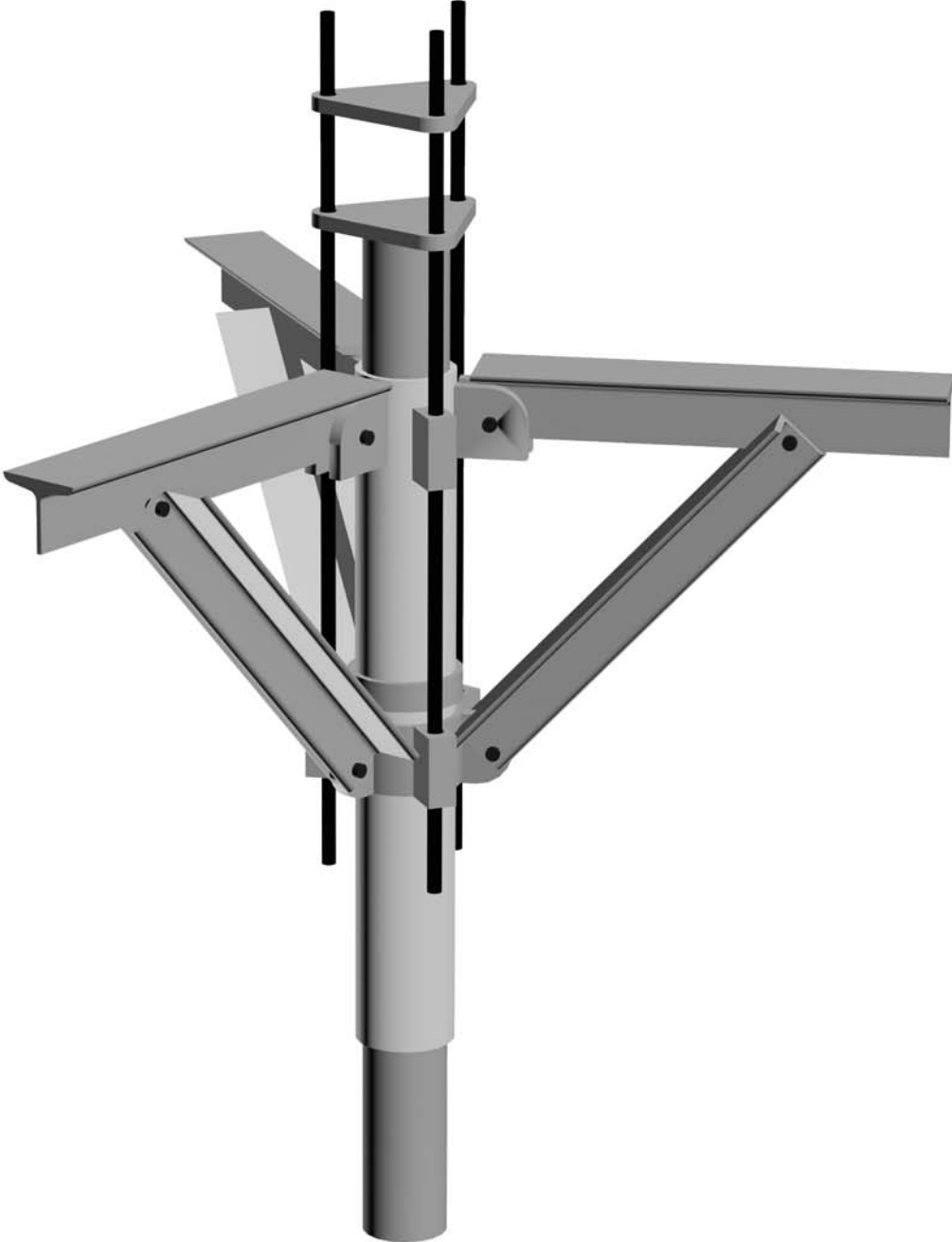


INTERIOR SLAB BRACKET ISB-07

SPECIFICATION AND DESIGN MANUAL



C o n t e n t s

Slab Bracket Specifications	Tab 1
Bracket Specification Certification	
Slab Bracket Material and Installation Specifications 16” arms	
Slab Bracket Material and Installation Specifications 24” arms	
Bracket Spacing and Slab Capacity Design Charts	Tab 2
Bracket Spacing and Slab Capacity Certification	
Slab Spacing Design Chart –Bracket with 16” arms	
Slab Spacing Design Chart –Bracket with 24” arms	
Typical Construction Submittal	Tab 3
Material and Load Specifications for Helical Pile (Foundation Support Works)	
Material and Load Specifications for Pipe Pile (Foundation Support Works)	
Slab Bracket Specification Package	

TAB 1: Slab Bracket Specifications



Rigorous and Responsive

ISB-07 (Interior Slab Bracket) Capacity Certification

Issued: **September 27, 2010**

Basis: **USF Test; SERNO: KC50A**
w/ Calibration traceable to NIST thru MTS Job No.: US1.15069

Dear **ISB-07** Specifier,

This letter is intended to certify the ultimate capacity and recommended working capacity of the ISB-07. This certification is based on the independent testing performed by the University of South Florida's Engineering Laboratory and their report issued on March 3, 2010.

Report Summary Excerpt: *The failure of the bracket occurred at just over 40,000 lbs (20 tons) of axial compression loading. The failure mechanism resulted when one of the thread rods ruptured just below the hex nut. Upon examination it was observed that the top plate evidenced yielding and the remaining two (2) threaded rods were deformed at the location of the top plate. The ISB-07 was able to sustain load until the threaded rod ruptured. It should be noted that the threaded rods were comprised of ASTM A193 Grade B7 alloy steel. Refer to the attached "Testing Results" sheet provided by the University of South Florida.*

Bracket Designation	Ultimate Capacity (Actual)	Working Capacity (Recommended)
ISB-07 w/ 16" Arms	40 Kips	20 Kips
ISB-07 w/ 24" Arms	88 Kips	44 Kips

We therefore certify the **ISB-07** (Interior Slab Bracket) as having the capacities listed above.

Sincerely,
Bracken Engineering

This document is not valid and can not be relied upon by anyone for any reason unless it is signed and sealed by the professionals named and shown as its authors. This copy is provided for informational purposes only.

William C. Bracken, PE
Principal Engineer
September 27, 2010
License No. PE 47676 / FL
License No. CA 7419 / FL



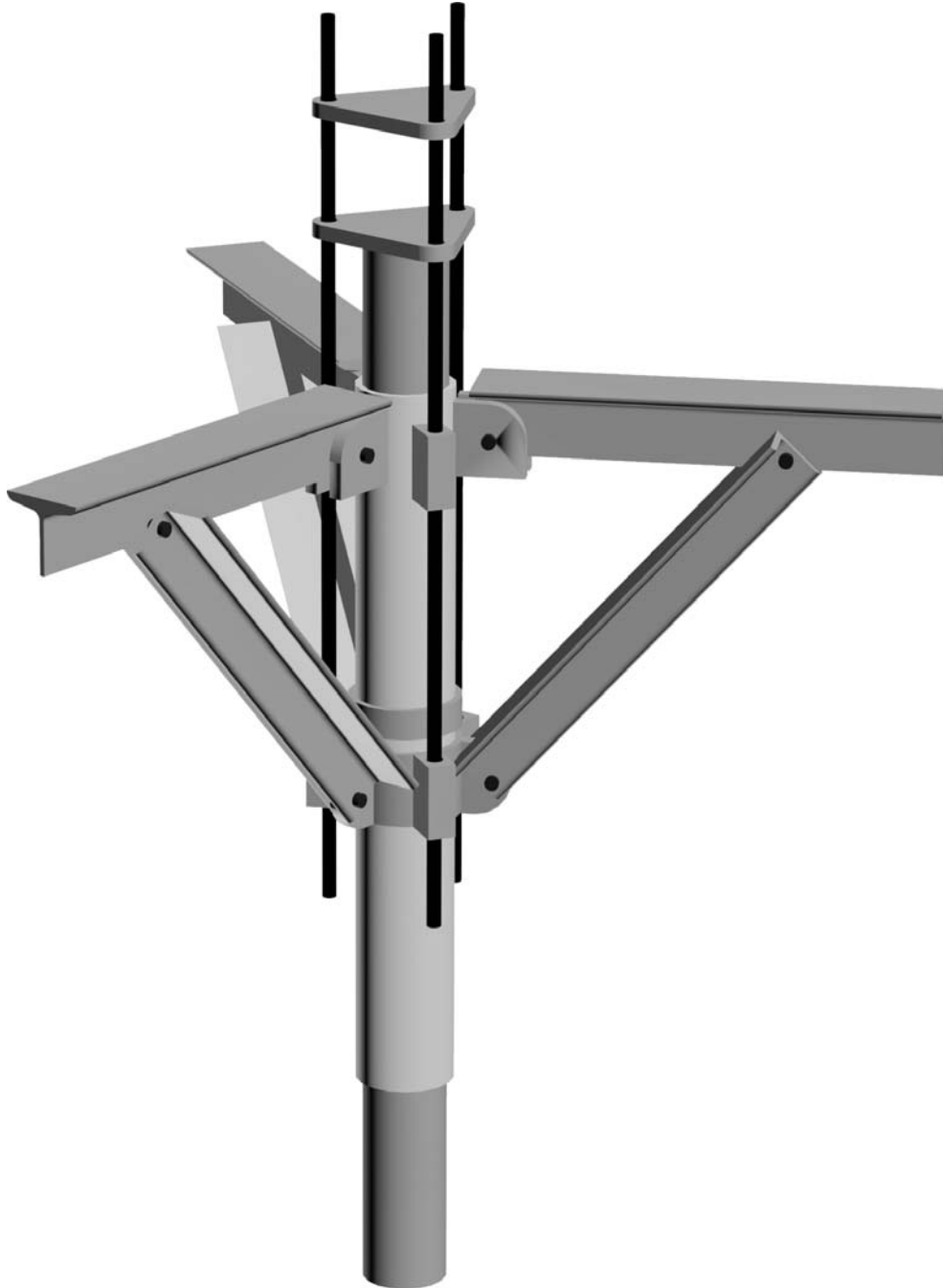
2701 West Busch Boulevard
Suite 200
Tampa, Florida 33618

Tel (800) 971-7252
(813) 243-4251
Fax (813) 243-9530

INTERIOR SLAB BRACKET

ISB-07

16" ARM ASSEMBLY



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:

WCB

DRAWN BY:

JCB

DATE:

03-02-10

SCALE:

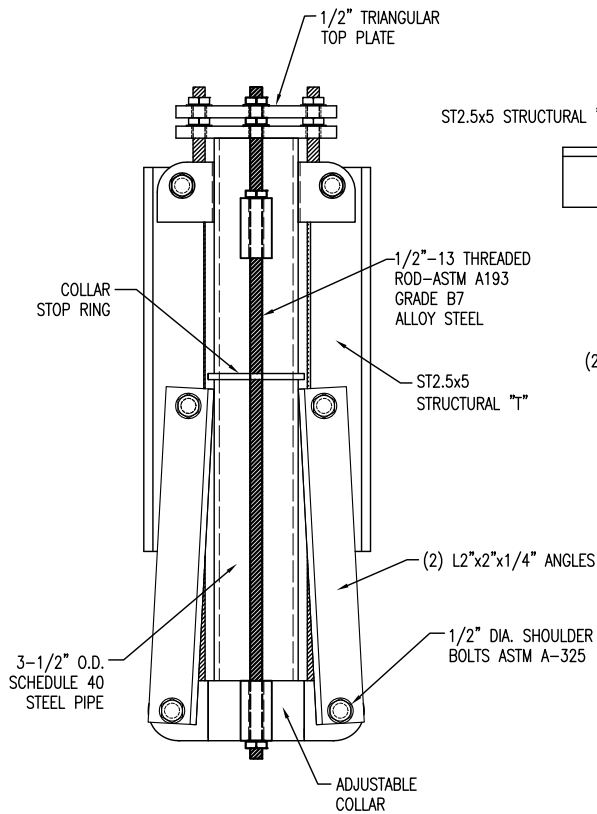
AS NOTED

SHEET #:

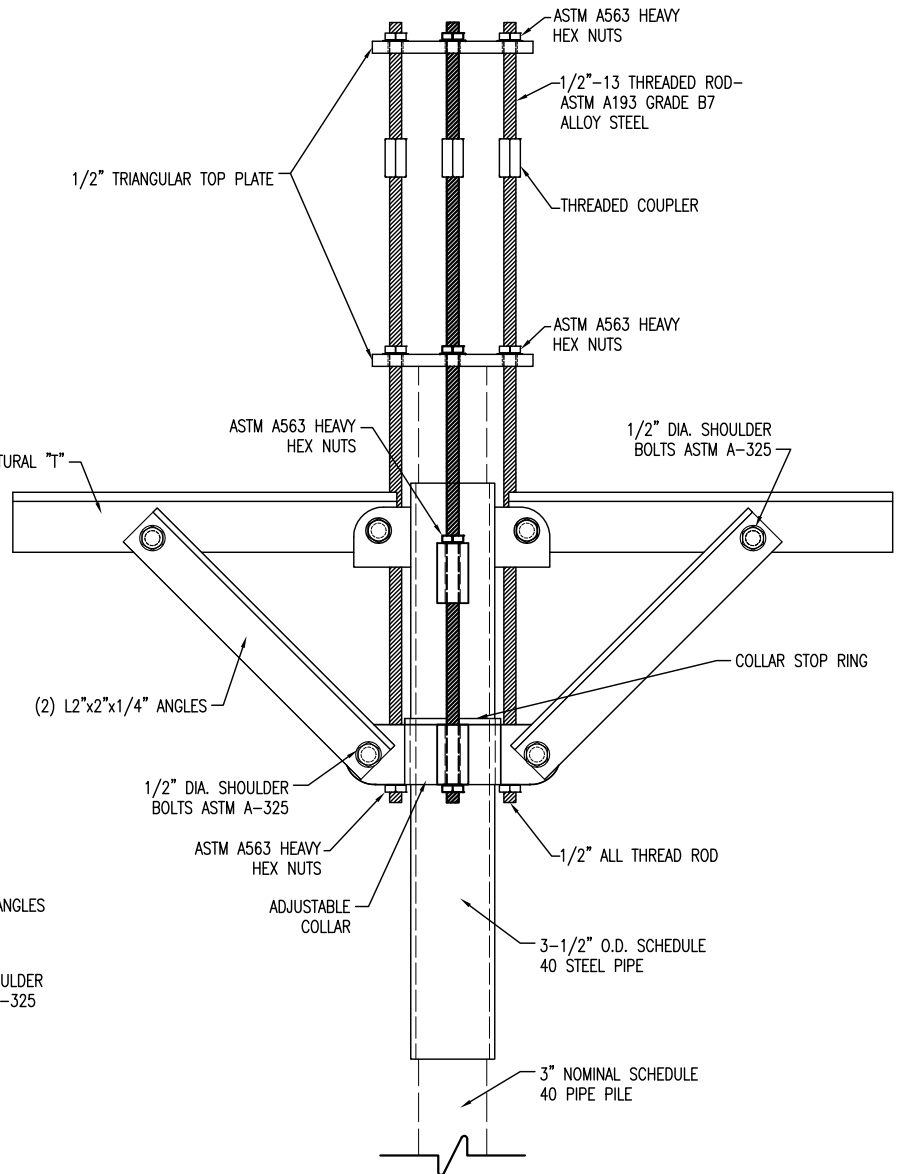
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16" ARM ASSEMBLY SPECIFICATIONS	
PART NAME	MATERIAL
A SUPPORT ARM	ASTM A36
B DIAGONAL SUPPORT	ASTM A36
C MAIN BRACKET PIPE	ASTM 53, A513 PIPE
D PIPE PILE	NOM. SCHED. 40
E ALL THREAD ROD	ASTM A193 GRADE B7
F LIFTING PLATES	ASTM A36
G ARM SUPPORT BLOCK	ASTM A36
H SHOULDER BOLT	ASTM A325
I DIAGONAL SUPPORT BLOCK	ASTM A36
J COLLAR STOP RING	ASTM A513
K ADJUSTABLE COLLAR	ASTM A513
L THREADED ROD SUPPORT BLOCK	ASTM A36
M HEX NUT	ASTM A563

NOTE: ALL WELDS ARE FULL LENGTH FILLET (E70).



