

May 23th, 2022

Re: Milestone Incentive: Innovation - Embodied Carbon Analysis

Dear: Julie Knorr

The University of Washington Health Science Education Building was analyzed to emit 2,220 tons of carbon in its upfront emissions. The material selection of CLT floors and exterior metal siding reduced upfront emissions by approximately 20% compared to a baseline building of same use, shape, and size.

The majority of these emissions comes from the buildings concrete, steel and insulation. Miller Hull conducted this whole building life cycle (WBLCA) assessment by using software known as Tally. Tally uses industry standard Environmental Product Declarations (EPD's) to calculate the global warming potential of each material shown in our Revit building information models. We leverage these tools during design to spotlight the most impactful materials and find feasible alternatives or compare design iterations to help material selection. At this time, Miller Hull is including substructure, superstructure, envelope, and fixed interior building elements in whole building life cycle assessment studies. These are analyzed in what is knowns as the A1 (raw material supply), A2 (transport) and A3 (manufacturing) product stages.

There are two types of emissions that the building industry is responsible for: operational energy emissions and embodied carbon emissions. The operational emissions result from the energy used by the building to heat and cool and provide electricity for any equipment and lights in the building. Embodied carbon emissions result from the energy used to extract, manufacture and transport building materials and products. Unlike operational emissions that can change over a building's lifetime depending on operation, embodied emissions are set at the time of construction. This means that there is no opportunity to reduce them as with operational emissions when a building can be operated more efficiently over time or receive energy from a cleaner source like an evolving campus utility or a greener regional utility grid. Between now and 2050, embodied emissions will account for almost half of the total climate impact incurred by the new buildings we are designing today. Emissions, like embodied carbon, that are added to the world now are more harmful because they are accumulating at a faster rate and link directly to human health problems and death rates right now. Reducing embodied emissions from our buildings is a critical step to addressing climate change.

The use of mass timber structure has been shown to reduce the embodied carbon of buildings. The majority of embodied emissions from architecture typically stems from a building's primary structural system. Typically, concrete and steel, common materials for building structure, are the highest emitters of embodied carbon emissions. Using a structural system alternative of mass timber like cross laminated timber (CLT), can help to reduce the embodied emissions of a building's structural system. In the UW HSEB project, we have been able to see a reduction in overall embodied carbon emissions because of the use of mass timber. Other benefits include the use of a regionally available, renewable resource and support for smaller economies that harvest and produce timber. The use of exposed CLT also provides an aesthetic benefit and helps to reduce duplicative materials for ceiling finishes. When wood is responsibly harvested, there can be great environmental and economic benefits.

Addressing embodied carbon in every project is a must in order to reach climate targets. Using building materials and products that support reducing these emissions is possible now and projects like the University of Washington's Health Science Education Building exemplify this. By using renewable and regionally-sourced resources like cross

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laminated timber helps the market realize the potential for emissions-reducing buildings. The University of Washington is helping other projects to see the value in wisely choosing building materials.

Attached you will find two life cycle assessments of embodied environmental impacts that include embodied carbon analysis.

- Attachment A Project Design is a report prepared to describe the current project basis of design.
- Attachment B Alternate Baseline Design is a report used to establishing an assumed baseline building where no CLT was used, and the metal panel siding was replaced with glass fiber reinforced concrete panels.

Sincerely,

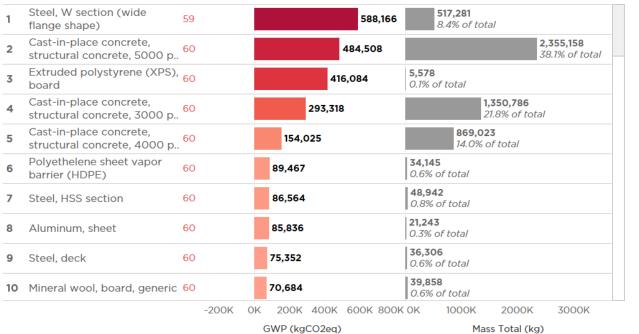
Bradly Gunn Project Architect, The Miller Hull Partnership

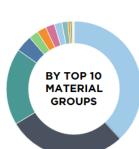
HEALTH SCIENCES EDUCATION BUILDING DESIGN

TOTAL GWP: **2,865 tCO2e** (618.7 passenger vehicles driving for a year*) GWP / AREA: **318 kgCO2e/m2**

| Study date: | May 20, 2022 |
|----------------|------------------------|
| Tally modeler: | Katherine Martin |
| Tally version: | Null |
| Project area: | 100,000 sf |
| Reference | 60 years |
| lifespan: | Envelope and Structure |
| Notes: | |

TOP MATERIALS BY GWP (57 materials defined, total)





BY LIFE CYCLE STAGE



| LATEST VERSION: 3.1 | 3.1 |
|-------------------------------|-------|
| [A1-A3] Product | • 75% |
| [A4] Transportation | 1% |
| [B2-B5] Maintenan | 6 5% |
| [C2-C4] End of Life | 17% |
| [D] Module D | 2% |

Z 1

| Metal | • | 39% |
|------------------|---|-----|
| Concrete | • | 29% |
| Insulation | • | 19% |
| Vapor barrier | • | 4% |
| Glazing | • | 2% |
| Plaster | • | 2% |
| Metal Coating | • | 2% |
| Ceiling tile | • | 2% |
| Roofing membra | • | 1% |
| Window frame | • | 1% |
| Coating | • | 0% |
| Adhesive / Seala | • | 0% |
| Composite | • | 0% |
| Door | • | 0% |
| Door frame | • | 0% |
| Opening hardwar | • | 0% |

| Structure | ٠ | 28% |
|---------------------|---|-----|
| Walls | • | 26% |
| Floors | ٠ | 22% |
| Roofs | ٠ | 12% |
| Curtainwall Panels | • | 4% |
| Ceilings | • | 3% |
| Curtainwall Mulli | • | 3% |
| Stairs and Railings | • | 1% |
| Doors | • | 0% |
| Windows | • | 0% |

HEALTH SCIENCES EDUCATION BUILDING

HEALTH SCIENCES EDUCATION BUILDING

Full building summary 5/19/2022



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Report Summary

Created with Tally

Commercial Version 2022.04.08.01

Author Company Date Katherine Martin The Miller Hull Partnership 5/19/2022

Project Location Gross Area Building Life HEALTH SCIENCES EDUCATION BUILDING 1607 NE Pacific Street 100,000 ft² 60 years

Boundaries

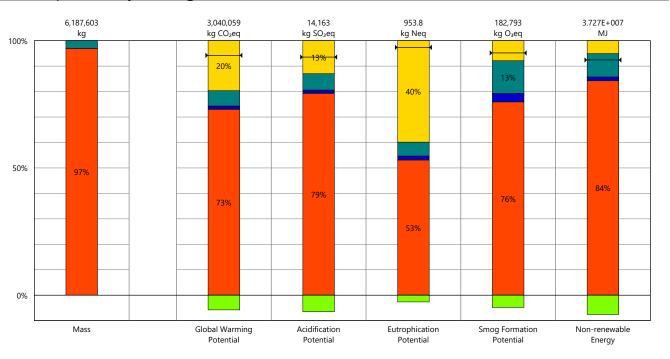
Cradle to grave, inclusive of biogenic carbon; see appendix for a full list of materials and processes

Goal and Scope of Assessment

Complete building envelope and structural elements, including foundations and footings, structural wall assembly (cladding to interior finish), structural floors and ceilings, and roof assemblies.

| Environmental Impact Totals | Product Stage [A1-A3] | Construction Stage [A4] | Use Stage [B2-B5] | End of Life Stage [C2-C4] | Module D [D] |
|---|--------------------------|----------------------------|----------------------|------------------------------|-----------------|
| Global Warming (kg CO₂eq) | 2,220,176 | 39,688 | 182,652 | 597,543 | -175,252 |
| Acidification (kg SO ₂ eq) | 11,232 | 183.9 | 909.3 | 1,838 | -914 |
| Eutrophication (kg Neq) | 506.7 | 14.97 | 51.89 | 380.2 | -25.1 |
| Smog Formation (kg O₃eq) | 138,829 | 6,077 | 23,492 | 14,396 | -8,801 |
| Ozone Depletion (kg CFC-11eq) | 0.2889 | 1.359E-009 | 3.943E-004 | 4.939E-005 | 9.009E-004 |
| Primary Energy (MJ) | 3.677E+007 | 577,149 | 3,703,493 | 2,025,103 | -3,731,000 |
| Non-renewable Energy (MJ) | 3.139E+007 | 563,338 | 3,416,642 | 1,894,656 | -2,823,543 |
| Renewable Energy (MJ) | 5,369,627 | 13,956 | 288,480 | 132,360 | -910,462 |
| Environmental Impacts / Area | | | | | |
| Global Warming (kg CO2eq/m²) | 239.0 | 4.272 | 19.66 | 64.32 | -18.9 |
| Acidification (kg SO ₂ eq/m ²) | 1.209 | 0.0198 | 0.09787 | 0.1978 | -0.09838 |
| Eutrophication (kg Neq/m ²) | 0.05454 | 0.001612 | 0.005586 | 0.04093 | -0.002705 |
| Smog Formation (kg O₃eq/m ²) | 14.94 | 0.6541 | 2.529 | 1.550 | -0.9474 |
| Ozone Depletion (kg CFC-11eq/m ² |) 3.110E-005 | 1.463E-013 | 4.244E-008 | 5.316E-009 | 9.697E-008 |
| Primary Energy (MJ/m ²) | 3,957 | 62.12 | 398.6 | 218.0 | -402 |
| Non-renewable Energy (MJ/m ²) | 3,379 | 60.64 | 367.8 | 203.9 | -304 |
| Renewable Energy (MJ/m ²) | 578.0 | 1.502 | 31.05 | 14.25 | -98.0 |

Results per Life Cycle Stage

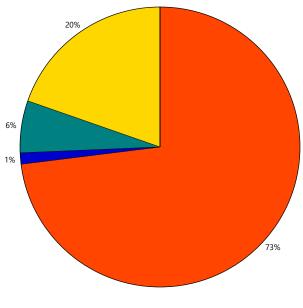


Legend

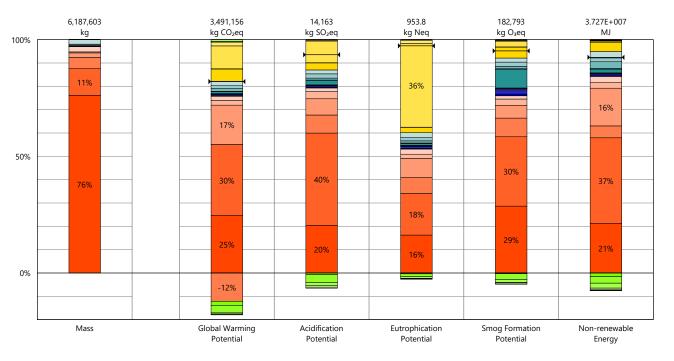
► Net value (impacts + credits)

Life Cycle Stages

Product [A1-A3]
 Transportation [A4]
 Maintenance and Replacement [B2-B5]
 End of Life [C2-C4]
 Module D [D]







Results per Life Cycle Stage, itemized by Division

Legend

► Net value (impacts + credits)

Product [A1-A3]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection 08 - Openings and Glazing
- 08 Opening 09 - Finishes

Transportation [A4]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection
- 08 Openings and Glazing
- 09 Finishes

Maintenance and Replacement [B2-B5]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites 07 - Thermal and Moisture Protection
- 08 Openings and Glazing
- 09 Finishes

End of Life [C2-C4]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection 08 - Openings and Glazing
- 08 Openings and G

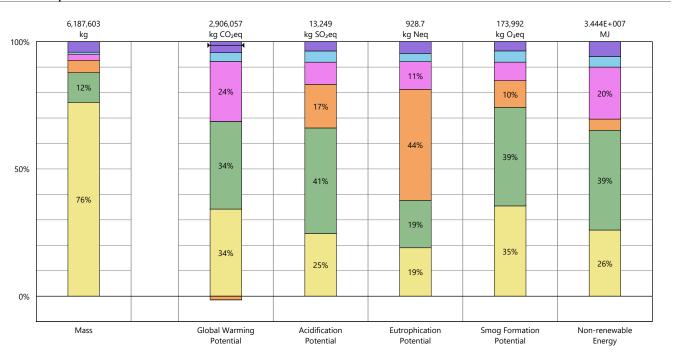
Module D [D]

| | | | | - | - | |
|---|---|-----|----|----|----|----|
| 1 | 0 | 3 - | Cc | nc | re | te |

05 - Metals

| 06 - Wood/Plastics/Composites |
|--------------------------------------|
| 07 - Thermal and Moisture Protection |
| 08 - Openings and Glazing |
| 09 - Finishes |

Results per Division



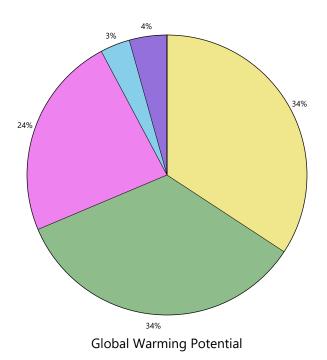
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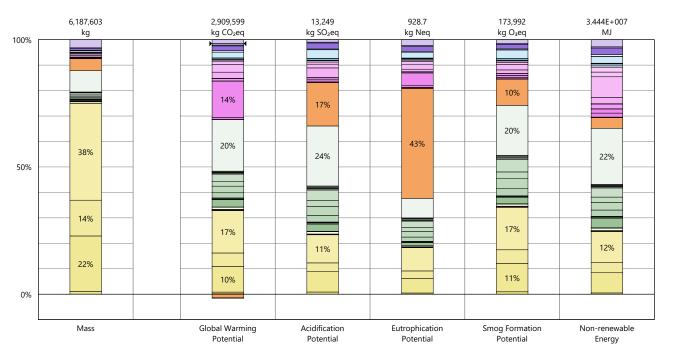
► Net value (impacts + credits)

Divisions

Γ

- 03 Concrete
- 05 Metals
 - 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection
- 08 Openings and Glazing
- 09 Finishes



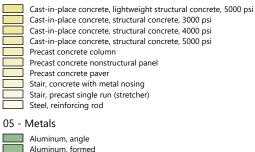


Results per Division, itemized by Tally Entry

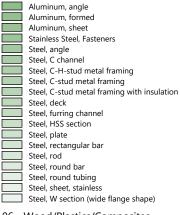
Legend

► Net value (impacts + credits)

03 - Concrete







06 - Wood/Plastics/Composites

Cross laminated timber (CLT)

Domestic hardwood Phenolic resin solid surface, sheet Plywood, interior grade

07 - Thermal and Moisture Protection

| EPDM, roofing membrane |
|---|
| Extruded polystyrene (XPS), board |
| Fiberglass clip system |
| Fluid applied synthetic polymer air barrier |

Metal roofing panels, formed

- Mineral wool, board, generic
- Polyethelene sheet vapor barrier (HDPE)
- Polyisocyanurate (PIR), board
- SBS modified bitumen, sheet
- Self adhering membrane
- Self-adhering sheet waterproofing, modified bituminous sheet Wood siding

08 - Openings and Glazing

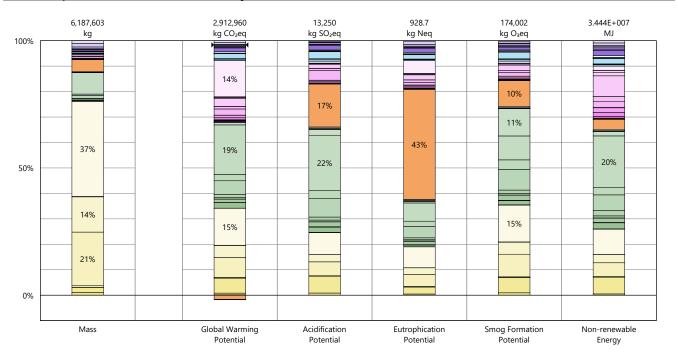
| _ | | | | |
|---|----------|----------|-----------|-----------|
| | Aluminum | mullion, | inclusive | of finish |

- Door frame, aluminum
- Door frame, steel, galvanized
- Door, exterior, aluminum
- Door, exterior, steel Door, interior, steel
- Glazing, custom IGU
- Glazing, monolithic sheet
- Window frame, vinyl

09 - Finishes

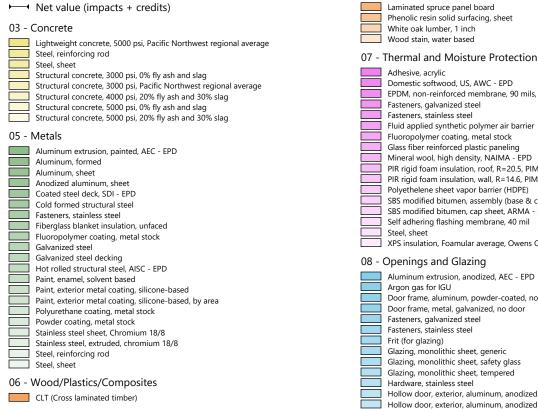


Acoustic ceiling system, mineral fiber board Fiberglass mat gypsum sheathing Wall board, gypsum



Results per Division, itemized by Material

Legend



Laminated spruce panel board

| | Adhesive, acrylic |
|----------|---|
| | Domestic softwood, US, AWC - EPD |
| | EPDM, non-reinforced membrane, 90 mils, SPRI - EPD |
| | Fasteners, galvanized steel |
| | Fasteners, stainless steel |
| | Fluid applied synthetic polymer air barrier |
| | Fluoropolymer coating, metal stock |
| | Glass fiber reinforced plastic paneling |
| | Mineral wool, high density, NAIMA - EPD |
| | PIR rigid foam insulation, roof, R=20.5, PIMA - EPD |
| | PIR rigid foam insulation, wall, R=14.6, PIMA - EPD |
| | Polyethelene sheet vapor barrier (HDPE) |
| | SBS modified bitumen, assembly (base & cap), ARMA - EPD |
| | SBS modified bitumen, cap sheet, ARMA - EPD |
| | Self adhering flashing membrane, 40 mil |
| | Steel, sheet |
| | XPS insulation, Foamular average, Owens Corning - EPD |
| <u> </u> | |
| 8 - I | Openings and Glazing |
| | Aluminum extrusion, anodized, AEC - EPD |

| Aluminum extrusion, anodized, AEC - EPD |
|---|
| Argon gas for IGU |
| Door frame, aluminum, powder-coated, no door |
| Door frame, metal, galvanized, no door |
| Fasteners, galvanized steel |
| Fasteners, stainless steel |
| Frit (for glazing) |
| Glazing, monolithic sheet, generic |
| Glazing, monolithic sheet, safety glass |
| Glazing, monolithic sheet, tempered |
| Hardware, stainless steel |
| Hollow door, exterior, aluminum, anodized |
| Hollow door ovtorior aluminum apodized large vision p |

Results per Division, itemized by Material (continued)

Legend (continued)

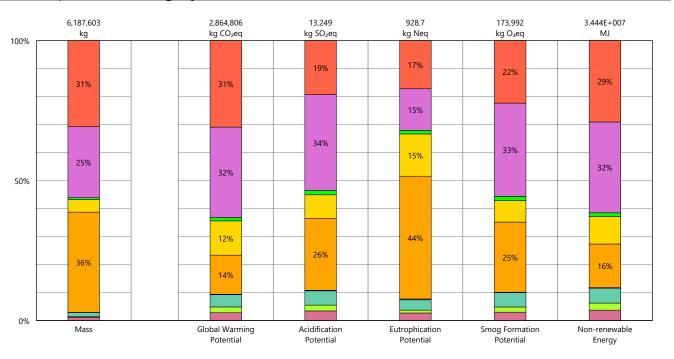


09 - Finishes

Acoustic ceiling tile (ACT), mineral fiber board Fiberglass mat gypsum sheathing board Paint, interior acrylic latex Suspended grid Wall board, gypsum, fire-resistant (Type X) Wall board, gypsum, moisture- and mold-resistant Wall board, gypsum, natural

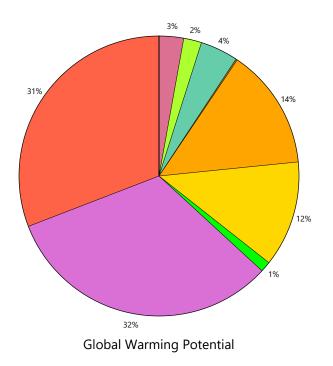
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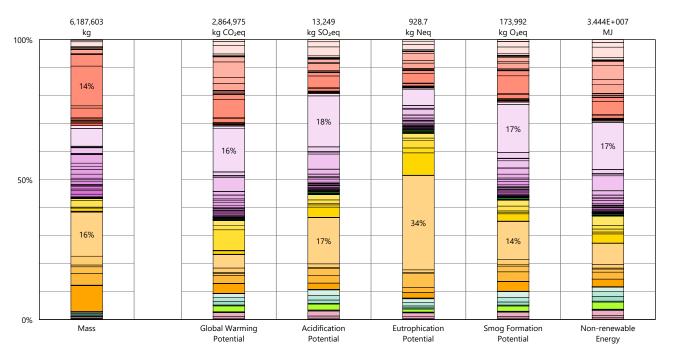
Results per Revit Category



Legend







Results per Revit Category, itemized by Family

Legend

Ceilings

| 5 |
|----------------------------|
| 1-C2- GWB on Mtl. Stud |
| 2-C2- GWB on Mtl. Stud |
| ACT 4 AcoustiBuilt Ceiling |
| C1 - ACT-1 - 2' x 4' |
| C1 - ACT-2 - 2' x 2' HRC |
| C1 - ACT-3 - 2' x 2' |
| C1 - ACT-5 - 2' x 6' |
| C2- GWB on Mtl. Stud |
| C7- GWB on Mtl. Stud 2 |
| Linear Wood Ceiling |

Curtainwall Mullions

Rectangular Mullion

Curtainwall Panels

| cp_HSEB - Base Material Panel_vertical |
|--|
| cp_HSEB - Skin Shingle flashing |
| cp_HSEB - Skin Shingle Panel_hoz |
| cp_HSEB - Window at Upper Levels |
| System Panel |

Doors



Floors

| - |
|--------------------------|
| (F1) SLAB ON GRADE |
| (F1) SLAB ON GRADE - 6" |
| (F1) SLAB ON GRADE - 8" |
| (F2) CONCRETE METAL DECK |

| (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION |
|---|
| (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) |

- (F3) CONCRETE METAL DECK W/ TOPPING SLAB
- (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR
- 12" Concrete Slab
- 155 1 HR RATED HORIZONTAL DUCT ENCLOSURE
- 3.5" Light Duty Paving Over Sturcture
- 3/16" Aluminum Plate

Roofs

- (R1) CLT ROOF
- (R1) CLT ROOF CLT PATTERN N/S
 (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT
 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2
 (R3) SBS OVER METAL DECK
 (R4) SOUTH VEST ROOF
 (R4) SOUTH VEST ROOF (INTERIOR)
 1/4" STEEL PLATE
 3/16" Aluminum Plate

Stairs and Railings

| Jun. | s and rainings |
|------|---|
| | Construction Specialties_Crash Rail_6" ECR-60S |
| | HSEB - Pipe Guardrail - GDR-2 |
| | HSEB - Pipe Guardrail - GDR-2 without handrail |
| | HSEB - STR-1 Precast Tread & Riser |
| | HSEB - STR-2 Precast Tread Steel Riser 2 |
| | HSEB Guardrail - Cable Rail |
| | HSEB Guardrail - Cable Rail without handrail |
| | HSEB Handrail - HNDRL-1 |
| | HSEB Handrail - HNDRL-3 |
| | HSEB PIPE Handrail - HNDRL-2 |
| | HSEB ST-11 (CAST IN PLACE) |
| | HSEB ST-9 (CAST IN PLACE) |
| | HSEB Type C - STR-4_Conc filled w/ C channel |
| | HSEB Type C_STR-10_Conc filled w/ C channel |
| | HSEB Type C_STR-5_Conc filled w/ C channel 2 |
| | HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access |
| | HSEB Type C_STR-8_Conc filled w/ Plate |
| | |

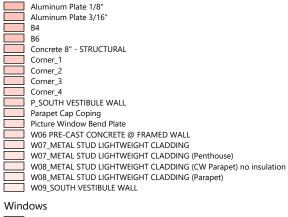
Results per Revit Category, itemized by Family (continued)

Legend (continued)

HSEB_STR-3_Precast Tread Steel Riser HSEB-GDR-4_Canerail

Structure

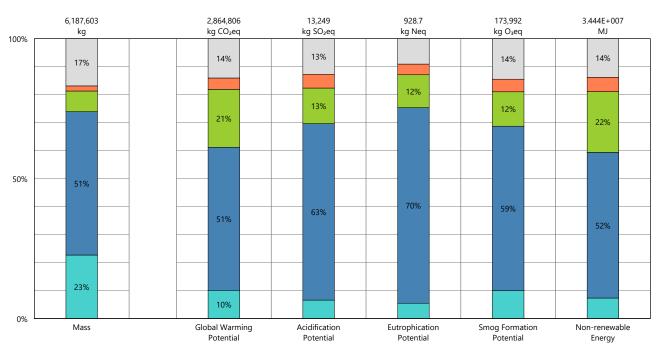
| | ture |
|-------|---|
| | 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d |
| | 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d |
| | 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d |
| | 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d |
| | 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F8.0 8x8x2.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d |
| | |
| | 04.016_LCL FND Slab_Spread Ftg_FW6.0 6x8x2.5d |
| | 04.017_LCL FND Slab_Cont. Ftg FW3.0_36wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx24d |
| | 04.017_LCL FND Slab_Cont. Ftg FW5.0_60wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW5.0A_60wx30d |
| | 04.017_LCL FND Slab_Cont. Ftg FW7.0_87wx42d 2 |
| | 04.017_LCL FND Slab_Cont. Ftg FW8.0_96wx48d |
| | 04.017_LCL FND Slab_Cont. Ftg_24wx12d |
| | KPFF - SCOL - Concrete - Round |
| | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC |
| | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x |
| | KPFF - SCOL - Steel - HSS - Round (C) - TC |
| | KPFF - SCOL - Steel - W - Wide Flange (C) - TC |
| | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace |
| | KPFF - SFRM - Steel - C - Channel (C) - TC |
| | KPFF - SFRM - Steel - HSS - Rectangular (C) - TC |
| | KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC |
| | KPFF - SFRM - Steel - L - Angle (C) - TC |
| | KPFF - SFRM - Steel - L - Aligie (C) - TC KPFF - SFRM - Steel - W - Wide Flange (C) - TC |
| | 5 () |
| | KPFF - SFRM - Steel - WT - Wide Flange Tee - TC |
| | KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC |
| | LCL_C_Pilaster_Rect_()w()d |
| | LCL_Embed_2x3-Nelson-Studs_OffSet |
| Walls | c |
| vvan. | |
| | (A1)_Furr Mtl Stud 7/8"_GWB (1-0) |
| | |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") 04.215_LCL_C_Slab Transition_Wall(4") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(11") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CUB_Wall(11") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.230_LCL_C_CURB_Wall(8") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CIRB_Wall(11") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOINDATION_Wall(10") 04.310_LCL_C_PIT_Wall(8") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CUB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_PII_Wall(8") 04.300_LCL_C_PII_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_Foundation_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Clab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.230_LCL_C_CURB_Wall(8") 04.300_LCL_C_Foundation_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(12") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_Foundation_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(22") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOUNDAUI(10") 04.300_LCL_C_PIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_Foundation_Wall(10") 04.300_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-86 1-N8 GFRC @ FRAMED WALL STAGGERED STUD |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOUNDATION_Wall(10") 04.300_LCL_C_FIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_Foundation_Wall(10") 04.310_LCL_C_FIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOURB_Wall(6") 04.300_LCL_C_PIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(2") 04.380_LCL_C_SHOTCRETE_Wall(2") 04.380_LCL_C_SHOTCRETE_Wall(2") 04.380_LCL_C_SHOTCRETE_Wall(2") 04.380_LCL_C_SHOTCRETE_Wall(2") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CUB_Wall(1") 04.225_LCL_C_CUBB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOURAMI(8") 04.300_LCL_C_FOURAMI(8") 04.300_LCL_C_SHOTCRETE_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_Floundation_Wall(10") 04.300_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(15") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOUNDATION_Wall(10") 04.310_LCL_C_FIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(8") 04.300_LCL_C_FOUNDATION_ 04.300_LCL_C_FOUNDATION_ 04.330_LCL_C_SHOTCRETE_Wall(16") 04.330_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W07_METAL STUD LIGHTWEIGHT CLADDING |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CUB_Wall(1") 04.225_LCL_C_CUBB_Wall(4") 04.225_LCL_C_CUBB_Wall(6") 04.225_LCL_C_CUBB_Wall(6") 04.320_LCL_C_FOURB_Wall(6") 04.300_LCL_C_FOURB_Wall(6") 04.330_LCL_C_FOURB_Wall(10") 04.330_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W07 METAL STUD LIGHTWEIGHT CLADDING |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8". GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.215_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(8") 04.300_LCL_C_Foundation_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 18" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_FURT HAT Channel 7/8"_GWB (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.320_LCL_C_FOUNDATION 04.300_LCL_C_FOUNDATION 04.300_LCL_C_FIT_Wall(8") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-86 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 18" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.215_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOUNDATION_Wall(10") 04.300_LCL_C_FOUNDATION_Wall(10") 04.330_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 2" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 2" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W07_METAL STUD LIGHTWEIGHT CLADDING 2-A0_FURT HAT Channel 7/8"_GWB (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.300_LCL_C_FOURB_Wall(6") 04.300_LCL_C_FOURDAWALI(10") 04.300_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 1-W07 METAL STUD LIGHTWEIGHT CLADDING 2-A0_FUIT HAT Channel 7/8"_GWB (2-0) 2 hour rated 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.215_LCL_C_CUB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(8") 04.300_LCL_C_FOURB_Wall(8") 04.300_LCL_C_SHOTCRETE_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_FUR HA CHANNEL 74FRIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8". GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(8") 04.300_LCL_C_Foundation_Wall(10") 04.300_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 12" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_FUR HA Channel 7/8"_GWB (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W07_METAL STUD LIGHTWEIGHT CLADDING |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) (B8)_TYP Mtl Stud 8"_GWB Insulation 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(8") 04.215_LCL_C_CUB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(8") 04.300_LCL_C_FOURB_Wall(8") 04.300_LCL_C_SHOTCRETE_Wall(10") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 8" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_FUR HA CHANNEL 74FRIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" |



LOUVER-parametric

A4_Furr Mtl Stud 4"_GWB (1-0)

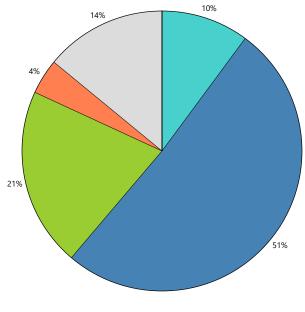




Legend

Building Elements
Substructure
Superstructure
Enclosure
Interiors

Undefined



Calculation Methodology

LIFE CYCLE ASSESSMENT METHODS

The following provides a description of terms and methods associated with the use of Tally to conduct life cycle assessment for construction works and construction products. Tally methodology is consistent with LCA standards ISO 14040-14044, ISO 21930:2017, ISO 21931:2010, EN 15804:2012, and EN 15978:2011. For more information about LCA, please refer to these standards or visit www.choosetally.com.

Studied objects

The life cycle assessment (LCA) results reported represent an analysis of a single building, multiple buildings, or a comparative analysis of two or more building design options. The assessment may represent the complete architectural, structural, and finish systems of the building(s) or a subset of those systems. This may be used to compare the relative environmental impacts associated with building components or for comparative study with one or more reference buildings. Design options may represent a full or partial building across various stages of the design process, or they may represent multiple schemes of a full or partial building that are being compared to one another across a range of evaluation criteria.

Functional unit and reference unit

A functional unit is the quantified performance of a product, building, or system that defines the object of the study. The functional unit of a single building should include the building type (e.g. office, factory), relevant technical and functional requirements (e.g. regulatory requirements, energy performance), pattern of use (e.g. occupancy, usable floor area), and the required service life. For a design option comparison of a partial building, the functional unit is the complete set of building systems or products that perform a given function. It is the responsibility of the modeler to assure that reference buildings or design options are functionally equivalent in terms of scope and relevant performance. The expected life of the building has a default value of 60 years and can be modified by the modeler.

The reference unit is the full collection of processes and materials required to produce a building or portion thereof and is quantified according to the given goal and scope of the assessment over the full life of the building. If construction impacts are included in the assessment, the reference unit also includes the energy, water, and fuel consumed on the building site during construction. If operational energy is included in the assessment, the reference unit includes the electrical and thermal energy consumed on site over the life of the building.

Data source

Tally utilizes a custom designed LCA database that combines material attributes, assembly details, and architectural specifications with environmental impact data resulting from the collaboration between KieranTimberlake and thinkstep. LCA modeling was conducted in GaBi 8.5 using GaBi 2018 databases and in accordance with <u>GaBi databases and modeling principles</u>. The data used are intended to represent the US and the year 2017. Where representative data were unavailable, proxy data were used. The datasets used, their geographic region, and year of reference are listed for each entry. An effort was made to choose proxy datasets that are technologically consistent with the relevant entry.

Data quality and uncertainty

Uncertainty in results can stem from both the data used and their application. Data quality is judged by: its measured, calculated, or estimated precision; its completeness, such as unreported emissions; its consistency, or degree of uniformity of the methodology applied on a study serving as a data source; and geographical, temporal, and technological representativeness. The <u>GaBi LCI databases</u> have been used in LCA models worldwide in both industrial and scientific applications. These LCI databases have additionally been used both as internal and critically reviewed and published studies. Uncertainty introduced by the use of proxy data is reduced by using technologically, geographically, and/or temporally similar data. It is the responsibility of the modeler to appropriately apply the predefined material entries to the building under study.

System boundaries and delimitations

The analysis accounts for the full cradle to grave life cycle of the design options studied across all life cycle stages, including material manufacturing, maintenance and replacement, and eventual end of life. Optionally, the construction impacts and operational energy of the building can be included within the scope. Product stage impacts are excluded for materials and components indicated as existing or salvaged by the modeler. The modeler defines whether the boundary includes or excludes the flow of biogenic carbon, which is the carbon absorbed and generated by biological sources (e.g. trees, algae) rather than from fossil resources.

Architectural materials and assemblies include all materials required for the product's manufacturing and use including hardware, sealants, adhesives, coatings, and finishing. The materials are included up to a 1% cut-off factor by mass except for known materials that have high environmental impacts at low levels. In these cases, a 1% cut-off was implemented by impact.

LIFE CYCLE STAGES

The following describes the scope and system boudaries used to define each stage of the life cycle of a building or building product, from raw material acquisition to final disposal. For products listed in Tally as Environmental Product Declarations (EPD), the full life cycle impacts are included, even if the published EPD only includes the Product stage [A1-A3].

Product [EN 15978 A1 - A3]

This encompasses the full manufacturing stage, including raw material extraction and processing, intermediate transportation, and final manufacturing and assembly. The product stage scope is listed for each entry, detailing any specific inclusions or exclusions that fall outside of the cradle to gate scope. Infrastructure (buildings and machinery) required for the manufacturing and assembly of building materials are not included and are considered outside the scope of assessment.

Transportation [EN 15978 A4]

This counts transportation from the manufacturer to the building site during the construction stage and can be modified by the modeler.

Construction Installation [EN 15978 A5] (Optional)

This includes the anticipated or measured energy and water consumed on-site during the construction installation process, as specified by the modeler.

Maintenance and Replacement [EN 15978 B2-B5]

This encompasses the replacement of materials in accordance with their expected service life. This includes the end of life treatment of the existing products as well as the cradle to gate manufacturing and transportation to site of the replacement products. The service life is specified separately for each product. Refurbishment of materials marked as existing or salvaged by the modeler is also included.

Operational Energy [EN 15978 B6] (Optional)

This is based on the anticipated or measured energy and natural gas consumed at the building site over the lifetime of the building, as indicated by the modeler.

End of Life [EN 15978 C2-C4]

This includes the relevant material collection rates for recycling, processing requirements for recycled materials, incineration rates, and landfilling rates. The impacts associated with landfilling are based on average material properties, such as plastic waste, biodegradable waste, or inert material. Stage C2 encompasses the transport from the construction site to end-of-life treatment based on national averages. Stages C3-C4 account for waste processing and disposal, i.e., impacts associated with landfilling or incineration.

Module D [EN 15978 D]

This accounts for reuse potentials that fall beyond the system boundary, such as energy recovery and recycling of materials. Along with processing requirements, the recycling of materials is modeled using an avoided burden approach, where the burden of primary material production is allocated to the subsequent life cycle based on the quantity of recovered secondary material. Incineration of materials includes credit for average US energy recovery rates.

| PRODUCT | CONSTRUCTION | USE | END-OF-LIFE | MODULE D |
|--|--|--|--|--|
| A1. Extraction A2. Transport (to factory) A3. Manufacturing | A4. Transport (to site) A5. Construction Installation | B1. Use B2. Maintenance B3. Repair B4. Replacement B5. Refurbishment | C1. Demolition C2. Transport (to disposal) C3. Waste processing C4. Disposal | D. Benefits and loads beyond the system boundary from: 1. Reuse 2. Recycling 3. Energy recovery |
| | | B6. Operational energy B7. Operational water | | |

Life-Cycle Stages as defined by EN 15978. Processes included in Tally modeling scope are shown in bold. Italics indicate optional processes.

Calculation Methodology

ENVIRONMENTAL IMPACT CATEGORIES

A characterization scheme translates all emissions and fuel use associated with the reference flow into quantities of categorized environmental impact. As the degree that the emissions will result in environmental harm depends on regional ecosystem conditions and the location in which they occur, the results are reported as impact potential. Potential impacts are reported in kilograms of equivalent relative contribution (eq) of an emission commonly associated with that form of environmental impact (e.g. kg CO₂eq).

