C.R. LAURENCE, CO. INC.
SPS- STACKING PARTITION SYSTEM

PREPARED FOR:
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DESIGN REPORT PREPARED BY:
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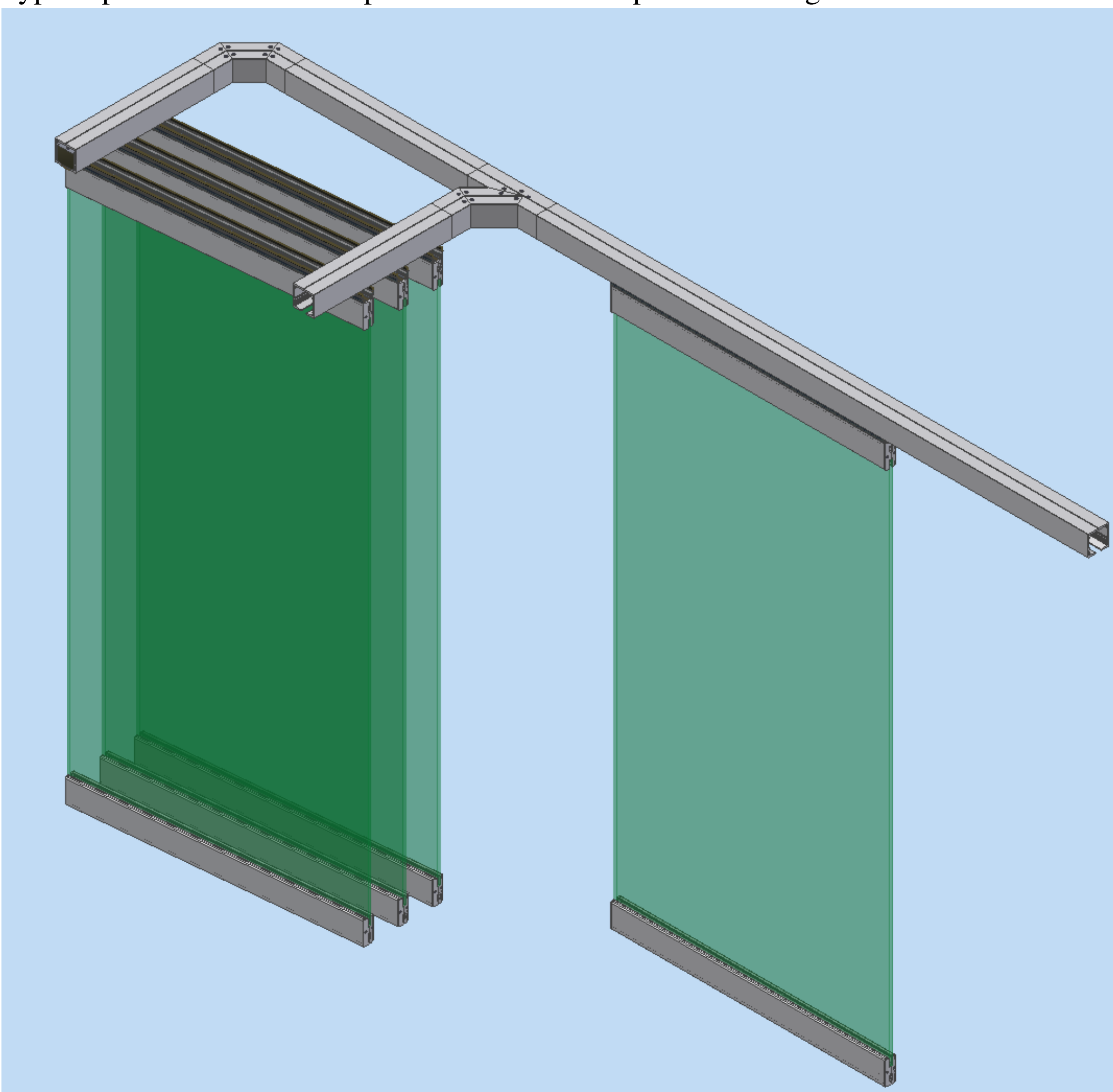
C.R. LAURENCE CO, INC –SPS: STACKING PARTITION SYSTEM

DESCRIPTION: Stacking partition wall for subdividing space and allowing the partition to be stored by stacking in a recessed space at the end of the partition. Partitions are intended for interior use or protected exterior locations.

CONSTRUCTION: Fully tempered glass panels or other flat panels hung on an extruded aluminum track attached to the ceiling. Attachment to the ceiling framing or supports can accommodate any type of ceiling construction that has adequate strength to support the partition. Typical panel width will be up to 6 feet wide and up to 12 feet high.



DESIGN PARAMETERS: The stacking partition system is designed to comply with the requirements of the 2007 and 2010 California Building Codes, 2003, 2006, 2009 and 2012 International Building Codes, 2001 and 2005 Aluminum Design Manuals and CPSC 16 CFR 1201.

DESIGN LOADS:

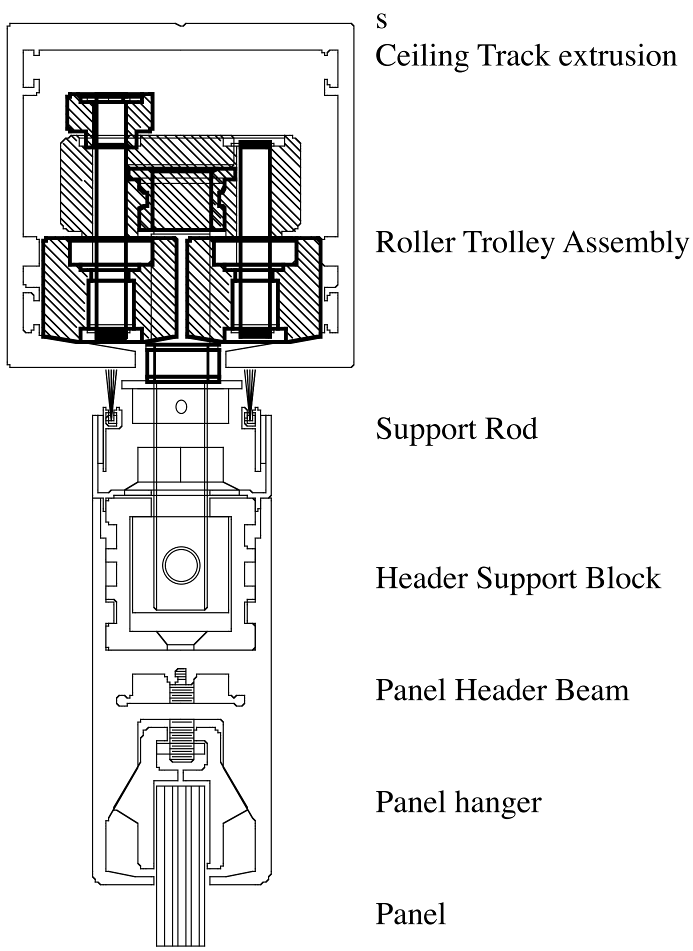
Dead Loads: Maximum Panel Weight 785 lb total weight or 131 plf
Live Load: 5 psf lateral
200 lbs concentrated on 1 sf
Wind Load: 26 psf – 3/4” glass (12’ max ht)
16.7 psf – 1/2” glass (10’ max ht)

Allowable lateral loads such as wind loads will be dependent on the panel height. Greater wind loads may be allowable for shorter panel heights.

