

hygIRC-C Model (cont.)

Examples of Numerical Simulations Conducted Using 2D and 3D hygIRC-C:

1. hygIRC-C vs hygIRC
2. Wetting and Drying of Cladding Systems
3. Moisture Assessment of Cladding Systems
4. Drying of Ventilated Wall Cavities
5. Evaluating Wall Energy Rating (WER)
6. Thermal Performance of Skylight Devices (ASHRAE -RP1415)
7. Foundation Wall Systems with Furred-Airspace Assembly
8. Insulated Concrete Foam (ICF) Wall systems
9. Wall Systems with Reflective Insulations
10. Performance of Roofing Systems
11. Aerodynamics on Buildings
12. Thermal Performance of EIFS Walls with Drainage Cavities
13. Hygrothermal Performance of Samples Used in Current Mould Experiments
14. Phase Change Materials (PCMs)

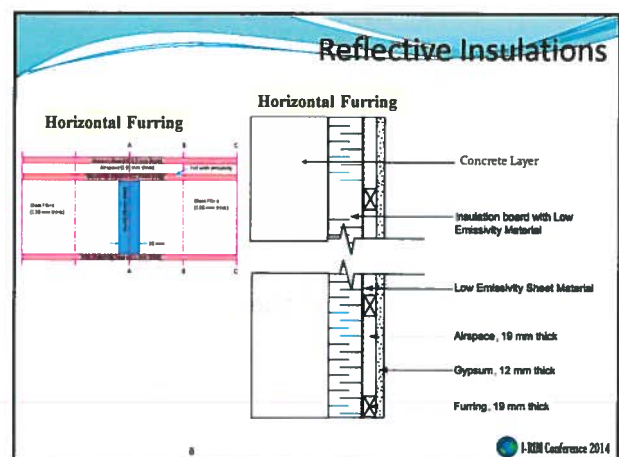
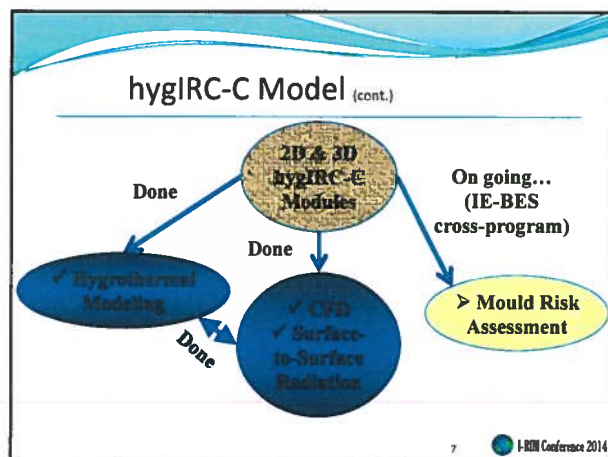
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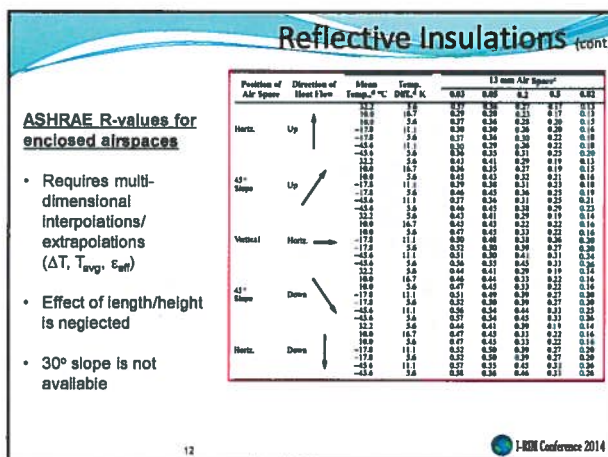
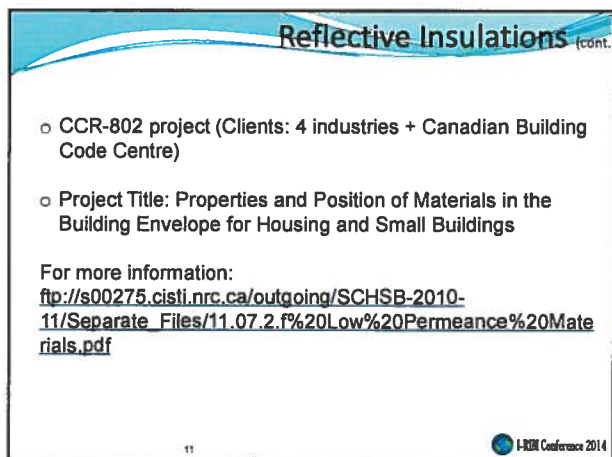
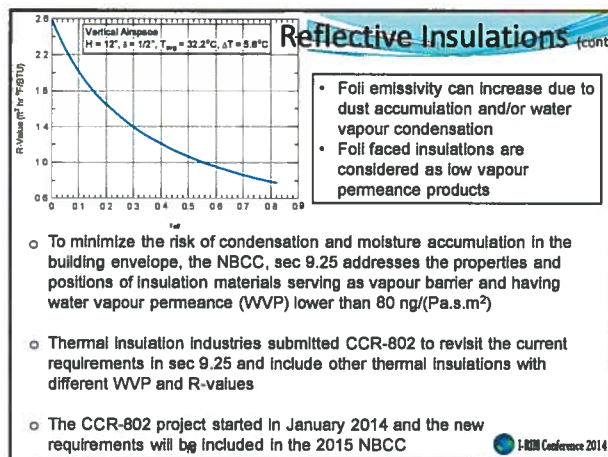
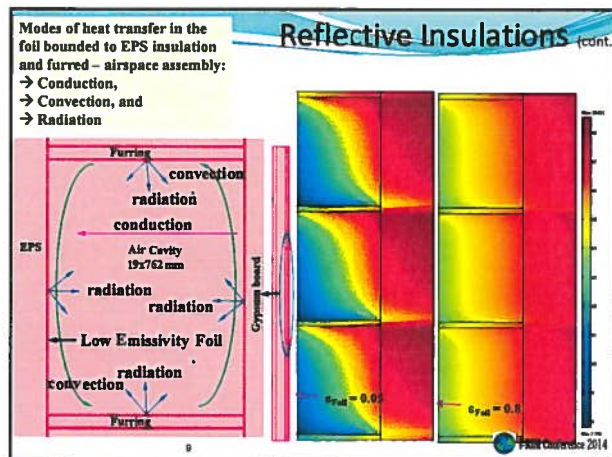
hygIRC-C Model (cont.)

