



## **PREFABRICATED STONE PANELS MANUFACTURED BY realstone SYSTEMS**

### **COMPLIANCE WITH THE 2006 ONTARIO BUILDING CODE**

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## 1.0 INTRODUCTION

This report describes the evaluation of realstone SYSTEMSTM prefabricated stone panel systems. The purpose of the evaluation was to determine whether the requirements of the 2006 edition of the Ontario Building Code were sufficient to assess compliance of the realstone SYSTEMS' panels without the need to submit the panels to the Ontario Building Materials Evaluation Commission (BMEC).

### 1.1 DOCUMENTS REVIEWED

In conducting the evaluation, the following documents were reviewed:

1. realstone SYSTEMS' marketing brochure
2. realstone SYSTEMS' Installation Guide, dated April 11, 2007
3. realstone SYSTEMS' "Prefabricated Stone Panel Master Guide Specification", Section 04 42 51, dated December 16, 2006
4. Test Report – conducted for realstone SYSTEMS by American Engineering Testing Inc., St. Paul, Minneapolis, dated October 5, 2005, revised November 7, 2005 – job number 05-02343
5. 2006 edition of the Ontario Building Code
6. BMEC Authorization Reports for Interior Finish Materials, Report 06-03-323 for "CanyonRock®" cementitious product which simulates natural stone, and 01-04-256 for "Cultured StoneTM" – manufactured light-weight, noncombustible stone for setting in stucco.

## 2.0 DESCRIPTION

realstone SYSTEMS' (RSS) product is an authentic split stone, fabricated by stonemasons in their factory. The stones are handpicked, cut and formed into panels. Each panel is made from slate, quartzite or sandstone. The prefabricated stone flat panels are 24 inches long by 6 inches high, corner pieces are 6 inches by 8 inches and 6 inches by 16 inches. The product is manufactured by adhering the natural stone together end to end and to a plastic backing mat, approximately 2 mm in thickness. The total panel thickness varies from ½ inch minimum to 2½ inches maximum, depending upon the thickness of the split stone used.

## 2.1 INSTALLATION

The RSS panels are intended for interior use as a wall finish, for fireplace mantels, shower and tub enclosures, waterfalls and entries in lobbies. The panels are also intended for exterior applications such as cladding of columns, wall finishes, landscape walls, fireplaces, privacy walls, waterfalls, and porches.

The product is applied to a clean flat surface such as walls formed of gypsum board or plywood on wood or steel studs or concrete masonry walls by first installing wire mesh or metal lath, where required (not usually required on concrete masonry wall applications) [note: in exterior applications, galvanized metal lath must be used]. A "scratch coat" of ½ inch thick mortar is applied over the mesh or lath and allowed to set. The RSS panels are applied using mortar by covering the back of panels with a ½ inch thickness and setting the panels onto the "scratch coated" wall. The installation requirements are very similar to those used for ceramic tile or granite stone facings. Grouting of the joints is not required nor is a sealant required over top of the stone panels.

### 3.0 REVIEW OF DOCUMENTATION

#### 3.1 2006 ONTARIO BUILDING CODE

Section 9.29 is the appropriate section of the Ontario Building Code (OBC) dealing with wall finishes. There are no specific requirements for products manufactured with natural stone. The material most similar to RSS is ceramic tile, which is regulated under OBC Subsection 9.29.10. There are no specific referenced standards for the production of ceramic tiles. The OBC provides specific means for installing ceramic wall tiles. The mortar base suggested for application of ceramic tile is very similar to that proposed for the RSS installation. The only specific mention of a reference standard is for the caulking used between wall tiles in shower applications, which are not applicable to RSS.

OBC Subsection 9.3.1. Concrete makes no mention of stones, slate or granite type wall panels. All requirements in this Subsection relate to load bearing uses of concrete.

OBC Article 9.20.6.6. Stone or Concrete Facings - this Article indicates that slab and panel facings of precast concrete and natural or artificial stone shall conform to Subsection 4.3.2. Subsection 4.3.2. entitled "Plain and Reinforced Masonry" references the CSA Standard S304.1 "Design of Masonry Structures". This Standard applies to load bearing applications of concrete facings and would not be applicable to interior or exterior finish materials such as the intended use for the RSS panels.

#### 3.2 TEST REPORT

realstone SYSTEMS' panels have been subjected to the following tests:

Test

Test Standard

Results

Density and Absorption

ASTM C97

specific gravity 2.72

absorption 1.1%

Compressive Strength

ASTM C39

parallel to rift 9,230 psi perpendicular to rift 16,500 psi

Flexural Strength

ASTM C880

parallel to rift 970 psi

perpendicular to rift 740 psi

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**Freeze-Thaw**

ASTM C67

average % loss: 0.18 to 0.37 breaking and cracking: none

**Coefficient of Friction**

ASTM C1028

dry condition 0.91

wet condition 0.67

For comparison purposes, freeze-thaw requirements for brick are a maximum percent loss of 0.5%. For the coefficient of friction, the Occupational Safety and Health Administration (OSHA) and Ceramic Tile Industries (CTI) recommend a minimum threshold value of 0.5 under both wet and dry conditions. In addition, the American Disability Act recommends an approximate threshold value for the static coefficient of friction of 0.6 under both wet and dry conditions.

In our review of the Ontario Building Code, none of the Standards referenced above are referred to in connection with any material requirements.

**3.3 EXISTING BMEC AUTHORIZATIONS**

In our review of existing BMEC authorizations for interior finish materials, we located two BMEC authorization reports for stone type interior and exterior finish materials. The reports were prepared for “Cultured Stone®” (BMEC 01-04-256) and “CanyonRock™” (06-03-323). Unlike the realstone SYSTEM™ natural stone product, these two products are manufactured products, which are intended to simulate real stone. Accordingly, these products were evaluated for such properties as “noncombustibility” and “flame spread ratings”. “Cultured Stone®” was evaluated as an alternative interior finish material under Section 9.28 “Stucco” of the OBC and “Canyon Rock™” was evaluated as an interior wall finish material under Article 3.1.13.1 “Interior Finish”, Section 9.29 “Interior Wall and Ceiling Finishes” and Sentence 9.22.9.1.(1) “Clearance of Combustible Materials” of the OBC. In the authorization reports for these products are evaluations of compressive strength, flexural strength, and freeze-thaw characteristics similar to those provided by realstone SYSTEMS.

#### 4.0 CONCLUSIONS

From our review of the product literature, testing information, Ontario Building Code requirements, and existing BMEC authorization reports, it is our opinion that the realstone SYSTEM<sup>™</sup> slate, quartzite or sandstone panels can be used in accordance with the Ontario Building Code without any additional evaluation by such bodies as the Building Materials Evaluation Commission (BMEC). The reasons for this conclusion is as follows:

- The product is a natural stone product, very similar to natural stone products presently used throughout many buildings in Ontario without evaluation by the BMEC,
  - The products installation is very similar to that of ceramic tile which is an acceptable, generically described material in the Ontario Building Code,
  - The testing conducted on the material demonstrates that it has material properties very similar to or superior than other generically described wall finish veneer systems such as brick or natural stone that are permitted for use without BMEC evaluation under the Ontario Building Code.
  - The product itself is a natural stone product that is noncombustible and does not require other testing such as flame spread rating evaluations to establish that it is a permitted interior finish material.
- On the basis of our review, we would not recommend that realstone SYSTEMS apply to the Building Materials Evaluation Commission as there would be no value added by such a submission and the Commission may rule that they have no jurisdiction in evaluating such a product since it can currently be installed in Ontario without such an evaluation.

