

Evaluation Report

**Metal Roof Assembly
Loadmaster Systems
“Super Span 150 I-250 Insulated Roof Deck System”
Impact Rated**

Manufacturer

Loadmaster Systems, Inc.

3100 Northwoods Place, Suite E
Peachtree Corners, GA 30071
(800) 527-4035

for

Florida Product Approval

FL 21581.2 R3

Florida Building Code 8th Edition (2023)

Per Rule 61G20-3

Method: 2 – B

Category: Roofing

Sub - Category: Metal Roofing

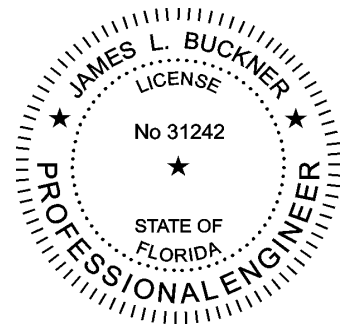
This item has been electronically signed and sealed by James L. Buckner, P.E., on this date using a Digital Signature. Printed copies of this document are not considered signed and sealed, and the signature must be verified on any electronic copies.

Prepared by:

James L. Buckner, P.E., SECB
Florida Professional Engineer # 31242
Florida Evaluation ANE ID: 1916
Report No. 02_23-562-LM-SS150-IR-ER8
Date: 10 / 20 / 2023

Contents:

Evaluation Report Pages 1 – 7
Attached Test Report # 32-0155T-11D-F



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1.0 Product

- 1.1 **Manufacturer:** Loadmaster System, Inc.
 1.2 **Assembly Name:** "Super Span 150 Deck" – Metal Roof Assembly

2.0 Evaluation Scope:**2.1 Compliance with the following**

Florida Building Code 8th Edition (2023) for Wind Load Resistance
 Florida Product Approval Rule 61G20-3.005 (1) (d)
 ICC 500- 14 Impact Test report per FBC 7th (2020)

2.2 Evaluation Classification:

Category: Roofing
 Sub Category: Metal Roofing

2.3 Properties Evaluated

Structural Properties

2.4 Limits of Evaluation:

This product assembly evaluation is limited to compliance with section 2.1 to section 2.4 of this report.

3.0 Product Assembly as Evaluated:

- **Metal Roof Panel:** McElroy 238T Panel, mechanically attached
- **Panel Clips:** Multispan Continuous Fixed Clip
- **Panel Batten:** 238T Panel Seam Cap
- **Deck System:** Loadmaster Super Span 150 I-250 Insulated Roof Deck System
 - Two layer of Loadmaster Duraclad Self-Adhered Roofing Underlayment
 - Two layer of Loadmaster Duraflex Mineral Board, mechanically attached steel deck
 - One layer of Rigid Insulation board
 - Loadmaster Super Span 150 Steel Deck, mechanically attached

4.0 Support:

Type: Purlins, Bar Joist or Roof Beam
 Material: Steel
 Top Flange Thickness: 12 Ga. Minimum
 Yield Strength: 33 ksi Minimum
 Spacing: 5'-0" (or 60") o.c. Maximum

(Design of support system is outside the scope of this evaluation)

5.0 Slope:

Minimum slope shall be: 1/4 : 12 or greater

Minimum slope shall be in compliance with FBC Chapter 15 based on the type of roof covering, applicable code sections and in accordance with manufacturer's recommendations.

6.0 Product Assembly Structural Performance:**6.1 Wind Uplift Resistance:**

*** Design Uplift Resistance: - 206 PSF**

** Allowable design pressure for allowable stress design (ASD)*

6.2 Large Missile Impact Test:

Test Results: **Pass** per the following criteria
Missile Size Criteria = Tornado Shelter per ICC 500-08 Section 305.1
Test Speed = 100 feet per second

Missile Weight = 15.2 lbs
Missile Length = 12 ft.
Missile Speed = 100 ft per second

Test Standard: **ICC 500-14, Section 305.1**
FBC 7th Edition (2020) Standard

Test Apparatus: ASTM E1886, Section 6
Per ICC 500-14, Section 804

Additional reference note to user:

FEMA 361 3rd Edition 2015, Safe Rooms for Tornadoes and Hurricanes is not included in this evaluation compliance certification. But, test criteria and results have much in common with certain criteria in sections B3.2.5.1 to B3.2.5.3.

7.0 Performance Standards Used for Evaluation:

7.1 The following test protocols were performed to demonstrate compliance with the intent of the code as this product is not addressed specifically in the code.

- UL580-06 – *Test for Uplift Resistance of Roof Assemblies—with Revisions through February 1998*
- UL 1897-12 – *Uplift test for roof covering system*
- ICC 500-14 – *Standard on the Design and Construction of Storm Shelters (Section 305.1 Only)*

8.0 Standard of Equivalence:

8.1 The UL 580-94 and the UL 1897-98 standard versions used to test the evaluated product assembly meets the prescribed standards in UL 580-06 and UL 1897-15 standard versions adopted by the Florida Building Code 8th Edition (2023) as evaluated in this report. The test criteria for the test referenced in above section 5.0, per ICC 500-08 is the same as section 305.1 in ICC 500-14 as adopted in Florida Building Code 7th (2020)

9.0 Code Compliance:

9.1 The product described herein have demonstrated compliance with the Florida Building Code 8th Edition (2023), Section 1708.2.

10.0 Limitations and Conditions of Use:

- 10.1 Diaphragm and axial load capacity is outside the scope of this evaluation.
- 10.2 This evaluation report for "Optional Statewide Approval" contains technical documentation, specifications and installation method(s) which include "Limitations and Conditions of Use" throughout the report in accordance with Rule 61G20-3.005. Per Rule 61G20-3.004, the Florida Building Commission is the authority to approve products under "Optional Statewide Approval".
- 10.3 Option for application outside "Limitations and Conditions of Use"
Rule 61G20-3.005(1)(e) allows engineering analysis for "project specific approval by the local authorities having jurisdiction in accordance with the alternate methods and materials authorized in the Code". Any modification of the product as evaluated in this report and approved by the Florida Building Commission is outside the scope of this evaluation and will be the responsibility of others.
- 10.4 This report is a building code product evaluation per FLPE rule (FAC) 61G15-36 to comply with Florida product approval rule (FAC) 61G20-3. This evaluation report is part of the Florida Building Commission approval for the listed code related criteria. This report by James Buckner, P.E. and CBUCK Engineering is not a design certification of code compliance construction submittal documentation, per FBC section 107, for any individual structure, site specific or permit design.
- 10.5 Design of support system is outside the scope of this report.
- 10.6 Fire Classification and Thermal Properties are outside the scope of Rule 61G20-3, and are therefore not included in this evaluation.
- 10.7 This report does not evaluate the use of this product for use in the High Velocity Hurricane Zone code section. (Dade & Broward Counties)

11.0 Quality Assurance:

The manufacturer has demonstrated compliance of roof panel products in accordance with the Florida Building Code and Rule 61G20-3.005 (3) for manufacturing under a quality assurance program audited by an approved quality assurance entity through Keystone Certifications, Inc. (FBC Organization ID# QUA 1824).

