

Sustainable Materials Action Packet

01 June 2023

We build with thousands of different materials. It matters, where those materials are coming from and how far they traveled, who produced them, how they were manufactured, and whether products and materials are designed for a future life when the building comes down.

This packet documents tools and thought processes that can help inform better material design choices. We encourage you to adapt these resources to the needs of your organization or practice and share them with others. The more we work together to improve the building products industry, the better it will be for our planet and its inhabitants. We welcome feedback at generativeimpacts@msrdesign.com

Download the latest version of this packet at msrdesign.com/generative-impacts

Materials Library Entry Criteria

To align our projects and practice with the sustainable and healthy building materials movement, we communicate our intentions to building products sales representatives and manufacturers using this one-page handout, which contains three categories of action:

1. What We Require: Transparency

A growing number of architecture firms and client organizations are requesting transparency on the composition and embodied carbon of building products.

2. What We Avoid: Harmful Ingredients and High Carbon Footprint

Transparency from product manufacturers plus growing industry knowledge enables us to select products for lower toxicity and carbon footprint.

3. Interpreting Eco-labels and Other Data

We support manufacturers that are leading market transformation in their product sector, and obtaining appropriate certifications.

Sustainable and Healthy Building Materials

A Practice Guide

We want the entire world to understand what it means to use better materials.

100 Level: Fast Track Learning 1-2-3

Accessible videos for everyone, including firm leadership and project managers.

200 Level: Early Steps for Better Materials

Select resources to support carbon and health-based materials decisions early in design or the RFP process.

300 Level: Find Products and Materials

Tools and databases to help you find better products.

400 Level: Advanced Learning

Chemistry deep dive, great case studies, latest research, best practice guides, and guidance for rewriting architectural specifications.

Tools for Product Manufacturers

This page highlights resources that are available to assist manufacturers in developing their documentation and becoming leaders in their sector. There is incredible room for innovation at this time as we find ways to move away from petroleum-based building products.

Cost-Of-Documentation Matrix For Manufacturers

Transparent reporting on ingredients, supply chain and embodied carbon is new and rapidly expanding territory for building product manufacturers.

Architectural Samples Donation Guide

To reduce waste, we have developed a workflow for returning product samples, but sometimes they still pile up, so we worked with Twin Cities ReStore, a branch of Habitat for Humanity, to develop guidelines for donating certain reuseable samples such as discontinued carpet tiles.

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01 June 2023

MSR Design is a signatory to the [AIA Materials Pledge](#), which is a commitment to address building materials impacts across five categories. Our goal is to support manufacturers that demonstrate transformation of their products to create a healthier, more equitable, lower carbon industry.

Human Health

Requesting ingredient disclosure and preferring products that foster life throughout their life cycles and seeking to eliminate the use of hazardous substances.

Climate Health

Requesting carbon footprint data and preferring products that reduce carbon emissions and sequester more carbon than emitted throughout their life cycles.

Ecosystem Health

Preferring products that regenerate natural air, water, and biological cycles through thoughtful supply chain management and restorative company practices.

Social Health and Equity

Preferring products from manufacturers that secure human rights in operations and supply chains in support of workers and communities where they operate.

Circular Economy

Reusing buildings and materials, and designing for future disassembly and reuse, materials efficiency, long life, and perpetual cycling.

IA. What We Require: Transparency

Products on our shelves require documentation of composition in one of the following formats:

[Health Product Declaration \(HPD\)](#)¹

An affordable option for manufacturers

[Declare Label](#)¹

Includes listing in popular designer-facing Declare Database

Ib. What We Require: Life Cycle Data

Products on our shelves require documentation of life cycle impact:

[Environmental Product Declaration \(EPD\)](#)¹

A third-party prepared and verified document disclosing life cycle impact

[Life cycle assessment \(LCA\) data](#)

If EPD is not available, provide a description of life cycle assessment efforts in progress

2a. What We Avoid: HARMFUL INGREDIENTS

- [Antimicrobials](#)
- [Stain repellants and other PFAS](#)
- [Bisphenols and phthalates](#)
- [Flame retardants](#)
- VOC emissions and VOC content²
- Formaldehyde²
- PVC (vinyl)²

²Not possible to eliminate certain chemistries yet? Talk to us.

2B. What We Avoid: HIGH EMBODIED CARBON

We consider the impact of a product's embodied carbon footprint in comparison to the reasonable expected life of the product; the contribution to reduced operating carbon of the project; and the potential for future reuse, among other factors.

