HYDRONIC HEATING SYSTEMS

The purpose of this STANDATA is to clarify the design requirements of hydronic heating systems, so that an acceptable level of performance may be maintained for all installations.

This STANDATA applies to any hydronic heating system intended to provide heat to the interior of the building. This would include systems that are designed as the primary heat source in the building, as well as any secondary heat sources (i.e. a house heated with a forced-air furnace that has hydronic heating at the perimeter of a walk-out basement). Examples of hydronic heating systems would include, but not be limited to:

- Poured-floor radiant tubing
- "Staple-up" radiant tubing
- Convective-plate in-floor tubing
- Radiators
- Baseboard heaters
- Fan-coil units

This STANDATA does not apply to systems that are not intended to provide heat to the interior of the building, such as exterior snowmelt systems or pool heaters.

DISCUSSION

Sentence 9.33.4.1.(1) specifies that heating and air-conditioning systems must be designed and installed according to "good practice" such as that described in various industry recognised documents that cover the design of these systems. Over the years, safety codes officers have raised issues over how they can verify that a hydronic heating system has been designed and installed properly according to the documents mentioned in Sentence 9.33.4.1.(1).

For buildings that fall within the scope of Sentences 2.4.2.1.(3) and (4) of Division C of the Alberta Building Code 2006, full professional involvement is required on the project and, in the specific case of hydronic heating systems for these buildings, a professional engineer is usually retained to do the design and construction review.

However, buildings that fall outside the scope of Sentences 2.4.2.1.(3) and (4) of Division C of the Alberta Building Code 2006 are not required to have professionals involved in the design and construction process, unless the safety codes officer is of the

opinion that some or all aspects of the building design are complex enough to warrant professional involvement. For these buildings, safety codes officers can use this STANDATA as a guide to evaluating the design and installation of hydronic heating systems that have been submitted for a building permit.

CODE REFERENCES

Article 9.33.4.1. states:

9.33.4.1. Design of Heating and Air-conditioning Systems
1) Heating and air-conditioning systems, including ducting, and mechanical heating and refrigeration equipment, shall be designed, constructed and installed to conform with good practice such as that described in
a) the ASHRAE Handbooks and Standards,
b) the HRAI Digest,
c) the Hydronics Institute Manuals, and
d) the SMACNA Manuals.
(See also Subsection 9.32.3. for the design of systems that also provide ventilation.)

INTERPRETATION

Proper verification of compliance with Sentence 9.33.4.1.(1) of the Alberta Building Code for hydronic heating systems in buildings that are not within the scope of Sentences 2.4.2.1.(3) and (4) of Division C can be obtained by following these procedures:

DESIGN REQUIREMENTS

Hydronic heating systems may be:

1. submitted as a pre-engineered package for review by the authority having jurisdiction, or

2. custom designed by

    a. a professional engineer licensed to practice in the province of Alberta,

    b. an individual who holds one of the following qualifications:

        i. A Certified Hydronics Designer, as certified by the Canadian Hydronics Council, or

        ii. A Residential Hydronics Design Technician, as certified by the Heating, Refrigeration and Air Conditioning Institute of Canada.

Pre-engineered packages shall consist of the basic generic system specifications and installation details prepared by a professional engineer together with additional system design data and floor plans specifically applicable to the project. The additional specific system design must be performed by

1. a professional engineer licensed to practice in the province of Alberta, or

2. an individual who holds one of the following qualifications:

    a. A Certified Hydronics Designer, as certified by the Canadian Hydronics Council, a council within the Canadian Institute for Plumbing and Heating, or

    b. A Residential Hydronics Design Technician, as certified by the Heating, Refrigeration and Air Conditioning Institute of Canada.

SUBMISSION REQUIREMENTS

For all hydronic heating system designs, the plans and specifications submitted shall include, but not be limited to, the following information:

1. The schematic arrangement of the system and the equipment specifications including, but not limited to, boilers, pumps, expansion tanks, zone controls, mixing valves and other system components such as supplementary baseboard and/or fan-coil units, water heater, etc. connecting to the system.

2. Boiler room layout, venting and combustion air provisions for all gas appliances.

3. Piping specifications, spacing, sizes, maximum loop lengths, and pipe support details. Floor plans showing a general layout of the piping loops required for each room or space and the location of the main headers, if applicable.

4. Locations, sizes and specifications for all heat terminal units, such as baseboard heaters, radiators, fan-coil units, etc., if applicable.

5. Cross sections through typical floor assemblies to show piping loop locations and the type of insulation to be provided.

6. System operating parameters including supply and return water temperatures, design flow rates and heat output coefficient of individual piping loops.

7. Room by room heat loss calculations.

VENTILATION REQUIREMENTS

The Alberta Building Code stipulates that adequate ventilation must be provided for all rooms and spaces in any building. Such provisions shall be properly identified, in detail, on the system design drawings submitted for review.

Sections 6.2. and 9.32. of the Alberta Building Code 2006 cover the design requirements for ventilation systems in various applications.

This INTERPRETATION is applicable throughout the province of Alberta.