12.0 Components / Material Standards

- 12.1 Metal Roof Panel (Used in Full Assembly):
 - Product Identification: ABC 238T Roof Panel
 - Manufacturer: McElroy Metal Mill Inc.
 - Material: Aluminum
 - Thickness: 0.040" Min.
 - Width: 14" Max.
 - Rib Height: 2-3/8"
 - Alloy: 3003-H14 per ASTM B209
 - Corrosion Resistance: Per FBC Section 1507.4.3
- 12.2 Panel Clip:
 - Type: Multispan (Continuous) Fixed Clip
 - Material: Steel
 - Thickness: 24 Ga. Min.
 - Yield Strength: 50 ksi Min.
 - Corrosion Resistance: Per FBC Section 1506.7

12.3 Clip Fastener:

Material: Pancake Head / Low Profile fastener
Size: #14-13 × 6"
Corrosion Resistance: Per FBC Section 1506.6 or 1507.4.4
Standard: Per SAE J78-1979

12.4 Panel Batten / Cap Seam:

Material: Aluminum
Thickness: 0.040" Min.
Alloy: 3003-H14
Corrosion Resistance: Per FBC Section 1507.4.3

12.5 Underlayment:

Product Identification: Loadmaster Duraclad Self-Adhered Roofing Underlayment
Thickness: 40 mil
Standard: Per FBC, Section 1507.4.5

12.6 Mineral Board:

Product Identification: Loadmaster Duraflex Mineral Board
Material: Mineral Paper Surfaced Gypsum
Dimension: 48" Wide × 150" Long (or 4' × 12'-6")
Thickness: 5/8" Nominal
Standard: Per ASTM C79

12.7 Insulation:

Product Identification: Loadmaster Rigid Insulation Board
Material: Polyisocyanurate Core with Fiber Reinforced Facers
Dimension: 48" Wide × 96" Long (or 4' × 8')
Thickness: 2-1/2" Nominal
Compressive Strength: 20 psi Minimum

12.8 Deck:

Product Identification: Loadmaster Super Span 150
Profile: Trapezoidal
Material: Steel
Thickness: 20 Ga. Min.
Rib Height: 1-1/2"
Yield Strength: 80 ksi Minimum
Standard: Per AISI Cold-Formed Steel Specification

12.9 Deck to Support Fastener #1:

Function: Attach Steel Deck to Steel Support *(For Attachment Option #1)*
Type: Hex-Head, Self-Drilling Screw
Size: #12 - 24 × 1-1/4" Minimum
Corrosion Resistance: Per FBC Section 1506.6 or 1507.4.4
Standard: Per SAE J78-1979

12.10 Deck Sidelap Fastener #3:

Function: Deck to Deck Side Lap Stitching *(For Attachment Options #1 & #2)*
 Type: Hex-Head, Self-Drilling Screw
 Size: #12 - 14 × 3/4" Minimum
 Corrosion Resistance: Per FBC Section 1506.6 or 1507.4.4
 Standard: Per SAE J78-1979

12.11 Board Fastener #4 & Washer:

Function: Simultaneously Attach Mineral Board and Insulation Board to Steel Deck
 Product Identification: Loadmaster Bugle Head Roofgrip Screw
 Size: #12 - 13 × 4-1/4"
 Corrosion Resistance: Per FBC Section 1506.6 or 1507.4.4
 Standard: Per SAE J78-1979

Washer Type: Loadmaster Compression Disc
 Washer Size & Shape: 1-5/16" Dia. Hexagonal Disc
 Washer Material: Steel
 Washer Thickness: 25 Ga. Minimum
 Corrosion Resistance: In compliance with FBC Section 1507.4.3
 ASTM A792 coated, or
 ASTM A653 G90 galvanized steel

13.0 General Installation Method:

Install the "Loadmaster Super Span 150 Deck" Metal Roof Assembly in compliance with the installation method listed in this report and applicable code sections of FBC 8th Edition (2023). The installation method described herein is in accordance with the scope of this evaluation report. Refer to manufacturer's installation instructions as a supplemental guide for attachment.

14.0 Evaluation Reference Data:**14.1 UL 580-94 and UL 1897-98 – Uplift Test**

Force Engineering & Testing, Inc., Test Lab (TST ID: 5328)
 Report Project No.: 32-0156T-11B, Report Date: 6/27/11

14.2 ICC 500-08 – Impact Test (Only)

Force Engineering & Testing, Inc., Test Lab (TST ID: 5328)
 Report Project No.: 32-0155T-11D-F, Report Date: 6/29/11

14.3 Quality Assurance

Keystone Certifications, Inc. (FBC Organization ID# QUA 1824)
 Loadmasters Systems, Inc. Licensee #877

14.4 Equivalency of Test Standard Certification

By James L. Buckner, P.E. @ CBUCK Engineering

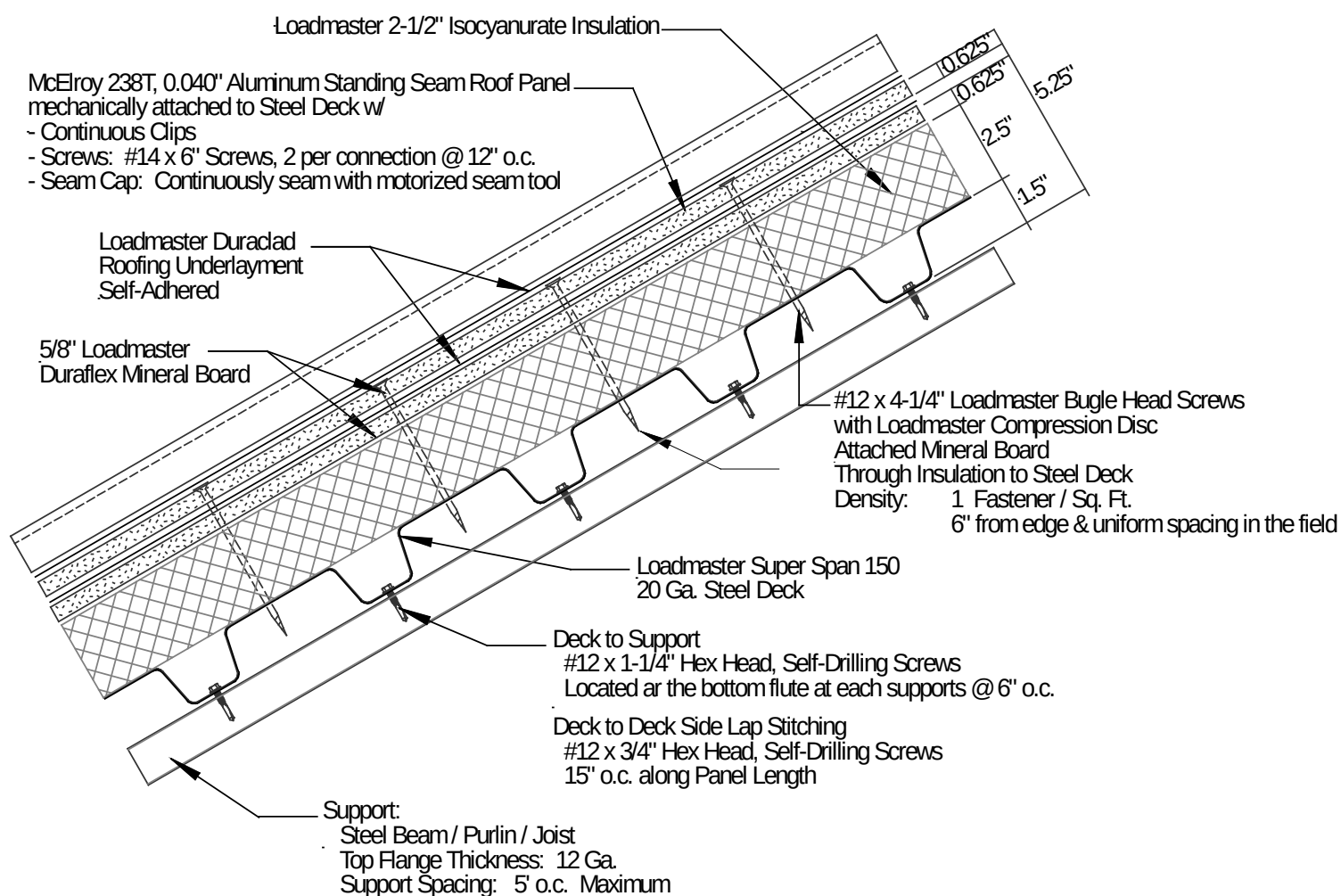
14.5 Certification of Independence

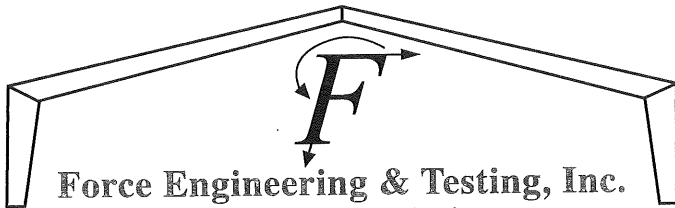
By James L. Buckner, P.E. @ CBUCK Engineering (FBC Organization # ANE 1916)

Installation Method

Loadmaster Systems, Inc.