The following list provides a description of environmental impact categories reported according to the TRACI 2.1 characterization scheme, the environmental impact model developed by the US EPA to quantify environmental impact risk associated with emissions to the environment in the United States. TRACI is the standard environmental impact reporting format for LCA in North America. Impacts associated with land use change and fresh water depletion are not included in TRACI 2.1. For more information on TRACI 2.1, reference Bare 2010, EPA 2012, and Guinée 2001. For further description of measurement of environmental impacts in LCA, see Simonen 2014.

Acidification Potential (AP)

kg SO₂eg

kg Neg

A measure of emissions that cause acidifying effects to the environment. The acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H^{+}) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication Potential (EP)

A measure of the impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). Nutrient enrichment may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. In aquatic ecosystems, increased biomass production may lead to depressed oxygen levels caused by the additional consumption of oxygen in biomass decomposition.

Global Warming Potential (GWP)

kg CO₂eq

kg CFC-11eg

A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may, in turn, have adverse impacts on ecosystem health, human health, and material welfare.

Ozone Depletion Potential (ODP)

14

A measure of air emissions that contribute to the depletion of the stratospheric ozone layer. Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. As these impacts tend to be very small, ODP impacts can be difficult to calculate and are prone to a larger margin of error than the other impact categories.

Smog Formation Potential (SFP)

kg O₃eq

A measure of ground level ozone, caused by various chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in sunlight. Human health effects can result in a variety of respiratory issues, including increasing symptoms of bronchitis, asthma, and emphysema. Permanent lung damage may result from prolonged exposure to ozone. Ecological impacts include damage to various ecosystems and crop damage.

Primary Energy Demand (PED)

MJ (lower heating value)

A measure of the total amount of primary energy extracted from the earth. PED tracks energy resource use, not the environmental impacts associated with the resource use. PED is expressed in energy demand from non-renewable resources and from renewable resources. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

Non-Renewable Energy Demand

MJ (lower heating value)

A measure of the energy extracted from non-renewable resources (e.g. petroleum, natural gas, etc.) contributing to the PED. Non-renewable resources are those that cannot be regenerated within a human time scale. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

Renewable Energy Demand

MJ (lower heating value)

A measure of the energy extracted from renewable resources (e.g. hydropower, wind energy, solar power, etc.) contributing to the PED. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

LCI Data

END-OF-LIFE [C2-C4]

A Life Cycle Inventory(LCI) is a compilation and quantification of inputs and outputs for the reference unit.The following LCI provides a summary of all energy, construction, transportation, and material inputs present in the study. Materials are listed in alphabetical order along with a list of all Revit families and Tally entries in which they occur, along with any notes and system boundaries accompanying their database entries. Each entry lists the detailed scope for the LCI data sources used from the GaBi LCI database and identifies the LCI data source.

For LCI data sourced from an Environmental Product Declaration (EPD), the product manufacturer, EPD identification number, and Program Operator are listed. Where the LCI source does not provide data for all life cycle stages, default North American average values are used. This is of particular importance for European EPD sources, as EPD data are generally only provided for the product stage, and North American average values are used for the remaining life cycle stages.

Where specific quantities are associated with a data entry, such as user inputs, energy values, or material mass, the quantity is listed on the same line as the title of the entry.

TRANSPORTATION [A4]

Default transportation values are based on the three-digit material commodity code in the 2012 Commodity Flow Survey by the US Department of Transportation Bureau of Transportation Statistics and the US Department of Commerce where more specific industry-level transportation is not available.

Transportation by Barge

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by barge.

LCI Source:

GLO: Average ship, 1500t payload capacity/ canal ts (2017) US: Diesel mix at filling station ts (2014)

Transportation by Container Ship

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by container ship.

LCI Source:

GLO: Container ship, 27500 dwt payload capacity, ocean going ts (2017) US: Heavy fuel oil at refinery (0.3wt.% S) ts (2014)

Transportation by Rail

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by cargo rail.

LCI Source:

GLO: Rail transport cargo - Diesel, average train, gross tonne weight 1000t / 726t payload capacity ts (2017)

US: Diesel mix at filling station ts (2014)

Transportation by Truck Scope:

The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by diesel truck.

LCI Source:

US: Truck - Trailer, basic enclosed / 45,000 lb payload - 8b ts (2017) US: Diesel mix at filling station ts (2014)

LCI Data (continued)

END-OF-LIFE [C2-C4]

Specific end-of-life scenarios are detailed for each entry based on the US construction and demolition waste treatment methods and rates in the 2016 WARM Model by the US Environmental Protection Agency except where otherwise specified. Heterogeneous assemblies are modeled using the appropriate methodologies for the component materials.

End-of-Life Landfill

Scope:

Materials for which no recycling or incineration rates are known, no recycling occurs within the US at a commercial scale, or which are unable to be recycled are landfilled. This includes glass, drywall, insulation, and plastics. The solids contents of coatings, sealants, and paints are assumed to go to landfill, while the solvents or water evaporate during installation. Where the landfill contains biodegradable material, the energy recovered from landfill gas utilization is reflected as a credit in Module D.

LCI Source:

US: Glass/inert on landfill ts (2017)

US: Biodegradable waste on landfill, post-consumer ts (2017)

US: Plastic waste on landfill, post-consumer ts (2017)

Concrete End-of-Life

Scope:

Concrete (or other masonry products) are recycled into aggregate or general fill material or they are landfilled. It is assumed that 55% of the concrete is recycled. Module D accounts for both the credit associated with off-setting the production aggregate and the burden of the grinding energy required for processing.

LCI Source:

US: Diesel mix at refinery ts (2014) GLO: Fork lifter (diesel consumption) ts (2016) EU - 28 Gravel 2/32 ts (2017) US: Glass/inert on landfill ts (2017)

Metals End-of-Life

Scope:

Metal products are modeled using the avoided burden approach. The recycling rate at end of life is used to determine how much secondary metal can be recovered after having subtracted any scrap input into manufacturing (net scrap). Net scrap results in an environmental credit in Module D for the corresponding share of the primary burden that can be allocated to the subsequent product system using secondary material as an input. If the value in Module D reflects an environmental burden, then the original product (A1-A3) contains more secondary material than is recovered.

LCI Source:

Aluminum - RNA: Primary Aluminum Ingot AA/ts (2010) Aluminum - RNA: Secondary Aluminum Ingot AA/ts (2010) Brass - GLO: Zinc mix ts (2012) Brass - GLO: Copper (99.99% cathode) ICA (2013) Brass - EU-28: Brass (CuZn20) ts (2017) Copper - DE: Recycling potential copper sheet ts (2016) Steel - GLO: Value of scrap worldsteel (2014) Zinc - GLO: Special high grade zinc IZA (2012)

Wood End-of-Life

Scope:

End of Life waste treatment methods and rates for wood are based on the 2014 Municipal Solid Waste and Construction Demolition Wood Waste Generation and Recovery in the United States report by Dovetail Partners, Inc. It is assumed that 63.5% of wood is sent to landfill, 22% to incineration, and 14.5% to recovery.

LCI Source:

US: Untreated wood in waste incineration plant ts (2017)

- US: Wood product (OSB, particle board) waste in waste incineration plant ts (2017)
- US: Wood products (OSB, particle board) on landfill, post-consumer ts (2017)
- US: Untreated wood on landfill, post-consumer ts (2017)
- RNA: Softwood lumber CORRIM (2011)

MODEL ELEMENTS

LCI Data

Revit Categories

Ceilings Curtainwall Mullions Curtainwall Panels Doors Floors Roofs Stairs and Railings Structure Walls Windows

HSEB_ARCH_D_19.rvt

Worksets ARCH_Ceilings ARCH_Exterior Walls ARCH_Floors & Roof ARCH_Vertical Circulation

Phases Base Budget Enabling Scope Existing Value Add Scope

HSEB_STRUCT_DC_19.rvt (Read-only) Worksets

Vorksels L - 04.220 Equipment Pads LCL-SLEEVES-BLOCKOUTS-MISC. S - Structural S - Structural - Baseline

Phases

Existing New Construction

PRODUCT [A1-A3]

Materials and components are listed in alphabetical order along with a list of all Revit families and Tally entries in which they occur. The masses given here refer to the quantity of each material used over the building's life-cycle, which includes both Product [A1-A3] and Use [B2-B5] stages.

Additional provided data describing scope boundaries for each life cycle stage may be useful for interpretation of the impacts associated with the specific material or component. Each material or component is listed with its service life, or period of time after installation it is expected to meet the service requirements prior to replacement or repair. This value is indicated in parentheses next to the mass of the material associated with the listed Revit family. Values for transportation distance or service life shown with an asterisk (*) indicate user-defined changes to default values. Values for service life shown with a dagger (†) indicate materials identified by the modeler as existing or salvaged.

Acoustic ceiling tile (ACT), mineral fiber board Used in the following Revit families:

| I | 31,086.8 kg |
|---|---|
| | 3,683.4 kg (50 yrs) 7,515.5 kg (50 yrs) 17,510.0 kg (50 yrs) 2,378.0 kg (50 yrs) |
| | |

Description: Mineral fiber board acoustic ceiling tile, 5/8" thick

Acoustic ceiling system, mineral fiber board

Life Cycle Inventory: 100% Mineral fiber board

C1 - ACT-1 - 2' x 4'

C1 - ACT-3 - 2' x 2'

C1 - ACT-5 - 2' x 6' Used in the following Tally entries:

C1 - ACT-2 - 2' x 2' HRC

Product Scope: Cradle to gate of panel only, excludes suspended grid system and installation hardware

Transportation Distance:

By truck: 172 km

End-of-Life Scope: 100% landfilled (inert waste)

LCI Source:

DE: Mineral fibres ceiling boards (EN15804 A1-A3) ts (2017)

Adhesive, acrylic

2,477.7 kg

| Used in the following Revit families: | |
|---|------------------------------------|
| (R1) CLT ROOF - CLT PATTERN N/S | 361.1 kg (20 yrs) |
| (R3) SBS OVER METAL DECK | 1,540.8 kg (20 yrs) |
| (R4) SOUTH VEST ROOF | 13.5 kg (20 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parap | pet) no insulation26.8 kg (20 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 535.4 kg (20 yrs) |
| | |

Used in the following Tally entries: SBS modified bitumen, sheet

Description:

Generic acrylic construction adhesive

Life Cycle Inventory: 5% Naphtha at refinery 95% Acrylate resin (solvent-systems) 0.5% NMVOC emissions

Product Scope:

Cradle to gate, plus emissions during application

Transportation Distance: By truck: 840 km

End-of-Life Scope:

99.5% solids to landfill (plastic waste)

| LCI Source: US: Naphtha at refinery ts (2014) DE: Acrylate resin (solvent-systems) ts (2017) | | EPD Expiration: 10/4/2021 | | |
|--|---------------------|--|---|--|
| Numinum extrusion, anodized, AEC - EPD | 3,507.9 kg | Aluminum, formed Used in the following Revit families: | 477.9 k | |
| Used in the following Revit families: Rectangular Mullion | 3,507.9 kg (60 yrs) | Corner_1 Corner_2 | 265.5 kg (60 yrs 212.4 kg (60 yrs | |
| Used in the following Tally entries: Aluminum mullion, inclusive of finish | | Used in the following Tally entries: Aluminum, formed | | |
| Description: Extruded and anodized aluminum part. Data based on industry-wid Aluminum Extruders Council. | le EPD from the | Description: Formed aluminum member. Data based on industry aluminum from the Aluminum Association (EPD ID 4 | | |
| Life Cycle Inventory: For information and quantities, see EPD | | Life Cycle Inventory: 100% Aluminum | | |
| Product Scope: Cradle to gate | | Product Scope: Cradle to gate | | |
| Transportation Distance: By truck: 663 km | | Transportation Distance: By truck: 663 km | | |
| End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | | End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | | |
| Module D Scope: Product has 34.5% scrap input while remainder is processed and cre burden | edited as avoided | Module D Scope: Product has 65% scrap input while remainder is proc burden | cessed and credited as avoided | |
| LCI Source: RNA: Aluminum extrusion, anodized - AEC (A1-A3) ts-EPD (2015) RNA: Primary Aluminum Ingot AA/ts (2010) RNA: Secondary Aluminum Ingot AA/ts (2010) | | LCI Source: RNA: Cold Rolled Aluminium ts/AA (2010) [EPD] GLO: Steel sheet stamping and bending (5% loss) ts US: Electricity grid mix ts (2014) | (2017) | |
| EPD Source: <u>11240237.101.1</u> | | US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Primary Aluminum Ingot AA/ts (2010) | | |
| EPD Designation Holder: Aluminum Extruders Council (AEC) | | RNA: Secondary Aluminum Ingot AA/ts (2010) | | |
| EPD Program Operator: UL Environment | | Aluminum, sheet Used in the following Revit families: | 19,863.4 k | |
| EPD Expiration: 10/4/2021 | | (R4) SOUTH VEST ROOF 1/4" STELL PLATE 3/16" Aluminum Plate Aluminum Plate | 112.5 kg (60 yrs 543.3 kg (60 yrs 41.7 kg (60 yrs | |
| luminum extrusion, painted, AEC - EPD | 12.0 kg | Aluminum Plate 1/8" Aluminum Plate 3/16" | 25.2 kg (60 yrs 221.2 kg (60 yrs | |
| Used in the following Revit families: Picture Window Bend Plate | 12.0 kg (60 yrs) | cp_HSEB - Skin Shingle flashing cp_HSEB - Skin Shingle Panel_hoz | 14.7 kg (60 yrs 6,681.8 kg (60 yrs | |
| Used in the following Tally entries: Aluminum, angle | | Parapet Cap Coping Rectangular Mullion | 500.6 kg (60 yrs 11,722.4 kg (60 yrs | |
| Description: Painted aluminum extrusions (not thermally-improved). Industry-wi | ide EPD from the | Used in the following Tally entries: Aluminum, sheet | | |
| Aluminum Extruders Council. EPD representative of conditions in N Life Cycle Inventory: | | Description: Aluminum sheet, formed and cut. Data based on industry-wide EPD for cold-rolled aluminum from the Aluminum Association (EPD ID 4786092064.101.1). | | |
| For information and quantities, see EPD Product Scope: | | Life Cycle Inventory: 100% Aluminum | | |
| Cradle to gate Transportation Distance: | | Product Scope: Cradle to gate | | |
| By truck: 663 km End-of-Life Scope: | | Transportation Distance: By truck: 663 km | | |
| 95% Recovered 5% Landfilled (inert material) Module D Scope: | | End-of-Life Scope: 95% Recovered | | |
| Credit given for the avoided burden associated with recovered mat | erial | 5% Landfilled (inert material) | | |
| LCI Source: EPD (US), American Extruders Council (2016) | | Module D Scope: Product has 65% scrap input while remainder is proc burden | cessed and credited as avoided | |
| EPD Source: <u>11240237.101.1</u> | | LCI Source: RNA: Cold Rolled Aluminium ts/AA (2010) [EPD] | | |
| EPD Designation Holder: Aluminum Extruders Council (AEC) | | GLO: Steel sheet stamping and bending (5% loss) ts US: Electricity grid mix ts (2014) | (2017) | |
| EPD Program Operator: UL Environment | | US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consum RNA: Primary Aluminum Ingot AA/ts (2010) | ption) ts (2014) | |

LCI Data (continued)

RNA: Secondary Aluminum Ingot AA/ts (2010)

| | | Proxied by Glulam |
|---|--|--|
| Anodized aluminum, sheet Used in the following Revit families: | 56.4 kg | Product Scope: Cradle to gate |
| 3/16" Aluminum Plate LOUVER-parametric | 56.4 kg (60 yrs) 0.0 kg (60 yrs) | Transportation Distance: By truck: 468 km |
| Used in the following Tally entries: Aluminum, sheet Description: Anodized aluminum sheet, formed and cut. Data based on indu | | End-of-Life Scope: 14.5% Recovered 22% Incinerated with energy recovery 63.5% Landfilled (wood product waste) |
| anodized aluminum from the Aluminum Extruders Council (EPE Life Cycle Inventory: | D ID 11240237.101.1). | Module D Scope: Recovered wood products credited as avoided burden. |
| 100% Anodized aluminum Product Scope: Cradle to gate | | LCI Source: RNA: Glue laminated timbers CORRIM (2011) |
| Transportation Distance: By truck: 663 km | | Coated steel deck, SDI - EPD Used in the following Revit families: (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) |
| End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | | Used in the following Tally entries: Steel, deck |
| Module D Scope: Product has 65% scrap input while remainder is processed and burden | credited as avoided | Description: Coated steel roof and floor deck panels, 1 ½" – 3" in de 22 – 16 gage material. Industry-wide EPD from the Stee |
| LCI Source: RNA: Cold Rolled Aluminium ts/AA (2010) [EPD] | | Life Cycle Inventory: For information and quantities, see EPD |
| GLO: Steel sheet stamping and bending (5% loss) ts (2017) RNA: Anodization of aluminum extrusion AEC/ts (2015) [EPD] US: Electricity grid mix ts (2014) | | Product Scope: Cradle to gate |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2 | 014) | Transportation Distance: By truck: 431 km |
| RNA: Primary Aluminum Ingot AA/ts (2010) [EPD] RNA: Secondary Aluminum Ingot AA/ts (2010) [EPD] | | End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) |
| Argon gas for IGU Used in the following Revit families: (FG2-AL) dr-DBL-A (FG2-CW) dr-DBL-CW | 58.5 kg 1.3 kg (40 yrs) 0.2 kg (40 yrs) | Module D Scope: Product has 28% scrap input while remainder is process burden. |
| cp_HSB - Window at Upper Levels System Panel | 23.2 kg (40 yrs) 33.7 kg (40 yrs) | LCI Source: US: Steel deck - Steel deck institute (SDI) (A1-A3) ts (20 |
| Used in the following Tally entries: Glazing, custom IGU | | EPD Source: <u>4786052957.101.1</u> |
| Description: Argon gas in insulating glass unit | | EPD Designation Holder: Steel Deck Institute |
| Life Cycle Inventory: Argon gas | | EPD Program Operator: UL Environment |
| Product Scope: Cradle to gate | | EPD Expiration: 12/15/2020 |
| Transportation Distance: By truck: 940 km | | Cold formed structural steel |
| End-of-Life Scope: 100% to landfill (inert waste) | | Used in the following Revit families: 1-C2- GWB on Mtl. Stud 1F5 - 1 HR RATED HORIZONTAL DUCT ENCLOSURE |
| LCI Source: US: Argon (gaseous) ts (2017) | | 2-C2- GWB on Mtl. Stud C1 - ACT-1 - 2' x 4' C1 - ACT-2 - 2' x 2' HRC |
| CLT (Cross laminated timber) | 294,549.2 kg | C1 - ACT-3 - 2' x 2' C1 - ACT-5 - 2' x 6' |
| Used in the following Revit families: | | C2- GWB on Mtl. Stud |
| (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR | 31,376.8 kg (60 yrs) 207,418.0 kg (60 yrs) | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC |
| (R1) CLT ROOF | 45,307.1 kg (60 yrs) | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace |
| (R1) CLT ROOF - CLT PATTERN N/S | 10,447.4 kg (60 yrs) | Linear Wood Ceiling |
| Used in the following Tally entries: Cross laminated timber (CLT) | | Used in the following Tally entries: Steel, C-H-stud metal framing Steel, C-stud metal framing |
| Description: | | Steel, furring channel |
| Engineered wood panel made of several layers of kiln-dried lun | nber stacked in | Steel, HSS section |

Engineered wood panel made of several layers of kiln-dried lumber stacked in alternating directions, bonded with structural adhesives, and pressed to form a solid rectangular panel.

Life Cycle Inventory: ed by Glub nce: th energy recovery ood product waste) roducts credited as avoided burden. ed timbers CORRIM (2011) - EPD 2,255.5 kg Revit families: TAL DECK (STRUCTURAL ONLY) 2,255.5 kg (60 yrs) Tally entries: nd floor deck panels, $1 \frac{1}{2}$ " – 3" in depth and manufactured from ial. Industry-wide EPD from the Steel Deck Institute. quantities, see EPD nce: material) rap input while remainder is processed and credited as avoided el deck institute (SDI) (A1-A3) ts (2012) der: or: 36,531.0 kg al steel Revit families: Stud 78.7 kg (60 yrs) HORIZONTAL DUCT ENCLOSURE 62.4 kg (60 yrs) Stud 431.1 kg (60 yrs) 2,097.7 kg (60 yrs) HRC 3,757.6 kg (60 yrs) 8,881.3 kg (60 yrs) 1,105.7 kg (60 yrs) 652.6 kg (60 yrs) tud - HSS - Rectangular (C) - TC 6,800.6 kg (60 yrs)

Steel, HSS section

Description: Cold-rolled or formed structural steel, such as used in steel studs. 12,601.9 kg (60 yrs) 61.4 kg (60 yrs)

| Life Cycle Inventory: 100% Cold rolled steel | | Life Cycle Inventory: 94% Aluminum | |
|--|---|--|-----------------------------|
| Product Scope: Cradle to gate | | 6% Powder coat (by weight) Product Scope: | |
| Transportation Distance: By truck: 431 km | | Cradle to gate excludes hardware, casing, sealant | |
| End-of-Life Scope: 98% Recovered | | Transportation Distance: By truck: 568 km | |
| 2% Landfilled (inert material) Module D Scope: | | End-of-Life Scope: 95% aluminum recovered 5% aluminum landfilled (inert material) | |
| Product has 16% scrap input while remainder is processed and burden | d credited as avoided | Module D Scope: Product has 36.4% scrap input while remainder is processed | and credited as avoided |
| LCI Source: RNA: Steel finished cold rolled coil worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) | | burden LCI Source: DE: Aluminium frame profile, powder coated (EN15804 A1-A | |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (GLO: Value of scrap worldsteel (2014) | 2014) | modified with: RNA: Aluminum extrusion, mill finish - AEC ts DE: Top coat powder (aluminium) (EN15804 A1-A3) ts (2017 RNA: Secondary Aluminum Ingot AA/ts (2010) | (2015) |
| | 4 000 0 1 | RNA: Primary Aluminum Ingot AA/ts (2010) | |
| Domestic softwood, US, AWC - EPD Used in the following Revit families: | 1,096.8 kg | Door frame, metal, galvanized, no door | 3.1 k |
| (R4) SOUTH VEST ROOF (R4) SOUTH VEST ROOF (INTERIOR) Linear Wood Ceiling | 141.9 kg (30 yrs) 163.7 kg (30 yrs) 549.3 kg (30 yrs) | Used in the following Revit families: (F1-HMW) dr-SGL-A | 3.1 kg (45 yr |
| P_SOUTH VESTIBULE WALL W09_SOUTH VESTIBULE WALL | 135.2 kg (30 yrs) 106.7 kg (30 yrs) | Used in the following Tally entries: Door frame, steel, galvanized | |
| Used in the following Tally entries: Wood siding | | Description: Stainless steel, 18 ga door frame | |
| Description: Kiln-dried and planed softwood dimensional lumber for stand | lard framing or planking | Life Cycle Inventory: 100% Galvanized steel | |
| Industry-wide EPD from the American Wood Council. | and manning of planking. | Product Scope: Cradle to gate, excludes hardware, jamb, casing, sealant | |
| Life Cycle Inventory: For information and quantities, see EPD | | Transportation Distance: By truck: 568 km | |
| Product Scope: Cradle to gate | | End-of-Life Scope: | |
| Transportation Distance: By truck: 383 km | | 98% recovered 2% landfilled (inert material) | |
| End-of-Life Scope: 14.5% Recovered 22% Incinerated with energy recovery | | Module D Scope: Product has a 44% scrap input while remainder is processed burden. | and credited as avoided |
| 63.5% Landfilled (wood product waste) Module D Scope: | | LCI Source: DE: Aluminium wing frame profile, powder coated (2011) | |
| Recovered wood products credited as avoided burden. | | modified with: US: Metal roll forming MCA (2010) GLO: Steel sheet stamping and bending (5% loss) ts (2012) RNA: Steel hot dip galvanized worldsteel (2007) | |
| RNA: Softwood lumber CORRIM (2011) EPD Source: | | EPDM, non-reinforced membrane, 90 mils, SPRI - EPD | 7,049.7 k |
| <u>13CA24184.102.1</u> EPD Designation Holder: | | Used in the following Revit families: (R1) CLT ROOF | 6,989.4 kg (20 yrs |
| American Wood Council and Canadian Wood Council | | (R4) SOUTH VEST ROOF Used in the following Tally entries: | 60.3 kg (20 yrs |
| EPD Program Operator: UL Environment | | EPDM, roofing membrane | |
| EPD Expiration: 4/16/2019 | | Description: Non-reinforced ethylene propylene diene terpolymer (EPDN membrane, default thickness of 90 mils (2.5 mm) Industry-w Ply Roofing Industry. | |
| Door frame, aluminum, powder-coated, no door Used in the following Revit families: | 99.2 kg | Life Cycle Inventory: For information and quantities, see EPD | |
| (F1-HMW) dr-SGL-A (FG1-CW) dr-SGL-CW (FC2-AL) dr DRLA | 10.6 kg (50 yrs) 10.6 kg (50 yrs) | Product Scope: | |
| (FG2-AL) dr-DBL-A (N1-HMW) dr-SGL-A temp-fence | 56.0 kg (50 yrs) 10.9 kg (50 yrs) 11.2 kg (50 yrs) | Cradle to gate Transportation Distance: | |
| Used in the following Tally entries: | 11.2 Kg (30 yis) | By truck: 172 km End-of-Life Scope: | |
| Door frame, aluminum Description: | | 100% Landfilled (plastic waste) LCI Source: | |
| Aluminum door frame | | US: Non-reinforced EPDM single ply roofing membrane, 90 | mils, A1-A3 - SPRI ts (2017 |

LCI Data (continued)

| PD Source: <u>4786842353.103.1</u> | | Transportation Distance: By truck: 1001 km | |
|--|--|---|------------------------------------|
| PD Designation Holder: Single Ply Roofing Industry (SPRI) | | End-of-Life Scope: 98% Recovered | |
| EPD Program Operator: UL Environment | | 2% Landfilled (inert material) Module D Scope: | |
| EPD Expiration: | | Product has 58% scrap input while remainder is processed and credited burden | as avoided |
| 2/14/2022 | | LCI Source: | |
| steners, galvanized steel | 459.9 kg | RER: Stainless steel Quarto plate (304) Eurofer (2010) | |
| Jsed in the following Revit families: | - | GLO: Steel turning ts (2017) US: Electricity grid mix ts (2014) | |
| (F1-HMW) dr-SGL-A (R1) CLT ROOF | 0.2 kg (40 yrs) 455.7 kg (40 yrs) | RER: Stainless steel flat product (304) - value of scrap Eurofer (2010) | |
| (R4) SOUTH VEST ROOF | 3.9 kg (40 yrs) | | |
| lsed in the following Tally entries: | | Fiberglass blanket insulation, unfaced | 8,304.9 k |
| Door frame, steel, galvanized | | Used in the following Revit families: 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 25.1 kg (60 yrs |
| EPDM, roofing membrane | | | 63.2 kg (60 yrs |
| Description: | | | 58.1 kg (60 yrs |
| Galvanized steel part, appropriate for use as fasteners and specie | alized hardware (bolts, | | 85.9 kg (60 yrs |
| rails, clips, etc.). | | | 36.6 kg (60 yrs 20.0 kg (60 yrs |
| ife Cycle Inventory: | | | 86.0 kg (60 yr |
| 100% Galvanized steel | | W07_METAL STUD LIGHTWEIGHT CLADDING 3,3- | 42.5 kg (60 yrs |
| Product Scope: | | | 22.0 kg (60 yrs |
| Cradle to gate | | W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insulation W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) 6 | 81.2 kg (60 yrs 22.6 kg (60 yrs |
| ransportation Distance: | | | 11.8 kg (60 yrs |
| By truck: 1001 km | | Used in the following Tally entries: | |
| nd-of-Life Scope: 70% Recovered | | Steel, C-stud metal framing with insulation | |
| 30% Landfilled (inert material) | | Description: | |
| /odule D Scope: | | Fiberglass batt | |
| Product has 16% scrap input while remainder is processed and c | redited as avoided | density varies from 10-14 kg/m ³ . | |
| burden | | Life Cycle Inventory: | |
| CI Source: | | 100% Fiberglass | |
| GLO: Steel wire rod worldsteel (2014) | | Product Scope: | |
| GLO: Steel turning ts (2017) |) to (2017) | Cradle to gate | |
| GLO: Electrolytic galvanisation (1 m ² steel sheet part, electrolytic GLO: Value of scrap worldsteel (2014) |) ts (2017) | Transportation Distance: By truck: 172 km | |
| steners, stainless steel | 251.1 kg | End-of-Life Scope: | |
| Jsed in the following Revit families: | _0 | 100% Landfilled (inert waste) | |
| (F1-HMW) dr-SGL-A | 0.2 kg (50 yrs) | LCI Source: | |
| (FG1-CW) dr-SGL-CW | 0.2 kg (50 yrs) | US: Fiberglass Batt NAIMA (2007) | |
| (FG2-AL) dr-DBL-A (N1-HMW) dr-SGL-A | 1.2 kg (50 yrs) 0.2 kg (50 yrs) | | |
| (R4) SOUTH VEST ROOF | 0.3 kg (50 yrs) | Fiberglass mat gypsum sheathing board | 19,777.6 k |
| (R4) SOUTH VEST ROOF (INTERIOR) | 0.4 kg (50 yrs) | Used in the following Revit families: (R1) CLT ROOF 9,4 | 83.4 kg (60 yrs |
| Corner_3 | 7.3 kg (60 yrs) | | 86.8 kg (60 yr |
| Corner_4 cp_HSEB - Base Material Panel_vertical | 7.2 kg (60 yrs) 24.7 kg (60 yrs*) | | 65.4 kg (60 yr: |
| cp_HSEB - Skin Shingle Panel_hoz | 189.9 kg (50 yrs) | | 66.9 kg (60 yr |
| Linear Wood Ceiling | 3.0 kg (50 yrs) | | 92.5 kg (60 yr: |
| P_SOUTH VESTIBULE WALL | 1.6 kg (50-60 yrs) | W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insulation | 52.6 kg (60 yrs 80.1 kg (60 yrs |
| temp-fence | 0.2 kg (50 yrs) | | 50.1 kg (60). |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) W09_SOUTH VESTIBULE WALL | 13.3 kg (60 yrs) 1.3 kg (50-60 yrs) | Used in the following Tally entries: Fiberglass mat gypsum sheathing | |
| lsed in the following Tally entries: | | Description: | |
| Door frame, aluminum | | Fiberglass treated gypsum sheathing product appropriate for use in high | n-moisture |
| Metal roofing panels, formed | | environments. | |
| Stainless Steel, Fasteners | | Life Cycle Inventory: | |
| Wood siding | | 92% Gypsum | |
| Description: Stainless steel part, appropriate for use as fasteners and speciali: | rad bardwara (balta | 8% Fiberglass mat | |
| rails, clips, etc.). Data based on industry-wide EPDs for primary a | | Product Scope: | |
| from the World Steel Association. | ···· , ··· · | Cradle to gate | |
| ife Cycle Inventory: | | Transportation Distance: By truck: 172 km | |
| 100% Stainless steel | | | |
| Product Scope: | | End-of-Life Scope: 100% Landfilled (inert waste) | |
| Cradle to gate | | | |

LCI Data (continued)

LCI Source:

DE: Gypsum plaster board (Moisture resistant) (EN15804 A1-A3) ts (2017) US: Fiberglass Duct Board NAIMA (2007)

Fluid applied synthetic polymer air barrier 16,719.9 kg Used in the following Revit families: 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 59.7 kg (40 yrs) 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 193.9 kg (40 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1,929.9 kg (40 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 614.5 kg (40 yrs) 1-W07_METAL STUD LIGHTWEIGHT CLADDING 5,178.9 kg (40 yrs) 3-W07_METAL STUD LIGHTWEIGHT CLADDING 76.3 kg (40 yrs) W06 PRE-CAST CONCRETE @ FRAMED WALL 1,637.5 kg (40 yrs) W07_METAL STUD LIGHTWEIGHT CLADDING 6,963.6 kg (40 yrs) W09_SOUTH VESTIBULE WALL 65.6 kg (40 yrs) Used in the following Tally entries: Fluid applied synthetic polymer air barrier Description Liquid-applied rubberized membrane Life Cycle Inventory: 34% Calcium carbonate 30% Polymer blend (SBS) 1% Silica 5% Titanium dioxide 30% Water Product Scope: Cradle to gate for materials only, neglects manufacturing requirements Transportation Distance: By truck: 555 km End-of-Life Scope: 70% Landfilled (plastic waste) (excludes water evaporation) LCI Source: US: Styrene-butadiene rubber (SBR) ts (2017) US: Silica sand (flour) ts (2017) US: Tap water from groundwater ts (2017) US: Titanium dioxide pigment ts (2017) US: Limestone flour (5mm) ts (2017) US: Electricity grid mix ts (2014) Fluoropolymer coating, metal stock 1,989.8 kg Used in the following Revit families: 1/4" STEEL PLATE 27.7 kg (60 yrs) 3/16" Aluminum Plate 2.1 kg (60 yrs) Aluminum Plate 1/8" 1.4 kg (60 yrs) Aluminum Plate 3/16' 12.6 kg (60 yrs) Corner_1 19.7 kg (60 yrs) Corner_2 15.8 kg (60 yrs) Corner_3 16.0 kg (60 yrs) 15.8 kg (60 yrs) Corner 4 cp_HSEB - Skin Shingle Panel_hoz 765.5 kg (60 yrs) KPFF - SCOL - Steel - HSS - Rectangular (C) - TC 48.6 kg (60 yrs) KPFF - SCOL - Steel - W - Wide Flange (C) - TC 441.2 kg (60 yrs) KPFF - SFRM - Steel - BRB - Buckling Restrained Brace 0.0 kg (60 yrs) KPFF - SFRM - Steel - HSS - Rectangular (C) - TC 80.5 kg (60 yrs) KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC 11.5 kg (60 yrs) KPFF - SFRM - Steel - L - Angle (C) - TC 1.8 kg (60 yrs) P_SOUTH VESTIBULE WALL 2.6 kg (60 yrs) Parapet Cap Coping 74.3 kg (60 yrs) Rectangular Mullion 421.2 kg (60 yrs) W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) 29.4 kg (60 yrs) W09_SOUTH VESTIBULE WALL 2.1 kg (60 yrs) Used in the following Tally entries: Aluminum, formed

Aluminum, sheet Metal roofing panels, formed Steel, angle Steel, HSS section

Steel, W section (wide flange shape)

Description:

Standard fluoropolymer coating for metals. This entry is used as a part of the larger MCA EPD for Roll Formed Steel Panels (EPD ID 13CA27321.101.1).

Life Cycle Inventory: 100% Fluoropolymer coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: US: Coil coating MCA (2010) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) Frit (for glazing) 2.1 kg Used in the following Revit families: System Panel 2.1 kg (40 yrs) Used in the following Tally entries: Glazing, custom IGU Description: Frit applied at a default density of 0.05 kg/m² gives 100% coverage with 19 micrometers thickness. User to select frit density of 20%, 30%, 40%, 50%, or 60% coverage Life Cycle Inventory: 90.9% Glass granulate 9% Butyl acetate 0.1% Nitrocellulose Product Scope: Cradle to gate Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) DE: Butyl acetate ts (2017) DE: Nitrocellulose (cellulose nitrate) ts (2017) DE: Expanded glass granulate ts (2017) IT: Flat-screen printing ENEA (2002) US: Tap water from groundwater ts (2017) 73,359.3 kg Galvanized steel Used in the following Revit families: (A1)_Furr Mtl Stud 7/8"_GWB (1-0) 51.0 kg (60 yrs) (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) 72.0 kg (60 yrs) (B8)_TYP Mtl Stud 8"_GWB Insulation 36.9 kg (60 yrs) (R4) SOUTH VEST ROOF 131.4 kg (60 yrs) (R4) SOUTH VEST ROOF (INTERIOR) 1,189.5 kg (60 yrs) 9.7 kg (60 yrs) 1-B6 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 52.1 kg (60 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1,269.2 kg (60 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 380.2 kg (60 yrs) 1 MOT METAL STUD LICUTWEICUT C

| I-WU/_METAL STUD LIGHTWEIGHT CLADDING | 5,461.7 Kg (60 yrs) |
|---|----------------------|
| 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated | 14.0 kg (60 yrs) |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 124.5 kg (60 yrs) |
| 6" Axiom Trim Piece | 185.6 kg (60 yrs) |
| A4_Furr Mtl Stud 4"_GWB (1-0) | 157.9 kg (60 yrs) |
| ACT 4 AcoustiBuilt Ceiling | 630.0 kg (60 yrs) |
| B4 | 90.4 kg (60 yrs) |
| B6 | 68.7 kg (60 yrs) |
| C7- GWB on Mtl. Stud 2 | 226.3 kg (60 yrs) |
| HSEB - Pipe Guardrail - GDR-2 | 1,171.6 kg (60 yrs) |
| HSEB - Pipe Guardrail - GDR-2 without handrail | 1,048.1 kg (60 yrs) |
| HSEB Guardrail - Cable Rail | 626.0 kg (60 yrs) |
| HSEB Guardrail - Cable Rail without handrail | 1,105.3 kg (60 yrs) |
| HSEB Handrail - HNDRL-1 | 1,445.7 kg (60 yrs) |
| HSEB Handrail - HNDRL-3 | 46.3 kg (60 yrs) |
| HSEB PIPE Handrail - HNDRL-2 | 205.4 kg (60 yrs) |
| HSEB-GDR-4_Canerail | 24.5 kg (60 yrs) |
| KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 12,562.2 kg (60 yrs) |
| | |

LCI Source:

RNA: Steel hot dip galvanized worldsteel (2007)

1-N8 GFRC @ FRAMED WALL STAGGERED STUD

1-W06 PRE-CAST CONCRETE @ FRAMED WALL

W06 PRE-CAST CONCRETE @ FRAMED WALL

1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22"

US: Electricity grid mix ts (2014)

US: Lubricants at refinery ts (2014)

US: Metal roll forming M CA (2010)

Glass fiber reinforced plastic paneling

Used in the following Revit families:

Used in the following Tally entries:

Fiberglass clip system

Life Cycle Inventory:

50% Glass fibers

Product Scope:

Cradle to gate

50% Polyester resin

Transportation Distance:

100% landfilled (plastic waste)

US: Electricity grid mix ts (2014)

Glazing, monolithic sheet, generic

Used in the following Revit families: cp_HSEB - Window at Upper Levels

Used in the following Tally entries:

Default thickness is 3 mm.

