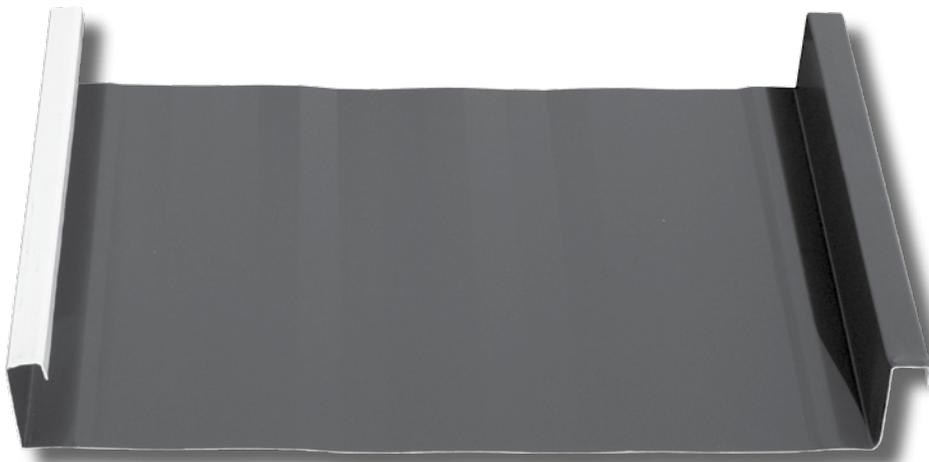


ML200 Standing Seam

Installation Manual



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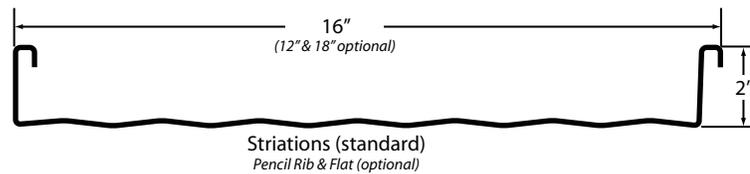
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IMPORTANT NOTICE

Read this manual in its entirety prior to beginning an installation. Refer to the ML200 Sample Details and Parts Guide along with this manual. Union procedures, recommendations and details must be followed to insure that the completed installation will be eligible for the appropriate warranty when applicable. This guide shows many of the proper applications, techniques and details required but is not intended to cover all instances, building requirements, designs and codes. Project conditions and details may require modifications or revisions. Such changes are to be covered with project drawings reviewed and approved by Union. In case of a conflict between this installation guide and other drawings, the installer is to contact Union for clarification prior to proceeding.

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Preparation

1. Confirm all dimensions by field measurements prior to ordering roof panels.
2. Confirm that the substrate and/or substructure to which the metal roofing system will be attached is complete, structurally sound including any necessary bracing and on plane within 1/4" in 20 feet or 3/8" in 40 feet tolerance. This includes, but is not limited to, all primary and secondary framing.
3. In the case of open steel framing, confirm that the distance from any ridge or peak to the vertical leg of the nearest supporting framing member does not exceed 12 inches.

Prior to beginning the installation confirm that a SEAMER RENTAL FORM has been completed, signed and submitted to Union to reserve the appropriate seamer kit.

Tools & Equipment

In addition to screw guns, drills, bits, clamps, pop rivet tools and other commonly used items for metal work, the following tools will be required:

- ML200 Electric Seamer Kit – When reserving, specify whether a single lock or double lock seam will be required. The kit consists of the following:
 - Seaming Kit chest for transportation and storage
 - Electric Seamer for either the single lock or double lock seam
 - Manual Seamer - Primary
 - Manual Seamer – Secondary (used prior to double lock electric seaming)
 - Tool Kit
 - Seamer Manual
 - Return documents
- Power shears or nibblers – To cut or notch panels and trim as required
- C-clamps - To clamp panel sidelaps together during installation. Standard C-clamps must be modified with rubber or fabric runners on the ends to prevent panel damage.
- Chalk or felt tip markers – Do not use lead pencils.

CAUTION

1. Field cutting of panels should be avoided when possible. If field cutting is required, the panels should be cut with nibblers, snips or shears to prevent edge rusting. All metal shavings must be removed from the roof at the time of cutting. Do NOT cut the panels with saws, abrasive blades, grinders or torches. They create high heat that can burn away the protective coating at the edge and create fine, hot steel particles which can accumulate on surfaces and cause staining or rusting.
2. Do not mark panels or flashings in a manner that will leave visible markings, stains, etc. Use chalk or felt tip markers. DO NOT use graphite (lead) pencils on unpainted panel surfaces as the graphite can cause surface rusting.

