
# ConXL 400 System

## Structural Steel Construction Product

**ENVIRONMENTAL PRODUCT DECLARATION**

**DATE OF ISSUE**
2/16/2024

**DATE OF EXPIRATION**
2/16/2029

**PRODUCT CATEGORY RULE**

**UL PART A**
Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010, V4.0

**UL PART B**
Designated Steel Construction Product EPD Requirement, UL 10010-34, V2.0

**DECLARED UNIT**

1 Metric Ton of Fabricated Structural Steel

ASTM INTERNATIONAL

| | |
|---|---|
| Program Operator | ASTM International<br>100 Barr Harbor Dr., West Conshohocken, PA 19428<br>cert@astm.org |
| Manufacturer Name and Address | ConXtech<br>6600 Koll Center Parkway<br>STE 210<br>Pleasanton, Ca 94566<br>Email: Info@ConXtech.com |
| Declaration Number | ASTM-EPD634 |
| Declared Product and Functional Unit | Structural Steel Construction Product<br>Declared Unit: 1 Metric Ton |
| Reference PCR and Version Number | ISO 21930:2017<br>**UL PART A**<br>Life Cycle Assessment Calculation Rules and Report Requirements, UL 10010, V4.0<br>**UL PART B**<br>Designated Steel Construction Product EPD Requirement, UL 10010-34, V2.0 |
| Product's intended Application and Use | Commercial |
| Intended Audience | Business-to-Business |
| Product RSL | N/A |
| Markets of Applicability | North America |
| Date of Issue | 2/16/2024 |
| Period of Validity | 5 Years from Date of Issue |
| EPD Type | Manufacturer Specific |
| EPD Scope | Cradle-to-Gate |
| Year of Reported Manufacturer Primary Data | 2022 |
| LCA Software and Version Number | GaBi 10.7.1.28 |
| LCI Database and Version Number | GaBi Database 2023.2 |
| LCIA Methodology and Version Number | TRACI 2.1 + IPCC AR5 |
| The sub-category PCR review was conducted by: | Dr. Tom Gloria (Chair)<br>Brandie Sebastian<br>James Littlefield |
| Independent verification of the declaration and data, according to ISO 21930:2017, UL Part A, ISO 14025:2006, and UL Part B sub-category.<br>☐ **INTERNAL** ☒ **EXTERNAL** | |
| This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by: | WAP Sustainability Consulting |

## LIMITATIONS:

- *Environmental declarations from different programs based upon differing PCRs may not be comparable*
- *Comparison of the environmental performance of construction works and construction products using EPD information shall be based on the product's use and impacts at the construction works level. In general, EPDs may not be used for comparability purposes when not considered in a construction works context. Given this PCR ensures products meet the same functional requirements, comparability is permissible provided the information given for such comparison is transparent and the limitations of these comparisons explained.*
- *When comparing EPDs created using this PCR, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared."*
- *The environmental impact results of steel products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the steel product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted. See Section 3.8 of the Part B Designated Steel Construction Product PCR for additional EPD comparability guidelines.*

# General Information

## COMPANY DESCRIPTION

ConXtech revolutionizes the landscape of structural steel construction with our groundbreaking lower-and-lock technology, compacting erection timelines to deliver cost savings and mitigate risks. Our core strength lies in unparalleled speed, as ConXtech consistently achieves erection rates 2x-4x faster than traditional steel methods. Established in 2004, we stand as a technology-driven company. At the heart of ConXtech's success is our patented design, made possible by seamlessly integrating end-to-end turnkey processes encompassing design, engineering, preconstruction, fabrication, and erection. This unique approach empowers global fabricators with cutting-edge technologies and fixtures, enabling them to execute lean-inspired, repeatable processes with unprecedented speed, precision tolerance, and unwavering quality. The result is a flawless fit in the field. Our diverse product range, tailored to project specifications and locations, includes solutions such as Special Moment Frame (SMF) and Braced Frame systems. The modular and prefabricated nature of our offerings ensures an unmatched speed to market, virtually eliminating on-site hot work through the use of bolted connections. ConXtech's commitment to innovation and efficiency sets us apart, making us the go-to choice for those seeking shortened construction timelines and superior structural solutions.

