

# Haz-Safe

## Haz-Safe Modular Buildings

Haz-Safe buildings can meet the needs of manufacturers in ways no one else can.



MODULAR BUILDINGS ARE WELL SUITED FOR [PILOT OPERATIONS](#) AS WELL AS [LARGE-SCALE MANUFACTURING](#).

Protecting people and processes in connection with hazardous materials has always been important. Maintaining safe operating conditions, however, has been made more challenging because of a business climate that places a premium on just-in-time supply as well as the ability to switch product lines, manufacturing locations or both in response to the ever-changing demands of the marketplace.

Meanwhile, many companies are under significant capital constraints, whether it's in the chemical, pharmaceutical, petrochemical, food or defense industries. That means investments in physical assets must generate a favorable return in both the short and long terms.



Haz-Safe buildings can be installed quicker than brick-and-mortar solutions.

HAZ-SAFE CAN MEET SAFETY REQUIREMENTS IN A MORE EFFICIENT AND EFFECTIVE MANNER.



Most of all, companies and their employees must have confidence they can perform their work in a safe environment, whether it's protecting them from explosions, fires, dangerous noises, chemical spills or extreme temperatures that can occur during the manufacturing, testing, mixing, dispensing, transportation and storage of hazardous materials.

Haz-Safe hazardous materials buildings can meet the needs of today's manufacturers in ways no one else can, offering solutions that are:

- flexible;
- cost effective; and
- meet or exceed industry and regulatory standards.

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## Introduction

New product launches, plant expansions and inspections resulting in unsatisfactory reviews from regulators or customers are just some of the reasons why manufacturers upgrade or take a fresh look at the buildings and the safety systems in them for the handling of hazardous materials.

Traditionally, manufacturers turned to architects to design brick-and-mortar buildings to address their concerns. Today, Haz-Safe modular buildings are meeting safety requirements in a more efficient and effective manner.



### Haz-Safe U.S. Patent Portfolio

#### [Modular Bolt-Up System:](#)

5,191,742  
5,285,617

#### [Overhead Rollup Door Installation Method:](#)

5,301,479

#### [Joining/Aligning Sleeve:](#)

5,396,742

#### [Blast Shaft:](#)

6,223,473

#### [Sloped Sump Floors/Trench:](#)

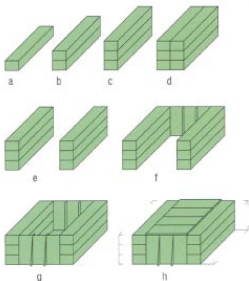
6,305,131 B1

#### [Posi-Ventilation System:](#)

7,565,773 B1

#### [Fire-Rated Walls:](#)

7,934,349 B1



Haz-Safe's patented [building block system](#) provides manufacturers with flexibility.