COLLAPSED VIEW



EXTENDED VIEW

THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:
WCB

DATE:
03-02-10

DRAWN BY:
JCB

SCALE:
AS NOTED

SHEET #:

02



2701 West Busch Boulevard
Suite 200
Tampa, Florida 33618

Tel (800) 971-7252
(813) 243-4251
Fax (813) 243-9530

INTERIOR SLAB BRACKET

ISB-07

16" ARM ASSEMBLY

INSTALLATION SEQUENCE:

- 1.) CORE A 10" DIAMETER HOLE IN EXISTING SLAB.
- 2.) EXCAVATE SOIL BENEATH SLAB TO ALLOW ARMS TO OPEN WITHOUT OBSTRUCTION.
- 3.) 3" NOM. SCHED. 40 PILE TO BE INSTALLED AS SPECIFIED BY ENGINEER. LEAVE ENOUGH PIPE (ABOVE BRACKET) TO ACCOMPLISH DESIRED LIFT.
- 4.) INSERT SLAB BRACKET OVER PILE AND EXTEND ARMS UNDER SLAB.
- 5.) TIGHTEN BOTTOM PLATE TO END OF PIPE PILE.
- 6.) PLACE STRUCTURAL MORTAR ON TOP SURFACE OF SUPPORT ARMS PRIOR TO MAKING CONTACT WITH BOTTOM SURFACE OF SLAB.
- 7.) HYDRAULIC RAM TO BE INSERTED BETWEEN TRIANGULAR PLATES AND PRESSURIZE SO AS TO ACCOMPLISH DESIRED LIFT. LIFTING LOAD SHOULD NOT EXCEED THE ALLOWABLE MAXIMUM LIFTING LOAD.
- 8.) BOLTS TO BE TIGHTENED ON BOTTOM PLATE OR THE MAIN BRACKET PIPE IS TO BE FULLY WELDED TO THE PIPE PILE SUBSEQUENT TO FINAL LIFT.
- 9.) EXCESS THREADED RODS ABOVE LOWER PLATE TO BE CUT.



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:

WCB

DRAWN BY:

JCB

DATE:

03-02-10

SCALE:

AS NOTED

SHEET #:

03

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2701 West Busch Boulevard
Suite 200
Tampa, Florida 33618

Tel (800) 971-7252
(813) 243-4251
Fax (813) 243-9530

INTERIOR SLAB BRACKET

ISB-07

24" ARM ASSEMBLY



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:

WCB

DRAWN BY:

JCB

DATE:

03-02-10

SCALE:

AS NOTED

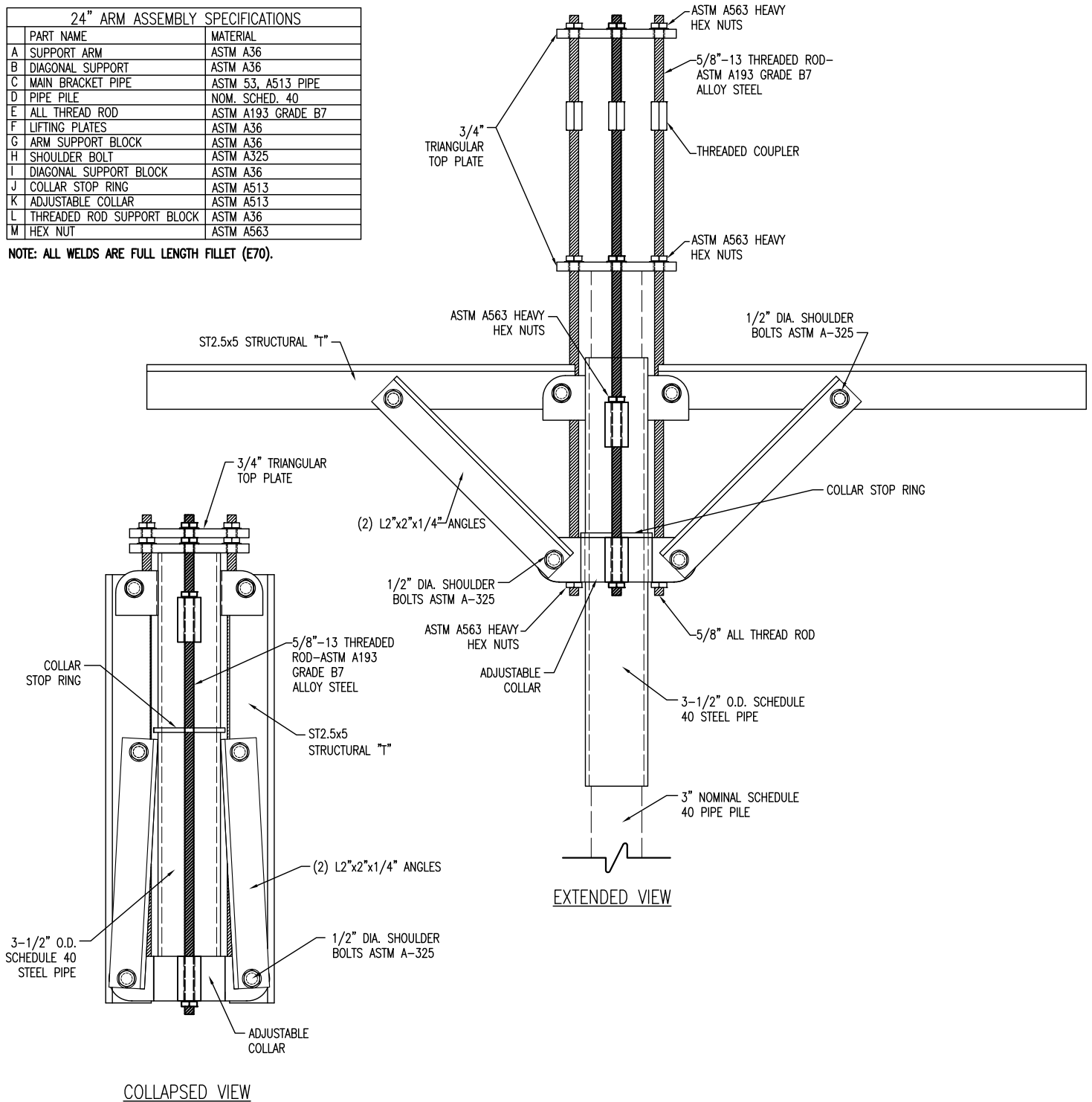
SHEET #:

01

24" ARM ASSEMBLY SPECIFICATIONS

PART NAME	MATERIAL
A SUPPORT ARM	ASTM A36
B DIAGONAL SUPPORT	ASTM A36
C MAIN BRACKET PIPE	ASTM 53, A513 PIPE
D PIPE PILE	NOM. SCHED. 40
E ALL THREAD ROD	ASTM A193 GRADE B7
F LIFTING PLATES	ASTM A36
G ARM SUPPORT BLOCK	ASTM A36
H SHOULDER BOLT	ASTM A325
I DIAGONAL SUPPORT BLOCK	ASTM A36
J COLLAR STOP RING	ASTM A513
K ADJUSTABLE COLLAR	ASTM A513
L THREADED ROD SUPPORT BLOCK	ASTM A36
M HEX NUT	ASTM A563

NOTE: ALL WELDS ARE FULL LENGTH FILLET (E70).



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY: WCB	DRAWN BY: JCB
DATE: 03-02-10	SCALE: AS NOTED

SHEET #:
02

24" ARM ASSEMBLY

INSTALLATION SEQUENCE:

- 1.) CORE A 10" DIAMETER HOLE IN EXISTING SLAB.
- 2.) EXCAVATE SOIL BENEATH SLAB TO ALLOW ARMS TO OPEN WITHOUT OBSTRUCTION.
- 3.) 3" NOM. SCHED. 40 PILE TO BE INSTALLED AS SPECIFIED BY ENGINEER. LEAVE ENOUGH PIPE (ABOVE BRACKET) TO ACCOMPLISH DESIRED LIFT.
- 4.) INSERT SLAB BRACKET OVER PILE AND EXTEND ARMS UNDER SLAB.
- 5.) TIGHTEN BOTTOM PLATE TO END OF PIPE PILE.
- 6.) PLACE STRUCTURAL MORTAR ON TOP SURFACE OF SUPPORT ARMS PRIOR TO MAKING CONTACT WITH BOTTOM SURFACE OF SLAB.
- 7.) HYDRAULIC RAM TO BE INSERTED BETWEEN TRIANGULAR PLATES AND PRESSURIZE SO AS TO ACCOMPLISH DESIRED LIFT. LIFTING LOAD SHOULD NOT EXCEED THE ALLOWABLE MAXIMUM LIFTING LOAD.
- 8.) BOLTS TO BE TIGHTENED ON BOTTOM PLATE OR THE MAIN BRACKET PIPE IS TO BE FULLY WELDED TO THE PIPE PILE SUBSEQUENT TO FINAL LIFT.
- 9.) EXCESS THREADED RODS ABOVE LOWER PLATE TO BE CUT.



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY: WCB	DRAWN BY: JCB
DATE: 03-02-10	SCALE: AS NOTED

SHEET #: 03

**TAB 2: Bracket Spacing and Slab Capacity
Design Charts**



Rigorous and Responsive

ISB-07 (Interior Slab Bracket) Bracket Spacing and Slab Capacity Certification

Issued: **September 27, 2010**

Basis: **University of South Florida - Testing**
Central Florida Testing Laboratory - Testing
Bracken Engineering - Engineering Analysis

Dear **ISB-07** Specifier,

This letter is intended to certify the values depicted in the **ISB-07 Bracket Spacing and Slab Capacity Design Graphs**. This certification is based on the independent testing performed by the University of South Florida's Engineering Laboratory, the independent testing performed by Central Florida Testing Laboratory and the engineering analysis performed by Bracken Engineering. The **ISB-07 Bracket Spacing and Slab Capacity Design Graphs** are for design purposes only and do not address any slab geometric abnormalities, sequencing or existing condition constraints. These design graphs are also based on the assumption that the slab is to be supported solely atop the brackets with no support or assistance from bearing soils. It is therefore the responsibility of the design professional to consider slab geometry, construction sequencing, existing conditions and final support conditions when designing from these tables.

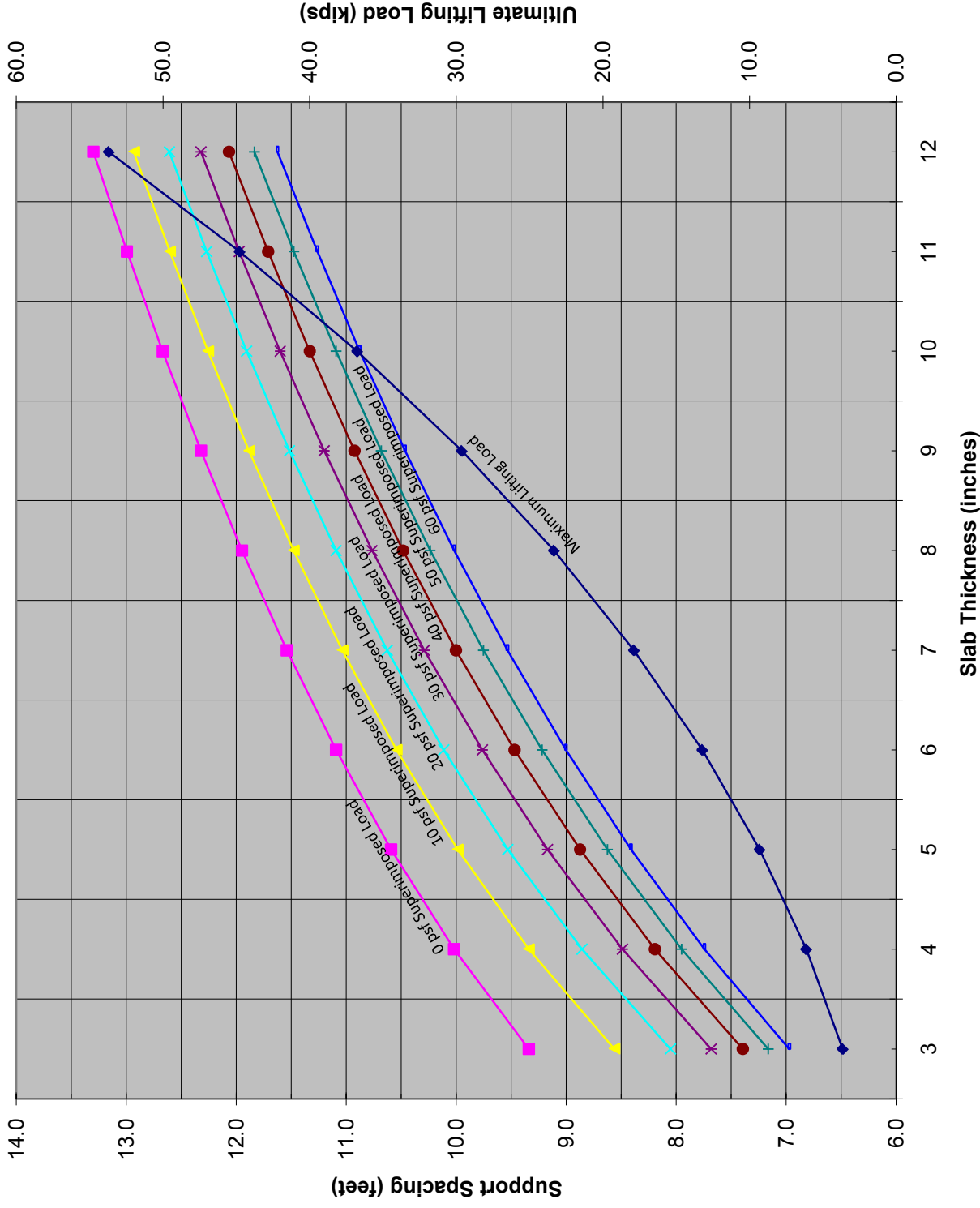
Bracken Engineering certifies the **ISB-07 (Interior Slab Bracket) Bracket Spacing and Slab Capacity Design Graphs** as having the capacities shown.

Sincerely,
Bracken Engineering

This document is not valid and can not be relied upon by anyone for any reason unless it is signed and sealed by the professionals named and shown as its authors. This copy is provided for informational purposes only.

William C. Bracken, PE
Principal Engineer
September 27, 2010
License No. PE 47676 / FL
License No. CA 7419 / FL

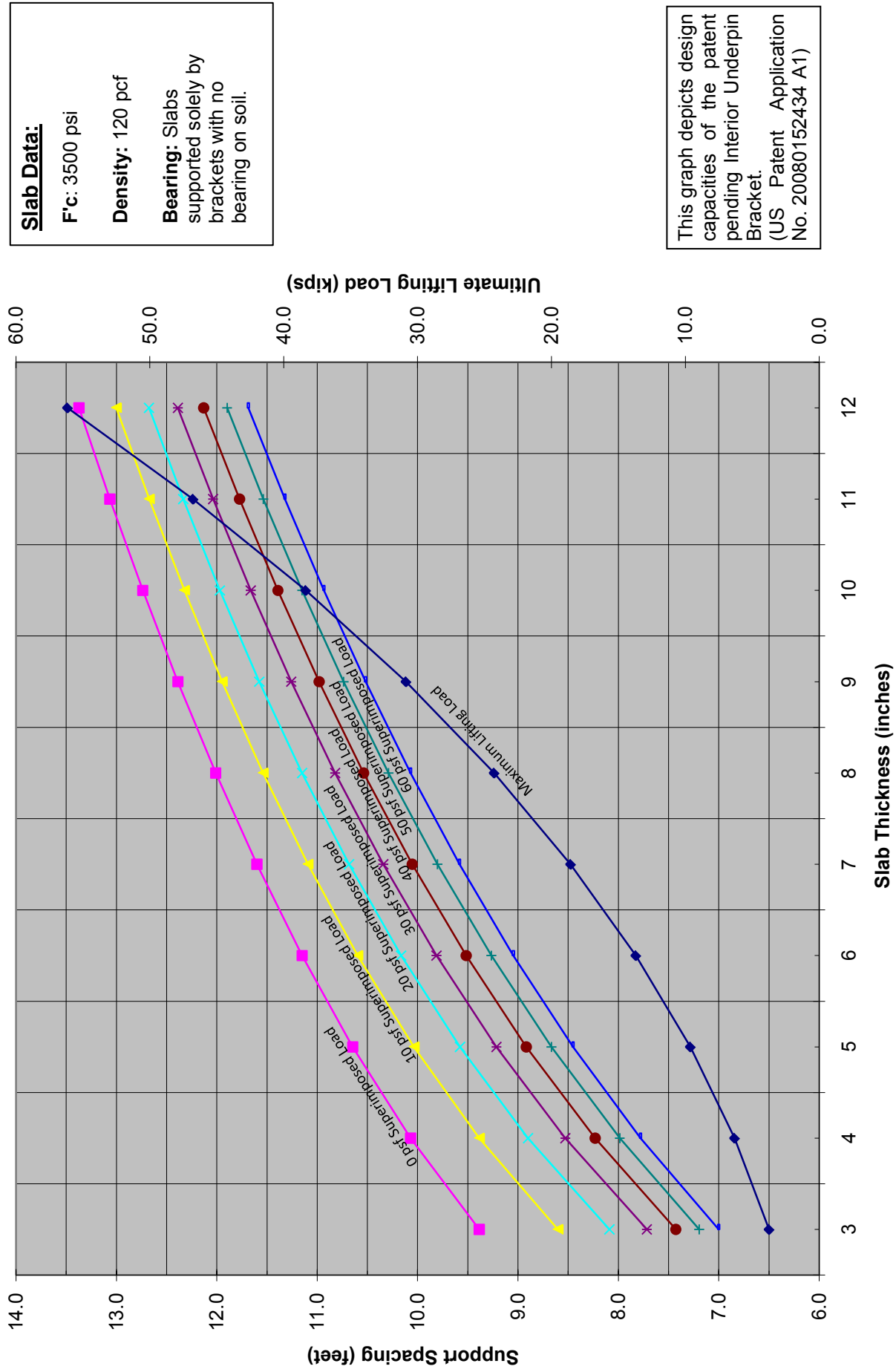
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" arms



