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FLOOR/CURB (HARD) MOUNTED SEISMIC BRACKETS

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<thead>
<tr>
<th>MODEL</th>
<th>A  (in.)</th>
<th>L  (in.)</th>
<th>T  (in.)</th>
<th>E  (in.)</th>
<th>ØD (in.)</th>
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<td>10.00</td>
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**Diagram:**

- **ATTACHMENT OPTIONS:**
  - **ATTACH EQUIPMENT TO THIS SURFACE.**
  - **ATTACH THIS SURFACE TO SUPPORT STRUCTURE.**

- **Dimensions:**
  - A/2
  - T
  - L/2
  - 3X ØD

- **Graphs:**
  - Vertical Load (x1000 LBS)
  - Horizontal Load (x1000 LBS)
KSMS SEISMIC EQUIPMENT BRACKET

MODEL | H (in.) | Lw (in.)
--- | --- | ---
KSMS-1 | 0.13 OR 0.25 | 1.00
KSMS-2 | 0.13 OR 0.25 | 2.00
KSMS-3 | 0.25 | 2.75
KSMS-4 | 0.25 | 4.00
KSMS-5 | 0.25 | 5.00
KSMS-6 | 0.25 | 6.00

VIEWS ON THIS DRAWING ARE INTENDED TO SHOW THE VARIOUS ATTACHMENT OPTIONS TO THE EQUIPMENT & STRUCTURE. THEY MAY BE USED IN OTHER COMBINATIONS THAN THOSE SHOWN.

OPTIONAL EQUIPMENT & STRUCTURE ATTACHMENT BY WELD

KSMS KNC SEISMIC EQUIP. BRACKET BY KINETICS.

ATTACHMENT HARDWARE BY KINETICS. (STRUCTURAL WASHER BY OTHERS IF REQUIRED.)

CONCRETE ANCHOR BY KINETICS

CONCRETE STRUCTURE BY OTHERS

EQUIPMENT

STRUCTURAL STEEL BY OTHERS

Lw

TYP

3 PLC.S

KNC

KMS-X
KSMS BRACKET INSTALLATION INSTRUCTIONS:

1.) LOCATE AND SET EQUIPMENT PER THE MECHANICAL DRAWINGS, OR PER THE INSTRUCTIONS OF THE DESIGN PROFESSIONAL OF RECORD.

2.) THE KSMS BRACKETS ARE THEN POSITIONED AGAINST THE LONG SIDES OF THE EQUIPMENT PER THE INSTRUCTIONS GIVEN IN DRAWINGS S-88.071-1A AND S-88.071-1B, AND THE "KINETICS SEISMIC CERTIFICATION". THE EQUIPMENT MOUNTING SURFACE OF THE KSMS BRACKET MUST BE ENTIRELY ON THE EQUIPMENT AS SHOWN IN DRAWING S-88.071-2B.

3.) THE DIMENSIONS (A) AND (B) GIVEN IN THE "KINETICS SEISMIC CERTIFICATION" ARE APPROXIMATE. HOLES IN THE BUILDING STRUCTURE SHOULD BE DRILLED ONLY AFTER THE KSMS BRACKETS HAVE BEEN POSITIONED AS DESCRIBED IN STEP 2.

4.) IF "BACKING" STEEL MUST BE ADDED TO THE EQUIPMENT TO MOUNT AND SUPPORT THE KSMS BRACKET IT MUST HAVE A THICKNESS AT LEAST AS GREAT AS THE KSMS BRACKET BEING USED TO MOUNT ATTACH THE EQUIPMENT TO THE BUILDING STRUCTURE.

5.) IF USING THE BOLTS OR ANCHORS TO ATTACH THE KSMS BRACKET TO THE BUILDING STRUCTURE, LOCATE, MARK, AND DRILL THE APPROPRIATE HHOLES IN THE STRUCTURE BEFORE PERMANENTLY ATTACHING THE BRACKET TO THE EQUIPMENT.

6.) IF USING BOLTS TO PERMANENTLY ATTACH THE KSMS BRACKET TO THE EQUIPMENT, LOCATE, MARK AND DRILL THE APPROPRIATE HOLES IN THE EQUIPMENT. THE KSMS BRACKET MOUNTING SURFACE MUST BE ENTIRELY ON THE EQUIPMENT AS SHOWN IN DRAWING S-88.071-2B.

7.) REPOSITION THE KSMS BRACKETS, AND MAKE THE PERMANENT ATTACHMENTS TO THE EQUIPMENT. THIS ATTACHMENT MAY BE EITHER BY USING THE BOLTS, NUTS, AND WASHERS PROVIDED WITH THE KSMS KITS, OR THE OPTIONAL WELDS AS SHOWN IN DRAWING S-88.071-2B.

8.) INSTALL THE CONCRETE ANCHORS OR BOLTS IN THE RESPECTIVE HOLES THAT HAVE BEEN DRILLED IN STRUCTURE.

9.) THE KSMS BRACKET MAY BE WELDED TO THE STRUCTURE USING THE WELD SIZE & LENGTH GIVEN IN DRAWING S-88.071-2B FOR THE OPTIONAL WELD ATTACHMENT TO THE EQUIPMENT.
#10-16 X 1.5 SELF DRILLING SHEET METAL SCREWS BY KINETICS
TWO (2) REQ.'D PER CLIP

#10-16 X 0.63 SELF DRILLING SHEET METAL SCREWS BY KINETICS
THREE (3) REQ.'D PER CLIP

NOTE: 1.) LOCATING DIMENSIONS ARE APPROX.
Pilot holes may be pre-drilled using a No. 22 drill.
2.) Fasteners to be located with bracket on curb.
REFERENCE DWG.S: 88.071-17, S-88.071-17B, S-88.071-17C, AND S-88.071-17D
KSMS & KSMG LOCATING GUIDE

PAGE 1 OF 2 – DRAWING: S-88.071-1A

N = NO. OF KNC SEISMIC CLIPS

A/(N/2-1)

A/3

A/2

A

B

B/2

W

W/2

L

L/2

A

L/2
KSMS & KSMG BRACKET LOCATING INSTRUCTIONS:

1.) SHOWN AT THE RIGHT IS A COPY OF THE FIGURE THAT APPEARS IN THE TOP LEFT HAND QUADRANT OF THE "KINETICS SEISMIC CERTIFICATION" FOR THE PIECE OF EQUIPMENT TO BE MOUNTED. THE POINTS 1, 2, 3, AND 4 INDICATE THE CORNER ATTACHMENT BRACKETS. THEY ARE LOCATED OFF OF THE GEOMETRIC CENTER LINES FOR THE EQUIPMENT.

2.) TYPICALLY (A) IS THE LOCATING DIMENSION ALONG THE LENGTH OF THE EQUIPMENT, AND (B) IS THE LOCATING DIMENSION ACROSS THE WIDTH OF THE EQUIPMENT.

3.) THE C.G. LOCATION FOR THE EQUIPMENT IS LOCATED OFF OF THE GEOMETRIC CENTER OF THE EQUIPMENT BY (Ex) ALONG THE LENGTH OF THE EQUIPMENT, AND (Ey) ACROSS THE WIDTH OF THE EQUIPMENT.

4.) DRAWING S-88.071-1A SHOWS THREE PLAN VIEWS OF A TYPICAL AIR HANDLING UNIT CABINET. THEY COULD ALSO REPRESENT TYPICAL PUMP BASES, FAN BASES, OR FAN HOUSINGS. IN THESE FIGURES, (L) IS THE LENGTH OF THE PIECE OF EQUIPMENT. THE DIMENSION (A) IS THE DISTANCE BETWEEN ATTACHMENT POINTS 1 & 3 AND 2 & 4. EACH OF THESE POINTS IS A DISTANCE (A/2) OFF OF THE CENTER OF THE EQUIPMENT. THE DIMENSION (B) IS THE DISTANCE BETWEEN ATTACHMENT POINTS 1 & 2 AND 3 & 4. EACH OF THESE POINTS IS A DISTANCE (B/2) OFF OF THE CENTER OF THE EQUIPMENT.

5.) IF THE "KINETICS SEISMIC CERTIFICATION" INDICATES THAT MORE THAN FOUR ATTACHMENT POINTS ARE REQUIRED FOR A PIECE OF EQUIPMENT, THERE WILL ALWAYS BE AN EVEN NUMBER OF ATTACHMENT POINTS. HALF OF THE ATTACHMENT POINTS WILL BE ON ONE LONG SIDE OF THE EQUIPMENT, AND HALF WILL BE ON THE OTHER LONG SIDE OF THE EQUIPMENT.

6.) THE ADDITIONAL ATTACHMENT POINTS WILL BE EQUALLY SPACED BETWEEN ATTACHMENT POINTS 1 & 3 AND 2 & 4.
KSMF MOUNTING KIT (MUSHROOM FANS, LOUVERS, AND ETC.)

NOTE: 1.) LOCATING DIMENSIONS ARE APPROX.
PILOT HOLES MAY BE PRE-DRILLED
USING A NO. 22 DRILL.
2.) FASTENERS TO BE LOCATED WITH
BRACKET ON CURB.
KSMF MOUNTING KIT (MUSHROOM FANS, LOUVERS, AND ETC.)

NOTE: 1.) LOCATING DIMENSIONS ARE APPROX.
MAY REQUIRE A PILOT HOLE
No. 22 DRILL X 1.25 DEEP
BY OTHERS

2 X 2 WOOD NAILER
BY OTHERS

(1.50)

(3.00)

0.56
TYP

1.13
TYP

1.50
TYP

1.50
TYP

(2.38)

0.25

(16)
GA.

TYP

1.75

(3.00)

(0.75)

PREFERRED INSTALLATION

OPTIONAL INSTALLATION

No. 10 X 2.50 "TEK" SCREW
BY KINETICS. 2 PER KIT

KSMF-1 KNC SEISMIC FAN CLIP

18 GA. GALVANIZED STEEL CURB WITH FULLY WELDED CORNERS
BY OTHERS.

1.50

18 GA. "TEK" SCREW
BY KINETICS.

NO. 10 X 0.63 "TEK" SCREW
BY KINETICS. 3 PER KIT

No. 10 X 0.63 "TEK" SCREW
BY KINETICS. 3 PER KIT

MAY REQUIRE A PILOT HOLE
No. 22 DRILL X 1.25 DEEP
BY OTHERS

0.75

0.75

1.13
TYP

2) FASTENERS TO BE LOCATED WITH BRACKET ON CURB.

PREFERED INSTALLATION

1) LOCATING DIMENSIONS ARE APPROX.
PILOT HOLES MAY BE PRE-DRILLED USING A NO. 22 DRILL.

TYP

2 PER KIT

3 PER KIT

NO. 10 X 2.50 "TEK" SCREW
BY KINETICS. 2 PER KIT

KSMF-1 KNC SEISMIC FAN CLIP

18 GA. GALVANIZED STEEL CURB WITH FULLY WELDED CORNERS
BY OTHERS.

1.50

18 GA. "TEK" SCREW
BY KINETICS.

NO. 10 X 0.63 "TEK" SCREW
BY KINETICS. 3 PER KIT

NOTE: 1.) LOCATING DIMENSIONS ARE APPROX.
MAY REQUIRE A PILOT HOLE
No. 22 DRILL X 1.25 DEEP
BY OTHERS

2 X 2 WOOD NAILER
BY OTHERS

(1.50)

(3.00)

0.56
TYP

1.13
TYP

1.50
TYP

(2.38)

0.25

(16)
GA.

TYP

1.75

(3.00)

(0.75)

PREFERRED INSTALLATION

OPTIONAL INSTALLATION

No. 10 X 2.50 "TEK" SCREW
BY KINETICS. 2 PER KIT

KSMF-1 KNC SEISMIC FAN CLIP

18 GA. GALVANIZED STEEL CURB WITH FULLY WELDED CORNERS
BY OTHERS.

1.50

18 GA. "TEK" SCREW
BY KINETICS.

NO. 10 X 0.63 "TEK" SCREW
BY KINETICS. 3 PER KIT

MAY REQUIRE A PILOT HOLE
No. 22 DRILL X 1.25 DEEP
BY OTHERS

0.75

0.75

1.13
TYP

2) FASTENERS TO BE LOCATED WITH BRACKET ON CURB.

PREFERED INSTALLATION

1) LOCATING DIMENSIONS ARE APPROX.
PILOT HOLES MAY BE PRE-DRILLED USING A NO. 22 DRILL.

TYP

2 PER KIT

3 PER KIT

NO. 10 X 2.50 "TEK" SCREW
BY KINETICS. 2 PER KIT

KSMF-1 KNC SEISMIC FAN CLIP

18 GA. GALVANIZED STEEL CURB WITH FULLY WELDED CORNERS
BY OTHERS.

1.50

18 GA. "TEK" SCREW
BY KINETICS.

NO. 10 X 0.63 "TEK" SCREW
BY KINETICS. 3 PER KIT

MAY REQUIRE A PILOT HOLE
No. 22 DRILL X 1.25 DEEP
BY OTHERS

0.75

0.75

1.13
TYP

2) FASTENERS TO BE LOCATED WITH BRACKET ON CURB.

PREFERED INSTALLATION

1) LOCATING DIMENSIONS ARE APPROX.
**KSMF-1 "MUSHROOM" FAN BRACKET INSTRUCTIONS:**

1. SHOWN AT THE RIGHT IS A COPY OF THE FIGURE THAT APPEARS IN THE TOP LEFT HAND QUADRANT OF THE "KINETICS SEISMIC CERTIFICATION" FOR THE PIECE OF EQUIPMENT TO BE MOUNTED. THE POINTS 1, 2, 3, AND 4 INDICATE THE CORNER ATTACHMENT BRACKETS. THEY ARE LOCATED OFF OF THE GEOMETRIC CENTER LINES FOR THE EQUIPMENT.

2. TYPICALLY (A) IS THE LOCATING DIMENSION ALONG THE LENGTH OF THE EQUIPMENT, AND (B) IS THE LOCATING DIMENSION ACROSS THE WIDTH OF THE EQUIPMENT. THESE DIMENSIONS, AS APPLIED, TO "MUSHROOM" FANS ARE DEFINED IN S-88.071-17B.


4. LOCATE THE KSMF-1 BRACKETS ON THE FAN CURB AS SHOWN IN S-88.071-17B, AND INSTALL (3) NO. 10 X 0.63 SELF-DRILLING TEK SCREWS PER BRACKET AS SHOWN IN S-88.071-17C. THESE TEK SCREWS ARE TO HOLD THE BRACKET IN PLACE WHILE THE FAN IS BEING SET.

5. INSTALL WEATHER STRIPPING (BY OTHERS) OVER THE TOP OF THE CURB & KSMF-1 BRACKETS.


7. SET THE FAN ON THE CURB AND ADJUST ITS POSITION SO THAT THE LOCATIONS MARKED IN STEP 5) LINE UP WITH THE KSMF-1 BRACKETS ON THE CURB.

8. INSTALL (2) NO. 10 X 2.50 SELF-DRILLING TEK SCREWS PER KSMF-1 BRACKET AS SHOWN IN S-88.071-17B AND S-88.071-C. THE SCREWS MUST PASS THROUGH THE BRACKET, CURB NAILER, AND CURB SHEET METAL TO BE EFFECTIVE.

9. APPLIED CAULKING (BY OTHERS) TO THE TOPS OF THE NO. 10 X 2.50 TEK SCREWS & FAN FLANGE TO SEAL THE CURB.
NOTES:
1.) EACH KSCM-1, KINETICS SEISMIC CURB ATTACHMENT BRACKET, KIT IS APPROX. EQUIVALENT TO ONE (1) 1/4-20 SAE GRADE 2 BOLT IN SHEAR. **HORIZONTAL RESTRAINT CAPACITY = 625 LBS.**
2.) AT LEAST ONE (1) KSCM-1 KIT IS REQUIRED FOR EACH SIDE OF THE CURB, SEE DRAWING S-88.071-18B.
3.) ATTACHMENT TO THE CURB IS BY THREE (3) No. 12-14 X 2.50 SELF DRILLING TEK SCREWS PER BRACKET.
4.) ATTACHMENT TO EQUIPMENT MAY BE BY WELD OR THREE (3) No. 12-14 X 0.75 SELF DRILLING TEK SCREWS SEE DRAWING S-88.071-18D DETAILS.
NOTES:

1.) KSCM-1 SEISMIC RESTRAINT BRACKETS (No. 1) THRU (No. 4) ARE REQUIRED FOR EACH CURB INSTALLATION.

2.) ADDITIONAL KSCM-1 RESTRAINT BRACKETS MAY BE REQUIRED AS INDICATED BY A KINETICS SEISMIC CERTIFICATION.

3.) ADDITIONAL KSCM-1 RESTRAINT BRACKETS ARE TO BE ADDED IN PAIRS (No. 5) & (No. 6); (No. 7) & (No. 8); (No. 9) & (No. 10); AND (No. 11) & (No. 12) AS SHOWN IN THE FIGURE ABOVE.
KSCM-1 SEISMIC RESTRAINT KIT INSTALLATION INSTRUCTIONS:

1.) SHOWN AT THE RIGHT IS A COPY OF THE FIGURE THAT APPEARS IN THE TOP LEFT HAND QUADRANT OF THE "KINETICS SEISMIC CERTIFICATION" FOR THE PIECE OF EQUIPMENT TO BE MOUNTED. THE POINTS 1, 2, 3, AND 4 INDICATE THE APPROX. POSITIONS OF THE FIRST KSCM-1 KITS. THEY ARE LOCATED OFF OF THE GEOMETRIC CENTER LINES FOR THE EQUIPMENT.

2.) TYPICALLY (A) IS THE LOCATING DIMENSION ALONG THE LENGTH OF THE EQUIPMENT, AND (B) IS THE LOCATING DIMENSION ACROSS THE WIDTH OF THE EQUIPMENT. THESE DIMENSIONS, AS APPLIED, TO THE KSCM-1 KITS ARE DEFINED IN S-88.071-18B. A WILL BE APPROX. EQUAL TO La, AND B WILL BE APPROX. EQUAL TO Lb AS SHOWN IN S-88.071-18B.

3.) THE C.G. LOCATION FOR THE EQUIPMENT IS LOCATED OFF OF THE GEOMETRIC CENTER OF THE EQUIPMENT BY (Ex) ALONG THE LENGTH OF THE EQUIPMENT, AND (Ey) ACROSS THE WIDTH OF THE EQUIPMENT.


5.) DEPENDING ON THE CONSTRUCTION OF THE EQUIPMENT THE KSCM-1 KITS MAY BE INSTALLED BEFORE OR AFTER THE EQUIPMENT IS SET IN PLACE, SEE S-88.071-18D FOR EXAMPLES. IN SOME CASES, ONE OF THE KSCM-1 BRACKETS MUST BE INSTALLED BEFORE THE EQUIPMENT IS SET IN PLACE. THE CONSTRUCTION OF THE EQUIPMENT MUST BE KNOWN AND STUDIED BEFORE SETTING THE TO ENSURE PROPER INSTALLATION OF THE KSCM-1 BRACKETS.

6.) ATTACHMENT OF THE KSCM-1 BRACKET TO THE CURB IS ACCOMPLISHED WITH THE THREE (3) No. 12-14 X 2.50 SELF-DRILLING TEK SCREWS. TO BE EFFECTIVE, THE THREADED PORTION OF THESE SCREWS MUST PASS THROUGH THE WOODEN NAILER, AND THE SHEET METAL OF THE CURB SIDE WALL.

CONTINUED ON S-88.071-18C SHT 2.
7.) THE EQUIPMENT ATTACHMENT IS MADE WITH THREE (3) NO. 12-14 X 0.75 SELF DRILLING TEK SCREWS.

8.) OPTIONAL ATTACHMENT IS MADE BY THREE (3) 1/8 X 1.0 WELDS. SEE S-88.071-18D FOR DETAILED EXAMPLES.

9.) SEAL ALL EQUIPMENT PENETRATIONS WITH A GOOD RTV CAULKING COMPOUND, BY OTHERS.

10.) WHEN ATTACHING TO EQUIPMENT USING SELF DRILLING TEK SCREWS, BE SURE THAT ELECTRICAL & CONTROL WIRES & CONDUITS, AND FLUIDS HOSES ARE NOT IN THE PATHS OF THE TEK SCREWS!

WARNING:
WHEN ATTACHING TO EQUIPMENT USING SELF DRILLING TEK SCREWS, BE SURE THAT ELECTRICAL & CONTROL WIRES & CONDUITS, AND FLUIDS HOSES ARE NOT IN THE PATHS OF THE TEK SCREWS!

CAUTION:
DO NOT BLOCK EQUIPMENT ACCESS & MAINTENANCE DOORS WITH KSCM-1 BRACKETS!

See S-88.071-18D for detailed examples.
KSCM-1 MOUNTING KIT (EQUIPMENT TO CURB ATTACHMENT)

NOTES:
1. PILOT HOLES MAY BE MADE WITH A No. 13 (0.185) DRILL.
2. KSCM-1 SEISMIC RESTRAINT BRACKET MAY BE TRIMMED TO FIT.
3. CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

CURB CONNECTION USING THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.

ROOF CURB BY OTHERS.

KSCM-1 SEISMIC RESTRAINT BRACKET BY KINETICS.

NOTES:
1. PILOT HOLES MAY BE MADE WITH A No. 13 (0.185) DRILL.
2. KSCM-1 SEISMIC RESTRAINT BRACKET MAY BE TRIMMED TO FIT.
3. CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.
KSCM-2 MOUNTING KIT (EQUIPMENT TO CURB ATTACHMENT)

NOTES:
1.) EACH KSCM-2, KINETICS SEISMIC CURB ATTACHMENT BRACKET, KIT IS APPROX. EQUIVALENT TO ONE (1) 1/4-20 SAE GRADE 2 BOLT IN SHEAR.

   **HORIZONTAL RESTRAINT CAPACITY = 625 LBS.**

2.) EACH KSCM-2 KIT CONTAINS TWO (2) "L" SHAPED BRACKETS OF DIFFERENT SIZE AS SHOWN ABOVE.

3.) AT LEAST ONE (1) KSCM-2 KIT IS REQUIRED FOR EACH SIDE OF THE CURB, SEE DRAWING S-88.071-19B.

4.) ATTACHMENT TO THE CURB IS BY THREE (3)
   No. 12-14 X 2.50 SELF DRILLING TEK SCREWS PER BRACKET.

5.) ATTACHMENT OF ONE BRACKET TO THE OTHER MAY BE BY WELD OR THREE (3) No. 12-14 X 0.75 SELF DRILLING TEK SCREWS.

6.) ATTACHMENT TO EQUIPMENT MAY BE BY WELD OR THREE (3) No. 12-14 X 0.75 SELF DRILLING TEK SCREWS SEE DRAWINGS S-88.071-19D & S-88.071-19E FOR DETAILS.
NOTES:
1.) KSCM-2 SEISMIC RESTRAINT BRKT. KITS (No. 1) THRU (No. 4) ARE REQUIRED FOR EACH CURB INSTALLATION.
2.) ADDITIONAL KSCM-2 RESTRAINT BRKT. KITS MAY BE REQUIRED AS INDICATED BY A KINETICS SEISMIC CERTIFICATION.
3.) ADDITIONAL KSCM-2 RESTRAINT BRKT. KITS ARE TO BE ADDED IN PAIRS (No. 5) & (No. 6); (No. 7) & (No. 8); (No. 9) & (No. 10); AND (No. 11) & (No. 12) AS SHOWN IN THE FIGURE ABOVE.
KSCM-2 SEISMIC RESTRAINT KIT INSTALLATION INSTRUCTIONS:

1.) Shown at the right is a copy of the figure that appears in the top left hand quadrant of the "Kinetics Seismic Certification" for the piece of equipment to be mounted. The points 1, 2, 3, and 4 indicate the approx. positions of the first KSCM-2 kits. They are located off of the geometric center lines for the equipment.

2.) Typically (A) is the locating dimension along the length of the equipment, and (B) is the locating dimension across the width of the equipment. These dimensions, as applied, to the KSCM-2 kits are defined in S-88.071-19B. A will be approx. equal to L_a, and B will be approx. equal to L_b as shown in S-88.071-19B.

3.) The C.G. location for the equipment is located off of the geometric center of the equipment by (Ex) along the length of the equipment, and (Ey) across the width of the equipment.

4.) Measure and mark the locations of the KSCM-2 restraint kits on the curb using S-88.071-19B as a guide. There must be at least one KSCM-2 kit for each side of the curb. When located according to S-88.071-19B, the KSCM-2 seismic bracket kits will allow the optimum load distribution in all sides of the curb.

5.) Depending on the construction of the equipment the KSCM-2 kits may be installed before or after the equipment is set in place, see S-88.071-19D & S-88.071-19E for examples. In some cases, one of the KSCM-2 brackets must be installed before the equipment is set in place. The construction of the equipment must be known and studied before setting the to ensure proper installation of the KSCM-2 brackets.

6.) Attachment of the KSCM-2 bracket to the curb is accomplished with the three (3) No. 12-14 X 2.50 self-drilling Tek screws. To be effective, the threaded portion of these screws must pass through the wooden nailer, and the sheet metal of the curb side wall! Continued on S-88.071-19C Sht 2.
KSCM-2 SEISMIC RESTRAINT KIT INSTALLATION INSTRUCTIONS CONT'D:

7.) WHEN ATTACHING THE TWO KSCM-2 BRACKETS TOGETHER, USE THREE (3) No. 12-14 X 0.75 SELF-DRILLING TEK SCREWS.

8.) THE EQUIPMENT ATTACHMENT IS MADE WITH THREE (3) 1/8 X 1.0 WELDS. SEE S-88.071-19D & S-88.071-19E FOR DETAILED EXAMPLES.

9.) SEAL ALL EQUIPMENT PENETRATIONS WITH A GOOD RTV CAULKING COMPOUND, BY OTHERS.

10.) WARNING: WHEN ATTACHING TO EQUIPMENT USING SELF-DRILLING TEK SCREWS, BE SURE THAT ELECTRICAL & CONTROL WIRES & CONDUITS, AND FLUID HOSES ARE NOT IN THE PATHS OF THE TEK SCREWS!

11.) CAUTION: DO NOT BLOCK EQUIPMENT ACCESS & MAINTENANCE DOORS WITH KSCM-2 BRACKETS!

KINNETICS™ Seismic Design Manual

MEMBER

KSCM-2 MOUNTING KIT (EQUIPMENT TO CURB ATTACHMENT)

PAGE 4 OF 6 – DRAWING: S-88.071-19C SHEET 2

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control ©2003
NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #2 BY KINETICS.

OPTIONAL EQUIPMENT CONNECTION THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.

NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #1 BY KINETICS.

CURB CONNECTION USING THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.

NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #2 BY KINETICS.

OPTIONAL EQUIPMENT CONNECTION THREE (3) No. 12-14 X 0.75 SELF DRILLING TEK SCREWS BY KINETICS.

NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #1 OR BRACKET #2 BY KINETICS.

CURB CONNECTION USING THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.

NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #2 BY KINETICS.

OPTIONAL EQUIPMENT CONNECTION THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.

NOTES:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #2 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

WEATHER SEAL BY OTHERS.

EQUIPMENT

KSCM-2 SEISMIC RESTRAINT BRACKET #1 OR BRACKET #2 BY KINETICS.

CURB CONNECTION USING THREE (3) No. 12-14 X 2.5 SELF DRILLING TEK SCREWS BY KINETICS.
Notes:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #1 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

Weather Seal By Others.

KSCM-2 Seismic Restraint Bracket #1 By Kinetics.

Optional Equipment Connection using three (3) No. 12-14 X 0.75 self-drilling Tek screws by Kinetics.

Curb Connection using three (3) No. 12-14 X 2.5 self-drilling Tek screws by Kinetics.

1/8
6 PLC.s per BRKT

Notes:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #1 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

Weather Seal By Others.

Optional Equipment Connection using three (3) No. 12-14 X 0.75 self-drilling Tek screws by Kinetics.

Curb Connection using three (3) No. 12-14 X 2.5 self-drilling Tek screws by Kinetics.

1/8
6 PLC.s per BRKT

Notes:
1.) PILOT HOLES MAY BE MADE WITH A No. 13 (Ø0.185) DRILL.
2.) KSCM-2 SEISMIC RESTRAINT BRACKET #1 MAY BE TRIMMED TO FIT.
3.) CAULKING OF EQUIPMENT PENETRATIONS TO BE BY OTHERS.

Weather Seal By Others.

Optional Equipment Connection using three (3) No. 12-14 X 0.75 self-drilling Tek screws by Kinetics.

Curb Connection using three (3) No. 12-14 X 2.5 self-drilling Tek screws by Kinetics.

1/8
6 PLC.s per BRKT
NOTES:
1.) EACH KSCV KIT, WHEN PROPERLY INSTALLED, WILL HAVE AN UPLIFT CAPACITY OF 1,000 LBS.

KSCV SEISMIC & WIND VERTICAL RESTRAINT
PAGE 1 OF 7 – DRAWING: S-88.071-20A

.building attachment by kinetics
(2) 0.25-20 UNC X 0.88 COUPLING NUT.
0.25 STANDARD STEEL WASHER.
0.25 STEEL FENDER WASHER.
0.25-20 UNC X 0.75 SELF-DRILLING TEK SCREWS.
6) 0.25-14 X 0.75 self-drilling tek screws.
KSCV equipment bracket
KSCV RESTRAINT CHANNEL
(2) 0.25-20 UNC X 12 THREADED ROD.
0.25 STANDARD STEEL WASHER.
0.25-20 UNC X 12 THREADED ROD.
OPT. 2
OPT. 1

13.15
3.00
3.00
4.50
14.00
1.41

Kinetics Noise Control © 2003
KINETICS™ Seismic Design Manual

MEMBER

Kinetics Noise Control ©2003
NOTES:
1.) A MINIMUM OF FOUR (4) KSCV VERTICAL SEISMIC & WIND RESTRAINT KITS ARE PER CURB WHEN INDICATED BY A KINETICS SEISMIC OR WIND CERTIFICATION.
2.) ADDITIONAL KSCV VERTICAL RESTRAINT KITS MAY BE REQUIRED AS INDICATED BY A KINETICS SEISMIC OR WIND CERTIFICATION.
3.) ADDITIONAL KSCV KITS MUST BE ADDED IN SETS OF FOUR (4). EACH ADDITIONAL KIT MAY BE INSTALLED IMMEDIATELY ADJACENT TO THE PREVIOUS KIT AT EACH CORNER POINT. MAINTAIN 1.00 INCH CLEARANCE BETWEEN KSCV EQUIPMENT BRACKETS.
KSCV SEISMIC & WIND VERTICAL RESTRAINT INSTRUCTIONS:

1.) SHOWN AT THE RIGHT IS A COPY OF THE FIGURE THAT APPEARS IN THE TOP LEFT HAND QUADRANT OF THE "KINETICS SEISMIC CERTIFICATION" FOR THE PIECE OF EQUIPMENT TO BE MOUNTED. THE POINTS 1, 2, 3, AND 4 INDICATE THE APPROX. POSITIONS OF THE FIRST KSCV KITS. THEY ARE LOCATED OFF OF THE GEOMETRIC CENTER LINES FOR THE EQUIPMENT.

2.) TYPICALLY (A) IS THE LOCATING DIMENSION ALONG THE LENGTH OF THE EQUIPMENT, AND (B) IS THE LOCATING DIMENSION ACROSS THE WIDTH OF THE EQUIPMENT. THESE DIMENSIONS, AS APPLIED, TO THE KSCV RESTRAINTS ARE DEFINED IN S-88.071-20B. A WILL BE APPROX. EQUAL TO La, AND B WILL BE APPROX. EQUAL TO Lb. ACTUAL VARIATIONS OF 10% TO 15% MAY BE EASILY TOLERATED.

