Aluminum Windows and Doors & the LEED® Certification Program

- *Window PRODUCTS can contribute to LEED Rating System*
- *Only Building PROJECTS can be LEED Certified*
- *Window PRODUCTS cannot be LEED Certified*

Aluminum:

- Recycled aluminum only requires 5% of the energy for primary billet production
- Aluminum windows can be manufactured with up to 60% recycled content. However Graham must be advised of requirements at the time of sales contract signature such that extrusion suppliers are notified.
- Life Cycle Assessment is positive - Since 1886, approximately 65% of an estimated 650m tons still in use today

Thermally Broken Frames:

- Aluminum frames should be thermally improved in order to meet more stringent energy performance requirements
- Thermally broken frames reduce heat transfer by more than 20%
- LEED points are assigned based on overall energy savings, therefore the lower the U-factor below required values the better

High Performance Glass:

- Performance will directly impact building mechanical requirements and energy consumption
- High performance glazing options can contribute to huge energy cost savings
- Amount of glass utilized will impact the amount of natural light being allowed into the building

Air Quality:

- Incorporating operable windows into the building design will contribute to indoor air quality
- Powder coat finishes contain no solvents and therefore emit negligible, if any, polluting VOC's into the atmosphere

Summary:

All Aluminum Window Products for LEED projects should:

- Utilize thermally improved frames
- Utilize high performance glazing
- Be manufactured with minimum of 20% recycled content
- If possible incorporate operable components

LEED® Program

The LEED (Leadership in Energy and Environmental Design) Green Building Rating System® is a voluntary, consensus based national standard for developing high-performance, sustainable buildings. Members of the U.S. Green Building Council representing all segments of the building industry developed LEED and continue to contribute to its evolution. To find out more about it, visit www.leedbuilding.org.

High Performance Windows

Because energy efficiency is a crucial component of sustainable design, energy-efficient windows can greatly impact the environmental performance of a building. The ability to create buildings with superior energy performance has been due, in large part, to the many improvements in window technology made during the last thirty years. These technologies are widely available and relatively inexpensive for most commercial and residential applications.

Available LEED Credits

There are six main categories with many sub-categories that make up the LEED rating system. The whole building project is evaluated and awarded credits (points) for a possible total of 100 base points and 10 bonus points. A minimum of 40 is required to qualify as LEED certified. **USGBC (United States Green Building Council) certifies buildings, not the materials that are used to construct the building**. Only a few LEED points are dependent upon third-party certification or proving equivalence to a given standard.

Using Graham Architectural Products High Performance windows, potentially contributes to obtaining these credits in the US Green Building Council's LEED certification program:

Category	Credit	Possible Points
Energy and Atmosphere	Optimize Energy Performance	19
Materials and Resources	A. Recycled Content B. Local/Regional Materials	4
Indoor Environmental Quality	A. Increased Ventilation B. Thermal Comfort C. Daylight & Views	4

See page 4 "Credit Assistance Matrix" for more details of how Graham products can help earn points.

To assist the LEED Project Manager or Engineer with the whole building calculations, we as a component of the building can only submit information and data relevant to our window systems. Bear in mind that the Project Manager must supply documentation for the claims he is making on all credits. An example would be for the recycled content of a given building component. Written verification for the components used on that building must be obtained. General information for materials is not adequate for final LEED evaluation. The following submittal cover page outlines the Graham product information that is provided when a project for LEED certification is being considered. This information does not include the standard product submittal items that are routinely provided. **Graham must be advised at time of sales contract if LEED data is required**.

An original of this form will be submitted with the project specific submittals.

GRAHAM ARCHITECTURAL PRODUCTS

LEED Submittal Data [1]

LEED CREDIT

Project Name: _____

Job #: _____

Project Location/Address: _____

City _____ State _____ Zip _____

Products (Series/model): _____

Glazing Description: _____

MR 6

Materials:

Aluminum: Source Location: ▾ Mileage from Source: _____
Get 500 Mile Radius

Glass: Source Location: ▾ Mileage from Source: _____
Get 500 Mile Radius

Manufacturer (GAP) Source Location: York, PA Mileage from Source: _____
Get 500 Mile Radius

EA 1

Energy Performance				
Product	Overall Thermal Performance	Glazing Performance		
Series/Model	U-Value	U-Value	SHGC	VT

