
MINDSCAPE INNOVATIONS

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September 25, 2009
File: AFI-G0908-p001

DuROCK Alfacing International Limited
101-B Roytec Rd.
Woodbridge, ON L4L 8A9

Attention: Ms. Dolores Ursini

Reference: LEED® Performance Assessment

Dear Ms. Dolores Ursini,

Attached please find our assessment of DuROCK's External Insulated Finishing System (EIFS) performance within the following LEED® rating systems: LEED Canada-NC (2004) and LEED Canada for Homes (2009). We are pleased to advise you that DuROCK's two EIFS products, Pressure Utilized Compartmented Cavity System (PUCCS) and InsulROCK, contribute towards:

- up to 16 points in LEED Canada-NC (2004), and may earn up to at least 2.5 points directly;
- up to 45 points in LEED Canada for Homes (2009), and may earn up to at least 5.5 points directly;

Please do not hesitate to contact us with any questions.

Best regards,

A handwritten signature in blue ink, appearing to read "Derek Satnik", is written over a light blue horizontal line.

Derek Satnik, P. Eng., LEED® AP
Managing Partner
(519) 744-3592
dsatnik@mi-group.ca

Attachments:

- Summary report entitled "LEED Performance Assessment", September 22, 2009.

cc. Kyle Anders, MASC

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Dear Ms. Dolores Ursini,

Thank you for contracting Mindscape Innovations Group Inc. (Mindscape) to assess your eligibility for points in the various LEED® rating systems. Mindscape is one of Canada's leading professional services firms in the commercial and residential energy ratings market, and is proud to have played a key role in founding the LEED Canada for Homes (2008) program especially. We provide consulting and certification services for all LEED Canada programs and matching US programs: residential and commercial, existing buildings and new. We are most actively engaged in the LEED for Homes market (low-rise, mid-rise, and high-rise), and are recognized experts in the LEED rating systems generally, on both sides of the border: US and Canada.

DuROCK Alfacing International Limited (DuROCK) External Insulation Finishing System (EIFS) products can play a key role in energy efficient and environmentally responsible design, and are used in many of the industry's best structures. The purpose of this report is to assess the point eligibility of DuROCK's two EIFS products, Pressure Utilized Compartmented Cavity System (PUCCS) and InsulROCK, in the LEED rating systems listed below.

1.0 INTRODUCTION

Before delving into a point-by-point assessment of the various LEED rating systems, it is important first to clarify and define several terms commonly used therein:

CaGBC: the Canada Green Building Council: an industry body active in the green building industry which, among other activities, is a licensee of the USGBC's LEED products, and which creates and delivers **LEED rating systems** and related programs in Canada.

LEED: “Leadership in Energy and Environmental Design”: a green building program designed to quantify the environmental benefit of various green building strategies in a rating system format, which ultimately includes a certification program that places a certification label on the constructed building.

LEED Rating System: the LEED program includes several “Rating Systems” which have been defined for niche markets, such as “LEED for New Construction and Major Renovations” (LEED NC), or “LEED for Existing Buildings: Operation and Maintenance” (LEED EB:OM), or “LEED for Homes”. Each rating system has the same general structure of **pre-requisites** and **credits**, and the same general process of **certification**, but the technical content will be customized to suit the intended target market, and the process may include specialized parties relevant only to that target market (such as home energy raters in the LEED for Homes rating system).

LEED Points: points are the central measuring stick in LEED **rating systems**, and are grouped by common strategies into **credits**. LEED **rating systems** will tend to have anywhere from 70 to ~130 total points, grouped into anywhere from 35 to 44 **credits**. Many **credits** will offer multiple points for progressively greater achievement on the same theme, such as increased energy efficiency, increased water efficiency, etc.

LEED Pre-requisite: a single mandatory strategy for sustainability that has been defined and made measurable. Whereas **credits** include optional measures that earn **points**, pre-requisites are not optional and do not earn points: every LEED certified building is required to achieve all the pre-requisites in the relevant **rating system**.

LEED Credit: a single optional strategy for sustainability that has been defined and made measurable, which may include one or several **points**, and where increased **points** could be earned under the same strategy for increased performance (eg: for increased energy efficiency, increased water efficiency, or some other measure as defined in the Credit).

LEED Certification: the process used by the USGBC and CaGBC to audit a building's design and to verify its constructed performance. Buildings which meet all the **pre-requisites** in the **rating system**, and which achieve a minimum number of **points**, are eligible to be certified at the “Certified”, “Silver”, “Gold”, and “Platinum” levels, each representing progressively greater achievement within the program. The nature and number of **pre-requisites** and the number of **points** required to meet each threshold varies with the specific LEED **rating system** (eg: LEED for Homes is different than LEED NC), but the process of certification is essentially the same in all LEED programs.