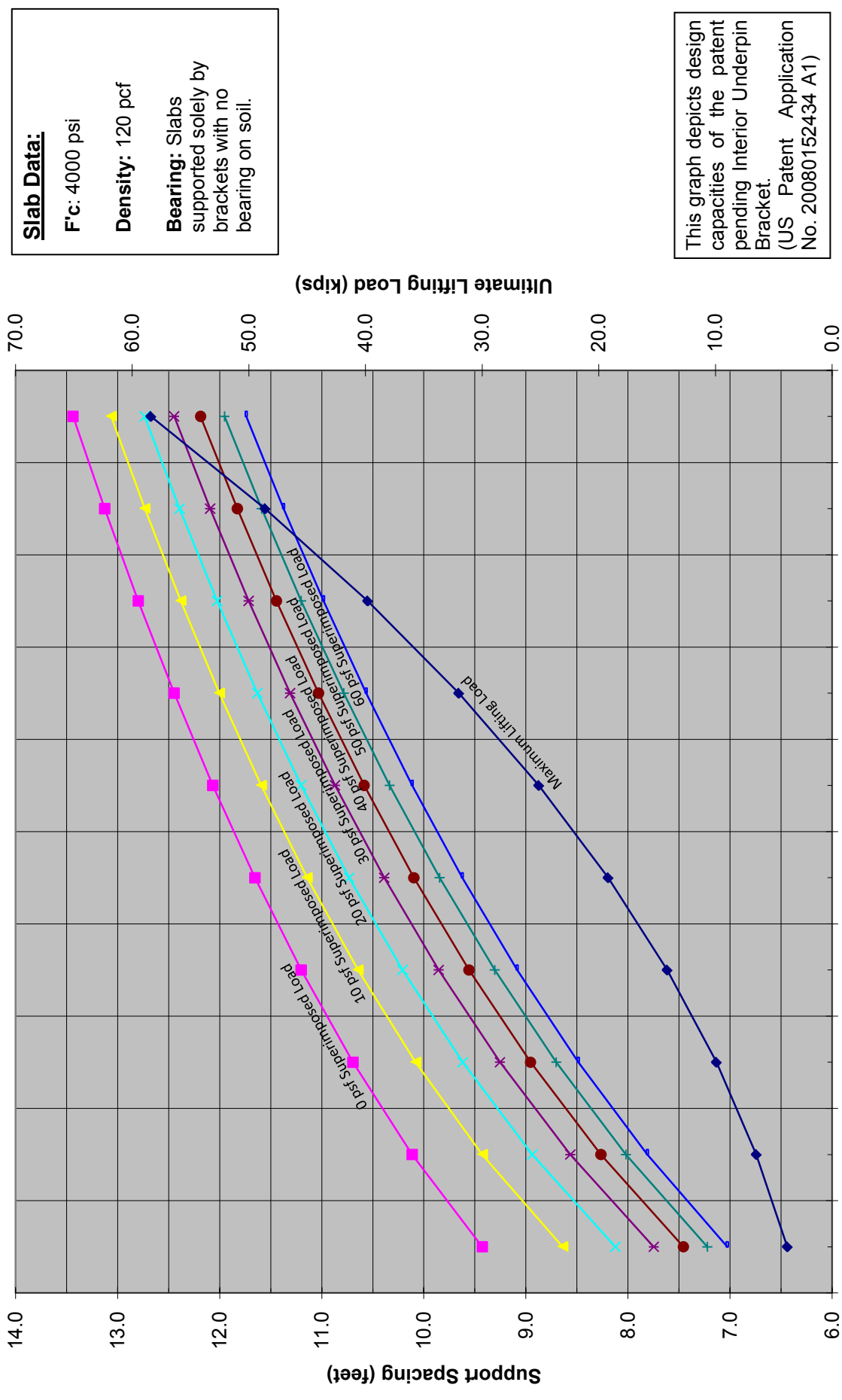
Slab Data:
F'c: 3000 psi
Density: 120 pcf
Bearing: Slabs supported solely by brackets with no bearing on soil.

This graph depicts design capacities of the patent pending Interior Underpin Bracket.
 (US Patent Application No. 20080152434 A1)

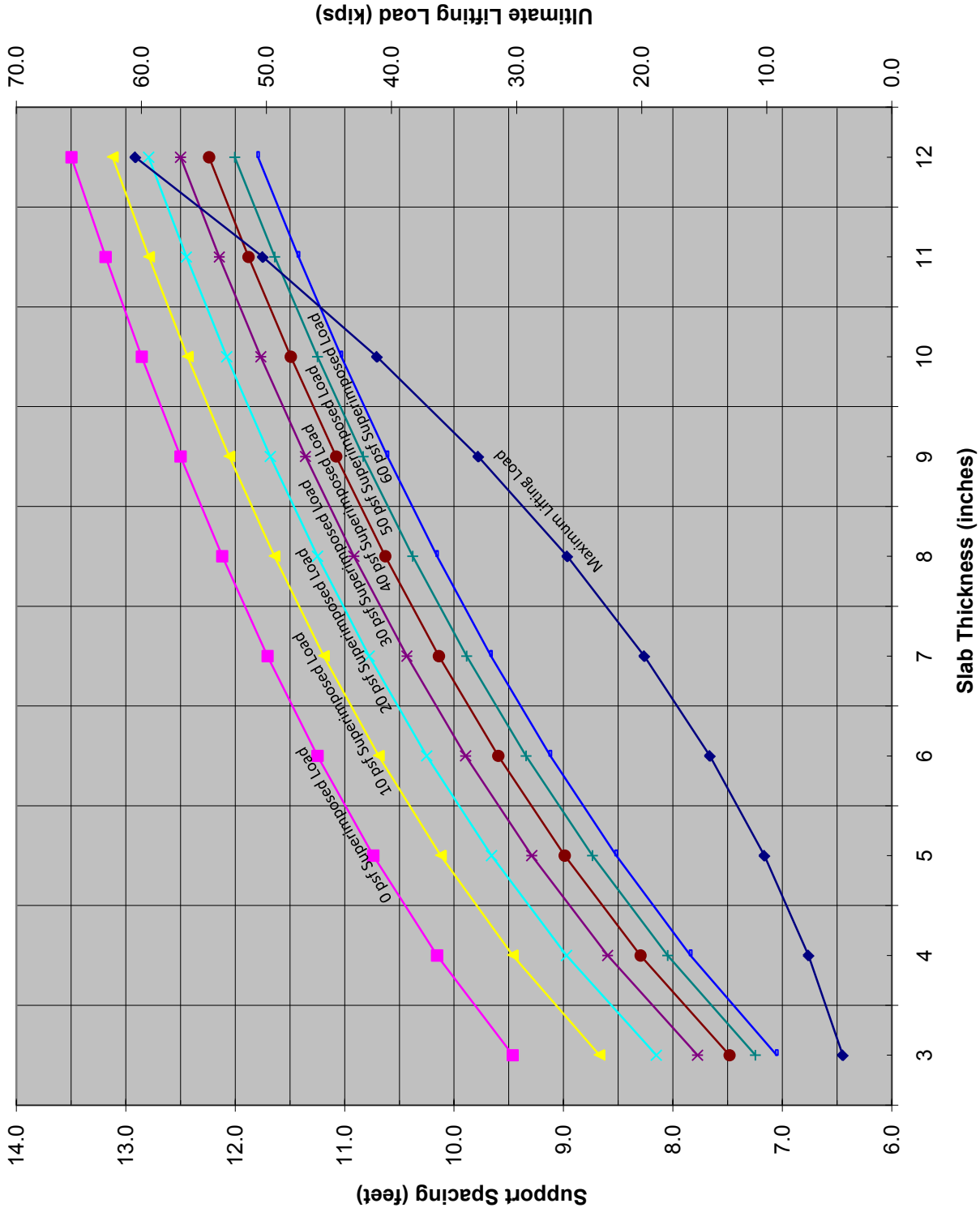
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" Arms



Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" Arms



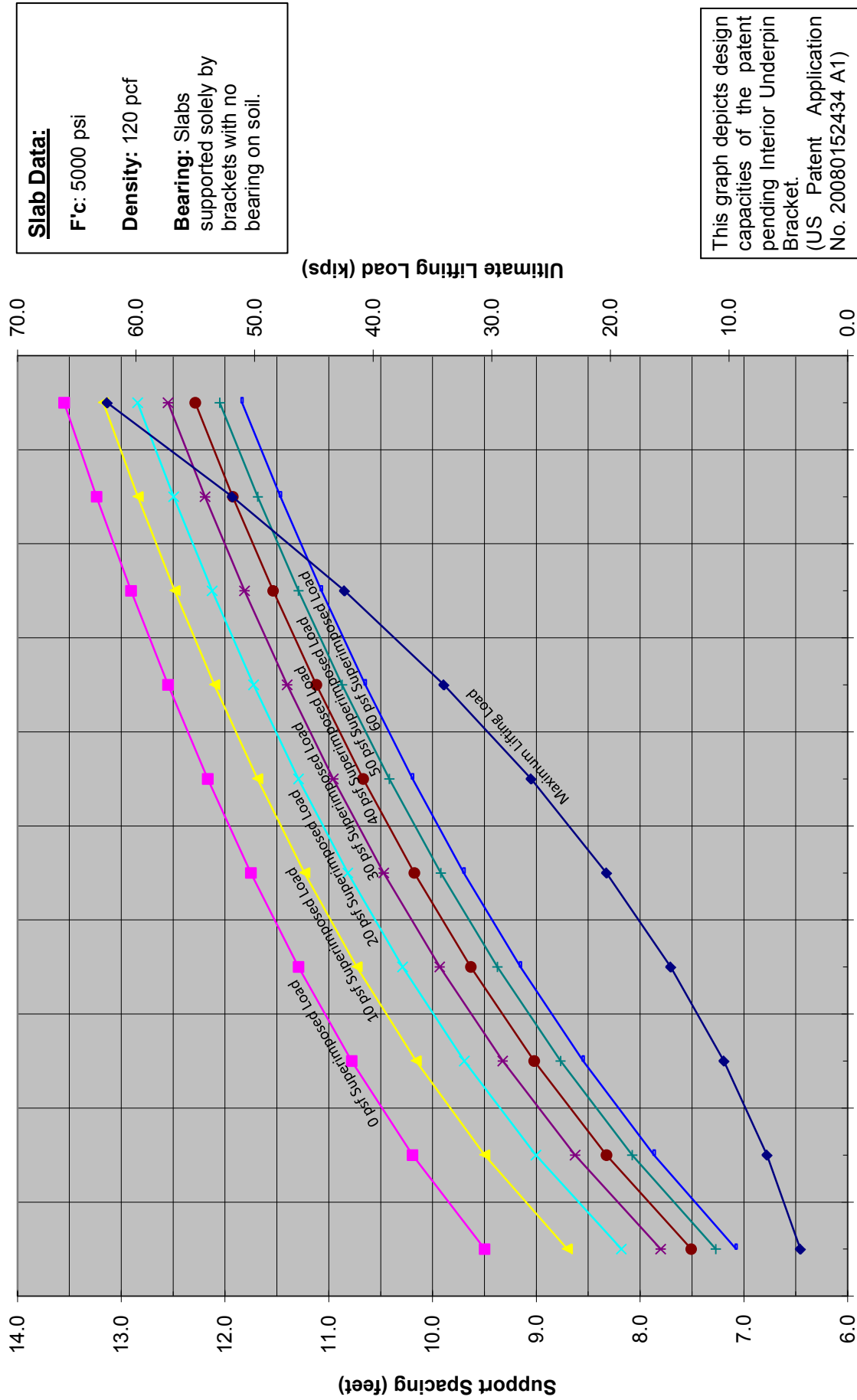
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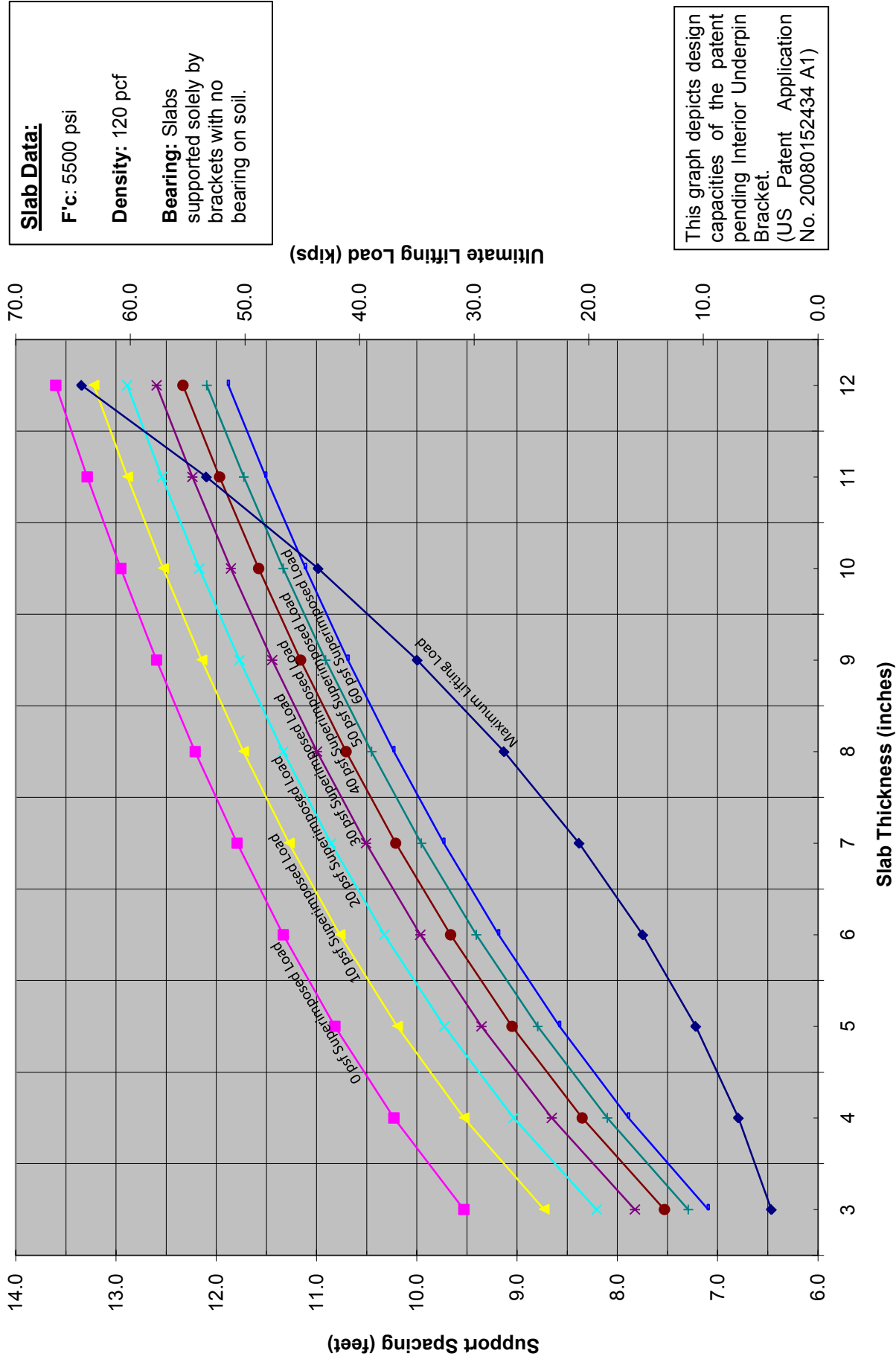
Slab Data:
F'c: 4500 psi
Density: 120 pcf
Bearing: Slabs supported solely by brackets with no bearing on soil.

