

# ML200 Panel

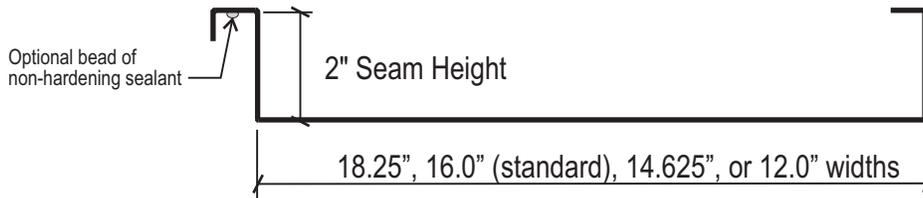
## Technical Data Guide

### Description

ML200 is a mechanical seamed standing seam roofing panel used on low to steep sloped commercial applications. The panel is factory formed in continuous lengths up to 60'-0" long. Attachment to either open framing or solid substrate with galvanized steel clips at specific intervals. Refer to product test results for clip spacing requirements.

### Application

Product can be applied to open framing (up to 5'-0" on center) and various solid substrate applications such as wood sheathing, wood planking, metal decking, and rigid insulation applied over metal decking. Minimum recommended slope is 1/2:12. The ML200 panel is applicable for projects requiring manufacturer's weathertightness warranty.



### Test Results

#### ASTM E-1680-95 Air Infiltration

Standard Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel System

Static Pressure Differential	Air Infiltration Rate
1.57 psf	0.001 cfm/ft <sup>2</sup>
6.24 psf	0.006 cfm/ft <sup>2</sup>

#### ASTM E-1646-95 Water Infiltration

Standard Test Method for Water Penetration of Exterior Metal Roof Panel System by Uniform Static Air Pressure Differential

Static Pressure Differential	Water Infiltration
6.24 psf	No Water Leakage

#### ASTM E-1592 Structural Performance - for 16" wide, 24 gauge ML200 Panel

Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference

Clip Spacing	Ultimate Load	Design Load
12" on center	223.6 psf	111.8 psf
60" on center	88.4 psf	44.2 psf

Notes:

1. The design load is calculated by dividing the ultimate load by the factor of safety of 2.0
2. Panel seam is 180 degree (double lock) profile

#### UL 1897 Wind Uplift Resistance - for 16" wide, 24 gauge ML200 Panel over 22 gauge steel deck

Standard test method to provide uplift resistance data for the evaluation of the attachment of roof covering to roof decks

Clip Spacing	Ultimate Load	Design Load
12" on center	232 psf	116 psf
36" on center	142 psf	71 psf

Notes:

1. The design load is calculated by dividing the ultimate load by the factor of safety of 2.0
2. Panel seam is 180 degree (double lock) profile
3. Panel clip: ML150 #32 Expansion Clip (22 gauge)

### Florida Approval Listings - Florida Bldg. Code 5th Addition (2014)

**FL7271.12 ML200 Panel up to 16" wide x 24 gauge over 22 gauge steel decking**



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# ML200 Panel Technical Data Guide

## Approval Listings

### UL790 Fire Resistance of Roof Covering Materials & UL2218 Impact Resistance of Roof Covering Materials

#### TGFU.R20494 Roofing Systems

##### Class A

Coated steel panels (surfacing) identified as "R Panel", "PBR Panel", "MasterRib", "5V Panel", "Advantage-Lok", "Advantage-Lok II", "Performa Steel Shingle", "Relia-Clad", "CSL Standing Seam" (SL150), "ML150", "ML200" and "SL175"