Super Span 150 Deck – Impact Rated Metal Roof Assembly





Force Engineering & Testing, Inc.

19530 Ramblewood Drive

Humble, Texas 77338

Phone: (281) 540-6603

Fax: (281) 540-9966

www.forceengineeringtesting.com

Project Number: 32-0155T-11D-F

Test Report Date: June 29, 2011

Test Material: 238T Panel 0.040" Aluminum 18" Wide over Loadmaster SS150 I-250 Insulated MIR15-67 Roof Deck System

Test Procedure: SSTD 12-99: SBCCI Test Standard for Determining Impact Resistance From Windborne Debris
ICC 500-2008: Section 804, Missile Impact Testing
FEMA 361-2008: Section 3.3.2, Debris Impact Criteria for Tornado Community Safe Rooms.

Test Location : Force Engineering & Testing Inc.
19530 Ramblewood Drive
Humble, Texas 77338

238T Panel 0.040" Alum. 18" Wide

(Over Loadmaster SS150 I-250 Insulated MIR15-67 Roof Deck System)

Report Prepared by:

Brandon Jasek, P.E.

Report Reviewed by:

Terrence E. Wolfe, P.E.



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ACCREDITED TL-417



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TEXAS DEPARTMENT
OF INSURANCE
ACCREDITED LABORATORY

Project Number : 32-0155T-11D-F

GENERAL:

The subject of this report is missile impact testing on a standing seam roof panel over the Loadmaster System.

TEST DATES:

June 8-10, 2011

TEST ASSEMBLY:

Panel Manu. Architectural Building Components
11625 North Rosslyn Road
Houston, Texas

Panel: 238T Panel, 0.040" 3003-H14 Aluminum, 18" Coverage, 2 3/8" tall rib

Panel Properties: $F_y = 21.7$ ksi Steel, 0.038" Coated thickness per ASTM E 8 (See Appendix)

Panel Batten: 0.040" 3003-H14 Aluminum w/ mastic

Panel Clip: Multispan (Continuous) 24 Ga. (0.025" coated thickness) Fixed Clip back to back

Clip Fastener: (1) #14-13 x 6" DP1 Concealor by TFC at 12" O.C. per side,
(2) total per connection at 12" O.C.

Fastener Spacing: 12" O.C.

Panels Ends: Both ends open

Panel Length: 5'-0"

Substrate Manu. Loadmaster Systems, Inc.
3175B Northwoods Parkway
Norcross, GA 30071

Substrate: Loadmaster Super Span 150 (20 Ga.) I-250 Insulated MIR15-67 Roof Deck System

- (1) Layer of Loadmaster Duraclad roofing underlayment. 40 mil thick self-adhered membrane.
- (1) Layer of 5/8" Loadmaster Duraflex mineral board. Attached to steel deck with minimum (6) #12-13 x 4 1/4" Loadmaster bugle head board screws w/ Loadmaster compression disc. The Loadmaster compression disc is 0.025" thick steel, 1 5/16" outside to outside hexagonal and concave.
- (1) Layer of Loadmaster Duraclad roofing underlayment. 40 mil thick self-adhered membrane.
- (1) Layer of 5/8" Loadmaster Duraflex mineral board.
- (1) Layer of 2 1/2" thick rigid insulation, polyisocyanurate foam core with fiber reinforced facers. Min. 20 psi compressive strength.
- 20 Ga. 1-1/2" Loadmaster Super Span 150 Steel Deck Grade 80 ksi. 5'-0" Deck Span. Deck Properties: $F_y = 91.9$ ksi, 0.036" Coated thickness per Tensile Test (See Appendix). Attached to framing w/ #12-24 x 1-1/4" HWH SD #5 no washer at every low flute (7) total. Sidelaps fastened together with (1) #12-14 x 3/4" SD#2 at 20" O.C.
- 16 Ga. 5'-0" x 5'-2 1/2" Frame

Project Number : 32-0155T-11D-F

TESTING APPARATUS:

Impact apparatus per ASTM E 1886, Section 6

RESULTS/CONCLUSIONS:

Missile: #2 Southern Yellow pine 2x4, length 12'-11.25", weight 15.2 lbs

Specimen A

Impact Location	Missile Velocity (ft/sec)	Permanent Deflection of Steel Deck After Testing	Results
Panel Rib	99.8	0.1875"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.
Center of Panel Pan	99.9	2.0000"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.
Corner, 6" from supports	100.1	2.8750"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.

Specimen B

Impact Location	Missile Velocity (ft/sec)	Permanent Deflection of Steel Deck After Testing	Results
3" Offset from Panel Rib	99.7	1.7500"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.
Center of Panel Pan	99.3	2.0000"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.
Corner, 6" from supports	99.6	2.3750"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.

Specimen C

Impact Location	Missile Velocity (ft/sec)	Permanent Deflection of Steel Deck After Testing	Results
Center of Panel Pan	99.6	2.18750"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.
Corner, 6" from supports	99.5	2.18750"	Passed: Missile penetrated the panel/mineral board/insulation but did not penetrate the steel deck.

Force Engineering &
Testing, Inc.
State of Texas
Reg. # F-4611

STATEMENT OF INDEPENDENCE:

Force Engineering & Testing, Inc. or any persons employed by them do not have any financial interest in Architectural Building Components & Loadmaster Systems, Inc.

