

The Living Building Challenge Specification Guidebook

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INTRODUCTION

THE LIVING BUILDING CHALLENGE

The Living Building Challenge is a certification program, advocacy tool, and philosophy defining the most advanced measure of sustainability in the built environment today. As a certification program, it addresses all buildings, at all scales and is an inclusive tool for transformative design. Whether the project is a single building, a renovation or a park, the Living Building Challenge provides a framework for design and construction of buildings that address the symbiotic relationship between people and the built environment.

Creating a successful Living Building Challenge (LBC) project requires open communication between project team members. Clearly incorporating the requirements of the Living Building Challenge into project specifications is a critical step in conveying the relevant program requirements to the construction team. The LBC specification resources have been developed to aid in that process.

The LBC specification resources include the following documents:

- **Living Building Challenge Specification Guidebook**
A narrative explanation of the specification writing process for LBC projects as well as instructions for using the other specification resource documents
- **Example Section 01 81 13, Sustainable Design Requirements**
An editable example of general LBC language
- **Example Section 01 74 19, Construction Waste Management**
An editable example of LBC language for Imperative 14 Net Positive Waste
- **Example Section 01 81 14, Construction Indoor Air Quality**
An editable example of the language for IAQ testing for compliance with Imperative 08 Healthy Interior Environment
- **Living Building Challenge Performance Requirements**
An editable example of language for inclusion in Division 03-50 to aid in compliance with a variety of Imperatives and corresponding Exceptions.

SPECIFICATION DEVELOPMENT FOR LBC

Project teams should expect some additional time and coordination to develop specifications for LBC projects. Up front planning and coordination ensures a more streamlined material review, specification, and submittal process.

Special care must be taken to review project specifications, especially those written from template specifications, and remove all references that are inhibitive of a project's Materials Petal goals. For example, many accessory products included in template specifications may contain Red List ingredients or require a non-compliant product for installation. Teams should be diligent to remove any unintended products from specifications. Review and

coordination during the specification writing process can help minimize costly change orders or RFIs that negatively impact project schedule.

HOW TO USE THE LBC SPECIFICATION GUIDEBOOK

The LBC specification resources include example language and guidance for writing custom specifications for projects attempting the Challenge. The LBC Specification Guidebook outlines sample specifications to address key requirements for product sourcing under Imperatives 08 Healthy Interior Environment, 10 Red List, 12 Responsibility Industry, 13 Living Economy Sourcing, and 14 Net Positive Waste Imperatives.

Project teams should review and edit the sample sections as needed to ensure they address the specific Imperatives, requirements, materials and processes applicable to their project. Not every reference will apply to every project and project teams may need to add requirements to address the requirements of other sustainability certification programs, material performance requirements, and/or reporting and implementation procedures.

Project teams should consider these resources as examples. Each project's specifications should be written to reflect the individual needs of the project.

CONSTRUCTION SPECIFICATIONS INSTITUTE AND MASTERFORMAT

Sample language and Living Building Challenge references included in this Handbook are organized by the Division and section numbers included in MasterFormat. MasterFormat, developed by the Construction Specifications Institute, standardizes the organization of specifications into 50 Divisions of construction information. Project teams should visit www.csinet.org for additional information on the Construction Specifications Institute and MasterFormat.

RESPONSIBILITY OF THE DESIGN TEAM AND SPEC WRITER

Communicating the requirements for the Living Building Challenge in a clear, concise, and correct manner is important to a successful Living Building Challenge project. Use of this LBC Specification Resource does not guarantee achievement of LBC requirements nor is it intended to replace the LBC Standard. The LBC Specification Resource is intended as one of many reference tools that has been compiled through feedback from successful LBC teams. It is the responsibility of the project's design professionals to communicate the Living Building Challenge requirements to all project team members through the project specifications and other parts of the legal contract documents.

Clear specifications outline the purchasing and installation requirements for compliant materials. The specifications become a written resource that can be passed on to manufacturers and subcontractors. It is important for designers and specification writers to verify that applicable construction related Living Building Challenge requirements are clearly stated in the specification. The design team should vet proprietary specifications calling out specific products

to confirm Living Building Challenge compliance before specifications are issued. It is also recommended that the design team draft a process for submittal review and approval that clearly communicates the documentation requirements for material submittals to support the team's Living Building Challenge goals.

