

Mother Nature's Green Building Material

The new sustainable stone standard will transform the material selection of natural stone for architects.

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In the 1990s, “design thinking,” a method of using synthesis to analyze complex problems, was used to generate solutions to the growing problems from climate change. Architects like William McDonough began to rephrase the questions surrounding the degradation of natural resources and pollution as a design problem. In his seminal book *From Cradle to Cradle*, he introduces what has now become a tidal wave of life-cycle analysis (LCA) environmental initiatives that document where and how materials are sourced, produced, transported, and reused. Today, architects, engineers, contractors, building owners, managers, and the public are driving a building revolution that encourages the design and construction of healthy buildings. These buildings give to rather than take from the environment from design through construction practices, including the choice of sustainable building materials.



Continuing Education

Use the following learning objectives to focus your study while reading this month's Continuing Education article.

Learning Objectives - After reading this article, you will be able to:

1. List the components of a new sustainable certification standard ANSI/NSC 373, which provides a life-cycle analysis (LCA) for dimensional stone products.
2. Define the various components of an LCA.
3. Discuss how compliance to ANSI/NSC 373's national and international requirements for environmental, ecological, human health, and social responsibility in stone quarrying and production satisfies the growing demand for sustainable product declarations.
4. Describe how the components of ANSI/NSC 373 are aligned with green building rating systems, such as LEED and the Living Building Challenge.
5. Explain how the Chain of Custody Standard (NSC COC) for natural stone products ensures the traceability of certified stone throughout the supply chain, from quarry to gate.



Photo courtesy of Northern Stone Supply

Natural stone is beautiful, durable, sustainable, and easy to maintain. Stone can be used in a wide variety of exterior and interior applications, as seen in this Las Vegas residence. This charcoal and white quartzite stack stone from Northern Stone Supply was supplied by Arizona Stone.

As the green movement grows, construction and manufacturing industries have begun to meet the demand for rigorous environmental documentation of many common building materials. Among these, the latest green initiatives are coming from the natural stone industry. Natural stone rates high on an environmental scale. It is recyclable, low maintenance, emits no VOCs, and is one of the most durable and most beautiful materials on the planet. In the past decade, this industry has increased its commitment to sustainability through the development of a new life-cycle assessment combined with a chain-of-custody material certification approved by the American National Standard Institutes (ANSI) and the National Stone Council (NSC). ANSI/NSC 373: Sustainable Production of Natural Dimension Stone will transform the material selections of natural stone and the stone industry.

In response to a growing demand for life-cycle information and documentation of building materials, natural stone quarries and production companies have initiated the development of a new LCA cradle-to-gate certification program and standard. The companion NSC Chain of Custody Standard (NSC COC) provides documentation from cradle to gate, referring to the documentation of a material from quarries to the project site.

According to Jessica Slomka, manager, National Center for Sustainability Standards, NSF International, LEED AP BD C, the ANSI/NSC 373: Sustainable Production of Natural Dimension Stone “establishes criteria to measure the extent to which natural stone is extracted and processed sustainably. The standard employs a comprehensive life-cycle approach to ensure that the most relevant aspects of quarry operations and stone fabrication are considered in the criteria for certification. Compliance to ANSI/NSC 373’s national and international requirements for environmental, ecological, human health, and social responsibility in stone quarrying and processing will satisfy the growing demand for sustainable product declarations.”



Denver Union Station. Photography credit: Steve Maylone Photographer and Ryan Dravitz

Natural stone is beautiful, durable, and sustainable. Stone used as a landscape material can withstand the harshest climates, as demonstrated in this granite community fountain installed at the Denver Union Station.

Jason F. McLennan, founder and chair of the International Living Future Institute and its influential Living Building Challenge, Declare product database, and Living Future unConference, was one of the many architects consulted to review early versions of this standard. He recommended that the industry pursue a third-party chain-of-custody declaration as part of the final versions of ANSI/NSC 373. This declaration is similar to that provided by the Forest Stewardship Council for wood products. According to the Natural Stone Council, “The Chain of Custody Standard has been developed as part of the ongoing efforts of a number of interested parties to document and improve the sustainability profile of natural dimension stone production. This standard complements the ANSI/NSC 373: Sustainability Assessment for Natural Dimension Stone by driving sustainability throughout the supply chain. It ensures that natural stone products that are sustainably produced are also handled throughout the supply chain in a manner that ensures their sustainability. These requirements are intended to form the basis of conformity assessment programs, such as third-party certification or registration.”¹



Photo courtesy of TexaStone Quarries

Green Market Drivers 101

The natural stone industry began this initiative to increase their market share of natural dimensional stone as a sustainable product. Since the 1990s, the growth of programs like the US Green Building Council LEED rating system, the Building Research Establishment Environmental Assessment Methodology (BREEAM) and the International Living Future Institute's Living Building Challenge (LBC) are just a few of the tens of thousands of individuals promoting environmental design. They are choosing materials that reduce, recycle, and reuse scarce natural resources in the creation of resilient, healthy buildings because of increased environmental concerns. Their choices are backed by research and increasing statistics that prove the social, economic, and environmental benefits of building green.