3.) THE C.G. LOCATION FOR THE EQUIPMENT IS LOCATED OFF OF THE GEOMETRIC CENTER OF THE EQUIPMENT BY (Ex) ALONG THE LENGTH OF THE EQUIPMENT, AND (Ey) ACROSS THE WIDTH OF THE EQUIPMENT.

4.) LOCATE THE POSITIONS OF THE REQUIRED KSCV BUILDING ATTACHMENT COMPONENTS RELATIVE TO THE CURB AND EXPECTED EQUIPMENT OVER-HANGS BEFORE THE INSULATION AND ROOF SYSTEM ARE INSTALLED. POSITIONS OF KSCV'S MAY BE MODIFIED TO AVOID STRUCTURAL SUPPORT STEEL.

5.) DRILL CLEARANCE HOLES THROUGH THE ROOF STRUCTURE FOR THE 0.25-20 UNC THREADED RODS. CLEARANCE HOLES MAY BE Ø0.31 TO Ø0.50 INCHES. THE LARGER CLEARANCE HOLES WILL ALLOW MORE LATITUDE FOR ADJUSTMENT AT FINAL ASSEMBLY.

6.) ESTIMATE THE THICKNESS OF THE INSULATION, ROOFING SYSTEM, AND BOOT OR FLASHING. IF NECESSARY, TRIM THE KSCV PIPE ASSEMBLY SO THAT THE PIPE CAP CLEAR THE BOOT OR FLASHING LEAVING ENOUGH ROOM TO SEAL THE JOINT.

7.) THREAD THE COUPLING NUT NINE (9) TURNS ONTO ONE END OF THE 0.25-20 UNC X 24 THREADED ROD. USE A THREAD LOCKING ADHESIVE, BY OTHERS, TO LOCK THE COUPLING NUT TO THE THREADED ROD. CONTINUED ON S-88.071-20C SHT 2.
KSCV SEISMIC & WIND VERTICAL RESTRAINT INSTRUCTIONS CONT'D:

8.) PLACE ON THE 0.25-20 UNC X 24 THREADED ROD A STANDARD 0.25 WASHER, AND THE 0.25 FENDER WASHER. THE FENDER WASHER MUST BEAR AGAINST THE KSCV PIPE ASSEMBLY, PER S-88.071-20A.

9.) FEED THE 0.25-20 UNC X 24 THREADED ROD THROUGH THE KSCV PIPE ASSEMBLY SO THAT THE FENDER WASHER BEARS AGAINST THE PIPE CAP IN THE KSCV PIPE ASSEMBLY, SEE S-88.071-20A.


11.) FEED THE THREADED ROD THROUGH THE CLEARANCE HOLE IN THE ROOF STRUCTURE UNTIL THE KSCV PIPE ASSEMBLY SITS FLUSH ON THE ROOF STRUCTURE. CORRUGATED ROOF STRUCTURES MAY NEED TO BE BRIDGED AS SHOWN IN S-88.071-20D.

12.) FEED THE KSCV RESTRAINT CHANNEL ONTO THE THREADED ROD, AND SECURE USING A 0.25 WASHER AND TWO 0.25-20 UNC NUTS AS SHOWN IN S-88.071-20D. THE KSCV ROOF BRACKET MAY BRIDGE ANY CORRUGATIONS IN THE ROOF STRUCTURE, OR IT MAY SIT IN A TROUGH, OR ON A CREST OF ANY CORRUGATIONS IN THE ROOF STRUCTURE.

13.) SEAL THE JOINT BETWEEN THE KSCV PIPE ASSEMBLY AND THE ROOF STRUCTURE WITH A GOOD RTV CAULKING MATERIAL, BY OTHERS. ALSO SEAL ANY PENETRATIONS IN THE ROOF STRUCTURE THAT WERE MADE BY FASTENERS USED TO ATTACH SHEET METAL BRIDGING MATERIAL WITH THE SAME RTV CAULKING MATERIAL, BY OTHERS.

14.) AFTER THE EQUIPMENT HAS BEEN PLACED, THREAD THE 0.25-20 UNC X 12 THREAD ROD INTO THE TOP OF THE COUPLING NUT UNTIL IT BOTTOMS OUT. THE THREADED ROD MAY NOW BE USED TO HELP LOCATE THE KSCV EQUIPMENT BRACKET TO THE EQUIPMENT.

15.) LOCATE AND ATTACH THE KSCV EQUIPMENT BRACKET TO THE SIDE OF THE EQUIPMENT IN A MANNER SIMILAR TO THE EXAMPLES SHOWN IN S-88.071-20E. DO NOT BLOCK EQUIPMENT ACCESS AND MAINTENANCE DOORS WITH THE KSCV EQUIPMENT BRACKET.

CONTINUED ON S-88.071-20C SHT3.
KSCV SEISMIC & WIND VERTICAL RESTRAINT INSTRUCTIONS CONT'D:

16.) WITH THE 0.25-20 UNC X 12 THREADED ROD IN THE APPROPRIATE HOLE IN THE KSCV EQUIPMENT BRACKET INSTALL THE STANDARD 0.25 WASHER AND TWO (2) 0.25-20 UNC NUTS AS SHOWN IN S-88.071-20E. SLIGHT MISALIGNMENTS MAY BE ACCOMMODATED BY BENDING THE TWO THREADED RODS UNTIL CONTACT IS MADE WITH THE HOLE IN THE TOP OF THE KSCV PIPE ASSEMBLY.

17.) SEAL ANY PENETRATIONS IN THE EQUIPMENT MADE DURING THE ATTACHMENT OF THE KSCV EQUIPMENT BRACKET WITH CAULKING COMPOUND.

18.) RE-SEAL THE JOINT BETWEEN THE THREADED ROD AND THE TOP OF THE KSCV PIPE ASSEMBLY WITH RTV CAULKING COMPOUND.

19.) IF NECESSARY, RE-SEAL THE JOINT BETWEEN THE KSCV PIPE ASSEMBLY AND THE BOOT OR FLASHING.
DO NOT BLOCK ACCESS & MAINT. DOORS WITH KSCV EQUIP. BRACKET!

TRIM PVC PIPE ASSEM. TO FIT APPLICATION.

TRIM 0.25-20 UNC X 12 THREADED ROD TO FIT APPLICATION.

WHEN ATTACHING KSCV BRACKET TO EQUIPMENT CABINET, USE ONLY THE SHEET METAL SCREWS PROVIDED BY KINETICS.

ATTACHING THE KSCV BRACKET TO THE EQUIPMENT CABINET BY WELDING IS NOT RECOMMENDED.

DO NOT BLOCK ACCESS & MAINT. DOORS WITH KSCV EQUIP. BRACKET!

TRIM PVC PIPE ASSEM. TO FIT APPLICATION.

TRIM 0.25-20 UNC X 24 THREADED ROD TO FIT APPLICATION.

TRIM 0.25-20 UNC X 12 THREADED ROD TO FIT APPLICATION.
### KSVR Seismic Curb Wall Reinforcement

**Document:** KINETICS™ Seismic Design Manual

**Page:** 1 of 3 – Drawing: S-88.071-21A

**Release Date:** 5/13/04

**Applicable Curb Height Range Inclusive (H) (in.):**
- 0.00 to 8.00
- 8.06 to 16.00
- 16.06 to 24.00
- 24.06 to 36.00

**Number of Vertical Reinforcements Per Kit:**
- 0.00 to 8.00: 4
- 8.06 to 16.00: 3
- 16.06 to 24.00: 2
- 24.06 to 36.00: 1

**Number of No. 10-16 x 2 self-drilling tek screws per reinforcement:**
- 0.00 to 8.00: 4
- 8.06 to 16.00: 3
- 16.06 to 24.00: 2
- 24.06 to 36.00: 1

**Notes:**
1. Each KSVR kit contains one (1) treated wood 2" x 2" x 48" long and eight (8) No. 10-16 x 2 self-drilling tek screws.
2. For the required number of vertical reinforcements for each curb wall and each curb, see the Kinetics Seismic & Wind Certification for the curb in question.

---

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KSVR SEISMIC CURB WALL REINFORCEMENT
PAGE 2 OF 3 – DRAWING: S-88.071-21B

**VIEW A**
- CURB HEIGHT
- CURB & WOODEN NAILER
- S = MAX. SPACING
- ACTUAL SIZE

**VIEW B**
- 2x2 TREATED WOOD REINFORCEMENT
- BY KINETICS.
- No. 10-16 X 2
- SELF-DRILLING
- TEK SCREWS
- BY KINETICS.

**VIEW C**
- 1.50 TYP
- 1.50 TYP
- 0.75 TYP
- 1.50 TYP

**KINETICS™ Seismic Design Manual**

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**International:** 614-889-0480
**Fax:** 614-889-0540
**World Wide Web:** www.kineticsnoise.com
**Email:** sales@kineticsnoise.com

Kinetics Noise Control ©2003
KSVR CURB WALL VERTICAL REINFORCEMENT KIT INSTRUCTIONS:

1.) MARK THE LOCATIONS FOR THE VERTICAL REINFORCEMENTS ON THE CURB WALLS ACCORDING TO THE KINETICS SEISMIC & WIND CERTIFICATION AND S-88.071-21B. THE MINIMUM NUMBER OF VERTICAL REINFORCEMENTS PER SIDE IS THREE (3). ONE (1) LOCATED ON EACH END OF THE CURB WALL AND ONE (1) AT APPROXIMATELY THE CENTER OF THE CURB WALL. IF MORE THAN THREE (3) VERTICAL REINFORCEMENTS ARE REQUIRED PER SIDE, ONE (1) REINFORCEMENT GOES AT EACH END OF THE CURB WALL AND THE REST ARE MORE-OR-LESS EQUALLY DISTRIBUTED ALONG THE CURB WALL AT A SPACING EQUAL TO (S) FROM THE KINETICS SEISMIC & WIND CERTIFICATION. THE SPACING BETWEEN ADJACENT VERTICAL REINFORCEMENTS MAY BE VARIED SLIGHTLY TO MISS THE CURB ATTACHMENTS TO THE ROOF.


3.) ATTACH THE VERTICAL REINFORCEMENT TO THE CURB WALL USING THE No.10-16 X 2 SELF-DRILLING TEK SCREWS PROVIDED IN THE KSCR KIT. THE NUMBER OF SCREWS REQUIRED FOR EACH REINFORCEMENT IS DEFINED BY S-88.071-21A. WHEN ONLY ONE (1) SCREW IS REQUIRED PER VERTICAL REINFORCEMENT, IT SHOULD BE PLACED IN THE CENTER OF THE REINFORCEMENT AS SHOWN ON S-88.071-21A. WHEN TWO (2) OR MORE SCREWS ARE REQUIRED FOR EACH VERTICAL REINFORCEMENT, AS SHOWN ON S-88.071-21A, THE TOP MOST AND BOTTOM MOST SHOULD BE 1.50 INCHES FROM THE ENDS OF THE VERTICAL REINFORCEMENT. WHEN MORE THAN TWO (2) SCREWS ARE REQUIRED PER VERTICAL REINFORCEMENT, THEY SHOULD BE EVENLY DISTRIBUTED BETWEEN THE TOP MOST, AND BOTTOM MOST SCREWS. THE HEADS OF THESE SCREWS MAY BE DRIVEN INTO THE VERTICAL REINFORCEMENT SLIGHTLY TO MAKE AN EASIER SURFACE TO FLASH OVER. **DO NOT DRIVE THE SCREW HEAD IN FAR ENOUGH TO SPLIT THE VERTICAL REINFORCEMENT!**
# CHAPTER P2
## FMS ISOLATOR / RESTRAINTS
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Kinetics Model FMS
This isolator was developed to handle a variety of seismic zones. The seismic element is placed on the bottom, close to the mounting surface, to minimize the tensile loading generated in the attachment hardware. The isolation element is mounted above the restraint and its size and shape can be varied independently of the restraint’s size and shape.

Specification
All Direction High Capacity Modular Seismic Isolator

1. Spring Isolators shall be comprised of two interfacing but independent elements, a coil spring element and a seismically rated housing. The spring coil element shall be comprised of one or more coil assemblies having all of the characteristics of free standing coil spring isolators as specified in the vibration isolation portion of the specification. The seismically rated housing shall be sized to match the force requirements applicable to the project and have the capability of accepting coils of various sizes, shapes, capacities and deflections as needed to meet the desired isolation criteria.

2. All spring forces will be contained within the coil/housing assembly and under no external load condition shall spring forces be carried through the restraint anchorage system.

3. The restraint element shall incorporate a steel housing and elastomeric elements at all dynamic contact points. The restraint will allow ¼” motion in any lateral or vertical direction from the neutral position. All elastomeric elements shall be replaceable.

4. To ensure the optimum anchorage capacity, the restraint will have an overturning factor (The ratio of the effective lateral snubber height to the short axis anchor spacing) of .33 or less.

5. The leveling nut or screw shall be made accessible for adjustment with the use of a pneumatic or electric impact wrench.

6. The spring element shall be replaceable without having to lift or otherwise remove any supported equipment.

7. Where required, a soft lateral cushioning element shall be fitted that can absorb the minor lateral forces generated by hydraulic or wind loads without contact being made at the main snubbing element.

The isolator shall be Model FMS as manufactured by Kinetics Noise Control or by other manufacturers who can meet the requirements above.
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).
INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:

1.) TO GENERATE THE SEISMIC RESTRAINT CAPACITY ENVELOPE, THE HIGHEST ISOLATOR LOAD FOR THE PIECE OF EQUIPMENT UNDER REVIEW IS USED AS A STARTING POINT.

2.) DETERMINE WHETHER THE ATTACHMENT IS TO BE TO STEEL, SELECT FIGURE 2, OR CONCRETE, SELECT FIGURE 3.

3.) THE VERTICAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #1 (FIG. 2) OR CURVE #4 (FIG. 3) AND PLOTTED ON THE VERTICAL AXIS OF FIGURE 1.

4.) THE HORIZONTAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #3 (FIG. 2) OR CURVE #6 (FIG. 3) AND PLOTTED ON THE HORIZONTAL AXIS OF FIGURE 1.

5.) THE COMBINED RESTRAINT CAPACITY IS THE POINT WHERE VERTICAL & HORIZONTAL CAPACITIES ARE EQUAL. THE COMBINED RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #2 (FIG. 2) OR CURVE #5 (FIG. 3). DRAW A HORIZONTAL LINE FROM THIS VALUE ON THE VERTICAL AXIS, AND A VERTICAL LINE FROM THIS VALUE ON THE HORIZONTAL AXIS. THE INTERSECTION POINT IS THE COMBINED CAPACITY POINT FOR THE GIVEN APPLICATION.

6.) CONNECT THE VERTICAL RESTRAINT CAPACITY, COMBINED RESTRAINT CAPACITY, AND THE HORIZONTAL RESTRAINT CAPACITY POINTS THAT YOU PLOTTED FOR YOUR APPLICATION. THIS WILL PRODUCE THE RESTRAINT CAPACITY ENVELOPE FOR YOUR APPLICATION.

7.) FOR THE RESTRAINT TO BE SUITABLE FOR THE APPLICATION, ALL WORST CASE SEISMIC LOAD COMBINATIONS MUST FALL WITHIN THE RESTRAINT ENVELOPE.
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).

FMSA SUBMITTAL DATA
PAGE 1 OF 2 – DRAWING: S-01-40.800 (2-D DATA)
INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:

1.) TO GENERATE THE SEISMIC RESTRAINT CAPACITY ENVELOPE, THE HIGHEST ISOLATOR LOAD FOR THE PIECE OF EQUIPMENT UNDER REVIEW IS USED AS A STARTING POINT.

2.) DETERMINE WHETHER THE ATTACHMENT IS TO BE STEEL, SELECT FIGURE 2, OR CONCRETE, SELECT FIGURE 3.

3.) THE VERTICAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #1 (FIG. 2) OR CURVE #4 (FIG. 3) AND PLOTTED ON THE VERTICAL AXIS OF FIGURE 1.

4.) THE HORIZONTAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #3 (FIG. 2) OR CURVE #6 (FIG. 3) AND PLOTTED ON THE HORIZONTAL AXIS OF FIGURE 1.

5.) THE COMBINED RESTRAINT CAPACITY IS THE POINT WHERE VERTICAL & HORIZONTAL CAPACITIES ARE EQUAL. THE COMBINED RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #2 (FIG. 2) OR CURVE #5 (FIG. 3). DRAW A HORIZONTAL LINE FROM THIS VALUE ON THE VERTICAL AXIS, AND A VERTICAL LINE FROM THIS VALUE ON THE HORIZONTAL AXIS. THE INTERSECTION POINT IS THE COMBINED CAPACITY POINT FOR THE GIVEN APPLICATION.

6.) CONNECT THE VERTICAL RESTRAINT CAPACITY, COMBINED RESTRAINT CAPACITY, AND THE HORIZONTAL RESTRAINT CAPACITY POINTS THAT YOU PLOTTED FOR YOUR APPLICATION. THIS WILL PRODUCE THE RESTRAINT CAPACITY ENVELOPE FOR YOUR APPLICATION.

7.) FOR THE RESTRAINT TO BE SUITABLE FOR THE APPLICATION, ALL WORST CASE SEISMIC LOAD COMBINATIONS MUST FALL WITHIN THE RESTRAINT ENVELOPE.
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).
INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:

1.) TO GENERATE THE SEISMIC RESTRAINT CAPACITY ENVELOPE, THE HIGHEST ISOLATOR LOAD FOR THE PIECE OF EQUIPMENT UNDER REVIEW IS USED AS A STARTING POINT.

2.) DETERMINE WHETHER THE ATTACHMENT IS TO BE TO STEEL, SELECT FIGURE 2, OR CONCRETE, SELECT FIGURE 3.

3.) THE VERTICAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #1 (FIG. 2) OR CURVE #4 (FIG. 3) AND PLOTTED ON THE VERTICAL AXIS OF FIGURE 1.

4.) THE HORIZONTAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #3 (FIG. 2) OR CURVE #6 (FIG. 3) AND PLOTTED ON THE HORIZONTAL AXIS OF FIGURE 1.

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6.) CONNECT THE VERTICAL RESTRAINT CAPACITY, COMBINED RESTRAINT CAPACITY, AND THE HORIZONTAL RESTRAINT CAPACITY POINTS THAT YOU PLOTTED FOR YOUR APPLICATION. THIS WILL PRODUCE THE RESTRAINT CAPACITY ENVELOPE FOR YOUR APPLICATION.

7.) FOR THE RESTRAINT TO BE SUITABLE FOR THE APPLICATION, ALL WORST CASE SEISMIC LOAD COMBINATIONS MUST FALL WITHIN THE RESTRAINT ENVELOPE.
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).

10.87
5.44
4.50
0.75
0.75

8.00
6.00
3.00
4X Ø0.56

6.00
4.75
3.00
6X Ø0.69

9.50
4.75
3.00

OPERATING CLEARANCE
1.12
INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:

1. TO GENERATE THE SEISMIC RESTRAINT CAPACITY ENVELOPE, THE HIGHEST ISOLATOR LOAD FOR THE PIECE OF EQUIPMENT UNDER REVIEW IS USED AS A STARTING POINT.

2. DETERMINE WHETHER THE ATTACHMENT IS TO BE TO STEEL, SELECT FIGURE 2, OR CONCRETE, SELECT FIGURE 3.

3. THE VERTICAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #1 (FIG. 2) OR CURVE #3 (FIG. 3) AND PLOTTED ON THE VERTICAL AXIS OF FIGURE 1.

4. THE HORIZONTAL RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #3 (FIG. 2) OR CURVE #6 (FIG. 3) AND PLOTTED ON THE HORIZONTAL AXIS OF FIGURE 1.

5. THE COMBINED RESTRAINT CAPACITY IS THE POINT WHERE VERTICAL & HORIZONTAL CAPACITIES ARE EQUAL. THE COMBINED RESTRAINT CAPACITY @ THE LOAD DETERMINED IN STEP 1 IS READ FROM CURVE #2 (FIG. 2) OR CURVE #5 (FIG. 3). DRAW A HORIZONTAL LINE FROM THIS VALUE ON THE VERTICAL AXIS, AND A VERTICAL LINE FROM THIS VALUE ON THE HORIZONTAL AXIS. THE INTERSECTION POINT IS THE COMBINED CAPACITY POINT FOR THE GIVEN APPLICATION.

6. CONNECT THE VERTICAL RESTRAINT CAPACITY, COMBINED RESTRAINT CAPACITY, AND THE HORIZONTAL RESTRAINT CAPACITY POINTS THAT YOU PLOTTED FOR YOUR APPLICATION. THIS WILL PRODUCE THE RESTRAINT CAPACITY ENVELOPE FOR YOUR APPLICATION.

7. FOR THE RESTRAINT TO BE SUITABLE FOR THE APPLICATION, ALL WORST CASE SEISMIC LOAD COMBINATIONS MUST FALL WITHIN THE RESTRAINT ENVELOPE.
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).

TYP 5X Ø0.81

OPERATING CLEARANCE 1.25

FMSD SUBMITTAL DATA
PAGE 1 OF 2 – DRAWING: S-01-40.400 (2-D DATA)

RELEASE DATE: 4/26/04
INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:
1.) TO GENERATE THE SEISMIC RESTRAINT CAPACITY ENVELOPE, THE HIGHEST ISOLATOR LOAD FOR THE PIECE OF EQUIPMENT UNDER REVIEW IS USED AS A STARTING POINT.
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7.) FOR THE RESTRAINT TO BE SUITABLE FOR THE APPLICATION, ALL WORST CASE SEISMIC LOADCOMBINATIONS MUST FALL WITHIN THE RESTRAINT ENVELOPE.

[Graphs showing load vs. capacity for steel and concrete attachments]
SPECIFICATIONS:
1.) 3-AXIS RESTRAINT WITH REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
2.) HOT DIPPED GALVANIZED.
3.) HOUSINGS MAY BE USED FOR BLOCKING DURING EQUIPMENT ERECTION.
4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).
### FMSE Submittal Data

**Page 2 of 2 – Drawing: S-01-40.500 (2-D Data)**

**Instructions for Construction of a Capacity Envelope:**

1. To generate the seismic restraint capacity envelope, the highest isolator load for the piece of equipment should be used as a starting point.
2. Determine whether the attachment is to be to steel, select Figure 2, or concrete, select Figure 3.
3. The vertical restraint capacity @ the load determined in step 1 is read from Curve #1 (Fig. 2) or Curve #4 (Fig. 3) and plotted on the vertical axis of Figure 1.
4. The horizontal restraint capacity @ the load determined in step 1 is read from Curve #3 (Fig. 2) or Curve #6 (Fig. 3) and plotted on the horizontal axis of Figure 1.
5. The combined restraint capacity @ the load determined in step 1 is read from Curve #2 (Fig. 2) or Curve #5 (Fig. 3). Draw a horizontal line from this value on the vertical axis, and a vertical line from this value on the horizontal axis. The intersection point is the combined capacity point for the given application.
6. Connect the vertical restraint capacity, combined restraint capacity, and the horizontal restraint capacity points that you plotted for your application. This will produce the restraint capacity envelope.
7. For the restraint to be suitable for the application, all worst case seismic load combinations must fall within the restraint envelope.

#### Vertical Force (LBS X 1000)

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#### Restraint Capacity Envelope

**Concrete Attachment**
- **Isolator Load (LBS X 1000):**
  - Figure 2
- **Vertical Force (LBS X 1000):**
  - Figure 3

**Steel Attachment**
- **Isolator Load (LBS X 1000):**
  - Figure 4
- **Vertical Force (LBS X 1000):**
  - Figure 5

### Kinetics Noise Control

- **Toll Free (USA only):** 800-959-1229
- **International:** 614-889-0480
- **Fax:** 614-889-0540
- **World Wide Web:** www.kineticsnoise.com
- **Email:** sales@kineticsnoise.com

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SPECIFICATIONS:
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4.) CAN BE USED WITH OR WITHOUT SPRING COIL(S).

9.00

18.00

9.00

12.00

12.00

16.00

4X Ø1.06

1.50

15.00

8X Ø1.06

7.50

9.50

5.00

1.75 OPERATING CLEARANCE

FMSF SUBMITTAL DATA
PAGE 1 OF 2 – DRAWING: S-01-40.600 (2-D DATA)

MEMBER

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INSTRUCTIONS FOR CONSTRUCTION OF A CAPACITY ENVELOPE:

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4. CAN BE USED WITH OR WITHOUT SPRING COIL(S).

 Ø1.38 TO Ø1.06 BUSHING FOR POST INSTALLED CONCRETE ANCHORS

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FMSG SUBMITTAL DATA
PAGE 1 OF 2 – DRAWING: S-01-40.700 (2-D DATA)

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# 1 Deflection – Single “A” Coil Set – 35 lbs to 800 lbs

<table>
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<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/INNER</th>
<th>LOAD @ 1 IN. DEFLECTION (LBS)</th>
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![Diagram of single "A" coil set](image)

1 DEFLECTION – SINGLE “A” COIL ISOLATION SUBMITTAL DATA

PAGE 1 OF 2

RELEASE DATE: 5/4/04

KINETICS™ Seismic Design Manual

1-805 AA/A/B 800 1.00 800.0 Chrome/White 800

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# Deflection – Double “A” Coil Sets – 740 lbs to 1,600 lbs

<table>
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<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE D LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/INNER</th>
<th>LOAD @ 1 IN. DEFLECTION (LBS)</th>
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**Diagram: Double “A” Coil Sets**
- Zinc Plated Coupling Nut
- Zinc Plated Steel Washer
- Painted Spring Load Plate Weldment
- Powder Coated 1” Deflection "A" Coil Springs
- Neoprene Spring Cups
- 3/8-16 UNC Zinc Plated Hanger Rod
- 5.62 Free Height

---

**1 DEFLECTION – DOUBLE “A” COIL ISOLATION SUBMITTAL DATA**

**Page 2 of 2**

**Release Date: 5/4/04**

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**Email:** sales@kineticsnoise.com

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1 Deflection – Single “C” Coil Set – 250 lbs to 3,500 lbs

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<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
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<th>LOAD @ 1 IN. DEFLECTION (LBS)</th>
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FREE HEIGHT 7.14 FMSA/B/C/D/E

ZINC PLATED COUPLING NUT
ZINC PLATED STEEL WASHER
ZINC PLATED SPRING CAP
POWDER COATED 1" DEFLECTION "C" COIL SPRINGS
NEOPRENE SPRING CUP
ZINC PLATED HANGER ROD 1/2-13 UNC FMSA/B/C/D/E
1 Deflection – Double “C” Coil Sets – 3,400 lbs to 7,000 lbs

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<th>ISOLATOR MODEL</th>
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<th>RATE D LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
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<th>SPRING COLOR OUTER/INNER</th>
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1” DEFLECTION – DOUBLE “C” COIL ISOLATION SUBMITTAL DATA
PAGE 2 OF 4

DOUBLE ZINC PLATED HANGER ROD NUTS
ZINC PLATED COUPLING NUTS
ZINC PLATED STEEL WASHERS
PAINTED TOP SPRING LOAD PLATE WELDMENT
POWDER COATED 1” DEFLECTION "C" COIL SPRINGS
PAINTED BOTTOM SPRING LOAD PLATE WELDMENT
NEOPRENE SOUND ISOLATION PAD
ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E/F/G
1 Deflection – Triple “C” Coil Sets – 3,750 lbs to 10,500 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATED LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN )</th>
<th>SPRING COLOR OUTER/INNER</th>
<th>LOAD @ 1 IN. DEFLECTION (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3750</td>
<td>C/D/E/F/G</td>
<td>3,750</td>
<td>1.09</td>
<td>3,440.4</td>
<td>Brown/-----</td>
<td>3,440</td>
</tr>
<tr>
<td>1-5100</td>
<td>C/D/E/F/G</td>
<td>5,100</td>
<td>0.95</td>
<td>5,368.5</td>
<td>Orange/-----</td>
<td>5,369</td>
</tr>
<tr>
<td>†1-5900</td>
<td>C/D/E/F/G</td>
<td>5,860</td>
<td>0.95</td>
<td>6,168.5</td>
<td>Orange/Gray</td>
<td>6,169</td>
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<tr>
<td>†1-6300</td>
<td>C/D/E/F/G</td>
<td>6,240</td>
<td>0.95</td>
<td>6,568.5</td>
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<tr>
<td>1-7395</td>
<td>--/D/E/F/G</td>
<td>7,395</td>
<td>1.00</td>
<td>7,395.0</td>
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<tr>
<td>†1-8195</td>
<td>--/D/E/F/G</td>
<td>8,195</td>
<td>1.00</td>
<td>8,195.0</td>
<td>Blue/Gray</td>
<td>8,195</td>
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<tr>
<td>†1-8595</td>
<td>--/D/E/F/G</td>
<td>8,595</td>
<td>1.00</td>
<td>8,595.0</td>
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<td>8,595</td>
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<tr>
<td>†1-9500</td>
<td>--/D/E/F/G</td>
<td>9,465</td>
<td>1.00</td>
<td>9,465.0</td>
<td>Blue/Brown</td>
<td>9,465</td>
</tr>
<tr>
<td>†1-10500</td>
<td>--/--/E/F/G</td>
<td>10,500</td>
<td>1.00</td>
<td>10,500.0</td>
<td>Blue/Brown</td>
<td>10,500</td>
</tr>
</tbody>
</table>

†Center coil set does not contain an inner coil.
‡Center coil set contains an inner coil and requires a special load washer.

