

Measures to help safeguard your greenhouse and its contents

Potential dangers to plants include weather damage, roof collapse and electrical fires.



Storing plants in a greenhouse is an efficient way to help them thrive while protecting them from the elements. However, there are certain hazards a business owner must take into account when deciding the structure of a greenhouse and the materials used to build it.

Potential dangers to your plants can include weather damage, roof collapse and electrical fires. By choosing the right materials for your needs and taking necessary safety precautions, you not only help protect your plants, but also your bottom line.

Materials used in greenhouse construction

The support system of a greenhouse is its frame. Common types of frames include Rigid, Quonset, A-frame and Gothic. Frame materials are typically metal (steel or aluminum), wood and sometimes concrete. The frames are then covered with glass or plastic materials that filter light and allow it to pass through.

See the next page to learn about these covering materials, and use that information as your starting point in choosing the right one for you.



Building style, greenhouse contents and local climate are key factors in choosing a material for construction.

While glass is an ideal material under favorable weather conditions for greenhouses, there are several alternatives depending on the building style, its contents and your local climate. The list below notes pros and cons of glass and several combustible materials considered plastics.

- **Glass** — Glass is noncombustible and used in high structures, usually A-frame and Rigid designs, to allow for the growth of tall plants. In a mild climate, glass is suitable for any greenhouse. However, because it's brittle, severe weather can cause major losses. Glass typically requires reglazing every 10 years to help maintain its strength.
- **Polycarbonate** —Also used in tall structures, polycarbonate is one of the strongest of the greenhouse coverings. It provides impact resistance to hail and other weather damage. In addition to A-frame and Rigid designs, it's also used in Gothic styles. It's nearly as transparent as glass and can last from 10 to 15 years.
- **Acrylic** —Acrylic's tensile strength is roughly the same as that of polycarbonate, but it's not as impact-resistant. As it ages, it becomes more brittle, which may cause it to crack in inclement weather. While acrylic may not be as strong as polycarbonate, it's still much stronger than glass. Acrylic structures may last from 10 to 20 years.
- **Fiberglass** —Fiberglass has the highest ultimate tensile strength compared to other materials. It's found in all common styles of greenhouses and is often used within the end walls of a greenhouse for its strength. There are also fiberglass products rated as fire-retardant that are a better choice for greenhouse construction. Life expectancy varies greatly from three to 20 years.
- **Polyethylene film** —The least expensive of covering materials, polyethylene has several advantages. It can reduce heating costs, resist hail when used in double layers and it's easy to install. The downside is the lifespan is only 18 to 36 months, and it can be susceptible to wind damage. It's used widely in Quonset- and Gothic-style structures, and sometimes seen on A-frames.

Why continuity planning is so important.

Given the perishable nature of plants, environmental changes inside and outside a greenhouse can cause severe losses. That's why it's critical to do adequate business continuity planning. Temperatures must be maintained and monitored for changes with alarms. In anticipation of power outages, preplanning for backup power is imperative.

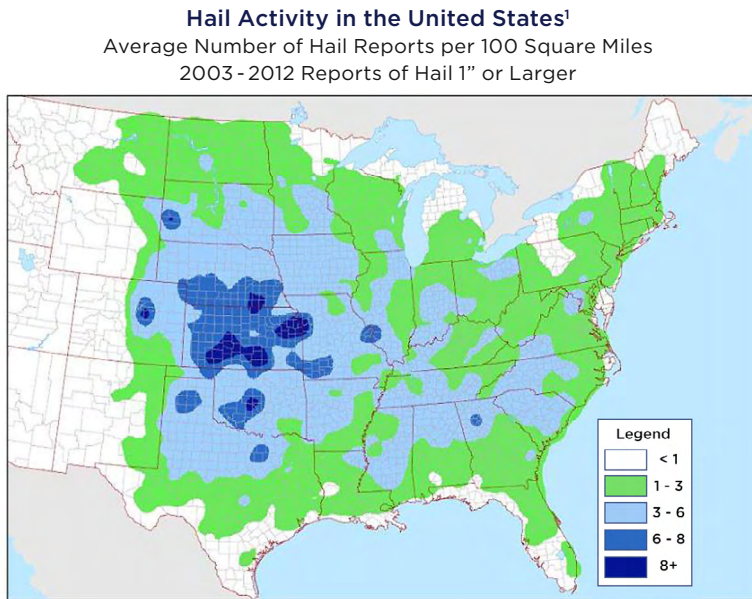
Nationwide® encourages all businesses with greenhouses to use the OFB-EZ Toolkit as their guide to developing a business continuity plan. Click on the picture of the Toolkit or ask your agent or Nationwide Loss Control Services representative for a copy.



Weather considerations

HAIL

A hailstorm can cause property damage to the greenhouse itself, but there may also be severe loss to the stock — highly perishable plants. Materials like glass and acrylic (low-impact resistance) are at a much higher risk in areas that receive strong hail activity, and this should be considered prior to construction.



WIND

During high winds, Quonset-style polytunnels (also known as hoop buildings) can become uprooted and blow away. As this type of greenhouse often has many similar structures nearby, the loss of one may cause a domino effect of losses.

For all building types, more space between structures is needed in high wind-rated geographic areas or if buildings are aligned with prevailing winds. A formal plan should be put in place to minimize storm damage. It may include pre-storm inspections of tree limbs, securing loose outdoor objects and closing vents, louvers and doors to structures.

FM Global has a comprehensive wind map resource available for download. Go to fmglobal.com and enter "Wind Design" in the search bar. In the document, you'll find wind maps for the entire U.S.

SNOW

Snow loading and ice may also play a role in greenhouse roof damage or cause collapse of the entire structure. In areas with high amounts of snowfall, a greenhouse may need a thicker frame and strong glazing materials to support the load.



In areas with high amounts of snowfall, a greenhouse may need a thicker frame.

¹ "Analysis of Hailstorm Frequency," Insurance Institute for Business & Home Safety, disastersafety.org/ibhs-analysis-of-hailstorm-frequency/ (downloaded Aug. 21, 2018)

Fire safety tips

Due to the use of combustible materials in construction, interior finishes and chemical use, ignition controls are imperative. Here are some tips for preventing fire in your greenhouses:

- Build greenhouse structures with ample space from other combustible structures (more than 50' from one-story and more than 100' from two-story structures)
- Organize combustible supplies and limit them to an amount for daily needs only
- Store extra materials, such as cardboards and plastics, neatly in separate structures
- Limit pallet storage to 6' in height, with individual stacks (four pallets per group) separated by at least 8' of space and /or 25' of commodity
- Provide proper containers for flammable liquids, chemicals and soiled rags
- Maintain clearance of materials from breaker panels, charging stations, powered equipment and heating units
- Program HVAC equipment and fans to automatically shut down in the event of a fire
- Ensure all electrical equipment is designed and listed for use in wet environments
- Use hot work permits to maintain safe welding operations
- Monitor temperatures where fertilizer is stored; fertilizers contain highly flammable ammonium nitrate and natural forms of fertilizer create heat through fermentation, which can cause them to smolder
- Place outdoor propane tanks at distances of 10' or more; if indoors, tanks should be in a dedicated room with high-level ignition controls; above-ground tanks should have properly classified electrical in use and be of the double-walled variety
- Prohibit smoking in and around greenhouse areas
- Keep inspection and maintenance logs to record preventive care actions



**Make sure
all electrical
equipment is
designed and listed
for use in wet
environments.**

Providing solutions
to help our members
manage risk.®

For your risk management
and safety needs, contact
Nationwide Loss Control
Services: 1-866-808-2101
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