LEED

The benefits to owners and users include energy savings from decreased operational costs, increased health benefits to occupants, increased property values, and decreased vacancy rates for LEED buildings. For example, the LEED Gold buildings in the General Services Administration's portfolio generally:

- consume 25 percent less energy and 11 percent less water;
- have 19 percent lower maintenance costs;
- have 27 percent higher occupant satisfaction;
- and have 34 percent lower greenhouse gas emissions.²

In 2015, 40 to 48 percent of new nonresidential buildings were green projects, resulting in a \$120-billion to \$145-billion market opportunity, and 40 percent of all nonresidential building starts in 2012 were green, as compared to 2 percent of all nonresidential building starts in 2005. Trending upward, the market for green buildings and green materials is growing globally. The most widely used green rating system in the United States is the U.S. Green Building Council's LEED rating system, and its global reach is growing. Architectural firms in Brazil, Singapore, the United Emirates, and the United Kingdom report that between 65 and 85 percent of their commercial and renovation projects will be green. Architects report that LEED is referenced in project specifications for 71 percent of their projects, valued at \$50 million and over.³

LEED v4, the latest version of the credential system, has published new, stringent standards for construction materials and methods. LEED v4 will take a more holistic approach to defining a green building material with a particular focus on life-cycle impacts in addition to supply chain management. Accounting for the life-cycle impact of materials, from raw materials through processing and installation, is beginning to drive material choices for buildings. Requirements for third-party certifications of how building products reach a building site, from the raw material through processing, installation, and deconstruction, are growing.

BREEAM

Globally, other leaders in the green movement require product life-cycle analysis and certifications. The Building Research Establishment Environmental Assessment Methodology (BREEAM) was established in 1990 and is considered the world's longest-operating method of rating green buildings. To date, BREEAM has 2.2 million registered buildings in more than 73 countries.⁴ The BREEAM guide, "The Approach to the Selection and Procurement of Construction Materials and Products," is a tool for architects who want to choose materials that reduce the life-cycle impact of a building's footprint across environmental, social, and economic aspects of sustainability. BREEAM requires the investigation of international supply chains, and the review of the holistic aspects of how materials are made, processed, and delivered to a site.⁵

Living Building Challenge

The International Living Future Institute's Living Building Challenge requires rigorous methodologies to be applied to green building projects. Its mission is "to lead and support the transformation toward communities that are socially just, culturally rich, and ecologically restorative." As of September 2015, there are nearly 300 registered Living Building Challenge projects measuring over 10 million square feet in 13 countries around the world. Resiliency, regeneration, equity, community, and materials transparency are among the criteria used to measure buildings that are net-zero and beyond. As architects grow in their abilities to design buildings that benefit the environment, the market for new ways of building that include new means of production and considerations of social impacts are the forefront of the green building movement. The Living Building Challenge begins to expand on the notion of net-zero impacts on the environment when building green.

MARKET RESPONSE

In response to this green revolution and the increase in the demand for green building products, the market has responded at varying levels. There are green declarations on most manufacturers' websites, often listing the many ways that their products meet a LEED credit. Manufacturers are providing a greater transparency of material components, particularly chemical components used in their installation and assembly. In addition to recyclability of a material, a new approach includes the reduction of waste in the design and manufacturing of products.

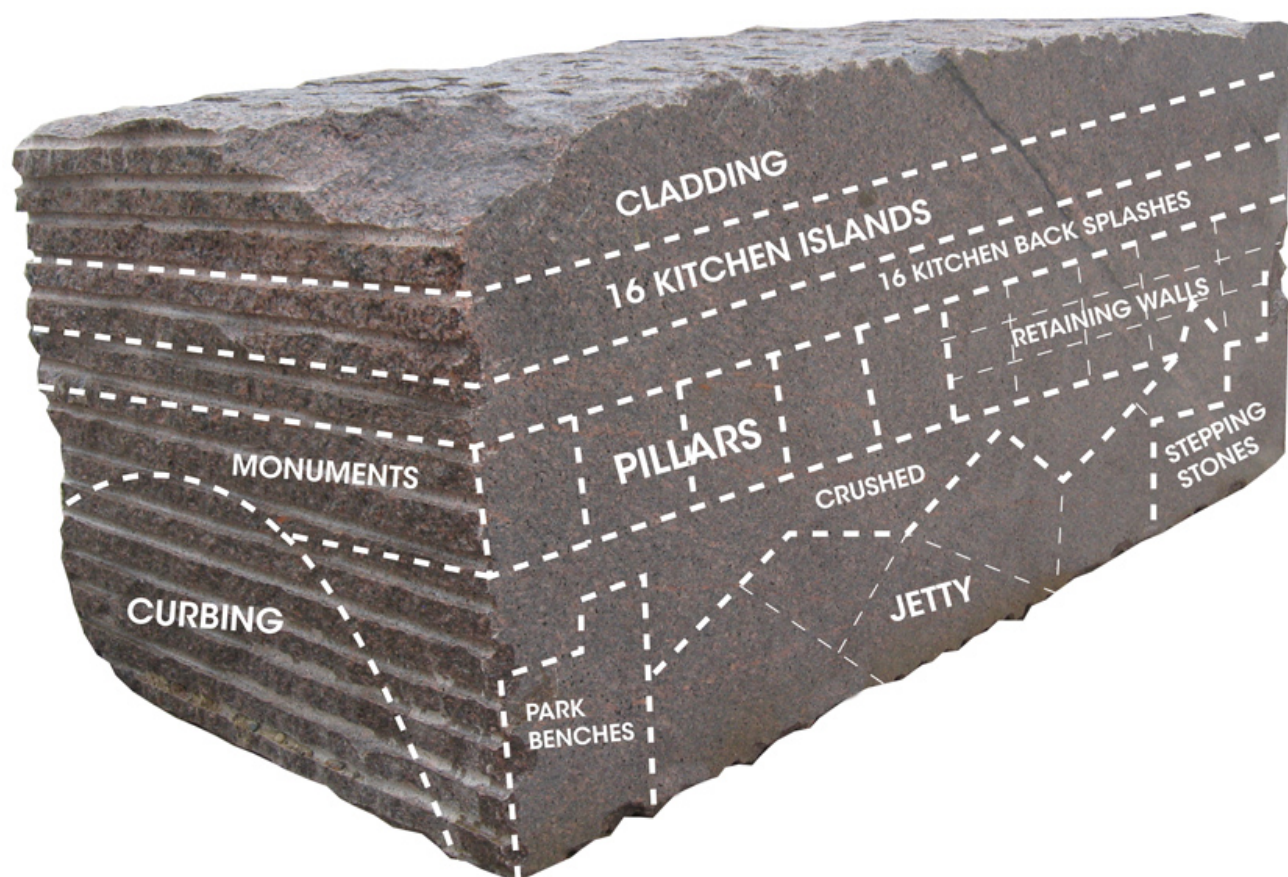


Image courtesy of Coldspring

One natural stone company uses this diagram to train employees on how to increase yields. It demonstrates a plan to utilize all material that is extracted.

