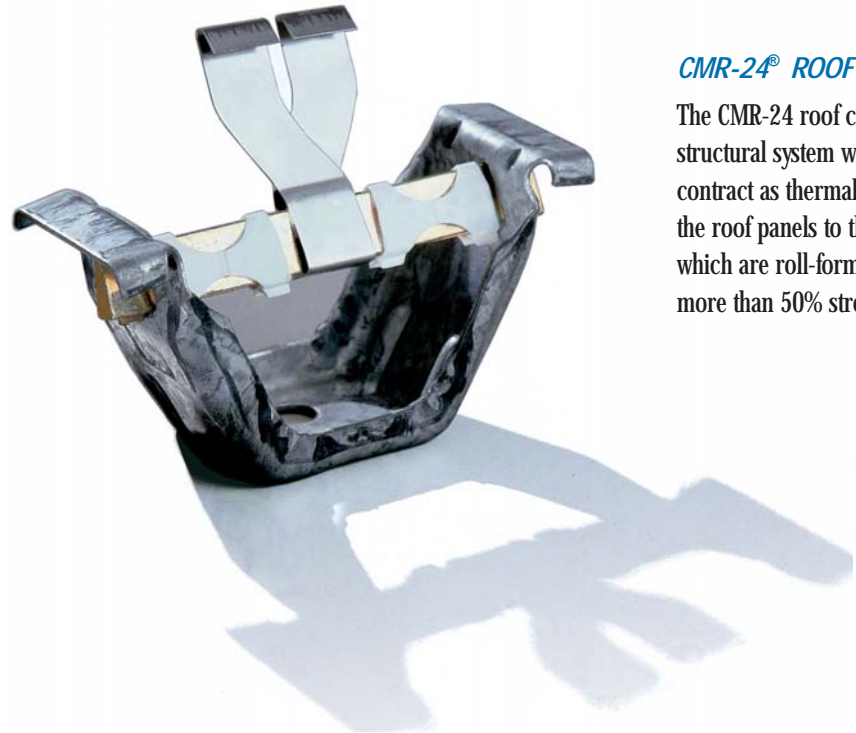


CMR-24® ROOF SYSTEM PANEL CLIP & ENDLAP

CMR-24® ROOF SYSTEM



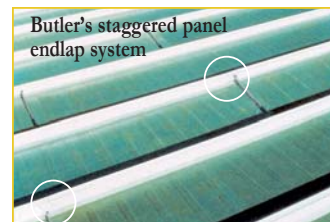
CMR-24® ROOF CLIP

The CMR-24 roof clip securely holds the panels to the supporting structural system while allowing the entire roof to expand and contract as thermal conditions change. Roof clips securely attach the roof panels to the supporting structurals by stainless steel tabs which are roll-formed into the panel seam. Stainless steel tabs are more than 50% stronger than other steel tabs.



An energy efficient composite roof system using the industry's most specified standing seam roof system.

ROOF PANEL ENDLAP CONNECTION



Butler staggers the panel endlaps to avoid the four-corner condition - another design feature to assure weathertightness and longer roof life.



Most manufacturers locate panel splices at exactly the same position across the entire roof. This creates a condition where four panel corners must be joined at the same location. That four-corner condition is very difficult to seal and keep weathertight.

FACTORY PUNCHED PANEL & STRUCTURALS



Butler: Factory Punched Panels (above)

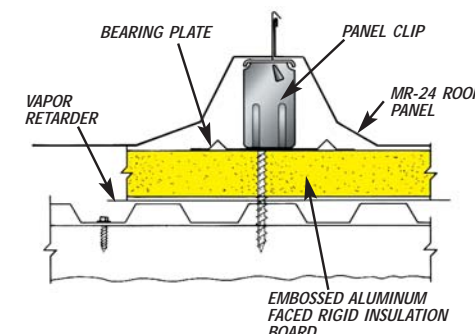
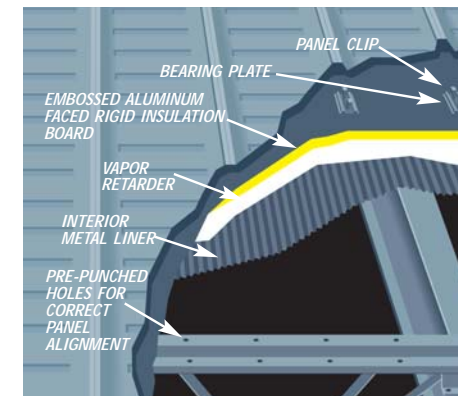


