

# METAL BUILDING MAINTENANCE MANUAL

C E C O B U I L D I N G S Y S T E M S





**Eastern Region**

P.O. Drawer 2387  
100 Red Iron Rd.  
Rocky Mount, NC 27802  
(252) 977-2131

**Midwestern Region**

P.O. Box 72  
305 N. Iris St.  
Mt. Pleasant, IA 52641  
(319) 385-8001

**Southern Region**

P.O. Drawer 911  
2400 Highway 45 North  
Columbus, MS 39703  
(662) 328-6722

**Company Division Headquarters** ■ P.O. Box 6500 ■ Columbus, MS 39703

<http://www.cecobuildings.com>

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**1-800-474-CECO (2326)**

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# Metal Building Maintenance Manual

Use the spaces below to record your building information for easy reference when contacting us for assistance.

## Building Information

### Building Owner

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_

Additional contact info \_\_\_\_\_

### Authorized Builder

Name \_\_\_\_\_

Address \_\_\_\_\_

\_\_\_\_\_

Phone \_\_\_\_\_

E-mail \_\_\_\_\_

Additional contact info \_\_\_\_\_

### Project Information

Work Order Number \_\_\_\_\_

Date of Completion \_\_\_\_\_

## Safety Symbol



Use of this symbol in the manual indicates a potential safety concern. Please read the accompanying text passages carefully for your own safety, for the safety of others and to prevent damage to your metal building.

***An effective building maintenance program may  
help reduce the cost of insurance!***

Replacement parts and service are available through your local authorized Builder. If an authorized Builder is not available call one of our company's regional offices and ask for customer service. Please have the work order number or project number handy when calling as this will help us locate the files for your project and aid us in providing you with assistance or parts as needed.

## Status at time of printing

We pursue a policy of continuous, ongoing development to ensure that our buildings remain state-of-the-art in technology, combining the latest in high quality materials and safety features. For this reason, it is possible that the features described in this manual may differ from those on your building.

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# INTRODUCTION

## Scope

Congratulations, and thank you for choosing a metal building for your project. This manual is an important reference tool in maintaining your building. It provides guidance in inspections, adjustments, cleaning and care for your building.

Metal buildings have evolved into structures requiring minimal maintenance because of improvements in materials, design applications and fabrication techniques. However, like many other investments, your building does require some attention to maintain its value and appearance. This manual is provided to help you keep your metal building in good condition.

The information in this manual is not intended to cover major work that should be done by an authorized Builder, but only to provide a guide for periodic care.

The information contained herein is only intended to provide recommendations for maintaining a typical building; due to special features and/or the location of your building, some or all of the recommendations contained herein may not apply to your building. Prior to performing any maintenance work on your building, you should consult applicable local and federal safety requirements and your local building contractor. Failure to provide regular maintenance, as set forth in this manual, may void any warranty, actual or implied, that may be applicable to a building or its components.

## Frequency of Maintenance

The frequency with which preventive maintenance activities should be performed will depend on several factors including the specific maintenance task, the environmental influences based on the location of your building, the age and condition of the building and your commitment to a preventive maintenance program.

Your maintenance schedule should begin immediately after a building is erected, modified or repaired.

We recommend most maintenance activities be performed at least twice annually. For buildings that are located in areas that have moderate to severe winters, inspections are recommended in the spring closely following winter and in the fall early enough to complete any necessary repairs prior to winter. Additional inspections and maintenance may be needed following severe or unusual storms.

Maintenance activities should be performed more frequently than twice per year on buildings located in coastal areas, areas subject to industrial pollution and areas with high humidity as a result of the increased exposure to corrosive elements in these areas. In addition, buildings used for activities that are potentially detrimental to the building such as indoor pools, animal confinement or activities that generate corrosive chemicals should have maintenance activities performed more frequently.



