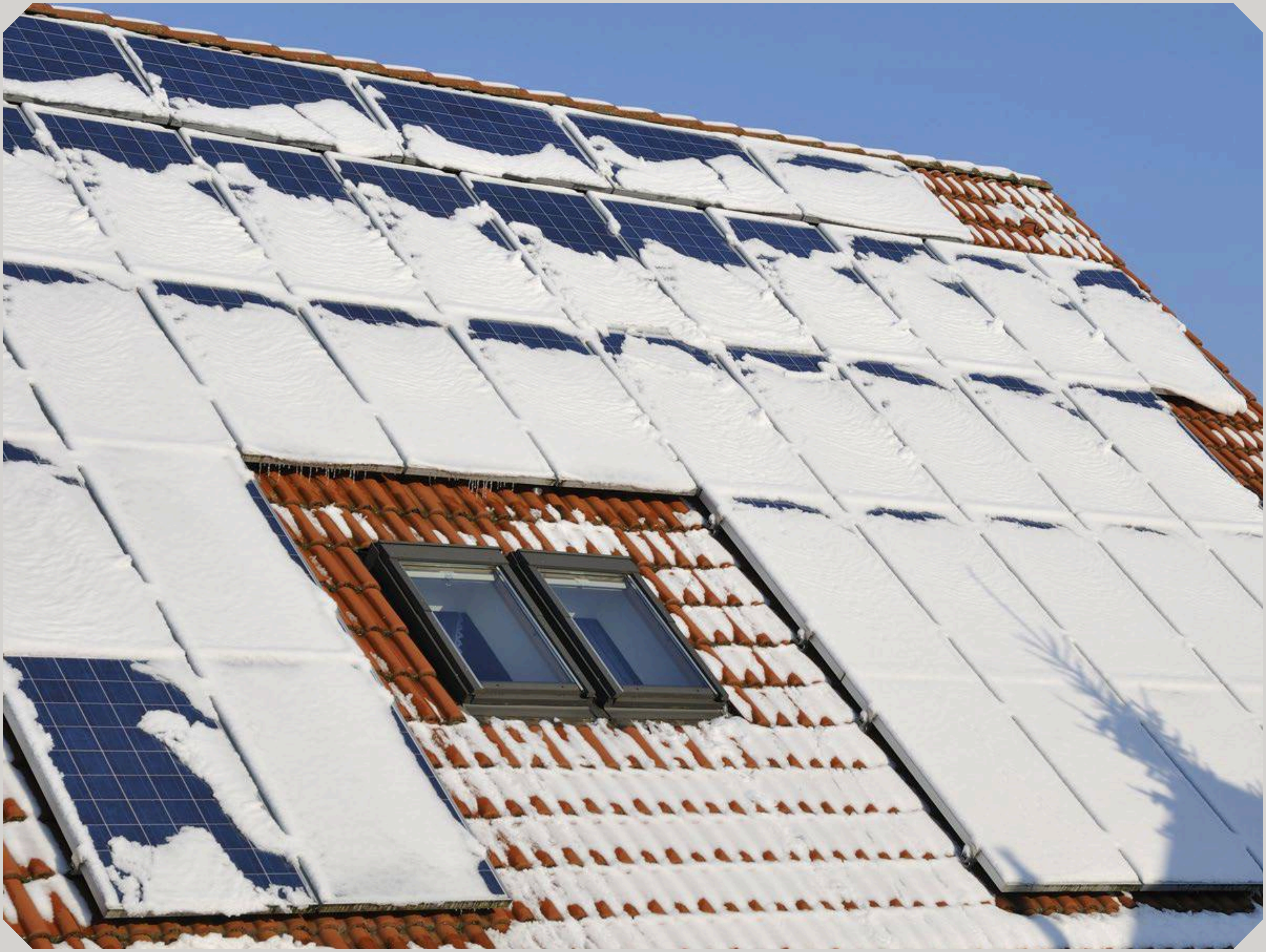

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INTRODUCTION

The load recommendations contained herein are for snow atop solar paneled roofs. The balanced loads, sliding loads and drift loads are all in terms of uniform or nonuniform downward acting pressures over all or portions of the roof. They are specifically intended for the structural design of roof beams, roof girders, and columns. They are not intended for the structural design of the solar panels themselves nor the above-the-roof-surface solar panel support components. The guide's use of north and south directions assumes a northern hemisphere site location.

Depending on the structural framing of the solar panel support system, the uniform loads recommended herein may resolve into concentrated "point" loads or "line" loads on the roof surface. These resultant, support system dependent, point and line loads should be used for the structural design of the roof deck and roof sheathing panels.

The snow loading recommendations contained herein are based on limited case history information (Corotis et al. 1979; O'Rourke 1979), laboratory studies (Irwin et al. 1984) design criteria (Cattaneo et al. 1981), and engineering judgment. The recommended sliding and drifting load cases in particular are intended to envelop actual distributions of snow loading. As such, refined approaches based on special studies may become available in the future and used to modify the snow load recommendation presented herein. Any such studies should be based on rational methods and an understanding of snow loading processes.

Finally, the recommendations contained herein are intended to cover snow load conditions that result from the presence of solar panels on a roof. The solar panel specific recommendations in this guideline are intended to be used with the snow load procedures in *Minimum Design Loads for Buildings and Other Structures,* Standard ASCE/SEI 7-10, including the load factors and load combinations. (Except for changes to figure and section numbering, this guide is also compatible with ASCE 7-16, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*.) The recommendations are not intended to replace the well-established snow load considerations in the ASCE 7-10 load standard. For example, Fig. 7-9 in ASCE 7-10 is to be used to determine the snow drift load at a roof step, even though the upper or lower level roof happens to have solar panels. In particular, it is recommended that the presence of solar panels on a higher level roof or an upwind roof should be conservatively neglected in the evaluation of sliding loads on a lower level roof, windward roof step drifts, leeward roof step drifts, parapet wall drifts, and gable roof drifts on a downwind roof. These issues are covered in more detail in Sections 3.4 and 4.5 wherein General Recommendations A and B are presented.

Chapter 1

SOLAR PANEL TYPES

Four types of solar panels are considered herein.

Flush Panels: Flush solar panel modules are installed parallel to but offset from the roof surface. When "direct attached," the airspace is approximately the height of the standing seams (~2 to 4 in.). When "rail mounted," the airspace is about 4 in. above the seams (~6 to 8 in. above flat surface between seams). The photographs in Fig. 1-1 show two examples of flush solar panels.

Fig. 1-1. Typical Flush Solar Panels (Photos courtesy of MBMA)

Tilted-Closed Panels: Tilted–closed solar panels are installed at an angle with respect to the roof surface with the back/north edge closed. The small airspace at the sunward/south and back/north edges is comparable to the standing seam height. The photographs in Fig. 1-2 show two examples of tilted–closed panels.

Fig. 1-2. Typical Tilted–Closed Solar Panels (Photos courtesy of MBMA)