US: Lubricants at refinery ts (2014)

US: Glass fibres ts (2017)

DE: Polyester Resin unsaturated (UP) ts (2017)

US: Thermal energy from natural gas ts (2014)

GLO: Plastic extrusion profile (unspecific) ts (2017)

GLO: Compressed air 7 bar (medium power consumption) ts (2014)

Standard float glass, uncoated. Note: this entry is appropriate for clear or tinted glass.

By truck: 172 km

End-of-Life Scope:

System Panel

Description:

Glazing

Product Scope:

Cradle to gate

By truck: 940 km

End-of-Life Scope:

LCI Source

Description:

or tinted glass.

Transportation Distance:

100% Landfilled (inert waste)

Glazing, monolithic sheet, safety glass

Used in the following Revit families:

Used in the following Tally entries:

Glazing, monolithic sheet

(N1-HMW) dr-SGL-A

DE: Window glass simple (EN15804 A1-A3) ts (2017

Standard safety glass, default thickness is 3mm. No

Glazing, custom IGU

Life Cycle Inventory

LCI Source:

Description:

GLO: Value of scrap worldsteel (2014)

GLO: Steel sheet stamping and bending (5% loss) ts (2014)

GLO: Compressed air 7 bar (medium power consumption) ts (2014)

1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD

Glass fibers with polyester resin formed into solid sheet stock

Full building summary

LCI Data (continued)

KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x 567.7 kg (60 yrs) KPFF - SCOL - Steel - HSS - Round (C) - TC 221.2 kg (60 yrs) KPFF - SFRM - Steel - HSS - Rectangular (C) - TC 15,577.6 kg (60 yrs) LCL_Embed_2x3-Nelson-Studs_OffSet 165.4 kg (45 yrs) 62.1 kg (60 yrs) P_SOUTH VESTIBULE WALL W06 PRE-CAST CONCRETE @ FRAMED WALL 2,026.0 kg (60 yrs) W07_METAL STUD LIGHTWEIGHT CLADDING 7,767.5 kg (60 yrs) W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) 16,481.0 kg (60 yrs) W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insulation18.8 kg (60 yrs) 1,934.1 kg (60 yrs) W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) W09_SOUTH VESTIBULE WALL 51.6 kg (60 yrs) Used in the following Tally entries: Steel, C-stud metal framing Steel, C-stud metal framing with insulation Steel, furring channel Steel, HSS section Steel, plate Steel, rectangular bar Steel, round tubing Description: Hot dipped galvanized steel profile, for use with cladding systems. Life Cycle Inventory: 100% Steel, hot dip galvanized Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope 98% Recovered 2% Landfilled (inert material) Module D Scope Product has 44% scrap input while remainder is processed and credited as avoided burden LCI Source: RNA: Steel hot dip galvanized worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) US: Metal roll forming M CA (2010) GLO: Value of scrap worldsteel (2014) Galvanized steel decking 33,605.6 kg Used in the following Revit families: 12,079.3 kg (60 yrs) (F2) CONCRETE METAL DECK (F3) CONCRETE METAL DECK W/ TOPPING SLAB 3,185.1 kg (60 yrs) (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 7,867.3 kg (60 yrs) (R3) SBS OVER METAL DECK 10,403.8 kg (60 yrs) (R4) SOUTH VEST ROOF (INTERIOR) 70.0 kg (60 yrs) Used in the following Tally entries: Steel, deck Description Hot dip galvanized steel roof decking, corrugated profile. Default roof decking is galvanized to G90 standards, coated on both sides of 20 gauge steel deck, roll formed and precut. Life Cycle Inventory: 100% Steel, hot dip galvanized Product Scope: Cradle to gate for deck only Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) Module D Scope Product has 44% scrap input while remainder is processed and credited as avoided burden

|) | |
|-------------------------|-------------------|
| | 68.3 kg |
| | 68.3 kg (30 yrs) |
| te: this entry is appro | opriate for clear |
| | t <i>ally</i> 。 |

318.0 kg

3.1 kg (60 yrs*)

10.2 kg (60 yrs*)

101.0 kg (60 yrs*)

32.2 kg (60 yrs*) 171.5 kg (60 yrs*)

4,667.0 kg

3,859.1 kg (40 yrs)

807.9 kg (40 yrs)

LCI Data (continued)

| Life Cycle Inventory: Sodium sulphate | | Product has 58% scrap input while remainder is processed and oburden | credited as avoided |
|---|-------------------------------------|---|----------------------|
| Soda (Na2CO3) Silica sand Calcium hydroxida | | LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) | |
| Calcium hydroxide Lime | | DE: Steel cast part machining ts (2017) | |
| Tin | | US: Electricity grid mix ts (2014) | 010) |
| Dolomite | | RER: Stainless steel flat product (304) - value of scrap Eurofer (20 | 010) |
| Product Scope: | | Hollow door, exterior, aluminum, anodized | 86.2 k |
| Cradle to gate | | Used in the following Revit families: | |
| Transportation Distance: By truck: 940 km | | (F2) dr-Double-Flush-with 4 sided jambs | 86.2 kg (30 yrs |
| | | Used in the following Tally entries: | |
| End-of-Life Scope: 100% Landfilled (inert waste) | | Door, exterior, aluminum | |
| LCI Source: | | Description: | aluurathana faam |
| DE: Window glass simple (EN15804 A1-A3) ts (2017) | | Anodized aluminum, exterior, with interior steel supports and po insulation | olyurethane toam |
| | | Life Cycle Inventory: | |
| Glazing, monolithic sheet, tempered | 34,096.8 kg | 3% Steel | |
| Used in the following Revit families: (FG1-CW) dr-SGL-CW | 61.9 kg (40 yrs) | 71% Anodized aluminum 25% Polyurethane foam | |
| (FG2-AL) dr-DBL-A | 862.9 kg (40 yrs) | | |
| (FG2-CW) dr-DBL-CW | 208.5 kg (40 yrs) | Product Scope: | 100 |
| cp_HSEB - Window at Upper Levels | 10,856.3 kg (40 yrs) | Cradle to gate, excludes assembly, frame, hardware, and adhesiv | ves |
| System Panel | 22,107.2 kg (40 yrs) | Transportation Distance: | |
| Used in the following Tally entries: | | By truck: 568 km | |
| Glazing, custom IGU | | End-of-Life Scope: | |
| Description: | | 70% Steel recovered 30% Steel landfilled (inert material) | |
| Tempered float glass. Note: this entry is appropriate for cle | ar or tinted glass. Default | 95% Aluminum recovered (includes processing and avoided but | rden credit) |
| thickness is 3 mm. | | 5% Aluminum is landfilled (inert material) | , |
| Life Cycle Inventory: | | 100% Insulation landfilled (plastic material) | |
| Tempered glazing | | Module D Scope: | |
| Product Scope: Cradle to gate | | Product has 50% aluminum scrap input and 1% steel scrap inpu processed and credited as avoided burden. | t while remainder is |
| Transportation Distance: | | LCI Source: | |
| By truck: 940 km | | DE: Polyurethane foam (PUR) ts (2017) RNA: Anodization of aluminium (EN15804 A1-A3) ts (2015) | |
| End-of-Life Scope: 100% Landfilled (inert waste) | | RNA: Cold Rolled Aluminum AA/ts (2010) | |
| | | GLO: Steel sheet stamping and bending (5% loss) ts (2017) | |
| LCI Source: | | US: Electricity grid mix ts (2014) | |
| DE: Window glass simple (EN15804 A1-A3) ts (2017) US: Electricity grid mix ts (2014) | | US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (20 |)14) |
| US: Thermal energy from natural gas ts (2014) | | RNA: Steel hot dip galvanized worldsteel (2007) | , |
| | | RNA: Secondary Aluminum Ingot AA/ts (2010) | |
| Hardware, stainless steel | 45.2 kg | RNA: Primary Aluminum Ingot AA/ts (2010) | |
| Used in the following Revit families: | | | |
| (F1-HMW) dr-SGL-A (F2) dr-Double-Flush-with 4 sided jambs | 7.0 kg (60 yrs) | Hollow door, exterior, aluminum, anodized, large vision panel Used in the following Revit families: | 236.9 k |
| (F2) dr-Double-Flush-with 4 sided Jambs (FG2-AL) dr-DBL-A | 7.5 kg (60 yrs) 10.3 kg (60 yrs) | (FG2-AL) dr-DBL-A | 118.4 kg (30 yrs |
| (FG2-CW) dr-DBL-CW | 10.3 kg (60 yrs) | (FG2-CW) dr-DBL-CW | 118.4 kg (30 yrs |
| (N1-HMW) dr-SGL-A | 5.3 kg (60 yrs) | Used in the following Tally entries: | |
| temp-fence | 4.7 kg (60 yrs) | Door, exterior, aluminum | |
| Used in the following Tally entries: | | Description: | |
| Door, exterior, aluminum | | Hollow, anodized aluminum exterior door inclusive of large visio | on panel (>50% door |
| Door, exterior, steel Door, interior, steel | | area), polyurethane foam insulation, no frame | |
| | | Life Cycle Inventory: | |
| Description: Finished, cast stainless steel, applicable for door, window c | r other accessory hardware | 47% Glass | |
| | rother accessory hardware | 3% Steel | |
| Life Cycle Inventory: 100% Stainless steel | | 37% Anodized aluminum 13% Polyurethane foam | |
| Product Scope: | | Product Scope: | |
| Cradle to gate | | Cradle to gate, excludes assembly, frame, hardware, and adhesiv | ves |
| | | Transportation Distance: | |
| Transportation Distance: By truck: 1001 km | | By truck: 568 km | |
| By truck: 1001 km End-of-Life Scope: | | End-of-Life Scope: | |
| By truck: 1001 km End-of-Life Scope: 98% Recovered | | End-of-Life Scope: 70% Steel recovered | |
| By truck: 1001 km End-of-Life Scope: | | End-of-Life Scope: | rden credit) |

86.2 kg 86.2 kg (30 yrs)

236.9 kg

118.4 kg (30 yrs) 118.4 kg (30 yrs)

HEALTH SCIENCES EDUCATION

Full building summary

LCI Data (continued)

| 100% Insulation landfilled (plastic material) 100% Glass landfilled (inert material) | |
|--|------------------------------------|
| Module D Scope: Product has 26% aluminum scrap input and 1% steel scrap input while processed and credited as avoided burden. | remainder is |
| LCI Source: DE: Polyurethane foam (PUR) ts (2017) RNA: Anodization of aluminium (EN15804 A1-A3) ts (2015) RNA: Cold Rolled Aluminum AA/ts (2010) | |
| GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) | |
| GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Steel hot dip galvanized worldsteel (2007) RNA: Secondary Aluminum Ingot AA/ts (2010) RNA: Primary Aluminum Ingot AA/ts (2010) | |
| DE: Window glass simple (EN15804) ts (2017) | |
| Hollow door, exterior, steel, galvanized Used in the following Revit families: (N1-HMW) dr-SGL-A | 96.7 kg 96.7 kg (30 yrs) |
| Used in the following Tally entries: Door, exterior, steel | |
| Description: Hollow door, exterior, steel, 18 ga. inclusive of EPS insulation, no frame | |
| Life Cycle Inventory: 5% Extruded polystyrene 95% Galvanized steel | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesives | |
| Transportation Distance: By truck: 568 km | |
| End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Core landfilled (biodegradable material) | |
| Module D Scope: Product has 44% scrap input while remainder is processed and credited burden. | d as avoided |
| LCI Source: DE: Expanded Polystyrene (PS 25) (EN15804 A1-A3) ts (2017) GLO: Steel sheet stamping and bending (5% loss) ts (2017) GLO: Value of scrap worldsteel (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Steel hot dip galvanized worldsteel (2007) | |
| Hollow door, interior, steel, fire-rated | 81.8 kg |
| Used in the following Revit families: (F1-HMW) dr-SGL-A | 81.8 kg (50 yrs) |
| Used in the following Tally entries: Door, interior, steel | |
| Description: Fire-rated door, interior, steel, inclusive of mineral fiber insulation, no fi | rame |
| Life Cycle Inventory: 72% Steel 28% Mineral wool | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesives | |
| Transportation Distance: By truck: 568 km | |
| End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) | |

Module D Scope: Product has 12% scrap input while remainder is processed and credited as avoided burden. LCI Source: DE: Expanded Polystyrene (PS 30) (EN15804 A1-A3) ts (2017) GLO: Steel sheet stamping and bending (5% loss) ts (2017) GLO: Value of scrap worldsteel (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Steel finsihed cold rolled coil worldsteel (2007) DE: Mineral fibres ceiling boards (EN15804 A1-A3) ts (2017) Hollow door, interior, steel, galvanized 157.1 kg Used in the following Revit families: (F1-HMW) dr-SGL-A 67.3 kg (50 yrs) temp-fence 89.7 kg (50 yrs) Used in the following Tally entries: Door, interior, steel Description: Hollow, galvanized steel interior door inclusive of honeycomb kraft paper, no frame Life Cycle Inventory: 12% Kraft core 88% Galvanized steel Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesives Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Core landfilled (biodegradable material) Module D Scope Product has 41% scrap input while remainder is processed and credited as avoided burden LCI Source: DE: Kraft paper ts (2017) GLO: Steel sheet stamping and bending (5% loss) ts (2017) GLO: Value of scrap worldsteel (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Steel hot dip galvanized worldsteel (2007) Hot rolled structural steel, AISC - EPD 518,506.5 kg Used in the following Revit families: HSEB Type C - STR-4_Conc filled w/ C channel 1,158.0 kg (60 yrs) HSEB Type C_STR-10_Conc filled w/ C channel 332.8 kg (60 yrs) HSEB Type C_STR-5_Conc filled w/ C channel 2 3,047.8 kg (60 yrs) KPFF - SCOL - Steel - W - Wide Flange (C) - TC 122,740.2 kg (60 yrs) KPFF - SFRM - Steel - C - Channel (C) - TC 4,966.2 kg (60 yrs) KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC 976.4 kg (60 yrs) KPFF - SFRM - Steel - L - Angle (C) - TC 264.1 kg (60 yrs) KPFF - SFRM - Steel - W - Wide Flange (C) - TC 384,876.4 kg (60 yrs) KPFF - SFRM - Steel - WT - Wide Flange Tee - TC 40.7 kg (60 yrs) KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC 104.0 kg (60 yrs) Used in the following Tally entries: Steel, angle Steel, C channel Steel, W section (wide flange shape) Description: Hot rolled structural steel. Industry-wide EPD from the American Institute of Steel Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope:

Cradle to gate Transportation Distance: By truck: 431 km

| End-of-Life Scope: 98% Recovered | Laminating (for glazing) 58.5 Used in the following Revit families: |
|--|---|
| 2% Landfilled (inert material) Module D Scope: | System Panel 58.5 kg (40) Used in the following Tally entries: |
| Product has 100% scrap input, burden reflects difference between recovered material and scrap input | Glazing, custom IGU |
| LCI Source: | Glazing lamination using PVB film |
| RNA: Hot rolled structural steel sections AISC (2010) EPD Source: <u>4786979051.102.1</u> | Life Cycle Inventory: 3% PVB film (30% adipic acid 70% PVB) |
| EPD Designation Holder: American Institute of Steel Construction | 97% Glass Product Scope: |
| EPD Program Operator: UL Environment | Cradle to gate Transportation Distance: |
| EPD Expiration: 3/31/2021 | N/A End-of-Life Scope: 100% Landfilled (inert waste) |
| IGU spacer 283.4 kg | LCI Source: |
| Used in the following Revit families: 6.3 kg (40 yrs) (FG2-AL) dr-DBL-A 6.3 kg (40 yrs) (FG2-CW) dr-DBL-CW 1.2 kg (40 yrs) cp_HSEB - Window at Upper Levels 112.7 kg (40 yrs) System Panel 163.2 kg (40 yrs) | DE: Adipic acid from cyclohexane ts (2017) DE: Polyvinyl Butyral Granulate (PVB) ts (2017) GLO: Plastic film (PE, PP, PVC) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) |
| Used in the following Tally entries: Glazing, custom IGU | |
| Description: Insulating glass unit (IGU) spacer and gasket used to separate two or more plies of glass. Density value assumes a 1/2" (13/2 mm) spacer. | Lightweight concrete, 5000 psi, Pacific Northwest regional average 65,224.5 Used in the following Revit families: HSEB Type C - STR-4_Conc filled w/ C channel 1,437.3 kg (60 y HSEB Type C_STR-10_Conc filled w/ C channel 552.8 kg (60 y |
| Life Cycle Inventory: 70% Polybutadiene rubber spacer 30% Nitrile rubber spacer | HSEB Type C_STR-5_Conc filled w/ C channel 2 2,234.5 kg (60) HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access 413.5 kg (60) HSEB Type C_STR-8_Conc filled w/ Plate 318.4 kg (60) |
| Product Scope: Cradle to gate | KPFF - SCOL - Concrete - Round 1,268.3 kg (60 y LCL_C_Pilaster_Rect_()w()d 58,999.5 kg (60 y |
| Transportation Distance: By truck: 940 km | Used in the following Tally entries: Cast-in-place concrete, lightweight structural concrete, 5000 psi |
| End-of-Life Scope: 100% Landfilled (inert waste) | Description: Lightweight concrete, 5000 psi, Pacific Northwest regional average. Mix design matches National Ready-Mix Concrete Association (NRMCA) Industry-wide EPD. |
| LCI Source: DE: Polybutadiene rubber ts (2017) DE: Nitrile butadiene rubber, incl. MMA (NBR-speciality) ts (2017) | Life Cycle Inventory: Expanded shale: 34%, Sand: 32%, Portland cement PCA - EPD: 19%, Water: 10%, Fly ash: 5%, Expanded slag: 1%, Admixture: <1% |
| Laminated spruce panel board 278.9 kg Used in the following Revit families: C7- GWB on Mtl. Stud 2 278.9 kg (30 yrs) | Product Scope: Cradle to gate Anchors, ties, and metal accessories outside of scope (<1% mass) |
| C7- GWB on Mtl. Stud 2 278.9 kg (30 yrs) Used in the following Tally entries: Plywood, interior grade | Transportation Distance: By truck: 24 km |
| Description: Laminated spruce woodboard (Duo-/Trio boards) consists of layers of spruce bonded with phenolic resin-based adhesive. Laminated woodboards in comparison to | End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) |
| laminated timber are thicker (45mm). Appropriate for use in interior applications. | Module D Scope: Avoided burden credit for coarse aggregate, includes grinding energy |
| Life Cycle Inventory: 100% Laminated wood board | LCI Source: |
| Product Scope: Cradle to gate, excludes finishes laminate as proxy for glue and adhesives during installation | US: Portland cement PCA/ts (2014) DE: Puruice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) |
| Transportation Distance: By truck: 383 km | DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) |
| End-of-Life Scope: 14.5% Recovered 22% Incinerated with energy recovery 63.5% Landfilled (wood product waste) | DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) |
| Module D Scope: | US: Colophony (rosin, refined) from CN pine gum rosin ts (2017) US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) |
| Recovered wood products credited as avoided burden. | |

| 30% utane) ts (2014) | | Overhead door closer, aluminum | 26.1 kg |
|--|----------------------|---|---|
| US: Light fuel oil at refinery ts (2014) | | Used in the following Revit families: (F1-HMW) dr-SGL-A | 4.7 kg (30 yrs |
| | | (FG2-AL) dr-DBL-A | 4.7 kg (30 yr 10.7 kg (30 yr |
| ow-e coating (for glazing) | 312.7 kg | (FG2-CW) dr-DBL-CW | 10.7 kg (30 yr |
| Used in the following Revit families: | | | · • · · · · · · · · · · · · · · · · · · |
| (FG2-AL) dr-DBL-A | 7.1 kg (40 yrs) | Used in the following Tally entries: | |
| (FG2-CW) dr-DBL-CW | 1.3 kg (40 yrs) | Door, exterior, aluminum | |
| cp_HSEB - Window at Upper Levels | 126.8 kg (40 yrs) | Door, interior, steel | |
| System Panel | 177.5 kg (40 yrs) | Description: | |
| Used in the following Tally entries: | | Aluminum overhead door closer. Data based on product-speci | fic EPD from FV S+B. |
| Glazing, custom IGU | | Life Cycle Inventory: | |
| Description: | | See EPD | |
| Low-e coating for application to glazing lite | | | |
| Life Cycle Inventory: | | Product Scope: Cradle to gate | |
| Ferro chrome mix | | 5 | |
| Nickel mix | | Transportation Distance: | |
| Tin | | By truck: 1001 km | |
| Silver mix | | End-of-Life Scope: | |
| Product Scoper | | 95% Recovered | |
| Product Scope: Cradle to gate | | 5% Landfilled (inert material) | |
| Cradie to gate | | Module D Scope: | |
| Transportation Distance: | | Product has 0% scrap input, burden reflects difference between | n recovered material an |
| N/A | | scrap input | |
| End-of-Life Scope: | | | |
| 100% Landfilled (inert waste) | | LCI Source: DE: Overhead door closer aluminum - FV S+B PE-EPD (2009) | |
| LCI Source: | | RNA: Secondary Aluminum Ingot AA/ts (2010) | |
| Low-e coating from DE: Double glazing unit (EN15804 A1-A3) ts (| 2017) | RNA: Primary Aluminium Ingot AA/ts (2010) | |
| | | | |
| in and word high density MAIMA FDD | 20.050.1 hr | EPD Source: | |
| ineral wool, high density, NAIMA - EPD Used in the following Revit families: | 39,858.1 kg | EPD-ARG-20160183-IBG1-EN | |
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 38.2 kg (60 yrs) | EPD Designation Holder: | |
| 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" | 248.2 kg (60 yrs) | European Federation of Associations of Lock and Builders Hard | ware Manufacturers |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 1,235.2 kg (60 yrs) | (ARGE) | |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STU | D 393.3 kg (60 yrs) | EPD Program Operator: | |
| 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 13,257.9 kg (60 yrs) | Institut Bauen and Umwelt (IBU) | |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 195.3 kg (60 yrs) | EPD Expiration: | |
| W06 PRE-CAST CONCRETE @ FRAMED WALL | 2,096.0 kg (60 yrs) | 9/13/2021 | |
| W07_METAL STUD LIGHTWEIGHT CLADDING | 17,826.7 kg (60 yrs) | 5,15,2021 | |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 1,184.1 kg (60 yrs) | Belief and and a state of | 0.640.71 |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) W09_SOUTH VESTIBULE WALL | 3,320.3 kg (60 yrs) | Paint, enamel, solvent based | 9,648.7 k |
| W09_SOUTH VESTIBULE WALL | 63.0 kg (60 yrs) | Used in the following Revit families: 3/16" Aluminum Plate | 5.0 kg (15 yr |
| Jsed in the following Tally entries: | | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 255.3 kg (15 yr |
| Mineral wool, board, generic | | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x | 23.1 kg (15 yr |
| Description: | | KPFF - SCOL - Steel - HSS - Round (C) - TC | 10.3 kg (15 yr |
| Rock board, heavy density. Industry-wide EPD from the North Am | erica Insulation | KPFF - SFRM - Steel - C - Channel (C) - TC | 94.7 kg (15 yr |
| Manufacturers Association. EPD representative of conditions in N | orth America. | KPFF - SFRM - Steel - HSS - Rectangular (C) - TC | 182.2 kg (15 yr |
| Life Cycle Inventory: | | KPFF - SFRM - Steel - W - Wide Flange (C) - TC | 9,069.8 kg (15 yr |
| For information and quantities, see EPD | | KPFF - SFRM - Steel - WT - Wide Flange Tee - TC | 1.9 kg (15 yr |
| | | KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC | 6.4 kg (15 yr |
| Product Scope: | | Used in the following Tally entries: | |
| Cradle to gate | | Aluminum, sheet | |
| Transportation Distance: | | Steel, C channel | |
| By truck: 172 km | | Steel, HSS section | |
| End-of-Life Scope: | | Steel, W section (wide flange shape) | |
| 100% Landfilled (inert waste) | | Description: | |
| LCI Source: | | Solvent-based enamel paint, appropriate for use on metals | |
| US: Rock board insulation (heavy density) NAIMA (2007) | | Life Cycle Inventory: | |
| | | 17% Binding agent | |
| EPD Source: | | 16% Pigments and fillers | |
| <u>4786060412.102.1</u> | | 67% Solvent | |
| | | Product Scope: | |
| 5 | | Cradle to gate, including emissions during application | |
| EPD Designation Holder: North American Insulation Manufacturer's Association (NAIMA) EPD Program Operator: | | | |
| North American Insulation Manufacturer's Association (NAIMA) EPD Program Operator: UL Environment | | Transportation Distance: By truck: 642 km | |
| North American Insulation Manufacturer's Association (NAIMA) EPD Program Operator: | | By truck: 642 km End-of-Life Scope: | |
| North American Insulation Manufacturer's Association (NAIMA) EPD Program Operator: UL Environment EPD Expiration: | | By truck: 642 km | |

| Paint, exterior metal coating, silicone-based | 493.4 kg |
|--|--|
| Used in the following Revit families: (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF cp_HSEB - Skin Shingle flashing HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access HSEB STR-2_Precast Tread Steel Riser LOUVER-parametric Used in the following Tally entries: | 60.0 kg (30 yrs) 165.6 kg (30 yrs) 219.0 kg (30 yrs) 1.2 kg (30 yrs) 1.3 kg (30 yrs) 10.2 kg (30 yrs) 5.1 kg (30 yrs) 1.9 kg (30 yrs) 1.2 kg (30 yrs) 3.8 kg (30 yrs) 0.8 kg (30 yrs) 1.1 kg (30 yrs) |
| Aluminum, sheet Steel, deck Steel, plate | |
| Description: Silicone-based metal paint, with a default coating thickness of 100 n | nicrons |
| Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents Product Scope: | |
| Cradle to gate, including emissions during application Transportation Distance: | |
| By truck: 642 km End-of-Life Scope: | |
| 100% to landfill (plastic waste) | |
| LCI Source: DE: Application coating silicone (building, exterior, white) ts (2017) | |
| Paint, exterior metal coating, silicone-based, by area | 18.2 kg |
| Used in the following Revit families: HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C STR-5 Conc filled w/ C channel 2 | 5.1 kg (30 yrs) 1.9 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel | 5.1 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: Steel, C channel Description: | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: Steel, C channel Description: Silicone-based metal paint, with a default coating thickness of 100 n Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: Steel, C channel Description: Silicone-based metal paint, with a default coating thickness of 100 n Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents Product Scope: | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: Steel, C channel Description: Silicone-based metal paint, with a default coating thickness of 100 n Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents Product Scope: Cradle to gate, including emissions during application Transportation Distance: | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 Used in the following Tally entries: Steel, C channel Description: Silicone-based metal paint, with a default coating thickness of 100 n Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents Product Scope: Cradle to gate, including emissions during application Transportation Distance: By truck: 642 km End-of-Life Scope: | 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |

| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) 160.0 kg (7 yr) Used in the following Tally entries: Acoustic celling system, mineral fiber board Wall board, gypsum Description: Acrystic-based paint for interior applications Life Cycle Inventory; 21% Binding agent 35% Pigments and fillers 42% Water 2% Organic solvents Product Scope: Cradie to gate, including emissions during application Transportation Distance: By truck: 642 km End-of-Life Scope: 2,684.0 kg (20 yr) Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin solid surface, sheet 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory; 85% Kraft paper 15% Phenolic resin 2,684.0 kg (20 yr) 90% landfilled (plastic waste) LCI Source: 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory; 85% Kraft paper 15% Phenolic resin 4,739.8 kg (60 yr) | | |
|--|--|---|
| A coustic ceiling system, mineral fiber board Wall board, gypsum Description: Acrylic-based paint for interior applications Life Cycle Inventory: 21% Binding agent 35% Pigments and fillers 42% Water 2% Organic solvents Product Scope: Cradle to gate, including emissions during application Transportation Distance: By truck: 642 km End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet Led Source: Description: Phenolic resin solid surface, sheet Description: Phenolic resin solid surface, sheet Description: Phenolic resin solid surface, sheet Description: Phenolic resin solid surfaces, sheet Description: Phenolic resin Solid surfaces sheet Description: Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin 2.684.0 kg (20 yr Used in the following Revit families: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin 2.684.0 kg (20 yr US: Electricity grid mix ts (2014) US: Electricity grid mix ts (2014) | | 26.8 kg (7 yrs) 160.0 kg (7 yrs) |
| Acrylic-based paint for interior applications Life Cycle Inventory; 21% Binding agent 35% Pigments and fillers 42% Water 2% Organic solvents Product Scope: Cradle to gate, including emissions during application Transportation Distance: By truck: 642 km End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 kg (20 yr) Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin solid surface, sheet Description: Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GL: Coppressed ar 7 for (matural gas ts (2014) US: Thernolic resin (45% concentration) ts (2017) GL: Copressed ar 7 for (motural gas ts (2014) US: Lubricants at refinery ts (2014) | Acoustic ceiling system, mineral fiber board | |
| 21% Binding agent 35% Pigments and fillers 42% Water 2% Organic solvents Product Scope: Cradle to gate, including emissions during application Transportation Distance: By truck: 642 km End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 lg Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Tally entries: 2,684.0 kg (20 yr) Phenolic resin solid surface, sheet 2,684.0 kg (20 yr) Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (m | | |
| Cradle to gate, including emissions during application Transportation Distance: By truck 642 km End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 I Used in the following Revit families: cp_HSEB - Base Material Panel_vertical 2,684.0 kg (20 yr Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin sturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) US: Corgneressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.71 Used in the following Revit families: (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60) yr (R3) SBS OVER METAL DECK 5,330.3 kg (60) yr (R4) SUFH YEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5* thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | 21% Binding agent 35% Pigments and fillers 42% Water | |
| Transportation Distance: By truck: 642 km End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 kg (20 yr) Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin surated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) (R) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) 11.7 kg (60 yr) Used in the following Revit families: R) (CLT ROOF - CLT PATTERN N/S | • | |
| End-of-Life Scope: 100% to landfill (plastic waste) LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 l Used in the following Revit families: cp_HSEB - Base Material Panel_vertical 2,684.0 kg (20 yr Used in the following Tally entries: Phenolic resin solid surface, sheet 2,684.0 kg (20 yr Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Phastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Libricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) 11,174.7 L Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr 1,093.0 kg (60 yr (R1) CLT ROOF 1,093.0 kg (60 yr 1,093.0 kg (60 yr (R4) SOUTH VEST ROOF Used in the following Tally entries: Polyisocyanurate (PIR), board 11.7 kg (60 yr 11.7 k | Transportation Distance: | |
| LCI Source: DE: Application paint emulsion (building, interior, white, wear resistant) ts (2017) Phenolic resin solid surfacing, sheet 2,684.0 I Used in the following Revit families: 2,684.0 kg (20 yr) Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) US: Lubricants at refinery ts (2017) 1,174.71 Used in the following Revit families: (R1) CLT ROOF (R1) CLT ROOF 4,739.8 kg (60 yr) (R1) CLT ROOF 1,739.8 kg (60 yr) (R3) SBS OVER METAL DECK 5,330.3 kg (60 yr) (R4) SOUTH VEST ROOF 1.17. kg (60 yr) Used in the following Tally entries: Polyisocya | End-of-Life Scope: | |
| Used in the following Revit Tamilies: cp_HSEB - Base Material Panel_vertical 2,684.0 kg (20 yr Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.71 Used in the following Revit families: (R1) CLT ROOF - CLT PATTERN N/S (R3) SBS OVER METAL DECK SJ30.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | LCI Source: | nt) ts (2017) |
| Used in the following Revit Tamilies: cp_HSEB - Base Material Panel_vertical 2,684.0 kg (20 yr Used in the following Tally entries: Phenolic resin solid surface, sheet Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.71 Used in the following Revit families: (R1) CLT ROOF - CLT PATTERN N/S (R3) SBS OVER METAL DECK SJ30.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | Phenolic resin solid surfacing sheet | 2 684 0 kg |
| Phenolic resin solid surface, sheet Description: Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Elubricants at refinery ts (2014) US: Lubricants at refinery ts (2014) US: Lubricants at refinery ts (2017) Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. </td <td>Used in the following Revit families:</td> <td>2,684.0 kg (20 yrs)</td> | Used in the following Revit families: | 2,684.0 kg (20 yrs) |
| Phenolic resin saturated kraft paper formed into solid sheet stock Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GL: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GL: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) Used in the following Revit families: (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R3) SBS OVER METAL DECK 5,33.0.3 kg (60 yr) (R4) SOUTH VEST ROOF 11.7 kg (60 yr) Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| 85% Kraft paper 15% Phenolic resin Product Scope: Cradle to gate Transportation Distance: By truck 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) Vised in the following Revit families: (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R4) SOUTH VEST ROOF 1.1.7 kg (60 yr) Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| Cradle to gate Transportation Distance: By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) USE Elevative trainilies: (R1) CLT ROOF CLT PATTERN N/S (R1) SOUF ACT PATTERN N/S (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | 85% Kraft paper | |
| By truck: 640 km End-of-Life Scope: 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.7 L Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R1) SBS OVER METAL DECK 5,330.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| 100% landfilled (plastic waste) LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.7 I Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr) (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr) (R4) SOUTH VEST ROOF 11.7 kg (60 yr) Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) EU-28: Kraft paper ts (2017) PIR rigid foam insulation, roof, R=20.5, PIMA - EPD 11,174.7 I Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R3) SBS OVER METAL DECK 5,330.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| Used in the following Revit families: (R1) CLT ROOF 4,739.8 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R3) SBS OVER METAL DECK 5,330.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) | |
| (R1) CLT ROOF 4,739.8 kg (60 yr (R1) CLT ROOF - CLT PATTERN N/S 1,093.0 kg (60 yr (R3) SBS OVER METAL DECK 5,330.3 kg (60 yr (R4) SOUTH VEST ROOF 11.7 kg (60 yr Used in the following Tally entries: Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | - | 11,174.7 kg |
| Polyisocyanurate (PIR), board Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | (R1) CLT ROOF (R1) CLT ROOF - CLT PATTERN N/S (R3) SBS OVER METAL DECK | 4,739.8 kg (60 yrs) 1,093.0 kg (60 yrs) 5,330.3 kg (60 yrs) 11.7 kg (60 yrs) |
| Polyisocyanurate rigid foam roof insulation with glass-fiber reinforced facers, R-value of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisocyanurate Insulation Manufacturers Association. | | |
| Life Cycle Inventory: | Polyisocyanurate rigid foam roof insulation with glass-fiber reinforce of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Polyisoc | |
| For information and quantities, see EPD | Life Cycle Inventory: For information and quantities, see EPD | |
| Product Scope: Cradle to gate | • | |
| Transportation Distance: By truck: 250 km | | |
| End-of-Life Scope: 100% Landfilled (plastic waste) | | |

LCI Data (continued)

| LCI Source: RNA: Polyisocyanurate rigid foam board roof insulaton, R=20.5 | (A1-A3) ts-EPD (2013) |
|---|---|
| EPD Source: EPD10043 | . , . , |
| EPD Designation Holder: Polyisocyanurate Insulation Manufacturers Association | |
| EPD Program Operator: NSF International | |
| EPD Expiration: 2/6/2020 | |
| PIR rigid foam insulation, wall, R=14.6, PIMA - EPD Used in the following Revit families: cp_HSEB - Skin Shingle flashing | 9.8 kg 9.8 kg (60 yrs) |
| Used in the following Tally entries: Polyisocyanurate (PIR), board | |
| Description: Polyisocyanurate rigid foam wall insulation with aluminum foil of R-value of 14.6, 2.25" thickness (57.2 mm). Industry-wide EPD fi Polyisocyanurate Insulation Manufacturers Association. | |
| Life Cycle Inventory: For information and quantities, see EPD | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 250 km | |
| End-of-Life Scope: 100% Landfilled (plastic waste) | |
| LCI Source: RNA: Polyisocyanurate rigid foam board wall insulation, R=14.6 | i (A1-A3) ts-EPD (2013) |
| EPD Source: EPD10042 | |
| EPD Designation Holder: Polyisocyanurate Insulation Manufacturers Association | |
| EPD Program Operator: NSF International | |
| EPD Expiration: 2/6/2020 | |
| Polyethelene sheet vapor barrier (HDPE) Used in the following Revit families: | 34,144.9 kg |
| (F1) SLAB ON GRADE | 570.6 kg (60 yrs) |
| (F1) SLAB ON GRADE - 6" | 0.4 kg (60 yrs) |
| (F1) SLAB ON GRADE - 8" (R1) CLT ROOF | 5.3 kg (60 yrs) 421.6 kg (60 yrs) |
| (R1) CLT ROOF - CLT PATTERN N/S | 97.2 kg (60 yrs) |
| (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT (R3) SBS OVER METAL DECK | 143.4 kg (60 yrs) 414.9 kg (60 yrs) |
| (R4) SOUTH VEST ROOF | 3.6 kg (60 yrs) |
| (R4) SOUTH VEST ROOF (INTERIOR) | 4.2 kg (60 yrs) |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" | 590.2 kg (60 yrs) 193.7 kg (60 yrs) |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 10 | 1,865.2 kg (60 yrs) |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" | 6,745.6 kg (60 yrs) |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" | 17,358.2 kg (60 yrs) 5,580.5 kg (60 yrs) |
| 2-W01 CONCRETE WALL WITHOUT CONC | 150.2 kg (60 yrs) |
| Used in the following Tally entries: Polyethelene sheet vapor barrier (HDPE) | |
| Description: Polyethelene sheet vapor barrier (HDPE) membrane entry exclusive of adhesive or other co-products | |
| Life Cycle Inventory: 100% Polyethylene film | |
| Product Scope: Cradle to gate | |
| - | |

| Transportation Distance: By truck: 1299 km | |
|--|---|
| End-of-Life Scope: 10.5% Recycled into HDPE 89.5% Landiflled (plastic waste) | |
| Module D Scope: Avoided burden credit includes processing | |
| LCI Source: US: Polyethylene High Density Granulate (PE-HD) ts (2017) GLO: Plastic Film (PE, PP, PVC) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) | |
| Polyurethane coating, metal stock Used in the following Revit families: KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 10.7 kg 10.7 kg (50 yrs) |
| Used in the following Tally entries: Steel, HSS section | |
| Description: Polyurethane coating, for metal stock | |
| Life Cycle Inventory: 100% Polyurethane coating | |
| Product Scope: Cradle to gate, includes installation | |
| Transportation Distance: N/A | |
| End-of-Life Scope: 100% Landfilled (inert waste) | |
| LCI Source: DE: Application base coat (automobile) ts (2017) DE: Polyurethane (copolymer-component) (estimation from TPL | J adhesive) ts (2017) |
| Powder coating, metal stock Used in the following Revit families: Picture Window Bend Plate | 1.7 kg 1.7 kg (50 yrs) |
| Used in the following Tally entries: Aluminum, angle | |
| Description: Powder coating, for metal stock | |
| Life Cycle Inventory: 100% Powder coating | |
| Product Scope: Cradle to gate, including application | |
| Transportation Distance: N/A | |
| End-of-Life Scope: 100% Landfilled (inert waste) | |
| LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) | |
| SBS modified bitumen, assembly (base & cap), ARMA - EPD Used in the following Revit families: | 18,668.2 kg |
| (R1) CLT ROOF - CLT PATTERN N/S (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no ii W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 2,720.6 kg (40 yrs) 11,609.5 kg (40 yrs) 101.8 kg (40 yrs) nsulatiœ02.3 kg (40 yrs) 4,034.0 kg (40 yrs) |
| Used in the following Tally entries: SBS modified bitumen, sheet | |
| Description: | |

Styrene-butadiene-styrene (SBS)-modified bituminous roofing consisting of a base sheet and cap sheet. Industry-wide EPD from the Asphalt Roofing Manufacturers Association.

