FABRAL®
METAL WALL AND ROOF SYSTEMS

Technical Bulletin

LEED 2009 NC PROGRAM

The LEED Green Building Rating System was developed to certify "green" buildings under a system created and promulgated by the U.S. Green Building Council. LEED stands for "**L**eadership in **E**nergy and **E**nvironmental **D**esign". The current version of this program is LEED 2009 NC, for New Construction. Architects and owners attempt to certify their buildings for a variety of reasons, including state and local government incentives, Federal government requirements, professional recognition and to demonstrate environmental responsibility. The 2009 program, although old, is still being used. Projects can be certified under this version of LEED thru October 31, 2016.

The rating system assigns project points in the following categories:
SS Sustainable Sites (26 possible points)
WE Water Efficiency (10 possible points)
EA Energy & Atmosphere (35 possible points)
MR Materials & Resources (14 possible points)
EQ Indoor Environmental Quality (15 possible points)
ID Innovation & Design process (6 possible points)
RP Regional Priority (4 possible points)

Up to 69 total possible points can be earned.

Certification levels are as follows:

Level	**Points**
Certification	40 - 49
Silver Certification	50 - 59
Gold Certification	60 - 79
Platinum	80 - 110

Several items serve as minimum requirements for any certification level and do not earn any points. These items are Erosion & Sediment Control, Fundamental Building Systems Commissioning, Minimum Energy Performance, CFC reduction in HVAC&R Equipment, Storage & Collection of Recyclables, Minimum Indoor Air Quality Performance, and Environmental Tobacco Smoking Control. The LEED program certifies buildings only, not individual construction products. Fabral cannot LEED certify any of our products.

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Architects can gain LEED points by using Fabral's products as follows:

Sustainable sites: One point can be obtained under credit **SS 7.**1 for covering 50 percent of the hard scape (parking lots, sidewalks, etc.) with material, such as metal roofing, that has a Solar Reflectance Index (SRI) of 29 or higher.

One point can be earned under credit **SS 7.2** by using a roof system that is highly reflective AND has high emissivity as rated by a new method called the Solar Reflectance Index (SRI). This requirement is intended to reduce the heat island effect. LEED no longer uses Energy Star program requirements; instead,. SRI is now calculated using the initial reflectivity and the initial emissivity. This means that, unlike Energy Star approval, we no longer have to wait three years for aged reflectivity values. The SRI must be at least 78 for a low slope roof of 2:12 or less.. For a steep slope roof greater than 2:12 pitch, the SRI must be at least 29. Fabral offers many colors that meet the steep slope requirements and a few that meet the stiffer low slope requirements. The SRI values for our standard colors and some special colors are listed in the tables on pages 5 and 6 of this technical bulletin.

Energy and Atmosphere: A reflective metal roof can also help toward the energy efficiency prerequisite and the optimized energy performance requirements in credit **EA 1** which offers up to 19 EA credits. This section compares the reduced design energy cost for the project to the energy cost budget according to ASHRAE (**A**merican **S**ociety of **H**eating, **R**efrigerating and **A**ir-Conditioning **E**ngineers, Inc.) Standard 90.1. The greater the energy savings, the more points earned. For example, 19 points are awarded for a 48 percent reduction in energy requirements over the ASHRAE energy budget. Highly reflective metal roofing helps reduce air conditioning costs and helps to meet this requirement, but is only a small part of the equation.

Under credit **EA 2**, between one and seven points may be earned for developing on-site renewable energy. **EA 2** allows one point for generating 1 percent of the building's energy requirements on-site with solar panels. **EA 2** allows up to seven points for generating 13 percent of the building's energy requirements on-site with solar panels. Fabral's metal roofing systems are an idea platform for solar panels.

Materials & Resources: One point can be earned under credit **MR 2** by recycling or salvaging at least 50 percent of the construction, demolition and land clearing waste. Naturally, 100 percent of any scrap metal roofing and siding panels or drop from cutting can be recycled. As with all LEED points, this 50 percent goal is based on the entire construction project, so recycling 100 percent of the metal roofing and siding panel scrap may not offset the scrap from other construction products that is not salvageable. As with most averaged points, however, the higher-than-required values from metal panels help to offset other "less green" products.

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An additional point can be earned under credit **MR 2** by recycling or salvaging at least 75 percent of the construction, demolition and land clearance waste. One point is awarded under credit **MR 4** if the weighted average recycled content of the building products are at least 10 percent, and an additional point is awarded if the weighted average recycled content of the building products are at least 20 percent. LEED defines recycled content as the post-consumer recycled content plus half the pre-consumer content. (Pre-consumer was previously referred to post-industrial recycled content.)

As noted in Fabral Technical Bulletin 725, LEED-qualifying recycled content levels are as follows:

	Post-Consumer	Pre-Consumer (post industrial)	Total per LEED MR4 post-consumer + ½ pre-consumer
Steel	19.8%	14.4%	27.0%
Aluminum	60%	25%	72.5%
Copper	50%	25%	62.5%

As you can see, the more metal roofing and siding used on a project, the greater the opportunity to offset other construction products with little or no recycled content to earn one to two from this credit.

