Dyna-Tite

SUSPENSION SYSTEM

ENGINEER MANUAL

DURO DYNE

www.durodyne.com

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Dyna-Tite™

PRODUCTS

Engineer Manual

CABLE LOCKS

The Dyna-Tite Cable Lock can be used as a fast and reliable way to suspend ductwork and equipment. Cable Locks are to be used on static load applications only.

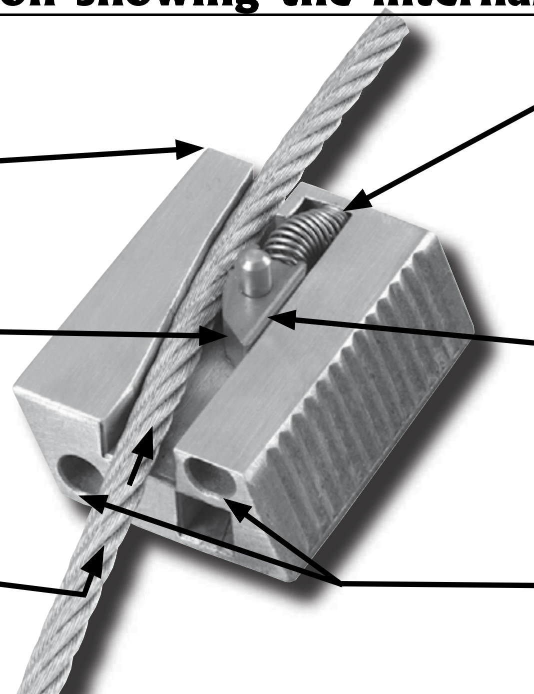
CL18 CL23

CL12

Features:

- Quick & easy to install
- No special tools or skills required
- Flexibility of installation
- External release pin

Cut-away section showing the internal components



DIE CAST HOUSING
Casting material combines anti-corrosion properties with strength.

SERRATED TEETH
Each pawl makes contact with the rope using serrated teeth. These press onto the wire rope and spread the load across the length of the pawl, maximizing the grip strength.

WIRE ROPE ENTRY
The wire rope is pushed into the Dyna-Tite Cable Lock channel.

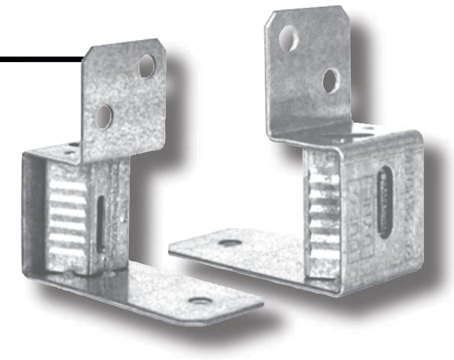
STAINLESS STEEL SPRINGS
The springs, one in each channel, are manufactured of stainless steel and provide initial engagement of the pawl to the wire rope.

LOCKING PAWL
One sintered steel locking pawl is seated in each channel. Every locking pawl incorporates a release pin for easy adjustment after installation.

THROUGH HOLE
Two “through holes” allow fast and secure hanging with only one Cable Lock (through holes are a feature on the CL23 only).

Cable Lock Size	Wire Rope Diameter	Safe Working Load at 5:1 Safety Factor
CL12	1/16 inch	0-75 lbs
	3/32 inch	25-150 lbs
	2.0 mm	12-55 kg
	2.5 mm	12-100 kg
CL18	3/32 inch	25-150 lbs
	1/8 inch	25-225 lbs
	2.5 mm	12-100 kg
	3.0 mm	12-120 kg
CL23	1/8 inch	25-250 lbs
	3/16 inch	50-640 lbs
	4.0 mm	25-180 kg

KV BRACKET



The KV Bracket assembly complements the Dyna-Tite Cable Lock suspension system by the addition of an integral bracket, which fastens the "captured" cable lock to the duct with sheet metal screws. Once the KV Bracket assembly is attached to the duct, the wire rope "drop" is passed into the entry hole at the top of the bracket, through the cable lock, and out the exit hole at the bottom. The locking teeth inside the cable lock engage the wire rope and secure the ductwork in place.

CABLE

Aviation Grade galvanized steel wire rope, supplied by Duro Dyne is manufactured to exacting standards and statistically tested to verify the breaking strength. Duro Dyne recommends only using wire rope supplied by Duro Dyne. Wire rope is available in 1/16 inch, 3/32 inch, 1/8 inch and 3/16 inch.

DURO LOOP

The Dyna-Tite suspension system is enhanced by the Duro Loop Cable Sling (a cable with a pre-looped end). Once the "free" end of the Duro Loop Cable Sling is pulled around the anchor point and through its looped end, it is already secured at one end, saving time at the jobsite. The "free" end is then passed through a channel in the Dyna-Tite Cable Lock. Then, the wire rope end is either wrapped around the ductwork or inserted through a fastening point and back up into the second channel of the same cable lock. The locking teeth inside the cable lock engage the wire rope which secures the ductwork in place.

To ensure maximum safety, use only looped wire rope supplied by Duro Dyne with cable lock applications.

CABLE CUTTER

When cutting cable, it is important to use a tool designed specifically for this purpose. Tools such as the Duro Dyne cable cutter ensure that the form of the rope is maintained when cutting it to size, prior to insertion in the Cable Lock. Cable Cutter features: Storage catch, 3/16 inch (4.76 mm) cutting capacity, spring loaded, 5'' (12.7 cm) long, vinyl coated handles and hardened steel blades.

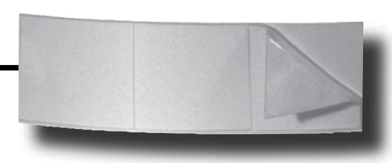
CABLE COUNTER LID

The Cable Counter Lid provides an easy method for the contractor to measure the wire rope to length. The lid fits on a standard five-gallon bucket, which can be used to easily transport wire rope, tools and Cable Locks on the job site.

CABLE SADDLE

Dyna-Tite Cable Saddle is used to protect spiral or rectangular ductwork and wire rope from abrading each other. The flexible saddle material is available in 25 foot rolls and is dispensed through an opening in the carton. The smooth lightweight construction provides easy use on the job site and allows for the saddle to be readily cut to length.

CABLE SADDLE ADHESIVE PATCHES



The self-stick patches are used in conjunction with the Cable Saddle to keep it in position while assembling the wire rope "drops". Each patch has a peel-off release backing to protect the surface from contaminants until ready for use.

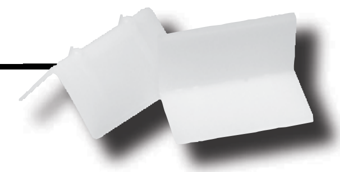
EYE BOLT & NUT

The eye bolt and nut provide a quickly installed, secure anchor point for wire rope "drops".

HANGER PLATE

Hanger Plates are a convenient way to provide an angled mounting hole. The zinc plated brackets have a 45° bend and a 1/4" (6.35 mm) mounting hole on each end.

CORNER PROTECTORS



Pulling wire rope tightly over abrasive 90 degree bends can fatigue the wire rope. Adding Corner Protectors minimizes the effects of harsh edges that wire rope crosses.

FLANGE BEAM FASTENERS

When a mounting hole to beams is needed quickly, Flange Beam Fasteners provide a fast and easy hammer-on solution.

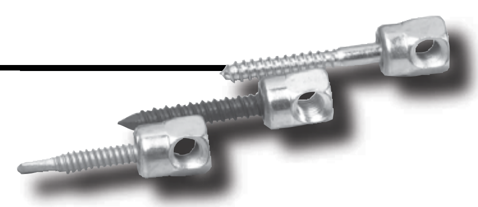
Vertical Flange Hanger

FLANGE HANGERS

“Z” Purlin Hanger

Flange Hangers provide a fast, hammer-on method to add a mounting hole to vertical Flange or “Z” Purlins.

SIDEWINDER HANGERS



Sidewinders can provide a “screw in” means of adding a mounting hole to concrete, wood or steel. Three different styles of self-tapping fasteners are available to provide a 3/8 x 16 threaded hole parallel to the surface the fastener is attached to.

STARTER KIT

The Starter Kit includes everything needed to tackle a small job:

1 Roll of 3/32 inch Cable
100 CL12 Cable Locks
1 Custom Cable Counter Lid & Bucket
1 Cable Cutter

<u>Roll of Cable</u> - Galvanized steel cable is manufactured to exact standards and is statistically tested to verify the breaking strength. The cable supplied in the starter kit is 3/32 inch (2.5 mm) diameter.

<u>The CL12</u> has a working load limit of 150 lbs (68 kg) when used with 3/32 inch cable and 75 lbs (34 kg) when used with 1/16 inch cable. Like all Dyna-Tite Cable Locks, it has an externally accessed adjustment pin.

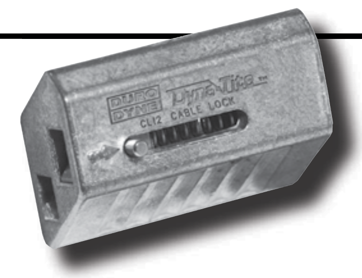
<u>Custom Cable Counter Lid</u> - The counter is capable of measuring wire rope lengths from 0 feet 0 inches to 9999 feet 11 inches. It is lightweight and has a push button reset. It is designed for use with Dyna-Tite wire rope for accurate sizing and elimination of waste. (A Metric Cable Counter Lid is also available.)

<u>Cable Cutter</u> - When cutting cable it is important to use a recognized cable cutter such as the Duro Dyne cutter. This will ensure that the round form of the rope is maintained prior to insertion in the cable lock. The cable cutter features; storage catch, 3/16 inch (4.76 mm) cutting capacity, spring loaded 5 inch (12.7 cm) long vinyl coated handles, and hardened steel blades.

SPECIFICATIONS

Engineer Manual

CL12 CABLE LOCK SPECIFICATIONS



Suggested Specification:

All ductwork and other equipment shall be supported using wire rope cable terminated by Cable Locks. All Cable Locks shall have an Ultimate Breaking Strength (U.B.S.) of at least 5 times the wire rope published Working Load Limit (W.L.L.). All wire rope shall have a U.B.S. of at least 5 times the published W.L.L. Wire ropes shall be of the size and spacing per the manufacturer's printed specifications. Wire Rope and Cable Locks shall be as supplied by Duro Dyne Corporation.

Specification Data

1) All wire rope supplied by Duro Dyne is statistically tested to minimum breaking strength.

2) CL12 has been submitted and tested to be an acceptable alternative to the duct hanger systems described in SMACNA HVAC-DCS 2nd edition By SMACNA Testing & Research Institute.

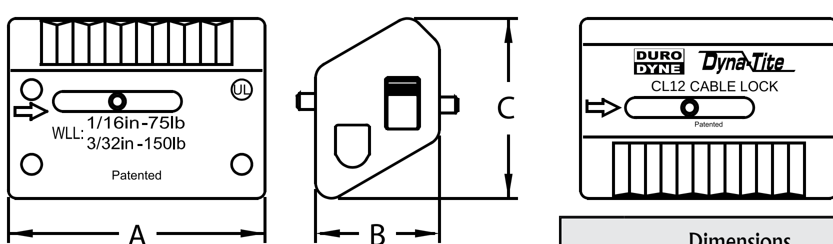
3) All Working Load Ratings of Dyna-Tite CL12 Cable Locks manufactured by Duro Dyne have been witnessed and verified by independent testing laboratories.

4) Dyna-Tite CL12 Cable Locks may be used in applications with temperatures up to 300° F (148°C).

5) Dyna-Tite CL12 Cable Lock pawls are constructed of corrosion resistant sintered steel.

6) Dyna-Tite CL12 Cable Lock springs are constructed of tempered stainless steel.

Code	Construction of Cable Lock	Wire Rope Diameter	Construction of Wire Rope	Safe Working Load at 5:1 Safety Factor
CL12	Stainless Steel Sintered Steel Zinc Alloy	1/16 inch	7x7 Hot Galvanized	0-75 lbs
		3/32 inch	7x7 Hot Galvanized	25-150 lbs
		2.0 mm	7x7 Hot Galvanized	12-55 kg
		2.5 mm	7x7 Hot Galvanized	12-100 kg



CL12

Dimensions		
	English	Metric
A	1.00 inch	25.4 mm
B	.483 inch	12.26 mm
C	.700 inch	17.78 mm

CL18 CABLE LOCK SPECIFICATIONS

Suggested Specification:

All ductwork and other equipment shall be supported using wire rope cable terminated by Cable Locks. All Cable Locks shall have an Ultimate Breaking Strength (U.B.S.) of at least 5 times the wire rope published Working Load Limit (W.L.L.). All wire rope shall have a U.B.S. of at least 5 times the published W.L.L. Wire ropes shall be of the size and spacing per the manufacturer's printed specifications. Wire Rope and Cable Locks shall be as supplied by Duro Dyne Corporation.

Specification Data

1) All wire rope supplied by Duro Dyne is statistically tested to minimum breaking strength.

2) CL18 has been submitted and tested to be an acceptable alternative to the duct hanger systems described in SMACNA HVAC-DCS 2nd edition By SMACNA Testing & Research Institute.

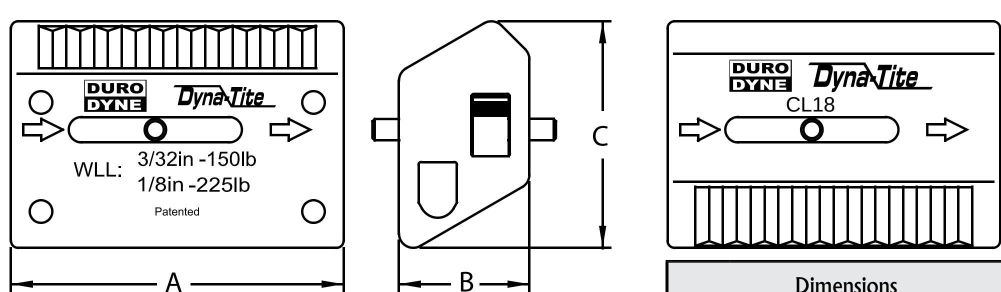
3) All Working Load Ratings of Dyna-Tite CL18 Cable Locks manufactured by Duro Dyne have been witnessed and verified by independent testing laboratories.