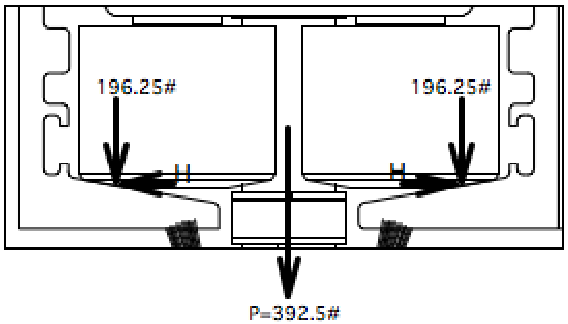
SYSTEM COMPONENTS

Refer to extrusion die drawings for specific dimensions.

PANEL HEADER BEAM: Aluminum extrusion strength determined as adequate from testing. Glass panel anchored into beam using compression wedges.



ROLLER TROLLEY ASSEMBLY: Strength determined as adequate from testing. Attaches to header beam by locking into header beam extrusion. Trolley assembly transfers vertical and horizontal loads to the ceiling track by direct bearing.



HORIZONTAL FORCE FROM TROLLEY
H = 1/2P*SIN(10°) = 34#
Bending Moment in flange/web
M = 196.25#*0.678" + 34#*3.25" = 244"#
Flange/web Section Modulus
Trib length=2.675"(trolley)+2*8*0.125(t web)=7.185"

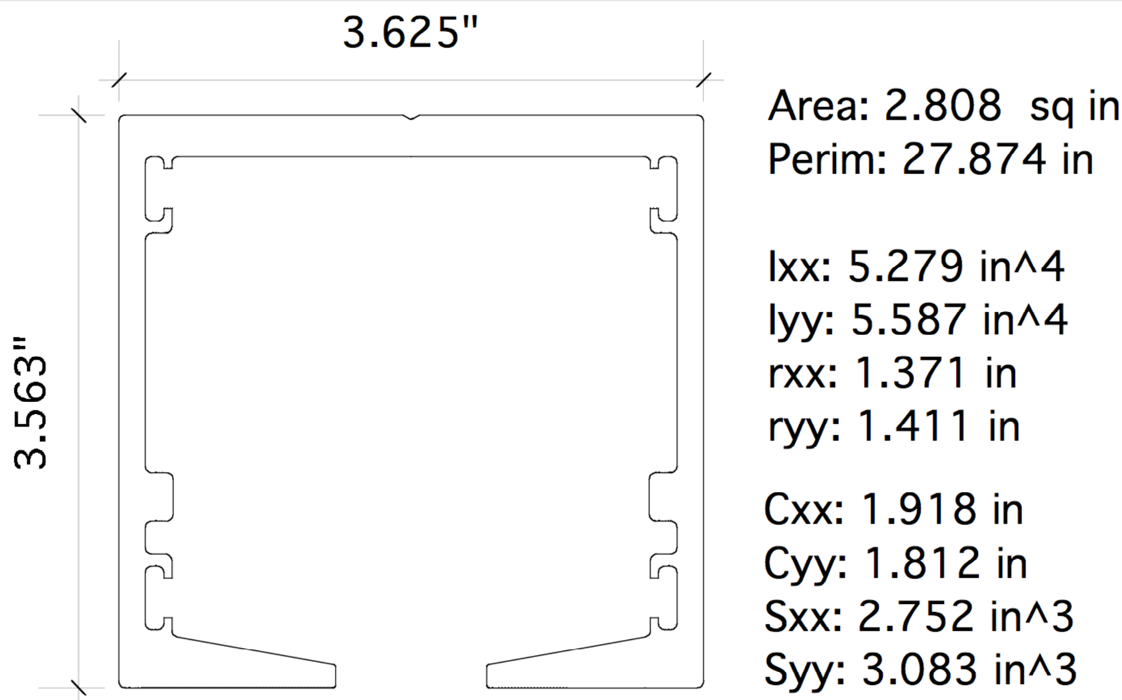
$$Sw = \frac{7.185*(.125)^2}{6} = 0.0187\ in^3$$

$fb = 244"\#/0.0187\ in^3 = 13{,}048\ psi$
Pmax = 20/13.048*392.5 = 601#

Trolley assembly loading on ceiling track is okay based on 6063-T6 aluminum allowable stress for element bending in own plane of 20 ksi. Minimum stacking distance is:

(13.048ksi/20ksi)*7.185" = 4.69 inches for maximum panel weight
(468/785)*4.69 = 2.79 inches for typical panel weight (6'x10'x1/2" glass).
2.81"/4.69"*785#= 470 lbs max panel weight at closest stacked spacing

CEILING TRACK: Aluminum extrusion, strength and serviceability determined by calculation. Track provides vertical and lateral support to the stacking panels.



Track strength – 6063-T6 Aluminum, allowable stresses from Aluminum Design Manual Table 2-24:

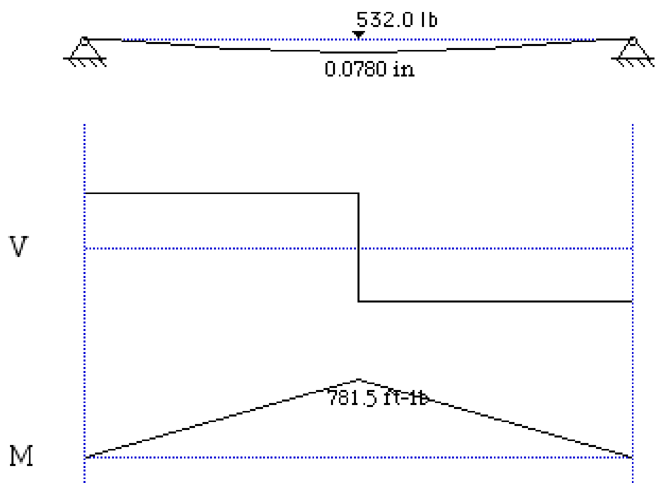
$F_t = 15$ ksi
$F_c = 16.7-0.073*(L/r_x) = 16.7-0.073*(72/1.37) = 12.86$ ksi
$M_{allowable} = S_{xx}*F_c = 2.75in^3*12.86\ ksi = 35{,}366"\#$

Calculate maximum track support spacing for deflection = 0.078”:

$\Delta = PL^3/(48EI) = 392.5*72^3/(48*5.25in^4*10.1x10^6psi = 0.0576” < 2mm$

$Pall = [\Delta*(48EI)/L^3]= [0.078*(48*5.25in^4*10.1x10^6psi)/(72^{3)}] = 532$ lbs

$M = 532^{\#}*72”/4 = 9{,}576”\#$



Based on track strength and stiffness the track supports may be spaced at up to 6 feet on center.

SUB-TRACK - REINFORCED TRACK
For extended support spacing

Track is strengthened by screwing track section together with a sub-track extrusion to form a composite section.

Composite track properties:

$I_{xx} = 29.130\ in^4$

$S_{xx} = 7.744\ in^3$

$I_{yy} = 8.222\ in^4$

$S_{yy} = 4.536\ in^3$

Calculate maximum track support spacing for deflection = 0.078”, estimate based on loads at 1/3 points (lights between supports).