On going...

- A new module for predicting the risk for mould growth will be implemented in hygIRC-C.
- hygIRC-C will be used to predict the performance of the whole building.

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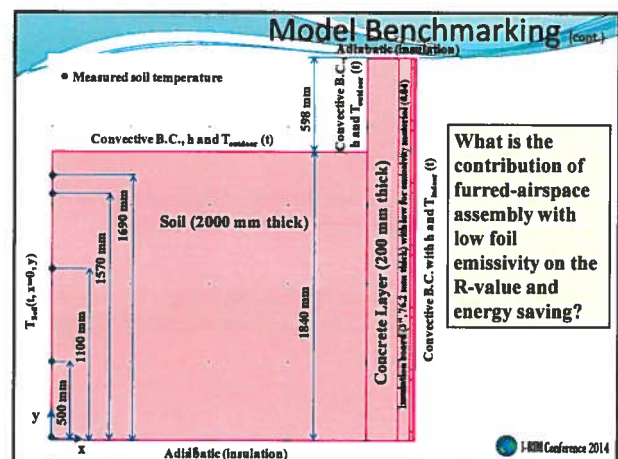
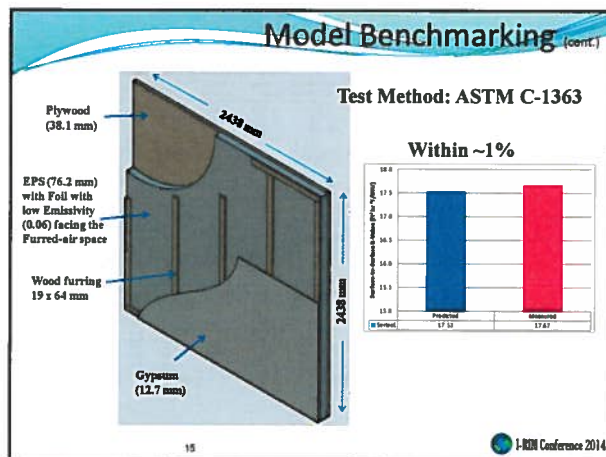
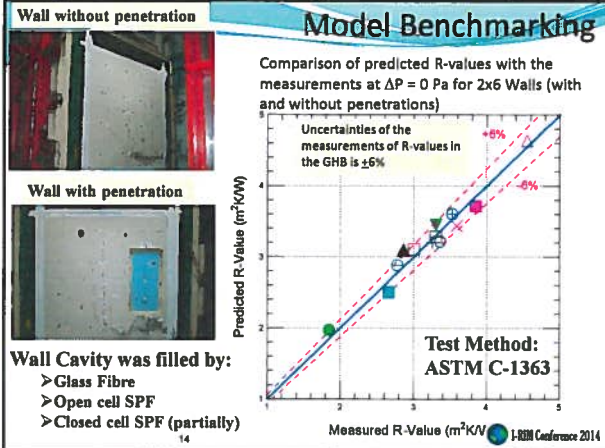


