



**DAMMON**  
**ENGINEERING, INC.**  
*Architects & Engineers*

554 Old Spanish Trail  
Slidell, LA 70458  
Phone: 985-649-5832  
Fax: 985-641-5950  
dammonengineering.com  
dammoneng@bellsouth.net

---

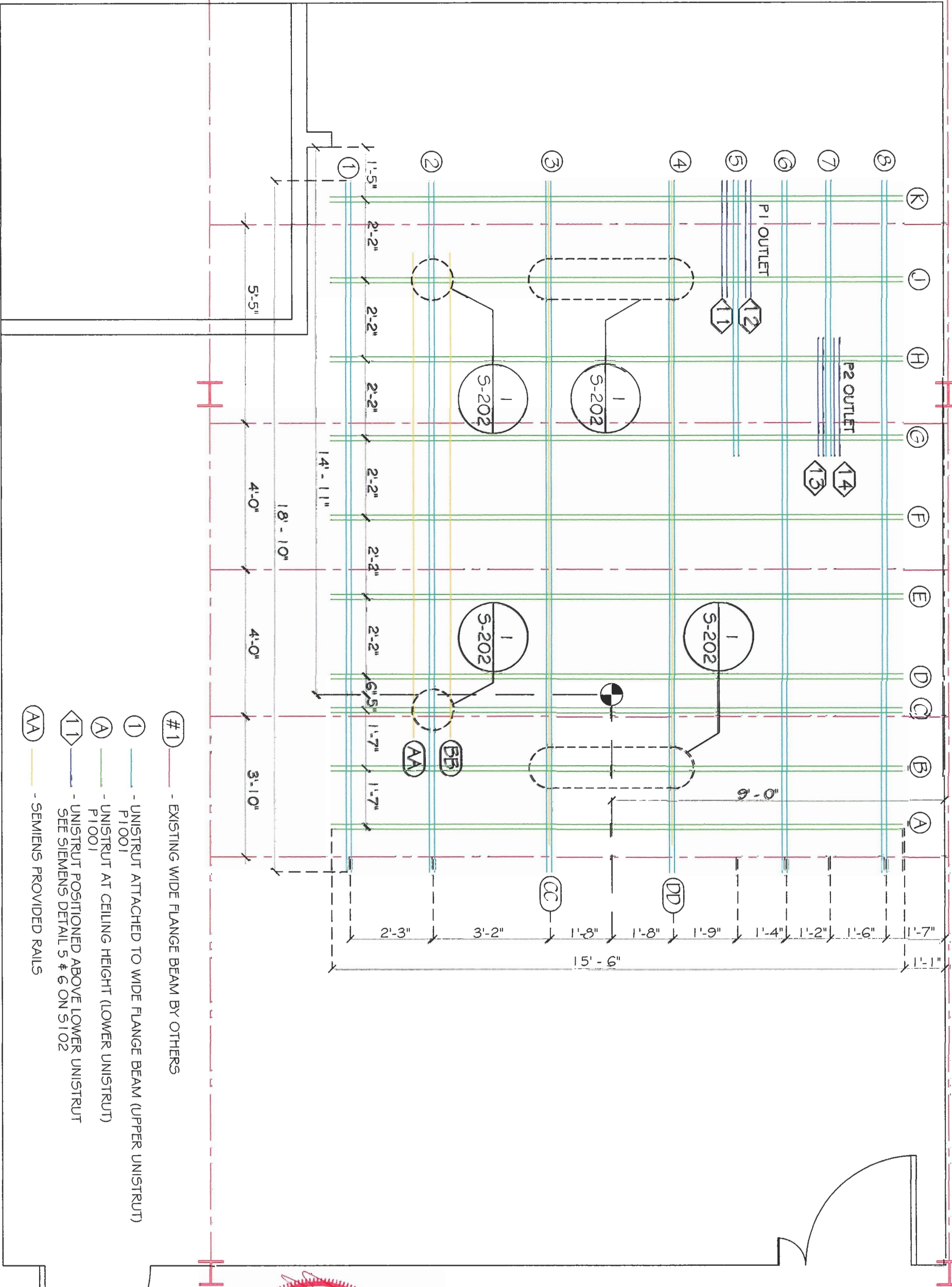
**Project:**  
**SMH Cath Lab 2 Submittal Data**

**Location:**  
**Slidell Memorial Hospital**  
**1001 Gause Blvd.**  
**Slidell, LA 70458**

**3/18/2013**

# STRUCTURAL CEILING PLAN

SCALE: 3/8" = 1"



- #1 - EXISTING WIDE FLANGE BEAM BY OTHERS
- ① - UNISTRUT ATTACHED TO WIDE FLANGE BEAM (UPPER UNISTRUT)  
P1001
- Ⓐ - UNISTRUT AT CEILING HEIGHT (LOWER UNISTRUT)  
P1002
- ◁11 - UNISTRUT POSITIONED ABOVE LOWER UNISTRUT  
SEE SIEMENS DETAIL 5 & 6 ON S102
- AA - SEMIENS PROVIDED RAILS



S-201

SLIDELL MEMORIAL HOSPITAL  
CATH LAB #2 UNISTRUT SYSTEM  
SLIDELL, LA

JOB#: 2169      DATE: 3/11/2013

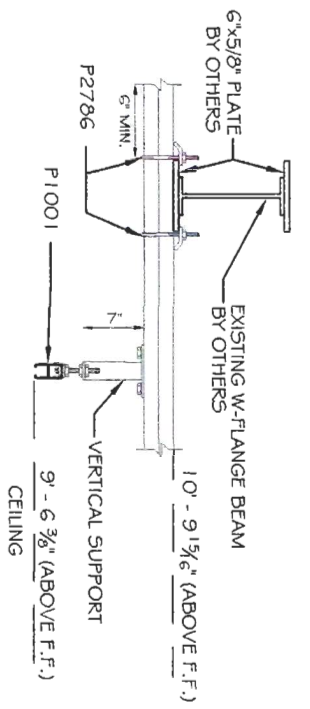
SCALE: 3/8" = 1"



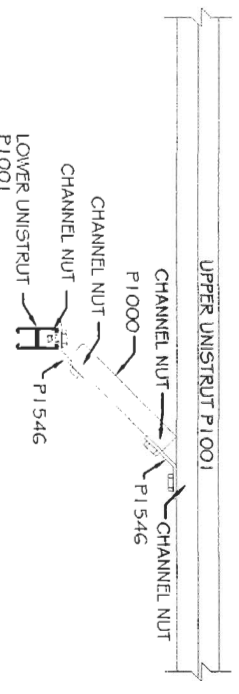
**DAMMON**  
ENGINEERING, INC.  
Architects & Engineers