RESPONSIBILITY OF THE CONSTRUCTION TEAM

All products installed on the project should be submitted for review by the design team as outlined in the Submittal Procedures specification section. Many installed products that typically do not require a detailed review by the design team, such as sheet metal for HVAC duct runs, may require approval for Living Building Challenge compliance. The construction team should be prepared to submit a higher than typical volume of products for review and approval. All products should be submitted prior to ordering to prevent costly substitutions.

The general contractor, subcontractors, and product representatives should closely follow the requirements outlined in the specifications. Any required product substitutions should be communicated as early in the submittal process as possible to avoid delays to the project schedule.

INCORPORATING IMPERATIVE REQUIREMENTS

All construction related activities related to the Living Building Challenge should be clearly stated in the project specifications. All general requirements, as well as clear processes for achieving these requirements should be included in Division 01. The project team should consider including the Living Building Challenge general requirements in Division 01 and specific material and installation requirements in the applicable section of Divisions 02-50.

LIVING BUILDING CHALLENGE LANGUAGE IN DIVISION 01

Division 01 sections are the appropriate place to outline all general Living Building Challenge requirements. Specific products are not typically addressed in this section.

PART 1- GENERAL

Part 1 of each specification section should include all the foundation information, references, and resources the construction team will need to understand and successfully implement the Living Building Challenge.

It is recommended that all Division 01 sections with a direct reference to the Living Building Challenge include:

- The applicable Living Building Challenge Standard, with version number
- All related Division 01 specification sections that include material or process requirements for successful LBC implementation
- References to additional guidance documents, such as Petal Handbooks
- A reference to coordination and process requirements
- A reference to submittal requirements
- Any definitions relating to LBC and the construction or submittal process
- Require a copy of the LBC Standard and Petal Handbooks remain on-site for construction team frequent reference

Sample language for these references is included in paragraphs 1.1- 1.6 of the sample Division 01 specifications. For example:

1.1	SUMMARY
A.	This section includes the sustainability requirements necessary to achieve Certification under the Living Building Challenge version 3.0.
1.2	RELATED SECTIONS
A.	The following sections are related:
1.	01 25 00 Substitution Procedures
2.	01 33 00 Submittal Procedures
3.	01 74 19 Construction Waste Management
4.	01 81 14 Indoor Air Quality Requirements
B.	Additional Living Building Challenge requirements included in individual sections.
1.3	REFERENCES
A.	Additional information on the Living Building Challenge and Certification requirements can be found:
1.	The International Living Future Institute webpage at www.living-future.org/lbc
2.	The Living Building Challenge version 3.0 standard
3.	The Living Building Challenge Dialogue
4.	The Living Building Challenge Petal Handbooks: Place, Water, Energy, Health, Materials, Equity, and Beauty

The project specification writer may wish to include more detailed process or submittal requirements in other sections. Care should be taken to confirm that process or submittal requirements outlined in the referenced Division 01 sections do not conflict with requirements outlined in the full Substitution Requirements or Submittal Procedures sections.

For project teams incorporating multiple sustainability certification programs into the project specifications, special care should be taken to avoid conflicting requirements. When multiple programs address the same issue, such as VOC limits, only the most stringent requirement should be included in the specification.

SUSTAINABLE DESIGN REQUIREMENTS- SECTION 01 81 13

All construction related requirements for the Living Building Challenge, with the exception of those with individual Division 01 sections should be outlined in the Sustainable Design Requirements section. For example, the requirements for Imperative 10, Red List would be stated in the Sustainable Design Requirements Section, but the requirements for Imperative 14, Net Positive Waste would be included in the Construction Waste Management section.

PART 1

Part 1 of the Sustainable Design Requirements section should include the paragraphs outlined in the above section, PART 1-GENERAL, of this resource.

PART 2

Part 2 of the Sustainable Design Requirements section should outline the material selection and purchasing requirements for Living Building Challenge compliance. The sample specification section included in this resource package outlines the material related requirements organized by Living Building Challenge Imperative.

The below example outlines the requirements for Imperative 12, Responsible Industry. The Imperative requirements are stated in outline form, with only those requirements pertaining to product selection included.