Safety

The Occupational Safety and Health Act (OSHA) has many regulations applicable to the installation of this or any other roof system. These regulations are identified as Part 1926, Safety and Health Regulations for Construction, and are available from government bookstores.

1. Metal roof panels are smooth which can cause the surface to be slippery when wet or covered with ice or snow. Even dust particles can make the surface difficult to walk on. Caution must always be used.
2. See "Handling" section for additional safety measures.

WARNING

Light transmitting roof panels will not support human weight or any significant human activities. Work near such must comply with OSHA or any other applicable regulations.

Delivery

1. Union roofing materials are carefully inspected and crated prior to being shipped and accepted by the transportation carrier. It is the transportation carrier's responsibility to deliver the shipment intact. It is the roofing contractor or consignee's responsibility to inspect the shipment for damages or shortages immediately upon receipt of materials.
2. Any shortages or damages must be noted and marked on the bill of lading prior to signing and accepting. In the case of packaged components (i.e. clips, fasteners), the quantities are marked on the container and should be checked against the bill of materials.
3. Union must immediately be notified of any shortages or damages.

Storage

1. Store panels, trim and accessories in a secure and protected area away from standing water, snow drifts and other potential causes of loss or damage.
2. Elevate panel bundles with blocking to allow air circulation.
3. Slope panel bundles to provide drainage of moisture.
4. Cover panels with a waterproof tarp.
5. Inspect stored materials daily for moisture accumulation. If such exists, materials should be dried and restacked.

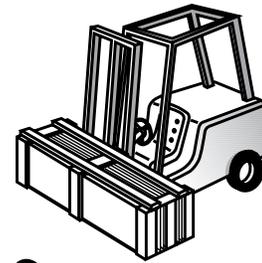
CAUTION:

- When placing materials on the roof such as bundles of roof panels, obtain prior confirmation that the structure is designed to support the point or uniformly distributed loads.
- Metal panels with strippable film must not be stored in the open, with direct exposure to the sun.

Handling

1. Hoisting equipment is necessary to unload and position roof panels and other large crates. Various types of equipment have limitations. It is the responsibility of the contractor to coordinate the appropriate equipment needed. Union must be notified prior to material loading at the plant if there are specific unloading requirements on a job.

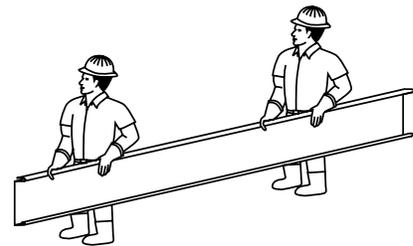
2. Forklifts are useful for unloading and handling panel lengths that do not exceed 25' and smaller crates. The forks must be spread at least 5' apart and blocking must be used to prevent panel damage.



3. Slings and spreader bars are required for longer panels. Under typical conditions, panel crates less than 35 feet in length can be lifted with two slings spaced at third points. Longer panels require at least three slings spaced at quarter points. The size and use of spreader bars and slings need to be confirmed by an engineer prior to handling.



4. The length of individual roof panels may need to be considered with regard to crew size. One person per 10 feet of panel is usually recommended if working under normal conditions without excessive wind or other important considerations. Individual panels should be lifted by the seam allowing the panel to hang naturally to prevent buckling. Do not pick up panels in a flat position or by the ends only.



5. Metal panels can conduct electricity. Do not allow panels to come into contact with power lines during handling or installation. Flag potential risk areas prior to beginning.

6. Edges of metal roof panels and trim can be razor sharp. Use protective hand gear and do not allow panels to injure others nearby.

7. Do not walk on the last panel being installed as an unsecured edge could cause the panel to collapse under a person's weight.

CAUTION:

Do not move panels during strong winds as one gust can easily exceed the capabilities of the handlers. Secure stacked panels so high winds cannot move panels.