4) CL18 Cable Locks may be used in applications with temperatures up to 300° F (148° C).

5) CL18 Cable Lock pawls are constructed of corrosion resistant sintered steel.

6) CL18 Cable Lock springs are constructed of tempered stainless steel.

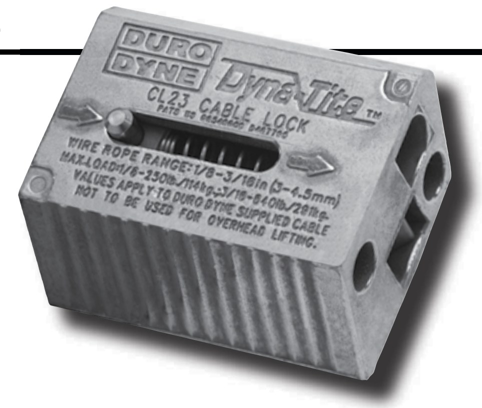
Code	Construction of Cable Lock	Wire Rope Diameter	Construction of Wire Rope	Safe Working Load at 5:1 Safety Factor
CL18	Stainless Steel Sintered Steel Zinc Alloy	3/32 inch	7x7 Hot Galvanized	25-150 lbs
		1/8 inch	7x7 Hot Galvanized	25-225 lbs
		2.5 mm	7x7 Hot Galvanized	12-100 kg
		3.0 mm	7x7 Hot Galvanized	12-120 kg



CL18

Dimensions		
	English	Metric
A	1.440 inch	36.57 mm
B	.565 inch	14.35 mm
C	.980 inch	24.89 mm

CL23 CABLE LOCK SPECIFICATIONS



Suggested Specification:

All ductwork and other equipment shall be supported using wire rope cable terminated by Cable Locks. All Cable Locks shall have an Ultimate Breaking Strength (U.B.S.) of at least 5 times the wire rope published Working Load Limit (W.L.L.). All wire rope shall have a U.B.S. of at least 5 times the published W.L.L. Wire ropes shall be of the size and spacing per the manufacturer's printed specifications. Wire Rope and Cable Locks shall be as supplied by Duro Dyne Corporation.

Specification Data

1) All wire rope supplied by Duro Dyne is statistically tested to minimum breaking strength.

2) CL23 has been submitted and tested to be an acceptable alternative to the duct hanger systems prescribed in SMACNA HVAC-DCS 2nd edition By SMACNA Testing & Research Institute.

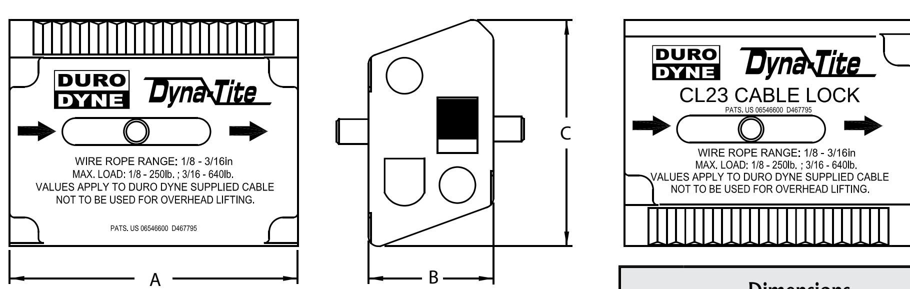
3) All Working Load Ratings of Dyna-Tite CL23 Cable Locks manufactured by Duro Dyne have been witnessed and verified by independent testing laboratories.

4) CL23 Cable Locks may be used in applications with temperatures up to 300° F (148° C).

5) CL23 Cable Lock pawls are constructed of corrosion resistant sintered steel.

6) CL23 Cable Lock springs are constructed of tempered stainless steel.

Code	Construction of Cable Lock	Wire Rope Diameter	Construction of Wire Rope	Safe Working Load at 5:1 Safety Factor
CL23	Stainless Steel Sintered Steel Zinc Alloy	1/8 inch	7x7 Hot Galvanized	25-250 lbs
		3/16 inch	7x19 Hot Galvanized	50-640 lbs
		4.0 mm	7x7 Hot Galvanized	25-180 kg

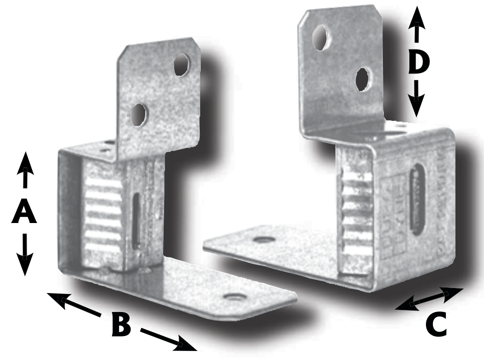


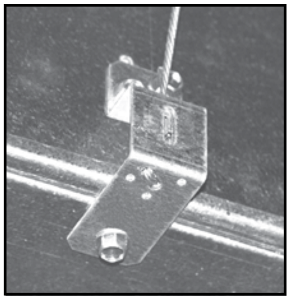
CL23

Dimensions		
	English	Metric
A	1.872 inch	47.54 mm
B	.812 inch	20.62 mm
C	1.469 inch	37.31 mm

KV BRACKET SPECIFICATIONS

FEATURES
- Can be used with rectangular ductwork and equipment
- Easily attached with sheet metal screws
- Cable lock pre-assembled to bracket
- Accessible release pin for simple adjustment



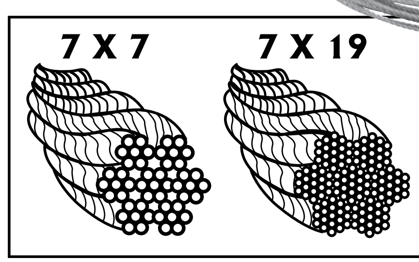


Dimensions		
	English	Metric
A	1 1/8 inch	28.57 mm
B	2 1/8 inch	53.97 mm
C	1 inch	25.4 mm
D	1 inch	25.4 mm

Code	Construction	Packaged	Working Load Limit
KV-12	Zinc Plated Steel	100 sets/ctn	75 lbs. with 1/16" wire rope
			150 lbs. with 3/32" wire rope

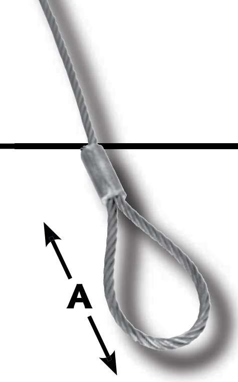
WIRE ROPE SPECIFICATIONS

Aviation grade galvanized wire rope supplied by Duro Dyne Corporation is manufactured to exacting standards and statistically tested to verify stated breaking strengths. Duro Dyne recommends only using wire rope supplied by Duro Dyne to ensure maximum safety of installation.



Code	Cable Diameter	Tolerance	Construction	Material	Minimum Ultimate Breaking Strength
WC6	3/16 inch	+.018/-.009 inch	7x19	Galvanized Steel	4200 lbs
WC4	1/8 inch	+.014/-.007 inch	7x7	Galvanized Steel	1700 lbs.
WC3	3/32 inch	+.012/-.006 inch	7x7	Galvanized Steel	920 lbs.
WC2	1/16 inch	+.010/-.006 inch	7x7	Galvanized Steel	480 lbs.

DURO LOOP SPECIFICATIONS

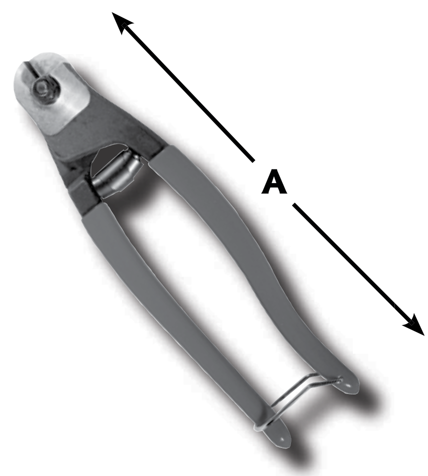


FEATURES
- Pre-Looped
- Aviation grade galvanized wire rope
- Tested to verify work load limits
- Utilizes 7x7 construction

Code	Dimensions			Quantity
	Cable Diameter	Length of Cable	Loop Size (Dimension A)	
LC5-332	3/32in	5ft	1-1/2in	100 per carton
LC10-332	3/32in	10ft	1-1/2in	100 per carton
LC15-332	3/32in	15ft	1-1/2in	100 per carton
LC5-18	1/8in	5ft	3in	100 per carton
LC10-18	1/8in	10ft	3in	100 per carton
LC15-18	1/8in	15ft	3in	100 per carton
LC25-332	3/32in	25ft	1-1/2in	50 per carton
LC25-18	1/8in	25ft	3in	50 per carton

CABLE CUTTER SPECIFICATIONS

FEATURES
- Safety catch
- 3/16" cutting capacity
- Spring loaded for ease of use
- 5" long handles for high leverage
- Hardened steel blades for durability
- Vinyl coated handles for comfortable, non-slip grip



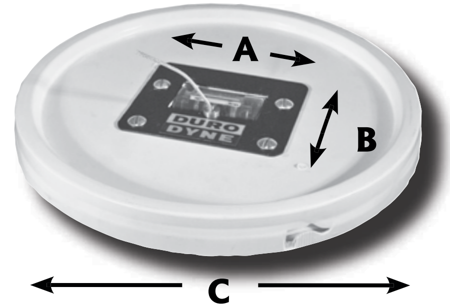
NEVER USE CUTTERS ON ENERGIZED CIRCUITS, WIRE, OR CABLE!

	Dimensions	
	English	Metric
A	7 1/2 inch	19.05 cm

CABLE COUNTER LID SPECIFICATIONS

FEATURES
- Counter displays from 0 feet and 0 inches to 9999 feet and 11 inches
- Metric counter also available
- Push button reset
- Designed for use with wire rope
- Fits most 5 gallon buckets
- Lightweight

	Dimensions	
	English	Metric
A	5 inch	127 mm
B	4 1/4 inch	107.95 mm
C	12 inch	304.8 mm



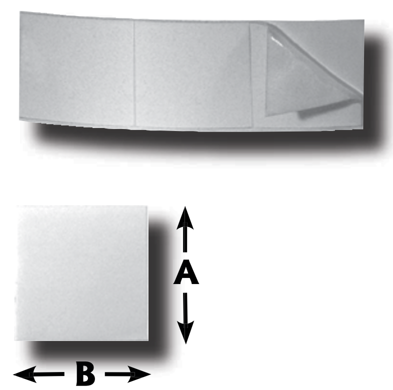
CABLE SADDLE SPECIFICATIONS

FEATURES
- Flexible black PVC
- UL rated 94 HB
- Groove to retain and accommodate cable

Dimensions		
	English	Metric
A	1 1/2 inch	38.1 mm

ADHESIVE PATCH SPECIFICATIONS

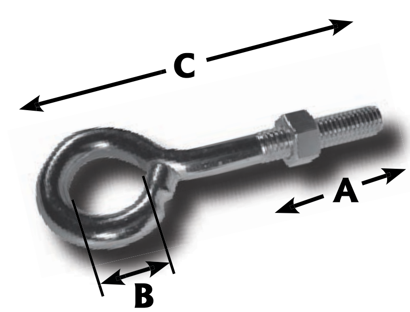
FEATURES
- For securing Cable Saddle
- Rubber-based double coated adhesive tape
- 1/32" thick, #5 density polyethylene foam, high tensile strength
- Application temperature range: 65° F to 120° F (18° C to 49° C)
- Generated surface temperature: 0° F to 150° F (-18° C to 65° C)
  Apply to surfaces that are clean, dry and free of oil



Dimensions		
	English	Metric
A	1 inch	25.4 mm
B	1 inch	25.4 mm

EYE BOLT & NUT SPECIFICATIONS

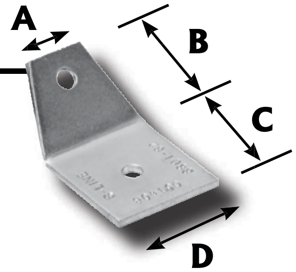
FEATURES
- Zinc plated low carbon steel
- 3/8 x 16 thread
- 1 1/2" thread length
- Working Load Limit: 144 lbs.



