



6/23/2021

Staging Dimensions
67 Industrial Blvd
New Castle, DE 19720
Attn: Kim Moore

RE: SD5000 Deck Certification 2021
CRE Project: 20.1313.01

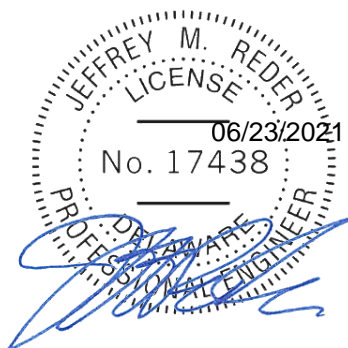
Dear Kim:

Clark Reder Engineering Inc. has performed an independent structural assessment of the load bearing capacity of the Staging Dimensions SD5000 deck for use in all 50 states of the United States. Our review is based on independent calculations as well as load tests performed on the decks in August 2001 by Twin City Testing Corporation. Attached please find the provided drawings as well as the testing lab report validating the allowable load capacity.

Clark Reder Engineering Inc. deems that the decks can be safely rated to support a uniformly distributed live load of 200 pounds per square foot (psf). The deck meets the requirements as set forth in the 2015 International Building Code as well as the 2018 International Building Code.

We trust this information is sufficient for your needs at this time. If you need any additional information, please do not hesitate to contact me.

Regards,
Clark Reder Engineering, Inc.





Jeffrey M. Reder, P.E

<p style="text-align: center;">Alabama</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. #: 31076</p>	<p style="text-align: center;">Alaska</p>  <p style="text-align: center;">Daniel J. Clark, S.E. P.E. # SE14360</p>	<p style="text-align: center;">Arizona</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 50654</p>
<p style="text-align: center;">Arkansas</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 14355</p>	<p style="text-align: center;">California</p>  <p style="text-align: center;">Daniel J. Clark, S.E. P.E. # S5317</p>	<p style="text-align: center;">Colorado</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # PE0051394</p>
<p style="text-align: center;">Connecticut</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 27576</p>	<p style="text-align: center;">Delaware</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 17438</p>	<p style="text-align: center;">District of Columbia</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # S920119</p>

<p style="text-align: center;">Florida</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 68622</p>	<p style="text-align: center;">Georgia</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # PE034581</p>	<p style="text-align: center;">Hawaii</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 14362-S</p>
<p style="text-align: center;">Idaho</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 14947</p>	<p style="text-align: center;">Illinois</p>  <p style="text-align: center;">Jeffrey M. Reder, S.E. P.E. # 81006866</p> <p style="color: red; font-size: small;">Clark Reder Engineering, Inc. is a professional design firm registered in Illinois #184.006693</p>	<p style="text-align: center;">Indiana</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # PE11600603</p>
<p style="text-align: center;">Iowa</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 19998</p>	<p style="text-align: center;">Kansas</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 21809</p>	<p style="text-align: center;">Kentucky</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 23597</p>

<p style="text-align: center;">Louisiana</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 30304</p>	<p style="text-align: center;">Maine</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 12873</p>	<p style="text-align: center;">Maryland</p>  <p>Professional Certification: I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland. License # 38421 Expiration Date: 01/29/2022</p> <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 38421</p>
<p style="text-align: center;">Massachusetts</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 48535</p>	<p style="text-align: center;">Michigan</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 6201056952</p>	<p style="text-align: center;">Minnesota</p>  <p>I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.</p> <p>Signature:  Typed or Printed Name: JEFFREY M. REDER Date: 06/23/2021 License #: 56104</p> <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 56104</p>
<p style="text-align: center;">Mississippi</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 20589</p>	<p style="text-align: center;">Missouri</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # PE-2010003345</p>	<p style="text-align: center;">Montana</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 28452</p>

<p align="center">Nebraska</p>  <p align="center">Daniel J. Clark, P.E. P.E. # E-14098</p>	<p align="center">Nevada</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 020117</p>	<p align="center">New Hampshire</p>  <p align="center">Daniel J. Clark, P.E. P.E. # 13605</p>
<p align="center">New Jersey</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 24GE05300600</p>	<p align="center">New Mexico</p>  <p align="center">Daniel J. Clark, P.E. P.E. # 20482</p>	<p align="center">New York</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 097763-1</p> <p><small>It is a violation of law for any person, unless acting under the direction of a licensed professional engineer, to alter this document in any way. If any part of this document is altered, the altering engineer shall affix to this document their seal and the notation "altered by" followed by their signature, the date, and description.</small></p>
<p align="center">North Carolina</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 046939</p>	<p align="center">North Dakota</p>  <p align="center">Daniel J. Clark, P.E. P.E. # PE-6586</p>	<p align="center">Ohio</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # E-67450</p>