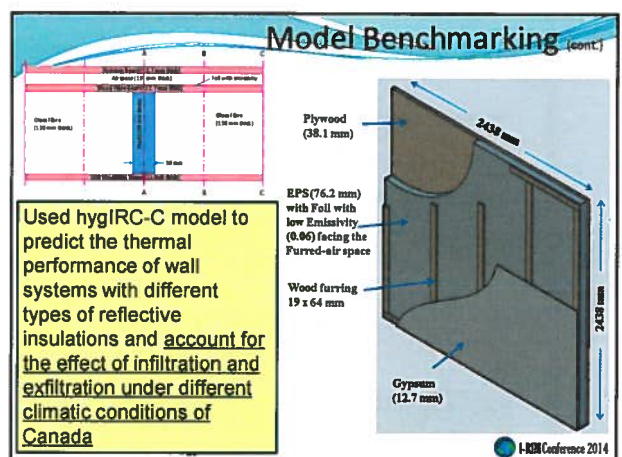
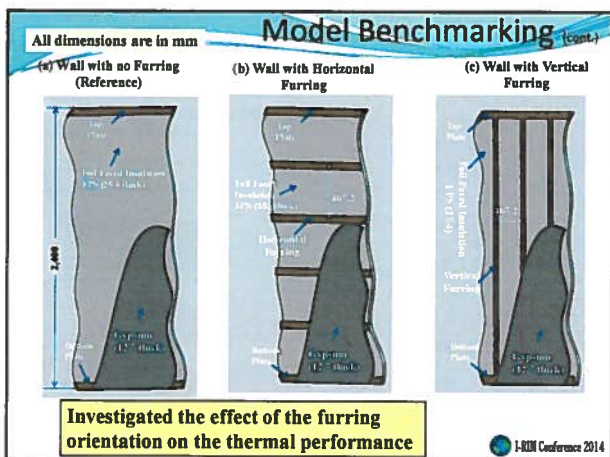
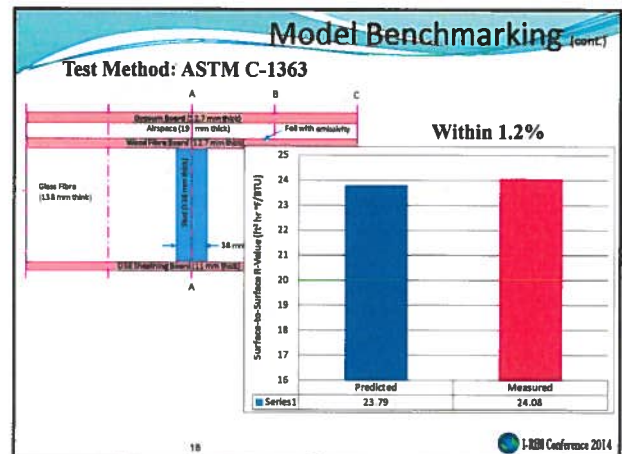
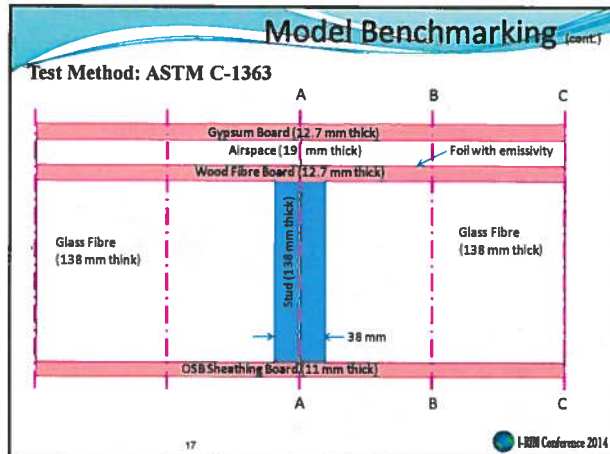


