



April 26, 2007

Mr. Will Prichard
M.M. PRODUCTS, INC.
1001 Haines Blvd.
Sturgis, MI 49091

Laboratory No.: Y345
Page 1 of 20

SUBJECT: Up-lift tests on “Invisi-Fast Hidden Deck Fastener” test assemblies.

Mr. Prichard:

As requested, Testing Engineers, Inc. performed the subject testing on the samples submitted on 04/19/07. Testing was performed on a 400 kip Tinius Olsen universal testing machine (calibration traceable to N.I.S.T.). Testing was performed in accordance with AC174 section 4.1.4, ASTM D7032 section 5.5 and ASTM D1761-00 sec. 41 (modified).

SAMPLE DESCRIPTION

Each test assembly consisted of two (2) 30” long joist simulators (nominal 2”x 6”) attached to two (2) 18” long deck boards secured to the joists with six (6) “Invisi-Fast Hidden Deck Fasteners” (see attached literature). The joists for all tests were pressure treated Ponderosa Pine spaced at 16” on center. Each bracket was installed per the manufactures recommendations i.e. one (1) screw in the center hole for the joist connection and two (2) screws for the deck board were applicable (see attached photos). Screws for assembly were coated 1-1/4” long x 0.179” thread O.D. x 0.112” root diameter (see attached data sheet).

PROCEDURE

The joists of each test assembly were placed on wood supports on the bed of the test machine. An axial compressive load was applied to the center of underside of the deck board using a 10” x 10” x 1” thick bearing plate and swivel-head load applicator. The direction of loading simulates an up-lift force on the deck boards. Dial indicators accurate to 0.001” were placed on each end of the bearing plate and measured vertical movement of the deck boards with respect to the joist. Displacement was recorded at 100-pound intervals until failure. Loading was applied at a 0.035” per /min until failure. Test description and results are presented in following Tables. Please see attached photographs.

M.M. PRODUCTS, INC.
April 26, 2007

Laboratory No.: Y345
Page 2 of 20

If you have any questions regarding this report and/or if we may be of further service please contact the undersigned at 510-835-3142 ext.181.

Sincerely,
TESTING ENGINEERS, INC.



Dan Watanabe
Materials Testing Division Manager

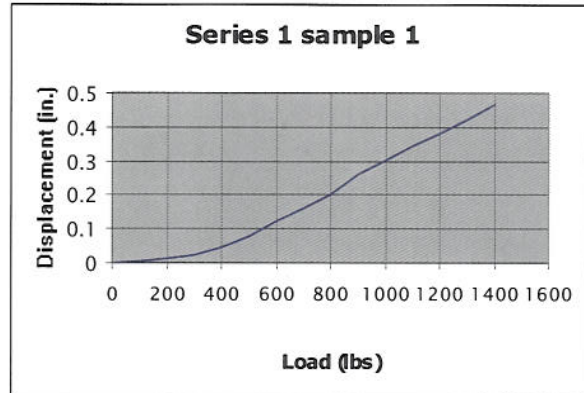
The results presented in this report relate only to the items (s) tested. This report can only be reproduced in its entirety unless written permission from TEI is obtained.

TABLE 1

Series 1: (2) 2 x 6 x 30" pressure treated Ponderosa Pine Joists (SG = .43) with LP. Weather Best deck board (SG = 1.0) using the Invisi-Fast bracket with 3/16" spacer.

Sample #1

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.006	0.007
200	0.011	0.013
300	0.023	0.025
400	0.048	0.045
500	0.087	0.070
600	0.145	0.100
700	0.195	0.130
800	0.245	0.160
900	0.305	0.216
1000	0.345	0.260
1100	0.390	0.295
1200	0.430	0.330
1300	0.480	0.360
1400	0.535	0.400



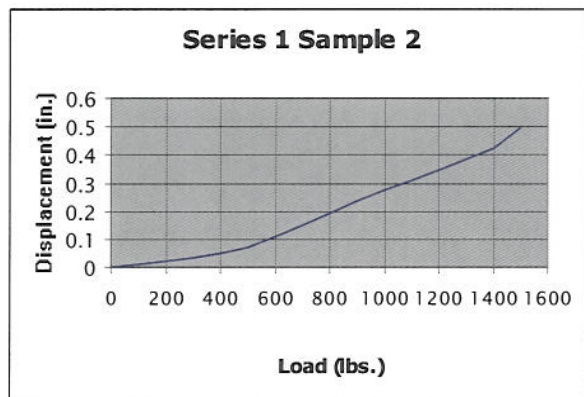
Ultimate Load = 1521 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1521 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1191PSF / 3 safety factor = 397 PSF

Sample #2

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.008	0.019
200	0.013	0.027
300	0.021	0.047
400	0.040	0.055
500	0.068	0.080
600	0.105	0.110
700	0.150	0.145
800	0.195	0.195
900	0.235	0.240
1000	0.270	0.280
1100	0.305	0.310
1200	0.345	0.350
1300	0.390	0.385
1400	0.425	0.420
1500	0.510	0.480



Ultimate Load = 1532 lbs.

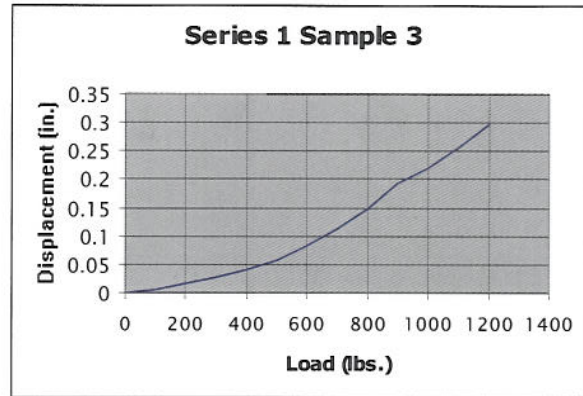
Failure Mode: Screws pulled from joist

Pounds per square foot [1532 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1200PSF / 3 safety factor = 400 PSF

Table 1 con't

Sample #3

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.006	0.007
200	0.015	0.020
300	0.025	0.030
400	0.035	0.045
500	0.055	0.060
600	0.080	0.085
700	0.110	0.115
800	0.145	0.153
900	0.190	0.195
1000	0.210	0.230
1100	0.250	0.265
1200	0.280	0.315