<p align="center">Oklahoma</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 24780</p>	<p align="center">Oregon</p>  <p align="center">EXPIRES: <u>12/31/2020</u></p> <p align="center">Jeffrey M. Reder, P.E. P.E. # 93904PE</p>	<p align="center">Pennsylvania</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # PE77455</p>
<p align="center">Rhode Island</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 9610</p>	<p align="center">South Carolina</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 35797</p>	<p align="center">South Carolina</p>  <p align="center">Clark Reder Engineering # 4827</p>
<p align="center">South Dakota</p>  <p align="center">Daniel J. Clark, P.E. P.E. # 10989</p>	<p align="center">Tennessee</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 00113846</p>	<p align="center">Texas</p>  <p align="center">Jeffrey M. Reder, P.E. P.E. # 124100</p> <p align="right" style="color: red;">Clark Reder Engineering F-12154</p>

<p style="text-align: center;">Utah</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 7536302-2203</p>	<p style="text-align: center;">Vermont</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # 018.0072612</p>	<p style="text-align: center;">Virginia</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 402061022</p>
<p style="text-align: center;">Washington</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 56469</p>	<p style="text-align: center;">West Virginia</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 18628</p>	<p style="text-align: center;">Wisconsin</p>  <p style="text-align: center;">Daniel J. Clark, P.E. P.E. # E-41230</p>
<p style="text-align: center;">Wyoming</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 13434</p>	<p style="text-align: center;">Puerto Rico</p>  <p style="text-align: center;">Jeffrey M. Reder, P.E. P.E. # 25845</p>	<p style="text-align: center;">Guam</p>  <p style="text-align: center;">Daniel J. Clark, S.E. P.E. # 1798</p>

Construction
Features:

- Bolt Construction Of 3-3/4" 6005-T5 Extruded Aluminum Frame & Corners Allows Easy Repair Of Damaged Piece Versus Replacement Of Entire Stage Deck.
- Nylock Nuts Eliminate Vibration and Noise Interference.

Performance:

- Certified Uniformly Distributed Live Load Of 200 Pounds Per Square Foot.

Single Sided Decks:

- Surface Options Are Interchangeable.

Locking Mechanism:

- (3) Male & (3) Female Dual Locks™ Activated From Top To Bottom Of Decks Provide 2500 Pounds Of Tensile Locking Strength.

Velcro:

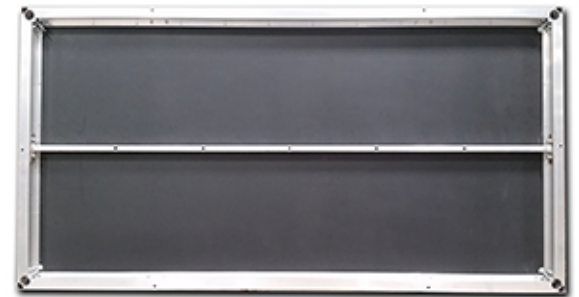
- 3/4" Block Male Velcro Installed On All Four Sides Of Deck.
- Velcro Is Inset In Specially Designed Channel On Extrusion To Protect From Damage.

Center Brace:

- 1" x 2" @ 8' Long Aluminum Rectangular Tube.

Leg Storage:

- Leg Clips For Fixed Or Adjustable Height Legs Are Mounted To The Underside Of Each Stage Deck Providing Convenient Storage Of Legs With Deck.