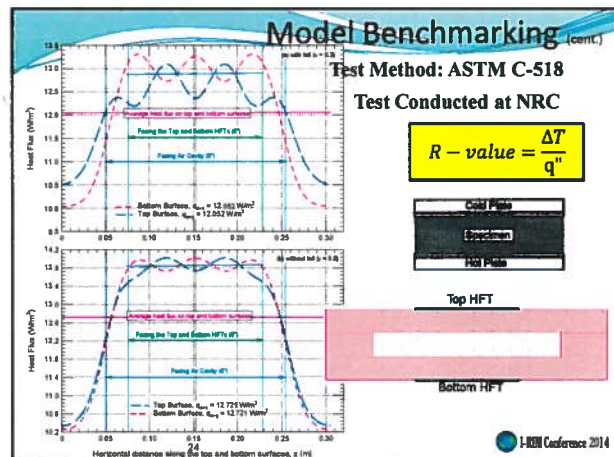
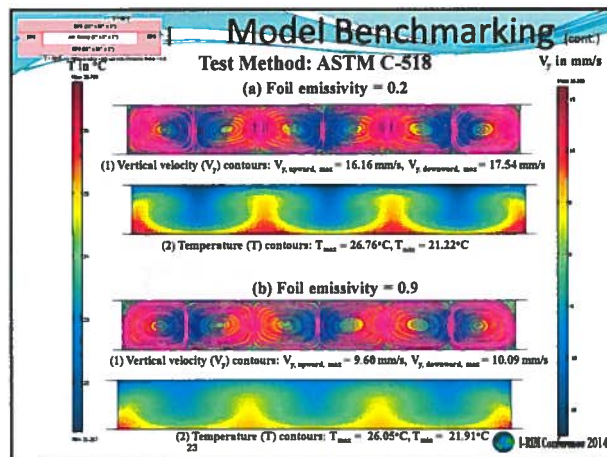
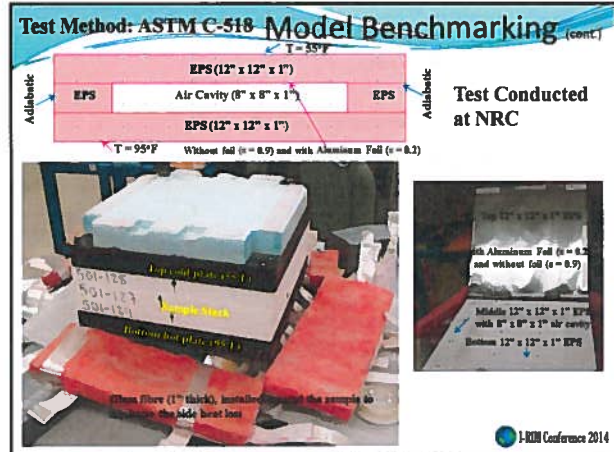
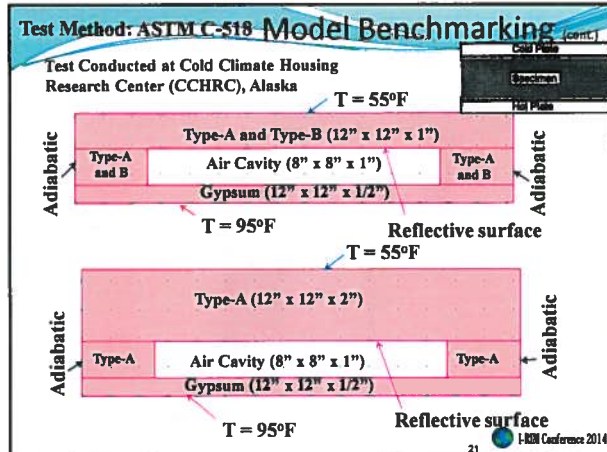
OBJECTIVES