## PRODUCT DESCRIPTIONS

ConXtech's ConXL400 connection has successfully undergone a comprehensive qualification review by the AISC 358 - Connection Prequalification Review Panel (CPRP). This endorsement led to its inclusion as Chapter 10 in the 2010 AISC 358 code book, specifically for Prequalified Connections designed for Special and Intermediate Steel Moment Frames in Seismic Applications. The versatility of the ConXL400 system extends beyond seismic applications to cater to the braced frame market in non-seismic scenarios, earning it the moniker of a full-scale "Erector Set" within the building industry.

Our innovative ConXL400 System applies cutting-edge technology throughout the entire building process. This system's approach is facilitated by lean-inspired processes, seamlessly integrating design, fabrication, shipping, and erection. Through a library of robust connectors, ConXL400 allows the configuration of beam and column assemblies to meet a diverse range of structural criteria, even the most stringent ones.

ConXL400 components undergo precision manufacturing in a state-of-the-art facility with highly automated processes, minimizing waste and carbon emissions while enhancing quality and cost efficiencies. The field assembly process is rapid and efficient, thanks to the simplicity of the system connector, ensuring a speedy, safe, and precise fit-up on-site.

The ConXL400 system simplifies the structural frame of a building into a kit of parts, consisting of three main components: (1) HSS tube or built-up-box columns, (2) wide flange beams, and (3) two patented interlocking joints—one forming a bi-axial moment connection (additionally usable as a flexible moment connection) with collar flanges, and the other our innovative gravity connection. Both connections are easily assembled by lowering and locking beams into place on-site, offering a streamlined and efficient solution for structural framing.

## PRODUCT APPLICABILITY

The ConXtech system is used as steel framing for buildings and is applicable in the following markets:

- **MISSION CRITICAL / DATA CENTERS**
- **MEDICAL OFFICE BUILDINGS & HOSPITALS**
- **COMMERCIAL OFFICE & RETAIL**
- **EDUCATION**
- **BIOTECH & PHARMACEUTICAL**
- **MEZZANINES, INDUSTRIAL PIPE RACK & PROCESSING STRUCTURES**

## PRODUCT AVERAGE

The ConXL 400 System impacts vary based on the percent contribution of the collars to the total project weight according to the collar count (CC). Results are reported according to the high and low CC values for 2022 projects.

## PRODUCT COMPOSITION

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

The ConXL400 System relies on two components: primary structural steel (PSS) and system collar flanges (SCF) . SCFs represent the unique value-add of the ConXL400 System. Namely, collars allow for bolting of perpendicular support beams to be attached to vertical column beams faster, with minimal human labor, and without welding. The SCFs make up less than 15% of the total system weight, but their manufacturing is energy intense and materially demanding. PSS sourcing varies dramatically based on global market forces. Primary EPD data for PSS was not available for the majority of steel purchased in 2022. Future integration of primary mill-specific EPD data for PSS could improve data quality and representativeness of the life cycle impacts.

***Table 1: Product Compositions***

| Material | Low Collar Count System | High Collar Count System | [%] |
|---|---|---|---|
| Primary Structural Steel | 94.2 | 89.6 | % |
| System Collar Flanges | 5.83 | 10.4 | % |

## TABLE 2: TECHNICAL REQUIREMENTS

***Table 2: Technical Requirements***

| | Assembly Rate | Height | Bay Size | Beam Depth | Column Size |
|---|---|---|---|---|---|
| ConXL400 System | 10,000 - 15,000 $ft^2$ per day | 2 - 8 stories (10 max) | 18’ - 45’+ | 18” - 30” (SMF) +30” (OMF) | 16” HSS or Box |

# LCA Methodology

## DECLARED UNIT

The declared unit of this EPD according to the PCR is One (1) metric ton of of fabricated structural steel.

