



Pointe-Claire, January 19, 2015

Deutsche Steinzeug Cremer & Breuer AG  
Buchtal 1  
D-92521 Schwarzenfeld

Project: TX 14 1458 03  
ASTM C1026-87

---

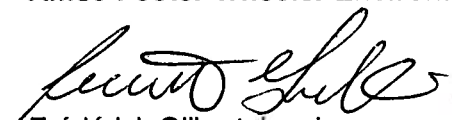
Attached are the results for ASTM C1026-87 (2002) "Standard Test Method for Measuring the Resistance of Ceramic Tile to Freeze-Thaw Cycling" on the glazed ceramic (KeraTwin K20) samples you provided.


These samples successfully passed the freeze-thaw cycling since no visible damage (crazing, chipping, cracks, etc.) was observed during any of the 15 total cycles.

In our opinion, the resistance to freezing and thawing test serves as a guide to the selection of the ceramic tile suitable for outdoor service in geographic areas subjected to freezing. It can be used as a test method to verify compliance with specifications for ceramic tiles, and provide a control test for determining the uniformity of the tile being manufactured for exterior facade installations.

We hope that this is satisfactory. Please do not hesitate to contact us if any further information is required.

**Amec Foster Wheeler Environment & Infrastructure**

  
Frédéric Gilbert, ing. jr.  
Junior Engineer Materials Engineering

  
Martin Laroche, ing. M.Sc.  
Department Head Geotechnical

CC/jf

P:\Project\TX910\TX9152703 CeraGres - tile tests\Rapport-lettre TX91527-eng2.doc

AMEC  
1868, boul. des Sources, suite 400  
Pointe-Claire, Québec  
CANADA H9R 5R2  
Tel +1 (514) 429-6555  
Fax +1 (514) 429-6550

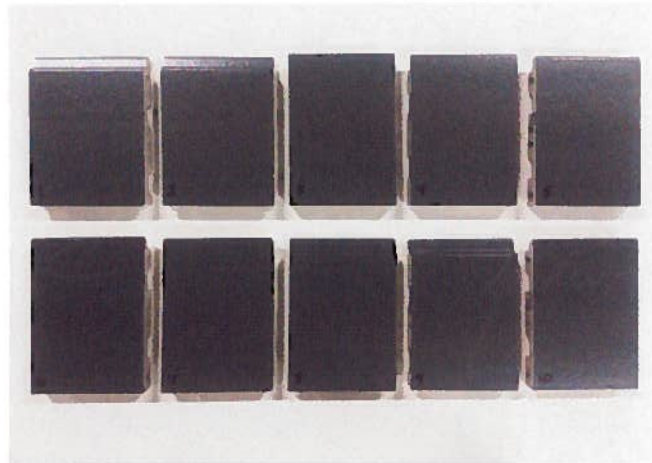
[www.amec.com](http://www.amec.com)

**Client:** Deutsche Steinzeug Cremer & Breuer AG  
**Project:** Essai ASTM C1026-87

**Material:** Ceramic KeraTwin K20 glazed  
**Size:** 15cm x 10cm x 2cm

**Significance and use:** The resistance to freezing and thawing test serves as a guide to the selection of the ceramic tile suitable for outdoor service in geographic areas subjected to freezing. It can be used as a test method to verify compliance with specifications for ceramic tiles, and provide a control test for determining the uniformity of the tile being manufactured for exterior installations.

No. #	Observation			
	prior to test	5 cycles	10 cycles	15 cycles
1	no damage	no damage	no damage	no damage
2	"	"	"	"
3	"	"	"	"
4	"	"	"	"
5	"	"	"	"
6	"	"	"	"
7	"	"	"	"
8	"	"	"	"
9	"	"	"	"
10	"	"	"	"



**Results:**

Ten tiles were used and after 15 cycles no visible damage ( crazing, chipping, cracks, etc.) was observed

Signature: 