LEGACY BUILDING SOLUTIONS

CUSTOM TENSION FABRIC BUILDINGS

Elements of Fabric Structures
May 2018 Webinar Q&A

Q. How are these structures rated for fire classification and calculation of required fire flow for fire protection?
Fabric buildings with FR fabric (meeting NFPA 701 Test Method 2) are classified as Type II B buildings.

Q. What is the fire rating?
Fabric buildings with FR fabric are rated as Type II B buildings.

Q. Do you have examples of fabric structures with fire protection (i.e., sprinklers)?
We have several examples of fabric structures with fire protection and sprinklers, including sports centers, hangars, storage buildings and manufacturing facilities.

Q. How does your structure carry fire protection for the type of structure as a hangar use?
Fire protection systems are accounted for and designed into the frame and subframe design on a project-by-project basis. Every building we have built that has a fire protection system has had some specialized frame designs to account for the loads.

Q. You mentioned industrial applications. Any blast design considerations?
We have not built any structures with blast design considerations to this point. We have, however, been in discussions with companies that need blow-out panels incorporated into their design, which is an area that we are working to offer some additional innovations and solutions.

Q. What is the maximum hail size that can be withstood without damage?
That is a difficult question because hail damage can change with size, velocity and shape. Like a trampoline, it is extremely rare that a fabric building experiences hail damage – unlike other building systems.

Q. Are live loads required for roof load criteria?
Live loads as well as snow, wind, collateral and seismic are all part of the many load combinations that are used to design our structures. Additionally, we reduce the 20psf live load when justified by the ASCE and local code enforcement authorities.

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Q. How do these buildings hold up in hurricanes?

The Legacy fabric and fabric attachment system have been tested per the Miami-Dade hurricane missile test and passed. We also have real-world experience and our buildings have performed very well. Each building manufacturer is required to test their specific system to ensure the complete system performs during an extreme weather event.

Q. Do these types of structures with separate panels experience any excessive vibration or "noise" during wind events?

The individual roof panels help to minimize vibration and movement due to the shorter widths of the panels. Additionally, Legacy's patented fabric attachment system creates proper horizontal and vertical tension on the panel to ensure a tight fabric panel long term.

Q. When you have to have openings in the fabric for vents and so forth, how does the weather-tight seal do in the long haul? Any tendency to tear (at corners) after high lateral loads?

Openings in the fabric require backing in the frame to attach to just like in metal buildings. Because the entire endwall is a continuous membrane and tensioned prior to flatbarring and cutting the opening, there is no additional strain at the corners and the opening – eliminating the potential for damage.

Q. What about lateral forces? I do not see any bracing to have structural integrity?

Lateral stability (side to side) is carried by the frames. They are ordinary moment frames so they can resist forces and moments and most often have a pinned base. Longitudinally, it is the roof bracing that carries the wind and seismic loads through the roof into the sidewalls and down into the foundation. We use steel rod bracing but also can use cable bracing for this loading.

Q. Would you explain the detail of the fabric connection to roof supports where it passes over?

The fabric is slid through a channel up and over the building. This occurs multiple times. The panels are connected using a male/female connection to ensure weather-tightness between panels.

Q. Does the fabric function as a diaphragm?

The fabric is flexible and in constant tension, it does not serve as a diaphragm.

Q. How are PV rails attached to the frames?

With the Legacy patented fabric attachment system, the aluminum extrusion is attached to the frame utilizing ½" bolts. This provides a much more durable attachment system than most manufacturers that use tek screws to attach the extrusion to the frame.

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Q. What penalty to the structure do roof-mounted solar panels pose?

All structures mounted with roof solar panels have to account for the increased collateral load. The shape of the solar panel will also greatly affect the snow build-up possibilities and wind flow over the building.

Q. Can fabric go over an existing purlin system?

Typically fabric structures have specialized framing and are designed to account for the flexibility of the fabric. It is not recommended to install over other framing systems.

Q. Are the fabric walls made in one piece?

Typically the fabric walls do not extend past 100-120' in length before a joint is introduced.

Q. What is your largest size building in the past?

Legacy has produced buildings that are up to 220' wide, and we are in the process of producing buildings with wider widths.

Q. Are the panels walkable?

Yes. The fabric is extremely strong and can carry a significantly greater load than an unsupported metal panel. Legacy completed a practical fabric load test in which we placed and drove a 10,000 lb. skidsteer on a suspended panel. See the video here.

Q. Recently fabric structures have been used on occupied roof tops. Do you have any information to share on that kind of use?

Fabric structures have been used in many applications including on occupied roof tops usually as shade structures. The most important consideration for this usage is to ensure that the main building has the capacity to take the additional loads that the fabric structure will apply to it.

Q. What about post-fabrication hot dip galvanizing? This should address the interior corrosion you note on the tubular structure.

It can so long as there are sufficient drain holes in the correct locations to allow the HDG to fully cover the interior of the tubes and drain out.

Q. What type of insulation values do these structures provide for energy code compliance?

Typical insulation used is R-30 fiberglass insulation, which is the same type used in metal buildings. Legacy also adds a fabric interior liner, which provides a seamless vapor barrier as well as a nice, smooth finish on the interior of the building. This also provides for better lighting performance from the lights installed in the building.

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Q. Have you built many fabric buildings in the south and in Mississippi?

We haven't yet built any structures in Mississippi, but we do have buildings in Georgia, Florida, Arkansas, Texas and other southern states. We have installed millions of square footage of buildings in 151 locations and six countries.

Q. Is the use of fabric structures more or less common in any part of the US?

The use of fabric structures is prevalent in all regions of the USA and just about every industry.

Q. At the beginning you folks mentioned a "Guide." What is the title?

I think you are referring to CSA S367, which is a guideline for pre-engineered membrane structures.

Q. Can you make a comparison on the cost for fabric and other structures?

Generally, Legacy structures are comparably priced to conventional pre-engineered metal buildings. Cost savings often become more substantial in clearspan widths over 120' wide.

Q. What is the actual cost of the fabric in general?

Typically the cost of the fabric is similar to metal cladding, however fabric is typically installed more quickly, allows natural light and is non-corrosive.

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