Metal, Finishes, and Colors

The standard base metal used for ML200 panels is galvalume. This is a high-quality sheet with a thin acrylic coating applied to both sides of the sheet using a sophisticated reverse roll coater. This acrylic coating contains chromium to provide excellent resistance to storage stain and transit corrosion. Galvalume Plus[®], used by Union, eliminates the need for conventional chemical treatment and vanishing oil. The reverse roll coater provides precise application of the acrylic film, assuring uniform film thickness. However, uniform visual appearance of unpainted Galvalume sheet cannot be guaranteed. The normally occurring variations in surface appearance typical of all hot-dip Galvalume product will still be present and will not be masked by the thin, clear acrylic film. If uniform visual appearance is critical, then pre-painted Galvalume sheet should be ordered.

The standard finish for ML200 panels is commonly referred to as a 1.0 mil Kynar 500[®] finish. This is a fluropolymer finish chemically known as polyvinylidene fluoride (PVDF). It consists of a .25 mil (range .20 to .30) primer with a .75 mil (range .70 to .80) topcoat that provides a nominal 1.0 total dry film thickness. The finish used for commercial applications has a 70% PVDF resin content offering excellent weathering and color stability characteristics.

A wide range of standard colors are offered by Union. These can be seen on Union's color charts, color chips and on the website. Custom colors are available upon request with additional lead times and processing costs usually associated. Contact Union to discuss project needs.

TOUCH-UP PAINT:

Touch-up paint supplied by Union can be used on scratches but it should be used sparingly and applied only with a small artist's brush or spray if applicable. If scratches penetrate to the base metal, a zinc rich primer should be used before the touch-up paint is applied.

Engineering and Testing

Union offers panel systems that have been engineered and tested to insure they will provide resistance to wind uplift, fire, air infiltration, water penetration and more. Test results are shown on Technical Data Sheets available to the roof architect, engineer or designer so that they can evaluate, design and specify a roof appropriately engineered for a building, its contents, applicable codes, etc.

There are numerous organizational entities that provide test method criteria and/or actual testing of roof materials and/or roof assemblies. These include U.L. (Underwriters Laboratories), ASTM (American Society For Testing and Materials), F.M. (Factory Mutual) and more. The roof architect, engineer or designer evaluates and specifies the level of testing that must be met in order to provide an appropriate roof for the building. Contact Union if assistance with testing requirements is needed.

Union provides ongoing testing of roof panel profiles and systems. Refer to Technical Data Sheets, the website or contact Union directly for the most current test results.

Design

1. ML200 can be used on roof slopes of ½:12 or greater.
2. Standard panel lengths are 5' to 40'. Shorter or longer panels may require additional operational procedures or handling expenses. Contact Union for recommendations.
3. ML200 is considered a structural roof panel because it can be installed over open steel framing such as that provided by purlins or bar joists. The architect, engineer or roof designer must use the roof panel engineering data provided by Union to calculate spans and other criteria necessary to meet building and code requirements.
4. ML200 panels are not designed for foot traffic other than that necessary during its standard installation and inspections. If foot traffic is required, utilize a Union approved walkway design.

CAUTION

- * The metal roofing system must be able to expand and contract independent of the building structure. When fixing or securing the panels at the eave, use a detail at the ridge that allows the panel to move or slide. When fixing or securing the panels at the ridge, use a detail at the eave that allows the panel to move or slide. Do NOT attach roof panels to the building structure at BOTH the ridge and the eave.
- * Standing seam roofs such as this do not provide diaphragm capabilities or purlin stability therefore other bracing may be required to conform to A.I.S.I. or A.I.S.C. requirements.
- * Sound insulation is recommended beneath all standing seam roof systems such as placing blanket insulation between the panel and the substructure.

Clips

A variety of clip types can be used to attach the ML200 roofing system to the substructure. Pictures of various clips are shown in the Parts Guide. The best clip for the project must be selected by the roof designer. To make this determination, the following questions need to be answered:

“FIXED” CLIPS or “FLOATING” CLIPS?

FIXED clips are one-piece clips that do not allow panel movement once the sidelaps of the panels have been seamed. Fixed clips are commonly used for roof designs where panels and/or panel runs do not exceed 40 feet. One exception is to always use a floating clip system when attaching to bar joists even when the panel run is less than 40 feet.

FLOATING clips are two-piece movable clips that provide for roof expansion and contraction. The bottom piece of the clip is screwed directly to the structure and remains stationary. The top (movable) piece then becomes integral with the panel sidelap as seaming occurs. The roof panel system can then move back and forth as much as the clip design allows. Thermal calculations must be made for each project to ensure that the thermal movement of the roof will not exceed the movement allowed by the clip.

