameter	Unit	LCIA Method	A1 – A3
GWP	[metric ton CO_2-eq.]	TRACI (version 2.1)	2.76
ODP	[metric ton CFC11-eq.]	TRACI (version 2.1)	1.18E-07
AP	[metric ton SO_2-eq.]	TRACI (version 2.1)	0.0156
EP	[metric ton N eq.]	TRACI (version 2.1)	6.45E-04
Smog	[metric ton O_3 eq.]	TRACI (version 2.1)	0.215
ADPE*	[metric ton Sb eq.]	CML Baseline Method, Version 4.1 (October 2012)	4.84E-05
ADPF	[MJ]	CML Baseline Method, Version 4.1 (October 2012)	3.27E04

Caption	GWP = Global warming potential, excluding biogenic carbon; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources

* This indicator is based on assumptions regarding current reserves estimates. Users should use caution when interpreting results because there is insufficient information on which indicator is best for assessing the depletion of abiotic resources.

Parameters Describing Resource Use

Resource use: 1 metric of DiamondPlus coated product

Parameter	Unit	A1 – A3
PERE	[MJ]	1990
PERM	[MJ]	0
PERT	[MJ]	1990
PENRE	[MJ]	3490
PENRM	[MJ]	0
PENRT	[MJ]	3490
SM	[metric ton]	0.464
RSF	[MJ]	0
NRSF	[MJ]	0
FW	[M^3]	Not reported

Caption	PERE = Use of renewable primary energy as raw materials; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as raw materials; PENRM = Use of non-renewable primary energy d as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Parameters Describing Waste Categories and Output Flows

Output flows and waste categories: 1 metric ton of DiamondPlus coated product

Parameter	Unit	A1- A3
HWD	[metric ton]	Not reported
NHWD	[metric ton]	Not reported
RWD	[metric ton]	Not reported
CRU	[metric ton]	0
MFR	[metric ton]	0.0665
MER	[metric ton]	0
EEE	[MJ]	0
EET	[MJ]	0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

FW, HWD, NHWD and RWD flows have not been reported as the worldsteel dataset used does report on waste and net water consumption flows in sufficient detail. The dataset is otherwise representative of the technology and conforms to ISO 14044.

Interpretation – DiamondPlus Coated

Module A1 dominates across all impact categories, contributing at least 90% of impacts in every category except for primary energy from renewable resources (PERT), where the contribution is lower at about 67%. For PERT, the higher A3 impacts come from the paper, corrugate and wood used in packaging, where the materials themselves embody renewable primary energy. With the exception of PERT, contributions from A3 range from 0–5% across the impact categories/indicators. As a whole, module A2 contributes very little, exhibiting a maximum contribution of about 2% in the case of Eutrophication potential (EP).