**1. Deck:** C-15/32 **Incline:** Unlimited **Impact:** Class 4  
Barrier Board: — 1/4 in. (min) G-P Gypsum DensDeck® with all joints staggered a min of 6 in. from the plywood joints.  
Ply Sheet (Optional): — Any UL Classified Type G1, G2 or G3 base/ply sheet, Type 15, 20 or 30 felt or UL Classified prepared roofing accessory or WR Grace "Ice and Water Shield".  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**2. Deck:** C-15/32 or spaced sheathing **Incline:** Unlimited **Impact:** Class 4  
Underlayment: — One layer Elk Corp. "VersaShield Underlayment", mechanically fastened.  
Ply Sheet (Optional): — One layer Type 30 base sheet or Elk Corp. "VersaShield", mechanically fastened.  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**3. Deck:** C-15/32 or spaced sheathing **Incline:** Unlimited **Impact:** Class 4  
Underlayment: — One or more layer Elk Corp. "VersaShield Underlayment", mechanically fastened.  
Batten: — 2" x 2" wood battens  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**4. Deck:** NC **Incline:** Unlimited **Impact:** Class 4  
Barrier Board: — 1/4 in. min. G-P Gypsum DensDeck®.  
Ply Sheet (Optional): — Any UL Classified Type G1, G2 or G3 base/ply sheet, Type 15, 20 or 30 felt or UL Classified prepared roofing accessory or WR Grace "Ice and Water Shield".  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**5. Deck:** NC **Incline:** Unlimited **Impact:** Class 4  
Barrier Board: — 7/16 OBS or 5/8 in. plywood over polyisocyanurate insulation board or polyisocyanurate composite board, any thickness.  
Ply Sheet (Optional): — Any UL Classified Type G1, G2 or G3 base/ply sheet, Type 15, 20 or 30 felt or UL Classified prepared roofing accessory or WR Grace "Ice and Water Shield".  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**6. Deck:** NC **Incline:** Unlimited **Impact:** Class 4  
Insulation: — Polyisocyanurate, glass fiber, perlite or wood fiber, any thickness.  
Ply Sheet (Optional): — Any UL Classified Type G1, G2 or G3 base/ply sheet, Type 15, 20 or 30 felt or UL Classified prepared roofing accessory or WR Grace "Ice and Water Shield".  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

**7. Deck:** NC **Incline:** Unlimited **Impact:** Class 4  
Insulation: — None required, however any UL Classified insulations may be used over open purlin spans. Any combination and any total thickness of insulation may be used.  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

##### Class C

Coated steel panels (surfacing) identified as "R Panel", "PBR Panel", "MasterRib", "5V Panel", "Advantage-Lok", "Advantage-Lok II", "Performa Steel Shingle", "Relia-Clad", "CSL Standing Seam" (SL150).

**1. Deck:** C-15/32 **Incline:** Unlimited **Impact:** Class 4  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.

### Maintenance and Repair Class A

Coated steel panels (surfacing) identified as "R Panel", "PBR Panel", "MasterRib", "5V Panel", "Advantage-Lok", "Advantage-Lok II", "Performa Steel Shingle", "Relia-Clad", "CSL Standing Seam", "ML150", "ML200" and "SL175".

**1. Deck:** C-15/32 or spaced sheathing **Incline:** Unlimited **Impact:** Class 4  
Existing Roof System: — Any class A, B, or C shingle  
Underlayment: — One layer Elk Corp. "VersaShield Underlayment", mechanically fastened.  
Surfacing: — Coated Steel roofing panels, mechanically fastened or with steel screws when roof deck fasteners (panel clips) not required.



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# ML200 Panel

## Technical Data Guide

### Approval Listings

#### UL580 Class 90 Wind Uplift Resistance

##### Construction No. 90 - ML200 Panel over Open Framing with Batt Insulation

1. Metal Panels: No. 24 MSG minimum thickness coated steel. Panel width 16 inches maximum
2. Purlins: No. Z-shaped, 16 MSG minimum thickness steel (40,000 psi min. yield strength) or "H" series open web steel joist. Maximum spacing 60-1/4 inches on center
3. Panel Clips: No. 22 MSG minimum coated steel (ML200 fixed or expansion clip) at each purlin location
4. Fasteners: No. 12-14 x 1" long (min.) self-drilling hex head plated steel screw. Two screws per clip.
5. Insulation (optional): Any compressible blanket type 6 inches maximum before compression. Additional 2 inch maximum thickness of compressible blanket insulation may be used between purlins