CHIEF ENGINEER: EMMETT DAMMON, P.E.  
ARCHITECT: NEWMAN KINCHEN  
5541 OLD SPANISH TRAIL  
SUITE 200, LA 70450

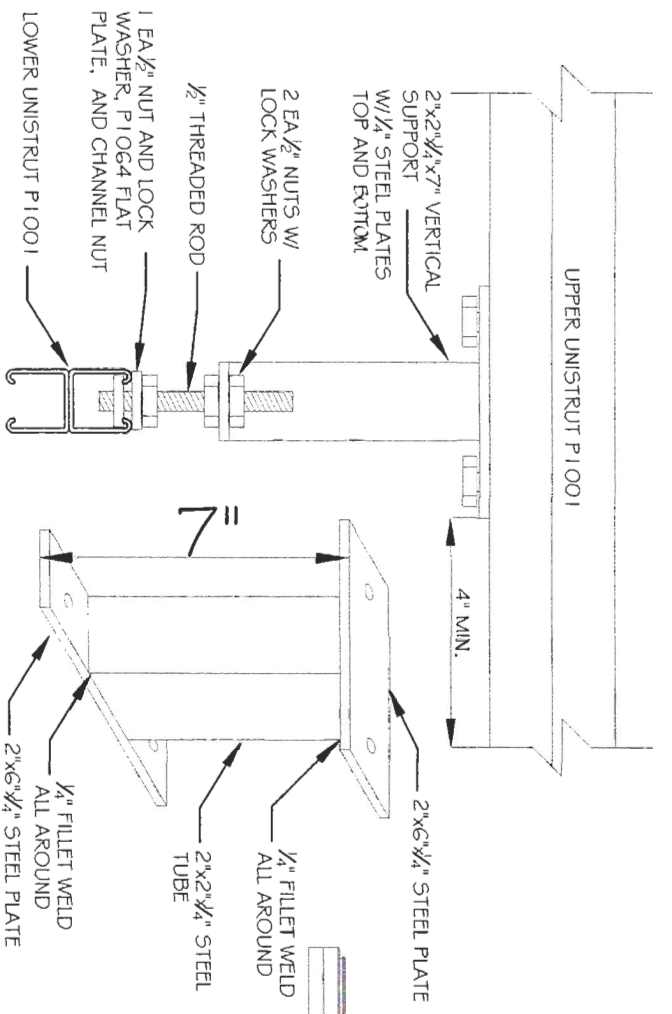
www.dammonengineering.com  
rdammoneng@bellsouth.net  
PHONE: 985-688-5832  
FAX: 985-688-8000



