

University of Missouri Extension

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Buying a Packaged Farm Building

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More than half the farm buildings constructed in Missouri today are selected from the wide variety of "pre-engineered" structures available from commercial manufacturers or large contracting firms. These buildings, commonly referred to as "package buildings," have been designed to reduce construction costs through standardization.

Package buildings are available in a variety of sizes and shapes, and they contain features that reflect both the needs of their intended use and the choice of their designer. Their purchase can be compared to that of a tractor or an automobile — there are high-price models, economy units and usually a variety of optional accessories that add to the cost.

This guide outlines some of the options and decisions you will have to make when shopping for and purchasing a package-type farm building.

Matching needs to buildings

The right building for your farm is the one that provides for all your needs at minimum cost. Many buildings are selected on physical size alone, not what they are able to do for a particular farmstead.

The first step in successful selection of a building is to decide what you want the building for. Is it a farrowing house for 20 sows, storage for an 8-row combine, a double 4 herringbone milking parlor or a hay storage barn? Each building has its own specific requirements for use.

On the other hand, there may be more than one way to satisfy these requirements. If you are going to provide opportunity for a maximum number of building manufacturers to compete for your business, decide what the building must accomplish, not how it is to be done.

It's a good idea to make a list of your needs before you start shopping. It will provide you with a basis for comparison when you look at different buildings. Include the following items on your list:

- Intended use of the building.
- Capacity (animals, tons of feed, number of machines, etc.).
- Special requirements, such as unusual door size or wall height.

- Connection to existing buildings or planned expansion within 2-3 years.

Site selection

The most successful building is the one that is completely integrated into the materials flow pattern of the farmstead. Site selection is often the most difficult task in getting ready for a new building, particularly if you are trying to do it yourself. You can get help with this process by contacting the MU Extension center in your county. Do it early in the planning process, as the "right location" may impose some constraints on the size or shape of building you can purchase.

Site preparation

Getting a particular location ready for a building involves removing topsoil, leveling the area and bringing utilities such as water and electricity to the site. The nature of the work usually means that local contractors will be engaged to do it. Many package builders, particularly those based some distance from your farm, prefer to have the owner arrange for site preparation work. If you are willing to accept this responsibility, you can save the general contractor's fee on this portion of the work. Package builders often provide site preparation specifications for the farmer who wants to do this work.

Metal frame, pole or conventional construction

The choice is yours. All three have been used with equal success for nearly every type of farm building. There is no general rule as to which type is most economical for any one situation. In fact, it is not unusual to find more variation in price among similar types of construction than among different ones.

The common denominator among types of buildings is the design load they are able to withstand. All farm buildings in Missouri should be designed to withstand 80 mph wind loads and 20 pounds per square foot (psf) live roof load. The live roof load can be reduced to 15 psf in southeast Missouri, where snow is not a major consideration. If the building has a suspended floor, it should be capable of supporting the minimum loads indicated in Table 1.

Table 1
Minimum recommended design loads for suspended floors in agricultural buildings

| Use | Load in pounds per square foot |
|-----------------------------|--------------------------------|
| Cattle barn — loose housing | 80 |
| Milking parlor | 70 |
| Milk room* | 50 |

| | |
|-----------------------------------|-----------------------------------|
| Sheep — solid floor | 30 |
| Swine — solid floor | 40 |
| Horses — solid floor | 100 |
| Poultry — floor supported systems | 40 |
| Shop* | 70 |
| Slotted floor systems | |
| Dairy and beef | 100 |
| Calves up to 400 pounds | 500 |
| Swine up to 50 pounds | 35 |
| Swine up to 200 pounds | 50 |
| Swine up to 400 pounds | 65 |
| Product storage | Use calculated weight of material |

Options

All package buildings are equipped with alternative or optional items. Some of the items you will have to choose from are listed below, along with advantages and disadvantages.

I. Windows

Windows are expensive additions to farm buildings and, to keep costs at a minimum, are being used less and less. The only place they are essential is in those structures that must conform to health regulations. When windows are used for illumination, keep window area equal to 8-10 percent of the floor area.

A. Wooden windows

1. Lower heat loss than metal-frame windows.
2. Relatively high maintenance cost in farm buildings.
3. Not good for high-moisture areas.

