BUYING A WALK-IN COOLER OR FREEZER

When making a decision on which walk-in cooler or freezer to buy, there are many things that must be considered. In the following guide we hope to go through all these considerations and provide you with the information you need to make an informed decision.

Index:

What is Important to You:

Most walk-in coolers and freezers manufactured today are constructed of foam insulation bonded between two sheets of sheet metal and come equipped with cam locking devices to allow the assembly of the panelized walk-in on site.

There are a few companies that also provide a completely assembled unit that is delivered on a truck and dropped off at your location. These are usually for outside the building installations. Refrigeration systems are also usually provided in several types of configurations along with the walk-ins. These systems will be explained later.

All walk-ins coolers and freezers are designed to keep the products inside cold.

When considering the purchase of a walk-in you most likely will be looking for the following things.

1. A walk-in that will keep your product at the desired temperature whether cooled or frozen.

2. A walk-in that can be installed in a quick and professional manner and not have delivery and installation problems that can negatively impact your business.

3. A walk-in that is easy to use. The door should be easy to operate and the temperature and light switch easy to use.

4. A walk-in that uses as little energy as possible to get the job done and still keep your product at the desired temperature.

5. A walk-in that lasts a long time without structural or degrading door, insulation or metal problems.

6. Once the above are met you want to spend as little as possible to buy, install and operate your walk-in.

What you really want is value in your walk-in purchase.

Make you decision on your needs and not what someone is trying to sell you. After all, customers' needs are not the same, one product does not fit all.

Materials:

Insulation Materials:

Since the implementation of the new Energy Independence and Security Act of 2007, which was implemented January 1, 2009, there are two particular insulation materials being used in walk-in Coolers and Freezers. These are Extruded Polystyrene and Foamed-In-Place Polyurethane insulations. Each insulation is constructed of gas filled cellular plastic foam and each brings with it different benefits to the customer.

1. Extruded Polystyrene

This insulation is used also in insulating underground concrete foundations and floors. It has a high initial R-value (R-32) and has a great moisture resistance and ability to retain around 47% of its R-value (or R-15) over the life of the product. It has great structural strength of up to 4 times that of polyurethane and expanded polystyrene. It is a little higher than expanded polystyrene insulation but about the same as polyurethane insulation. It is better than expanded polystyrene and polyurethane insulation if overall performance is considered. It is an insulation that will continue to pay dividends in energy savings for as long as you own the walk-in.

2. Polyurethane

Polyurethane is among many other things used as packaging foam and in the construction of walk through outside residential and commercial doors. It has a high initial R-value (R-32) but is less capable of moisture resistance and R-value retention. It can only retain around 19% of its initial R-value (or R-6) over the life of the product. It is a good insulation for manufacturing products that include intricate parts that need to be bonded together. Polyurethane has been used in the manufacturing process of walk-in coolers and freezers for many years.

Metal Skins:

Walk-ins come with several different types of skins depending on what the customer desires. Each of these skins provides different benefits to the customer.

1. G 90 Galvanized

This metal used to be the most popular choice for walk-ins but with its exorbitant increase in price over the last two years it has lost popularity. The G90 depicts the type of galvanizing with G60 having less resistance to corrosion than G90. G90 is the minimum needed in producing a walk-in cooler or freezer. It used to have the advantages of being reasonably priced but has become sensitive to price fluctuations. It is strong and more dent resistant than aluminum. Its disadvantages are the increase in price and the fact that it can develop “white rust” if it is not handled correctly in installation and if caustic cleaners are used. Once white rust has formed it can turn into red rust if not treated. G90 can be stucco embossed making it even stronger and also give it the aluminum embossed look that is sometimes desired in the market. G90 is usually provided in 26-gauge minimum thickness for walls and ceilings and a 16-20 gauge thickness for floors. Note that G90 galvanized floors are not approved for manufacture by the National Sanitation Foundation for food service applications. Galvanized floors however can be used if quarry tile is installed over the floor before use.

2. Aluminum

Aluminum as a raw material is more sensitive to price fluctuations. It is very resistant to corrosion except for salt spray and is not as strong as other metals and can dent very easily. Aluminum is usually provided in 40-60 mill thickness for walls andceilings and 100-120 mill thickness for floors. Sometimes aluminum floors are 1/8th-inch thick and diamond tread-plate embossed to add further strength. Most of the time aluminum for walls and ceilings are stucco embossed to increase their strength.