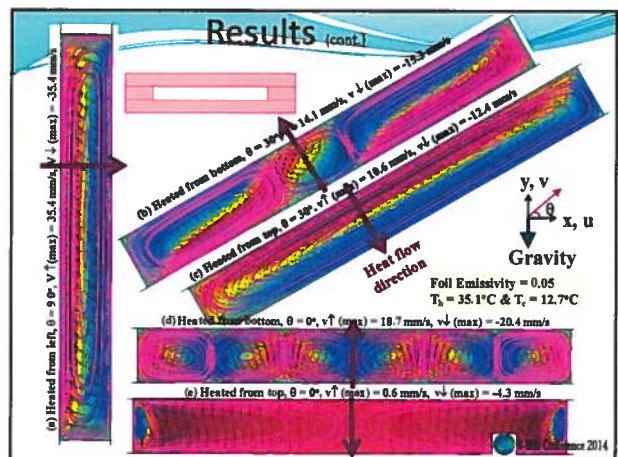
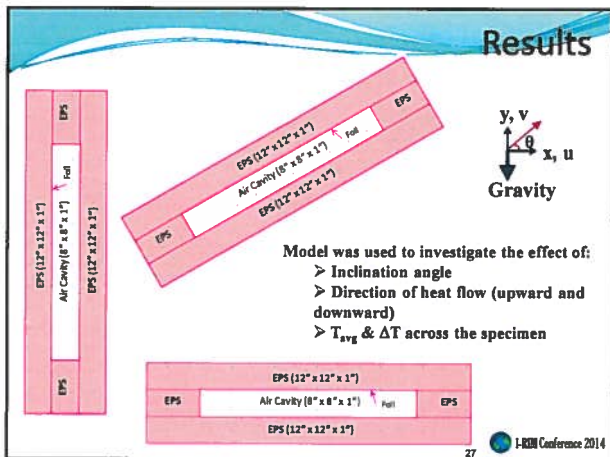
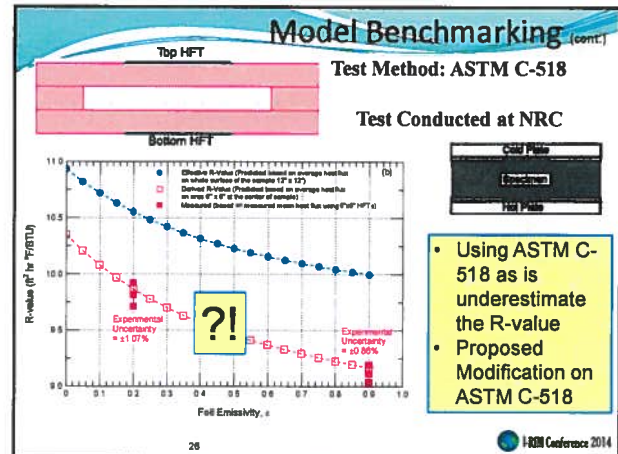
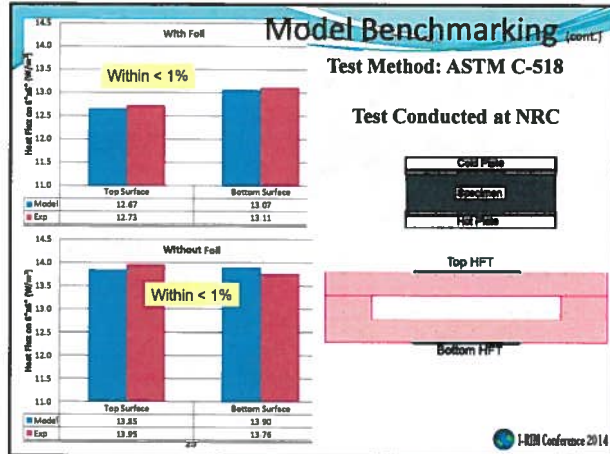
- ❑ Benchmark hyIRC-C model
- ❑ Conduct parametric study in order to develop practical correlations for determining the effective R-values of enclosed airspaces with different:
 - Dimensions (aspect ratios),
 - Average temperatures,
 - Temperature differentials,
 - Direction of heat transfer, and
 - Wide Range of emissivity
- ❑ Test R-value correlations