Underside Of Stage Deck

Standard Surface Options

1. Black Haircell Polyvinyl
2. Pepper Grey Carpet - 26 oz.
3. Black Carpet - 31 oz.
4. Unfinished Plywood - 1" Thick 9-Ply Marine Grade
5. Grated Aluminum - 1" x 3/16" Mill Finish
6. "Millk Plexi" / Natural Polypropylene



Female Dual Lock



Male Dual Lock



Center Brace



Leg Receiver



Corner Extrusion

662 Cromwell Avenue, St. Paul, MN 55114-1776
(651) 645-3601, Fax: (651) 659-7348

PROJECT NUMBER: 3018 01 30879

PAGE: 1 of 10

DATE: August 28, 2001

TWIN CITY TESTING CORPORATION

**662 Cromwell Avenue
St. Paul, Minnesota 55114**

**STRUCTURAL PERFORMANCE
OF PORTABLE STAGE DECKS
MANUFACTURED BY STAGING DIMENSIONS**

**Prepared for:
STAGING DIMENSIONS
722 Bluecrab Road
Newport News, VA 23606**

Client Purchase Order Number: Check #222

Test Conducted By:



**Josh L. Jonssen
Engineering Technician
Product Testing Department
Phone: (651) 659-7319**

Reviewed By:



**Mathew N. Botz
Project Manager
Product Testing Department
Phone: (651) 659-7353**

The test results contained in this report pertain only to the samples submitted for testing and not necessarily to all similar products.

INTRODUCTION:

This report presents the results of Structural Performance Tests conducted on two (2) samples of Portable Stage Deck assemblies. The test samples were submitted by Staging Dimensions on August 6, 2001 with testing completed on August 23, 2001.

The scope of work was limited to conducting Uniform Load and Concentrated Load Tests on the samples submitted.

SUMMARY:

Uniform Load Test

The portable stage deck deflected 4.9” while applying a uniform load of 500-psf, resulting in a permanent set of 0.92”. No visible cracks or deformation were apparent.

Concentrated Load Test

The portable stage deck reached 2260 lbf before audible cracking was heard. A load of 3784 lbf was reached before the decking panel cracked below the load plate.

See TEST DATA section for detailed results

SPECIMEN DESCRIPTION

The specimens were described as Portable Stage Decks manufactured by Staging Dimensions measuring 4’ x 8’ and weighing 145-lbs without the 1-¼ Schedule 40 6061-T6 Aluminum legs. The following specifications were supplied by the client and were not verified by TCT.

Stage Deck Specifications (not verified):

- Manufactured By: Staging Dimensions
722 C Blue Crab Road
Newport News, VA 23606
- Panel construction: 31/32 7-Ply Douglas Fir Plywood
0.050 Haircell Polypropylene Deck Surface
0.020 Polypropylene Backer
- Edge Extrusion: 6105-T5 Structural Extruded Aluminum
- Corner Extrusion: 6105-T5 Structural Extruded Aluminum
- Center Brace: 1” x 2” x 125” – 6063-T52 Aluminum Extruded Tube
- Bolts: 3/8-16 x 2-1/2” Hex Head Grade 5 Zinc Plated
4 per corner

SPECIMEN DESCRIPTION: Continued

Bolts: 3/8-16 x 2-1/2" Hex Head Grade 5 Zinc Plated
2 per center brace

Screws: #10 x 1" Serrated Head Indented Hex Alloy Zinc Plated
Pont Screws Spaced Every 8-inches

Legs: Four, One per corner per deck. Leg material is 1-1/4"
schedule 40 6061-T6 Aluminum Straight Pipe
1.667 Outer diameter, 1.38" Inner diameter



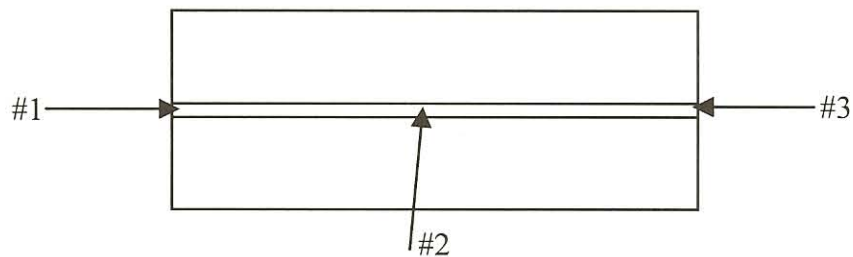
Lower Surface

TEST METHOD:

These tests were performed in accordance with a customized test procedure provided by Staging Dimensions.

Uniform Load Structural Test

Panels were supported in accordance with manufacturer's instructions. Three deflection measuring devices were positioned centrally at the center-span and at the supports (See diagram).