## SYSTEM BOUNDARY

***Table 3: Description of the System Boundary Modules***

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

*Figure 1: System Boundary Diagram*

| Raw Material Extraction &Processing (A1) | Transportation (A2) | Manufacturing (A3) |
|---|---|---|
| Structural Steel | Transport | Electricity |
| Moment Collars | Fuel | Propane |
| | | Welding Gasses |
| | | Welding Wire |
| | | Ancillary Materials |
| | | Emissions to Water |
| | | Scrap Steel |
| | | Manufacturing Water |

### ALLOCATION

General principles of allocation were based on ISO 14040/44. To derive a per-unit value for manufacturing inputs (electricity, thermal energy, and water) for the collar manufacturing, facility level allocation on the basis of mass was adopted. To derive a per-unit value for manufacturing inputs of the primary structural steel, facility level allocation on the basis of manufacturing squarefootage associated with ConXtech subcontracted manufacturing was first used, then allocation on the basis of mass was adopted. As a default, secondary GaBi datasets use a physical basis for allocation.

### 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 functional unit. No materials were knowingly excluded from this analysis.

### PERIOD UNDER REVIEW

Data were obtained from ConXtech for calendary year 2022.

# Technical Information and Scenarios

### MANUFACTURING

PSS beams are sourced from various mills and shipped to Veracruz, MX for fabrication. Beams are cut to size and further fabricated according to the needs of each project. Collars are prepared for the project. External galvanization occurs for roughly 5% of the material used. Prepared fabricated beams and collar components are shipped to job sites where the framing is assembled.

### PACKAGING

No single use packaging is required to transport the fabricated ConXL 400 System to a jobsite.

# Results

Environmental impacts were calculated using the GaBi software platform. Impact results have been calculated using IPCC AR5 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. Note that ISO 21930 indicators for biogenic carbon are not reported as the GWP impact category excludes biogenic carbon and there is no biogenic carbon present in the product.

| Acronym [Unit] | Environmental Indicators | Methodology |
|---|---|---|
| **Life Cycle Impact Assessment Indicators** | | |
| GWP [kg $CO_2$ eq]* | Global Warming Potential, excl biogenic carbon | IPCC AR5 |
| 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 |
| Resources [MJ, Surplus Energy]* | Resources, Fossil fuels [MJ surplus energy] | TRACI 2.1 |
| **Resource Use Indicators** | | |
| RPRE [MJ] | Use of renewable primary energy | ISO 21930 |
| RPRM [MJ] | Renewable primary energy resources used as raw materials | 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 |
| 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** | | |
| 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 |
| EE [MJ] | Exported energy | ISO 21930 |

**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.*

### LCA RESULTS

Results are reported for both extremes of collar counts found in 2022 project data. A1 results are separated between the collar and the PSS. Totals for A1-A3 are also provided.

*Table 4: LCA Results, per declared unit for High Collar Count ConXL 400 System*

| Impact Categories | Collar A1 | PSS A1 | A2 | A3 | A1-A3 |
|---|---|---|---|---|---|
| **Life Cycle Impact Assessment Indicators** | | | | | |
| GWP [kg $CO_2$ eq] | 5.48E+02 | 1.06E+03 | 7.84E+01 | 9.22E+00 | 1.70E+03 |
| ODP [kg CFC-11 eq] | 1.86E-11 | 1.21E-08 | 1.08E-13 | 2.80E-13 | 1.21E-08 |
| AP [kg $SO_2$ eq] | 1.68E+00 | 2.59E+00 | 9.12E-01 | 4.80E-02 | 5.24E+00 |
| EP [kg N eq] | 1.02E-01 | 1.23E-01 | 5.22E-02 | 3.05E-03 | 2.80E-01 |
| SFP [kg $O_3$ eq] | 3.47E+01 | 3.82E+01 | 2.01E+01 | 7.74E-01 | 9.38E+01 |
| Resources [MJ] | 2.39E+02 | 1.18E+03 | 1.58E+02 | 1.06E+01 | 1.59E+03 |
| **Resource Use Indicators** | | | | | |
| RPRE [MJ] | 6.54E+02 | 8.98E+02 | 7.49E+00 | 1.61E+01 | 1.58E+03 |
| RPRM [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRPRE [MJ] | 6.33E+03 | 1.46E+04 | 1.11E+03 | 1.15E+02 | 2.22E+04 |
| NRPRM [MJ] | 0.00E+00 | 1.36E+01 | 0.00E+00 | 0.00E+00 | 1.36E+01 |
| SM [kg] | 1.45E+01 | 9.45E+02 | 0.00E+00 | 0.00E+00 | 9.59E+02 |
| RSF [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RE [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW [$m^3$] | 7.75E+01 | 5.08E+00 | 1.43E-02 | 4.43E-02 | 8.26E+01 |
| **Output Flows and Waste Categories** | | | | | |
| HWD [kg] | 2.23E+01 | 9.27E-03 | 5.75E-10 | 1.57E-01 | 2.24E+01 |
| NHWD [kg] | 5.08E+00 | 1.35E+01 | 4.49E-02 | 2.99E-01 | 1.89E+01 |
| HLRW [kg] | 7.02E-05 | 8.29E-04 | 8.10E-07 | 1.16E-06 | 9.01E-04 |
| ILLRW [kg] | 5.92E-02 | 6.94E-01 | 6.79E-04 | 1.00E-03 | 7.55E-01 |
| CRU [kg] | 0.00E+00 | 5.17E+00 | 0.00E+00 | 0.00E+00 | 5.17E+00 |
| MR [kg] | 4.47E+01 | 6.13E+00 | 0.00E+00 | 1.11E+02 | 1.61E+02 |
| MER [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