2C. What We Avoid: MONSTROUS HYBRIDS

Products made of dissimilar materials and joined with adhesives are frequently non-recyclable composites. We consider the degree to which products are designed for disassembly.

3. How We Prioritize Other Product Data

Compliance with chemical hazard lists

Prefer free of [GreenScreen Benchmark 1](#)

Certifications, eco-labels, and verified data

We look for high quality eco-labels to help us understand reduced impacts in key areas affected by the manufacturing of this product. Prefer third-party certifications and those that address specific product category hotspots. Independent third-party verified labels and data help us reduce greenwashing¹.

Circularity programs

We give preference to products with strong take-back and realistic recycling programs

Socially responsible manufacturing

Disclosure of human rights practices in the building product supply chain is limited. We are gathering data to improve specification of manufacturing that supports workers.

¹Manufacturers may seek third-party verification for [HPDs](#) and [Declare labels](#). [EPDs](#) are third-party verified per requirements of the standard.

Questions? We value our relationship with you. What are the most sustainable, healthy, low embodied carbon materials you offer? Let's start a conversation.

1 Embodied Carbon & Global Warming Potential Carbon Leadership Forum

Collaborative of building industry professionals, material suppliers, owners, and policymakers working to decarbonize the built environment.

<https://carbonleadershipforum.org>

What is embodied carbon in buildings? / VIDEO (6 min)

Endeavor Centre's Chris Magwood describes how material selection can make the difference between a large carbon footprint and a net carbon sink.

<https://www.youtube.com/watch?v=hlpivin01vQ>

Plastic Buildings: The New Driver of Fossil Fuel Demand

Article by the Healthy Building Network.

<https://healthybuilding.net/blog/579-our-plastic-buildings-the-new-driver-of-fossil-fuel-demand>



2

Avoiding Toxic Materials

Six Classes of Chemicals of Concern/VIDEOS (4 min each)

A series from Green Science Policy Institute on chemistry to remove from use in consumer and building products.

PFAS (per- and polyfluoroalkyl substances)

<https://www.sixclasses.org/videos/pfas>

Antimicrobials

<https://www.sixclasses.org/videos/antimicrobials>

Flame Retardants

<https://www.sixclasses.org/videos/flame-retardants>

Bisphenols and Phthalates

<https://www.sixclasses.org/videos/bisphenols-phthalates>

Mercury, Arsenic, Cadmium, Lead

<https://www.sixclasses.org/videos/certain-metals>

Specific Solvents

<https://www.sixclasses.org/videos/some-solvents>



3

Sustainable Building Materials/Big Picture

What is a circular economy?

An economy where waste is eliminated, resources are circulated, and nature is regenerated.

<https://ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>

The Impact of Toxins on the Developing Brain/VIDEO (7 min)

From the Little Things Matter series, about body burden.

<https://www.youtube.com/watch?v=E6KoMabzIBw>

Centering Equity in Sustainable Building

The most impacted communities are underrepresented in the design and construction of sustainable buildings.

<https://www.greenbuilt.org/articles/jacqui-patterson-and-mandy-lee-centering-equity-in-sustainable-buildings-why-green-buildings-are-a-civil-rights-issue>

AIA Materials Pledge (Executive Summary)

Architecture firms committed to asking manufacturers for transparency and prefer products that support human, climate, ecosystem, and social health.

