WINDOWS • CURTAIN WALLS • ENTRANCES • STOREFRONTS

GENERAL SERVICE AND MAINTENANCE MANUAL

Part# YSM1

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WHERE WINDOWS ARE JUST THE BEGINNING®

EFCO a Pella Company

1000 COUNTY ROAD MONETT, MO 65708 • 800.221.4169 • EFCOCORP.COM

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SECTION 1

GENERAL INFORMATION

All EFCO products are designed for minimum maintenance requirements once properly installed. Since all moving contacts are aluminum against nylon, no lubrication is required. However, guide tracks should be cleared of dirt and debris periodically.

The following sheets describe parts for the EFCO products supplied for typical projects. Occasionally, a part will break and need replacing. Most of these parts are stocked by EFCO and can be shipped immediately upon request. Please send all requests to the following address:

EFCO EXPEDITE DEPARTMENT
EFCO CORPORATION
1000 County Road
P.O. Box 609
Monett, Missouri 65708

Or Call

Toll Free: 1-800-221-416
Fax: 417-235-7313

The materials in this packet are based on typical window types and job conditions. Due to the custom nature of EFCO's Business, some material in this packet may not apply to your specific job. In as much as EFCO Corporation has no control over how others may use this material, we do not guarantee that the same results as those described herein will be obtained. Each user of the materials and/or procedures should make their own tests to determine the suitability of the materials or procedures for their own particular field use.

SECTION 2

GLASS CARE MAINTENANCE AND CLEANING

2.a. GENERAL CLEANING

Wash, rinse, and dry the glass at frequent intervals particularly during construction. For all glass surfaces, except coated glass use soft, clean, grit-free cloths, to apply a solution of a mild soap or detergent in water with a maximum of 2% concentration, or use a slightly acidic cleaning solution. Do not allow the soap or cleaning solution to dry on the surface. Follow this immediately with a high volume of clean water, and prompt removal of excess rinse water with a clean squeegee. ***Ensure that not only the glass, but also the surrounding surfaces are rinsed well.***

SOME IMPORTANT CAUTIONS

1. Do not mark or coat glass partially or completely with “x’s” or other symbols with any material whatsoever. If paper or adhesive is alkaline in character, the contact area may be attacked directly. If paper or adhesive is neutral or slightly acid in character, it may “protect” the contact area and permit adjacent exposed surfaces to weather or age. Although subtle, such conditions are sometimes sufficiently evident to be annoying.

2. Splatter from welding may cause permanent surface damage, reduce strength, and lead to breakage.

SECTION 2

GLASS CARE MAINTENANCE AND CLEANING

2.b. CLEANING OF COATED OR REFLECTIVE SURFACES

Clean coated glasses with a solution of mild soap or other mild detergent in water with a maximum concentration of 2%. Apply this with grit free clothes or sponges, followed immediately by rinsing the glass and surrounding areas with a high volume of clear water and removal of excess rinse water with a squeegee. Do not allow the soap solution to dry on the surface. Remove grease and glazing materials with commercial solvents such as xylene, toluene, mineral spirits or naptha and follow with normal wash and rinse. Be careful not to damage glazing or insulating unit seals by over generous applications of strong solvents. Comply with solvent manufactures directions on label for toxicity and flammability warnings.

Because fingerprints, grease stains, smears, dirt, scum, sealant residue, scratches, and abrasions (on either surface) are more noticeable on reflective glasses than on non-reflective glass. Take extra care in cleaning to be sure that gritty dirt particles picked up by the cloths do not scratch the glass.

Coated glasses should be cleaned at least 3-4 times per year so that materials such as metal irons, alkali rundown from concrete, stucco, etc. are not permitted a long residence time on the coated glass surfaces. As residence time of the stain increases, there is an increasing probability that diffusion into the coating will occur. This results in a more difficult stain to remove and could damage the coating.

Do not use harsh cleaners, abrasive cleaners, alkaline materials, fluoride salts, chlorine based cleaners or hydrogen producing compounds.

NOTE: All cleaning products must be completely rinsed from the glass and surrounding surfaces before the process is complete.