*Table 5: LCA Results, per declared unit for Low Collar Count ConXL 400 System*

| Impact Categories | Collar A1 | PSS A1 | A2 | A3 | A1-A3 |
|---|---|---|---|---|---|
| **Life Cycle Impact Assessment Indicators** | | | | | |
| GWP [kg $CO_2$ eq] | 3.08E+02 | 1.12E+03 | 7.40E+01 | 9.65E+00 | 1.51E+03 |
| ODP [kg CFC-11 eq] | 1.05E-11 | 1.27E-08 | 9.97E-14 | 2.93E-13 | 1.27E-08 |
| AP [kg $SO_2$ eq] | 9.47E-01 | 2.73E+00 | 8.47E-01 | 5.03E-02 | 4.57E+00 |
| EP [kg N eq] | 5.73E-02 | 1.29E-01 | 4.92E-02 | 3.19E-03 | 2.39E-01 |
| SFP [kg $O_3$ eq] | 1.95E+01 | 4.01E+01 | 1.88E+01 | 8.10E-01 | 7.93E+01 |
| Resources [MJ] | 1.34E+02 | 1.24E+03 | 1.50E+02 | 1.11E+01 | 1.53E+03 |

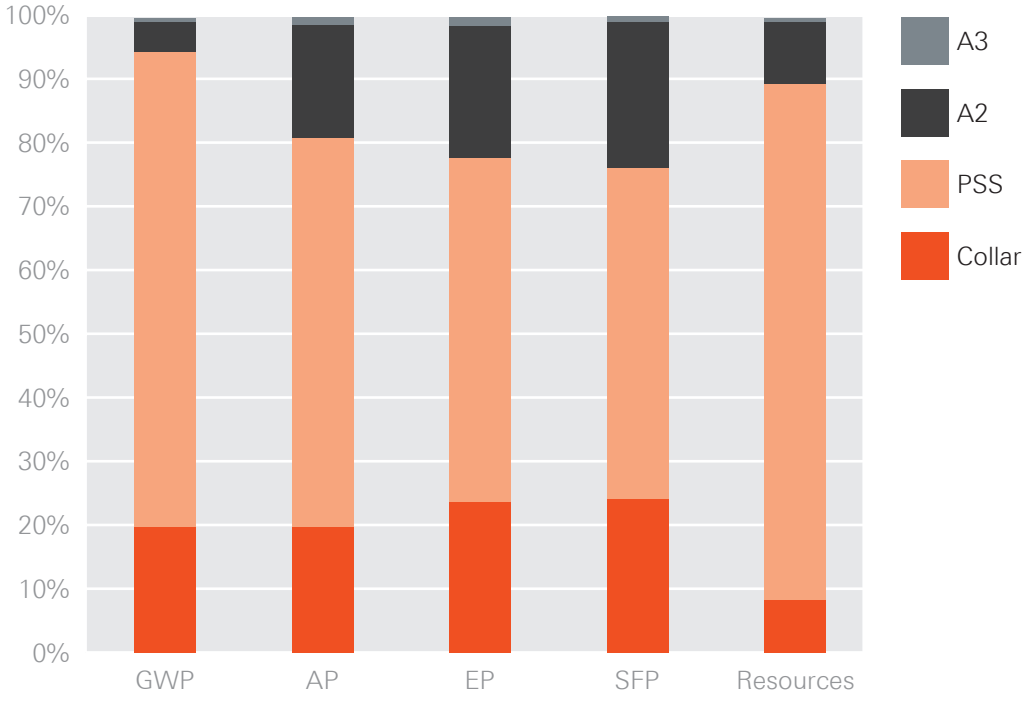
| Impact Categories | Collar A1 | PSS A1 | A2 | A3 | A1-A3 |
|---|---|---|---|---|---|
| **Resource Use Indicators** | | | | | |
| RPRE [MJ] | 3.68E+02 | 9.44E+02 | 6.60E+00 | 1.69E+01 | 1.34E+03 |
| RPRM [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRPRE [MJ] | 3.56E+03 | 1.54E+04 | 1.05E+03 | 1.20E+02 | 2.01E+04 |
| NRPRM [MJ] | 0.00E+00 | 1.43E+01 | 0.00E+00 | 0.00E+00 | 1.43E+01 |
| SM [kg] | 8.17E+00 | 9.93E+02 | 0.00E+00 | 0.00E+00 | 1.00E+03 |
| RSF [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RE [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW [$m^3$] | 4.36E+01 | 5.33E+00 | 1.18E-02 | 4.65E-02 | 4.90E+01 |
| **Output Flows and Waste Categories** | | | | | |
| HWD [kg] | 1.25E+01 | 9.74E-03 | 4.75E-10 | 1.65E-01 | 1.27E+01 |
| NHWD [kg] | 2.86E+00 | 1.42E+01 | 4.17E-02 | 3.14E-01 | 1.74E+01 |
| HLRW [kg] | 3.95E-05 | 8.71E-04 | 6.89E-07 | 1.22E-06 | 9.12E-04 |
| ILLRW [kg] | 3.33E-02 | 7.29E-01 | 5.78E-04 | 1.05E-03 | 7.64E-01 |
| CRU [kg] | 0.00E+00 | 5.43E+00 | 0.00E+00 | 0.00E+00 | 5.43E+00 |
| MR [kg] | 2.51E+01 | 6.44E+00 | 0.00E+00 | 1.15E+02 | 1.47E+02 |
| MER [kg] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EE [MJ] | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

## INTERPRETATION

Despite contributing 10.4% of the total weight, the collar contributed to over 30% of impacts for GWP, AP, EP, and SFP.

A2 transportation contributed most meaningfully to AP, EP, and SFP. The release of particulate matter from sea and freight transportation is more impactful to these impact categories than GWP.