5/19/2022

LCI Data (continued)

| Life Cycle Inventory: For information and quantities, see EPD | | Life Cycle Inventory: 82% Rubberized asphalt (25% SBS) | |
|---|--|---|----------------------------------|
| Product Scope: Cradle to gate, accounts for product overlap when installing | | 18% Polyethylene HD Product Scope: | |
| Transportation Distance: | | Cradle to gate for materials only, neglects manufacturing rec | quirements |
| By truck: 172 km End-of-Life Scope: | | Transportation Distance: By truck: 172 km | |
| 100% Landfilled (plastic waste) | | End-of-Life Scope: 100% Landfilled (plastic waste) | |
| LCI Source: RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) I ARMA (A1-A3) (2012) RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) I ARMA (A1-A3) (2012) | 5 | LCI Source: US: Styrene-butadiene rubber (SBR) ts (2017) DE: Bitumen cold adhesive (EN15804 A1-A3) ts (2017) US: Polyethylene High Density Granulate (PE-HD) ts (2017) | |
| EPD Source: 4787168709.105.1 | | GLO: Plastic Film (PE, PP, PVC) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) | |
| EPD Designation Holder: Asphalt Roofing Manufacturers Association (ARMA) | | US: Lubricants at refinery ts (2014) | |
| EPD Program Operator: | | Stainless steel door hinge | 52.5 kg |
| UL Environment | | Used in the following Revit families: (F1-HMW) dr-SGL-A | 9.8 kg (30 yrs |
| EPD Expiration: | | (F2) dr-Double-Flush-with 4 sided jambs | 8.1 kg (30 yrs |
| 10/28/2021 | | (FG2-AL) dr-DBL-A | 11.2 kg (30 yrs |
| DC and ified hitsurger and shart ADMA FDD | 0.400.0 hrs | (FG2-CW) dr-DBL-CW | 11.2 kg (30 yrs |
| BS modified bitumen, cap sheet, ARMA - EPD Used in the following Revit families: | 8,400.9 kg | (N1-HMW) dr-SGL-A temp-fence | 5.7 kg (30 yrs 6.5 kg (30 yrs |
| (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT | 2,285.1 kg (60 yrs) | • | 0.5 kg (50) i |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" | 111.1 kg (60 yrs) | Used in the following Tally entries: Door, exterior, aluminum | |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" | 36.5 kg (60 yrs) | Door, exterior, steel | |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" | 351.2 kg (60 yrs) 1,270.0 kg (60 yrs) | Door, interior, steel | |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" | 3,268.1 kg (60 yrs) | Description: | |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL WITHOUT CONC | 1,050.7 kg (60 yrs) 28.3 kg (60 yrs) | Stainless steel and aluminum door and window hinge. Data l EPD from FSB. | based on product-specifc |
| Used in the following Tally entries: Self-adhering sheet waterproofing, modified bituminous sheet | | Life Cycle Inventory: See EPD | |
| Description: | | Product Scope: | |
| Styrene-butadiene-styrene (SBS)-modified bituminous cap she | | Cradle to gate | |
| from the Asphalt Roofing Manufacturers Association. EPD repre | esentative of conditions | Transportation Distance: | |
| in North America. | | By truck: 1001 km | |
| Life Cycle Inventory: For information and quantities, see EPD | | End-of-Life Scope: 98% Recovered | |
| Product Scope: | | 2% Landfilled (inert material) | |
| Cradle to gate | | Module D Scope: | |
| Transportation Distance: By truck: 172 km | | Product has a 0% scrap input while remainder is processed a burden. | nd credited as avoided |
| End-of-Life Scope: | | LCI Source: | |
| 100% Landfilled (plastic waste) LCI Source: | | DE: Door and window hinge - FV S+B PE-EPD (2009) RER: Stainless steel flat product (304) - value of scrap Eurofer | r (2010) |
| RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) i ARMA (A1-A3) (2012) | roofing cap sheet - | EPD Source: EPD-FSB-2010111-D | |
| EPD Source: <u>4787168709.105.1</u> | | EPD Designation Holder: Franz Schneider | |
| EPD Designation Holder: Asphalt Roofing Manufacturers Association (ARMA) | | EPD Program Operator: Institut Bauen and Umwelt (IBU) | |
| EPD Program Operator: UL Environment | | EPD Expiration: 1/14/2016 | |
| EPD Expiration: 10/28/2021 | | Stainless steel sheet, Chromium 18/8 Used in the following Revit families: | 43.4 kg |
| | 45.41 | Construction Specialties_Crash Rail_6" ECR-60S | 43.4 kg (45 yrs |
| elf adhering flashing membrane, 40 mil Used in the following Revit families: (R4) SOUTH VEST ROOF | 13.1 kg 13.1 kg (40 yrs) | Used in the following Tally entries: Steel, sheet, stainless | |
| Used in the following Tally entries: Self adhering membrane | | Description: Stainless steel sheet, Type 304 (Chromium 18/8) | |
| - | | Life Cycle Inventory: | |
| Description: | | | |

| Product Scope: | | 04.017_LCL FND Slab_Cont. Ftg FW5.0A_60wx30d | 6,269.2 kg (60 yrs) |
|---|---|---|--|
| Cradle to gate | | 04.017_LCL FND Slab_Cont. Ftg FW7.0_87wx42d 2 | 987.7 kg (60 yrs) |
| Transportation Distance: | | 04.017_LCL FND Slab_Cont. Ftg FW8.0_96wx48d | 3,053.2 kg (60 yrs) |
| By truck: 418 km | | 04.017_LCL FND Slab_Cont. Ftg_24wx12d 04.215_LCL_C_Slab Transition_Wall(12") | 135.9 kg (60 yrs) 1,889.4 kg (60 yrs) |
| End-of-Life Scope: | | 04.215_LCL_C_Slab Transition_Wall(15") | 882.7 kg (60 yrs) |
| 98% Recovered | | 04.215_LCL_C_Slab Transition_Wall(4") | 111.7 kg (60 yrs) |
| 2% Landfilled (inert material) | | 04.215_LCL_C_Slab Transition_Wall(6") | 58.6 kg (60 yrs) |
| Module D Scope: | | 04.215_LCL_C_Slab Transition_Wall(8") | 831.3 kg (60 yrs) |
| Product has 52% scrap input while remainder is processed and credite | ed as avoided | 04.225_LCL_C_CURB_Wall(11") | 640.6 kg (60 yrs) |
| burden | | 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") | 8.9 kg (60 yrs) 272.4 kg (60 yrs) |
| LCI Source: | | 04.225_LCL_C_CURB_Wall(8") | 21.6 kg (60 yrs) |
| RER: Stainless steel cold rolled coil (304) Eurofer (2010) | | 04.300_LCL_C_Foundation_Wall(10") | 803.5 kg (60 yrs) |
| GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | 04.310_LCL_C_PIT_Wall(8") | 174.5 kg (60 yrs) |
| US: Electricity grid mix ts (2014) | | 04.380_LCL_C_SHOTCRETE_Wall(16") | 2,833.9 kg (60 yrs) |
| US: Lubricants at refinery ts (2014) | | 04.380_LCL_C_SHOTCRETE_Wall(19") | 1,384.2 kg (60 yrs) |
| GLO: Compressed air 7 bar (medium power consumption) ts (2014) RER: Stainless steel flat product (304) - value of scrap Eurofer (2010) | | 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") | 17,844.2 kg (60 yrs) 4,729.3 kg (60 yrs) |
| | | 12" Concrete Slab | 60.7 kg (60 yrs) |
| Control on the day of the 10/0 | 600.2.1 | Concrete 8" - STRUCTURAL | 566.3 kg (60 yrs) |
| Stainless steel, extruded, chromium 18/8 Used in the following Revit families: | 690.3 kg | HSEB - STR-1 _Precast Tread & Riser | 175.4 kg (60 yrs) |
| HSEB Guardrail - Cable Rail | 176.3 kg (60 yrs) | HSEB - STR-2 Precast Tread Steel Riser 2 | 892.2 kg (60 yrs) |
| HSEB Guardrail - Cable Rail without handrail | 514.0 kg (60 yrs) | HSEB ST-11 (CAST IN PLACE) | 38.4 kg (60 yrs) |
| Used in the following Tally entries: | | HSEB ST-9 (CAST IN PLACE) | 112.6 kg (60 yrs) |
| Steel, round bar | | HSEB_STR-3_Precast Tread Steel Riser KPFF - SCOL - Concrete - Round | 216.9 kg (60 yrs) 0.0 kg (60 yrs) |
| | | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace | 329.3 kg (60 yrs) |
| Description: Stainless steel, extruded, Type 304 (Chromium 18/8) | | LCL_C_Pilaster_Rect_()w()d | 0.0 kg (60 yrs) |
| | | Used in the following Tally entries: | |
| Life Cycle Inventory: | | Cast-in-place concrete, lightweight structural concrete, 5000 psi | |
| 100% Stainless steel | | Cast-in-place concrete, structural concrete, 3000 psi | |
| Product Scope: | | Cast-in-place concrete, structural concrete, 4000 psi | |
| Cradle to gate | | Cast-in-place concrete, structural concrete, 5000 psi | |
| Transportation Distance: | | Precast concrete column Stair, concrete with metal nosing | |
| By truck: 431 km | | Stair, concrete with metal hosing Stair, precast single run (stretcher) | |
| End-of-Life Scope: | | Steel, reinforcing rod | |
| 98% Recovered | | Steel, rod | |
| 2% Landfilled (inert material) | | Description: | |
| Module D Scope: | | Common unfinished tempered steel rod suitable for structural re | inforcement (rebar) |
| Product has 52% scrap input while remainder is processed and credite | ed as avoided | Life Cycle Inventory: | |
| burden | | 100% Steel rebar | |
| LCI Source: | | | |
| RER: Stainless steel cold rolled coil (304) Eurofer (2010) | | Product Scope: Cradle to gate | |
| GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | - | |
| US: Electricity grid mix ts (2014) | | Transportation Distance: | |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) | | By truck: 431 km | |
| RER: Stainless steel flat product (304) - value of scrap Eurofer (2010) | | End-of-Life Scope: | |
| ······································ | | | |
| Steel, reinforcing rod | | 70% Recovered | |
| Used in the following Revit families: | 128 247 9 kg | 70% Recovered 30% Landfilled (inert material) | |
| (F1) SLAB ON GRADE | 128,247.9 kg | 30% Landfilled (inert material) Module D Scope: | |
| (F1) SLAB ON GRADE - 6" | 128,247.9 kg 5,757.9 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar | d credited as avoided |
| | - | 30% Landfilled (inert material) Module D Scope: | d credited as avoided |
| (F1) SLAB ON GRADE - 8" | 5,757.9 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar | ld credited as avoided |
| (F2) CONCRETE METAL DECK | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 3,992.2 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. | d credited as avoided |
| (F2) CONCRETE METAL DECK (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: | d credited as avoided |
| (F2) CONCRETE METAL DECK (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: | |
| (F2) CONCRETE METAL DECK (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) (F3) CONCRETE METAL DECK W/ TOPPING SLAB | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: | 9,279.6 kg |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK (0/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 6 (F3) CONCRETE METAL DECK (W/ TOPPING SLAB 5 (F4) CONCRETE DECK (0/ 3 PLY CLT FLOOR 22 | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 4,255.8 kg (60 yrs) 3,921.8 kg (60 yrs) 7,656.3 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 | 9,279.6 kg 188.4 kg (60 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK (0/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 6 (F3) CONCRETE METAL DECK (W/ TOPPING SLAB 5 (F4) CONCRETE DECK (0/ 3 PLY CLT FLOOR 22 | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 5 (F3) CONCRETE METAL DECK W/ TOPPING SLAB 5 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 5 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 7,656.3 kg (60 yrs) 1,384.9 kg (60 yrs) 705.8 kg (60 yrs) 705.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 5 (F3) CONCRETE METAL DECK W/ TOPPING SLAB 5 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 2 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 2 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 2 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 53.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,656.3 kg (60 yrs) 1,384.9 kg (60 yrs) 705.8 kg (60 yrs) 828.1 kg (60 yrs) 3,444.6 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C - STR-4_Conc filled w/ C channel | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK (0/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 6 (F4) CONCRETE METAL DECK (W/ TOPPING SLAB 5 (F4) CONCRETE DECK (0/ 3 PLY CLT FLOOR 2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 6 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 5 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 4 | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.34 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,056.3 kg (60 yrs) 7,058 kg (60 yrs) 828.1 kg (60 yrs) 84,44.6 kg (60 yrs) 4,666.0 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK (/) 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 6 (F3) CONCRETE METAL DECK (V TOPPING SLAB 5 (F4) CONCRETE DECK (/) 3 PLY CLT FLOOR 2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 5 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,056.3 kg (60 yrs) 705.8 kg (60 yrs) 8,2444.6 kg (60 yrs) 3,4444.6 kg (60 yrs) 7,666.0 kg (60 yrs) 7,68 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2 _Precast Tread Steel Riser 2 HSEB Type C _ STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access | 9,279.6 kg 188.4 kg (60 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK O/ 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 5 (F3) CONCRETE METAL DECK (W/ TOPPING SLAB 5 (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR 27 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 5 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 4 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 4 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,656.3 kg (60 yrs) 7,656.3 kg (60 yrs) 705.8 kg (60 yrs) 8,244.6 kg (60 yrs) 4,666.0 kg (60 yrs) 7,68 kg (60 yrs) 19.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ Plate | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 994.2 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) |
| (F2) CONCRETE METAL DECK 4 (F3) CONCRETE DECK (/) 3 PLY CLT FLOOR N/W DIRECTION 4 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 6 (F3) CONCRETE METAL DECK (V TOPPING SLAB 5 (F4) CONCRETE DECK (/) 3 PLY CLT FLOOR 2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 5 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 8,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,056.3 kg (60 yrs) 705.8 kg (60 yrs) 8,2444.6 kg (60 yrs) 3,4444.6 kg (60 yrs) 7,666.0 kg (60 yrs) 7,68 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ C channel 2 HSEB Type C_STR-6_Conc filled w/ Plate HSEB_STR-3_Precast Tread Steel Riser | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 994.2 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) |
| (F2) CONCRETE METAL DECK 14 (F3) CONCRETE DECK (J 3 PLY CLT FLOOR N/W DIRECTION 15 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 16 (F3) CONCRETE METAL DECK (VT OPPING SLAB 16 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR 22 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 17 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 16 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d 04.016_LCL FND Slab_Spread Ftg_F4.0 4x8x2.5d 04.016_LCL FND Slab_Spread Ftg_F4.0 9x8x2.5d 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d 12x12x44 | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) 7,656.3 kg (60 yrs) 1,384.9 kg (60 yrs) 8,281.1 kg (60 yrs) 8,444.6 kg (60 yrs) 4,666.0 kg (60 yrs) 7,6.8 kg (60 yrs) 1,98 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access HSEB Type C_STR-8_Conc filled w/ Plate HSEB Type C_STR-8_CONC filled wide HSEB Type C_STR-8_CONC filled w/ Plate HSEB Type C_STR-8_CONC filled wide HSEB Type Type Type Type Type Type Type Type | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,38.4.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) 58.4 kg (60 yrs) |
| (F2) CONCRETE METAL DECK F3 (F3) CONCRETE DECK (J 3 PLY CLT FLOOR N/W DIRECTION F3 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) F3 (F3) CONCRETE METAL DECK (W TOPPING SLAB F4 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F2 (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 50 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d 50 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 64 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d 04.016_LCL FND Slab_Spread Ftg_F3.0 8x82.5d 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d 04.016_LCL FND Slab_Spread Ftg_F4.0 8x82.5d 04.016_LCL FND Slab_Spread Ftg_F3.0 8x82.5d 04.016_LCL FND Slab_Spread Ftg_F3.0 8x82.5d 04.016_LCL FND Slab_Spread Ftg_FW3.0 6x8x2.5d 04.017_LCL FND Slab_Spread Ftg_FW3.0_36wx18d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 4,255.8 kg (60 yrs) 3,921.8 kg (60 yrs) 7,056.3 kg (60 yrs) 7,058.4 kg (60 yrs) 8,244.6 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,52.9 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ Plate HSEB Type C_STR-8_Conc filled w/ Plate HSEB STR-3_Precast Tread Steel Riser P_SOUTH VESTIBULE WALL W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 994.2 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) 58.4 kg (60 yrs) 346.1 kg (60 yrs) |
| (F2) CONCRETE METAL DECK F3 (F3) CONCRETE DECK (J 3 PLY CLT FLOOR N/W DIRECTION F3 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) F3 (F3) CONCRETE METAL DECK (W/ TOPPING SLAB F3 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 3 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 5 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 5 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 5 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CONCRETE DECK (J 7 PLY CLT FLOOR F3 (F4) CL FND Slab_Spread Ftg_F12.0 12x12x4d F4 (F4) CL FND Slab_Spread Ftg_F2.0 2x2x11"d F4 (F4) CL FND Slab_Spread Ftg_F4.0 4x4x1.5d F4 (F4) CL FND | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 4,255.8 kg (60 yrs) 7,556.3 kg (60 yrs) 7,656.3 kg (60 yrs) 7,656.3 kg (60 yrs) 8,28.1 kg (60 yrs) 8,244.6 kg (60 yrs) 19.8 kg (60 yrs) 19.8 kg (60 yrs) 19.8 kg (60 yrs) 19.7 6 kg (60 yrs) 19.7 6 kg (60 yrs) 1,525.9 kg (60 yrs) 8,28.3 kg (60 yrs) 8,28.3 kg (60 yrs) 8,28.3 kg (60 yrs) 9,45.8 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access HSEB Type C_STR-8_Conc filled w/ Plate HSEB Type C_STR-8_CONC filled W/ Plat | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) |
| (F2) CONCRETE METAL DECK 14 (F3) CONCRETE DECK (J) 3 PLY CLT FLOOR N/W DIRECTION 15 (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) 16 (F3) CONCRETE METAL DECK (W) TOPPING SLAB 16 (F4) CONCRETE METAL DECK (W) TOPPING SLAB 17 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 3 PLY CLT FLOOR 22 (F4) CONCRETE DECK (J) 1 PLY CLT FLOOR 22 (F4) CL CL FND Slab_Spread Ftg_F12.0 10/10/3.0d 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d (J4) 016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d (J4) 016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d 04.016_LCL FND Slab_Spread Ftg_F3.0 3x8x2.5d (J4) 016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d (J4) 016_LCL FND Slab_Cont. Ftg FW4.0_48wx18d 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx24d | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) 5.3.4 kg (60 yrs) 3,992.2 kg (60 yrs) 4,255.8 kg (60 yrs) 4,255.8 kg (60 yrs) 3,921.8 kg (60 yrs) 7,056.3 kg (60 yrs) 7,058.4 kg (60 yrs) 8,244.6 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,9.8 kg (60 yrs) 1,52.9 kg (60 yrs) | 30% Landfilled (inert material) Module D Scope: Product has a 16.4% scrap input while remainder is processed ar burden. LCI Source: GLO: Steel rebar worldsteel (2014) Steel, sheet Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-6_Conc filled w/ Plate HSEB Type C_STR-8_Conc filled w/ Plate HSEB STR-3_Precast Tread Steel Riser P_SOUTH VESTIBULE WALL W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 9,279.6 kg 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 994.2 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) 584.4 kg (60 yrs) 346.1 kg (60 yrs) |

LCI Data (continued)

| Stair, concrete with metal nosing Steel, plate | | Structural concrete, 3000 psi, Pacific Northwest regional averag Used in the following Revit families: | |
|--|-------------------------|---|---|
| Description: Steel sheet | | (F2) CONCRETE METAL DECK (F3) CONCRETE DECK (/ 3 PLY CLT FLOOR N/W DIRECTION (F3) CONCRETE METAL DECK (CTRUCTURAL ONLY) | 236,435.8 kg (60 yrs 110,972.3 kg (60 yrs |
| Life Cycle Inventory: 100% Steel sheet | | (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) (F3) CONCRETE METAL DECK W/ TOPPING SLAB (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR | 36,533.6 kg (60 yrs 187,033.1 kg (60 yrs 733,587.9 kg (60 yrs |
| Product Scope: Cradle to gate | | Used in the following Tally entries: Cast-in-place concrete, structural concrete, 3000 psi | |
| Transportation Distance: By truck: 418 km | | Description: Structural concrete, 3000 psi, Pacific Northwest regional average | |
| End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) | | National Ready-Mix Concrete Association (NRMCA) Industry-wic Life Cycle Inventory: Coarse aggregate: 45%, Sand: 35%, Portland cement PCA - EPD: | |
| Module D Scope: | | ash: 3%, Expanded slag: <1%, Admixture: <1% | - |
| Product has 16% scrap input while remainder is processed burden | and credited as avoided | Product Scope: Cradle to gate | |
| LCI Source: | | Anchors, ties, and metal accessories outside of scope (<1% mass | s) |
| RNA: Steel finished cold rolled coil worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | Transportation Distance: By truck: 24 km | |
| US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) t | rs (2014) | End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) | |
| GLO: Value of scrap worldsteel (2014) | 42,250,1 km | Module D Scope: Avoided burden credit for coarse aggregate, includes grinding e | energy |
| ructural concrete, 3000 psi, 0% fly ash and slag Used in the following Revit families: | 42,359.1 kg | LCI Source: | |
| 3.5" Light Duty Paving Over Sturcture | 7,088.3 kg (30 yrs) | US: Portland cement PCA/ts (2014) | |
| cp_HSEB - Base Material Panel_vertical | 35,270.7 kg (60 yrs) | DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) | |
| Jsed in the following Tally entries: | | DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) | |
| Precast concrete nonstructural panel | | DE: Fly ash (EN15804 A1-A3) ts (2017) | |
| Precast concrete paver | | DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) | |
| Description: | | DE: alcium nitrate ts (2017) | |
| Structural concrete, 3000 psi, 0% fly ash and slag. Mix desig | n matches National | DE: Sodium ligninsulfonate ts (2017) | |
| Ready-Mix Concrete Association (NRMCA) Industry-wide El | | DE: Sodium naphtalene sulfonate [estimated] ts (2017) | |
| ife Cycle Inventory: | | US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | |
| Coarse aggregate: 44%, Sand: 36%, Portland cement PCA - Admixture: <1% | EPD: 13%, Water: 7%, | US: Colophony (rosin, refined) from CN pine gum rosin ts (2017) US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) |) |
| Product Scope: | | US: Natural gas mix ts (2014) | |
| Cradle to gate | | US: Diesel mix at filling station (100% fossil) ts (2014) | |
| Anchors, ties, and metal accessories outside of scope (<1% | mass) | US: Liquefied Petroleum Gas (LPG) (70% propane | |
| Transportation Distance: By truck: 24 km | | 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) | |
| End-of-Life Scope: | | Structural concrete, 4000 psi, 20% fly ash and 30% slag | 856,960.1 k |
| 55% Recycled into coarse aggregate | | Used in the following Revit families: | 050,500.1 K |
| 45% Landfilled (inert material) | | (F1) SLAB ON GRADE | 567,361.6 kg (60 yr |
| Aodule D Scope: | | (F1) SLAB ON GRADE - 6" | 468.0 kg (60 yr |
| Avoided burden credit for coarse aggregate, includes grind | ing energy | (F1) SLAB ON GRADE - 8" | 8,422.4 kg (60 yr |
| LCI Source: | | (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d | 140,358.3 kg (60 yr 3,728.8 kg (60 yr |
| US: Portland cement PCA/ts (2014) | | 04.215 LCL C Slab Transition Wall(12") | 48,061.4 kg (60 yr |
| DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (20) | 17) | 04.215_LCL_C_Slab Transition_Wall(15") | 22,454.6 kg (60 yr |
| DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(4") | 2,842.4 kg (60 yr |
| DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(6") | 1,489.9 kg (60 yr |
| DE: Expanded clay (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(8") 04.225_LCL_C_CURB_Wall(11") | 21,146.0 kg (60 yr |
| DE: alcium nitrate ts (2017) | | 04.225_LCL_C_CURB_Wall(4") | 16,294.9 kg (60 yr 227.3 kg (60 yr |
| DE: Sodium ligninsulfonate ts (2017) | | 04.225_LCL_C_CURB_Wall(6") | 6,929.8 kg (60 yr |
| DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | | 04.225_LCL_C_CURB_Wall(8") | 549.0 kg (60 yr |
| US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (2 | 2017) | 12" Concrete Slab | 16,414.9 kg (60 yr |
| US: Tap water from groundwater ts (2017) | | HSEB ST-11 (CAST IN PLACE) | 210.9 kg (60 yr |
| US: Electricity grid mix s (2014) | | Used in the following Tally entries: | |
| US: Natural gas mix ts (2014) | | Cast-in-place concrete, structural concrete, 4000 psi | |
| US: Diesel mix at filling station (100% fossil) ts (2014) | | Description: | |
| US: Liquefied Petroleum Gas (LPG) (70% propane | | Structural concrete, 4000 psi, 20% fly ash and 30% slag. Mix des | ign matches National |
| 30% utane) ts (2014) US: Light fuel oil at refinend ts (2014) | | Ready-Mix Concrete Association (NRMCA) Industry-wide EPD. | |
| US: Light fuel oil at refinery ts (2014) | | Life Cycle Inventory: | |
| | | Coarse aggregate: 45%, Sand: 31%, Portland cement PCA - EPD: | 9%, Water: 7%. |

Coarse aggregate: 45%, Sand: 31%, Portland cement PCA - EPD: 9%, Water: 7%, Expanded slag: 5%, Fly ash: 3%, Admixture: <1%

LCI Data (continued)

| Cradle to gate Anchors, ties, and metal accessories outside of scope (<1% n | nass) | US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) | |
|---|--|---|--|
| Transportation Distance: | | | |
| By truck: 24 km | | Structural concrete, 5000 psi, 20% fly ash and 30% slag Used in the following Revit families: | 2,312,934.3 kg |
| End-of-Life Scope: | | 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d | 56,528.9 kg (60 yrs) |
| 55% Recycled into coarse aggregate | | 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d | 74,100.0 kg (60 yrs) |
| 45% Landfilled (inert material) | | 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d | 36,178.5 kg (60 yrs) |
| Module D Scope: | | 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d | 55,398.3 kg (60 yrs) |
| Avoided burden credit for coarse aggregate, includes grindir | ig energy | 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d | 3,014.9 kg (60 yrs) |
| | 5 57 | 04.016_LCL FND Slab_Spread Ftg_F8.0 8x8x2.5d | 20,099.2 kg (60 yrs) |
| LCI Source: US: Portland cement PCA/ts (2014) | | 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d | 13,990.9 kg (60 yrs) |
| DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017 | 0 | 04.016_LCL FND Slab_Spread Ftg_FW6.0 6x8x2.5d | 69,640.5 kg (60 yrs) |
| DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) |) | 04.017_LCL FND Slab_Cont. Ftg FW3.0_36wx18d | 31,217.6 kg (60 yrs) |
| DE: Fly ash (EN15804 A1-A3) ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d | 33,450.2 kg (60 yrs) |
| DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx24d | 86,718.6 kg (60 yrs) |
| DE: Expanded clay (EN15804 A1-A3) ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW5.0_60wx18d | 89,913.9 kg (60 yrs) |
| DE: alcium nitrate ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW5.0A_60wx30d | 64,658.2 kg (60 yrs) |
| DE: Sodium ligninsulfonate ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW7.0_87wx42d 2 | 66,939.6 kg (60 yrs) |
| DE: Sodium naphtalene sulfonate [estimated] ts (2017) | | 04.017_LCL FND Slab_Cont. Ftg FW8.0_96wx48d 04.017_LCL FND Slab_Cont. Ftg_24wx12d | 188,932.2 kg (60 yrs) 1,847.0 kg (60 yrs) |
| US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | | 04.300_LCL_C_Foundation_Wall(10") | 36,007.1 kg (60 yrs) |
| US: Colophony (rosin, refined) from CN pine gum rosin ts (20 | 117) | 04.310_LCL_C_PIT_Wall(8") | 11,479.1 kg (60 yrs) |
| US: Tap water from groundwater ts (2017) | | 04.380_LCL_C_SHOTCRETE_Wall(16") | 210,675.0 kg (60 yrs) |
| US: Electricity grid mix s (2014) | | 04.380_LCL_C_SHOTCRETE_Wall(19") | 49,101.7 kg (60 yrs) |
| US: Natural gas mix ts (2014) | | 04.380_LCL_C_SHOTCRETE_Wall(22") | 859,916.8 kg (60 yrs) |
| US: Diesel mix at filling station (100% fossil) ts (2014) | | 04.380_LCL_C_SHOTCRETE_Wall(24") | 247,805.7 kg (60 yrs) |
| US: Liquefied Petroleum Gas (LPG) (70% propane | | HSEB ST-11 (CAST IN PLACE) | 752.2 kg (60 yrs) |
| 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) | | HSEB ST-9 (CAST IN PLACE) | 2,812.3 kg (60 yrs) |
| 03. Light fuel of at rennery is (2014) | | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace | 1,755.9 kg (60 yrs) |
| | | Used in the following Tally entries: | |
| tructural concrete, 5000 psi, 0% fly ash and slag | 8,728.6 kg | Cast-in-place concrete, structural concrete, 5000 psi | |
| Used in the following Revit families: | 2 5 20 4 1 - (60) | Precast concrete column | |
| HSEB - STR-1 _Precast Tread & Riser HSEB - STR-2 _Precast Tread Steel Riser 2 | 2,539.4 kg (60 yrs) 4,844.9 kg (60 yrs) | Description: | |
| HSEB_STR-3_Precast Tread Steel Riser | 1,344.3 kg (60 yrs) | Structural concrete, 5000 psi, 20% fly ash and 30% slag. Mix | design matches National |
| | 1,5 1 1.5 kg (66 yrs) | Ready-Mix Concrete Association (NRMCA) Industry-wide EPI | |
| Used in the following Tally entries: | | | |
| Stair, concrete with metal nosing | | Life Cycle Inventory: | DD: 119/ Water: 70/ |
| Stair, precast single run (stretcher) | | Coarse aggregate: 41%, Sand: 30%, Portland cement PCA - E Expanded slag: 6%, Fly ash: 4%, Admixture: <1% | PD: 11%, Water: 7%, |
| Description: | | | |
| Structural concrete, 5000 psi, 0% fly ash and slag. Mix design | | Product Scope: | |
| Ready-Mix Concrete Association (NRMCA) Industry-wide EPE |). | Cradle to gate Anchors, ties, and metal accessories outside of scope (<1% r | nacc) |
| Life Cycle Inventory: | | | 1055) |
| Coarse aggregate: 40%, Sand: 33%, Portland cement PCA - E | PD: 20%, Water: 7%, | Transportation Distance: | |
| Admixture: <1% | | By truck: 24 km | |
| Product Scope: | | End-of-Life Scope: | |
| Cradle to gate | | 55% Recycled into coarse aggregate | |
| Anchors, ties, and metal accessories outside of scope (<1% n | nass) | 45% Landfilled (inert material) | |
| Anchors, ties, and metal accessories outside of scope (< 1% h | | | |
| | | Module D Scope: | |
| | | Module D Scope: Avoided burden credit for coarse aggregate, includes grindir | ng energy |
| Transportation Distance: By truck: 24 km | | Avoided burden credit for coarse aggregate, includes grindir | ng energy |
| Transportation Distance: By truck: 24 km End-of-Life Scope: | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: | ng energy |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017 | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) | ıg energy | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: | ig energy | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir | ıg energy | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) | |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Portland cement PCA/ts (2014) DE: Panel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) DE: Sodium nigninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Stag-tap dranulate (EN15804 A1-A3) ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium nydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 US: Tap water from groundwater ts (2017) | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Stag-tap clay (EN15804 A1-A3) ts (2017) DE: Stag-tap clay (EN15804 A1-A3) ts (2017) DE: Stag-tap clay (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: action nitrate (EN15804 A1-A3) ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium nigninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap (2017) DE: Jalcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Sodium nitrate ts (2017) DE: Sodium nigninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Salg-tap granulate (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) | | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Sodium nitrate ts (2017) DE: Sodium nigninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 US: Tap water from groundwater ts (2017) US: Natural gas mix ts (2014) US: Natural gas mix ts (2014) | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Soliaun nitrate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) |) | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Solium nitrate ts (2017) DE: Sodium ligninsuffonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium nydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) US: Diesel mix at filling station (100% fossil) ts (2014) US: Liquefied Petroleum Gas (LPG) (70% propane | 7) |
| Transportation Distance: By truck: 24 km End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) Module D Scope: Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: algutan nitrate ts (2017) DE: algutan nitrate ts (2017) DE: Sodium nigninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 |) | Avoided burden credit for coarse aggregate, includes grindir LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Sug-tap granulate (EN15804 A1-A3) ts (2017) DE: Sodium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium niphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (20 US: Tap water from groundwater ts (2017) US: Natural gas mix ts (2014) US: Natural gas mix ts (2014) US: Liesel mix at filling station (100% fossil) ts (2014) US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) | 7) |
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| Suspended grid | 6,606.7 kg | Used in the following Tally entries: | |
|---|--|---|--|
| Used in the following Revit families: C1 - ACT-1 - 2' x 4' | 782.8 kg (50 yrs) | Wall board, gypsum | |
| C1 - ACT-2 - 2' x 2' HRC | 1,597.2 kg (50 yrs) | Description: | |
| C1 - ACT-3 - 2' x 2' | 3,721.3 kg (50 yrs) | Moisture- and mold-resistant gypsum board | |
| C1 - ACT-5 - 2' x 6' | 505.4 kg (50 yrs) | Life Cycle Inventory: | |
| Used in the following Tally entries: | | 100% Moisture-resistant gypsum wallboard (Gypsum, Boric acid, Ce | ment, Sodium |
| Acoustic ceiling system, mineral fiber board | | lignin sulfonate, Glass fibres, Silane, Polyglucose, Perlite, Paper, Case | ein glue) |
| | | Product Scope: | |
| Description: Cold-rolled galvanized steel for lightweight ceiling grid | | Cradle to gate | |
| 5 5 5 55 | | Transportation Distance: | |
| Life Cycle Inventory: | | By truck: 172 km | |
| 100% HDG steel | | End-of-Life Scope: | |
| Product Scope: | | 100% Landfilled (inert waste) | |
| Cradle to gate | | LCI Source: | |
| Transportation Distance: | | DE:Gypsum plaster board (Moisture resistant) (EN15804 A1-A3) ts (2 | 2017) |
| By truck: 431 km | | | |
| End-of-Life Scope: | | Well beaution actival | 65 417 5 h |
| 98% recovered | | Wall board, gypsum, natural Used in the following Revit families: | 65,417.5 kg |
| 2% landfilled (inert material) | | (A1)_Furr Mtl Stud 7/8"_GWB (1-0) | 353.7 kg (30 yrs |
| Module D Scope: | | (A3)_Furr Mtl Stud 7/8"_GWB (1-0) | 395.3 kg (30 yrs |
| Product has 44% scrap input while remainder is processed and cr | edited as avoided | (B8)_TYP Mtl Stud 8"_GWB Insulation | 156.0 kg (30 yrs |
| burden | | 1-B6 | 37.8 kg (30 yrs |
| | | 1-C2- GWB on Mtl. Stud | 203.7 kg (30 yrs |
| LCI Source: | | 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 149.4 kg (30 yrs |
| RNA: Steel hot dip galvanized worldsteel (2007) | | 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 4,824.8 kg (30 yrs |
| US: Metal roll forming (MCA) (2010) | | 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD | 1,536.4 kg (30 yrs |
| US: Electricity grid mix ts (2014) | | 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated | 118.0 kg (30 yrs |
| US: Thermal energy from natural gas ts (2014) | | 2-A0_GWB Type X (2-0) 2 hour rated | 169.4 kg (30 yrs |
| GLO: Value of scrap worldsteel (2014) | | 2-C2- GWB on Mtl. Stud | 1,397.2 kg (30 yrs |
| | | 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 915.4 kg (30 yrs |
| Nall board, gypsum, fire-resistant (Type X) | 43,127.3 kg | ACT 4 AcoustiBuilt Ceiling | 1,078.1 kg (30 yrs |
| Used in the following Revit families: | | B4 | 924.8 kg (30 yrs |
| 1-C2- GWB on Mtl. Stud | 444.9 kg (30 yrs) | B6 | 488.7 kg (30 yrs |
| 1F5 - 1 HR RATED HORIZONTAL DUCT ENCLOSURE | 761.0 kg (30 yrs) | C2- GWB on Mtl. Stud | 6,591.9 kg (30 yrs |
| 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 35,345.8 kg (30 yrs) | C7- GWB on Mtl. Stud 2 | 387.3 kg (30 yrs |
| 2-C2- GWB on Mtl. Stud | 4,958.8 kg (30 yrs) | P_SOUTH VESTIBULE WALL | 207.9 kg (30 yrs |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 416.5 kg (30 yrs) | W06 PRE-CAST CONCRETE @ FRAMED WALL | 8,187.4 kg (30 yrs |
| A4_Furr Mtl Stud 4"_GWB (1-0) | 1,200.2 kg (30 yrs) | | 34,817.8 kg (30 yrs |
| Used in the following Tally entries: | | W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) W09_SOUTH VESTIBULE WALL | 2,312.6 kg (30 yrs 164.0 kg (30 yrs |
| Wall board, gypsum | | | 104.0 kg (50 yrs |
| Description: | | Used in the following Tally entries: | |
| Fire-resistant gypsum board | | Wall board, gypsum | |
| | | Description: | |
| Life Cycle Inventory: 100% Fire-resistant gypsum wallboard (Gypsum, Boric acid, Ceme | ent Sodium lianin | Natural gypsum board | |
| sulfonate, Glass fibres, Silane, Polyglucose, Perlite, Paper, Casein g | | Life Cycle Inventory: | |
| | jiuc) | 100% Gypsum wallboard (Gypsum, Boric acid, Cement, Glass fibres, | |
| Product Scope: | | Ferrochrome-lignine sulfonate, Silane, Polyglucose, Perlite, Paper, C | asein glue) |
| Cradle to gate | | | 5, |
| Transportation Distance: | | Product Scope: Cradle to gate | |
| By truck: 172 km | | - | |
| End-of-Life Scope: | | Transportation Distance: | |
| 100% Landfilled (inert waste) | | By truck: 172 km | |
| LCI Source: | | End-of-Life Scope: | |
| DE: Gypsum plaster board (Fire protection) (EN15804 A1-A3)PE (2 | 2017) | 100% Landfilled (inert waste) | |
| | | LCI Source: | |
| | | DE: Gypsum wallboard (EN15804 A1-A3) ts (2017) | |
| Wall board, gypsum, moisture- and mold-resistant | 86,468.2 kg | | |
| Used in the following Revit families: (R4) SOUTH VEST ROOF | 122.7 kg (20 vm) | White oak lumber, 1 inch | 1 400 E ka |
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 123.7 kg (30 yrs) 141.1 kg (30 yrs) | Used in the following Revit families: | 1,400.5 kg |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 4,559.5 kg (30 yrs) | (R4) SOUTH VEST ROOF | 188.8 kg (50 yrs |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUI | | (R4) SOUTH VEST ROOF (INTERIOR) | 217.7 kg (50 yrs |
| 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 24,470.2 kg (30 yrs) | Rectangular Mullion | 993.9 kg (50 yrs |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 288.3 kg (30 yrs) | - | 555.5 kg (50) is |
| P_SOUTH VESTIBULE WALL | 196.5 kg (30 yrs) | Used in the following Tally entries: | |
| W06 PRE-CAST CONCRETE @ FRAMED WALL | 7,737.1 kg (30 yrs) | Domestic hardwood | |
| W07_METAL STUD LIGHTWEIGHT CLADDING | 32,902.8 kg (30 yrs) | Description: | |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 2,185.4 kg (30 yrs) | | |
| | | | |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 12,256.7 kg (30 yrs) | | |