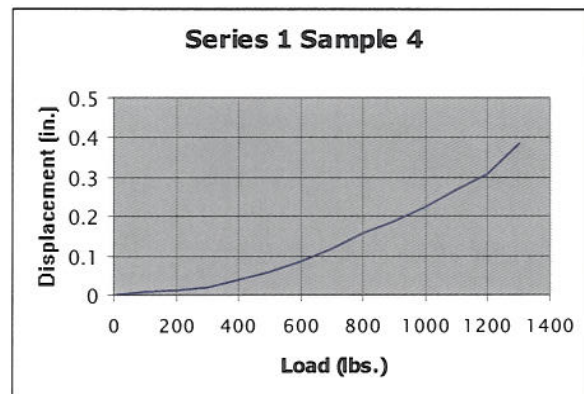
Ultimate Load = 1302 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1302 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1020PSF / 3 safety factor = 340 PSF

Sample #4

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.004	0.009
200	0.008	0.015
300	0.018	0.025
400	0.035	0.041
500	0.058	0.062
600	0.081	0.093
700	0.110	0.125
800	0.152	0.163
900	0.180	0.200
1000	0.210	0.235
1100	0.255	0.280
1200	0.290	0.322
1300	0.380	0.390



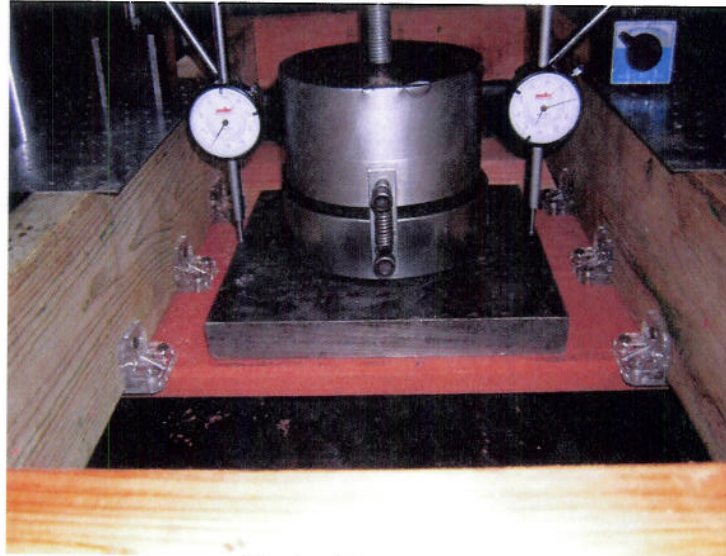
Ultimate Load = 1501 lbs.

Failure Mode: Screws pulled from joist

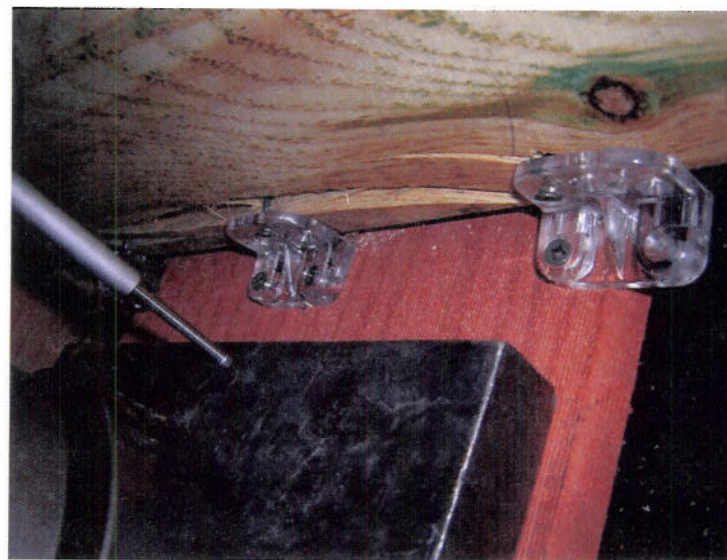
Pounds per square foot [1501 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1175PSF / 3 safety factor = 392 PSF

Series 1 average uplift = 382 PSF

Table 1 con't



Typical Test Set-up



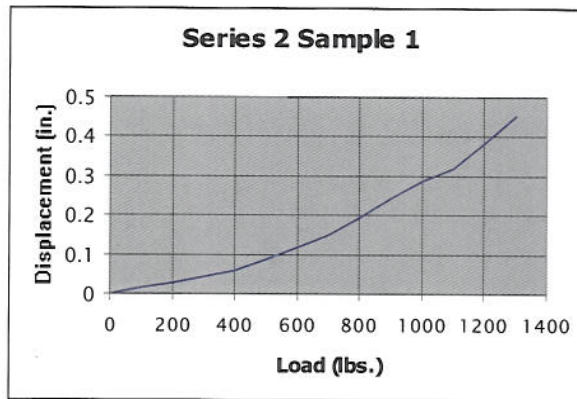
Typical Failure

TABLE 2

Series 2: (2) 2 x 6 x 30" pressure treated Ponderosa Pine Joists (SG = .43) with TREX deck board (SG = 0.91-0.95) using the Invisi-Fast bracket with 1/4" spacer.

Sample #1

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.017	0.015
200	0.033	0.026
300	0.045	0.038
400	0.065	0.055
500	0.092	0.080
600	0.123	0.110
700	0.160	0.140
800	0.205	0.180
900	0.245	0.240
1000	0.295	0.280
1100	0.340	0.300
1200	0.402	0.360
1300	0.505	0.400



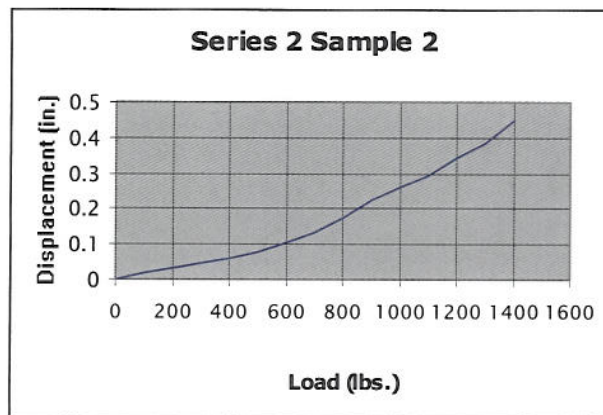
Ultimate Load = 1393 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1393 lbs./ 1.277 sq. ft (1.333' x 0.958')] = 1091PSF / 3 safety factor = 364 PSF

Sample #2

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.025	0.015
200	0.040	0.026
300	0.056	0.038
400	0.060	0.055
500	0.076	0.080
600	0.100	0.110
700	0.130	0.140
800	0.170	0.180
900	0.210	0.240
1000	0.245	0.280
1100	0.290	0.300
1200	0.330	0.360
1300	0.370	0.400
1400	0.430	0.470



Ultimate Load = 1508 lbs.