Dimensions		
	English	Metric
A	1 1/2 inch	38.1 mm
B	3/4 inch	19.05 mm
C	4 inch	101.6 mm

HANGER PLATE

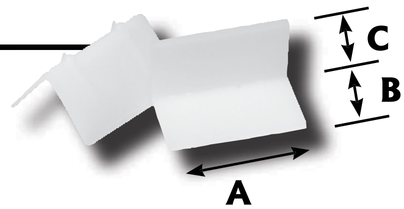
- 45 degree Hanger Plate
- Zinc plated
- 1/8" (3.17 mm) thick
- 1/4" (6.35 mm) diameter holes



Dimensions		
	English	Metric
A	1.18 inch	30.16 mm
B	1.20 inch	30.55 mm
C	1.62 inch	41.27 mm
D	1.62 inch	41.27 mm

CORNER PROTECTORS

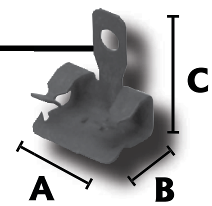
- Ribbed plastic
- Molded for snug corner fit



Dimensions		
	English	Metric
A	1.87 inch	47.62 mm
B	1 inch	25.4 mm
C	1 inch	25.4 mm

FLANGE BEAM FASTENERS

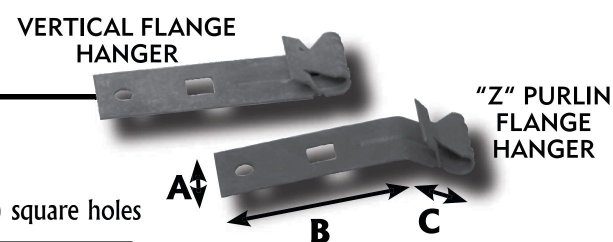
- Permits fast and easy installation on beams
- Simply installed with a hammer
- 1/4" (6.35 mm) diameter hole
- .04 in (1.01 mm) approx. thick steel



Flange Thickness		Static Load Cap.	
English	Metric	English	Metric
3/32" - 9/64"	2.38 mm - 3.57 mm	160 lbs.	72 kg
1/8" - 1/4"	3.17 mm - 6.35 mm	200 lbs.	90 kg
5/16" - 1/2"	7.93 mm - 12.7 mm	200 lbs.	90 kg
9/16" - 3/4"	14.28 mm - 19.05 mm	200 lbs.	90 kg

Dimension A		Dimension B		Dimension C	
English	Metric	English	Metric	English	Metric
1.125 inch	28.57 mm	.5 inch	12.7 mm	1.12 inch	28.57 mm
1.25 inch	31.75 mm	.87 inch	22.22 mm	1.5 inch	30.16 mm
1.25 inch	31.75 mm	.87 inch	22.22 mm	1.5 inch	38.10 mm
1.25 inch	31.75 mm	.87 inch	22.22 mm	1.68 inch	42.86 mm

FLANGE HANGERS



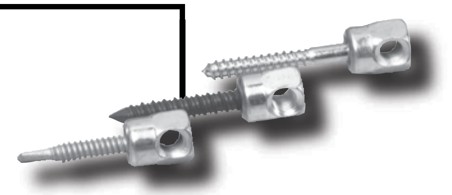
- Suspend cable from vertical flange or "Z" Purlins
- Simply install with a hammer
- .042 inch (1.06 mm) thick steel
- With 1/4 inch (6.35 mm) diameter round and 3/8" (9.52 mm) square holes

Description	Flange Thickness		Static Load Cap.	
	English	Metric	English	Metric
Vertical Flange Hanger	1/16" to 1/4"	1.58 to 6.35 mm	160 lbs.	72 kg.
"Z" Purlin Flange Hanger	1/16" to 1/4"	1.58 to 6.35 mm	160 lbs.	72 kg.

Dimensions		
	English	Metric
A	1 inch	25.4 mm
B	2.5 inch	63.5 mm
C	.87 inch	22.2 mm

SIDEWINDER HANGERS

- For use in concrete, wood or steel
- No pilot hole required for wood or steel
- Sidewinder hangers can be used for side mounting
- Made of zinc plated steel
- Threaded hole with 3/8 x 16 thread
- Hex head for 5/8" wrench



For Use In	Screw Size	Pilot Hole	Static Load Cap.	
			English	Metric
Concrete	5/16" x 1-1/2"	1/4"	160 lbs.	72 kg
Wood	1/4" x 2"	None	200 lbs.	90 kg
Steel	1/4" x 1"	None	200 lbs.	90 kg

INSTALLATION

Engineer Manual

STANDARD INSTALLATION

STEP 1
Pull the adjustment pin back and thread the wire rope into one locking channel in the cable lock.

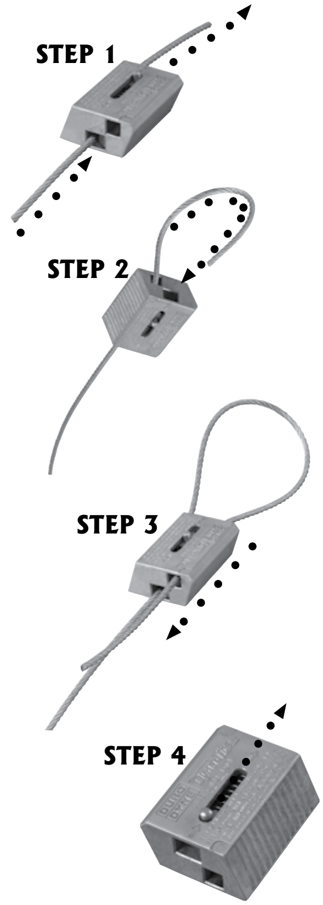
STEP 2
Pass the wire rope "tail" through (or around) the anchor point (Eyehook, Beam, or Purlin).

STEP 3
Pull the adjustment pin back and thread the wire rope tail into the second locking channel in the cable lock.

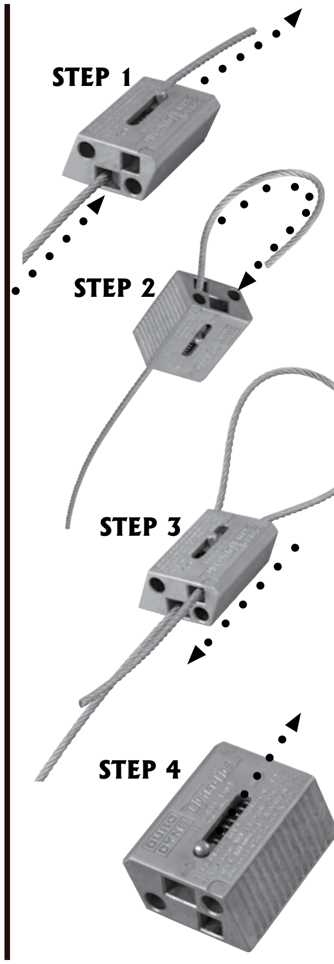
STEP 4
Prior to the load being applied, the wire rope can be adjusted in either direction.

Adjusting The Cable Lock
With the load off the wire rope and the Cable Lock, push the release pin in the direction of the arrow on the Cable Lock. This will release the locking pawl and allow the wire rope to be moved freely in either direction. (After a load has been applied it may be necessary to pull the cable slightly to disengage the teeth on the pawl). Be sure the load is fully supported before attempting an adjustment.

CL12 & CL18



CL23



OPTIONAL FIGURE 8 INSTALLATION (CL23 ONLY)

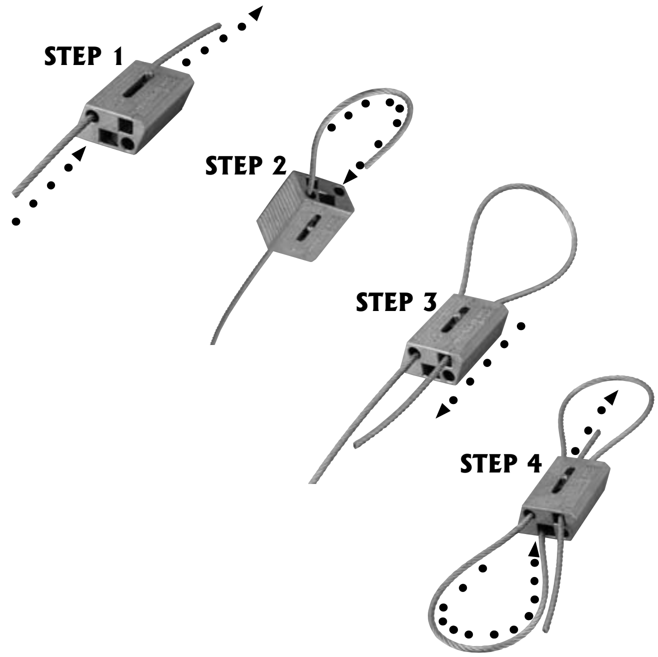
STEP 1
Thread the wire rope into the "through hole" in CL23.

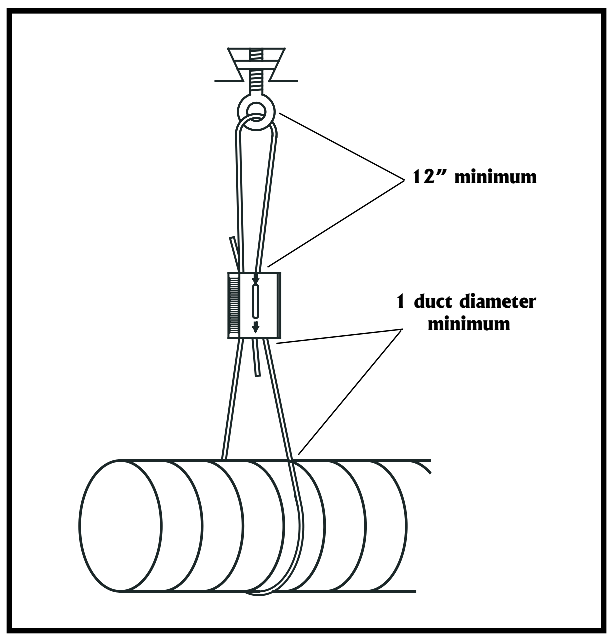
STEP 2
Pass the wire rope "tail" through (or around) the anchor point (Eyehook, Beam, or Purlin).

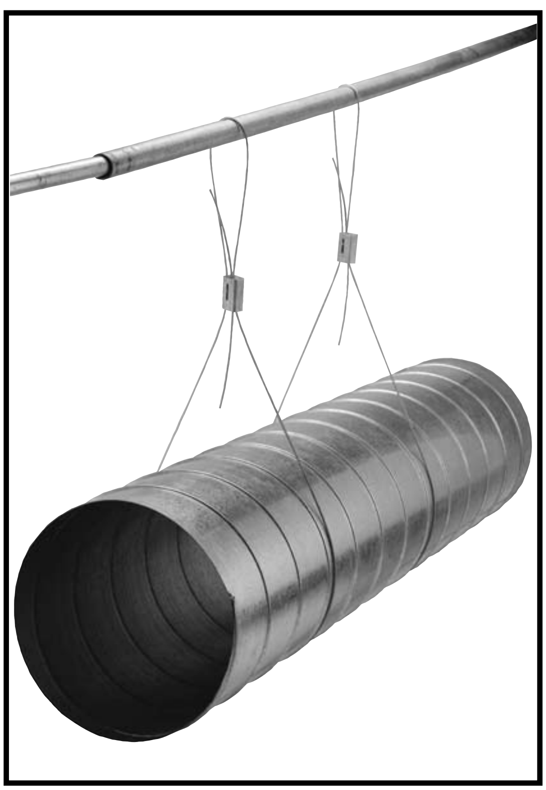
STEP 3
Pull the adjustment pin back and thread the wire rope tail into one locking channel in the CL23. Pull at least six inches of the wire rope through.

STEP 4
Pass the other wire rope end through (or around) the bracket or fixture on the object to be suspended. Return the wire rope to the CL23. Pull the adjustment pin back and push at least six inches of wire rope through to remaining locking channel.

For final adjustment see Step 4 above in Standard Assembly.

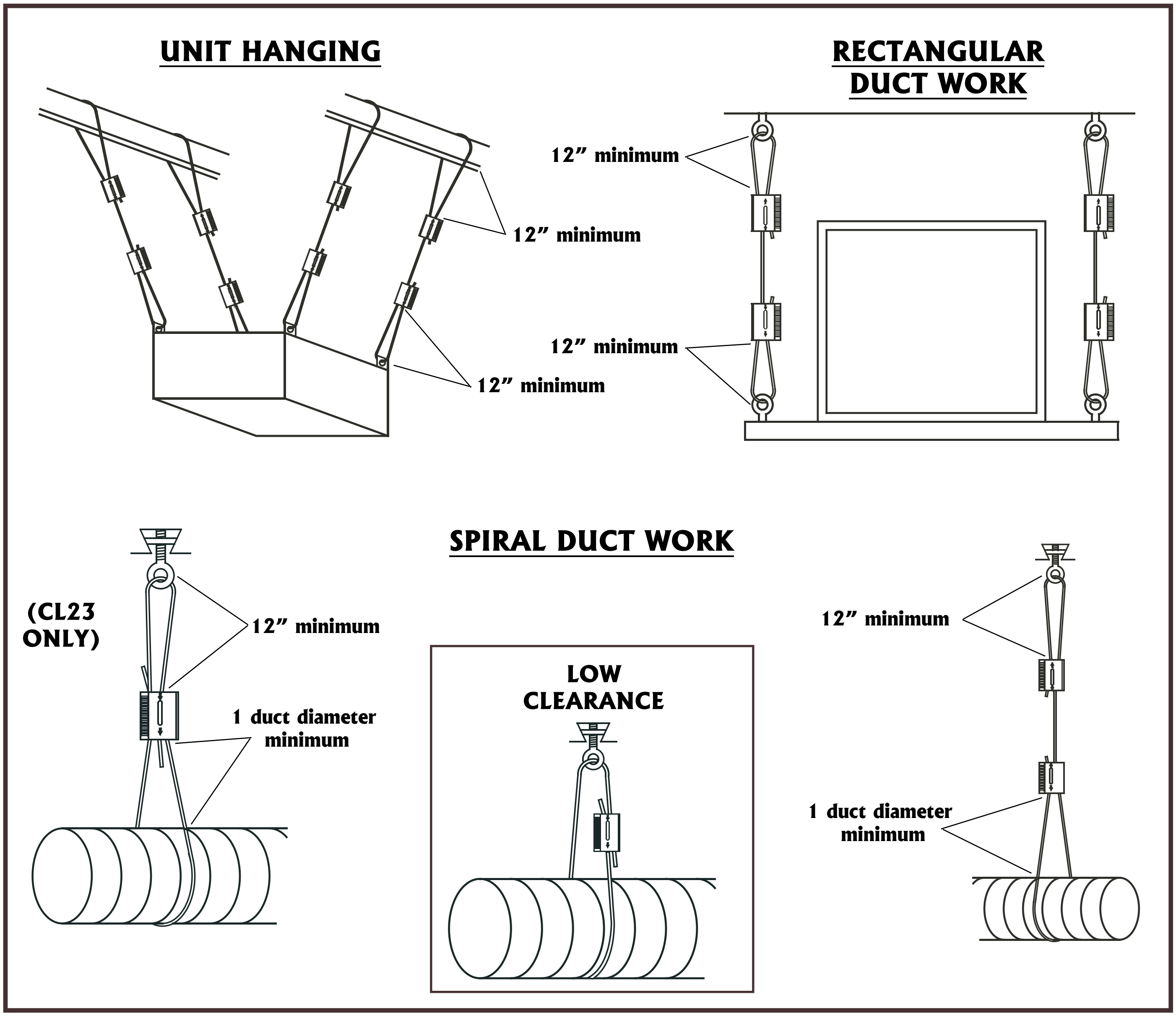




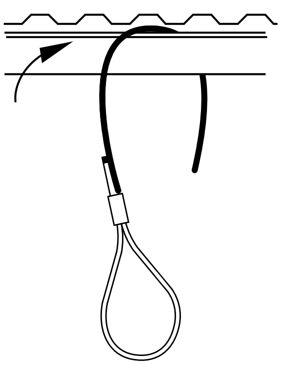


TYPICAL INSTALLATIONS

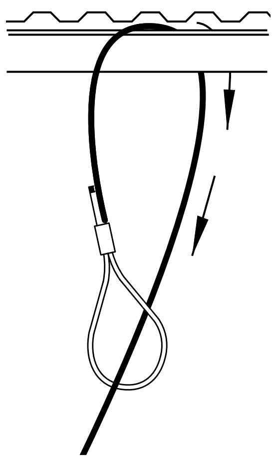
Dyna-Tite cable locks and wire rope can be used for suspension in a variety of ways to accommodate most mechanical & HVAC construction applications.



