



Research & Development Highlights

Technical Series
90-209

Certified Exhaust Fans: Laboratory and Field Testing

Introduction

The Canadian Standards Association (CSA) standard *CAN/CSA-C260-M90: Rating the Performance of Residential Mechanical Ventilating Equipment* describes the testing of devices such as kitchen fans, bathroom fans, heat recovery ventilators (HRVs), and others for flow and acoustic performance. As this standard was being finalized, CMHC, Energy, Mines and Resources Canada (EMR), and Ontario Hydro funded a study to test the practicality of the standard and the applicability of the laboratory results to fans installed in actual houses.

Research Program

Three devices were tested in the research. Five samples of a mid-priced kitchen fan were purchased at different stores to permit testing of the variability of results for a single model. The fan chosen was one grade up from those generally chosen by tract builders, and had been previously performance tested using the American Home Venting Institute (HVI) standard. Five samples of a similar bathroom fan were also purchased. A single HRV, donated by the manufacturer, was used to verify the test procedures developed for HRVs.

There were three phases to the testing. ORTECH International conducted the laboratory flow testing; the National Research Council (NRC) performed the laboratory acoustic testing; and a combined NRC/CMHC team undertook flow and acoustic testing after the fans had been installed in houses by a tract builder.

Findings

The laboratory testing, according to the procedures of the new standard, showed there was very little difference in the performance results of the five samples of each model. Flow results ranged from 47 to 49 L/s for the bathroom fans and 89 to 96 L/s for the kitchen fans. The acoustic testing showed the fans to be within 1 dbA of the mean value obtained.

Testing personnel made several comments on the procedure, some of which were integrated into the last edition of

the standard, and some that will await further discussion by the committee. The optional "sone rating" procedure, to harmonize with the HVI standard, requires some additional work, as results can differ depending on how the standard is interpreted.

Only six of the ten fans were installed in new houses and tested on site, due to a housing slump during the test period. The site tests showed that the fans exhibited significantly lower flows than their standardized test results, ranging from 28 to 32 L/s for the bathroom fans and 42 to 78 L/s for the kitchen fans. Acoustic results were within roughly 1.5 dbA of the laboratory sound power results, with some minor differences due to measurement technique and fan discharge orientation.

Implications for the Housing Industry

These tests show that the CSA standard is suitable for rating the performance of residential exhaust equipment. The field testing shows that even knowledgeable builders cannot easily construct fan ducting systems that allow a fan to match its rated flows. This suggests that the fans be rated against a higher resistance in a future revision of the standard, or that fans with stiffer fan curves be specified if builders want to meet a certain exhaust capacity. The acoustic testing results can be used by designers to predict sound pressure levels at various points within the rooms. This procedure might be integrated as well in any standard revision.

Project Manager: Don Fugler

Research Report: Field Measurement of Sound from Residential Ventilation Fans (1991)

Research consultant: National Research Council and J.D. Quirt

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

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