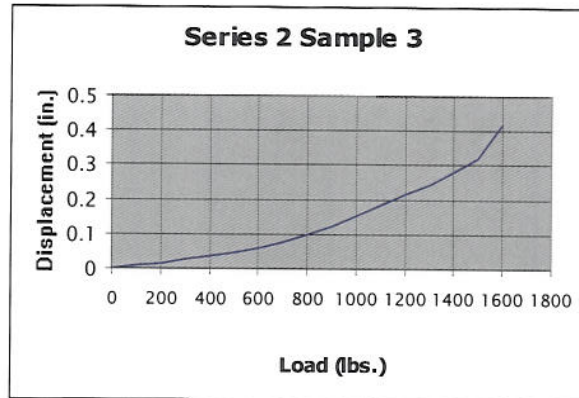
Failure Mode: Screws pulled from joist

Pounds per square foot [1508 lbs./ 1.277 sq. ft (1.333' x 0.958')] = 1181PSF / 3 safety factor = 394 PSF

TABLE 2

Sample #3

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.008	0.009
200	0.010	0.016
300	0.030	0.025
400	0.037	0.035
500	0.045	0.043
600	0.060	0.055
700	0.074	0.075
800	0.095	0.102
900	0.120	0.125
1000	0.145	0.160
1100	0.175	0.190
1200	0.205	0.230
1300	0.230	0.260
1400	0.260	0.300
1500	0.310	0.330
1600	0.440	0.400



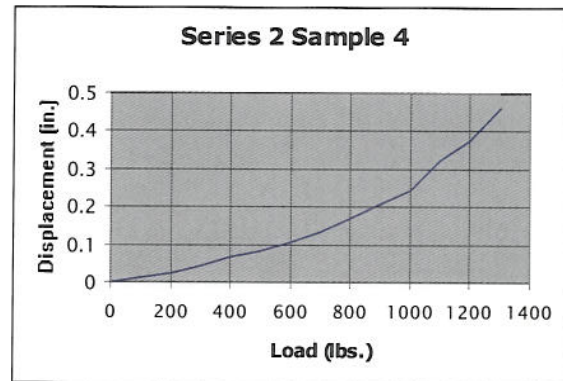
Ultimate Load = 1839 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1839 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1440PSF / 3 safety factor = 480 PSF

Sample #4

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.010	0.011
200	0.023	0.023
300	0.043	0.045
400	0.063	0.067
500	0.082	0.086
600	0.107	0.108
700	0.138	0.133
800	0.175	0.165
900	0.215	0.200
1000	0.255	0.235
1100	0.335	0.310
1200	0.382	0.365
1300	0.465	0.460



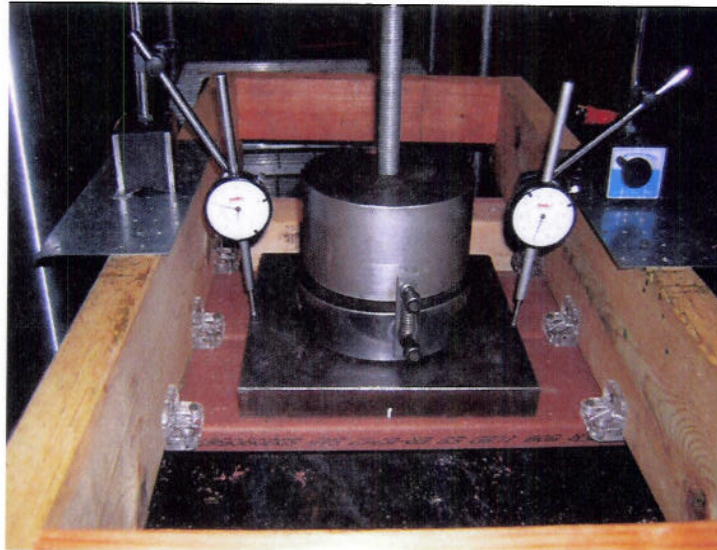
Ultimate Load = 1464 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1464 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1146PSF / 3 safety factor = 382 PSF

Series 2 average uplift = 405 PSF

TABLE 2 Con't



Typical Set-up



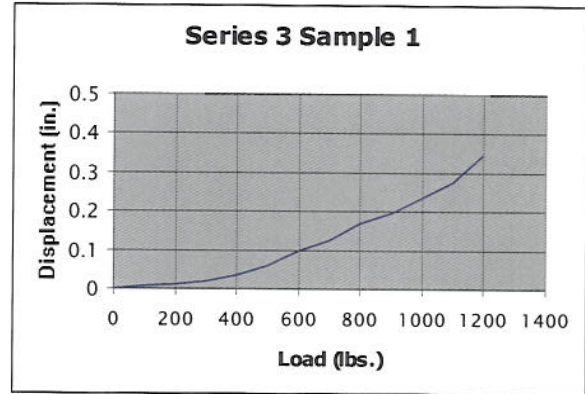
Typical Failure

TABLE 3

Series 3: (2) 2 x 6 x 30" pressure treated Ponderosa Pine Joists (SG = .43) with Redwood (2 x 6, SG= .37) using the Invisi-Fast bracket with 1/8" spacer.

Sample #1

Load	Displacement (in.)	
0	0	0
100	0.004	0.009
200	0.006	0.016
300	0.012	0.025
400	0.035	0.035
500	0.075	0.043
600	0.140	0.055
700	0.180	0.075
800	0.235	0.102
900	0.265	0.125
1000	0.310	0.160
1100	0.360	0.190
1200	0.460	0.230



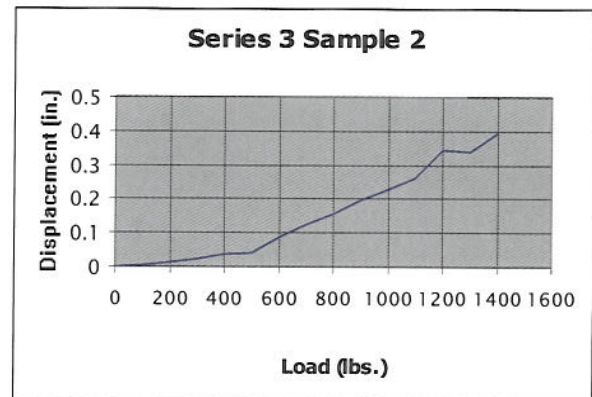
Ultimate Load = 1274 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1274 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 998PSF / 3 safety factor = 330 PSF

Sample #2

Load	Displacement (in.)	
0	0	0
100	0.007	0.006
200	0.017	0.014
300	0.024	0.021
400	0.040	0.037
500	0.041	0.038
600	0.090	0.088
700	0.122	0.122
800	0.158	0.158
900	0.195	0.195
1000	0.230	0.230
1100	0.260	0.260
1200	0.295	0.395
1300	0.340	0.340
1400	0.380	0.410



Ultimate Load = 1540 lbs.