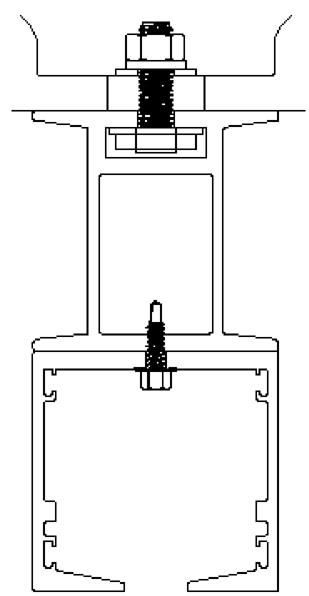
$\Delta = P(8/9)L^3/(24EI)=0.037PL^3/(29.130in^4*10.1x10^6psi \leq 0.078$

Solve for L based on P = 400# (785# maximum panel weight)

$L^3/ = [(0.078/(0.037*400)*(29.130in^4*10.1x10^6psi]^{1/3}= 100.4”$

Check deflection for 8’ on center spacing and a maximum panel weight of 785#

$\Delta = 0.037*785*96^3/(29.130in^4*10.1x10^6psi) = 0.087”$



Maximum load to hanger for 8’ on center spacing:

$R_V = 2*785\# = 1{,}570\#$

$M = 785\#*96”/4 = 18{,}840”\#$

Track stress:

$f_b = 18{,}840”\#/7.744in^3 = 2{,}432$ psi

Determine required spacing of screws to connect the two tracks together to develop the composite section.

Screw strength – 1/4" self drilling screw into 1/4" thick 6063-T6 aluminum

Tension strength of screw for pullout (ADM equation 5.4.2.1-3)
$P_{not} = 0.58A_{sn}t_cF_{tu2}$ = 0.58*0.539"*0.25"*30 ksi = 2,345#
(Tension load will be under 20% of strength so no reduction for interaction with shear is required.)
Shear strength of screw connection:
For bearing on screw, ADM Eq. 5.4.3-2
$P_{av} = F_{tu2}Dt_2/n_u$ = 30ksi*0.25"*0.25"/3.0 = 625#
For screw strength:
$V_s = 0.65*A_sF_v/1.6$= 0.65*0.0372in^2*42ksi/1.6 = 634#

Shear flow at neutral axis:
$V = R_V/2$ = 1,570/2 = 785
$q = VA_ty'/I$ = 785#*2.808in^2*1.844"/29.13in^4 = 140#/in

Screw spacing = 625#/140#/in = 4.46" on center at support – Running track sections.
For parking areas – s = 2*625#/785#*2.75" = 4.38" use 4" on center

SCREW SPACING BASED ON PANEL WEIGHT:

Panel weight per lineal foot	screw spacing	Deadload/screw
52 plf (1/2" glass x 8' tall)	785/(4*52)*4.46 = 16.8"	73#
65 plf (1/2" glass x 10' tall)	785/(4*65)*4.46 = 13.5"	73#
78 plf (1/2" glass x 12' tall)	785/(4*78)*4.46 = 11.2"	73#
80 plf (3/4" glass x 8' tall)	785/(4*80)*4.46 = 10.9"	73#
100 plf (3/4" glass x 10' tall)	785/(4*100)*4.46 = 8.75"	73#
120 plf (3/4" glass x 12' tall)	785/(4*120)*4.46 = 7.3"	73#
140 plf (3/4" glass x 14' tall)	785/(4*140)*4.46 = 6.25"	73#
160 plf (3/4" glass x 16' tall)	785/(4*160)*4.46 = 5.5"	73#

MAXIMUM VERTICAL HANGER SPACING - based on panel weight
Based on maximum allowable track deflection of L/1200:
$L = [0.064*EI/w]^{1/3} = [0.064*29.130in^4*10.1x10^6psi/w]^{1/3} = [18,828,932/w]^{1/3}$

Panel weight per lineal foot	maximum hanger spacing	Moment
52 plf (1/2" glass x 8' tall)	163"	14,392"#
65 plf (1/2" glass x 10' tall)	151"	15,438"#
78 plf (1/2" glass x 12' tall)	142"	16,383"#
80 plf (3/4" glass x 8' tall)	141"	16,568"#
100 plf (3/4" glass x 10' tall)	131"	17,876"#
120 plf (3/4" glass x 12' tall)	123" limited to 118" by hanger strength.	17,405"#
140 plf (3/4" glass x 14' tall)	117" limited to 101" by hanger strength.	14,876"#
160 plf (3/4" glass x 16' tall)	112" limited to 88" by hanger strength.	12,607"#

MAXIMUM LATERAL LOAD ON SUB-TRACK REINFORCED TRACK SECTION

Lateral load will increase tension on screws to sub-track:
T_l = 2.55*Z/1.8” = 1.417*Z
Total screw tension $T_t = T_l + T_D \leq 0.2*2,345/3$ = 156#/screw
As typical dead load per screw = 73# based on the screw spacing previous page the allowable lateral load is:
T_l = 156-73 = 83#
Z = 83/1.417 = 58.5#/ screw.
Increased lateral load for extra screws:
Z_{extra} = (2,345/3)/1.417 = 552# for each screw more than required by spacing on previous page.

Torsional strength of track:
$I_{trackyy} = 5.587\ in^4$ $J_{track} = 0.826\ in^4$ a = 8.48”
Shear center at 2.23” from web

Torsion load:
T_u = Z*(2.23”+2.4”) = 4.63Z

Torsion capacity (approximate)
$T_{max} = F_aJ/(2h)$ = 20ksi*0.826/(2*3.625) = 2279”#

Maximum total lateral load on track between supports
Z = 2*2,279”#/4.63”= 984#
Maximum allowable load for a single panel trolley will be controlled by leg bending rather than torsion.

Torsion capacity of the composite section:
$J_{sub} = 2.20\ in^4$
Shear center 3.76” above bottom
T_u = Z*(3.76”- 2.4”) = 1.36Z

Reduction for bending stress of composite section:
Maximum bending stress is limited by deflection criteris-
$f_b = M/7.744in^3$ = 18,840”#/7.744 = 2,432 psi

$T_{max} = F_aJ/(2h)$ = (15ksi-2.4ksi)*(0.826+2.20)/(2*3.625) = 5,259”#
Z = 5,259”#/1.36”= 3,867#
Number of panels that can be supported based on maximum trolley load:
N = 3,867/705 = 5.5 panels
Torsional loading will not control allowable lateral load.

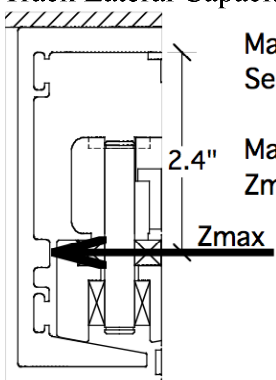
LATERAL LOAD ON CEILING TRACK

Live load = 5 psf*12’/2 = 30 plf for 3’ trib width Z_{live} = 3*30=90#

Earthquake Load $F_p = 1.6S_{DS}I_pW_p = 1.6S_{DS}*1.0*10.3psf=16.5S_{DS}psf=99S_{DS}plf$

Seismic and Wind Load applications require that the bottom of the panels be secured against lateral movement by use of either retractable pins or lateral bearing on a bottom track.

Track Lateral Capacity



Mall = Seff*Ft

$$Seff=\frac{(2.4"*2+2.5"+8*0.25")*0.25"^2}{6} = 0.097\ in^3$$

Mall= 0.097 in^3*20ksi = 1,937"#

Zmax = (1,937"#-244"#)/2.4"=705#

Allowable lateral load for the panels is 705 lbs per trolley:

S_{DS}= 705#/(3’*99plf) = 2.37

S_{MS}=3/2*2.37 = 3.56

Therefore this system can be used in all seismic zones without modification.