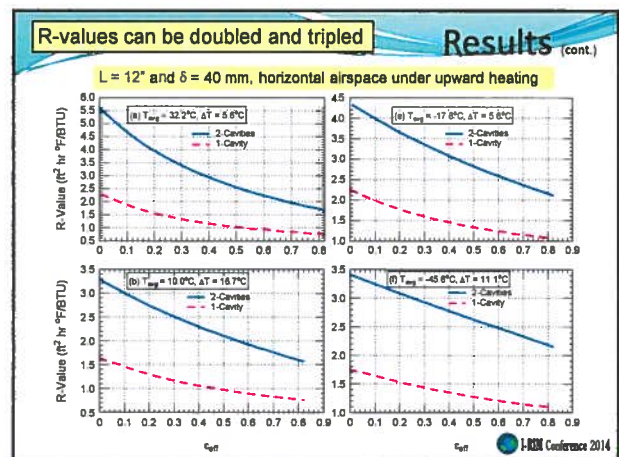
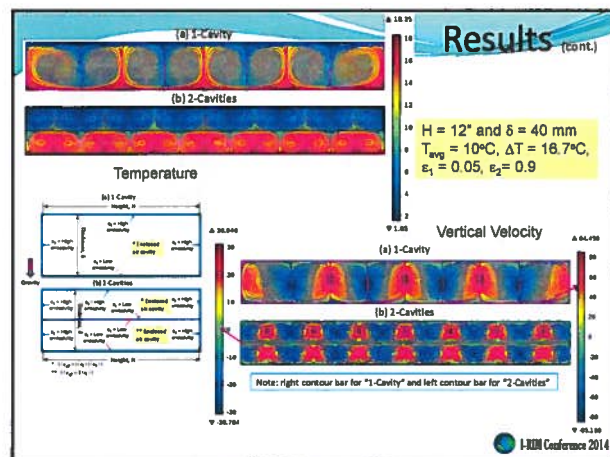
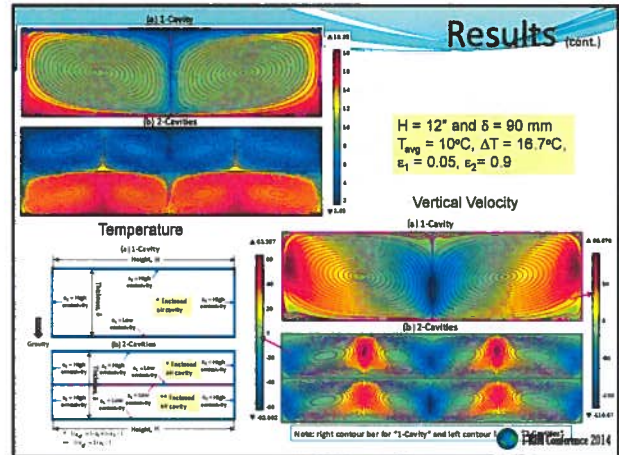
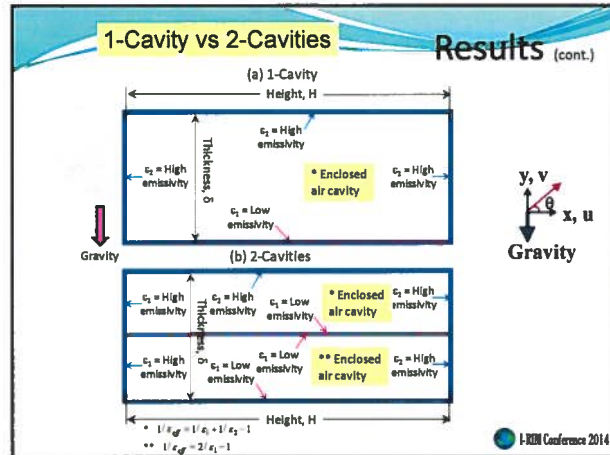
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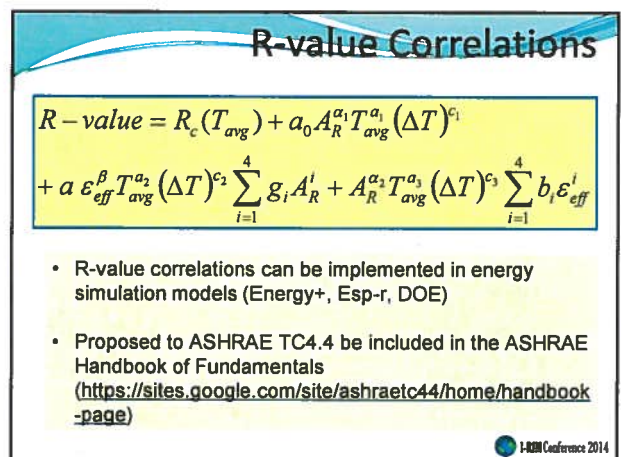
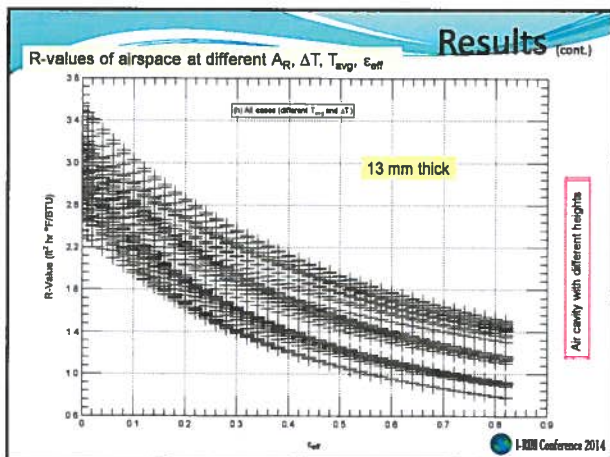
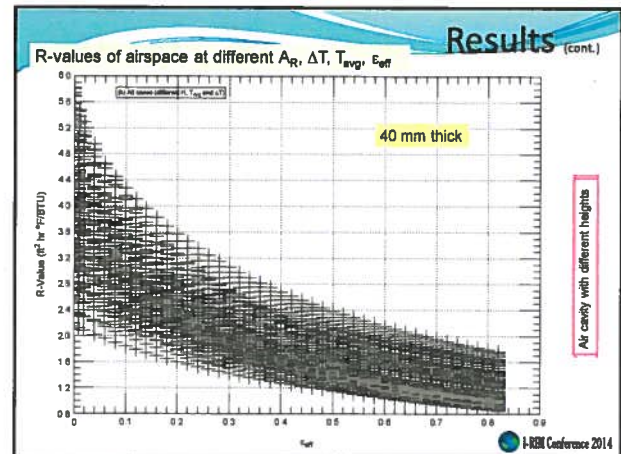
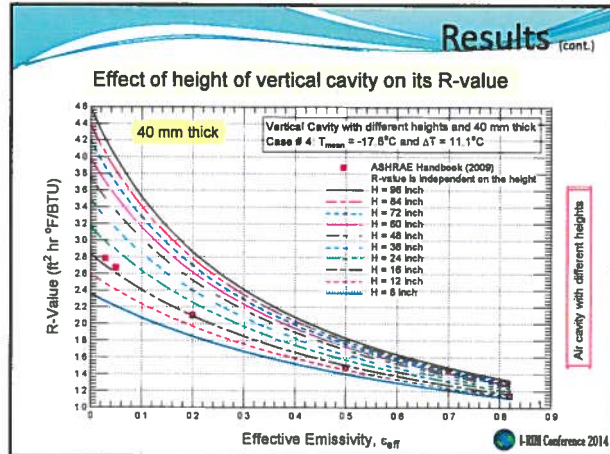