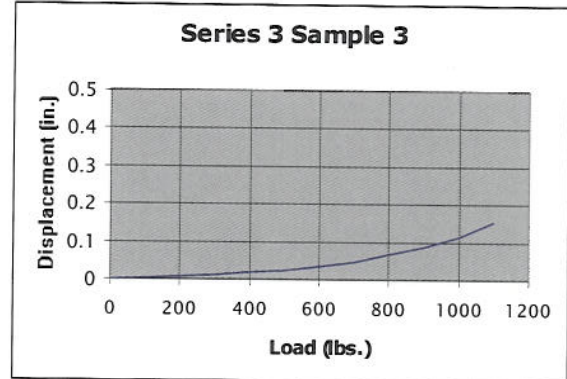
Failure Mode: Screws pulled from joist

Pounds per square foot [1540 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1206PSF / 3 safety factor = 402 PSF

TABLE 3 Con't

Sample #3

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.002	0.007
200	0.005	0.013
300	0.006	0.018
400	0.010	0.026
500	0.018	0.033
600	0.030	0.040
700	0.045	0.051
800	0.068	0.065
900	0.095	0.080
1000	0.125	0.105
1100	0.160	0.145



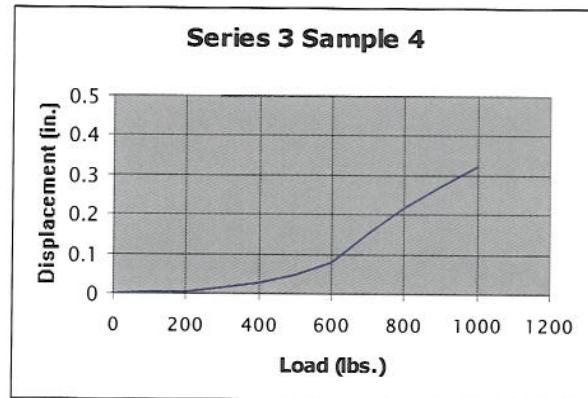
Ultimate Load = 1192 lbs.

Failure Mode: Screws pulled from joist

Pounds per square foot [1192 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 933PSF / 3 safety factor = 311 PSF

Sample #4

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.003	0.002
200	0.005	0.004
300	0.022	0.008
400	0.038	0.015
500	0.065	0.032
600	0.102	0.055
700	0.205	0.105
800	0.270	0.160
900	0.340	0.205
1000	0.395	0.250



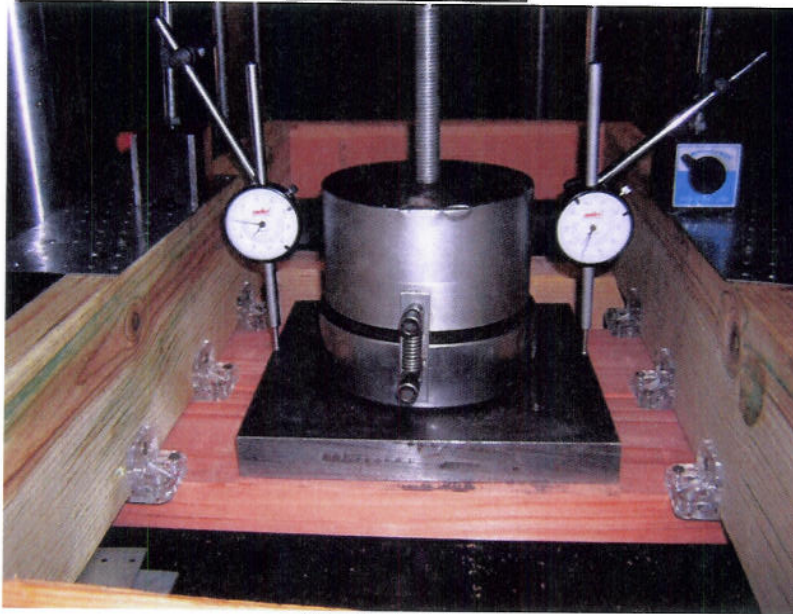
Ultimate Load = 1090 lbs.

Failure Mode: Screws pulled from joist

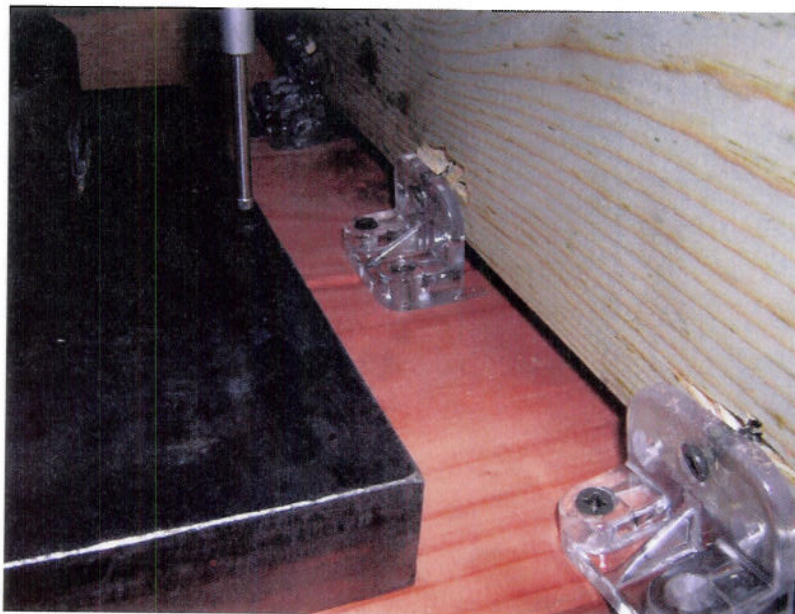
Pounds per square foot [1090 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 854PSF / 3 safety factor = 285 PSF