DOUBLE ZINC PLATED HANGER ROD NUTS
ZINC PLATED COUPLING NUTS
ZINC PLATED STEEL WASHERS
PAINTED TOP SPRING LOAD PLATE WELDMENT
POWDER COATED 1" DEFLECTION "C" COIL SPRINGS
PAINTED BOTTOM SPRING LOAD PLATE WELDMENT
NEOPRENE SOUND ISOLATION PAD
ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E/F/G

1" DEFLECTION – TRIPLE “C” COIL ISOLATION SUBMITTAL DATA
PAGE 3 OF 4

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com
### 1" Deflection – Quad “C” Coil Sets – 9,860 lbs to 14,000 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used with FMS Model</th>
<th>Rate d Load (LBS)</th>
<th>Deflection @ Rated Load (IN)</th>
<th>Spring Rate (LBS/IN)</th>
<th>Spring Color Outer/Inner</th>
<th>Load @ 1 IN. Deflection (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9860</td>
<td>E/F/G</td>
<td>9,860</td>
<td>1.00</td>
<td>9,860.0</td>
<td>Blue/---------</td>
<td>9,860</td>
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<tr>
<td>1-11460</td>
<td>E/F/G</td>
<td>11,460</td>
<td>1.00</td>
<td>11,460.0</td>
<td>Blue/Gray</td>
<td>11,460</td>
</tr>
<tr>
<td>1-14000</td>
<td>E/F/G</td>
<td>14,000</td>
<td>1.00</td>
<td>14,000.0</td>
<td>Blue/Brown</td>
<td>14,000</td>
</tr>
</tbody>
</table>

**Notes:**
- **Double Zinc Plated Hanger Rod Nuts**
- **Zinc Plated Coupling Nuts**
- **Zinc Plated Steel Washers**
- **Painted Top Spring Load Plate Weldment**
- **Powder Coated 1" Deflection "C" Coil Springs**
- **Painted Bottom Spring Load Plate Weldment**
- **Neoprene Sound Isolation Pad**
- **Zinc Plated Hanger Rod 1-8 UNC FMSE/F/G**
- **Zinc Plated Coupling Nuts**
- **Steel Washers**
- **Painted Top Spring Load Plate Weldment**
- **Powder Coated 1" Deflection "C" Coil Springs**
- **Painted Bottom Spring Load Plate Weldment**
- **Neoprene Sound Isolation Pad**
- **Zinc Plated Hanger Rod 1-8 UNC FMSE/F/G**

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1" Deflection – Quad "C" Coil Isolation Submittal Data

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Released Date: 5/6/04

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control © 2003
2 Deflection – Single Coil Set – 100 lbs to 2,000 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/INNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-100</td>
<td>B/C/D/E</td>
<td>100</td>
<td>2.00</td>
<td>50.0</td>
<td>Gray/-----</td>
</tr>
<tr>
<td>2-250</td>
<td>B/C/D/E</td>
<td>250</td>
<td>2.00</td>
<td>125.0</td>
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<tr>
<td>2-500</td>
<td>B/C/D/E</td>
<td>500</td>
<td>2.00</td>
<td>250.0</td>
<td>Green/-----</td>
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<tr>
<td>2-750</td>
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<td>375.0</td>
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<td>497.5</td>
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<tr>
<td>2-1395</td>
<td>B/C/D/E</td>
<td>1,395</td>
<td>2.00</td>
<td>697.5</td>
<td>Orange/Green</td>
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<tr>
<td>2-1600</td>
<td>B/C/D/E</td>
<td>1,600</td>
<td>2.00</td>
<td>800.0</td>
<td>Red/-----</td>
</tr>
<tr>
<td>2-1975</td>
<td>B/C/D/E</td>
<td>2,000</td>
<td>2.00</td>
<td>1,000.0</td>
<td>Red/Green</td>
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</table>

SPECIAL ZINC PLATED ADJUSTMENT NUT
ZINC PLATED STEEL WASHER
ZINC PLATED STEEL SPRING CAP
POWDER COATED 2" DEFORMATION COIL SPRINGS
NEOPRENE SPRING CAP
ZINC PLATED HANGER ROD 1/2-13 UNC FMSB/C/D/E

8.10 FREE HEIGHT
2.3.3

## 2 Deflection – Single Coil Set – 2,000 lbs to 4,500 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATED LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/MIDDLE/INNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-2000</td>
<td>C/D/E</td>
<td>2,000</td>
<td>2.00</td>
<td>1,000.0</td>
<td>Orange/-----/-----</td>
</tr>
<tr>
<td>2-2250</td>
<td>C/D/E</td>
<td>2,250</td>
<td>2.00</td>
<td>1,125.0</td>
<td>Orange/Blue/-----</td>
</tr>
<tr>
<td>2-2500</td>
<td>C/D/E</td>
<td>2,500</td>
<td>2.00</td>
<td>1,250.0</td>
<td>Blue/-----/-----</td>
</tr>
<tr>
<td>2-2750</td>
<td>C/D/E</td>
<td>2,750</td>
<td>2.00</td>
<td>1,375.0</td>
<td>Orange/Black/-----</td>
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<tr>
<td>2-3000</td>
<td>C/D/E</td>
<td>3,000</td>
<td>2.00</td>
<td>1,500.0</td>
<td>Blue/Green/-----</td>
</tr>
<tr>
<td>2-3600</td>
<td>C/D/E</td>
<td>3,600</td>
<td>2.00</td>
<td>1,800.0</td>
<td>Orange/Red/-----</td>
</tr>
<tr>
<td>2-4500</td>
<td>C/D/E</td>
<td>4,500</td>
<td>2.00</td>
<td>2,250.0</td>
<td>Blue/Red/Green</td>
</tr>
</tbody>
</table>

### Diagram:

- Special Zinc Plated Adjustment Nut
- Zinc Plated Steel Washer
- Painted Load Plate
- Weldment
- Powder Coated 2" Deflection
- Coil Springs
- Neoprene Sound Isolation Pad
- Zinc Plated Hanger
- Rod 3/4-10 UNC FMSC/D/E

### Technical Details:

- 9.18 Free Height
## 2 Deflection – Double Coil Set – 1,990 lbs to 4,000 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODEL</th>
<th>RATE LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/INNER</th>
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</thead>
<tbody>
<tr>
<td>2-1990</td>
<td>B/C/D/E</td>
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<td>995.0</td>
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<td>2-2790</td>
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<td>2.00</td>
<td>1,395.0</td>
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<td>2-3200</td>
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<td>2.00</td>
<td>1,600.0</td>
<td>Red/-----</td>
</tr>
<tr>
<td>2-4000</td>
<td>B/C/D/E</td>
<td>4,000</td>
<td>2.00</td>
<td>2,000.0</td>
<td>Red/Green</td>
</tr>
</tbody>
</table>

DOUBLE ZINC PLATED HANGER ROD NUTS
SPECIAL ZINC PLATED ADJUSTMENT NUT
ZINC PLATED STEEL WASHERS
PAINTED TOP SPRING LOAD PLATE WELDMENT
POWDER COATED 2" DEFLECTION COIL SPRINGS
PAINTED BOTTOM SPRING LOAD PLATE WELDMENT
NEOPRENE SOUND ISOLATION PAD
ZINC PLATED HANGER ROD
1/2-13 UNC FMSB/C/D
~8.38 FREE HEIGHT
2" DEFL. – 5,000 lbs to 9,000 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE D LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/MIDDLE/INNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5000</td>
<td>C/D/E/F/G</td>
<td>5,000</td>
<td>2.00</td>
<td>2,500.0</td>
<td>Blue/-----/-----</td>
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<tr>
<td>2-5500</td>
<td>C/D/E/F/G</td>
<td>5,550</td>
<td>2.00</td>
<td>2,750.0</td>
<td>Orange/Black/-----</td>
</tr>
<tr>
<td>2-6000</td>
<td>C/D/E/F/G</td>
<td>6,000</td>
<td>2.00</td>
<td>3,000.0</td>
<td>Blue/Green/-----</td>
</tr>
<tr>
<td>2-7200</td>
<td>--/D/E/F/G</td>
<td>7,200</td>
<td>2.00</td>
<td>3,600.0</td>
<td>Orange/Red/-----</td>
</tr>
<tr>
<td>2-9000</td>
<td>--/D/E/F/G</td>
<td>9,000</td>
<td>2.00</td>
<td>4,500.0</td>
<td>Blue/Red/Green</td>
</tr>
</tbody>
</table>

DOUBLE ZINC PLATED HANGER ROD NUTS
SPECIAL ZINC PLATED ADJUSTMENT NUT
ZINC PLATED STEEL WASHERS
PAINTED TOP SPRING LOAD PLATE WELDMENT
POWDER COATED 2" DELECTION COIL SPRINGS
PAINTED BOTTOM SPRING LOAD PLATE WELDMENT
NEOPRENE SOUND ISOLATION PAD
ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E/F/G
## 2 Deflection – Triple Coil Set – 9,100 lbs to 13,500 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODEL S</th>
<th>RATE LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/MIDDLE/INNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-9100</td>
<td>D/E/F/G</td>
<td>9,000</td>
<td>2.00</td>
<td>4,500.0</td>
<td>Blue/Green/-----</td>
</tr>
<tr>
<td>2-9750</td>
<td>D/E/F/G</td>
<td>9,750</td>
<td>2.00</td>
<td>4,875.0</td>
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</tr>
<tr>
<td>2-10800</td>
<td>--/E/F/G</td>
<td>10,800</td>
<td>2.00</td>
<td>5,400.0</td>
<td>Orange/Red/-----</td>
</tr>
<tr>
<td>2-12000</td>
<td>--/E/F/G</td>
<td>12,000</td>
<td>2.00</td>
<td>6,000.0</td>
<td>Orange/Red/Green</td>
</tr>
<tr>
<td>2-13500</td>
<td>--/E/F/G</td>
<td>13,500</td>
<td>2.00</td>
<td>6,750.0</td>
<td>Blue/Red/Green</td>
</tr>
</tbody>
</table>

**Diagram:**
- Double Zinc Plated Hanger Rod Nuts
- Special Zinc Plated Adjustment Nut
- Zinc Plated Steel Washers
- Painted Top Spring Load Plate Weldment
- Powder Coated 2” Deflection Coil Springs
- Painted Bottom Spring Load Plate Weldment
- Neoprene Sound Isolation Pad
- Zinc Plated Hanger Rod 3/4-10 UNC FMSD/E/F/G

**Technical Notes:**
- Free Height: ~9.88
2 Deflection – QUAD Coil Set – 14,000 lbs to 18,000 lbs

<table>
<thead>
<tr>
<th>ISOLATOR MODEL</th>
<th>USED WITH FMS MODELS</th>
<th>RATE D LOAD (LBS)</th>
<th>DEFLECTION @ RATED LOAD (IN)</th>
<th>SPRING RATE (LBS/IN)</th>
<th>SPRING COLOR OUTER/MIDDLE/INNER</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-14000</td>
<td>E/F/G</td>
<td>13,980</td>
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<td>6,990.0</td>
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<td>2-16000</td>
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<td>8,000.0</td>
<td>Orange/Red/Green</td>
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<tr>
<td>2-18000</td>
<td>E/F/G</td>
<td>18,000</td>
<td>2.00</td>
<td>4,500.0</td>
<td>Blue/Red/Green</td>
</tr>
</tbody>
</table>

DOUBLE ZINC PLATED HANGER ROD NUTS

SPECIAL ZINC PLATED ADJUSTMENT NUTS

ZINC PLATED STEEL WASHERS

PAINTED TOP SPRING LOAD PLATE WELDMENT

POWDER COATED 2" DEFLECTION COIL SPRINGS

PAINTED BOTTOM SPRING LOAD PLATE WELDMENT

NEOPRENE SOUND ISOLATION PAD

ZINC PLATED HANGER ROD 1-8 UNC FMSE/F/G

~10.38 FREE HEIGHT
### 4” Deflection – Single Coil Set – 100 lbs to 1,600 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-100</td>
<td>C/D/E</td>
<td>100</td>
<td>4.00</td>
<td>25.0</td>
<td>Gray</td>
</tr>
<tr>
<td>4-250</td>
<td>C/D/E</td>
<td>250</td>
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<td>62.5</td>
<td>Blue</td>
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<td>4-500</td>
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<td>125.0</td>
<td>Green</td>
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<tr>
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<td>750</td>
<td>4.00</td>
<td>187.5</td>
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<td>4-1000</td>
<td>C/D/E</td>
<td>1,000</td>
<td>4.00</td>
<td>250.0</td>
<td>Red</td>
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<td>312.5</td>
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<td>4-1600</td>
<td>C/D/E</td>
<td>1,600</td>
<td>4.00</td>
<td>400.0</td>
<td>Orange</td>
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</table>

- **SPECIAL ZINC PLATED ADJUSTMENT NUT**
- **ZINC PLATED STEEL WASHER**
- **PAINTED TOP SPRING LOAD PLATE WELDMENT**
- **POWDER COATED 4” DEFLECTION COIL SPRING**
- **PAINTED BOTTOM SPRING LOAD PLATE**
- **NEOPRENE SOUND ISOLATION PAD**
- **ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E**
- **FREE HEIGHT 12.30”**
### 4" Deflection – Single Coil Set – 2,250 lbs to 5,800 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color Outer/Inner</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-2250</td>
<td>E/F/G</td>
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<td>4.00</td>
<td>562.5</td>
<td>Beige/-----</td>
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<tr>
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<td>E/F/G</td>
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<td>4.00</td>
<td>687.5</td>
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<tr>
<td>4-3250</td>
<td>E/F/G</td>
<td>3,250</td>
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<td>812.5</td>
<td>Beige/Red</td>
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<td>E/F/G</td>
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<td>962.5</td>
<td>Beige/Orange</td>
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<td>4.00</td>
<td>1,175.0</td>
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<td>E/F/G</td>
<td>5,200</td>
<td>4.00</td>
<td>1,300.0</td>
<td>Chrome/Red</td>
</tr>
<tr>
<td>4-5800</td>
<td>E/F/G</td>
<td>5,800</td>
<td>4.00</td>
<td>1,450.0</td>
<td>Chrome/Orange</td>
</tr>
</tbody>
</table>

**Diagram:**

- Special Zinc Plated Adjustment Nut
- Zinc Plated Steel Washer
- Painted Top Spring Load Plate Weldment
- Powder Coated 4" Deflection Coil Springs
- Painted Bottom Spring Load Plate
- Neoprene Sound Isolation Pad
- Painted Bottom Spring Load Plate
- Zinc Plated Hanger Rod 1-8 UNC FMSE/F/G

**Dimensions:**

- 13.84 Free Height

---

**4" DEFL. – 2,250 to 5,800 SINGLE COIL ISOLATION SUBMITTAL DATA**

**PAGE 2 OF 8**
4” Deflection – Double Coil Set – 1,500 lbs to 3,200 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-1500</td>
<td>C/D/E</td>
<td>1,500</td>
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<td>375.0</td>
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<tr>
<td>4-2000</td>
<td>C/D/E</td>
<td>2,000</td>
<td>4.00</td>
<td>500.0</td>
<td>Red</td>
</tr>
<tr>
<td>4-2500</td>
<td>C/D/E</td>
<td>2,500</td>
<td>4.00</td>
<td>625.0</td>
<td>Brown</td>
</tr>
<tr>
<td>4-3200</td>
<td>C/D/E</td>
<td>3,200</td>
<td>4.00</td>
<td>800.0</td>
<td>Orange</td>
</tr>
</tbody>
</table>

SPECIAL ZINC PLATED
ADJUSTMENT NUTS
ZINC PLATED STEEL WASHERS

PAINTED TOP
SPRING LOAD PLATE WELDMENT

POWDER COATED
4” DEFLECTION COIL SPRINGS

PAINTED BOTTOM
SPRING LOAD PLATE WELDMENT

NEOPRENE SOUND ISOLATION PAD

ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E

~12.88 FREE HEIGHT

4” DEFL. – 1,500 to 3,200 DOUBLE COIL ISOLATION SUBMITTAL DATA

PAGE 3 OF 8

RELEASE DATE: 5/13/04

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Email: sales@kineticsnoise.com

4.5" Free Height
### 4” Deflection – Double Coil Set – 5,500 lbs to 11,600 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color Outer/Inner</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5500</td>
<td>E/F/G</td>
<td>5,500</td>
<td>4.00</td>
<td>1,375.0</td>
<td>Beige/Green</td>
</tr>
<tr>
<td>4-6500</td>
<td>E/F/G</td>
<td>6,500</td>
<td>4.00</td>
<td>1,625.0</td>
<td>Beige/Red</td>
</tr>
<tr>
<td>4-7700</td>
<td>E/F/G</td>
<td>7,700</td>
<td>4.00</td>
<td>1,925.0</td>
<td>Beige/Orange</td>
</tr>
<tr>
<td>4-8400</td>
<td>E/F/G</td>
<td>8,400</td>
<td>4.00</td>
<td>2,100.0</td>
<td>Chrome/-----</td>
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<tr>
<td>4-9400</td>
<td>E/F/G</td>
<td>9,400</td>
<td>4.00</td>
<td>2,350.0</td>
<td>Chrome/Green</td>
</tr>
<tr>
<td>4-10400</td>
<td>E/F/G</td>
<td>10,400</td>
<td>4.00</td>
<td>2,600.0</td>
<td>Chrome/Red</td>
</tr>
<tr>
<td>4-11600</td>
<td>E/F/G</td>
<td>11,600</td>
<td>4.00</td>
<td>2,900.0</td>
<td>Chrome/Orange</td>
</tr>
</tbody>
</table>

**Double Zinc Plated Hanger Rod Nuts**

**Zinc Plated Steel Washers**

**Painted Top Spring Load Plate Weldment**

**Painted Bottom Spring Load Plate Weldment**

**Powder Coated 4” Deflection Coil Springs**

**Neoprene Sound Isolation Pad**

**Zinc Plated Hanger Rod 1-8 UNC FMSE/F/G**

**~15.19 Free Height**
## 4" Deflection – Triple Coil Set – 3,000 lbs to 4,800 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-3000</td>
<td>C/D/E/F/G</td>
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<td>4.00</td>
<td>750.0</td>
<td>Red</td>
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<tr>
<td>4-3750</td>
<td>C/D/E/F/G</td>
<td>3,750</td>
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<td>937.5</td>
<td>Brown</td>
</tr>
<tr>
<td>4-4800</td>
<td>C/D/E/F/G</td>
<td>4,800</td>
<td>4.00</td>
<td>1,200.0</td>
<td>Orange</td>
</tr>
</tbody>
</table>

### Diagram

- Double Zinc Plated Hanger Rod Nuts
- Special Zinc Plated Adjustment Nuts
- Zinc Plated Steel Washers
- Painted Top Spring Load Plate Weldment
- Powder Coated 4" Deflection Coil Springs
- Painted Bottom Spring Load Plate Weldment
- Neoprene Sound Isolation Pad
- Zinc Plated Hanger Rod 3/4-10 UNC FMSC/D/E/F/G

~12.88 Free Height
### 4" Deflection – Triple Coil Set – 11,700 lbs to 17,400 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color Outer/Inner</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-11700</td>
<td>E/F/G</td>
<td>11,550</td>
<td>4.00</td>
<td>2,887.5</td>
<td>Beige/Orange</td>
</tr>
<tr>
<td>4-14100</td>
<td>E/F/G</td>
<td>14,100</td>
<td>4.00</td>
<td>3,525.0</td>
<td>Chrome/Green</td>
</tr>
<tr>
<td>4-17400</td>
<td>E/F/G</td>
<td>17,400</td>
<td>4.00</td>
<td>5,350.0</td>
<td>Chrome/Orange</td>
</tr>
</tbody>
</table>

**Diagram:**

- **Double Zinc Plated Hanger Rod Nuts**
- **Zinc Plated Steel Washers**
- **Painted Top Spring Load Plate Weldment**
- **Powder Coated 4" Deflection Coil Springs**
- **Neoprene Sound Isolation Pad**
- **Painted Bottom Spring Load Plate Weldment**
- **Zinc Plated Hanger Rod 1-8 UNC FMSE**
  1 1/4-7 UNC FMSF/G

---

**4" DEFL. – 11,700 to 17,400 TRIPLE COIL ISOLATION SUBMITTAL DATA**

**Release Date:** 5/13/04

**DOCUMENT:**

- **KINETICS™ Seismic Design Manual**
- **MEMBER**

**KINETICS Noise Control © 2003**
### 4" Deflection – Quad Coil Set – 5,000 lbs to 6,400 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-5000</td>
<td>C/D/E/F/G</td>
<td>5,000</td>
<td>4.00</td>
<td>1,250.0</td>
<td>Brown</td>
</tr>
<tr>
<td>4-6400</td>
<td>--/D/E/F/G</td>
<td>6,400</td>
<td>4.00</td>
<td>1,600.0</td>
<td>Orange</td>
</tr>
</tbody>
</table>

- **SPECIAL ZINC PLATED ADJUSTMENT NUTS**
- **ZINC PLATED STEEL WASHERS**
- **PAINTED TOP SPRING LOAD PLATE WELDMENT**
- **POWDER COATED 4" DEFLECTION COIL SPRINGS**
- **PAINTED BOTTOM SPRING LOAD PLATE WELDMENT**
- **NEOPRENE SOUND ISOLATION PAD**
- **DOUBLE ZINC PLATED HANGER ROD NUTS**
- **ZINC PLATED HANGER ROD 3/4-10 UNC FMSC/D/E/F/G**
- **~12.88 FREE HEIGHT**

Kinetics Noise Control © 2003
### 4" Deflection – Quad Coil Set – 17,800 lbs to 23,200 lbs

<table>
<thead>
<tr>
<th>Isolator Model</th>
<th>Used With FMS Models</th>
<th>Rated Load (lbs)</th>
<th>Deflection @ Rated Load (in)</th>
<th>Spring Rate (lbs/in)</th>
<th>Spring Color Outer/Inner</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-17800</td>
<td>E/F/G</td>
<td>17,800</td>
<td>4.00</td>
<td>4,450.0</td>
<td>Chrome/Blue</td>
</tr>
<tr>
<td>4-20800</td>
<td>E/F/G</td>
<td>20,800</td>
<td>4.00</td>
<td>5,200.0</td>
<td>Chrome/Red</td>
</tr>
<tr>
<td>4-23200</td>
<td>--/F/G</td>
<td>23,200</td>
<td>4.00</td>
<td>5,800.0</td>
<td>Chrome/Orange</td>
</tr>
</tbody>
</table>

---

**Diagram:**
- **NEOPRENE SOUND ISOLATION PAD**
- **PAINTED BOTTOM SPRING LOAD PLATE WELDMENT**
- **ZINC PLATED HANGER ROD 1-8 UNC FMSE**
- **PAINTED TOP SPRING LOAD PLATE WELDMENT**
- **POWDER COATED 4" DEFLECTION COIL SPRINGS**
- **SPECIAL ZINC PLATED ADJUSTMENT NUTS**
- **ZINC PLATED STEEL WASHERS**
- **DOUBLE ZINC PLATED HANGER ROD NUTS**
- **ZINC PLATED HANGER ROD 1-4/7 UNC FMSF/G**

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**4" DEFL. – 17,800 to 23,200 QUAD COIL ISOLATION SUBMITTAL DATA**

PAGE 8 OF 8

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**Email:** sales@kineticsnoise.com
FMS Isolator/Restraint Selection Information

The purpose of this section is to provide enough data to allow the reader to make a preliminary FMS Isolator/Restraint selection for your application. The final selection should be made with the help of Kinetics Noise Control Engineering. Since the FMS is a seismic device, a detailed analysis must be performed to ensure that the proper restraint and/or isolator model has been chosen for your application based on your building code, specification, geographical location, and geotechnical data.

Table P2.4-1 lists the various FMS models, and some of the basic application data.

Table P2.4-1; General Comparison of FMS Isolator/Restraint Models

<table>
<thead>
<tr>
<th>FMS RESTRAINT MODEL</th>
<th>SUBMITTAL DRAWING NUMBER</th>
<th>MAXIMUM (^1) COMBINED RESTRAINT CAPACITY (STEEL) (LB)</th>
<th>MAXIMUM (^2) COMBINED RESTRAINT CAPACITY (CONCRETE) (LB)</th>
<th>MAXIMUM ISOLATION RATING (LB)</th>
<th>APPROXIMATE RESTRAINT WEIGHT (LB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FMSAA</td>
<td>S-10-40.100</td>
<td>615</td>
<td>410</td>
<td>805</td>
<td>9.0</td>
</tr>
<tr>
<td>FMSA</td>
<td>S-10-40.800</td>
<td>1,520</td>
<td>905</td>
<td>2,500</td>
<td>11.6</td>
</tr>
<tr>
<td>FMSB</td>
<td>S-10-40.200</td>
<td>3,175</td>
<td>1,040</td>
<td>3,000</td>
<td>18.4</td>
</tr>
<tr>
<td>FMSC</td>
<td>S-10-40.300</td>
<td>5,900</td>
<td>2,160</td>
<td>6,500</td>
<td>49.3</td>
</tr>
<tr>
<td>FMSD</td>
<td>S-10-40.400</td>
<td>9,565</td>
<td>3,045</td>
<td>10,000</td>
<td>86.7</td>
</tr>
<tr>
<td>FMSE</td>
<td>S-10-40.500</td>
<td>14,470</td>
<td>4,840</td>
<td>21,000</td>
<td>189.7</td>
</tr>
<tr>
<td>FMSF</td>
<td>S-10-40.600</td>
<td>26,100</td>
<td>9,875</td>
<td>24,000</td>
<td>268.0</td>
</tr>
<tr>
<td>FMSG</td>
<td>S-10-40.700</td>
<td>40,500</td>
<td>23,500</td>
<td>24,000</td>
<td>437.0</td>
</tr>
</tbody>
</table>

\(^1\) Maximum restraint values for a load having equal horizontal and vertical components without isolation.

\(^2\) Bolted or welded to structural steel.

\(^3\) Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
Figure P2.4-1 shows the restraint capacity envelopes for the entire FMS family if the restraint is attached to structural steel. These curves are for non-isolated restraints. The FMS family is unique in that isolation will change the restraint capacities of the unit, and quite often for the better. However, these curves will allow the reader to select one or two FMS models that may fit their application. Figure P2.4-2 presents the restraint capacity envelopes for the entire FMS family if the restraint is to be attached to 3,000 psi minimum compressive strength steel reinforced concrete. Again, these curves are for non-isolated restraints. The restraint capacities are affected, normally in a positive manner, by the addition of isolation to the system.

Tables P2.4-2 through P2.4-9 give the restraint capacities for the FMS family with various isolation loads applied to the restraints. These values will allow the reader to make a reasonable estimate as to whether a given isolator/restraint combination will work for the application under consideration. When a tentative selection has been made a plot of the appropriate capacity envelope should be constructed for the isolator/restraint combination being used, see the appropriate submittal sheets for the selected FMS, and the actual load points plotted on the capacity envelope chart. If the actual load points fall inside the capacity envelope, the selected FMS is adequate. If they do not fall inside the capacity envelope, select the next largest FMS.
Figure P2.4-2; FMS Restraint Capacity Envelopes for Steel Attachment.
Figure P2.4-1; FMS Restraint Capacity Envelopes for Concrete Attachment.
Table P2.4-2; FMSAA Restraint Capacities at Various Isolator Loads.

<table>
<thead>
<tr>
<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (2 STEEL) (LB)</th>
<th>VERT. CAPACITY (2 STEEL) (LB)</th>
<th>¹COMB. CAPACITY (2 STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3 CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3 CONCRETE) (LB)</th>
<th>¹COMB. CAPACITY (3 CONCRETE) (LB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1,015</td>
<td>1,275</td>
<td>615</td>
<td>835</td>
<td>745</td>
<td>410</td>
</tr>
<tr>
<td>100</td>
<td>1,070</td>
<td>1,375</td>
<td>655</td>
<td>910</td>
<td>845</td>
<td>465</td>
</tr>
<tr>
<td>200</td>
<td>1,120</td>
<td>1,285</td>
<td>700</td>
<td>975</td>
<td>945</td>
<td>520</td>
</tr>
<tr>
<td>300</td>
<td>1,170</td>
<td>1,185</td>
<td>740</td>
<td>1,030</td>
<td>1,045</td>
<td>570</td>
</tr>
<tr>
<td>400</td>
<td>1,220</td>
<td>1,085</td>
<td>780</td>
<td>1,060</td>
<td>1,085</td>
<td>625</td>
</tr>
<tr>
<td>500</td>
<td>1,265</td>
<td>985</td>
<td>820</td>
<td>1,065</td>
<td>985</td>
<td>675</td>
</tr>
<tr>
<td>600</td>
<td>1,275</td>
<td>885</td>
<td>850</td>
<td>1,065</td>
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<td>725</td>
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<tr>
<td>700</td>
<td>1,275</td>
<td>885</td>
<td>755</td>
<td>1,065</td>
<td>785</td>
<td>755</td>
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<tr>
<td>805</td>
<td>1,275</td>
<td>685</td>
<td>660</td>
<td>1,065</td>
<td>685</td>
<td>660</td>
</tr>
</tbody>
</table>

¹ Maximum restraint values for a load having equal horizontal and vertical components without isolation.

² Bolted or welded to structural steel.

³ Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
Table P.2.4-3: FMSA Restraint Capacities at Various Isolator Loads.

<table>
<thead>
<tr>
<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (2 STEEL) (LB)</th>
<th>VERT. CAPACITY (2 STEEL) (LB)</th>
<th>^1COMB. CAPACITY (2 STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3 CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3 CONCRETE) (LB)</th>
<th>^1COMB. CAPACITY (3 CONCRETE) (LB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>2,520</td>
<td>3,050</td>
<td>1,520</td>
<td>2,075</td>
<td>1,570</td>
<td>905</td>
</tr>
<tr>
<td>250</td>
<td>2,655</td>
<td>3,300</td>
<td>1,630</td>
<td>2,310</td>
<td>1,820</td>
<td>1,055</td>
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<tr>
<td>500</td>
<td>2,790</td>
<td>3,255</td>
<td>1,740</td>
<td>2,505</td>
<td>2,070</td>
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<tr>
<td>750</td>
<td>2,915</td>
<td>3,005</td>
<td>1,845</td>
<td>2,655</td>
<td>2,320</td>
<td>1,355</td>
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<td>1,000</td>
<td>3,040</td>
<td>2,755</td>
<td>1,950</td>
<td>2,720</td>
<td>2,570</td>
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<td>1,250</td>
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<td>2,505</td>
<td>2,050</td>
<td>2,720</td>
<td>2,505</td>
<td>1,635</td>
</tr>
<tr>
<td>1,500</td>
<td>3,115</td>
<td>2,255</td>
<td>2,130</td>
<td>2,720</td>
<td>2,255</td>
<td>1,775</td>
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<tr>
<td>1,750</td>
<td>3,115</td>
<td>2,005</td>
<td>1,900</td>
<td>2,720</td>
<td>2,005</td>
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<td>1,665</td>
<td>2,720</td>
<td>1,755</td>
<td>1,665</td>
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<tr>
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<td>3,115</td>
<td>1,505</td>
<td>1,425</td>
<td>2,720</td>
<td>1,505</td>
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<td>1,255</td>
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<td>2,720</td>
<td>1,255</td>
<td>1,190</td>
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<tr>
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<td>755</td>
<td>740</td>
<td>2,720</td>
<td>755</td>
<td>715</td>
</tr>
<tr>
<td>3,500</td>
<td>3,035</td>
<td>255</td>
<td>240</td>
<td>2,720</td>
<td>255</td>
<td>240</td>
</tr>
</tbody>
</table>

^1 Maximum restraint values for a load having equal horizontal and vertical components without isolation.

^2 Bolted or welded to structural steel.

^3 Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
### Table P2.4-4: FMSB Restraint Capacities at Various Isolator Loads.

<table>
<thead>
<tr>
<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (2 STEEL) (LB)</th>
<th>VERT. CAPACITY (2 STEEL) (LB)</th>
<th>¹COMB. CAPACITY (2 STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3 CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3 CONCRETE) (LB)</th>
<th>¹COMB. CAPACITY (3 CONCRETE) (LB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>5,210</td>
<td>4,880</td>
<td>3,175</td>
<td>2,355</td>
<td>1,700</td>
<td>1,040</td>
</tr>
<tr>
<td>250</td>
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</table>

¹ Maximum restraint values for a load having equal horizontal and vertical components without isolation.

² Bolted or welded to structural steel.

³ Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.

---

FMS ISOLATOR/RESTRAINIT SELECTION INFORMATION

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control © 2003
## Table P2.4-5: FMSC Restraint Capacities at Various Isolator Loads.

<table>
<thead>
<tr>
<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (2&quot; STEEL) (LB)</th>
<th>VERT. CAPACITY (2&quot; STEEL) (LB)</th>
<th>'COMB. CAPACITY (2&quot; STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3&quot; CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3&quot; CONCRETE) (LB)</th>
<th>'COMB. CAPACITY (3&quot; CONCRETE) (LB)</th>
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1. Maximum restraint values for a load having equal horizontal and vertical components without isolation.

2. Bolted or welded to structural steel.

3. Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
Table P2.4-6; FMSD Restraint Capacities at Various Isolator Loads.

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<tr>
<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (°STEEL) (LB)</th>
<th>VERT. CAPACITY (°STEEL) (LB)</th>
<th>COMB. CAPACITY (°STEEL) (LB)</th>
<th>HORIZ. CAPACITY (°CONCRETE) (LB)</th>
<th>VERT. CAPACITY (°CONCRETE) (LB)</th>
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1 Maximum restraint values for a load having equal horizontal and vertical components without isolation.