Primary fabrication energy inputs at the Preacero Pellizzari facility in Veracruz, MX contributes little to any impact category considered. The scrap rate of 12.2% at the Pellizzari facility is meaningful to the total impacts as more input steel is required for higher scrap rates. Moment collars are fabricated in Changzhou, CN



# Additional Environmental Information

## ENVIRONMENT AND HEALTH DURING MANUFACTURING

Measures relating to environmental and health protection during the product manufacturing process extending beyond national guidelines (of the production country) may be described, e.g. reference to a product safety data sheet (SDS), description of Environmental Management Systems or similar, programs addressing air emissions, waste water, noise, etc.

## ENVIRONMENT AND HEALTH DURING INSTALLATION

Information should be provided in this section on the relationship between the product, the environment and health, including any possible harmful substances or emissions e.g. reference to a product safety data sheet (SDS). Any recommendations concerning cleaning, maintenance, etc. of the declared product should be listed in Section 4 “technical information on scenarios”. In establishing safe threshholds fo exposure for humans, measures such as Reference Concentrations (RfC) or Reference Dose (RfD) can be used, which are established by US EPA and available in the Integrated Risk Information System database. In establishing safe thresholds of exposure for flora/fauna, measures such as Criteria Maximum Concentration (CMC) or Criterion Continuous Concentration (CCC) can be used, also established by US EPA and available as part of the National Recommended Water Quality Criteria. Other data sources can be used to establish safe thresholds of exposure for humans and flora/fauna, with justification.

## ADDRESSING GWP MAXIMUMS

Several governmental legislative bodies are seeking to decrease the carbon intensity of the building sector by setting GWP maximums for building products. The formula below was developed to determine the maximum mill-specific GWP for primary steel. Variables and values for determining maximums are provided in Table 6.

