STEEL BUILDING INFO GUIDE

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Free Steel Building Guide

Steel buildings, also called prefabricated or pre-engineered steel buildings, have been popular for decades for uses such as storage, warehousing, airplane hangars, retail and complexes for sports, recreation and entertainment. Today they offer outstanding flexibility and have been adopted for all manner of uses, from garages to small shops, workshops and craft space, and even homes and churches!

Modern steel buildings have come a long way from the simple structures of the past. They're supremely customizable, and can even be made to look like any kind of conventional building you like. Explore this free guide to steel buildings and learn what they have to offer, their strength, customizability, and why they're good for any use you might have, from storage to extra living space.

A Brief History of Steel Buildings

As popular as steel buildings are, many buildings you see that appear to be steel construction are, in fact, wood-frame buildings that are just wrapped in sheet metal. They're traditional structures trying to take advantage of the aesthetic of steel, but without gaining any of the practical benefits.

Full steel buildings first became popular in the early 20th century. At this time the steel industry boomed, and it became a building material of choice due to its sheer tensile strength, and its cost efficiency. Later in the century, computer software came into existence that could effectively design steel trusses and full buildings. Such software would expand the capabilities and utility of steel buildings. This allowed them to be designed to handle different loads, and even allowing for clear-spans of up to 300 feet.

Advantages of Steel Structures

The advantages of steel are numerous. It's extremely cost-effective, with the time and expense of erecting a steel building greatly reduced from conventional construction costs. A steel building, in fact, can be erected in just days or weeks, while an equivalent wood-frame building might take months, even longer than a year to erect. Since many of the elements of a steel building are prefabricated and designed before they are brought to site, overall costs of construction can be reduced by up to 60%.

Steel also offers superior weight-to-strength ratio, and can support a great deal of stress without the need for support struts or pillars. In addition, steel does not burn, warp, shrink, rot or crack — it's far more structurally sound than wood. In addition, there are no pests that will infest steel. You need not worry about bore bees, termites, carpenter ants or any other damaging infestation. It doesn't breed mold, and it doesn't emit volatile organic compounds. Whatever the environment sends against it, steel can handle it. It's also exceptionally low maintenance, as a result of its sheer strength and durability.

Adding an additional cost-savings element, all of these factors together can result in reduced insurance costs of up to 40%, and some manufacturers can offer structural warranty on the building that will be good for up to 30 years. Finally, they're supremely customizable and can be made with a façade to look like any other kind of building material. Whether you want it to look like stone or brick, or add any kind of siding you like, it's all available.

Because of all of these reasons, steel has become the number one choice in the market for a building material.

Eco-Friendly Building Material

If you're looking to go green with your construction, you can't beat steel as a material. It's an incredibly eco-friendly material. Many buildings are processed using recycled steel, which has the unique ability to retain all of its properties when reused and recycled. There's no deterioration or weakening in second- or third-generation steel products. In addition, consider that up to 50 trees can be used to build a 2000-square-foot building, whereas if you use steel, the same building can be erected by recycling six scrapped automobiles.

Some have criticized the steel industry for creating carbon emissions. In truth, the steel industry has been a leader in developing technologies to create and further environmentally-friendly methods of manufacturing. They have reduced carbon emissions significantly, and many other industries have adopted techniques pioneered by the steel industry.

Types of Steel Buildings

There are a broad variety of straight-wall and arched steel buildings available, each with its own uses. These include rigid frame buildings, open web truss, Quonset huts, hybrid buildings, tube frame and light gage frame buildings.

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Rigid Frame Structures

Rigid frame structures are also called I-beam buildings or red iron buildings. They are most commonly used for industrial and commercial applications. Rigid frames are set on piers or footing, and are often situated on optional concrete slabs. Trusses are normally placed on 25- to 30-foot centers. Erecting these kinds of buildings requires heavy equipment, as the trusses are bolted together before being lifted and put in place.

Secondary framing members on a rigid frame building are made of large C's or Z's, and are placed every five to seven feet, and sheet metal is connected using stitch screws, where there is no available secondary framing.

The problem with rigid frame structures comes in that while they can be designed to withstand many snow and wind loads, their shallow roof pitch can create zoning issues, unless the buildings are on industrial land. These pitches are generally between 0.5:12 and 2:12, and the frames are available with clear-spans of up to 300 feet. They can, however, be erected quickly and are available in a broad range of colors. Depending on the manufacturing, some drilling and field welding may be required.