Pre-production strategies include the planning of how to optimize all material being extracted in order to minimize waste and increase yields. This strategy includes the development of employee training programs that focus on waste reduction. One natural stone company uses diagrams to demonstrate how to get the greatest yield from all materials extracted. To meet the goals of certification, its plans include not only an inventory of excess materials and solid waste but also a management plan that includes the creative approach to extraction in pre-production as well as post-production strategies.

A post-production strategy created in partnership with Jason F. McLennan incorporates post-processed stone remains. This innovation uses excess process materials and aligns with criteria in the ANSI/NSC 373 standards. This process uses remnant stone pieces that are cut and incorporated into patterns that mimic interlocking earth forms. Some of these patterns use geometrics, such as the Fibonacci series or natural shapes like cracked mud. These approaches are examples of how the natural stone industry is developing new products that meet the demand for sustainable materials that reduce waste and meet strict environmental targets.

With the growth of more stringent requirements for third-party product declarations by the leading green rating systems, it is becoming no longer acceptable for a product manufacturer to provide a "self-declaration" of environmental benefits on their websites. Present and future rating systems are requiring third-party testing and certifications that verify compliance to environmental goals, from extraction to installation, without any "greenwashing" or exaggerating the environmental material attributes of a product.

Material suppliers are enacting stronger environmental initiatives for developing healthy and socially beneficial building materials. These materials are designed to meet the triple bottom line of social, economic, and environmental sustainability. The call for increased environmental accountability in the marketplace led to the development of the new stone industry standard—ANSI/NSC 373: Sustainable Production of Dimensional Stone, Production of Dimensional Stone, which has been roundly embraced by industry leaders. As Brenda Edwards of TexaStone Quarries—the stone industry's first certified ANSI/NSC 373 Gold Quarry Operations and Silver Processing Fabricator—notes, "The NSC 373 standard taught me so much about the efficiency of our business and ways to improve."

ANSI/NSC 373: Sustainable Production of Dimension Stone

NSF International’s National Center for Sustainable Standards began development of a dimension stone sustainability assessment standard utilizing the input of various stakeholders, including quarry operators, processors, users, public health, academia, and others as required by any ANSI initiative. The collaboration of these stakeholders guided the criteria development for the assessment of sustainable quarry operations and processing, including life-cycle considerations. NSF International through the National Center for Sustainability Standards (NCSS) in association with Ecoform, an independent consultant, helped NSC develop the ANSI/NSC 373: Sustainable Production of Dimensional Stone.

This standard establishes criteria to measure the extent to which natural stone is extracted and processed sustainably. Components of the dimensional stone ANSI/NSC 373 include the following attributes. The standard:

- is credible and science based;
- provides life-cycle considerations;
- includes multiple attributes of the material;
- is applicable internationally;
- and is sustainable.

The Natural Stone Council, a nonprofit organization, is a collaboration of businesses and trade associations that have joined forces to promote the use of natural stone in commercial, residential, government, institutional, educational, and all types of interior and exterior applications. The NSC has recently published ANSI/NSC 373: Sustainable Production of Natural Dimension Stone and NSC 373: Chain of Custody Standard.

The Natural Stone Council utilizes NSF Sustainability to independently certify NSC 373: Sustainable Production of Natural Dimension Stone. The goals for this standard are to:

- establish a set of well-defined environmental, ecological, social responsibility, and human health metrics;
- educate key members of the design and building professions on the value and benefits of connections with green building programs.
- provide a method for improving baseline environmental performance for stone;
- and be applicable domestically and internationally, from quarry through fabrication and installation.

This consensus-driven new standard will encourage material selection transformations. Life-cycle assessments will encourage design professionals to look beyond single attributes of a material, such as the use of recycled material. They will be able to evaluate and choose materials with transparent, scientific documentation of sustainable benefits.

Kathy Spanier, marketing director of Coldspring, is also the chair of the Natural Stone Council’s Sustainability Committee. She has been actively pursuing acceptance of the standard by various sustainability market drivers, such as the USGBC and the Living Building Challenge. According to Spanier, “the criteria contained in this Standard was developed and selected based on sound scientific and engineering principles intended to achieve credible, accurate, reproducible, and measurable results. This standard will demonstrate that the natural stone industry is a player in the sustainability movement.”

Chain of Custody (NSC COC)

According to Slomka, the companion Chain of Custody Standard applies to all aspects of the supply chain. The chain of custody tracks the stones as the material moves from the quarry to manufacturing and through the supply chain to the ultimate destination, including the jobsite or the end user. For a product to be claimed as Genuine Stone certified, there must be an unbroken chain of certified organizations that conform to the COC standards covering every change in the legal ownership of product, from the certified quarry up to the point where the product is finished or sold to retail.

The standard is applicable to quarries and processors of natural dimension stone using a comprehensive life-cycle approach to ensure that the most relevant aspects of quarry operations and stone fabrication are considered in the criteria for certification.

The identification and measurement of impacts on human health, environment, and the surrounding community is key to this sustainability initiative. Because natural stone is quarried in countries around the world, the scope of the standard includes North American and international quarries and processing facilities. The standard assists in the determination of whether a dimensional stone product has been extracted, produced, and transported in an environmentally preferable manner consistent with the principles of sustainability.