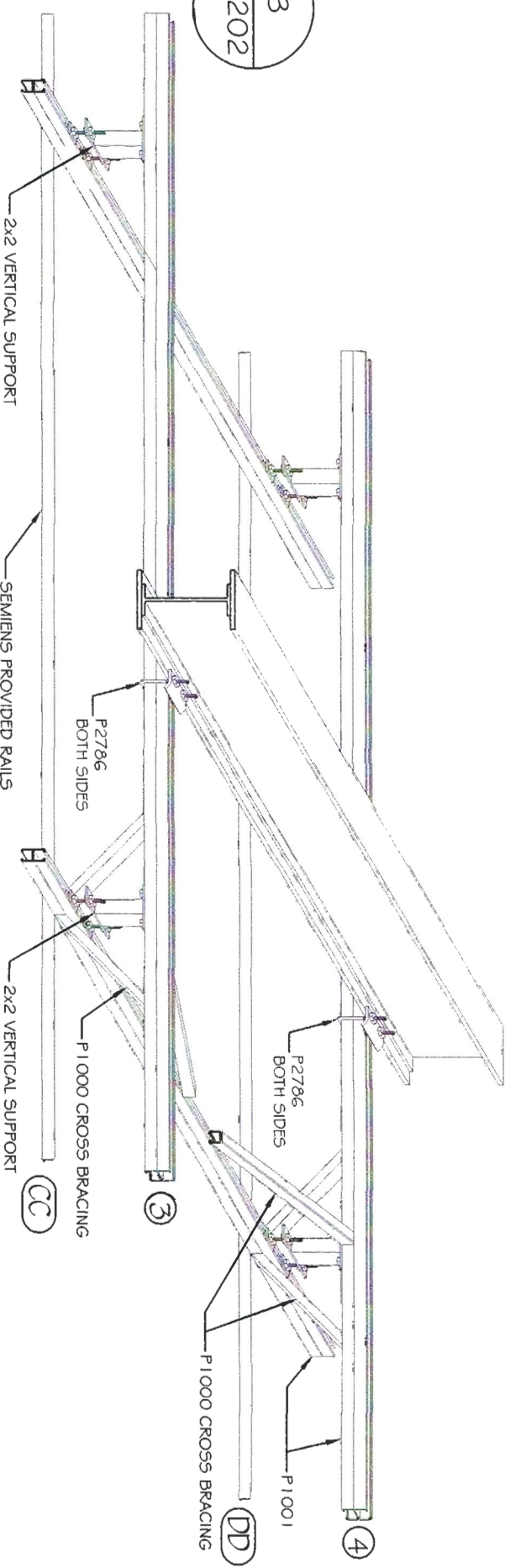
SUPPORT SECTION TYP. 3  
N.T.S. S-202



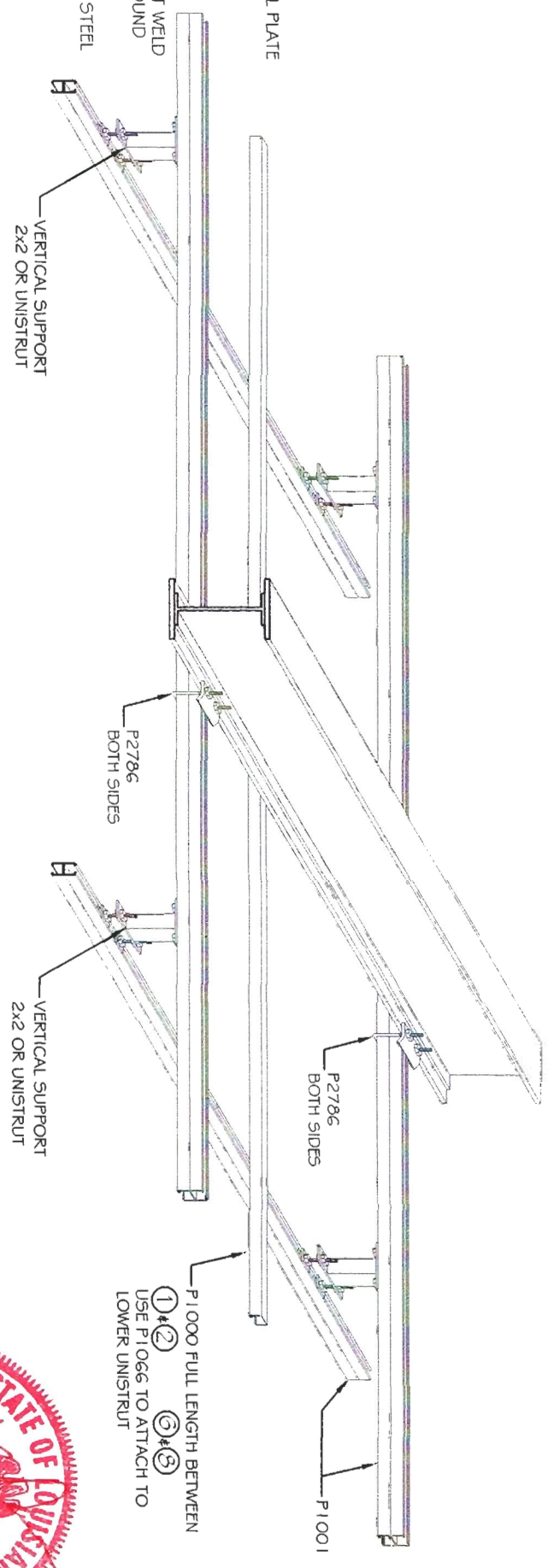
HORIZONTAL SUPPORT SYSTEM DETAIL 4  
N.T.S. S-202



VERTICAL SUPPORT SYSTEM DETAIL 5  
N.T.S. S-202



ISO UNISTRUT SUPPORT @ INTERSECTING SIEMENS RAILS (TYP.) 1  
N.T.S. S-202



ISO UNISTRUT SUPPORT (TYP.) 2  
N.T.S. S-202



S-202

SLIDELL MEMORIAL HOSPITAL  
CATH LAB #2 UNISTRUT SYSTEM  
SLIDELL, LA

JOB#: 2169 DATE: 3/18/2013  
SCALE: AS NOTED

The above drawings and specifications, designs and engineering, mechanical drawings are and shall remain the property of Dammon Engineering, and no part thereof shall be copied, reproduced, or used in any way without the written consent of Dammon Engineering. Your contact with these drawings or specifications shall constitute your acceptance of the accuracy of these drawings.



**DAMMON**  
ENGINEERING, INC.  
Architects & Engineers

CHIEF ENGINEER: EMMETT DAMMON, P.E.  
CHIEF ARCHITECT: KEVIN KINCHEN  
554 OLD SPANISH TRAIL  
SLIDELL, LA 70458

www.dammonengineering.com  
dammoneng@bellsouth.net  
PHONE: 905-649-5032  
FAX: 905-641-5950

SMH CATH LAB2

3/18/2013

UNISTRUT Support System  
FOR SIEMEN'S EQUIPMENT

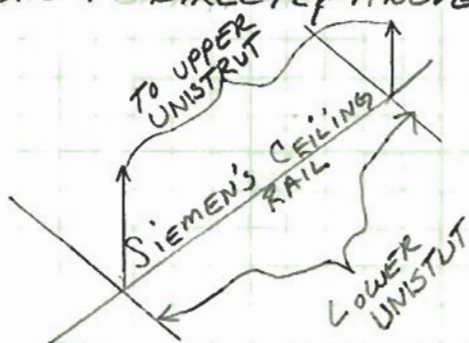
GIVEN: SIEMEN'S S101 dwg dated 8/20/2012 Project 1200240  
 SIEMEN'S S102 dwg dated 8/20/2012 Project 1200240  
 SIZELER S100 Rev2 dwg dated 2/25/2013 Project 41035.65  
 SIZELER S200 Rev2 dwg dated 2/25/2013 Project 41035.65  
 UNISTRUT Corporation METAL Framing CATALOG #12

REQUIRED: Calculate & DESIGN UNISTRUT System To Support SIEMEN'S EQUIPMENT BEING INSTALLED IN CATH LAB2 at SMH.

## DESCRIPTION:

THE CEILING LOADS PROVIDED BY SIEMEN'S ARE GIVEN ALONG SIEMEN'S CEILING RAIL THAT IS ATTACHED TO A LOWER LAYER OF UNISTRUT MOUNTED AT CEILING HEIGHT. THE CEILING RAILS INTERSECT THE UNISTRUT SUPPORT SYSTEM AT 90° ANGLE. THE LOWER, CEILING MOUNTED, UNISTRUT SYSTEM IS HUNG & BRACED TO ANOTHER UNISTRUT SYSTEM ABOVE THE LOWER SYSTEM. THIS SYSTEM ABOVE IS RUNNING ORTHOGONAL TO THE LOWER SYSTEM, AND PARALLEL, OR DIRECTLY ABOVE, THE SIEMEN'S CEILING RAIL. THE UNISTRUT SYSTEM ABOVE THE CEILING UNISTRUT SYSTEM IS SUPPORTED BY 5-W-FLANGE BEAMS THAT RUN ORTHOGONAL TO THIS UNISTRUT SYSTEM. A 5/8" X 6" PLATE HAS BEEN ADDED TO THE W-FLANGE BEAM TO SUPPORT THE UNISTRUT SYSTEM.