Series 3 average uplift = 332 PSF

TABLE 3 Con't



Typical Set-up



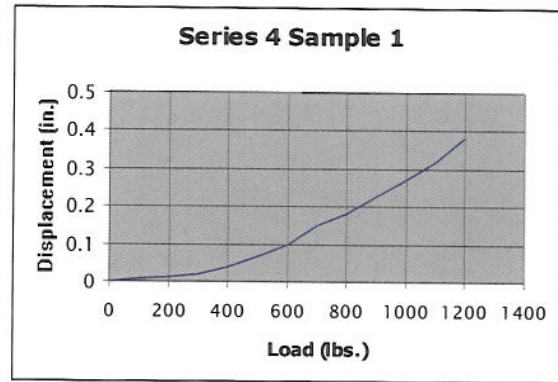
Typical Failure Mode

TABLE 4

Series 4: (2) 2 x 6 x 30" pressure treated Ponderosa Pine Joists (SG = .43) with pressured treated Ponderosa Pinedeck board using the Invisi-Fast bracket with no spacer.

Sample #1

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.006	0.008
200	0.012	0.015
300	0.019	0.024
400	0.038	0.038
500	0.068	0.062
600	0.110	0.090
700	0.157	0.140
800	0.205	0.160
900	0.250	0.210
1000	0.295	0.250
1100	0.345	0.290
1200	0.405	0.360



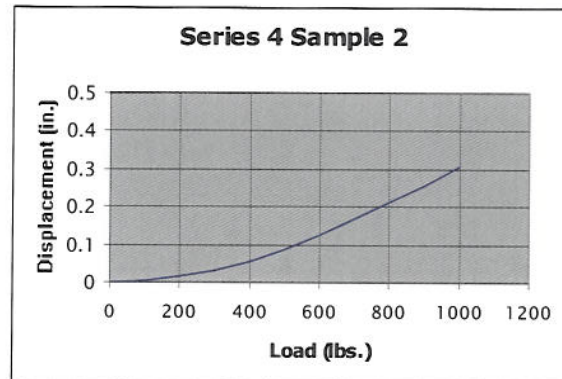
Ultimate Load = 1283 lbs.

Failure Mode: Screws pulled from joist & decking

Pounds per square foot [1283 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 1005PSF / 3 safety factor = 335 PSF

Sample #2

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.005	0.005
200	0.018	0.012
300	0.035	0.028
400	0.058	0.053
500	0.088	0.086
600	0.125	0.130
700	0.162	0.175
800	0.210	0.218
900	0.250	0.265
1000	0.300	0.315



Ultimate Load = 1107 lbs.

Failure Mode: Screws pulled from joist & decking

Pounds per square foot [1107 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 867PSF / 3 safety factor = 289 PSF

TABLE 4 Con't

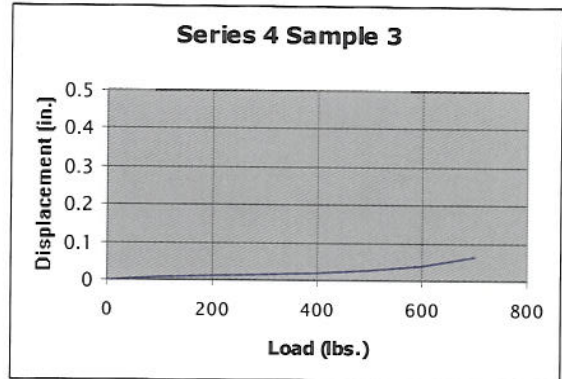
Sample #3

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.007	0.006
200	0.015	0.006
300	0.019	0.009
400	0.025	0.013
500	0.035	0.018
600	0.052	0.030
700	0.072	0.052

Ultimate Load = 816 lbs.

Failure Mode: Screws pulled from decking

Pounds per square foot [816 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 639PSF / 3 safety factor = 213 PSF



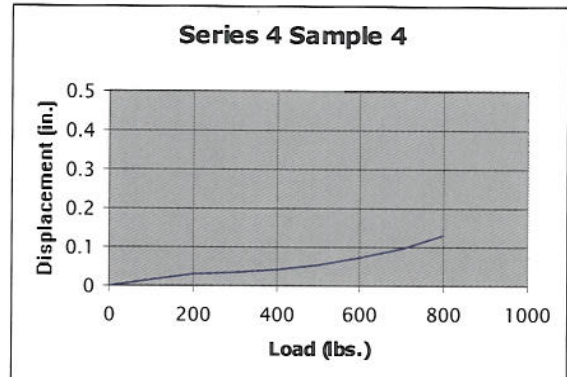
Sample #4

<u>Load</u>	<u>Displacement (in.)</u>	
0	0	0
100	0.018	0.016
200	0.035	0.024
300	0.040	0.028
400	0.047	0.035
500	0.058	0.046
600	0.080	0.065
700	0.105	0.090
800	0.140	0.120

Ultimate Load = 898 lbs.

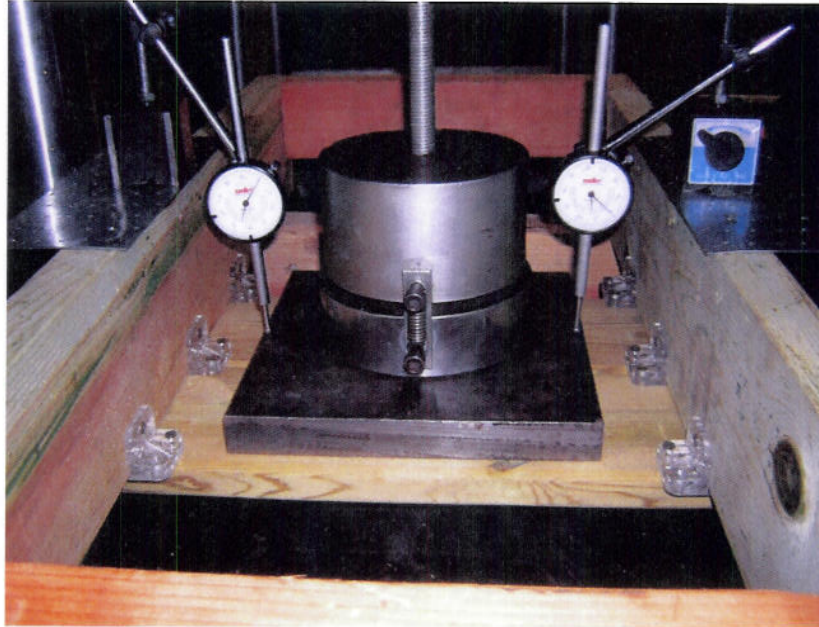
Failure Mode: Screws pulled from decking