Local / Regional Content: goods are defined as being “local” or “regional” within all forms of LEED if they are (80% by mass) extracted, processed, manufactured and shipped from within 800km (500mi) of the jobsite when shipped by truck, or 2400km (1500mi) when shipped by rail or boat, or a proportional combination of these two (e.g. 600 km by truck, $\frac{3}{4}$ the truck limit, and 600 km by boat, $\frac{1}{4}$ the boat limit).

This report will assess the eligibility of DuROCK’s PUCCS and InsulROCK products in the following LEED rating systems:

1. LEED Canada-New Construction (NC) (2004), owned and delivered by the Canada Green Building Council (CaGBC) in Canada;
2. LEED Canada for Homes (2009), owned and delivered by the CaGBC in Canada;

*Assumptions: The potential energy savings achieved by DuROCK's EIFS products was assessed based on typical energy losses of building components as provided by the U.S. Department of Energy. It is assumed that EIFS products are only used as above grade wall components within the building envelope, and thus would only directly influence the heat gains/losses across these components. As shown in the breakdown of energy end-uses in commercial buildings in Figure 1 and residential buildings in Figure 2, heat gains/losses across wall components are responsible for approximately 3% and 9% of overall building energy use, respectively.

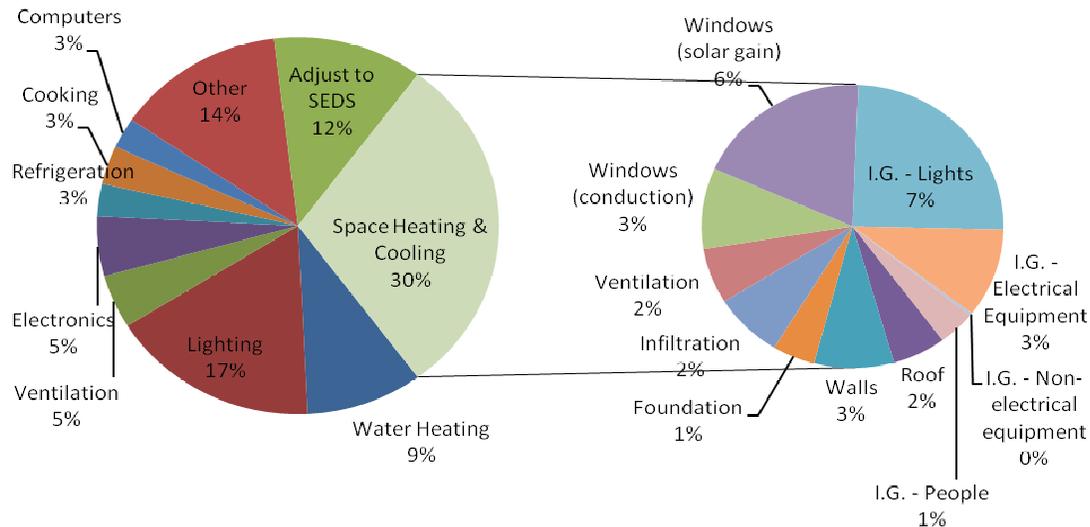


Figure 1: Energy end-use splits for commercial buildings¹.