THE SUPPORTS FOR SIEMEN'S CEILING RAILS SHOWN AS A & D ON S102 SHALL BE CONNECTED THRU THE LOWER UNISTRUT SYSTEM DIRECTLY ABOVE TO THE UPPER UNISTRUT SYSTEM.



$$F_x = (+/-) 450 \#$$

$$F_y = -1,668 \#$$

$$F_z = (+/-) 675 \#$$

1 OF 7

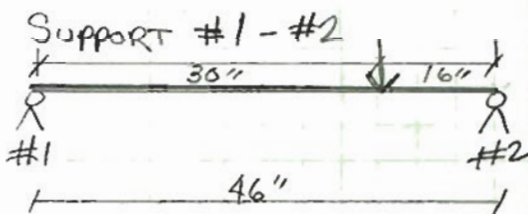
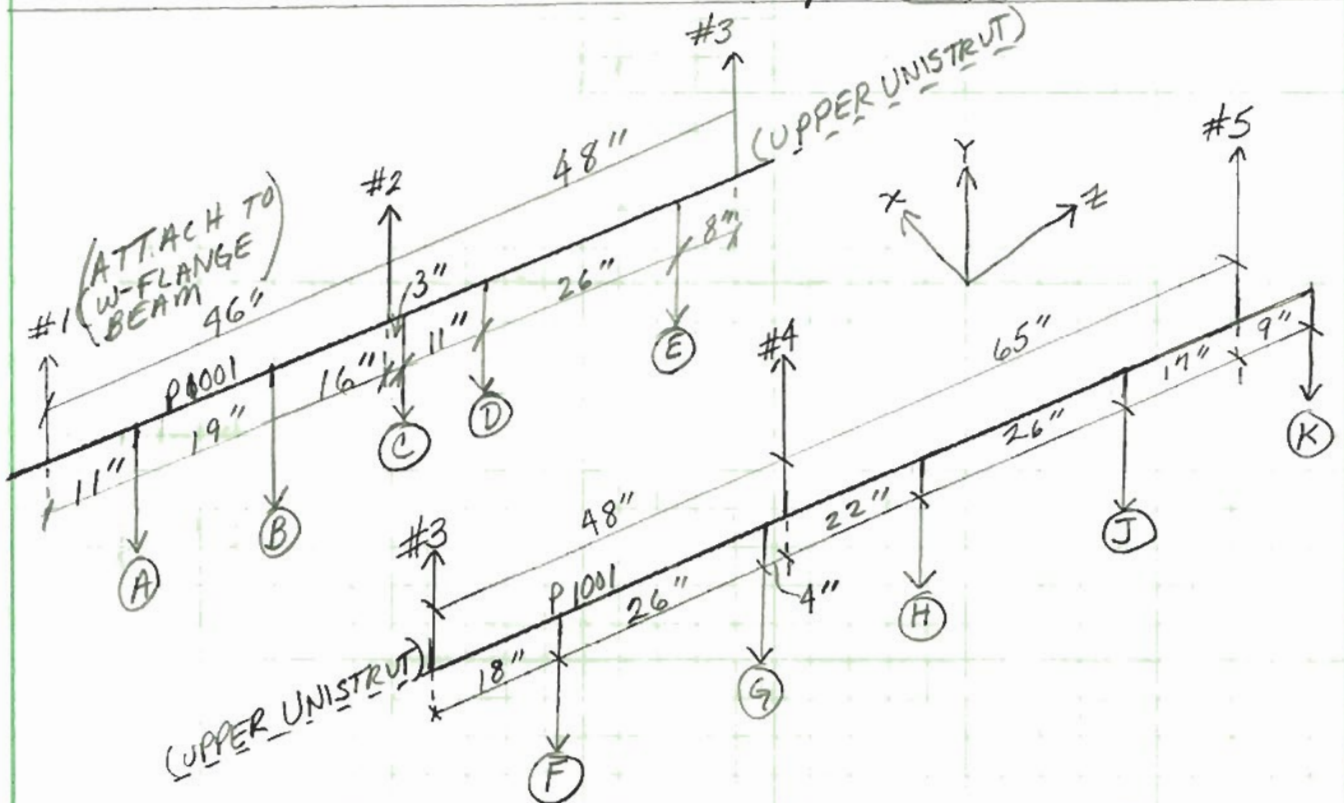
# ANALYSIS UPPER UNISTRUT

W-FLANGE BEAM(S) WITH 6"x5/8" PLATE SUPPORT UPPER UNISTRUT (P1001) USING 2EA BEAM CLAMPS (P2786) (1 EACH SIDE OF W-FLANGE BEAM) AT EACH & EVERY INTERSECTION. EACH BEAM CLAMP SUPPORTS 1,000#.

2 Clamps @ 1000# = 2,000# @ EACH INTERSECTION.

PRODUCT SUBMITTAL ATTACHED P1001

P2786



Max Moment FOR SPAN :

$$P_t \text{ Load} = 1664\#$$

$$\sum M_{\#1} = (1664\#)(30") = (\#2)(46")$$

$$\#2 = 1085.2\# \uparrow$$

$$\#1 = 578.8\# \uparrow$$

$$\text{Max Moment} = 1085.2\# \times 16"$$

$$= 17,363 \text{ in}\cdot\#$$

$$\text{Section Modulus P1001 } S = 0.571 \text{ in}^3$$

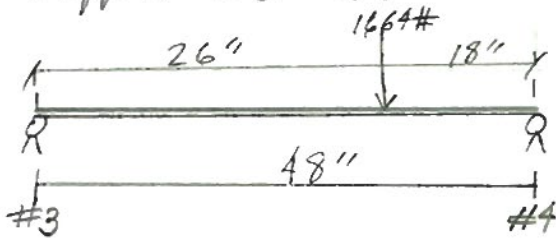
$$\text{Required Capacity: } \frac{32,556}{0.571} = 30,408 \text{ psi}$$

P1001  
 Available Uniform Load on 48" span = 2400#  
 Max Moment =  $2400\# \times 24" = 57,600 \text{ in}\cdot\#$   
 Available Capacity:  $\frac{57,600}{.571} = 100,875 \text{ psi}$  (For 48" Span)  
 100.8 ksi > 730.4 ksi OK      Factor of Safety 3.3

