

## FEMA Building Guidelines

The following rules are only a few of the federal guidelines established by FEMA. More information, including building plans, materials, and more, are available either by calling 1-888-565-3896 and requesting publication FEMA 320 (titled "Taking Shelter from the Storm: Building a Safe Room Inside Your House") or at the FEMA Safe Room website (<http://www.fema.gov/mit/saferoom>).

### High Winds - Tested with a 3-second gust of 250 mph

- Walls, doors, and ceilings must be able to withstand the peak wind velocity without buckling or separating
- The shelter cannot overturn or slide

### Debris - Tested with a 15 lb. two-by-four wooden board propelled at 100 mph (250mph wind speed equivalent)

- The walls & ceiling of a shelter must resist penetration by a test object

### Other Requirements

- Shelters must have a protected ventilation system
- Shelters should have at least a fire extinguisher, flashlights, a first-aid kit, 8 hours' supply of drinking water, and a NOAA weather radio

### Additional Requirements for Underground Shelters

- Shelters must be watertight and resist flotation due to saturated soil
- Shelters must contain a transmitter of some sort to signal the location of the shelter to emergency personnel, should debris trap shelter occupants



'Storm cellar' that survived a deadly Oklahoma City F5 tornado

## Where Can I Find More Information?



An F2 tornado struck New Hope (Madison Co. AL) on November 24, 2001. This storm shelter remained completely intact while the house nearby was destroyed.

There's much more information available about specifications, pricing options, and other details online. FEMA maintains a general storm shelter information site at

<http://www.fema.gov/mit/saferoom>

The National Storm Shelter Industry standard, along with other industry news, is available at

<http://www.nssa.cc/>

Texas Tech's Wind Science and Engineering Research Center explains the testing process and has a number of links:

<http://www.wind.ttu.edu/>

And of course, for your best source for area weather information and more information on storm shelters, head to our website:

<http://www.srh.noaa.gov/shv>

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**Photo credits:** Front panel, Xenia Damage (inspiration for in-residence shelters): WISE; Wheeler Lake Tornado: Sam Todd (via NWS Birmingham); Underground Shelter: Susan Albert; In-Residence Shelter: Federal Emergency Management Agency; Air Cannon: WISE; Oklahoma City F5: FEMA; New Hope: NWS Birmingham.



## Storm Shelters

**The best way to protect you and your family from tornadoes.**



Department of Commerce  
National Oceanic and Atmospheric Administration

**National Weather Service**

**Shreveport, Louisiana**

**Putting service back into weather**



An F1 tornado struck Limestone County AL west of Athens on December 16, 2000. Luckily, no one was injured or killed. The tornado crossed the Tennessee River at Wheeler Lake, as seen here.

## Why do I need a storm shelter?

You may hear a lot about “Tornado Alley” in the Great Plains, but we have a tornado alley of our own right here in the Mid-South. Consider this:

- Alabama is **13th** in the nation in the number of tornadoes since 1950...
- ...**3rd** in the nation in tornado deaths
- ...**3rd** in the nation for tornado injuries
- ...and **4th** in “killer” tornadoes!
- While just **5%** of all tornadoes in and around Huntsville were considered “violent” (F4 or F5), these storms accounted for more than **75%** of all tornado deaths, and almost **70%** of injuries!

Our area gets hit pretty hard with tornadoes, and the recommended “interior room or closet” may not be enough when a deadly tornado hits. That’s why you should consider building or buying a storm shelter for your family. *It only takes one deadly tornado to make a storm shelter worth the cost.*

## What kinds of storm shelters are there?

The three main types of shelters are designed to help you get protection from severe weather no matter where you live. While each one is designed to keep you and your family safe, each has its own pros and cons:



**Underground:** A modern version of the old ‘storm cellars’, these shelters are usually safe from flying debris and high winds, but are less likely to be occupied if access requires outdoor exposure. Installation can be a problem, depending on the type of rock and the water table in your area.



**In-residence:** These act more like fortified closets, so they are more accessible when a tornado is coming.

They are usually built into a new house using reinforced concrete, reinforced masonry, or wood/steel combinations. Building one into an existing house can be difficult and costly. Alternatives include pre-built metal shelters that are not only easier to install, but can be placed almost anywhere in the house.

**Community:** If a family shelter isn’t an option, community shelters can hold multiple families (from 12 people all the way up to several hundred). Commonly used with manufactured housing areas, these shelters are usually above-ground, exposing them to flying debris, but many more lives can be saved.

## What’s the best storm shelter?

There’s no one authority to tell you what the best storm shelter is, nor can the federal government endorse a specific type of storm shelter as being ‘the best.’ However, safety standards for storm shelters and shelter components have been established by the Federal Emergency Management Agency to ensure that you will be protected in most tornadoes, while the National Storm Shelter Association has also established a shelter standard. The Wind Science and Engineer-



The Wind Science and Engineering Research Center at Texas Tech University tests various storm shelters and their components. One test uses this air cannon, which shoots 15-pound two-by-four wooden boards at shelter walls and doors to simulate flying debris. (Photo courtesy WISE)

ing Research Center at Texas Tech University performs tests on shelters and various shelter components to see if they meet both sets of guidelines. Researchers use a high-powered air cannon to shoot wooden two-by-fours at shelter walls and doors to simulate flying debris, while another test uses a wind tunnel to simulate the high winds and stress that walls would encounter. Depending on the type of shelter that’s right for you, these tests and guidelines can help you choose the shelter that can best protect your family when a *real* tornado hits.