***Table 6: Product GWP Maximum Calculator***

| Name | Value | Unit |
|---|---|---|
| GWP Maximum [M] | 1,080* | kg of $CO_2$e per metric ton |
| Collar Count % [CC] | project variable | % |
| Collar Count GWP [CC GWP] | CC x 3,790*** | kg of $CO_2$e per metric ton |
| Scrap Rate [SR]**** | 12.15 | % |
| Required Steel (including scrap) [RS] | (1-CC)+((1-CC) x SR) | metric tons |
| A1 Farbication Loss AISC** [FL] | 7.7 | % |
| A1 GWP Limit | ((M-CC GWP)/RS) x (1+FL) | g of $CO_2$e per metric ton |

* *The GWP maximum value 1,080 kg of $CO_2$e per MT specifically refers to the GWP maximum described by the Buy Clean California Act (BCCA) and does not reflect the GWP maximum set by all legislative bodies*

** *The AISC reports that an average of 1.077 MT of unfabricated structural steel is required to produce 1 MT of fabricated structural steel. This rate is used frequently within North American Structural Steel EPDs and Structural Steel EPDs are published with the inclusion of fabrication impacts in the A2 and A3 modules*

*** *Moment Collar A1 impacts (kg of $CO_2$e per MT)*

**** *Calculated as scrap weight divided by finished collar weight*

The above formula allows for ConXtech to procure PSS below the A1 GWP limit for the purpose of satisfying GWP Maximum limits. Each project will have a unique CC which will dictate the PSS A1 GWP maximum for the particular project. Purchasing PSS from mills which publish mill-specific EPD data where the GWP value falls below the A1 GWP maximum should satisfy the GWP Maximum requirements.

## EXTRAORDINARY EFFECTS

***Fire***

Structural steel offers favorable fire performance due to its high melting point, uniform thermal conductivity, and predictable behavior. Fire-resistant coatings can be applied to enhance protection, and steel maintains ductility and deformation capacity even at high temperatures. Structural steel's fire endurance is defined by building codes, and ongoing research aims to improve fire resistance. Compliance with local codes and employing fire protection measures are essential for ensuring the safety of occupants in buildings with structural steel.

***Mechanical Destruction***

ConXtech has demonstrated its commitment to structural safety through progressive collapse resistance testing. Our connections were tested in accordance with Chapter K of the AISC Seismic Provisions at a state of the art testing facility. This involves subjecting ConXtech structures to rigorous evaluations to ensure resilience against potential structural failures, such as those resulting from extreme events like explosions or other catastrophic incidents. The testing process assesses the ability of ConXtech's innovative designs to withstand and mitigate the impact of localized failures, reinforcing the reliability and robustness of their structural solutions in the face of unforeseen challenges.

# Further Information

https://www.conxtech.com/

https://www.conxtech.com/wp-content/uploads/2022/08/CX-ENG-STD-000001_Design_of_Connections_v2.pdf

https://www.conxtech.com/white-papers/

*GWP Calculator Available based on Collar Count*

# References


*California Department of General Services (DGS). (2023). Buy Clean California Act Compliance Environmental Product Declaration Compliance Guide, Rev. A, February 22.*

*IPCC. (2013). Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge, United Kingdom and New York, NY, USA: Cambridge University Press.*

*ISO. (2006). ISO 14025: Environmental labels and declarations - Type III environmental declarations - Principles and procedures. Geneva: International Organization for Standardization.*

*ISO. (2006). ISO 14040/Amd 1:2020: Environmental management - Life cycle assessment - Principles and framework. Geneva: International Organization for Standardization.*

*ISO. (2006). ISO 14044/Amd 1:2017/Amd 2:2020: Environmental Management - Life cycle assessment - Requirements and Guidelines. Geneva: International Organization for Standardization.*

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

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*UL Environment. (2020). Part B: Designated Steel Construction Product EPD Requirements, UL 10010-34, V2.0.*

*US EPA. (2012). TRACI: The Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts. Version 2.1 - User Guide. Retrieved from https://nepis.epa.gov/Adobe/PDF/P100HN53.pdf*