## SAFETY

### General Safety Recommendations

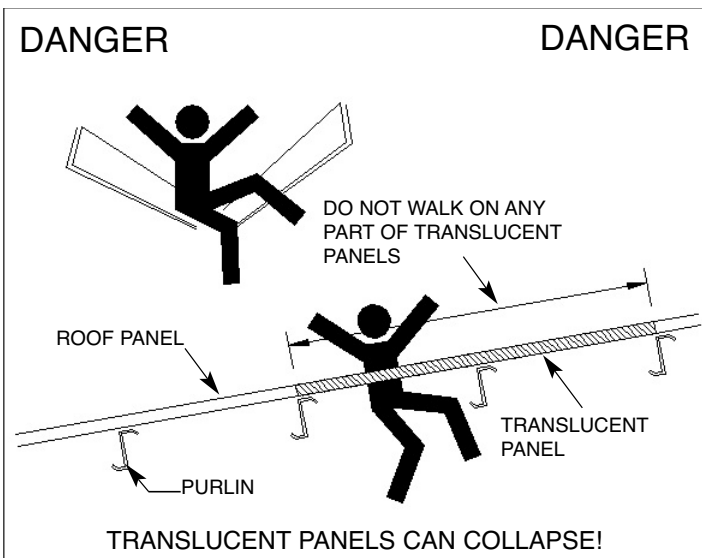
**Always follow and comply with all federal, state and local rules and regulations including, but not limited to, OSHA regulations when performing routine building maintenance and/or renovations. Failure to follow these regulations could result in personal injury or death to you or bystanders.**

**Always use OSHA approved Fall Protection when working in elevated places; do not walk on wet roof panels; do not walk, step or sit on skylights (translucent roof panels), ridge-caps or gutters because of the possibility they may collapse.**

Always comply with governing regulations, use proper safety equipment, and follow appropriate safety procedures for each maintenance activity.

In addition, do not forget to consult your insurance carrier and fire hazard inspector about building maintenance or major renovations. They can be valuable resources for the latest information on safety and risk management.

### Translucent Roof Panel Fall Protection



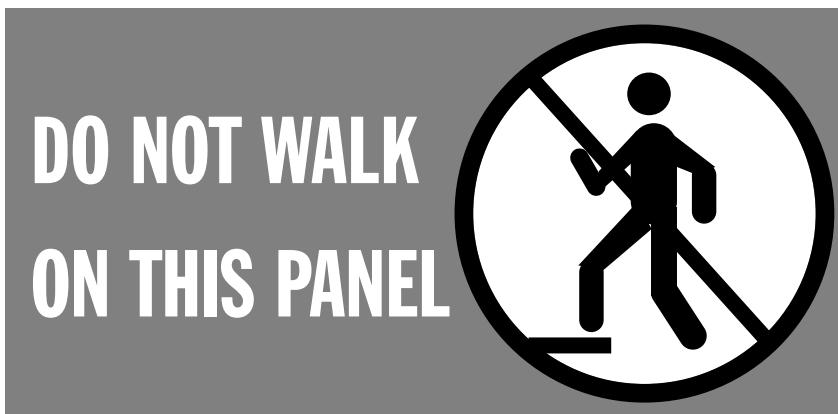
It is important to understand that OSHA considers skylights a roof opening, and as such, it is the building owner's responsibility to provide fall protection. Translucent roof panels, commonly known as skylights and/or fiberglass reinforced panels (FRP), are not made to support concentrated loads such as foot traffic. Translucent panels are designed to allow natural light

into a building, yet they are capable with proper installation and maintenance of resisting wind and snow loads. Stepping on a translucent panel could cause the panel to collapse causing the person to fall and sustain serious injury.

Accumulations of dirt and/or snow on a roof can easily conceal the location of a roof translucent panel. As a result, it is highly recommended that each person planning to go on the roof review the roof framing plan drawing which is part of the erection drawings for your building to identify the locations of rafters and purlins and “as-built” roof translucent panels. An up to date copy of the roof framing plan drawing that accurately shows the locations of roof translucent panels should be kept readily available and carefully reviewed by everyone who will be on the roof - **BEFORE** they go on the roof.



Although the translucent roof panels have a “DO NOT WALK ON THIS PANEL” warning label on each panel these warning labels may be covered with dirt, debris and/or snow; this is why it is imperative that people know the location of these panels **BEFORE** going on the roof. These warning labels must not be removed for any reason. (Note: The actual label used may vary somewhat from the sample shown.)