2.3	IMPERATIVE 12- RESPONSIBLE INDUSTRY
A.	All timber products must be:
1.	Certified to Forest Stewardship Council (FSC) 100% labeling standards
a.	Chain of Custody must be maintained from harvest through final product manufacturing
2.	From Salvaged Sources
3.	From the intentional harvest of timber onsite for the purpose of clearing the area for construction or restoring/maintaining the continued ecological function of the onsite bionetwork.
B.	One Declare product must be installed for every 500 square meters (5,381 square feet).
C.	Refer to the Dialogue and the Materials Petal Handbook for specific guidance, including exceptions, on the Responsible Industry Imperative requirements.

ILFI's sample Sustainable Design Requirements Section outlines the product requirements for the Healthy Indoor Environment, Red List, Responsible Industry, and Living Economy Sourcing Imperatives.

PART 3

Part 3 of the Sustainable Design Requirements Section should also outline reporting, installation, and execution requirements for Living Building Challenge compliance. Requirements should be specific and align with the project's defined goals. Project teams should include any processes or reporting requirements, such as regular LBC reporting meetings, not explicitly required by LBC, but developed to aide the team in coordination efforts or documentation of LBC.

The below is an example of specific requirements for ongoing reporting. Each attempted Imperative is represented, allowing the project team to check in on submittal and waste management progress at regular intervals. Routine reporting by the construction team is not required for LBC Certification, but gives the team an opportunity to identify and correct issues with compliance or reporting in a timely manner.

3.3 MEETINGS AND PROGRESS REPORTING

- A. The General Contractor is required to attend all construction Living Building Challenge progress meetings.
 - 1. Meeting schedule, time, and dates will be agreed upon at the commencement of construction.
- B. Prior to each meeting, the General Contractor is to provide the following items to the owner or owner's representative.
 - 1. Up-to-date submittal log and submittal schedule
 - 2. Up-to-date Material Construction Budget with line item cost of each approved product
 - 3. Invoices with line item cost and Chain of Custody number highlighted for all FSC products delivered onsite.
 - 4. Construction Waste Management progress reports.

Care should be taken to make sure the Sustainable Design Requirements section is not redundant or conflicting to other spec sections. The section should include all sustainability requirements not specifically represented in other sections.

CONSTRUCTION WASTE MANAGEMENT REQUIREMENTS- SECTION 01 74 19

The execution and reporting requirements for Imperative 14, Net Positive Waste, should be included in the Construction Waste Management section. This section should be referenced in the Sustainable Design Requirements section.

PART 1

Part 1 of the Construction Waste Management section should include the paragraphs outlined in the above section, PART 1-GENERAL, of this resource.

PART 2

The salvaged material requirement of the Net Positive Waste Imperative should be included in the Sustainable Design Requirements section. There are no other material selection requirements associated with Construction Waste Management; therefore this section is not used.

PART 3

Part 3 of the Construction Waste Management section should outline all reporting, execution, and waste handling requirements for Living Building Challenge compliance. Requirements should be specific and align with the project's goals.

The example below outlines the specific waste reporting thresholds for the Net Positive Waste Imperative, as shown in Part 3.1. The remaining requirements outlined in Part 3 of the Construction Waste Management section reference or are exceptions to the above thresholds.

3.1	NET POSITIVE WASTE DIVERSION THRESHOLDS	
A.	End of project diversion rates are to meet the following minimum material specific thresholds:	
1.	Metals	99%
2.	Paper & Cardboard	99%
3.	Soil & Biomass	100%
4.	Rigid foam, Carpet & Insulation	95%
5.	All others- combined weighted average	90%

The Construction Waste Management section should clearly outline all requirements for the sorting and process of waste generated during the construction process. Requirements for waste sorting and processing onsite, removal and process offsite, and reporting requirements should all be included.

CONSTRUCTION INDOOR AIR QUALITY- SECTION 01 81 14

The execution and reporting requirements for indoor air quality testing in Imperative 08, Healthy Interior Environment, should be included in the Construction Indoor Air Quality Requirements section and referenced in the Sustainable Design Requirements section.

PART 1

Part 1 of the Construction Indoor Air Quality Requirements section should include the paragraphs outlined in the above section, PART 1-GENERAL, of this resource.

PART 2

Requirements for interior building products with the potential to emit VOCs and compliance with CDPH Standard Method v1.1-2010 have been included in Part 2 of the Sustainable Design Requirements section. There are no other material selection requirements associated with Construction Indoor Air Quality; therefore there is no LBC specific text suggested for this section.