Pounds per square foot [898 lbs./ 1.277 sq. ft (1.333'x 0.958')] = 703PSF / 3 safety factor = 234 PSF



Series 4 average uplift = 268 PSF

TABLE 4 Con't



Typical Test Set-up



Typical Failure

Hidden Deck Fasteners By Invisi-Fast

<http://invisifast.com/specs.php>



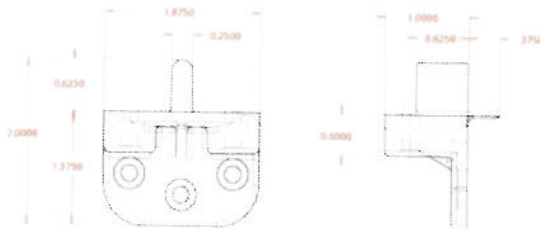
SPECIFICATIONS

Invisi-Fast Hidden Deck Fastener Features

- Compatible with Composite, Hardwoods, Treated (Including the new ACQ treated lumber), Cedar, and Vinyl.
- Guaranteed to Last Longer than your deck.
- Made of DURABLE CLEAR, UV Resistant, Lexan material that can be painted.
For a MSDS of Lexan, [click here](#). [PDF Format]
- Available in 2 styles, with built on board spacer (1/4", 3/16", and 1/8") and without.
- Boards are evenly spaced with built on board spacer.
- Unique Overhang Tabs for hands free attachment.
- Proudly Made in the USA.

Invisi-Fast Hidden Deck Fastener Advantages

- Under deck design helps prevent premature wood rotting around fastener.
- Helps keep labor costs down.
(compared to other hidden deck fastening systems)
- No special tools needed to install.
- Will not corrode like galvanized deck fasteners.



Requires approximately 1.75 pieces per square foot of decking if joists are 16" on center, for a more accurate estimate, contact us via our [Contact Page](#) or use our [Calculator](#) to find the amount of fasteners you need for your project.



Patent Pending

For Invisi-Fast
Warranty Information,
[click here](#).

Composite Decking Manufacturer's Recommended Spacing Chart*

1/8"	3/16"	1/4"
Correct Deck™	Geodeck™	Trex™
Timber-Tech™	Weather Best™	Rhino Deck™
EverGrain Decking™	Fiberon™ Decking	Symmatrix™
Elk Cross Timbers™		Latitudes Composite Decking™
Vekadeck™		ChoiceDek™
Exotics by Monarch™		Veranda™
Procell™		

*Chart refers to Composite Decking Only

[Deck fastener Installation](#) | [Invisi-Fast Specs](#) | [Hidden Deck Fasteners](#) | [About Us](#) | [Contact Us](#)

© 2007 MM Products, Inc.

TESTING

For LEXAN Testing Results,
[click here](#). [PDF Format]

INVISI-FAST™

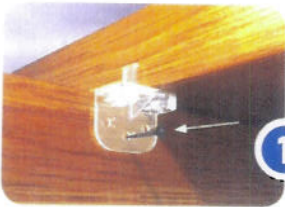
HIDDEN DECK FASTENER INSTALLATION

TYPICAL INSTALLATION



Prior to First Board Installation: Starting from the outside, attach the Invisi-Fast with no spacer between each joist. Once all are installed between each joist, you are ready for your first board. *Install first board with proper overhang and secure using the top holes (Deck Board Holes) of the Invisi-Fast fastener.

*To prevent squeaks we recommend applying a 3/8" bead of Silicone or Construction Adhesive along joist before installing Invisi-Fast hidden deck fastener to help fill in voids and imperfections on the mating surfaces between the joist and deck boards. Not applying adhesive will not compromise stability.



Step 1: Using the Invisi-Fast with spacer, slide the convenient Overhang Tabs under your first deck board for hands free attachment. Then, using an approved deck screw, fasten the Invisi-Fast to the joist using a lower hole (1).

We recommend one screw to be fastened into the joist. The other 2 holes are to be used as backups (if wood imperfection is present.)



Step 2: Secure the deck board by using the corresponding upper hole. Slide your second board into place. Secure deck board by using the remaining upper hole.

Continue this process for the length of the joist.

Note: When 2 boards meet each other on a joist, install an Invisi-Fast on each side of the joist.



Step 3: Repeat this process until the last deck board.

Step 4: Prior to securing the final board, cut your board to size if necessary. Using the Invisi-Fast without a spacer, secure the Invisi-Fast to the inside perimeter board (rimboard) using the lower hole. Then once all perimeter fasteners are secure, fasten your final deck board using the upper deck board holes.



**GE Advanced Materials
 Plastics**

**LEXAN® Resin 103R
 Americas: COMMERCIAL**

UL rated HB as of 10/97 200 series recommended when V 2 rating required. Nonhalogenated 7.0 MFR, for thicker sections without sinks. UV Stabilized for outdoor and lighting. Internal mold release.