MR 4

Recycled Aluminum Content				
Total Weight	% Post Consumer [2]	% Pre-Consumer [3]	% Total Material	Value of Recycled Material
0	40.00%	0.00%	40.00%	$0.00

MR 4

Recycled Glass Content				
Total Weight	% Post Consumer [2]	% Pre-Consumer [3]	% Total Material	Value of Recycled Material
#N/A	0.00%	25.00%	12.50%	$0.00

Prepared By: _____ Date: _____

1 The information submitted here by Graham Architectural Products should be deemed accurate but is not guaranteed. Submissions of this data for Leed points are the responsibility of the building owner and the information contained herin should be submitted for Leed points at the descretion of the building owner or the owners agent. Graham Architectrual Products makes no express claim or guarantee that Leed points will be awarded for any of the information contained in this document.

2 Post-consumer material is defined as waste material generated by households or by commercial, industrial and institutional facilities in their role as end-users of the product, which can no longer be used for its intended purpose.

3 Pre-consumer material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (i.e., rework, regrind or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.

LEED® Rating System Credit Assistance Matrix

CATEGORY	CREDIT	DESCRIPTION	AWARD POINTS	LEED REQUIREMENTS	What Graham Can Do
ENERGY & ATMOSHERE	EA 1	**Optimize Energy Performance** <u>Three options:</u> Whole Building Energy Simulation	1-19	**Intent:** Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use. **Requirements:** Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2007 by a whole building project simulation using the Building Performance Rating Method in Appendix G of the Standard. (Higher the percentage the more points)	Graham provides high performance insulating glass units that reduce the energy demand on the HVAC system and save costs. Triple glazing available on select models. Graham manufactures thermally broken aluminum windows & doors and window wall systems for increased thermal performance. Graham offers optional dual polyamide thermal strut on some models for improved energy performance and safety.
		Prescriptive Compliance	1	Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate for the project.	
		Prescriptive Compliance	1-3	Prescriptive Compliance Path: advanced Buildings™ Core Performance™ Guide. Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute	
MATERIALS & RESOURCES	MR 4	**Recycled Content** Recycled Content / Points: 10% / 1; 20% / 2	1-2	**Intent:** Increase demand for building products incorporating recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials. **Requirements**: Use materials with recycled content such that the sum of postconsumer recycled content plus 1/2 of the preconsumer content constitutes at least 10% or 20%, based on cost, of the total value of the materials in the project.	Graham uses glass manufactured with an average of 25% recycled content. Graham Architectural Products aluminum window & door extrusions are produced with an average of 40% recycled content.
	MR 5	**Regional Materials** Regional Materials / Points: 10% / 1; 20% / 2	1-2	**Intent:** Increase demand for building materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation. **Requirements:** Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20%, based on cost, of the total materials value. If only a fraction of a product or material is extracted, harvested, or recovered and manufactured locally, then only that percentage (by weight) can contribute to the regional value.	Graham's manufacturing facility is located in York, PA within 500 miles of most North eastern U.S. markets and we use aluminum and glass from regional suppliers.
INDOOR ENVIRONMENTAL QUALITY	IEQ 2	**Increased ventilation**	1	**Intent:** To provide additional outdoor air ventilation to improve indoor air quality (IAQ) and promote occupant comfort, well-being and productivity.	Graham offers many types and styles of operable products to allow natural ventilation.
	IEQ 7.1	**Thermal Comfort**	1	**Intent:** Provide a comfortable thermal environment that supports the productivity and well-being of building occupants.	Graham's complete product line provides several options that assist with thermal comfort ratings such as shading devices, low U-value designs and glass tinting.
		Daylight & Views		**Intent:** Provide for the building occupants a connection between indoors spaces and the outdoors through the introduction of daylight views into the regularly occupied areas of the building.	Graham has many glass options available with high performance and high visible light transmittance. Graham window, door, curtainwall and storefronts allow daylight access to secure and remote areas of the building that would not have allowed for glass in past practices. Optional light shelf designs available for increased lighting.
	IEQ 8.1	Daylight	1	**Requirements 8.1:** Achieve a minimum daylight factor of 2% (excluding all direct sunlight penetration) in 75% of all spaces occupied for critical visual tasks.	
	IEQ 8.2	Views	1	**Requirements 8.2:** Achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces.	