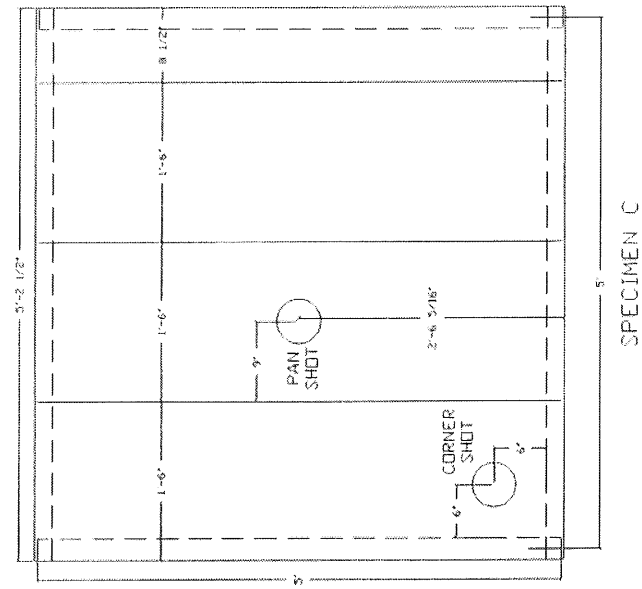
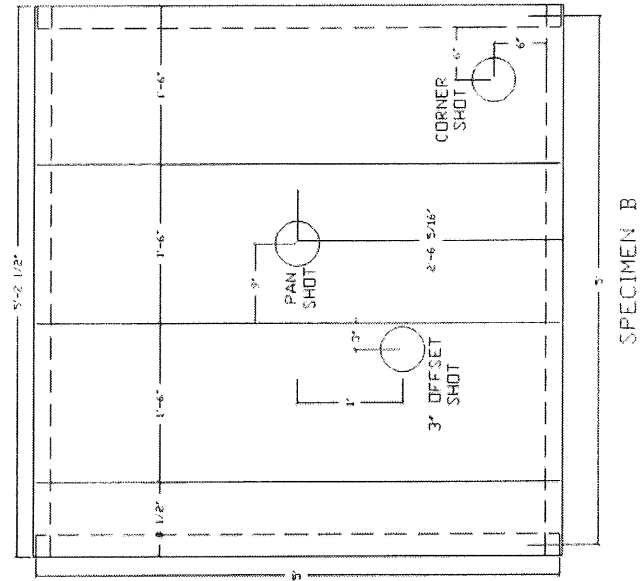
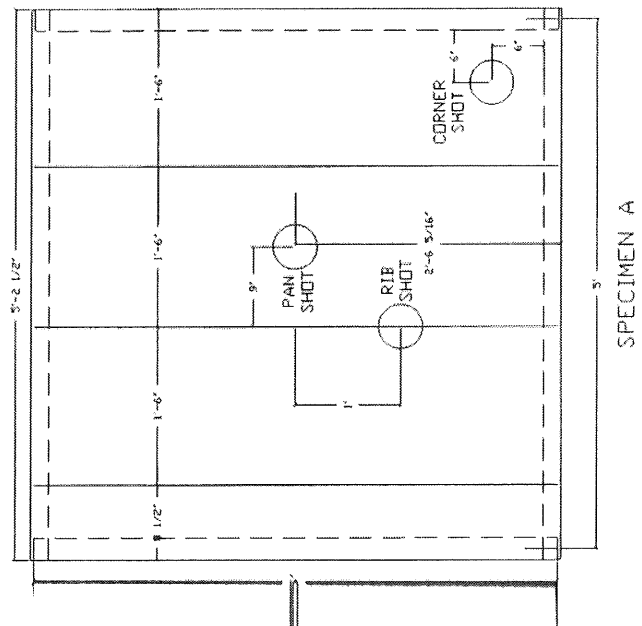
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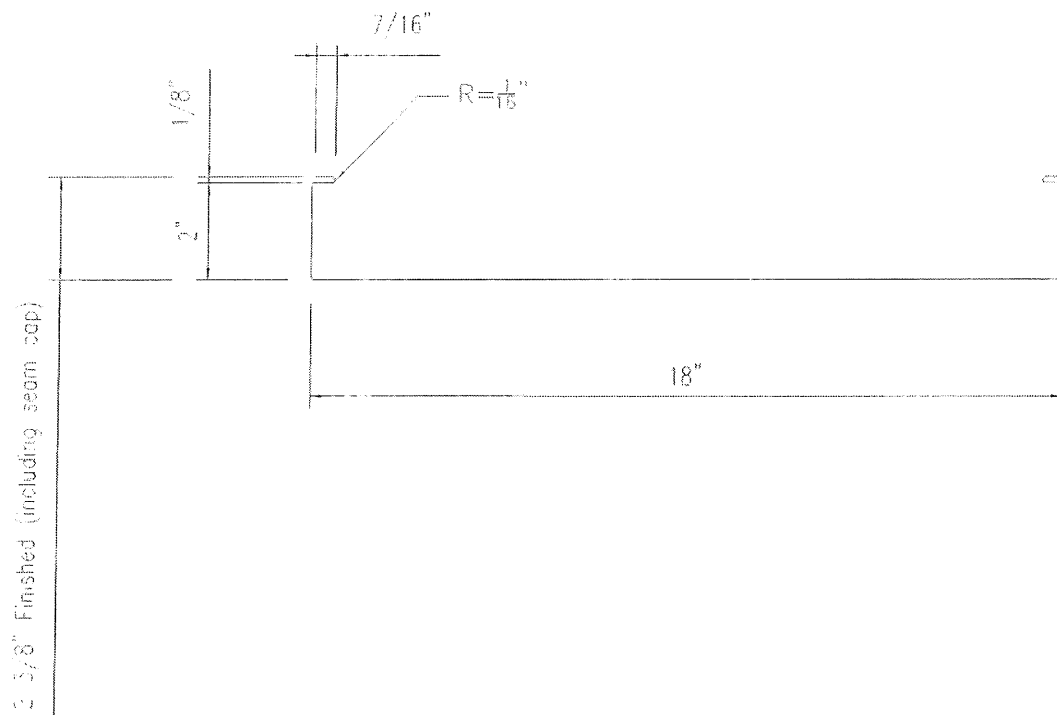
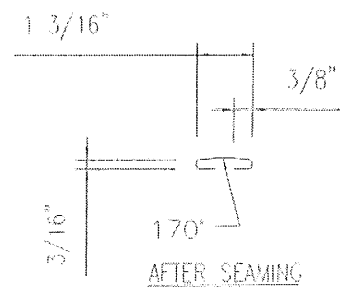
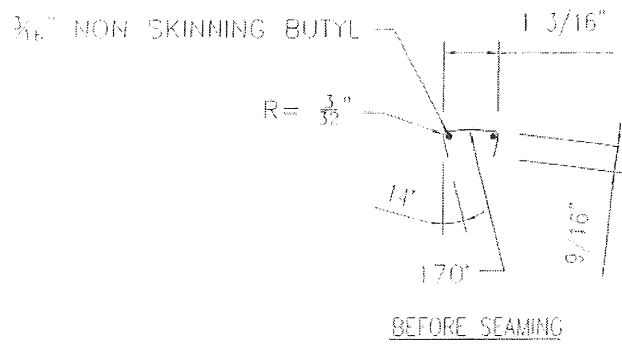


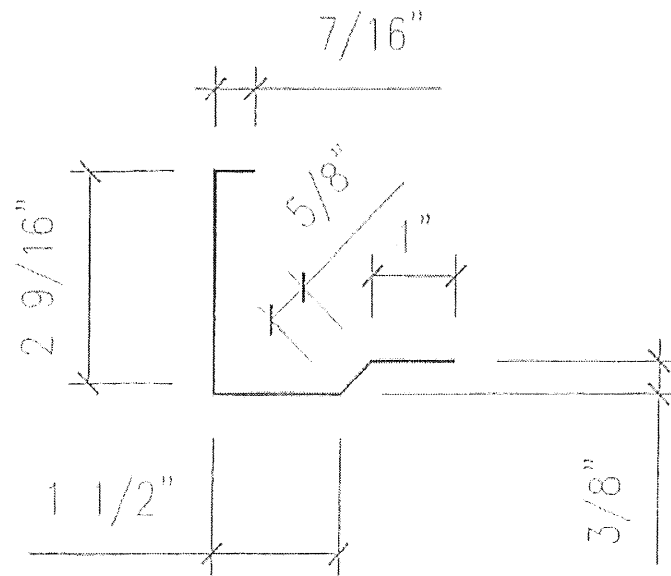
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Appendix

IMPACT LOCATIONS







24 GA. CONTINUOUS CLIP
FOR 238T PANEL

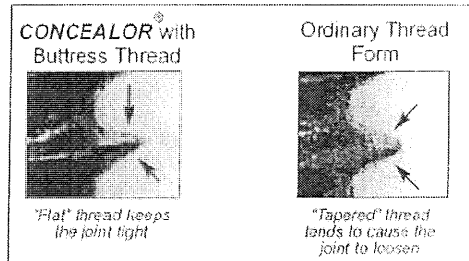


#14 DP1 Drill Points

Fasten into metal or wood

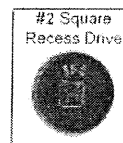
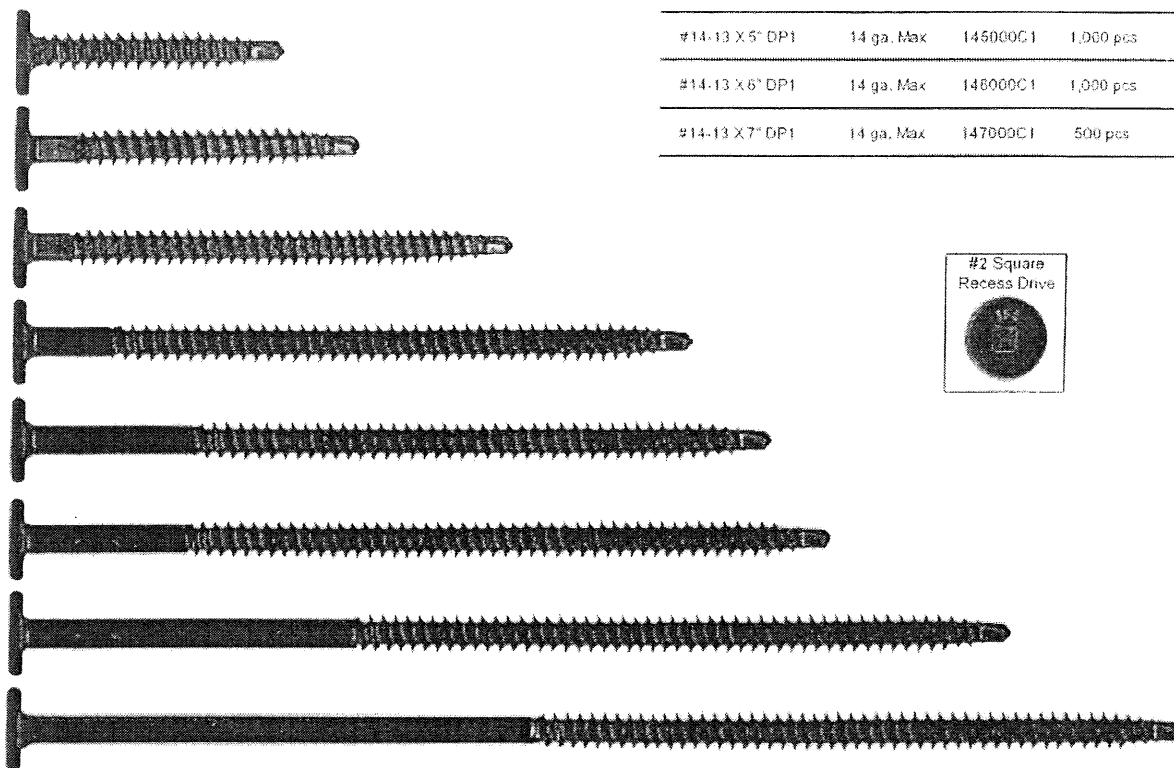
#14 DP1 CONCEALOR® is engineered to perform in a variety of applications. Special buttress thread form provides exceptional clamping loads and resists loosening compared to ordinary thread forms. Specified in many metal roofing systems to attached SSR clips over rigid insulation into metal deck. *FM approved for preliminary attachment of nail base insulation without the use of stress plates.*