## **Roof and Wall Translucent Panel Maintenance Recommendations**

To maintain good appearance and long life, translucent panels or fiberglass reinforced panels (FRP), especially roof panels, should be hosed down or washed periodically. Cleaning removes the accumulation of dust, dirt and debris which can combine with sunlight and wind to attack exposed surfaces, both chemically and abrasively. When cleaning these panels non-corrosive cleaning compounds should be used. Avoid the use of compounds containing ammonia or chlorine since they may cause panel discoloration.

Translucent panels should be cleaned periodically to allow for maximum light penetration. Depending on your buildings location it may be necessary for these panels to be cleaned on a more frequent basis. A good time to check and see if the panels need to be cleaned or resurfaced is in the Fall, since the upcoming winter months will provide fewer daylight hours and the need for maximum light penetration is greatest.

Panels may be able to be repaired/refinished when panels show excessive amounts of dullness, discoloration and fiber exposure, known as blooming. All of these contribute to the reduction of light transmission through the panel. If the translucent panel is severely deteriorated, replacement should be considered.

Application of a refinisher typically requires only a minimal amount of effort and panel preparation. First, wash panels off with water or non-corrosive cleaning compounds. Washing the translucent panels will normally remove any dirt that may be embedded in the panel's surface. If an excessive amount of fiber exposure (blooming) has occurred, trapping large quantities of dirt, use a stiff bristle brush or fine steel wool to loosen the dirt, followed by a thorough rinsing with clear water to prepare the panels. Be sure that the panels are thoroughly dry before applying the refinisher. The refinisher can be applied by either brush or spray; however, brushing is recommended for optimum results. You should always follow the refinisher manufacturer's application, handling and safety instructions when working with the refinisher. It is recommended that protective gloves be worn when refinishing the translucent panels to protect your hands from the refinishing chemicals and/or splinters from exposed fibers.

## SNOW

### Snow and Ice Removal



Be aware of weather conditions that may contribute to snow and/or ice accumulation on the roof. If you suspect snow and ice accumulation has loaded the roof beyond its capacity, you should have the snow and/or ice removed by people experienced in performing such work. An excessive amount of snow and/or ice can cause the roof to collapse resulting in damage to property and/or personal injury or death.

***FM Global Property Loss Prevention Data Sheet 1-54 paragraph 2.1.1.1.19 recommends that roofs be cleared of snow when half of the safe maximum snow depth is reached. (See Snow Removal Chart.)***

Although it is difficult to accurately assess what a safe maximum accumulation of snow/ice would be, a close approximation can be made. The first step is for the building owner to obtain the snow load that the building has been designed to carry. The design snow load is shown on the cover sheet of the metal building erection drawings and on the Letter of Certification for the building.

Due to the differences in density between fresh and frozen snow there is no fixed correlation between snow depth and snow density. The density of snow can range from 10 pounds per cubic foot for relatively dry fresh snow to 60 pounds per cubic foot for snow that has partially thawed and then frozen.

One method of determining the density of snow on a roof is to carefully shovel or carve out a 1 foot by 1 foot column of snow through the snow's full depth. Be very careful not to damage the

roof. Place this snow in a plastic trash bag or other water proof container for transporting the removed snow to a scale to weigh the contents. Measure the depth of the snow where the sample was removed.

Using the measured weight and depth calculate the density of the snow in pounds per cubic foot. By dividing the design snow load (in pounds per square foot) by the snow density (in pounds per cubic foot) you can determine the depth of snow at the design snow load for the actual density of the snow.

The design snow depth can also be estimated based on the design snow load and the estimated density of the snow and/or ice buildup. The density of fresh relatively dry snow in lbs. per cubic foot is estimated to be 0.13 multiplied by the Design Snow Load (in pounds per square foot, PSF) + 14. The following is a table of design snow loads and the corresponding one half design snow depths obtained by using this method.

## Snow Removal Chart

(for fresh dry snow)

Note: Remove snow from roof when the depth of snow in the “One Half Design Snow Depth” column is reached for each corresponding “Design Snow Load.”