This graph depicts design capacities of the patent pending Interior Underpin Bracket.
 (US Patent Application No. 20080152434 A1)

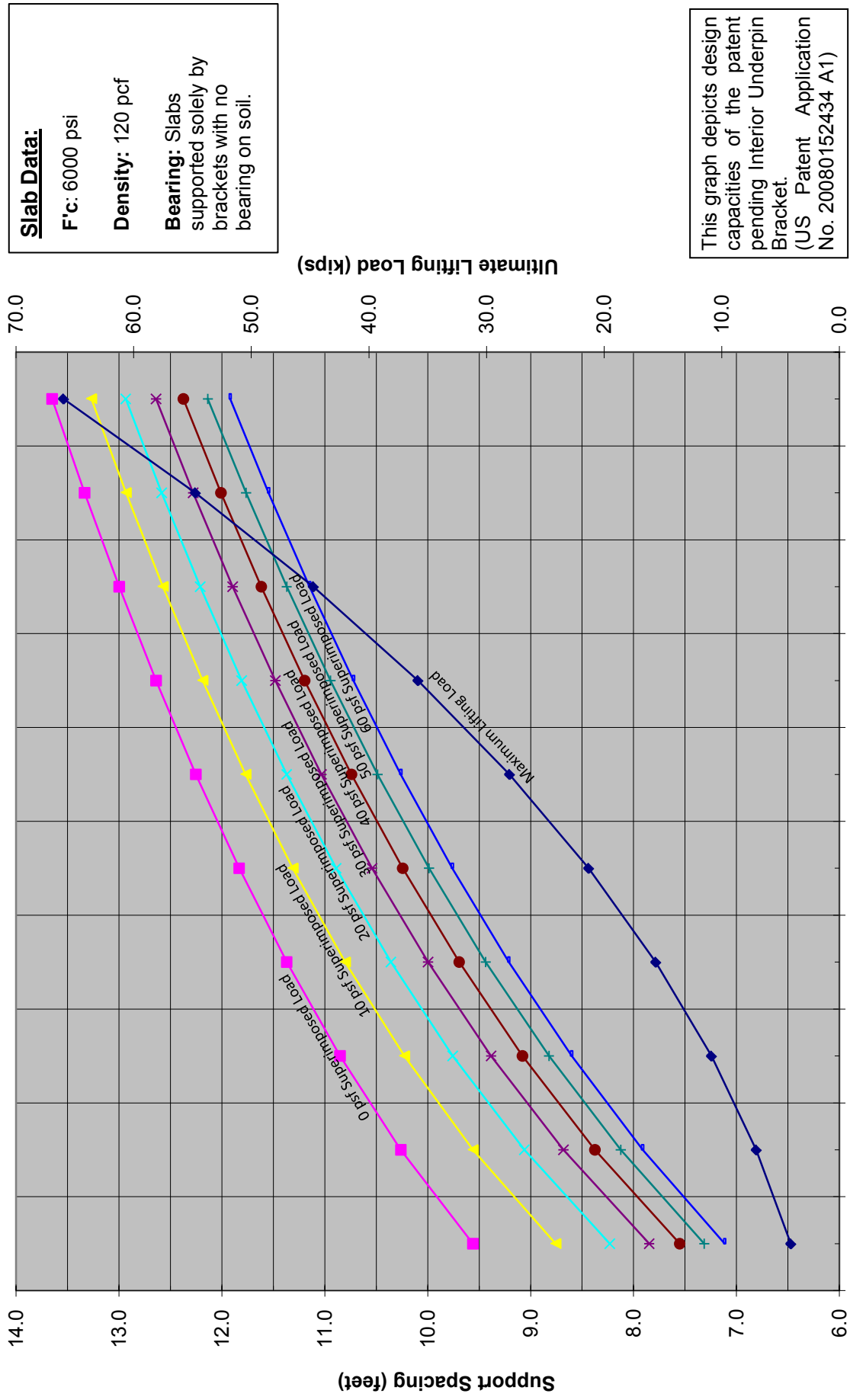
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" Arms



Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" Arms

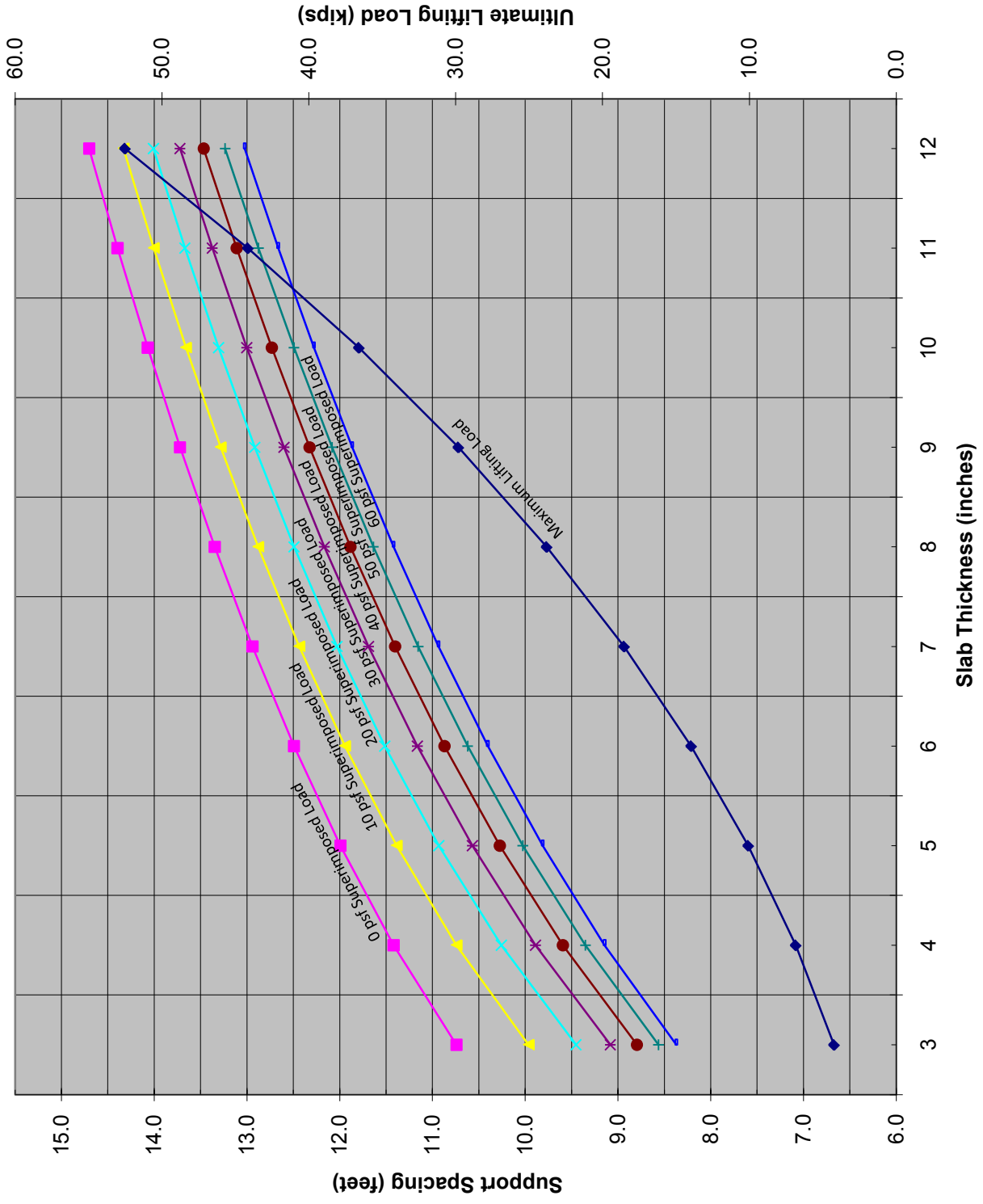


Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 16" Arms



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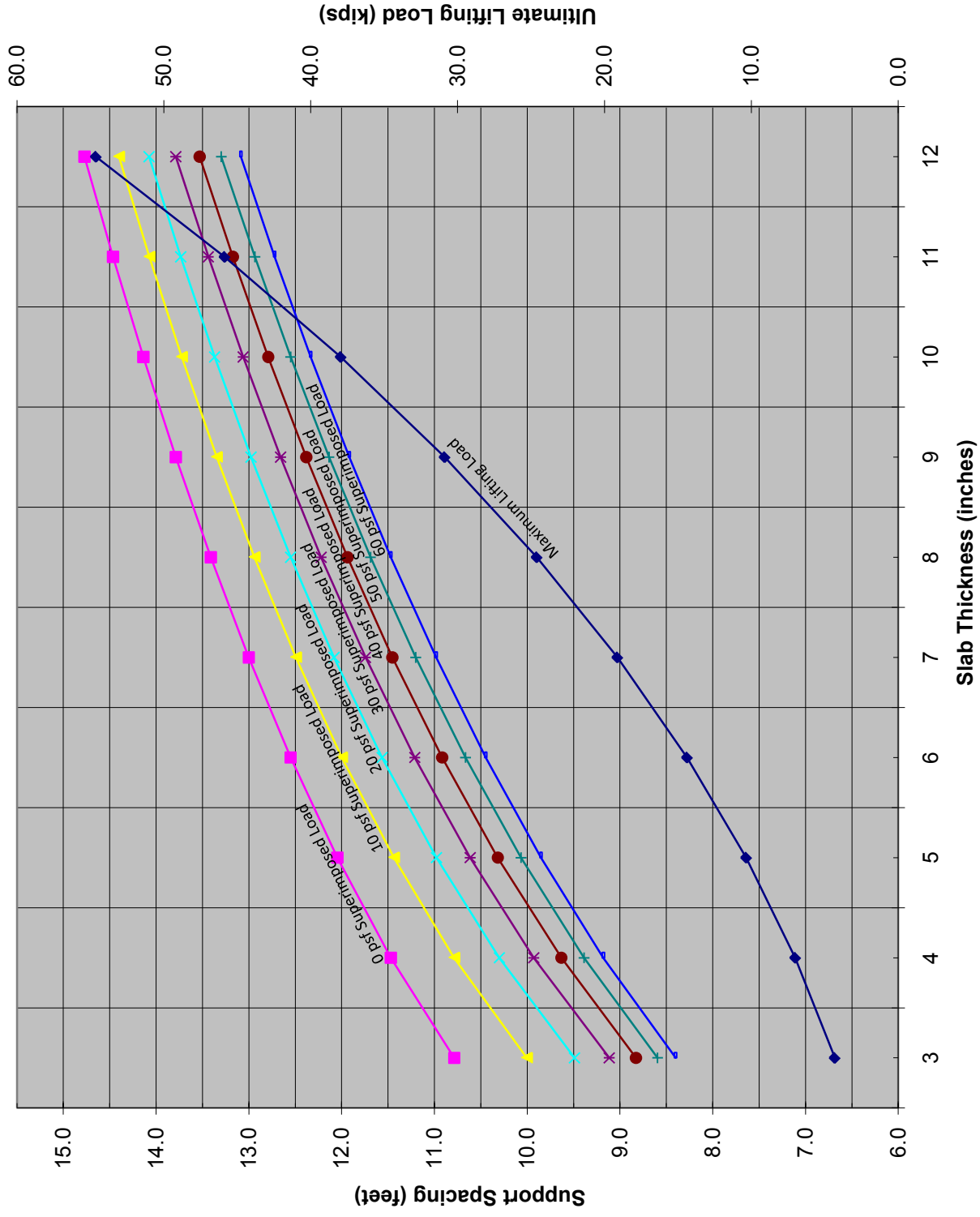
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" arms



Slab Data:
F'c: 3000 psi
Density: 120 pcf
Bearing: Slabs supported solely by brackets with no bearing on soil.

This graph depicts design capacities of the patent pending Interior Underpin Bracket.
 (US Patent Application No. 20080152434 A1)

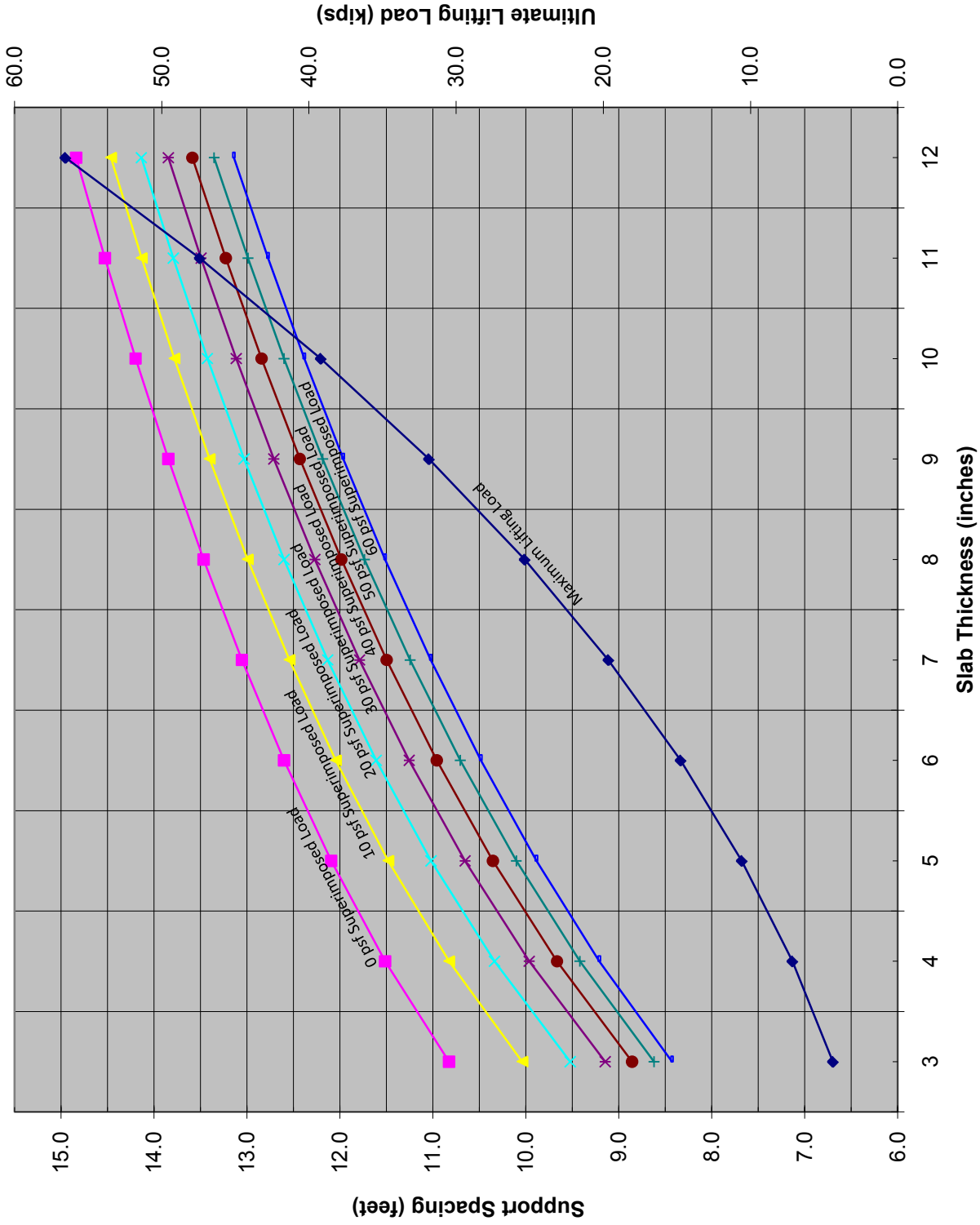
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



Slab Data:
F'c: 3500 psi
Density: 120 pcf
Bearing: Slabs supported solely by brackets with no bearing on soil.