## Flexible Solutions

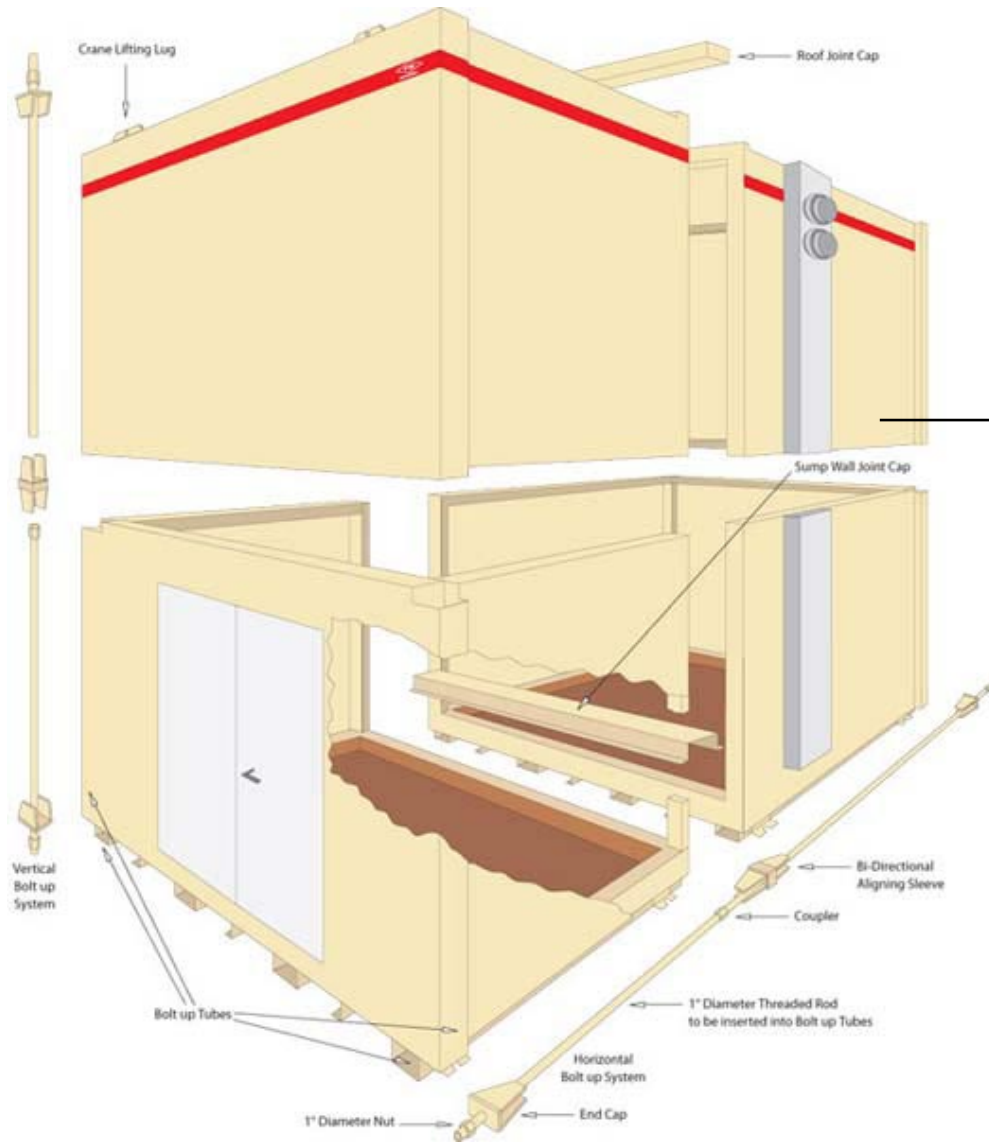
Haz-Safe [modular buildings](#) offer a high degree of flexibility, making them ideal for everything from small batch manufacturing to large-scale operations.



Pilot facilities can begin with one modular building and easily add additional buildings as manufacturing volume increases. Large-scale manufacturing operations, meanwhile, can break up their processes into a series of smaller processes, enhancing safety while minimizing the impact of incidents within the plant or natural disasters. Moreover, Haz-Safe modular buildings offer greater production flexibility for downtime cleaning, maintenance and trial modifications for process improvements.

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PATENTED  
[BOLT-UP SYSTEM](#)  
 CAN JOIN BUILDINGS  
 FROM SIDE TO SIDE  
 AND FROM TOP TO  
 BOTTOM.



Modular units loaded into C-130 for trip to Aleutian Islands.

Haz-Safe buildings are not set in concrete ... literally ... and are not forced to stay at the location where originally installed. As a result, they can be taken apart and moved to the other side of the site, across the road, to another city, state, etc. That's not possible with a brick-and-mortar building.

In fact, Haz-Safe buildings can be shipped almost anywhere in the world. For example, Haz-Safe supplied the [U.S. Coast Guard](#) with a building for Attu on northwestern end of Alaskan Aleutian island chain. The modules were shrink-wrapped, placed in wood crates and shipped from Haz-Safe's plant in Ohio via tractor-trailer to Seattle. They were then transported by barge to Anchorage, Alaska, for loading onto a C-130 aircraft for the last leg of the journey.

