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Design Guidelines for Thermal Envelope Integrity in
Office Buildings.

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ABSTRACT

Office building envelopes are generally successful in meeting a range of structural, aesthetic and thermal requirements. However, poor thermal envelope performance does occur due to the existence of discontinuity in the envelope insulation and air barrier systems, such as thermal bridges and air leakage sites. These discontinuity result from designs that do not adequately account for heat, air and moisture transmission, with many thermal defects being associated with inappropriate or inadequate detailing of the connections of envelope components. Despite the existence of these thermal envelope performance problems, information is available to design and construct envelopes that do perform well. In order to bridge the gap between available knowledge and current practice, NIST is developed thermal envelope design guidelines for federal office buildings for the General Services Administration. The goal of this project is to transfer the knowledge on thermal envelope design and performance from the building research, design and construction communities into a form that will be used by building design professionals.

This paper describes the guidelines prepared by NIST for GSA. These guidelines are organised by envelope construction system and contain practical information on the avoidance of thermal performance problems such as thermal bridging, insulating system defects, moisture migration problems, and excessive envelope air leakage. For each envelope system, both good and bad practice are discussed with an emphasis on the graphical presentation of envelope design details.