This graph depicts design capacities of the patent pending Interior Underpin Bracket.
 (US Patent Application No. 20080152434 A1)

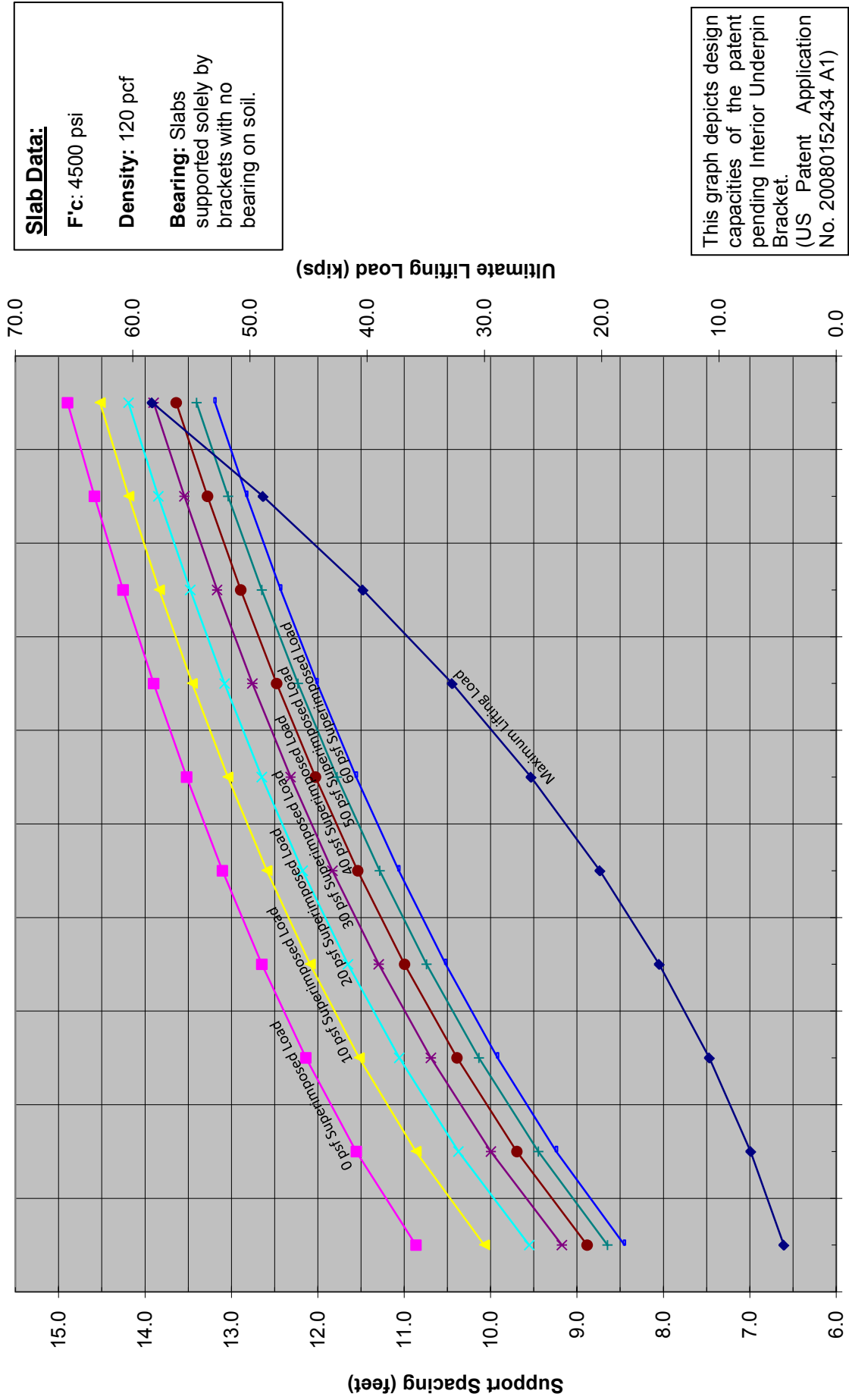
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



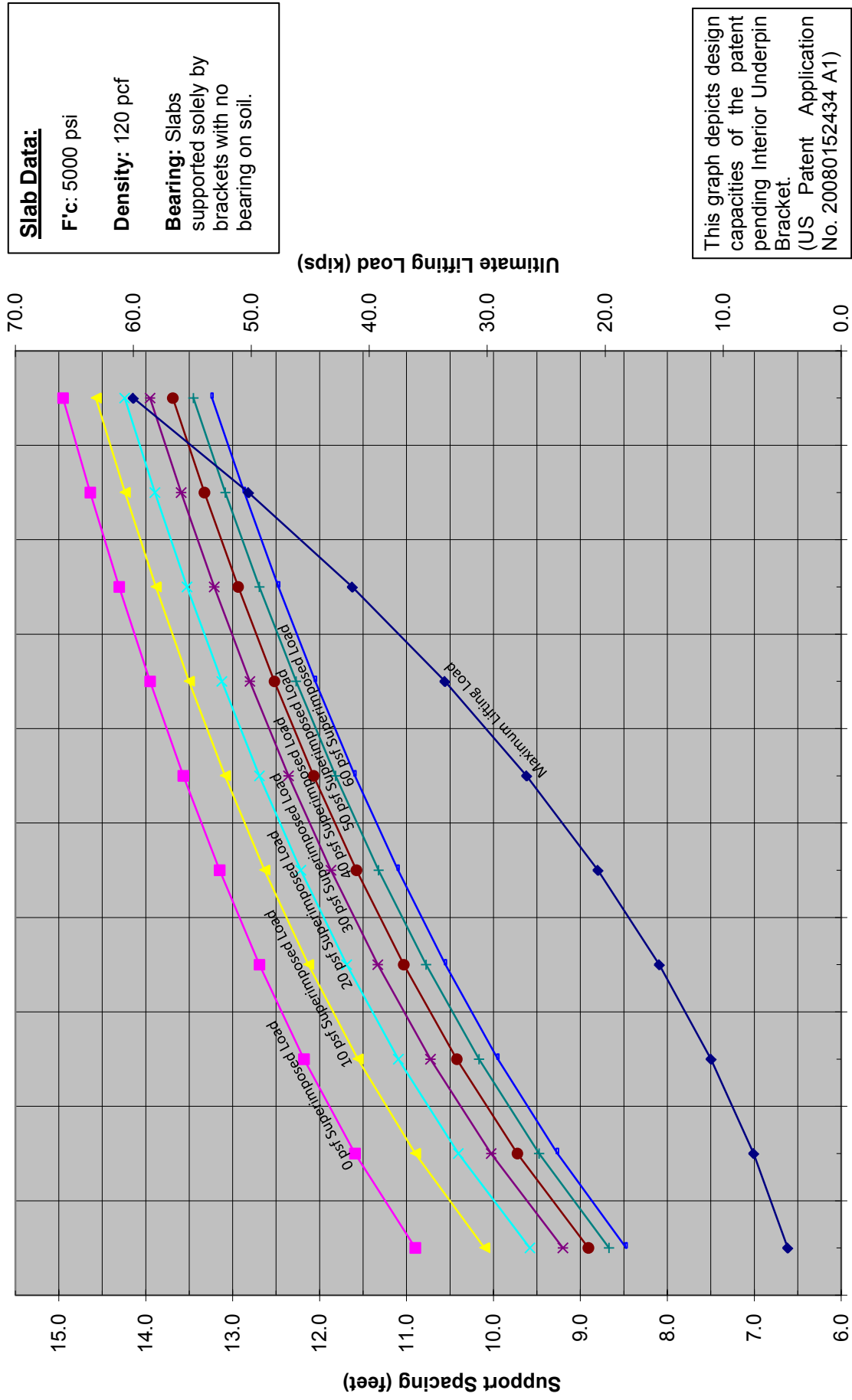
Slab Data:
F'c: 4000 psi
Density: 120 pcf
Bearing: Slabs supported solely by brackets with no bearing on soil.

This graph depicts design capacities of the patent pending Interior Underpin Bracket.
 (US Patent Application No. 20080152434 A1)

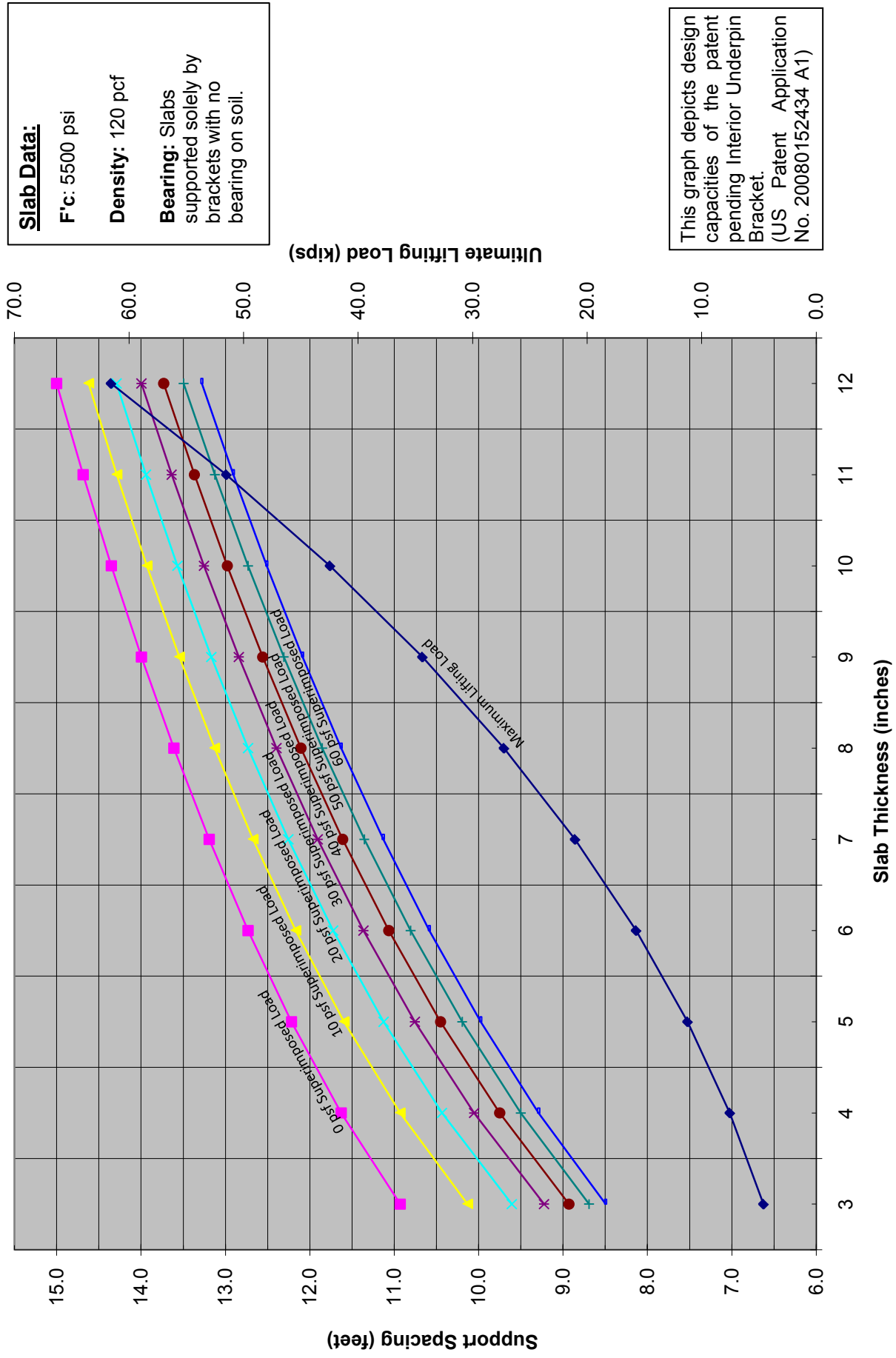
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



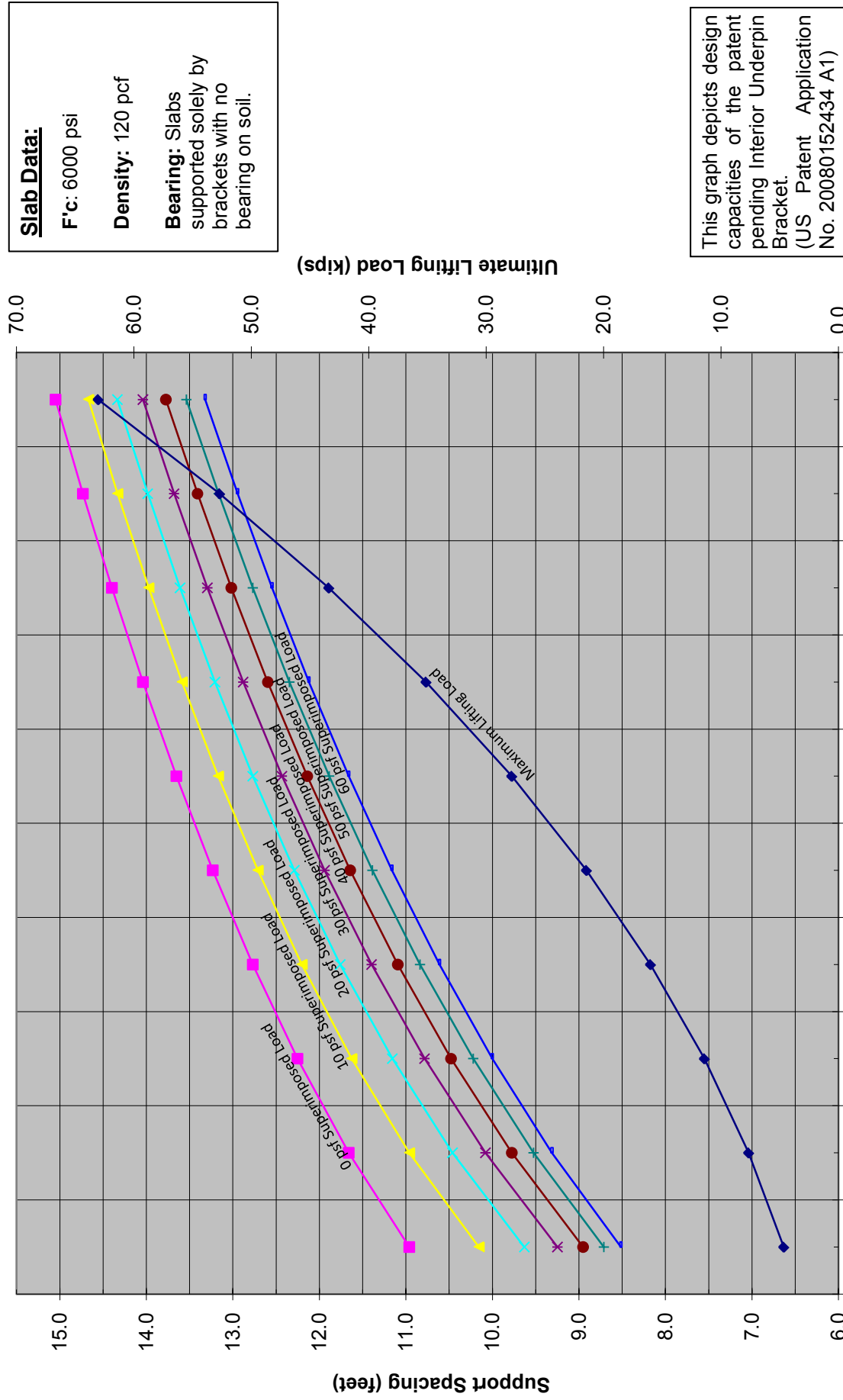
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



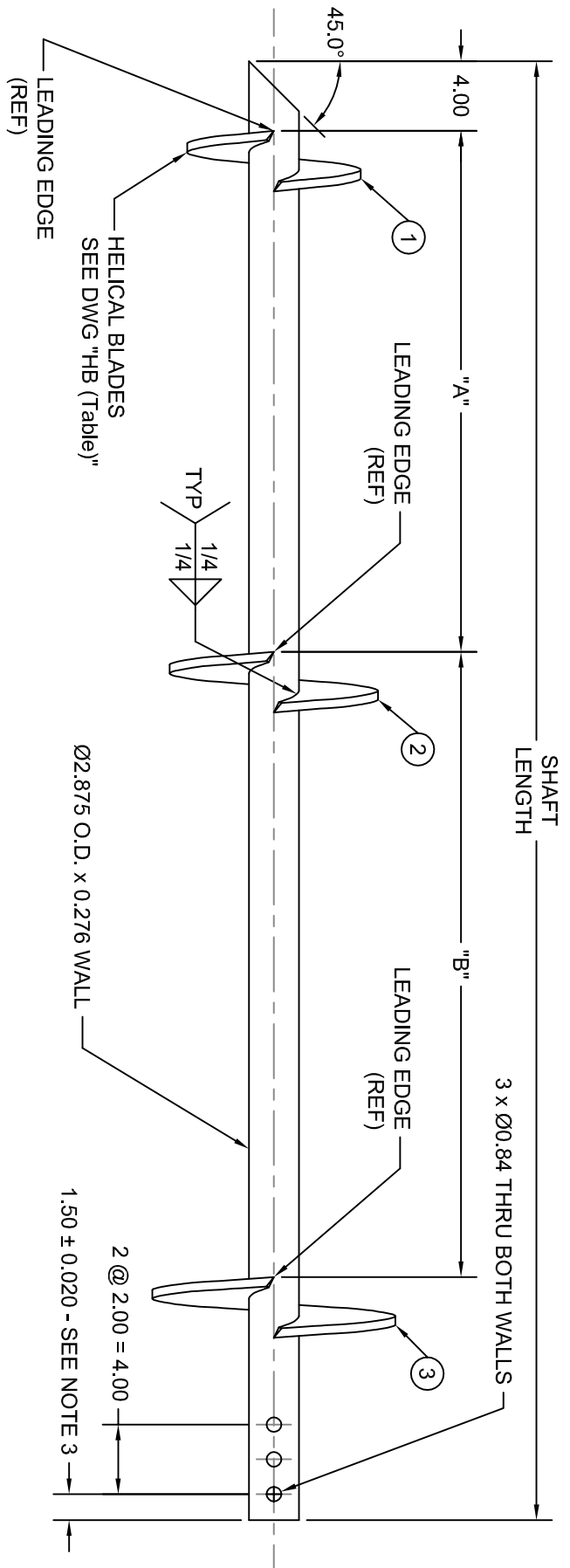
Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



Support Spacing and Maximum Lifting Loads Based on Slab Capacity (Mildly Reinforced) Interior Support Bracket with 24" Arms



TAB 3: Typical Construction Submittal



NOTES:

1. SEE LATEST REVISION OF DRAWING "FSI-MATERIALS" FOR MATERIAL DESIGNATIONS AND MINIMUM MECHANICAL PROPERTIES.
2. ALL WELDING TO BE IN ACCORDANCE WITH AWS D1.1 LATEST ISSUE WITH E70-XX MIN ELECTRODE.
3. SHAFTS SHOULD BE IN FULL CONTACT WHEN THIS ITEM IS COUPLED WITH 3 x Ø¾" BOLTS TO ITEM HP288E. TIGHTER TOLERANCE IS GIVEN AT SHAFT ENDS TO ENSURE THIS SHAFT TO SHAFT CONTACT IS ACHIEVED.