2 Bolted or welded to structural steel.

3 Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
### Table P2.4-7; FMSE Restraint Capacities at Various Isolator Loads.

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<th>HORIZ. CAPACITY (2 STEEL) (LB)</th>
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<th>¹COMB. CAPACITY (2 STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3 CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3 CONCRETE) (LB)</th>
<th>¹COMB. CAPACITY (3 CONCRETE) (LB)</th>
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¹ Maximum restraint values for a load having equal horizontal and vertical components without isolation.

² Bolted or welded to structural steel.

³ Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
Table P2.4-8; FMSF Restraint Capacities at Various Isolator Loads.

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¹ Maximum restraint values for a load having equal horizontal and vertical components without isolation.

2 Bolted or welded to structural steel.

³ Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
### Table P2.4-9: FMSG Restraint Capacities at Various Isolator Loads.

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<th>ISOLATOR LOAD (LB)</th>
<th>HORIZ. CAPACITY (2 STEEL) (LB)</th>
<th>VERT. CAPACITY (2 STEEL) (LB)</th>
<th>(^1)COMB. CAPACITY (2 STEEL) (LB)</th>
<th>HORIZ. CAPACITY (3 CONCRETE) (LB)</th>
<th>VERT. CAPACITY (3 CONCRETE) (LB)</th>
<th>(^1)COMB. CAPACITY (3 CONCRETE) (LB)</th>
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<td>19,500</td>
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1. Maximum restraint values for a load having equal horizontal and vertical components without isolation.

2. Bolted or welded to structural steel.

3. Anchored to 3,000 psi minimum compressive strength steel reinforced concrete using post installed wedge type anchors.
## CHAPTER P3
### FLSS/FLS/FHS ISOLATORS AND RESTRAINTS

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<th>Section</th>
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<td>General Descriptions and Specifications</td>
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<td>Load Spreader Plate Data</td>
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<td>Installation Instructions</td>
<td>P3.5</td>
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Kinetics Model FLSS
Seismic control restrained spring vibration isolators consist of free-standing, large diameter, laterally stable steel springs assembled into welded steel housing assemblies that are designed to limit vertical movement of the isolated equipment if equipment loads are reduced or if the equipment is subjected to large external forces such as seismic events. The housings also provide a constant free and operating height to facilitate installation. Spring elements are complete with internal noise isolation pads and have an adjusting and leveling bolt as a part of the top load plate assembly. Large holes are provided in all isolators for bolting to the structure and to the supported equipment. To assure stability, the springs have a lateral spring stiffness greater than 1.2 times the rated vertical stiffness and are designed to provide a minimum of 50% overload capacity. FLSS springs are available with deflections to 4 inches (100 mm) and with load capacities to 11,800 lbs. (5364 kg) as standard products. Custom isolators with higher deflection and greater load capabilities are also available. Kinetics Model FLSS spring isolators are recommended for the isolation of vibration produced by equipment carrying a large fluid load which may be drained, such as boilers and chillers, and for the isolation of cooling towers, air-cooled condensers, etc., where motion due to wind loads must be minimized.

Specification
Vibration isolators shall be seismically rated restrained spring isolators for equipment that is subject to load variations and large external forces. Isolators shall consist of large diameter, laterally stable steel springs assembled into welded steel housing assemblies designed to limit movement of the supported equipment in all directions.

Housing assembly shall be of fabricated steel members and shall consist of a top load plate complete with adjusting and leveling bolts, adjustable vertical restraints, isolation washers, and a bottom plate with internal non-skid noise isolation pads and holes for anchoring of the housing to the supporting structure. Housing shall be electro-zinc plated or hot-dip galvanized for corrosion resistance. Housing shall be designed to provide a constant free and operating height within 1/8 inch (3 mm).

The isolator housing shall provide a minimum of 1g restraint in all directions if attached with through bolts. Spring elements shall be selected to provide static deflections as shown on the vibration isolation schedule or as indicated or required in the project documents. Springs shall be color coded or otherwise identified.

Spring elements shall have a lateral stiffness greater than 1.0 times the rated vertical stiffness and shall be designed to provide a minimum of 50% overload capacity. Spring elements shall be epoxy powder coated, and shall have a 1000-hour rating when tested in accordance with ASTM B-117.
Kinetics Model FLS
Vibration isolators consist of free-standing large diameter laterally stable steel springs assembled into welded steel housing assemblies that are designed to limit vertical movement of the isolated equipment if equipment loads are reduced or if the equipment is subjected to large external forces. The housings also provide a constant free and operating height to facilitate installation. Spring elements are complete with internal noise isolation pads and have an adjusting and leveling bolt as a part of the top load plate assembly. Springs are epoxy powder coated, with a 1000-hour salt spray rating per ASTM B-117. Holes are provided in all isolators for bolting to the structure and to the supported equipment. The isolator can be welded to the structure as well. To assure stability, the springs have a lateral spring stiffness greater than 1.0 times the rated vertical stiffness, and are designed to provide a minimum of 50% overload capacity. FLS springs are available with deflections to 2.03 inches (52 mm) and with load capacities to 15,600 lbs. (7076 kg) as standard products. Custom isolators with higher deflection and greater load capabilities are also available. Kinetics Model FLS spring isolators are recommended for the isolation of vibration produced by equipment carrying a large fluid load which may be drained, such as boilers, cooling towers and chillers, and for the isolation of cooling towers, air-cooled condensers, etc., where motion due to wind loads must be minimized.

Specification
Vibration isolators for equipment which is subject to load variations and large external or torque forces shall consist of large diameter laterally stable steel springs assembled into welded steel housing assemblies designed to limit vertical movement of the supported equipment.

Housing assembly shall be of fabricated steel members and shall consist of a top load plate complete with adjusting and leveling bolts, vertical restraints, isolation washers, and a bottom plate with internal non-skid noise isolation pads and holes provided for anchoring to the supporting structure. Housing shall be hot dip galvanized for corrosion resistance. Housing should be designed to provide a constant free and operating height within 1/8 inch (0.06 mm).

Spring elements shall have a lateral stiffness greater than 1.0 times the rated vertical stiffness and shall be designed to provide a minimum of 50% overload capacity. Spring elements shall be epoxy powder coated, and shall have a 1000-hour rating when tested in accordance with ASTM B-117.
Kinetics Model FHS
Seismic control restrained spring isolators meet specifications for Kinetics Model FDS isolators and include a steel housing assembly to limit both lateral and vertical movement of the supported equipment during an earthquake without degrading the vibration isolation of the spring during normal equipment operating conditions. Standard FHS isolators incorporate a steel housing which encloses a neoprene snubber. Depending on the load and seismic zone, an optional steel load spreader plate to distribute the load among concrete anchors may be applied. A neoprene pad fitted in series with the spring is provided. Equipment attachment is by way of a bolt screwed downward through the equipment foot. Removal of the isolator for servicing can be easily accomplished as the isolator is not fitted with a protruding stud. In conformance with all current building code standards, the restraining system is designed to withstand a minimum 1.0g acceleration force. Motion is limited to approximately 0.2” in any direction.

Specification
Spring isolators shall be seismic control restrained spring isolators, incorporating a single or multiple coil spring element, having all of the characteristics of free-standing coil spring isolators as specified in the vibration isolation portion of this specification. Springs shall be restrained using a housing engineered to limit both lateral and vertical movement of the supported equipment during an earthquake without degrading the vibration isolation capabilities of the spring during normal equipment operating conditions.

Vibration isolators shall incorporate a steel housing and neoprene snubbing grommet system designed to limit motion to no more than 1/4” (6 mm) in any direction and to prevent any direct metal-to-metal contact between the supported member and the fixed restraint housing. The restraining system shall be designed to withstand the seismic design forces in any lateral or vertical direction without yield or failure. Where the capacity of the anchorage hardware in concrete is inadequate for the required seismic loadings, an adapter base plate to allow the addition of more or larger anchors will be fitted to fulfill these requirements. In addition to the primary isolation coil spring, the load path will include a minimum 1/4” (6 mm) thick neoprene pad.

Spring elements shall be color coded or otherwise easily identified. Springs shall have a lateral stiffness greater than 1.2 times the rated vertical stiffness and shall be designed to provide a minimum of 50% overload capacity. Non-welded spring elements shall be epoxy powder coated and shall have a minimum of a 1000-hour rating when tested in accordance with ASTM B-117.

To facilitate servicing, the isolator will be designed in such a way that the coil spring element can be removed without the requirement to lift or otherwise disturb the supported equipment.
Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

**Specifications:**
- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- housings may be used for blocking during equipment erection.

**FLSS 1" Deflection Seismic Isolator**

**Drawing:**

- **Type:** 1-250/3500
- **Dimensions:**
  - A2
  - B2
  - L2
  - T2
  - D2

**Anchor Bolt Torque:** 75 FT-LB
**Pull Test:** 2670 LB

**Table of Spring Coils:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Color</th>
<th>Free HT</th>
<th>O.D.</th>
<th>Rated Load</th>
<th>Defl.</th>
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</thead>
<tbody>
<tr>
<td>FLSS</td>
<td>1-250</td>
<td>Blue</td>
<td>4.20</td>
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<td>800</td>
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<td>1-1000</td>
<td>Red</td>
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<td>3.00</td>
<td>1000</td>
<td>1.15</td>
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<tr>
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<td>1-1250</td>
<td>Brown</td>
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<td>3.00</td>
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<td>4.20</td>
<td>3.00</td>
<td>3500</td>
<td>1.00</td>
</tr>
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</table>

1-250/3500 requires 0.62 Dia. x 4.00 Min. Embed Anchors in Concrete

(Allowable Loads Based On 3000 PSI Min Concrete)

1-250/3500 Anchor Bolt Torque - 75 FT-LB, Pull Test - 2670 LB
Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

SPECIFICATIONS:
- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kv/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- housings may be used for blocking during equipment erection.

<table>
<thead>
<tr>
<th>STANDARD RATINGS</th>
<th>SPRING COIL</th>
</tr>
</thead>
</table>
| TYPE | SIZE | OUTER | INNER | FREE HT. | O.D. | LOAD | DEF.
| FLSS 1-2500 | BROWN | 4.20 | 3.00 | 2500 | 1.09 |
| FLSS 1-3400 | ORANGE | 4.20 | 3.00 | 3400 | 0.95 |
| FLSS 1-4400 | ORANGE | 4.20 | 3.00 | 4400 | 1.00 |
| FLSS 1-4930 | BLUE | 4.20 | 3.00 | 4930 | 1.00 |
| FLSS 1-5730 | BLUE | 4.20 | 3.00 | 5730 | 1.00 |
| FLSS 1-7000 | BLUE | 4.20 | 3.00 | 7000 | 1.00 |

1-2500/7000 requires 0.62 dia. x 4.00 MIN. EMBED ANCHORS IN CONCRETE (ALLOWABLE LOADS BASED ON 3000 PSI MIN CONCRETE)
1-2500/7000 anchor bolt torque - 75 FT-LB, pull test - 2670 LB
FLSS Submittal Drawings
DRAWING #: S-01-21-13S – FLSS 1-5000/14000

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614-889-0540
www.kineticsnoise.com
sales@kineticsnoise.com

FLSS 1" DEFLECTION SEISMIC ISOLATOR
IP UNITS (INCHES AND POUNDS)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>L</th>
<th>W</th>
<th>T</th>
<th>A</th>
<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>d</th>
<th>H</th>
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<td>15.75</td>
<td>8.00</td>
<td>0.50</td>
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<td>0.81</td>
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STANDARD RATING SF:

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<th>O.D. LOAD</th>
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<td>ORANGE GRAY</td>
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</table>

1-5000/14000 REQUIRES 0.75 DIA. x 4.75 MIN. EMBED ANCHORS IN CONCRETE
ALLOWABLE LOADS BASED ON 3000 PSI MIN CONCRETE
1-5000/14000 ANCHOR BOLT TORQUE - 150 FT-LB, PULL TEST - 3625 LB

VERTICAL RESTRAINT BOLT

REMOVABLE BLOCKING

VERTICAL FORCE LBS X 1000

HORIZONTAL FORCE LBS X 1000

Computed horiz and vert seismic load combinations must fall within the restraint
capacity envelope. Contact KNC for bolted to steel data.
**FLSS Submittal Drawings**

**DRAWING #S-01-22.21S – FLSS 2-100/1975**

**RELEASE DATE:** 2/01/05

---

**Computed horizontal and vertical seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.**

---

**Vertically And Lateral Restrained Spring Isolator With Constant Free And Operating Height And Replaceable Neoprene Snubbing Elements.**

Minimum coil overload of 50%.

**Specifications:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Powder coated coils and hot dipped galvanized bracket housings may be used for blocking during equipment erection.

---

### FLSS 2-100/1975

**Units (Inches and Pounds):**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Unit</th>
<th>Free Spring Coil O.D.</th>
<th>Rated Spring Coil O.D.</th>
<th>Spring Coil Rate</th>
<th>Deflection</th>
<th>Free Height</th>
<th>Operating Height</th>
<th>Rated Load</th>
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<td>1975</td>
<td>2.00</td>
<td>1975</td>
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</table>

---

**Specifications:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Powder coated coils and hot dipped galvanized bracket housings may be used for blocking during equipment erection.

---

**KINETICS™ Seismic Design Manual**

**KINETICS™ Noise Control © 2003**
**FLSS Submittal Drawings**

**DRAWING #:** S-01-22.22S – FLSS 2-2000/4500

**RELEASE DATE:** 2/01/05

---

### FLSS 2\(^{2}\) - Deflection Seismic Isolator

**Type:** FLSS 2\(^{2}\)

**Dimensions:** (inches and pounds)

<table>
<thead>
<tr>
<th>IP Units</th>
<th>A2</th>
<th>B2</th>
<th>L2</th>
<th>T2</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ratings:**

- **Vertical Restraint:** H - HT.
- **Horizontal Force:** LBS X 1000

---

### Specifications:

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- **Springs Coil:** H, D, E
- **Outer Size:** 7.00
- **Inner Size:** 4.99
- **Height:** 0.31
- **Operative Height:** 0.75
- **Deflection:** 2.75

---

### Computed Seismic Load Combinations:

- Vertical and horizontal load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

---

### Bolted to Steel

- Vertical Force = 23800 LBS
- Horizontal Force = 2800 LBS

---

### Bolted or Welded to Steel

- Minimum Kx/Ky Ratio of 1.0 for bolted or welded to steel.
- Elements must be bolted or welded to steel in an approved manner.

---

### Anchoring

- Equipment anchoring must be done in an approved manner.
- Minimum anchor load of 50% must be provided.
- All elements must be solid loaded and welded.
- Anchor bolts may be used for bolting during equipment erection.

---

**Kinetics Noise Control © 2003**
Computed horizontal and vertical bolt force combinations must fall within the restraint capacity envelope. Contact KNC for bolt to steel data.

**Specifications:**
- Vertically and laterally restrained spring isolator with neoprene snubbing elements.
- Minimum coil wire load of 90%.
- Powder coated coils and hot dipped galvanized bracket.
- All elements are permanently attached to the top plate.
- Equipment may be used for blocking during equipment erection.

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**FLSS Submittal Drawings**
**DRAWING #S-01-22.23S – FLSS 2-4000/9000**

**Releas Date:** 2/01/05
Computed horizontal and vertical seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

### FLSS Submittal Drawings

**DRAWING #:** S-01-22.24S – FLSS 2-8000/18000

**RELEASE DATE:** 2/01/05

**KINETICS™ Seismic Design Manual**

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**Specifications:**
- Vertical and laterally restrained spring isolators with constant free and operating height and replaceable elements are used for blocking during equipment erection.
- Elements may be used for bolting during equipment erection.
- Minimum Kc ratio of 1.0.
- All elements are made of Galvanized Bracket and Hot Dipped Galvanized Bracket for bolting during equipment erection.

**Table:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Standard Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-8000/18000</td>
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</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>

**FLSS 2" Deflection Seismic Isolator Points (inches and pounds):**

<table>
<thead>
<tr>
<th>FLSS</th>
<th>Deflection</th>
<th>Seismic Isolator</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-8000/18000</td>
<td>0.75 DIA. x 4.75 MIN. EMBED ANCHORS IN CONCRETE</td>
<td></td>
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</tbody>
</table>

**FLSS 2-8000/18000 Anchor Bolt Torque:**
- 150 FT-LB
- Pull Test: 3625 LB

**VERTICAL FORCE LBS X 1000:**
- 24400 LBS
- 38000 LBS

**HORIZONTAL FORCE LBS X 1000:**
- 1000

---

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---

**Contact Information:**
- Toll Free (USA only): 800-959-1229
- International: 614-889-0480
- Fax: 614-889-0540
- World Wide Web: www.kineticsnoise.com
- Email: sales@kineticsnoise.com

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**Member:**

---

**Printed on:**

---

**Document:**

---
Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

**Specifications:**
- Horizontally and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum kx/kv ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket housings may be used for blocking during equipment erection.

**FLSS Submittal Drawings**

**DRAWING #S-01-22.41S – FLSS 4-100/1600**

**KINETICS™ Seismic Design Manual**

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**INTERNATIONAL:** 614-889-0480
**FAX:** 614-889-0540
**WORLD WIDE WEB:** www.kineticsnoise.com
**EMAIL:** sales@kineticsnoise.com

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Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

A2, B2, L2, T2, D2 DIMENSIONS REFER TO OPTIONAL BASE-PLATE USED TO INCREASE RATING WHEN ATTACHED TO CONCRETE

VERTICAL RESTRAINT BOLT

REMOVABLE BLOCKING

VERT. FORCE = 18000 LBS

ANCHORED TO CONCRETE

WELDED TO STEEL THROUGH BOLTED

VERT. FORCE = 31700 LBS

ALL MOUNTING BOLT PATTERNS SYMMETRICAL ABOUT ISOLATOR CENTER-LINE

HORIZONTAL FORCE LBS X 1000

VERTICAL FORCE LBS X 1000

FLSS 4" DEFLECTION SEISMIC ISOLATOR

IP UNITS (INCHES AND POUNDS)

<table>
<thead>
<tr>
<th>TYPE</th>
<th>L W T A B D E F d H</th>
</tr>
</thead>
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<td>FLSS</td>
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FLSS Submittal Drawings

DOCUMENT:
P3.2.1-9

Kinetics Noise Control © 2003

Kinetics Noise Control 

KINETICS™ Seismic Design Manual
Computed horizontal and vertical load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

A2, B2, L2, T2, D2 DIMENSIONS REFER TO OPTIONAL BASE-PLATE USED TO INCREASE RATING WHEN ATTACHED TO CONCRETE

HORIZONTAL FORCE LBS X 1000

VERTICAL FORCE LBS X 1000

VERTICAL RESTRAINT BOLT

ANCHORED TO CONCRETE

ANCHORED TO CONCRETE THROUGH BOLTED WELDED TO STEEL

FLSS 4" DEFLECTION SEISMIC ISOLATOR

CHROME

GREEN BLACK BROWN ORANGE RED

4-5500 requires 0.62 dia. x 4.00 min. embedded anchors in concrete

4-5500/11600 anchored to concrete through bolted welded to steel

specs:

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot-dipped galvanized bracket housings may be used for blocking during equipment erection.

Specifications:

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot-dipped galvanized bracket housings may be used for blocking during equipment erection.
Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
F3.2.2-1
FLS Submittal Drawings
DRAWING #5-01-22.11 - FLS 1-250/3500

Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
**FLS 1" DEFLECTION ISOLATOR**

**IP UNITS (INCHES AND POUNDS)**

<table>
<thead>
<tr>
<th>TYPE</th>
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<th>T</th>
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<th>B</th>
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<tbody>
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<td>1-2500/7000</td>
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**Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.**

**SPECIFICATIONS:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- housings may be used for blocking during equipment erection.

**COLOR**

- FLS 1" DEFLECTION ISOLATOR

**Units (Inches and Pounds)**

- Allowable loads based on 3000 PSI min concrete.

**Anchor Bolt Torque**

- 1-2500/7000 anchor bolt torque - 75 ft-lb, pull test - 2670 lb.

**VERTICAL RESTRAINT BOLT**

- Removable blocking used to increase rating when attached to concrete.

**VERTICAL FORCE LBS X 1000**

- A2, B2, L2, T2, D2 dimensions refer to optional baseplate used to increase rating when attached to concrete.
Computed horizon and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
**Specifications:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- Housings may be used for blocking during equipment erection.

**Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.**
Computed horizon and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
Computed max and aux seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

**SPECIFICATIONS:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbering elements.
- Minimum coil overload of 50%.
- Powder coated coils and hot dipped galvanized bracket equipment.
- Housings may be used for blockout during equipment erection.

**FLS 2" DEFLECTION ISOLATOR**

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<thead>
<tr>
<th>SIZE</th>
<th>TYPE</th>
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**COLORS:**

- Inner: Blue, Green, Black, Orange, Red

**RATED LOADS (BASED ON 3000 PSI MIN CONCRETE):**

- 2-4000: 4000 lbs
- 2-5000: 5000 lbs
- 2-5500: 5500 lbs
- 2-6000: 6050 lbs
- 2-6500: 6500 lbs
- 2-7000: 7000 lbs
- 2-7800: 7800 lbs
- 2-8200: 8200 lbs
- 2-9000: 9000 lbs

**VERTICAL FORCE (LBS X 1000):**

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<tr>
<td>2-6500</td>
<td>FLS</td>
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**HORIZONTAL FORCE (LBS X 1000):**

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**KINETICS™ Seismic Design Manual**

**MEMBER**

Kinetics Noise Control © 2003
**FLS 2" DEFLECTION ISOLATOR**

**IP UNITS (INCHES AND POUNDS)**

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<th>B</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>d</th>
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<td>11.00</td>
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**SPECIFICATIONS:**
- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements are safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- housings may be used for blocking during equipment erection.

Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
Computed horizontal and vertical seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

IF EQUIP SUPPORT STEEL IS 90° TO THE LONG ISOLATOR AXIS, AN ADDITIONAL PLATE EQUAL IN THICKNESS TO THE TOP PLATE IS REQUIRED.

**VERTICAL FORCE LBS X 1000**

- **HORIZONTAL FORCE LBS X 1000**

### SPECIFICATIONS:

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- All elements safe at solid loading.
- Powder coated coils and hot-dipped galvanized bracket housings may be used for blocking during equipment erection.

**FLS Submittal Drawings**

**DRAWING #S-01-22.41 – FLS 4-100/1600**

**RELEAS DATE:** 02/01/05

**DOCUMENT:** P3.2.2-8

Kinetics Noise Control © 2003
**FLS Submittal Drawings**

**DRAWING #: 01-22.42 - FLS 4-2250/5800**

**Table: FLS 4" Deflection Isolator**

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**Specifications:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable Neoprene Snubbing Elements.
- Minimum coil overload of 50%.
- Minimum Kx/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dip galvanized bracket.
- Housings may be used for blocking during equipment erection.

**Diagram:**

- Vertical restraint bolt.
- Removable blocking.
- Vertical force lbs x 1000.
- Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
Computed hour and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

**Specifications:**

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.
- All elements safe at solid loading.
- Powder coated coils and hot-dipped galvanized bracket.
- housings may be used for blocking during equipment erection.

**Dimensions:**

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<th>Type</th>
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<th>O.D.</th>
<th>H.T.</th>
<th>Load Defl.</th>
<th>Raised</th>
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</thead>
<tbody>
<tr>
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<td>5.50</td>
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<td>Beige</td>
<td>8.00</td>
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<td>5.50</td>
<td>0.21</td>
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<tr>
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<td>1.50</td>
<td>5.50</td>
<td>0.21</td>
<td>0.21</td>
</tr>
</tbody>
</table>

**Vert. Force LBS x 1000:**

- 4-5500/11600 = 24,500 LBS
- 4-5500/11600 = 13,000 LBS

**Horizontal Force LBS x 1000:**

- 4-5500/11600 Reaches 0.62 dia. x 4.00 min. embed anchor in concrete.

**Table:**

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Color</th>
<th>Free Load</th>
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<th>H.T.</th>
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<td>1.50</td>
<td>5.50</td>
<td>0.21</td>
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**Figures:**

- 4-5500/11600 requires 0.62 dia. x 4.00 min. embed anchor in concrete.
- 4-5500/11600 anchor bolt torque - 75 ft-lb. pull test - 2,670 lb.
MEMBER

Computed horizontal and vertical load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.

SPECIFICATIONS:
- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- Minimum coil overload of 50%.

FLS Submittal Drawings
DRAWING #S-01-22.44 – FLS 4-11000/23200

KINETICS™ Seismic Design Manual

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International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

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FHS 1" DEFLECTION SEISMIC ISOLATOR

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**T-P UNITS (INCHES AND POUNDS)**

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* INCLUDES WELDED GUSSET AS SHOWN

**SPECIFICATIONS:**

- Vertically and LATERALLY RESTRAINED SPRING ISOLATOR WITH CONSTANT FREE AND OPERATING HEIGHT AND REPLACEABLE NEOPRENE SNUBBING ELEMENTS.
- 0.25 NOMINAL CLEARANCE IN SNUBBING ELEMENTS.
- MINIMUM OVERLOAD OF 50%.
- MINIMUM Kx/Ky RATIO OF 1.0.
- ALL ELEMENTS SAFE AT SOLID LOADING.
- POWDER COATED COILS AND HOT DIPPED GALVANIZED BRACKET
- OSHPD APPROVAL NUMBER R-0433

Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
## FHS 2" DEFLECTION SEISMIC ISOLATOR

### STANDARD RATINGS

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<th>H</th>
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<th>Z</th>
<th>T</th>
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### I-P UNITS (INCHES AND POUNDS)

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<th>CAPACITY</th>
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*Includes welded gusset as shown.

2-100/1975 requires 0.62 DIA x 4.0 MIN embed anchors in concrete.
2-2000/4500 requires 1.0 DIA x 6.0 MIN embed anchors in concrete.
(Lettable loads based on 3000 PSI MIN concrete).

### SPECIFICATIONS:

- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- 0.25 nominal clearance in snubbing elements.
- Minimum overload of 50%.
- Minimum Kv/Ky ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket.
- OSHPD Approval number R-0433.

---

Example graphs of horizontal and vertical restraint capacity are shown, with computed load combinations indicating the isolator's performance under seismic conditions.
**FHS 4" DEFLECTION SEISMIC ISOLATOR**

<table>
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<tr>
<th>TYPE</th>
<th>L (IN)</th>
<th>W (IN)</th>
<th>H (IN)</th>
<th>D (IN)</th>
<th>Z (IN)</th>
<th>T (IN)</th>
<th>A (IN)</th>
<th>E (IN)</th>
<th>O.D. (IN)</th>
<th>CAPACITY (LBS)</th>
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<td>4-100/1600</td>
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<td>0.62</td>
<td>0.50</td>
<td>0.81</td>
<td>3.50</td>
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<td>4-2250/5800</td>
<td>14.76</td>
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<td>0.88</td>
<td>0.50</td>
<td>0.94</td>
<td>5.00</td>
<td>5.63</td>
<td>1250</td>
</tr>
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</table>

*Includes welded gusset as shown*

4-100/1600 requires 0.62 DIA x 4.0 MIN EMBED ANCHORS IN CONCRETE
4-2250/5800 requires 1.0 DIA x 9.0 MIN EMBED ANCHORS IN CONCRETE
ALLOWABLE LOADS BASED ON 3000 PSI MIN CONCRETE

**SPECIFICATIONS:**
- Vertically and laterally restrained spring isolator with constant free and operating height and replaceable neoprene snubbing elements.
- 0.25 nominal clearance in snubbing elements.
- Minimum overloads of 50%.
- Minimum ky/kx ratio of 1.0.
- All elements safe at solid loading.
- Powder coated coils and hot dipped galvanized bracket
- OSHPD APPROVAL NUMBER R-043

Computed horiz and vert seismic load combinations must fall within the restraint capacity envelope. Contact KNC for bolted to steel data.
INSTALLATION INSTRUCTIONS

KINETICS MODEL (FLS & FLSS) SPRING ISOLATOR

NOTE:

KINETICS NOISE CONTROL SUGGESTS THAT MODEL FLS & FLSS ISOLATORS BE ON THE JOBSITE PRIOR TO ARRIVAL OF THE EQUIPMENT.

1. COORDINATE THE LOCATION OF EACH ISOLATOR WITH THE APPROPRIATE SUBMITTAL DRAWING AND WITH THE COLOR CODE CHART PROVIDED FOR THE SPRINGS.

2. PLACE THE ISOLATORS IN THEIR PROPER LOCATION AND ATTACH BOTTOM PLATE TO THE BUILDING SUPPORT STEEL.

3. SET THE EQUIPMENT FOOT, BRACKET OR SUPPORT STEEL ON TOP OF THE ISOLATORS AND ATTACH TO THE FLS TOP PLATE PER PROJECT SPECIFICATIONS.

4. LOosen THE VERTICAL RESTRAINT JAM NUTS TO THE END OF THE RESTRAINT BOLTS.

5. IN TURNS, ROTATE THE LEVELING BOLTS COUNTER-CLOCKWISE SEVERAL COMPLETE TURNS ON EACH ISOLATOR UNTIL THE BLOCKING ELEMENT CAN BE REMOVED BY PRYING APART WITH A SCREW DRIVER. IT WILL BE NECESSARY TO MAKE SEVERAL CIRCLES OF THE ISOLATORS IN ORDER TO UNIFORMLY RAISE THE EQUIPMENT. DO NOT ATTEMPT TO PLACE ALL THE WEIGHT ON ANY ONE ISOLATOR, THIS MAY RESULT IN DAMAGE TO THE ISOLATOR.

6. DO NOT ATTEMPT TO MOVE ISOLATORS LATERALLY WITH THE WEIGHT OF THE EQUIPMENT ON THEM. IF IT IS NECESSARY TO MOVE THE EQUIPMENT, REMOVE THE EQUIPMENT FROM THE ISOLATORS FIRST. FAILURE TO FOLLOW THIS PROCEDURE COULD RESULT IN DAMAGE TO THE ISOLATORS.

7. WHEN THE EQUIPMENT IS LEVEL PER THE EQUIPMENT MANUFACTURER'S TOLERANCE, TIGHTEN THE VERTICAL RESTRAINING NUTS FINGER TIGHT, THE BACK OFF ONE FULL TURN. LOCK THE BOLTS WITH JAM NUTS PROVIDED.

8. DISCARD ALL BLOCKING ELEMENTS.
INSTALLATION INSTRUCTIONS
FOR
TYPE FHS KINETICS SPRING ISOLATION MOUNT

1. COORDINATE THE LOCATION OF EACH ISOLATOR WITH THE APPROPRIATE SUBMITAL DRAWING.
2. REMOVE THE ATTACHMENT BOLT AND ONE WASHER FROM THE TOP OF THE LEVELING NUT. INSERT IT INTO THE EQUIPMENT BRACKET (IT IS NOT NECESSARY TO INSTALL THE SPRING AT THIS POINT).
3. ALIGN THE EQUIPMENT AND CENTER THE ISOLATOR.

ISOLATOR HOUSING ANCHOR BOLT LOCATIONS.
4. RAISE THE EQUIPMENT OR EQUIPMENT BASE AND INSTALL THE ISOLATOR ANCHORS IN THE FLOOR.
5. LOCATE THE SPRINGS AND LOWER THE EQUIPMENT. NOTE WITH APPROXIMATELY THE DESIRED FLOOR CLEARANCE.