Credit **MR 5** awards one or two points if a weighted average of 10 or 20 percent of the building material is **manufactured and harvested** within 500 miles of the jobsite. Since the materials used by Fabral are extracted from all over the world and are difficult to trace back from a specific project to the extraction point, metal panels typically do not contribute to this credit.

Innovation and Design credits are also available by incorporating Fabral's Phase Change Material into a building project.

We frequently receive questions about the VOC levels in our panels. LEED VOC standards apply only to field-applied paint used inside the interior of the building. As a result, our panels do not contribute to building VOC levels.

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LEED v4 2012 NC PROGRAM

LEED v4 was introduced in 2012. Buildings may now be certified under this version even though the 2009 program can still be used until October 31, 2016. Fabral has begun receiving requests for information for registration under this version. While LEED v4 has the same categories and certification level points as the 2009 version, some qualifications have changed.

The **Sustainable Sites** category still uses the SRI index but the requirements have changed. Low slope roofs, still defined as ≤ 2:12 now require an initial SRI of 82 or higher or an aged SRI of **64** or higher. Steep slopes now require an initial SRI of 39 or higher or an aged SRI of 32 or higher to qualify.

Energy & Atmosphere credits now offer 18 possible points for energy efficient buildings; well-insulated and highly reflective metal roofing and siding can help earn these points.

Materials & Resources credits have major changes. Up to three points can be obtained by conducting a whole building Life Cycle Assessment (LCA) that demonstrates a 10 percent reduction from a base line building in at least three of the six impact categories shown here:

Global warming potential (greenhouse gases) (CO2e)
Depletion of the stratospheric ozone layer (kg CFC-11)
Acidification of land and water sources (moles H+ or kg SO2)
Eutrophication (kg nitrogen or kg phosphate)
Formation of tropospheric ozone (kg NOx, kg O3eq, or kg ethane)
Depletion of nonrenewable energy resources (MJ)

An additional two points can be earned by submitting an Environmental Product Declarations (EPD) on at least 20 permanently installed products that meet the disclosure criteria.

Fabral metal systems contribute to LEED certification by offering both LCA data and an EPD. These documents are too large to attach to this technical bulletin but can be downloaded from our website. Please note that the substantial service life expectancy of metal panels also helps reduce the environmental impact of Fabral products compared to products that must be replaced more frequently.

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ARCHITECTURAL KYNAR COLORS
As of 8/05/13

COLOR	Color Number	Initial Total Solar Reflectivity (color family)*	3 Yr. Exposed Solar Reflectivity (color family)*	Initial Emissivity (color family)*	Energy Star Approved	Initial Total Solar Reflectivity (actual)	Initial Emissivity (actual)	SRI	Meets LEED 2009 Requirement	Meets LEED v4 2012 Requirement
ALMOND	S23	0.61	0.55	0.87	YES	0.63	0.86	75	STEEP	STEEP
BONE WHITE	S03	0.71	0.67	0.84	YES	0.72	0.84	87	LOW & STEEP	LOW & STEEP
BRANDYWINE	S24	0.25	0.23	0.85	YES	0.26	0.85	24	NO	NO
BRIGHT COPPER	S25	0.45	0.35	0.77	YES	0.49	0.85	55	STEEP	STEEP
BRIGHT SILVER	S66	0.57	0.35	0.77	YES	0.60	0.77	68	STEEP	STEEP
CLASSIC GREEN	S02	0.26	0.25	0.83	YES	0.26	0.84	24	NO	NO
CHAMPAGNE	S20	0.37	0.35	0.75	YES	0.37	0.83	38	STEEP	NO
CHARCOAL GRAY	S01	0.27	0.25	0.85	YES	0.32	0.85	32	STEEP	NO
COLONIAL RED	S10	0.25	0.23	0.83	YES	0.34	0.86	35	STEEP	NO
DARK BRONZE	S04	0.25	0.25	0.83	YES	0.26	0.84	24	NO	NO
HARTFORD GREEN	S05	0.27	0.25	0.83	YES	0.10	0.82	2	NO	NO
MANSARD BROWN	S07	0.26	0.25	0.85	YES	0.29	0.86	29	STEEP	NO
MATTE BLACK	S08	0.27	0.25	0.83	YES	0.27	0.86	26		NO
MEDIUM BRONZE	S09	0.26	0.25	0.85	YES	0.30	0.87	31	STEEP	NO
PATINA GREEN	S14	0.26	0.27	0.89	YES	0.29	0.87	29	STEEP	NO
PEWTER	S11	0.36	0.35	0.77	YES	0.36	0.85	38	STEEP	NO
REGAL BLUE	S12	0.26	0.25	0.85	YES	0.28	0.86	27	STEEP	NO
REGAL WHITE	S38	0.68	0.65	0.86	YES	0.68	0.86	82	LOW & STEEP	LOW & STEEP
SANDSTONE	S17	0.50	0.35	0.85	YES	0.54	0.86	63	STEEP	STEEP
SIERRA TAN	S70	0.31	0.31	0.87	YES	0.38	0.86	41	STEEP	STEEP
SILVERSMITH	S15	0.53	0.35	0.77	YES	0.53	0.80	59	STEEP	STEEP
SLATE BLUE	S13	0.26	0.25	0.85	YES	0.26	0.85	24	NO	NO
SLATE GRAY	S19	0.37	0.35	0.85	YES	0.37	0.86	39	STEEP	STEEP
STONE GRAY	S18	0.36	0.35	0.84	YES	0.36	0.84	37	STEEP	NO
SURREY BEIGE	S21	0.40	0.41	0.90	YES	0.40	0.86	43	STEEP	STEEP
GALVALUME		0.78	0.58	0.06	YES	0.78	0.06	75	STEEP	STEEP
GALVALUME / CLEAR COATED		0.68	0.55	0.14	YES	0.68	0.14	58	STEEP	STEEP