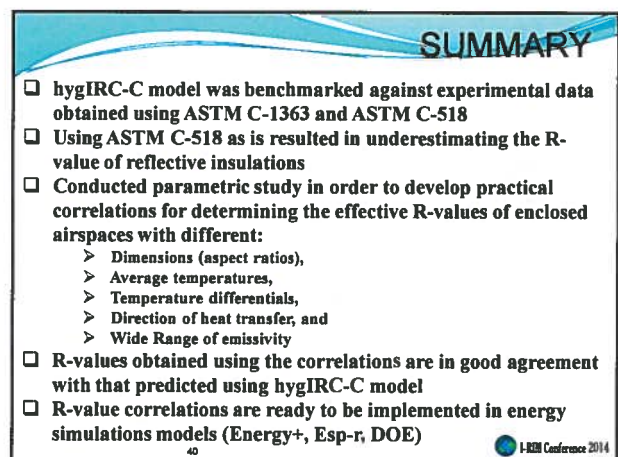
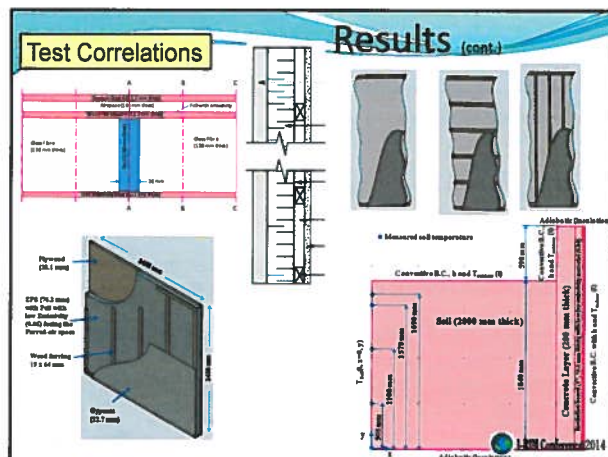
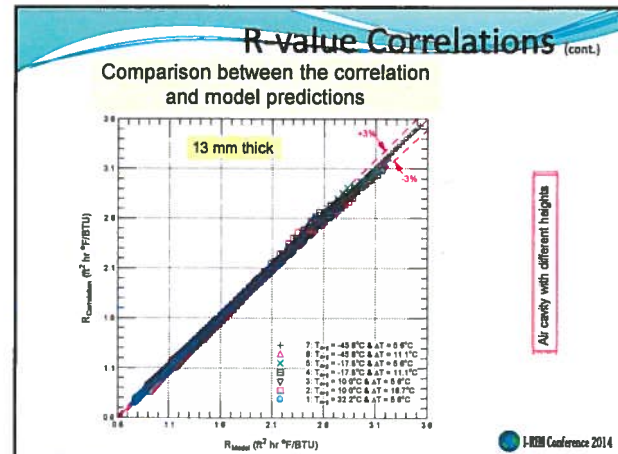
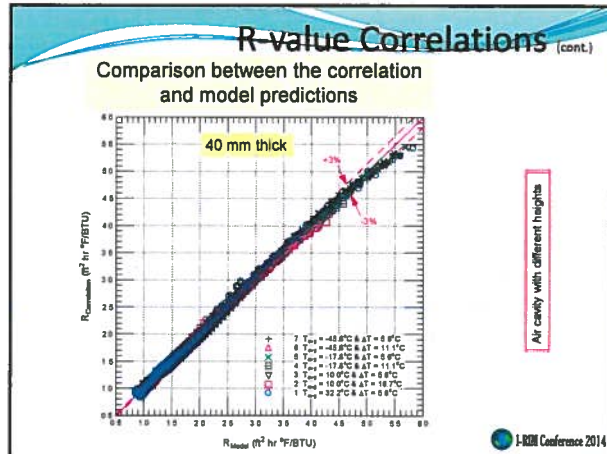












