A Building Science Toolbox...

FOR
ARCHITECTS, ENGINEERS, TECHNOLOGISTS AND TECHNICIANS
THAT UNDERTAKE BUILDING ENVELOPE DESIGN

The Heat, Air and Moisture Building Science Toolbox, V. 1B-E/M

The Heat, Air and Moisture Building Science Toolbox, V.1B-E/M, is a computer program designed to simplify the application of building science principles to the design of any cladding and exterior wall system. With this computer program, you will determine thermal properties, determine temperature gradients, locate winter and summer dewpoint temperatures, analyze potential winter and summer wall condensation, determine air leakage rates through openings, determine the effect of height and temperature on stack effect and fan pressurization on the building envelope, use the psychrometric tool and produce project specific reports.

The Building Science Toolbox was developed specifically for architects, engineers, technologists and technicians designing building envelope systems. It contains 5 building science tools. These are; 1) the "R" Value Analysis Tool, 2) the Condensation Analysis Tool, 3) the Air Leakage Analysis Tool, 4) the Building Pressure Analysis Tool and 5) the Psychrometric Tool.

1) The "R" Value Analysis Tool is used to design the thermal attributes of a wall assembly, to evaluate the nominal "R" value of the assembly, to illustrate the temperature gradients through
the assembly and to determine the location of the winter and summer dewpoint temperatures. Each wall design is evaluated against the specific climatic and indoor conditions selected.

2) The Condensation Analysis Tool enables the user to undertake a vapour diffusion analysis of a wall assembly and to determine the sensitivity of the wall design to cavity condensation. By an appropriate selection of materials, the user may optimize the vapour barrier performance of any wall design for any indoor humidity condition and any outdoor climatic condition.

3) The Air Leakage Analysis Tool enables the user to determine the air leakage rates through any size opening, for 3 types of flow paths and for a wide range of operating air pressure differences. It can also be applied to whole building analysis. The air barrier tool also analyses the loss of moisture by air leakage and the energy gain or loss through air leakage. The results are presented as flow rates, per second, per hour and per month.

4) The Building Pressure Tool allows the user to determine stack effect pressures at any building height and for any temperature difference within prescribed limits. The fan pressurization effect is caused by the selection of the makeup air rate, the exhaust air rate and the air leakage properties of the building envelope.
5) **The Psychrometric Tool.** The humidity, temperature and pressure of ambient air are also known as the psychrometric properties of the air. The Psychrometric Tool facilitates the analysis of ambient air conditions. By selecting 3 properties of air, 2 of which are known, the program determines the 3rd property and displays it on the psychrometric chart. For example, the Psychrometric Tool may be used to determine dewpoint temperature of air from a known dry bulb temperature and indoor relative humidity.

6.0 **The Main Library.** In addition to the above, the H.A.M. Toolbox includes a library of climatic data and a list of generic construction materials with basic properties. The user may edit the library to expand the climatic database to include any city of choice and to broaden the material database with any manufacturer’s data. Each tool prints a single page report, project specific, for easy reference to project specific decisions.

7.0 **The Wall Library.** Version 1B was expanded to include a wall design library. This Library is used to store your exterior wall designs for quick retrieval and further development or analysis. When a wall system is designed within one tool it may be recalled in the other. There is no limit to the number of wall design projects stored.

8.0 **A Conversion Wizard.** Version 1B was also expanded to include a conversion wizard. From time to time, the user may be required to provide information in the other system of units, either from metric (ME) to inch/pound units (US) of vice versa. The conversion wizard is simple
to use and includes difficult to find conversion factors not normally available in standard conversion tables.

**9.0 Screen Appearance.** The screen appearance may now be expanded or contracted to suit any computer screen resolution without the necessity of altering the computer settings.

**10.0 The Developer.** Rick Quirouette, B. Arch, and a former researcher of the Institute for Research in Construction of the National Research Council of Canada developed the H.A.M. Building Science Toolbox. His building envelope consulting practice is in demand throughout North America for project design review, forensic analysis, and expert testimony and as a speaker at building science symposia. The H.A.M Toolbox Version1B-E/M was designed for use on a personal computer using Windows 95, 98, ME, 2000, XP or NT operating systems. It is a stand-alone program and does not require or link to AutoCAD or other similar architectural software.

The H.A.M. Toolbox is a must for any building design office. Building Science is no longer a matter of tradition and experience. In the absence of costly field testing, this software will provide the best overall prediction of the actual heat, air and moisture loads related to the design of the exterior wall resulting from the indoor and outdoor conditions.

**With the H.A.M Toolbox you will...**

- Open it, use it and close it. The science need not be reviewed again.
- Finally be able to rationalize air leakage control and the air barrier criteria.
- Design energy efficient exterior walls.
- Learn how to minimize the risk of condensation, mold and wetness in exterior walls.
- Understand stack effect and other air pressure induced problems.
- Analyze your wall design for hot or cold, humid or dry climate conditions.
- Customize the main library with your own climate design data.
- Customize the main library with your preferred construction material specifications.
- Undertake a true value engineering assessment.
- Become the office building science expert.
- Save staff time and fees, and optimize the envelope design quickly.
- Illustrate your wall design and analysis with instant reports.

**Ordering and Purchasing Information**

See insert for ordering and purchasing information. Also, an order form is included for your convenience and a more rapid delivery. For more information contact any of the dealer names and or contacts listed on the inserts through E-mail, fax or telephone.
ORDER FORM

THE HEAT, AIR and MOISTURE BUILDING SCIENCE TOOLBOX, V.1B-E/M
(Developed by Quirouette Building Specialists (QBS) Ltd.)

I wish to purchase (become licensed to use) the QBS Ltd. Heat, Air and Moisture Building Science Toolbox computer program, Version 1B-E/M. I understand that the software is for use on one computer in our office and one computer at home. Please print your name, firm name and address, carefully. The company name & address will appear permanently on your copy of the software CD and its output reports.

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