These buildings are best for sporting arenas and other large commercial uses. They are exceptionally cost-effective as non-insulated, large buildings, but if they aren't insulated, they might sweat, which can cause dripping and condensation inside.

Open Web Truss Buildings

The open web truss construction style was first created in the 1950s. It's commonly seen structured around a bar joist in large retail stores because of the strength these joists offer. When used in this fashion, they make buildings much easier to construct.

The roof pitch for these structures ranges between 4:12 and 3:12 in general, but it can be designed to support a pitch of anywhere between .5:12 through 12:12 without sacrificing any truss integrity. In fact, the ability to have steeper roof pitches allows these buildings to much more easily be erected in residential areas.

The overall weight of building materials in an open web truss structure tends to be heavier than in other steel buildings, but the placement of the secondary framing on two-foot centers, and the close bay spacing of the trusses results in unparalleled strength and rigidity to stand against snow and winds. The steeper roof pitch also allows for multi-floor structures for storage, living space, or the height for heavy equipment like hoists and automobile lifts.

These sorts of buildings are ideal for interior finish work. Such designs tend to have stiffer standard deflections than other types of steel buildings, and a wide range of exterior finishing materials, sidings and facades are available. Windows and doors can be located during construction for perfect arrangement, and the style allows for superior strength and bay spacing.

If there is a limit to an open web truss design, it's that there is a 100-foot width clear-span. If more space is required, however, half-trusses and self-supporting overhangs can be added to accommodate such needs.

Quonset Huts

Quonset huts are also called arch buildings. They possess a curved or rounded shape, and are best known for their use as military barracks. However, today they are used in just about every application you can imagine, including garages, barns, hay storage, livestock shelters, and even residential homes. If there's a type of steel structure with virtually limitless possibilities, it's the Quonset hut.

They are usually less expensive than other varieties of steel buildings, making them perfect for do-it-yourself projects or for those in need of an outbuilding fast without putting an undue strain on their wallet. These buildings have a wide variety of available options in terms of size, type of steel, thickness, tensile strength, and coatings. Most come with a rust warranty ranging up to 30 years, and like other kinds of steel structures they can be finished to look like a conventional building if you like.

Hybrid Structures

Many steel buildings on the market today are hybrid buildings. They combine the strength of an open web truss, and combine it with lumber to create a wood secondary frame. This offers a unique, cost-saving versatility to construction. The secondary frame eliminates issues of condensation and creates a natural thermal break. The primary web truss frame still maintains the strength benefits of this form of building.

Some people prefer wood for the ease of custom interior finishes, and appreciate how easy and inexpensive it is to insulate these buildings. In fact, these hybrid structures are unique in that they can be insulated either when erected, or in the future. It's an outstanding alternative to a pole building and features rigid-frame wood trusses combined with heavy steel frames spaced 25 feet apart, and a secondary framing comprising five- to seven-foot centers.

It shares the same limitation of an open web truss, that it has a maximum clear-span of 100 feet.

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Tube Frame Structures

These buildings, in general, are used for carports, garages and RV covers. They are, however, seeing increased use in fabric buildings. They are constructed of galvanized steel or aluminum, tend to be very lightweight, and are appreciated by budget-minded consumers in need of a storage shed or inexpensive garage. Fabric buildings on tube frames are often used for riding arenas and grain storage areas. However, they tend to have shorter warranties and don't carry the same strength as other varieties of steel structures.

Light Gage Frame Buildings

Light gage frame buildings are most often used for light utility storage or mini storage areas. Such buildings are generally comprised only of secondary framing members, which are screwed together to form a truss system or walls. If a foundation is used, it is generally a simple slab. Some packages are designed to go up very fast, and they're extremely cost-effective. Their limitations are that they have very low clear-span widths, there are limited options available, and they don't have the tensile strength of other forms of structure.

Steel Building Maintenance Requirements

One of the most important advantages that steel buildings offer is their lack of required ongoing maintenance. In fact, the maintenance on these buildings is so low that they are often legitimately called maintenance free. Steel doesn't rot, warp or split like wood. It's not vulnerable to infestation by termites, carpenter ants, bore bees or other pests. The steel on such structures is specially treated to resist rust for decades, with warranties ranging up to 50 years depending on the building and manufacturer.