| Kiln-dried American White Oak hardwood lumber of 1" nominal in the eastern United States, focusing on the main production ter | | End-of-Life Scope: 38.7% solids to landfill (plastic waste) | |
|--|---|--|--|
| region-specific characteristics. White oak is frequently used for mouldings, flooring, furniture, doors, and millwork. Link for interactive LCA data tool is provided at the link listed as "EPD Information" full LCA report is available at http://naturespackaging.org/wp-content/uploads/2016/02/LifeCycleAssessment-Lumber.pdf. | | LCI Source: US: Tap water from groundwater ts (2017) US: Acrylate resin (solvent-systems) ts (2017) DE: Acrylate (emulsion) ts (2017) | |
| Life Cycle Inventory: 100% White Oak | | US: Dipropylene glycol by product propylene glycol via PO hyd | |
| Product Scope: Cradle to gate, uncoated | | XPS insulation, Foamular average, Owens Corning - EPD Used in the following Revit families: (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT | 5,577.8 kg 2,783.8 kg (60 yrs) |
| Transportation Distance: By truck: 383 km | | 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" | 50.8 kg (60 yrs) 16.7 kg (60 yrs) |
| End-of-Life Scope: 14.5% Recovered 22% Incinerated with energy recovery 63.5% Landfilled (wood product waste) | | 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL WITHOUT CONC | 160.4 kg (60 yrs) 580.2 kg (60 yrs) 1,493.0 kg (60 yrs) 480.0 kg (60 yrs) 12.9 kg (60 yrs) |
| Module D Scope: Recovered wood products credited as avoided burden. | | Used in the following Tally entries: Extruded polystyrene (XPS), board | |
| LCI Source: US: White Oak lumber, 1 inch (769 kg/m ³), kiln-dried ts/AHEC (20 EPD Source: | 017) | Description: FOAMULAR XPS (polystyrene) insulation board, HFC foaming a representative of US manufacturing condition. FOAMULAR insu with a variety of R-values and compressive strengths. The defat | lation board is available |
| Information EPD Designation Holder: American Hardwood Export Council (AHEC) | | thermal resistance of RSI 1 and a compressive strength of 30 p: R-value and compressive strength of the assembly is known, us to designate a specific product. | si. If the intended |
| Window frame, vinyl, fixed Used in the following Revit families: cp_HSEB - Window at Upper Levels | 5,801.7 kg 5,801.7 kg (30 yrs) | Note: This temporary entry is sourced directly from third-party replaces a Tally entry that is undergoing a quality assurance rev developed using data from ecoinvent and modeled in SimaPro | view. This entry |
| Use in the following Tally entries: Window frame, vinyl | | Life Cycle Inventory: For information and quantities, see EPD. | |
| Description: Vinyl fixed window frame inclusive of steel bracing Life Cycle Inventory: 46% PVC part | | Product Scope: Cradle to gate. Note: Product stage expanded to include blowing agent emissi and installation, and diffusion from product over service life (B1 make a significant contribution to GWP they have been include |). As these impacts |
| 54% metal reinforcement (Zinc-coated steel) Product Scope: | | Transportation Distance: By truck: 1190 km | a in the product stage. |
| Cradle to gate, excludes hardware, casing, sealant Transportation Distance: By truck: 496 km | | End-of-Life Scope: 100% Landfilled (plastic waste), includes blowing agent emissio disposal | ns released during |
| End-of-Life Scope: 100% Landfilled (plastic waste) | | LCI Source: US: Extruded polystyrene (XPS) insulation board, FOAMULAR - (2018), modeled with Simapro 8, source for secondary data is e | - |
| LCI Source: DE: Window frame PVC-U (EN15804 A1-A3) ts (2017) | | EPD Source: 4788721182.101.1 | |
| Wood stain, water based Used in the following Revit families: | 2,753.0 kg | EPD Designation Holder: Owens Corning | |
| (F4) CONCRETE DECK O/ 3 PLY CLT FLOOR (R4) SOUTH VEST ROOF (R4) SOUTH VEST ROOF (INTERIOR) | 2,676.2 kg (10 yrs) 4.3 kg (10 yrs) 4.9 kg (10 yrs) | EPD Program Operator: UL Environment | |
| Rectangular Mullion Used in the following Tally entries: Cross laminated timber (CLT) Domestic hardwood | 67.6 kg (10 yrs) | EPD Expiration: 1/1/2024 | |
| Description: Semi-transparent stain for interior and exterior wood surfaces | | | |
| Life Cycle Inventory: 60% Water 28% Acrylate resin 7% Acrylate emulsion 5% Dipropylene glycol 1.3% NMVOC emissions | | | |
| Product Scope: Cradle to gate, including emissions during application | | | |
| Transportation Distance: By truck: 642 km | | | |

HEALTH SCIENCES EDUCATION BUILDING

Full building summary 5/19/2022

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Report Summary

Created with Tally

Commercial Version 2022.04.08.01

Author Company Date Katherine Martin The Miller Hull Partnership 5/19/2022

Project Location Gross Area Building Life HEALTH SCIENCES EDUCATION BUILDING 1607 NE Pacific Street 100,000 ft² 60 years

Boundaries

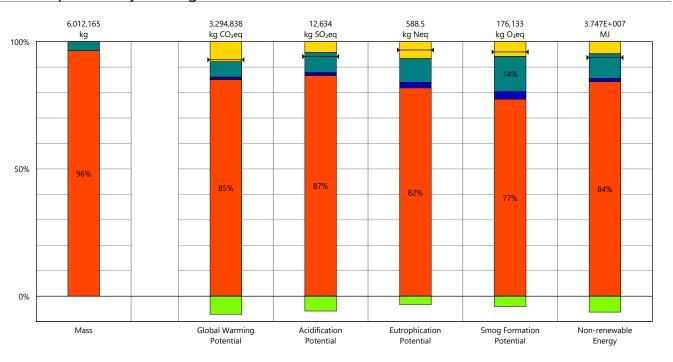
Cradle to grave, inclusive of biogenic carbon; see appendix for a full list of materials and processes

Goal and Scope of Assessment

Complete building envelope and structural elements, including foundations and footings, structural wall assembly (cladding to interior finish), structural floors and ceilings, and roof assemblies.

| Environmental Impact Totals | Product Stage [A1-A3] | Construction Stage [A4] | Use Stage [B2-B5] | End of Life Stage [C2-C4] | Module D [D] |
|---|--------------------------|----------------------------|----------------------|------------------------------|-----------------|
| Global Warming (kg CO₂eq) | 2,803,595 | 33,934 | 198,521 | 258,788 | -234,238 |
| Acidification (kg SO ₂ eq) | 10,952 | 157.2 | 989.9 | 534.3 | -736 |
| Eutrophication (kg Neq) | 481.7 | 12.80 | 55.05 | 38.92 | -19.3 |
| Smog Formation (kg O₃eq) | 136,435 | 5,196 | 24,342 | 10,160 | -7,105 |
| Ozone Depletion (kg CFC-11eq) | 0.2672 | 1.162E-009 | 4.665E-004 | 4.938E-005 | 0.001196 |
| Primary Energy (MJ) | 3.348E+007 | 493,475 | 3,968,178 | 1,871,516 | -2,608,063 |
| Non-renewable Energy (MJ) | 3.160E+007 | 481,667 | 3,641,479 | 1,750,090 | -2,340,270 |
| Renewable Energy (MJ) | 1,880,759 | 11,933 | 328,624 | 123,439 | -267,817 |
| Environmental Impacts / Area | | | | | |
| Global Warming (kg CO2eq/m ²) | 301.8 | 3.653 | 21.37 | 27.86 | -25.2 |
| Acidification (kg SO ₂ eq/m ²) | 1.179 | 0.01693 | 0.1066 | 0.05751 | -0.07927 |
| Eutrophication (kg Neq/m ²) | 0.05185 | 0.001378 | 0.005926 | 0.004189 | -0.002078 |
| Smog Formation (kg O₃eq/m ²) | 14.69 | 0.5593 | 2.620 | 1.094 | -0.7648 |
| Ozone Depletion (kg CFC-11eq/m ² |) 2.876E-005 | 1.251E-013 | 5.021E-008 | 5.316E-009 | 1.287E-007 |
| Primary Energy (MJ/m ²) | 3,604 | 53.12 | 427.1 | 201.4 | -281 |
| Non-renewable Energy (MJ/m ²) | 3,401 | 51.85 | 392.0 | 188.4 | -252 |
| Renewable Energy (MJ/m ²) | 202.4 | 1.284 | 35.37 | 13.29 | -28.8 |

Results per Life Cycle Stage

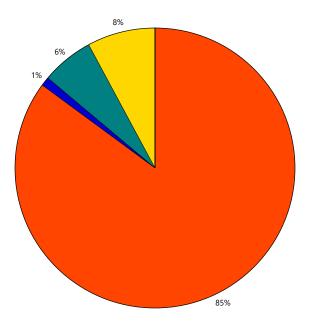


Legend

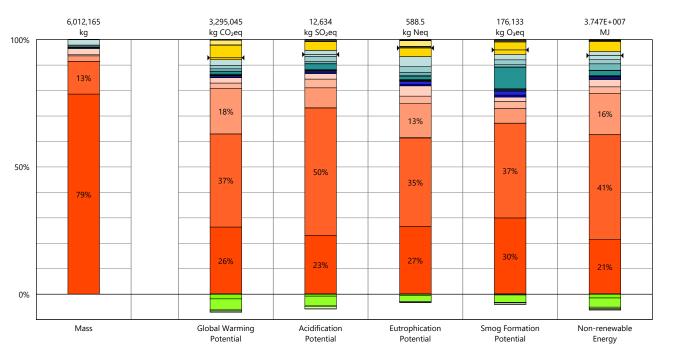
► Net value (impacts + credits)

Life Cycle Stages

Product [A1-A3] Transportation [A4] Maintenance and Replacement [B2-B5] End of Life [C2-C4] Module D [D]



Global Warming Potential



Results per Life Cycle Stage, itemized by Division

Legend

► Net value (impacts + credits)

Product [A1-A3]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection 08 - Openings and Glazing
- 09 Finishes

Transportation [A4]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection
- 08 Openings and Glazing 09 - Finishes

Maintenance and Replacement [B2-B5]

- 03 Concrete
- 05 Metals
- 06 Wood/Plastics/Composites
- 07 Thermal and Moisture Protection 08 - Openings and Glazing
- 09 Finishes

End of Life [C2-C4]

- 03 Concrete
 - 05 Metals
 - 06 Wood/Plastics/Composites 07 - Thermal and Moisture Protection
- 07 Thermal and Moisture 08 - Openings and Glazing
- 09 Finishes

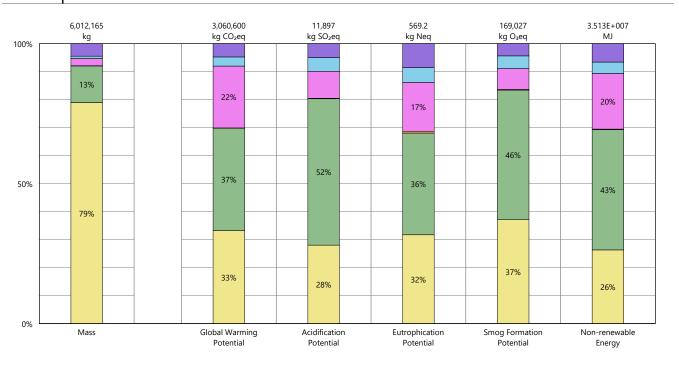
Module D [D]

| | | - | - |
|------|-------|------|------|
| 0 | 3 - (| Conc | rete |

05 - Metals

| 06 - Wood/Plastics/Composites |
|--------------------------------------|
| 07 - Thermal and Moisture Protection |
| 08 - Openings and Glazing |
| 09 - Finishes |

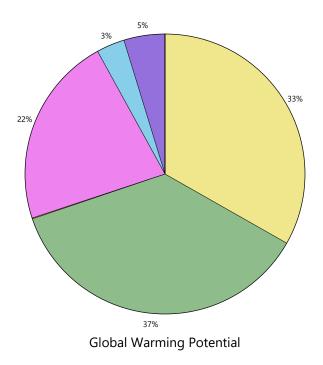
Results per Division

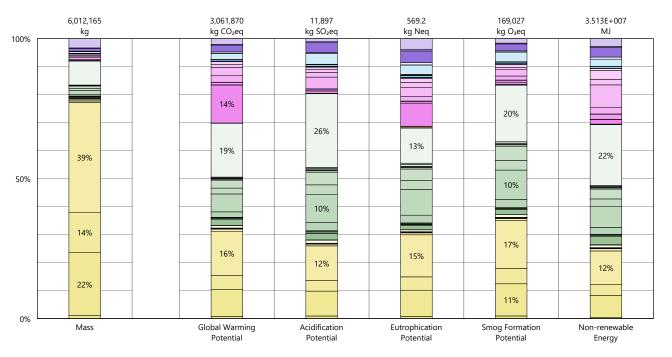


Legend

Divisions

03 - Concrete
05 - Metals
06 - Wood/Plastics/Composites
07 - Thermal and Moisture Protection
08 - Openings and Glazing
09 - Finishes





Results per Division, itemized by Tally Entry

Legend

03 - Concrete

- Cast-in-place concrete, lightweight structural concrete, 5000 psi Cast-in-place concrete, structural concrete, 3000 psi Cast-in-place concrete, structural concrete, 4000 psi Cast-in-place concrete, structural concrete, 5000 psi Glass fiber reinforced concrete, spray coating Precast concrete column Precast concrete nonstructural panel Precast concrete paver Stair, concrete with metal nosing Stair, precast single run (stretcher) Steel, reinforcing rod 05 - Metals Aluminum, angle Aluminum, formed Aluminum, sheet Stainless Steel, Fasteners Steel, angle Steel, C channel Steel, C-H-stud metal framing Steel, C-stud metal framing Steel, C-stud metal framing with insulation Steel, deck Steel, furring channel
- Steel, HSS section Steel, plate Steel, rectangular bar
- Steel, rod Steel, round bar
- Steel, round tubing
- Steel, sheet, stainless Steel, W section (wide flange shape)

06 - Wood/Plastics/Composites

Domestic hardwood



```
Phenolic resin solid surface, sheet
Plywood, interior grade
```

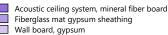
07 - Thermal and Moisture Protection

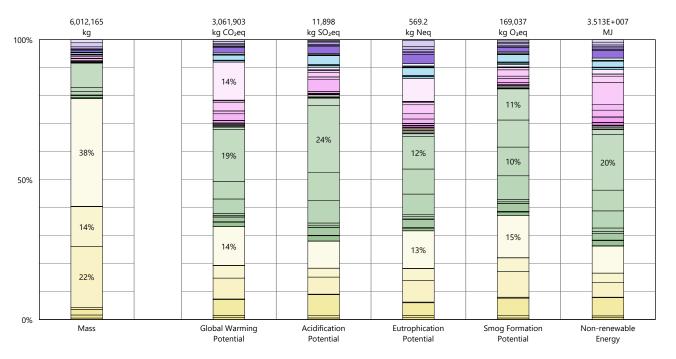
- EPDM, roofing membrane
- Extruded polystyrene (XPS), board
- Fiberglass clip system Fluid applied synthetic polymer air barrier
- Metal roofing panels, formed
- Mineral wool, board, generic
- Polyethelene sheet vapor barrier (HDPE)
- Polyisocyanurate (PIR), board SBS modified bitumen, sheet
- Self adhering membrane
- Self-adhering sheet waterproofing, modified bituminous sheet Wood siding

08 - Openings and Glazing

- Aluminum mullion, inclusive of finish Door frame, aluminum Door frame, steel, galvanized Door, exterior, aluminum Door, exterior, steel Door, interior, steel Glazing, custom IGU
- Glazing, monolithic sheet
- Window frame, vinyl

09 - Finishes





Results per Division, itemized by Material

Legend

03 - Concrete

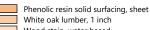
- GFRC, spray coating Lightweight concrete, 5000 psi, Pacific Northwest regional average Steel, reinforcing rod
- Steel, sheet
- Structural concrete, 3000 psi, 0% fly ash and slag
- Structural concrete, 3000 psi, Pacific Northwest regional average
- Structural concrete, 4000 psi, 20% fly ash and 30% slag
- Structural concrete, 5000 psi, 0% fly ash and slag
- Structural concrete, 5000 psi, 20% fly ash and 30% slag

05 - Metals

| | Aluminum extrusion, painted, AEC - EPD |
|----|--|
| | Aluminum, formed |
| | Aluminum, sheet |
| | Anodized aluminum, sheet |
| | Coated steel deck, SDI - EPD |
| | Cold formed structural steel |
| | Fasteners, stainless steel |
| | Fiberglass blanket insulation, unfaced |
| | Fluoropolymer coating, metal stock |
| | Galvanized steel |
| | Galvanized steel decking |
| | Hot rolled structural steel, AISC - EPD |
| | Paint, enamel, solvent based |
| | Paint, exterior metal coating, silicone-based |
| | Paint, exterior metal coating, silicone-based, by area |
| | Polyurethane coating, metal stock |
| | Powder coating, metal stock |
| | Stainless steel sheet, Chromium 18/8 |
| | Stainless steel, extruded, chromium 18/8 |
| | Steel, reinforcing rod |
| | Steel, sheet |
| 06 | Mood/Plastics/Compositor |

06 - Wood/Plastics/Composites

Laminated spruce panel board



White oak lumber, 1 inch Wood stain, water based

07 - Thermal and Moisture Protection

Adhesive, acrylic

- Domestic softwood, US, AWC EPD EPDM, non-reinforced membrane, 90 mils, SPRI - EPD
- Fasteners, galvanized steel
- Fasteners, stainless steel
 - Fluid applied synthetic polymer air barrier
- Fluoropolymer coating, metal stock
- Glass fiber reinforced plastic paneling
- Mineral wool, high density, NAIMA EPD
- PIR rigid foam insulation, roof, R=20.5, PIMA EPD
- PIR rigid foam insulation, wall, R=14.6, PIMA EPD
- Polyethelene sheet vapor barrier (HDPE)
- SBS modified bitumen, assembly (base & cap), ARMA EPD
- SBS modified bitumen, cap sheet, ARMA EPD
- Self adhering flashing membrane, 40 mil Steel, sheet
- XPS insulation, Foamular average, Owens Corning EPD

08 - Openings and Glazing

Aluminum extrusion, anodized, AEC - EPD Argon gas for IGU Door frame, aluminum, powder-coated, no door Door frame, metal, galvanized, no door Fasteners, galvanized steel Fasteners, stainless steel Frit (for glazing) Glazing, monolithic sheet, generic Glazing, monolithic sheet, safety glass Glazing, monolithic sheet, tempered Hardware, stainless steel Hollow door, exterior, aluminum, anodized Hollow door, exterior, aluminum, anodized, large vision panel Hollow door, exterior, steel, galvanized

Results per Division, itemized by Material (continued)

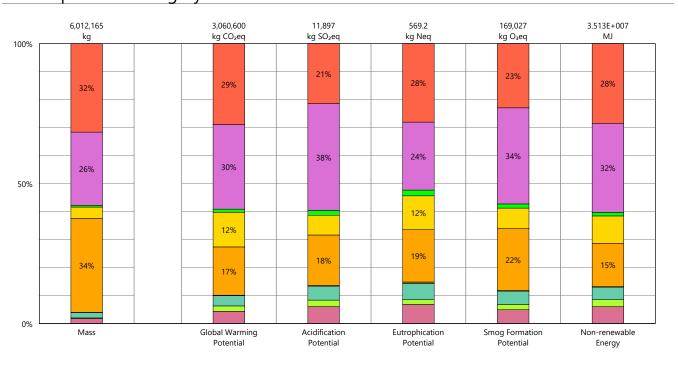
Legend (continued)



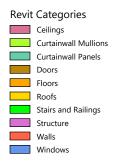
Low-e coating (for glazing) Overhead door closer, aluminum Stainless steel door hinge Window frame, vinyl, fixed 09 - Finishes

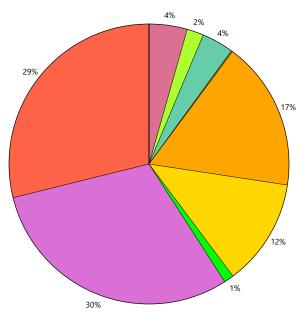
Acoustic ceiling tile (ACT), mineral fiber board Fiberglass mat gypsum sheathing board Paint, interior acrylic latex Paint, interior acryine races
 Suspended grid
 Wall board, gypsum, fire-resistant (Type X)
 Wall board, gypsum, moisture- and mold-resistant
 Wall board, gypsum, moisture- and mold-resistant Wall board, gypsum, natural

Results per Revit Category

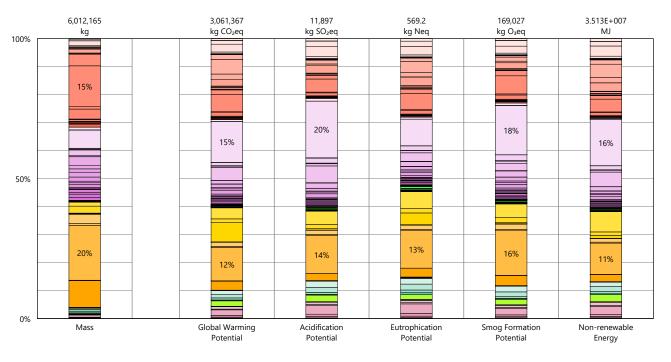


Legend





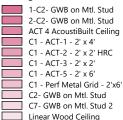
Global Warming Potential



Results per Revit Category, itemized by Family

Legend

Ceilings



Curtainwall Mullions

Rectangular Mullion

Curtainwall Panels

| Curta | |
|-------|--|
| | cp_HSEB - Base Material Panel_vertical |
| | cp_HSEB - Skin Shingle flashing |
| | cp_HSEB - Skin Shingle Panel_hoz |
| | cp_HSEB - Window at Upper Levels |
| | System Panel |

Doors



Floors

| 5 |
|-------------------------|
| (F1) SLAB ON GRADE |
| (F1) SLAB ON GRADE - 6" |
| (F1) SLAB ON GRADE - 8" |

| (F2) CONCRETE METAL DECK |
|--|
| (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) |
| (F3) CONCRETE METAL DECK W/ TOPPING SLAB |
| 12" Concrete Slab |
| 1F5 - 1 HR RATED HORIZONTAL DUCT ENCLOSURE |
| 3.5" Light Duty Paving Over Sturcture |
| 3/16" Aluminum Plate |

Roofs

| (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT |
|---|
| (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 |
| (R3) SBS OVER METAL DECK |
| (R4) SOUTH VEST ROOF |
| (R4) SOUTH VEST ROOF (INTERIOR) |
| 1/4" STEEL PLATE |
| 3/16" Aluminum Plate |

Stairs and Railings

| Stans and Kanings |
|---|
| Construction Specialties_Crash Rail_6" ECR-60S |
| HSEB - Pipe Guardrail - GDR-2 |
| HSEB - Pipe Guardrail - GDR-2 without handrail |
| HSEB - STR-1 _Precast Tread & Riser |
| HSEB - STR-2 Precast Tread Steel Riser 2 |
| HSEB Guardrail - Cable Rail |
| HSEB Guardrail - Cable Rail without handrail |
| HSEB Handrail - HNDRL-1 |
| HSEB Handrail - HNDRL-3 |
| HSEB PIPE Handrail - HNDRL-2 |
| HSEB ST-11 (CAST IN PLACE) |
| HSEB ST-9 (CAST IN PLACE) |
| HSEB Type C - STR-4_Conc filled w/ C channel |
| HSEB Type C_STR-10_Conc filled w/ C channel |
| HSEB Type C_STR-5_Conc filled w/ C channel 2 |
| HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access |
| HSEB Type C_STR-8_Conc filled w/ Plate |
| HSEB_STR-3_Precast Tread Steel Riser |
| HSEB-GDR-4_Canerail |

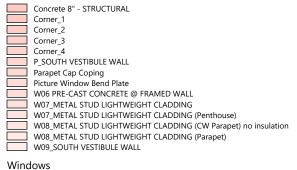
Results per Revit Category, itemized by Family (continued)

Legend (continued)

Structure

| 00.00 | |
|-------|--|
| | 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d |
| | 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d |
| | 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d |
| | 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d |
| | 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F8.0 8x8x2.5d |
| | 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d |
| | 04.016_LCL FND Slab_Spread Ftg_FW6.0 6x8x2.5d |
| | 04.017_LCL FND Slab_Cont. Ftg FW3.0_36wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx24d |
| | |
| | 04.017_LCL FND Slab_Cont. Ftg FW5.0_60wx18d |
| | 04.017_LCL FND Slab_Cont. Ftg FW5.0A_60wx30d |
| | 04.017_LCL FND Slab_Cont. Ftg FW7.0_87wx42d 2 |
| | 04.017_LCL FND Slab_Cont. Ftg FW8.0_96wx48d |
| | 04.017_LCL FND Slab_Cont. Ftg_24wx12d |
| | KPFF - SCOL - Concrete - Round |
| | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC |
| | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x |
| | KPFF - SCOL - Steel - HSS - Round (C) - TC |
| | KPFF - SCOL - Steel - W - Wide Flange (C) - TC |
| | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace |
| | KPFF - SFRM - Steel - C - Channel (C) - TC |
| | KPFF - SFRM - Steel - HSS - Rectangular (C) - TC |
| | KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC |
| | KPFF - SFRM - Steel - L - Angle (C) - TC |
| | KPFF - SFRM - Steel - W - Wide Flange (C) - TC |
| | KPFF - SFRM - Steel - WT - Wide Flange Tee - TC |
| | KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC |
| | LCL_C_Pilaster_Rect_()w()d |
| | LCL_Embed_2x3-Nelson-Studs_OffSet |
| | |
| Walls | |
| | (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) |
| | (B8)_TYP Mtl Stud 8"_GWB Insulation |
| | 04.215_LCL_C_Slab Transition_Wall(12") |
| | 04.215_LCL_C_Slab Transition_Wall(15") |
| | 04.215_LCL_C_Slab Transition_Wall(4") |
| | 04.215_LCL_C_Slab Transition_Wall(6") |
| | 04.215_LCL_C_Slab Transition_Wall(8") |
| | 04.225_LCL_C_CURB_Wall(11") |
| | 04.225_LCL_C_CURB_Wall(4") |
| | 04.225_LCL_C_CURB_Wall(6") |
| | 04.225_LCL_C_CURB_Wall(8") |
| | 04.225_LCL_C_Foundation_Wall(10") |
| | UH.SUU_LCL_C_FUUHUALIUH_WAII(TU) |

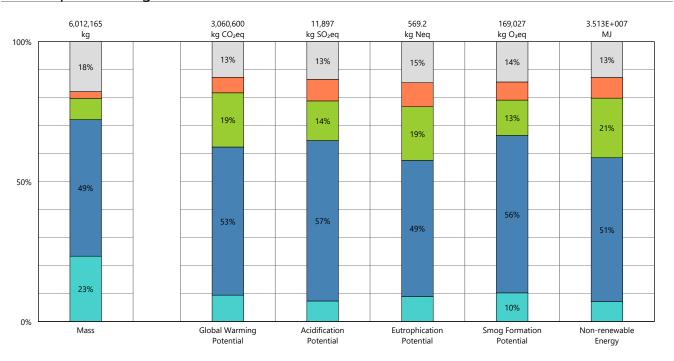
| | 04.225_LCL_C_CURB_Wall(4") |
|--|--|
| | 04.225_LCL_C_CURB_Wall(6") |
| | 04.225_LCL_C_CURB_Wall(8") |
| | 04.300_LCL_C_Foundation_Wall(10") |
| | 04.310_LCL_C_PIT_Wall(8") |
| | 04.380_LCL_C_SHOTCRETE_Wall(16") |
| | 04.380_LCL_C_SHOTCRETE_Wall(19") |
| | 04.380_LCL_C_SHOTCRETE_Wall(22") |
| | 04.380_LCL_C_SHOTCRETE_Wall(24") |
| | 1-B6 |
| | 1-N8 GFRC @ FRAMED WALL STAGGERED STUD |
| | 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" |
| | 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" |
| | 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" |
| | 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" |
| | 1-W06 PRE-CAST CONCRETE @ FRAMED WALL |
| | 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD |
| | 1-W07_METAL STUD LIGHTWEIGHT CLADDING |
| | 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated |
| | 2-A0_GWB Type X (2-0) 2 hour rated |
| | 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" |
| | 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" |
| | 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" |
| | 2-W01 CONCRETE WALL WITHOUT CONC |
| | 3-W07_METAL STUD LIGHTWEIGHT CLADDING |
| | A4_Furr Mtl Stud 4"_GWB (1-0) |
| | Aluminum Plate 1/8" |
| | Aluminum Plate 3/16" |
| | B4 |
| | B6 |



window

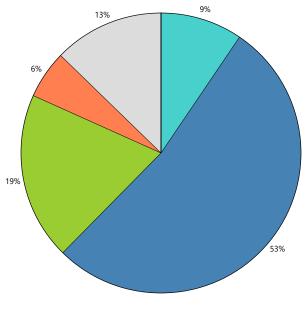
LOUVER-parametric

Results per Building Element



Legend

Building Elements
Substructure
Superstructure
Enclosure
Interiors
Undefined



Global Warming Potential

Calculation Methodology

LIFE CYCLE ASSESSMENT METHODS

The following provides a description of terms and methods associated with the use of Tally to conduct life cycle assessment for construction works and construction products. Tally methodology is consistent with LCA standards ISO 14040-14044, ISO 21930:2017, ISO 21931:2010, EN 15804:2012, and EN 15978:2011. For more information about LCA, please refer to these standards or visit www.choosetally.com.

Studied objects

The life cycle assessment (LCA) results reported represent an analysis of a single building, multiple buildings, or a comparative analysis of two or more building design options. The assessment may represent the complete architectural, structural, and finish systems of the building(s) or a subset of those systems. This may be used to compare the relative environmental impacts associated with building components or for comparative study with one or more reference buildings. Design options may represent a full or partial building across various stages of the design process, or they may represent multiple schemes of a full or partial building that are being compared to one another across a range of evaluation criteria.

Functional unit and reference unit

A functional unit is the quantified performance of a product, building, or system that defines the object of the study. The functional unit of a single building should include the building type (e.g. office, factory), relevant technical and functional requirements (e.g. regulatory requirements, energy performance), pattern of use (e.g. occupancy, usable floor area), and the required service life. For a design option comparison of a partial building, the functional unit is the complete set of building systems or products that perform a given function. It is the responsibility of the modeler to assure that reference buildings or design options are functionally equivalent in terms of scope and relevant performance. The expected life of the building has a default value of 60 years and can be modified by the modeler.

The reference unit is the full collection of processes and materials required to produce a building or portion thereof and is quantified according to the given goal and scope of the assessment over the full life of the building. If construction impacts are included in the assessment, the reference unit also includes the energy, water, and fuel consumed on the building site during construction. If operational energy is included in the assessment, the reference unit includes the electrical and thermal energy consumed on site over the life of the building.

Data source

Tally utilizes a custom designed LCA database that combines material attributes, assembly details, and architectural specifications with environmental impact data resulting from the collaboration between KieranTimberlake and thinkstep. LCA modeling was conducted in GaBi 8.5 using GaBi 2018 databases and in accordance with <u>GaBi databases and modeling principles</u>. The data used are intended to represent the US and the year 2017. Where representative data were unavailable, proxy data were used. The datasets used, their geographic region, and year of reference are listed for each entry. An effort was made to choose proxy datasets that are technologically consistent with the relevant entry.

Data quality and uncertainty

Uncertainty in results can stem from both the data used and their application. Data quality is judged by: its measured, calculated, or estimated precision; its completeness, such as unreported emissions; its consistency, or degree of uniformity of the methodology applied on a study serving as a data source; and geographical, temporal, and technological representativeness. The <u>GaBi LCI databases</u> have been used in LCA models worldwide in both industrial and scientific applications. These LCI databases have additionally been used both as internal and critically reviewed and published studies. Uncertainty introduced by the use of proxy data is reduced by using technologically, geographically, and/or temporally similar data. It is the responsibility of the modeler to appropriately apply the predefined material entries to the building under study.

System boundaries and delimitations

The analysis accounts for the full cradle to grave life cycle of the design options studied across all life cycle stages, including material manufacturing, maintenance and replacement, and eventual end of life. Optionally, the construction impacts and operational energy of the building can be included within the scope. Product stage impacts are excluded for materials and components indicated as existing or salvaged by the modeler. The modeler defines whether the boundary includes or excludes the flow of biogenic carbon, which is the carbon absorbed and generated by biological sources (e.g. trees, algae) rather than from fossil resources.

Architectural materials and assemblies include all materials required for the product's manufacturing and use including hardware, sealants, adhesives, coatings, and finishing. The materials are included up to a 1% cut-off factor by mass except for known materials that have high environmental impacts at low levels. In these cases, a 1% cut-off was implemented by impact.

5/19/2022

Calculation Methodology

LIFE CYCLE STAGES

The following describes the scope and system boudaries used to define each stage of the life cycle of a building or building product, from raw material acquisition to final disposal. For products listed in Tally as Environmental Product Declarations (EPD), the full life cycle impacts are included, even if the published EPD only includes the Product stage [A1-A3].

Product [EN 15978 A1 - A3]

This encompasses the full manufacturing stage, including raw material extraction and processing, intermediate transportation, and final manufacturing and assembly. The product stage scope is listed for each entry, detailing any specific inclusions or exclusions that fall outside of the cradle to gate scope. Infrastructure (buildings and machinery) required for the manufacturing and assembly of building materials are not included and are considered outside the scope of assessment.

Transportation [EN 15978 A4]

This counts transportation from the manufacturer to the building site during the construction stage and can be modified by the modeler.

Construction Installation [EN 15978 A5] (Optional)

This includes the anticipated or measured energy and water consumed on-site during the construction installation process, as specified by the modeler.

Maintenance and Replacement [EN 15978 B2-B5]

This encompasses the replacement of materials in accordance with their expected service life. This includes the end of life treatment of the existing products as well as the cradle to gate manufacturing and transportation to site of the replacement products. The service life is specified separately for each product. Refurbishment of materials marked as existing or salvaged by the modeler is also included.