Design Snow Load (psf)	One Half Design Snow Depth (inches)
10	4
15	6
20	7
25	8
30	10
35	11
40	12
50	14
60	17
70	18
80	20
90	21
100	22

## Suggested Snow and Ice Removal Procedure



There are many safety concerns related to the removal of snow or ice from a roof. Plan any effort to remove snow or ice carefully and remain alert and cautious during the removal activity. Risks include, but are not limited to, slipping/falling from the roof, falling through translucent panels and injuring others as large amounts of ice and/or snow fall from the roof striking someone standing or walking below. In order to help prevent accidents and injuries when removing snow and/or ice you should always:

- 1) Post warning signs or place safety barricades to keep people from entering an area below a roof where snow removal is being performed.
- 2) Perform snow removal if possible when a building is unoccupied.
- 3) Always comply fully with all safety regulations and provide proper safety equipment to workers before working on the roof. If possible, remove snow without getting on the roof by using draglines to remove the snow on the roof. Avoid standing in the path of sliding snow or ice as it is being removed from the roof.
- 4) Place ladders at the end of the building away from where the snow is being removed so that the sliding snow will not knock the ladders over.
- 5) Never send one person alone to remove snow. Always use a safety observer who can monitor the snow removal process and be prepared to provide or obtain immediate assistance if required.
- 6) Be cautious of snow or ice breaking away and sliding down the roof, even on buildings having a low sloped roof.
- 7) Use extreme care when working along the edge of the roof.
- 8) Watch for extreme deflections in roofing panels and listen for unusual noises when snow and ice build-up conditions exist. Extreme deflections and/or noise can indicate the structural integrity of the roof has been compromised. If either of these conditions exist the area should be evacuated immediately and a trained professional should be called to remove the accumulation of snow and/or ice.

**The following are some suggestions that generally apply; however, it is recommended that an Engineer be consulted before snow removal is initiated.**

- 1) Remove all hanging icicles from eaves and gutters before removing snow from the roof. Snow may accumulate on icicles during snow removal placing an additional load on the edge of the roof. Care must be exercised to avoid damage to the building and endangering people.
- 2) Remove snow in a pattern that does not cause an unbalanced loading condition on the roof. Avoid large differences in snow depth between adjacent areas of the roof. Do not remove all of the snow from small areas and then move on to another area. Instead, remove the snow in layers from the entire roof thereby decreasing the load gradually and evenly across the entire surface of the roof.
- 3) Remove snow from drifted areas first, down to a level with other snow. For example, if an area has drifts four feet deep and the snow on the main roof is two feet deep, trim off the drifts to two feet before proceeding.
- 4) Remove snow incrementally, removing snow from the eave towards the ridge, sliding the snow off the roof over the gutter.
- 5) Remove the snow from the middle one-third of each bay for the full width of the building, beginning with the most snow packed bay. Complete snow removal on the remainder of the building.
- 6) On gable buildings, remove snow on both sides of the ridge at the same time.
- 7) Never use metal shovels on any type of roof. Do not use picks, axes or other sharp tools to break up ice on the roof. The use of such tools can easily damage the roof.
- 8) Do not remove snow to less than a 3" depth over the roof panels. Care must be taken to eliminate hitting panel fasteners, snow guards, etc. If an ice layer above a roof panel is not excessively thick it should be left.
- 9) Care must be taken in removal of ice and snow around ventilator bases, pipe flashing and HVAC units, due to the ease of damaging neoprene boots, pipes, conduits, etc.