SECTION 2

GLASS CARE MAINTENANCE AND CLEANING

2.c. DEGLAZING AND REGLAZING FOR WET GLAZED APPLICATIONS

Deglazing of Broken or Defective Glass

1. Remove glazing beads by applying pressure to the inside lower edge of the bead to compress the glazing vinyl. While maintaining inward pressure give a slight upward movement. If the bead is tight it maybe necessary to insert a putty knife in the crevice between the bead and the sash of the frame then give a slight twisting motion as pressure is applied to the bead.
2. Remove broken or defective glass—in some cases it may be necessary to cut the old sealant loose from the glass by running a utility knife between the glass and the glazing leg.
3. Remove all existing sealants and dirt from the glazing surface of the sash or frame. This is usually done by scraping with a putty knife or similar object.
4. Wipe down the sash or frame glazing surface with a solvent saturated oil-free cloth. Suitable solvents include xylol, toluol or methyl ethyl ketone. Always follow the manufactures' instructions for handling of solvents.

Glazing/Reglazing the Window

1. Apply a bead of silicone sealant to the glazing surface. Glazing surfaces should be prepared in accordance with the sealant manufactures' instructions to assure good adhesion. Surrounding temperatures must be within the sealant manufactures' specified range during application and curing. Special attention must be given to condensed moisture or frost on cold metal surfaces with can occur if glazing when temperature in below 40° F.
2. Install setting blocks and edge blocks—glass should always be set on two identical rubber setting blocks of an acceptable rubber material having a shore a durometer hardness of 85+/-5. The setting blocks should be the proper size and design to assure full bearing surface of both lites of glass in an insulated unit.
3. After inserting the glass, reinstall horizontal glazing beads and then the vertical beads by applying an inward pressure on the inside bottom of the bead with a slight downward pressure. Some types of glazing may require a slight tap from a rubber hammer/mallet to get the bead started.
4. Clean off excess sealant with a clean cloth or paper towel.
5. Allow sealant to cure a minimum of 24 hours before operating the window, see sealant manufacturers' instructions for actual cure time.

NOTE: EFCO Corporation assumes no responsibility for failure of insulated glass units due to faulty installation.

SECTION 2

GLASS CARE MAINTENANCE AND CLEANING

2.d. DEGLAZING AND REGLAZING FOR TAPE GLAZING APPLICATIONS

Deglazing of Broken or Defective Glass

1. Remove glazing beads by applying pressure to the inside lower edge of the bead to compress the glazing vinyl. While maintaining inward pressure give a slight upward movement. If the bead is tight it maybe necessary to insert a putty knife in the crevice between the bead and the sash of the frame then give a slight twisting motion as pressure is applied to the bead.
2. Remove broken or defective glass—in some cases it may be necessary to cut the old sealant loose from the glass by running a utility knife between the glass and the glazing leg.
3. Remove all existing sealants and dirt from the glazing surface of the sash or frame. This is usually done by scraping with a putty knife or similar object.
4. Wipe down the sash or frame glazing surface with a solvent saturated oil-free cloth. Suitable solvents include xylol, toluol or methyl ethyl ketone. Always follow the manufactures' instructions for handling of solvents.

Glazing/Reglazing the Window

1. Glazing surfaces should be prepared in accordance with the tape manufactures' instructions to assure good adhesion. Surrounding temperatures must be within the tape manufactures' specified range during application. Special attention must be given to condensed moisture or frost on cold metal surfaces with can occur if glazing when temperature in below 40˚ F.
2. Apply a pre-formed sealing tape (tremco 440 or equal) so that that edge is approximately 1/32" below the sight line of the glazing leg. If the sash but joint is in a vertical direction, the glazer shall run the tape initially on the head and sill member going directly over this joint. Should butt joints in the sash run horizontally, tape must first be applied to the jambs so that it crosses over the joint. Do not stretch or lap the adjoining lengths of tape. This would prevent full contact around the entire perimeter of the glass or panel. Remove backing paper from tape just prior to setting glass.
3. Install setting blocks and edge blocks—glass should always be set on two identical rubber setting blocks of an acceptable rubber material having a shore a durometer hardness of 85+/-5. The setting blocks should be the proper size and design to assure full bearing surface of both lites of glass in an insulated unit.
4. After inserting the glass, reinstall horizontal glazing beads and then the vertical beads by applying an inward pressure on the inside bottom of the bead with a slight downward pressure. Some types of glazing may require a slight tap from a rubber hammer/mallet to get the bead started.
5. Cap bead glass with silicone sealant at inside glazed applications.
6. Allow cap bead sealant to cure a minimum of 24 hours before operating the window, see sealant manufacturers' instructions for actual cure time.