Other Manufacturer (above)

Without factory punching of both panels & structurals, these misaligned panels bind on clips, strain seams and compromise the life and weathertightness of the roof.

The CMR-24® roof system uses the same exclusive panel seaming process and clip system used on the MR-24® roof system. The panel seam is permanently roll-formed for weathertightness and the clip holds the panels securely to the structural system while allowing the entire roof to move like a single membrane.

The CMR-24 roof system is available in 24 gage unpainted Galvalume Plus® or 24 gage galvanized steel painted with the Butler-Cote® finish system (a fluoropolymer containing 70% Kynar 500® or Hylar 5000® resin). The CMR-24 roof system has a U.L. Class 90 wind uplift rating and a Factory Mutual Class A Fire rating.



METAL LINER

The steel liner panel is corrugated for added strength and delivers a uniform, attractive appearance to the underside of the roof. The liner also acts as a diaphragm to transfer loads through the roof system. Available galvanized or painted, the liner panel can be easily cleaned.

VAPOR RETARDER

A vapor retarder keeps the insulation material joints dry and prevents condensation from forming within the roof system.

INSULATION

Superior quality rigid board insulation, with embossed aluminum facing on both sides, is available in a variety of thicknesses and insulation values. The CMR-24 can deliver exceptional R-values.

Unlike fiberglass blanket insulation, rigid foam board insulation does not absorb noise and may not be suitable for certain buildings. For buildings where noise transmitted through the roof may be a concern, the ThermalLiner™ insulation system by Butler should be considered.

BEARING PLATE

The bearing plate evenly distributes the weight of the roof panels and clips to the supporting structural steel.

WARRANTY

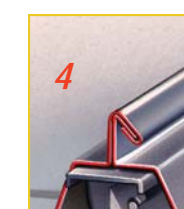
The CMR-24 roof system is available with a 25-year warranty, not just against perforation, but weathertightness as well. With reasonable care and maintenance, it is your 25-year solution to roof problems.



Butler's exclusive Pittsburgh double-lock standing seam assures consistent weathertightness with virtually maintenance free performance for many years.



During installation, (left - 1-5) the edges of each roof panel are joined and field roll-formed 180 degrees by machine, completing a full 360 degree seam. Inside the seam, a factory-applied sealant eliminates the chance for even tiny capillary leaks.



The seaming process uses a heavy-duty, four-stand, electric, portable Roof Runner® roll forming machine.

BUTLER QUALITY
Every material, coating and process used in your new Butler® building is tested to ensure strict compliance with rigorous performance standards. Butler tests every supplier on a continuous basis. Butler is the only manufacturer in the industry committed to this level of quality.

Galvalume Plus® is a registered trademark of BIEC International, Inc.
Galvalume® is a registered trademark of BIEC International, Inc.
Acrylume™ is a trademark of United States Steel.
Fluropon® is a registered trademark of The Valspar Corporation.
Kynar 500® is a registered trademark of ATOFINA.
Hylar 5000® is a registered trademark of Solvay S.A.

Butler building products are constantly being improved; therefore, the information contained herein is subject to change without notice. Before finalizing project details, contact your nearest Butler Builder® or Butler Manufacturing Company for the latest information.



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CMR-24® ROOF SYSTEM SPECIFICATIONS

1. GENERAL

The roof shall be covered with the CMR-24® roof system as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions.