Support #2 - #3

Required Capacity same as #1 - #2 OK

Support #3 - #4



Max Moment For Span :

$$\sum M_{\#3} (1664\#) \times 26" = (\#4) \times 48"$$

$$\#4 = 901.3\#$$

$$\#3 = 762.7\#$$

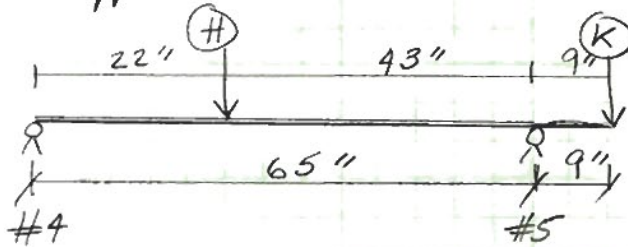
$$M = 901.3\# \times 18" = 16,223$$

$$\text{REQUIRED CAPACITY} = \frac{16,223}{0.571} = 28,412 \text{ psi}$$

100.8 ksi > 28.4 ksi OK

Factor of Safety: 3.5 OK

Support for #4 - #5



Max Moment @ (H)

$$\sum M_{\#4} (1664\#) \times 22" = (\#5) (65")$$

$$\#5 = 563.2\#$$

$$\#4 = 1100.8\#$$

$$\text{Max Moment} = 1100.8\# \times 22" = 24,217.5 \text{ in}\cdot\#$$

$$\text{REQUIRED CAPACITY} = \frac{24,217.5}{.571} = 42,412 \text{ psi}$$

P1001  
 AVAILABLE UNIFORM LOAD ON 65" SPAN  
 1750#

$$\text{MAX MOMENT} (1750\#) \times \frac{65"}{2} = 56,875 \text{ in}\cdot\#$$

$$\text{AVAILABLE CAPACITY} = \frac{56,875}{0.571} = 99,604 \text{ psi}$$

99.6 ksi > 42.4 ksi OK

MARGIN OF SAFETY = 2.3 OK

END OF UPPER  
 UNISTRUT ANALYSIS

ANALYSIS 2"x2"x1/4" x 7" VERTICAL SUPPORT

EACH VERTICAL SUPPORT IS CONNECTED TO UPPER & LOWER UNISTRUT SYSTEM BY 2 EA 1/2" CHANNEL NUTS.

EACH CHANNEL NUT, P. 1010, HAS ALLOWABLE PULL OUT STRENGTH OF 2000#.

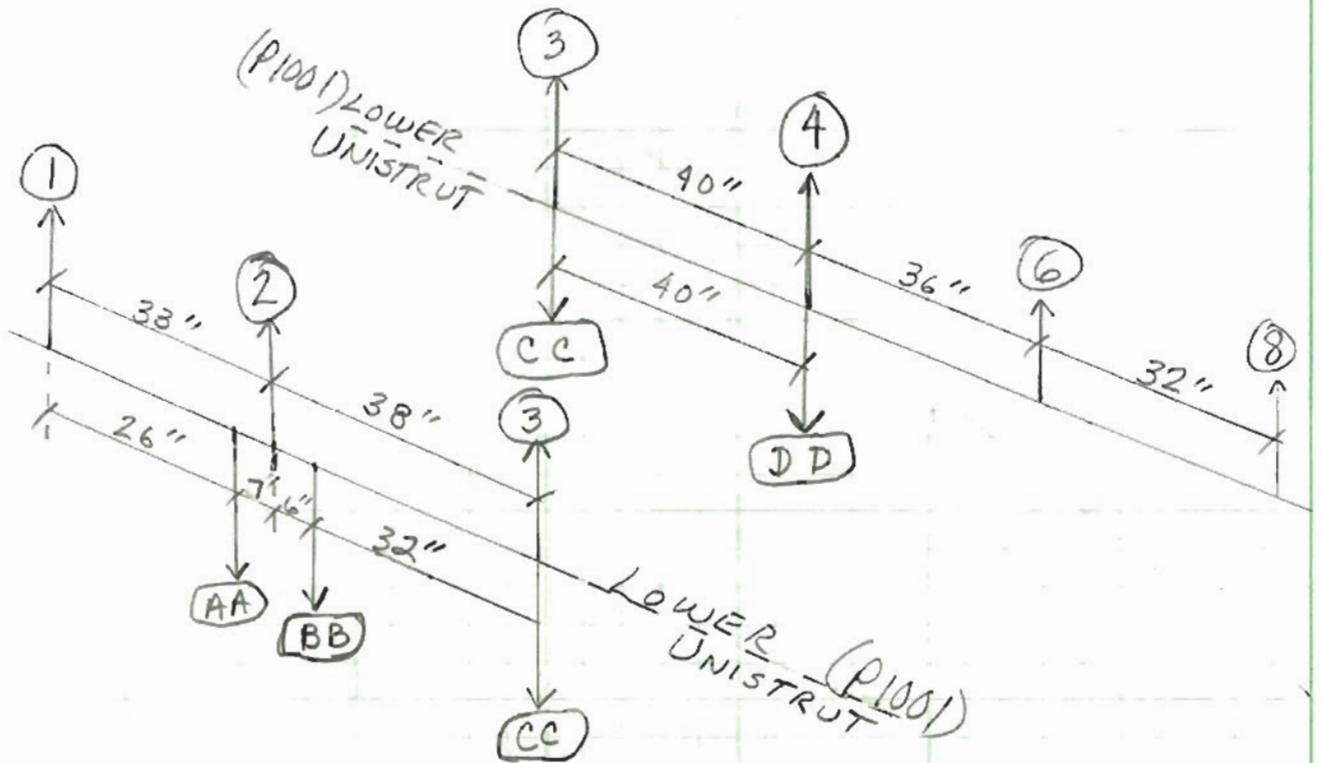
REQUIRE PULL OUT 1664# < 4000# OK

---

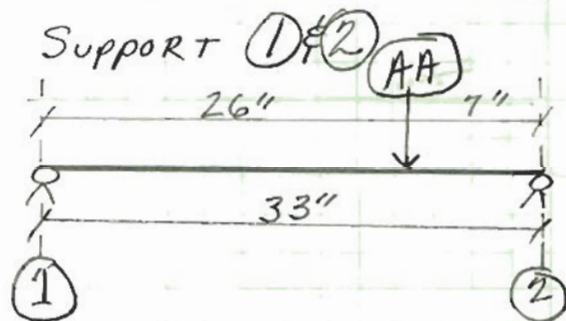
EACH VERTICAL SUPPORT HAS 1/4" STEEL PLATE WELDED

# ANALYSIS LOWER UNISTRUT

THE LOWER UNISTRUT IS SUPPORTED BY VERTICAL SUPPORTS @ INTERSECTIONS WITH UPPER UNISTRUT



LOADS (CC) & (DD) ARE SUPPORTED DIRECTLY ABOVE & DONOT CAUSE A MOMENT ON LOWER UNISTRUT.



