

The Performance of EIFS vs Metal Cladding

General Comparison

General This technical bulletin addresses the question raised in relation to the use of metal cladding systems in lieu of an EIFS on the basis that the associated number of joints needed in the metal cladding is less than the one in an EIFS.

- Assessment Perspectives**
- Code Compliance
 - Increased Thermal Performance
 - Water Tightness of Joints and Frequency
 - Long Term Maintenance
 - Weight of EIFS

This is in response to the performance issues that were alleged with respect to the design, use, and maintenance of EIFS cladding in comparison to metal cladding systems. The main alleged issue was that a metal cladding system would have less joints and easier to maintain than an EIFS.

It is hard to address such allegations and to address a metal cladding system in comparison with the EIFS one without knowing the specifics of that metal system. Metal cladding systems comes in an array of designs, ranging from sheet metal, plank siding to curtain wall types. Also, these systems could be available in integral insulation designs and/or installed above insulation. A technically sound response needs to be based on the general advantages of an EIF System versus a metal cladding one.

EIFS happens to carry the highest number of advantages when it comes to establishing the best choice of a cladding solution. This is not said from a marketing perspective, but rather from Code's requirements, economics, life cycle costing and esthetic perspectives.

Code Compliance EIFS is a Code acceptable solution whose specifications and usage are covered by the National Building Code of Canada and the provincial building codes that are based on the NBC model code. While other cladding systems are as well prescribed in the said codes, their acceptance is based and limited to the material characteristics prescriptions of these products, while the EIFS is based on a complete integrated system performance and design. As an example, metal cladding systems are not subjected to Durability Test, other than a UV test to assess the paint of the metal cladding. Moisture management is mandated only on curtain wall systems. Moisture management, the continuity of the second plane of protection, its materials, components and drainage are not integrally associated to the metal cladding, while the said aspects represent an integral part of an EIFS Code compliance.

Thermal Performance Increased Thermal Performance/Temperature Variation
Thermal control is a code requirement, where this specific aspect has been emphasized by the new Energy Code requirements with respect to Effective R-values (R_{eff}) of walls and minimum Continuous Insulation (CI) requirements that are clearly defined in the National Energy Code of Canada for Buildings (NECB) and in the Supplementary Standards SB 10 and SB 12 of the OBC's Building Code Compendium. As EIFS provides an integral, external insulation reducing thermal bridging effects, it happens to be the most efficient and viable solution to comply with the said new requirements. The energy efficiency and the required continuous insulation is integral to EIFS while the same characteristics need to be added/designed on other non-insulative systems. With respect to temperature variation, the difference between the capacity of EIFS reducing temperature variation and metal cladding is huge. Metal is highly conductive to heat and cold temperatures that would lead to significant temperature changes within the wall assembly.

The temperature at a South face of a wall could get in summer to about 80 °C which happens to be the melting point of EPS that could have been used in conjunction with the metal cladding and which could also be a melting point to certain modified bituminous membranes that could be used as WRBs.

**Joints –
Water
Tightness &
Frequency**

Water-tightness of Joints and Frequency

From a moisture management perspective, as of 2015, EIFS has been a Code-prescribed Acceptable cladding Solution.

As a Code acceptable and compliant cladding solution, Durabond's EIFS is based on a rainscreen design to provide the highest level of moisture protection that is based on a 1st plane of protection that is provided by the EPS/Lamina combination, and a 2nd plane of protection that is based on the minimum 10-mm, Geometrically Defined Drainage Cavity (GDDC), Weather Resistive Barrier (WRB), and flashing combination. As such, EIFS has a capillary break that is usually mandated only for coastal areas.

Even with the existence of construction tolerances and/or deficiencies at the level of joints, the provided 2nd plane of protection, when executed properly, is capable of managing any incidental water passing the 1st line of defense, i.e. "the cladding". This represents a main performance aspect ("proper moisture management) which is a design feature of rainscreen system on which the EIFS design is based.