TEST METHODS: Continued

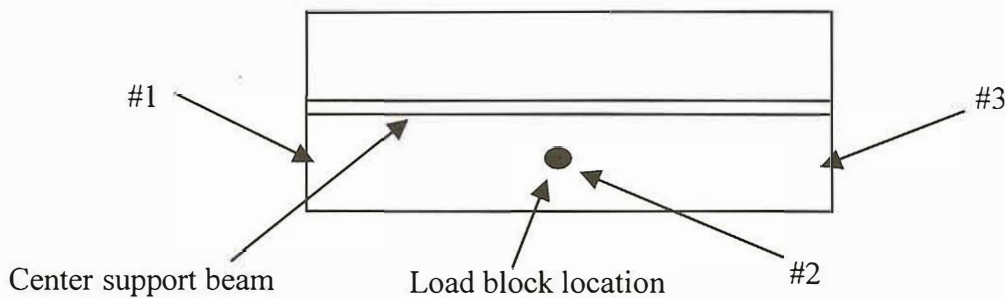
Uniform Loading was applied by means of an air bladder placed over the upper panel surface. The specimen was loaded in the following manner:

- 0-psf to 150-psf to 0-psf
- 0-psf to 250-psf to 0-psf
- 0-psf to 500-psf

Deflection measurements were recorded before, during and after the loading to determine 'loaded' deflection and permanent deformation.

Concentrated Live Loading Structural Proof Test

The panels shall be supported in accordance with manufacturer's instructions. The concentrated load test was conducted on one portable stage deck. Loading was applied through a 2"x2" load plate positioned at mid-point of length and at quarter point of center. Three deflection measuring devices were positioned at the center-span and at the supports (See diagram). The panel was then loaded in 100 lb increments until failure was achieved.



REMARKS:

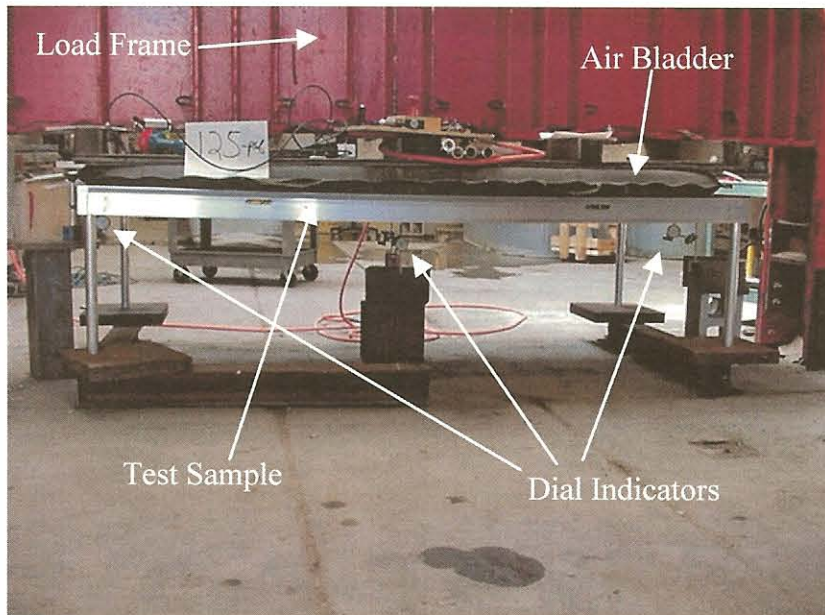
The test samples will be returned to the client by client's shipping service. Staging Dimensions was present for the testing conducted on 8/23/01.