MAX MOMENT FOR SPAN

$$\uparrow M \text{ @ } 1 \quad 26'' \times 1664\# = \textcircled{2} \times 33$$

$$\textcircled{2} = 1311.0\#$$

$$\textcircled{1} = 353\#$$

$$\text{MAX MOMENT} = 1311\# \times 7'' = 9,177 \text{ in-}\#$$

$$\text{REQUIRED CAPACITY} = \frac{9177}{0.571} = 16,071 \text{ psi}$$

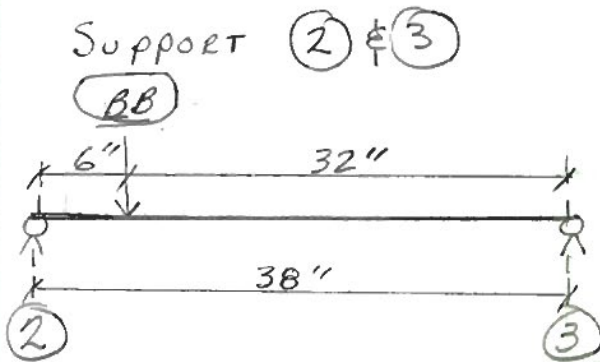
AVAILABLE UNIFORM LOAD FOR 36" SPAN

$$3130\# \times \left(\frac{36}{2}\right) = 56,340$$

$$\text{AVAILABLE CAPACITY} = \frac{56,340}{0.571} = 98,669 \text{ psi}$$

98.7 ksi > 16.1 ksi OK

FACTOR OF SAFETY 6.1 OK



Max Moment For Span

$$\uparrow M (2) (1664\#) \times 6" = (3) \times 38"$$

$$(3) = 262.7\#$$

$$(2) = 1401.3\#$$

$$\text{Max Moment} = 1401.3\# \times 6" \\ = 8407.6 \text{ IN}\cdot\#$$

$$\text{REQUIRED CAPACITY} = \frac{8407.6}{0.571} = 14,724 \text{ psi}$$

AVAILABLE UNIFORM LOAD FOR 48" SPAN = 2400#

$$2400\# \times (48/2) = 57,600$$

$$\text{AVAILABLE CAPACITY} = \frac{57,600}{0.571} = 100,875$$

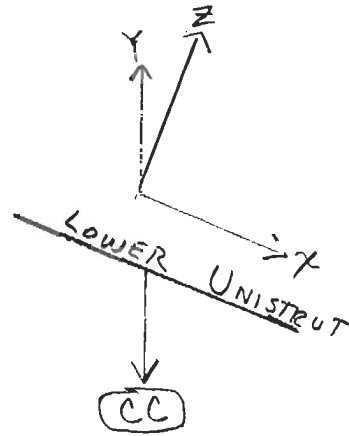
100.9 ksi > 14.7 ksi OK

Factor of Safety : 6.9 OK

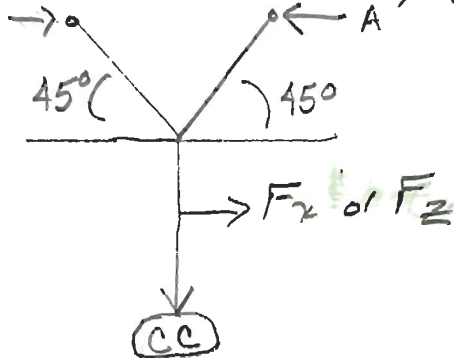
ANALYSIS of X & Z FORCES

$F_x = 450 \# (+/-)$

$F_z = 675 \# (+/-)$



ANALYSIS of  $F_x, F_y$  &  $F_z$



$F_x = \sin 45^\circ \times 675 \# = 477.3 \# \rightarrow$   
 $F_y = \cos 45^\circ \times 675 \# = 477.3 \# \uparrow$

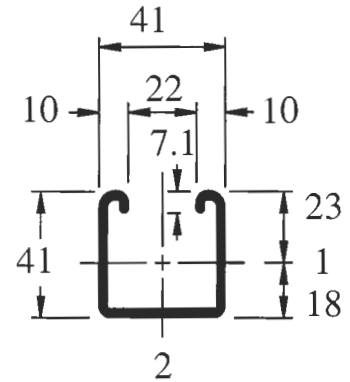
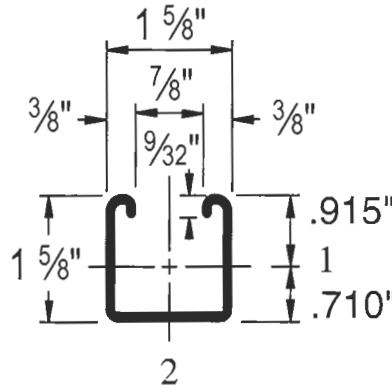
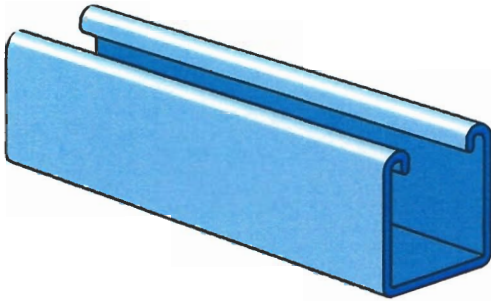
THE FORCE @ A ABOVE =  $F_x$ ; THIS CONNECTION IS BY ONE CHANNEL NUT AT UPPER UNISTRUT. MINIMUM  $3/8"$  CHANNEL NUT FOR CROSS SUPPORT. P 1008 ( $3/8"$ ) PROVIDES 800# RESISTANCE TO SLIP.

$800 \# > 477.3 \#$  OK





P1000®



**Notes:**

\* Load limited by spot weld shear.

\*\*  $KL/r > 200$

NR = Not Recommended.

- Above loads include the weight of the member. This weight must be deducted to arrive at the net allowable load the beam will support.
- Long span beams should be supported in such a manner as to prevent rotation and twist.
- Allowable uniformly distributed loads are listed for various simple spans, that is, a beam on two supports. If load is concentrated at the center of the span, multiply load from the table by 0.5 and corresponding deflection by 0.8.
- For Pierced Channel, Beam Load Values in the tables are multiplied by the following factor:

"DS" Series	70%	"T" Series	85%
"KO" Series	95%	"H3" Series	90%
"SL" Series	85%	"HS" Series	90%

W/100 Ft: 189 Lbs (281 kg/100 m)  
 Allowable Moment 5,070 In-Lbs (570 N•m)  
 12 Gauge Nominal Thickness .105" (2.7mm)

**MATERIAL**

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

**STEEL: PLAIN**

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and  
 16 Ga. (1.5 mm) ASTM A1011 SS GR 33.