WIND LOADING CAPACITY OF TRACK

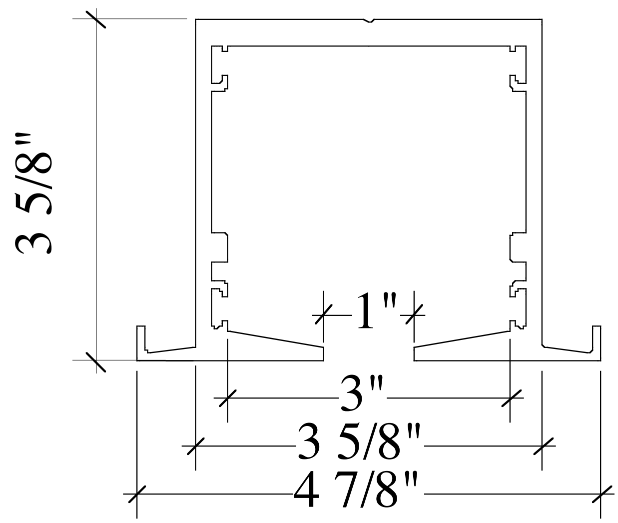
Lateral capacity for wind loading is the same as for seismic loading = 705 lbs per trolley

For 12’ panel, 6’ wide the maximum allowable wind load is:

705#/(3’x6’) = 39 psf based on track capacity Maximum wind load based on 1/2” glass strength is 26 psf which will govern allowable load.

For smaller panel sizes the wind load per square foot may be increased so that the maximum load per trolley is under 705 lbs and the glass stress remains under 9.6 ksi based on fully tempered glass.

FLANGED CEILING TRACK: Aluminum extrusion, strength and serviceability determined by calculation. Track provides vertical and lateral support to the stacking panels.



Area: 3.00 sq in
Perim: 31.21 in

I_{xx}: 5.883 in^4
I_{yy}: 6.518 in^4
r_{xx}: 1.399 in
r_{yy}: 1.473 in

C_{xx}: 1.799 in
C_{yy}: 2.426 in
S_{xx}: 3.270 in^3
S_{yy}: 2.686 in^s

Track strength – 6063-T6 Aluminum, allowable stresses from Aluminum Design Manual Table 2-24:

F_t = 15 ksi
F_c = 16.7-0.073*(L/r_x) = 16.7-0.073*(72/1.399) = 12.94 ksi
$M_{allowable}$ = S_{xx}*F_c = 3.27in^3*12.94 ksi = 42,324"#

Calculate maximum track support spacing for deflection = 0.078":

Δ = PL^3/(48EI) = 392.5*72^3/(48*5.883in^4*10.1x10^{6}psi = 0.0645" < 2mm
Pall = [Δ*(48EI)/L^3]= [0.078*(48*5.883in^4*10.1x10^{6}psi)/(72$^{3)}$] = 591 lbs
M = 591$^{\#}$*72"/4 = 10,636"#

Based on track strength and stiffness the track supports may be spaced at up to 6 feet on center.

LATERAL LOAD ON FLANGED CEILING TRACK

Live load = 5 psf*12'/2 = 30 plf for 3' trib width Z_{live} = 3*30=90#
Earthquake Load $F_p = 1.6S_{DS}I_pW_p = 1.6S_{DS}$*1.0*10.3psf=16.5$S_{DS}$psf=99$S_{DS}$plf
Seismic and Wind Load applications require that the bottom of the panels be secured against lateral movement by use of either retractable pins or lateral bearing on a bottom track.
Track Lateral Capacity

Mall = Seff*Ft
$$\text{Seff} = \frac{(2.4"*2+2"*8+8*0.25")*0.25"^2}{6} = 0.2375 \text{ in}^3$$
Mall= 0.2375 in *20ksi = 4,750"#
Zmax = (4,750"#-244"#)/2.4"=1,878#

Allowable seismic load for the panels is 1,878 lbs per trolley:

S_{DS}= 1,878#/(3'*99plf) = 6.32
S_{MS}=3/2*6.32 = 9.48

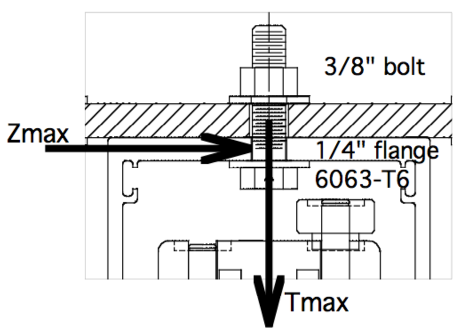
Therefore this system can be used in all seismic zones without modification.

WIND LOADING CAPACITY OF FLANGED TRACK
Lateral capacity for wind loading is the same as for seismic loading=1,878 lbs per trolley.
For 12’ panel, 6’ wide the maximum allowable wind load is:

1,878#/(3’x6’) = 104 psf based on track capacity. Maximum wind load based on glass strength is 26 psf which will govern allowable load.

For smaller panel sizes the wind load per square foot may be increased so that the maximum load per trolley is under 1,878 lbs and the glass stress remains under 5 ksi based on fully tempered glass Fr> 20 ksi and a safety factor of 4.0.

CEILING TRACK HANGER: The ceiling track will be connected to the ceiling structural framing using 3/8” diameter A307 galvanized or ASTM E593 Condition CW, 316 stainless steel bolts. The maximum load that can be carried by the bolt based on the track strength bearing on the bolt washer and head was determined by calculation as 1,135 lbs per bolt – tear over.



Pnov = C*t*Ftu(Dw-Dh)
Pnov=1.0*0.25"*30ksi(5/8"-7/16")=1.78k
BUT NOT LESS THAN:
Pnov=(0.27+1.45t/D)D*t*Fty
Pnov=(0.27+1.45*0.25"/0.675")0.675"*0.25"*25ksi
Pnov=3,405#
Tmax=Pnov/3 = 3,405# = 1,135#

Zmax=Db*F_B = 3/8*30ksi = 11.25k

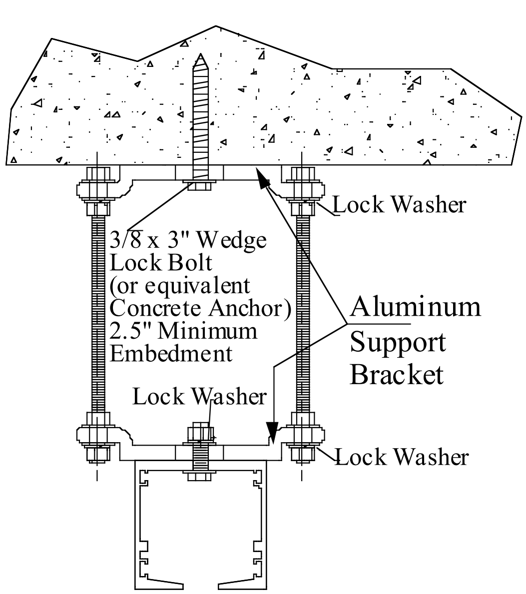
Check top flange for bending around bolt:

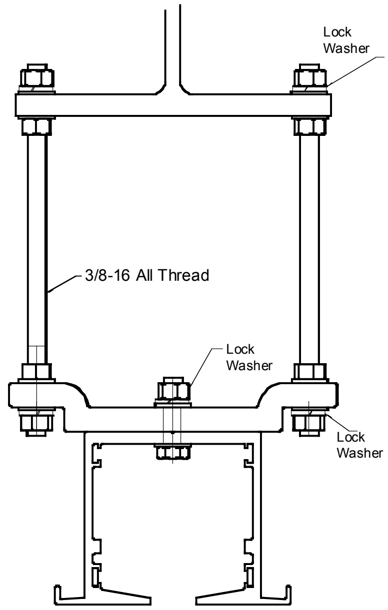
S_{eff}= (5/8”+8*0.25*2)(1/4”)^2/6 = 0.0487 in^3
F_c = 20 ksi – 6063-T6 flat element bent about own axis
M_{all} = 20ksi*0.0487 in^3 = 974”#
T_{max} = M_{all}*4/3.3” = 1,181#

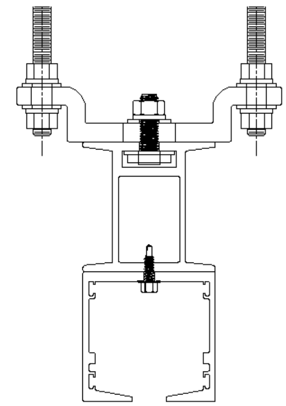
Bolts are capable of carrying the full panel weight – 6 foot on center allowable spacing.