NOTE: EFCO Corporation assumes no responsibility for failure of insulated glass units due to faulty installation.

SECTION 3

FINISH CARE MAINTENANCE AND CLEANING

3.a. PAINTED ALUMINUM CARE AND CLEANING

GENERAL CLEANING PROCEDURE:

Start cleaning at the top of the window(s) at the highest part of the building, rinse the area moving downward with moderate water pressure to dislodge the soil. If rinsing with moderate water pressure does not remove soil then low pressure scrubbing with a soft bristle brush or sponge may be employed. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. Thoroughly rinse the surface after scrubbing.

REMOVAL OF LIGHT SURFACE SOIL:

If soil remains after the above procedure has been attempted, a solution of mild soap in water with a maximum concentration of 2% may be applied with a soft bristle brush, sponge or soft cloth. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. ***The surfaces must be thoroughly rinsed by spraying a large volume of clean water*** and thoroughly dried with a clean cloth. Do not allow soap solution to dry on the painted surface or surrounding surfaces. To minimize rundown of cleaning products over the lower portions of the building rinse such areas as soon as possible. ***When rinsing pay special attention to joints and crevices.***

REMOVAL OF HEAVY SURFACE SOIL:

If surface soil still adheres after using the above procedures spot cleaning with some type of mild solvent such as mineral spirits, or isopropyl alcohol may be used to remove grease, sealant or caulking compounds. Use extra caution to avoid allowing these solvents to contact any gaskets or other rubber or plastic parts. Strong solvents or cleaners containing solvents may have a deleterious or softening effect on paints and should be avoided. To prevent harm to the finish, these types of solvent or emulsion cleaners should be spot tested and the coating manufacturer should be consulted. Care should be taken to not mar or scratch the surface, since this could give an undesirable appearance if viewed from certain angles. Cleaners of this type are usually applied with a clean cloth and removed with a clean cloth. ***Remaining residue should be washed with the above mild soap solution and rinsed with a high volume clean of water***. Use solvent cleaners sparingly, remove promptly and rinse thoroughly. Always follow manufactures instructions for handling of solvents.

SECTION 3

FINISH CARE MAINTENANCE AND CLEANING

3.a. PAINTED ALUMINUM CARE AND CLEANING

SOME IMPORTANT DO'S & DON'TS:

- DON'T use paint removers, aggressive alkaline, acid or abrasive cleaners. **
- DON'T use cleaners containing trisodium phosphate, or highly alkaline, highly acidic, fluoride or chlorine based cleaners. **
- DON'T mix different cleaners.
- DON'T attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated, and cleaning no uniformity can occur. Surfaces cleaned under these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance.
- DON'T use strong cleaners on other building accessories where it is possible for the cleaner to come in contact with the painted surface. If an aggressive cleaner is required for some other component of the building, extreme care must be taken to prevent the cleaner from contacting the aluminum finish.
- DON'T allow any cleaning products to dry on the painted surface or surrounding surface.
- DO follow the manufacturers recommendations for mixing and diluting cleaners.
- DO test clean a small area first.
- DO protect the aluminum from building fallout such as wet plaster, mortar, dust, paint, welding splatter and the like, during installation.
- DO remove alkaline building materials such as wet plaster and wet mortar immediately and washed the soiled area with clean water.
- ***DO thoroughly rinse away all cleaning products with a high volume of clean water***.

