

and data services to be delivered to a home over high-speed, always-on broadband connections. In the Internet Home, the gateway is connected to wall-mounted control panels in each room, manufactured by Crestron, Inc. (Rockleigh, New Jersey). Among other functions, the system can control temperature and lights and can lower or raise window blinds at the touch of a button.

WASHINGTON, DC — Manufacturers of room air conditioners and the Association of Home Appliance Manufacturers (AHAM) are lobbying to kill an antipollution proposal issued by the Texas Natural Resources Conservation Commission. The proposal would require manufacturers to coat the outdoor coils of room air conditioners with a proprietary catalytic material that supposedly converts ground-level ozone to oxygen. AHAM spokespeople say that the catalyst, manufactured by Engelhard Corp., is unproven, expensive, and would impose energy penalties on new air-conditioning equipment to the detriment of Texas' environment. Representatives from Carrier, Friedrich Air Conditioning Co., GE Appliances, and Goodman Manufacturing were among those testifying against the proposal. For more information, visit: www.aham.org.

UPTON, NY — Brookhaven National Laboratory has begun laboratory tests to determine if the use of fuels derived from vegetable oils — called biofuels — would be a viable alternative to conventional fuel oil for residential heating. The researchers will evaluate cost,

emissions, wear and tear on oil-burner components, and the efficiency of biofuels to see if blending a small percentage of biofuel with conventional fuel oil is a feasible way to stretch oil supplies.

COUNTRY CLUB HILLS, IL — Members of the Building Officials and Code Administrators International (BOCA) approved a pair of resolutions that could result in major changes for the future of BOCA and the International Code Council (ICC). One resolution encourages further consolidation of the services of the three model code organizations (BOCA, the International Conference of Building Officials, and the Southern Building Code Congress International), which would promote uniformity at all levels of government, consistency in code enforcement, and universal educational programs for code officials, architects, engineers, contractors, and public administrators. The second resolution would extend voting rights to industry representatives. Currently, the ICC process only permits representatives of state and local governments to cast votes on code content issues. Some observers view this move as a competitive response to the National Fire Protection Association's new Consensus Codes, which work through an open consensus process (see *EDU*, June 2000).

FACTOID DEPT: The Energy Information Administration recently reported that 47% of US households now have central air conditioning, up from only 23% in 1978.

RESEARCH AND IDEAS

Millennium Home

A&S Homes, the largest custom-home builder in Manitoba, Canada, has unveiled a 2,225-ft² (207-m²) bungalow that culminates 26 years of experience in cold-climate building. Because of its state-of-the-art energy and home automation systems, the so-called Millennium Home was one of the stars in the recent Winnipeg, Manitoba, Parade of Homes.

A&S Homes builds about 100 custom homes a year, ranging from 1,800 ft²-3,000 ft² (167 m²-279 m²). The average price is about Cdn \$200,000. But the Millennium Home, which costs about twice that much, was designed from day one to be a trendsetter. "There's really no other home like it in all of Manitoba," says Frank Spezzano, who handles the company's sales and marketing. "We're building homes in one of the driest, coldest climates in the world — in fact, the design dry-bulb temperature here is -34°C — so we take great care in getting the energy details right. The home is also right on the cutting edge with its automation and communications features."

As shown in the adjoining spec sheet, the Millennium Home is framed with 2x6 wood studs and sits on a full basement, which is furred out and insulated to R-12 (RSI 2.2). The walls combine 6 inches of fiberglass batt and 1 inch of Johns Manville polyisocyanurate sheathing to produce a very tight R-27 (RSI 4.9) assembly (see Figure 2).



Figure 2 — A&S Homes is pioneering the use of insulating sheathing (1" polyisocyanurate) in Manitoba, Canada. The 6-inch wall cavity behind the sheathing is filled with batts, yielding an R-27 wall.