Furthermore, in its 2nd plane of protection, the EIFS contains a continuously-applied Water Resistive Barrier (WRB) that is intended to protect the inner portions of the wall assembly against any incidental water passing the cladding. The said WRB is monolithic and continuous in comparison with discontinuous WRB that are associated with other cladding systems and which does not have the same level of water resistance. The element of continuity in the design and application of the WRB addresses the required protection not only within the field of the wall, but particularly at junctions, interfaces, fenestration and other openings. The said EIFS-WRB has been subjected to stringent performance requirements to ensure the longevity and durability of its performance under several climate conditions. The integrity of the said WRB is protected by the adhesion of the system that would eliminate any puncturing due to fasteners going through the WRB. Even with a mechanically attached system, the integrity of the WRB is also ensured by the waterproofing and self-sealability levels that would be provided by the self-adhered modified bituminous membrane that is specified for use with such system.

With respect to joints and joints' frequency, please note that the frequency of joints is not a particular characteristic of an EIFS in comparison with other cladding systems. Joints are specified and required equally, among all claddings, as they address specific interfaces requirements that are associated to building movements, differential settlement, dissimilar substrates, openings and fenestrations. Hence joints are important elements of design regardless of the chosen cladding system. Without such joints you are definitely geared to cladding failure and moisture intrusion.

Another crucial and important aspect of joints' frequency is the need for compartmentalization in order to be in full conformance with the fire protection requirements of the building code. Cladding systems meeting the fire protection requirements rely on such compartmentalization to provide the required fire safety level. Preliminary reports on a recent international fire demonstrate the vulnerability of metal cladding systems due to the lack of compartmentalization. Durabond's EIFS have been validated for its full conformance to the fire requirements of the code. Compartmentalization with an EIFS is way simpler than in a metal cladding system.

Having joints does not entail an automatic impact on durability and maintenance. A good joint system, having the proper sealants, design and execution (ex. Silicone, Low Modulus of Elasticity, etc.) could easily provide you with 10 to 15-year performance. There is a proven record of such performance associated with the use of EIFS.

**Long Term
Maintenance**

Long-term Maintenance

EIFS enjoys the features of a low maintenance cladding system, particularly with respect to colour fading, paint chipping, corrosion, sealant etc. To preserve such low maintenance, not all EIFS are equal. Two main quality aspects need to be specified: Base coat thickness and sealant's quality. Proper selection of these two components will provide you with a durable, low maintenance system. Durabond's EIFS features "Uniplast", an excellent quality Base Coat, that is based on a perfect balance between thicker coating thickness and good polymer content.

The choice of the sealants on the other hand plays an important role in providing a low maintenance system. Silicone sealants are well known for durable, long lasting performance. When coupled with choosing a low modulus sealant (K50), along with proper installation, you would end in long and extended service life of the sealant and increased performance at the joints.

Cladding Weight

Weight of EIFS

EIFS constitute a low weight cladding system, particularly the EPS version of these systems in comparison with other available claddings, 1.36 kg/m² (< 3 lbs/ft²). Definitely the weight would be higher in the event of using mineral wool based on the weight of the insulation. This insulation weight would translate the same in the event the same insulation is used in conjunction with a metal cladding or any other cladding. Accordingly, this extra weight associated with mineral wool EIFS is not specific to EIFS.

Conclusion

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In conclusion, EIFS integrates many advantages that other claddings are not capable of offering integrally. All EIFS performance aspects (durability of materials/systems, wind resistance, and fire protection) have been validated and not just assumed. A life cycle costing analysis would show, without any doubt, the advantages of EIFS over all other cladding systems. The following are few of these advantages:

Code compliant	Capacity to provide Air/Vapour Controls
Provide design versatility (Colour Texture Forms)	Light weight
Adaptable for new and retrofit	Ease of repair
Validated for combustible/noncombustible construction	Low maintenance
Rainscreen design	Low initial cost
Provide thermal efficiency	Pay dividends w.r.t Energy and sustainability Programs (Go Green)/Leed etc.
Reduce thermal bridging	Speed of application
Reduce temperature variations	Site Applied and Plant manufactured
Less thermal movements	Better Colour fastness than conventional painted metals
SB 10 and SB 12 Compliant	Not susceptible to corrosion
Reduce temperature fluctuations	Easier adaptation to Construction Tolerances



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