Here is why we use a special thread...

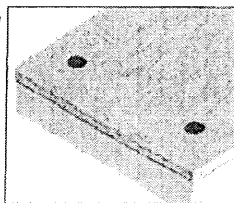


Sizes

Description	Drilling Thickness	Part Number	Carton Quantity	WT Per M Pcs
#14-13 X 1-1/2" DP1	14 ga. Max	141500C1	2,500 pcs	14.0#
#14-13 X 2" DP1	14 ga. Max	142000C1	1,000 pcs	18.0#
#14-13 X 3" DP1	14 ga. Max	143000C1	1,000 pcs	26.0#
#14-13 X 4" DP1	14 ga. Max	144000C1	1,000 pcs	29.5#
#14-13 X 4-1/2" DP1	14 ga. Max	144500C1	1,000 pcs	36.5#
#14-13 X 5" DP1	14 ga. Max	145000C1	1,000 pcs	40.0#
#14-13 X 6" DP1	14 ga. Max	146000C1	1,000 pcs	47.0#
#14-13 X 7" DP1	14 ga. Max	147000C1	500 pcs	54.0#



FM Approved for attaching nail base; no plates required for 1-90 uplift.



Technical Data: Please refer to pages 6 & 7.



Pullout



Pullout In Steel - Average Ultimate in Pounds (35ksi Test Material)

Fastener Dia. & Point	Material Thickness							
	24ga (.024")	22ga (.021")	20ga (.030")	18ga (.048")	16ga (.060")	14ga (.075")	12ga (.105")	1/8" (.125")
#10-16 DP3	208	267	295	503	710	968		
#12-14 DP3	215	292	343	555	752	1,066		
#12-14 DP1/Lap	261	338	390	649	890	1,259		
#12-24 DP4				375	500	978	1,200	2,000
#14-13 DP1	466	564	672	830	900	1,350		3,844

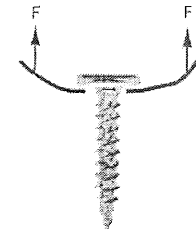


Pullout In Wood - Average Ultimate in Pounds

Fastener Dia. & Point	Wood Type and Thickness						
	1/2" Plywood	5/8" Plywood	3/4" Plywood	7/16" OSB	1 1/2" OSB	2 1/2" OSB	2 x 4 SYP
#10-13 GP	350	390	550	234	326	352	800
#10-9 GP	362	396	558	235	331	358	810
#12-14 DP1	376	415	598	251	351	378	860
#12-14 GP	377	418	600	255	356	382	865
#14-13 DP1	407	493	625	325	357	446	1200

Decking fasteners tested with full thread embedment. 2x4 SYP with 1" embedment

Pullover



Steel Thickness	Pullover Results
24 ga (.024")	1,003 lbs.
22 ga (.020")	1,178 lbs.
20 ga (.036")	1,250 lbs.

Corrosion Resistance

Finish and Corrosion Test Data

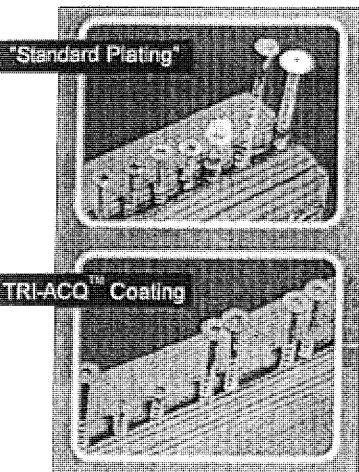
Carbon Steel Fasteners

Coating: 0003" min zinc and yellow
Salt Spray: 48 hrs

BLACK EPOXY (Exceeds FM 4470)
1,000+ hrs

TRI-ACQ™ Long Life (ASTM B117)
1,000+ hrs

TRI-ACQ™ Long-life Coating /
Corrosion test results in ACQ lumber



1,000 hrs salt spray
ACQ lumber decking boards

Corrosion Chart

Base Metal	Fastener Metals					
	Zinc & Galvanized Steel	Aluminum & Aluminum Alloys	Steel & Cast Iron	Brasses, Copper, Bronze, Monel	Martensitic Stainless Type 410	Austenitic Stainless Type 302, 304, 316
Zinc & Galvanized Steel	A	B	B	C	C	C
Aluminum & Aluminum Alloys	A	A	B	C	Not Recommended	B
Steel & Cast Iron	AD	A	A	C	C	B
Form (Lead-Tin) Plated Steel Sheet	AGE	AE	AE	C	C	B
Brasses, Copper, Bronze, Monel	AGE	AE	AE	A	A	B
Pacific Stainless Steel (Type 439)	AGE	AE	AE	A	A	A
Austenitic Stainless Steel Type 302, 304, 316	AGE	AE	AE	AE	A	A

Key

- A) Corrosion of the base metal is not increased by the fastener
- B) Corrosion of the base metal is roughly increased by the fastener
- C) Corrosion of the base metal may be markedly increased by the fastener
- D) The plating on the fastener is rapidly consumed leaving the bare fastener metal
- E) Corrosion of the fastener is increased by the base metal