****NOTE:** EFCO Corporation will not be responsible for defects caused by exposure to corrosive chemicals.

SECTION 3

FINISH CARE MAINTENANCE AND CLEANING

3.a. ANODIZED ALUMINUM CARE AND CLEANING

GENERAL CLEANING PROCEDURE:

Start cleaning at the top of the window(s) at the highest part of the building, rinse the area moving downward with moderate water pressure to dislodge the soil. If rinsing with moderate water pressure does not remove soil then low pressure scrubbing with a soft bristle brush or sponge may be employed. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. Thoroughly rinse the surface after scrubbing.

REMOVAL OF LIGHT SURFACE SOIL:

If soil remains after the above procedure has been attempted, a solution of mild soap in water with a maximum concentration of 2% may be applied with a soft bristle brush, sponge or soft cloth. The washing should be accomplished with uniform pressure, cleaning first with a horizontal motion and then with a vertical motion. Care should be taken to not mar or scratch the surface. ***The surfaces must be thoroughly rinsed by spraying a large volume of clean water*** and thoroughly dried with a clean cloth. Do not allow soap solution to dry on the painted surface or surrounding surfaces. To minimize rundown of cleaning products over the lower portions of the building rinse such areas as soon as possible. ***When rinsing pay special attention to joints and crevices.***

REMOVAL OF HEAVY SURFACE SOIL:

If surface soil cannot be removed by the above noted procedures, cleaning with the assistance of an abrasive pad can be employed. CAUTION: Abrasive pads should not be used on surfaces with a factory applied clear organic protective coating (lacquer) unless the clear coating has deteriorated and must be removed.

Thoroughly wet with clean water or the mild soap solution mentioned above. Hand scrub the surface using a nylon abrasive cleaning pad such as Norton Bear-Tex No. 668 or 3M Scotch Brite No. 7447. Begin at the top and work down, rubbing with uniform pressure across the surface in the direction of the metal grain. After scrubbing, the metal surface should be thoroughly rinsed with clean water or wiped with solvents to remove all residues. ***Thorough rinsing is required and cleaning products should not be permitted to dry on the surface***. Wipe dry with a clean cloth.

Do not use excessive abrasive scrubbing even on stubborn stains. This can adversely affect the finish and may result in an appearance that is even more undesirable than the stain. This also could void the warranty.

REMOVAL OF NON WATER SOLUABLE DEPOSITS:

If it is necessary to remove oils, wax, polish, or other materials, MEK, Xylene, Acetone or Toluene solvent is recommended. CAUTION: MEK and similar solvents may damage organic sealants, gaskets, or glazing materials, and should be used with extreme care in order to not come in contact with these materials. Solvents should be avoided on anodic finishes protected by clear organic coatings. Always follow the manufacture's instructions regarding handling of solvents.

SECTION 3

FINISH CARE MAINTENANCE AND CLEANING

3.a. ANODIZED ALUMINUM CARE AND CLEANING

SOME IMPORTAMTS DO'S & DON'TS:

- DON'T use aggressive alkaline or acid cleaners on aluminum finishes. **
- DON'T use cleaners containing trisodium phosphate, phosphoric acid, hydrochloric acid, hydrofluoric acid, fluorides, chlorine based cleaners or similar compounds on anodized aluminum surfaces. **
- DON'T mix different types of cleaners.
- DON'T attempt to clean hot, sun-heated surfaces since possible chemical reactions on hot metal surfaces will be highly accelerated, and cleaning no uniformity can occur. Surfaces cleaned under these adverse conditions can become streaked or stained so that they cannot be restored to their original appearance.
- DON'T use strong cleaners on other building accessories where it is possible for the cleaner to come in contact with the painted surface. If an aggressive cleaner is required for some other component of the building, extreme care must be taken to prevent the cleaner from contacting the aluminum finish.
- DON'T allow muriatic acid (hydrochloric) used for cleaning brick to drip on the aluminum. If this should occur, the acid should be immediately washed off with clean water.
- DON'T allow cleaning products to dry on the anodized surface or the surrounding surfaces.
- DO follow the manufacturers recommendations for proper mixing and diluting of cleaners.
- DO test clean a small area first.
- DO protect the aluminum from building fallout such as wet plaster, mortar, dust, paint, welding splatter and the like, during installation.
- DO remove alkaline building materials such as wet plaster and wet mortar immediately and washed the soiled area with clean water. If these materials are allowed to remain in contact with the anodized surface for an extended period of time, staining will occur.
- ***DO rinse off all cleaning products with a high volume of clean water.***

