



**A PRELIMINARY ASSESSMENT OF THE
SOLAR SHADE SCREEN SYSTEM FOR
REDUCING RESIDENTIAL COOLING LOADS**

PREPARED FOR:

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SUMMARY

A preliminary assessment was conducted of an exterior shade screen system designed to reduce residential cooling loads by restricting solar gains through windows. The analysis showed that the system has the potential to significantly reduce the design cooling load, save space cooling energy, permit (in some cases) the use of a smaller capacity air-conditioning system and, if combined with other low-energy cooling techniques, may permit the air-conditioning system to be eliminated.

As part of the analysis, the design cooling loads were estimated for a typical 147 m² (1584 ft²) bungalow using various window types and glazing distributions. The analysis, which was performed for three locations (Winnipeg, Montreal and Toronto) showed that in all cases, the shade screens reduced the design cooling load by approximately one-third, roughly 1.8 kW (0.5 tons).

The retail cost of the shade screens was estimated at \$38.12/m² (\$3.54/ft²), assuming that production and installation were performed by a window manufacturer and included with the purchase of new windows. The cost of retrofitting the shade screens to existing windows was estimated to be two to three times greater.

A series of field observations were also made of the screens installed on four typical bungalows in Winnipeg. These showed that: proper tensioning of the fabric mesh was required to prevent optical distortions, an improved system was needed for mounting the screens, house appearance was not negatively affected by the screens and that homeowner reaction to the screens was generally favourable.

Recommendations were made for further, more detailed, studies to investigate the system's impact on the annual cooling load and on methods to integrate the screens with other, low-energy methods of reducing the cooling load.

This study was conducted as part of the Flair Homes Energy Demo/CHBA Flair Mark XIV Project.

RÉSUMÉ

On a effectué une évaluation préliminaire d'un système d'écrans pare-soleil extérieurs conçu pour réduire les demandes de froid résidentielles, en limitant les gains solaires à travers les fenêtres. L'analyse a révélé que le système a la capacité de réduire substantiellement la demande de froid de calcul, d'économiser l'énergie de refroidissement des espaces, de permettre, dans certains cas, l'utilisation d'une installation de conditionnement d'air de plus faible capacité et, utilisé conjointement avec d'autres techniques de refroidissement à faible énergie, de permettre l'élimination de l'installation de conditionnement d'air.

Dans cette analyse, les demandes de froid de calcul ont été estimées pour un bungalow type de 147 m² (1 584 pi²), muni de divers types de fenêtre et de distributions de vitrage. L'analyse, qui a été effectuée pour trois emplacements, soit Winnipeg, Montréal et Toronto, a révélé que dans tous les cas, les écrans pare-soleil réduisaient la demande de froid de calcul d'à peu près un tiers, soit environ 1,8 kW (0,5 tonne).

Le prix au détail des écrans pare-soleil a été estimé à 38,12 \$/m² (3,54 \$/pi²), en supposant que la production et l'installation étaient effectuées par un fabricant de fenêtres et qu'ils étaient compris avec l'achat de fenêtres neuves. Le coût de réadaptation des écrans pare-soleil à des fenêtres existantes a été estimé à deux ou trois fois plus.

On a effectué également une série d'observations sur le terrain d'écrans pare-soleil installés sur quatre bungalows types, à Winnipeg. Les observations ont révélé qu'une tension appropriée des mailles du tissu était requise pour prévenir les distorsions optiques, que le système de montage des écrans devait être amélioré, que l'apparence de la maison ne se trouvait pas dégradée par les écrans et que la réaction du propriétaire aux écrans était généralement favorable.

Il a été recommandé d'effectuer d'autres études plus détaillées afin de déterminer l'incidence du système sur la demande de froid annuelle et en vue de trouver des méthodes pour intégrer les écrans à d'autres méthodes de réduction, à faible énergie, de la demande de froid.

Cette étude a été effectuée dans le cadre du Projet de démonstration de la maison à haut rendement énergétique/Mark XIV de l'ACCH, de Flair Homes.

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