FLUSH or OFFSET CLIPS?

Will the roof panel system sit flush on top of the substructure, e.g. purlins, or is an offset gap needed to allow for continuous batt insulation placement or other purpose?

UTILITY CLIPS are economical clips where flush or “zero clearance” is desired between the metal roof panels and the supporting substrate or substructure. With open steel framing, this application might be found on an outdoor pavilion or canopy. It might also be found when installing the roof over steel decking and rigid board insulation. Utility clips require the use of a low profile fastener such as one with a pancake head.

LOW CLIPS are designed to provide a 3/8” gap between the top of the substructure and the bottom of the metal roof panel system. This application can be found when installing batt insulation of 1 to 6” thickness over open steel framing as the insulation can compress down to the 3/8” as it drapes over a supporting purlin or bar joist.

HIGH CLIPS are designed to provide a 1” gap between the substructure and the bottom of the metal roof panels. This allows from 6 to 12” of fiberglass batt insulation to be installed as it will compress as it goes over a supporting purlin or bar joist.

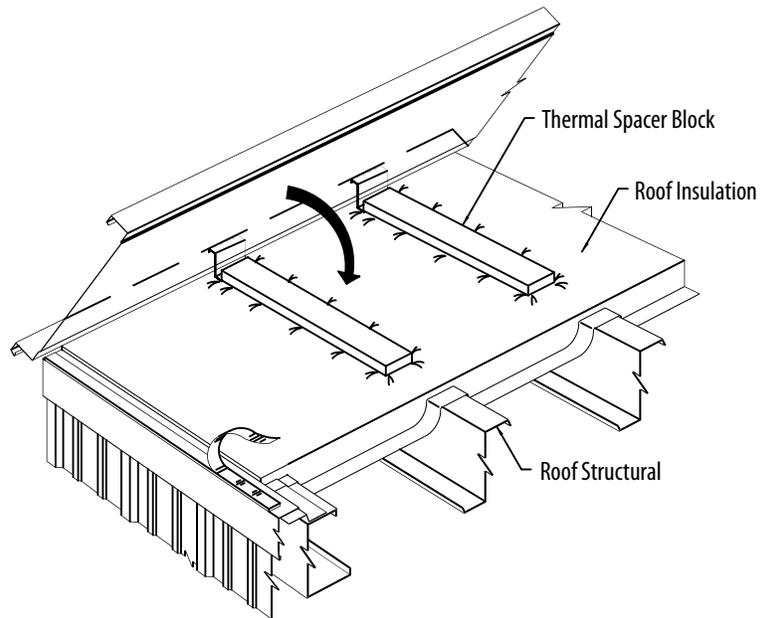
NOTE: The type of clip determines the height of the roof panel system above the substructure. This affects associated details, i.e. eave, rake, ridge, therefore the parts and pieces utilized for those details must take this into account.

U.L. RATED CLIPS?

Roof specifications and/or project requirements may or may not require U.L. clips. U.L. clips typically provide better wind uplift resistance because they are wider, e.g. 3” vs. 2”.

Thermal Spacers

Thermal spacers are high-density extruded polystyrene blocks installed over the purlins to improve the insulation value. The thickness to be used depends on the type of clip and corresponding offset. For example, a low, floating clip provides a 3/8" offset between the purlin and the bottom of the roof panels, therefore a 3/8" thermal spacer would be used.



Noise

Sound attenuation such as blanket insulation or polystyrene thermal spacers should be installed between the metal roof panel system and the substructure to minimize noise potential during heavy winds or thermal expansion/contraction periods. This is recommended for all standing seam roofs with the importance being relative to the use of the building.

Vapor Retarders

The need for a vapor barrier or retarder must be determined by the architect or engineer responsible for the roof design. This includes the type and location. The following are typical examples that require vapor retarders:

- a. Buildings with high interior humidity such as indoor swimming pools, many manufacturing operations, food, paper and other wet-process industrial plants.
- b. Buildings where outside winter temperatures below 40° are anticipated along with an average winter interior relative humidity of 45% or greater is expected.
- c. Buildings where construction products and processes release moisture after the roof has been installed. This can occur with concrete, masonry, plaster and other wet curing processes.