Note: Surface treatment and environment can change activity

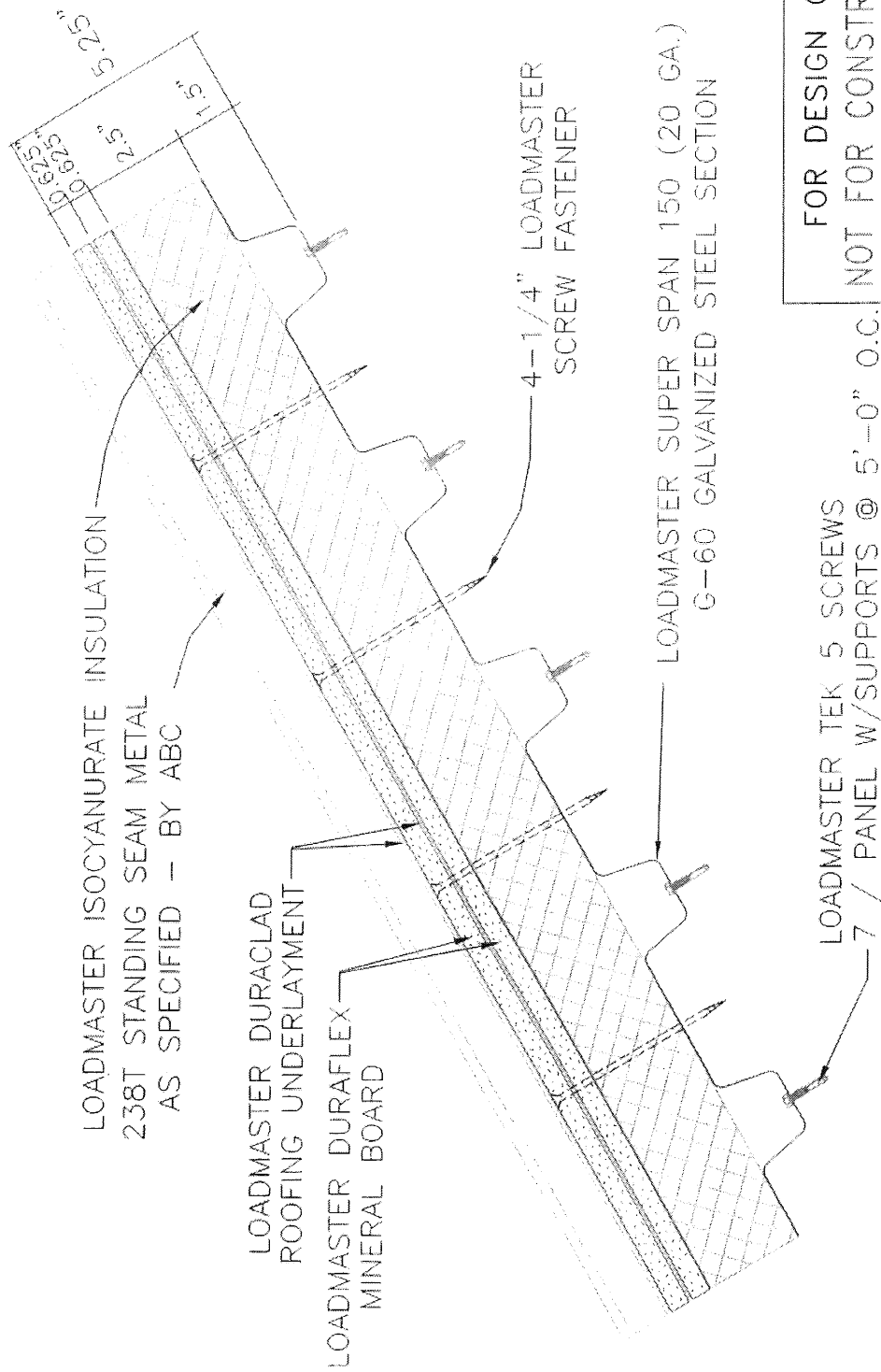
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ACQ Lumber Information

As recommended by the Southern Pine Council (SPC) and recognized by the NRCA, the following fasteners are acceptable for use in ACQ pressure treated lumber;

- Hot-dipped galvanized complying with ASTM A153,
- or coated with proprietary anti-corrosion coatings like our TFC TRI-ACQ™.
- For maximum corrosion protection, fasteners made of 302, 304, or 316 stainless steel should be considered.

REV	DESCRIPTION	DATE



FOR DESIGN ONLY
NOT FOR CONSTRUCTION

AREA NAME: UL 580/UL 1897

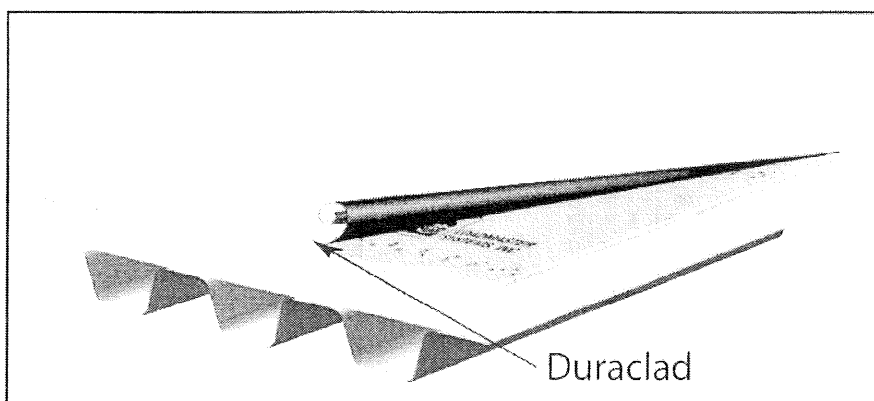


LOADMASTER
SYSTEMS, INC.

LOADMASTER SUPER SPAN 150 I-250
INSULATED MIR 15-67 ROOF DECK ASSEMBLY

SCALE: NOT TO SCALE DRAWING NAME / COMPUDESIGN#:

DATE: 08-23-2011



Loadmaster Duraclad Roofing Underlayment

- For use with standing seam metal roofs, asphalt shingles, bituminous roofing, tile or slate
- 40 mil self-adhesive asphalt membrane
- 2 layers of modified (SBS) bitumen surrounding a strong, inert, non-woven polyester core
- Reflective white fabric top surface for non-skid & ultra-violet protection
- Paper release sheet on bottom
- Self-sealing around screw penetrations
- Resists decay and decomposition
- Exposure up to 120 days

Property	Value	Test Method
Thickness	40 mils +5mils	Visual Observation
Color	Top - White Bottom - Black	Visual Observation
Core Tensile Strength	1,400 psi	ASTM D 882-A
SBS Bitumen Elongation	500%	ASTM B D412
Permeance	0.003 perms 0.04 gm/hr/m	ASTM E96
Puncture Resistance	84 lbs. average	ASTM E154
Pliability	Passes	ASTM D146-78A

Roll size: 36" x 75' (225 sf./roll)

Roll Weight: 82 lbs./roll

USE:

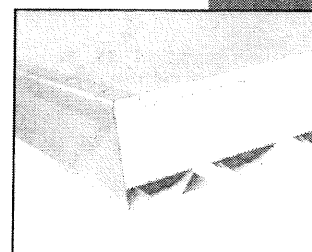
Duraclad is specifically manufactured as an underlayment to be installed over Loadmaster Duraflex Mineral Board. For specific details regarding specification, use, storage and installation of Duraclad Roofing Underlayment please refer to the Loadmaster Reference Manual or the Loadmaster Technical Department.

*Duraclad smooth surface underlayment is also available without the reflective white fabric surfacing.



**LOADMASTER
SYSTEMS, INC.**

(800) 527-4035 Fax: (770) 381-1783
PO Box 2169, Duluth, GA 30096
www.loadmaster.net



Loadmaster Duraclad

Loadmaster Duraflex Mineral Board

Description: Loadmaster Duraflex Mineral board is a specially designed high density, weather resistant fiberglass reinforced panel designed to perform multiple functions in the Loadmaster assembly. The mineral board is 1/2 or 5/8-inch thick, 4 feet wide and 12'-6" long, with paper bonded to all surfaces except panel ends. Four longitudinal rows of numbers along the length of the board provide location markings for the placement of screw fasteners in accordance with specified Duraflex attachment patterns. Edges of the board are tongue and grooved for interlocking installation. Ends are square cut to form tight butt joints.

Function: Duraflex mineral board functions as a structural element in the assembly by providing flexural rigidity. In addition, it serves as a substrate for the application of roofing. Special design considerations have given it outstanding qualities to provide load distribution, permeability, low water absorption, high indentation resistance, fire retardant characteristics, compatibility with hot bitumen, resistance to moving, static and impact shock loads, as well as excellent resistance to vibration and wind uplift forces. High compressive strength also provides a tough traffic bearing substrate which increases penetration resistance for roofing membranes.

ASTM Specification: Loadmaster Duraflex mineral board meets or exceeds the performance criteria in ASTM Specification C-79.

Weatherability: In accordance with the accepted criteria governing the design of roofing substrates, the Loadmaster mineral board is not, in itself, a "waterproof" element. The board is specifically designed to allow for the proper transmission of water vapor and a degree of moisture migration so that water, which might enter the substrate during initial construction, and/or subsequent roof leaks, can be quickly dissipated without creating an excessive build-up of vapor pressure. While these essential functional characteristics are somewhat opposed to weatherability characteristics, the Loadmaster board is, nonetheless, weather resistant within the scope of its intended use. While it is recommended that the roofing be applied as soon as practical after the board is in place, it is not essential to do so, when reasonable limits.

