



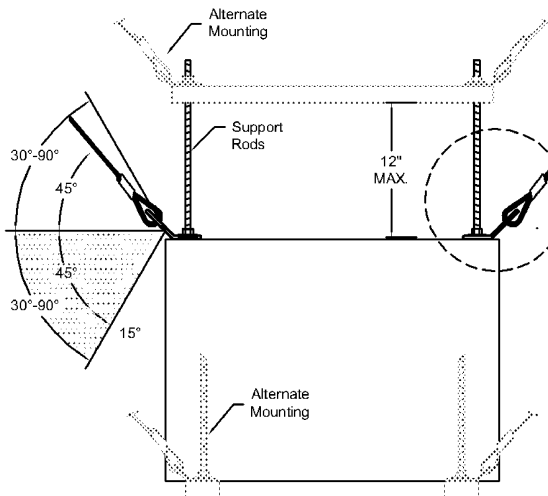
Novia Associates, Inc.
1 Northwestern Dr.
Salem, NH 03079
Ph: 603-898-8600
Fax: 603-898-2755
email: info@noviaassociates.com

PROJECT: _____

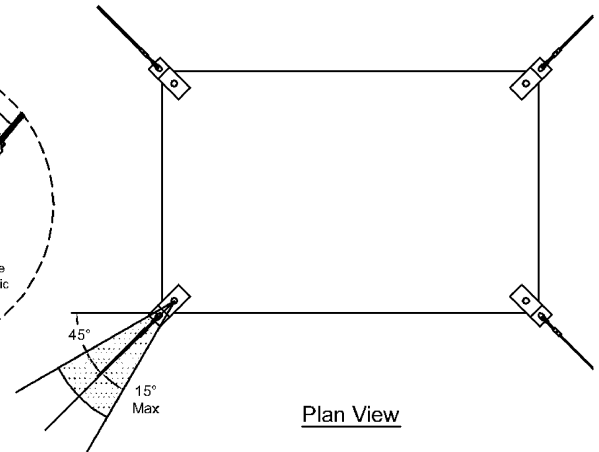
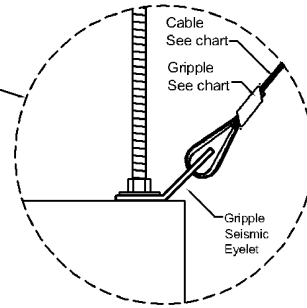
CUSTOMER: _____

Ceiling Hung Equipment Gripple Restraint

CEILING 02/09/10



Elevation



Plan View

Gripple Restraint Chart

GS-12 SET: (4) GS-12 GRIPPLES, (4) GS-12 END FITTINGS WITH 20' OF 1/8" CABLE, AND (4) GS-12 EYELETS.

GS-19 SET: (4) GS-19 GRIPPLES, (4) GS-19 END FITTINGS WITH 20' OF 3/16" CABLE, AND (4) GS-19 EYELETS.

SEISMIC RESTRAINT TYPES

Type	Cable	Concrete Anchor	Embed. (in.)	Weld Length*
GS-12	1/8"	3/8" HILTI	2 1/2"	2"
GS-19	3/16"	5/8" HILTI	4"	2"

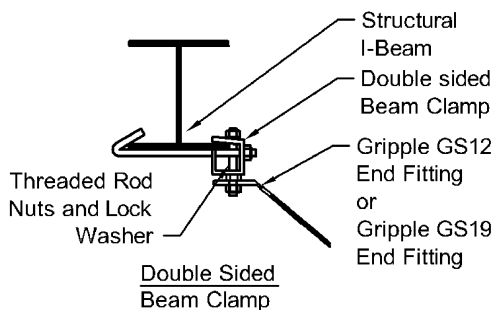
* Weld length per angle clip are given as an optional attachment method - in lieu of concrete anchors should field conditions dictate.

EQUIPMENT TAG

Restraint type

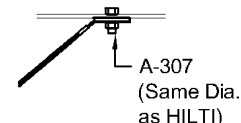
Sets

Attachment to Structure Details

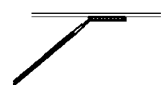


Concrete Anchor(1)

Structural Steel



Bolted to Steel



Welded to Steel

SEE GRIPPLE INSTALLATION INSTRUCTIONS

BY: _____

DATE: _____

DWG#: _____



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Salem, NH 03079
Phone 603-898-8600
Fax 603-898-2755
info@noviaassociates.com

SSD-5000G

SEISMIC ANALYSIS FOR SUSPENDED EQUIPMENT

BY: RR | CHKD: | DATE: 02/09/10

PAGE: 1 OF 3 | DWG.NO.: SSD-5000G



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Salem, NH 03079
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Fax 603-898-2755
info@noviaassociates.com

SSD-5000G

1. INPUT DATA

The design "g" force will be determined by the specifications.