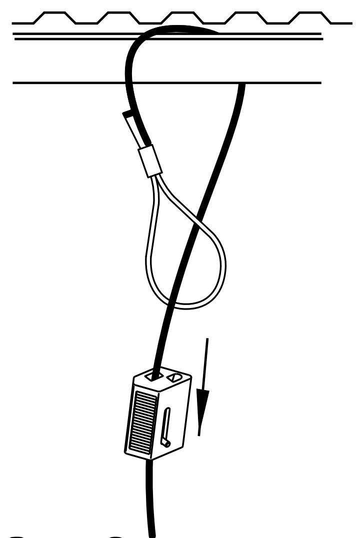
DURO LOOP CABLE SLING INSTALLATION



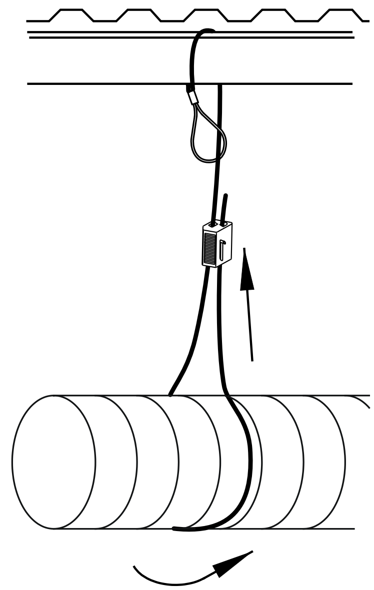
Step #1
Pass the end of the wire rope around the anchor point.



Step #2
Pass the end of the wire rope through the cable loop.



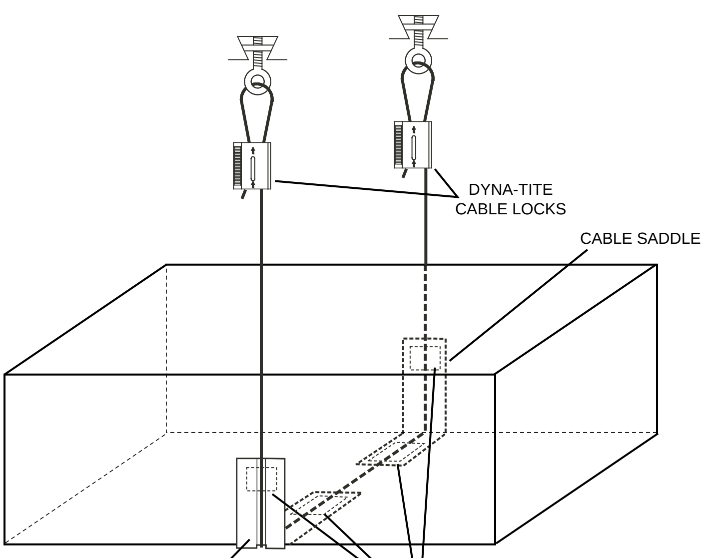
Step #3
Pull adjustment pin back and pass the end of the wire rope through the Dyna-Tite Cable Lock.



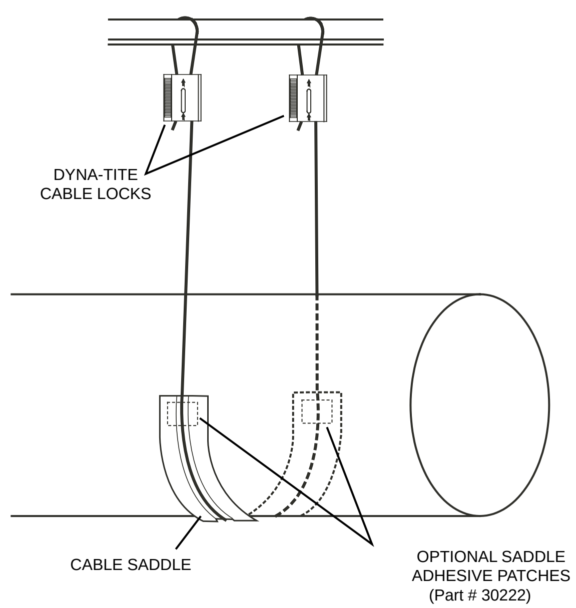
Step #4
Loop the wire rope around the ductwork and back up through the Cable Lock.

CABLE SADDLE (optional installation)

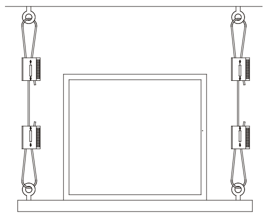
RECTANGULAR DUCT

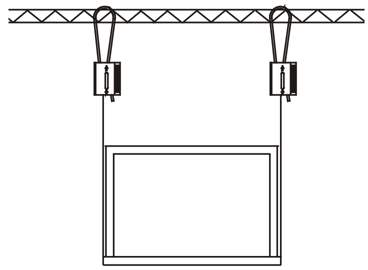


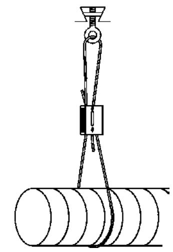
SPIRAL DUCT



HANGING DUCTWORK







CL12

Rectangular Duct Hanging Table				
Maximum Half of Duct Perimeter	10 ft Spacing 1 Pair	8 ft Spacing 1 Pair	5 ft Spacing 1 Pair	4 ft Spacing 1 Pair
p/2 = 30″	1/16	1/16	1/16	1/16
p/2 = 72″		3/32	3/32	1/16
p/2 = 96″			3/32	3/32
p/2 = 120″			3/32	3/32

Round Duct Hanging Table				
Maximum Round Pipe Diameter	10 ft Spacing Single Wire	8 ft Spacing Single Wire	5 ft Spacing Single Wire	4 ft Spacing Single Wire
10″	1/16	1/16	1/16	1/16
18″	3/32	3/32	1/16	1/16
24″		3/32	3/32	1/16
36″			3/32	3/32
50″				3/32

CL18

Rectangular Duct Hanging Table				
Maximum Half of Duct Perimeter	10 ft Spacing 1 Pair	8 ft Spacing 1 Pair	5 ft Spacing 1 Pair	4 ft Spacing 1 Pair
p/2 = 30″	3/32″	3/32″	3/32″	3/32″
p/2 = 72″	1/8″	1/8″	1/8″	3/32″
p/2 = 96″		1/8″	1/8″	1/8″
p/2 = 120″			1/8″	1/8″

Round Duct Hanging Table				
Maximum Round Pipe Diameter	10 ft Spacing Single Wire	8 ft Spacing Single Wire	5 ft Spacing Single Wire	4 ft Spacing Single Wire
10″	3/32″	3/32″	3/32″	3/32″
18″	1/8″	1/8″	3/32″	3/32″
24″	1/8″	1/8″	1/8″	3/32″
36″	1/8″	1/8″	1/8″	1/8″
50″			1/8″	1/8″
60″				1/8″

CL23

Rectangular Duct Hanging Table				
Maximum Half of Duct Perimeter	10 ft Spacing 1 Pair	8 ft Spacing 1 Pair	5 ft Spacing 1 Pair	4 ft Spacing 1 Pair
p/2 = 30″	1/8	1/8	1/8	1/8
p/2 = 72″	1/8	1/8	1/8	1/8
p/2 = 96″	3/16	1/8	1/8	1/8
p/2 = 120″	3/16	3/16	1/8	1/8
p/2 = 168″	3/16	3/16	3/16	3/16
p/2 = 192″	3/16	3/16	3/16	3/16

Round Duct Hanging Table				
Maximum Round Pipe Diameter	10 ft Spacing Single Wire	8 ft Spacing Single Wire	5 ft Spacing Single Wire	4 ft Spacing Single Wire
10″	1/8	1/8	1/8	1/8
18″	1/8	1/8	1/8	1/8
24″	1/8	1/8	1/8	1/8
36″	1/8	1/8	1/8	1/8
50″	3/16	3/16	1/8	1/8
60″	3/16	3/16	3/16	1/8
84″	3/16	3/16	3/16	3/16

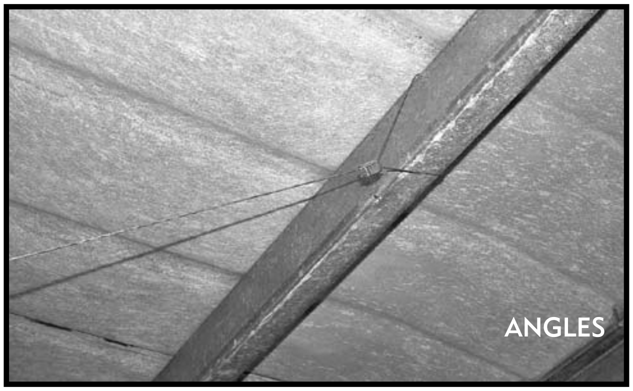
DESIGN CONSIDERATIONS

Engineer Manual

EFFECT OF HANGING AT ANGLES ON SAFE WORKING LOADS

Cable Locks can be used to suspend objects safely at angles of up to 60° from the vertical. However, suspension at angles does reduce the safe working load per the table below.

Size		Vertical		15°		30°		45°		60°	
English	Metric	English	Metric	English	Metric	English	Metric	English	Metric	English	Metric
3/16"	4.76 mm	640 lbs	291 kg	625 lbs	283 kg	559 lbs	253 kg	455 lbs	206 kg	325 lbs	147 kg
1/8 inch	3.17 mm	250 lbs	114 kg	240 lbs	108 kg	215 lbs	97 kg	175 lbs	79 kg	125 lbs	56 kg
3/32"	2.5 mm	150 lbs	68 kg	144 lbs	65 kg	129 lbs	58 kg	105 lbs	47 kg	75 lbs	34 kg
1/16"	2 mm	75 lbs	55 kg	72 lbs	32 kg	64.5 lbs	29 kg	52.5 lbs	23 kg	37.5 lbs	17 kg
Load		100%		96%		86%		70%		50%	



SAFETY RECOMMENDATIONS

As a matter of sound engineering practice, the Dyna-Tite assembly must be located no closer than 12 inches to the suspension point. In the case of round duct, where the wire rope encircles the duct, the Dyna-Tite must be located the distance of one diameter from the duct wall. Adherence to these minimum clearances will distribute the load the most efficiently among all duct hanging components.

- **TO FACILITATE HEIGHT ADJUSTMENT:** Install the object low and adjust it upwards to the desired level.
- **DO NOT EXCEED THE WORKING LOAD LIMIT (WLL) OF THE PRODUCT:** Each product is load rated and incorporates a minimum safety factor of 5:1. This WLL takes into account the specification criteria of the Dyna-Tite Cable Lock and the wire rope.
- **DO NOT USE ON COATED WIRE ROPE:** It is important to maintain the metal to metal contact between the locking wedges in the Dyna-Tite and the wire rope.
- **DO NOT APPLY PAINT OR OTHER COATING:** to any part of the assembly as these may impair the free movement of the locking wedges inside the Dyna-Tite Cable Lock.
- **DO NOT APPLY LUBRICANT:** to any part of the assembly as this will alter the surface nature of the wire rope and attract dirt and debris.
- **DO NOT USE FOR LIFTING:** (UNDER HOOK SLINGS) This product is designed for static load applications only.
- **KEEP THE PRODUCT CLEAN AND FREE FROM DIRT:** Any dirt should be removed from the product prior to assembly.
- **INSPECT PERIODICALLY:** Upon inspection, discard and replace if worn, distorted, or damaged.
- **REMOVE DAMAGED WIRE ENDS:** Using a designated pair of wire rope cutters prior to inserting into the Dyna-Tite Cable Lock.

Dyna-Tite™

CASE STUDIES

Engineer Manual

SHEET METAL WERKS

Sheet Metal Werks and Duro Dyne Corp. share an industry relationship that has endured for nearly 20 years and extends beyond the fabrication of ductwork. In the process of hanging duct systems, SMW has utilized the Dyna-Tite suspension system. Using cable locks and wire rope in place of threaded rod and band iron has cut installation time, improved safety on the job and has virtually revolutionized the process of hanging ductwork.

President, Kevin Ryan recalled a local restaurant chain requiring their ductwork to be raised 6" from the original installed position. The 6" uplift was completed throughout the entire restaurant within 45 minutes. Sheet Metal Werks has installed the Dyna-Tite system in school building projects, various retail stores as well as major commercial buildings.