Haz-Safe can also design buildings that fit through doors measuring as little as 7-foot square. ["Knockdown" modular buildings](#) are shipped to client sites intact and then disassembled into a series of panels, which can easily fit through small openings. This enables Haz-Safe buildings to be used in confined spaces or hard-to-reach locations, avoiding costly modifications to existing facilities. When reassembled, knockdown modules enjoy the same structural integrity and safety ratings as similar Haz-Safe buildings.



Walls of "knockdown" building are maneuvered through door measuring 7-foot square.

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## Cost Effective

Haz-Safe modular buildings provide a “speed-to-market” advantage, enabling manufacturers to generate revenue sooner and minimize costs in the process. That’s because the buildings are manufactured at the Haz-Safe plant, not the customer’s site.

Because of controlled shop conditions, Haz-Safe can supply more accurate cost estimates earlier in projects than brick-and-mortar buildings, giving decision-makers greater confidence during project formulation and funding stages. Furthermore, the buildings can be custom designed to plug into existing utility connections.

Because Haz-Safe buildings are constructed in a controlled environment, waste at the customer’s site is significantly reduced compared to brick-and-mortar buildings. Haz-Safe achieves a wind- and water tight environment because each module, before leaving the factory, is shrink-wrapped to maintain cleanliness.

Modular buildings can also reduce construction time because of parallel construction. While the Haz-Safe buildings are fabricated at a Haz-Safe plant, the foundation can be poured and prepared at the customer’s site. That’s not possible with the sequential construction process inherent with brick-and-mortar buildings.

Buildings are tested before shipping, minimizing disruption at the customer’s site. And prefabricated buildings from Haz-Safe also reduce staging area requirements and possible installation delays because of inclement weather.

The efficiencies from fabricating buildings at Haz-Safe’s plant, not the customer’s site, can have a significant impact on the bottom line for manufacturers.

Simple things, such as Haz-Safe’s decision to place the hinges at the bottom of its [blast panels](#), can have a meaningful financial impact, too. If a blast were to occur in a Haz-Safe building, the energy can be directed upward through a patented shaft ... instead of outward. As a result, Haz-Safe buildings can occupy less space or fit in places others can’t. This makes efficient use of a customer’s manufacturing footprint, which is at a premium in older plant sites that often have little room to grow.

HAZ-SAFE BUILDINGS  
ARE CONSTRUCTED  
IN A CONTROLLED  
ENVIRONMENT,  
MINIMIZING DELAYS  
AND WASTE.



[Blast panels](#) hinged at bottom enable explosive energy to be directed upward.



OPEN BOTTOM  
ALLOWS RAIN AND  
SNOW TO PASS  
THROUGH LEFT BLAST  
SHAFT. RIGHT SHAFT  
SHOWS RELIEF  
PANELS WHEN  
EXPLOSION OCCURS,  
FORCING BLAST  
EFFECTS OUT  
OPEN TOP.



Patented [blast shafts](#) enable buildings to be placed close to existing facilities.

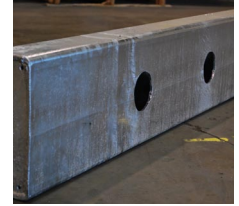
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## Safety Measures

Since the company was founded in 1991, Haz-Safe has constructed its buildings with frames made of tubular steel covered in 10-gauge plate steel. The result is a strong, continuously welded building that is wider, longer and taller than units made of steel studs because tubular steel has a higher strength-to-weight ratio than even beams and channels. As a result, the use of tubular steel creates a significantly safer structure.

PATENTED  
[POSI-VENT TUBE SYSTEM](#) REMOVES  
HEAVIER-THAN-AIR  
FUMES FROM SUMP  
UNDER FLOOR  
GRATING.



Openings in the underside of [Posi-Vent tube system](#) enable fan system to draw heavier-than-air fumes into tube.

The hollow portion of tubular steel enables Haz-Safe engineers to implement multiple innovative safety measures. For example, the interior is used to remove heavier-than-air fumes from the building through a patented Posi-vent tube system.