6. INSTALL ANCHOR NUTS TO FIRMLY ATTACH THE FHS HOUSING TO THE FLOOR OR HOUSEKEEPING PAD.
7. LOOSELY BOLT EQUIPMENT TO THE ISOLATOR USING THE ATTACHMENT BOLT.
8. ADJUST THE ISOLATOR BY TURNING THE LEVELING NUT CW UNTIL THE FHS HOUSING TOP PLATE IS CENTERED BETWEEN THE RUBBER SNUBBING PADS ON THE LEVELING SCREW.

IN A SIMILAR MANNER, CONTINUE WITH THE ADJUSTMENT OF THE REMAINING ISOLATORS.
9. TIGHTEN THE ADJUSTMENT BOLT, THUS BOLTING THE SPRING TO THE SUPPORTED EQUIPMENT AND LOCKING THE LEVELING BOLT AGAINST TURNING.
10. DO NOT ATTEMPT TO MOVE THE ISOLATORS LATERALLY WITH THE WEIGHT OF THE EQUIPMENT ON THEM. IF IT IS NECESSARY TO MOVE THE EQUIPMENT, REMOVE THE WEIGHT FROM THE ISOLATORS BY RAISING THE EQUIPMENT BEFORE MOVING.
# CHAPTER P4

**KRMS / RQ ELASTOMERIC ISOLATORS AND RESTRAINTS**

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<td>General Description (RQ)</td>
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<td>RQ</td>
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<tr>
<td>Installation Instructions</td>
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</tr>
</tbody>
</table>
Description
Kinetics Model RQ Vibration Isolators are one-piece molded neoprene mounts with encapsulated metal inserts. The metal inserts provide all-directional resistance for horizontally and vertically applied loads. Each isolator incorporates two bolt-down holes on the bottom load surface and a steel top load plate for attachment to the supported equipment. The neoprene is highly oil resistant and has been designed to operate within the strain limits of the isolator to provide the maximum isolation and longest life expectancy possible using neoprene compounds. Model RQ is designed for up to 0.15" (4 mm) deflection, available in two sizes and four capacities from 500 lbs. to 1300 lbs. (227 kg to 591 kg). Kinetics Model RQ is recommended for the isolation of vibration produced by small pumps, vent sets, low pressure packaged air-handling units, etc., and is usually selected when first cost must be minimized.

Specifications
Vibration isolators shall be neoprene, molded from oil-resistant compounds, with a cast-in-top steel load transfer plate for bolting to supported equipment and a bolt-down plate with holes provided for anchoring to the supporting structure. Isolator shall provide lateral load resistance for loads applied parallel to mounting surface. Neoprene vibration isolators shall have minimum operating static deflections as shown on the Vibration Isolation Schedule or as indicated on the project documents but not exceeding published load capabilities.

Neoprene vibration isolators shall be Model RQ, by Kinetics Noise Control, Inc.
### P4.2.2

#### MODEL RQ

- **DRAWING # S-02.05-1C**

#### ISOLATOR TYPE | DURO. | RATED COMPRESSION CAPACITY | RATED DEFLECTION | A | B | C | D | E | F | G
<table>
<thead>
<tr>
<th></th>
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<td>500 LBS.</td>
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<td>3.25</td>
<td>5.38</td>
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<td>0.50</td>
<td>1.50</td>
<td>4.12</td>
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<td>750 LBS.</td>
<td>0.15</td>
<td>3.25</td>
<td>5.38</td>
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<td>0.50</td>
<td>1.50</td>
<td>4.12</td>
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<td>RQ-1000</td>
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<td>1000 LBS.</td>
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<td>3.88</td>
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**HORIZONTAL SHEAR CAPACITY:** 1800 LBS.

**HORIZONTAL DEFLECTION:** 0.25” (MAX.)

![Diagram](image)

- **D** - BOLT SIZE
- **G** - MOLDED CAVITY FOR STANDARD HEX NUT

---

**KINETICS™** Seismic Design Manual

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**Kinetics Noise Control ©2003**
CHAPTER P5
HS SERIES RESTRAINTS

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Load Spreader Plate Data P5.4
Installation Instructions P5.5
**HS-2 SEISMIC SNUBBER**

**DRAWING # S-04.13-1A**

**RELEASE DATE: 12/19/03**

**KINETICS™ Noise Control © 2003**

### Dimensions

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<tr>
<th>MODEL NO.</th>
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<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
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<td>5.00</td>
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**LOAD LIMIT VALUES**

- STANDARD ANCHORS: 945# 1308# 1677# 3354#
- ANCHORS 100% INS. 1267# 1854# 2646# 5235#
- BOLTED TO STEEL: 1624# 2887# 4300# 6966#
- WELDED TO STEEL: 1779# 3387# 4922# 6966#

**Anchor Loads Based on ITW Trubolt Wedge Anchors in 3500 PSI Stone Aggregate Concrete**

**NOTE:**

1. ALL DIMENSIONS IN INCHES.
HS-5 SEISMIC SNUBBER

DRAWING # S-04.80-1A

RELEASE DATE: 12/19/03

KINETICS Noise Control © 2003

HS-5 LOAD CAPACITY IN POUNDS

ANCHORED TO CONCRETE BOLTED OR WELDED TO STEEL

OPERATING CLEARANCE FOR THE HS-5 SNUBBER IS APPROX. 0.25 IN ALL DIRECTIONS.

KINETICS HS-5 SNUBBER LISTED CAPACITIES ARE BASED ON EQUAL SIMULTANEOUSLY APPLIED VERTICAL AND HORIZONTAL LOADS. HORIZONTAL LOADS CAN BE APPLIED ON EITHER AXIS.

CAPACITIES FOR INDIVIDUALLY APPLIED LOADS ARE HIGHER, CONSULT KINETICS FOR DETAILS.

CAPACITIES ASSUME THE USE OF THE INDICATED ANCHORS EMBEDDED THEIR APPROVED EMBEDMENT DEPTH IN 3000 PSI CONCRETE. (NO SPECIAL INSPECTION IS REQUIRED.)
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**ESR / KSR / KSCR ROOF TOP EQUIPMENT RATED CURBS**

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ESR / KSR / KSCR SERIES RESTRAINTS

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control © 2003
Kinetics Model ESR

- 1g seismic restraint & 125 mph wind restraint for most equipment
- Access ports for each isolator to inspect, level or change springs after equipment placement
- Up to 4" deflection, powder-coated steel springs with 50% overload capacity
- High-frequency noise isolation pads
- Environmentally inert elastomeric seal for an air- and water-tight closure between the curb and isolation rail
- Supply and return duct support hardware
- Structural steel curb with wood nailer.

Specification

All rooftop air-handling units shall be supported by vibration isolation curbs as manufactured by Kinetics Noise Control. The vibration isolation curbs shall be complete assemblies designed to resiliently support the equipment at the specified elevation and shall constitute a fully enclosed air- and weather-tight system. The isolation curb shall consist of an upper support rail with supply and return duct supports on which the equipment and duct openings rest, and a lower support curb which is attached to the roof structure, separated by free-standing, housed, laterally stable steel springs.

The upper support rail shall provide continuous structural support for the rooftop equipment and shall be designed to provide isolation against casing-radiated vibration in the rooftop equipment housing and structure borne vibration from rotating and mechanical equipment in the rooftop package.

The upper support rail shall consist of a structural channel with sufficient elevation above the spring to preclude interference with the rooftop equipment and permit access to inspect the isolation system after placement of the rooftop equipment. Support of the RTU by weather seal attachment bolt heads is not permitted.

The lower support curb shall be a formed channel fabricated of heavy gauge galvanized steel with a continuous 1-1/2 in x 1-1/2 in (38 mm x 38 mm) nominal wood nailer attached to the isolation support pedestals. The isolation support pedestal, which includes the seismic and wind load restraints, shall be bolted or welded to the building support steel to suitably transfer seismic and wind load forces to the building structure. The lower support curb shall have a minimum elevation of 14 in (356 mm) from the top of the wood nailer to the base of the curb.

Spring components shall be (1 in/25 mm)(2 in/51 mm)(4 in/102 mm) deflection, free-standing, laterally stable steel springs. Springs shall have a lateral stiffness greater than
1.2 times the rated vertical stiffness and shall be designed for a typical 50% overload to solid. All springs shall have an epoxy-based, powder-coated finish and be color coded to indicate load capacity. Spring coils shall rest on minimum 0.25 in (6 mm) neoprene noise pads.

Seismic and wind load restraints shall be designed to limit movement in all directions. Restraint components shall include neoprene snubbers at all contact points for energy absorption. There shall be no metal-to-metal contact. The isolation curb shall be designed to withstand horizontal wind loads of 125 mph (200 km/h) and seismic forces of 1g. The vibration isolation curb shall be air and weather tight using an elastomeric seal, which is attached to the upper support frame with a galvanized steel clip. The seal shall extend down past the wood nailer of the lower support assembly and flash over the roof material at the wood nailer on the lower support curb. The seal shall be Class A, as tested in accordance with approved Underwriter’s Laboratories, Inc., provisions. Metal or combination metal and elastomer seals are not permitted. The seal may not be penetrated for isolator adjustment.

The isolation curb system shall be complete with cross-bracing, as required, as a part of the upper and lower assemblies. Supply and return flex connector support hardware shall be supplied for installation by the contractor in the field. The supports will be clearly marked and dimensioned on the submittal and installation drawings. The support hardware shall be cut-to-length, galvanized steel channels supported and connected with stamped and punched galvanized steel duct support hangers. The support hangers shall allow the support elevation to be equal to or lower than the equipment rail elevation. Supply air and return duct shall be flexibly attached by the contractor to prevent transmission of vibration to the building structure.

Airborne noise control packages, if required, shall be supported by the roof structure within the curb and shall have no rigid contact with the isolation curb. The isolation curb assemblies shall be shipped to the job site with the upper support rail, lower support curb, springs, and restraints completely assembled. The contractor shall be required to assemble the four corners, attach the curb to the roof structure, install cross-bracing and flex connector supports as necessary, and install and attach rooftop equipment.

Vibration isolators shall be selected by the manufacturer for each specific application to comply with deflection requirements as shown on the Vibration Isolation Schedule or as indicated on the project documents.
Kinetics Model KSCR
- Internal seismic restraint
- 100 mph wind restraint
- 1 in or 2 in deflection springs
- Supply and return flexible connector support hardware
- EPDM air- and weather-tight seal for non-ducted applications
- High profile, non-interference aluminum equipment rail
- Accessible, interchangeable springs

Specification
All rooftop air-handling units shall be supported by vibration isolation curbs as manufactured by Kinetics Noise Control. The vibration isolation curbs shall be complete assemblies designed to resiliently support the equipment at the specified elevation and shall constitute a fully enclosed air- and weather-tight system.

The isolation curb shall consist of an upper support rail with supply and return flexible connector supports on which the equipment and duct openings rest and a lower support curb which is attached to the roof structure, separated by free-standing, unhoused, laterally stable steel springs and lateral seismic and/or wind load restraints. The upper support rail shall provide continuous structural support for the rooftop equipment and shall be designed to provide isolation against casing-radiated vibration in the rooftop equipment housing and structure borne vibration from rotating and mechanical equipment in the rooftop package.

The upper support rail shall consist of an extruded aluminum structural shape with a minimum height of 4.75 in (121 mm) above the spring to preclude interference with the rooftop equipment and permit access to inspect, level, or change the springs after placement of the rooftop equipment.

The lower support curb shall be a formed channel fabricated of heavy gauge galvanized steel with a continuous 1-1/2 in x 1-1/2 in (38 mm x 38 mm) nominal wood nailer. The base plate of the curb shall be 1 in (25 mm) wide and shall be welded, bolted or screwed to the building support steel.

The lower support curb shall have a minimum elevation of 14 in (356 mm). Spring components shall be (1 in/25 mm) (2 in/51 mm) deflection, free-standing, unhoused, laterally stable steel springs. Springs shall have a lateral stiffness greater than 1.0 times the rated vertical stiffness and shall be designed for a typical 50% overload to solid. All springs shall have an epoxy-based, powder-coated finish and be color coded to indicate load capacity. Springs shall rest on a neoprene noise pad. The spring and
noise pad shall be captured in a retainer cap secured to the lower support curb. The lateral stabilizers shall be stainless steel spring assemblies factory-located and installed to provide seismic and/or wind load restraint. The standard system shall have a 100 mph (161 km/h) wind load restraint capacity and a minimum horizontal restraint capacity of 1,000 lbs. (455 kg) in both axes.

The weather seal shall run continuously around the perimeter of the curb and be joined in the field with one seam using a double-faced elastomeric adhesive. The weather seal shall be fastened to the wood nailer of the lower support curb using screws and an aluminum fascia strip.

Supply and return flexible connector support hardware shall be supplied for installation by the contractor in the field. The supports will be clearly marked and dimensioned on the submittal and installation drawings. The support hardware shall be cut-to-length, galvanized steel channels supported and connected with stamped and punched galvanized steel duct support hangers. The support hangers shall allow the duct support elevation to be equal to or lower than the equipment rail elevation. Supply and return air duct shall be flexibly attached by the contractor to prevent transmission of vibration to the building structure.

The isolation curb assemblies shall be shipped to the job site with the upper support rail, lower support curb, springs, and stabilizers completely assembled. The contractor shall assemble the four corners and attach the curb to the roof structure.

The isolation curb assembly shall include a troubleshooting kit to permit the contractor to level or adjust the loading of the isolation system immediately after placement of the rooftop equipment should the actual weight and/or distribution differ from design values. Vibration isolators shall be selected by the manufacturer for each specific application to comply with deflection requirements as shown on the Vibration Isolation Schedule or as indicated on the project documents.
Kinetics Model KSR

Kinetics KSR perimeter isolation system is designed and engineered to mount on top of an existing fixed curb system and isolate packaged rooftop equipment from the roof structure. Designed for easy installation, minimum interference with equipment overhang, and with accessible springs, the Kinetics KSR goes well beyond internal isolation by reducing casing-radiated vibration caused by turbulent air flow as well as compressor and fan vibration. KSR rails have a positive elastomeric air and weather seal permitting the inside of the unit to be used as a return air plenum. The KSR mates with the inside of the manufacturer’s curb eliminating any internal interference. The KSR also features an impressive family of options including:

- Aluminum weather seal flashing
- Seismic restraint
- Airborne noise control package
- Duct block offs

**Specification**

Spring components shall be (1 in/25 mm), (2 in/51 mm) deflection, free-standing, unhoused, laterally stable steel springs. Springs shall have a lateral stiffness greater than 1.0 times the rated vertical stiffness and shall be designed for 50% overload to solid.

Springs shall be color coded to indicate load capacity.

Rails shall provide continuous support for the rooftop equipment and shall be designed to provide isolation against casing-radiated vibration in the rooftop equipment housing and structure borne vibration from rotating and mechanical equipment in the rooftop package. Rail assembly shall consist of extruded aluminum top and bottom members connected by spring isolators and a continuous air- and water-tight seal. The seal shall be a beaded elastomeric material retained in a keyway along the top extrusion. The weather strip shall be sealed along the bottom with an aluminum fascia strip.

Rail assemblies shall incorporate means for attachment to the building and the supported equipment and shall incorporate additional stiffening members if necessary to assure stability. Vibration isolators shall be selected by the manufacturer for each specific application to comply with deflection requirements as shown on the Vibration Isolation Schedule or as indicated on the project documents.
**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 1 INCH (25 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

**RERAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

EACH PEDESTAL MUST BE WELDED TO SUPPORTING STEEL WITH A MIN: .25" WELD 12" LONG AT EACH END OF THE PEDESTAL BASE.

**ROOFTOP EQUIPMENT**

**DRAWING # S-89.100-1**

**RELEAS DATE: 4/10/00**

**KINETICS™ Seismic Design Manual**
**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 1 INCH (25 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT FULL LOADING

SPRING ISOLATORS ARE PAINTED.

**RESTRAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

FOR STANDARD HEIGHT CURBS THE BOLTING ATTACHMENT SHOWN IS SUITABLE FOR 3000 LB LOADS AS WELL, WITH EXTENDED HEIGHT CURBS CONTACT FACTORY FOR RESTRAINT RATINGS.

**ROOFTOP EQUIPMENT**

**ROOF CURB/ ISOLATION RAIL**

**CAPACITY PER PEDESTAL BY SPRING TYPE**

<table>
<thead>
<tr>
<th>RATED LOAD (LB/KG)</th>
<th>RATED DEFL (IN/mm)</th>
<th>SPRING FR. HT. (IN/mm)</th>
<th>SPRING O. D. (IN/mm)</th>
<th>COLOR CODE</th>
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<tr>
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</tr>
<tr>
<td>1000/455</td>
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<td>4.0/101</td>
<td>3.0/76</td>
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<tr>
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<td>3.0/76</td>
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</table>
**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 2 INCH (50 mm) STATIC DEFLECTION

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

**NOTE:**

MODEL ESR WILL PROVIDE CONTINUOUS SUPPORT OF UNIT WEIGHT WITH 4" TOP RAIL.

**RESTRAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL WIND OR SEISMIC LOADING. TO ACHIEVE FULL RATING, ESR MUST BE STANDARD HEIGHT AND EACH PEDESTAL MUST BE WELDED TO SUPPORTING STRUCTURAL STEEL WITH A MIN. 0.25" WIDE 12" LONG AT EACH END. 3000 LB CAPACITY CAN ALSO BE ACHIEVED IF BOLTED TO STRUCTURAL STEEL USING 5/8" HARDWARE.

<table>
<thead>
<tr>
<th>RATED LOAD (LB/KG)</th>
<th>RATED DEF. (IN/MM)</th>
<th>SPRING FR. HT. (IN/MM)</th>
<th>SPRING O. D. (IN/MM)</th>
<th>COLOR CODE</th>
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</thead>
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<tr>
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<td>GREEN</td>
</tr>
<tr>
<td>750/339</td>
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<td>5.88/149</td>
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<td>ORANGE</td>
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<td>3.5/89</td>
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CAPACITY PER PEDESTAL BY SPRING TYPE
**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 2 INCH (50 mm) STATIC DEFORMATION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

**NOTE:**

MODEL ESR TO PROVIDE CONTINUOUS SUPPORT OF UNIT WEIGHT WITH 4" TOP RAIL.

**RESTRAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING FOR STANDARD HEIGHT CURBS THE BOLTING ATTACHMENT SHOWN IS SUITABLE FOR 3000 LB LOADS AS WELL. WITH EXTENDED HEIGHT CURBS CONTACT FACTORY FOR RESTRAINT RATINGS.

**ROOFTOP EQUIPMENT**

- **ROOF Curb/Isolation Rail**
  - **ALL-DIRECTIONAL SEISMIC SNUBBER**
  - **4" TOP RAIL**
  - **CONTINUOUS WOOD NAILER**
  - **LEVELING BOLT**
  - **BLOCK WITH STEEL SHING (4) .62 BOLTS/PEDESTAL (BY OTHERS)**

**RATED LOAD** | **RATED DEFULL IN/MM** | **SPRING FR. HT. IN/MM** | **SPRING O.D. IN/MM** | **COLOR CODE**
---|---|---|---|---
250/113 | 2.00/50 | 5.75/146 | 3.5/89 | BLUE
500/226 | 2.00/50 | 5.75/146 | 3.5/89 | GREEN
750/339 | 2.00/50 | 5.75/146 | 3.5/89 | BLACK
995/450 | 2.00/50 | 5.88/149 | 3.5/89 | ORANGE
1400/636 | 2.00/50 | 5.88/149 | 3.5/89 | ORNG/GRN

**CAPACITY PER PEDESTAL BY SPRING TYPE**
ESR-2 ISOLATION CURB W/ CONDENSER SUPPORT

SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 2 INCH (50 mm) STATIC DEFLECTION

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

NOTE:

MODEL ESR TO PROVIDE CONTINUOUS SUPPORT OF UNIT WEIGHT WITH 4" TOP RAIL.

RESTRAINT AND ATTACHMENT DATA

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL WIND OR SEISMIC LOAD. TO ACHIEVE FULL RATING, ESR MUST BE STANDARD HEIGHT AND EACH PEDESTAL MUST BE WELDED TO SUPPORTING STRUCTURAL STEEL WITH A MIN. 0.25" WELD 12" LONG AT EACH END. 3000 LB CAPACITY CAN ALSO BE ACHIEVED IF BOLTED TO STRUCTURAL STEEL USING 5/8" HARDWARE.

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<tr>
<th>RATED LOAD</th>
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<th>SPRING FR. H.</th>
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<td>5.88/149</td>
<td>3.5/89</td>
<td>RED/GRN</td>
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</table>

CAPACITY PER PEDESTAL
SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 3 INCH (76 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

RESTRAINT AND ATTACHMENT DATA

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

EACH PEDESTAL MUST BE WELDED TO SUPPORTING STEEL WITH A MIN .25" WELD 12" LONG AT EACH END OF THE PEDESTAL BASE

ROOFTOP EQUIPMENT

ROOF CURB/ISOLATION RAIL

ALL-DIRECTIONAL SEISMIC SNUBBER

HIGH FREQUENCY NEOPRENE ELEMENTS

CONTINUOUS WOOD NAILEER

REMOVABLE ACCESS PANEL

LEVELING BOLT

CONTINUOUS GALVANIZED STEEL CURB PERIMETER

P6.2.1

MODEL ESR-3 ISOLATION RAIL

DRAWING # S-89.300

RELEASE DATE: 8/20/97

Kinetics Noise Control © 2003
**MODEL ESR-3 ISOLATION RAIL (BOLT DOWN)**

**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 3 INCH (75 mm) STATIC DEFORMATION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SLOID LOADING

SPRING ISOLATORS ARE PAINTED.

**RESTRAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

FOR STANDARD HEIGHT CURBS, THE BOLTING ATTACHMENT SHOWN IS SUITABLE FOR 3000 LB LOADS AS WELL, WITH EXTENDED HEIGHT CURBS CONTACT FACTORY FOR RESTRAINT RATINGS.

**ROOFTOP EQUIPMENT**

**CAPACITY PER PEDESTAL BY SPRING TYPE**

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<tr>
<th>RATED LOAD (LBS)</th>
<th>RATED DEFL (IN/MM)</th>
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</table>

**KINETICS™ Seismic Design Manual**
**SPRING DATA**

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 4 INCH (100 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

**RESTRAINT AND ATTACHMENT DATA**

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

EACH PEDESTAL MUST BE WELDED TO SUPPORTING STEEL WITH A MIN .25" WELD 12" LONG AT EACH END OF THE PEDESTAL BASE

**ROOFTOP EQUIPMENT**

- **ROOF CURB/ISOLATION RAIL**
- **ALL-DIRECTIONAL SEISMIC SNUBBER**
- **4" [ TOP RAIL**
- **SPRING ISOLATOR SEE CHART**
- **LEVELING BOLT**
- **CONTINUOUS GALVANIZED STEEL CURB PERIMETER**
- **REMOVABLE ACCESS PANEL**

**RATED LOAD**

<table>
<thead>
<tr>
<th>RATED LOAD</th>
<th>RATED DEFL.</th>
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<th>SPRING O. D.</th>
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</table>

**CAPACITY PER PEDESTAL BY SPRING TYPE**

**KINETICS™**

Seismic Design Manual
MODEL ESR-4 ISOLATION RAIL (BOLT DOWN)

DRAWING # S-89.401-1A

RELEASE DATE: 6/12/00

KINETICS™ Seismic Design Manual

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control © 2003
MODEL ESR-4 ISOLATION CURB W/ COND. SUPPORT

SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 4 INCH (100 mm) STATIC DEFLECTION

SPRING ISOLATORS HAVE A MINIMUM kx/ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

RESTRAINT AND ATTACHMENT DATA

RESTRAINT PEDESTALS DESIGNED FOR 3000 LB LATERAL AND VERTICAL SIMULTANEOUS LOADING

EACH PEDESTAL MUST BE WELDED TO SUPPORTING STEEL WITH A MIN .25" WELD 4" LONG AT EACH END OF THE PEDESTAL BASE

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<td>5.63/149</td>
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<td>10.0/254</td>
<td>5.63/149</td>
<td>ORG/GRN</td>
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CAPACITY PER PEDESTAL
SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 1 INCH (25 mm) STATIC DEFORMATION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SUGGESTED LOADING

SPRING ISOLATORS ARE PAINTED.

<table>
<thead>
<tr>
<th>RATED LOAD</th>
<th>RATED DEFL.</th>
<th>SPRING FR. HT.</th>
<th>SPRING O. D.</th>
<th>COLOR CODE</th>
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<tbody>
<tr>
<td>LB/ KG</td>
<td>IN/mm</td>
<td>mm/ IN mm</td>
<td>IN/ mm</td>
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<td>1.00/25</td>
<td>2.50/63</td>
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<tr>
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<td>2.50/63</td>
<td>1.46/37</td>
<td>BROWN</td>
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SPECIAL NOTE:
ALL UNITS SUPPLIED WITH A TROUBLE SHOOTING PACKAGE FOR LEVELING EQUIPMENT, IF REQUIRED, DURING INSTALLATION.

PRE-PUNCHED BOLTING HOLES IN TOP EXTRUSION FOR HARDWARE BY KNC

WIND/SEISMIC RESTRAINT BRACKET QUANTITY AND LOCATION PRE-DETERMINED BY KNC

HARDWARE BY KNC

TYPICAL SECTION SHOWING WIND/SEISMIC RESTRAINT
NOTE: IF SEISMIC APPLICATION IS REQUIRED CONSULT SALES REPRESENTATIVE.

TYPICAL SECTION SHOWING SPRING ISOLATOR
SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 2 INCH (50 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.0

SPRING ISOLATORS ARE SAFE AT SOLO LOADING

SPRING ISOLATORS ARE PAINTED.

SPECIAL NOTE:
ALL UNITS SUPPLIED WITH A TROUBLE SHOOTING PACKAGE FOR LEVELING EQUIPMENT.
IF REQUIRED, DURING INSTALLATION.

<table>
<thead>
<tr>
<th>RATED LOAD LB/KG</th>
<th>RATED DEF L IN/mm</th>
<th>SPRING FR HT IN/mm</th>
<th>SPRING O D IN/mm</th>
<th>COLOR CODE</th>
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<tr>
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<td>65/30</td>
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<td>3.75/95</td>
<td>1.46/37</td>
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PRE PUNCHED BOLTING HOLES IN TOP EXTRUSION FOR HARDWARE BY KNC

WIND/SEISMIC RESTRAINT BRACKET QUANTITY AND LOCATION PRE-DETERMINED BY KNC

HARDWARE BY KNC

TYPICAL SECTION SHOWING WIND/SEISMIC RESTRAINT
NOTE: IF SEISMIC APPLICATION IS REQUIRED CONSULT SALES REPRESENTATIVE.
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SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

PRE PUNCHED HOLE
HOLES IN TOP EXTRUSION
FOR HARDWARE SUPPLIED
BY KNC

KSR KEOP. VERTICAL RESTRAINT
( OPT - AS REQ'D)

WIND/SEISMIC RESTRAINT
BRACKET QUANTITY AND
LOCATION DETERMINED
BY KNC PER ORDER

HARDWARE BY KNC

TYPICAL SECTION
SHOWING WIND/SEISMIC LATERAL & VERTICAL RESTRAINT

NOTE:
IF SEISMIC APPLICATION IS REQUIRED
CONSULT SALES REPRESENTATIVE.

SPECIAL NOTE:
ALL UNITS SUPPLIED WITH A TROUBLE SHOOTING PACKAGE
FOR LEVELING EQUIPMENT, IF REQUIRED, DURING INSTALLATION.

<table>
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<td>FR. HT.</td>
<td>O. D.</td>
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<td>1.46/37</td>
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### SPRING DATA

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SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

**SPECIAL NOTE:**

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<th>COLOR</th>
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<td>LB/KG</td>
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<td>IN/mm</td>
<td>D. D.</td>
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**PRE PUNCHED BOLTING HOLES IN TOP EXTRUSION FOR HARDWARE SUPPLIED BY KNC**

**KSR NEOP VERTICAL RESTRAINT** (OPT - AS REQ'D)

WIND/SEISMIC RESTRAINT BRACKET QUANTITY AND LOCATION DETERMINED BY KNC PER ORDER

HARDWARE BY KNC

**TYPICAL SECTION SHOWING WIND/SEISMIC LATERAL & VERTICAL RESTRAINT**

**NOTE:** IF SEISMIC APPLICATION IS REQUIRED CONSULT SALES REPRESENTATIVE.
TABLE 6.2.3

<table>
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<tr>
<th>Rated Load (Lb/kg)</th>
<th>Rated Defl. (in/mm)</th>
<th>Spring Fr. Ht. (in/mm)</th>
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<td>BROWN</td>
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</table>

SNAR DC BUILDING ISOLATION RAIL

SPRING DATA

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SPRING ISOLATORS HAVE A MINIMUM Kx/Ky OF 1.2

SPRING ISOLATORS HAVE A TYPICAL OVERLOAD CAPACITY OF 50%

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

DUCT BLOCK-OFF

BY KNC

PRE-PUNCHED BOLTING HOLES IN TOP EXTRUSION FOR HARDWARE BY KNC

NEOPRENE VERT REST (WHERE REQUIRED)

WIND/SEISMIC RESTRAINT

BRACKET QUANTITY AND LOCATION PRE-DETERMINED BY KNC

HARDWARE BY KNC

TYPICAL SECTION SHOWING WIND/SEISMIC RESTRAINT

NOTE: IF SEISMIC APPLICATION IS REQUIRED CONSULT SALES REPRESENTATIVE.
SPRING DATA

SPRING ISOLATORS ARE COMPUTER SELECTED AND LOCATED TO PROVIDE A NOMINAL 2 INCH (50 mm) STATIC DEFLECTION.

SPRING ISOLATORS HAVE A MINIMUM KY/KX OF 1.0

SPRING ISOLATORS ARE SAFE AT SOLID LOADING

SPRING ISOLATORS ARE PAINTED.

RATED LOAD | RATED DEF. | SPRING LOAD | SPRING O. D. | COLOR CODE
------------|------------|-------------|--------------|------------
30/14       | 2.00/50    | 3.75/95     | 1.46/37      | GRAY       
65/30       | 2.00/50    | 3.75/95     | 1.46/37      | BLUE       
120/55      | 2.00/50    | 3.75/95     | 1.46/37      | GREEN      
205/93      | 2.00/50    | 3.75/95     | 1.46/37      | BLACK      

SPECIAL NOTE:
ALL UNITS SUPPLIED WITH A TROUBLE SHOOTING PACKAGE FOR LEVELING EQUIPMENT, IF REQUIRED, DURING INSTALLATION.

DUCT BLOCK-OFF
BY KNC

PRE PUNCHED BOLTING
HOLES IN TOP EXTRUSION
FOR HARDWARE BY KNC

NEOPRENE VERT REST
(WHERE REQUIRED)

WIND/SEISMIC RESTRAINT
BRACKET QUANTITY AND
LOCATION PRE-DETERMINED
BY KNC

HARDWARE BY KNC

TYPICAL SECTION
SHOWING WIND/SEISMIC RESTRAINT
NOTE:
IF SEISMIC APPLICATION IS REQUIRED
CONSULT SALES REPRESENTATIVE.

INSULATION
(OPTIONAL)

WEATHER SEAL

COVER STRIP
PRE PUNCHED

FLASHING
(BY OTHERS)

Curb material
16 GA.

14.00 (355 mm)

20.42 OPER HIGHT
(520 mm)

SUPPORTED ROOFTOP EQUIP.

CLOSED-CELL FOAM
WEATHERSTRIPPING

EXTRUDED ALUMINUM RAIL

WEATHER SEAL

COVER STRIP
PRE PUNCHED

FLASHING
(BY OTHERS)

Curb material
16 GA.