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TEST DATA: Load Tests

UNIFORM LOADING

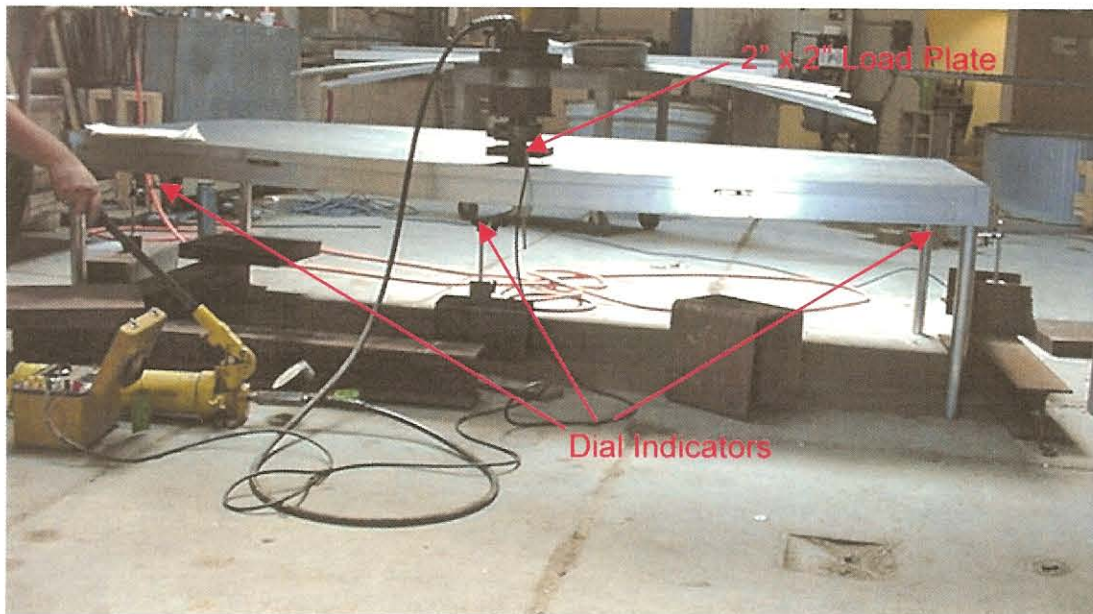
Pressure (psf)	East Deflection (Dial #1)	Center Deflection (Dial #2)	West Deflection (Dial #3)
0	0.000	0.000	0.000
50	0.027	0.481	0.024
100	0.057	0.858	0.064
150	0.078	1.673	0.098
0	0.010	0.816	0.028
50	0.039	1.242	0.056
100	0.065	1.678	0.082
161	0.100	2.180	0.118
175	0.113	2.448	0.128
200	0.123	2.612	0.142
225	0.135	2.691	0.156
250	0.153	2.916	0.174
0	0.013	0.916	0.033
300	0.183	3.434	0.208
400	0.233	4.330	0.270
500	0.262	4.881	0.312
0	0.023	0.924	0.049



