Research & Development Highlights

Technical Series
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Domestic Hot Water Tanks as a Space Heating Appliance

Introduction

This study investigated the potential for domestic hot water (DI{W) tanks to serve as both space heating and potable hot water appliances.

The Northwest Territories Housing Corporation has installed several of these system in its housing units in recent years and found them to perform very successfully. Hot water tanks, however, are not certified as space heating appliances. This made it difficult for regulatory agencies in the territories to sanction their use for this application.

Because of the potential reductions in capital, installation and maintenance costs, particularly for remote communities, the Northwest Territories Housing Corporation was eager to determine if the concerns raised by the regulatory community were justifiable.

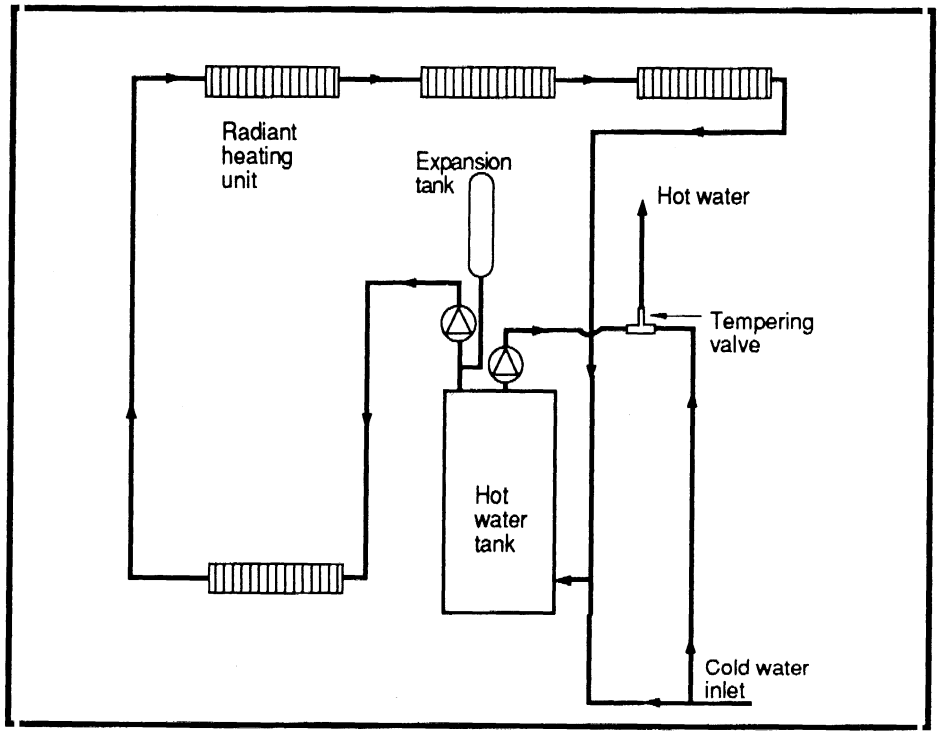
The study had three objectives:

1. Review the relevant codes and standards to determine the impediments to approving DHW tanks as combination space and hot water appliances.
2. Inspect DHW tanks which had been serving as combination appliances for several years and assess their state and condition.
3. Analyze the cost-effectiveness of utilizing DHW tanks as space heating appliances.

Results

Codes and Standards

The study found that there was a clear distinction in codes and standards between appliances serving as hot water



Schematic of a typical domestic hot water tank/space heating system.

appliances and those serving as space heating. The present codes and standards for the installation and use of domestic hot water tanks do not allow for their use as space heating appliances. A domestic hot water tank is limited to use as a heater for potable water. If hot water is required for space heating, a boiler is deemed the approved type of equipmenL Historically, boilers were deemed the appliance of choice for space heating because of their higher efficiencies and ability to meet the typical heating requirements of the house. In addition, because boilers are designed to run continuously over extended periods, several safety features have been built into their design.

Until recently, there has been no strong motivation to consider having DHW tanks approved as space heating appliances. Recently, the use of DHW tanks as an auxiliary heating appliance has become popular in some areas. As a result, there is pressure to develop a guideline for installing DHW units for this application.

Field Inspection

A field inspection of two DHW tanks used for space heating showed no deterioration beyond what would be expected after six years of service. There was very little sediment build-up in the bottom of the tank; no fouling or plugging of the flow lines; and little or no deterioration of the fire chamber, fire guard insulation blanket or flue baffle.

Cost-Effectiveness

In the Northwest Territories, as much as $2,200 (1989) could be saved on purchase and installation by installing a DHW system instead of a boiler.

However, because the boiler system is more energy-efficient than the DHW system, the additional cost can be recovered after about six years of use.

This cost-effectiveness analysis does not take into account factors such as maintenance and shipping, which in some northern and remote communities are significant. This may make the DHW system more economically attractive in these areas.

A complete life-cycle cost analysis is required in order to consider all the factors which are necessary in concluding the most effective system to install.

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Research Report: Final Report *for Field Investigation of Domestic Hot Water Tan/cs as a Space Heating Appliance*

Research Consultant: *Howell Mayhew Engineering*

A *full report on this research project is available from the Canadian Housing Information Centre at the address below.*

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