HANGER ATTACHMENT TO THE CEILING

Connection to ceiling structure:







Typical to concrete

Typical to steel beam

ALUMINUM HANGER BRACKET

The aluminum hanger bracket is cut from an extrusion made with 6063-T6 with slotted holes punched for the bolts. The design strength of the bracket is 1,180 lbs for the bolt to the track so that the bracket will support the maximum allowable track load.

$$M = \frac{5.626"*1180\#}{4} = 1,660"\#$$

For 2-1/2" bracket width

$$S = 2.5"*t^2/6$$

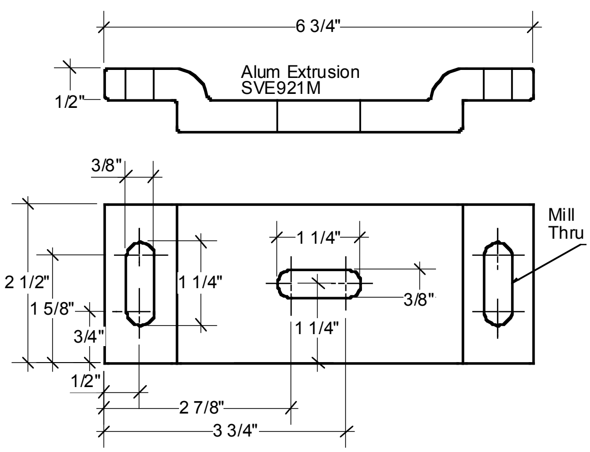
$$S_{req} = 1,660"\#/20,000 \text{ psi} = 0.083 \text{ in}$$

$$t_{min} = \sqrt{\frac{0.083*6}{2.5"}} = 0.45"$$

Block shear at bolt

$$P_{sr} = F_{su}*A_{nv}/n_u$$

$$P_{sr} = \frac{19*5/16"*0.5"*2}{3} = 1,980\#$$



HANGER SUPPORT REQUIREMENTS

Recommended hanger spacing (aluminum bracket):

Typical Installation – 4 feet on center hanger spacing (471 lb panel weight)

Maximum spacing is 6 feet on center.

Recommended 40 inch maximum rod length.

The hangers and tracks can support a maximum panel weight of 590 lbs when spaced at 4 feet on center. Higher panel weights may be supported if closer hanger spacing is used. The maximum panel weight of 1,180 lbs may be supported if hanger spacing is reduced to 2 feet on center.

When installing into concrete the minimum anchor edge distance is 2-5/8", minimum thickness is 3-1/2" and minimum concrete strength, f'c is 3,000 psi at the time the anchor is installed.

Lock washer under nut, Extra-Thick Internal-Tooth Lock Washer 3/8" Screw Size, 0.398" ID, 0.747" OD, 0.043" Minimum thickness, shall be installed against the steel bracket plate and not the aluminum track. Lock washers shall be used at all nuts.

When connecting to steel the minimum thickness of the support beam flange is :

Anchor to web distance	Minimum flange thickness
<3"	1/4"
3"-6"	3/8"
6"-12"	1/2"

Other flange thickness and distance combinations may be permissible if checked for a concentrated load of 1,135 lbs.

Ceiling support structure design shall be capable of supporting a concentrated dead load of 1,135 lbs at each anchor point. The overall ceiling structure shall be capable of supporting the additional load of 1.5 times the partition weight concurrent with all load cases that dead loads are additive. When dead loads are subtractive then no dead load for the partition should be included.

LATERAL BRACING

When the track is installed using the hangers (not directly attached to the supporting structure) lateral bracing is required to restrain side sway of the track. For non-seismic, non-wind applications the lateral bracing shall support a minimum of 5 psf lateral load. For seismic applications the lateral bracing shall be designed for a maximum load of 705 lbs per panel.

The standard lateral bracing will be installed using the standard detail with the bars installed in pairs in a V or X pattern. The typical bracing spacing is:

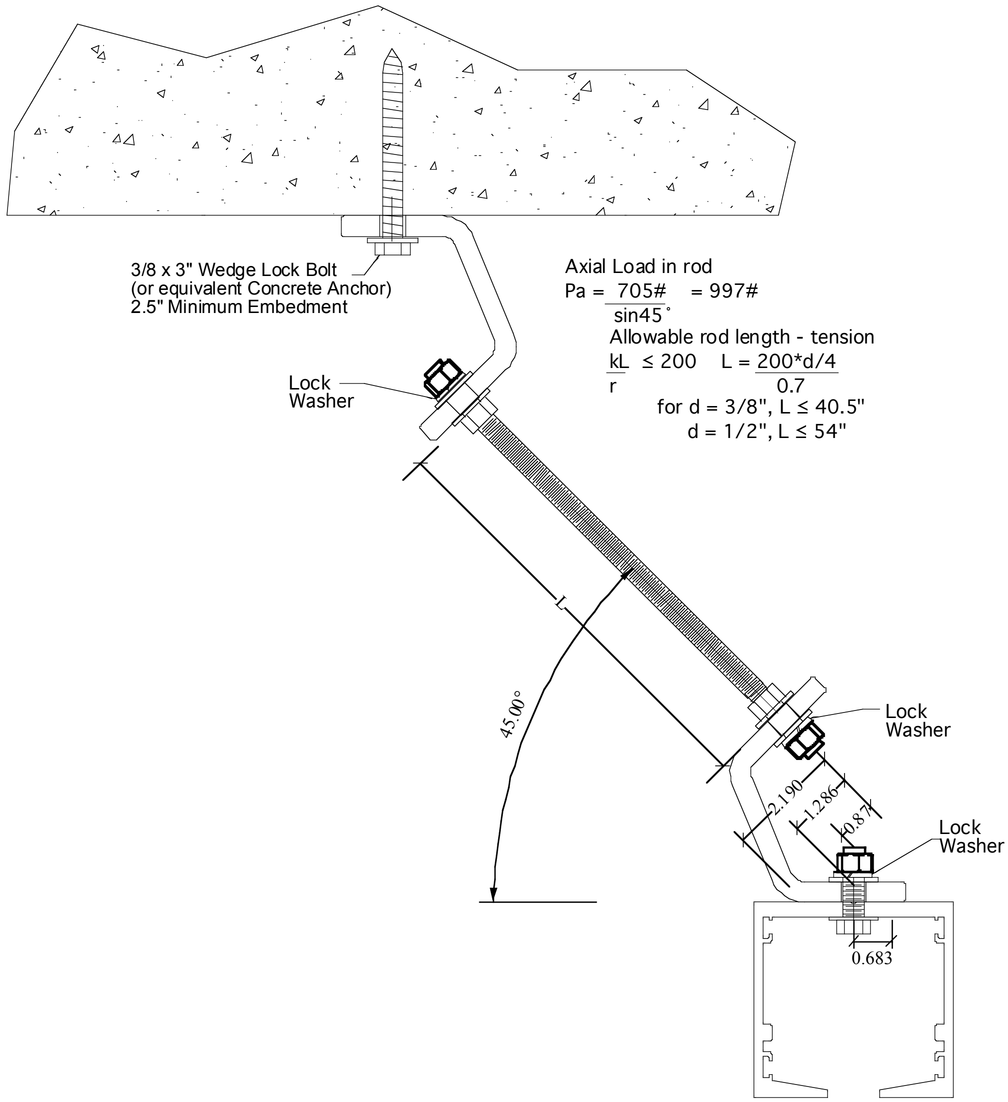
Non-seismic/non-wind applications – 12 feet on center

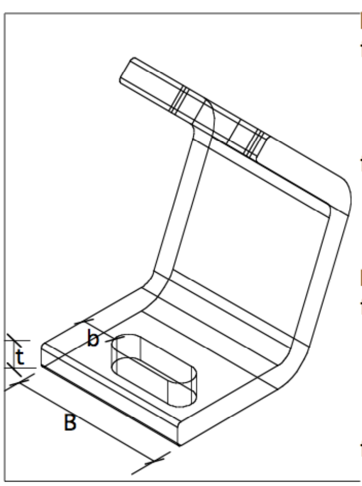
Seismic load applications – 8 feet on center

Wind load applications – 8 feet on center (may be reduced for increased loads)

Lengthwise bracing (parallel to track) – within 6 feet of end and 24 feet maximum spacing between braces.