****NOTE:** EFCO Corporation will not be responsible for defects caused by exposure to corrosive chemicals.

SECTION 4

Recommended Maintenance and Cleaning for Windows, Curtainwall, Storefront, Entrance Doors, Terrace Doors, and Sliding Glass Doors in a Coastal Environment

4.a. MONTHLY:

- Blow or vacuum all sand and salt residue from all sill tracks and/or weeps.
- Wash the exterior of the system, both glass and frame, with the same mild soap solution mentioned previously in these instructions. Thoroughly spray rinse with a high volume of fresh water. When cleaning, the use of foam sponges and soft bristle brushes are acceptable. (Reference previous sections.)

4.b. PERIODICALLY:

- Care of Stainless Steel hardware
    - Stainless Steel is rust resistant due to the alloy components of chrome and nickel.
    - However regular care and maintenance is still required to ensure the longevity and maintain the appearance of this material.
    - Since the base material is a form of steel, surface staining can occur in aggressive environmental condition.
    - Wash surface regularly with warm, clean water and the same mild soap solution previously mentioned. Follow this with a thorough rinse with a high volume of clean water. The soap solution should only be used if surface deposits are visible.
    - If any surface staining does occur, use only a stainless steel cleaner to remove the staining per the manufacturers instructions.
    - DO NOT use household cleansers, abrasive cleansers, or steel wool at any time to clean the surface.
- Entrance door hardware can be lightly cleaned with the same mild soap solution as mentioned earlier. Cleaning with air or wipe down method of moving parts should be done as needed depending on level of contamination and use. See hardware manufactures cleaning and maintenance schedule for cleaning and lubrication instructions for swing door hardware.

SECTION 4

Recommended Maintenance and Cleaning for Windows, Curtainwall, Storefront, Entrance Doors, Terrace Doors, and Sliding Glass Doors in a Coastal Environment

4.c. QUARTERLY:

- Clean all sand from both the window and door latch mechanisms.
- Clean sand from rollers and moving parts. Avoid using spray lubricants as they will promote adherence of outside elements.

4.d. ANNUALLY:

- Check all exterior caulk and seals, recaulk where necessary.
- Check the roller track of windows and doors for damage caused by rollers or roller bearings that are worn. Replace all stiff or worn rollers.

NOTE: The performance and record keeping of this preventive maintenance is required per EFCO's warranty terms and conditions and will help to ensure that your EFCO products continue to function as they were designed and will help to extend the life of the product.

SECTION 5

CONDENSATION

5.a. ABOUT CONDENSATION:

Moisture on windows and doors is commonly referred to as condensation. While it can be concerning or frustrating, condensation can be minimized or prevented by controlling the inside relative humidity.

Interior Condensation:
Condensation on the interior of windows and doors is not caused by the window or door product. Condensation is the result of high humidity levels in the building. Air with high humidity holds water vapor until it comes into contact with a surface temperature less than or equal to the dew point (the temperature at which air becomes saturated and produces dew). Because window surfaces are usually the coldest part of the building envelope, condensation appears on windows first, generally in the form of water droplets of frost on the roomside of the window. As interior air becomes drier or as the window surfaces become warmer, condensation will begin to dissipate.

Replacing drafty windows and doors reduces air infiltration into the building, making it tighter. Because a tighter building retains more humidity, condensation on colder surfaces in the building may occur more frequently than before the renovation.

Condensation Causing Conditions

- Humidity is higher than recommended.
- High humidity causes higher dew point.
- Condensation appears on interior of window because temperature is below due point.

Condensation Preventing Conditions

- Humidity is at recommended level.
- Lower humidity causes lower dew point.
- No condensation appears on interior of window because temperature is above due point.