Spec Sheet



GENERAL

Size: 2,225 ft² (207 m²)

Garage: 33 x 22 ft (726 ft² x 68 m²)

Style: Bungalow with full basement

Location: Winnipeg, Manitoba, Canada

Lot size: 90 x 170 ft

Price: Cdn \$399,900

ENVELOPE

Basement: 4-inch concrete floor over 6 inches of buckshot gravel; 8-inch concrete walls furred in and insulated to R-12 (RSI 2.2); 6-mil poly air-vapor retarder

Floor: TJI floor joists; ¾-inch T&G subfloor screwed down and glued; Johns Manville Sound-SHIELD acoustic insulation

Walls: 6-inch wood studs @ 16 inches O.C.; R-20 (RSI 3.6) fiberglass batt insulation; 7/16-inch OSB sheathing; 1-inch polyisocyanurate foam sheathing with trillaminate foil facer bonded on each side (R-7.2 — RSI 1.3); Tyvek StuccoWrap. Garage common wall air sealed and insulated to R-20 (RSI 3.6)

Windows: All Weather Windows; PVC; low-e, argon-filled glass; U-value 0.29

Exterior doors: Garage and back door are insulated steel, front door is insulated fiberglass

Attic: 18.5 inches of Johns Manville Climate Pro blown-in loose-fill fiberglass (R-50 — RSI 9) on flat ceilings; R-38 batt (RSI 6.8) on vaulted ceilings

Air sealing: 6-mil poly air-vapor retarder used in basement, exterior walls, and ceiling; all penetrations through plates sealed; airtight pot lights and electrical boxes

Roof: Engineered roof trusses @ 24 inches O.C.; OSB with H clips; 20-year asphalt shingles

Attic venting: Soffit and gable vents

Siding: Combination of stucco, brick, and siding

Interior partitions: 2x4 wood studs filled with Johns Manville Sound-SHIELD acoustic batt; 2x6 framing used on heavy mechanical walls

HVAC

Heating: Heil 90+ two-stage gas furnace, 125,000 Btu/hr, with dedicated combustion air intake; thermostats and all other controls for Honeywell appliances (heat recovery ventilator, electronic air filter, and humidifier) are consolidated in the Honeywell Perfect Climate comfort center located in the basement

Cooling: Heil 2.5-ton high efficiency

Ductwork: All mastic-sealed metal ducts are inside conditioned space; Honeywell three-zone distribution

Fireplace: Heat Saver gas fireplace

Water heating: High-efficiency Johnwood

Whole-house mechanical ventilation: Honeywell F50F heat recovery ventilator

OTHER FEATURES

- Category-five structured wiring throughout; bedside keypad appliance consolidates telephone, security, and alarm clock; front-door security camera transmitted to every TV; all home-automation functions are controllable through phone
- Honeywell electronic air cleaner
- Radon gas protection under basement floor

The sheathing was wrapped with Tyvek StuccoWrap before the claddings went on.

Flat ceilings were blown with 18.5 inches of loose-fill fiberglass (R-50 — RSI 9); the vaulted ceiling have R-38 (RSI 6.8) batts (see Figure 3). Ceilings, walls, and basement were all fitted with a continuous poly air-vapor retarder. All penetrations through the plates were sealed. Airtight pot lights and electrical boxes were used throughout. The vinyl windows have double-pane, low-e, argon-filled glass and a U-factor of 0.29. The result is a home that is extremely tight and well insulated.

The house is equipped with a Honeywell three-zone, forced-air distribution system that uses mastic-sealed



Figure 3 — Flat ceilings in the Millennium Home were blown with 18.5 inches of loose-fill fiberglass (R-50); vaulted ceiling have R-38 batts.

For subscriptions call (800) 964-5118 or (781) 641-5118 or visit our Web site: www.cutter.com/energy/

metal ductwork. Conditioned air is provided by a Heil high-efficiency gas furnace and central air conditioner.

Spezzano tells *EDU* that he has tried three different brands of heat recovery ventilators in the past four years and has finally settled on the Honeywell F50E. "We find that it runs quieter and is much less finicky than the other HRVs [heat recovery ventilators] we've tried," he notes.

The Millennium Home's thermostat, zoning controls, humidifier control, electronic air cleaner control, and HRV control are all consolidated in the Honeywell Perfect Climate comfort center located in the basement. This puts everything in one convenient place and avoids cluttering up the walls with multiple controls.