2. COMPONENT DESCRIPTION

2.1 Roof Panels

2.1.1 Roof panel shall be the factory roll-formed MR-24® roof system panel as manufactured by Butler Manufacturing Company; 24" wide, with 2 major corrugations, 2" high (2-3/4" including seam) 24" on center. The flat of the panel shall contain cross flutes 6" on center perpendicular to the major corrugations the entire length of the panel to reduce wind noise and improve walkability.

2.1.2 Panel material as specified shall be 24 gage aluminum-zinc alloy-coated steel (AZ55) with mill-applied acrylic surface treatment (GALVALUME PLUS® or ACRYLUME™). Minimum 0.55 ounce coated weight per square foot (approximately 55% aluminum 45% zinc applied by the continuous hot dip method) as determined by the triple-spot test per ASTM A792

OR

24 gage galvanized (G-90 coating), per ASTM specification A653 (G90), and painted with exterior colors of Butler-Cote® finish system, a full strength, 70% Kynar 500® or Hylar 5000® fluoropolymer coating. Manufacturer warrants that coating shall not blister, peel, crack, chip, or experience material rust through for 25 years. For a period of 25 years chalking shall not exceed #8 - ASTM D4214 and fading shall be 5ΔE Color Difference Units or less.

OR

Special material or color as applicable for custom design.

2.1.3 Panel of maximum possible length shall be used to minimize endlap; eave panel shall extend beyond the structural line of the sidewall.

2.1.4 Panel shall be factory prepunched at panel end to match prepunched holes in the eave structural member. Panel end splice shall be floating and factory prepunched and prenotched. Panel end splice shall allow the roof panel to expand and contract with roof panel temperature change.

2.1.5 Ridge assembly shall be designed to allow roof panel to move lengthwise with expansion/contraction as the roof panel temperature changes. Parts shall be factory prepunched for correct field assembly. Panel closure and interior reinforcing strap shall be installed to seal the panel ends at the ridge. The attachment fasteners shall not be exposed on the weather side. A lockseam plug shall be used to seal the lockseam portion of the panel. A hi-tensile steel ridge cover shall span from panel closure to panel closure and flex as the roof system expands and contracts.

2.2 Insulation Board

2.2.1 Insulation board shall be rigid glass fiber-reinforced polyisocyanurate foam board, 4" wide, 3/4" or 1-3/4" thick (as specified), or custom design thickness up to 4" and covered with embossed aluminum facing both sides.

2.3 Vapor Retarder

2.3.1 Vapor retarder shall be 0.0032" minimum thick vinyl (perm rating 1.0);

OR

A flame resistant vapor retarder facing material consisting of vinyl film and metallized substrate laminated to a fiberglass scrim reinforcement. (VRP™) (perm rating .02)

2.4 Liner Panel

2.4.1 Interior liner panel shall be formed from 0.015" (minimum thickness) coated steel with minimum yield strength of 80,000 psi.

2.4.2 Unpainted liner panel shall be (GALVALUME) aluminum-zinc alloy coated steel. The coating (approximately 55% aluminum and 45% zinc) shall be applied by the continuous hot dip method. The coating shall be a minimum of 0.50 ounces per square foot as determined by the triple spot test per ASTM specification A792, OR

Painted panel shall be G60 galvanized steel conforming to ASTM specification A653 (G60) and 0.50 mil (minimum) Snow White polyester paint on exposed side and 0.30 mil (minimum) non-color controlled wash coat primer on unexposed side.

2.4.3 Panel shall be nominal 36" wide with corrugations 9/16" high, 2- 9/16" on center; panel shall be factory cut to required length.

3. SYSTEM DESIGN

3.1 All components of the CMR-24 roof system shall be designed in accordance with sound engineering methods and practices.

3.2 MR-24 roof system panel and liner panel shall be designed in accordance with AISI "Specifications for the Design of Light Gage, Cold-Formed Steel Structural Members," or CAN/CSAS 136 "Cold-Formed Steel Structural Members"-latest edition.

3.3 Paneling system shall be designed to support design live load.

3.4 Endwall trim and roof transition flashing shall allow the roof panel to move relative to the wall panel and/or the parapet as the roof expands and contracts with temperature change.