Metal Skins (continued):

3. Galvalume

Galvalume is steel coated with a combination of aluminum and galvanizing material. It has the strength of steel but is twelve times more corrosion resistant than galvanized. It is usually provided in a 26-gauge minimum thickness. It has a gray look that is usually embossed to make it look more appealing. Now, it is generally less expensive than both aluminum and G90 galvanized. If value is desired it is the product of choice.

4. Painted G90 Galvanized

Painted galvanized is more expensive than Galvalume but is more resistant to corrosion and has the benefit of providing a choice in color for customers who want the painted look. NSF must approve the paint system used for the walk-in to be NSF approved.

5. Stainless Steel

Stainless steel is the most expensive of all metal skins normally used in walk-in construction. It is the strongest and least corrosive of all the metals and usually comes in 24-gauge thickness. It comes in different polishes such as brushed and polished. Most walk-in coolers come with the brushed look to reduce the visibility of scratches.

Refrigeration Systems:

Refrigeration systems consist of a condensing unit and an evaporation coil. The condensing unit is located outside the walk-in and the evaporator is located inside the walk-in. The compressor compresses gas to a liquid. The liquid is then pumped through the condensing unit coil while a fan blows outside air through the coil. Gas is condensed to a liquid and is then pumped through a small copper pipe into the walk-in to the evaporator coil. There, through the expansion valve located in the evaporator coil the liquid is allowed to expand back into a gas. The expansion of the liquid to a gas causes a rapid chilling of the evaporator coil. Since heat always flows toward cold, inside the walkin air is blown across the evaporation coil to let the coil absorb heat from inside the walkin. The gas is then allowed to exit the walk-in through a larger copper pipe to the condensing unit where it is once again compressed and cooled to a liquid state and returned to the evaporator coil inside the walk-in. There the cycle is started over.

The new EISA law requires all new walk-ins be equipped with high efficiency motors to be compliant. These cost a little bit more but save you money in the long run. Some suppliers may try to sell you non EISA compliant refrigeration systems. To be compliant with the law and purchase the best lifetime value always ask for EISA compliant equipment.

1. Remote Systems

Remote systems are the least expensive systems to purchase. They consist of a condensing unit, evaporator unit and misc. parts such as expansion valve, site glass, dryer, pump down solenoid thermostat, and on freezers a timer and drain heater to install the system. They require the use of a licensed refrigeration installer since they are pumped down and charged with refrigerant gas on site. The installer will also charge for any other parts needed for the install such as copper pipe, pipe insulation, connectors, and electrical. They are less expensive systems to buy with the walk-in but may cost more over all depending on what the going hourly rate is with the installer and the cost of the parts he provides. They also provide an advantage by allowing the condensing unit to be located outside the building. There the condensing unit can dump its heat without adding extra heat to the building and air conditioning systems.

2. Pre-Assembled Remote Systems

Pre-assembled Remote Systems are the same as Remote Systems except all the parts are shipped installed on either the condensing unit or the evaporator coil. Pre-assembled Remote Pre-charged systems come with the condensing unit, the evaporator coil and line set (copper pipes that connect the two units) charged with refrigeration gas. A licensed refrigeration technician will be needed to install the refrigeration system. These systems may or may not be less expensive depending on the cost of the system, the refrigeration service and electronics service charges.

Refrigeration Systems (continued):

3. Standard Top Mount

Top Mount Systems are self-contained refrigeration systems. They come with all parts, copper lines and refrigeration gases completely installed. A licensed refrigeration technician will be needed to install the refrigeration system. The only downside to these units is that the evaporator hangs down inside the walk-in taking up shelf space and head room in small walk-ins. Some units come with low profile coils that help but do not eliminate this problem.

4. Side Mount Refrigeration System

Side Mount Refrigeration Systems are the same as Top Mount Refrigeration Systems except they are installed on one of the wall panels with bolts that go through the refrigeration plug and wall panel and are attached with nuts on the inside of the walk-in. They also require that a condensation drain hose be connected to a drain nearby. A licensed refrigeration technician will be needed to install the refrigeration system. One downside is that you lose shelf space where the evaporation unit extends inside the walk-in.