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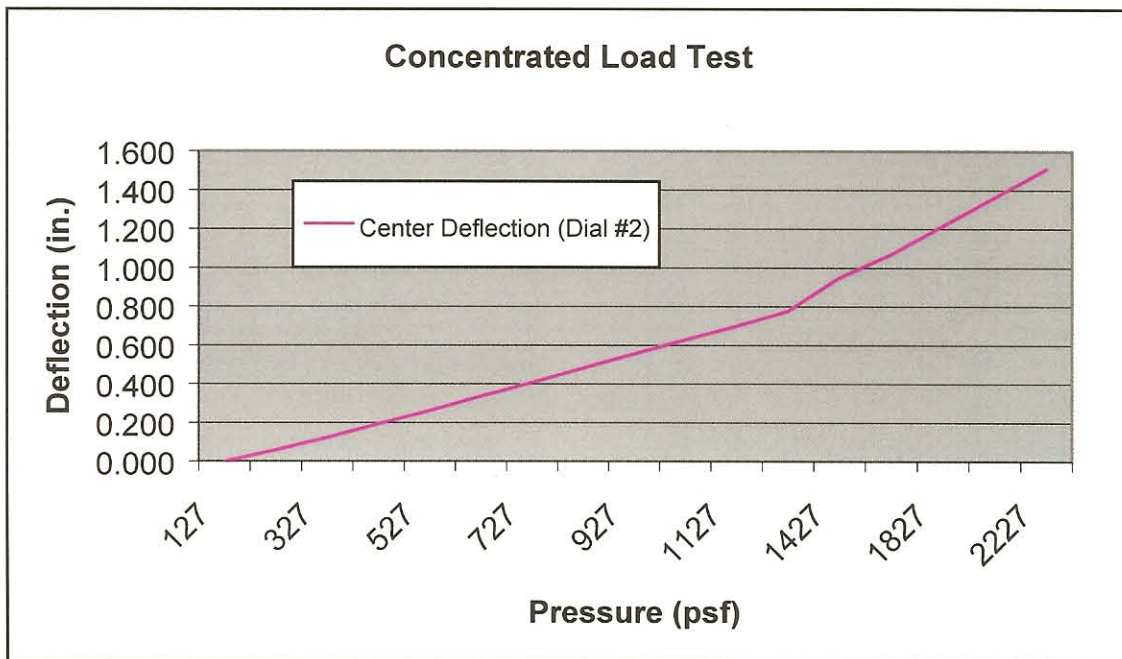
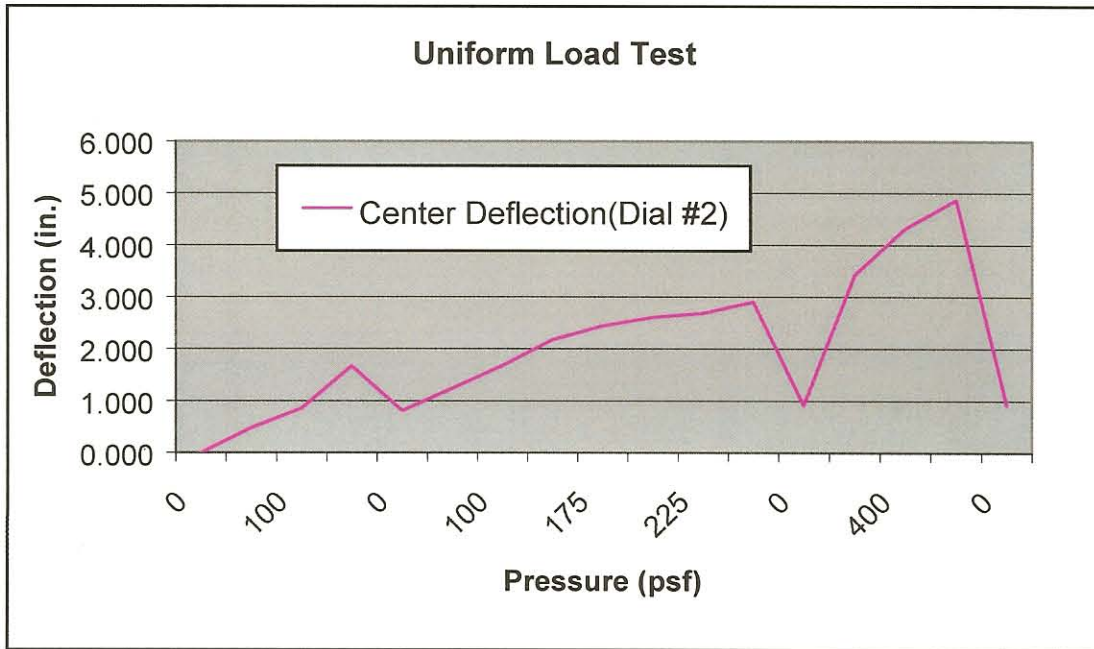
CONCENTRATED LOAD

Pressure (psf)	East Deflection (Dial #1)	Center Deflection (Dial #2)	West Deflection (Dial #3)
127	0.000	0.000	0.000
227	0.001	0.059	0.003
327	0.001	0.123	0.004
427	0.002	0.194	0.004
527	0.003	0.264	0.005
627	0.003	0.338	0.005
727	0.004	0.408	0.005
827	0.005	0.482	0.006
927	0.005	0.556	0.007
1027	0.006	0.628	0.008
1127	0.006	0.700	0.010
1227	0.007	0.777	0.010
1427	0.008	0.949	0.012
1627	0.003	1.070	0.013
1827	0.002	1.217	0.016
2027	0.002	1.364	0.020
2227	0.002	1.511	0.022
2260	Cracking Noise		
2320	Cracking Noise		
2327	0.002	1.616	0.023
2427	0.002	1.699	0.024
2670	Distinct Cracking Noise		
2800	Rapid pressure drop to 2600		
3784	Visible cracks on lower surface and platform deformation on both surfaces (See Photographs)		