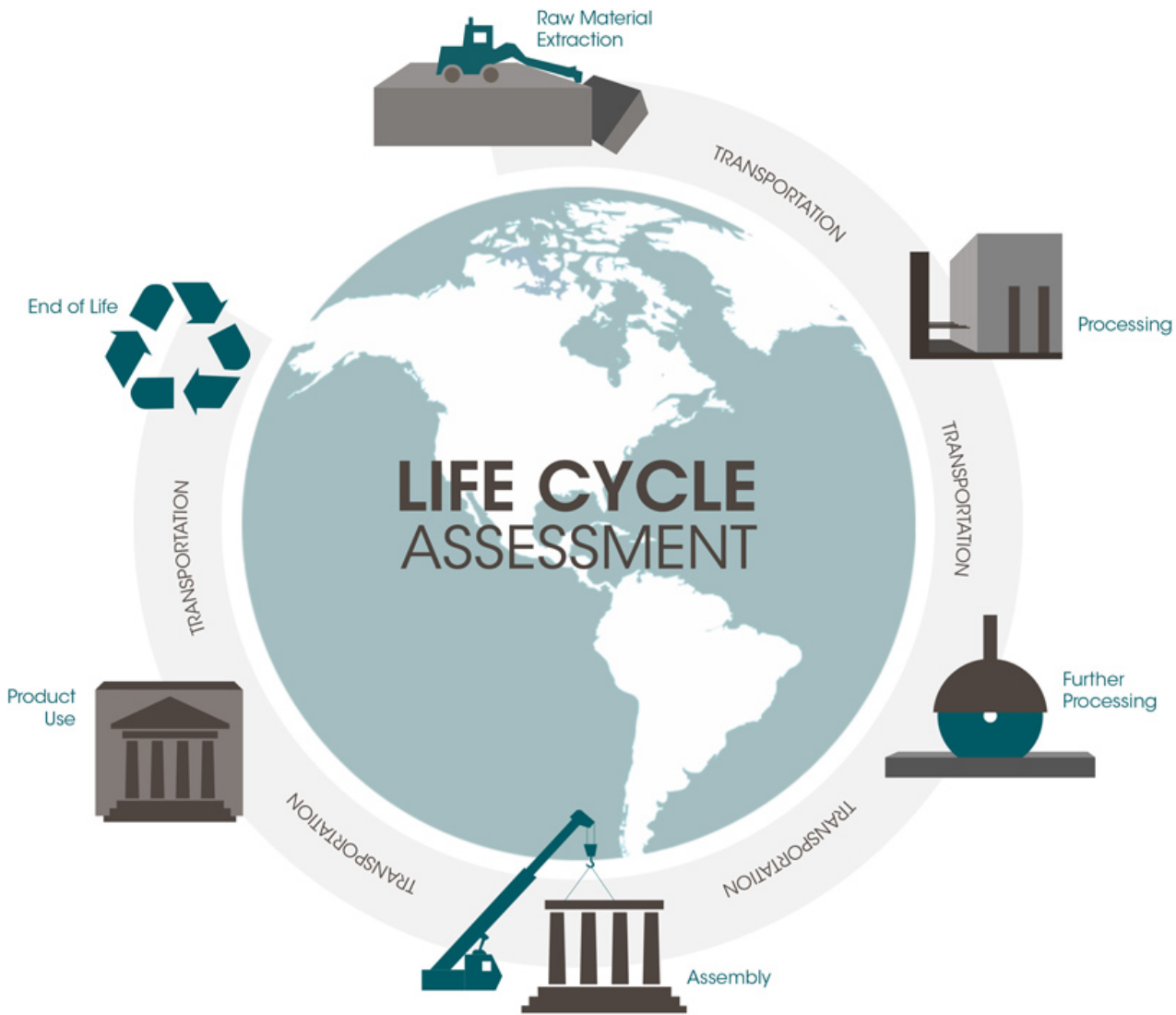


Image courtesy of Coldspring

Life-Cycle Assessment Cycle

LIFE-CYCLE ASSESSMENT

A life-cycle assessment/analysis or LCA compares and quantifies all of the inputs and outputs of material flows and assesses how those flows affect the environment. This analysis includes the documentation of raw-material production, manufacture, distribution, use, and disposal, including all intervening transportation steps necessary or caused by the products existence. The certification of the supply chain of a product may also establish the social LCA of a product that includes the implications and impact on individuals and communities impacted by this process.

The International Standard Organization's ISO 14000 environmental management standards allow companies to understand the management of life-cycle analysis and environmental responsibilities. The American National Standards Institute (ANSI) is a private non-profit organization that oversees the development of voluntary consensus standards for products, services, processes, systems, and personnel in the United States. The organization also coordinates U.S. standards with international standards so that American products can be used worldwide.

Life-cycle analysis considers the impact of using a material from beginning to the end. Impacts accounted for within an LCA include energy required, water consumed, pollution generated, ecosystems affected, among many others. The resulting certification provides the assurance that the products that the design professional specifies meet social, economic, and environmental targets, driving holistic, sustainable building industry practices.



SILVER QUARRIER
ANSI/NSC 373-2013



BRONZE QUARRIER
ANSI/NSC 373-2013



GOLD FABRICATOR
ANSI/NSC 373-2013



PLATINUM QUARRIER
ANSI/NSC 373-2013

Image courtesy of the Natural Stone Council

Four levels of achievement can be obtained for quarriers and processors through the ANSI/NSC 373 Sustainable Production of Dimension Stone Certification Program.