**STEEL: PRE-GALVANIZED**

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and  
 16 Ga. (1.5 mm) ASTM A653 GR 33.

For other materials, see Special Metals or Fiberglass sections.

**FINISHES**

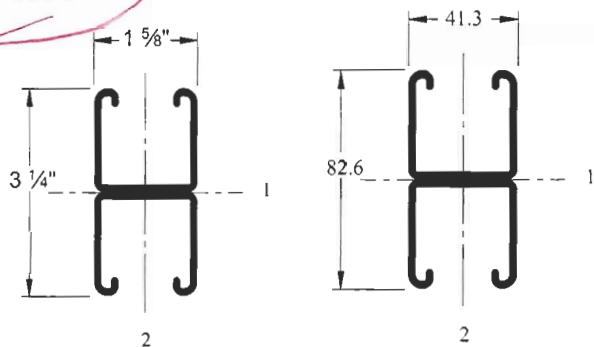
All channels are available in:

- **Perma Green III (GR).**
- Pre-galvanized (PG), conforming to ASTM A653 G90.
- Hot-dipped galvanized (HG), conforming to ASTM A123.
- Plain (PL).

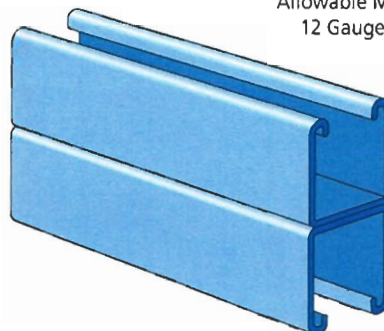
<b>Project:</b> SMH CATH LAB2 UNISTRUT SUPPORT SYSTEM <b>Architect / Engineer:</b> DAMMON ENGINEERING <b>Date:</b> 3/16/2013 <b>Phone:</b> (985) 649-5832 <b>Contractor:</b> NATAL <b>Address:</b> _____ _____ <b>Notes 1:</b> _____ _____ <b>Notes 2:</b> _____ _____	<b>Approval Stamp:</b> _____ _____ _____
---	---



### P1001



Wt/100 Ft: 380 Lbs (566 kg/100 m)  
 Allowable Moment 14,390 In-Lbs (1,630 N•m)  
 12 Gauge Nominal Thickness .105" (2.7mm)



Channel Finishes:  
 PL, GR, HG, PG;  
 Standard Lengths:  
 10' & 20'

### COLUMN LOADING – P1001

Height In	Maximum Unbraced Allowable Load at Slot Face Lbs	Maximum Column Load Applied at C.G.			
		K = 0.65 Lbs	K = 0.80 Lbs	K = 1.0 Lbs	K = 1.2 Lbs
24	6,430	25,060	24,620	23,900	23,050
36	6,230	24,000	23,050	21,570	19,890
48	5,950	22,590	21,030	18,690	16,170
60	5,620	20,890	18,690	15,540	12,400
72	5,240	18,990	16,170	12,400	8,960
84	4,830	16,970	13,640	9,470	6,580
96	4,390	14,900	11,200	7,250	5,040
108	3,930	12,860	8,960	5,730	3,980
120	3,510	10,910	7,250	4,640	**

### BEAM LOADING – P1001

Span In	Max Allowable Uniform Load Lbs	Defl. at Uniform Load In	Uniform Loading at Deflection		
			Span/180 Lbs	Span/240 Lbs	Span/360 Lbs
24	3,130 *	0.03	3,130 *	3,130 *	3,130 *
36	3,130 *	0.07	3,130 *	3,130 *	3,130 *
48	2,400	0.13	2,400	2,400	2,400
60	1,920	0.20	1,920	1,920	1,630
72	1,600	0.28	1,600	1,600	1,130
84	1,370	0.39	1,370	1,240	830
96	1,200	0.50	1,200	950	640
108	1,070	0.64	1,000	750	500
120	960	0.79	810	610	410
144	800	1.13	560	420	280
168	690	1.54	410	310	210
192	600	2.01	320	240	160
216	530	2.55	250	190	130
240	480	3.15	200	150	100

### MATERIAL

Unistrut channels are accurately and carefully cold formed to size from low-carbon strip steel. All spot-welded combination members, except P1001T, are welded 3" (76 mm) maximum on center.

#### STEEL: PLAIN

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and 16 Ga. (1.5 mm)  
 ASTM A1011 GR33

#### STEEL: PRE-GALVANIZED

12 Ga. (2.7 mm), 14 Ga. (1.9 mm) and 16 Ga. (1.5mm)  
 ASTM A653 GR 33

For other materials, see Special Metals or Fiberglass sections.

### FINISHES

All channels are available in:

- Perma Green II (GR)
- Pre-galvanized (PG), conforming to ASTM A653 G90
- Hot-dipped galvanized (HG), conforming to ASTM A123
- Plain (PL)

Project: SMH CATH LAB2 UNISTRUT SUPPORT SYSTEM  
 Architect / Engineer: DAMMON ENGINEERING  
 Date: 3/16/2013 Phone: 985-649-5832  
 Contractor: NATAL  
 Address: \_\_\_\_\_

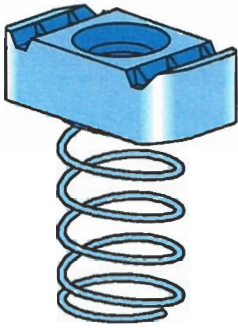
Approval Stamp: \_\_\_\_\_

Notes 1: \_\_\_\_\_

Notes 2: \_\_\_\_\_



### CHANNEL NUT WITH SPRING



Part Number	Nut Size Thread	Wt/100 pcs Lbs (kg)	Use With
P1006-0832	#8 -32	7 (3.2)	P1000, P1100, P2000, P3000
P1006-1024	#10 -24	7 (3.2)	
P1006-1420	1/4" -20	7 (3.2)	
P1007	5/16" -18	6 (2.7)	
P1008	3/8" -16	10 (4.5)	
P1009	7/16" -14	9 (4.1)	
P1010	1/2" -13	12 (5.4)	

### MATERIAL

Unistrut channel nuts are manufactured from mild steel bars, and after machining operations are completed, they are case hardened, assuring positive biting action into the inturned edge of the Unistrut channel.