Maximum Recommended humidity Levels

Outside Temperature	Inside Humidity
20° F to 40° F	Not over 40%
10° F to 20° F	Not over 35%
0° F to 10° F	Not over 30%
-10° F to 0° F	Not over 25%
-20° F to -10° F	Not over 20%
-20° F or below	Not over 15%

SECTION 5

CONDENSATION

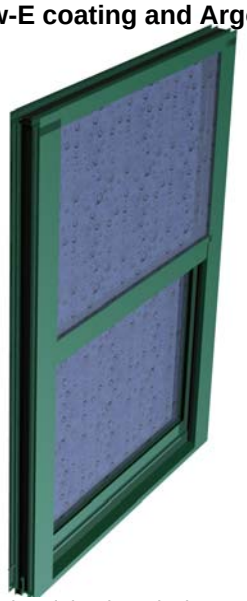
5.a. ABOUT CONDENSATION:

Exterior Condensation:

Exterior condensation generally occurs in the summer months. It is caused by three main conditions: high outdoor humidity, little or no wind and a clear night sky. It forms in the same way as roomside condensation when the temperature of the window is cooled below the dew point of the outside air (as opposed to inside air in roomside condensation).

To combat exterior condensation, open window coverings at night to warm up exterior glass and remove or trim shrubbery near windows or doors to promote air circulation. Increasing the air conditioner setting by a couple of degrees warmer might also help.

High Performance Insulated Glass w/ Low-E coating and Argon infill



- Heat loss to the night air and sky cools outside glass.
- Energy efficient windows keep heat inside the building so exterior surface of window stays cool.
- Condensation appears because exterior window temperature is below the dew point.

Standard Clear Insulated Glass

- Heat loss to the night air and sky cools outside of window.
- Less energy efficient windows allow heat from inside the building to warm up exterior surface of window.
- Condensation does not appear because the temperature of the exterior surface of window is above the dew point.

Condensation Between Glass:

Condensation between two pieces of insulated glass is not controllable and is an indication of glass seal failure. Contact your local EFCO sales representative or EFCO Corporation.

Effects of Condensation:

Higher interior humidity can lead to structural damage to the building and health hazards. Because these effects frequently occur unseen in wall cavities, drops ceilings, and crawl spaces, the visible signs of condensation on the window is a good clue that humidity levels are too high.

Problems such as window condensation and musty odor are nuisances, while others can be more serious such as water stains on walls and ceilings or structural damage. The important thing to remember is that the windows are trying to tell you to reduce indoor humidity before it causes unseen, costly problems elsewhere in the building.

SECTION 5

CONDENSATION

5.b. PREVENTING CONDENSATION:

Quick tips for controlling humidity and condensation:

Source of humidity	Suggested Action
Cooking and dishwashing	Vent stove range hoods to the outside, cover cooking pots to reduce steam
Showers and baths	Vent bathroom exhaust fans to the outside and use fans for at least 15 minutes after taking a shower
Ironing, washing and drying laundry	Properly vent appliances to the outside, use clothes dryers instead of hanging wet clothes indoors, use exhaust fans
Inadequate ventilation of windows	Open window coverings (shades, curtains) and make sure interior doors are left open during the day to allow air circulation; remove inside screens
Moisture producing areas	Close doors and windows to greenhouse areas, hot tubs or pools, cover large aquariums
Furnace	Make sure furnace is working properly and serviced regularly. Consider dryer heat sources such as gas or electric furnaces
Stale, damp air	Install an Air-to-Air exchanger to vent moist air outside and make sure its openings are not blocked. Don't cover or deflect warm air registers, don't close off rooms, open windows slightly to let in cool dry air
Excessive humidifier use	Monitor humidity levels with hygrometers to keep moisture in air at optimum levels, turn humidifiers off or down
Indoor plants	Circulate air with small fans
Damp basement	Run a dehumidifier in the basement to reduce excess moisture
New wood, plaster, cement, and other building materials	Building materials contain a lot of moisture. The first heating season causes this moisture to flow into the air and settle on cool surfaces. This type of condensation may last a few heating seasons.