Environmental, Social, and Economic Metrics

The standard is a point-based system with prerequisite and optional criteria in 10 categories. Modeled after similar rating systems, each facility operator of a stone quarry or stone fabrication facility meeting all of the prerequisite points can earn a bronze certification. Higher certifications can be met by meeting an increasing amount of optional criteria: silver (prerequisite plus eight optional), gold (prerequisite plus 15 optional), and platinum (prerequisite plus 22 optional). The process for certification includes document review, an on-site audit, and then an initial one-year certification. In year two and three, there is a surveillance review of the documents only. Year four includes another document review and on-site audit. Certification is an ongoing and continuous improvement process, and recertification takes place every three years.

The key metrics that are measured and verified include the following components:

- Water
- Transportation and chain of custody
- Site management
- Land reclamation
- Corporate governance
- Energy
- Management of excess process material and waste
- Safer chemical and materials management
- Human health and safety
- Innovation

Each of these categories contains both required and optional components.



Photo Courtesy of TexaStone Quarries

Holding ponds for water reclamation

Water Quality

Water is an important element in the stone processing system. In addition to protecting ground water aquifers, the standard encourages quarry operators and fabricators to minimize fresh water consumption and ensure the quality of water released back to the environment. Only 3 percent of the world’s water supply is available as a fresh water resource.⁶ Fresh water resources are limited, and rising levels of pollution continue to cause concerns for the safe management of drinking water. Globally, there is fresh water scarcity, and the majority of humanity struggles with access to clean, fresh water.

To meet the requirements of this element of the standard, facility operators are required to develop and maintain an annual water inventory. This inventory is organized by water source; for example, municipal potable, direct rainwater captured for reuse, on-site wells, or reclaimed grey water. The facility will separate water used for manufacturing and nonmanufacturing operations. They will also document the amount of recycled water. A minimum of 25 percent of water accounted for in the water inventory will be required to be captured and recycled.

Optional criteria included additional quotients for water capture, recycling, enhanced water treatment, best practice water use, reuse, and sludge management. These criteria outline best practices for a facility that through its extraction and fabricating process promotes the efficient and safe use of scarce water resources.

Transportation and Chain of Custody

These credits require that the operators implement a management plan for efficient transportation of stone to and from a quarry or processing facility to the next step in the delivery process, whether it is to be processed, stored, or directly to a project site. The Chain of Custody certification is required for this credit and can be combined with certification to ANSI/NSC 373. For a product to be claimed as certified, there must be an unbroken chain of certified organizations covering every change in the legal ownership of product, from the certified quarry up to the point where the product is finished or sold to retail. The Chain of Custody Standard specifies the management and production requirements for chain-of-custody control with respect to sourcing, labeling (where applicable), and sale of products as certified to the standard.



Stone being shipped from Mountain Valley Stone to Delta Stone Products

The standard defines and addresses the basic elements of a chain-of-custody management system, which includes:

- Quality management
- Material receipt and storage
- Volume control
- Sales and delivery
- General labeling requirements
- Outsourcing

The benefits of chain of custody are that it clearly enhances the market brand for a sustainable product and meets the most stringent of sustainable green building rating systems. In addition, by adopting more sustainable operation and business models, quarries and fabricators save money through optimized energy, transportation, and increased environmentally efficient practices.

Site Management

Within quarry operations there are various forms of mining, including open-pit, underground, boulder, etc., with open-pit being the most prevalent. There are best practices for their management that benefit surrounding communities outlined in this credit. These include the development of a site management plan that addresses all of the impacts to the site and surrounding community from these mining operations. The intent of this key criterion is to prevent stormwater pollution, provide dust control and hazardous material storage, as well as the installation of safety fencing. Site management includes the compliance to the highest levels of safe working conditions. For fabrication facilities, requirements also include the development of procedures for safe storage of equipment, recycling, and measures to control or contain occupational hazards, such as exposure to chemicals and dust.



Photo courtesy of Halquist Stone Company



Photo courtesy of Mountain Valley Stone

Enhanced site management extends the definition of the boundaries of a site. These optional credits require the measurement of the impact from operations on human health or the environment. A site management plan is created that limits the physical boundaries of operations and measures the extended site. This includes the surrounding ecosystem identifying the impacts of operations on critical habitats, biodiversity, native plants, and water resources.



Photos courtesy of Michels Corporation

Land reclamation can result in recreational land. Seen here, the extraction process (left) and reclaimed land at Plymouth Pit, located on CTH S, north of STH 23, Town of Plymouth, Sheboygan County, Wisconsin.

Land Reclamation

As residents of Sheboygan County, Wisconsin, know, land reclamation for the purposes of providing recreational land is a boon for the community.

To assert the value of NSC 373, Michael Schumacher, marketing and sales specialist for Michels Corporation, says, “Pursuit of the NSC 373 certification was an easy decision, as it aligns with so much of what we stand for as an organization. There is a tangible benefit to both the environment and our clients. As the market continues its search for sustainable products, it is important for buyers to know that they are choosing a stone that was harvested and produced in an environmentally and socially responsible manner.”

The intent of this credit is to outline the post-closure reclamation plan that will allow for site cleanup, the removal of infrastructure, and ecosystem restoration for adaptive reuse. Additional points are achieved by responsible site closure and community engagement as well as exemplary ecosystem restorations.

Corporate Governance

Social accountability or equity is one of the three legs of the environmental stool. Along with environmental and economic development, equity is considered one of the three “Es” of sustainable development. Credits for corporate governance are based on the documentation of just labor practices, with prohibitions of child labor and clear anti-discrimination policies. These facilities allow employee participation in the development of community outreach activities and optional social accountability for fair hiring practices, employee educational opportunities, and corporate ethics.