PART NUMBER DESCRIPTION:

HP288L7H802-3836

- HELVICAL PILE
- SHAFT SIZE CODE
- LEAD SECTION CODE
- SHAFT LENGTH CODE
- BLADE STYLE CODE
- BLADE CONFIGURATION CODE
- BLADE THICKNESS CODE
- BLADE MATERIAL CODE

Part #: **HP288L (Table)** Date: 11/09/09
 Title: Ø2-7/8" Leads
 Revision: 6 Sheet: 1 of 5

FOUNDATION SUPPORTWORKS™

12330 Cary Circle, Omaha, NE 68128
 Phone: 800-281-8545

Material: SHAFT: FSI-S-625
 BLADES: SEE DWG "HB (Table)"

All Dimensions Inches
 Tolerance: ±0.030 U.N.O. Scale: **NONE**
 DO NOT SCALE DRAWING

PART NUMBER	BLADE NO. 1	BLADE NO. 2	BLADE NO. 3	SHAFT LENGTH ± 0.13	"A" ± 0.13	"B" ± 0.13	WEIGHT (LBS)
HP288L5H8-3836	HB288H8-3836	N/A	N/A	60.00	N/A	N/A	41.8
HP288L5H0-3836	HB288H10-3836	N/A	N/A	60.00	N/A	N/A	44.8
HP288L5H2-3836	HB288H12-3836	N/A	N/A	60.00	N/A	N/A	48.4
HP288L5H4-3836	HB288H14-3836	N/A	N/A	60.00	N/A	N/A	52.8
HP288L5H80-3836	HB288H8-3836	HB288H10-3836	N/A	60.00	24.00	N/A	49.5
HP288L5H02-3836	HB288H10-3836	HB288H12-3836	N/A	60.00	30.00	N/A	56.1
HP288L5H24-3836	HB288H12-3836	HB288H14-3836	N/A	60.00	36.00	N/A	64.1
HP288L5H8-3850	HB288H8-3850	N/A	N/A	60.00	N/A	N/A	41.8
HP288L5H0-3850	HB288H10-3850	N/A	N/A	60.00	N/A	N/A	44.8
HP288L5H2-3850	HB288H12-3850	N/A	N/A	60.00	N/A	N/A	48.4
HP288L5H4-3850	HB288H14-3850	N/A	N/A	60.00	N/A	N/A	52.8
HP288L5H80-3850	HB288H8-3850	HB288H10-3850	N/A	60.00	24.00	N/A	49.5
HP288L5H02-3850	HB288H10-3850	HB288H12-3850	N/A	60.00	30.00	N/A	56.1
HP288L5H24-3850	HB288H12-3850	HB288H14-3850	N/A	60.00	36.00	N/A	64.1
HP288L5H8-5036	HB288H8-5036	N/A	N/A	60.00	N/A	N/A	43.3
HP288L5H0-5036	HB288H10-5036	N/A	N/A	60.00	N/A	N/A	47.3
HP288L5H2-5036	HB288H12-5036	N/A	N/A	60.00	N/A	N/A	52.2
HP288L5H4-5036	HB288H14-5036	N/A	N/A	60.00	N/A	N/A	58.0
HP288L5H80-5036	HB288H8-5036	HB288H10-5036	N/A	60.00	24.00	N/A	53.5
HP288L5H02-5036	HB288H10-5036	HB288H12-5036	N/A	60.00	30.00	N/A	62.4
HP288L5H24-5036	HB288H12-5036	HB288H14-5036	N/A	60.00	36.00	N/A	73.1
HP288L5H8-5050	HB288H8-5050	N/A	N/A	60.00	N/A	N/A	43.3
HP288L5H0-5050	HB288H10-5050	N/A	N/A	60.00	N/A	N/A	47.3
HP288L5H2-5050	HB288H12-5050	N/A	N/A	60.00	N/A	N/A	52.2
HP288L5H4-5050	HB288H14-5050	N/A	N/A	60.00	N/A	N/A	58.0
HP288L5H80-5050	HB288H8-5050	HB288H10-5050	N/A	60.00	24.00	N/A	53.5
HP288L5H02-5050	HB288H10-5050	HB288H12-5050	N/A	60.00	30.00	N/A	62.4
HP288L5H24-5050	HB288H12-5050	HB288H14-5050	N/A	60.00	36.00	N/A	73.1

Part #: **HP288L (Table)** Date: 11/09/09
Title: \varnothing 2-7/8" Leads
Revision: 6 Sheet: 2 of 5

FOUNDATION SUPPORTWORKS
12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material: SHAFT: FSI-S-625
BLADES: SEE DWG "HB (Table)"

All Dimensions Inches
Tolerance: ± 0.030 U.N.O.

Scale: **NONE**
DO NOT SCALE DRAWING

PART NUMBER	BLADE NO. 1	BLADE NO. 2	BLADE NO. 3	SHAFT LENGTH ±0.13	"A" ±0.13	"B" ±0.13	WEIGHT (LBS)
HP288L7H8-3836	HB288H8-3836	N/A	N/A	84.00	N/A	N/A	57.2
HP288L7H0-3836	HB288H10-3836	N/A	N/A	84.00	N/A	N/A	60.2
HP288L7H2-3836	HB288H12-3836	N/A	N/A	84.00	N/A	N/A	63.8
HP288L7H4-3836	HB288H14-3836	N/A	N/A	84.00	N/A	N/A	68.2
HP288L7H80-3836	HB288H8-3836	HB288H10-3836	N/A	84.00	24.00	N/A	64.9
HP288L7H02-3836	HB288H10-3836	HB288H12-3836	N/A	84.00	30.00	N/A	71.5
HP288L7H24-3836	HB288H12-3836	HB288H14-3836	N/A	84.00	36.00	N/A	79.5
HP288L7H802-3836	HB288H8-3836	HB288H10-3836	HB288H12-3836	84.00	24.00	30.00	76.2
HP288L7H024-3836	HB288H10-3836	HB288H12-3836	HB288H14-3836	84.00	30.00	36.00	87.2
HP288L7H8-3850	HB288H8-3850	N/A	N/A	84.00	N/A	N/A	57.2
HP288L7H0-3850	HB288H10-3850	N/A	N/A	84.00	N/A	N/A	60.2
HP288L7H2-3850	HB288H12-3850	N/A	N/A	84.00	N/A	N/A	63.8
HP288L7H4-3850	HB288H14-3850	N/A	N/A	84.00	N/A	N/A	68.2
HP288L7H80-3850	HB288H8-3850	HB288H10-3850	N/A	84.00	24.00	N/A	64.9
HP288L7H02-3850	HB288H10-3850	HB288H12-3850	N/A	84.00	30.00	N/A	71.5
HP288L7H24-3850	HB288H12-3850	HB288H14-3850	N/A	84.00	36.00	N/A	79.5
HP288L7H802-3850	HB288H8-3850	HB288H10-3850	HB288H12-3850	84.00	24.00	30.00	76.2
HP288L7H024-3850	HB288H10-3850	HB288H12-3850	HB288H14-3850	84.00	30.00	36.00	87.2
HP288L7H8-5036	HB288H8-5036	N/A	N/A	84.00	N/A	N/A	58.7
HP288L7H0-5036	HB288H10-5036	N/A	N/A	84.00	N/A	N/A	62.7
HP288L7H2-5036	HB288H12-5036	N/A	N/A	84.00	N/A	N/A	67.6
HP288L7H4-5036	HB288H14-5036	N/A	N/A	84.00	N/A	N/A	73.4
HP288L7H80-5036	HB288H8-5036	HB288H10-5036	N/A	84.00	24.00	N/A	68.9
HP288L7H02-5036	HB288H10-5036	HB288H12-5036	N/A	84.00	30.00	N/A	77.8
HP288L7H24-5036	HB288H12-5036	HB288H14-5036	N/A	84.00	36.00	N/A	88.5
HP288L7H802-5036	HB288H8-5036	HB288H10-5036	HB288H12-5036	84.00	24.00	30.00	84.0
HP288L7H024-5036	HB288H10-5036	HB288H12-5036	HB288H14-5036	84.00	30.00	36.00	98.7
HP288L7H8-5050	HB288H8-5050	N/A	N/A	84.00	N/A	N/A	58.7
HP288L7H0-5050	HB288H10-5050	N/A	N/A	84.00	N/A	N/A	62.7
HP288L7H2-5050	HB288H12-5050	N/A	N/A	84.00	N/A	N/A	67.6
HP288L7H4-5050	HB288H14-5050	N/A	N/A	84.00	N/A	N/A	73.4
HP288L7H80-5050	HB288H8-5050	HB288H10-5050	N/A	84.00	24.00	N/A	68.9
HP288L7H02-5050	HB288H10-5050	HB288H12-5050	N/A	84.00	30.00	N/A	77.8
HP288L7H24-5050	HB288H12-5050	HB288H14-5050	N/A	84.00	36.00	N/A	88.5
HP288L7H802-5050	HB288H8-5050	HB288H10-5050	HB288H12-5050	84.00	24.00	30.00	84.0
HP288L7H024-5050	HB288H10-5050	HB288H12-5050	HB288H14-5050	84.00	30.00	36.00	98.7

Part #: **HP288L (Table)** Date: 11/09/09
Title: Ø2-7/8" Leads
Revision: 6 Sheet: 4 of 5

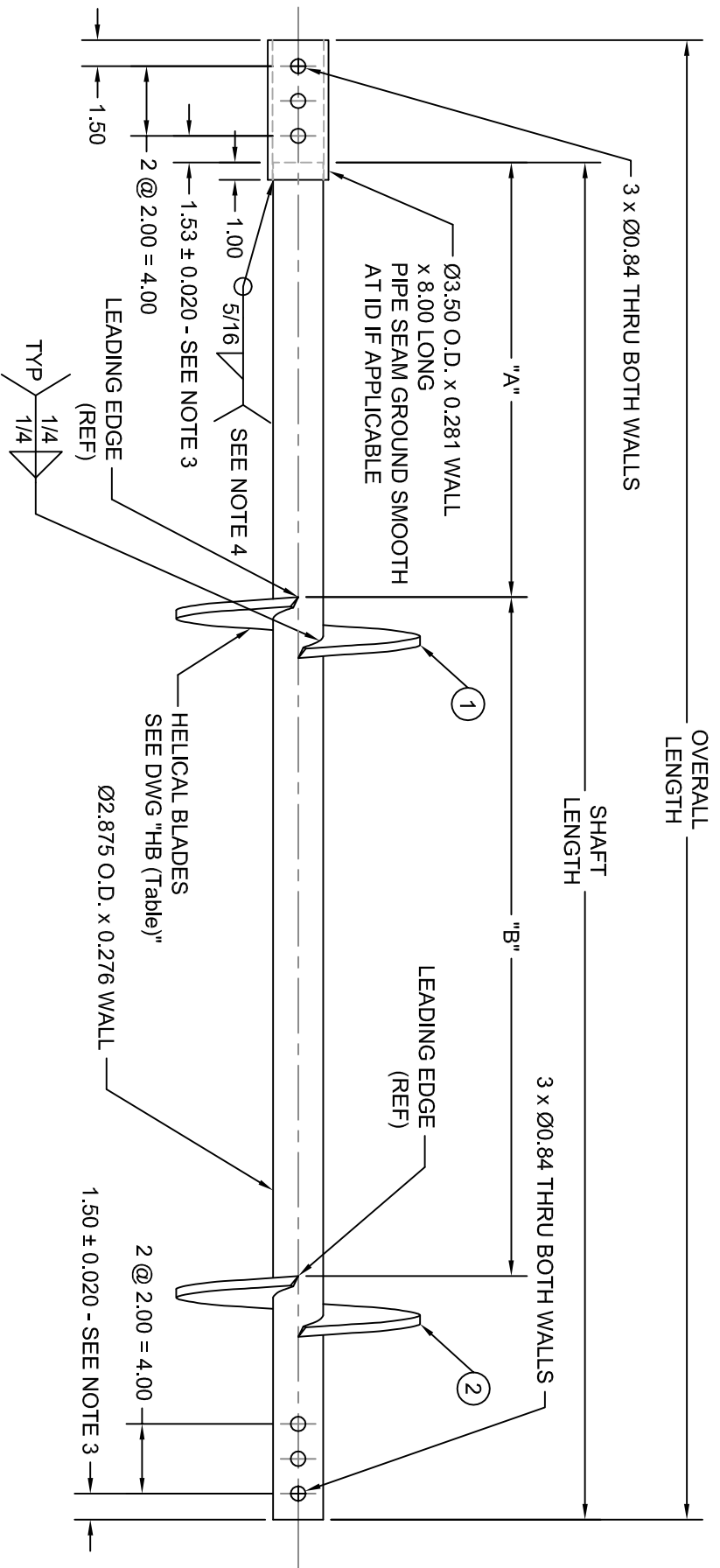
FOUNDATION

12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material: SHAFT: FSI-S-625
BLADES: SEE DWG "HB (Table)"

All Dimensions Inches
Tolerance: ±0.030 U.N.O.