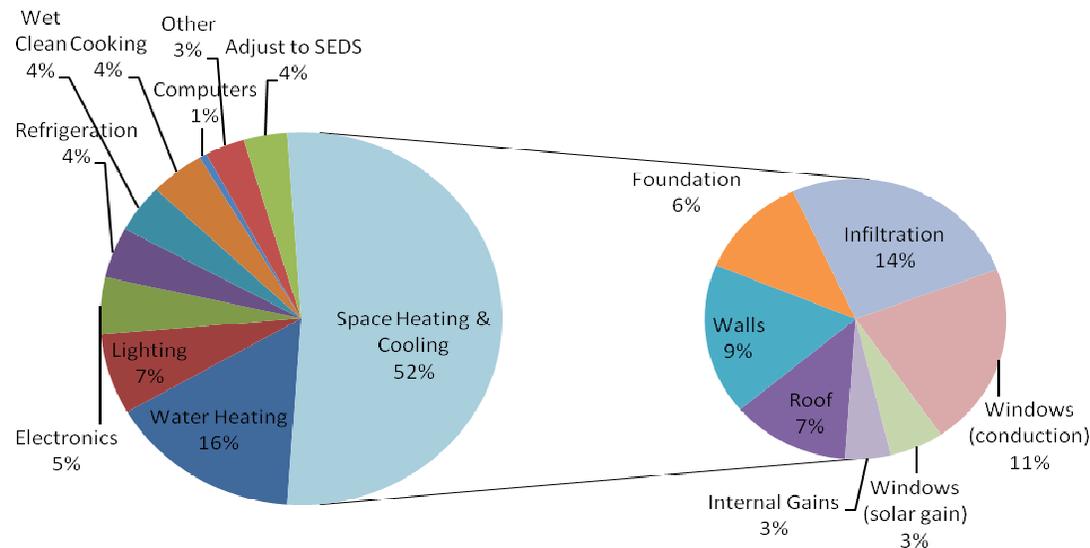


Figure 2: Energy end-use splits for residential buildings².

¹ 2008 Building Energy Data Book, U.S. Department of Energy, 2008, Table 3.1.4 and 3.1.12, accessed online 2009/07/17 @:

http://buildingsdatabook.eren.doe.gov/docs%5CDataBooks%5C2008_BEDB_November.pdf

Energy benchmarks within the LEED Canada-NC (2004) system are based on ASHRAE 90.1-1999 standards, which specify a minimum effective R value for commercial wall components of ~2.3 in most climate zones³. Similarly, the energy benchmarks within the LEED Canada for Homes (2009) system are based on IECC2004 standards, which specify minimum effective R values ranging from 13 to 21, depending on climate zone⁴. The maximum effective R values for DuROCK's EIFS components, as well as the maximum energy savings attributed to heat/gain loss across wall components and overall energy use, are shown in Table 1. The maximum effective R values of the EIFS products were calculated by multiplying their R-value per inch by their maximum available thicknesses, obtained from the product literature on DuROCK's website⁵. These were then compared with the minimum insulation requirements mentioned above to obtain the maximum overall energy savings of 3% and 5% for commercial and residential buildings, respectively, which were used throughout the LEED assessments. It should, be noted, particularly within the LEED Canada for Homes (2009) system, that the overall building energy savings provided by EIFS products depends strongly on climate zone, wall insulation thickness, and any complimentary strategies.

Table 1: Maximum energy saving potential of DuROCK EIFS products.

DuRock EIFS Product	Max Effective R-value (h-ft ² ·F/Btu)	Commercial (R-2.3 minimum standard)		Residential (R-13 – R-21 minimum standard)	
		Max. % Reduction in Heat Gains/Loss Across Walls	Max. % Overall Energy Savings	Max. % Reduction in Heat Gains/Loss Across Walls	Max. % Overall Energy Savings*
NC Construction	20	89	3	-5 - 35	-0.5 - 5
WC House Wrap	24	90		13 - 46	
WC Polar Bear	24	90		13 - 46	
Insul - Hard Coat	20	89		-5 - 35	
Insul WC House Wrap	24	90		12.5 - 46	
Insul - NC	20	89		-5 - 35	
Insul - NC Walls	26.1	91		19.5 - 50	
Insul - WC Polar Bear	24	90		12.5 - 46	

*Strongly dependent on climate zone and corresponding minimum insulation standards as specified in IECC 2004

² 2008 Building Energy Data Book, U.S. Department of Energy, 2008, Table 2.1.5 and 2.1.14, accessed online 2009/07/17 @: http://buildingsdatabook.eren.doe.gov/docs%5CDataBooks%5C2008_BEDB_November.pdf

³ ANSI/ASHRAE/IESNA Standard 90.1 – 2004, Energy Standard for Buildings Except Low-Rise Residential Buildings, American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., Atlanta GA, ©2004, pp. 22-30.

⁴ 2004 International Energy Conservation Code® Supplement Edition, International Code Council Inc., U.S.A., ©2005, pp. 22.

⁵ DuROCK website, accessed online 2009/07/18@: <http://www.durock.com/>

Each of the ratings systems will be analyzed in the same way, using the following table:

Table 2: Standard Evaluation Table

[Rating System] Credit	Total Available Points	Relevant Benefit of DuROCK EIFS Product	Maximum DuROCK Point Contribution
(1)	(2)	(3)	(4)

This report will (1) reference the specific rating system that is being assessed, (2) list the total number of points which may potentially be affected by DuROCK's EIFS products under the various credits defined in the referenced rating systems, (3) briefly explain how the EIFS products fulfill the intent of the referenced credits, and (4) include an opinion of the actual number of points that the EIFS products could contribute towards earning within the referenced rating system (which are typically expected to be less than the total points available for a given credit). The indicated "Potential DuROCK Point Contribution" reflects available industry standard resources and Mindscape's professional experience in our own projects and is in no way a guarantee of future project performance.