14.00 (355 mm)

20.42 OPER HIGHT
(520 mm)

SUPPORTED ROOFTOP EQUIP.

CLOSED-CELL FOAM
WEATHERSTRIPPING

EXTRUDED ALUMINUM RAIL

WEATHER SEAL

COVER STRIP
PRE PUNCHED

FLASHING
(BY OTHERS)

Curb material
16 GA.

14.00 (355 mm)

20.42 OPER HIGHT
(520 mm)

SUPPORTED ROOFTOP EQUIP.

CLOSED-CELL FOAM
WEATHERSTRIPPING

EXTRUDED ALUMINUM RAIL

WEATHER SEAL

COVER STRIP
PRE PUNCHED

FLASHING
(BY OTHERS)

Curb material
16 GA.

14.00 (355 mm)

20.42 OPER HIGHT
(520 mm)
The installation instruction for the ESR, KSR, and KSCR can be found on our website, http://www.kineticsnoise.com
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KSGC: Light Duty GRIPPLE Cable Restraint Kit (KSCA – KSCA) P7.2.2
KSUA: Light Duty U-Bolt Cable Restraint Kit (KSUA – KSUA) P7.2.3
KSLG: Light Duty GRIPPLE Cable Restraint Kit (KSCA – KSUA) P7.2.4
KSCU: Light Duty GRIPPLE Cable Restraint Kit (KSUA – KSCA) P7.2.5
KSUG: Light Duty GRIPPLE Cable Restraint Kit (KSUA – KSUA) P7.2.6

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KSQF: Light Duty GRIPPLE Bulk Cable Restraint Kit (KSCA – KSCA) P7.3.2
KSUA: Light Duty U-Bolt Clip Bulk Cable Restraint Kit (KSUA – KSUA) P7.3.3
KSCCU: Light Duty U-Bolt Clip Bulk Cable Restraint Kit (CCA – KSUA) P7.3.4
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KSCC-AK (For Use with CCA Brackets) P7.4.3
KSCC4-AK (For Use with CCA-4 Brackets) P7.4.4

Selection Information P7.5
Installation Instructions P7.6
## KSWC U-BOLT CLIP CABLE RESTRAINT KIT (KSCA – KSCA)

### TABLE

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>&quot;MAX. CABLE TENSION&quot;</th>
<th>&quot;MAX. HORIZONTAL CABLE FORCE @ A=0°&quot;</th>
<th>&quot;MAX. HORIZONTAL CABLE FORCE @ A=30°&quot;</th>
<th>&quot;MAX. HORIZONTAL CABLE FORCE @ A=45°&quot;</th>
<th>&quot;MAX. HORIZONTAL CABLE FORCE @ A=60°&quot;</th>
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</thead>
<tbody>
<tr>
<td>KSWC-125</td>
<td>1/8</td>
<td>955 lbs. II CLASS</td>
<td>955 lbs. II CLASS</td>
<td>825 lbs. II CLASS</td>
<td>675 lbs. II CLASS</td>
<td>475 lbs. I CLASS</td>
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<tr>
<td>KSWC-187</td>
<td>3/16</td>
<td>1,635 lbs. III CLASS</td>
<td>1,175 lbs. III CLASS</td>
<td>1,415 lbs. III CLASS</td>
<td>1,155 lbs. III CLASS</td>
<td>815 lbs. III CLASS</td>
</tr>
<tr>
<td>KSWC-250</td>
<td>1/4</td>
<td>2,960 lbs. IV CLASS</td>
<td>1,175 lbs. III CLASS</td>
<td>2,560 lbs. IV CLASS</td>
<td>2,090 lbs. IV CLASS</td>
<td>1,480 lbs. III CLASS</td>
</tr>
</tbody>
</table>

*For KSCA Bracket Welded to Steel Per S-90.379-1B.

### Diagram

- **A=45°±15° INSTALLATION ANGLE**

- See Attachment Kit Submittal S-90.385-2A for bolting & welding instructions.

- See Attachment Kit Submittal S-90.385-2B for concrete anchor instructions.

- See S-90.382-1B for end loop instructions.

- See S-90.382-1B for equipment attach. options.

- KSJC RESTRAINT CABLE KIT by Kinetics. Each kit contains two cable assemblies.
### KSGC GRIPPLE CABLE RESTRAINT KIT (KSCA – KSCA)

**Document**: Page 1 of 1 - Drawing # S-90.391-1A

**Release Date**: 5/21/04

**KINETICS™ Seismic Design Manual**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSGC-125</td>
<td>1/8</td>
<td>500</td>
<td>500</td>
<td>430</td>
<td>350</td>
<td>250</td>
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<tr>
<td>KSGC-187</td>
<td>3/16</td>
<td>1,235</td>
<td>1,235</td>
<td>1,065</td>
<td>870</td>
<td>615</td>
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**Installation Angle**: A=45°±15°

**Structure**: By others

**Concrete Structure**: By others
KSUA U-BOLT CLIP CABLE RESTRAINT KIT (KSUA – KSUA)

Page 1 of 1 - Drawing # S-90.397-1A

Release Date: 5/21/04

Documentation:

P7.2.3

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### KSLG GRIPPLE CABLE RESTRAINT KIT (KSCA – KSUA)

#### PAGE 1 OF 1 - DRAWING # S-90.412-1A

**MAX. CABLE TENSION**

<table>
<thead>
<tr>
<th>MODEL</th>
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<th>1/8 in.</th>
<th>1/4 in.</th>
<th>3/16 in.</th>
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<tbody>
<tr>
<td>KSLG-125</td>
<td>1,235 lbs.</td>
<td>350 lbs.</td>
<td>870 lbs.</td>
<td>350 lbs.</td>
</tr>
<tr>
<td>KSLG-187</td>
<td>1,235 lbs.</td>
<td>500 lbs.</td>
<td>870 lbs.</td>
<td>500 lbs.</td>
</tr>
</tbody>
</table>

**MAX. HORIZONTAL CABLE FORCE @ A=60°**

<table>
<thead>
<tr>
<th>MODEL</th>
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<th>3/16 in.</th>
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</thead>
<tbody>
<tr>
<td>KSLG-125</td>
<td>250 lbs.</td>
<td>430 lbs.</td>
<td>1,065 lbs.</td>
<td>430 lbs.</td>
</tr>
<tr>
<td>KSLG-187</td>
<td>250 lbs.</td>
<td>500 lbs.</td>
<td>1,235 lbs.</td>
<td>500 lbs.</td>
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**MAX. HORIZONTAL CABLE FORCE @ A=30°**

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<th>1/4 in.</th>
<th>3/16 in.</th>
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<tr>
<td>KSLG-125</td>
<td>250 lbs.</td>
<td>430 lbs.</td>
<td>1,065 lbs.</td>
<td>430 lbs.</td>
</tr>
<tr>
<td>KSLG-187</td>
<td>250 lbs.</td>
<td>500 lbs.</td>
<td>1,235 lbs.</td>
<td>500 lbs.</td>
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**MAX. HORIZONTAL CABLE FORCE @ A=0°**

<table>
<thead>
<tr>
<th>MODEL</th>
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<td>250 lbs.</td>
<td>500 lbs.</td>
<td>1,235 lbs.</td>
<td>500 lbs.</td>
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**MAX. HORIZONTAL CABLE FORCE @ A=45°±15°**

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<td>KSLG-187</td>
<td>250 lbs.</td>
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<td>1,235 lbs.</td>
<td>500 lbs.</td>
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</table>

**CLASSIFICATION**

- CLASS I
- CLASS II
- CLASS III

**INSTALLATION ANGLE**

- A=45°±15°
- A=30°

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR CONCRETE ANCHOR INSTRUCTIONS.**

**SEE S-90.388-3A FOR END LOOP INSTRUCTIONS.**

**KSLG RESTRAINT CABLE KIT BY KINETICS.**

**EACH KIT CONTAINS TWO CABLE ASSEMBLIES.**

**STEEL STRUCTURE BY OTHERS**

**CONCRETE STRUCTURE BY OTHERS**

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**INSTALLATION ANGLE**

- A=45°±15°

**Kinetics Noise Control © 2003**
<table>
<thead>
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<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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</thead>
<tbody>
<tr>
<td>KSCU-2</td>
<td>2</td>
<td>250</td>
<td>250</td>
<td>215</td>
<td>175</td>
<td>125</td>
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<tr>
<td>KSCU-3</td>
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<td>500</td>
<td>500</td>
<td>430</td>
<td>350</td>
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<tr>
<td>KSCU-4</td>
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<td>1,235</td>
<td>1,235</td>
<td>1,065</td>
<td>870</td>
<td>615</td>
</tr>
</tbody>
</table>

**INSTALLATION ANGLE**

A = 45° ± 15°

**CONCRETE STRUCTURE BY OTHERS**

SEE ATTACHMENT KIT SUBMITTAL S-90.385-5A FOR BOLTING INSTRUCTIONS.

**STEEL STRUCTURE BY OTHERS**

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

**CONCRETE STRUCTURE BY OTHERS**

SEE ATTACHMENT KIT SUBMITTAL S-90.385-5B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.388-3A FOR END LOOP INSTRUCTIONS

KSCU RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.
### KSUG Gripple Cable Restraint Kit (KSUA – KSUA)

**Page 1 of 1 - Drawing # S-90.409-1A**

**Document:**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
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<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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<tr>
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<td>250 -0-</td>
<td>215 -0-</td>
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<td>500</td>
<td>500 I</td>
<td>430 I</td>
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<td>1,235 III</td>
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<td>870 II</td>
<td>615 II</td>
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**Steel Structure by Others**

**Concrete Structure by Others**

**See Attachment Kit Submittal S-90.385-5B for Concrete Anchor Instructions.**

**KSUG Restraint Cable Kit by Kinetics. Each Kit Contains Two Cable Assemblies.**

**See S-90.388-3A for End Loop Instructions.**

**Installation Angle**

- **A=45°±15°**

---

**Kinetics Noise Control © 2003**
## KSWC U-BOLT CLIP CABLE RESTRAINT KIT (KSCA – KSCA)

**MODEL** | **CABLE SIZE** | **MAX. CABLE TENSION** | **MAX. HORIZONTAL CABLE FORCE @ A=0°** | **MAX. HORIZONTAL CABLE FORCE @ A=30°** | **MAX. HORIZONTAL CABLE FORCE @ A=45°** | **MAX. HORIZONTAL CABLE FORCE @ A=60°**
---|---|---|---|---|---|---
KSWC-125 | 1/8 | 955 | II | 955 | II | 825 | II | 675 | II | 475 | I
KSWC-187 | 3/16 | 1,635 | III | 1,175 | III | 1,415 | III | 1,155 | III | 815 | II
KSWC-250 | 1/4 | 2,960 | IV | 1,175 | III | 2,560 | IV | 2,090 | IV | 1,480 | III

*MAX. HORIZONTAL CABLE FORCE @ A=0° and A=30°:
- KSWC-125: 825 lbs.
- KSWC-187: 1,415 lbs.
- KSWC-250: 2,560 lbs.

*MAX. HORIZONTAL CABLE FORCE @ A=45° and A=60°:
- KSWC-125: 675 lbs.
- KSWC-187: 1,155 lbs.
- KSWC-250: 2,090 lbs.

---

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR CONCRETE ANCHOR INSTRUCTIONS.**

**SEE S-90.382-1B FOR END LOOP INSTRUCTIONS.**

**KSWC RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.**

**A=45°±15° INSTALLATION ANGLE**

**CONCRETE STRUCTURE BY OTHERS**

**STEEL STRUCTURE BY OTHERS**

* FOR KSCA BRACKET WELDED TO STEEL PER S-90.379-1B.
KSGC GRIPPLE CABLE RESTRAINT KIT (KSCA – KSCA)

MAX. CABLE TENSION

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<th>MODEL</th>
<th>3/16 in.</th>
<th>1/8 in.</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
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<tbody>
<tr>
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<td>870</td>
<td>III</td>
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MAX. HORIZONTAL CABLE FORCE @ A=30°

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<th>CLASS</th>
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<tr>
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<td>I</td>
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<tr>
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MAX. HORIZONTAL CABLE FORCE @ A=60°

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<th>MAX. HORIZONTAL CABLE FORCE</th>
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<tbody>
<tr>
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<td>I</td>
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<tr>
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<td>III</td>
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MAX. HORIZONTAL CABLE FORCE @ A=45°±15° INSTALLATION ANGLE

CLASS I

<table>
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<th>MODEL</th>
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<tr>
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CLASS II

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<th>lbs.</th>
<th>CLASS</th>
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<td>I</td>
</tr>
<tr>
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CLASS III

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<tr>
<td>KSGC-125</td>
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<tr>
<td>KSGC-187</td>
<td>1,235</td>
<td>1,235</td>
<td>III</td>
<td>870</td>
<td>III</td>
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SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.388-3A FOR END LOOP INSTRUCTIONS.

KSGC RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.

KINETICS Noise Control © 2003

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com
### KSUA U-BOLT CLIP CABLE RESTRAINT KIT (KSUA – KSUA)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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<tr>
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<td>IV</td>
<td>2,560</td>
<td>2,090</td>
<td>1,480</td>
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A=45°±15° INSTALLATION ANGLE

A=45°±15° INSTALLATION ANGLE

SEE ATTACHMENT KIT SUBMITTAL S-90.385-5A FOR BOLTING INSTRUCTIONS.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-5B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.397-1B FOR END LOOP INSTRUCTIONS

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH OPTIONS.

KSUA RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.

### Notes

- **MAX. HORIZONTAL CABLE FORCE**
  - @ A=0°
  - @ A=30°
  - @ A=45°
  - @ A=60°

- **CABLE SIZE**
  - 1/8
  - 3/16
  - 1/4

- **CLASS**
  - II
  - III
  - IV

- **HORIZONTAL CABLE FORCE**
  - lbs.

- **MAX. CABLE TENSION**
  - lbs.

### Steel Structure by Others

- See S-90.397-1B for end loop instructions.

### Concrete Structure by Others

- See attachment kit submittals S-90.385-5B for concrete anchor instructions.

### Concrete Anchor Instructions

- See appropriate submittals for equipment attach. options.

### STEEL STRUCTURE BY OTHERS

- See attachment kit submittal S-90.385-5A for bolting instructions.

### CONCRETE STRUCTURE BY OTHERS

- See attachment kit submittal S-90.385-5B for concrete anchor instructions.
<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
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<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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<td>I</td>
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<tr>
<td>KSLG-187</td>
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<td>III</td>
<td>1,065</td>
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MAX. CABLE TENSION

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<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
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<td>I</td>
<td>430</td>
<td>I</td>
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<tr>
<td>KSLG-187</td>
<td>3/16</td>
<td>1,235</td>
<td>1,235</td>
<td>III</td>
<td>1,065</td>
<td>III</td>
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MAX. HORIZONTAL CABLE FORCE @ A=0°

<table>
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<tr>
<th>MODEL</th>
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<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
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<td>1/8</td>
<td>500</td>
<td>430</td>
<td>I</td>
<td>250</td>
</tr>
<tr>
<td>KSLG-187</td>
<td>3/16</td>
<td>1,235</td>
<td>1,065</td>
<td>III</td>
<td>615</td>
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MAX. HORIZONTAL CABLE FORCE @ A=30°

<table>
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<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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<tr>
<td>KSLG-125</td>
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<td>350</td>
<td>I</td>
</tr>
<tr>
<td>KSLG-187</td>
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MAX. HORIZONTAL CABLE FORCE @ A=45°

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</tr>
<tr>
<td>KSLG-187</td>
<td>3/16</td>
<td>1,235</td>
<td>I</td>
</tr>
</tbody>
</table>

MAX. HORIZONTAL CABLE FORCE @ A=60°

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**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.**

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**SEE S-90.388-3A FOR END LOOP INSTRUCTIONS.**

**KSLG RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.**

**CONCRETE STRUCTURE BY OTHERS**

**STEEL STRUCTURE BY OTHERS**

**A=45°±15° INSTALLATION ANGLE**

**A=45°±15° INSTALLATION ANGLE**
KSCU GRIPPLE CABLE RESTRAINT KIT (KUSA – KSCA)

<table>
<thead>
<tr>
<th>MODEL</th>
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<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
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<tbody>
<tr>
<td>KSCU-2</td>
<td>2</td>
<td>250</td>
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<td>215</td>
<td>-0-</td>
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<td>KSCU-3</td>
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<td>500</td>
<td>500</td>
<td>I</td>
<td>430</td>
<td>I</td>
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<td>KSCU-4</td>
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<td>1,235</td>
<td>III</td>
<td>1,065</td>
<td>III</td>
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For concrete anchors, see attachment kit submittal S-90.385-5B for concrete anchor instructions.

For equipment attach. options, see appropriate submittals.

See S-90.388-3A for end loop instructions.

KSCU restraint cable kit by Kinetics. Each kit contains two cable assemblies.

For bolting instructions, see attachment kit submittal S-90.385-5A.

Class: -0-

Max. cable tension:
- 250 lbs. (1,139 N)
- 500 lbs. (2,224 N)
- 1,235 lbs. (5,515 N)

Max. horizontal cable force:
- @ A=0°: 215 lbs. (953 N)
- @ A=30°: 175 lbs. (784 N)
- @ A=45°: 125 lbs. (557 N)

Installation angle: A=45° ± 15°

Concrete structure by others.

Steel structure by others.

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KINETICS™ Seismic Design Manual
**KSUG GRIPPLE CABLE RESTRAINT KIT (KSUA - KSUA)**

**PAGE 1 OF 1 - DRAWING # S-90.409-1A**

**RELEASE DATE: 5/21/04**

<table>
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<th>MODEL</th>
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<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
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**SEE ATTACHMENT KIT SUBMITTAL S-90.385-5A FOR BOLTING INSTRUCTIONS.**

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**SEE S-90.388-3A FOR END LOOP INSTRUCTIONS**

**KSUG RESTRAINT CABLE KIT BY KINETICS. EACH KIT CONTAINS TWO CABLE ASSEMBLIES.**

**A=45°±15° INSTALLATION ANGLE**

**A=45°±15° INSTALLATION ANGLE**
**KSWC U-BOLT CLIP BULK CABLE RESTRAINT KIT (KSCA – KSCA)**

**PAGE 1 OF 1 - DRAWING # S-90.384-2A**

**RELEASE DATE: 5/21/04**

---

**MODEL**

| CABLE SIZE | *MAX. CABLE TENSION* &nbsp;&n

---

**TABLE:**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th><em>MAX. CABLE TENSION</em> @ A=0°</th>
<th><em>MAX. HORIZONTAL CABLE FORCE @ A=30°</em></th>
<th><em>MAX. HORIZONTAL CABLE FORCE @ A=45°</em></th>
<th><em>MAX. HORIZONTAL CABLE FORCE @ A=60°</em></th>
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<tr>
<td>KSWC-125B</td>
<td>1/8</td>
<td>955 CLASS II</td>
<td>825 CLASS II</td>
<td>675 CLASS II</td>
<td>475 CLASS I</td>
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<tr>
<td>KSWC-187B</td>
<td>3/16</td>
<td>1,635 CLASS III</td>
<td>1,415 CLASS III</td>
<td>1,155 CLASS III</td>
<td>815 CLASS II</td>
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<tr>
<td>KSWC-250B</td>
<td>1/4</td>
<td>2,960 CLASS IV</td>
<td>2,560 CLASS IV</td>
<td>2,090 CLASS IV</td>
<td>1,480 CLASS III</td>
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</tbody>
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---

**INSTALLATION ANGLE:**

A=45°±15°

---

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR END LOOP INSTRUCTIONS.**

---

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.**

---

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

---

**SEE S-90.382-1B FOR END LOOP INSTRUCTIONS.**

---

**KSCW BULK RESTRAINT CABLE KIT BY KINETICS. EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.**

---

**KINETICS™ Seismic Design Manual**
KSQF GRIPPLE BULK CABLE RESTRAINT KIT (KSCA – KSCA)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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<tbody>
<tr>
<td>KSQF-125</td>
<td>1/8</td>
<td>500</td>
<td>500</td>
<td>430</td>
<td>350</td>
<td>250</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>I</td>
<td>I</td>
<td>I</td>
<td>-0-</td>
</tr>
<tr>
<td>KSQF-187</td>
<td>3/16</td>
<td>1,235</td>
<td>1,235</td>
<td>1,065</td>
<td>870</td>
<td>615</td>
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<td></td>
<td></td>
<td></td>
<td>III</td>
<td>III</td>
<td>III</td>
<td>II</td>
</tr>
</tbody>
</table>

A=45°±15° INSTALLATION ANGLE

SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.388-3A FOR END LOOP INSTRUCTIONS

KSQF BULK RESTRAINT CABLE KIT BY KINETICS. EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.

MAX. HORIZONTAL CABLE FORCE @ A=0°
CLASS I 500 lbs.
CLASS II 1,235 lbs.

MAX. HORIZONTAL CABLE FORCE @ A=30°
CLASS I 430 lbs.
CLASS II 870 lbs.

MAX. HORIZONTAL CABLE FORCE @ A=45°
CLASS I 350 lbs.
CLASS II 615 lbs.

MAX. HORIZONTAL CABLE FORCE @ A=60°
CLASS I 250 lbs.
CLASS II 615 lbs.

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KINETICS™ Seismic Design Manual
KSUA U-BOLT CLIP BULK CABLE RESTRAINT KIT (KSUA – KSUA)

MODEL Number | CABLE SIZE | CLASS | INSTALLATION ANGLE | MAX. HORIZONTAL CABLE FORCE @ A=0° | MAX. HORIZONTAL CABLE FORCE @ A=15° | MAX. HORIZONTAL CABLE FORCE @ A=30° | MAX. HORIZONTAL CABLE FORCE @ A=45°
--- | --- | --- | --- | --- | --- | --- | ---
KSUA-125B | 1/8 | | 945 | 1,635 | 1,415 | 1,155 | 955 lbs. in.
KSUA-187B | 3/16 | | 925 | 1,635 | 1,415 | 1,155 | 675 lbs. in.
KSUA-250B | 1/4 | | 675 | 1,415 | 1,155 | 955 lbs. in.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-5A FOR BOLTING INSTRUCTIONS.

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

SEE S-90.397-1B FOR END LOOP INSTRUCTIONS.

KSUA BULK RESTRAINT CABLE KIT BY KINETICS. EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.

* MAX. CABLE TENSION

| MODEL | CABLE SIZE | CLASS | INSTALLATION ANGLE | MAX. CABLE TENSION |
--- | --- | --- | --- | ---
KSUA-125B | 1/8 | | | 825 lbs.
KSUA-187B | 3/16 | | | 1,635 lbs.
KSUA-250B | 1/4 | | | 1,155 lbs.

See attachment kit submittal S-90.385-5 for concrete anchor instructions.

For KSUA-2 bracket bolted to steel per S-90.379-1B.

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com
KSCCU U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA – KSCU)

MODEL | CABLE SIZE | * MAX. CABLE TENSION | * MAX. HORIZONTAL CABLE FORCE @ A=0° | * MAX. HORIZONTAL CABLE FORCE @ A=30° | * MAX. HORIZONTAL CABLE FORCE @ A=45° | * MAX. HORIZONTAL CABLE FORCE @ A=60°
-------|------------|----------------------|--------------------------------------|--------------------------------------|--------------------------------------|--------------------------------------
KSCCU-250B | 1/4 | 2960 | IV | 2960 | IV | 2560 | IV | 2090 | IV | 1480 | III

CONCRETE STRUCTURE BY OTHERS

SEE ATTACHMENT KIT SUBMITTAL S-90.385-8B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.384-11B FOR END LOOP INSTRUCTIONS

A=45°±15° INSTALLATION ANGLE

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

* FOR KSUA BRACKET BOLTED TO STEEL WITH 1/2" DIA. BOLT.

SEE ATTACHMENT KIT SUBMITTAL S-90.397-1B FOR END LOOP INSTRUCTIONS

KSCCU BULK RESTRAINT CABLE KIT BY KINETICS.
EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.
KSCCU4 U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA-4 – KSUA)

PAGE 1 OF 1 - DRAWING # S-90.384-13A

* MAX. HORIZONTAL CABLE FORCE @ A=45°

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CLASS</th>
<th>lbs.</th>
<th>1 or 2</th>
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<td>V</td>
<td>1480</td>
<td></td>
</tr>
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* MAX. HORIZONTAL CABLE FORCE @ A=60°

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CLASS</th>
<th>lbs.</th>
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<tbody>
<tr>
<td>KSCCU4-250B</td>
<td>V</td>
<td>2090</td>
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* MAX. CABLE TENSION

<table>
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<th>MODEL</th>
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<th>V</th>
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<tr>
<td>KSCCU4-250B</td>
<td>V</td>
<td>2960</td>
<td></td>
</tr>
</tbody>
</table>

CONCRETE STRUCTURE BY OTHERS

SEE ATTACHMENT KIT SUBMITTAL S-90.385-11B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.386-11B FOR END LOOP INSTRUCTIONS.

CONCRETE STRUCTURE BY OTHERS

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

SEE S-90.387-11B FOR END LOOP INSTRUCTIONS.

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### KSCC U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA – CCA)

**PAGE 1 OF 1 - DRAWING # S-90.384-11A**

**RELEASE DATE:** 5/21/04

### INSTALLATION ANGLE

<table>
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<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
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<tbody>
<tr>
<td>KSCC-250B</td>
<td>1/4</td>
<td>2960 IV</td>
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<tr>
<td></td>
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<td>2960 IV</td>
</tr>
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<td></td>
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<td>2560 IV</td>
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<td>2090 IV</td>
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<td>1480 III</td>
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<td>KSCC-375B</td>
<td>3/8</td>
<td>5915 V</td>
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<td>4180 IV</td>
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<td>2955 IV</td>
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<td>KSCC-500B</td>
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<td>8500 V</td>
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<td>3375 IV</td>
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<td>6250 V</td>
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<td>6010 V</td>
</tr>
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<td></td>
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<td>4250 IV</td>
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### TABLE

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<tr>
<th>CLASS</th>
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<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>lbs.</th>
<th>CLASS</th>
<th>lbs.</th>
<th>CLASS</th>
<th>lbs.</th>
<th>CLASS</th>
<th>lbs.</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>KSCC-250B</td>
<td>1/4</td>
<td>2960 IV</td>
<td>2560</td>
<td>IV</td>
<td>2090</td>
<td>IV</td>
<td>1480</td>
<td>III</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KSCC-375B</td>
<td>3/8</td>
<td>5915 V</td>
<td>5120</td>
<td>V</td>
<td>4180</td>
<td>IV</td>
<td>2955</td>
<td>IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KSCC-500B</td>
<td>1/2</td>
<td>8500 V</td>
<td>6250</td>
<td>V</td>
<td>6010</td>
<td>V</td>
<td>4250</td>
<td>IV</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

### SEE ATTACHMENT KIT SUBMITTAL S-90.385-8B FOR CONCRETE ANCHOR INSTRUCTIONS.

### SEE ATTACHMENT KIT SUBMITTAL S-90.385-8A FOR BOLTING & WELDING INSTRUCTIONS.

### SEE S-90.384-11B FOR END LOOP INSTRUCTIONS.

### STEEL STRUCTURE BY OTHERS

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**DOCUMENT DATE:** 5/21/04

**P7.3.6**

**VISCERA**
KSCC4 U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA-4 – CCA)

**PAGE 1 OF 1 - DRAWING # S-90.384-12A**

**TOLL FREE (USA Only):** 800-959-1229
**INTERNATIONAL:** 614-889-0480
**FAX:** 614-889-0540
**World Wide Web:** www.kineticsnoise.com
**Email:** sales@kineticsnoise.com

**RELEASE DATE:** 5/21/04

---

**TABLE:**

| CABLE SIZE | MODEL | CLASS | HORIZONTAL CABLE FORCE | ORIENTATION | IN | lbs. | ORIENTATION |
|------------|-------|-------|-------------------------|-------------|____|____|-------------|
| 3/8 in.    | KSCC4-250B | IV | 36 | 1 | 2960
| 1/2 in.    | KSCC4-375B | IV | 36 | 1 | 2980
| 1/4 in.    | KSCC4-500B | IV | 12 | 1 | 2950

---

**NOTES:**

- For CCA-4 bracket bolted to concrete.
- See attachment kit submittal S-90.385-11B for concrete anchor instructions.
- See S-90.384-11B for end loop instructions.
- Orientation 1 or 2.

---

**CONCRETE STRUCTURE BY OTHERS:**

- Orientation 1 or 2.
- See attachment kit submittal S-90.385-11B for concrete anchor instructions.

---

**INSTALLATION ANGLE:**

- A = 30° ± 15°
- A = 45° ± 15°
### KSWC U-BOLT CLIP BULK CABLE RESTRAINT KIT (KS - KSCA)

**Page 1 of 1 - Drawing # S-90.384-2A**

**Release Date:** 5/21/04

**KSCW BULK RESTRAINT CABLE KIT BY KINETICS.**

**Each standard kit contains enough material for (2) 12 ft. cable assemblies.**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
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</thead>
<tbody>
<tr>
<td>KSWC-187B</td>
<td>3/16 in.</td>
<td>1,635 lbs. Class III</td>
<td>1,175 lbs. Class III</td>
<td>1,415 lbs. Class III</td>
<td>1,155 lbs. Class III</td>
<td>815 lbs. Class II</td>
</tr>
<tr>
<td>KSWC-250B</td>
<td>1/4 in.</td>
<td>2,960 lbs. Class IV</td>
<td>1,175 lbs. Class III</td>
<td>2,560 lbs. Class IV</td>
<td>2,090 lbs. Class IV</td>
<td>1,480 lbs. Class III</td>
</tr>
</tbody>
</table>

*FOR KSCA BRACKET WELDED TO STEEL PER S-90.379-1B.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-2A FOR BOLTING & WELDING INSTRUCTIONS.

SEE ATTACHMENT KIT SUBMITTAL S-90.385-2B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.382-1B FOR END LOOP INSTRUCTIONS.

