



MORRISON HERSHFIELD

October 1, 2012

Ray Snitynsky, M.Sc., P.Ag.  
TBC (Canada) Inc.  
45016 Rochon Rd.  
P.O. Box 577, La Salle, Manitoba  
ROG 1B0

Dear Mr. Snitynsky,

**Re: Radon Barrier properties of Quik-Therm**

I understand that you have been asked to provide some information regarding how Quik-Therm meets the radon barrier requirements in the 2010 National Building Code of Canada (NBC), which will be included in upcoming provincial building code updates.

The 2010 NBC contains requirements for controlling the leakage of soil gas from the ground into a building. Sentence 9.13.4.2.(1) states that *"All wall, roof and floor assemblies separating conditioned space from the ground shall be protected by an air barrier system conforming to Subsection 9.25.3."*

Sentence 9.25.3.6.(1) states that *"Materials used to provide a barrier to the ingress of air through floors-on-ground shall conform to CAN/CGSB-51.34-M, "Vapour Barrier, Polyethylene Sheet for use in Building Construction."* While the code and the referenced standard lack clarity in this area (CAN/CGSB-51.34-M applies mainly to polyethylene sheet material for use in building walls), their intent is that a low-permeability material be installed below slabs on ground, as illustrated by the required water vapour permeance for polyethylene sheet listed in CAN/CGSB-51.34-M of  $15 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ .

The mean water vapour permeance of a 0.5 inch thick sample of Quik-Therm was tested by Architectural Testing, Inc. (ATI) of York, PA according to the Dry Cup procedure outlined in ASTM E96 "Standard Test Method for Vapor Transmission of Materials". Test results are included in ATI's Report No. A8676.01-106-31, dated 5/23/11. ATI is a well-recognized and certified laboratory to carry out testing including ASTM E96. The results produced by ATI's testing show that the water vapour permeance of a 0.5 inch thick sample of Quik-Therm (complete with metalized reflective polypropylene) is approximately  $5.87 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ .

Based on the results of the ATI testing, Quik-Therm satisfies the water vapour permeance requirement of CAN/CGSB-51.34-M. We note that the ATI test was performed according to the Dry Cup method, and the value listed in CAN/CGSB-51.34-M is based on the Wet Cup method. However, results from the Dry Cup and Wet Cup methods can be directly compared since Quik-Therm is not a hygroscopic material.

Therefore, when installed with taped seams and sealed at its perimeter and at penetrations, Quik-Therm satisfies the air barrier requirements in Subsection 9.25.3 and as such is acceptable for use as a means of controlling soil gas leakage (including Radon) as per Subsection 9.13.4. Please note that the concrete must be poured directly onto the Quik-Therm

(i.e. not onto a sand layer) in order for code requirements to be satisfied. This is further explained in Appendix Sentences A-9.25.3.6.(2) and (3) in the 2010 NBC.

Other physical properties listed in CAN/CGSB-51.34-M (such as tensile strength, elongation and impact resistance) apply to polyethylene sheets which are to be installed in building walls. The intent of these requirements is for the sheet to remain intact when installed in order to perform its intended function as an air/vapour barrier. When installed with taped joints and sealed at penetrations and its perimeter, Quik-Therm will perform in a similar manner below slabs on ground. In this application, Quik-Therm meets the intent of the physical requirements for polyethylene sheets listed in CAN/CGSB-51.34-M.

In conclusion, when sealed at its perimeter and at all penetrations, and when installed with taped joints, Quik-Therm satisfies the requirements of Subsections 9.13.4 and 9.25.3 and therefore will act as a Radon barrier.

In addition, we note that since Quik-Therm is intended to be installed at locations which separate interior from exterior space, it must also meet the requirements of 9.25.1.1.(2).(a). The ATI test results noted above show that Quik-Therm meets the requirements of Subsection 9.25.4, which requires that vapour barriers have a permeability of less than  $60 \text{ ng}/(\text{Pa}\cdot\text{s}\cdot\text{m}^2)$ . We also note that, as insulation, it can be installed to satisfy 9.25.2.

Yours truly,  
Morrison Hershfield Limited

  
Mark Lawton, P. Eng.  
Sr. Building Science Specialist, Principal