2. SEISMIC RESTRAINT DATA

The seismic restraints are labeled GS-12 or GS-19

Type GS-12 consists of four 1/8" cable restraints connected to Gripple GS12 end fittings on the equipment side and Gripple GS12 eyelets on the structure side. The restraint will utilize a Gripple GS12 seismic fastener. The restraint will be connected to the structure with four 3/8" Hilti Kwik Bolts with 2-1/2" embedment, four 3/8" A-307 steel bolts, 2" of 1/8" fillet weld (1" each side of eyelet) or a double sided beam clamp utilizing a minimum 3/8" rod/bolt.

Type GS-19 consists of four 3/16" cable restraints connected to Gripple GS19 end fittings on the equipment side and Gripple GS19 eyelets on the structure side. The restraint will utilize a Gripple GS19 seismic fastener. The restraint will be connected to the structure with four 5/8" Hilti Kwik Bolts with 4" embedment, four 5/8" A-307 steel bolts, 2" of 1/8" fillet weld (1" each side of eyelet) or a double sided beam clamp utilizing a minimum 5/8" rod/bolt.

Cable break strengths are derived from Military Specification MIL-W-83420:

<u>Cable size</u>	<u>Max. Strength</u>	<u>Allowable Strength</u>
1/8" Diam.	2,000 lbs.	975 lbs.
3/16" Diam.	4,200 lbs.	2,050 lbs.

3. INSTALLATION ANGLE:

Angle of cable from vertical. Typical range 45° to 60°, expandable to 30° to 150°.



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SSD-5000G

4. DERIVED FORCES

Total Shear Force (F_h) = "g" force x Equipment Weight

Total Tensile force on cable (F_{cable}) = $F_h / (\sin \Phi)$

Shear Force @ Anchor (F_{vb}) = $F_{cable} * \sin \Phi$

Tensile Force @ Anchor (F_{tb}) = $F_{cable} * \cos \Phi$ * Prying action correction factor

Combined Shear and Tensile Forces = $(F_{vb}/F_{va})^{5/3} + (F_{tb}/F_{ta})^{5/3}$

Shear Force at Support Rod = $F_{cable} * \sin \Phi$

Tensile Force at Support Rod = $W_e / \text{Number of Support Rods}$

Actual Shear Stress Developed in Rod = F_v/A_b From AISC ASD 9th ed. p4-147

Actual Tensile Stress Developed in Rod = F_t/A_b From AISC ASD 9th ed. p.4-147

A_b = Minimum Root Area of Anchor

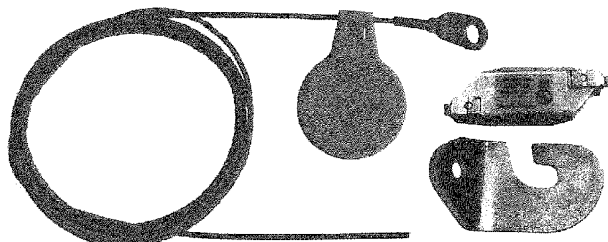
W_e = Equipment Weight

F_{va} = Anchors' allowable shear strength

F_{ta} = Anchors' allowable tensile strength

Gripple® Seismic Bracing System

Contents



UNDERSTANDING GRIPPLE SEISMIC CODES

End Fixing

E-45° eyelet (GS12 only)
S-Standard single bracket (GS19 only)
DS-Standard double bracket (GS25 only)

Cable Length

10, 15 or 20ft

Style of loose bracket

S-Standard bracket
R-Retrofit bracket
DS-Double standard bracket
DR-Double retrofit bracket
(Double brackets for GS25 only)

GS12-10E4-S4

Cable Size

GS12-1/8"
GS19-3/16"
GS25-1/4"

Hole Size in End Fixing

4-3/8"
5-1/2"
8-3/4"
10-1"

Hole Size in Loose Brackets

4-3/8"
5-1/2"
8-3/4"
10-1"