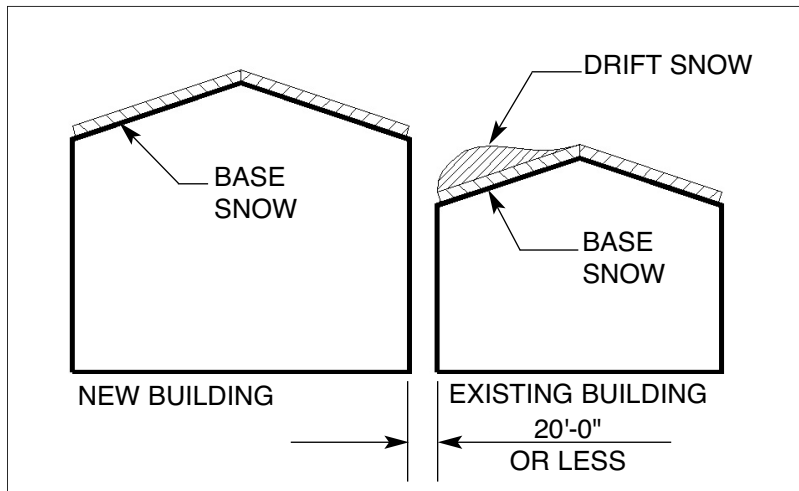
10) Snow or ice should not be allowed to accumulate at the base of metal wall panels; accumulation of snow in this location may permanently damage panels.

## Structural Modifications

**Before making any structural modifications** you must contact a design professional for assistance. Always make certain you have a copy of the complete instructions and related information regarding any modifications from your design professional prior to making any modification.

Some typical major modifications include but are not restricted to:

- 1) Removal or relocation of X-rod or other types of bracing
- 2) Cutting into any structural component
- 3) Removal or relocation of frame flange brace angles
- 4) Addition of any load not specifically included in the certification letter for the original building design
- 5) Adding adjacent building(s), especially if new one is taller.



Placing a new taller building adjacent to an existing building can result in snow drift loads on the existing building that were not considered in the original design. The new snow drift load could cause the original building to collapse. When adding a new building within 20 feet of an existing building, the existing building should be checked for potential additional loads and reinforced if necessary.

## ACCESSORIES

### Eave Gutters, Valley Gutters, Downspouts and Scuppers



When working on or inspecting gutters, downspouts and/or scuppers, be aware of safety issues in doing so including, but not limited to, falling from the roof and injuries from using a high-pressure hose for cleaning. Always follow OSHA and other governing requirements for fall protection and tie-off.

Visually inspect gutters for accumulation of debris that would prevent gutters or downspouts from operating properly. Clean out all accumulated debris regularly using a water hose with sufficient pressure to flush dirt and small debris. Larger items such as rocks, cans, limbs and heavy accumulations of leaves or pine needles should be removed by hand. It is recommended that suitable gloves be worn. Gutter obstructions can cause dirt to build up which holds moisture that can cause premature rusting and allow standing water to accumulate on the roof that may result in a leak through an improperly sealed sidelap or endlap. Blocked downspouts can produce the same results if they are not allowed to drain freely. The weight of accumulated debris in a gutter compounded with ice and snow could exceed the load carrying capacity of the gutter and gutter support clips and cause the gutter to fall. Check for and repair any loose connections.

The purpose of a scupper is to provide an emergency overflow for water collected on the roof and to provide a visible warning that the primary drainage system may be blocked.

## Personnel Doors



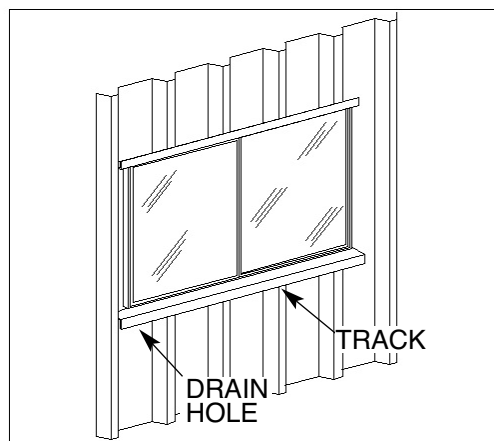
Although one person can perform most minor door maintenance, some activities such as complete removal or rehang of a door may require two or more people to prevent injury.