B. Metal frame windows

1. Best for damp areas.
2. Usually lower cost than wood-frame windows.
3. Easier to install in agricultural buildings.
4. Relatively low maintenance.

C. Plastic roof panels

1. Good light source for uninsulated, cold buildings.
2. Keep panel area to 8-10 percent of floor area.

II. Siding

A. Metal

1. Low maintenance.
2. Available in pre-painted finish colors that will last 15-20 years without refinishing.
3. Subject to mechanical damage when exposed directly to livestock.

B. Wood

1. Will withstand mechanical abuse.
2. Better insulating value than either metal or masonry.
3. Requires periodic painting or stain to preserve appearance.

C. Masonry

1. Very low maintenance.
2. High initial cost.
3. Difficult to insulate.
4. Requires separate foundation when used with pole- or steel-frame buildings.

III. Roofing

A. Metal (aluminum or steel)

1. White color has slightly better reflective quality than natural metal.
2. Requires less roof framing than shingles and is lower in cost.

B. Solid deck with shingles

1. Better insulating value than metal roof.

IV. Insulation

Insulation is an increasingly important part of modern farm building construction. Even buildings that are considered "cold structures" are receiving minimum amounts of insulation to moderate summer and winter temperature extremes.

There are many choices of insulating material available. To provide a basis of comparison between buildings, you should specify insulation based on its R value. General recommended levels are as follows:

A. Cold buildings operated at outside temperature:

Ceilings (roof): R = 2-4 for summer heat.

Walls: No insulation.

B. Buildings where animal heat provides only winter minimum temperatures:

Ceilings: R = 16

Walls: R = 9-12

C. Buildings with supplemental heating systems:

Ceilings: R = 24

Walls: R = 13

V. Interior finish

There are an almost infinite number of choices of material for interior finish in farm buildings. A performance specification rather than identification of a specific material usually will provide a better comparison among building manufacturers. Items that should be considered in developing a performance specification are:

A. Mechanical strength. If interior finish is exposed to animals, it will have to take considerable abuse.

B. Moisture resistance.

C. Ease of cleaning.

D. Color.

VI. Environmental control system

All livestock buildings and some other farm structures will have some means of modifying interior environment. Performance specifications usually will result in the lowest cost to you.

A. Ventilation

B. Heating

The heating system should be designed to maintain a specified interior temperature when outside temperature falls to -10 degrees Fahrenheit (0 degrees Fahrenheit for southeast Missouri). Interior temperature desired will depend on building usage. An automatic temperature control system should be specified.

VII. Electrical system

A. Lighting.

B. General outlets.

C. Special equipment.

VIII. Floor

A 4-inch-thick concrete floor is sufficient for most farm buildings. Reinforcing is not necessary if floors are placed over a well drained, compacted fill material. Floors should be thickened to 8 inches for a distance of 2 feet in from doors where equipment will be entering the building.

Use a 6-sack mix concrete made with air entraining cement. Pitch floors 1/8-1/4 inch per foot to floor drains.

Special needs additions

Almost every building will be modified to provide some special feature for the farm it is located on. Before you start looking, try to make a list of the "extras" you want included in your building. Some of the more common additions are:

- Bathroom
- Office

- Animal handling facilities
- Feed storage room
- Equipment such as farrowing crates, milking stalls, etc.

Insurability

Farm buildings are becoming extremely complex structures and usually represent a considerable investment that must be protected with insurance. During the past few years, there has been an increasing reluctance on the part of some insurance companies to assume coverage for complex farm buildings. When shopping for a building, and definitely before you buy, make sure the structure you purchase will be eligible for any insurance coverage you might want to place on it.

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Related MU Extension publications

- AED40, Greenhouse Barns for Dairy Housing
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=AED40>
- AED44, Hoop Barns for Gestating Swine
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=AED44>
- AED50, Hoop Barns for Beef Cattle
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=AED50>
- AED51, Hoop Barns for Dairy Cattle
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=AED51>
- AED52, Hoop Barns for Horses, Sheep, Rabbits, and Multiple Utilization
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=AED52>
- G1005, Selecting and Working With a Farm Building Contractor
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G1005>
- G1107, Ventilation for Warm Confinement Livestock Buildings
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G1107>
- G1721, Insulation for Your Home
<http://extension.missouri.edu/publications/DisplayPub.aspx?P=G1721>

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