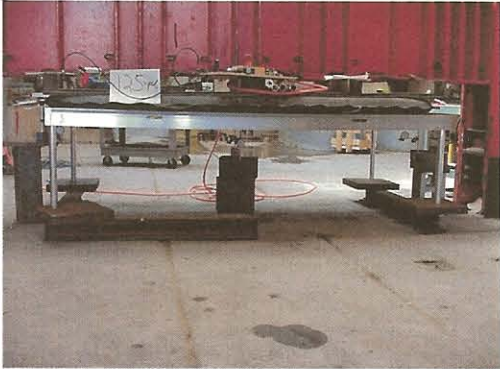


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Graphs



Photographs



125-psf uniform load



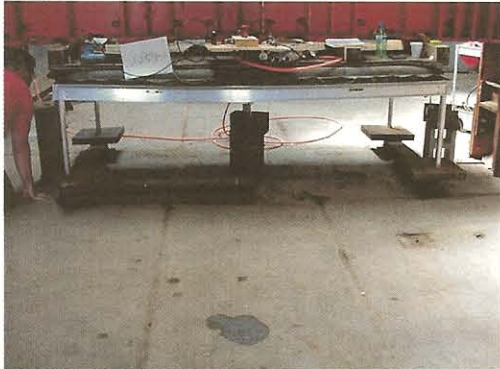
140-psf uniform load



175-psf uniform load



200-psf uniform load



225-psf uniform load



250-psf uniform load



300-psf uniform load



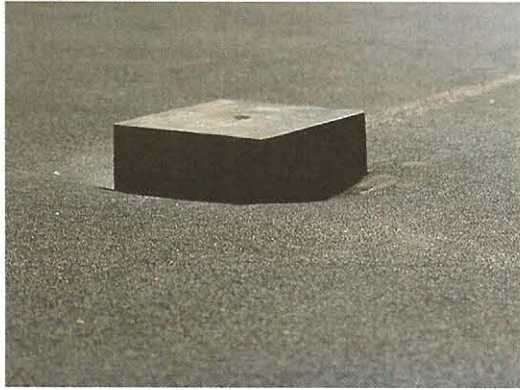
400-psf uniform load



500-psf uniform load



Concentrated load test



Load Block & Test surface
after concentrated loading



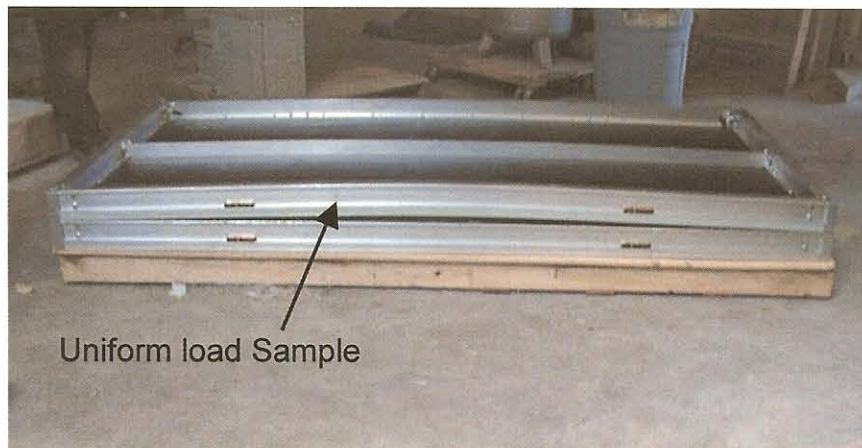
Imprint on test surface
caused by load plate



Deformation of lower surface
after concentrated loading



Deformation of lower surface
after concentrated loading



Uniform load Sample

Test Samples after testing

GENERAL ASSEMBLY SPECIFICATIONS FOR STANDARD AND CUSTOM DECK FABRICATIONS;(UNLESS OTHERWISE SPECIFIED)

1. DECK ASSEMBLY SHALL BE FREE FROM SHARP EDGES,BURRS AND DEFECTS IN WORKMANSHIP
2. DIMENSIONAL INSPECTION SHALL BE CONDUCTED PRIOR TO SHIPMENT TO ASSURE ACCUMULATED TOLERANCES DO NOT EXCEED FINAL ASSY TOLERANCES
3. LOCK PERFORMANCE SHALL BE INSPECTED PRIOR TO SHIPMENT TO ASSURE LOCKS OPERATE FREELY AND ARE IN THE PROPER ORIENTATION
4. DECK SURFACE MATERIAL SHALL BE CUT AND INSTALLED SO AS TO PRESENT NO GAPS BETWEEN EXTRUSION AND SIDE OF DECK SURFACE
5. DECK SURFACE SHALL BE SHIMMED USING 1MM X25MM ABS PLASTIC SHIM CONTINUOUSLY AROUND PERIMETER PRIOR TO ATTACHMENT BY SCREWS
6. DECK SURFACE MATERIAL SHALL BE COATED WITH THE APPROPRIATE MATERIAL PER W/O SPECIFICATION AND ALLOWED TO DRY ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS
7. DECK SHALL BE SECURED WITH # 10X1 HEX DRIVE WOOD SCREWS TO 35IN-LB (DO NOT TEAR OUT)
8. ALL MACHINE SCREW THREADED FASTENERS SHALL BE GR5 STEEL AND CLEAR ZINC PLATED
9. ALL NUTS SHALL BE OF A NYLON INSERT TYPE AND CLEAR ZINC PLATED
10. 3/8-16 FASTENERS ON HOLLOW SECTIONS SHALL BE TORQUED TO 22 LB-FT AND NYLON LOCKNUT VISUALLY INSPECTED FOR PROPER SEATING
11. 1/4-20 FASTENERS ON SOLID SECTIONS RETAINING THE SOUTHCO DUAL-LOCKS SHALL BE TORQUED TO 6 LB-F AND INSPECTED FOR PROPER SEATING