PART 3

Part 3 of the Construction Indoor Air Quality section should outline all reporting, execution, and allowable concentration maximums for Living Building Challenge compliance. Requirements should be specific and align with the project’s goals.

The Construction Indoor Air Quality section should clearly outline all requirements for air quality requirements following construction completion. As written in the sample section, air quality testing following construction completion is the responsibility of the General Contractor. The project specification writer should edit or remove this section if the responsibility for air quality testing does not fall under the General Contractor’s scope of work or the requirements do not apply to the LBC scope of the project. Project

teams should also keep in mind that air quality testing is required three to twelve months after occupancy, in addition to the pre-occupancy test after construction completion.

MATERIALS REVIEW PROCESS SPECIFICATIONS

In addition to clearly outlining Imperative requirements, project teams should outline a material review and reporting process in the project specifications. A project's process should be tailored to the unique needs and requirements of the project and the process should be clearly communicated in the contract documents.

SUBMITTAL PROCEDURES - SECTION 01 33 00

Before incorporating Living Building Challenge requirements into the Submittal Procedures, project teams should develop a product submittal and review process that address the needs and schedule of the project, while address the Living Building Challenge requirements. Such a submittal review process should addresses:

- Overall project schedule
- Time required to review a standard submittal vs. a Living Building Challenge submittal (if different)
- Responsible party/parties for reviewing submittals against the project's performance requirements and LBC requirements
- Additional shop drawings or product information needed to address LBC requirements
- Submittal tracking and reporting to ensure all required submittals are reviewed to confirm LBC compliance

Project teams should keep in mind that additional time during the construction phase will be required to review submittals for products that were not vetted during the design phase. It is recommended that the project owner, architect, engineer, construction manager, and sustainability consultant- as applicable- collaborate to develop a submittal review plan before developing the Submittal Procedures specification section. The team should include the need for submittal cover letters or LBC summary sheets in the plan development discussion.

SUBSTITUTION PROCEDURES - SECTION 01 25 00

Similar to the development of the submittal review plan, project teams should discuss the substitution requirements prior to developing the specification section. Often products are not available in the time frame required for installation, are not compatible with site conditions, or for various other reasons require product substitutions. Project teams should outline the parameters for an acceptable product substitution and any additional documentation required with a substitution request.

SPECIFIC PRODUCTS REQUIREMENTS

LBC SPECIFICATIONS FOR DIVISIONS 03-50

Specific material requirements, including any applicable Living Building Challenge Materials Petal exceptions (see current Materials Petal Handbook), are not addressed in Division 01, and should be clearly stated in the individual sections of Divisions 03-50. Example language for many of the more frequently used specific exceptions for specific materials is included in the other documents in the LBC specification resources. Language for more general exceptions, such as the I10-E1 General Red List and I10-E4 Proprietary Ingredients exceptions, that cannot be anticipated by product, have not been included since they would not typically be included in specifications, but rather in other education materials.

PERFORMANCE/PRESCRIPTIVE SPECIFICATIONS

Projects using performance or prescriptive specifications, also known as an open spec, should include relevant Living Building Challenge requirements at the beginning of Part 2, followed by specific LBC material requirements and exceptions, followed by the specific performance requirements of the product(s) being specified.

For example, the below demonstrates the integration of general Living Building Challenge requirements (2.1 A), the language for Exception I10-E11, Composite Wood Sheet Goods (see 2.1 B), and the prescriptive requirements for stile and rail wood doors (2.2 A & B). The overarching requirements of the Living Building Challenge are listed at the top of the section, followed by exception language and detailed Living Building Challenge material requirements, and lastly all performance and prescriptive requirements for the product or products included in the specification section. Product language is included for reference only.