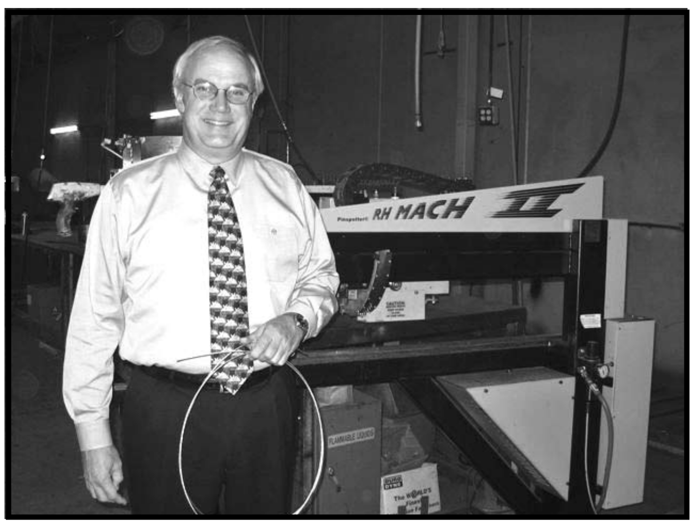
Installed CL23 Cable Locks

Kevin Ryan, President of Sheet Metal Werks

CATES SHEET METAL & BRYANT A/C CONTRACTORS

Cates Sheet Metal and Bryant A/C have found Duro Dyne's Dyna-Tite Cable Locks and Wire Rope to be essential instruments in their contracting business. The strong, lightweight Dyna-Tite cable locks when used with wire rope, dramatically cut the installation time of rectangular and spiral duct compared to the traditional method of trapeze and threaded rod. Paul Russell (pictured below), president of Cates Sheet Metal & Jr. Executive President of SMACNA-KC, indicated labor savings of 20% using Dyna-Tite over the traditional method. Cates Sheet Metal has used Dyna-Tite on several jobs most notably the Kansas City Star Newspaper Building and the Overland Park Convention Center.

Rick Spinelli of Bryant A/C Contractors, INC. in Long Island, NY who manufacturers spiral pipe was impressed with Dyna-Tite when he saw it demonstrated at a trade show. He purchased it to hang spiral duct and found it was quick, easy to install and looked great. Spinelli found Dyna-Tite easier to work with than band iron and much quicker and less expensive than threaded rod and saddles. Foreman Dan Hagan (Bryant A/C Contractors INC.) suggests keeping a roll of wire rope and a box of Dyna-Tites on the truck at all times. Hagan now uses Dyna-Tite for guy wires on roof stacks of all of his commercial jobs. It has eliminated the need to carry cable, clamps and turnbuckles. Dyna-Tite has even been used to hang air handlers on residential jobs.

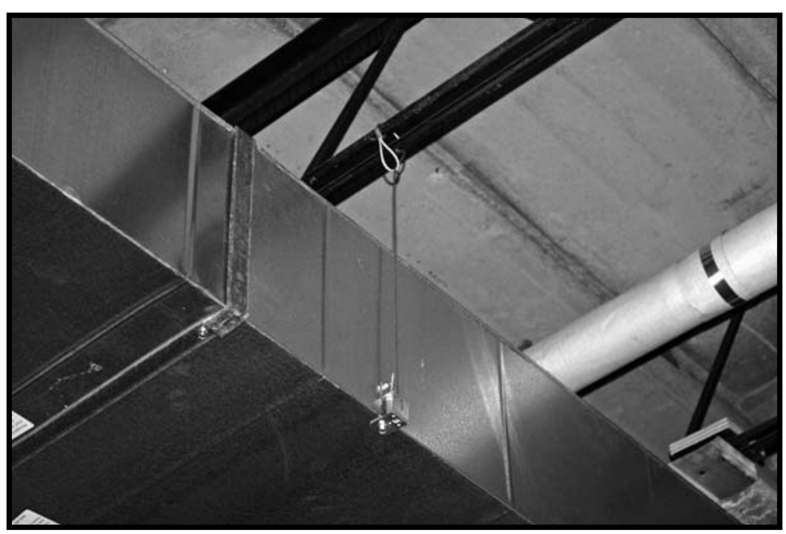


Paul Russel, President of Cates Sheet Metal & Jr. Executive President of SMACNA-KC.

ELMONT LIBRARY

KV Brackets were recently installed in the Elmont Library in Nassau County, NY, as it was being renovated into office space. The installation was handled by the contractor Mirage Mechanical Systems Inc., a division of Blue Diamond Sheet Metal that handles light commercial projects. Robert Lawless owner of several accomplished HVAC companies including Blue Diamond Sheet Metal, Diamond Blue Mechanical and Mirage Mechanical, has been utilizing Duro Dyne Products since Blue Diamond's inception in 1983. They work closely with SW Anderson Sales, a New York distributor of HVAC products, to purchase Duro Dyne materials. After hearing about the KV Bracket, SW Anderson salesman Brandon Boos suggested the use of the new bracket to Al LaBella and Brian Sadenwater, Vice President and Supervisor respectively, for Mirage Mechanical. The install was planned as a three day project but was easily completed in two days. Mirage Service Technicians, Mike Anzalone and David Domena, had utilized the Dyna-Tite system before and were amazed at the labor savings. They were further impressed by the ease of the KV Bracket because it allows them to attach the cable lock to the ductwork prior to hanging the duct. After screwing the brackets into the ductwork they then dropped 25' looped cables from the ceiling and threaded it through the KV Bracket that was attached to the ductwork on the floor. They then proceeded to push the ductwork up along the wire rope. Anzalone felt this method improved safety by eliminating the need to walk up the ladder while carrying the ductwork. The locking teeth inside the cable lock engaging the wire rope served as an extra set of hands holding the ductwork. Domena especially liked pairing the KV Bracket with Dyna-Tite's DuroLoop cable. The pre-sized lengths eliminated the need to measure and cut the wire on site. Overall 180 KV Brackets were used at the installation. Mirage Mechanical said they definitely plan to utilize the KV Bracket on future installations. The increase in labor savings, productivity, safety, and efficiency were readily apparent to all.

Installation of the KV Bracket at the Elmont Library in Nassau County, NY



An installed Dyna-Tite KV Bracket and Duro Loop Cable

KAY HEATING

"IT'S ABOUT TIME"... DYNA-TITE DUCT HANGERS FROM DURO DYNE.

On one of my many trips to Hoffman-Hoffman in Greensboro N.C., our salesman told me about, "Dyna-Tite", a new system that will "revolutionize the HVAC market". (As if I have never heard that one before!) Benette Funderburke, Hoffman-Hoffman's local sales representative, escorted me into his office while talking about this new system to hang duct. In his office he handed me a cable lock with a wire in each end. He asked, "What do you think?" "Not impressed", was my response. However, as he explained how the system worked it was as if a LIGHT WAS SUDDENLY TURNED ON.

Like most HVAC Contractors, we have been using threaded rod or wide band to hang duct. Both methods work. However, the band method is time intensive and will make you say things your mother should not hear! I asked to borrow the Dyna-Tite (one cable lock and a piece of wire) and headed back to the office. I met with the owner of our company to show him my find. He too was amazed at how simple Dyna-Tite was to install and how much cleaner the finished product looked. (He could not understand why it took so long for someone to come up with a better way.)

That day, we purchased a quantity of hangers and wire for a test run. With one job the ease of installation and time savings was apparent. The crew that used it that day came back raving about the Dyna-Tite system. The training time for this crew was only 5 minutes. We knew everyone would eventually be as excited about this new system, although we were met with the "OLD WAY" attitude from a few local inspectors and engineers. However, the more we showed this system the more everyone was convinced.

We did a building in Winston Salem in which we asked permission to use the Dyna-Tite system. The engineer gave the all clear with the condition that if they did not like it we would have to take it down. From the first day he was sold and the owner of the building could not say often enough how great things looked.

Don't be turned off by the price, (IT REALLY IS NOT COSTLY) look at the savings in payroll and a lot less aggravation. We now stock the Dyna-Tite system and use it on every one of our commercial jobs where possible. The new smaller cable locks, "CL12", are value priced and make the system even more attractive. If you haven't tried it you are missing out on a great system. Just try it once and you will be sold. Remember the training time is only 5 minutes. After 18 years in the HVAC industry, we needed this.

George Hendrix
KAY HTG
GREENSBORO, N.C.

HARLEY DAVIDSON

The ductwork pictured below was installed at the Thunder Mountain Harley Davidson Shop with Dyna-Tite CL23 cable locks and Dyna-Tite 1/8 wire rope. HVAC contractor, Poudre Valley Air performed the install and the Dyna-Tite products were supplied by Hercules Industries in Fort Collins, CO. Approximately 110 CL23 Cable Locks were used to hang duct-work throughout the store.

Installation of CL23 Cable Locks and 1/8 wire rope.

MISSISSIPPI AIR NATIONAL GUARD

These pictures were taken of a Dyna-Tite install in a C-17 hanger at the Mississippi Air National Guard in Jackson MS. The ceiling height is 102 ft and some of the drops are over 30' in length. Spiral pipe is over 30" in diameter. Ivey's Mechanical performed the install and the Dyna-Tites were supplied by Ward Mechanical.

Spiral Ductwork hung by Dyna-Tites (above and at right)

Dyna-Tite™

TESTING

Rize Enterprises, LLC is licensed to produce or sell cable locks designed and developed by Duro Dyne National Corporation. Where test reports included is this binder reference a Duro Dyne product, the corresponding Rize part is shown in the following chart:

Duro Dyne	*Rize*
N/A	*KL50*
CL12	*KL100*
CL18	*KL150*
CL23	*KL200*

Engineer Manual

RADCO TEST REPORT
Test Report No. RAD-4014
Project No. C9621
Lab No. TL - 2181

TENSILE STRENGTH TESTING FOR RIZE KL-100 AND KL-150 KWIK-LOC CABLE LOCK SYSTEMS

Prepared for

DURO DYNE
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Bay Shore, NY 11706

by

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Issued: December 11, 2006

TABLE OF CONTENTS

1.0 INTRODUCTION

At the request of Duro Dyne, RADCO conducted tensile strength tests on Rize KL-100 Kwik-Loc and Rize KL-150 Kwik-Loc Cable Lock Systems in accordance with ASTM E8, "Standard Test Methods for Tension Testing of Metallic Materials". In addition to tensile strength testing, RADCO tested for slippage of the cable grip at the working load limit.

2.0 TEST SPECIMENS

Samples in excess of the test requirements and spools of wire rope were submitted by Duro Dyne and were received at the RADCO testing laboratory on June 6, 2005. The sizes of the galvanized carbon steel cables used for the Rize Systems were 1/16", 3/32", and 1/8". The Rize KL-100 Kwik-Lok and Rize-150 Kwik-Lok Cable Lock Systems are composed of a KL-100 or KL-150 Cable Lock (casing, 2 springs, 2 pawls and 2 pins) and a cable that forms a single loop. The samples were tested under the following conditions:

a) One end of the cable looped around a 1" (25.4 mm) steel dowel (stationary).

b) The other end of the cable looped around a 1" x 1" stainless steel on a 3-point knife edges.

Five (5) samples per size were tested for both conditions. The test samples were conditioned at a room temperature of 72 ± 5°F (22 ± 3°C) and 50 ± 5% relative humidity for 24 hours prior to testing.

Testing was performed on November 15,2006.

3.0 TEST SETUP AND PROCEDURE

Five (5) samples per size and two wire thickness per size were tested for tensile strength and slippage. Testing for tension and slippage was conducted on a United Universal Testing Machine (UTM) in accordance with ASTM E4.

The UTM is equipped with a calibrated electronic load cell and a computerized data collection system. A 2,000 lb load cell was used for the KL-100 tests and a 20,000 lb load cell was used to perform tension tests for the KL-150.

Each Kwik-Lok Cable Lock System was looped around a 1" (25.4 mm) diameter steel dowel at one end (bottom) and around a 1" x 1" stainless steel knife-edge at the other end of the UTM. Test gage length of 16 inches (406.4 mm) was used to perform the tension test.

Tensile load with a constant rate of loading of 0.70 in/min (17.8 mm/min) was applied. The Kwik-Lok Cable Lock System was pre-loaded with its minimum working tensile force which was 6% of the working load. These forces are shown in the tables on section 5.

To determine if any slippage will occur in the Kwik-Lok Cable Lock, the rope was pulled on both ends in opposite directions manually and was marked prior to commencing the test. Black ink markings were placed on both ends of the cable (where no elongation caused by tension will exist) one-inch

(25.4 mm) from the base of the lock. The distance between the markings and the base of the Kwik-Lok Cable Lock at the working load limit was measured and recorded with a caliper to the nearest 0.01in (0.254 mm). Tension was applied to the Kwik-Lok Cable Lock System until one of the components failed. The failure force (Ultimate Load) and the type of failure were recorded.

4.0 TEST EQUIPMENT

1. "United" Table Model Electro-mechanical Testing Machine, Model No. STM-20.
2. "Mitutoyo" Absolute Digimatic Caliper, capable of measuring to 0.0001 in., Model No. CD - 6" CS

5.0 TEST RESULTS

KL-100

Sample Description	6% Pre-load @ 75 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
1/16" Cable	4.5 lbs	1	0.12 ; 0.18	575	Rope @ the lock
		2	0.13; 0.11	498	Rope @ the lock
		3	0.16; 0.13	716	Rope @ the lock
		4	0.15; 0.10	466	Rope @ the lock
		5	0.08; 0.14	545	Rope @ the lock
	Average Slippage: **0.13 in.** Average Ultimate Load: **560 lb.**				

Sample Description	6% Pre-load @ 150 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
3/32" Cable	9.0 lbs	1	0.10; 0.10	1436	Rope @ the lock
		2	0.12; 0.15	1677	Rope @ the knife edge
		3	0.13; 0.12	1691	Rope @ the knife edge
		4	0.13; 0.14	1561	Rope @ the lock
		5	0.12; 0.17	1653	Rope @ the knife edge
	Average Slippage: **0.13 in.** Average Ultimate Load: **1604 lb.**				

KL-150

Sample Description	6% Pre-load @ 150 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
3/32" Cable	9.0 lbs	1	0.11; 0.16	1588	Rope @ the knife edge
		2	0.13; 0.18	1021	Rope @ the lock
		3	0.05; 0.18	1009	Rope @ the lock
		4	0.13; 0.08	1573	Rope @ the lock
		5	0.13; 0.17	1223	Rope @ the lock
	Average Slippage: 0.13 in. Average Ultimate Load: 1283 lb.				