Note: Reflectivity tested by ASTM C1549 and Emissivity measured by ASTM C1371.
*Indicates color family values, which are used by the Energy Star program. LEED uses actual values.
Note: LEED 2009 certification requires an SRI of 29 or higher for steep slope roofs (>2:12) and an SRI of 78 or higher for low slopes (≤2:12). CRRC approved colors were not submitted for Energy Star approval.
Note: LEED v4 2012 certification requires an SRI of 39 or higher for steep slope roofs (>2:12) and an SRI of 82 or higher for low slopes (≤2:12).

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COLORS
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COLOR	Color Number	Initial Total Solar Reflectivity (color family)*	3 Yr. Exposed Solar Reflectivity (color family)*	Initial Emissivity (color family)*	Energy Star Approved	Initial Total Solar Reflectivity (actual)	Initial Emissivity (actual)	SRI	Meets LEED 2009 Requirement	Meets LEED v4 2012 Requirement
BRIGHT WHITE	824	0.53	0.63	0.85	YES	0.60	0.85	71	STEEP	STEEP
EVERGREEN	875	0.27	0.25	0.85	YES	0.27	0.86	26	NO	NO
CHARCOAL	851	0.27	0.25	0.85	YES	0.35	0.86	37	STEEP	NO
CLASSIC	853	0.25	0.22	0.86	YES	0.26	0.86	25	NO	NO
TAN	855	0.44	0.41	0.84	YES	0.38	0.90	42	STEEP	STEEP
COCOA BROWN	856	0.26	0.22	0.85	YES	0.35	0.85	36	STEEP	NO
DARK BROWN	859	0.26	0.22	0.86	YES	0.30	0.86	30	STEEP	NO
HICKORY MOSS	870	0.38	0.37	0.87	YES	0.36	0.89	39	STEEP	STEEP
TRUE BLACK	882	0.30	0.24	0.85	YES	0.30	0.85	30	STEEP	NO
IVORY	883	0.61	0.63	0.86	YES	0.62	0.89	75	STEEP	STEEP
CARIBBEAN BLUE	881	0.26	0.29	0.85	YES	0.27	0.90	28	NO	NO
LIGHTSTONE	887	0.52	0.51	0.86	YES	0.51	0.90	60	STEEP	STEEP
LIGHT GRAY	889	0.31	0.31	0.87	YES	0.31	0.87	32	STEEP	NO
PATINA GREEN	893	0.36	0.36	0.84	YES	0.38	0.90	42	STEEP	STEEP
BRICK RED	898	0.32	0.33	0.86	YES	0.31	0.90	33	STEEP	NO
WHITE	899	0.62	0.53	0.86	YES	0.54	0.89	64	STEEP	STEEP
BRIGHT RED	845	0.25	0.22	0.86	YES	0.32	0.86	33	STEEP	NO
ANTIQUE BRONZE	854	0.26	0.22	0.83	YES	0.29	0.83	27	NO	NO
GALLERY BLUE	826	0.25	0.25	0.86	YES	0.29	0.86	29	STEEP	NO
HARTFORD GREEN	821	0.29	0.22	0.85	YES	0.29	0.85	28	NO	NO
BRIGHT COPPER PENNY	939	0.48	0.35	0.77	YES	0.48	0.83	53	STEEP	STEEP
SIERRA BROWN	896	0.25	0.25	0.85	YES	0.25	0.85	23	NO	NO
POLAR WHITE	860	0.55	0.63	0.83	YES	0.63	0.89	76	STEEP	STEEP
GALVALUME		0.78	0.58	0.06	YES	0.40	0.86	75*	STEEP	STEEP
GALVALUME/		0.68	0.55	0.14	YES	0.61	0.85	58*	STEEP	STEEP

Note: Reflectivity tested by ASTM C1549 and Emissivity measured by ASTM C1371.
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