Please note that it is important to understand the difference between claiming that a certain product will *earn* points as opposed to claiming that it will *contribute towards* points. The reality is that the **LEED programs reward buildings, not products**, so although your product may have been a vital contributor towards an earned point, it may not be the only contributor for that point. For example, if a point is earned by an insulated concrete form product (ICF) for recycled content in LEED-NC under credit MRc2 because there was sufficient recycled content included in the concrete used on the job, then the ICF product will very likely have contributed strongly to this point. However, so may the concrete in the foundation and floors, and it may be true that the ICF portion of the total concrete used was not sufficient to earn a point without also including the content used in the floors.

It is recommended that DuROCK avoid needing to educate their clients on this sensitivity by simply stating that you "*contribute towards*" the points referenced in sections 2.0 through 3.0 below. The added benefit to this approach is that you then have the ability to make seemingly larger claims which are no less true. For example, although it is true that in LEED Canada-NC (2004) (see Table 3 below) under credit EAc1 you may only earn up to 0.5 points, it is equally true that you are contributing towards the full 10 points that are available under that credit. For clarity, you cannot claim to have *earned* points until after the CaGBC's auditing consultants have verified that your product was in fact responsible for the points directly, but you can always claim to be *contributing towards* the total number of points available in a given credit. Sample claims that could be made are included later in this report after each assessment table to offer further clarity.

2.0 LEED CANADA-NC (2004)

Table 3: DuROCK EIFS products in LEED Canada-NC (2004)

LEED Canada-NC (2004) Credit	Total Available Points	Relevant Benefit of DuROCK insulation Product	Maximum DuROCK Point Contribution
EAp2: Minimum Energy Performance	(required)	<p>Insulation products, including those used in DuROCK's EIFS products, may contribute towards meeting minimum energy performance improvements of:</p> <p>-OPTION 1: reduce design energy consumption to comply with Natural Resources Canada's (NRCan) Commercial Building Incentive Program (CBIP) requirement for 25% reduction relative to consumption of the reference building designed to the Model National Energy Code for Buildings 1997 (MNECB), or</p> <p>-OPTION2: reduce design energy cost by 18% relative to reference building designed to ASHRAE/IESNA 90.1-1999</p>	No Points Available (NPA)
EAc1: Optimize Energy Performance	10	Up to 3% energy savings can be achieved with DuROCK insulation versus traditional energy options. This can earn up to 0.5 points, assuming the minimum energy performance requirements for EAp2 were met through other means.	0.5
MRc1.1&1.2: Building Reuse	2	When used as part of a restoration project, DuROCK's EIFS products may contribute towards maintaining 75% (1 point) to 95% (2 points) of a building's existing structural shell, conserving resources and reducing waste. Wall components contribute a maximum 50% towards this effort, yielding a direct maximum contribution of 1 point.	1
MRc2: Construction Waste Management	2	DuROCK EIFS products are packaged in recyclable pails, bags, and totes and shipped on reusable skids. They would therefore contribute towards waste diversion of 50% (1 point) or 75% (2 points) necessary to earn credit, but would not contribute sufficiently to earn points without further contributions from the rest of the project.	<1

LEED Canada-NC (2004) Credit	Total Available Points	Relevant Benefit of DuROCK insulation Product	Maximum DuROCK Point Contribution
MRc5: Regional Materials	2	Projects local to Vaughan, Ontario (see Section 1 for definition of “local”) may contribute towards the minimum 10% (1 point) to 20% (2 points) of local content building material, based on cost, required for credit. EIFS products are likely able to directly contribute towards no more than a maximum 10% of the total cost of construction materials.	1
IEQp1: Minimum Indoor Air Quality Performance	(required)	The reduction in air leakage and accompanying moisture movement of DuROCK’s EIFS products may contribute towards meeting the minimum requirements of ASHRAE 62.1-2001, Ventilation for Acceptable Indoor Air Quality.	NPA
Total:	16	Of the 16 total LEED Canada-NC (2004) points which DuROCK EIFS products contribute towards, it is likely that DuROCK will be able to directly take credit for at least up to 2.5 points, and towards helping meet the prerequisites noted above.	>2.5

It should be noted that LEED Canada-NC (2004) is currently being updated and is scheduled for re-release late fall 2009. It is expected that the pending update will not have any significant impact on the assessment of point eligibility for DuROCK’s insulation products as provided in this report.