Insulating a Steel Building

One of the major downsides of steel buildings is that — if not properly insulated — they are subject to condensation and dripping. The right insulation provides an important thermal break and vapor barrier that's required to mitigate this risk. There are a number of ways to accomplish this effectively.

The key to proper insulation is what is known as the R-value. This is a measure of the thermal resistance used in the building, or a measure of the insulation's ability to mitigate heat loss under specific test conditions. There are R-value standards across the construction industry. When insulating a steel building, the most popular method to achieve the desired R-value is the use of traditional fiberglass blanket insulation placed between the secondary framing and sheet metal.

Other options for insulation include rigid board, spray foam and reflective insulation. Each has its own unique characteristics, and each performs differently, being ideal for specific regions. Radiant heat can be combined with insulation and makes uses of a hot water system running through the concrete flooring, slab or foundation.

Steel Building Planning Guide

There are many things to consider when you're undertaking any new building project. These include your budget, your time frame, your aesthetics, the design you want, the supplier you use, warranties and more. Before you even begin building, you'll want to sit down and create a detailed plan of action which will allow you to avoid unpleasant and unexpected surprises, and get the most out of your new structure.

Budgeting Your Purchase

When creating your budget, there are a number of factors to consider. There will be land costs, the costs of building permits, labor costs, the cost of the building package itself, insulation costs, and the costs of building.

The base cost of erecting a building will range from $6 to $11 per square foot. Creating a foundation will run between $4 and $9 per square foot, and the cost of erecting the building can run anywhere from $3 to $10 per square foot. Accessories and incidentals can run anywhere from zero cost to up to 30% of the total building cost or more.

Time Frame

Time frame considerations revolve around when you plan to use the building, and how quickly you need to have it erected. In general, the entire process of constructing a steel building — from placing your order, through design, fabrication and delivery — can take anywhere from six to eight weeks, if you're working with a reputable company. That means if you need to be up and running within three or four months, you should start the process right away. While the pricing of steel can fluctuate, most reputable builders will offer price protection through delivery.

Design Requirements

Before you place your order, check local building codes. While most steel buildings can be created and designed to suit just about any building code, it's important to know the regulations and statutes you need to follow. In addition, local codes may limit your options in terms of budgetary considerations and what's practical.

Once you've educated yourself on building codes, snow and wind load requirements and the like, you'll need to determine whether you're going to build it yourself. If so, you'll need to make sure that your building is designed for DIY construction.

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Functionality

Of course, you'll need to be absolutely clear about what you need from your building. Make a note of the exact dimensions you need — length, width, internal area and the like. Will you eventually need to expand the building? What doors and windows will you want? How large will they be and where will they need to be situated? What function will they serve? Do you need walk doors? Overhead doors? Ventilation windows? Large windows for lighting and view? Do you need insulation for the building, and how will it be heated and cooled, if at all? What roof pitch do you need?

Consider all of these factors and others to be sure your design meets your exact needs. One of the greatest benefits of a steel building is that it can be designed exactly to your specifications.

Warranty Considerations

Steel buildings are outstanding for their lack of ongoing maintenance needs. That being said, you'll want to be sure that your structure is properly warranted. Make sure that the company with whom you work offers a solid warranty plan. These can range anywhere from one year to 50 years, depending on the kind of building and the specific design elements.

Choosing the Right Company

There are tons of steel building manufacturers on the market today, and far too many use pressure tactics and dishonest tricks by their salesmen to close a deal. They might try to pass off a canceled building as an outstanding deal that you can get if you buy right now when, in fact, this is just a trick to get an unwanted product off their hand.

In reality, if a company is pushing a canceled building on you, the question you should ask is why they're saddled with canceled buildings to begin with. In addition, if a company waffles on delivery time, that's a red flag. You should always be given information about the complete package you're getting, including framing, sheet metal, trim, closures, framed opening materials, and fasteners. If you're also buying doors from the company, make sure you have complete information about the kind of doors you're getting.

Certainly you're interested in the cost, but that shouldn't ever be your first consideration. Putting cost ahead of other questions will often result in you getting a final product with which you won't be satisfied. There are many different options and styles available with steel buildings, and you need to ask the right questions to get the best results. In the end, always remember that you get what you pay for, and going with a discount provider is generally going to end up with you getting a substandard product.

For more information, or to place your order for a steel building, contact Metal Pro Buildings today!

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