Scale: **NONE**
DO NOT SCALE DRAWING



NOTES:

1. SEE LATEST REVISION OF DRAWING "FSI-MATERIALS" FOR MATERIAL DESIGNATIONS AND MINIMUM MECHANICAL PROPERTIES.
2. ALL WELDING TO BE IN ACCORDANCE WITH AWS D1.1 LATEST ISSUE WITH E70-XX MIN ELECTRODE.
3. SHAFTS SHOULD BE IN FULL CONTACT WHEN THIS ITEM IS COUPLED WITH 3 x Ø¾" BOLTS TO ITEM HP288L OR ANOTHER HP288E. TIGHTER TOLERANCE IS GIVEN AT SHAFT ENDS TO ENSURE THIS SHAFT TO SHAFT CONTACT IS ACHIEVED.
4. AT COUPLER WELD PROVIDE DEEP PENETRATION AS REQUIRED TO ACHIEVE A MINIMUM EFFECTIVE WELD THROAT OF 0.221"

PART NUMBER DESCRIPTION:

IF APPLICABLE	HP288E7H44-3836
HELICAL PILE	_____
SHAFT SIZE CODE	_____
EXTENSION SECTION CODE	_____
SHAFT LENGTH CODE	_____
BLADE STYLE CODE	_____
BLADE CONFIGURATION CODE	_____
BLADE THICKNESS CODE	_____
BLADE MATERIAL CODE	_____

Part #: HP288E (Table) Date: 11/09/09
 Title: Ø2-7/8" Extensions
 Revision: 9 Sheet: 1 of 2

FOUNDATION SUPPORTWORKS
 12330 Cary Circle, Omaha, NE 68128
 Phone: 800-281-8545

Material: SHAFT & COUPLER: FSI-S-625
 BLADES: SEE DWG "HB (Table)"

All Dimensions Inches
 Tolerance: ±0.030 U.N.O. Scale: NONE
 DO NOT SCALE DRAWING

PART NUMBER	BLADE NO. 1	BLADE NO. 2	SHAFT LENGTH ± 0.13	OVERALL LENGTH ± 0.13	"A" ± 0.13	"B" ± 0.13	WEIGHT (LBS)
HP288E3	N/A	N/A	30.00	37.00	N/A	N/A	25.1
HP288E5	N/A	N/A	54.00	61.00	N/A	N/A	40.4
HP288E7	N/A	N/A	78.00	85.00	N/A	N/A	55.7
HP288E5H4-3836	HB288H14-3836	N/A	54.00	61.00	28.00	N/A	56.1
HP288E5H4-3850	HB288H14-3850	N/A	54.00	61.00	28.00	N/A	56.1
HP288E5H4-5036	HB288H14-5036	N/A	54.00	61.00	28.00	N/A	61.3
HP288E5H4-5050	HB288H14-5050	N/A	54.00	61.00	28.00	N/A	61.3
HP288E5V4-3836	HB288V14-3836	N/A	54.00	61.00	28.00	N/A	54.3
HP288E5V4-3850	HB288V14-3850	N/A	54.00	61.00	28.00	N/A	54.3
HP288E5V4-5036	HB288V14-5036	N/A	54.00	61.00	28.00	N/A	59.0
HP288E5V4-5050	HB288V14-5050	N/A	54.00	61.00	28.00	N/A	59.0
HP288E7H44-3836	HB288H14-3836	HB288H14-3836	78.00	85.00	25.00	39.00	87.1
HP288E7H44-3850	HB288H14-3850	HB288H14-3850	78.00	85.00	25.00	39.00	87.1
HP288E7H44-5036	HB288H14-5036	HB288H14-5036	78.00	85.00	25.00	39.00	97.5
HP288E7H44-5050	HB288H14-5050	HB288H14-5050	78.00	85.00	25.00	39.00	97.5
HP288E7V44-3836	HB288V14-3836	HB288V14-3836	78.00	85.00	25.00	39.00	83.5
HP288E7V44-3850	HB288V14-3850	HB288V14-3850	78.00	85.00	25.00	39.00	83.5
HP288E7V44-5036	HB288V14-5036	HB288V14-5036	78.00	85.00	25.00	39.00	92.9
HP288E7V44-5050	HB288V14-5050	HB288V14-5050	78.00	85.00	25.00	39.00	92.9

Part #: **HP288E (Table)** Date: 11/09/09
Title: **Ø2-7/8" Extensions**
Revision: 9 Sheet: 2 of 2

FOUNDATION

12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material: SHAFT & COUPLER: FSI-S-625
BLADES: SEE DWG "HB (Table)"

All Dimensions Inches
Tolerance: ± 0.030 U.N.O.

Scale: **NONE**
DO NOT SCALE DRAWING

Model 288 Helical Pile System **RETROFIT APPLICATIONS**

▶ Retrofit piles use side-load brackets, introducing eccentricity into the system. The Model 288 Helical Pile System incorporates an external sleeve at the top of the pile to aid in resisting the bending forces generated by this loading condition. This helps preserve the axial compressive capacity of the pile shaft. The external sleeve extends through and below the foundation bracket to essentially create a bracket that is 30 inches tall.

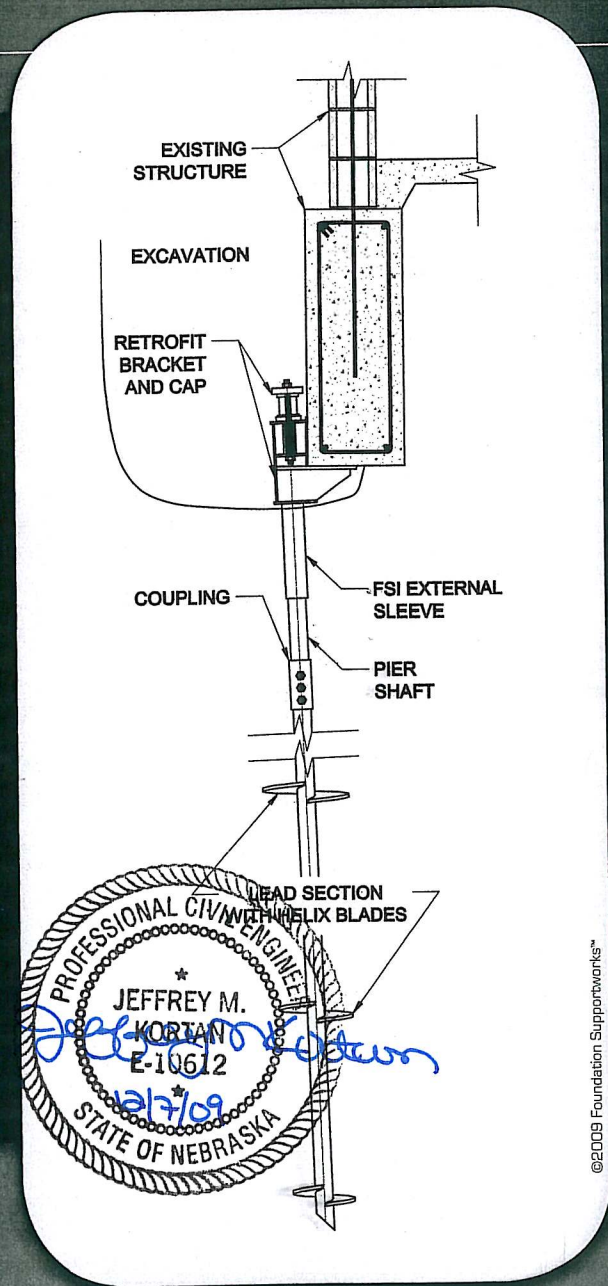
The depth or length of sleeve and pile over which the bending force dissipates is a function of the soil stiffness. This depth is greater in soft clay and loose sand, thereby increasing the amount of bending in the pile shaft and decreasing the system capacity.

Soil Type	Consistency/ Relative Density	Soil Strength Parameters			Allowable System Capacity* (kips)**
		SPT, N-value (blows/ft)	Cohesion (psf)	Friction Angle (degrees)	
Clay	Very Soft	< 2	< 250	-	25.3
Clay	Soft	2 - 3	250 - 500	-	27.8
Clay	Medium Stiff	4 - 7	501 - 1,000	-	30.9
Clay	Stiff	8 - 15	1,001 - 2,000	-	34.5
Clay	Very Stiff	16 - 32	2,001 - 4,000	-	36.8
Sand	Very Loose	< 3	-	26 - 30	32.6
Sand	Loose	4 - 9	-	28 - 34	33.0
Sand	Medium	10 - 29	-	30 - 36	34.4
Sand	Dense	30 - 49	-	34 - 40	34.8

* Capacity based upon a concrete compressive strength of 2,500 psi for the foundation.

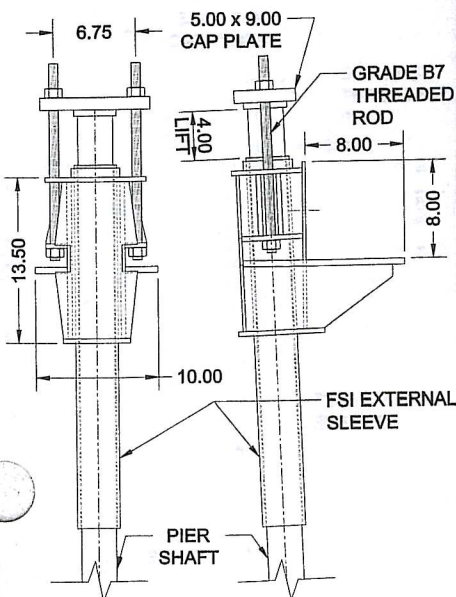
** Capacity considers a loss in black, uncoated steel thickness due to corrosion over a period of 50 years. The design period and corrosion loss rates are in accordance with ICC-ES AC308.

** 1 kip = 1,000 pounds (lb.)



©2009 Foundation Supportworks™

Retrofit Bracket



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Model 288 Helical Pile System **BRACKET SPECIFICATIONS**

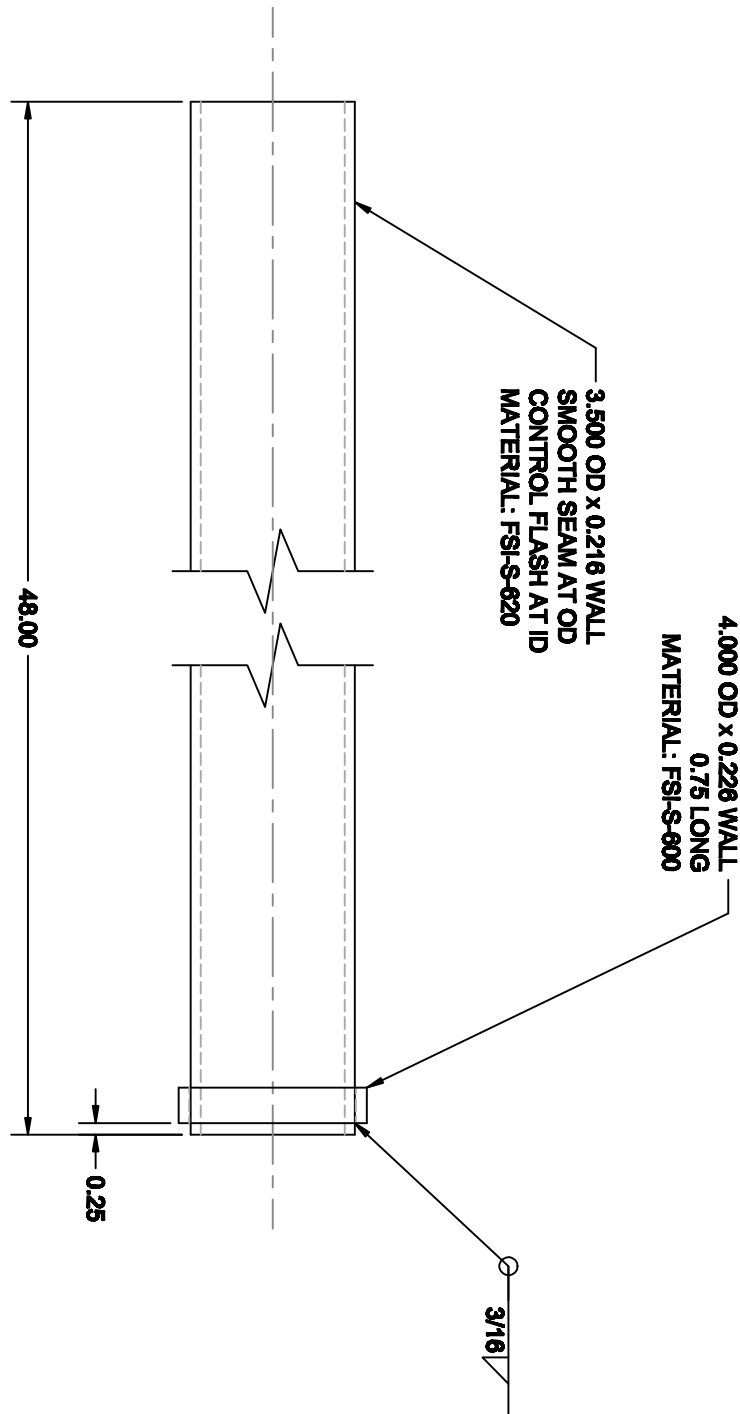
▶ **Bracket:** Weldment manufactured from 0.25", 0.375", and 0.50"-thick steel plate. Yield strength = 36 ksi (min.), tensile strength = 58 ksi (min.).

External Sleeve: 3.50" OD x 0.216" wall x 30" long with sleeve collar welded to one end. Yield strength = 50 ksi (min.), tensile strength = 62 ksi (min.).

Bracket Cap: 5.0" wide x 9.0" long x 1" thick plate with confining ring welded to one side. Yield strength = 50 ksi (min.), tensile strength = 65 ksi (min.).

All-Thread Rod: 0.75" diameter x 16" long, zinc plated. Grade B7, tensile strength = 125 ksi (min.).

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NOTES:

1. SEE LATEST REVISION OF DRAWING "FSI-MATERIALS" FOR MATERIAL DESIGNATIONS AND MINIMUM MECHANICAL PROPERTIES.
2. ALL WELDING TO BE IN ACCORDANCE WITH AWS D1.1 LATEST ISSUE WITH E70-XX MIN ELECTRODE.

Part #:
FS288ES48

Date: 08/04/08

Title:
EXTERNAL SLEEVE - 48"

Revision: 1

Sheet: 1 of 1

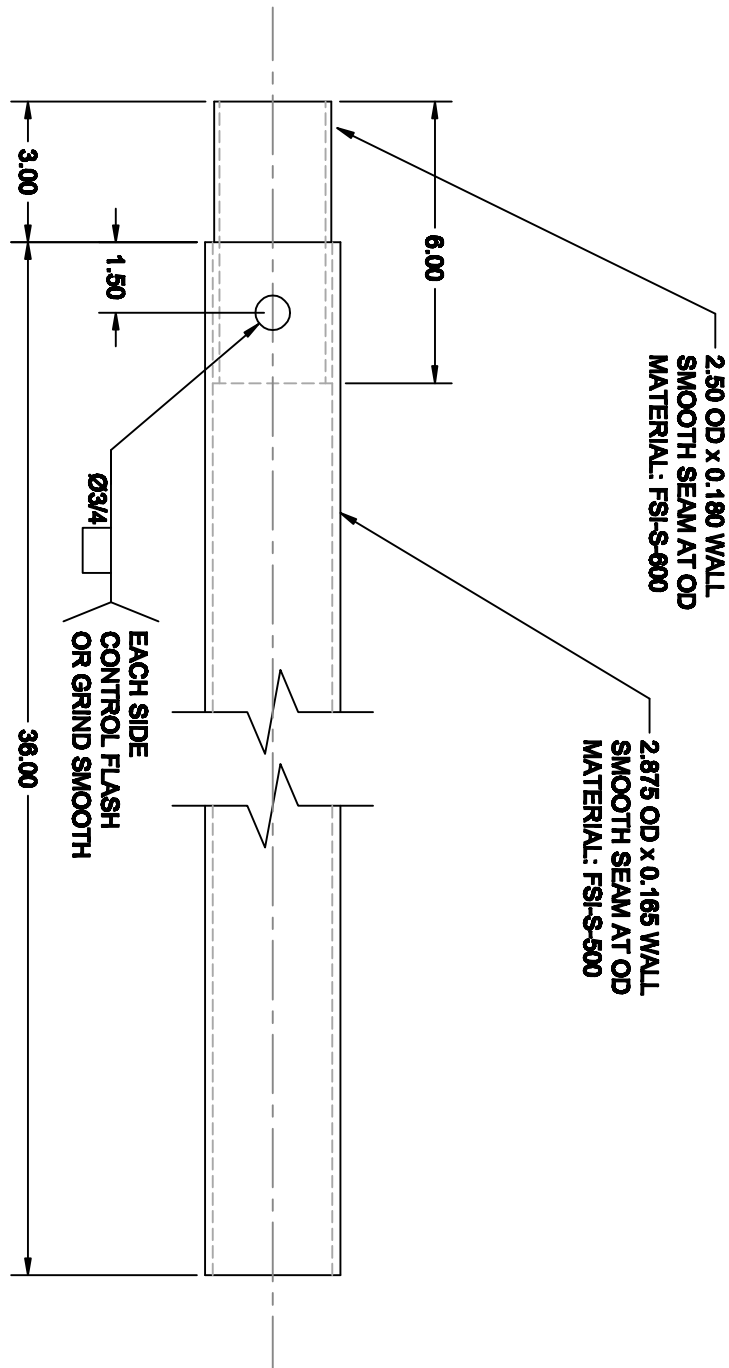
FOUNDATION
SUPPORTWORKS

12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material:
SEE INDIV. PIECES

All Dimensions Inches
Tolerance: ± 0.030 U.N.O.

Scale: 1 : 4
DO NOT SCALE DRAWING



NOTES:

1. SEE LATEST REVISION OF DRAWING "FSI-MATERIALS" FOR MATERIAL DESIGNATIONS AND MINIMUM MECHANICAL PROPERTIES.
2. ALL WELDING TO BE IN ACCORDANCE WITH AWS D1.1 LATEST ISSUE WITH E70-XX MIN ELECTRODE.