Personnel doors must be checked periodically for the following:

- 1) Check for tightness of locksets, closure hardware and hinges
- 2) Check for and repair any loose fasteners on all doors
- 3) Check for and repair any misalignment of door leaf and its frame, making sure the leaf does not rub, bind or have too much of a gap between leaf, jambs, headers and/or threshold
- 4) Lightly oil mechanical parts including hinges
- 5) Check for and repair any wind damage and other physical damage
- 6) Check for any delamination of door leaf's skin and replace leaf if needed
- 7) Check for and repair any air leaks with appropriate sealant, adjustments, and replacement parts

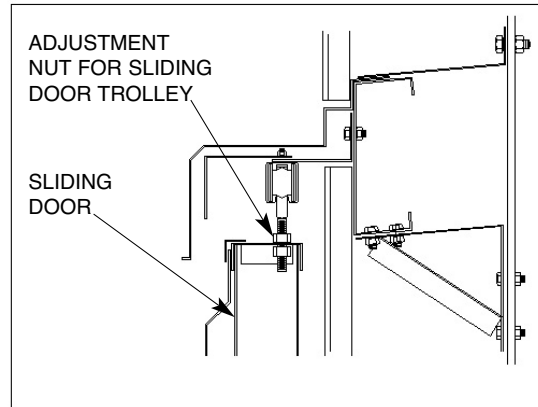
## Windows

Windows usually require very little maintenance. Lubricate the window track, clear sill drain holes and inspect sealant at top and sides of windows. Check for and repair any air and water leaks at windows and overhead doors. Remove all old caulk and apply new caulk as required.



## Sliding Doors

Lubrication of door casters is generally not required as casters are packed with grease and sealed by the door manufacturer. If a sliding door becomes difficult to operate, adjustments to the base guide or caster height may be necessary. Check for and remove any dirt or debris in the door guide.



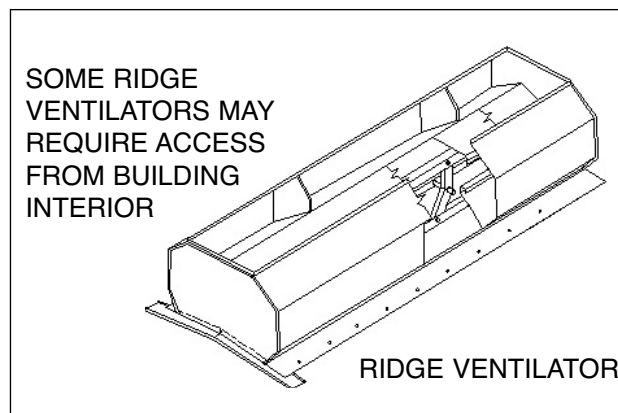
## Overhead Doors

Check and tighten the bolted connections of the framing supporting an overhead door as needed. Contact the door manufacturer if the door becomes difficult to operate or is out of alignment. Only a qualified technician should perform torsion spring adjustments.

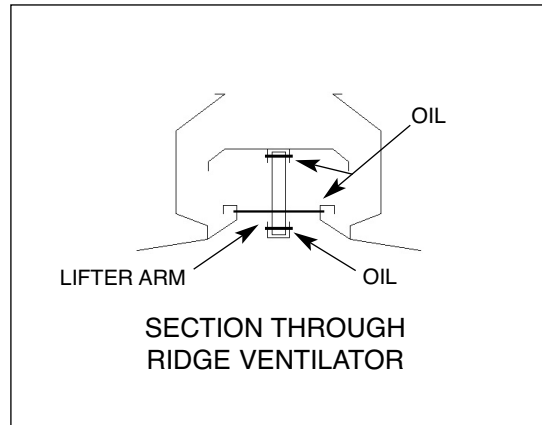
## Roof Ventilators



Safety concerns when working on a roof ventilator include but are not limited to falling from the roof and possible electrical shock hazards if the ventilator includes an electrically operated fan. Make sure to use proper fall protection and tie-off when working in an elevated location and that the electric power to any electrical equipment is turned off and properly locked-out or tagged-out before maintenance is performed. The top of the ventilator will usually have an insect screen that prevents making adjustments or repairs to the interior of the ventilator without removing the ventilator. Maintenance or repair activities to the operational components inside of the ventilator will require accessing the unit from below, inside the building or removing the ventilator from the ridge and turning the ventilator over to gain access. If a ventilator is removed for maintenance be sure to properly mark and cover the opening in the roof where the ventilator was removed to prevent a fall hazard.