SECTION 5

CONDENSATION

5.c. FREQUENTLY ASKED QUESTIONS:

WHAT IS CONDENSATION?
Condensation is the process by which a gas changes to a liquid. As air become saturated with too much humidity, it cannot hold the water vapor. Moisture is in the air all around us. When warm, moist air contacts a cooler surface, such as window glass, the air cools and cannot hold as much water vapor so it condenses and collects on the cool surface.

DO WINDOWS OR DOORS CAUSE ROOMSIDE CONDENSATION?
Windows and doors do not cause condensation. Typically the first place condensation can be seen is on window and door glass. Just like a bathroom mirror doesn't cause condensation after a hot shower and car windows don't cause interior frost in the winter when several passengers are in the vehicle; the cooler surface is simply where it collects.

WHY DOES ROOMSIDE CONDENSATION OCCUR?
Condensation is water appearing on the roomside of windows and doors because conditions are just right for this to happen. The roomside glass surface temperature is at or below the dew point for the amount of moisture (humidity) in the inside air. When warmer air, which can hold more moisture than cooler air contacts the cool surface of the glass, the air condenses the excess moisture out onto the cool surface.

WHAT IS DEW POINT?
The temperature of air, at a given humidity level, at which it can no longer hold all of its water vapor and some of the water must condense into liquid water.

WHAT CAUSES EXCESS HUMIDITY?
Everyday living: Showers, baths, cooking, washing dishes, laundry, pet water bowls and cleaning all add moisture to the air; as much as 4 gallons or more per day in some living areas. People even exhale moisture into the air as they breathe. Building construction: Modern, energy efficient, well insulated, building help hold down heating and cooling costs however, the same building techniques that help blocks outdoor air from entering buildings also keep moisture from venting to the outdoors.

IS ROOMSIDE CONDENSATION MORE LIKELY TO OCCUR IN CERTAIN CLIMATES OF TIMES OF THE YEAR?
In areas where January temperatures average 35° F or less, condensation is more likely to occur. In the summer and fall months, buildings pick up moisture from the damp air. As the heating season begins and windows are closed, the indoor air will have more moisture, so temporary condensation for the first few weeks is possible.

ARE THERE OTHER CASES WHERE WINDOW CONDENSATION IS ONLY TEMPORARY?
Building materials used in new construction or renovation such as wood, cement, dry wall, plaster and paint all contain moisture which is gradually released into the air. This excess moisture can cause condensation but will usually disappear after the first few heating seasons. Buildings also absorb moisture during humid summers. This moisture condenses during the first few weeks of heating until the building dries out. Additionally, anytime there are quick and sudden drops in temperature during the heating season, condensation may temporarily appear.

WHY DO I HAVE CONDENSATION WITH MY NEW WINDOWS WHEN MY OLD WINDOWS DID NOT?
Windows do not cause condensation; however, they are an indicator of high humidity levels. The older less efficient windows allowed air to move across the glass by letting outdoor air inside or allowing inside air to escape outdoors, preventing the air temperature of the glass from reaching the dew point.

WHY DO I HAVE CONDENSATION ON MY WINDOWS AND MY NEIGHBOR DOES NOT?
Indoor temperature, ventilation, air exchange, window coverings and floor plans as well as everyday life can vary from room to room. It is not unusual for a family of four to contribute 15 to 20 pounds of moisture per day to their indoor environment depending on their habits. The typical family of four can produce 12 pounds of moisture per day just breathing. Washing dishes for three meals a day can produce one pound of moisture. One shower can add 1/4 pound and there are many other activities or situations where moisture is added to the indoor air.

IN THE SAME ROOM, WHY DOES ONE WINDOW HAVE ROOM SIDE CONDENSATION AND OTHERS DO NOT?
There are many factors attributing to this phenomenon including any number of the following; Air circulation within the room or building varying room temperatures, air register location, type of window (hung and sliding windows may be colder), window size, glass type (Low-E versus clear), window coverings, window screens, placement of moisture sources in relation to windows (i.e. plants), the direction the windows are facing, elevation of the windows, wind direction, direction of the sun or partial blockage of the sun due to trees, buildings, etc.