3.5 Neither the liner panel nor the MR-24 roof system panel shall be considered to be a safe work platform until completely secured to the structural system. Therefore, walkboards or other safety equipment, as required by safety standards, shall be provided by the erecting contractor to provide for worker safety during panel installation.

4. SYSTEM INSTALLATION

4.1 Liner panel and insulation board shall be positioned and aligned by installing the starting panel against the endwall trim clips and the side wall eave structural.

4.2 Liner panel shall be placed with edges up and corrugations perpendicular to secondary structural; and endlap shall always occur over secondary structural.

4.3 Liner panel is attached to roof secondary structural members with self-drilling screws according to the manufacturer's drawings and design requirements.

4.4 Vapor retarder shall be installed over the liner panel with 6" minimum sidelap and endlap.

4.5 Panel clips and bearing plates shall be positioned by matching the hole in the clip with the prepunched hole in the secondary structural members.

4.6 Panel shall be positioned and properly aligned by matching the prepunched holes in the panel end with the prepunched holes in the eave structural member and by aligning the panel with the panel clip.

4.7 MR-24 roof system panel sidelap shall be field-seamed by a self-propelled and portable electrical lock seaming machine. The machine field forms the final 180 degrees of a 360 degree Pittsburgh double-lock standing seam; all sidelap sealant shall be factory applied.

4.8 MR-24 roof system panel endlap, when required, shall be at least 6", sealed with Butler sealant and fastened together by clamping plates. Sealant shall contain hard nylon cubes which prevent mastic from flowing out due to clamping action. The panel lap shall be joined by means of a two-piece clamped connection consisting of a bottom reinforcing plate and a top panel strap. The panel endlap shall be located directly over, but not fastened to, a supporting secondary roof structural member and be staggered, so as to avoid a four panel lap splice condition.

5. FASTENERS

5.1 Insulation board, bearing plates, and panel clips shall be fastened to structural members with Scrubolt™ fasteners as per manufacturer's erection drawings, using factory prepunched holes in structural members. Scrubolt fasteners shall contain a metal backed sealing washer which serves as a torque indicator.

5.2 Connection of MR-24 roof system panel-to-structural member except at eave shall be made with clips with movable stainless steel tabs that are seamed into the standing seam sidelap.

5.3 Panel-to-panel connections shall be made with a positive, field-formed standing double-lock seam, formed by a special seaming machine. The machine field forms the final 180 degrees of a 360 degree Pittsburgh double-lock standing seam; all sidelap sealant shall be factory applied.

5.4 Pre-drilling of the structural members is mandatory in order to maintain proper alignment of the roof system. Fasteners penetrating the metal membrane at the following locations shall not exceed the frequency listed:

FASTENING SYSTEM	FREQUENCY
Basic Panel System	0 per sq. ft.
Exterior Eave Gutter	2 per lineal ft.
Gable Trim (no parapet)	2 per lineal ft.
Ridge	1 per lineal ft.
High Eave (no parapet)	2 per lineal ft.
Panel Splices	2 per lineal ft.
High Side Transition	1 per lineal ft.

6. ACCESSORIES

6.1 Accessories (i.e., ventilator, skylight, gutter, fascia) shall be as standard with Butler Manufacturing Company, unless otherwise noted and furnished as specified.

6.2 The color coating on all gutter, downspout, gable trim and eave trim to be Butler-Cote finish system, a full strength, 70% Kynar 500 or Hylar 5000 fluoropolymer coating.

6.3 Location of standard accessories shall be as shown on erection drawings as furnished by Butler Manufacturing Company.

6.4 Material used in flashing and transition parts and furnished as standard by Butler Manufacturing Company may or may not match the roof panel material. Parts shall be compatible and shall not cause a corrosive condition. Copper and lead material shall not be used with GALVALUME or optional aluminum coated panel.