Bracket strength:





Determine t_{min}

for B = 2.5"

$$t = \sqrt{\frac{2183\text{"\#}/20000\text{psi}*6}{2.5\text{"}}} = 0.5\text{"}$$

for B = 1-9/16"

$$t = \sqrt{\frac{2183\text{"\#}/20000\text{psi}*6}{1.5625\text{"}}} = 0.66\text{"}$$

Determine b_{min}

for t = 0.5", B = 2.5"

$$2b = \frac{1633\text{"\#}/20000*6}{0.5^2} = 1.96\text{"}$$

max hole size = 2.5"-1.96" = 0.54" long

for t = 0.66", B = 1-9/16"

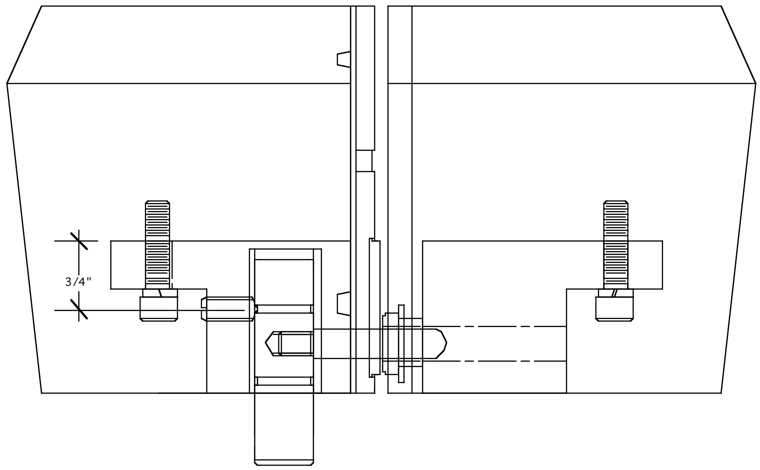
$$2b = \frac{1633\text{"\#}/20000*6}{0.66^2} = 1.125\text{"}$$

max hole size = 1-9/16"-1-1/8" = 7/16" long

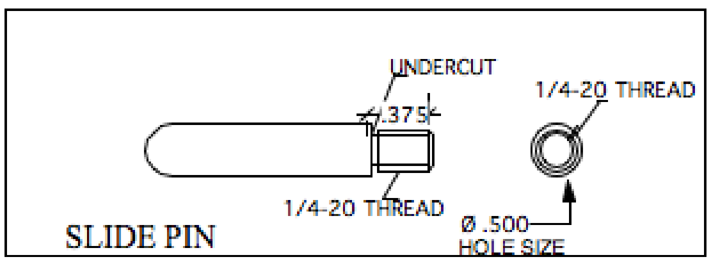
Two options for the bracket were designed based on bracket length.

The hole slot length can be increased when overall bracket length is increased by the same amount.

BOTTOM RAIL FITTINGS

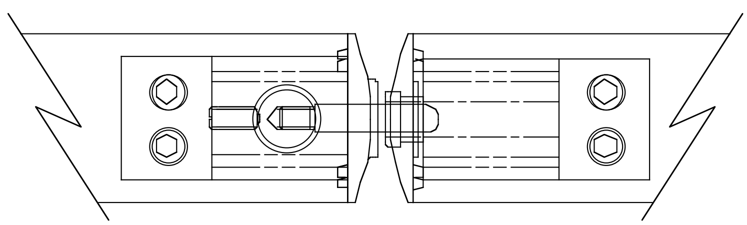


Bottom rails of panels are connected together using pins in the end cap assembly.



Pin Shear Strength
Minor root area = 0.0398 in^2

$V_{all} = 0.4 * 50\ ksi * 0.0398\ in^2 = 795\ lbs$



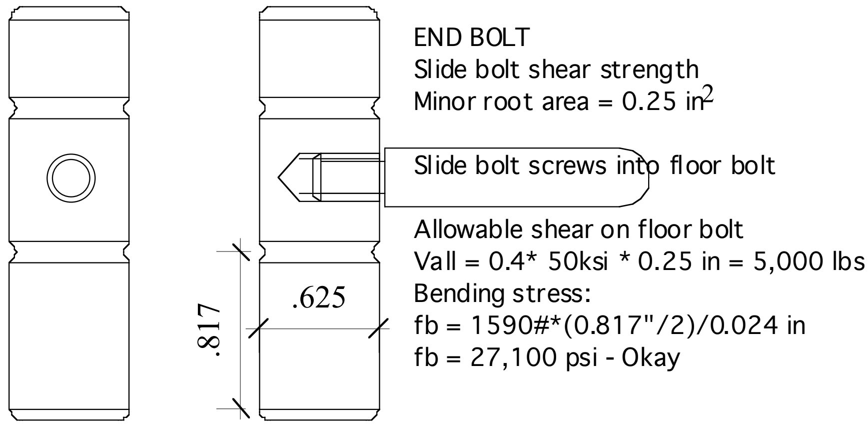
End Sliding Pin
Shear transfer between panels at bottom rail:
795# shear transfer strength

$$V = \frac{795\#}{6' * 12'/4} = 44\ psf$$

Panels are locked together by the sliding pins

End cap pins are capable of transferring all tributary lateral loads between panels to safely lock panels together at the bottom panel corners. The allowable wind load based on a maximum panel size is 44 psf based on the sliding pin strength.

The panels are secured in place at the base by the floor bolt which inserts into the floor receiver hole.



Maximum lateral load for the slide pin based on 6 ft by 12 ft panel size is 44 psf. Higher wind loads may be allowed for smaller panel sizes provided the tributary lateral load at the slide assembly is under 1,590 lbs (795# per panel). There are no special considerations for the end caps, pins or slide when used in curved wall sections.

WITHDRAWAL OF LOCKING PIN

Under lateral loading the glass lite deflection will cause the locking pin to withdraw from the bottom hole. If the pin withdraws more than 1/2 the length then there is the potential for the pin to slip out.