Operational Energy [EN 15978 B6] (Optional)

This is based on the anticipated or measured energy and natural gas consumed at the building site over the lifetime of the building, as indicated by the modeler.

End of Life [EN 15978 C2-C4]

This includes the relevant material collection rates for recycling, processing requirements for recycled materials, incineration rates, and landfilling rates. The impacts associated with landfilling are based on average material properties, such as plastic waste, biodegradable waste, or inert material. Stage C2 encompasses the transport from the construction site to end-of-life treatment based on national averages. Stages C3-C4 account for waste processing and disposal, i.e., impacts associated with landfilling or incineration.

Module D [EN 15978 D]

This accounts for reuse potentials that fall beyond the system boundary, such as energy recovery and recycling of materials. Along with processing requirements, the recycling of materials is modeled using an avoided burden approach, where the burden of primary material production is allocated to the subsequent life cycle based on the quantity of recovered secondary material. Incineration of materials includes credit for average US energy recovery rates.

| PRODUCT | CONSTRUCTION | USE | END-OF-LIFE | MODULE D |
|--|--|--|--|--|
| A1. Extraction A2. Transport (to factory) A3. Manufacturing | A4. Transport (to site) A5. Construction Installation | B1. Use B2. Maintenance B3. Repair B4. Replacement B5. Refurbishment | C1. Demolition C2. Transport (to disposal) C3. Waste processing C4. Disposal | D. Benefits and loads beyond the system boundary from: 1. Reuse 2. Recycling 3. Energy recovery |
| | | B6. Operational energy B7. Operational water | | |

Life-Cycle Stages as defined by EN 15978. Processes included in Tally modeling scope are shown in bold. Italics indicate optional processes.

Calculation Methodology

ENVIRONMENTAL IMPACT CATEGORIES

A characterization scheme translates all emissions and fuel use associated with the reference flow into quantities of categorized environmental impact. As the degree that the emissions will result in environmental harm depends on regional ecosystem conditions and the location in which they occur, the results are reported as impact potential. Potential impacts are reported in kilograms of equivalent relative contribution (eq) of an emission commonly associated with that form of environmental impact (e.g. kg CO₂eq).

The following list provides a description of environmental impact categories reported according to the TRACI 2.1 characterization scheme, the environmental impact model developed by the US EPA to quantify environmental impact risk associated with emissions to the environment in the United States. TRACI is the standard environmental impact reporting format for LCA in North America. Impacts associated with land use change and fresh water depletion are not included in TRACI 2.1. For more information on TRACI 2.1, reference Bare 2010, EPA 2012, and Guinée 2001. For further description of measurement of environmental impacts in LCA, see Simonen 2014.

Acidification Potential (AP)

ka SO₂ea

kg Neg

A measure of emissions that cause acidifying effects to the environment. The acidification potential is a measure of a molecule's capacity to increase the hydrogen ion (H^+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.

Eutrophication Potential (EP)

A measure of the impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). Nutrient enrichment may cause an undesirable shift in species composition and elevated biomass production in both aquatic and terrestrial ecosystems. In aquatic ecosystems, increased biomass production may lead to depressed oxygen levels caused by the additional consumption of oxygen in biomass decomposition.

Global Warming Potential (GWP)

kg CO₂eq

kg CFC-11eg

A measure of greenhouse gas emissions, such as carbon dioxide and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may, in turn, have adverse impacts on ecosystem health, human health, and material welfare.

Ozone Depletion Potential (ODP)

A measure of air emissions that contribute to the depletion of the stratospheric ozone layer. Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. As these impacts tend to be very small, ODP impacts can be difficult to calculate and are prone to a larger margin of error than the other impact categories.

Smog Formation Potential (SFP)

kg O₃eq

A measure of ground level ozone, caused by various chemical reactions between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in sunlight. Human health effects can result in a variety of respiratory issues, including increasing symptoms of bronchitis, asthma, and emphysema. Permanent lung damage may result from prolonged exposure to ozone. Ecological impacts include damage to various ecosystems and crop damage.

Primary Energy Demand (PED)

MJ (lower heating value)

A measure of the total amount of primary energy extracted from the earth. PED tracks energy resource use, not the environmental impacts associated with the resource use. PED is expressed in energy demand from non-renewable resources and from renewable resources. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

Non-Renewable Energy Demand

MJ (lower heating value)

A measure of the energy extracted from non-renewable resources (e.g. petroleum, natural gas, etc.) contributing to the PED. Non-renewable resources are those that cannot be regenerated within a human time scale. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

Renewable Energy Demand

MJ (lower heating value)

A measure of the energy extracted from renewable resources (e.g. hydropower, wind energy, solar power, etc.) contributing to the PED. Efficiencies in energy conversion (e.g. power, heat, steam, etc.) are taken into account when calculating this result.

LCI Data

END-OF-LIFE [C2-C4]

A Life Cycle Inventory(LCI) is a compilation and quantification of inputs and outputs for the reference unit.The following LCI provides a summary of all energy, construction, transportation, and material inputs present in the study. Materials are listed in alphabetical order along with a list of all Revit families and Tally entries in which they occur, along with any notes and system boundaries accompanying their database entries. Each entry lists the detailed scope for the LCI data sources used from the GaBi LCI database and identifies the LCI data source.

For LCI data sourced from an Environmental Product Declaration (EPD), the product manufacturer, EPD identification number, and Program Operator are listed. Where the LCI source does not provide data for all life cycle stages, default North American average values are used. This is of particular importance for European EPD sources, as EPD data are generally only provided for the product stage, and North American average values are used for the remaining life cycle stages.

Where specific quantities are associated with a data entry, such as user inputs, energy values, or material mass, the quantity is listed on the same line as the title of the entry.

TRANSPORTATION [A4]

Default transportation values are based on the three-digit material commodity code in the 2012 Commodity Flow Survey by the US Department of Transportation Bureau of Transportation Statistics and the US Department of Commerce where more specific industry-level transportation is not available.

Transportation by Barge

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by barge.

LCI Source:

GLO: Average ship, 1500t payload capacity/ canal ts (2017) US: Diesel mix at filling station ts (2014)

Transportation by Container Ship

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by container ship.

LCI Source:

GLO: Container ship, 27500 dwt payload capacity, ocean going ts (2017) US: Heavy fuel oil at refinery (0.3wt.% S) ts (2014)

Transportation by Rail

Scope: The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by cargo rail.

LCI Source:

GLO: Rail transport cargo - Diesel, average train, gross tonne weight 1000t / 726t payload capacity ts (2017)

US: Diesel mix at filling station ts (2014)

Transportation by Truck Scope:

The data set represents the transportation of 1 kg of material from the manufacturer location to the building site by diesel truck.

LCI Source:

US: Truck - Trailer, basic enclosed / 45,000 lb payload - 8b ts (2017) US: Diesel mix at filling station ts (2014)

LCI Data (continued)

END-OF-LIFE [C2-C4]

Specific end-of-life scenarios are detailed for each entry based on the US construction and demolition waste treatment methods and rates in the 2016 WARM Model by the US Environmental Protection Agency except where otherwise specified. Heterogeneous assemblies are modeled using the appropriate methodologies for the component materials.

End-of-Life Landfill

Scope:

Materials for which no recycling or incineration rates are known, no recycling occurs within the US at a commercial scale, or which are unable to be recycled are landfilled. This includes glass, drywall, insulation, and plastics. The solids contents of coatings, sealants, and paints are assumed to go to landfill, while the solvents or water evaporate during installation. Where the landfill contains biodegradable material, the energy recovered from landfill gas utilization is reflected as a credit in Module D.

LCI Source:

US: Glass/inert on landfill ts (2017)

US: Biodegradable waste on landfill, post-consumer ts (2017)

US: Plastic waste on landfill, post-consumer ts (2017)

Concrete End-of-Life

Scope:

Concrete (or other masonry products) are recycled into aggregate or general fill material or they are landfilled. It is assumed that 55% of the concrete is recycled. Module D accounts for both the credit associated with off-setting the production aggregate and the burden of the grinding energy required for processing.

LCI Source:

US: Diesel mix at refinery ts (2014) GLO: Fork lifter (diesel consumption) ts (2016) EU - 28 Gravel 2/32 ts (2017) US: Glass/inert on landfill ts (2017)

Metals End-of-Life

Scope:

Metal products are modeled using the avoided burden approach. The recycling rate at end of life is used to determine how much secondary metal can be recovered after having subtracted any scrap input into manufacturing (net scrap). Net scrap results in an environmental credit in Module D for the corresponding share of the primary burden that can be allocated to the subsequent product system using secondary material as an input. If the value in Module D reflects an environmental burden, then the original product (A1-A3) contains more secondary material than is recovered.

LCI Source:

Aluminum - RNA: Primary Aluminum Ingot AA/ts (2010) Aluminum - RNA: Secondary Aluminum Ingot AA/ts (2010) Brass - GLO: Zinc mix ts (2012) Brass - GLO: Copper (99.99% cathode) ICA (2013) Brass - EU-28: Brass (CuZn20) ts (2017) Copper - DE: Recycling potential copper sheet ts (2016) Steel - GLO: Value of scrap worldsteel (2014) Zinc - GLO: Special high grade zinc IZA (2012)

Wood End-of-Life

Scope:

End of Life waste treatment methods and rates for wood are based on the 2014 Municipal Solid Waste and Construction Demolition Wood Waste Generation and Recovery in the United States report by Dovetail Partners, Inc. It is assumed that 63.5% of wood is sent to landfill, 22% to incineration, and 14.5% to recovery.

LCI Source:

US: Untreated wood in waste incineration plant ts (2017)

US: Wood product (OSB, particle board) waste in waste incineration plant ts (2017)

- US: Wood products (OSB, particle board) on landfill, post-consumer ts (2017)
- US: Untreated wood on landfill, post-consumer ts (2017)

RNA: Softwood lumber CORRIM (2011)

LCI Data

MODEL ELEMENTS

Revit Categories

Ceilings Curtainwall Mullions Curtainwall Panels Doors Floors Roofs Stairs and Railings Structure Walls Windows

HSEB_ARCH_D_19_Baseline_with ceilings.rvt

Worksets ARCH_Ceilings ARCH_Exterior Walls ARCH_Floors & Roof ARCH_Vertical Circulation

Phases Base Budget Enabling Scope Existing Value Add Scope

HSEB_STRUCT_DC_19.rvt (Read-only)

Worksets L - 04.220 Equipment Pads LCL-SLEEVES-BLOCKOUTS-MISC. S - Structural S - Structural - Baseline

Phases

Existing New Construction

PRODUCT [A1-A3]

Materials and components are listed in alphabetical order along with a list of all Revit families and Tally entries in which they occur. The masses given here refer to the quantity of each material used over the building's life-cycle, which includes both Product [A1-A3] and Use [B2-B5] stages.

Additional provided data describing scope boundaries for each life cycle stage may be useful for interpretation of the impacts associated with the specific material or component. Each material or component is listed with its service life, or period of time after installation it is expected to meet the service requirements prior to replacement or repair. This value is indicated in parentheses next to the mass of the material associated with the listed Revit family. Values for transportation distance or service life shown with an asterisk (*) indicate user-defined changes to default values. Values for service life shown with a dagger (†) indicate materials identified by the modeler as existing or salvaged.

Acoustic ceiling tile (ACT), mineral fiber board Used in the following Revit families:

| 3,770.1 kg (50 yrs 7,515.5 kg (50 yrs 27,390.4 kg (50 yrs 3,623.4 kg (50 yrs | - | -,- | | |
|---|---------|-----|-----|------|
| 27,390.4 kg (50 yrs | | | | |
| | 7,515.5 | kg | (50 | yrs) |
| 3,623.4 kg (50 yrs | | | | |
| | 3,623.4 | kg | (50 | yrs |

42.299.4 ka

Used in the following Tally entries:

Acoustic ceiling system, mineral fiber board

Description: Mineral fiber board acoustic ceiling tile, 5/8" thick

Life Cycle Inventory: 100% Mineral fiber board

C1 - ACT-1 - 2' x 4'

C1 - ACT-3 - 2' x 2'

C1 - ACT-5 - 2' x 6'

C1 - ACT-2 - 2' x 2' HRC

Product Scope: Cradle to gate of panel only, excludes suspended grid system and installation hardware

Transportation Distance:

By truck: 172 km

End-of-Life Scope: 100% landfilled (inert waste)

LCI Source:

DE: Mineral fibres ceiling boards (EN15804 A1-A3) ts (2017)

Adhesive, acrylic

4,043.6 kg

| Jsed in the following Revit families: | |
|---|----------------------------|
| (R3) SBS OVER METAL DECK | 3,467.8 kg (20 yrs) |
| (R4) SOUTH VEST ROOF | 13.5 kg (20 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no | insulation26.8 kg (20 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 535.4 kg (20 yrs) |
| | |

Used in the following Tally entries: SBS modified bitumen, sheet

Description:

Generic acrylic construction adhesive

Life Cycle Inventory:

5% Naphtha at refinery 95% Acrylate resin (solvent-systems) 0.5% NMVOC emissions

Product Scope:

Cradle to gate, plus emissions during application

Transportation Distance: By truck: 840 km

End-of-Life Scope:

99.5% solids to landfill (plastic waste)

LCI Source: US: Naphtha at refinery ts (2014)

tally

LCI Data (continued)

DE: Acrylate resin (solvent-systems) ts (2017)

| | | U |
|---|---|------------------------|
| Aluminum extrusion, anodized, AEC - EPD Used in the following Revit families: Rectangular Mullion | 3,507.9 kg 3,507.9 kg (60 yrs) | U |
| Used in the following Tally entries: Aluminum mullion, inclusive of finish | -, | D |
| Description: Extruded and anodized aluminum part. Data based on ind Aluminum Extruders Council. | lustry-wide EPD from the | Li |
| Life Cycle Inventory: For information and quantities, see EPD | | Р |
| Product Scope: Cradle to gate | | Т |
| Transportation Distance: By truck: 663 km | | E |
| End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | | M |
| Module D Scope: Product has 34.5% scrap input while remainder is process burden | ed and credited as avoided | L |
| LCI Source: RNA: Aluminum extrusion, anodized - AEC (A1-A3) ts-EPD RNA: Primary Aluminum Ingot AA/ts (2010) RNA: Secondary Aluminum Ingot AA/ts (2010) | (2015) | |
| EPD Source: <u>11240237.101.1</u> | | |
| EPD Designation Holder: Aluminum Extruders Council (AEC) | | Alu |
| EPD Program Operator: UL Environment | | U |
| EPD Expiration: 10/4/2021 | | |
| Aluminum extrusion, painted, AEC - EPD | 12.0 kg | |
| Used in the following Revit families: | | |
| Picture Window Bend Plate | 12.0 kg (60 yrs) | |
| Picture Window Bend Plate Used in the following Tally entries: Aluminum, angle | 12.0 kg (60 yrs) | U |
| Used in the following Tally entries: | dustry-wide EPD from the | |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In | dustry-wide EPD from the | U D |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: | dustry-wide EPD from the | D |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: | dustry-wide EPD from the | D |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: | dustry-wide EPD from the | D Li P T |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered | dustry-wide EPD from the tions in North America. | D Li P T E |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) Module D Scope: | dustry-wide EPD from the tions in North America. | D Li P T E |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) Module D Scope: Credit given for the avoided burden associated with recov LCI Source: | dustry-wide EPD from the tions in North America. | D |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) Module D Scope: Credit given for the avoided burden associated with recov LCI Source: EPD (US), American Extruders Council (2016) EPD Source: | dustry-wide EPD from the tions in North America. | D Li P T E |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) Module D Scope: Credit given for the avoided burden associated with recov LCI Source: EPD (US), American Extruders Council (2016) EPD Source: 11240237.101.1 EPD Designation Holder: | dustry-wide EPD from the tions in North America. | D Li P T E |
| Used in the following Tally entries: Aluminum, angle Description: Painted aluminum extrusions (not thermally-improved). In Aluminum Extruders Council. EPD representative of condit Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) Module D Scope: Credit given for the avoided burden associated with recov LCI Source: EPD (US), American Extruders Council (2016) EPD Source: 11240237.101.1 EPD Designation Holder: Aluminum Extruders Council (AEC) EPD Program Operator: | dustry-wide EPD from the tions in North America. | D Li P T E |

| Aluminum, formed | 477.9 kg |
|---|---|
| Used in the following Revit families: Corner 1 | 265.5 kg (60 yrs) |
| Corner_2 | 212.4 kg (60 yrs) |
| Used in the following Tally entries: Aluminum, formed | |
| Description: Formed aluminum member. Data based on industr aluminum from the Aluminum Association (EPD ID | |
| Life Cycle Inventory: 100% Aluminum | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 663 km | |
| End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | |
| Module D Scope: Product has 65% scrap input while remainder is pro burden | ocessed and credited as avoided |
| LCI Source: RNA: Cold Rolled Aluminium ts/AA (2010) [EPD] GLO: Steel sheet stamping and bending (5% loss) t US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consun RNA: Primary Aluminum Ingot AA/ts (2010) RNA: Secondary Aluminum Ingot AA/ts (2010) | |
| Aluminum, sheet | 16,028.6 kg |
| Used in the following Revit families: | |
| (R4) SOUTH VEST ROOF 1/4" STEEL PLATE | 112.5 kg (60 yrs) 543.3 kg (60 yrs) |
| 3/16" Aluminum Plate | 41.7 kg (60 yrs) |
| Aluminum Plate 1/8" | 25.2 kg (60 yrs) |
| Aluminum Plate 3/16" | 221.2 kg (60 yrs) |
| C1 - Perf Metal Grid - 2'x6' | 2,847.0 kg (60 yrs) |
| cp_HSEB - Skin Shingle flashing | 14.7 kg (60 yrs) |
| Parapet Cap Coping Rectangular Mullion | 500.6 kg (60 yrs) 11,722.4 kg (60 yrs) |
| Used in the following Tally entries: Aluminum, sheet | |
| Description: Aluminum sheet, formed and cut. Data based on in aluminum from the Aluminum Association (EPD ID | |
| Life Cycle Inventory: 100% Aluminum | |
| Product Scope: Cradle to gate | |
| Transportation Distance: | |
| By truck: 663 km | |
| By truck: 663 km End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | |
| End-of-Life Scope: 95% Recovered | ocessed and credited as avoided |

RNA: Cold Rolled Aluminium ts/AA (2010) [EPD]

GLO: Steel sheet stamping and bending (5% loss) ts (2017)

US: Electricity grid mix ts (2014)

US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014) RNA: Primary Aluminum Ingot AA/ts (2010) RNA: Secondary Aluminum Ingot AA/ts (2010)

LCI Data (continued)

| nodized aluminum, sheet Jsed in the following Revit families: | 56.4 kg | End-of-Life Scope: 98% Recovered | |
|---|--------------------------------------|--|---|
| 3/16" Aluminum Plate | 56.4 kg (60 yrs) | 2% Landfilled (inert material) | |
| LOUVER-parametric | 0.0 kg (60 yrs) | Module D Scope: | |
| Jsed in the following Tally entries: Aluminum, sheet | | Product has 28% scrap input while remainder is processed a burden. | nd credited as avoided |
| Description: | | LCI Source: | |
| Anodized aluminum sheet, formed and cut. Data based on inc | | US: Steel deck - Steel deck institute (SDI) (A1-A3) ts (2012) | |
| anodized aluminum from the Aluminum Extruders Council (EP | D ID 11240237.101.1). | EPD Source: | |
| ife Cycle Inventory: 100% Anodized aluminum | | <u>4786052957.101.1</u> | |
| | | EPD Designation Holder: | |
| Product Scope: Cradle to gate | | Steel Deck Institute | |
| Fransportation Distance: | | EPD Program Operator: UL Environment | |
| By truck: 663 km | | EPD Expiration: | |
| End-of-Life Scope: | | 12/15/2020 | |
| 95% Recovered | | | |
| 5% Landfilled (inert material) | | Cold formed structural steel | 48,358.5 k |
| Module D Scope: Product has 65% scrap input while remainder is processed and | d craditad as avaidad | Used in the following Revit families: | 79.7 kg (60 vm |
| Product has 65% scrap input while remainder is processed and burden | l credited as avoided | 1-C2- GWB on Mtl. Stud 1F5 - 1 HR RATED HORIZONTAL DUCT ENCLOSURE | 78.7 kg (60 yrs 62.4 kg (60 yrs |
| | | 2-C2- GWB on Mtl. Stud | 431.1 kg (60 yr |
| .Cl Source: RNA: Cold Rolled Aluminium ts/AA (2010) [EPD] | | C1 - ACT-1 - 2' x 4' | 2,136.8 kg (60 yrs |
| GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | C1 - ACT-2 - 2' x 2' HRC | 3,757.6 kg (60 yr |
| RNA: Anodization of aluminum extrusion AEC/ts (2015) [EPD] | | C1 - ACT-3 - 2' x 2' C1 - ACT-5 - 2' x 6' | 13,343.2 kg (60 yr 1,655.2 kg (60 yr |
| US: Electricity grid mix ts (2014) | | C1 - Perf Metal Grid - 2'x6' | 6,591.0 kg (60 yr |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (| 2014) | C2- GWB on Mtl. Stud | 652.6 kg (60 yr |
| RNA: Primary Aluminum Ingot AA/ts (2010) [EPD] | | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 6,800.6 kg (60 yr |
| RNA: Secondary Aluminum Ingot AA/ts (2010) [EPD] | | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace Linear Wood Ceiling | 12,601.9 kg (60 yr 247.5 kg (60 yr |
| | 50 5 km | Used in the following Tally entries: | |
| gon gas for IGU Jsed in the following Revit families: | 58.5 kg | Steel, C-H-stud metal framing | |
| (FG2-AL) dr-DBL-A | 1.3 kg (40 yrs) | Steel, C-stud metal framing Steel, furring channel | |
| (FG2-CW) dr-DBL-CW | 0.2 kg (40 yrs) | Steel, HSS section | |
| cp_HSEB - Window at Upper Levels System Panel | 23.2 kg (40 yrs) 33.7 kg (40 yrs) | Description: | |
| , | 55.7 kg (40 yrs) | Cold-rolled or formed structural steel, such as used in steel | studs. |
| Jsed in the following Tally entries: Glazing, custom IGU | | Life Cycle Inventory: 100% Cold rolled steel | |
| Description: | | | |
| Argon gas in insulating glass unit | | Product Scope: Cradle to gate | |
| ife Cycle Inventory: Argon gas | | Transportation Distance: | |
| 5 5 | | By truck: 431 km | |
| Product Scope: Cradle to gate | | End-of-Life Scope: | |
| - | | 98% Recovered | |
| ransportation Distance: By truck: 940 km | | 2% Landfilled (inert material) | |
| ind-of-Life Scope: | | Module D Scope: | |
| 100% to landfill (inert waste) | | Product has 16% scrap input while remainder is processed a burden | nd credited as avoided |
| .CI Source: | | | |
| US: Argon (gaseous) ts (2017) | | LCI Source: RNA: Steel finished cold rolled coil worldsteel (2007) | |
| | | GLO: Steel sheet stamping and bending (5% loss) ts (2017) | |
| ated steel deck, SDI - EPD | 2,255.5 kg | US: Electricity grid mix ts (2014) | |
| Jsed in the following Revit families: | | US: Lubricants at refinery ts (2014) | (2014) |
| (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) | 2,255.5 kg (60 yrs) | GLO: Compressed air 7 bar (medium power consumption) ts GLO: Value of scrap worldsteel (2014) | s (2014) |
| Jsed in the following Tally entries: Steel, deck | | | |
| Description: | | Domestic softwood, US, AWC - EPD | 2,968.3 k |
| Coated steel roof and floor deck panels, $1 \frac{1}{2}$ – 3" in depth at | nd manufactured from | Used in the following Revit families: (R4) SOUTH VEST ROOF | 141.9 kg (30 yrs |
| 22 – 16 gage material. Industry-wide EPD from the Steel Deck | Institute. | (R4) SOUTH VEST ROOF (INTERIOR) | 163.7 kg (30 yrs |
| ife Cycle Inventory: | | Linear Wood Ceiling | 2,420.8 kg (30 yrs |
| For information and quantities, see EPD | | P_SOUTH VESTIBULE WALL | 135.2 kg (30 yrs |
| Product Scope: | | W09_SOUTH VESTIBULE WALL | 106.7 kg (30 yrs |
| Cradle to gate | | Used in the following Tally entries: | |
| | | Wood siding | |
| Fransportation Distance: | | 5 | |

tally.

LCI Data (continued)

Description: Kiln-dried and planed softwood dimensional lumber for standard framing or planking. Industry-wide EPD from the American Wood Council Product Scope: Life Cycle Inventory: For information and quantities, see EPD Product Scope: By truck: 568 km Cradle to gate End-of-Life Scope: Transportation Distance: 98% recovered By truck: 383 km End-of-Life Scope: Module D Scope: 14.5% Recovered 22% Incinerated with energy recovery burden. 63.5% Landfilled (wood product waste) LCI Source: Module D Scope Recovered wood products credited as avoided burden. I CL Source RNA: Softwood lumber CORRIM (2011) EPD Source: 13CA24184.102.1 EPD Designation Holder: American Wood Council and Canadian Wood Council EPD Program Operator: **UL Environment** Description: EPD Expiration: 4/16/2019 99.2 ka Door frame, aluminum, powder-coated, no door Used in the following Revit families: (F1-HMW) dr-SGL-A 10.6 kg (50 vrs) Product Scope (FG1-CW) dr-SGL-CW 10.6 kg (50 yrs) Cradle to gate (FG2-AL) dr-DBL-A 56.0 kg (50 yrs) (N1-HMW) dr-SGL-A 10.9 kg (50 yrs) temp-fence 11.2 kg (50 yrs) By truck: 172 km Used in the following Tally entries: End-of-Life Scope: Door frame, aluminum Description[.] I CL Source Aluminum door frame Life Cycle Inventory: EPD Source: 94% Aluminum 6% Powder coat (by weight) Product Scope: Cradle to gate excludes hardware, casing, sealant **UL Environment** Transportation Distance EPD Expiration: By truck: 568 km 2/14/2022 End-of-Life Scope: 95% aluminum recovered 5% aluminum landfilled (inert material) Module D Scope Product has 36.4% scrap input while remainder is processed and credited as avoided burden LCI Source: DE: Aluminium frame profile, powder coated (EN15804 A1-A3) ts (2017) modified with: RNA: Aluminum extrusion, mill finish - AEC ts (2015) Description: DE: Top coat powder (aluminium) (EN15804 A1-A3) ts (2017) RNA: Secondary Aluminum Ingot AA/ts (2010) rails, clips, etc.) RNA: Primary Aluminum Ingot AA/ts (2010) Door frame, metal, galvanized, no door 3.1 kg Used in the following Revit families: Product Scope: (F1-HMW) dr-SGL-A 3.1 kg (45 yrs) Cradle to gate Used in the following Tally entries: Door frame, steel, galvanized

Description: Stainless steel, 18 ga door frame

Life Cycle Inventory: 100% Galvanized steel Cradle to gate, excludes hardware, jamb, casing, sealant Transportation Distance: 2% landfilled (inert material) Product has a 44% scrap input while remainder is processed and credited as avoided DE: Aluminium wing frame profile, powder coated (2011) modified with: US: Metal roll forming MCA (2010) GLO: Steel sheet stamping and bending (5% loss) ts (2012) RNA: Steel hot dip galvanized worldsteel (2007) EPDM, non-reinforced membrane, 90 mils, SPRI - EPD 60.3 kg Used in the following Revit families (R4) SOUTH VEST ROOF 60.3 kg (20 yrs) Used in the following Tally entries: EPDM, roofing membrane Non-reinforced ethylene propylene diene terpolymer (EPDM) synthetic rubber roofing membrane, default thickness of 90 mils (2.5 mm) Industry-wide EPD from the Single Ply Roofing Industry Life Cycle Inventory: For information and quantities, see EPD Transportation Distance: 100% Landfilled (plastic waste) US: Non-reinforced EPDM single ply roofing membrane, 90 mils, A1-A3 - SPRI ts (2017) 4786842353.103.1 EPD Designation Holder: Single Ply Roofing Industry (SPRI) EPD Program Operator: Fasteners, galvanized steel 4.2 ka Used in the following Revit families: (F1-HMW) dr-SGL-A 0.2 kg (40 yrs) (R4) SOUTH VEST ROOF 3.9 kg (40 yrs) Used in the following Tally entries: Door frame, steel, galvanized EPDM, roofing membrane Galvanized steel part, appropriate for use as fasteners and specialized hardware (bolts, Life Cycle Inventory: 100% Galvanized steel Transportation Distance: By truck: 1001 km End-of-Life Scope: 70% Recovered 30% Landfilled (inert material)

LCI Data (continued)

Module D Scope:

Product has 16% scrap input while remainder is processed and credited as avoided burden

- LCI Source:
- GLO: Steel wire rod worldsteel (2014)
- GLO: Steel turning ts (2017)
- GLO: Electrolytic galvanisation (1 m² steel sheet part, electrolytic) ts (2017) GLO: Value of scrap worldsteel (2014)

| Fasteners, stainless steel | 261.2 kg |
|---|--------------------|
| Used in the following Revit families: | |
| (F1-HMW) dr-SGL-A | 0.2 kg (50 yrs) |
| (FG1-CW) dr-SGL-CW | 0.2 kg (50 yrs) |
| (FG2-AL) dr-DBL-A | 1.2 kg (50 yrs) |
| (N1-HMW) dr-SGL-A | 0.2 kg (50 yrs) |
| (R4) SOUTH VEST ROOF | 0.3 kg (50 yrs) |
| (R4) SOUTH VEST ROOF (INTERIOR) | 0.4 kg (50 yrs) |
| Corner_3 | 7.3 kg (60 yrs) |
| Corner_4 | 7.2 kg (60 yrs) |
| cp_HSEB - Base Material Panel_vertical | 24.7 kg (60 yrs*) |
| cp_HSEB - Skin Shingle Panel_hoz | 189.9 kg (50 yrs) |
| Linear Wood Ceiling | 13.1 kg (50 yrs) |
| P_SOUTH VESTIBULE WALL | 1.6 kg (50-60 yrs) |
| temp-fence | 0.2 kg (50 yrs) |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 13.3 kg (60 yrs) |
| W09_SOUTH VESTIBULE WALL | 1.3 kg (50-60 yrs) |
| Used in the following Tally entries: Door frame, aluminum Metal roofing panels, formed Stainless Steel, Fasteners Wood siding | |
| Description: Stainless steel part, appropriate for use as fasteners and speciali rails, clips, etc.). Data based on industry-wide EPDs for primary a from the World Steel Association. | |
| Life Cycle Inventory: 100% Stainless steel | |
| Product Scope: Cradle to gate | |
| Transportation Distance: | |

Transportation Distance: By truck: 1001 km

End-of-Life Scope: 98% Recovered 2% Landfilled (inert material)

Module D Scope:

Product has 58% scrap input while remainder is processed and credited as avoided burden

LCI Source:

RER: Stainless steel Quarto plate (304) Eurofer (2010) GLO: Steel turning ts (2017) US: Electricity grid mix ts (2014) RER: Stainless steel flat product (304) - value of scrap Eurofer (2010)

Fiberglass blanket insulation, unfaced

| Used in the following Revit families: | |
|--|------------------------|
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 25.1 kg (60 yrs) |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 463.2 kg (60 yrs) |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD | 258.1 kg (60 yrs) |
| 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 2,485.9 kg (60 yrs) |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 36.6 kg (60 yrs) |
| P_SOUTH VESTIBULE WALL | 20.0 kg (60 yrs) |
| W06 PRE-CAST CONCRETE @ FRAMED WALL | 786.0 kg (60 yrs) |
| W07_METAL STUD LIGHTWEIGHT CLADDING | 3,342.5 kg (60 yrs) |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 222.0 kg (60 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insu | lation81.2 kg (60 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 622.6 kg (60 yrs) |
| W09_SOUTH VESTIBULE WALL | 11.8 kg (60 yrs) |
| Used in the following Tally entries: | |

Steel, C-stud metal framing with insulation

Fiberglass batt density varies from 10-14 kg/m³. Life Cycle Inventory: 100% Fiberglass Product Scope: Cradle to gate Transportation Distance: By truck: 172 km End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: US: Fiberglass Batt NAIMA (2007) 17,443.5 kg Fiberglass mat gypsum sheathing board Used in the following Revit families (R3) SBS OVER METAL DECK 16,801.5 kg (60 yrs) (R4) SOUTH VEST ROOF 166.9 kg (60 yrs) (R4) SOUTH VEST ROOF (INTERIOR) 192.5 kg (60 yrs) 3-W07 METAL STUD LIGHTWEIGHT CLADDING 152.6 kg (60 yrs) W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insulation 80.1 kg (60 yrs) Used in the following Tally entries: Fiberglass mat gypsum sheathing Description: Fiberglass treated gypsum sheathing product appropriate for use in high-moisture environments Life Cycle Inventory: 92% Gypsum 8% Fiberglass mat Product Scope: Cradle to gate Transportation Distance: By truck: 172 km End-of-Life Scope: 100% Landfilled (inert waste) I CI Source DE: Gypsum plaster board (Moisture resistant) (EN15804 A1-A3) ts (2017) US: Fiberglass Duct Board NAIMA (2007) 16,719.9 kg Fluid applied synthetic polymer air barrier Used in the following Revit families: 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 59.7 kg (40 yrs) 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 193.9 kg (40 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1,929.9 kg (40 yrs) 614.5 kg (40 yrs) 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 1-W07_METAL STUD LIGHTWEIGHT CLADDING 5,178.9 kg (40 yrs) 3-W07 METAL STUD LIGHTWEIGHT CLADDING 76.3 kg (40 yrs) W06 PRE-CAST CONCRETE @ FRAMED WALL 1,637.5 kg (40 yrs) W07 METAL STUD LIGHTWEIGHT CLADDING 6,963.6 kg (40 yrs) W09 SOUTH VESTIBULE WALL 65.6 kg (40 yrs) Used in the following Tally entries: Fluid applied synthetic polymer air barrier Description: Liquid-applied rubberized membrane Life Cycle Inventory: 34% Calcium carbonate 30% Polymer blend (SBS) 1% Silica 5% Titanium dioxide 30% Water Product Scope: Cradle to gate for materials only, neglects manufacturing requirements Transportation Distance:

By truck: 555 km End-of-Life Scope:

8,304.9 kg

Description:

70% Landfilled (plastic waste) (excludes water evaporation)

1,224.3 kg

Full building summary

LCI Data (continued)

LCI Source:

- US: Styrene-butadiene rubber (SBR) ts (2017) US: Silica sand (flour) ts (2017)
- US: Tap water from groundwater ts (2017)
- US: Titanium dioxide pigment ts (2017) US: Limestone flour (5mm) ts (2017)
- US: Electricity grid mix ts (2014)
- Fluoropolymer coating, metal stock

| Used in the following Revit families: | |
|---|--------------------------------------|
| 1/4" STEEL PLATE | 27.7 kg (60 yrs) |
| 3/16" Aluminum Plate | 2.1 kg (60 yrs) |
| Aluminum Plate 1/8" | 1.4 kg (60 yrs) |
| Aluminum Plate 3/16" | 12.6 kg (60 yrs) |
| Corner_1 | 19.7 kg (60 yrs) |
| Corner_2 | 15.8 kg (60 yrs) |
| Corner_3 | 16.0 kg (60 yrs) |
| Corner_4 | 15.8 kg (60 yrs) |
| KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 48.6 kg (60 yrs) |
| KPFF - SCOL - Steel - W - Wide Flange (C) - TC | 441.2 kg (60 yrs) |
| KPFF - SFRM - Steel - BRB - Buckling Restrained Brace | 0.0 kg (60 yrs) |
| KPFF - SFRM - Steel - HSS - Rectangular (C) - TC KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC | 80.5 kg (60 yrs) 11.5 kg (60 yrs) |
| KPFF - SFRM - Steel - L - Angle (C) - TC | 1.8 kg (60 yrs) |
| P_SOUTH VESTIBULE WALL | 2.6 kg (60 yrs) |
| Parapet Cap Coping | 74.3 kg (60 yrs) |
| Rectangular Mullion | 421.2 kg (60 yrs) |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 29.4 kg (60 yrs) |
| W09_SOUTH VESTIBULE WALL | 2.1 kg (60 yrs) |
| | |
| Used in the following Tally entries: | |
| Aluminum, formed | |
| Aluminum, sheet | |
| Metal roofing panels, formed Steel, angle | |
| Steel, HSS section | |
| Steel, W section (wide flange shape) | |
| | |
| Description: | |
| Standard fluoropolymer coating for metals. This entry is used a | |
| MCA EPD for Roll Formed Steel Panels (EPD ID 13CA27321.101 | .1). |
| Life Cycle Inventory: | |
| 100% Fluoropolymer coating | |
| Product Scope: | |
| Cradle to gate, including application | |
| | |
| Transportation Distance: | |
| N/A | |
| End-of-Life Scope: | |
| 100% Landfilled (inert waste) | |
| | |
| LCI Source: | |
| US: Coil coating MCA (2010) | |
| US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) | |
| 03. Merinai energy non natural gas is (2014) | |
| | |
| Frit (for glazing) | 2.1 kg |
| Used in the following Revit families: | |
| System Panel | 2.1 kg (40 yrs) |
| Used in the following Tally entries: | |
| Glazing, custom IGU | |
| - | |
| Description: Frit applied at a default density of 0.05 kg/m ² gives 100% cover | rado with 19 |
| micrometers thickness. User to select frit density of 20%, 30%, 4 | |
| coverage. | +070, 5070, 01 0070 |
| 5 | |
| Life Cycle Inventory: | |