PART 1 - SECTION 08 14 33 – STILE AND RAIL WOOD DOORS

PART 2 - PART 2 - PRODUCTS

- 2.1 LIVING BUILDING CHALLENGE PERFORMANCE REQUIREMENTS
- A. All materials and equipment are to meet the requirements outlined in specification section 01 18 13, sustainable design requirements. Products are to comply with the written requirements for living building challenge compliance including, but not limited to:
 - 1. Red list
 - 2. Living economy sourcing
 - 3. Responsible industry
 - 4. Healthy indoor environment
 - B. Added formaldehyde is allowed in door rail joints.
- 2.2 STILE AND RAIL WOOD DOORS
- A. General construction
 - 1. Door finish grade: premium
 - 2. Wood species and finish type: to be selected by architect
 - 10 B. Door construction
 - 1. Stile and rail construction: clear lumber, may be edge glued for width. Similar grain and color and arranged for optimum match

PROPRIETARY SPECIFICATIONS

Projects utilizing proprietary specifications, also known as a closed spec, should include Living Building Challenge requirements at the beginning of Part 2, followed by specific LBC material requirements and exceptions, followed by the specific performance requirements of the product(s) being specified and then the specific manufacturer and product specified. This ensures substitutions have clear standards for compliance.

The example below includes proprietary spec language for a product that falls under Exception I10-E11, Composite Wood Sheet Goods. Project teams must verify that all products called out by product/model number meet the Living Building Challenge requirements; only materials that have been vetted should be called out by manufacturer and product name in the specifications.

PART 3 - SECTION 08 14 33 - STILE AND RAIL WOOD DOORS

PART 4 - PART 2 - PRODUCTS

2.1 LIVING BUILDING CHALLENGE PERFORMANCE REQUIREMENTS

- C. All materials and equipment are to meet the requirements outlined in specification section 01 18 13, sustainable design requirements. Products are to comply with the written requirements for living building challenge compliance including, but not limited to:
 - 1. Red list
 - 2. Living economy sourcing
 - 3. Responsible industry
 - 4. Healthy indoor environment
- D. Added formaldehyde is allowed in door rail joints.

2.2 STILE AND RAIL WOOD DOORS

- E. General construction
 - 1. Door finish grade: premium
 - 2. Wood species and finish type: to be selected by architect
- F. Door construction
 - 1. Stile and rail construction: clear lumber, may be edge glued for width. Similar grain and color and arranged for optimum match between adjacent pieces.
- G. Approved manufacturers
 - 1. Acme wood door company: fsc oak door model #1234-abc
 - 2. Doors and widgets inc: fsc oak door model #ab-123.45
 - 3. Door technologies company: fsc oak door model #a-123

ADDITIONAL STEPS TO SUCCESS

Specifications should be used to clearly communicate the requirements of the Living Building Challenge and expectations for reporting progress. Specifications should be considered an important part of the Materials process, but should not be considered the only means of communicating LBC requirements. Below are additional, optional measures that can be implemented:

SETTING UP A REVIEW PROCESS

It is recommended the team develop a materials review process early in the project. The process should address materials section, review, specification, and documentation with responsible parties for each phase. The outlined process will help in the development of specifications and a submittal process for a Living Building Challenge project. The process should be reviewed with all applicable project team members and modified if needed to suit the changing needs of the project.

CONTRACTOR AND INSTALLER TRAINING

Project teams should consider contractor and installer training to further communicate the unique mission and requirements of the project. It is recommended the team include an overview of the Living Building Challenge, a detailed look at the Materials Petal and Healthy Interior Environment requirements, the project specific reporting and submittal requirements, avenues for contractors to have questions addressed, and available reference resources onsite. Teams should consider video recording the initial training or scheduling multiple training sessions through the construction schedule.

ONSITE RESOURCES

Teams should consider keeping Living Building Challenge reference materials available onsite. Copies of the applicable Living Building Challenge Standard, printed copies of the Petal Handbooks, project specific Dialogue posts, and an outline of any Living Building Challenge onsite training materials to provide onsite team members with easy access to resources. Signage and regular LBC site walkthroughs may also serve as a helpful reminder of the specified requirements.

OAC MEETINGS AND REPORTING

Utilize Owner/Architect/Contractor meetings to report on Living Building Challenge progress. It is recommended that the General Contractor designate a point person responsible for tracking and reporting on all Living Building Challenge criteria within the General Contractors scope of work. Teams should consider including the following in regular updates:

- Review of the submittal log to verify all submitted products have been reviewed for LBC compliance and all required products have been submitted for review.
- Verification that all product submittals shown as approved in the submittal log have been tracked in the Material Tracking Table.
- Review of FSC purchases and collected invoices

- Review of Living Economy Sourcing progress, including product cost
- Verification of the number of salvaged and Declare products incorporated to date
- Review of Net Positive Waste tracking
- Review of measures included in the Material Conservation Management Plan, relating to the construction phase