Accurate Alarm and Communications (Winnipeg) installed Category 5 phone, TV, and computer cables

throughout the house and selected a Communicque automation system. Communicque, manufactured by Digital Security Controls (Toronto, Ontario, Canada), is designed to do everything through the phone system. Thus the homeowner can control all of the appliances, inside temperature and humidity, lights, intercom, and security systems from any telephone in the world. "If you like, you can answer the front doorbell from your bedroom by simply picking up the phone, then deactivate the lock and let your guest into the living room," Spezzano says. "You could also do that from Paris using your cell phone if you wanted. There are very few houses in the world as smart as this one."

For more information, contact: A&S Homes, 463 St. Anne's Road, Winnipeg, Manitoba, Canada R2M 3C9. Tel: (204) 256-0863; Fax: (204) 257-5561.

Assessing the Energy-Saving Value of Roof Coatings

Most designers and builders intuitively understand that white roofs can lower the air-conditioning load in buildings by reflecting solar radiation back into the atmosphere rather than absorbing it through the roof deck into conditioned space. There's also a lot of anecdotal evidence that light-colored roofs enjoy longer lives because they suffer less damage from heat and ultraviolet radiation than dark-colored roofs (see *EDU*, May 1999). But how are designers and builders to quantify these advantages and decide if a certain coating is worth the price?

Some of the answers are provided by a three-year field test that's just been completed by the Buildings Technology Center (BTC) at Oak Ridge National Laboratory. Sponsored by the National Roof Coating

Manufacturers Association, the tests included 24 low-slope roof coating systems and four uncoated specimens. These were put into place in June 1997 and have been continually exposed to the Knoxville, Tennessee, climate. The object of the experiment was to determine the effect of weathering on the thermal performance of roofs equipped with different coating systems and to model the performance of each system in climates other than that of East Tennessee.

The tests included 8 white coatings, 13 aluminum coatings, an aluminized asphalt emulsion, and 2 capsheets. The capsheets have reflective metal surfaces that are factory-adhered to a modified bitumen membrane material. A total of 10 systems were applied to APP-modified bitumen, and 14 were applied to

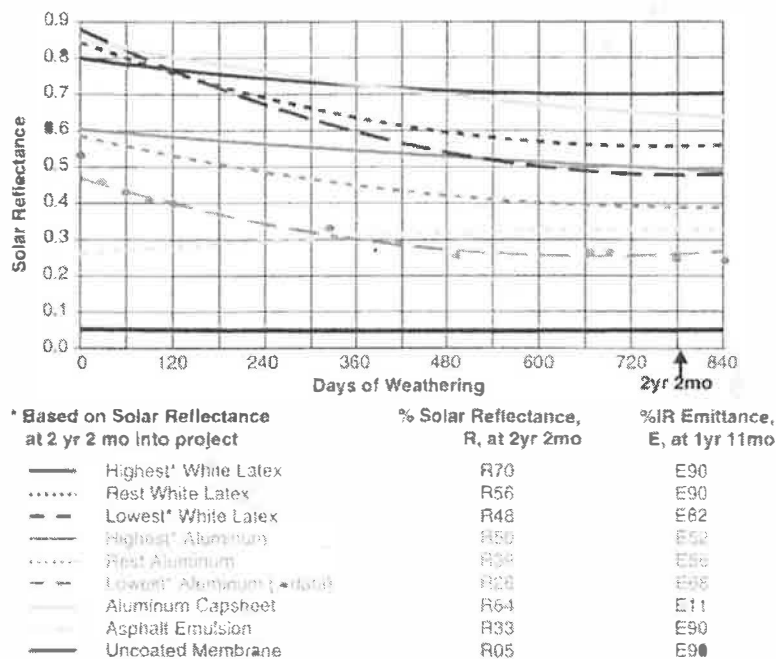


Figure 4 — A history of solar spectrum reflectances for various coated and uncoated surfaces exposed continuously to the Knoxville, Tennessee, climate since June 1997.

Join our free weekly e-mail service, *CutterEdge Buildings*: www.cutter.com/energy/