**CONCRETE STRUCTURE BY OTHERS**

**STEEL STRUCTURE BY OTHERS**

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**A=45°±15° INSTALLATION ANGLE**
### KSQF GRIPPLE BULK CABLE RESTRAINT KIT (KSCA – KSCA)

**Page 1 of 1 - Drawing # S-90.384-4A**

**RELEASE DATE:** 5/21/04

**DOCUMENT:** P7.3.2

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<table>
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<th>MODEL</th>
<th>CABLE SIZE</th>
<th>MAX. CABLE TENSION</th>
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<td>KSQF-125</td>
<td>3/16 in.</td>
<td>1.235 lbs.</td>
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<tr>
<td>KSQF-187</td>
<td>1/8 in.</td>
<td>500 lbs.</td>
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<tr>
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<th>CLASS II</th>
<th>CLASS III</th>
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<tbody>
<tr>
<td>lbs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KSQF-125</td>
<td>500</td>
<td>430</td>
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</tr>
<tr>
<td>KSQF-187</td>
<td>1,235</td>
<td>870</td>
<td>1,235</td>
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<table>
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<th>CLASS II</th>
<th>CLASS III</th>
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<tbody>
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<td>lbs.</td>
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<td></td>
<td></td>
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<tr>
<td>KSQF-125</td>
<td>250</td>
<td>615</td>
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<table>
<thead>
<tr>
<th>INSTALLATION ANGLE</th>
<th>A=45±15°</th>
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**KSOF GRIPPLE BULK CABLE RESTRAINT KIT**

**PAGE 1 OF 1 - DRAWING # S-90.384-4A**

**RELEASE DATE:** 5/21/04

**DOCUMENT:** P7.3.2

---

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**World Wide Web:** www.kineticsnoise.com
**Email:** sales@kineticsnoise.com
KSUA U-BOLT CLIP BULK CABLE RESTRAINT KIT (KSUA – KSUA)

PAGE 1 OF 1 - DRAWING # S-90.384-8A

**For KSUA-2 bracket bolted to steel per S-90.379-1B.**

**For concrete attachment kit see S-90.385-5b for anchor instructions.**

**For equipment attachment options see S-90.397-1B.**

**For end loop instructions see S-90.385-5a.**

**KSUA bulk restraint cable kit by Kinetics. Each standard kit contains enough material for (2) 12 ft. cable assemblies.**

---

**Cable Size**

<table>
<thead>
<tr>
<th>Model</th>
<th>Class</th>
<th>Class</th>
<th>Class</th>
<th>Class</th>
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</thead>
<tbody>
<tr>
<td>KSUA-125B</td>
<td>1/8</td>
<td>9/65</td>
<td>1/65</td>
<td>1/65</td>
</tr>
<tr>
<td>KSUA-187B</td>
<td>3/16</td>
<td>1/65</td>
<td>1/65</td>
<td>1/65</td>
</tr>
<tr>
<td>KSUA-250B</td>
<td>1/4</td>
<td>1/65</td>
<td>1/65</td>
<td>1/65</td>
</tr>
</tbody>
</table>

**For end loop instructions see S-90.385-5a.**

**For Concrete anchor see S-90.385-5b.**

**For equipment attachment options see S-90.397-1B.**

---

**Installation Angle**

- A=45°±15°
- A=45°±15°
- A=45°±15°
- A=45°±15°

**Max. Horizontal Cable Force @ A=45°**

<table>
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<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>825 lbs.</td>
</tr>
<tr>
<td>3/16</td>
<td>955 lbs.</td>
</tr>
<tr>
<td>1/4</td>
<td>1,475 lbs.</td>
</tr>
</tbody>
</table>

---

**Max. Horizontal Cable Force @ A=30°**

<table>
<thead>
<tr>
<th>Cable Size</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>675 lbs.</td>
</tr>
<tr>
<td>3/16</td>
<td>915 lbs.</td>
</tr>
<tr>
<td>1/4</td>
<td>1,095 lbs.</td>
</tr>
</tbody>
</table>

---

**Max. Horizontal Cable Force @ A=0°**

<table>
<thead>
<tr>
<th>Cable Size</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>525 lbs.</td>
</tr>
<tr>
<td>3/16</td>
<td>755 lbs.</td>
</tr>
<tr>
<td>1/4</td>
<td>980 lbs.</td>
</tr>
</tbody>
</table>

---

**Max. Cable Tension**

<table>
<thead>
<tr>
<th>Cable Size</th>
<th>Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/8</td>
<td>1,475 lbs.</td>
</tr>
<tr>
<td>3/16</td>
<td>2,950 lbs.</td>
</tr>
<tr>
<td>1/4</td>
<td>3,590 lbs.</td>
</tr>
</tbody>
</table>

---

**For end loop instructions see S-90.385-5a.**

---

**KSUA Bulk restraint kit by Kinetics. Each standard kit contains enough material for (2) 12 ft. cable assemblies.**
**KSCCU U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA – KSCU)**

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCCU-250B</td>
<td>1/4</td>
<td>2960</td>
<td>2960</td>
<td>2560</td>
<td>2090</td>
<td>1480</td>
</tr>
</tbody>
</table>

**FOR KSUA BRACKET BOLTED TO STEEL WITH 1/2" DIA. BOLT.**

**SEE S-90.397-1B FOR END LOOP INSTRUCTIONS.**

**SEE S-90.384-11B FOR END LOOP INSTRUCTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-8B FOR CONCRETE ANCHOR INSTRUCTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-8B FOR CONCRETE ANCHOR INSTRUCTIONS.**

**CONCRETE STRUCTURE BY OTHERS**

**A=45°±15° INSTALLATION ANGLE**

**A=45°±15° INSTALLATION ANGLE**

KSCCU BULK RESTRAINT CABLE KIT BY KINETICS. EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.
<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=30°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
<th>ORIENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCCU4-250B</td>
<td>1/4</td>
<td>in.</td>
<td>lbs.</td>
<td>CLASS</td>
<td>lbs.</td>
<td>CLASS</td>
<td>1 or 2</td>
</tr>
</tbody>
</table>

*MAX. HORIZONTAL CABLE FORCE @ A=45°±15° INSTALLATION ANGLE

SEE ATTACHMENT KIT SUBMITTAL S-90.385-11B FOR CONCRETE ANCHOR INSTRUCTIONS.

SEE S-90.384-11B FOR END LOOP INSTRUCTIONS

CONCRETE STRUCTURE BY OTHERS

SEE APPROPRIATE SUBMITTAGS FOR EQUIPMENT ATTACH. OPTIONS.

ORIENTATION 1

ORIENTATION 2

* FOR CCA-4 BRACKET BOLTED TO CONCRETE

CONCRETE STRUCTURE BY OTHERS

SEE S-90.397-1B FOR END LOOP INSTRUCTIONS

A=45°±15° INSTALLATION ANGLE

FOR EQUIPMENT ATTACH. OPTIONS.

SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.

ORIENTATION 1

ORIENTATION 2
### INSTALLATION ANGLE

- **A=45°±15°**

### KSCC U-BOLT CLIP BULK CABLE RESTRAINT KIT (CCA – CCA)

<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>* MAX. CABLE TENSION</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=0°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=45°</th>
<th>* MAX. HORIZONTAL CABLE FORCE @ A=60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCC-250B</td>
<td>1/4</td>
<td>2960 IV</td>
<td>2960 IV</td>
<td>2560 IV</td>
<td>2090 IV</td>
</tr>
<tr>
<td>KSCC-375B</td>
<td>3/8</td>
<td>5915 V</td>
<td>3375 IV</td>
<td>5120 V</td>
<td>4180 IV</td>
</tr>
<tr>
<td>KSCC-500B</td>
<td>1/2</td>
<td>8500 V</td>
<td>3375 IV</td>
<td>6250 V</td>
<td>4250 IV</td>
</tr>
</tbody>
</table>

**FOR CCA BRACKET WELDED TO STEEL.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-8A FOR CONCRETE ANCHOR INSTRUCTIONS.**

**SEE ATTACHMENT KIT SUBMITTAL S-90.385-8B FOR CONCRETE STRUCTURE BY OTHERS.**

**SEE APPROPRIATE SUBMITTALS FOR EQUIPMENT ATTACH. OPTIONS.**

**SEE S-90.384-11B FOR END LOOP INSTRUCTIONS.**

**SEE S-90.384-11B FOR END LOOP INSTRUCTIONS.**

**KSCC BULK RESTRAINT CABLE KIT BY KINETICS.**

**EACH STANDARD KIT CONTAINS ENOUGH MATERIAL FOR (2) 12 FT. CABLE ASSEMBLIES.**

**FOR BUSINESS USE ONLY. DO NOT COPY.**

**Kinetics Noise Control © 2003**

**Kinetics Noise Control © 2003**
<table>
<thead>
<tr>
<th>MODEL</th>
<th>CABLE SIZE</th>
<th>CLASS</th>
<th>ORIENTATION 1</th>
<th>ORIENTATION 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCC4-250B</td>
<td>1/2 in.</td>
<td>Class I</td>
<td>36 lbs.</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>KSCC4-375B</td>
<td>1/2 in.</td>
<td>Class II</td>
<td>500 lbs.</td>
<td>450 lbs.</td>
</tr>
<tr>
<td>KSCC4-500B</td>
<td>1/2 in.</td>
<td>Class III</td>
<td>700 lbs.</td>
<td>650 lbs.</td>
</tr>
</tbody>
</table>

*For CCA-4 bracket bolted to concrete.

**For CCA-4 bracket bolted to concrete.
### Through Bolted or Welded

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=0°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=30°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=45°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=60°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=0°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=30°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=45°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCA-AK-250</td>
<td>0.25</td>
<td>2.570</td>
<td>2.985</td>
<td>3.405</td>
<td>3.820</td>
<td>2.470</td>
<td>2.960</td>
<td>3.470</td>
<td>3.960</td>
</tr>
<tr>
<td>KSCA-AK-375</td>
<td>0.38</td>
<td>1.175</td>
<td>1.700</td>
<td>2.240</td>
<td>2.775</td>
<td>1.725</td>
<td>2.240</td>
<td>2.775</td>
<td>3.300</td>
</tr>
<tr>
<td>KSCA-AK-500</td>
<td>0.50</td>
<td>2.000</td>
<td>2.970</td>
<td>4.360</td>
<td>5.750</td>
<td>2.970</td>
<td>4.360</td>
<td>5.750</td>
<td>7.140</td>
</tr>
</tbody>
</table>

### Anchored to Concrete

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=0°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=30°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=45°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=60°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=0°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=30°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=45°</th>
<th>MAX. HORIZ. FORCE ORIENTATION 2 @ A=60°</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCA-AK-250</td>
<td>0.25</td>
<td>255</td>
<td>140</td>
<td>215</td>
<td>240</td>
<td>255</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>KSCA-AK-375</td>
<td>0.38</td>
<td>990</td>
<td>560</td>
<td>300</td>
<td>450</td>
<td>520</td>
<td>560</td>
<td>570</td>
<td>570</td>
</tr>
<tr>
<td>KSCA-AK-500</td>
<td>0.50</td>
<td>665</td>
<td>865</td>
<td>455</td>
<td>670</td>
<td>785</td>
<td>865</td>
<td>935</td>
<td>935</td>
</tr>
</tbody>
</table>

**NOTE:**
- Neoprene grommet required for KSCA-AK-250/-375 by Kinetics.
- Concrete anchor by Kinetics.
- Do not use this hole!!
- For anchor embedded & edge dist. See "Anchor capacities used by KNC Seismic Programs-Wedge type anchor applications".
- KSCA Bracket by Kinetics.
- Through bolted or welded anchored to concrete or orientation.

**OPTIONAL WELD ATTACHMENT EQUAL TO (1) SIZE (ØD) UNC BOLT.**

**NEOPRENE GROMMET REQUIRED FOR KSCA-AK-250/-375 BY KINETICS.**

**CONCRETE ANCHOR BY KINETICS.**

**DO NOT USE THIS HOLE!!**

---

**KINETICS™ Seismic Design Manual**

**MEMBER**

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THROUGH BOLTED OR WELDED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSUA-AK 250</td>
<td>0.25</td>
<td>1,085</td>
<td>II</td>
<td>450</td>
<td>I</td>
<td>290</td>
<td>I</td>
<td>540</td>
<td>II</td>
</tr>
<tr>
<td>KSUA-AK 375</td>
<td>0.38</td>
<td>1,595</td>
<td>III</td>
<td>965</td>
<td>II</td>
<td>710</td>
<td>II</td>
<td>1,325</td>
<td>III</td>
</tr>
<tr>
<td>KSUA-AK 500</td>
<td>0.50</td>
<td>2,510</td>
<td>IV</td>
<td>1,800</td>
<td>IV</td>
<td>2,510</td>
<td>IV</td>
<td>2,425</td>
<td>IV</td>
</tr>
</tbody>
</table>

ANCHORED TO CONCRETE

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
<th>MAX. HORIZ. FORCE ORIENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSUA-AK 250</td>
<td>0.25</td>
<td>260</td>
<td>I</td>
<td>170</td>
<td>0</td>
<td>100</td>
<td>0</td>
<td>185</td>
<td>0</td>
</tr>
<tr>
<td>KSUA-AK 375</td>
<td>0.38</td>
<td>360</td>
<td>II</td>
<td>220</td>
<td>0</td>
<td>390</td>
<td>I</td>
<td>380</td>
<td>I</td>
</tr>
<tr>
<td>KSUA-AK 500</td>
<td>0.50</td>
<td>885</td>
<td>II</td>
<td>550</td>
<td>II</td>
<td>330</td>
<td>I</td>
<td>580</td>
<td>II</td>
</tr>
</tbody>
</table>

KSUA-AK CABLE ANCHORAGE HARDWARE KIT FOR KSUA BRACKETS

Page 1 of 1 - Drawing # S-90.385-5A & S-90.385-5B

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

Kinetics Noise Control © 2003
THROUGH BOLTED OR WELDED

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=0° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=30° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=45° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=60° lbs.</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCA-AK-250</td>
<td>0.25</td>
<td>1.00</td>
<td>570</td>
<td>II</td>
<td>985</td>
<td>II</td>
<td>695</td>
<td>II</td>
<td>625</td>
</tr>
<tr>
<td>KSCA-AK-375</td>
<td>0.38</td>
<td>1.25</td>
<td>1.175</td>
<td>III</td>
<td>2.405</td>
<td>III</td>
<td>1.700</td>
<td>III</td>
<td>1.175</td>
</tr>
<tr>
<td>KSCA-AK-500</td>
<td>0.50</td>
<td>2.00</td>
<td>1.175</td>
<td>III</td>
<td>2.970</td>
<td>IV</td>
<td>1.820</td>
<td>III</td>
<td>1.175</td>
</tr>
</tbody>
</table>

ORIENTATION 1

ORIENTATION 2

NEOPRENE GROMMET REQUIRED FOR KSCA-AK-250/-375 BY KINETICS.

KSCA BRACKET BY KINETICS.

DO NOT USE THIS HOLE!!

ANCHORED TO CONCRETE

<table>
<thead>
<tr>
<th>MODEL</th>
<th>BOLT/ANCHOR SIZE (ØD) (UNC)</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=0° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=30° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=45° lbs.</th>
<th>CLASS</th>
<th>MAX. HORIZ. FORCE ORIENTATION 1 @ A=60° lbs.</th>
<th>CLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>KSCA-AK-250</td>
<td>0.25</td>
<td>200</td>
<td>-0</td>
<td>415</td>
<td>I</td>
<td>255</td>
<td>I</td>
<td>140</td>
<td>-0</td>
</tr>
<tr>
<td>KSCA-AK-375</td>
<td>0.38</td>
<td>435</td>
<td>I</td>
<td>990</td>
<td>II</td>
<td>560</td>
<td>II</td>
<td>300</td>
<td>I</td>
</tr>
<tr>
<td>KSCA-AK-500</td>
<td>0.50</td>
<td>665</td>
<td>II</td>
<td>1.620</td>
<td>III</td>
<td>865</td>
<td>II</td>
<td>455</td>
<td>I</td>
</tr>
</tbody>
</table>

ORIENTATION 1

ORIENTATION 2

NEOPRENE GROMMET REQUIRED FOR KSCA-AK-250/-375 BY KINETICS.

CONCRETE ANCHOR BY KINETICS.

KSCA BRACKET BY KINETICS.

DO NOT USE THIS HOLE!!

KINNETICS™ Seismic Design Manual

MEMBER
### KSUA-AK CABLE ANCHORAGE HARDWARE KIT FOR KSUA BRACKETS

**Page 1 of 1 - Drawing # S-90.385-5A & S-90.385-5B**

**Release Date:** 5/21/04

#### KSUA-AK Cable Anchorage Hardware Kit for KSUA Brackets

**Model:** KSUA-AK-250, KSUA-AK-375, KSUA-AK-500

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KSUA-AK-250</td>
<td>0.25 (0.38 (0.50)</td>
<td>1,095 lbs. (2,650 lbs. (3,850 lbs.)</td>
<td>825 lbs. (2,000 lbs. (2,850 lbs.)</td>
<td>540 lbs. (1,250 lbs. (2,425 lbs.)</td>
<td>290 lbs. (900 lbs. (1,800 lbs.)</td>
<td>505 lbs. (1,300 lbs. (2,650 lbs.)</td>
<td>450 lbs. (1,000 lbs. (2,000 lbs.)</td>
<td>360 lbs. (800 lbs. (1,650 lbs.)</td>
</tr>
<tr>
<td>KSUA-AK-375</td>
<td>0.38 (0.50)</td>
<td>1,395 lbs. (3,850 lbs.)</td>
<td>1,095 lbs. (2,850 lbs.)</td>
<td>710 lbs. (1,600 lbs.)</td>
<td>1,230 lbs. (3,000 lbs.)</td>
<td>1,300 lbs. (3,000 lbs.)</td>
<td>1,250 lbs. (2,500 lbs.)</td>
<td>1,095 lbs. (2,200 lbs.)</td>
</tr>
<tr>
<td>KSUA-AK-500</td>
<td>0.50 (0.75)</td>
<td>2,450 lbs. (6,150 lbs.)</td>
<td>2,850 lbs. (7,000 lbs.)</td>
<td>2,425 lbs. (5,700 lbs.)</td>
<td>2,250 lbs. (5,000 lbs.)</td>
<td>1,800 lbs. (4,200 lbs.)</td>
<td>1,800 lbs. (4,200 lbs.)</td>
<td>1,615 lbs. (3,800 lbs.)</td>
</tr>
</tbody>
</table>

**Through Bolted or Welded**

**Orientation 1**

**Orientation 2**

**Structural Steel by Others**

**KSUA Cable Restraint Kit by Kinetics**

**Anchored to Concrete**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>KSUA-AK-250</td>
<td>0.25 (0.38 (0.50)</td>
<td>530 lbs. (1,360 lbs. (1,880 lbs.)</td>
<td>260 lbs. (675 lbs. (930 lbs.)</td>
<td>170 lbs. (420 lbs. (620 lbs.)</td>
<td>100 lbs. (220 lbs. (330 lbs.)</td>
<td>185 lbs. (425 lbs. (650 lbs.)</td>
<td>170 lbs. (360 lbs. (580 lbs.)</td>
<td>150 lbs. (330 lbs.)</td>
</tr>
<tr>
<td>KSUA-AK-375</td>
<td>0.38 (0.50)</td>
<td>1,395 lbs. (3,850 lbs.)</td>
<td>575 lbs. (1,480 lbs. (2,200 lbs.)</td>
<td>360 lbs. (800 lbs. (1,200 lbs.)</td>
<td>220 lbs. (450 lbs. (700 lbs.)</td>
<td>390 lbs. (860 lbs. (1,400 lbs.)</td>
<td>360 lbs. (780 lbs. (1,300 lbs.)</td>
<td>330 lbs. (660 lbs.)</td>
</tr>
<tr>
<td>KSUA-AK-500</td>
<td>0.50 (0.75)</td>
<td>2,390 lbs. (6,150 lbs.)</td>
<td>885 lbs. (2,200 lbs. (3,300 lbs.)</td>
<td>550 lbs. (1,200 lbs. (1,800 lbs.)</td>
<td>330 lbs. (720 lbs. (1,100 lbs.)</td>
<td>580 lbs. (1,300 lbs. (2,100 lbs.)</td>
<td>570 lbs. (1,100 lbs. (1,800 lbs.)</td>
<td>510 lbs. (990 lbs.)</td>
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</table>

**FOR ANCHOR EMDEMMENT & EDGE DIST. SEE "ANCHOR CAPACITIES USED BY KNC SEISMIC PROGRAMS-WEDGE TYPE ANCHOR APPLICATIONS".**

**Concrete by Others**

**KSUA Cable Restraint Kit by Kinetics**

**KSUA Cable Attachment Bracket by Kinetics**

**KSUA -AK Attachment Kit by Kinetics**

Kinetics Noise Control © 2003
# CHAPTER P8

## OTHER REQUIRED COMPONENTS FOR SUSPENDED SYSTEMS

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</table>
KHRC-A ADJUSTABLE STIFFENER KIT

DRAWING # S-90.500-1A

RELEASE DATE: 12/19/03

THUMB SCREW BY KINETICS IN HOLES #1 FOR L 1 X 1 AND L 1.5 X 1.5 ANGLE.

THUMB SCREW BY KINETICS IN HOLES #2 FOR L 2 X 2 ANGLES.

L 1 X 1 X 0.13
L 1.5 X 1.5 X 0.25

Ø0.38 MIN. TYP.
Ø1.00 MAX. TYP.

L 2 X 2 X 0.13
L 2 X 2 X 0.25

KHRC-A OUTER CLAMP HALF BY KINETICS.

KHRC-A INNER CLAMP HALF BY KINETICS.

HOLE #1
HOLE #2

HOLE #1
HOLE #2
KHRC-A ADJUSTABLE STIFFENER KIT

KHRC-A ADJUSTABLE ANGLE STIFFENER KIT BY KINETICS.

STIFFENER ANGLE BY OTHERS. SIZE RECOMMENDED ON TABLE 4b OF KINETICS "SITE SPECIFIC FORCE CLASS TABLES".

L1
L2
L3

COUPLING & ANCHOR BY OTHERS.

THREADED HANGER ROD BY OTHERS.

KSWC CABLE RESTRAINT KIT SHOWN BY KINETICS.

KCHB CLEVIS HANGER BRACE KIT SHOWN BY KINETICS.

CLEVIS HANGER BY OTHERS.

IMPORTANT NOTES:
1.) THE VALUES OF L2 AND (L1+L3) MUST NOT EXCEED THE MAXIMUM UNSTIFFENED HANGER ROD LENGTH FROM TABLE 4b OF KINETICS "SITE SPECIFIC FORCE CLASS TABLES".
2.) A MINIMUM OF TWO (2) KHRC-A'S ARE REQUIRED PER HANGER ROD INSTALLATION.
KHRC-A ADJUSTABLE STIFFENER KIT

0.38 MAX.
0.25 MAX.

ISOLATION BY KINETICS

STIFFENER ANGLE BY OTHERS. SIZE RECOMMENDED ON TABLE 4b OF KINETICS "SITE SPECIFIC FORCE CLASS TABLES".

KHRC-A ADJUSTABLE ANGLE STIFFENER KIT BY KINETICS.

L1
L2
L3

VERTICAL LIMIT STOP @ ALL RESTRAINT LOCATIONS.

THREADED HANGER ROD BY OTHERS.

KSWC CABLE RESTRAINT KIT SHOWN BY KINETICS.

KCHB CLEVIS HANGER BRACE KIT SHOWN BY KINETICS.

IMPORTANT NOTES:
1.) THE VALUES OF L2 AND (L1+L3) MUST NOT EXCEED THE MAXIMUM UNSTIFFENED HANGER ROD LENGTH FROM TABLE 4b OF KINETICS "SITE SPECIFIC FORCE CLASS TABLES".
2.) A MINIMUM OF TWO (2) KHRC-A'S ARE REQUIRED PER HANGER ROD INSTALLATION.
### KCHB CLEVIS HANGER BRACE

**DRAWING # S-90.600-1A**

**PIPE SIZE**

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**MODEL**

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**KCHB BRACE ANGLE**

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**KCHB CLEVIS HANGER BRACE ANGLE STRAP**

Each kit contains (1) per model description in table at the right.
KINEMATICS™ Seismic Design Manual

KCHB CLEVIS HANGER BRACE

DRAWING # S-90-600-1B

RELEASE DATE: 12/19/03

KSWC CABLE RESTRAINT KIT
BY KINETICS

5/8-11 UNC HANGER ROD
SHOWN BY OTHERS.

STEP 1:
POSITION BRACE ANGLE ON
CLEVIS HANGER BOLT. WRAP
BRACE ANGLE STRAP AROUND
ANGLE & BOLT. THREAD STRAP
THROUGH SLOT, PULL TIGHT,
AND BEND AS SHOWN ABOVE.

KCHB BRACE ANGLE
STRAP (2) PER
KIT BY KINETICS.

KCHB CLEVIS
HANGER BRACE
KIT BY KINETICS

STEP 2:
WRAP EXCESS ANGLE BRACE
STRAP AROUND ANGLE &
BOLT AS SHOWN ABOVE.

KCHB BRACE ANGLE
(1) PER KIT BY KINETICS.

KCHB CLEVIS
HANGER BRACE
KIT BY KINETICS

KSWC CABLE
RESTRAINT KIT
BY KINETICS

5/8-11 UNC HANGER ROD
SHOWN BY OTHERS.

CLEVIS
HANGER
BY OTHERS

5" SCHED. 40
PIPE SHOWN.

KSWC CABLE
RESTRAINT KIT
BY KINETICS

5/8-11 UNC HANGER ROD
SHOWN BY OTHERS.
Kinetics KSBC Seismically Rated Beam Clamp

There is frequently a desire to attach seismic restraints to roof or floor support I-beams. Equally often the ability to add holes to these beams for bolts or to weld tabs to them is not possible or practical. In these conditions, Beam Clamps can often be used as long as they are of the proper type, are properly sized and are properly installed.

Before proceeding in the selection of a beam clamp, first determine that the beams to which the restraint is to be attached are oriented properly. All connections must be positive and not rely on friction to carry the seismic load. This means that the direction of the cable and/or strut used to resist the forces must be at right angles to the beam. If the cable or strut is oriented in line with the beam axis, a beam clamp cannot be used and a weld-on tab or bolted connection is required.

If, based on the above, it is possible to use a beam clamp, an appropriate type and size must be selected. Most commercially available Beam Clamps are not appropriate for the attachment of restraints as they are designed to support vertical loads and not transfer horizontal ones. Unless rated for horizontal loads by the manufacturer, “conventional” beam clamps should not be used. As a minimum, appropriate beam clamps must meet the following set of requirements:

1) Beam clamps must engage both sides of a beam such that, even if the attachment bolt is not fully tightened, there is no possibility that the clamp can be pulled off of the beam.
2) Both the clamp bracket itself and the arm that engages the opposite side of the beam must be adequate to transfer the full horizontal load that is required for the application.
3) The hardware used to attach the restraint or strut bracket to the beam clamp must also be adequate to transfer the full horizontal load that is required for the application.
4) All components used must be rated using factors consistent with code requirements and appropriate for seismic design.

The Kinetics Noise Control KSBC Beam Clamp is designed to address the horizontal loads expected from seismic events. The two (2) sizes available use 3/8” and 1/2” attachment hardware and are equivalent to full bolted connections for hardware of the same size. (Thus if documentation requires that a 3/8” bolt be used, a 3/8” beam clamp is equally acceptable.)

Note that, as with any seismic connection to structural elements, the ability of the structural element to resist the design seismic load is known only by the structural engineer of record. As these forces can be significant and because beams used to support structures are typically designed around the vertical or gravity loads, there may be structural issues that must be addressed when connecting to and applying large horizontal forces to these members. Always, before connecting restraints to beams or
other structural elements, ensure that the capacity of the elements to resist these loads is adequate. Kinetics Noise Control is not in a position to accept any responsibility for problems that develop from restraints being attached to inadequate structural elements.

Typical KSBC shown with KSUA attachment clip
(Can also be used with KSCA clip)
KSBC Beam Clamp

APPROX. 3 1/4" TALL

3/8" X 2" LONG HEX HEAD BOLT

1/2" ALL THREAD 1/2" FLAT WASHER

KSBC-2 ASSEMBLY

APPROX. 2" TALL

KSBC-2 ASSEMBLY

I-BEAM (BY OTHERS)

MINIMUM CLAMPING WIDTH = 3" MAXIMUM CLAMPING WIDTH = 9"

KINETICS SEISMIC BEAM CLAMP ASSEMBLY DOES NOT INCLUDE THESE BRACKETS. SHOWN FOR OPTIONAL ASSEMBLY ONLY.

KSUC-2 SEE DRAWINGS 90.379-1A

KSCASE DRAWINGS-90.379-1A

1/2" FLAT WASHER

1/2" ALL THREAD

KSUA-2 SEE DRAWINGS 90.379-5A FOR 1/2" ROD

MEMBER

APPROX.

P8.2.7

RELEASE DATE: 1/6/05

DOCUMENT:

KINETICS™ Seismic Design Manual

DUBLIN, OHIO, USA • MISSISSAUGA, ONTARIO, CANADA

Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

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KSBC Beam Clamp
PAGE 3 OF 4

KINETICS™ Seismic Design Manual

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Toll Free (USA only): 800-959-1229
International: 614-889-0480
Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

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KSBC Beam Clamp

3/8" X 2" LONG HEX HEAD BOLT

3/8" FLAT WASHER

3/8" HEX NUT

KSUA-1 SEE DRAWING 90.379-5AFOR 3/8" ROD

APPROX. 3" TALL

3/8" ALL THREAD

KSBC-1 ASSEMBLY

APPROX. 3" TALL

I-BEAM (BY OTHERS)

MINIMUM CLAMPING WIDTH = 3"

MAXIMUM CLAMPING WIDTH = 9"

KSBC-1 ASSEMBLY

APPROX. 2" TALL

KINETICS™ Seismic Design Manual

Kinetics Noise Control © 2003
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## ARCHITECTURAL RESTRAINT ELEMENTS

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FFR-1 FLOOR RESTRAINT (LIFT SLAB)

1.0 DIA WEEP HOLE

4.00 ID X 4.50 OD NEOPRENE TUBE

5.25

7.00

62 ANCHOR BOLTS
5.00 MIN EMBEDMENT

3.50 SCH 40 PIPE

6.00

0.25

3.38

3.50

5.00 SCH 40 PIPE

5.25

7.00

ADDITIONAL CONCRETE THICKNESS LOCATION

ALIGNMENT CAP
REBAR (12" OC MIN REQUIREMENT)

FFR-1 LIFT SLAB RESTRAINT
LATERAL CAPACITY = 4000 #
IN 3000 PSI CONCRETE

P9.2.1

PAGE 1 OF 1 - DRAWING # SS-20000202

RELEASE DATE: 5/17/04

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**ANCHOR BOLTS AND ATTACHMENT HARDWARE**

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KCAB Wedge Type Seismic Anchor Data

The Seismic Certification programs written and used by Kinetics Noise Control use the model **KCAB Wedge Type Anchor** data listed in Table P10.2.1-1 below. The various terms and dimensions referenced in this document are defined in Figure P10.2.1-1. Any anchors that are substituted and/or supplied by others must be evaluated and approved by the Design Professional of Record. The data listed in Table P10.2.1-1 is drawn from ICBO report data. All relevant factors for proper installation of these anchors are defined in documentation provided by Kinetics Noise Control.

The data provided in Table P10.2.1-1 is based on concrete with a minimum compressive strength of **3,000 psi** and a minimum embedment depth equal to 8 anchor diameters.

### Table P10.2.1-1: KCAB Wedge Type Seismic Anchor Basic Capacities (Reference: Figure P10.2.1-1)

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<td>4,225</td>
<td>10-1/4</td>
<td>9-3/4</td>
</tr>
<tr>
<td>7/8</td>
<td>7</td>
<td>2,264</td>
<td>6,210</td>
<td>12-5/16</td>
<td>9-1/8</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>2,535</td>
<td>8,328</td>
<td>14-5/8</td>
<td>13-1/2</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>2,730</td>
<td>8,328</td>
<td>12</td>
<td>13-1/2</td>
</tr>
<tr>
<td>1-1/4</td>
<td>10</td>
<td>5,105</td>
<td>9,918</td>
<td>15</td>
<td>12-15/16</td>
</tr>
</tbody>
</table>

1) For Non-California projects these values may be inflated by 33-1/3% for seismic and wind applications. For California Non-OSHPD projects these values must be reduced by 20%. For California OSHPD projects the allowable loads for lightweight, 2,000 psi, concrete must be reduced by 20% to simulate cracked concrete. In this case the values listed here do not apply.

2) Minimum spacing and edge distance are required to develop the maximum listed allowable loads.