Based on the data shown in Table 3 above, DuROCK may confidently claim that its EIFS products make valuable contributions towards the available and related 16 points in the LEED Canada-NC (2004) rating system, and further that they may directly take credit for up to at least 2.5 points.

It should be noted that the precise energy benefit of the EIFS products for EAc1 are dependent on climate zone, insulation thickness used, and any complimentary strategies. It is recommended that DuROCK perform more precise study on this energy impact in different case scenarios, correlating the results to LEED points, and making these case studies available internally to sales personnel.

3.0 LEED CANADA FOR HOMES (2009)

Table 4: DuROCK EIFS products in LEED Canada For Homes (2009)

LEED Canada for Homes (2009) Credit	Total Available Points	Relevant Benefit of DuROCK EIFS Product	Maximum DuROCK Point Contribution
EAc1.1: Optimizing Energy Performance	(required)	Insulation products, including those used in DuROCK's EIFS products, may contribute towards meeting minimum energy performance improvements of ERS 76 or HERS 80.	No Points, Available (NPA)
EAc1.2: Optimizing Energy Performance	34	Up to 5% energy savings can be achieved with DuROCK EIFS products versus traditional energy options. This can earn up to 5 points, assuming the minimum energy performance requirements for EAc1.1 were met through other means.	5
EAc2: Insulation ⁶	2	DuROCK EIFS products may contribute towards the enhanced insulation requirements eligible for 2 points, both by offering high R-values and by greatly simplifying the effort required to achieve HERS Grade 1 workmanship. Effective R-values of both wall, ceiling, floor and basement components must exceed those specified in IECC2004 code by 20%, thus EIFS wall components would likely be able to contribute directly towards a maximum of 1 point	1
MRC2: Environmentally Preferable Products	8	Siding/masonry materials local to Vaughan, Ontario may earn 0.5 points (see Section 1.0 for definition of "local"). Another 0.5 points may be earned for having roof, wall and floor insulation that are local to Vaughan, Ontario, which EIFS products could contribute in part towards.	>0.5
MRC3: Waste Management	3	DuROCK EIFS products are packaged in recyclable pails, bags, and totes and shipped on reusable skids. They would therefore contribute towards waste diversion of 38-88% (1-2 points) necessary to earn credit, but would not contribute sufficiently to earn points without further contributions from the rest of the project.	<1

⁶ Please note that LEED for Homes includes both a "performance" path of calculated energy use (EAc1) and a prescriptive path (EAc2-6). These two paths are mutually exclusive, so only one can be used. For the purpose of this report, only EAc1 has been summed into the point total.

LEED Canada for Homes (2009) Credit	Total Available Points	Relevant Benefit of DuROCK EIFS Product	Maximum DuROCK Point Contribution
Total:	45	Of the 45 total LEED Canada for Homes (2009) points which DuROCK insulation products contribute towards, it is likely that DuROCK EIFS products will be able to directly take credit for up to at least 5.5 points, and towards helping meet the prerequisites noted above.	>5.5

Based on the data shown in Table 4 above, DuROCK may confidently claim that its EIFS products make valuable contributions towards the available and related 45 points in the LEED Canada for Homes (2009) rating system, and further that they may directly contribute up to at least 5.5 points, depending on the project.

As in Section 2.0, it is recommended that case studies be performed under different scenarios and made available.

CONCLUSIONS

The various LEED rating systems recognize top industry leadership in building design and construction. Regardless of the type of building constructed, DuROCK's EIFS products will contribute positively towards a more sustainable built environment, and they are recognized in the various LEED rating systems.

It should be noted that the effectiveness of DuROCK's EIFS products in reducing energy consumption (i.e. the 3% and 5% maximum potential energy savings for commercial and residential buildings referred to previously in this report) and in earning energy points in LEED are strongly correlated to different climate zones, to the minimum insulation and air infiltration requirements of different jurisdictions, and to the thickness of insulation used in the wall components. It is recommended that DuROCK study, more precisely, the improvements realized by their EIFS products versus traditional options specified in the ANSI/ASHRAE Standard 90.1 and IECC 2004 standards in various cases, and that DuROCK keep an appropriately comprehensive set of case studies available for sales staff to reference as and when appropriate.

Please do not hesitate to contact us with any questions.

Best regards,



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