Sample Description	6% Pre-load @ 225 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
1/8" Cable	13.5 lbs	1	0.12; 0.21	2222	Rope @ the knife edge
		2	0.22; 0.12	2424	Rope @ the knife edge
		3	0.14; 0.14	2444	Rope @ the knife edge
		4	0.11; 0.19	2538	Rope @ the knife edge
		5	0.12; 0.18	2488	Rope @ the knife edge
	Average Slippage: 0.16 in. Average Ultimate Load: 2423 lb.				

6.0 SUMMARY

The factor of Safety was calculated as follows: Ultimate Load divided by the Working Load. The average factor of safety calculated for each sizes are: **10.8:1** for Rize KL-150 Kwik-Lok Cable Lock using a 1/8" diameter cable, **8.5:1** for Rize KL-150 Kwik-Lok Cable Lock using a 3/32" diameter cable, **10.7:1** for Rize KL-100 Kwik-Lok Cable Lock using a 3/32" diameter cable, and **7.5:1** for Rize KL-150 Kwik-Lok Cable Lock using a 3/32" diameter cable

******END OF REPORT******

APPENDIX A

UTM DATA SHEETS (4 pages)

RADCO
• CERTIFICATION • LIFTING
• TESTING • INSPECTION

Nov 15, 2006

Tensile Properties of Metals (Wire locks)

Report No. 4688

Test Date 15-Nov-06 Testing Machine SFM-20

Customer Name Duro Dyne
Operator Winston Wade
Wire thickness 1/8

Purchase Order C9621
Part No. KL150

Load Cell (01457) Capacity (Lbs) 20000
Preload Value (Lbs) 13.5

Crosshead Speed (Inches / min) or Rate 0.7
Extension or Position Measured by XHD (XHD2)

Test No	Spec ID	Tensile (lbs)
18703	1	2,222
18704	2	2,424
18705	3	2,444
18706	4	2,538
18707	5	2,488
Mean		2,423
Median		
Std Dev		121
Maximum		2,538
Minimum		2,222
Range		315

By: Winston Wade Date 11-15-06

RADCO, INC. 3220 E. 59th Street Long Beach, CA 90805 TEL (562)272-7231 FAX (562)529-7513

RADCO
• CERTIFICATION • LIFTING
• TESTING • INSPECTION

Nov 15, 2006

Tensile Properties of Metals (Wire locks)

Report No. 4685

Test Date 15-Nov-06 Testing Machine SFM-20

Customer Name Duro Dyne
Operator Winston Wade
Wire thickness 1/16

Purchase Order C9621
Part No. KL100

Load Cell (TV104047) Capacity (Lbs) 2000
Preload Value (Lbs) 4.5

Crosshead Speed (Inches / min) or Rate 0.7
Extension or Position Measured by XHD (XHD2)

Test No	Spec ID	Tensile (lbs)
18688	1	575
18689	2	498
18690	3	716
18691	4	466
18692	5	545
Mean		560
Median		
Std Dev		97
Maximum		716
Minimum		466
Range		250

By: Winston Wade Date: 11-15-06

RADCO, INC. 3220 E. 59th Street Long Beach, CA 90805 TEL (562)272-7231 FAX (562)529-7513

RADCO
CERTIFICATION • LISTING • TESTING • INSPECTION

Nov 15, 2006

Tensile Properties of Metals (Wire locks)

Report No. 4686

Test Date 15-Nov-06 Testing Machine SFM-20

Customer Name Duro Dyne
Operator Winston Wade
Wire thickness 3/32

Purchase Order C9621
Part No. KL100

Load Cell (TV104047) Capacity (Lbs) 2000
Preload Value (Lbs) 9

Crosshead Speed (Inches / min) or Rate 0.7
Extension or Position Measured by XHD (XHD2)

Test No	Spec ID	Tensile (lbs)
18693	1	1,436
18694	2	1,677
18695	3	1,691
18696	4	1,561
18697	5	1,653
Mean		1,604
Median		
Std Dev		107
Maximum		1,691
Minimum		1,436
Range		255

By: Winston Wade Date: 11-15-06

RADCO · CERTIFICATION · LIFTING · TESTING · INSPECTION

Nov 15, 2006

Tensile Properties of Metals (Wire locks)

Report No. 4687

Test Date 15-Nov-06 Testing Machine SFM-20

Customer Name Duro Dyne
Operator Winston Wade
Wire thickness 3/32

Purchase Order C9621
Part No. KL150

Load Cell (01457) Capacity (Lbs) 20000
Preload Value (Lbs) 9

Crosshead Speed (Inches / min) or Rate 0.7
Extension or Position Measured by XHD (XHD2)

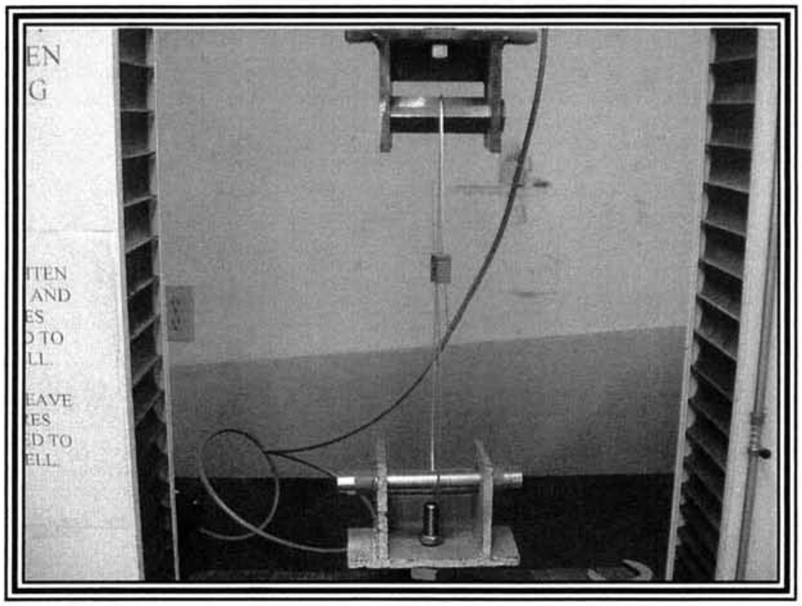
Test No	Spec ID	Tensile (lbs)
18698	1	1,588
18699	2	1,021
18700	3	1,009
18701	4	1,573
18702	5	1,223
	Mean	1,283
	Median	
	Std Dev	285
	Maximum	1,588
	Minimum	1,009
	Range	579

By: Winston Wade Date: 11-15-06

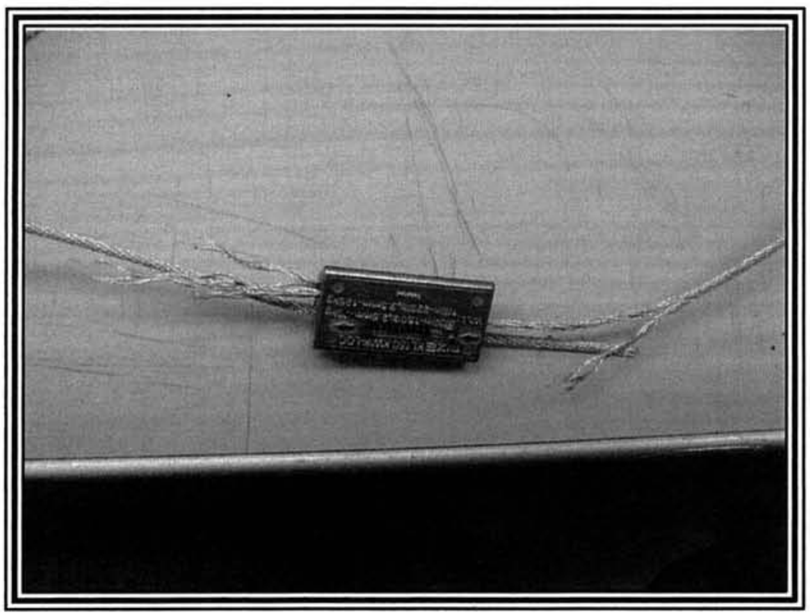
RADCO, INC. 3220 E. 59th Street Long Beach, CA 90805 TEL (562)272-7231 FAX (562)529-7513

APPENDIX B

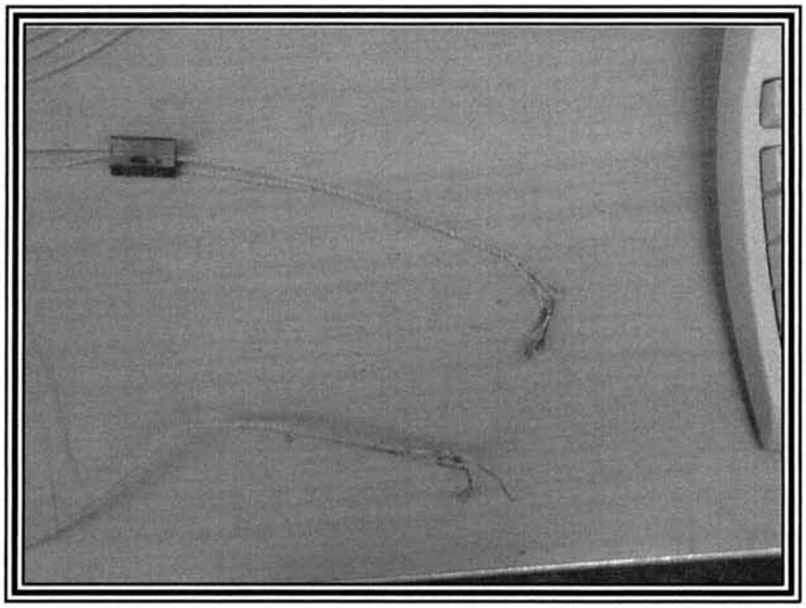
PHOTOGRAPHS (2 PAGES)



KL-100 in test fixture



Wire failure at lock



Wire failure at knife edge

RADCO TEST REPORT
Test Report No. RAD-3125
Project No. C8382
Lab No. TL - 2181

TENSILE STRENGTH TESTING
FOR DYNA-TITE CL23 CABLE LOCK SYSTEM

Prepared for

DURO DYNE
130 Route 110
Farmingdale, NY 11735

by

R A D C O
Resources, Applications, Designs and Controls, Inc.
Listing and Testing Division
3220 E. 59th St.
Long Beach, CA 90805
Tel: 562-272-7231
Fax: 562-529-7513
www.radcoinc.com

Prepared by:

Derick E. Gutierrez
Senior Consultant

Submitted by:

Michael L. Zieman, P.E.
President

Issued August 2002

RAD-3125

TABLE OF CONTENTS

1.0 INTRODUCTION

At the request of Duro Dyne, RADCO conducted tensile strength tests on Dyna-Tite CL23 Cable Lock Systems in accordance with ASTM E8, "Standard Test Methods for Tension Testing of Metallic Materials". In addition to tensile strength testing, RADCO tested for slippage of the cable grip at the working load limit.

2.0 TEST SPECIMENS

Five (5) samples of each size were randomly selected by RADCO personnel from the assembly plant at Duro Dyne's head office in Farmingdale, NY on June 04, 2002 . The sizes of the galvanized carbon steel cables used for the Dyna-Tite Systems were 1/8" and 3/16". The Dyna-Tite CL23 Cable Lock System is composed of a CL23 Cable Lock (casing, 2 springs, 2 pawls and 2 pins) and a cable that forms two loops at both ends. The samples were tested under the following conditions:

a) One end of the cable looped around a 1" (25.4 mm) steel dowel (stationary).

b) The other end of the cable looped around a 1" x 1" stainless steel on a 3-point knife edges.

Five (5) samples per size were tested for both conditions. The test samples were conditioned at a room temperature of 72 ± 5°F (22 ± 3°C) and 50 ± 5% relative humidity for 24 hours prior to testing.

Testing was performed on July 25 and 26, 2002.

3.0 TEST SETUP AND PROCEDURE

3.1 TENSILE STRENGTH TESTING WITH CABLE AROUND A 1" DIAMETER DOWEL AND 3-POINT KNIFE-EDGED 1"X1" STAINLESS STEEL.

Five (5) samples per size were tested for tensile strength and slippage. Testing for tension and slippage was conducted on a United Universal Testing Machine (UTM) in accordance with ASTM E4.

The UTM is equipped with a calibrated electronic load cell and a computerized data collection system. A 20,000 lb load cell was used to perform tension tests for all represented sizes.

Each pre-constructed Dyna-Tite CL23 Cable Lock System was looped around a 1" (25.4 mm) diameter steel dowel at one end (bottom) and around a 1" x 1" stainless steel knife-edge at the other end of the UTM. Test gage length of 16 inches (406.4 mm) was used to perform the tension test.

Tensile load with a constant rate of loading of 0.70 in/min (17.8 mm/min) was applied. The Dyna-Tite CL23 Cable Lock System was pre-loaded with its minimum working tensile force which was 6% of the working load. These forces are shown in the tables on section 5.

To determine if any slippage will occur in the Dyna-Tite CL23 Cable Lock, the rope was pulled on both ends in opposite directions manually and was marked prior to commencing the test. Blue masking tape markings were placed on both ends of the cable (where no elongation caused by tension will exist) one-inch (25.4 mm) from the base of the lock. The distance between the markings and the base of the Dyna-Tite CL23 Cable Lock at the working load limit was measured and recorded with a caliper to the nearest 0.0001in (0.00254 mm). Tension was applied to the Dyna-Tite CL23 Cable Lock System until one of the components failed. The failure force (Ultimate Load) and the type of failure were recorded.