<https://www.aia.org/pages/6351155-materials-pledge>

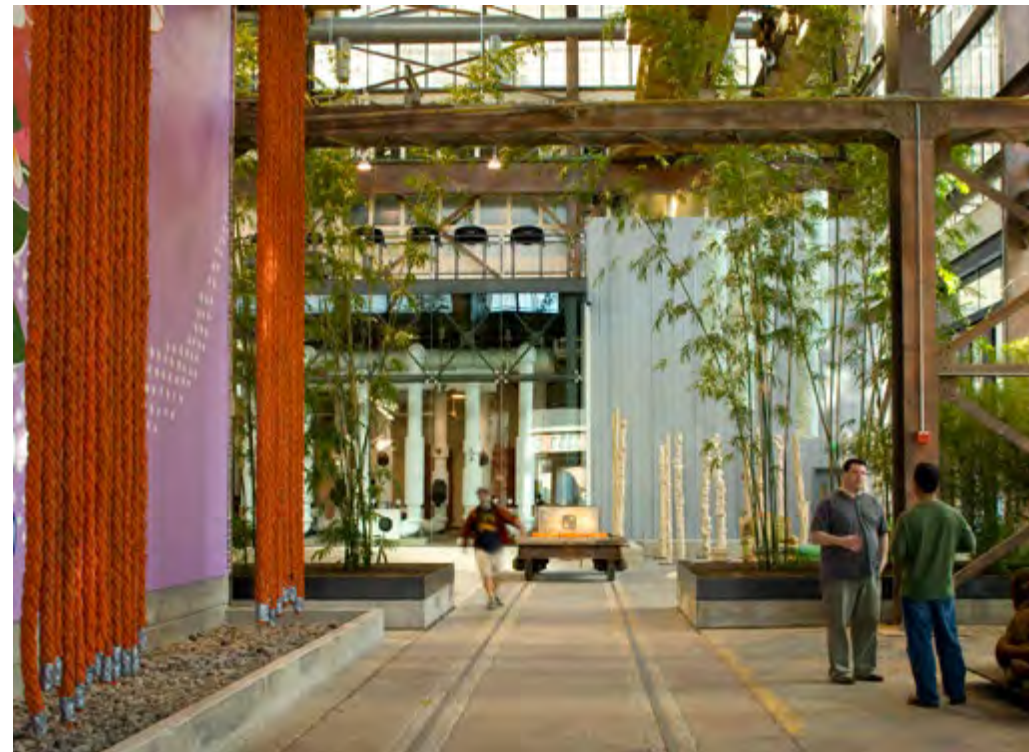
Impact of Green Buildings on Cognitive Function/VIDEOS (3 min each)

Summary of studies from Harvard School of Public Health, SUNY Upstate Medical University and Syracuse University conclusively linking indoor environmental quality to cognitive function of building occupants.

<https://thecogfxstudy.com/study-1>

<https://thecogfxstudy.com/study-2>

<https://thecogfxstudy.com/study-3>



SD



DD

CD

CA

Starting a project

Design Your Materials Palette

MSR Design Materials Library Entry Criteria

The Material Library Entry Criteria is a simple tool for filtering materials and products that demonstrate a commitment to the [Resources and Wellbeing Measures of the Framework for Design Excellence](#).

Design for Human Health

HBN Informed Tool

“The easy way to select healthier building products.”

<https://informed.healthybuilding.net>

HomeFree Transformation Targets

A stoplight chart for building your materials palette.

<https://homefree.healthybuilding.net/products>

ILFI Materials for Affordable Housing product list

Resources for getting started with Red List Free materials.

<https://living-future.org/affordable-housing>

Design for Embodied Carbon

Carbon Smart Materials Palette

Building your palette with carbon in mind.

<https://materialspalette.org>

Embodied carbon calculation based on your model or drawings

- Tally embodied carbon modeling plugin for Revit
<https://choosetally.com>
- One Click LCA embodied carbon modeling plugin for Revit
<https://www.oneclicklca.com>
- Athena spreadsheet-based impact estimator
<http://www.athenasmi.org/our-software-data/impact-estimator>
- CARE Tool Carbon Avoided Retrofit Estimator
<https://caretool.org>

Design for Deconstruction & Reuse

All for Reuse Ecosystem Map

Salvaged and reused materials can lower your carbon footprint.

<https://www.allforreuse.org/ecosystem-map>

2. Find Products & Materials | Tools for Designers & Specifiers

01 June 2023

SD

DD

CD

CA

Product Databases & Procurement Platforms

Mindful Materials Portal

Search products, documentation and certifications.

<https://portal.mindfulmaterials.com>

Ecomedes

Search products, documentation and certifications.

<https://products.ecomedes.com>

Declare Product Database

Search Red List Free and Red List Compliant products.

<https://living-future.org/declare>

Origin Database

Searchable by category, brand or certification type.

<https://www.origin.build/#>

Red2Green (subscription platform and database)

Platform and database tailored specifically to the documentation requirements of the Living Building Challenge Materials Petal.

<https://materiallybetter.com>

Practice Greenhealth (formerly Healthier Hospitals Initiative)

List of furniture that avoid chemicals of concern for use in healthcare and other settings. Expanded website includes additional guidance on sustainable procurement as well.

<https://practicegreenhealth.org/topics/safer-chemicals/healthy-interiors>

EC3 Embodied Carbon Comparison Tool

Tool for comparing the embodied carbon footprint of specific brands, as opposed to estimating based on product category averages.

<https://buildingtransparency.org>

Product Samples

Material Bank

Filter, order and return product samples by brand and certification.