Suitability for Roofing: Should a Loadmaster deck be rained on or become wet, there should be no traffic on the deck until the mineral board is dry. The deck is ready to roof when the mineral board appears dry, and no frying or sizzling sound occurs during application of hot roofing asphalt.

Packaging and Storage: Duraflex mineral board is shipped in palletized bundles weighing approximately 4,000 lbs. When stored outside it is recommended that Duraflex mineral Board be covered and placed upon no less than 5 support blocks extending fully under the width of the boards.

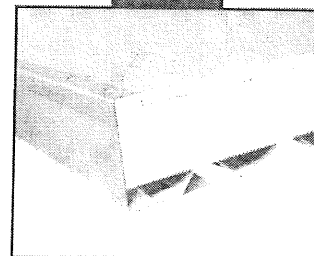
Property	Value
Thickness	1/2" or 5/8"
Weight (lbs./sq.ft.)	2.0 nom or 2.5 nom
Length	12'-6"
Width	4'-0"
Core Compressive Strength	400 psi nom
Flame Spread	15
Permeability	16 perms



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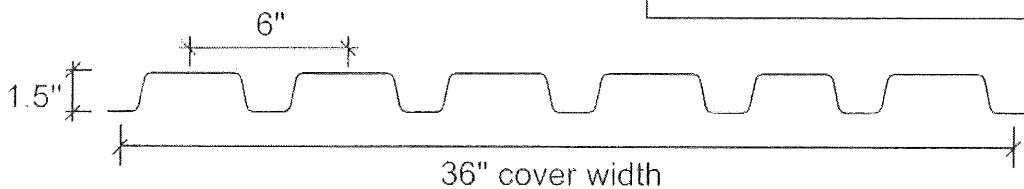
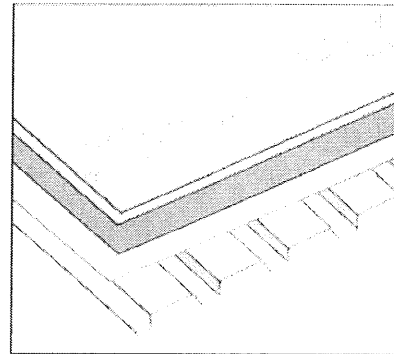
Loadmaster Duraflex



Loadmaster Super Span 150

High-Tensile Steel Section

Super Span 150 is a high-tensile steel section rolled from 80,000 psi minimum yield steel in a 1-1/2" deep profile. Super Span 150 is available in gray primer coated, G-60 or G-90 galvanized. It is available in acoustical and non-acoustical profiles.



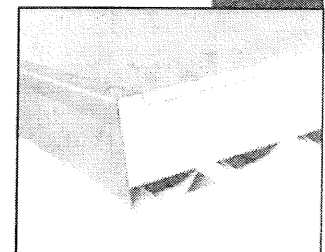
Gauge	22	20	18	16
Design Thickness (in.)	0.0295	0.0358	0.0474	0.06
Nominal Pitch (in.)	6	6	6	6
Nominal Depth (in.)	1.5	1.5	1.5	1.5
Cover Width (in.)	36	36	36	36
Weight - Painted (psf)	1.7	2.1	2.8	3.5
Weight - Galvanized (psf)	1.8	2.2	2.9	3.6
Moment of Inertia (pos.) in. ⁴	0.1517	0.1968	0.2839	0.3739
Moment of Inertia (neg.) in. ⁴	0.1824	0.2220	0.2945	0.3736
Section Modulus (pos.) in. ³	0.1786	0.2213	0.3013	0.3884
Section Modulus (neg.) in. ³	0.1859	0.2320	0.3111	0.3938
Minimum Yield Strength (ksi)	80	80	80	80
Allowable Flexural Strength (ksi)	36	36	36	36

3 span condition 	Safe Uniform Total Load Table in PSF										
	Center to Center Support Spacing										
	5'-0"	5'-6"	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"
SS150 22 ga.	146	121	102	87	75	65	58	51	46	41	37
SS150 20 ga.	182	151	127	109	94	82	72	64	57	51	46
SS150 18 ga.	244	203	171	146	126	110	97	86	76	69	62
SS150 16 ga.	309	256	216	184	159	139	122	108	97	87	78

- Physical properties were computed in accordance with specifications section of the "Cold Formed Steel Design Manual" published by the American Iron and Steel Institute (AISI) and also conform to the specifications of the Steel Deck Institute.
- Steel Sections are rolled from steel conforming to ASTM specification A-611 Grade E (minimum) for painted or ASTM specification ASTM-A553 for galvanized finish.
- Acoustical steel sections sustain 95% of the loads printed in the table.



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PO Box 2169, Duluth, GA 30096
www.loadmaster.net



Loadmaster Super Span 150



METALLURGICAL ENGINEERING SERVICES, INC.

Consulting • Failure Analysis • Laboratory Testing

July 8, 2011

REPORT OF: Tensile Testing

REPORT TO: Force Engineering & Testing, Inc.
Gianna Willits
19530 Ramblewood Drive
Humble, Texas 77338

DATE APPROVED: July 1, 2011

IDENTIFICATION: 1 ea. Metal Roof Panel identified as:
B) 32-0155T-11B; Architectural Building Components, 238T Alum.

PROCEDURES: Tensile testing was performed per ASTM E8-09 on the flat aluminum sheet sample using a Satec Systems Model Apex 22EMF, S/N: 1017, calibration due 6/14/12. The temperature at the time of testing was 76°F, with relative humidity at 47%.

RESULTS: *Tensile Test* - 2" Gage Length, 0.2% Offset

SQR Dimensions Inches			Ultimate Strength		Yield Strength		Elong
Width	Thickness	Area, In ²	Load, Lbs	PSI	Load, Lbs	PSI	%
0.4970	0.0380	0.0189	467	24,700	409	21,700	6.8

These results are based on the tests performed and are subject to change upon the receipt of new or additional information.

Respectfully submitted,

METALLURGICAL ENGINEERING SERVICES, INC.

Firm Registration No. F-2674

Daniel A. Stolk, P.E.
President

Purchase Order No. 32-0155T-11B

Lab No. 26168-B

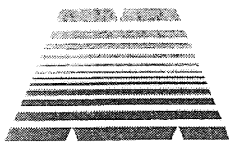
Page 1 of 1

NOTE: Submitted material will be retained for 30 days unless otherwise notified in writing.
Any interpretations and/or opinions made in our reports are not subject to the accreditation.
Our letters and reports are for the exclusive use of the client to whom they are addressed. The use of our name must receive our prior written approval. Our letters and reports apply to the sample tested and/or inspected, and are not necessarily indicative of the qualities of apparently identical or similar materials

(972) 480-0033 • FAX (972) 480-0036 • 845 E. Arapaho Road • Richardson, Texas 75081 • www.metengr.com



14 of 18 Test Lab
Cert. 3065.01



METALLURGICAL ENGINEERING SERVICES, INC.

Consulting • Failure Analysis • Laboratory Testing

July 5, 2011

REPORT OF: Tensile Testing

REPORT TO: Force Engineering & Testing, Inc.
Gianna Willits
19530 Ramblewood Drive
Humble, Texas 77338

DATE APPROVED: June 27, 2011

IDENTIFICATION: 1 ea. Steel Coupon identified as:
D) 32-0156T-11D;
Deck

20 Ga

PROCEDURES:

Tensile testing was performed per ASTM E8-09 on the submitted steel sample using a Satec Systems Model Apex 22EMF, S/N: 1017, calibration due 6/14/12. The temperature at the time of testing was 76°F, with relative humidity at 47%.

RESULTS: *Tensile Test* - 2" Gage Length, 0.2% Offset

SQR Dimensions Inches			Ultimate Strength		Yield Strength		Elong
Width	Thickness	Area, In ²	Load, Lbs	PSI	Load, Lbs	PSI	%
0.5010	0.0360	0.0180	1,664	92,400	1,655	91,900	11.1

These results are based on the tests performed and are subject to change upon the receipt of new or additional information.