GENERAL MATERIALS SPECIFICATIONS FOR STANDARD AND CUSTOM DECK FABRICATIONS;(UNLESS OTHERWISE SPECIFIED)

1. ALUMINUM PERIMETER AND CORNER EXTRUSIONS SHALL BE OF TYPE 6105-T5 (MINIMUM TENSILE STRENGTH 30KPSI- MODULUS APPROX. 1.0E6 PSI) FOR SECTIONS REFER TO .PDF DWG SW-06425 REV B AND SW-06424 REV-A
2. ALUMINUM CENTER BRACE AND END PLATES SHALL BE OF 6061-T6 (6063 IS NOT AN ACCEPTABLE ALTERNATIVE MATERIAL)
3. WELDING ROD IF USED SHALL BE ER4043 AND WELDING CONDUCTED WITH APPLICABLE AWS STANDARDS FOR PENETRATION AND CLEANLINESS
4. DECK SURFACE MATERIALS SHALL BE IN ACCORDANCE WITH WORK ORDER OR DRAWING SPECIFICATION
5. ALL STEEL FORMED BRACKETS SHALL BE CONSTRUCTED FROM H.R.S. OR H.R.P.O. NO COLD ROLLED MATERIALS SHALL BE USED UNLESS PRIOR NORMALIZING HAS BEEN PERFORMED

CUSTOM DECK SPECIFIC GENERAL SPECIFICATIONS: (THESE SPECIFICATIONS ARE IN ADDITION TO THE PREVIOUS GENERAL SPECIFICATIONS)

1. ALL WELDED CORNER FABRICATIONS SHALL BE IN ACCORDANCE WITH AWS WELDING PROCEDURES FOR 6005-T5 MATERIAL
2. ALL WELDED CORNER CONSTRUCTIONS SHALL RECEIVE EITHER A REINFORCEMENT BRACKET OR A LEG SOCKET CORNER REINFORCING BRACKET (SEE WELDED DECK DETAILS FOR TYPICAL CONSTRUCTION)
3. EITHER THE CORNER REINFORCEMENT BRACKET OR THE LEG SOCKET REINFORCEMENT BRACKET MUST BE BOLTED THRU THE PERIMETER EXTRUSION WITH 4 3/8-16X2.25 GR5 HHCS AND NYLON INSERT NUTS
4. OUTSIDE CORNERS OF WELDED JOINTS MUST BE DEBURRED AND ALL SPATTER REMOVED FROM LEG SOCKET REINFORCEMENT BRACKETS PRIOR TO FINISHING OPERATIONS
5. SIDE LEG SOCKET ADAPTERS SHALL BE BOLTED THRU PERIMETER EXTRUSION 4 PLACES WITH 3/8-16X2.25 GR5 HHCS AND NYLON INSERT NUTS (SEE WELDED DECK DETAILS FOR TYPICAL CONSTRUCTION))

STAGING DIMENSIONS INC.		DATE	SCALE	PROJECT
TITLE		ISSUE NO.	DATE	DESCRIPTION
DECK SECTIONS AND STANDARDS				
REV	NO.	DATE	DESCRIPTION	BY
B	SD_DSS			

STAGING DIMENSIONS INC.
1000 EAST 17TH AVENUE
DENVER, CO 80202
TEL: 303.733.1100
WWW.STAGINGDIMENSIONS.COM

SCALE: 1/4" = 1'-0"
SHEET 1 OF 3