Creating an Energy Management Program

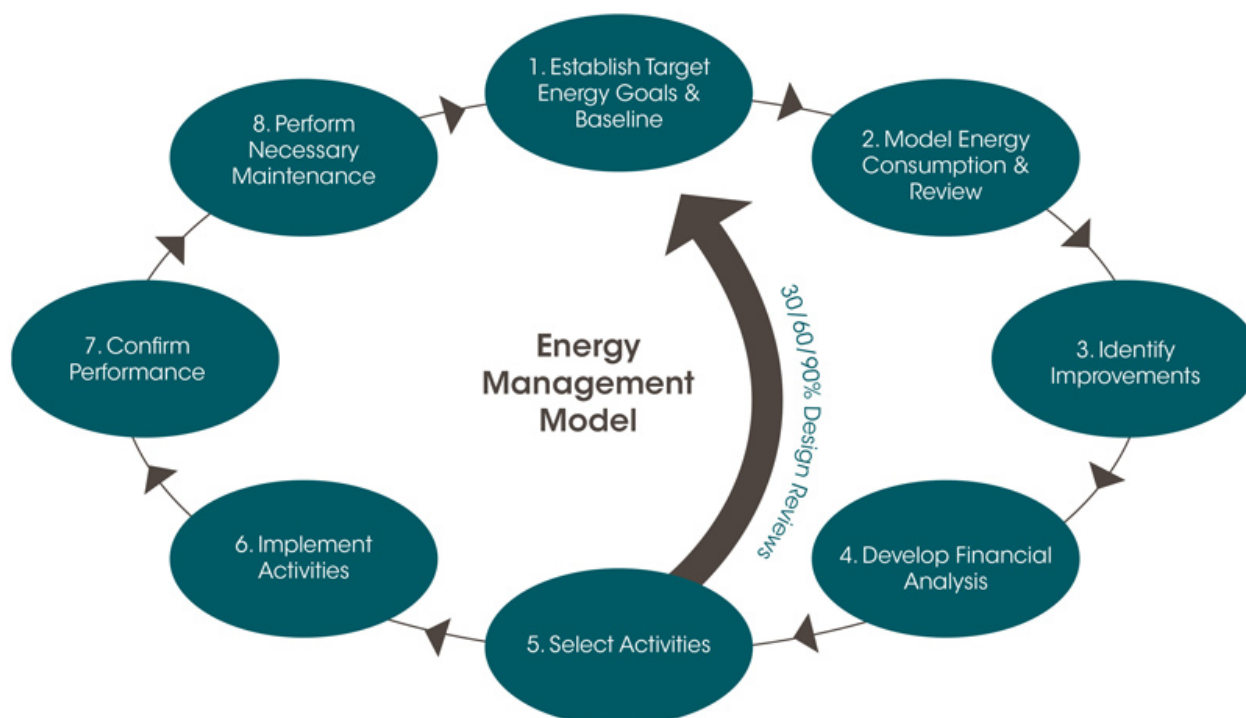


Image courtesy of Coldspring

Energy

An energy inventory is required as the first step to achieving this credit. The focus of the standard is to improve energy efficiency, thereby reducing carbon impacts as a part of an effort to implement lean and control costs, while maintaining the highest safety, environmental, and corporate financial standards. Optional credits include the evaluation of carbon management and the use of renewable and alternative energy sources.

An energy management program begins by establishing target goals, modeling and quantifying those goals, and developing strategies for the implementation of new energy-efficient methods and equipment. Through the development of a strong energy management program with a long-term maintenance plan, facility operators will directly benefit the bottom line, reducing the cost of energy by increasing energy efficiency.



Image courtesy of Coldspring

Maximizing the efficient use of quarried stone

Management of Excess Process Material

According to a 2009 Natural Stone Council best practices report: "The natural stone industry is unique in that the majority of its solid waste stream is its raw material, often in unadulterated form. It is estimated that 175 million tons of quarrying waste are produced each year, and although a portion of this waste may be utilized on-site, such as for excavation pit refill or berm construction, it is often difficult to find a use for all scrap stone and fines produced. Coupling this with the industry's other waste streams, such as heavy equipment, wastewater sludge, and general site trash, it is necessary that every operation in the natural stone industry develop and abide by a waste management plan."⁷ The Management of Excess Process Materials Credit requires an inventory of excess materials and solid waste and the formation of a management plan.



Photo courtesy of Stony Creek Quarry

This report identifies the reasons to manage wastes. “Solid waste is a drain on pocketbooks, a threat to worker health and safety, and a burden on the environment. Moreover, its disorderly accumulation on-site portrays an image of irresponsibility, hampering local support for the company. Through implementation of a proactive waste management strategy, unnecessary fines, occupational exposures, and environmental degradation can be avoided. Additionally, an opportunity exists for companies to distinguish themselves as a socially responsible and environmentally considerate operation.” Decreasing the amount of excess waste that goes into a landfill at all stages provides economic, social, and environmental value to the environment as well as to this industry.

Safer Chemical and Materials Management

Stone is a natural material; it emits no VOCs and has no chemicals. However, some chemicals are used in its fabrication, in addition to being used to clean the workplace and equipment. As with most of these credits, this credit requires an inventory and chemical management plan. Material Safety Data Sheets (MSDS) must be submitted for each product or material identified. An additional credit can be obtained by the elimination or reduction of chemicals of concern, like those that may be used as sealants, cleaning products, and for equipment. Primary and secondary chemicals of concern are outlined in the standard and include chemicals that deplete the ozone, carcinogens, mutagens, those that effect reproduction, and asthmagens.

Human Health and Safety

Human health and safety are the primary goals of any sustainable initiative. This credit requires an occupational safety plan and training for all employees. The credit goes beyond basic OSHA regulations to improve work safety, air quality and exposure, and emergency procedures. The lack of best practice safety procedures has cost effects. For example, by evaluating the heights of barriers, modern equipment with the latest safety controls, and increased ventilation systems, companies will prevent accidents, reduce injuries, and retain employees.