WP = 0.817”/2 = 0.408”

For a 120” lite height

H = 120”, A = 120”+0.4” = 120.4”

A = R∂(0.017453293) = 120.4”

R∂ = 6898”

H = 2Rsin(∂/2)

Solving for ∂ and R

∂ = 16.04˚ and R = 430.05”

Δ = R(1-cos(∂/2)) = 430.05”(1-cos(16.04˚/2) = 4.2”

Uniform load for Δ = 4.2”

$w = \Delta*384EI/5H^4$

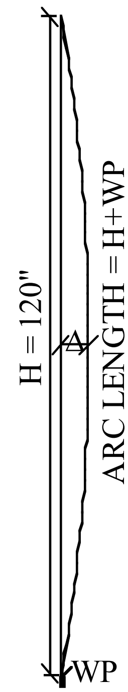
For E = 10,400 ksi, I = 0.41875 in^4/ft for 3/4” glass

$w = 4.2”*384*10{,}400ksi*0.41875\ in^4/(5*120^4)*12”/ft$

w = 81.3 psf

I = 0.125 in^4/ft for 1/2” glass and H = 108”, Δ = 4.00

$w = 4.2”*384*10{,}400ksi*0.125\ in^4/(5*108^4)*12”/ft$ = 37 psf (1/2” glass)



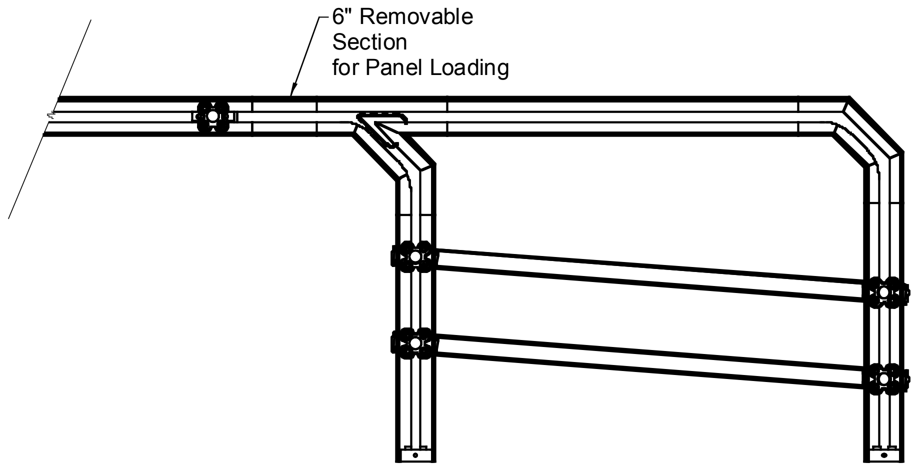
STACKING AREA HANGER SPACING

Typical panel spacing in the stacking area will be 2-13/16” when panels are fully stored. At this spacing the maximum allowable panel weight is 471 lbs unless the track is reinforced. Required hanger bolt spacing for 471 lb panel weight is

S = 1,135#/(471lb/2)*2.81” = 13.5” Use 12” on center

This hanger spacing is applicable to the aluminum brackets and for directly fastening the rail to the support structure.

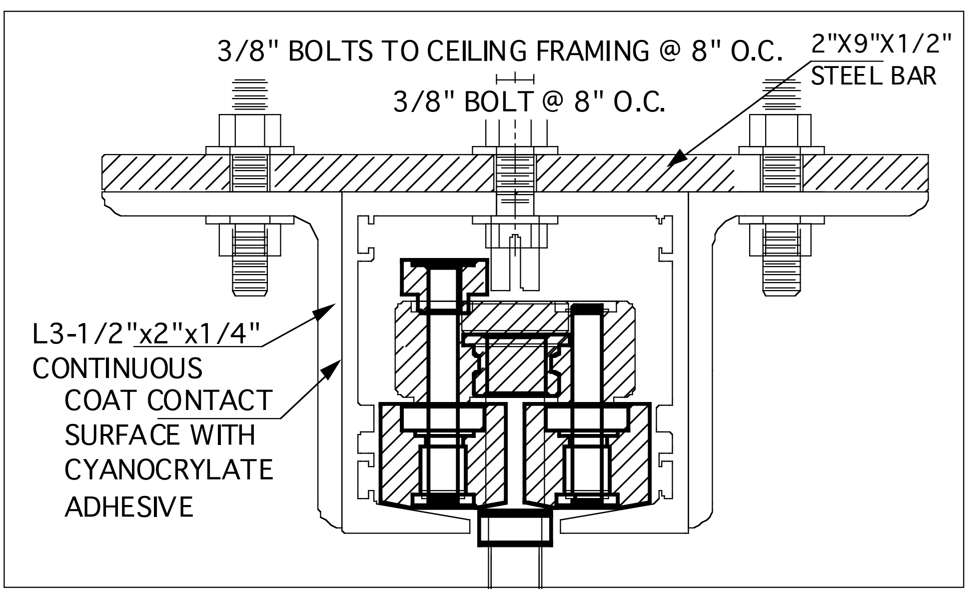
Flanged track has the same allowable panel weight in the stacking area.



REINFORCED TRACK SECTION IN STACKING AREA

For panels exceeding 471 lbs each the track must be reinforced to prevent the track from spreading when the panels are full stacked. Bolt spacing

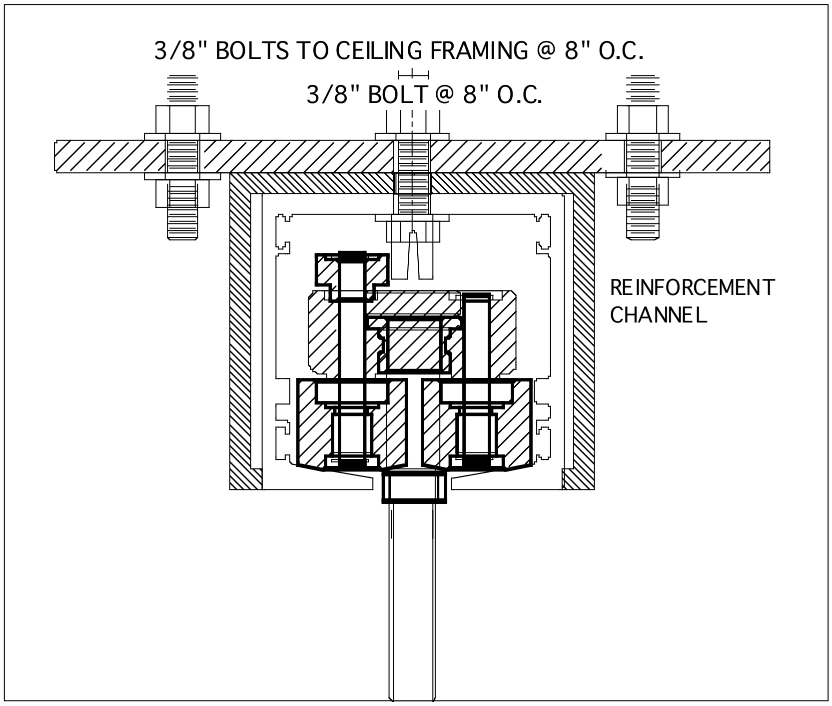
S = 1,135#/(785lb/2)*2.81” = 8.13” Use 8” on center

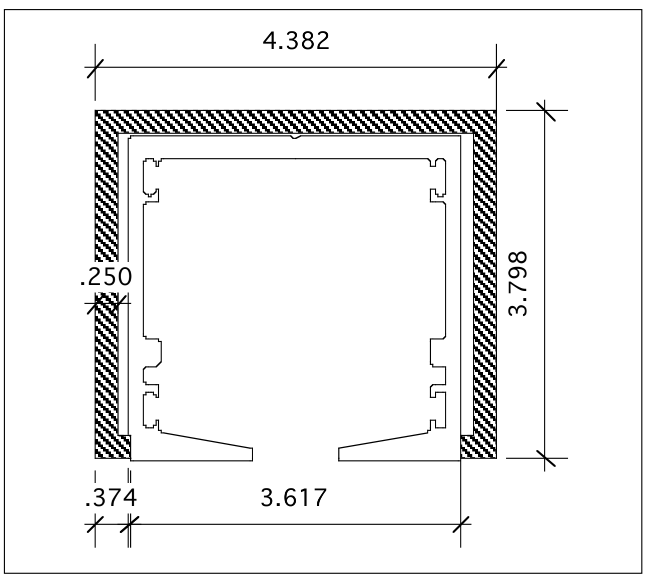


Angle thickness: Smin= (0.244”^{k}/6)/10ksi = 0.0244 in^3

Tmin=(0.0244*6/2.813)$^{1/2}$ = 0.23” use 1/4”

Reinforcement channel extrusion can be used in the panel parking area to strengthen the track section to prevent the track from spreading when the heavy panels are stacked tight together.





