CSA SPE-17:22

HVAC guide for Part 9 homes

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Preface

This is the first edition of CSA SPE 17, *HVAC guide for Part 9 homes*.

CSA Group acknowledges that the development of this Guide was made possible, in part, by the financial support of BC Hydro, FortisBC, BC Housing, and the City of Vancouver.

This Guide was prepared and reviewed by the Development Committee on HVAC Guide for Part 9 Homes.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
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0 Introduction

0.1 Background

The ultimate performance of the heating, ventilation, and air conditioning (HVAC) system in a residential Part 9 home depends upon proper sizing, installation, and commissioning, with each of these components being equally critical to delivering the designed efficiency of the equipment itself.

In new construction, adequate planning and upfront integrated design of HVAC systems in new, low-rise residential buildings is often not considered, resulting in systems not being fully optimized for performance.

Research published by the American Council for an Energy-Efficient Economy (ACEEE) shows that 50 to 70% of HVAC systems are improperly installed, causing them to be 10 to 50% less efficient than if they received quality design, specification, and installation.

HVAC has been the single largest source of new home complaints by their owners. Design, poor quality systems, and inadequate installations have all been found to be the problem in different parts of Canada.

Expanding on this, Canada's Part 9 residential building industry is going through a significant period of change where builders, architects/designers, engineers, trades, manufacturers, authority having jurisdictions (AHJ), and other industry stakeholders are adapting to increasing market demand for enhanced performance in homes. This is characterized by a transition to performance-based energy codes or standards like the *BC Energy Step Code*, Net Zero, or the Passive House standard, as well as a growing regulatory focus on decarbonization.

The combination of market and regulatory conditions and rapidly evolving technologies creates an opportunity for the residential design and construction community to significantly improve overall indoor comfort, achieve better home performance, and enhanced resiliency and health outcomes at the same time. The risk is that an integrated sequence of HVAC design, sizing, installation, and commissioning could be overlooked, or not fully considered, as residential buildings seek to achieve low-energy/low-carbon performance targets, resulting in the following:

a) Increased costs — Improperly sized equipment costs more to install and operate. It increases maintenance and repairs, and shortens the life cycle of equipment.
b) Poor comfort — Inadequate approaches to equipment selection, HVAC design, and installation results in HVAC "short-cycling" and poor performance (e.g., uneven temperatures, equipment noise).
c) Performance liabilities — Incorrectly designed HVAC systems are more likely to undermine a homeowners' sense of satisfaction and tarnish builder reputations while also creating potential liabilities and warrantee claims.
d) Home aesthetics — Larger or poorly designed HVAC systems can incorporate equipment and duct requirements that compromise living spaces with larger than needed bulkheads and chases.