Part #:

PP288T

Revision: 0

Date: 07/10/08

Sheet: 1 of 1



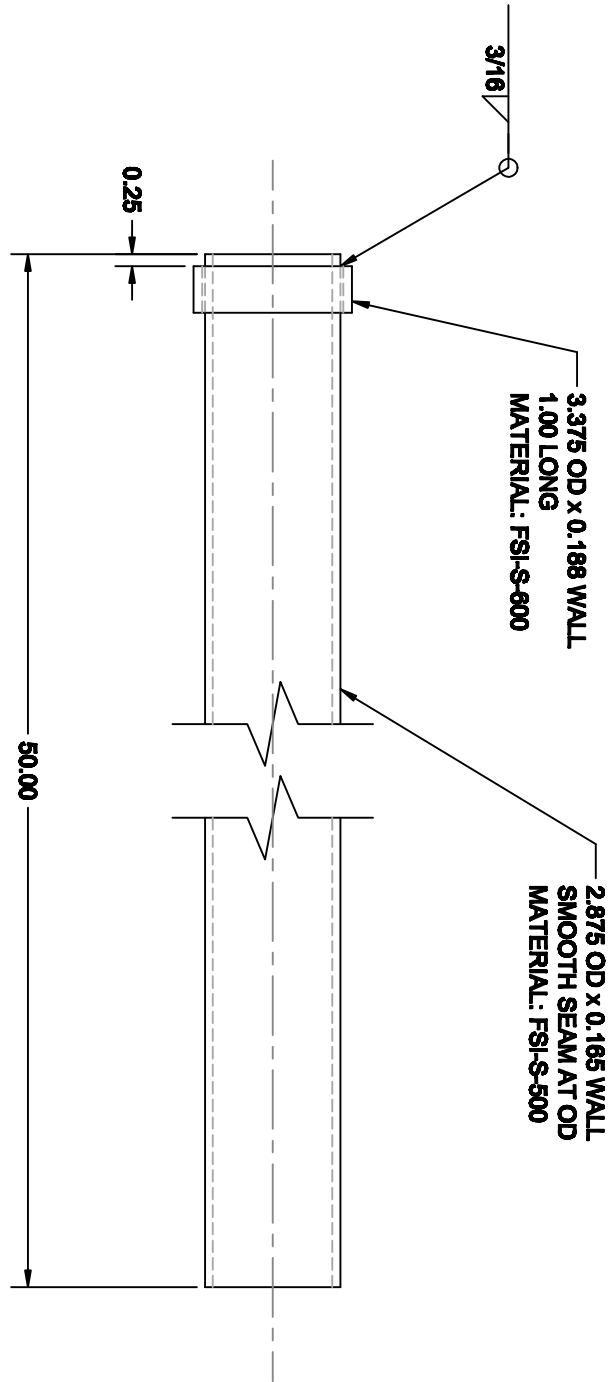
12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material:

SEE INDIV. PIECES

All Dimensions Inches
Tolerance: ±0.030 U.N.O.

Scale: 1 : 4
DO NOT SCALE DRAWING



NOTES:

1. SEE LATEST REVISION OF DRAWING "FSI-MATERIALS" FOR MATERIAL DESIGNATIONS AND MINIMUM MECHANICAL PROPERTIES.
2. ALL WELDING TO BE IN ACCORDANCE WITH AWS D1.1 LATEST ISSUE WITH E70-XX MIN ELECTRODE.

Part #:

PP288ST

Revision: 0

Date: 07/10/08

Sheet: 1 of 1



12330 Cary Circle, Omaha, NE 68128
Phone: 800-281-8545

Material:

SEE INDIV. PIECES

All Dimensions Inches
Tolerance: ± 0.030 U.N.O.

Scale: 1 : 4
DO NOT SCALE DRAWING

Material Number	Industry Designation and Grade	Description	Minimum Mechanical Properties				Finish	Weldable	Check Weldability	Not Weldable
			Yield Strength (ksi)	Tensile Strength (ksi)	Brinell Hardness	Charpy (ft-lbs)				
FSI-A-010	ASTM B-209 Grade 6061-T6	Aluminum - bars, plates, shapes	40	45	--	--	N/A - Unless noted on drawing or P.O.		X	
FSI-S-010	ASTM A36	Steel - bars, plates, shapes	36	58	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-020	ASTM A572 - Grade 50	Steel - plates, shapes	50	65	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-100	ASTM A1011 C1008-C1010	Steel - Sheet	41	49	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-200	ASTM A108 Grade 1018 - Cold Drawn	Steel - Threaded Rod	70	85	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-210	ASTM A193 Grade B7	Steel - Threaded Rod	--	125	--	--	N/A - Unless noted on drawing or P.O.		X	
FSI-S-220	AISI 1541	Steel - Threaded Rod	--	120	--	--	N/A - Unless noted on drawing or P.O.		X	
FSI-S-230	Medium Carbon Steel	Steel - Threaded Rod	70	85	--	--	N/A - Unless noted on drawing or P.O.		X	

FSI-Materials

Revision: 4

Date: 6/4/2009

12330 Cary Circle
 Omaha, NE 68128
 800-281-8545



Material Number	Industry Designation and Grade	Description	Minimum Mechanical Properties				Finish	Weldable	Check Weldability	Not Weldable
			Yield Strength (ksi)	Tensile Strength (ksi)	Brinell Hardness	Charpy (ft-lbs)				
FSI-S-300	ANSI 4140	Steel - bars	60	95	--	--	N/A - Unless noted on drawing or P.O.		X	
FSI-S-310	ASTM A108 Grade 1018	Steel - bars	56	90	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-320	AISI 1144	Steel - bars	100	115	--	--	N/A - Unless noted on drawing or P.O.		X	
FSI-S-400	C1530	Steel - Round Corner Square Bar	90	115	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-500	ASTM A500 Grade C	Steel - Round Mechanical Tube, Triple Coated In-Line Galvanized	50	55	--	--	Triple Coated In-Line Galvanized	X		
FSI-S-600	ASTM A53 Grade B Type E & S	Steel - Round Carbon Pipe	35	60	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-610	ASTM A500 Grade B	Steel - Round Carbon Pipe	42	58	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-620	ASTM A500 Grade B or C	Steel - Round Carbon Pipe	50	62	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-625	ASTM A500 Grade B or C	Steel - Round Carbon Pipe	60	70	--	--	N/A - Unless noted on drawing or P.O.	X		
FSI-S-630	ASTM A513 Type 5	Steel - Round Drawn Over Mandrel	70	80	--	--	N/A - Unless noted on drawing or P.O.	X		

FSI-Materials

Revision: 4

Date: 6/4/2009

12330 Cary Circle

Omaha, NE 68128

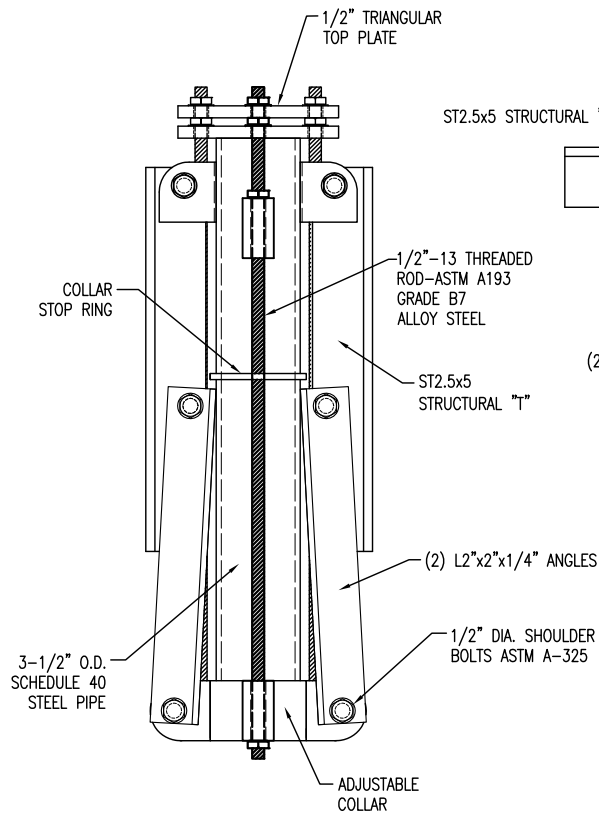
800-281-8545



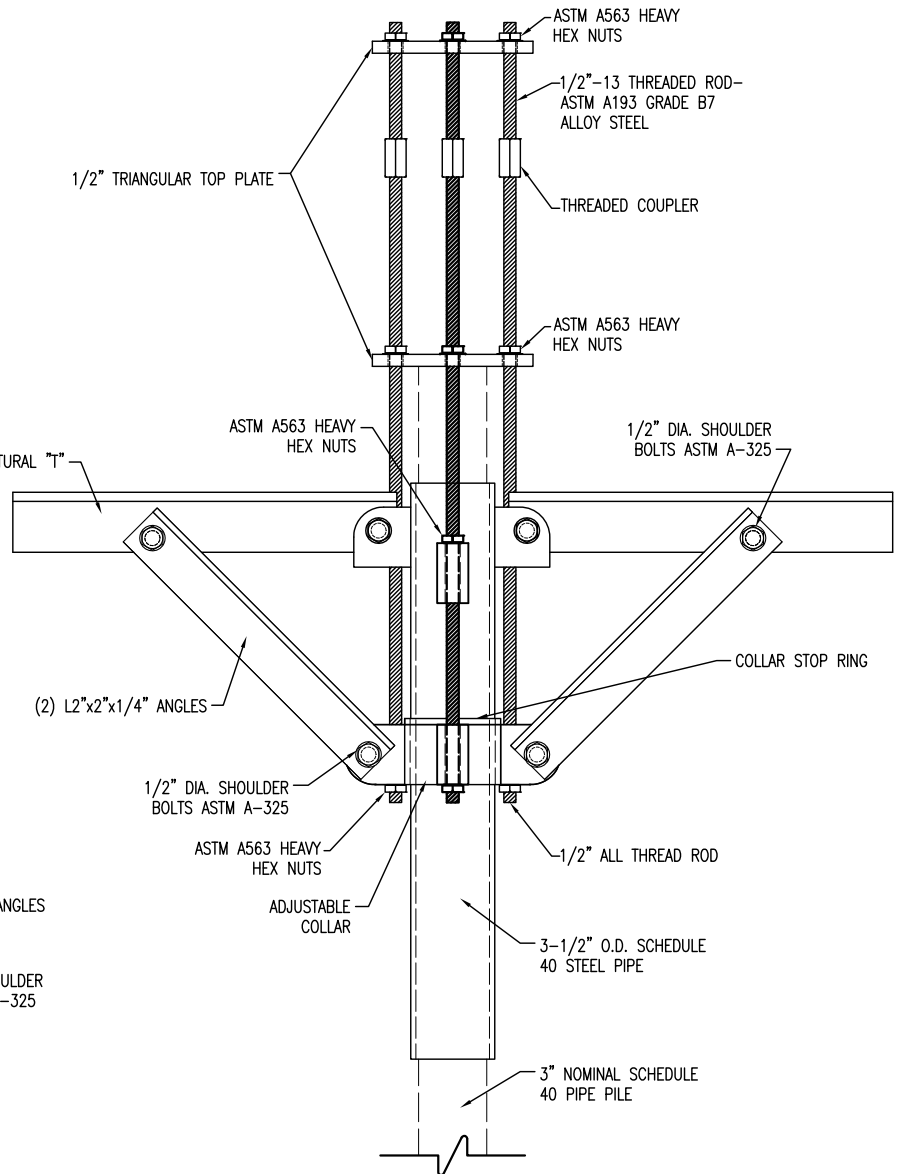
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16" ARM ASSEMBLY SPECIFICATIONS	
PART NAME	MATERIAL
A SUPPORT ARM	ASTM A36
B DIAGONAL SUPPORT	ASTM A36
C MAIN BRACKET PIPE	ASTM 53, A513 PIPE
D PIPE PILE	NOM. SCHED. 40
E ALL THREAD ROD	ASTM A193 GRADE B7
F LIFTING PLATES	ASTM A36
G ARM SUPPORT BLOCK	ASTM A36
H SHOULDER BOLT	ASTM A325
I DIAGONAL SUPPORT BLOCK	ASTM A36
J COLLAR STOP RING	ASTM A513
K ADJUSTABLE COLLAR	ASTM A513
L THREADED ROD SUPPORT BLOCK	ASTM A36
M HEX NUT	ASTM A563

NOTE: ALL WELDS ARE FULL LENGTH FILLET (E70).



COLLAPSED VIEW



EXTENDED VIEW

THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:
WCB

DATE:
03-02-10

DRAWN BY:
JCB

SCALE:
AS NOTED

SHEET #:

02



2701 West Busch Boulevard
Suite 200
Tampa, Florida 33618

Tel (800) 971-7252
(813) 243-4251
Fax (813) 243-9530

INTERIOR SLAB BRACKET

ISB-07

16" ARM ASSEMBLY

INSTALLATION SEQUENCE:

- 1.) CORE A 10" DIAMETER HOLE IN EXISTING SLAB.
- 2.) EXCAVATE SOIL BENEATH SLAB TO ALLOW ARMS TO OPEN WITHOUT OBSTRUCTION.
- 3.) 3" NOM. SCHED. 40 PILE TO BE INSTALLED AS SPECIFIED BY ENGINEER. LEAVE ENOUGH PIPE (ABOVE BRACKET) TO ACCOMPLISH DESIRED LIFT.
- 4.) INSERT SLAB BRACKET OVER PILE AND EXTEND ARMS UNDER SLAB.
- 5.) TIGHTEN BOTTOM PLATE TO END OF PIPE PILE.
- 6.) PLACE STRUCTURAL MORTAR ON TOP SURFACE OF SUPPORT ARMS PRIOR TO MAKING CONTACT WITH BOTTOM SURFACE OF SLAB.
- 7.) HYDRAULIC RAM TO BE INSERTED BETWEEN TRIANGULAR PLATES AND PRESSURIZE SO AS TO ACCOMPLISH DESIRED LIFT. LIFTING LOAD SHOULD NOT EXCEED THE ALLOWABLE MAXIMUM LIFTING LOAD.
- 8.) BOLTS TO BE TIGHTENED ON BOTTOM PLATE OR THE MAIN BRACKET PIPE IS TO BE FULLY WELDED TO THE PIPE PILE SUBSEQUENT TO FINAL LIFT.
- 9.) EXCESS THREADED RODS ABOVE LOWER PLATE TO BE CUT.



THIS DRAWING IS FOR INFORMATIONAL PURPOSES ONLY. IT IS THE OPINION OF THE ENGINEER THAT THE INFORMATION CONTAINED WITHIN THIS DRAWING IS CORRECT AND IS BASED ON ALL AVAILABLE INFORMATION. IF EXISTING CONDITIONS ARE FOUND TO VARY FROM THESE SKETCHED, THE ENGINEER IS TO BE NOTIFIED.

DESIGNED BY:

WCB

DRAWN BY:

JCB

DATE:

03-02-10

SCALE:

AS NOTED

SHEET #:

03



Rigorous and Responsive

ISB-07 (Interior Slab Bracket) Capacity Certification

Issued: **September 27, 2010**

Basis: **USF Test; SERNO: KC50A**
w/ Calibration traceable to NIST thru MTS Job No.: US1.15069

Dear **ISB-07** Specifier,

This letter is intended to certify the ultimate capacity and recommended working capacity of the ISB-07. This certification is based on the independent testing performed by the University of South Florida's Engineering Laboratory and their report issued on March 3, 2010.

Report Summary Excerpt: *The failure of the bracket occurred at just over 40,000 lbs (20 tons) of axial compression loading. The failure mechanism resulted when one of the thread rods ruptured just below the hex nut. Upon examination it was observed that the top plate evidenced yielding and the remaining two (2) threaded rods were deformed at the location of the top plate. The ISB-07 was able to sustain load until the threaded rod ruptured. It should be noted that the threaded rods were comprised of ASTM A193 Grade B7 alloy steel. Refer to the attached "Testing Results" sheet provided by the University of South Florida.*

Bracket Designation	Ultimate Capacity (Actual)	Working Capacity (Recommended)
ISB-07 w/ 16" Arms	40 Kips	20 Kips
ISB-07 w/ 24" Arms	88 Kips	44 Kips

We therefore certify the **ISB-07** (Interior Slab Bracket) as having the capacities listed above.

Sincerely,
Bracken Engineering

This document is not valid and can not be relied upon by anyone for any reason unless it is signed and sealed by the professionals named and shown as its authors. This copy is provided for informational purposes only.

William C. Bracken, PE
Principal Engineer
September 27, 2010
License No. PE 47676 / FL
License No. CA 7419 / FL