Publications in area of reflective insulations

1. Saber, H.H., "Practical Correlation for Thermal Resistance of Low-Sloped Enclosed Airspaces with Downward Heat Flow for Building Applications", *HVAC & R Research Journal*, DOI: 10.1080/10707669.2013.824775, <http://dx.doi.org/10.1080/10707669.2013.824775>, pp. 1-33, October 2013.
2. Saber, H.H., "Practical Correlation for Thermal Resistance of Horizontal Enclosed Airspaces with Downward Heat Flow for Building Applications", *Journal of Building Physics*, DOI: 10.1177/1744259113508473, The online version of this article can be found at: <http://jeb.sagepub.com/content/early/2013/06/20/1744259113508473>, In press, July 2013.
3. Saber, H.H., "Practical Correlation for Thermal Resistance of 45° Sloped Enclosed Airspaces with Downward Heat Flow for Building Applications", *Journal of Building and Environment*, volume 65, pp. 154-169, 2013, the online version is available at: <http://dx.doi.org/10.1016/j.buildenv.2013.04.009>.
4. Saber, H.H., "Practical Correlations for Thermal Resistance of Horizontal Enclosed Airspaces with Upward Heat Flow for Building Applications", *Journal of Building and Environment*, <http://dx.doi.org/10.1016/j.buildenv.2012.12.016>, vol. 61, pp. 169-187, 2013.
5. Saber, H.H., "Practical Correlations for the Thermal Resistance of Vertical Enclosed Airspaces for Building Applications", *Journal of Building and Environment*, <http://dx.doi.org/10.1016/j.buildenv.2013.02.003>, vol. 59, pp. 379-396, January 2013.
6. Saber, H.H., Maref, W., Sherren, G., Swinton, M.C., "Numerical modelling and experimental investigations of thermal performance of reflective insulations", *Journal of Building Physics*, vol. 36, no. 2, pp. 163-177, 2012 (NRCC-54538), DOI: 10.1177/1744259112444021. The online version of this article can be found at: <http://jeb.sagepub.com/content/early/2012/04/25/1744259112444021>.
7. Saber, H.H., "Investigation of thermal performance of reflective insulations for different applications", *Journal of Building and Environment*, 53, pp. 37-44, June 2011, URL: <http://www.nrcc.gc.ca/obj/irc/doc/pubs/nrcv53562.pdf>, DOI: <http://dx.doi.org/10.1016/j.buildenv.2011.12.018>.

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Publications in area of reflective insulations

(cont.)

9. Saber, H.H., "Thermal Performance of Wall Assemblies with Low Emissivity" *Journal of Building Physics*, vol. 36, no. 3, pp. 308-329, 2013, DOI: 10.1177/1744259112450419, The online version of this article can be found at: <http://jeb.sagepub.com/content/early/2012/07/02/1744259112450419>.
9. Saber, H.H., Maref, W., Swinton, M.C., "Thermal response of basement wall systems with low emissivity material and furred airspace", *Journal of Building Physics*, vol. 35, no. 2, pp. 353-371, 2012, (NRCC-53962), URL: <http://www.nrcc.gc.ca/obj/irc/doc/pubs/nrcv53962.pdf>, DOI: <http://dx.doi.org/10.1177/1744259111411652>.
10. Saber, H.H., Maref, W., Swinton, M.C., St-Onge, C., "Thermal analysis of above-grade wall assembly with low emissivity materials and furred-airspace", *Journal of Building and Environment*, 46, (7), pp. 1403-1414, January-09-11 (NRCC-53584), URL: <http://www.nrcc.gc.ca/obj/irc/doc/pubs/nrcv53584.pdf>, DOI: <http://dx.doi.org/10.1016/j.buildenv.2011.01.002>.
11. Saber, H.H., and Maref, W., "Effect of Furring Orientation on Thermal Response of Wall Systems with Low Emissivity Material and Furred-Airspace", *The Building Enclosure Science & Technology (BEST3) Conference* to be held in April 2-4, 2012 in Atlanta, Georgia, USA, November 2011.
12. Saber, H.H., Maref, W., and Swinton, M.C., "Numerical Investigation of Thermal Response of Basement Wall Systems with Low Emissivity Material and Furred - Airspace", *13th Canadian Conference on Building Science and Technology (13th CCBST) conference*, held in May 10-13, 2011, Winnipeg, Canada.
13. Saber, H.H., and Swinton, M.C., "Determining through Numerical Modeling the Effective Thermal Resistance of a Foundation Wall System with Low Emissivity Materials and Furred - airspace", *ICBEST 2010 - International Conference on Building Envelope Systems and Technologies* (Vancouver, B.C., June 27-30, 2010), pp. 247-257.

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Questions?

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