Strength of legs

$$S = \frac{1"*0.25^2}{6} = 0.01\ in^3/in$$

$$Z = \frac{15ksi*0.01in^3/in*2.81"}{3.25\ in} = 130\ lbs$$

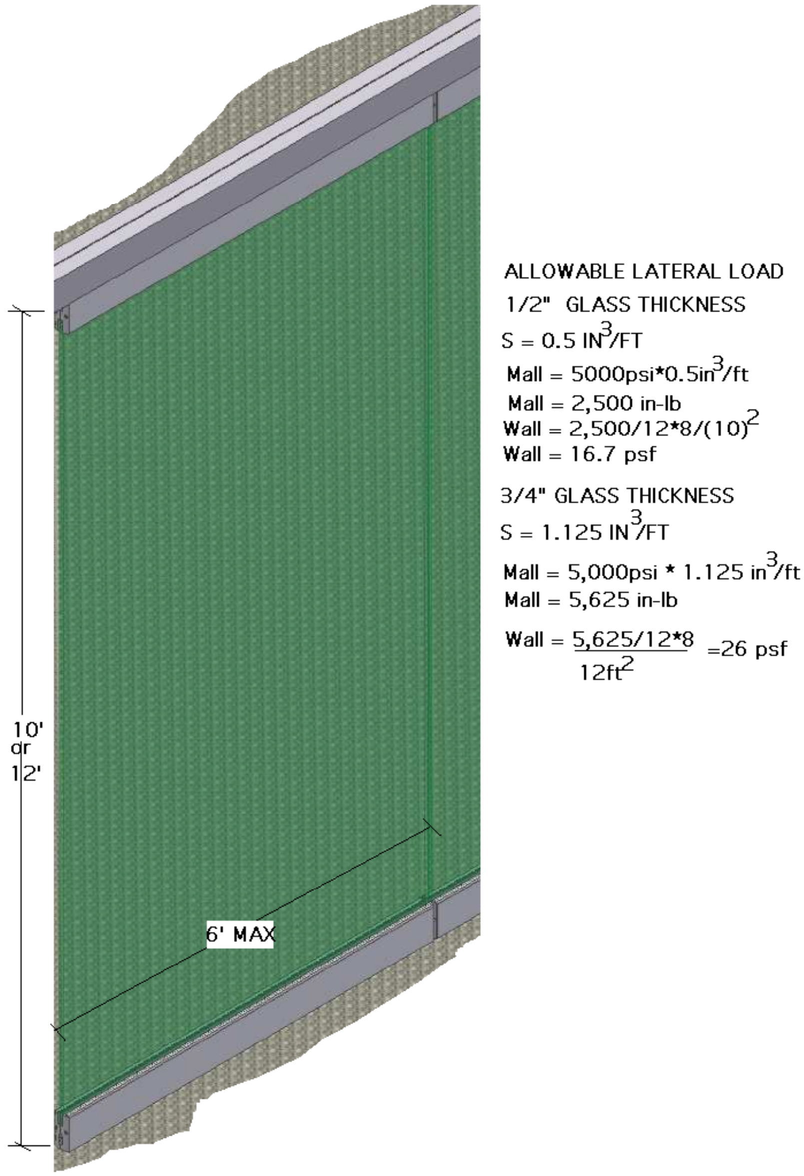
Allowable trolley vertical load

$$P = \frac{130\ lbs}{\sin(10^\circ)} = 748\ lbs$$

With the stiffener installed along the track in the stacking area the panel weight may be over 1000 lbs allowing for the maximum proposed panel size and weight stacked at the minimum spacing in the stacking area.

GLASS PANEL STRENGTH

All glass is fully tempered with a minimum $f_r > 20$ksi. Glass is designed for a factor of safety of 4.0 for live loads.



For interior applications in which the partitions are installed without the end cap pins and slide bolts:

Allowable lateral load if bottom is not restrained - 5 psf – 3/4” glass 12’ panel height:

M = 5psf*12’^{2}/2 *12”/’ = 4.320 in-lb < 5,625 in-lb OK

For 1/2” glass determine the maximum panel height – No bottom restraint:

H = [2,500 lb-in*2/(5psf*12”)]$^{1/2}$ = 9’ 1-3/4” = 9’6” total height.

USE RECOMMENDATIONS
Exterior wall applications should be limited to areas with water management in the floor, and should not exceed GANA guidelines for pivot door size/glass thickness. Larger panel sizes may be used when glass panels are properly designed and evaluated by a qualified engineer.

MAXIMUM GLASS PANEL SIZE (GANA)
(This will set max panel height.)
1/2" Glass 48x108"
3/4" Glass 48x120"
Larger panel sizes may be used when glass panels are properly designed and evaluated by a qualified engineer.

WIND LOADS
When panels are subject to wind loads the panels shall be evaluated in accordance with ASTM E1300-12a. Panels shall use bottom locking pins. Lateral loads to the rails and bottom locking pins shall not exceed the allowable loads given in this report.

LIMITATIONS
This report and design analysis is based on analytical procedures only. Standard mechanics of materials methods assuming elastic behavior were used. Suitability for specific uses shall be verified by specifier prior to installation. The design of the supporting roof/ceiling structure is the responsibility of others.

This report is limited to the components and uses as detailed herein and as manufactured by C. R. Laurence Co., Inc.

CONCLUSION
The stacking partition system as designed complies with the requirements of the 2007 and 2010 and 2013 California Building Codes, 2006, 2009 and 2012 International Building Codes, and 2001, 2005 and 2010 Aluminum Design Manuals.

MATERIAL SPECIFICATIONS:

Extruded Aluminum Components: Conforming to ASTM B 221 (ASTM B 221M), Alloy 6063, Temper T6.

Aluminum sheet: ASTM B209, 5052-H32. – Non-structural applications

Aluminum bars, and plate: Conforming to ASTM B 221 (ASTM B 221M), Alloy 6061, Temper T6.

Stainless Steel Components: Conforming to ASTM A 666-84, Type 304 or Type 316.

Brass Components: Conforming to ASTM B 455, UNS C38500, Architectural Bronze. – Non-structural use only.

Sealant: One-part silicone sealant, conforming to ASTM C 920 Type S, Grade NS, Class 50, Use NT, G and A, clear or available color as specified.

Steel plate: ASTM A36

Steel threaded rods: ASTM A307 Grade A or ASTM F1554 Grade 36 minimum

Stainless steel threaded rods: ASTM F593 CW alloy group 1 or 2

Steel Bolts: ASTM A307 dimensions per ASME B18.9

Stainless Bolts: ASTM F593 CW, Alloy group 2 stainless steel bolts, dimensions per ASME B18.9

Cap screws: ASTM A574, dimensions per ASME B18.3

Nuts: ASTM A563 Grade matched to bolt, dimensions per ASME B18.2.2

Stainless steel nuts: ASTM F594 CW Alloy Group 2

Flat Washers: ASME B18.22.1 Type B Regular.

Locking washers: ASME B18.21.1 Split lock or tooth lock.