<https://www.materialbank.com>

Quick Search for Transparency Documentation

Sustainable Minds Transparency Catalog

All HPDs and all EPDs in North America with MasterFormat filtering.

<https://www.transparencycatalog.com>

Eco-Label Quality Check

Ecolabel Index (free basic access)

What is a good ecolabel? Look for independent, third-party verified.

<https://www.ecolabelindex.com/ecolabels>

Salvaged Materials Sourcing

Building Product Ecosystems map

A growing network of resources for procuring salvaged materials from commercial and residential-scale projects.

<https://www.buildingproductecosystems.org/regional-reuse-resources>

3. References

Natural & Biobased Materials

Sustainably harvested, biobased building materials have the potential to sequester more carbon than we emit by using them. Avoid greenwashing by using certified products. Avoid plastic-based glues, binders and components that jeopardize the possibility of end-of-life recycling or composting.

Forest Stewardship Council (FSC) certified lumber

FSC supplier search for North America.

<https://sourcing.climatesmartwood.org>

Hempitecture

Resources for building with hempcrete

<https://www.hempitecture.com/post/hempcrete-wall-detailing>

Parsons Healthy Materials Lab: Hemp & Lime

Hempcrete demonstration projects; information on industrial hemp cultivation, hemp and lime use, the potential of manufacturing, and creation of hemp-based products to create a complete cycle of block production to construct affordable and healthier housing.

<https://healthymaterialslab.org/tool-guides/hemp-lime-1>

Endeavour Centre Sustainable Building Encyclopedia

Encyclopedia of sustainable building materials.

<https://endeavourcentre.org/resources-for-building-green/free-encyclopedia-of-sustainable-building-materials>

Straw Bale Building Details: An Illustrated Guide

How to build with straw bale.

<https://www.strawbuilding.org/Straw-Bale-Building-Details>

Salvage & Reuse

Material Reuse in Commercial Projects report (CallisonRTKL)

Opportunities for material reuse within commercial projects, where high turnover of interiors means valuable materials can go to waste.

https://cdn.crtkl.com/wp-content/uploads/sites/1/2021/03/CRTKL-CoLab_Report-1.pdf

Healthy Materials Deep Dive

Harvard For Health

Clear, actionable core elements of healthy indoor environments.

<https://forhealth.org>

Parsons Healthy Materials Lab

(free articles + paid certificate program)

Podcast, videos and other resources on non-toxic building product developments. Online material health certificate program.

<https://healthymaterialslab.org>

Parson HML Textiles Guides

<https://healthymaterialslab.org/tool-guides/textile-guides>

Chemical Databases

The Red List

Up-to-date restricted chemistry from The Living Building Challenge.

<https://living-future.org/red-list>

Pharos + Chemical Hazard Data Commons

Look up chemicals to understand their hazard indicators.

<https://pharosproject.net>

Green Screen List Translator System

Understand the “list of lists” approach to quickly identify chemicals of high concern. Chemicals identified as Benchmark 1 (highest concern) through Benchmark 4 (lowest concern) based on a chemical’s presence across many international hazard lists.

<https://www.greenscreenchemicals.org/learn/greenscreen-list-translator>

Upgrade Your Specs

HomeFree Product Spec Guidance

Within several different product categories, HomeFree has provided sample specs that meet dark green and light green criteria on the HomeFree hazard spectrum. For example, in the paint category:

<https://homefree.healthybuilding.net/files/homefree-paint-specifications>

Other product categories:

<https://homefree.healthybuilding.net/products>

Journalism and Research

BuildingGreen.com (membership)

The latest journalism on high performance buildings and materials.

<https://www.buildinggreen.com>

Green Building Advisor (free basic access)

Detailed advice on high performance buildings and assemblies.

<https://www.greenbuildingadvisor.com>

Healthy Building Network

In-depth research reports and chemical expertise

<https://healthybuilding.net>

Parsons: Trace Material Podcast Series/Podcast

A fascinating series of podcasts on the problems and promises of developing material categories.

Trace Material Season 1: Hemp

Trace Material Season 2: Plastics

Trace Material Season 3: Fungi

<https://healthymaterialslab.org/projects/podcast>

Ensia Magazine

A solutions-focused nonprofit media outlet reporting on our changing planet, and groundbreaking things people are doing to address climate change mitigation.

<https://ensia.com>

Project Drawdown

Project Drawdown is a world-class research organization that reviews, analyses, and identifies the most viable global climate solutions, and shares these findings with the world.