IMPORTANT USAGE INFORMATION

- GRIPPLE SEISMIC restraint bracing systems should only be used in conjunction with threaded rod at required seismic bracing points.
- NEVER EXCEED THE MAXIMUM LOAD OF THE PRODUCT.
During installation take slack out of assembly by hand pulling the tail end of the cable.
- COMPLIANCE WITH LOCAL CODES and, where applicable, NATIONAL CODES are the buyer's and / or installer's responsibility.
- INTEGRITY OF THE BUILDING STRUCTURE to which Gripple Seismic Bracing Systems are attached is the responsibility of the installer and / or specifying engineer.
- DO NOT APPLY LUBRICANT to any part of the assembly.
- DO NOT USE FOR HOISTING such as in a crane or pulley situation.
- DO NOT JOIN TWO CABLE ASSEMBLIES TOGETHER i.e. using the Gripple fasteners as a splice.

Gripple® Seismic Technical Manual should be consulted when designing or installing seismic bracing systems using Gripple Seismic kits.

Gripple Cable Size	Length	Bracket Type	Rod/Structural Attachment Size	Product Code
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GS12 Max Load: 638lbs (290kg) 2:1 SF	10ft	Standard	3/8"	GS12-10E4-S4
			1/2"	GS12-10E5-S5
		Retrofit	3/8"	GS12-10E4-R4
			1/2"	GS12-10E5-R5
	15ft	Standard	3/8"	GS12-15E4-S4
			1/2"	GS12-15E5-S5
		Retrofit	3/8"	GS12-15E4-R4
			1/2"	GS12-15E5-R5
	20ft	Standard	3/8"	GS12-20E4-S4
			1/2"	GS12-20E5-S5
		Retrofit	3/8"	GS12-20E4-R4
			1/2"	GS12-20E5-R5

GS19 Max Load: 1000lbs (450kg) 2:1 SF	10ft	Standard	3/8"	GS19-10S4-S4
			1/2"	GS19-10S5-S5
			3/4"	GS19-10S8-S8
		Retrofit	1"	GS19-10S10-S10
			3/8"	GS19-10S4-R4
			1/2"	GS19-10S5-R5
	15ft	Standard	3/4"	GS19-10S8-R8
			1"	GS19-10S10-R10
		Retrofit	3/8"	GS19-15S4-S4
			1/2"	GS19-15S5-S5
			3/4"	GS19-15S8-S8
	20ft	Standard	1"	GS19-15S10-S10
			3/8"	GS19-15S4-R4
			1/2"	GS19-15S5-R5
		Retrofit	3/4"	GS19-15S8-R8
			1"	GS19-15S10-R10
			3/8"	GS19-20S4-S4
		Standard	1/2"	GS19-20S5-S5
			3/4"	GS19-20S8-S8
			1"	GS19-20S10-S10
	20ft	Standard	3/8"	GS19-20S4-R4
			1/2"	GS19-20S5-R5
			3/4"	GS19-20S8-R8
		Retrofit	1"	GS19-20S10-R10

GS25 Max Load: 2376lbs (1080kg) 2:1 SF	10ft	Standard	3/8"	GS25-10DS4-DS4
			1/2"	GS25-10DS5-DS5
			3/4"	GS25-10DS8-DS8
		Retrofit	1"	GS25-10DS10-DS10
			3/8"	GS25-10DS4-DR4
			1/2"	GS25-10DS5-DR5
	15ft	Standard	3/4"	GS25-10DS8-DR8
			1"	GS25-10DS10-DR10
		Retrofit	3/8"	GS25-15DS4-DS4
			1/2"	GS25-15DS5-DS5
			3/4"	GS25-15DS8-DS8
	20ft	Standard	1"	GS25-15DS10-DS10
			3/8"	GS25-15DS4-DR4
			1/2"	GS25-15DS5-DR5
		Retrofit	3/4"	GS25-15DS8-DR8
			1"	GS25-15DS10-DR10
			3/8"	GS25-20DS4-DS4
		Standard	1/2"	GS25-20DS5-DS5
			3/4"	GS25-20DS8-DS8
			1"	GS25-20DS10-DS10
	20ft	Standard	3/8"	GS25-20DS4-DR4
			1/2"	GS25-20DS5-DR5
			3/4"	GS25-20DS8-DR8
		Retrofit	1"	GS25-20DS10-DR10