##### Construction No. 176 - ML200 Panel over Open Framing with Batt Insulation

1. Metal Panels: No. 24 MSG minimum thickness coated steel. Panel width 16 inches maximum
2. Purlins: No. Z-shaped, 16 MSG minimum thickness steel (40,000 psi min. yield strength). Maximum spacing 60-1/4 inches on center
3. Fasteners: For panel to purlin to be 12-14 x 1" long self-drilling hex head plated steel screw with 1/2 inch washer. Spacing to be 16 inches on center with one fastener located 2 inches from the female sided of each panel.
4. Insulation (optional): Any compressible blanket type 6 inches maximum before compression. Additional 2 inch maximum thickness of compressible blanket insulation may be used between purlins

##### Construction No. 180 - ML200 Panel over Open Framing with Rigid Insulation

1. Metal Panels: No. 24 MSG minimum thickness coated steel. Panel width 16 inches maximum
2. Purlins: No. Z-shaped, 16 MSG minimum thickness steel (40,000 psi min. yield strength) or "H" series open web steel joist. Maximum spacing 60-1/4 inches on center
3. Panel Clips: No. 22 MSG minimum coated steel (ML200 fixed or expansion clip) at each purlin location
4. Bearing Plate: Minimum No. 18 MSG thickness steel, 4-1/2 inch wide x 6 inch long located at each clip
5. Fasteners: No. 12-14 self-drilling hex head plated steel screw. Length sufficient to penetrate purlin minimum 3/4 inches. Two screws per clip.
6. Insulation: Rigid type foamed plastic supplied in 4 foot sheets. Minimum thickness 1 inch, maximum thickness 3 inches
7. Liner Panel (optional): No. 29 MSG minimum coated steel; 9/16 inch depth with ribs having 3/4 inch wide crest and spaced 2.667 inches on center. (Minimum yield strength to be 80,000 psi)

##### Construction No. 238 - ML200 Panel over Rigid Insulation over Metal Decking

1. Metal Panels: No. 24 MSG minimum thickness coated steel. Panel width 16 inches maximum
2. Liner Panel (decking): 3 inch deep and fabricated of No. 22 MSG steel (yield strength to be 33,000 psi)
3. Panel Clips: No. 22 MSG minimum coated steel (ML200 fixed or expansion clip)
4. Bearing Plate: Minimum No. 18 MSG thickness steel, 4-1/2 inch wide x 6 inch long
5. Fasteners: No. 12 flat head screw to attach bearing plate to liner panel. Three fasteners per bearing plate. Screws to attached panel clip to bearing plate to be No. 18 by 1 inch long self-drilling hex washer head plated steel screw. Two screws per clip.
6. Rigid Insulation: Rigid type foamed plastic supplied in 4 foot sheets. Minimum thickness 1 inch (density min. 2 PCF)

##### Construction No. 238A - ML200 Panel over Rigid Insulation over Metal Decking

1. Metal Panels: No. 24 MSG minimum thickness coated steel. Panel width 16 inches maximum
2. Liner Panel (decking): 1-1/2 inch deep type A, B, F, or N deck fabricated of No. 22 MSG minimum gauge steel (yield strength to be 33,000 psi)
3. Panel Clips: No. 22 MSG minimum coated steel (ML200 fixed or expansion clip). Space 30 inches on center max.
4. Bearing Plate: Minimum No. 18 MSG thickness steel, 4-1/2 inch wide x 6 inch long
5. Fasteners: No. 12 x minimum 3-3/4 inch long self drilling plated steel screw. Two screws per clip
6. Rigid Insulation: Rigid type foamed plastic supplied in 4 foot sheets. Minimum thickness 1 inch (density min. 2 PCF)

Complete UL assembly information for each construction number can be referenced online at Underwriters Laboratories Online Certifications Directory (UL.com).



# ML200 Panel

## Technical Data Guide

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### Sectional Properties and Load Tables for ML200 Panel - 12" wide

12" Wide ML200 Panel - Sectional Properties

Gauge	Thickness (inches)	Weight (psf)	Yield Stress (ksi)	Allowable Shear (kips/ft)	Top in Compression (Positive Bending)			Bottom in Compression (Negative Bending)		
					I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft	I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft
24	0.0225	1.383	50	1.06	0.1833	0.1149	3.4400	0.0900	0.0809	2.4230
22	0.0285	1.747	50	1.70	0.2522	0.1619	4.7670	0.1218	0.1138	3.4070

Notes on Section Properties:

1. Section properties and allowables are calculated in accordance with North American Specification for the Design of Cold-Formed Steel Structural Members (2007 Edition)
2. I +/- is for deflection determination and S +/- is for bending determination.
3. M<sub>a</sub> is allowable bending moment and V<sub>a</sub> is allowable shear.
4. All values are for one foot of panel width.
5. Minimum deliverable bare steel thickness should not be less than 0.95 of design thickness.