Vents that do not have moving parts will require very little maintenance. Ventilators containing moving parts such as pulleys, rollers or cranks for flue operation will require periodic lubrication at pivot points. Simple operation from time to time will aid in breaking corrosion loose. A vibrating fan indicates that there may be a problem with the fan. Not only can a vibrating fan cause damage to itself, but may cause damage to the building as well. A fan that is vibrating needs to be checked promptly and appropriate corrective measures taken before additional damage is caused. Many times a vibration could mean a bent fan blade.



## Wall Mounted Exhaust Fans and Louvers



Safety concerns when working on a wall mounted exhaust fan or louvers include, but are not limited to, falling if the fan or louver is elevated and possible electrical shock hazards if the exhaust fan or louver is electrically operated. Make sure that you have proper fall protection equipment and that the electric power to any electrical equipment is turned off and properly locked-out or tagged-out before maintenance is performed.

Check operation of manual louvers and louvers electrically interlocked with exhaust fans, and repair or replace as needed. Fixed louvers that do not have moving parts will require very little maintenance. Operable louvers containing moving parts such as vanes will require periodic lubrication at pivot points. Simple operation from time to time will aid in breaking corrosion loose. A vibrating ventilation fan indicates that there may be a problem with the fan. Not only can a vibrating fan cause damage to itself, but may cause damage to the building as well. A fan that is vibrating needs to be checked promptly and appropriate corrective measures taken before additional damage is caused. Many times a vibration could mean a bent fan blade or worn belt.

## Insulation



Although we are not aware of any long-term health related concerns with fiberglass blanket insulation, you should always wear protective clothing such as long sleeves, long pants, gloves, eye protection and/or a respiratory filter when working with insulation. Information concerning: RECOMMENDED WORK PRACTICES FOR FIBERGLASS, ROCK WOOL AND SLAG WOOL (SVF) INSULATION PRODUCTS is available from the North American Insulation Manufacturers Association (NAIMA, [www.naima.org](http://www.naima.org)).

Check for wet or damaged insulation periodically. Wet or damaged insulation transfers heat, whether from the heating system in winter or from the sun in summer, which is not only costly but also uncomfortable for the people in your building which may reduce their productivity.

Torn insulation backing, which is usually white vinyl or foil (called a water vapor retarder), can allow moist air (water vapor) inside the building to move directly through the insulation. The moist air can condense in the insulation making it less effective and on the inside surface of the roof and wall panels causing the panels to deteriorate. Pressure sensitive tapes with an exposed side that matches the facing used on the insulation are available from most insulation suppliers for use in repairing a torn vapor retarder.

Pockets of extremely moist air in the building can cause condensation problems. The following procedures will help or possibly eliminate the problem:

- 1) Seal small tears in the water vapor retarder with vinyl tape
- 2) Replace large areas of damaged insulation
- 3) Install fans to disperse pockets of moisture-laden air
- 4) Eliminate the source of high moisture in the building

**Caution:** Condensation problems are easily mistaken for roof leaks. If your building is experiencing excessive condensation have the HVAC contractor or engineer check humidity levels to determine if they are within projected values.

## FINISHES



Protective clothing, protective eyewear and/or a respiratory filter may be appropriate when working with chemicals, paints or cleaners. Use appropriate caution and safety equipment when using a high-pressure hose to clean surfaces.

### Cleaning Finish Paint Systems

The high quality paint finishes used on the metal roof and wall panels will maintain their appearance and protective value for a long time if properly maintained. Improperly maintained panels will accumulate dirt and film deposits over time causing the panels to lose their original appearance; to prevent this it is important to establish a proper maintenance program to keep the finishes in prime condition.

The most important cleaning is done immediately after the erection of the building, as metal shavings are present and are somewhat magnetized because of the screw and drill rotation. Shavings are not always visible and must be swept off the roof and walls to prevent corrosion of the particles, which will stain the panel surface.