5. Saddle Mount Refrigeration System

Saddle Mount Refrigeration Systems come completely pre-assembled on a bracket that is designed to be mounted over the top of one of the wall panels. These systems must be installed on a panel with slots cut in the top to allow the bracket to go through the wall. These systems are hung over the wall before the installation of the roof. A licensed refrigeration technician will be needed to install the refrigeration system. These units also have the evaporator coil that hangs from the top of the panel but it is more toward the top and doesn't interfere with the shelving as much as a side-mount unit.

6. Penthouse Refrigeration System

Penthouse Refrigeration Systems are like Standard Top Mount Systems except they do not have an evaporator coil sticking down inside the walk-in. The air inside the walk-in is drawn up through the evaporator coil located with the condensing unit on top of the walk-in to be cooled. A licensed refrigeration technician will be needed to install the refrigeration system. These systems sometimes seem higher in upfront cost but when all things are considered including the fact that they are factory assembled and don't take up space in the walk-in it is less expensive in the long run.

7. Roll Up Refrigeration System

Roll up Refrigeration Systems are much like Penthouse Refrigeration Systems except they are rolled up to an opening in the side of the walk-in and attached to the unit. One difference is that even though the evaporator coil is located outside the unit it takes up shelf space inside the walk-in because shelving should not be installed in front of the unit. A licensed refrigeration technician will be needed to install the refrigeration system.

Now that you know all about these units don't let it be confusing. To simplify the selection of refrigeration system, first decide whether allowing the condensing unit to dump heat into the building is unacceptable. If it is then a remote unit is the correct choice. Whether it is pre-assembled pre-charged should be decided by evaluating the difference in cost of having it done in the field or at the walk-in plant.

If dumping the heat inside the building is not a concern then choosing a self contained side mount or top mount refrigeration system verses a penthouse or rollup refrigeration unit should be decided by how important the space in the walk-in is to you. If space is important then a penthouse unit is the choice. If space is not a big consideration then side-mount, top mount or rollup unit may be the choice.

Whatever the refrigeration system you chose it is important to check the efficiency of the unit and the manufacturer's warranty to make your final choice.

Refrigeration Systems (continued):

The key to determining the proper refrigeration load requirement for any box rests on two general items:

1. Product Load or Internal Heat Load

This would include incoming temperature of product being stored, heat of respiration of product being stored, any change of state of the product (freezing), and any heat given off by lights, motors, people, etc.

2. External Load

This would include any air infiltration load, radiant load through walls, ceiling, floors, etc. Ambient temperature or ambient temperature difference from external box temperature to internal box temperature can have a significant impact on the load required.

On walk-in coolers for example, the difference in wall and infiltration loads from an 80°F ambient to a 90°F ambient is approximately 18-20%. From an 80°F ambient to a 100°F ambient that difference increases as much as 30%. See table 1.

Table 1

Data from Russell's Engineering Manual

Walk-in Coolers
BTU/Hour Wall and Infiltration Losses

BTU Per Hour Wall & Infiltration Losses				
Cooler Size	Average Temperature			Average Product Load
L x D x H*	80°	90°	100°	BTU/Hr.
8 x 6 x 9	3,430	4,200	4,940	950
10	4,140	5,030	5,950	1,190
12	4,820	5,890	6,950	1,430
14	5,490	6,720	7,950	1,650
16	5,640	6,800	8,100	1,900
18	5,930	7,250	8,540	2,150
20	6,490	7,930	9,370	2,380
22	7,070	8,650	10,210	2,620
24	7,690	9,370	11,050	2,850

Note: Wall and infiltration losses based on ambient temperatures listed and cooler construction incorperating 4" polyurethane or equivalent. All loads adjusted to 16 - 18 hours running time. *Charts usable for 8' and 10' heights also.

In all cases, the refrigeration technician should use proper sizing tools such as the Russell Engineering manual RU-ENG-0313A to determine the proper load requirements.

Source: HTPG Tech Note February 2019

Refrigeration Systems (continued):

Table 2

Data from Russell's Engineering Manual

Walk-in Freezers
To Determine BTU Per Hour Loads
Low Temperature Walk-in Storage Freezer

1. Select Freezer size. Determine Design ambient temperature of location. (80° air conditioned location, 90° non-air conditioned location, 100° southern states or outdoor location.) Find BTU wall and infiltration losses per hour in appropriate box temperature column.

2. Add on Average Product Load BTU/hr. If a specific product is known, use page 12 only for product load. When page 12 is used, do not add the Average Product Load.