Fusible link drops down fire-rated shutter.

The inside of tubular steel also accommodates Haz-Safe's patented [bolt-up method](#) for joining the modules together. Bolt-up rods are hidden inside the structural tubular frame both horizontally and vertically so that the exterior and interior surfaces are clear and free from unsightly exposed flanges, nuts and bolts. In addition, this bolt-up method can withstand the impact of an explosion better than traditional approaches because the sag in the bolt enables it to act as a shock absorber.

Furthermore, the void inside the tubes can be filled with rebar and cement, adding to the strength and durability of modular buildings, if needed.

Tubular steel construction also enables the installation of crane hoist systems in Haz-Safe buildings, allowing workers to safely stack pallet loads or tote tanks, minimizing risk of ergonomic injuries.

Haz-Safe's patented wall construction methods also enable its buildings to meet stringent standards for fire and explosion safety.

In fact, Haz-Safe wall construction is Factory Mutual approved for 1, 2 and 4 hours. Furring strips are attached horizontally across the vertical tubular steel frames on one side of the wall. As a result, this provides fire protection inside the building. In addition, layers of [fire-rated gypsum panels](#) hold the furring away from the vertical members, creating a thermal or sound break between the inner and outer surfaces of the wall, dramatically slowing down heat or noise from penetrating the wall.

The gypsum panels, meanwhile, have a [white porcelain ceramic finish](#), which reflects not just 95 percent of light but also radiant heat. This protects the steel protecting the fire-rated gypsum, adding to the time of the fire rating of the



Demonstration model shows bolt-up hardware.

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HAZ-SAFE WALLS ARE FACTORY MUTUAL APPROVED FOR FIRE RESISTANCE UP TO 16 FEET HIGH.

walls. Porcelain ceramics are so effective in high-heat applications that they are used as a part of spark plugs within combustion chambers and catalytic converters where gasoline “explosions” and hot gases are constant.

In terms of aesthetics, porcelain is the most permanent color finish available on metal. It's impervious to aging, industrial pollution and the weather. It is stain proof, non-porous, non-absorbent and highly resistant to most acids.

Haz-Safe's fire-tested approach for the manufacture of vertical wall members is so effective that it is Factory Mutual approved up to 16 feet high. Competitive technologies can reach no higher than 9 feet.

Haz-Safe buildings are also Factory Mutual approved for [blast protection](#), meeting the 215-pounds-per square foot requirement established in 2009.

In fact, Haz-Safe makes walls that can withstand more than 400-pounds-per-square foot of percussion.



[Porcelain ceramic steel finish](#) benefits form and function of Haz-Safe buildings.

MANUFACTURED IN A CONTROLLED ENVIRONMENT, HAZ-SAFE BUILDINGS OFFER EFFICIENCY AND SIMPLICITY.



### Conclusion:

Whether it's fitting a modular building through a 7-foot door or shipping a unit half way around the world, Haz-Safe hazardous materials buildings can meet the varied needs of customers who use hazardous materials in their processes ... especially in today's “just-in-time,” capital constrained manufacturing environment.

Haz-Safe modular buildings are ideal for customers with pilot facilities while also offering them the ability to add buildings as demand increases. Large-scale manufacturers can use separate Haz-Safe buildings to isolate materials and processes, enhancing safety and the prospects for business continuity. Moreover, Haz-Safe buildings can be moved from location to location, offering a significant degree of flexibility.

Use of Haz-Safe buildings, meanwhile, can help clients generate revenue sooner and reduce costs in the process because the custom-designed structures are manufactured in a controlled environment, minimizing waste and disruption at the client's facility while enabling parallel construction. Haz-Safe's patented upshaft blast technology enables its modular buildings to occupy less space.

The use of tube steel, meanwhile, makes Haz-Safe buildings stronger and safer than ordinary construction methods. And Haz-Safe's wall construction meets Factory Mutual standards for fire and blast protection, giving manufacturers comfort that they can protect people and processes involved with the handling of hazardous materials.

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