Under normal conditions, a fresh water washing two or three times per year using a regular garden hose under pressure will keep the paint finish in good condition.

## **1. Light Dirt Build-Up**

After longer periods of time, it may occasionally be desirable to wash a building with a suitable cleaner, using a long handle 4" soft bristle push broom similar to that used for sweeping floors. The use of a bristle broom will allow reaching the sides of the wall panel ribs and the scrubbing action of the broom will work on top of the ribs and flat areas of the panels. Wetting down the area to be cleaned with fresh water prior to washing will greatly ease the cleaning operation.

The use of detergents in this case is NOT recommended, since the residual material left on the surface by detergents may have a degrading effect on the paint film after a period of time.

After cleaning with a cleaning solution, (tri-sodium phosphate, or similar solution is a good cleaner) hosing down with fresh water will insure against any harmful residual material being left on the paint finish.

**NEVER USE SOLVENTS OR THINNERS FOR WASHING DOWN ANY PAINTED SURFACE EXCEPT AS OTHERWISE PROVIDED HEREIN.**

Solvents and thinners may have a tendency to break down the surface of the paint and may cause spotty chalking on the paint finish wherever solvent is applied, solvents have a tendency to convert the paint back to its original unbaked state.

## **2. Heavy Dirt Build-Up**

In areas where heavy dirt deposits dull the surface, a solution of water and a detergent (1/3 cup of Tide detergent per gallon of water, for example) may be used. A soft bristle brush/broom with long handle may be useful. A clear water rinse should follow.

## **3. Mildew**

Mildew may occur in areas subject to high humidity. To remove mildew along with dirt, the following solution is recommended:

1/3 cup detergent (Tide, for example)  
2/3 cup tri-sodium phosphate (Soilex, for example)  
1 quart sodium chlorite, 5% solution (Clorox, for example)  
3 quarts water

## **4. Oil, Grease, Tar, Wax, Caulk, Etc., Clean-up**

A clean lint-free cloth soaked with mineral spirits should be used to remove oil, grease, tar, wax, caulk, etc. Wipe the mineral spirits dry with another clean lint-free cloth before the solvent has evaporated from the surface. Follow the mineral spirits wipe with a detergent cleaning and rinsing.

## **Touch-up Painting**

Field applied touch-up paint used to repair scratches is not as durable as the original factory applied finish but will provide satisfactory service if properly applied. The touch-up paint may fade at a faster rate than the factory applied paint so it is important to use as little touch-up paint as possible; this will minimize the color differences as the paint ages. The smallest practical brush should be used in all cases where touch-up spray equipment is not available.

Touch-up paint must be thoroughly mixed to obtain the correct color and gloss. For best results do not apply touch-up paint when surface to be coated is wet, or when the temperature is below 55 degrees F (12.8 degrees C) or above 90 degrees F (32 degrees C). Touch-up paint will usually dry in four to five hours after application at 75 degrees F (23.9 degrees C). One coat is sufficient for most applications.

## **PROJECT DOCUMENTS**

For your convenience and use the following documents are provided for all buildings when applicable. These documents should be kept in a safe location along with other items related to the building, such as architectural drawings and information on building equipment. We recommend making additional copies of pertinent documents and storing them separately in case one set is lost or damaged.

Experience has shown that sooner or later these documents will be needed. They are invaluable in making repairs and modifications, and should you ever decide to sell the building, the documentation can be an important selling tool.

### **1. Letter of Engineering Design Certification**

The letter of certification will include information concerning the building code used in the engineering design of the structure, the design loads, the building size and any special load conditions

### **2. Erection Drawings**

These drawings show the structural, enclosure and trim components of the building. The architectural drawing does NOT always contain all of these details. The job number appears in the lower right corner of all pages.

### **3. Parts and Packing List**

This is several pages long and contains the bill of materials for every piece and part shipped to you with your building order. It describes each part in detail, including its color, finish, length and quantity shipped.

### **4. Warranties (if applicable)**

When applicable a written warranty is provided.

### **5. Product Certifications**

Underwriters Laboratories Listings

Certifications from insurers, test labs or independent certification agencies