Life Cycle Inventory: 90.9% Glass granulate 9% Butyl acetate 0.1% Nitrocellulose

Product Scope: Cradle to gate

Transportation Distance: N/A

| End-of-Life Scope: 100% Landfilled (inert waste) | |
|---|--|
| LCI Source: US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) | |
| DE: Butyl acetate ts (2017) DE: Nitrocellulose (cellulose nitrate) ts (2017) DE: Expanded glass granulate ts (2017) | |
| IT: Flat-screen printing ENEA (2002) US: Tap water from groundwater ts (2017) | |
| Galvanized steel Used in the following Revit families: | 74,032.5 kg |
| (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) | 72.0 kg (60 yrs) |
| (B8)_TYP Mtl Stud 8"_GWB Insulation | 36.9 kg (60 yrs) |
| (R4) SOUTH VEST ROOF (R4) SOUTH VEST ROOF (INTERIOR) | 131.4 kg (60 yrs) 1,189.5 kg (60 yrs) |
| 1-B6 | 9.7 kg (60 yrs) |
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD | 52.1 kg (60 yrs) |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 1,269.2 kg (60 yrs) |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 380.2 kg (60 yrs) |
| 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated | 5,461.7 kg (60 yrs) 14.0 kg (60 yrs) |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING | 124.5 kg (60 yrs) |
| A4_Furr Mtl Stud 4"_GWB (1-0) | 157.9 kg (60 yrs) |
| ACT 4 AcoustiBuilt Ceiling | 1,539.8 kg (60 yrs) |
| B4 B6 | 90.4 kg (60 yrs) 68.7 kg (60 yrs) |
| C7- GWB on Mtl. Stud 2 | 226.3 kg (60 yrs) |
| HSEB - Pipe Guardrail - GDR-2 | 1,171.6 kg (60 yrs) |
| HSEB - Pipe Guardrail - GDR-2 without handrail | 1,048.1 kg (60 yrs) |
| HSEB Guardrail - Cable Rail | 626.0 kg (60 yrs) |
| HSEB Guardrail - Cable Rail without handrail HSEB Handrail - HNDRL-1 | 1,105.3 kg (60 yrs) 1,445.7 kg (60 yrs) |
| HSEB Handrail - HNDRL-3 | 46.3 kg (60 yrs) |
| HSEB PIPE Handrail - HNDRL-2 | 205.4 kg (60 yrs) |
| HSEB-GDR-4_Canerail | 24.5 kg (60 yrs) |
| KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 12,562.2 kg (60 yrs) |
| KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x KPFF - SCOL - Steel - HSS - Round (C) - TC | 567.7 kg (60 yrs) 221.2 kg (60 yrs) |
| KPFF - SFRM - Steel - HSS - Rectangular (C) - TC | 15,577.6 kg (60 yrs) |
| LCL_Embed_2x3-Nelson-Studs_OffSet | 165.4 kg (45 yrs) |
| P_SOUTH VESTIBULE WALL | 62.1 kg (60 yrs) |
| W06 PRE-CAST CONCRETE @ FRAMED WALL W07_METAL STUD LIGHTWEIGHT CLADDING | 2,026.0 kg (60 yrs) 7,767.5 kg (60 yrs) |
| W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 16,481.0 kg (60 yrs) |
| W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no insu | |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) | 1,934.1 kg (60 yrs) |
| W09_SOUTH VESTIBULE WALL | 51.6 kg (60 yrs) |
| Used in the following Tally entries: | |
| Steel, C-stud metal framing | |
| Steel, C-stud metal framing with insulation Steel, furring channel | |
| Steel, HSS section | |
| Steel, plate | |
| Steel, rectangular bar | |
| Steel, round tubing | |
| Description: Hot dipped galvanized steel profile, for use with cladding systems. | |
| Life Cycle Inventory: 100% Steel, hot dip galvanized | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 431 km | |
| End-of-Life Scope: 98% Recovered | |

98% Recovered 2% Landfilled (inert material)

Module D Scope: Product has 44% scrap input while remainder is processed and credited as avoided burden

HEALTH SCIENCES EDUCATION BOTMENING Alternate baseline design

Full building summary

| LCI Source: RNA: Steel hot dip galvanized worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (201 US: Metal roll forming M CA (2010) | 4) | Glass fiber reinforced plastic paneling Used in the following Revit families: 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD W06 PRE-CAST CONCRETE @ FRAMED WALL | 318.0 kg 3.1 kg (60 yrs* 10.2 kg (60 yrs* 101.0 kg (60 yrs* 32.2 kg (60 yrs* 171.5 kg (60 yrs* |
|---|--|--|---|
| GLO: Value of scrap worldsteel (2014) | | Used in the following Tally entries: Fiberglass clip system | |
| Salvanized steel decking Used in the following Revit families: (F2) CONCRETE METAL DECK (F3) CONCRETE METAL DECK W/ TOPPING SLAB (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF (INTERIOR) | 89,764.5 kg 55,227.3 kg (60 yrs) 3,185.1 kg (60 yrs) 7,867.3 kg (60 yrs) 23,414.7 kg (60 yrs) 70.0 kg (60 yrs) | Description: Glass fibers with polyester resin formed into solid sheet stock Life Cycle Inventory: 50% Glass fibers 50% Polyester resin | |
| Used in the following Tally entries: | | Product Scope: Cradle to gate | |
| Steel, deck Description: | | Transportation Distance: By truck: 172 km | |
| Hot dip galvanized steel roof decking, corrugated profile. Default galvanized to G90 standards, coated on both sides of 20 gauge s and precut. | | End-of-Life Scope: 100% landfilled (plastic waste) | |
| Life Cycle Inventory: 100% Steel, hot dip galvanized Product Scope: Cradle to gate for deck only. Transportation Distance: | | LCI Source: DE: Polyester Resin unsaturated (UP) ts (2017) US: Glass fibres ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) | |
| By truck: 431 km End-of-Life Scope: 98% Recovered | | GLO: Compressed air 7 bar (medium power consumption) ts (2014) | |
| 2% Landfilled (inert material) | | Glazing, monolithic sheet, generic Used in the following Revit families: | 4,667.0 kg |
| Module D Scope: Product has 44% scrap input while remainder is processed and cr burden | edited as avoided | cp_HSEB - Window at Upper Levels System Panel | 3,859.1 kg (40 yrs 807.9 kg (40 yrs |
| LCI Source: RNA: Steel hot dip galvanized worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2014) US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (201 US: Metal roll forming M CA (2010) | 4) | Used in the following Tally entries: Glazing, custom IGU Description: Standard float glass, uncoated. Note: this entry is appropriate for cle Default thickness is 3 mm. Life Cycle Inventory: Glazing | ear or tinted glass. |
| GLO: Value of scrap worldsteel (2014) | | Product Scope: Cradle to gate | |
| FRC, spray coating Used in the following Revit families: cp_HSEB - Skin Shingle Panel_hoz | 35,240.5 kg 35,240.5 kg (50 yrs) | Transportation Distance: By truck: 940 km | |
| Used in the following Tally entries: Glass fiber reinforced concrete, spray coating | | End-of-Life Scope: 100% Landfilled (inert waste) | |
| Description: Glass fiber reinforced concrete (GFRC) used in spray-up process, propulsion agent. | inclusive of | LCI Source: DE: Window glass simple (EN15804 A1-A3) ts (2017) | |
| Life Cycle Inventory: 21% Cement | | Glazing, monolithic sheet, safety glass Used in the following Revit families: (N1-HMW) dr-SGL-A | 68.3 kg (30 yrs |
| 63% Sand 16% Water 3% Acrylate resin | | Used in the following Tally entries: Glazing, monolithic sheet | |
| Product Scope: Cradle to gate, includes propulsion agent, excludes all other insta | illation impacts | Description: Standard safety glass, default thickness is 3mm. Note: this entry is a | ppropriate for clear |
| Transportation Distance: By truck: 172 km | | or tinted glass. Life Cycle Inventory: | |
| End-of-Life Scope: 100% Landfilled | | Sodium sulphate Soda (Na2CO3) Silica sand | |
| LCI Source: US: Portland cement PCA/ts (2014) US: Tap water from groundwater ts (2017) US: Silica sand (Excavation and processing) ts (2017) US: Glass fibres ts (2017) | | Calcium hydroxide Lime Tin Dolomite | |
| DE: Acrylate resin (epoxy-functional) ts (2017) | | Product Scope: Cradle to gate | |

| Transportation Distance: By truck: 940 km | | Hollow door, exterior, aluminum, anodized Used in the following Revit families: | 86.2 |
|--|--|---|-------------------|
| End-of-Life Scope: | | (F2) dr-Double-Flush-with 4 sided jambs | 86.2 kg (30 yı |
| 100% Landfilled (inert waste) LCI Source: | | Used in the following Tally entries: Door, exterior, aluminum | |
| DE: Window glass simple (EN15804 A1-A3) ts (2017) | | Description: Anodized aluminum, exterior, with interior steel supports and polyu | urethane foam |
| lazing, monolithic sheet, tempered | 34,096.8 kg | insulation | |
| Used in the following Revit families: | (101-(40) | Life Cycle Inventory: | |
| (FG1-CW) dr-SGL-CW (FG2-AL) dr-DBL-A | 61.9 kg (40 yrs) 862.9 kg (40 yrs) | 3% Steel 71% Anodized aluminum | |
| (FG2-CW) dr-DBL-CW | 208.5 kg (40 yrs) | 25% Polyurethane foam | |
| cp_HSEB - Window at Upper Levels | 10,856.3 kg (40 yrs) | | |
| System Panel | 22,107.2 kg (40 yrs) | Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesives | |
| Used in the following Tally entries: | | Transportation Distance: | |
| Glazing, custom IGU | | By truck: 568 km | |
| Description: | and the state of t | End-of-Life Scope: | |
| Tempered float glass. Note: this entry is appropriate for cl thickness is 3 mm. | ear or tinted glass. Default | 70% Steel recovered | |
| | | 30% Steel landfilled (inert material) | |
| Life Cycle Inventory: Tempered glazing | | 95% Aluminum recovered (includes processing and avoided burder 5% Aluminum is landfilled (inert material) | h credit) |
| | | 100% Insulation landfilled (plastic material) | |
| Product Scope: Cradle to gate | | Module D Scope: | |
| - | | Product has 50% aluminum scrap input and 1% steel scrap input w | hile remainder is |
| Transportation Distance: By truck: 940 km | | processed and credited as avoided burden. | |
| | | LCI Source: | |
| End-of-Life Scope: 100% Landfilled (inert waste) | | DE: Polyurethane foam (PUR) ts (2017) | |
| | | RNA: Anodization of aluminium (EN15804 A1-A3) ts (2015) | |
| LCI Source: | | RNA: Cold Rolled Aluminum AA/ts (2010) | |
| DE: Window glass simple (EN15804 A1-A3) ts (2017) US: Electricity grid mix ts (2014) | | GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) | |
| US: Thermal energy from natural gas ts (2014) | | US: Lubricants at refinery ts (2014) | |
| | | GLO: Compressed air 7 bar (medium power consumption) ts (2014) | |
| ardware, stainless steel | 45.2 kg | RNA: Steel hot dip galvanized worldsteel (2007) | |
| Used in the following Revit families: | 2 | RNA: Secondary Aluminum Ingot AA/ts (2010) RNA: Primary Aluminum Ingot AA/ts (2010) | |
| (F1-HMW) dr-SGL-A | 7.0 kg (60 yrs) | KNA. Filmary Aluminum ingot AA/IS (2010) | |
| (F2) dr-Double-Flush-with 4 sided jambs | 7.5 kg (60 yrs) | Hellen, deer, enterier, eluminum, enediered leves vision nevel | 226.0 |
| (FG2-AL) dr-DBL-A (FG2-CW) dr-DBL-CW | 10.3 kg (60 yrs) 10.3 kg (60 yrs) | Hollow door, exterior, aluminum, anodized, large vision panel Used in the following Revit families: | 236.9 |
| (N1-HMW) dr-SGL-A | 5.3 kg (60 yrs) | (FG2-AL) dr-DBL-A | 118.4 kg (30 y |
| temp-fence | 4.7 kg (60 yrs) | (FG2-CW) dr-DBL-CW | 118.4 kg (30 y |
| Used in the following Tally entries: | | Used in the following Tally entries: | |
| Door, exterior, aluminum | | Door, exterior, aluminum | |
| Door, exterior, steel Door, interior, steel | | Description: | |
| | | Hollow, anodized aluminum exterior door inclusive of large vision p | oanel (>50% door |
| Description: Finished, cast stainless steel, applicable for door, window | or other accessory bardware | area), polyurethane foam insulation, no frame | |
| | of other accessory naruware | Life Cycle Inventory: | |
| Life Cycle Inventory: 100% Stainless steel | | 47% Glass 3% Steel | |
| | | 37% Anodized aluminum | |
| Product Scope: | | 13% Polyurethane foam | |
| Cradle to gate | | Product Scope: | |
| Transportation Distance: By truck: 1001 km | | Cradle to gate, excludes assembly, frame, hardware, and adhesives | |
| • | | Transportation Distance: | |
| End-of-Life Scope: 98% Recovered | | By truck: 568 km | |
| 2% Landfilled (inert material) | | End-of-Life Scope: | |
| | | 70% Steel recovered | |
| Module D Scope: | and credited as avoided | 30% Steel landfilled (inert material) | |
| • | | 95% Aluminum recovered (includes processing and avoided burder 5% Aluminum is landfilled (inert material) | n credit) |
| Module D Scope: Product has 58% scrap input while remainder is processed burden | | 100% Insulation landfilled (plastic material) | |
| Product has 58% scrap input while remainder is processed burden | | (Provide matching) | |
| Product has 58% scrap input while remainder is processed burden | | 100% Glass landfilled (inert material) | |
| Product has 58% scrap input while remainder is processed burden LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) DE: Steel cast part machining ts (2017) | | | |
| burden LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) DE: Steel cast part machining ts (2017) US: Electricity grid mix ts (2014) | fer (2010) | 100% Glass landfilled (inert material) Module D Scope: Product has 26% aluminum scrap input and 1% steel scrap input w | hile remainder is |
| Product has 58% scrap input while remainder is processed burden LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) DE: Steel cast part machining ts (2017) | fer (2010) | Module D Scope: | hile remainder is |
| Product has 58% scrap input while remainder is processed burden LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) DE: Steel cast part machining ts (2017) US: Electricity grid mix ts (2014) | fer (2010) | Module D Scope: Product has 26% aluminum scrap input and 1% steel scrap input w | hile remainder is |
| Product has 58% scrap input while remainder is processed burden LCI Source: RER: Stainless steel Quarto plate (304) Eurofer (2010) DE: Steel cast part machining ts (2017) US: Electricity grid mix ts (2014) | fer (2010) | Module D Scope: Product has 26% aluminum scrap input and 1% steel scrap input w processed and credited as avoided burden. | hile remainder is |

LCI Data (continued)

| RNA: Cold Rolled Aluminum AA/ts (2010) GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) | | RNA: Steel finsihed cold rolled coil worldsteel (2007) DE: Mineral fibres ceiling boards (EN15804 A1-A3) ts (2017) | |
|--|-------------------|--|--|
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (2014 | 1) | Hollow door, interior, steel, galvanized | 157.1 k |
| RNA: Steel hot dip galvanized worldsteel (2007) | | Used in the following Revit families: (F1-HMW) dr-SGL-A | 67.3 kg (50 yrs |
| RNA: Secondary Aluminum Ingot AA/ts (2010) RNA: Primary Aluminum Ingot AA/ts (2010) | | temp-fence | 89.7 kg (50 yrs |
| DE: Window glass simple (EN15804) ts (2017) | | Used in the following Tally entries: Door, interior, steel | |
| lollow door, exterior, steel, galvanized | 96.7 kg | Description: | |
| Used in the following Revit families: (N1-HMW) dr-SGL-A | 96.7 kg (30 yrs) | Hollow, galvanized steel interior door inclusive of honeycon | no kran paper, no trame |
| Used in the following Tally entries: | | Life Cycle Inventory: 12% Kraft core | |
| Door, exterior, steel | | 88% Galvanized steel | |
| Description: Hollow door, exterior, steel, 18 ga. inclusive of EPS insulation, no f | rame | Product Scope: Cradle to gate, excludes assembly, frame, hardware, and ad | hesives |
| Life Cycle Inventory: 5% Extruded polystyrene | | Transportation Distance: By truck: 568 km | |
| 95% Galvanized steel | | End-of-Life Scope: | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: | 5 | 70% Steel recovered 30% Steel landfilled (inert material) | |
| Transportation Distance: | | 100% Core landfilled (biodegradable material) | |
| By truck: 568 km | | Module D Scope: | |
| End-of-Life Scope: | | Product has 41% scrap input while remainder is processed a burden. | and credited as avoided |
| 70% Steel recovered 30% Steel landfilled (inert material) | | LCI Source: | |
| 100% Core landfilled (biodegradable material) | | DE: Kraft paper ts (2017) | |
| Module D Scope: | | GLO: Steel sheet stamping and bending (5% loss) ts (2017) GLO: Value of scrap worldsteel (2014) | |
| Product has 44% scrap input while remainder is processed and cre burden. | edited as avoided | US: Electricity grid mix ts (2014) | |
| LCI Source: | | US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) t: | s (2014) |
| DE: Expanded Polystyrene (PS 25) (EN15804 A1-A3) ts (2017) GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | RNA: Steel hot dip galvanized worldsteel (2007) | |
| GLO: Value of scrap worldsteel (2014) US: Electricity grid mix ts (2014) | | Hot rolled structural steel, AISC - EPD | 518,506.5 k |
| US: Lubricants at refinery ts (2014) | • | Used in the following Revit families: HSEB Type C - STR-4_Conc filled w/ C channel | 1,158.0 kg (60 yrs |
| GLO: Compressed air 7 bar (medium power consumption) ts (2014 RNA: Steel hot dip galvanized worldsteel (2007) | +) | HSEB Type C_STR-10_Conc filled w/ C channel | 332.8 kg (60 yrs |
| | | HSEB Type C_STR-5_Conc filled w/ C channel 2 KPFF - SCOL - Steel - W - Wide Flange (C) - TC | 3,047.8 kg (60 yr: 122,740.2 kg (60 yr: |
| ollow door, interior, steel, fire-rated | 81.8 kg | KPFF - SFRM - Steel - C - Channel (C) - TC | 4,966.2 kg (60 yrs |
| Used in the following Revit families: (F1-HMW) dr-SGL-A | 81.8 kg (50 yrs) | KPFF - SFRM - Steel - Kicker Brace - L - Angle - TC KPFF - SFRM - Steel - L - Angle (C) - TC | 976.4 kg (60 yrs 264.1 kg (60 yrs |
| Used in the following Tally entries: | 5. 5. | KPFF - SFRM - Steel - W - Wide Flange (C) - TC | 384,876.4 kg (60 yrs |
| Door, interior, steel | | KPFF - SFRM - Steel - WT - Wide Flange Tee - TC KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC | 40.7 kg (60 yrs 104.0 kg (60 yrs |
| Description: Fire-rated door, interior, steel, inclusive of mineral fiber insulation, | no frame | Used in the following Tally entries: Steel, angle | |
| Life Cycle Inventory: | | Steel, C channel | |
| 72% Steel 28% Mineral wool | | Steel, W section (wide flange shape) | |
| | | Description: | rican Institute of Steel |
| Product Scope: | s | Hot rolled structural steel. Industry-wide EPD from the Ame Construction | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: | 5 | Construction. Life Cycle Inventory: | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km | 5 | Construction. Life Cycle Inventory: For information and quantities, see EPD | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered | s | Construction. Life Cycle Inventory: | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: | 5 | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) Module D Scope: | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) Module D Scope: Product has 12% scrap input while remainder is processed and cre burden. | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) | |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) 100% Insulation landfilled (plastic material) Module D Scope: Product has 12% scrap input while remainder is processed and cre burden. LCI Source: DE: Expanded Polystyrene (PS 30) (EN15804 A1-A3) ts (2017) | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered | tween recovered material |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) 100% Insulation landfilled (plastic material) Module D Scope: Product has 12% scrap input while remainder is processed and cre burden. LCI Source: | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) Module D Scope: | tween recovered material |
| Product Scope: Cradle to gate, excludes assembly, frame, hardware, and adhesive: Transportation Distance: By truck: 568 km End-of-Life Scope: 70% Steel recovered 30% Steel landfilled (inert material) 100% Insulation landfilled (plastic material) Module D Scope: Product has 12% scrap input while remainder is processed and cre burden. LCI Source: DE: Expanded Polystyrene (PS 30) (EN15804 A1-A3) ts (2017) GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | Construction. Life Cycle Inventory: For information and quantities, see EPD Product Scope: Cradle to gate Transportation Distance: By truck: 431 km End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) Module D Scope: Product has 100% scrap input, burden reflects difference be | tween recovered material |

157.1 kg 67.3 kg (50 yrs) 89.7 kg (50 yrs)

me, hardware, and adhesives material) mainder is processed and credited as avoided ng (5% loss) ts (2017) power consumption) ts (2014) eel (2007) 518,506.5 kg channel 1,158.0 kg (60 yrs) channel 332.8 kg (60 yrs) hannel 2 3,047.8 kg (60 yrs) (C) - TC 122,740.2 kg (60 yrs) 4,966.2 kg (60 yrs) 976.4 kg (60 yrs) TC Angle - TC 264.1 kg (60 yrs) 384,876.4 kg (60 yrs) 40.7 kg (60 yrs) e (C) - TC ge Tee - TC ge Tee (C) - TC 104.0 kg (60 yrs) ide EPD from the American Institute of Steel D reflects difference between recovered material ns AISC (2010)

| EPD Source: <u>4786979051.102.1</u> EPD Designation Holder: | | Life Cycle Inventory: 3% PVB film (30% adipic acid 70% PVB) |
|--|--|---|
| American Institute of Steel Construction EPD Program Operator: | | 97% Glass Product Scope: Cradle to gate |
| UL Environment EPD Expiration: | | Transportation Distance: N/A |
| 3/31/2021 | | End-of-Life Scope: |
| IGU spacer Used in the following Revit families: | 283.4 kg | 100% Landfilled (inert waste) LCI Source: |
| (FG2-AL) dr-DBL-A (FG2-CW) dr-DBL-CW cp_HSEB - Window at Upper Levels System Panel | 6.3 kg (40 yrs) 1.2 kg (40 yrs) 112.7 kg (40 yrs) 163.2 kg (40 yrs) | DE: Adipic acid from cyclohexane ts (2017) DE: Polyvinyl Butyral Granulate (PVB) ts (2017) GLO: Plastic film (PE, PP, PVC) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) |
| Used in the following Tally entries: Glazing, custom IGU | | US: Lubricants at refinery ts (2014) |
| Description: Insulating glass unit (IGU) spacer and gasket used to separate two glass. Density value assumes a 1/2" (13/2 mm) spacer. Life Cycle Inventory: 70% Polybutadiene rubber spacer | or more plies of | Lightweight concrete, 5000 psi, Pacific Northwest regional average 65,224.5 kg Used in the following Revit families: 1,437.3 kg (60 yrs) HSEB Type C - STR-4_Conc filled w/ C channel 552.8 kg (60 yrs) HSEB Type C_STR-5_Conc filled w/ C channel 2 2,234.5 kg (60 yrs) |
| 30% Nitrile rubber spacer Product Scope: Cradle to gate | | HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access 413.5 kg (60 yrs; HSEB Type C_STR-8_Conc filled w/ Plate 318.4 kg (60 yrs; KPFF - SCOL - Concrete - Round 1.268.3 kg (60 yrs; LCL_C_Pilaster_Rect_0w)d 58,999.5 kg (60 yrs; |
| Transportation Distance: By truck: 940 km | | Used in the following Tally entries: Cast-in-place concrete, lightweight structural concrete, 5000 psi |
| End-of-Life Scope: 100% Landfilled (inert waste) | | Description: Lightweight concrete, 5000 psi, Pacific Northwest regional average. Mix design |
| LCI Source: DE: Polybutadiene rubber ts (2017) DE: Nitrile butadiene rubber, incl. MMA (NBR-speciality) ts (2017) | | matches National Ready-Mix Concrete Association (NRMCA) Industry-wide EPD. Life Cycle Inventory: Expanded shale: 34%, Sand: 32%, Portland cement PCA - EPD: 19%, Water: 10%, Fly ash: 5%, Expanded slag: 1%, Admixture: <1% |
| Laminated spruce panel board Used in the following Revit families: C7- GWB on Mtl. Stud 2 | 278.9 kg 278.9 kg (30 yrs) | Product Scope: Cradle to gate Anchors, ties, and metal accessories outside of scope (<1% mass) |
| Used in the following Tally entries: Plywood, interior grade | | Transportation Distance: By truck: 24 km |
| Description: Laminated spruce woodboard (Duo-/Trio boards) consists of layers with phenolic resin-based adhesive. Laminated woodboards in com laminated timber are thicker (45mm). Appropriate for use in interio | nparison to | End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) |
| Life Cycle Inventory: 100% Laminated wood board | | Module D Scope: Avoided burden credit for coarse aggregate, includes grinding energy |
| Product Scope: Cradle to gate, excludes finishes laminate as proxy for glue and adhesives during installation Transportation Distance: By truck: 383 km End-of-Life Scope: 14.5% Recovered | | LCI Source: US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017) DE: Gravel (Grain size 2/32) (EN15804 A1-A3) ts (2017) DE: Fly ash (EN15804 A1-A3) ts (2017) DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) DE: Expanded clay (EN15804 A1-A3) ts (2017) DE: alcium nitrate ts (2017) |
| 22% Incinerated with energy recovery 63.5% Landfilled (wood product waste) | | DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) |
| Module D Scope: Recovered wood products credited as avoided burden. | | US: Colophony (rosin, refined) from CN pine gum rosin ts (2017) US: Tap water from groundwater ts (2017) US: Electricity grid mix s (2014) |
| LCI Source: | | US: Natural gas mix ts (2014) US: Diesel mix at filling station (100% fossil) ts (2014) |
| DE: Laminated wood panel board ts (2017) | | |
| | 58.5 kg 58.5 kg (40 yrs) | US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) |
| DE: Laminated wood panel board ts (2017) Laminating (for glazing) Used in the following Revit families: | - | 30% utane) ts (2014) |

| Low-e coating (for glazing) Used in the following Revit families: | 312.7 kg | Overhead door closer, aluminum Used in the following Revit families: | 26.1 kg |
|---|--|--|---|
| (FG2-AL) dr-DBL-A (FG2-CW) dr-DBL-CW | 7.1 kg (40 yrs) 1.3 kg (40 yrs) | (F1-HMW) dr-SGL [–] A (FG2-AL) dr-DBL-A | 4.7 kg (30 yrs 10.7 kg (30 yrs |
| cp_HSEB - Window at Upper Levels System Panel | 126.8 kg (40 yrs) 177.5 kg (40 yrs) | (FG2-CW) dr-DBL-CW | 10.7 kg (30 yrs |
| Used in the following Tally entries: Glazing, custom IGU | | Used in the following Tally entries: Door, exterior, aluminum Door, interior, steel | |
| Description: Low-e coating for application to glazing lite | | Description: Aluminum overhead door closer. Data based on product-speci | fic EPD from FV S+B. |
| Life Cycle Inventory: Ferro chrome mix | | Life Cycle Inventory: See EPD | |
| Nickel mix Tin Silver mix | | Product Scope: Cradle to gate | |
| Product Scope: Cradle to gate | | Transportation Distance: By truck: 1001 km | |
| Transportation Distance: N/A | | End-of-Life Scope: 95% Recovered 5% Landfilled (inert material) | |
| End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: | | Module D Scope: Product has 0% scrap input, burden reflects difference betweer | n recovered material and |
| Low-e coating from DE: Double glazing unit (EN15804 A1-A3) ts (20 | 017) | scrap input LCI Source: DE: Overhead door closer aluminum - FV S+B PE-EPD (2009) | |
| Mineral wool, high density, NAIMA - EPD Used in the following Revit families: | 39,858.1 kg | RNA: Secondary Aluminum Ingot AA/ts (2010) RNA: Primary Aluminium Ingot AA/ts (2010) | |
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W05 CONCRETE WALL W/ EXTERIOR INSULATION 22" 1-W06 PRE-CAST CONCRETE @ FRAMED WALL | 38.2 kg (60 yrs) 248.2 kg (60 yrs) 1,235.2 kg (60 yrs) | EPD Source: EPD-ARG-20160183-IBG1-EN | |
| 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 1-W07_METAL STUD LIGHTWEIGHT CLADDING | 393.3 kg (60 yrs) 13,257.9 kg (60 yrs) | EPD Designation Holder: European Federation of Associations of Lock and Builders Hard | lware Manufacturers |
| 3-W07_METAL STUD LIGHTWEIGHT CLADDING W06 PRE-CAST CONCRETE @ FRAMED WALL | 195.3 kg (60 yrs) 2,096.0 kg (60 yrs) | (ARGE) | |
| W07_METAL STUD LIGHTWEIGHT CLADDING W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 17,826.7 kg (60 yrs) 1,184.1 kg (60 yrs) | EPD Program Operator: Institut Bauen and Umwelt (IBU) | |
| W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) W09_SOUTH VESTIBULE WALL | 3,320.3 kg (60 yrs) 63.0 kg (60 yrs) | EPD Expiration: 9/13/2021 | |
| Used in the following Tally entries: Mineral wool, board, generic | | Paint, enamel, solvent based | 9,648.7 kg |
| Description: Rock board, heavy density. Industry-wide EPD from the North Ame Manufacturers Association. EPD representative of conditions in Nor | | Used in the following Revit families: 3/16" Aluminum Plate KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 5.0 kg (15 yrs 255.3 kg (15 yrs |
| Life Cycle Inventory: For information and quantities, see EPD | | KPFF - SCOL - Steel - HSS - Rectangular (C) - TC- 2x KPFF - SCOL - Steel - HSS - Round (C) - TC KPFF - SFRM - Steel - C - Channel (C) - TC | 23.1 kg (15 yrs 10.3 kg (15 yrs 94.7 kg (15 yrs |
| Product Scope: Cradle to gate | | KPFF - SFRM - Steel - HSS - Rectangular (C) - TC KPFF - SFRM - Steel - W - Wide Flange (C) - TC | 182.2 kg (15 yrs) 9,069.8 kg (15 yrs) |
| Transportation Distance: By truck: 172 km | | KPFF - SFRM - Steel - WT - Wide Flange Tee - TC KPFF - SFRM - Steel - WT - Wide Flange Tee (C) - TC | 1.9 kg (15 yrs) 6.4 kg (15 yrs) |
| End-of-Life Scope: 100% Landfilled (inert waste) | | Used in the following Tally entries: Aluminum, sheet Steel. C channel | |
| LCI Source: US: Rock board insulation (heavy density) NAIMA (2007) | | Steel, HSS section Steel, W section (wide flange shape) | |
| EPD Source: 4786060412.102.1 | | Description: Solvent-based enamel paint, appropriate for use on metals | |
| - D Designation Holder: North American Insulation Manufacturer's Association (NAIMA) | | Life Cycle Inventory: 17% Binding agent | |
| EPD Program Operator: UL Environment | | 16% Pigments and fillers 67% Solvent | |
| EPD Expiration: 11/8/2018 | | Product Scope: Cradle to gate, including emissions during application Transportation Distance: | |
| | | Transportation Distance: By truck: 642 km | |
| | | End-of-Life Scope: 33% Solids landfilled (plastic waste) | |
| | | LCI Source: DE: Solvent paint white (EN15804 A1-A3) ts (2017) | |
| | | | |

| Paint, exterior metal coating, silicone-based | 767.3 kg |
|---|--|
| Used in the following Revit families: (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF cp_HSEB - Skin Shingle flashing HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C_STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 HSEB Type C_STR-6_Conc filled w/ Plate Stringer - Roof Access HSEB Type C_STR-8_Conc filled w/ Plate HSEB_TR-9_Precast Tread Steel Riser LOUVER-parametric | 60.0 kg (30 yrs) 165.6 kg (30 yrs) 492.8 kg (30 yrs) 1.2 kg (30 yrs) 10.2 kg (30 yrs) 10.2 kg (30 yrs) 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) 3.8 kg (30 yrs) 0.8 kg (30 yrs) 2.5 kg (30 yrs) 11.1 kg (30 yrs) |
| Used in the following Tally entries: Aluminum, sheet Steel, deck Steel, plate | |
| Description: Silicone-based metal paint, with a default coating thickness of 100 m | icrons |
| Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents Product Scope: Cradle to gate, including emissions during application | |
| Transportation Distance: By truck: 642 km | |
| End-of-Life Scope: 100% to landfill (plastic waste) | |
| LCI Source: DE: Application coating silicone (building, exterior, white) ts (2017) | |
| Paint, exterior metal coating, silicone-based, by area Used in the following Revit families: HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-10_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel 2 | 18.2 kg 5.1 kg (30 yrs) 1.9 kg (30 yrs) 11.2 kg (30 yrs) |
| Used in the following Tally entries: Steel, C channel | |
| Description: Silicone-based metal paint, with a default coating thickness of 100 m | icrons |
| Life Cycle Inventory: 23% Binding agent 35% Pigments and fillers 40% Water 1.5% Organic solvents | |
| Product Scope: Cradle to gate, including emissions during application | |
| Transportation Distance: By truck: 642 km | |
| End-of-Life Scope: 100% to landfill (plastic waste) | |
| LCI Source: DE: Application coating silicone (building, exterior, white) ts (2017) | |
| Paint, interior acrylic latex Used in the following Revit families: 1-C2- GWB on Mtl. Stud 1-W07_METAL STUD LIGHTWEIGHT CLADDING 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated 2-C2- GWB on Mtl. Stud 3-W07_METAL STUD LIGHTWEIGHT CLADDING A4_Furr Mtl Stud 4"_GWB (1-0) ACT 4 AcoustiBuilt Ceiling C1 - ACT-1 - 2' x 4' C2- GWB on Mtl. Stud | 3,448.0 kg 14.1 kg (7 yrs) 1,791.9 kg (7 yrs) 4.1 kg (7 yrs) 96.7 kg (7 yrs) 26.4 kg (7 yrs) 60.8 kg (7 yrs) 182.3 kg (7 yrs) 628.7 kg (7 yrs) 456.2 kg (7 yrs) |

| C7- GWB on Mtl. Stud 2 W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 26.8 kg (7 yrs) 160.0 kg (7 yrs) |
|--|--|
| Used in the following Tally entries: Acoustic ceiling system, mineral fiber board Wall board, gypsum | |
| Description: Acrylic-based paint for interior applications | |
| Life Cycle Inventory: 21% Binding agent 35% Pigments and fillers 42% Water 2% Organic solvents | |
| Product Scope: Cradle to gate, including emissions during application | |
| Transportation Distance: By truck: 642 km | |
| End-of-Life Scope: 100% to landfill (plastic waste) | |
| LCI Source: DE: Application paint emulsion (building, interior, white, wear re | esistant) ts (2017) |
| Phenolic resin solid surfacing, sheet | 2,684.0 kg |
| Used in the following Revit families: cp_HSEB - Base Material Panel_vertical | 2,684.0 kg (20 yrs) |
| Used in the following Tally entries: Phenolic resin solid surface, sheet | |
| Description: Phenolic resin saturated kraft paper formed into solid sheet sto | ck |
| Life Cycle Inventory: 85% Kraft paper 15% Phenolic resin | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 640 km | |
| End-of-Life Scope: 100% landfilled (plastic waste) | |
| LCI Source: US: Phenolic resin (45% concentration) ts (2017) GLO: Plastic extrusion profile (unspecific) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts (20 EU-28: Kraft paper ts (2017) | 014) |
| PIR rigid foam insulation, roof, R=20.5, PIMA - EPD | 12,008.0 kg |
| Used in the following Revit families: (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF | 11,996.3 kg (60 yrs) 11.7 kg (60 yrs) |
| Used in the following Tally entries: Polyisocyanurate (PIR), board | |
| Description: Polyisocyanurate rigid foam roof insulation with glass-fiber reir of 20.5, 3.5" thickness (89 mm). Industry-wide EPD from the Pol Insulation Manufacturers Association. | |
| Life Cycle Inventory: For information and quantities, see EPD | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 250 km | |
| End-of-Life Scope: | |

LCI Data (continued)

| LCI Source: RNA: Polyisocyanurate rigid foam board roof insulaton, R=20.5 (| A1-A3) ts-EPD (2013) |
|---|---|
| EPD Source: EPD10043 | |
| EPD Designation Holder: Polyisocyanurate Insulation Manufacturers Association | |
| EPD Program Operator: NSF International | |
| EPD Expiration: 2/6/2020 | |
| | |
| PIR rigid foam insulation, wall, R=14.6, PIMA - EPD Used in the following Revit families: cp_HSEB - Skin Shingle flashing | 9.8 kg 9.8 kg (60 yrs) |
| Used in the following Tally entries: Polyisocyanurate (PIR), board | |
| Description: Polyisocyanurate rigid foam wall insulation with aluminum foil o R-value of 14.6, 2.25" thickness (57.2 mm). Industry-wide EPD fro Polyisocyanurate Insulation Manufacturers Association. | |
| Life Cycle Inventory: For information and quantities, see EPD | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 250 km | |
| End-of-Life Scope: 100% Landfilled (plastic waste) | |
| LCI Source: RNA: Polyisocyanurate rigid foam board wall insulation, R=14.6 | (A1-A3) ts-EPD (2013) |
| EPD Source: EPD10042 | |
| EPD Designation Holder: Polyisocyanurate Insulation Manufacturers Association | |
| EPD Program Operator: NSF International | |
| EPD Expiration: 2/6/2020 | |
| | 24.144.0 hr |
| Polyethelene sheet vapor barrier (HDPE) Used in the following Revit families: | 34,144.9 kg |
| (F1) SLAB ON GRADE | 570.6 kg (60 yrs) |
| (F1) SLAB ON GRADE - 6" | 0.4 kg (60 yrs) |
| (F1) SLAB ON GRADE - 8" | 5.3 kg (60 yrs) |
| (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT (R3) SBS OVER METAL DECK | 143.4 kg (60 yrs) 933.7 kg (60 yrs) |
| (R4) SOUTH VEST ROOF | 3.6 kg (60 yrs) |
| (R4) SOUTH VEST ROOF (INTERIOR) | 4.2 kg (60 yrs) |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" | 590.2 kg (60 yrs) |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" | 193.7 kg (60 yrs) |
| 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" | 1,865.2 kg (60 yrs) |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_18 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" | 6,745.6 kg (60 yrs) 17,358.2 kg (60 yrs) |
| 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" | 5,580.5 kg (60 yrs) |
| 2-W01 CONCRETE WALL WITHOUT CONC | 150.2 kg (60 yrs) |
| Used in the following Tally entries: Polyethelene sheet vapor barrier (HDPE) | |
| Description: | |
| Polyethelene sheet vapor barrier (HDPE) membrane entry exclusive of adhesive or other co-products | |
| Life Cycle Inventory: 100% Polyethylene film | |
| Product Scope: Cradle to gate | |
| Transvertetion Distances | |