3. When Glass Display Doors are used, add total from Page 9.

4. Add BTU/hr load totals for the Net Refrigeration requirements.

To Determine BTU Per Hour Loads Low Temperature Walk-in Storage Freezer										
Freezer Size	80° Ambient			90° Ambient			100° Ambient			Average Product Load BTU/Hr.
L x D x H*	Box 0°	-10°	-20°	0°	-10°	-20°	0°	-10°	-20°	
8 x 6 x 9	6,060	6,410	6,750	6,200	6,550	6,890	6,360	6,710	7,050	1,210
10	6,610	7,010	7,390	6,820	7,230	7,620	7,050	7,470	7,910	1,510
12	7,130	7,580	8,010	7,360	7,820	8,260	7,610	8,080	8,570	1,820
14	7,640	8,130	8,610	7,880	8,390	8,870	8,150	8,670	9,210	2,110
16	8,130	8,670	9,190	8,360	8,890	9,420	8,640	9,170	9,690	2,420
18	8,610	9,190	9,750	8,880	9,480	10,050	9,180	9,800	10,430	2,730
20	9,080	9,700	10,310	9,360	10,000	10,620	9,670	10,340	11,020	3,020
22	9,540	10,200	10,850	9,840	10,520	11,180	10,170	10,870	11,600	3,330
24	9,990	10,700	11,390	10,300	11,010	11,700	10,690	11,400	12,090	3,630

Note: Wall and infiltration losses based on ambient temperatures listed and cooler construction incorperating 4" polyurethane or equivalent. All loads adjusted to 16 - 18 hours running time. *Charts usable for 8' and 10' heights also.

In all cases, the refrigeration technician should use proper sizing tools such as the Russell Engineering manual RU-ENG-0313A to determine the proper load requirements.

Source: HTPG Tech Note February 2019

Outdoor Applications:

Cooler and Freezer refrigeration systems that are installed outdoors require a winter kit. This kit provides a compressor cover, a crank case heater to keep the oil in the compressor warm so the compressor will operate properly in the cold weather, and a fan cycle control will keep the head pressure at the proper levels.

Outdoor Coolers and Freezer need to have rain roof installed to prevent water from leaking into the box. A rain roof can be made of a single membrane polyester polyvinyl, chloride roof system with connectors and a drip cap for the door, or it can be metal flashing that installs over the roof seam to prevent water from leaking into the box.

Walk-in Coolers and Freezers Without A Floor

Walk-in coolers and freezers sometime come without a floor. Special precautions need to be taken to eliminate future problems. Walk-in coolers and freezers without a floor must be installed on a ground contact concrete floor. A cooler can be installed without insulating the floor and a thermal break under each wall panel but we recommend installing both. A freezer must be installed on an insulated concrete floor and must include a thermal break under each wall panel.

An engineer or architect in your area will be required for the final design of your pad to meet local code approvals. If these precautions are taken you should have trouble free performance with you walk-in floor.

Manufacturer:

No matter what walk-in system you buy, one of the most important decisions is deciding which manufacturer to purchase from. There are many manufacturers of walk-in coolers and freezers. They all have their niche in the walk-in industry. The amount of service they offer the end user varies. Look for a walk-in company that has these traits.

1. The company should have been in business for at least ten years.

2. The company should have a good web site explaining the items they offer and information about the company.

3. The company should answer the phone with a person not an answering device. Answering devices are for their convenience and not yours. Should you call you should always be able to talk to someone.

4. They should have clear quotes with itemized listing of the items provided.

5. They should be very informative and pleasant on the phone and treat you with interest and respect.

6. Their location and shipping cost need to be clearly spelled out. Shipping is a very important item in figuring up front cost of the project.

7. Check the warranty clearly so that you know what is covered should problems occur.

8. Get references of other customers.

9. Make sure they are National Sanitation Foundation and UL approved.

10. The company should specify how the walk-in is manufactured with the types of materials are used in its construction.

Conclusion:

Buying a walk-in cooler or freezer can be a large investment. Make sure you are totally informed before making a decision. Make sure you buy what you need and not what a salesperson is trying to sell you. Remember you are the one that will have to live with the walk-in you choose. Good Shopping!

A Product of Craig Industries, Inc.
CRAIG INDUSTRIES

401 Delaware St. Quincy, IL 62301 | 800.521.2665 | www.uscooler.com