

Thermal Bow

Design professionals, building owners, and project managers need to be aware of a potential door condition known as **“Thermal Bow”**. “Thermal Bow” is primarily the result of the sun’s rays heating the door’s exposed metal surface. “Thermal Bow” may also occur when there is a dramatic temperature differential between conditioned interior space and the external environment. The severity of this condition or phenomenon, to a great extent, depends on:

- 1) Door color
- 2) Intensity of the sun’s rays
- 3) Length of exposure
- 4) Door construction

Typical symptoms of “Thermal Bow” are door skin distortion across the exterior face of the door and, due to possible overall door expansion, difficulty latching or unlatching the hardware. While in some extreme cases the door skin distortion may be permanent, usually the effect of “Thermal Bow” will be present only while the sun’s rays are hitting the face of the door. “Thermal Bow” will also affect the door clearances and cause the door to be difficult or impossible to operate. Immediate attention and correction may be required (in the field by others) to maintain the door manufacturer’s warranty and, in some cases, prevent permanent damage to the door and door hardware from occurring. The symptoms and possible damage of “Thermal Bowing” are not a product defect.

American National Standards Institute (ANSI) recognizes this phenomenon in the ANSI A205.8 standard. The following Building Professionals also recognize this standard and the condition of “Thermal Bow”:

- American Institute of Architects
- American Iron and Steel Institute
- Builders Hardware Manufacturers Association
- Canadian Steel Door Manufacturers Association
- Door and Hardware Institute (DHI)
- Factory Mutual Research Corporation
- Hollow Metal Manufacturers Association (HMMA)/Division of National Association of Architectural Metal Manufacturers (NAAMM)
- International Conference of Building Officials
- Intertek Testing Services
- Manufactured Housing Institute
- National Association of Home Builders
- Steel Door Institute (SDI)
- Underwriters Laboratories
- Window & Door Manufacturers Association

Recommended Solution

This condition can often be alleviated by painting the exposed door surface a very light color. However, in extreme cases, blocking the sun’s rays is highly recommended, and may be the only solution.