12" Wide ML200 Panel - Allowable Live and Wind Loads (psf)

Gauge	Span	Load	Span (ft)							
			2	2.25	2.5	3	3.5	4	4.5	5
24	Single	LL	573.3	453.0	366.9	254.8	187.2	143.3	113.3	91.7
		WL	403.8	319.1	258.5	179.5	131.9	92.2	64.7	47.2
	2 Span	LL	364.5	293.8	241.5	171.0	127.2	98.2	78.0	63.5
		WL	474.7	388.1	322.6	232.2	174.6	135.8	108.4	88.5
	3 Span	LL	414.6	335.6	276.8	197.1	147.0	113.7	90.5	73.7
		WL	530.8	436.7	364.9	264.7	200.1	156.2	122.2	89.1
22	Single	LL	794.5	627.8	508.5	353.1	259.4	198.6	156.9	127.1
		WL	567.8	448.7	363.4	252.4	185.4	124.8	87.6	63.9
	2 Span	LL	523.9	420.6	344.7	243.1	180.3	139.0	110.3	89.6
		WL	685.8	557.0	460.6	329.0	246.1	190.6	151.9	123.8
	3 Span	LL	598.9	482.6	396.6	280.9	208.9	161.2	128.1	104.2
		WL	772.9	631.2	524.3	377.0	283.1	220.0	165.4	120.5

Notes on Load Table:

1. Allowable live or wind load is the smallest load due to bending, shear, combined bending and shear and deflection limitation of span/240.
2. These loads are for panel strength. Panel sidelaps, clips, fasteners, and all supports must be designed or tested to resist all loads imposed on the panel.
3. Allowable wind loads based on stress have not been increased by 33.33% for wind uplift.
4. For roof panels, self weight of the panel has to be deducted from the allowable inward load to arrive at the actual 'live load' carrying of the panel.
5. LL= Live Load, WL= Wind Load.



# ML200 Panel

## Technical Data Guide

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### Sectional Properties and Load Tables for ML200 Panel - 16" wide

16" Wide ML200 Panel - Sectional Properties

Gauge	Thickness (inches)	Weight (psf)	Yield Stress (ksi)	Allowable Shear (kips/ft)	Top in Compression (Positive Bending)			Bottom in Compression (Negative Bending)		
					I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft	I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft
24	0.0225	1.267	50	0.79	0.1421	0.0846	2.5330	0.0677	0.0608	1.8220
22	0.0285	1.601	50	1.27	0.2018	0.1233	3.6920	0.0915	0.0857	2.5640

Notes on Section Properties:

- Section properties and allowables are calculated in accordance with North American Specification for the Design of Cold-Formed Steel Structural Members (2007 Edition)
- I +/- is for deflection determination and S +/- is for bending determination.
- M<sub>a</sub> is allowable bending moment and V<sub>a</sub> is allowable shear.
- All values are for one foot of panel width.
- Minimum deliverable bare steel thickness should not be less than 0.95 of design thickness.

16" Wide ML200 Panel - Allowable Live and Wind Loads (psf)

Gauge	Span	Load	Span (ft)							
			2	2.25	2.5	3	3.5	4	4.5	5
24	Single	LL	422.1	333.5	270.2	187.6	137.8	105.5	83.4	67.5
		WL	303.6	239.9	194.3	134.9	99.1	69.3	48.7	35.5
	2 Span	LL	273.9	220.8	181.5	128.6	95.6	73.8	58.7	47.7
		WL	351.5	287.1	238.5	171.5	128.8	100.1	80.0	65.3
	3 Span	LL	311.5	252.2	208.1	148.1	110.5	85.5	68.1	55.4
		WL	393.4	323.4	270.0	195.7	147.8	115.3	91.8	67.0
22	Single	LL	615.4	486.2	393.8	273.5	200.9	153.8	121.6	98.5
		WL	427.3	337.6	273.4	189.9	139.5	93.7	65.8	48.0
	2 Span	LL	394.0	316.3	259.2	182.9	135.7	104.5	83.0	67.4
		WL	526.7	428.4	354.6	253.7	189.9	147.3	117.4	95.7
	3 Span	LL	450.4	362.9	298.3	211.3	157.1	121.3	96.4	78.4
		WL	592.6	484.8	403.1	290.4	218.4	169.9	124.2	90.6