4.0 TEST EQUIPMENT

1. "United" Table Model Electro-mechanical Testing Machine, Model No. STM-20.
2. "Mitutoyo" Absolute Digimatic Caliper, capable of measuring to 0.0001 in., Model No. CD - 6" CS

5.0 TEST RESULTS

5.1 Tensile Strength & Slippage of the Dyna-Tite CL23 Cable Lock System

Sample Description	6% Pre-load @ 240 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
1/8" Cable	14.4 lbs	1	0.1120 ; 0.0640	1567	Rope @ the lock
		2	0.0920; 0.0399	1436	Rope @ the lock
		3	0.0275; 0.0317	1542	Rope @ the lock
		4	0.0315; 0.0360	1621	Rope @ the lock
		5	0.0880; 0.0500	1705	Rope @ the lock
	Average Slippage: **0.0573 in.** Average Ultimate Load: **1574 lb.**				

Sample Description	6% Pre-load @ 640 lb Working load	Sample No.	Slippage @ both ends of the cable at Max. working load limit (in.)	Ultimate Load (lbs)	Description of failure
3/16" Cable	38.4 lbs	1	0.2475; 0.2715	3681	Broken Lock
		2	0.3328; 0.3517	3761	Broken Lock
		3	0.2224; 0.2515	3903	Broken Lock
		4	0.2046; 0.3211	3677	Broken Lock
		5	0.2355; 0.2400	4492	Broken Lock
	Average Slippage: **0.2679 in.** Average Ultimate Load: **3903 lb.**				

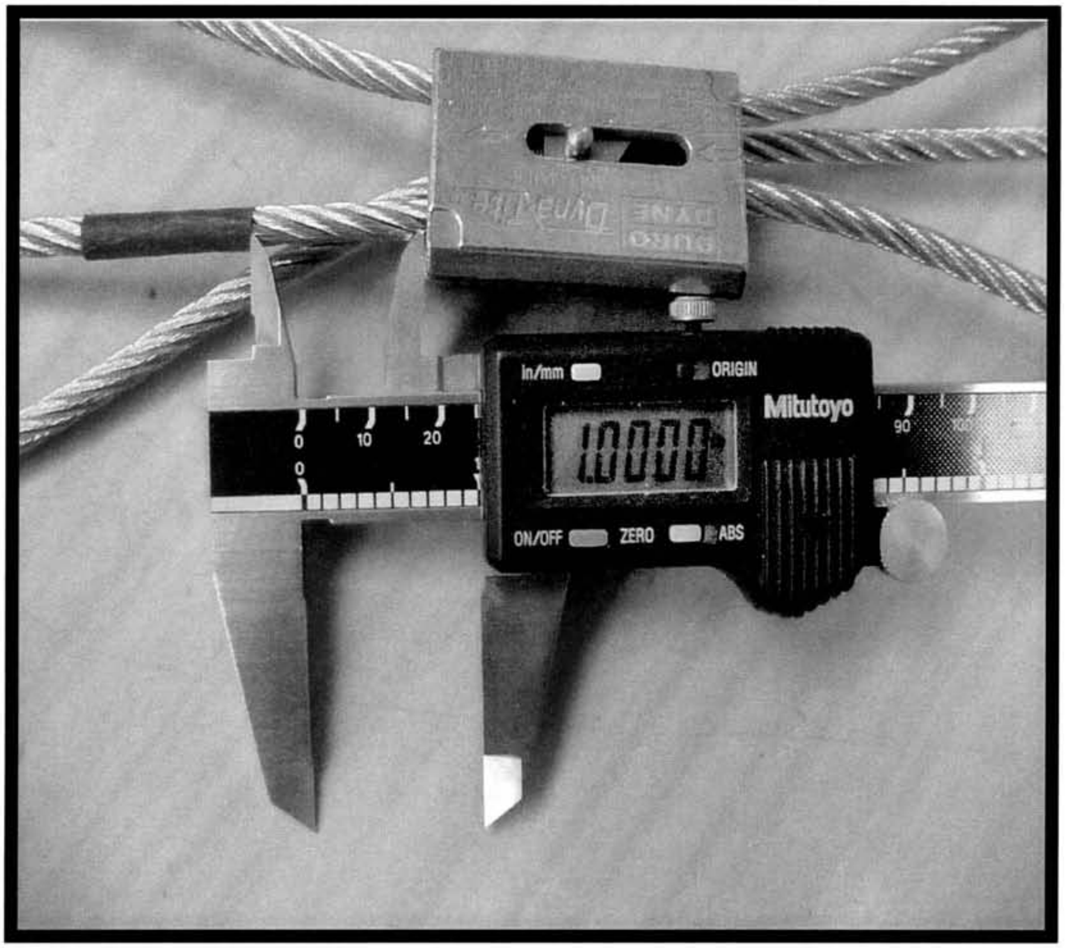
6.0 SUMMARY

The factor of Safety was calculated as follows: Ultimate Load divided by the Working Load. The average factor of safety calculated for each sizes are: **6½:1** for Dyna-Tite CL23 Cable Lock using a 1/8" diameter cable and **6:1** for Dyna-Tite CL23 Cable Lock using a 3/16" diameter cable.

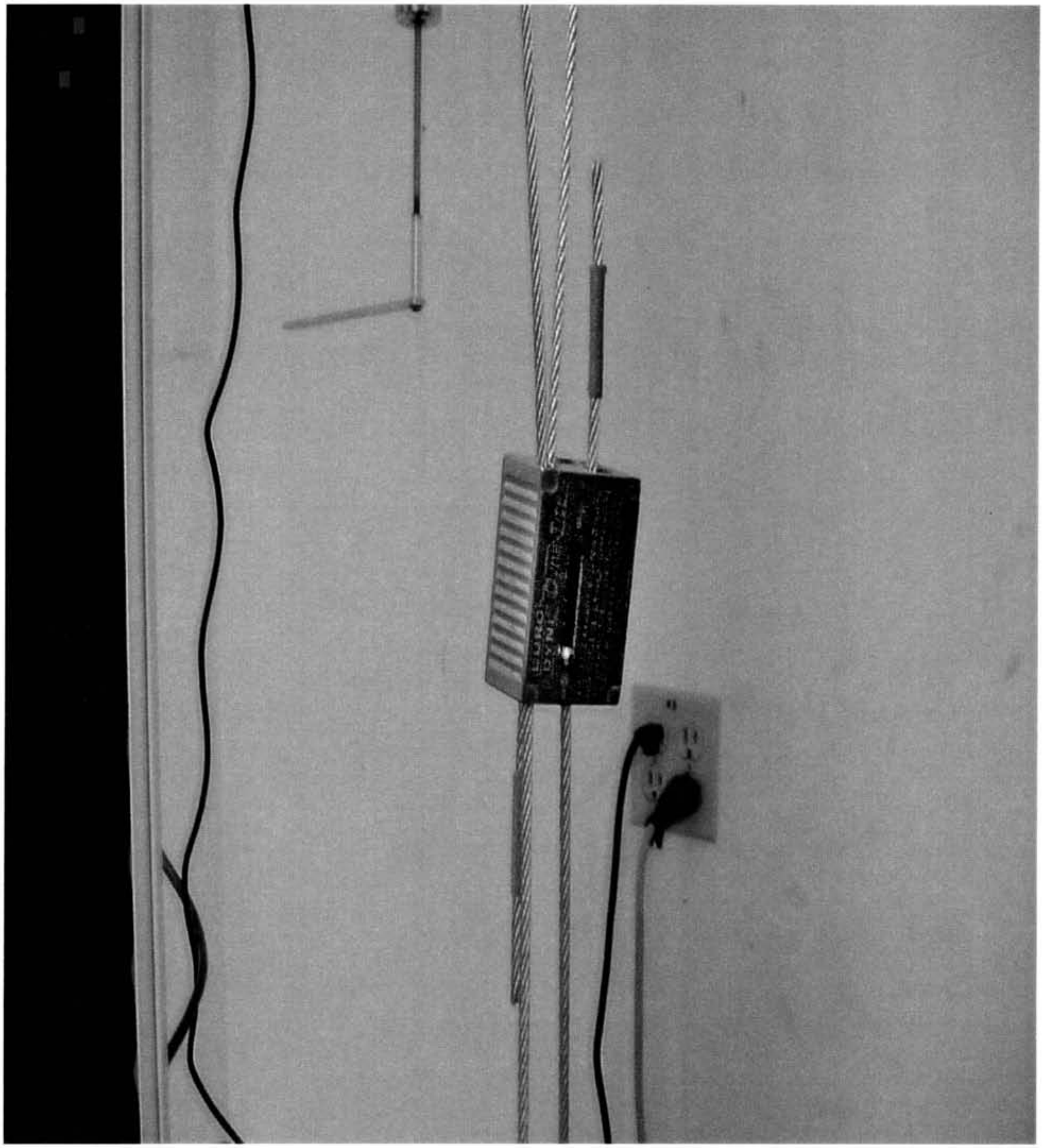
****END OF REPORT****

APPENDIX A

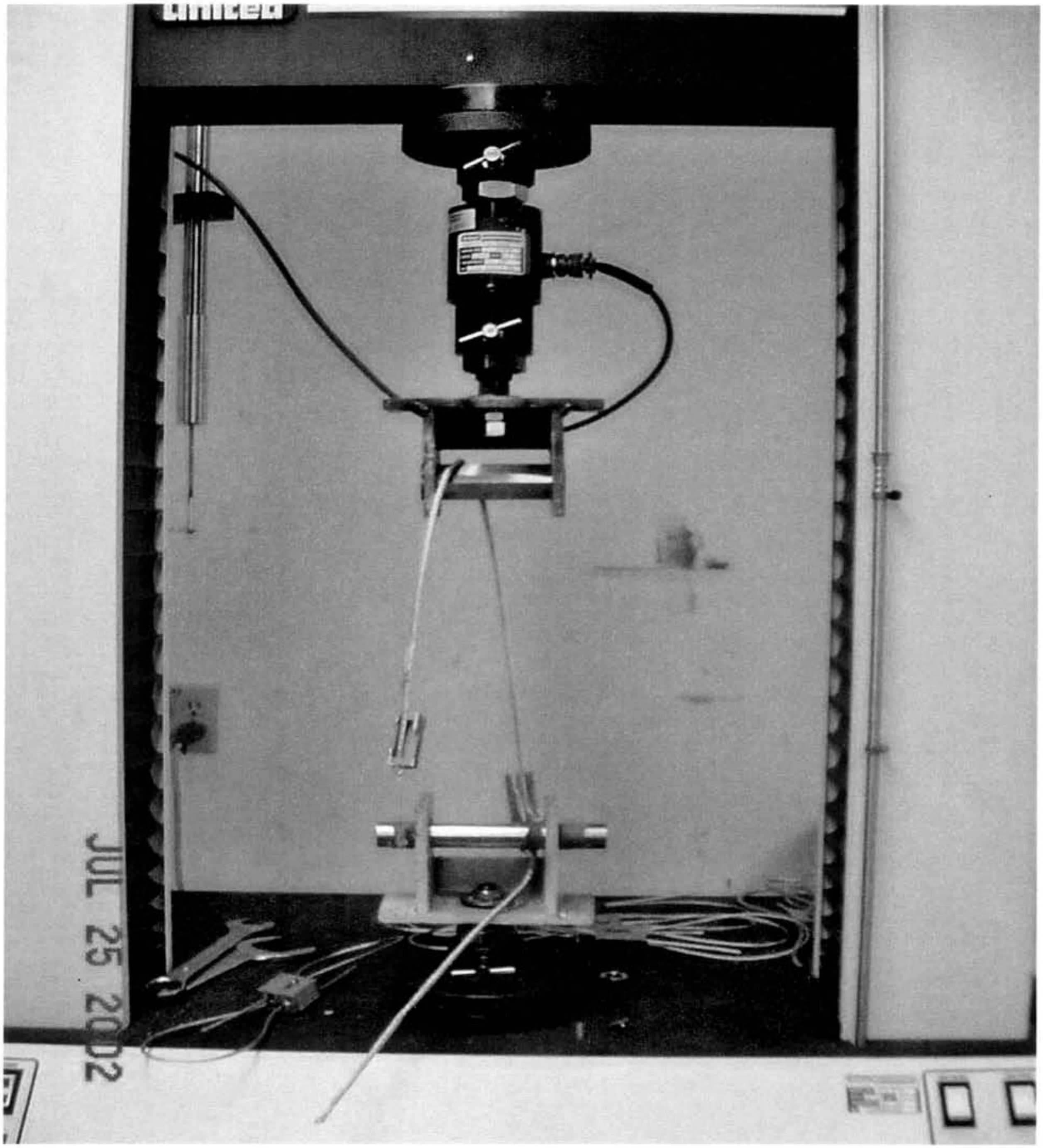
DYNA-TITE CL23 CABLE LOCK SYSTEM PRODUCT DATA