Wind and Building Codes

One or more building codes will apply to a building. The specific code(s) as well as the version or year of the code that will apply depends on the most recent statutes passed by the local, state and/or federal governing authorities. For example, a 2006 version of a code may be available but applicable statutes might only require that the 2002 code requirements be met. It is the responsibility of the roof architect, engineer or designer to determine applicable code(s). The most popular code is currently the 2006 International Building Code®. Other building codes specific to a geographical area can also be of great importance such as that written by Dade County Florida to address roofs in high wind zone areas.

Union offers a variety of details or methods that can be used to meet high wind resistance requirements. These range from clip selection to seam selection (double lock versus single lock) and more. Contact Union for information regarding specific project requirements.

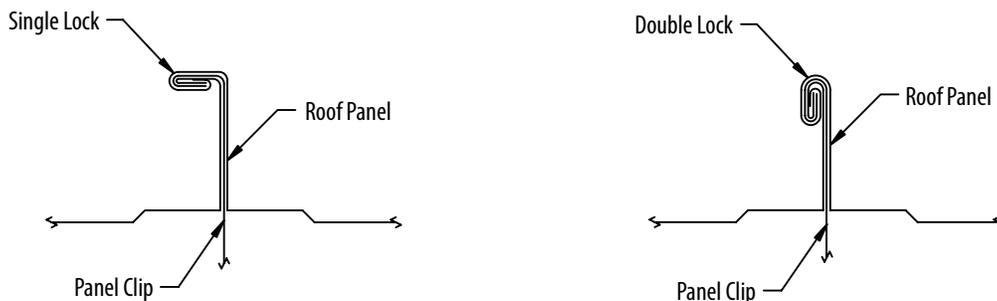
Panels

ML200 panels are available in 12", 16" and 18" widths with 16" being the width most commonly specified by architects. The standard "pan" of the panel is striated with pencil ribs and flat offered at no additional charge. Flat panels require that the a waiver be signed acknowledging the possibility of oil canning that can sometimes be seen in metal panels made from the thickness used in all standing seam metal roofing systems.

CAUTION

Oil canning is an inherent characteristic of flat metal in gauges used for standing seam roofing systems and is not a cause for rejection as this can occur with any system and can result from a wide variety of reasons. Striations or pencil ribs are highly recommended for the best appearance..

ML200 can be installed with a single lock or double lock seam as shown below. The single lock seam is most commonly used. The double lock is available for higher wind resistant applications as determined by the architect, engineer or roof designer.



1. Panels with no endlaps and less than 6:12 slope may be installed from either direction. On some projects, there may be roof conditions which require a specific sheeting direction. Confirm such prior to ordering panels and starting the erection.
2. Confirm that the first or start panel is being installed square to construction as desired to keep panel installations on module. A string line should be set to precisely locate the leading edge of the start panel once the start and finish dimensions have been determined.
3. The start panel is the reference line for checking panel coverage and insuring the installation remains on module.
4. The recommended installation sequence is to complete each panel run from eave to ridge before starting the next panel run. This will help ensure straight runs and allow insulation to be installed immediately ahead of each run if applicable.
5. Panel coverage during installation is to be checked every four panel runs at the ridge, eave and any endlap locations to remain on module. The check should be done with metal measuring tape held taut, parallel to the eave and measured to the same side of the seam.
6. Do not overdrive screws that can strip threads and/or damage the sealing washer. Use appropriate torque settings. With sealing washers, tighten the fastener until the sealing washer just starts to visually bulge from under the metal dome. Have approved oversized screws available for immediate installation in case of stripping or breaking a screw during installation.

CAUTION:

1. Failure to maintain modularity within a 1/8" width tolerance per panel can lead to seaming difficulty, objectionable appearance, a need for field modifications or reordering of parts and in severe cases a reduction in seam performance.
2. Roof panels are not designed for foot traffic or work areas. If foot traffic is required, protect the roof panels by using soft soled shoes and temporary walkway pads.

Seaming

1. The installer is responsible for insuring that the proper seam is being installed and that the seaming tools are in good working order.
2. Before seaming, inspect the full length of each roof panel sidelap to insure that the male and female leg are fully nested. Also confirm that each clip is properly engaged. Any condition where they are not nested or engaged must be corrected prior to any attempts at seaming.
3. The single lock seamer can be used in either direction.
4. The double lock seamer can be used in one direction only.
5. Use manual seaming tools and the electric seamer in accordance with instructions provided with the seaming kit.