Innovation

Innovation promotes continuous improvement and industry transformation. Innovation credits allow quarriers and processors to display new opportunities for the reduction, reuse, and elimination of waste. Innovators advance industry standards. This credit provides guidelines for innovation credits in health and safety, transportation, and waste reclamation or reuse.



Photo courtesy of Stony Creek Quarry



Coldspring
ANSI/NSC 373
2015 Initial Certification

SECTION 5 - WATER

	Points Possible	Points Applied	Points Awarded
Headquarters	6	6	6
Charcoal	6	5	5
Mesabi	6	5	5
Rockville	6	5	5

SECTION 7 - SITE MANAGEMENT

	Points Possible	Points Applied	Points Awarded
Headquarters	4	1	1
Charcoal	4	3	3
Mesabi	4	1	1
Rockville	4	1	1

SECTION 8 - LAND RECLAMATION + ADAPTIVE REUSE

	Points Possible	Points Applied	Points Awarded
Headquarters	4	0	0
Charcoal	4	4	4
Mesabi	4	4	4
Rockville	4	4	4

SECTION 9 - CORPORATE GOVERNANCE

	Points Possible	Points Applied	Points Awarded
Headquarters	2	2	2
Charcoal	2	2	2
Mesabi	2	2	2
Rockville	2	2	2

SECTION 10 - ENERGY

	Points Possible	Points Applied	Points Awarded
Headquarters	7	2	2
Charcoal	7	2	2
Mesabi	7	2	2
Rockville	7	2	2

SECTION 11 - MGMT OF EXCESS PROCESS MATL + WASTE

	Points Possible	Points Applied	Points Awarded
Headquarters	5	2	2
Charcoal	5	4	4
Mesabi	5	3	3
Rockville	5	3	3

SECTION 12 - SAFER CHEMICAL + MATERIALS MGMT

	Points Possible	Points Applied	Points Awarded
Headquarters	7	0	0
Charcoal	7	1	1
Mesabi	7	1	1
Rockville	7	1	1

SECTION 13 - HUMAN HEALTH + SAFETY

	Points Possible	Points Applied	Points Awarded
Headquarters	2	2	2
Charcoal	2	2	2
Mesabi	2	2	2
Rockville	2	0	0

SECTION 14 - INNOVATION

	Points Possible	Points Applied	Points Awarded
Headquarters	5	4	4
Charcoal	5	4	4
Mesabi	5	4	4
Rockville	5	4	4

2015 CERTIFICATION LEVEL

	Total Points	Level Achieved
Headquarters	19	gold
Charcoal	27	platinum
Mesabi	24	platinum
Rockville	22	platinum

bronze prereqs **silver** prereqs, 8+ points

gold prereqs, 15+ points **platinum** prereqs, 22+ points

Image courtesy of Coldspring

Final audit report confirming certification

Alignment With Green Building Programs

Leaders in the stone industry reached out to a variety of green building rating systems to obtain their feedback on ANSI/NSC 373. Connections were made with key contacts at International Living Future Institute (ILFI), USGBC, Green Globes, and the International Green Construction Code. There are many ways that this new certification of natural stone products can be embedded into credits achieved in the programs. As an example, certified natural stone products align with the Materials and Resources section of LEED or the Responsible Industry within the Material Petal of the Living Building Challenge.

USGBC

The LEED Steering Committee approved certification to ANSI/NSC 373: Sustainable Production of Natural Dimensional Stone as a “USGBC-approved program” third-party verification (full credit) in Option 1 of LEED v4 BD+C and ID+C Material Resources credit Building Product Disclosure and Optimization: Sourcing of Raw Materials, provided that the facility and/or quarry operation has earned certification, including either optional credit 7.2.1 (Ecosystem Boundaries) or 7.2.2 (Environmental Impact Assessment), and has made its scorecard publicly available.

- The sourcing of raw material is defined by LEED as environmental impacts of raw material acquisition, energy use and efficiency, content of material and chemical substances, emissions to air, soil and water, and waste generation. Choosing a locally quarried natural stone product provides an additional incentive in meeting this criterion.
- Material ingredient reporting uses a wide range of programs, including cradle to cradle and health product declarations (HPDs). Since natural stone is composed of one natural ingredient, this is an industry material benefit.

All of the initiatives for water conservation, waste reduction, and energy savings in fabricating facilities can be directly applied to LEED during construction or renovation.

The International Green Construction Code (IgCC)

The International Green Construction Code (IgCC) version 2015 references NSC 373 as an approved standard for material selection. IgCC provides a regulatory framework for green commercial construction for new and existing buildings. The AIA, ASHRAE, ICC, IES, and USGBC are in the process of aligning ASHRAE Standard 189.1, IgCC, and LEED. Therefore, IgCC's adoption of NSC 373 should assist in promoting the adoption of NSC 373 within LEED.

The Living Building Challenge

In addition to LEED v4, the Living Building Challenge is advocating the Sustainability Standard for Natural Dimension Stone for Living Building projects using natural stone. ANSI/NSC 373 aligns within the LBC 3.1 Material Petal in the Responsible Industry category.

According to Spanier, in addition to LEED, “Being named an approved program by the the ILFI within Responsible Sourcing of Materials is a huge accomplishment for the stone industry, and has come as the result of tremendous coordination and years of cooperation among stone industry associations, environmental experts, and additional stakeholders to further the awareness of sustainably sourced natural stone.”