Transportation Distance: By truck: 1299 km

| End-of-Life Scope: | |
|--|---|
| 10.5% Recycled into HDPE 89.5% Landiflled (plastic waste) | |
| Module D Scope: | |
| Avoided burden credit includes processing LCI Source: US: Polyethylene High Density Granulate (PE-HD) ts (2017) | |
| GLO: Plastic Film (PE, PP, PVC) ts (2017) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) US: Lubricants at refinery ts (2014) | |
| Polyurethane coating, metal stock | 10.7 |
| Used in the following Revit families: KPFF - SCOL - Steel - HSS - Rectangular (C) - TC | 10.7 kg (50 y |
| Used in the following Tally entries: Steel, HSS section | |
| Description: Polyurethane coating, for metal stock | |
| Life Cycle Inventory: 100% Polyurethane coating | |
| Product Scope: Cradle to gate, includes installation | |
| Transportation Distance: N/A | |
| End-of-Life Scope: 100% Landfilled (inert waste) | |
| LCI Source: DE: Application base coat (automobile) ts (2017) DE: Polyurethane (copolymer-component) (estimation from TPL | J adhesive) ts (2017) |
| Powder coating, metal stock | 995.2 |
| Used in the following Revit families: C1 - Perf Metal Grid - 2'x6' Picture Window Bend Plate | 993.5 kg (50 y 1.7 kg (50 y |
| Used in the following Tally entries: Aluminum, angle Aluminum, sheet | |
| Description: Powder coating, for metal stock | |
| | |
| Life Cycle Inventory: 100% Powder coating | |
| | |
| 100% Powder coating Product Scope: | |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: | |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: | |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) SBS modified bitumen, assembly (base & cap), ARMA - EPD | 30,466.4 |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) | 26,128.4 kg (40 y 101.8 kg (40 y |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) SBS modified bitumen, assembly (base & cap), ARMA - EPD Used in the following Revit families: (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF | 26,128.4 kg (40 y 101.8 kg (40 y nsulatio202.3 kg (40 y |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) SBS modified bitumen, assembly (base & cap), ARMA - EPD Used in the following Revit families: (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no i W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) Used in the following Tally entries: SBS modified bitumen, sheet | 26,128.4 kg (40 y 101.8 kg (40 y |
| 100% Powder coating Product Scope: Cradle to gate, including application Transportation Distance: N/A End-of-Life Scope: 100% Landfilled (inert waste) LCI Source: DE: Application top coat powder (aluminium) ts (2017) DE: Coating powder (industry, outside, red) ts (2017) SBS modified bitumen, assembly (base & cap), ARMA - EPD Used in the following Revit families: (R3) SBS OVER METAL DECK (R4) SOUTH VEST ROOF W08_METAL STUD LIGHTWEIGHT CLADDING (CW Parapet) no i W08_METAL STUD LIGHTWEIGHT CLADDING (Parapet) Used in the following Tally entries: | 26,128.4 kg (40 y 101.8 kg (40 y 101.8 kg (40 y 4,034.0 kg (40 y 4,034.0 kg (40 y |

LCI Data (continued)

Product Scope: 18% Polyethylene HD Cradle to gate, accounts for product overlap when installing Product Scope: Transportation Distance: Cradle to gate for materials only, neglects manufacturing requirements By truck: 172 km Transportation Distance: End-of-Life Scope: By truck: 172 km 100% Landfilled (plastic waste) End-of-Life Scope: LCI Source: 100% Landfilled (plastic waste) RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) roofing base sheet -LCI Source: ARMA (A1-A3) (2012) US: Styrene-butadiene rubber (SBR) ts (2017) RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) roofing cap sheet -DE: Bitumen cold adhesive (EN15804 A1-A3) ts (2017) ARMA (A1-A3) (2012) US: Polyethylene High Density Granulate (PE-HD) ts (2017) GLO: Plastic Film (PE, PP, PVC) ts (2017) EPD Source: <u>4787168709.105</u>.1 US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) EPD Designation Holder: US: Lubricants at refinery ts (2014) Asphalt Roofing Manufacturers Association (ARMA) EPD Program Operator: Stainless steel door hinge **UL Environment** Used in the following Revit families: EPD Expiration: (F1-HMW) dr-SGL-A (F2) dr-Double-Flush-with 4 sided jambs 10/28/2021 (FG2-AL) dr-DBL-A (FG2-CW) dr-DBL-CW SBS modified bitumen, cap sheet, ARMA - EPD 8,400.9 kg (N1-HMW) dr-SGL-A Used in the following Revit families: temp-fence (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT 2,285.1 kg (60 yrs) 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 111.1 kg (60 yrs) Used in the following Tally entries: 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 36.5 kg (60 yrs) Door, exterior, aluminum 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 351.2 kg (60 yrs) Door, exterior, steel 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" 1,270.0 kg (60 yrs) Door, interior, steel 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 3,268.1 kg (60 yrs) Description: 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 1,050.7 kg (60 yrs) Stainless steel and aluminum door and window hinge. Data based on product-specifc 2-W01 CONCRETE WALL WITHOUT CONC 28.3 kg (60 yrs) EPD from FSB Used in the following Tally entries: Life Cycle Inventory: Self-adhering sheet waterproofing, modified bituminous sheet See EPD Description Product Scope: Styrene-butadiene-styrene (SBS)-modified bituminous cap sheet. Industry-wide EPD Cradle to gate from the Asphalt Roofing Manufacturers Association. EPD representative of conditions in North America. Transportation Distance: By truck: 1001 km Life Cycle Inventory For information and quantities, see EPD End-of-Life Scope: 98% Recovered Product Scope: 2% Landfilled (inert material) Cradle to gate Module D Scope Transportation Distance: Product has a 0% scrap input while remainder is processed and credited as avoided By truck: 172 km burden End-of-Life Scope: LCI Source: 100% Landfilled (plastic waste) DE: Door and window hinge - FV S+B PE-EPD (2009) LCI Source: RER: Stainless steel flat product (304) - value of scrap Eurofer (2010) RNA: Atactic-polypropylene (APP)-modified bitumen (asphalt) roofing cap sheet -EPD Source: ARMA (A1-A3) (2012) EPD-FSB-2010111-D EPD Source: EPD Designation Holder: 4787168709.105.1 Franz Schneider EPD Designation Holder: EPD Program Operator: Asphalt Roofing Manufacturers Association (ARMA) Institut Bauen and Umwelt (IBU) EPD Program Operator: EPD Expiration: **UL Environment** 1/14/2016 EPD Expiration: 10/28/2021 Stainless steel sheet, Chromium 18/8 Used in the following Revit families Self adhering flashing membrane, 40 mil 13.1 kg Construction Specialties_Crash Rail_6" ECR-60S Used in the following Revit families: Used in the following Tally entries: (R4) SOUTH VEST ROOF 13.1 kg (40 yrs) Steel, sheet, stainless Used in the following Tally entries: Description: Self adhering membrane Stainless steel sheet, Type 304 (Chromium 18/8) Description: Life Cycle Inventory: 40 mil (1 mm) Asphalt rubber sheet inclusive of polyethelyne backing 100% Stainless steel plate Life Cycle Inventory: Product Scope: 82% Rubberized asphalt (25% SBS) Cradle to gate

52.5 kg

9.8 kg (30 yrs)

8.1 kg (30 yrs)

11.2 kg (30 yrs)

11.2 kg (30 yrs)

5.7 kg (30 yrs)

6.5 kg (30 yrs)

43.4 kg

43.4 kg (45 yrs)

| Transportation Distance: By truck: 418 km | | |
|--|--|----------|
| End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) | | |
| Module D Scope: Product has 52% scrap input while remainder is processed a burden | nd credited as avoided | |
| LCI Source: RER: Stainless steel cold rolled coil (304) Eurofer (2010) GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) | | |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts RER: Stainless steel flat product (304) - value of scrap Eurofe | | |
| Stainless steel, extruded, chromium 18/8 | 690.3 kg | |
| Used in the following Revit families: HSEB Guardrail - Cable Rail HSEB Guardrail - Cable Rail without handrail | 176.3 kg (60 yrs) 514.0 kg (60 yrs) | |
| Used in the following Tally entries: Steel, round bar | | |
| Description: Stainless steel, extruded, Type 304 (Chromium 18/8) | | U |
| Life Cycle Inventory: 100% Stainless steel | | |
| Product Scope: Cradle to gate | | |
| Transportation Distance: By truck: 431 km | | |
| End-of-Life Scope: 98% Recovered 2% Landfilled (inert material) | | D |
| Module D Scope: Product has 52% scrap input while remainder is processed a burden | nd credited as avoided | Li Pi |
| LCI Source: RER: Stainless steel cold rolled coil (304) Eurofer (2010) GLO: Steel sheet stamping and bending (5% loss) ts (2017) | | Ti |
| US: Electricity grid mix ts (2014) US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) ts | ; (2014) | E |
| RER: Stainless steel flat product (304) - value of scrap Eurofe | r (2010) | |
| Steel, reinforcing rod Used in the following Revit families: | 128,247.9 kg | N |
| (F1) SLAB ON GRADE (F1) SLAB ON GRADE - 6" | 5,757.9 kg (60 yrs) 4.0 kg (60 yrs) | LO |
| (F1) SLAB ON GRADE - 8" | 53.4 kg (60 yrs) | |
| (F2) CONCRETE METAL DECK | 40,904.3 kg (60 yrs) | ~ |
| (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) (F3) CONCRETE METAL DECK W/ TOPPING SLAB | 1,397.0 kg (60 yrs) 3,921.8 kg (60 yrs) | Ste U |
| (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 | 1,384.9 kg (60 yrs) | 0 |
| 04.016_LCL FND Slab_Spread Ftg_F10.0 10x10x3.0d | 705.8 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d | 828.1 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d | 3,444.6 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F12.0 14x14x4.5d 04.016 LCL FND Slab Spread Ftg F2.0 2x2x11"d | 4,666.0 kg (60 yrs) 76.8 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F4.0 4x4x1.5d | 19.8 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F8.0 8x8x2.5d | 202.9 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_F9.0 9x9x2.75d | 197.6 kg (60 yrs) | |
| 04.016_LCL FND Slab_Spread Ftg_FW6.0 6x8x2.5d | 1,525.9 kg (60 yrs) | |
| 04.017_LCL FND Slab_Cont. Ftg FW3.0_36wx18d 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d | 828.3 kg (60 yrs) 945.8 kg (60 yrs) | |
| 04.017_LCL FND Slab_Cont. Ftg FW4.0_46wx180 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx24d | 1,920.7 kg (60 yrs) | |
| 04.017_LCL FND Slab_Cont. Ftg FW5.0_60wx18d | 14,137.7 kg (60 yrs) | U |
| 04.017_LCL FND Slab_Cont. Ftg FW5.0A_60wx30d | 6,269.2 kg (60 yrs) | |
| 04.017_LCL FND Slab_Cont. Ftg FW7.0_87wx42d 2 | 987.7 kg (60 yrs) | |
| 04.017_LCL FND Slab_Cont. Ftg FW8.0_96wx48d 04.017_LCL FND Slab_Cont. Ftg_24wx12d | 3,053.2 kg (60 yrs) 135.9 kg (60 yrs) | |
| | | |

| 04.215_LCL_C_Slab Transition_Wall(12") 04.215_LCL_C_Slab Transition_Wall(4") 04.215_LCL_C_Slab Transition_Wall(6") 04.215_LCL_C_Slab Transition_Wall(6") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(1") 04.225_LCL_C_CURB_Wall(4") 04.225_LCL_C_CURB_Wall(6") 04.225_LCL_C_CURB_Wall(6") 04.320_LCL_C_FOUNDATION_Wall(10") 04.330_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(16") 04.380_LCL_C_SHOTCRETE_Wall(19") 04.380_LCL_C_SHOTCRETE_Wall(22") 04.380_LCL_C_SHOTCRETE_Wall(24") 12" Concrete Slab Concrete Slab Concrete 8" - STRUCTURAL HSEB - STR-1_Precast Tread & Riser HSEB - STR-2_Precast Tread & Riser HSEB STR-9 (CAST IN PLACE) HSEB ST-9 (CAST IN PLACE) HSEB ST-9 (CAST IN PLACE) HSEB_STR-3_PRecast Tread Steel Riser KPFF - SCOL - Concrete - Round KPFF - SFRM - Steel - BRB - Buckling Restrained Brace LCL_C_Pilaster_Rect_()w()d | 1,889.4 kg (60 yrs) 882.7 kg (60 yrs) 111.7 kg (60 yrs) 58.6 kg (60 yrs) 831.3 kg (60 yrs) 8.9 kg (60 yrs) 212.4 kg (60 yrs) 212.4 kg (60 yrs) 213.5 kg (60 yrs) 174.5 kg (60 yrs) 1,384.2 kg (60 yrs) 1,384.2 kg (60 yrs) 60.7 kg (60 yrs) 5566.3 kg (60 yrs) 175.4 kg (60 yrs) 382.4 kg (60 yrs) 112.6 kg (60 yrs) 112.6 kg (60 yrs) 112.6 kg (60 yrs) 216.9 kg (60 yrs) 213.9 kg (60 yrs) |
|---|---|
| Used in the following Tally entries: Cast-in-place concrete, lightweight structural concrete, 5000 psi Cast-in-place concrete, structural concrete, 3000 psi Cast-in-place concrete, structural concrete, 4000 psi Cast-in-place concrete, structural concrete, 5000 psi Precast concrete column Stair, concrete with metal nosing Stair, precast single run (stretcher) Steel, reinforcing rod Steel, rod | |
| Description: Common unfinished tempered steel rod suitable for structural re Life Cycle Inventory: | inforcement (rebar) |
| 100% Steel rebar | |
| Product Scope: Cradle to gate | |
| Transportation Distance: By truck: 431 km | |
| End-of-Life Scope: 70% Recovered 30% Landfilled (inert material) | |
| Module D Scope: Product has a 16.4% scrap input while remainder is processed an burden. | nd credited as avoided |
| LCI Source: GLO: Steel rebar worldsteel (2014) | |
| iteel, sheet | 9,279.6 kg |
| Used in the following Revit families: Corner_3 Corner_4 HSEB - STR-2_Precast Tread Steel Riser 2 HSEB Type C - STR-4_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ C channel HSEB Type C_STR-5_Conc filled w/ Plate Stringer - Roof Access HSEB Type C_STR-6_Conc filled w/ Plate HSEB_STR-3_Precast Tread Steel Riser P_SOUTH VESTIBULE WALL W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) W09_SOUTH VESTIBULE WALL W05_SUTH VESTIBULE WALL | 188.4 kg (60 yrs) 239.6 kg (60 yrs) 5,384.4 kg (45-60 yrs) 623.5 kg (45 yrs) 242.9 kg (45 yrs) 170.0 kg (45 yrs) 133.4 kg (45 yrs) 852.8 kg (45-60 yrs) 58.4 kg (60 yrs) 346.1 kg (60 yrs) |
| Used in the following Tally entries: Metal roofing panels, formed Stair, concrete with metal nosing Steel, plate | |

| Description: Steel sheet Life Cycle Inventory: | | Structural concrete, 3000 psi, Pacific Northwest regional ave Used in the following Revit families: (F2) CONCRETE METAL DECK (F3) CONCRETE METAL DECK (STRUCTURAL ONLY) | rage 1,304,562.7 kg 1,080,996.0 kg (60 yrs 36,533.6 kg (60 yrs | |
|---|-------------------------|---|--|--|
| 100% Steel sheet Product Scope: | | (F3) CONCRETE METAL DECK W/ TOPPING SLAB Used in the following Tally entries: | 187,033.1 kg (60 yrs | |
| Cradle to gate | | Cast-in-place concrete, structural concrete, 3000 psi | | |
| Transportation Distance: By truck: 418 km | | Description: Structural concrete, 3000 psi, Pacific Northwest regional aver | | |
| End-of-Life Scope: 98% Recovered | | National Ready-Mix Concrete Association (NRMCA) Industry-wide EPD. | | |
| 2% Landfilled (inert material) Module D Scope: | | Life Cycle Inventory: Coarse aggregate: 45%, Sand: 35%, Portland cement PCA - EPD: 10%, Water: 8%, Fly ash: 3%, Expanded slag: <1%, Admixture: <1% | | |
| Product has 16% scrap input while remainder is processed a | and credited as avoided | Product Scope: | | |
| burden | | Cradle to gate | | |
| LCI Source: | | Anchors, ties, and metal accessories outside of scope (<1% n | nass) | |
| RNA: Steel finished cold rolled coil worldsteel (2007) GLO: Steel sheet stamping and bending (5% loss) ts (2017) US: Electricity grid mix ts (2014) | | Transportation Distance: By truck: 24 km | | |
| US: Lubricants at refinery ts (2014) GLO: Compressed air 7 bar (medium power consumption) t GLO: Value of scrap worldsteel (2014) | s (2014) | End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) | | |
| tructural concrete, 3000 psi, 0% fly ash and slag | 42,359.1 kg | Module D Scope: Avoided burden credit for coarse aggregate, includes grindin | ig energy | |
| Used in the following Revit families: 3.5" Light Duty Paving Over Sturcture | 7,088.3 kg (30 yrs) | LCI Source: | | |
| cp_HSEB - Base Material Panel_vertical | 35,270.7 kg (60 yrs) | US: Portland cement PCA/ts (2014) | n | |
| Used in the following Tally entries: | 5 | DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (2017 DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) |) | |
| Precast concrete nonstructural panel | | DE: Fly ash (EN15804 A1-A3) ts (2017) | | |
| Precast concrete paver | | DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | | |
| Description: | | DE: Expanded clay (EN15804 A1-A3) ts (2017) | | |
| Structural concrete, 3000 psi, 0% fly ash and slag. Mix design matches National Ready-Mix Concrete Association (NRMCA) Industry-wide EPD. Life Cycle Inventory: Coarse aggregate: 44%, Sand: 36%, Portland cement PCA - EPD: 13%, Water: 7%, Admixture: <1% | | DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) US: Colophony (rosin, refined) from CN pine gum rosin ts (2017) US: Tap water from groundwater ts (2017) | | |
| | | | | |
| Product Scope: Cradle to gate | | US: Natural gas mix ts (2014) | | |
| Anchors, ties, and metal accessories outside of scope (<1% | mass) | US: Diesel mix at filling station (100% fossil) ts (2014) | | |
| Transportation Distance: | | US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) | | |
| By truck: 24 km | | US: Light fuel oil at refinery ts (2014) | | |
| End-of-Life Scope: 55% Recycled into coarse aggregate 45% Landfilled (inert material) | | Structural concrete, 4000 psi, 20% fly ash and 30% slag Used in the following Revit families: | 856,960.1 k | |
| | | (F1) SLAB ON GRADE | 567,361.6 kg (60 yrs | |
| Module D Scope: Avoided burden credit for coarse aggregate, includes grind | | (F1) SLAB ON GRADE - 6" | 468.0 kg (60 yr | |
| 55 5 5 | ing energy | (F1) SLAB ON GRADE - 8" | 8,422.4 kg (60 yr | |
| .Cl Source: | | (R2) STRUCTURAL SLAB LAYER OF ASSEMBLY R2 | 140,358.3 kg (60 yr 3,728.8 kg (60 yr | |
| US: Portland cement PCA/ts (2014) DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (201 | 7) | 04.016_LCL FND Slab_Spread Ftg_F2.0 2x2x11"d 04.215_LCL_C_Slab Transition_Wall(12") | 48,061.4 kg (60 yr | |
| DE: Gravel (Grain size 2/32) (EN15804 A1-A3) s (2017) | ., | 04.215_LCL_C_Slab Transition_Wall(15") | 22,454.6 kg (60 yr | |
| DE: Fly ash (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(4") | 2,842.4 kg (60 yr | |
| DE: Slag-tap granulate (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(6") | 1,489.9 kg (60 yr | |
| DE: Expanded clay (EN15804 A1-A3) ts (2017) | | 04.215_LCL_C_Slab Transition_Wall(8") | 21,146.0 kg (60 yr | |
| DE: alcium nitrate ts (2017) DE: Sodium ligninsulfonate ts (2017) DE: Sodium naphtalene sulfonate [estimated] ts (2017) | | 04.225_LCL_C_CURB_Wall(11") 04.225_LCL_C_CURB_Wall(4") | 16,294.9 kg (60 yr 227.3 kg (60 yr | |
| | | 04.225_LCL_C_CURB_Wall(6") | 6,929.8 kg (60 yr | |
| US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | | 04.225_LCL_C_CURB_Wall(8") | 549.0 kg (60 yr | |
| US: Colophony (rosin, refined) from CN pine gum rosin ts (2017) | | 12" Concrete Slab | 16,414.9 kg (60 yr | |
| US: Tap water from groundwater ts (2017) | | HSEB ST-11 (CAST IN PLACE) | 210.9 kg (60 yr | |
| US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) | | Used in the following Tally entries: | | |
| US: Diesel mix at filling station (100% fossil) ts (2014) | | Cast-in-place concrete, structural concrete, 4000 psi | | |
| US: Liquefied Petroleum Gas (LPG) (70% propane | | Description: | | |
| 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) | | Structural concrete, 4000 psi, 20% fly ash and 30% slag. Mix o Ready-Mix Concrete Association (NRMCA) Industry-wide EPE | | |
| | | Life Cycle Inventory: Coarse aggregate: 45%, Sand: 31%, Portland cement PCA - El Expanded slag: 5%, Fly ash: 3%, Admixture: <1% | PD: 9%, Water: 7%, | |

LCI Data (continued)

| | US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) US: Light fuel oil at refinery ts (2014) | |
|---------------------|---|--|
| | - | |
| | | 2,312,934.3 kg |
| | | 56,528.9 kg (60 yrs) |
| | 04.016_LCL FND Slab_Spread Ftg_F11.0 11x11x3.25d | 74,100.0 kg (60 yrs) |
| | 04.016_LCL FND Slab_Spread Ftg_F12.0 12x12x4d | 36,178.5 kg (60 yrs) |
| | · - | 55,398.3 kg (60 yrs) |
| ergy | | 3,014.9 kg (60 yrs) 20,099.2 kg (60 yrs) |
| | | 13,990.9 kg (60 yrs) |
| | | 69,640.5 kg (60 yrs) |
| | 04.017_LCL FND Slab_Cont. Ftg FW3.0_36wx18d | 31,217.6 kg (60 yrs) |
| | 04.017_LCL FND Slab_Cont. Ftg FW4.0_48wx18d | 33,450.2 kg (60 yrs) |
| | = | 86,718.6 kg (60 yrs) |
| | | 89,913.9 kg (60 yrs) |
| | | 64,658.2 kg (60 yrs) 66,939.6 kg (60 yrs) |
| | = | 188,932.2 kg (60 yrs) |
| | 04.017_LCL FND Slab_Cont. Ftg_24wx12d | 1,847.0 kg (60 yrs) |
| | 04.300_LCL_C_Foundation_Wall(10") | 36,007.1 kg (60 yrs) |
| | 04.310_LCL_C_PIT_Wall(8") | 11,479.1 kg (60 yrs) |
| | | 210,675.0 kg (60 yrs) |
| | | 49,101.7 kg (60 yrs) |
| | | 859,916.8 kg (60 yrs) 247,805.7 kg (60 yrs) |
| | | 752.2 kg (60 yrs) |
| | HSEB ST-9 (CAST IN PLACE) | 2,812.3 kg (60 yrs) |
| | KPFF - SFRM - Steel - BRB - Buckling Restrained Brace | 1,755.9 kg (60 yrs) |
| 0 700 6 1 | Used in the following Tally entries: | |
| 8,728.6 Kg | Cast-in-place concrete, structural concrete, 5000 psi | |
| 2,539.4 kg (60 yrs) | Precast concrete column | |
| 4,844.9 kg (60 yrs) | Description: | |
| 1,344.3 kg (60 yrs) | Structural concrete, 5000 psi, 20% fly ash and 30% slag. Mix | |
| | Ready-Mix Concrete Association (NRMCA) Industry-wide EP | D. |
| | Life Cycle Inventory: | |
| | Coarse aggregate: 41%, Sand: 30%, Portland cement PCA - E | PD: 11%, Water: 7%, |
| | Expanded slag: 6%, Fly ash: 4%, Admixture: <1% | |
| ches National | Product Scope: | |
| | | |
| | Anchors, ties, and metal accessories outside of scope (<1%) | mass) |
| 0%, Water: 7%, | Transportation Distance: | |
| | By truck: 24 km | |
| | End-of-Life Scope: | |
| | 55% Recycled into coarse aggregate | |
| | 45% Landfilled (inert material) | |
| | Module D Scope: | |
| | Avoided burden credit for coarse aggregate, includes grindi | ng energy |
| | LCI Source: | |
| | US: Portland cement PCA/ts (2014) | |
| | DE: Pumice gravel (grain size 4/16) (EN15804 A1-A3) ts (201 | 7) |
| | | |
| ergy | | |
| | | |
| | | |
| | DE: Sodium ligninsulfonate ts (2017) | |
| | DE: Sodium naphtalene sulfonate [estimated] ts (2017) | |
| | US: Sodium hydroxide (caustic soda) ix (100%) ts (2017) | |
| | US: Colophony (rosin, refined) from CN pine gum rosin ts (2) | 017) |
| | | |
| | US: Tap water from groundwater ts (2017) | |
| | US: Electricity grid mix s (2014) | |
| | | |
| | US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) | |
| | US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) US: Diesel mix at filling station (100% fossil) ts (2014) US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) | |
| | US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) US: Diesel mix at filling station (100% fossil) ts (2014) US: Liquefied Petroleum Gas (LPG) (70% propane | |
| | US: Electricity grid mix s (2014) US: Natural gas mix ts (2014) US: Diesel mix at filling station (100% fossil) ts (2014) US: Liquefied Petroleum Gas (LPG) (70% propane 30% utane) ts (2014) | |
| | | 8,728.6 kg 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (60 yrs) 1,344.3 kg (60 yrs) 2,539.4 kg (41,43) kg (41,53) kg (41,53) kg (21,71) 2, kg kg manutate (1,41,580 kg (41,43) kg (21,71) 2, kg kg manut |

| Suspended grid Used in the following Revit families: | 8,989.6 kg | Used in the following Tally entries: Wall board, gypsum | |
|---|---|---|---|
| C1 - ACT-1 - 2' x 4' C1 - ACT-2 - 2' x 2' HRC C1 - ACT-3 - 2' x 2' | 801.2 kg (50 yrs) 1,597.2 kg (50 yrs) 5,821.1 kg (50 yrs) | Description: Moisture- and mold-resistant gypsum board | |
| C1 - ACT-5 - 2' x 6' Used in the following Tally entries: | 770.1 kg (50 yrs) | Life Cycle Inventory: 100% Moisture-resistant gypsum wallboard (Gypsum, Boric acid, Cement, Sodium lignin sulfonate, Glass fibres, Silane, Polyglucose, Perlite, Paper, Casein glue) | |
| Acoustic ceiling system, mineral fiber board Description: Cold-rolled galvanized steel for lightweight ceiling grid | | Product Scope: Cradle to gate | |
| Life Cycle Inventory: 100% HDG steel | | Transportation Distance: By truck: 172 km | |
| Product Scope: Cradle to gate | | End-of-Life Scope: 100% Landfilled (inert waste) | |
| Transportation Distance: By truck: 431 km | | LCI Source: DE:Gypsum plaster board (Moisture resistant) (EN15804 A1-A3) ts (2 | 2017) |
| 98% recovered 2% landfilled (inert material) | | Wall board, gypsum, natural Used in the following Revit families: (A3)_Furr Mtl Stud 3-5/8"_GWB (1-0) | 66,620.6 kg 395.1 kg (30 yrs) |
| Module D Scope: Product has 44% scrap input while remainder is processed and credi burden | ited as avoided | (B8)_TYP Mtl Stud 8"_GWB Insulation 1-B6 1-C2- GWB on Mtl. Stud | 156.0 kg (30 yrs) 37.8 kg (30 yrs) 203.7 kg (30 yrs) |
| LCI Source: RNA: Steel hot dip galvanized worldsteel (2007) US: Metal roll forming (MCA) (2010) US: Electricity grid mix ts (2014) US: Thermal energy from natural gas ts (2014) GLO: Value of scrap worldsteel (2014) | | 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD 2-A0_Furr Hat Channel 7/8"_GWB (2-0) 2 hour rated 2-A0_GWB Type X (2-0) 2 hour rated 2-C2- GWB on Mtl. Stud 3-W07_METAL STUD LIGHTWEIGHT CLADDING 4-CT 4_0exput/Disting | 149.4 kg (30 yrs) 4,824.8 kg (30 yrs) 1,536.4 kg (30 yrs) 118.0 kg (30 yrs) 169.4 kg (30 yrs) 1,397.2 kg (30 yrs) 915.4 kg (30 yrs) 2,635.1 kg (30 yrs) |
| Wall board, gypsum, fire-resistant (Type X) Used in the following Revit families: 1-C2- GWB on Mtl. Stud 1F5 - 1 HR RATED HORIZONTAL DUCT ENCLOSURE 1-W07_METAL STUD LIGHTWEIGHT CLADDING 2-C2- GWB on Mtl. Stud 3-W07_METAL STUD LIGHTWEIGHT CLADDING A4_Furr Mtl Stud 4"_GWB (1-0) Used in the following Tally entries: | 43,127.3 kg 444.9 kg (30 yrs) 761.0 kg (30 yrs) 35,345.8 kg (30 yrs) 4,958.8 kg (30 yrs) 416.5 kg (30 yrs) 1,200.2 kg (30 yrs) | ACT 4 AcoustiBuilt Ceiling B4 B6 C2- GWB on Mtl. Stud C7- GWB on Mtl. Stud 2 P_SOUTH VESTIBULE WALL W06 PRE-CAST CONCRETE @ FRAMED WALL W07_METAL STUD LIGHTWEIGHT CLADDING W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) W09_SOUTH VESTIBULE WALL | 2,031, kg (30 yrs) 924.8 kg (30 yrs) 488.7 kg (30 yrs) 6,591.9 kg (30 yrs) 387.3 kg (30 yrs) 207.9 kg (30 yrs) 34,817.4 kg (30 yrs) 2,312.6 kg (30 yrs) 164.0 kg (30 yrs) |
| Wall board, gypsum Description: | | Used in the following Tally entries: Wall board, gypsum | |
| Fire-resistant gypsum board | | Description: Natural gypsum board | |
| Life Cycle Inventory: 100% Fire-resistant gypsum wallboard (Gypsum, Boric acid, Cement, Sodium lignin sulfonate, Glass fibres, Silane, Polyglucose, Perlite, Paper, Casein glue) Product Scope: | | Life Cycle Inventory: 100% Gypsum wallboard (Gypsum, Boric acid, Cement, Glass fibres, Ferrochrome-lignine sulfonate, Silane, Polyglucose, Perlite, Paper, Casein glue) | |
| Cradle to gate Transportation Distance: | | Product Scope: Cradle to gate | |
| By truck: 172 km End-of-Life Scope: | | Transportation Distance: By truck: 172 km | |
| 100% Landfilled (inert waste) LCI Source: | | End-of-Life Scope: 100% Landfilled (inert waste) | |
| DE: Gypsum plaster board (Fire protection) (EN15804 A1-A3)PE (201 | 7) | LCI Source: DE: Gypsum wallboard (EN15804 A1-A3) ts (2017) | |
| Wall board, gypsum, moisture- and mold-resistant Used in the following Revit families: (R4) SOUTH VEST ROOF | 86,468.2 kg 123.7 kg (30 yrs) | White oak lumber, 1 inch Used in the following Revit families: | 1,400.5 kg |
| 1-N8 GFRC @ FRAMED WALL STAGGERED STUD 1-W06 PRE-CAST CONCRETE @ FRAMED WALL 1-W06 PRE-CAST CONCRETE @ FRAMED WALL STAGGERED STUD | 141.1 kg (30 yrs) 4,559.5 kg (30 yrs) 1,451.9 kg (30 yrs) 24,470.2 kg (30 yrs) 288.3 kg (30 yrs) 196.5 kg (30 yrs) | (R4) SOUTH VEST ROOF (R4) SOUTH VEST ROOF (INTERIOR) Rectangular Mullion Used in the following Tally entries: Domestic hardwood | 188.8 kg (50 yrs) 217.7 kg (50 yrs) 993.9 kg (50 yrs) |
| W06 PRE-CAST CONCRETE @ FRAMED WALL W07_METAL STUD LIGHTWEIGHT CLADDING W07_METAL STUD LIGHTWEIGHT CLADDING (Penthouse) | 7,737.1 kg (30 yrs) 32,902.8 kg (30 yrs) 2,185.4 kg (30 yrs) 12,256.7 kg (30 yrs) 155.0 kg (30 yrs) | Description: Kiln-dried American White Oak hardwood lumber of 1" nominal thickness as produce in the eastern United States, focusing on the main production technologies and region-specific characteristics. White oak is frequently used for mouldings, flooring, furniture, doors, and millwork. Link for interactive LCA data tool is provided at the link listed as "EPD Information" | |

LCI Data (continued)

| full LCA report is available at http://naturespackaging.org/wp-content/uploads/2016/02/LifeCy | cleAssessment-Lumber.pdf. | US: Dipropylene glycol by product propylene glycol via PO hyd | rogenation ts (2017) |
|---|-------------------------------------|--|--|
| Life Cycle Inventory: 100% White Oak | | XPS insulation, Foamular average, Owens Corning - EPD Used in the following Revit families: | 5,577.8 kg |
| Product Scope: Cradle to gate, uncoated Transportation Distance: By truck: 383 km | | (R2) INSULATION O/ ASPHALT MEMBRANE O/ STRUCT 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 11" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 16" 1-W01 CONCRETE WALL W/ EXTERIOR INSULATION 8" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_16" | 2,783.8 kg (60 yrs 50.8 kg (60 yrs 16.7 kg (60 yrs 160.4 kg (60 yrs 580.2 kg (60 yrs |
| End-of-Life Scope: 14.5% Recovered 22% Incinerated with energy recovery | | 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_22" 2-W01 CONCRETE WALL W/ EXTERIOR INSULATION_24" 2-W01 CONCRETE WALL WITHOUT CONC | 1,493.0 kg (60 yrs) 480.0 kg (60 yrs) 12.9 kg (60 yrs) |
| 63.5% Landfilled (wood product waste) Module D Scope: | | Used in the following Tally entries: Extruded polystyrene (XPS), board | |
| Recovered wood products credited as avoided burden. CI Source: US: White Oak lumber, 1 inch (769 kg/m ³), kiln-dried ts/AHEC (2017) | | Description: FOAMULAR XPS (polystyrene) insulation board, HFC foaming agent. EPD representative of US manufacturing condition. FOAMULAR insulation board is available | |
| EPD Source: Information | | with a variety of R-values and compressive strengths. The defau thermal resistance of RSI 1 and a compressive strength of 30 ps R-value and compressive strength of the assembly is known, us to decignate a coeffic product. | i. If the intended |
| EPD Designation Holder: American Hardwood Export Council (AHEC) | | to designate a specific product. | |
| Window frame, vinyl, fixed | 5,801.7 kg | Note: This temporary entry is sourced directly from third-party verified EP replaces a Tally entry that is undergoing a quality assurance review. This e developed using data from ecoinvent and modeled in SimaPro but adher | view. This entry |
| Used in the following Revit families: cp_HSEB - Window at Upper Levels | 5,801.7 kg (30 yrs) | Life Cycle Inventory: For information and quantities, see EPD. | |
| Used in the following Tally entries: Window frame, vinyl | | Product Scope: Cradle to gate. | |
| Description: Vinyl fixed window frame inclusive of steel bracing | | Note: Product stage expanded to include blowing agent emissi and installation, and diffusion from product over service life (B1 make a significant contribution to GWP they have been include |). As these impacts |
| Life Cycle Inventory: 46% PVC part 54% metal reinforcement (Zinc-coated steel) | | Transportation Distance: By truck: 1190 km | a in the product stage. |
| Product Scope: Cradle to gate, excludes hardware, casing, sealant | | End-of-Life Scope: 100% Landfilled (plastic waste), includes blowing agent emissio | ns released during |
| Transportation Distance: By truck: 496 km | | disposal LCI Source: | |
| End-of-Life Scope: 100% Landfilled (plastic waste) | | US: Extruded polystyrene (XPS) insulation board, FOAMULAR - (2018), modeled with Simapro 8, source for secondary data is e | |
| LCI Source: DE: Window frame PVC-U (EN15804 A1-A3) ts (2017) | | EPD Source: <u>4788721182,101.1</u> | |
| Wood stain, water based | 76.8 kg | EPD Designation Holder: Owens Corning | |
| Used in the following Revit families: (R4) SOUTH VEST ROOF | 4.3 kg (10 yrs) | EPD Program Operator: UL Environment | |
| (R4) SOUTH VEST ROOF (INTERIOR) Rectangular Mullion | 4.9 kg (10 yrs) 67.6 kg (10 yrs) | EPD Expiration: 1/1/2024 | |
| Used in the following Tally entries: Domestic hardwood | | | |
| Description: Semi-transparent stain for interior and exterior wood surfaces | | | |
| Life Cycle Inventory: 60% Water 28% Acrylate resin 7% Acrylate emulsion 5% Dipropylene glycol 1.3% NMVOC emissions | | | |
| Product Scope: Cradle to gate, including emissions during application | | | |
| Transportation Distance: By truck: 642 km | | | |
| End-of-Life Scope: 38.7% solids to landfill (plastic waste) | | | |
| LCI Source: US: Tap water from groundwater ts (2017) US: Acrylate resin (solvent-systems) ts (2017) DE: Acrylate (emulsion) ts (2017) | | | |

5/19/2022