SECTION 5

CONDENSATION

5.c. FREQUENTLY ASKED QUESTIONS:

DO WINDOW COVERINGS OR DRAPES CAUSE ROOMSIDE CONDENSATION ON WINDOWS OR DOORS?
Drapes and other window coverings do not cause condensation; however they can contribute to the problem by restricting the flow of air over the glass surface. Therefore, condensation is more likely to occur when drapes are closed and shades are pulled down.

HOW DOES AIR CIRCULATION IMPACT ROOMSIDE CONDENSATION?
Air circulation affects the supply of fresh air to all areas of the room. Poor air circulation within the room will keep the air next to your windows cooler. When air movement is restricted next to a cool surface the air will cool down sooner than well circulated air. As room are temperature decreases, its ability to hold the water vapor decreases. Using the same principle as a defroster in an automobile, supplying fresh air to the window areas slows down the cooling process and reduces condensation.

DOES THE AMOUNT OF ROOMSIDE CONDENSATION DEPEND ON WINDOW TYPES?
Sometimes hung and sliding windows may experience more condensation than other window styles. The window depth must be split between the two sashes because the glass is oriented in different planes, therefore those sashes are sometimes not as deep as other window type making them generally have less condensation resistance. Hung and sliding windows could be a few degrees cooler in temperature than other window types in the same room.

WHY DOES A STRIP OF CONDENSATION SOMETIMES FORM ALL THE WAY AROUND THE ROOMSIDE OF THE WINDOW?
The center of the glass stays warmer than the glass close to the edge. The strip of condensation is NOT an indication the window is leaking air or not functioning correctly.

HOW CAN EXCESS HUMIDITY CAUSE PROBLEMS?
Excess humidity can create problems; some are just nuisances like condensation on the windows, musty smell, others can be serious such as blistering of peeling paint, damage to insulation, stains on walls and ceilings or structural damage to the building.

WILL ROOMSIDE CONDENSATION RUIN MY WINDOWS?
If condensation issues are not addressed, window problems may appear over time.

WHY DO I STILL HAVE ROOMSIDE CONDENSATION EVEN THOUGH I AM RUNING A DEHUMIDIFIER?
The humidity is likely still too high. There are a variety of reasons condensation may still be appearing including but not limited to; varying air temperature in the home, air circulation, window coverings and other sources of water placing more moisture in the air than the humidifier can remove.

WHAT CAN I DO TO CONTROL ROOMSIDE CONDENSATION?
Reduce humidity. See table on page 15 for specific examples.

DO WINDOWS OR DOORS CAUSE EXTERIOR CONDENSATION?
No, windows and doors do not cause condensation. Exterior condensation is dew; the same condensation you see on cars and lawns on some mornings. Dew on windows is a natural atmospheric phenomenon, and it doesn't mean your windows are leaking air or malfunctioning in any way. Actually, exterior condensation is a sign of energy efficiency, indicating the outside pane is thoroughly insulated from the heat indoors.

WHY DOES EXTERIOR CONDENSATION OCCUR?
Exterior condensation happens when the exterior surface temperature of the window falls below the dew point of the air. This type of condensation is more likely to occur when outside humidity levels are higher. It typically occurs in the spring and fall when cool nights follow warm days.

HOW CAN I CONTROL EXTERIOR CONDENSATION?
Open the drapes or shades at night, increase the interior temperature a few degrees at night or shield the windows or doors from direct line of sight to the sky using trees, awnings, etc.

WHAT DOES CONDENSATION BETWEEN THE GLASS MEAN?
Condensation between the sealed panes of an insulated glass unit is an indication if seal failure and the insulated glass unit will need to be replaced.

SECTION 5

CONDENSATION

5.d. SOURCES AND ADDITIONAL INFORMATION:

- http://www.aamanet.org
- http://www.wdma.com
- http://www.extension.umn.edu
- http://www.uwex.edu
- http://www.efficientwindows.org
- Condensation Problems In Your Home: Prevention and Solution: U.S. Dept of Agriculture Forest Services. Agriculture Info Bulletin No. 373
- The Condensation Answer Book: Anderson