TYPICAL PROPERTIES ¹	TYPICAL VALUE	UNIT	STANDARD
MECHANICAL			
Tensile Stress, yld, Type I, 50 mm/min	62	MPa	ASTM D 638
Tensile Stress, brk, Type I, 50 mm/min	65	MPa	ASTM D 638
Tensile Strain, yld, Type I, 50 mm/min	7	%	ASTM D 638
Tensile Strain, brk, Type I, 50 mm/min	110	%	ASTM D 638
Flexural Stress, yld, 1.3 mm/min, 50 mm span	93	MPa	ASTM D 790
Flexural Modulus, 1.3 mm/min, 50 mm span	2340	MPa	ASTM D 790
Hardness, Rockwell M	70	-	ASTM D 785
Hardness, Rockwell R	118	-	ASTM D 785
Taber Abrasion, CS-17, 1 kg	10	mg/1000cy	ASTM D 1044
IMPACT			
Izod Impact, unnotched, 23°C	3204	J/m	ASTM D 4812
Izod Impact, notched, 23°C	907	J/m	ASTM D 256
Tensile Impact, Type "S"	546	kJ/m ²	ASTM D 1822
Falling Dart Impact (D 3029), 23°C	169	J	ASTM D 3029
THERMAL			
Vicat Softening Temp, Rate B/50	154	°C	ASTM D 1525
HDT, 0.45 MPa, 6.4 mm, unannealed	137	°C	ASTM D 648
HDT, 1.82 MPa, 6.4 mm, unannealed	132	°C	ASTM D 648
CTE, -40°C to 95°C, flow	6.84E-05	1/°C	ASTM E 831
Specific Heat	1.25	J/g·°C	ASTM C 351
Thermal Conductivity	0.19	W/m·°C	ASTM C 177
Relative Temp Index, Elec	130	°C	UL 746B
Relative Temp Index, Mech w/impact	130	°C	UL 746B
Relative Temp Index, Mech w/o impact	130	°C	UL 746B
PHYSICAL			
Specific Gravity	1.2	-	ASTM D 792
Specific Volume	0.83	cm ³ /g	ASTM D 792
Density	1.19	g/cm ³	ASTM D 792
Water Absorption, 24 hours	0.15	%	ASTM D 570
Water Absorption, equilibrium, 23°C	0.35	%	ASTM D 570
Water Absorption, equilibrium, 100°C	0.58	%	ASTM D 570
Mold Shrinkage, flow, 3.2 mm	0.5 - 0.7	%	GE Method

¹ Typical values only. Variations within normal tolerances are possible for various batches. All values are maintained at least after 48 hours storage at 23°C/50% relative humidity. All properties tested the melt volume rate are measured on injection-molded samples. All samples are prepared according to ISO 285.

² Only typical values for material selection purposes. Not to be used for part or stock design.
³ This rating is not intended to reflect methods presented by this or any other material under actual use conditions.
⁴ Dart measurement according to UL.

LEXAN® (MMA) Lexan 103R (MMA) 200

PLEASE CONTACT YOUR LOCAL SALES OFFICE FOR AVAILABILITY IN YOUR AREA. DISCLAIMER: THE MATERIALS AND PRODUCTS OF THE BUSINESSES MAKING UP THE GE PLASTICS UNIT OF GENERAL ELECTRIC COMPANY, ITS SUBSIDIARIES AND AFFILIATES ("GE") ARE SOLD SUBJECT TO GE'S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDERS, ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, GE MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, IS THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USE CONDITIONS OR RISKS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING GE MATERIALS, PRODUCTS, RECOMMENDATIONS OR ADVICE, EXCEPT AS PROVIDED IN GE'S STANDARD CONDITIONS OF SALE. GE AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS OR PRODUCTS DESCRIBED HEREIN. GE DOES NOT ACCEPT RESPONSIBILITY FOR MIXING OR DETERMINATION AS TO THE SUITABILITY OF GE'S MATERIALS, PRODUCTS, RECOMMENDATIONS, OR ADVICE FOR ITS OWN PARTICULAR USE. EACH USER MUST CONDUCT ALL TESTS AND ANALYSES NECESSARY TO VERIFY THAT ITS END-USE APPLICATIONS OF GE'S MATERIALS OR PRODUCTS WILL BE SAFE AND SUITABLE FOR USE UNDER END-USE CONDITIONS. NOTHING IN THIS OR ANY OTHER DOCUMENT, NOR ANY ORAL RECOMMENDATION OR ADVICE, SHALL BE HELD TO CONSTITUTE A WARRANTY OR GUARANTEE OF ANY KIND. GE DISCLAIMS, UNLESS ANY SUCH RECOMMENDATION IS SPECIFICALLY AGREED TO IN A WRITING SIGNED BY GE, ALL STATEMENTS CONTAINED IN SUBSIDIARIES OR AFFILIATES CONCERNING SUCH USE OR DESIGN OR AS A RECOMMENDATION FOR THE USE OF SUCH MATERIAL, PRODUCT OR DESIGN IN THE PERFORMANCE OF ANY PATENT OR OTHER INTELLECTUAL PROPERTY RIGHTS OF GENERAL ELECTRIC COMPANY OR ANY OF ITS SUBSIDIARIES OR AFFILIATES.

© 2007 GE is a trademark of the General Electric Company.
 © 1997-2007 General Electric Company. All rights reserved.



GE Advanced Materials
 Plastics

LEXAN® Resin 103R
 Americas: COMMERCIAL

TYPICAL PROPERTIES ¹	TYPICAL VALUE	UNIT	STANDARD
PHYSICAL			
Mold Shrinkage, flow, 3.2 mm	0.5 - 0.7	%	GE Method
Melt Flow Rate, 300 C/1.2 kgf	7	g/10 min	ASTM D 1238
OPTICAL			
Light Transmission	88	%	ASTM D 1003
Haze	1	%	ASTM D 1003
Refractive Index	1.586	-	ASTM D 542
ELECTRICAL			
Volume Resistivity	>1.E+17	Ohm cm	ASTM D 257
Dielectric Strength, in air, 3.2 mm	14.9	kV/mm	ASTM D 149
Relative Permittivity, 50/60 Hz	3.17	-	ASTM D 150
Relative Permittivity, 1 MHz	2.96	-	ASTM D 150
Dissipation Factor, 50/60 Hz	0.0009	-	ASTM D 150
Dissipation Factor, 1 MHz	0.01	-	ASTM D 150
Hot Wire Ignition (PLC)	4	PLC Code	UL 746A
High Voltage Arc Track Rate (PLC)	2	PLC Code	UL 746A
High Ampere Arc Ign, surface (PLC)	1	PLC Code	UL 746A
Comparative Tracking Index (UL) (PLC)	2	PLC Code	UL 746A
FLAME CHARACTERISTICS			
UL Recognized, 94HB Flame Class Rating (3)	0.76	mm	UL 94
UV-light, water exposure/immersion	F1	-	UL 746C

¹ Typical values only. Tolerances within normal tolerances are possible for various causes. All values are measured at least after 48 hours storage at 23°C/50% relative humidity. All operations, except the melt volume rate are measured on injection molded samples. All samples are prepared according to ISO 2918.

² Only typical data for material selection purposes. Not to be used for part or tool design.
³ This rating is not intended to reflect hazards presented by this or any other material unless stated for comparison.
⁴ Other measurements according to UL.