3) If the Clearance Hole Diameter is greater than or equal to 1/8” more than the Anchor Size, fill the clearance space with grout or epoxy, or use the appropriate Kinetics Noise Control model TG Grommet.
Figure P10.2.1-1: KCAB Wedge Type Seismic Anchor Installation Guide.
### Table P10.2.1-2: Anchor Length by Length Code Stamp (Anchor Size Independent)

<table>
<thead>
<tr>
<th>Length Code Stamp</th>
<th>Anchor Length (in)</th>
<th>Length Code Stamp</th>
<th>Anchor Length (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.5 to 2.0</td>
<td>K</td>
<td>6.5 to 7.0</td>
</tr>
<tr>
<td>B</td>
<td>2.0 to 2.5</td>
<td>L</td>
<td>7.0 to 7.5</td>
</tr>
<tr>
<td>C</td>
<td>2.5 to 3.0</td>
<td>M</td>
<td>7.5 to 8.0</td>
</tr>
<tr>
<td>D</td>
<td>3.0 to 3.5</td>
<td>N</td>
<td>8.0 to 8.5</td>
</tr>
<tr>
<td>E</td>
<td>3.5 to 4.0</td>
<td>O</td>
<td>8.5 to 9.0</td>
</tr>
<tr>
<td>F</td>
<td>4.0 to 4.5</td>
<td>P</td>
<td>9.0 to 9.5</td>
</tr>
<tr>
<td>G</td>
<td>4.5 to 5.0</td>
<td>Q</td>
<td>9.5 to 10.0</td>
</tr>
<tr>
<td>H</td>
<td>5.0 to 5.5</td>
<td>R</td>
<td>10.0 to 11.0</td>
</tr>
<tr>
<td>I</td>
<td>5.5 to 6.0</td>
<td>S</td>
<td>11.0 to 12.0</td>
</tr>
<tr>
<td>J</td>
<td>6.0 to 6.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table P10.2.1-3: Anchor Size vs. Tightening Torque for Standard Weight Concrete

<table>
<thead>
<tr>
<th>Anchor Size (in)</th>
<th>Anchor Tightening Torque (ft-lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>8.00</td>
</tr>
<tr>
<td>3/8</td>
<td>25.00</td>
</tr>
<tr>
<td>1/2</td>
<td>55.00</td>
</tr>
<tr>
<td>5/8</td>
<td>90.00</td>
</tr>
<tr>
<td>3/4</td>
<td>175.0</td>
</tr>
<tr>
<td>7/8</td>
<td>250.0</td>
</tr>
<tr>
<td>1</td>
<td>300.0</td>
</tr>
</tbody>
</table>

### Table P10.2.1-4: Minimum Cover Requirements per ACI 318-02

<table>
<thead>
<tr>
<th>Minimum Cover (in)</th>
<th>Concrete Exposure Condition Cast-in-Place &amp; Nonprestressed</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Cast-in-place and permanently exposed to the ground.</td>
</tr>
<tr>
<td>1-1/2</td>
<td>Exposed to the ground or weather.</td>
</tr>
<tr>
<td>3/4</td>
<td>Slabs, walls, or joists not exposed to the weather or ground.</td>
</tr>
<tr>
<td>1-1/2</td>
<td>Beams or Columns not exposed to the weather or ground.</td>
</tr>
<tr>
<td>3/4</td>
<td>Shells or folded plate members not exposed to the weather or ground.</td>
</tr>
</tbody>
</table>
KUAB Type P Undercut Seismic Anchor Data

The Seismic Certification programs written and used by Kinetics Noise Control use the model **KUAB Type P Undercut Anchor** data listed in Tables P10.2.2-1, P10.2.2-2, and P10.2.2-3 below. **Type P** indicates that the anchor is a *pre-setting or pre-positioning* type of anchor. The various terms and dimensions referenced in this document are defined in Figures P10.2.2-1, P10.2.2-2, and P10.2.2-3. Any other anchors that are substituted and/or supplied by others must be evaluated and approved by the Design Professional of Record. The data listed in Tables P10.2.2-1 through P10.2.2-3 is drawn from **ICC ES Report ESR-1546 (Issued August 1, 2004)**. All relevant factors for proper installation of these anchors are defined in documentation provided by Kinetics Noise Control.

The values in Table P10.2.2-1 are based on normal-weight concrete with a compressive strength of **3,000 psi**, and are adjusted for seismic and wind loading applications in accordance with the provisions established in **ACI 318-02 Appendix D**.

### Table P10.2.2-1: KUAB Type P Undercut Seismic Anchor Capacities.
(Reference: Figure P10.2.2-1)

<table>
<thead>
<tr>
<th>Undercut Anchor Model</th>
<th>Anchor Size(^1) mm (in)</th>
<th>Req. Embed.(^2) mm (in)</th>
<th>Seismic Tensile Allow. ASD(^3) N (lbs)</th>
<th>Seismic Shear Allow. ASD(^3) N (lbs)</th>
<th>Req. Spacing(^2) mm (in)</th>
<th>Req. Edge Dist.(^2) mm (in)</th>
<th>Length Code Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUAB-01 M10 (3/8)</td>
<td>100 (3.94)</td>
<td>19,424 (4,365)</td>
<td>8,869 (1,993)</td>
<td>300 (11.81)</td>
<td>150 (5.91)</td>
<td>I</td>
<td></td>
</tr>
<tr>
<td>KUAB-02 M12 (1/2)</td>
<td>125 (4.92)</td>
<td>24,284 (5,457)</td>
<td>12,856 (2,889)</td>
<td>375 (14.76)</td>
<td>188 (7.38)</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>KUAB-03 M16 (5/8)</td>
<td>190 (7.48)</td>
<td>48,567 (10,914)</td>
<td>23941 (5,380)</td>
<td>570 (22.44)</td>
<td>285 (11.22)</td>
<td>R</td>
<td></td>
</tr>
<tr>
<td>KUAB-04 M20 (3/4)</td>
<td>250 (9.84)</td>
<td>72,851 (16,371)</td>
<td>36797 (8,269)</td>
<td>750 (29.53)</td>
<td>375 (14.76)</td>
<td>V</td>
<td></td>
</tr>
</tbody>
</table>

1 - If the Clearance Hole Diameter is greater than or equal to 1/8” more than the Anchor Size, fill the clearance space with grout or epoxy, or use the appropriate Kinetics Noise Control model TG Grommet.

2 - Required embedment, spacing, and edge distance are required to develop the maximum listed allowable loads.

3 - These values *may not* be inflated by 33-1/3% for seismic and wind applications!
Figure P10.2.2-1: KUAB Type P Undercut Seismic Anchor Placement Guide.

Table P10.2.2-2: KUAB Type P Undercut Seismic Anchor Dimensional Data.
(Reference: Figure P10.2.2-2)

<table>
<thead>
<tr>
<th>Undercut Anchor Model</th>
<th>Anchor Size mm (in)</th>
<th>$\Phi A$ mm (in)</th>
<th>$B$ mm (in)</th>
<th>$C$ mm (in)</th>
<th>$\Phi D$ mm (in)</th>
<th>$\Phi E$ mm (in)</th>
<th>$F$ mm (in)</th>
<th>$\Phi G$ mm (in)</th>
<th>$H$ mm (in)</th>
<th>Length Code Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUAB-01</td>
<td>M10 (3/8)</td>
<td>20 (0.79)</td>
<td>107 (4.21)</td>
<td>20 (0.79)</td>
<td>12 (0.47)</td>
<td>10 (0.39)</td>
<td>17 (0.67)</td>
<td>27.5 (1.08)</td>
<td>170 (6.69)</td>
<td>I</td>
</tr>
<tr>
<td>KUAB-02</td>
<td>M12 (1/2)</td>
<td>22 (0.87)</td>
<td>135 (5.31)</td>
<td>30 (1.18)</td>
<td>14 (0.55)</td>
<td>12 (0.47)</td>
<td>19 (0.75)</td>
<td>33.5 (1.32)</td>
<td>190 (7.48)</td>
<td>L</td>
</tr>
<tr>
<td>KUAB-03</td>
<td>M16 (5/8)</td>
<td>30 (1.18)</td>
<td>203 (7.99)</td>
<td>40 (1.57)</td>
<td>18 (0.71)</td>
<td>16 (0.63)</td>
<td>24 (0.94)</td>
<td>45.5 (1.79)</td>
<td>270 (10.63)</td>
<td>R</td>
</tr>
<tr>
<td>KUAB-04</td>
<td>M20 (3/4)</td>
<td>37 (1.46)</td>
<td>266 (10.47)</td>
<td>50 (1.97)</td>
<td>22 (0.87)</td>
<td>20 (0.79)</td>
<td>30 (1.18)</td>
<td>50 (1.97)</td>
<td>350 (13.78)</td>
<td>V</td>
</tr>
</tbody>
</table>
Table P10.2.2-3: Anchor Size vs. Tightening Torque for Standard Weight Concrete.

<table>
<thead>
<tr>
<th>Undercut Anchor Model</th>
<th>Anchor Size mm (in)</th>
<th>Anchor Tightening Torque N-m (ft-lbs)</th>
<th>Length Code Stamp</th>
</tr>
</thead>
<tbody>
<tr>
<td>KUAB-01</td>
<td>M10 (3/8)</td>
<td>50 (37)</td>
<td>I</td>
</tr>
<tr>
<td>KUAB-02</td>
<td>M12 (1/2)</td>
<td>80 (59)</td>
<td>L</td>
</tr>
<tr>
<td>KUAB-03</td>
<td>M16 (5/8)</td>
<td>120 (88)</td>
<td>R</td>
</tr>
<tr>
<td>KUAB-04</td>
<td>M20 (3/4)</td>
<td>300 (221)</td>
<td>V</td>
</tr>
</tbody>
</table>
TG Bolt Isolation Grommet Submittal Data

The Kinetics Noise Control model *TG Bolt Isolation Grommet* is used primarily to fill the excess clearance in the anchor/bolt holes in equipment/isolator mounting plates/feet. The codes and best practice require that the diameter of an anchor/bolt hole not exceed the diameter of the anchor/bolt by more than \( \frac{1}{8} \) inch. In many cases, the seismic analysis will indicate that an anchor/bolt of smaller size than that provided for in the mounting plate/foot may be used for a specific application. The Kinetics Noise Control model *TG Bolt Isolation Grommet* may be used in these cases to bring the anchor/bolt hole clearance into line with the code and best practice recommended clearance for the smaller anchor/bolt size. In order to perform satisfactorily in this type of application, the material used for the model *TG Bolt Isolation Grommet* is 80 Durometer Neoprene. A typical Kinetics Noise Control model *TG Bolt Isolation Grommet* is shown below in Figure P10.2.3-1. The dimensional data for the product family line is given in Tables P10.2.3-1 and P10.2.3-2. A typical *TG Bolt Isolation Grommet Installation* is shown in Figure P10.2.3-2.

![Figure P10.2.3-1: Typical Model TG Bolt Isolation Grommet.](image)

<table>
<thead>
<tr>
<th>Size (in)</th>
<th>ØA</th>
<th>ØB</th>
<th>ØE</th>
</tr>
</thead>
<tbody>
<tr>
<td>KINETICS®</td>
<td>1/4</td>
<td>TG-25</td>
<td>80 Durometer Neoprene</td>
</tr>
</tbody>
</table>

**Figure P10.2.3-1: Typical Model TG Bolt Isolation Grommet.**

---

**TG BOLT ISOLATION GROMMET SUBMITTAL DATA**

**PAGE 1 OF 3**

**KINETICS Noise Control**

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Fax: 614-889-0540
World Wide Web: www.kineticsnoise.com
Email: sales@kineticsnoise.com

**DOCUMENT:**

P10.2.3

**RELEASE DATE:** 9/20/04

Kinetics Noise Control © 2003
Table P10.2.3-1: TG Bolt Isolation Grommet English Dimensional Data.

<table>
<thead>
<tr>
<th>Model</th>
<th>Anchor/Bolt Size (in)</th>
<th>( \Phi A ) (in)</th>
<th>( \Phi B ) (in)</th>
<th>( C ) (in)</th>
<th>( D ) (in)</th>
<th>( \Phi E ) (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG-25</td>
<td>1/4</td>
<td>1.00</td>
<td>0.25</td>
<td>0.13</td>
<td>0.38</td>
<td>0.50</td>
</tr>
<tr>
<td>TG-38</td>
<td>3/8</td>
<td>1.25</td>
<td>0.38</td>
<td>0.13</td>
<td>0.50</td>
<td>0.63</td>
</tr>
<tr>
<td>TG-50</td>
<td>1/2</td>
<td>1.63</td>
<td>0.50</td>
<td>0.13</td>
<td>0.50</td>
<td>0.75</td>
</tr>
<tr>
<td>TG-63</td>
<td>5/8</td>
<td>2.00</td>
<td>0.63</td>
<td>0.19</td>
<td>0.63</td>
<td>0.88</td>
</tr>
<tr>
<td>TG-75</td>
<td>3/4</td>
<td>2.25</td>
<td>0.75</td>
<td>0.19</td>
<td>0.63</td>
<td>1.00</td>
</tr>
<tr>
<td>TG-100</td>
<td>1</td>
<td>2.75</td>
<td>1.00</td>
<td>0.25</td>
<td>0.88</td>
<td>1.25</td>
</tr>
<tr>
<td>TG-125</td>
<td>1-1/4</td>
<td>3.25</td>
<td>1.25</td>
<td>0.25</td>
<td>0.88</td>
<td>1.50</td>
</tr>
<tr>
<td>TG-150</td>
<td>1-1/2</td>
<td>3.75</td>
<td>1.50</td>
<td>0.25</td>
<td>1.00</td>
<td>1.75</td>
</tr>
</tbody>
</table>

Table P10.2.3-2: TG Bolt Isolation Grommet Metric Dimensional Data.

<table>
<thead>
<tr>
<th>Model</th>
<th>Anchor/Bolt Size (in)</th>
<th>( \Phi A ) (mm)</th>
<th>( \Phi B ) (mm)</th>
<th>( C ) (mm)</th>
<th>( D ) (mm)</th>
<th>( \Phi E ) (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TG-25</td>
<td>1/4</td>
<td>25.4</td>
<td>6.4</td>
<td>3.2</td>
<td>9.5</td>
<td>12.7</td>
</tr>
<tr>
<td>TG-38</td>
<td>3/8</td>
<td>31.8</td>
<td>9.5</td>
<td>3.2</td>
<td>12.7</td>
<td>15.9</td>
</tr>
<tr>
<td>TG-50</td>
<td>1/2</td>
<td>41.3</td>
<td>12.7</td>
<td>3.2</td>
<td>12.7</td>
<td>19.1</td>
</tr>
<tr>
<td>TG-63</td>
<td>5/8</td>
<td>50.8</td>
<td>15.9</td>
<td>4.8</td>
<td>15.9</td>
<td>22.2</td>
</tr>
<tr>
<td>TG-75</td>
<td>3/4</td>
<td>57.2</td>
<td>19.1</td>
<td>4.8</td>
<td>15.9</td>
<td>25.4</td>
</tr>
<tr>
<td>TG-100</td>
<td>1</td>
<td>69.9</td>
<td>25.4</td>
<td>6.4</td>
<td>22.2</td>
<td>31.8</td>
</tr>
<tr>
<td>TG-125</td>
<td>1-1/4</td>
<td>82.6</td>
<td>31.8</td>
<td>6.4</td>
<td>22.2</td>
<td>38.1</td>
</tr>
<tr>
<td>TG-150</td>
<td>1-1/2</td>
<td>95.3</td>
<td>38.1</td>
<td>6.4</td>
<td>25.4</td>
<td>44.4</td>
</tr>
</tbody>
</table>
Figure P10.2.3-2: Typical TG Bolt Isolation Grommet Installation.
KCCAB CRACKED CONCRETE WEDGE TYPE SEISMIC ANCHOR DATA

Table P10.2.4-1; Model KCCAB Anchor Capacities – Standard Embedment in 3,000 psi Normal Weight Concrete

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>2</td>
<td>5/8</td>
<td>1,102</td>
<td>691</td>
<td>999</td>
<td>6</td>
<td>4 3/8</td>
<td>4</td>
</tr>
<tr>
<td>1/2</td>
<td>4</td>
<td>3 1/4</td>
<td>2,386</td>
<td>1,706</td>
<td>2,839</td>
<td>9 3/4</td>
<td>7 1/2</td>
<td>6</td>
</tr>
<tr>
<td>5/8</td>
<td>4</td>
<td>3/4</td>
<td>2,835</td>
<td>2,284</td>
<td>4,678</td>
<td>12</td>
<td>8 3/4</td>
<td>6</td>
</tr>
<tr>
<td>3/4</td>
<td>5</td>
<td>3/4</td>
<td>4,272</td>
<td>3,321</td>
<td>6,313</td>
<td>14 1/4</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

Figure P10.2.4-1; Seismic Capacity Envelopes for Model KCCAB Concrete Anchors with Standard Embedment
Figure P10.2.4-2; KCCAB Cracked Concrete Seismic Anchor Installation Guide
### Table P10.2.4-2: Anchor Length by Length Code Stamp (Anchor Size Independent)

<table>
<thead>
<tr>
<th>Length Code Stamp</th>
<th>Anchor Length (in)</th>
<th>Length Code Stamp</th>
<th>Anchor Length (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1.5 up to 2.0</td>
<td>M</td>
<td>7.5 up to 8.0</td>
</tr>
<tr>
<td>B</td>
<td>2.0 up to 2.5</td>
<td>N</td>
<td>8.0 up to 8.5</td>
</tr>
<tr>
<td>C</td>
<td>2.5 up to 3.0</td>
<td>O</td>
<td>8.5 up to 9.0</td>
</tr>
<tr>
<td>D</td>
<td>3.0 up to 3.5</td>
<td>P</td>
<td>9.0 up to 9.5</td>
</tr>
<tr>
<td>E</td>
<td>3.5 up to 4.0</td>
<td>Q</td>
<td>9.5 up to 10.0</td>
</tr>
<tr>
<td>F</td>
<td>4.0 up to 4.5</td>
<td>R</td>
<td>10.0 up to 11.0</td>
</tr>
<tr>
<td>G</td>
<td>4.5 up to 5.0</td>
<td>S</td>
<td>11.0 up to 12.0</td>
</tr>
<tr>
<td>H</td>
<td>5.0 up to 5.5</td>
<td>T</td>
<td>12.0 up to 13.0</td>
</tr>
<tr>
<td>I</td>
<td>5.5 up to 6.0</td>
<td>U</td>
<td>13.0 up to 14.0</td>
</tr>
<tr>
<td>J</td>
<td>6.0 up to 6.5</td>
<td>V</td>
<td>14.0 up to 15.0</td>
</tr>
<tr>
<td>K</td>
<td>6.5 up to 7.0</td>
<td>W</td>
<td>15.0 up to 16.0</td>
</tr>
<tr>
<td>L</td>
<td>7.0 up to 7.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table P10.2.4-3: Anchor Size vs. Tightening Torque for Standard Weight Concrete

<table>
<thead>
<tr>
<th>Anchor Size (in)</th>
<th>Anchor Tightening Torque (ft-lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3/8</td>
<td>25.00</td>
</tr>
<tr>
<td>1/2</td>
<td>40.00</td>
</tr>
<tr>
<td>5/8</td>
<td>60.00</td>
</tr>
<tr>
<td>3/4</td>
<td>110.0</td>
</tr>
</tbody>
</table>
KCAB Wedge Type Anchor Selection Guide

For wedge type concrete anchors, the factor of safety is computed using the following equation.

\[ F.S. \geq 1 = \frac{1}{[(T/T_A)^{(5/3)}] + (P/P_A)^{(5/3)}} \]  
(Eq. P10.3.1-1)

Where:
- \( F.S. \) = the factor of safety.
- \( T \) = the applied tensile force acting on the anchor (lbs).
- \( T_A \) = the allowable tensile load for the specified anchor size (lbs).
- \( P \) = the applied shear force acting on the anchor (lbs).
- \( P_A \) = the allowable shear load for the specified anchor size (lbs).

It is possible to use Equation P10.3.1-1 to compute an allowable combined anchor load where the applied tensile force is equal to the applied shear force. With this information, a capacity envelope may be constructed for the various wedge type concrete anchors that are specified and used by Kinetics Noise Control. In Equation P10.3.1-2 the applied tensile load has been made equal to the applied shear load, and is designated as \( F_C \).

\[ 1 = \frac{1}{[(F_C/T_A)^{(5/3)}] + (F_C/P_A)^{(5/3)}} \]  
(Eq. P10.3.1-2)

Solving Equation P10.3.1-2 for \( F_C \) and simplifying will yield the following result.

\[ F_C = (T_A \cdot P_A) \cdot \left[ \frac{1}{(T_A)^{(5/3)} + (P_A)^{(5/3)}} \right]^{(3/5)} \]  
(Eq. P10.3.1-3)

The data provided in Table P10.3.1-1 is based on concrete with a minimum compressive strength of 3,000 psi and a minimum embedment depth equal to 8 anchor diameters. The capacity envelopes for the anchors presented in Table P10.3.1-1 are plotted in Figures P10.3.1-1 through P10.3.1-4.
Table P10.3.1-1; KCAB Wedge Type Anchor Basic Capacities.

<table>
<thead>
<tr>
<th>Anchor Size² (in)</th>
<th>Minimum Required Embed. Depth (in)</th>
<th>ASD Allow. Tensile Load¹ (T=0) (lbs)</th>
<th>ASD Allow. Shear Load¹ (P=0) (lbs)</th>
<th>ASD Allow. Comb. Load¹ (F₃=T=P) (lbs)</th>
<th>LRFD Allow. Tensile Load¹ (T=0) (lbs)</th>
<th>LRFD Allow. Shear Load¹ (P=0) (lbs)</th>
<th>LRFD Allow. Com. Load¹ (F₃=T=P) (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/4</td>
<td>2</td>
<td>280</td>
<td>400</td>
<td>215</td>
<td>392</td>
<td>560</td>
<td>301</td>
</tr>
<tr>
<td>3/8</td>
<td>3</td>
<td>588</td>
<td>1,018</td>
<td>480</td>
<td>823</td>
<td>1,425</td>
<td>672</td>
</tr>
<tr>
<td>1/2</td>
<td>4</td>
<td>874</td>
<td>1,769</td>
<td>744</td>
<td>1,224</td>
<td>2,477</td>
<td>1,041</td>
</tr>
<tr>
<td>5/8</td>
<td>5</td>
<td>1,317</td>
<td>2,640</td>
<td>1,118</td>
<td>1,844</td>
<td>3,696</td>
<td>1,565</td>
</tr>
<tr>
<td>3/4</td>
<td>6</td>
<td>1,668</td>
<td>4,225</td>
<td>1,486</td>
<td>2,335</td>
<td>5,915</td>
<td>2,080</td>
</tr>
<tr>
<td>7/8</td>
<td>7</td>
<td>2,264</td>
<td>6,210</td>
<td>2,044</td>
<td>3,170</td>
<td>8,694</td>
<td>2,861</td>
</tr>
<tr>
<td>1</td>
<td>8</td>
<td>2,535</td>
<td>8,328</td>
<td>2,346</td>
<td>3,549</td>
<td>11,659</td>
<td>3,285</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>2,730</td>
<td>8,328</td>
<td>2,503</td>
<td>3,822</td>
<td>11,659</td>
<td>3,504</td>
</tr>
<tr>
<td>1-1/4</td>
<td>10</td>
<td>5,105</td>
<td>9,918</td>
<td>4,301</td>
<td>7,147</td>
<td>13,885</td>
<td>6,021</td>
</tr>
</tbody>
</table>

1) For Non-California projects these values may be inflated by 33-1/3% for seismic and wind applications. For California Non-OSHPD projects these values must be reduced by 20%. For California OSHPD projects the allowable loads for lightweight, 2,000 psi, concrete must be reduced by 20% to simulate cracked concrete. In this case the values listed here do not apply.
2) If the Clearance Hole Diameter is greater than or equal to 1/8" more than the Anchor Size, fill the clearance space with grout or epoxy, or use the appropriate Kinetics Noise Control model TG Grommet.
Figure P10.3.1-1; Basic ASD Values for 1/4” through 1/2” Anchors.

Figure 10.3.1-2; Basic ASD Values for 5/8” Though 7/8” Anchors
Figure P10.3.1-3; Basic ASD Values for 1" through 1-1/4" Anchors.

Figure 10.3.1-4; Basic LRFD Values for 1/4" Though 5/8" Anchors
Figure P10.3.1-5; Basic LRFD Values for 5/8” through 7/8” Anchors.

Figure 10.3.1-2; Basic LRFD Values for 1” Though 1-1/4” Anchors
KUAB Type P Undercut Seismic Anchor Selection Guide

The Kinetics Noise Control model KUAB Type P Undercut Seismic Anchors are purchased from HILTI, Inc., and are described in Document P.10.2.2. The Seismic Restraint Envelopes for this type of anchor will be constructed according to the information found in ICC ES Report number ESR-1546, Section 4.2.1. In this document, the following definitions will apply.

\[
T = \text{the applied tensile load in the anchor.} \\
T_A = \text{the allowable tensile load in the anchor, ASD or LRFD.} \\
P = \text{the applied shear load in the anchor.} \\
P_A = \text{the allowable shear load in the anchor, ASD or LRFD.} \\
F_C = \text{the combined load case where } T = P.
\]

For applied shear loads \( P \leq 0.2P_A \) the full allowable load in tension \( T_A \) may be taken. For applied tensile loads \( T \leq 0.2T_A \) the full allowable load in shear \( P_A \) may be taken. For all other conditions;

\[
\frac{T}{T_A} + \frac{P}{P_A} \leq 1.2 \quad \text{(Eq. P10.3.2-1)}
\]

Setting \( T = P = F_C \), and solving for the combined load \( F_C \) will provide the closing data point for the Seismic Restraint Envelopes.

\[
F_C = \frac{1.2T_A P_A}{P_A + T_A} \quad \text{(Eq. P10.3.2-2)}
\]

The ASD, and LRFD Allowable Tensile, Shear, Combined Loads for the Kinetics Noise Control model KUAB Type P Undercut Seismic Anchors are given in Table P10.3.2-1. The Seismic Restraint Envelopes for those anchors are presented in Figures P10.3.2-1 and P10.3.2-2 for ASD values, and Figures P10.3.2-3 and P10.3.2-4 for LRFD values.
Table P10.3.2-1; KUAB Type P Undercut Seismic Type Anchor Capacities
(HILTI HDA-P Undercut Concrete Anchors)

<table>
<thead>
<tr>
<th>Anchor Size (mm)</th>
<th>Min. Req'd Embed. Depth (in)</th>
<th>ASD Allow. Tensile Load&lt;sup&gt;2&lt;/sup&gt; (T=0) (lbs)</th>
<th>ASD Allow. Shear Load&lt;sup&gt;2&lt;/sup&gt; (P=0) (lbs)</th>
<th>ASD Allow. Comb. Load&lt;sup&gt;2&lt;/sup&gt; (F&lt;sub&gt;C&lt;/sub&gt;=T=P) (lbs)</th>
<th>LRFD Allow. Tensile Load&lt;sup&gt;2&lt;/sup&gt; (T=0) (lbs)</th>
<th>LRFD Allow. Shear Load&lt;sup&gt;2&lt;/sup&gt; (P=0) (lbs)</th>
<th>LRFD Allow. Comb. Load&lt;sup&gt;2&lt;/sup&gt; (F&lt;sub&gt;C&lt;/sub&gt;=T=P) (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M10 [ 3/8 ]</td>
<td>4</td>
<td>4,365</td>
<td>1,993</td>
<td>1,642</td>
<td>6,111</td>
<td>2,790</td>
<td>2,299</td>
</tr>
<tr>
<td>M12 [ 1/2 ]</td>
<td>5</td>
<td>5,457</td>
<td>2,889</td>
<td>2,267</td>
<td>7,640</td>
<td>4,045</td>
<td>3,174</td>
</tr>
<tr>
<td>M16 [ 5/8 ]</td>
<td>7-1/2</td>
<td>10,914</td>
<td>5,380</td>
<td>4,324</td>
<td>15,280</td>
<td>7,532</td>
<td>6,054</td>
</tr>
</tbody>
</table>

1) If the Clearance Hole Diameter is greater than or equal to 1/8" more than the Anchor Size, fill the clearance space with grout or epoxy, or use the appropriate Kinetics Noise Control model TG Grommet.

2) These values may not be inflated by 33-1/3% for seismic and wind applications!

Figure P10.3.2-1; Basic ASD Values for M10 and M12 Anchors.
Figure P10.3.2-2; Basic ASD Values for M16 and M20 Anchors.

Figure P10.3.2-3; Basic LRFD Values for M10 and M12 Anchors.
Figure P10.3.2-4; Basic LRFD Values for M16 and M20 Anchors.
KCAB and KCCAB anchors shall be installed in holes drilled into the base material using carbide-tipped masonry drill bits complying with ANSI B212.15-1994. The nominal drill bit diameter shall be equal to that of the anchor. The drilled hole shall exceed the required anchor embedment depth by at least one anchor diameter to permit over-driving of anchors and to provide a dust collection area.

Anchors shall be installed to a minimum embedment depth and with at least the minimum edge distance as specified in the table below.

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Minimum Embedment (in)</th>
<th>Minimum Edge Distance (in)</th>
<th>Minimum Embedment (in)</th>
<th>Minimum Edge Distance (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25</td>
<td>2.0</td>
<td>3.38</td>
<td>2.00</td>
<td>6.50</td>
</tr>
<tr>
<td>0.38</td>
<td>3.0</td>
<td>4.88</td>
<td>3.25</td>
<td>7.50</td>
</tr>
<tr>
<td>0.50</td>
<td>4.0</td>
<td>6.75</td>
<td>4.00</td>
<td>8.75</td>
</tr>
<tr>
<td>0.62</td>
<td>5.0</td>
<td>8.25</td>
<td>4.75</td>
<td>9.00</td>
</tr>
<tr>
<td>0.75</td>
<td>6.0</td>
<td>9.75</td>
<td>5.75</td>
<td>9.75</td>
</tr>
<tr>
<td>1.00 (Hi Capacity)</td>
<td>8.0</td>
<td>13.50</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The anchor shall be hammered into the predrilled hole until at least 6 threads (KCAB) or 4 threads (KCCAB) are below the fixture surface. The nut shall be tightened against the washer until the torque values specified in the table below are obtained.

<table>
<thead>
<tr>
<th>Anchor Size</th>
<th>Torque (in lb)</th>
<th>Torque (Nm)</th>
<th>Torque (in lb)</th>
<th>Torque (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.25</td>
<td>4</td>
<td>6</td>
<td>25</td>
<td>34</td>
</tr>
<tr>
<td>0.38</td>
<td>20</td>
<td>27</td>
<td>40</td>
<td>54</td>
</tr>
<tr>
<td>0.50</td>
<td>40</td>
<td>54</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>0.62</td>
<td>85</td>
<td>115</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>0.75</td>
<td>150</td>
<td>202</td>
<td>110</td>
<td>149</td>
</tr>
<tr>
<td>1.00</td>
<td>325</td>
<td>439</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

See page to follow for detailed installation procedure.
1) Hammer drill a hole to the same nominal diameter as the KCAB or KCCAB using a bit complying with ANSI B212.15-1994. The hole depth should exceed the listed embedment depth by 1 anchor diameter. The component being restrained can be used as a guide to properly locate the hole.

2) Clean the hole using an air source to blow the debris out.

3) Drive the anchor bolt into the hole using a hammer.
   a) KCAB anchors should be driven in to their rated embedment depth (with at least 6 threads being driven below the surface against which the nut will bear).
   b) KCCAB anchors should be driven in to their rated embedment depth (with the marker on the side of the anchor flush with the concrete surface and with at least 4 threads being driven below the surface against which the nut will bear).

4) Tighten the nut to the recommended installation torque.