7. PERFORMANCE TESTING

7.1 Underwriters Laboratories - The roof system shall carry a U.L. wind uplift resistance classification of 90 to ensure structural integrity and possible reduction of insurance rates (Construction No. 178)

7.2 U. S. Army Corps of Engineers Guide Specification 07416.

The CMR-24 roof system has been tested and certified in accordance with the Army Corps of Engineers Guide Specification 07416 (Test Method for Structural Performance of Standing Seam Metal Roof Systems By Uniform Static Air Pressure Difference).

7.3 Air Infiltration shall not exceed .050 cfm per square foot of roof area when tested in reference to ASTM E 1680, latest edition at a static pressure differential of 12.0 psf.

7.4 There shall be no uncontrolled water penetration through the panel seams when tested in reference to ASTM E 1646, latest edition at a static pressure differential of 12.0 psf.

7.5 FM Global - The roof system shall qualify for Approval as Class 1 Panel Roof (FMRC Standard 4471) and be listed in Factory Mutual Approval Guide - latest edition.

7.6 National Fire Protection Association - The roof system shall be considered acceptable where Class A roof coverings are required for exterior fire exposure.

7.7 U.B.C. The roof system shall be considered acceptable where Class A roof coverings are required for exterior fire exposure.

7.8 S.B.C. The roof system shall be considered acceptable where Class A roof coverings are required for exterior fire exposure.

7.9 B.O.C.A. - The roof system shall be considered acceptable where Class A roof coverings are required for exterior fire exposure.

8. PROVISION FOR EXPANSION/CONTRACTION

8.1 Provision for thermal expansion movement of the MR-24 roof system panel shall be accomplished by the use of clips with a movable tab. The stainless steel tab shall be factory centered on the roof clip when installed to assure full movement in either direction. A force of no more than 8 pounds will be required to initiate tab movement. Each clip shall accommodate a minimum of 1.25" movement in either direction.

8.2 The roof shall provide for thermal expansion/contraction without detrimental effect on the roof panel when there is a ±100°F temperature difference between the inside structural framework of the building and the temperature of the roof panels.

9. THERMAL PERFORMANCE

9.1 The R-value for available rigid insulation thicknesses shall be as follows:

RIGID INSULATION THICKNESS (IN INCHES)	R-VALUE
0.75	8.9
1.00	10.4
1.50	13.8
1.75	15.8
2.00	17.0
2.50	19.8
3.00	23.0
3.50	25.1
4.00	29.3

10. PHYSICAL PERFORMANCE

10.1 The vinyl vapor retarder shall have a water vapor permeance (perm) rating of 1.0 when tested in accordance with ASTM E96. Workability temperature shall be 40° F. minimum,

OR

For conditions of high interior humidity vinyl film and metallized substrate laminated to a fiberglass scrim reinforcement (VRP™) vapor retarder with a water vapor permeance (perm) rating of .02 when tested in accordance with ASTM E96 Proc. A. Workability temperature shall be -40° F. minimum.

10.2 The vapor retarder shall have a U.L. fire hazard classification (U.L. 723) with the following ratings:

CATEGORY	VINYL	VRP
Flame Spread	25	25
Smoke Developed	50	50

10.3 The insulation board facing shall have a water vapor permeance (perm) rating of 0.03 when tested in accordance with ASTM E96.

10.4 The insulation board shall carry a Class I FM Global Approval and a U.L. Fire Hazard Classification (U.L. 723) with the following ratings:

CATEGORY	RATING
Flame Spread	25 or less
Smoke Developed	less than 90 for 3/4" insulation. less than 200 for 1-3/4" insulation

WIND UPLIFT

As winds blow over the roof of a building, a suction is created which exerts an upward force called wind uplift. Tested in accordance with the Corps of Engineers and the CEGS 07416/ASTM E 1592 tests, the CMR-24 roof system carries the highest wind uplift ratings (Class 90) awarded by Underwriters Laboratories. It has been fully tested and approved by the Factory Mutual Research Corporation as a Class 1 panel roof and is available in various windstorm classifications including 1-60, 1-90 and 1-120. (Heavier gage material or decreased purlin spacing may be required.)

These ratings may result in lower insurance premiums for your new building.