

described below, a variety of options and devices can serve as non-engineered openings).

- Engineered openings (or covers and devices) that are specifically designed and certified by a registered design professional as meeting the required performance and design requirements outlined below (and, if applicable, the community's building code).
- Engineered openings (or covers and devices) for which an Evaluation Report has been issued by the International Code Council (ICC) Evaluation Service, Inc. (ICC-ES), a subsidiary of the International Code Council, Inc. (<http://www.iccsafe.org>).

The International Residential Code® includes both the prescriptive (non-engineered) alternative and the engineered openings alternative.

The International Building Code® also includes both alternatives by reference to ASCE 24.

The following requirements for installation apply regardless of whether engineered openings or non-engineered openings are used to satisfy the NFIP requirements (also see page 13, Requirements and Guidance for Installation of Openings):

- Each enclosed area must have a minimum of two openings; if there are multiple enclosed areas, each area must have openings in its exterior walls,
- The bottom of each opening must be no more than 1 foot above the higher of the interior or exterior grade immediately under the opening, and
- Any screens, grates, grilles, fixed louvers, or other covers or devices must not block or impede the automatic flow of floodwaters into and out of the enclosed area.

Unacceptable Measures

It is important to note that FEMA has determined that certain measures are not acceptable as flood openings, including:

- Standard foundation air ventilation devices that can be closed manually, because they do not allow for the automatic entry and exit of floodwaters unless they are permanently disabled in the open position.
- Standard foundation air ventilation devices that have detachable solid covers that are intended to be manually installed over the opening in cold weather, because they do not allow for the automatic entry and exit of floodwaters when the cover is in place.
- Standard foundation air ventilation devices that are designed to open and close based on temperature (unless they also are designed to allow for the automatic entry and exit of floodwaters).
- Windows below the BFE, because the automatic entry and exit of floodwaters cannot be satisfied by the expectation that windows will break under rising floodwaters.
- Garage doors without openings installed in them, because human intervention is required to open the doors when flooding is expected. Gaps between the garage door and the door jamb or walls do not count towards the net open area requirement.
- Standard exterior doors without openings installed in them.