Bolt Size	Channel Nut ASTM
1/4" & 5/16"	A1011 SS GR45
3/8", 7/16" & 1/2"	A576 GR1015 Modified
5/8" & 3/4"	A36 or A675 GR60
7/8"	A36

### FINISHES

Nuts, bolts and washers are electro-galvanized (EG), ASTM B633 Type III SC1 finish, unless otherwise noted.

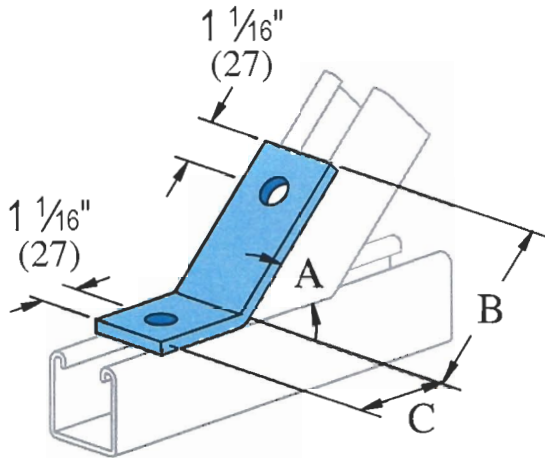
Many hardware items are also available in stainless steel. Consult factory for ordering information.

<p><b>Project:</b> SMH CATH LAB2 UNISTRUT SUPPORT SYSTEM</p> <p><b>Architect / Engineer:</b> DAMMON ENGINEERING INC.</p> <p><b>Date:</b> 3/16/2013      <b>Phone:</b> 985-649-5832</p> <p><b>Contractor:</b> _____</p> <p><b>Address:</b> _____</p> <p><b>Notes 1:</b> _____</p> <p><b>Notes 2:</b> _____</p>	<p><b>Approval Stamp:</b></p>
---	-------------------------------



P1546, P2094 THRU P2100

WW/100 pcs: 58 Lbs (26.3 kg)



Part No.	"A" Degree (rad)	"B" In (mm)	"C" In (mm)
P2094	82 1/2° 1.44	3 9/16 91	1 11/16 43
P2095	75° 1.31	3 3/16 91	1 11/16 43
P2096	67 1/2° 1.18	3 1/2 89	1 1/4 44
P2097	60° 1.05	3 1/2 86	1 1/8 48
P2098	52 1/2° 0.92	3 1/4 83	2 1/16 52
<b>P1546</b>	<b>45° 0.79</b>	<b>3 76</b>	<b>2 5/16 59</b>
P2099	37 1/2° 0.65	3 1/2 89	1 3/16 46
P2100	37 1/2° 0.65	2 11/16 68	2 1/8 67

Standard Dimensions for 1 5/8" (41mm) width series channel fittings (Unless Otherwise Shown on Drawing)

Hole Diameter: 3/16" (14mm); Hole Spacing - From End: 1 1/16" (21mm); Hole Spacing - On Center: 1 7/8" (48mm); Width: 1 5/8" (41mm); Thickness: 1/4" (6mm)

### MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

Many fittings are also available in stainless steel, aluminum and fiberglass. Consult factory for ordering information.

### FINISHES

Fittings are available in:

Perma-Green III (GR),

Electro-galvanized (EG), conforming to ASTM B633 Type III SC1;

Hot-dipped galvanized (HG), conforming to ASTM A123 or A153 and

Plain (PL).

Project: SMH CATH LAB2 UNISTRUT SUPPORT SYSTEM

Approval Stamp:

Architect / Engineer: DAMMON ENGINEERING

Date: 3/16/2013 Phone: (985) 649-5832

Contractor: NATAL

Address: \_\_\_\_\_

Notes 1: \_\_\_\_\_

Notes 2: \_\_\_\_\_

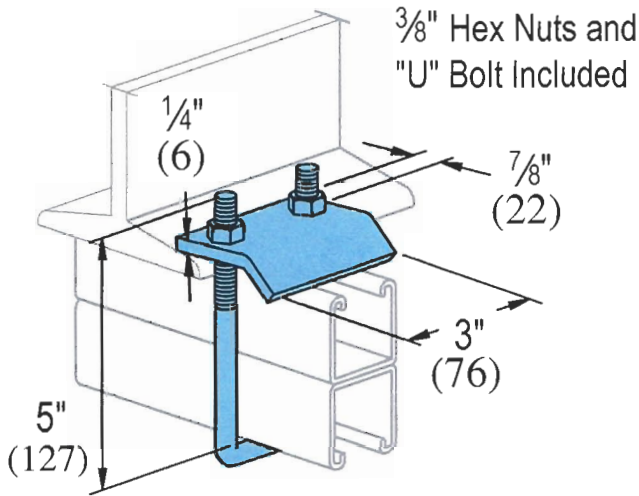


P2786

W/100 pcs: 92 Lbs (41.7 kg)

• For use with Beams up to 3/4" (19)  
Flanges and with  
Channels P1001, P1101, P2001,  
P3001, P5000, and P5500.

Design Load Each  
1000 Lbs (4.45 kN)  
Use in Pairs Only



**Note:** When used for mechanical supports, load capacities of brackets and fittings should be in compliance with the American Standard Code for Pressure Piping. Clamps are designed to be used with W, M, S & HP Shape beams, Standard C & Misc. MC Channels, Angles & Structural Tees. Clamps must be used in pairs where indicated. For beam clamps with HG finish, standard hardware is EG finish. For optional stainless steel hardware, please contact the factory for availability.

### MATERIAL

Fittings, unless noted, are made from hot-rolled, pickled and oiled steel plates, strip or coil, and conform to ASTM specifications A575, A576, A635, or A36. The fitting steel also meets the physical requirements of ASTM A1011 SS GR 33. The pickling of the steel produces a smooth surface free from scale.

Many fittings are also available in stainless steel, aluminum and fiberglass. Consult factory for ordering information.

### FINISHES

Fittings are available in:

Perma-Green III (GR),

Electro-galvanized (EG), conforming to  
ASTM B633 Type III SC1;

Hot-dipped galvanized (HG), conforming to  
ASTM A123 or A153 and

Plain (PL).

**Project:** SMH CATH LAB2 UNISTRUT SUPPORT SYSTEM

**Approval Stamp:**

**Architect / Engineer:** DAMMON ENGINEERING INC.

**Date:** 3/16/2013

**Phone:** 985-649-5832

**Contractor:**

**Address:**

**Notes 1:**

**Notes 2:**