<https://drawdown.org>

Choose a certification

Estimated Cost Matrix

See following page.

Select the Best Ecolabel

Ecolabel Index

What is a good ecolabel? Find out whether a label is independent and third-party verified, and choose the best one for your product.

<https://www.ecolabelindex.com/ecolabels>

Create Documentation

Composition

Health Product Declaration Collaborative (HPDC)

HPDC is a resource and network for manufacturers looking to use the HPD standard for ingredient disclosure.

<https://www.hpd-collaborative.org/hpd-user-guide>

Toxnot online platform

Automate product compliance, get feedback to improve supply chains, and streamline sustainability reporting .

<https://toxnot.com>

Declare Product Database

Use the Toxnot platform to prepare your product label on Declare.

<https://living-future.org/declare>

Pharos Tutorials

Guided tutorials and webinars help you get the most out of Pharos.

<https://pharosproject.net/tutorials>

Innovate

Lead in Your Sector

The Living Product Challenge

A framework for manufacturers to create next-in-class products.

<https://living-future.org/lpc>

The Circular Design Guide

An exhilarating time to be an innovator / safe and circular materials.

<https://www.circulardesignguide.com/safe-circular>

Green Chemistry

12 Principles of Green Chemistry / VIDEO

John Warner presents the principles of green chemistry.

<https://www.johnwarner.org/learning>

Implications of green chemistry in science, engineering and design.

<https://bioneers.org/tag/john-warner>

Plastics

Clean Production Action

Links to the chemical footprint project, Principles for Chemical Ingredient Disclosure, Greenscreen, The Plastics Scorecard more.

<https://www.cleanproduction.org/resources/category/cpa-videos>

The Plastics Scorecard report

Measuring the chemical footprint of plastics and evaluating progress to safer chemicals in polymer manufacturing.

<https://www.bizngo.org/sustainable-materials/plastics-scorecard>

Biomaterials (An Introduction)

University of Colorado Living Materials Laboratory

Biology meets polymer and cement chemistry to create bio-based building materials.

<https://spot.colorado.edu/~wisr7047>







Tidal Vision

Chitosan is one of the most abundant biopolymers in the world, second only to cellulose.

<https://www.tidalvision.com/chitosan>



Example Costs of Product Labels and Disclosure

		HUMAN HEALTH		LIFE CYCLE IMPACTS			
		PRICING REFLECTS RIGOR AND EXTENT OF PROGRAM REQUIREMENTS AND ASSESSOR CREDENTIALS					
							
		Health Product Declaration (HPD) documents the contents of a building product along with associated health information.	Declare is a nutrition-style label created to support the Living Building Challenge Red List. (Also consider Living Product Challenge)	Material Health Certificate is a singular achievement score, evaluated based on the C2C banned list of chemicals.	Cradle to Cradle (C2C) certification is a multi-attribute label based on the concept of circularity and continuous improvement.	Level is a multi-attribute certification applicable to furnishings. It evaluates both the product and the manufacturing facility.	Environmental Product Declaration (EPD) is a comprehensive report that evaluates a product's environmental impacts.
Valid for		3 years	1 year	2 years	2 years	ongoing	5 years typ.
Cost of label		\$250 for five HPDs, using HPD Builder platform	\$1000 for 1-10 labels, volume discount for 11+	\$3600 standalone; or free with C2C certification	\$3600, includes Matl Health Certificate	\$25,000+ total over a three year process	\$4000-\$8000+, based on program and scope
Membership		\$500-\$1500 (optional, includes unlimited HPDs)	\$250	\$1800+, depending on scale of manufacturer	\$1800+, depending on scale of manufacturer	\$3200+, depending on scale of manufacturer	n/a
Change fee		n/a for minor updates	case by case	\$650-750	\$650-750	n/a	n/a
Renewal fee		\$250 for five HPDs, renewal does not apply	\$800	\$1000	\$1000	\$8000 (annual)	\$0-\$1300, depending on program operator
Difficulty		Easy to Intermediate, depending on method of inventory and disclosure; completeness of data.	Intermediate, with largest hurdle being ability to disclose to 100ppm.	Easy, if done in tandem with C2C certification, where required data is already complete.	Advanced. Requires expert-level knowledge of the product and manufacturing.	Intermediate to Advanced; number of plant locations and complexity.	Intermediate to Advanced; complexity of product and product category.
Timeframe		Intermediate depending on complexity. Days to weeks.	Intermediate, depending on complexity. Weeks to several weeks or more.	Substantial, but reduced if pursuing simultaneous C2C certification.	Substantial. Three months to one year.	Substantial. Three years for full certification cycle.	Intermediate. Minimum 4 weeks based on program operator and complexity.
Consultant fees		\$2500+ per HPD, depends on complexity*	\$2500+ per label, depends on complexity*	\$10,000+ alone; \$1000 or less combined with C2C	\$25,000+	Included in costs above	Requires an independent LCA practitioner. Fee varies based on provider and scope; \$2000 to \$10000+ for greater complexity.
Third-party verification		\$2000+ (optional)	\$2000+ (optional)	Included by default	Included by default	Included by default	Additional LCA review (refer to LEED v4 credit language) may increase fees by \$3000-\$4000.
Notes		Fillable PDF version of HPD is available at no cost to manufacturers. However, use of the HPD Builder is recommended.*	Renewal fee waived for removing Red List ingredient or removing all proprietary ingredients.*	Free label cost with simultaneous C2C initial certification or recertification.*		Additional BIFMA licensing fee \$5000+ to use Level logo.	