Notes on Load Table:

- Allowable live or wind load is the smallest load due to bending, shear, combined bending and shear and deflection limitation of span/240.
- These loads are for panel strength. Panel sidelaps, clips, fasteners, and all supports must be designed or tested to resist all loads imposed on the panel.
- Allowable wind loads based on stress have not been increased by 33.33% for wind uplift.
- For roof panels, self weight of the panel has to be deducted from the allowable inward load to arrive at the actual 'live load' carrying of the panel.
- LL= Live Load, WL= Wind Load.



# ML200 Panel

## Technical Data Guide

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### Sectional Properties and Load Tables for ML200 Panel - 18" wide

18" Wide ML200 Panel - Sectional Properties

Gauge	Thickness (inches)	Weight (psf)	Yield Stress (ksi)	Allowable Shear (kips/ft)	Top in Compression (Positive Bending)			Bottom in Compression (Negative Bending)		
					I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft	I <sub>xx</sub> in <sup>4</sup> /ft	S <sub>xx</sub> in <sup>3</sup> /ft	M <sub>a</sub> in.kips/ft
24	0.0225	1.228	50	0.71	0.1280	0.0748	2.2390	0.0600	0.0541	1.6200
22	0.0285	1.553	50	1.13	0.1833	0.1099	3.2910	0.0813	0.0762	2.2810

Notes on Section Properties:

1. Section properties and allowables are calculated in accordance with North American Specification for the Design of Cold-Formed Steel Structural Members (2007 Edition)
2. I +/- is for deflection determination and S +/- is for bending determination.
3. M<sub>a</sub> is allowable bending moment and V<sub>a</sub> is allowable shear.
4. All values are for one foot of panel width.
5. Minimum deliverable bare steel thickness should not be less than 0.95 of design thickness.

18" Wide ML200 Panel - Allowable Live and Wind Loads (psf)

Gauge	Span	Load	Span (ft)							
			2	2.25	2.5	3	3.5	4	4.5	5
24	Single	LL	373.1	294.8	238.8	165.8	121.8	93.3	73.7	59.7
		WL	270.0	213.3	172.8	120.0	88.2	61.5	43.2	31.5
	2 Span	LL	243.6	196.3	161.4	114.3	85.0	65.6	52.2	42.4
		WL	311.2	254.2	211.1	151.7	114.0	88.6	70.7	57.7
	3 Span	LL	277.0	224.3	185.0	131.7	98.3	76.0	60.5	49.3
		WL	348.5	286.3	239.0	173.1	130.7	101.9	81.5	59.4
22	Single	LL	548.4	433.3	351.0	243.8	179.1	137.1	108.3	87.8
		WL	380.2	300.4	243.3	169.0	124.2	83.3	58.5	42.7
	2 Span	LL	350.6	281.5	230.7	162.7	120.7	93.0	73.8	60.0
		WL	469.1	381.6	315.9	226.0	169.2	131.2	104.6	85.3
	3 Span	LL	400.7	322.9	265.4	188.0	139.8	107.9	85.8	69.8
		WL	527.7	431.7	359.1	258.7	194.6	151.4	110.4	80.5

Notes on Load Table:

1. Allowable live or wind load is the smallest load due to bending, shear, combined bending and shear and deflection limitation of span/240.
2. These loads are for panel strength. Panel sidelaps, clips, fasteners, and all supports must be designed or tested to resist all loads imposed on the panel.
3. Allowable wind loads based on stress have not been increased by 33.33% for wind uplift.
4. For roof panels, self weight of the panel has to be deducted from the allowable inward load to arrive at the actual 'live load' carrying of the panel.
5. LL= Live Load, WL= Wind Load.