Respectfully submitted,

METALLURGICAL ENGINEERING SERVICES, INC.
Firm Registration No. F-2674


Daniel A. Stolk, P.E.
President

Purchase Order No. 32-0156T-11 D

Lab No. 26146-D

Page 1 of 1

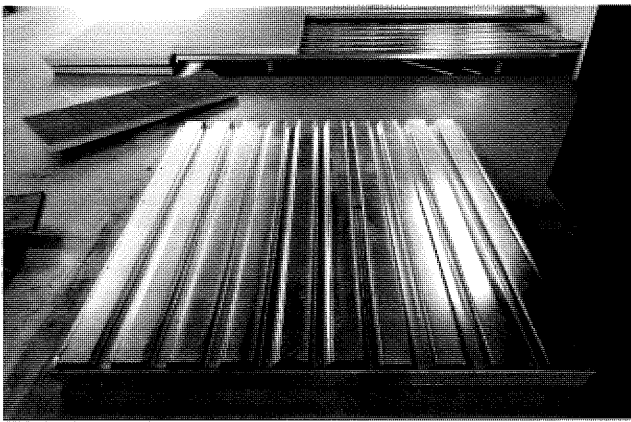
NOTE: Submitted material will be retained for 30 days unless otherwise notified in writing.
Any interpretations and/or opinions made in our reports are not subject to the accreditation.
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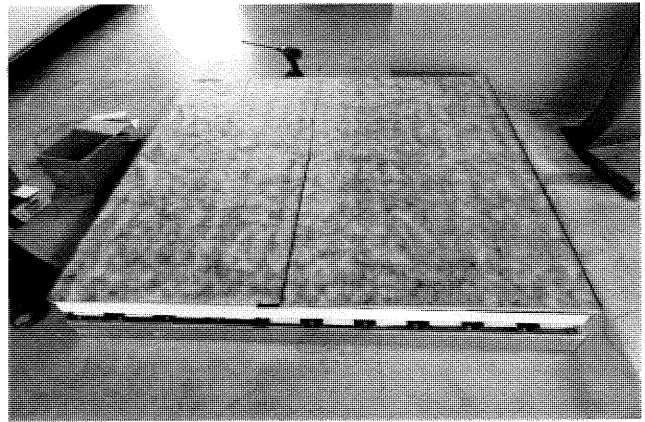


15 of 18 Test Lab
Cert. 3065.01

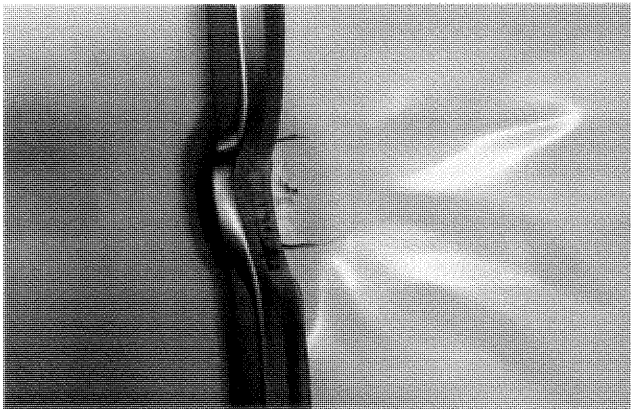
Photos



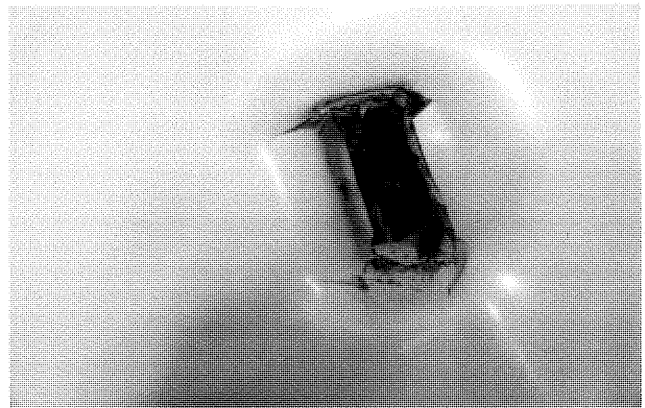
STEEL DECK ATTACHED TO FRAME



LOADMASTER SYSTEM



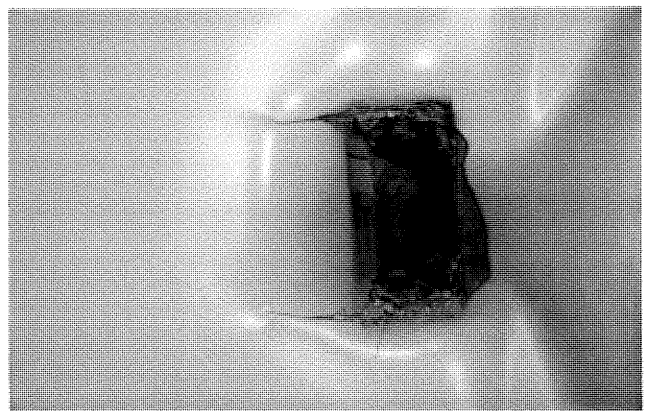
SPECIMEN A, RIB SHOT



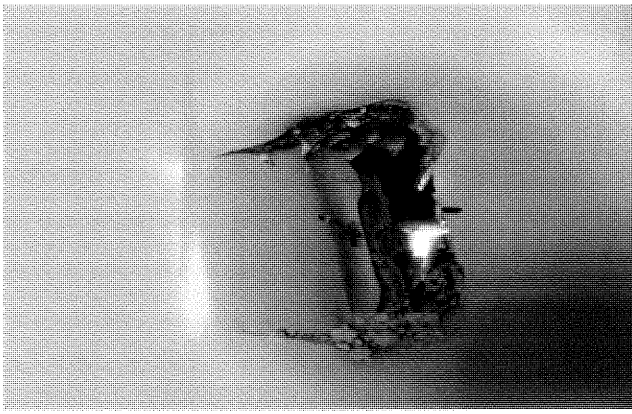
SPECIMEN A, PAN SHOT



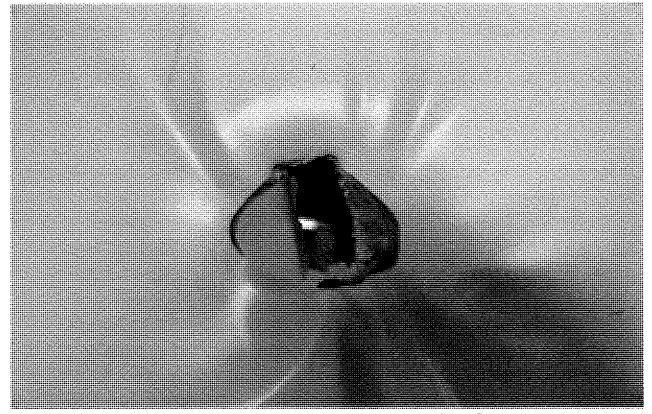
SPECIMEN A, CORNER SHOT



SPECIMEN B, 3" OFFSET RIB SHOT



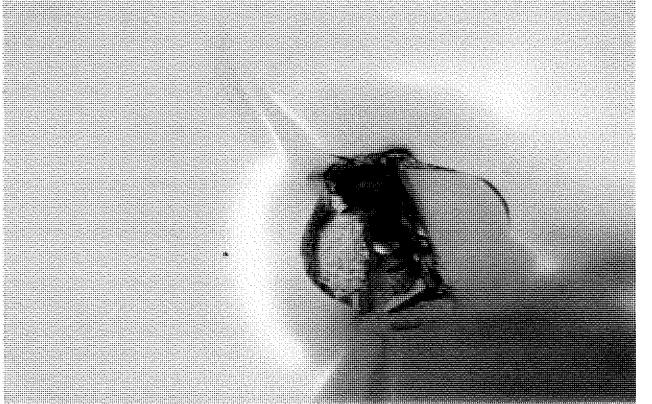
SPECIMEN B, PAN SHOT



SPECIMEN B, CORNER SHOT



SPECIMEN C, PAN SHOT



SPECIMEN C, CORNER SHOT