*For the most efficient process, recommend manufacturer identify a point of contact in-house who is technically advanced, familiar with production, and connected to upstream suppliers. An experienced consultant, familiar with program language and requirements, can significantly reduce company time spent pursuing certification.

Costs and fees will vary by consultant, program operator, location, and complexity of the product and supply chain. Contact A Greener Space consulting firm with questions. <https://www.agreenspace.com> specializes in educating and helping manufacturers obtain certification.

GOT ARCHITECTURAL + INTERIOR DESIGN PRODUCT SAMPLES?

UP-CYCLE THEM!

ReStore

Twin Cities Habitat for Humanity

Twin Cities ReStore sells donated building and project supplies for DIY projects and uses the proceeds to support Habitat for Humanity building projects in Minnesota. Architecture and interior design firms throw away a lot of product samples every month because they cannot be returned to the manufacturer.

- Note: Some manufacturers request that their samples be returned to the product representative, or offer a prepaid return box. Returns should always be a first priority.
- Drop-off locations: 510 County Road D W, New Brighton, MN 55112 2700 Minnehaha Ave S, Minneapolis, MN 55406
- Drop-off hours: Tuesday - Friday 10AM-5PM, Saturday 10AM-3PM
- Email: restore@tchabitat.org
- Phone: 612-588-3820
- Schedule a pickup: Donations can be brought to a drop-off location or ReStore offers a free pick-up service: restore.tchabitat.org/donate
- Donatables: Stack larger items neatly; sort and box smaller items into similar categories. ReStore can deliver tote bins to your office to be filled and picked up in the same week, please phone or email to arrange.

Donation Guidelines: Architectural Samples*

Brick	Loose brick & blocks, dirt free and not broken No brick samples mounted to sample boards
Door hardware	Door and other hardware can be used in Habitat projects, even if it is mounted to sample boards.
Flooring	Carpet tiles of all sizes and styles No laminate, resilient flooring or wood flooring pieces
Furniture (used office furniture)	ReStore does not accept or sell office furniture. Instead please contact Furnish Office & Home: http://www.furnishofficeandhome.org/
Glass	Loose glass tile, glass block, glass panels No insulated glass units (IGUs) or window glass samples. No mirrors except small and framed.
Solid surface	Pieces of polished solid surface in different colors, especially in matched sizes and attractive display boxes
Stone	Loose stone facing & blocks, dirt free and not broken No stone samples mounted to sample boards.
Textiles	Contact ReStore regarding large pieces of fabric No textile memos
Tile	Loose ceramic tile of different sizes and colors, not broken or chipped
Wall panels	Plastic or other material wall and partition panels larger than coaster-size, especially in matched sizes and attractive display boxes
Wood	Limited to interesting or attractive wood pieces 8"x8" or larger (i.e. something you could picture using in an art project). Matched coaster-size pieces may be acceptable. No siding, trim, really big pieces, lumber
Random odds and ends / small pieces	Interesting and attractive samples that you could imagine using in an arts & crafts project, coaster-size at minimum, preferably 8"x8" or larger. Especially when there are multiples of a similar size, and attractive display packaging such as decorative boxes, bins or baskets. No fasteners, foam, binders, books, paint chips, laminate chips, acoustic tile, insulation, or assemblies.

*See general donation guidelines for any category not listed in this chart.