5/04 (P) Lex 103R (4/16/2001)

PLEASE CONTACT YOUR LOCAL SALES OFFICE FOR AVAILABILITY IN YOUR AREA. DISCLAIMER - THE MATERIALS AND PRODUCTS OF THE BUSINESSES MAKING UP THE GE PLASTICS UNIT OF GENERAL ELECTRIC COMPANY, ITS SUBSIDIARIES AND AFFILIATES (GEP), ARE SOLD SUBJECT TO GEP'S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, GEP MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (I) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER EMPLOYED CONDITIONS, OR (II) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING GEP MATERIALS, PRODUCTS, RECOMMENDATIONS OR ADVICE, EXCEPT AS PROVIDED IN GEP'S STANDARD CONDITIONS OF SALE. GEP AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS OR PRODUCTS DESCRIBED HEREIN. Each user bears full responsibility for making its own determination as to the suitability of GEP's materials, products, recommendations or advice for its own particular use. It will user must identify and perform all tests and analyses necessary to assure that its finished parts incorporating GEP materials or products will be safe and suitable for use under end use conditions. Nothing in this or any other document, nor any oral recommendations or advice, shall be deemed to alter, vary, supersede, or waive any provision of GEP's Standard Conditions of Sale or this Disclaimer, unless any such modification is specifically agreed to in a writing signed by GEP. No disclaimer contained in publications or affiliates covering such use or design, or as a recommendation for the use of such material, product or design in the infringement of any patent or other intellectual property right.

© 2004, GE Plastics, GE Plastics Company
 © 2007, GE Plastics, GE Plastics Company. All rights reserved.



GE Advanced Materials
 Plastics

LEXAN® Resin 103R
 Americas: COMMERCIAL

PROCESSING PARAMETERS	TYPICAL VALUE	UNIT
Injection Molding		
Drying Temperature	120	°C
Drying Time	3 - 4	hrs
Drying Time (Cumulative)	48	hrs
Maximum Moisture Content	0.02	%
Melt Temperature	310 - 330	°C
Nozzle Temperature	305 - 325	°C
Front - Zone 3 Temperature	310 - 330	°C
Middle - Zone 2 Temperature	300 - 320	°C
Rear - Zone 1 Temperature	290 - 310	°C
Mold Temperature	80 - 115	°C
Back Pressure	0.3 - 0.7	MPa
Screw Speed	40 - 70	rpm
Shot to Cylinder Size	40 - 60	%
Vent Depth	0.025 - 0.076	mm

1) Typical values only. Variations within normal tolerances are possible for various colors. All values are measured at least after 48 hours storage at 23°C/50% relative humidity. All properties, except for melt volume rate, are measured on injection molded samples. All samples are prepared according to ISO 794.

2) Dry typical data for 103R is for injection purposes that it be used for parts or tool design. 3) This rating is not intended to reflect hazards presented by this or any other material under actual use conditions. 4) Open measurement according to UL.

Source: GMD, Last Update 04/14/2007

PLEASE CONTACT YOUR LOCAL SALES OFFICE FOR AVAILABILITY IN YOUR AREA. **DISCLAIMER: THE MATERIALS AND PRODUCTS OF THE BUSINESSES MAKING UP THE GE PLASTICS UNIT OF GENERAL ELECTRIC COMPANY, ITS SUBSIDIARIES AND AFFILIATES (GE), ARE SOLD SUBJECT TO GE'S STANDARD CONDITIONS OF SALE, WHICH ARE INCLUDED IN THE APPLICABLE DISTRIBUTOR OR OTHER SALES AGREEMENT, PRINTED ON THE BACK OF ORDER ACKNOWLEDGMENTS AND INVOICES, AND AVAILABLE UPON REQUEST. ALTHOUGH ANY INFORMATION, RECOMMENDATIONS, OR ADVICE CONTAINED HEREIN IS GIVEN IN GOOD FAITH, GE MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, (B) THAT THE RESULTS DESCRIBED HEREIN WILL BE OBTAINED UNDER END-USER CONDITIONS, OR (C) AS TO THE EFFECTIVENESS OR SAFETY OF ANY DESIGN INCORPORATING GE MATERIALS, PRODUCTS, RECOMMENDATIONS OR ADVICE. EXCEPT AS PROVIDED IN GE'S STANDARD CONDITIONS OF SALE, GE AND ITS REPRESENTATIVES SHALL IN NO EVENT BE RESPONSIBLE FOR ANY LOSS RESULTING FROM ANY USE OF ITS MATERIALS OR PRODUCTS DESCRIBED HEREIN.** GE is not responsible for making its own determination as to the suitability of GE's materials, products, recommendations, or advice for a user's particular use. Each user must specify and perform all tests and analysis necessary to assure that its finished parts incorporating GE's materials or products will be safe and suitable for use under end use conditions. Nothing in this or any other document, nor any oral representation or advice, shall be deemed to alter, vary, supersede, or waive any provision of GE's Standard Conditions of Sale or this disclaimer, unless any such modification is specifically agreed to in a writing signed by GE. No statement contained in this document or any other document shall be construed to grant any license under any patent or other intellectual property rights of General Electric Company or any of its subsidiaries or affiliates covering such use or design, or as a recommendation for the use of such material, product or design, if the infringement of any patent or other intellectual property rights of GE is a violation of the General Electric Company.

LEXAN is a trademark of the General Electric Company.
 © 1997-2004 General Electric Company. All rights reserved.

APR-26-2007 THU 03:07 PM

FAX NO.

P. 01

ATTN: Brett

FROM
 Brian@36's

PART NO.	Flat Head Combo Drive T-17		
Drawing Date	1/13/2007	Revised Date	Version



Manufacturing Specification:

Unit:mm

SPEC	HEAD DIA	ACROSS WIDTH	HEAD THICK	THICK NESS	RECESS DEPTH	MAJOR DIA	MINOR DIA	Bit	LENGTH
size	A	W	H	U	Q	D1	D2		L
#8x1"	7.42~ 8.43	4.50~ 5.10	2.54~ 2.74	0.5~ 0.7	1.83~ 2.36	4.35~ 4.70	2.55~ 2.85	#2	24.6~26.2

Technical Information:

- (1)Material : C1018-C1022
- (2)Pull-Out : Table(1)
- (3)Shear Test : Table(1)
- (4)Torque : Table(2)
- (5)Salt Spray Test : Min. 1000 Hrs
- (6)For ASTM G95(DIN 50018) : Min. 5 Cycles

Table (1)

Force Gauge	Pull-Out Plywood (Lbs)	Shear (Lbs)
#8x1"	302	1212

Table (2)

Torque	#8
Coarse Thread	40 kg-cm