Photo courtesy of Coldspring

Natural stone with ANSI/NSC 373 certified label

Sustainable Stone

ANSI/NSC 373 is an initiative that demonstrates the sustainable leadership in the natural stone industry. This standard is a contribution to the environmental movement as a best practice for material sourcing and management. This industry has streamlined material choices for architects and design professionals who are documenting buildings for a variety of green building rating systems. As green product certifications and labels become common initiatives, a new market is being created for verifiable sustainable materials. There are currently six processing companies and 15 quarries officially certified by the standard, including:

Coldspring – One processing facility and three quarries
Delta Stone Products – One processing facility
Halquist Stone Company – One processing facility and four quarries
Stony Creek – One quarry
Michels Stone Fabrication/ABJ – One processing facility and four quarries
Mountain Valley Stone – One quarry
Northern Stone Supply, Inc. – One processing facility and one quarry
TexaStone Quarries – One processing facility and one quarry

Anjanette Green, a materials analyst at stok, an environmental building strategies firm in San Francisco, California, is an environmental consultant who has been closely watching the development of this standard. She has worked on projects throughout the United States and China. She believes that the stone industry is doing its part toward leadership in sustainability. Now, it is up to designers and architects to begin to specify these materials both at home and abroad.

“It is up to the design industry to rally around the ANSI/NSC 373 Standard and to support the quarries and fabricators participating in the effort. Using the certification program and its guidelines could serve to inspire all quarries, both domestic and abroad, to adapt more environmentally sustainable and humanely just practices.”

Natural stone already provides numerous benefits as a green material. It is durable, recyclable, and produces no VOCs. The added advantage of choosing a certified product with one of the highest life-cycle assessments and chain-of-custody documentation makes the choice even easier.

EDUCATIONAL OPPORTUNITIES GIVE DESIGNERS COMPREHENSIVE OVERVIEW OF BUILDING WITH NATURAL STONE



Marmomac Academy—an outgrowth of Marmomac, the leading international trade show for stone and related design and technologies—offers educational activities on designing with natural stone to architects, interior designers, and architectural students. Designing with natural stone helps architects learn advanced techniques in the use of marble, granite, and other stone materials. The program is a unique combination of classroom lectures, guided architectural tours, and field trips. This comprehensive approach enables designers to better understand stone’s full life cycle—including how marble is quarried, cut, processed, finished, selected for specific jobs, and installed, all using the latest technologies and products.

Learn more at www.marmomac.com/it (<http://www.marmomac.com/it>).

END NOTES

Special thanks to the following NSC 373 Certified companies for their help with providing photos. The list of certified companies includes:

Coldspring (<http://www.coldspringusa.com/quarry/>)
Delta Stone Products (<http://deltastoneproducts.com/>)
Mountain Valley Stone (<https://www.mountainvalleystone.com/>)

Michels Stone (<https://www.michels.us>)
Northern Stone Supply (<http://www.northernstonesupply.com/>)
Halquist Stone Company (<https://www.halquiststone.com/>)
Stony Creek Quarry (<http://stonycreekquarry.com/>)
TexaStone Quarries (<http://www.texastone.com/>)

¹ANSI/NSC 373: Sustainable Stone and NSC Chain of Custody. NSF International. Web. 16 March 2016. <http://www.nsf.org/services/by-industry/sustainability-environment/sustainability-standards-protocols/ansi-nsc-373-sustainable-stone-nsc-chain-custody/> (<http://www.nsf.org/services/by-industry/sustainability-environment/sustainability-standards-protocols/ansi-nsc-373-sustainable-stone-nsc-chain-custody/>).

²Watson, Rob. Green Building Market and Impact Report 2011. GreenBiz. Web. 16 March 2016. <https://www.greenbiz.com/research/report/2011/11/07/green-building-market-and-impact-report-2011> (<https://www.greenbiz.com/research/report/2011/11/07/green-building-market-and-impact-report-2011>).

³Green Building Facts. 23 Feb 2015. Web. 9 March 2016. <http://www.usgbc.org/articles/green-building-facts> (<http://www.usgbc.org/articles/green-building-facts>).

⁴BREEAM in numbers. Web. 10 March 2016. <http://www.breeam.com> (<http://www.breeam.com>).

⁵Yates, Alan. "Strategic approach to the selection and procurement of construction materials and products." Web. 9 March 2016. [http://www.breeam.com/filelibrary/Briefing Papers/Strategic-Approach-to-the-Selection-and-Procurement-of-Construction-Materials-and-Products.pdf](http://www.breeam.com/filelibrary/Briefing%20Papers/Strategic-Approach-to-the-Selection-and-Procurement-of-Construction-Materials-and-Products.pdf) (<http://www.breeam.com/filelibrary/Briefing Papers/Strategic-Approach-to-the-Selection-and-Procurement-of-Construction-Materials-and-Products.pdf>).

⁶Where is Earth's Water? The USGS Water Science School. Web. 16 March 2016. <http://water.usgs.gov/edu/earthwherewater.html> (<http://water.usgs.gov/edu/earthwherewater.html>).

⁷Best Practices of the Natural Stone Industry. Natural Stone Council. 1 April 2009. Web. 16 March 2016. http://isse.utk.edu/ccp/projects/naturalstone/pdfs/BestPractice3_SolidWasteManagement_FINAL.pdf (http://isse.utk.edu/ccp/projects/naturalstone/pdfs/BestPractice3_SolidWasteManagement_FINAL.pdf).

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(<http://www.naturalstoneinstitute.org/>)

The Natural Stone Institute offers a wide array of technical and training resources, professional development, regulatory advocacy, and networking events for the natural stone industry. Learn more at www.naturalstoneinstitute.org (<http://www.naturalstoneinstitute.org>).



THE UNITED VOICE OF THE
NATURAL STONE INDUSTRY
(<http://www.naturalstonecouncil.org>)

The Natural Stone Council is a collaboration of stone businesses and trade associations. Learn more at www.naturalstonecouncil.org (<http://www.naturalstonecouncil.org>).