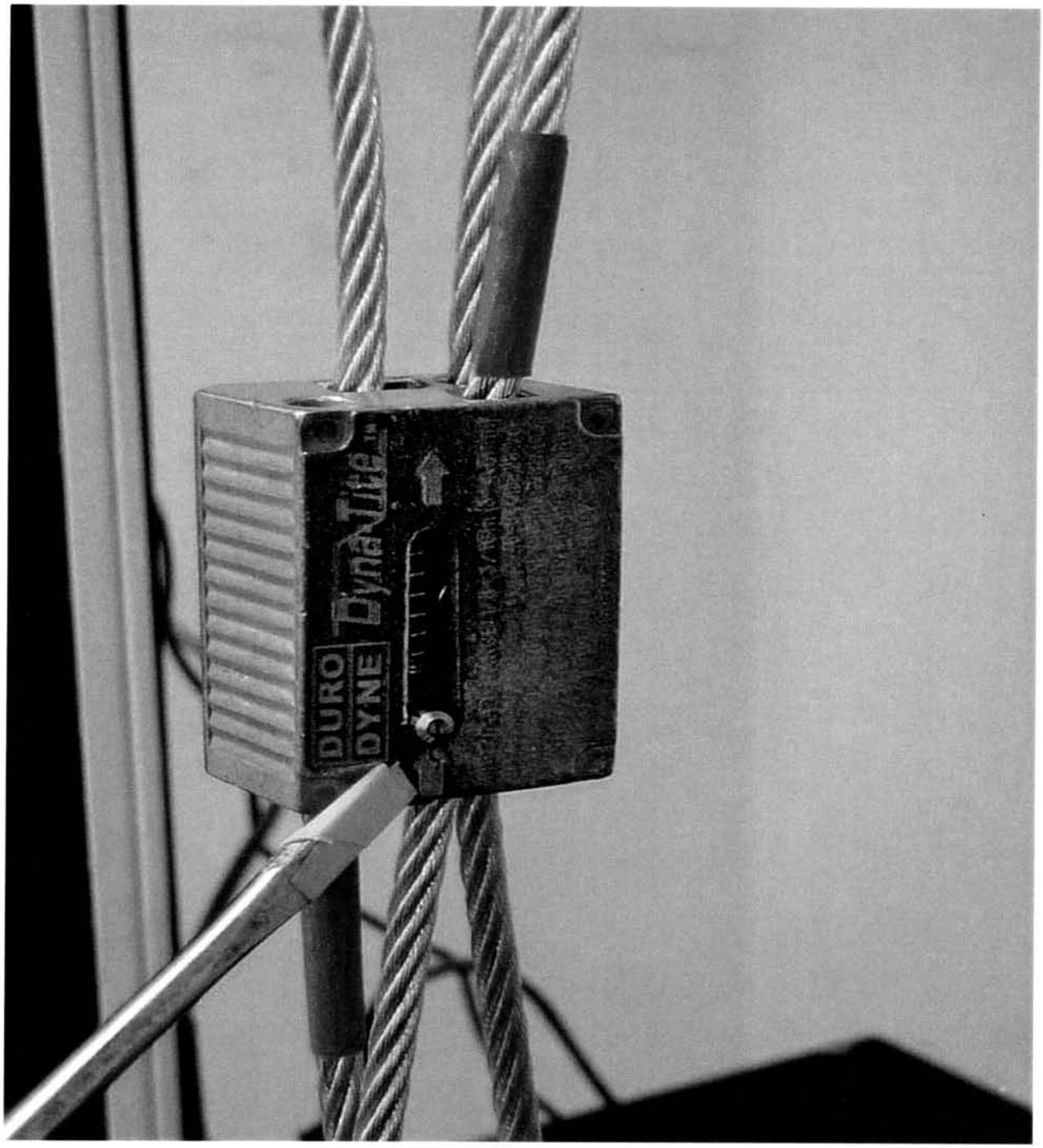
Typical setup to test for slippage.
Marking rope to test for slippage of 3/16" Galvanized Carbon Steel on a
DYNA-TITE CL23 CABLE LOCK SYSTEM.
Rope pre-loaded with 38.4 lb. of tension.



BROKEN 1/8" CABLE IN DYNA-TITE CL23 LOCK
@ 1705 LB ULTIMATE LOAD



BROKEN DYNA-TITE CL23 LOCK ON 3/16" CABLE
@ 3761 LB ULTIMATE LOAD



BROKEN DYNA-TITE CL23 LOCK ON 3/16" CABLE
@ 4492 LB ULTIMATE LOAD

CERTIFICATE OF TEST

Issued by : TUV NEL Ltd
Mechanical Testing

Certificate No. : MSLQ - 2 **Date of Issue :**7 June 2005

nel
technology for life

TUV NEL Ltd,
East Kilbride,
Glasgow, G75 0QU, UK.

Tel No. 01355 220222.
Fax No. 01355 272791

Authorised Signatories:

D Hare, L Hunter, R Hone, D. Rooney

Customer Zip-Clip Ltd, 33 Vastre Industrial Estate, Newton Powys SY16 1DZ

Project No. PPE500000 **NEL Test Mark:** MSLQ-06-10

Specimen Received Date 12 May 2005 **Date of Test:** 17 May 2005

Specimen Description: 5 off 2.0mm dia 7x7 steel galvanised wire c/w 2 off KL-100 cable locks for each wire sample.

Object of Test The object of the test was to provide a SWL with 5:1 Factor of Safety for a 2mm dia 7x7 steel galvanised wire.

Method of Test 5 samples of 2mm dia wire were tested. The wire samples were looped at each end using a KL100 cable lock. A load of 300 kg was applied to each sample using an Instron screw driven two space universal testing machine. At the customers request each sample was loaded to destruction.

Results

Sample (2.0mm wire)	300 kg load	Destruction (kg)
MSLQ-06	Pass	383 kg
MSLQ-07	Pass	388 kg
MSLQ-08	Pass	414 kg
MSLQ-09	Pass	392.3 kg
MSLQ-10	Pass	379.2 kg

SWL (2.0 mm wire) = 60 kg / 5:1 FOS = 300 kg

Comments The 2.0mm dia wire samples achieved load to destruction in excess of a 5:1 Factor of Safety when tested at NEL.

Distribution

Zip-Clip Ltd	1 Copy
NEL	1 Copy

Tested by....T. Callagher....

PPE/Testcert_general_Issue 1.0

CERTIFICATE OF TEST

Issued by : TUV NEL Ltd
Mechanical Testing

Certificate No. : MSLQ -1 **Date of Issue :**7 June 2005

nel technology for life	**TUV NEL Ltd,** **East Kilbride,** **Glasgow, G75 0QU, UK.** **Tel No. 01355 220222.** **Fax No. 01355 272791**	**Authorised Signatories:** D Hare, L Hunter, R Hone, D. Rooney

Customer Zip-Clip Ltd, 33 Vastre Industrial Estate, Newton Powys SY16 1DZ

Project No. PPE500000 **NEL Test Mark:** MSLQ-01-05

Specimen Received Date 12 May 2005 **Date of Test:** 17 May 2005

Specimen Description: 5 off 2.5mm dia 7x7 steel galvanised wire c/w 2 off KL-100 cable locks for each wire sample.

Object of Test The object of the test was to provide a SWL with 5:1 Factor of Safety for a 2.5mm dia 7x7 steel galvanised wire.

Method of Test 5 samples of 2.5 mm dia wire were tested. The wire samples were looped at each end using a KL100 cable lock. A load 500 kg was applied to each sample using an Instron screw driven two space universal testing machine. At the customers request each sample was loaded to destruction.

Results

Sample (2.5 mm wire)	500 kg load	Destruction (kg)
MSLQ-01	Pass	551.5 kg
MSLQ-02	Pass	557.6 kg
MSLQ-03	Pass	534 kg
MSLQ-04	Pass	538 kg
MSLQ-05	Pass	565 kg

SWL (2.5 mm wire) = 100 kg / 5:1 FOS = 500 kg

Comments The 2.5mm dia wire samples achieved load to destruction in excess of a 5:1 Factor of Safety when tested at NEL.

Distribution

Zip-Clip Ltd	1 Copy
NEL	1 Copy

Tested by......T. Callagher......

PPE/Testcert_general_Issue 1.0

CERTIFICATE OF TEST

Issued by : TUV NEL Ltd
Mechanical Testing and Analysis

Certificate No. : MSPK **Date of Issue :**23 August 2005

TUV NEL Ltd,
East Kilbride,
Glasgow, G75 0QU, UK.

Tel No. 01355 220222.
Fax No. 01355 272791

technology for life

Authorised Signatories:

D Hare, L Hunter, R Hone, D. Rooney

R Hunter

Customer Zip-Clip Ltd, 33 Vastre Industrial Estate, Newton Powys SY16 1DZ

Project No. PPE500000 **NEL Test Mark:** MSPK-01-05

Specimen Received Date 08 August 2005 **Date of Test:** 16 August 2005

Specimen Description: 5 off 4.0mm dia 7x7 steel galvanised wire c/w one KL-200 cable lock for each wire sample.

Object of Test The object of the test was to provide a SWL with 5:1 Factor of Safety for a 4mm dia 7x7 steel galvanised wire.

Method of Test 5 samples of 4mm dia wire were tested. The wire samples were looped at each end and thread through a KL-200 cable lock. See Product Identification. A load of 1150 kg was applied to each sample using a 200 kN capacity hydraulic test machine. At the customers request each sample was loaded to destruction.

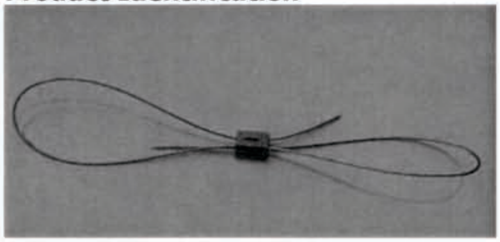
Results

Sample (4.0mm wire)	1150 kg load	Destruction (kg)
MSPK-01	Pass	1470.40 kg
MSPK-02	Pass	1568.29 kg
MSPK-03	Pass	1474.48 kg
MSPK-04	Pass	1240.97 kg
MSPK-05	Pass	1755.92 kg

SWL (4.0 mm wire) = 230 kg / 5:1 FOS = 1150 kg

Comments The 4.0mm dia wire samples achieved load to destruction in excess of a 5:1 Factor of Safety when tested at NEL.

Product Identification



4.0 mm wire c/w KL-200 Cable Lock

Distribution

Zip-Clip Ltd	1 Copy
NEL	1 Copy

******End of Test Certificate****** **Tested by**......F Gallagher......

PPE/Testcert_general_Issue 1.0

February 15, 2007

Stephen S. Martin
Product Development Director
Duro Dyne Corporation
81 Spence Street
Bay Shore, NY 11706

RE: Duro Dyne Cable Lock System

Dear Mr. Martin:

The SMACNA Testing & Research Institute (STRI) verifies in the attached Test Report, Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System as submitted and tested to be acceptable alternatives to the duct hanger systems prescribed in the SMACNA *HVAC Duct Construction Standards* (HVAC-DCS), 3rd Edition 2005, Chapter 5, Tables 5-1, 5-1M, and 5-2 subject to the conditions in the attached Test Report.

Sincerely,

Eli P. Howard, III
Executive Director

Enclosure

SMACNA TESTING & RESEARCH INSTITUTE
HEADQUARTERS: 4201 LAFAYETTE CENTER DRIVE • CHANTILLY, VIRGINIA 20151-1209
MAILING ADDRESS: P.O. BOX 221230 • CHANTILLY, VIRGINIA 20153-1230
PHONE: (703) 803-2980 • FAX: (703) 803-3732

SMACNA TESTING & RESEARCH INSTITUTE
TEST REPORT

TEST & VERIFICATION REPORT ON
DURO DYNE "DYNA-TITE CL12 AND CL118" CABLE LOCK SYSTEM

The SMACNA Testing & Research Institute (STRI) verifies Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System as submitted and described below to be acceptable alternatives to the duct hanger systems prescribed in the *HVAC Duct Construction Standards* (HVAC-DCS), 3rd Edition 2005, Chapter 5, Tables 5-1, 5-1M and 5-2 and subject to the following conditions and limitations:

1. Consistent with the HVAC-DCS requirements, upper attachment of the system directly to structures (without another device transferring the load between the wire rope and structure) shall have an allowable load not more than one-fourth of the wire rope system failure load.

2. Lower attachments, such as illustrated in HVAC-DCS Figure 5-5, shall have a minimum safety factor of two and shall not be used in a manner that would deform the duct shape or cause excessive concentrated loads on ducting.

   With respect to HVAC-DCS Figure 5-5, Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System may be adapted to any of the illustrated support configurations except the two-tier trapeze method in the lower right. This adaptation also applies to the strut channel support in Figure 5-6.

   Wire rope support of trapeze bars for oval duct suspension relative to HVAC-DCS specification S3.18 is acceptable.

   Wire rope passed continuously under round and rectangular duct (with both ends attached overhead) is acceptable provided that duct shape is retained and points of contact with the duct are not overstressed. Use of stress distribution saddles shall be prescribed as necessary.

3. The HVAC-DCS Table 5-1 maximum hanger spacing of 10 feet and Table 5-2 maximum spacing of 12 feet shall be maintained (and decreased as necessary to conform to Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System working load limits).

   Since Chapter 5 of the HVAC-DCS has prescribed uses and limits on duct size for single wire supports and the Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System uses wire rope that have larger load capacity, use is not restricted to the HVAC-DCS diametrical limits for single wires.

4. When Duro Dyne Corporation allows its hanger wire to be in a non-vertical orientation, it shall, in accordance with accepted engineering practice, provide users with adjustments to its working loads and, as necessary to conform to manufacturers' recommendations, approve the

method of transfer of loadings to supporting and supported members. This stipulation shall not be construed as preempting any duty of an installer to obtain approval of the support system by an appropriate authority prior to making the installation. The SMACNA HVAC-DCS does not specifically provide for non-vertical hanger systems.

5. Criteria for use of Duro Dyne "Dyna-Tite CL12 and CL118" Cable Lock System for support of risers is not included in this verification.

Duro Dyne Corporation submitted their "Dyna-Tite CL12 and CL118" Cable Lock System which consisted of:

1. A "system" with the following components: a galvanized steel wire rope, a preformed loop created and maintained thereon by a manufacturer supplied CL12 and CL118 Cable Lock (casing, springs, pawls, and pins) and an attachable loop fixing metal grip.

2. Each system was supplied with suitably matched, compatible load rated components with load rating performance data conducted by an accredited testing laboratory.

The SMACNA Testing & Research Institute conducted a comprehensive evaluation of the submittal as an acceptable alternative for use with the SMACNA *HVAC Duct Construction Standards – Metal and Flexible,* 3rd Edition 2005. This analysis included: minimum and maximum working load ranges that will prevent slip and separation of components of the systems; breaking strength of the wire rope; load test results for wire rope systems and failure load tests.

SMACNA
TESTING & RESEARCH
INSTITUTE

December 20, 2002

Mr. Stephen S. Martin
Product Development Director
Duro Dyne Corporation
81 Spence Street
Bay Shore, NY 11706

Re: Duro Dyne Cable Lock System

Dear Mr. Martin:

The SMACNA Testing & Research Institute (STRI) verifies in the attached Test Report, Duro Dyne "Dyna-Tite CL23" Cable Lock System as submitted and tested to be acceptable alternatives to the duct hanger systems prescribed in the SMACNA HVAC Duct Construction Standards (HVAC-DCS), 2nd Edition 1995, Chapter 4, Tables 4-1, 4-1M, 4-2 and 4-2M subject to the conditions in the attached Test Report.

Sincerely,

Dennis M. Bradshaw

Dennis M. Bradshaw
Executive Director

DMB/dd

Enclosure

04 Martin_Duro Dyne

SMACNA TESTING & RESEARCH INSTITUTE
HEADQUARTERS: 4201 LAFAYETTE CENTER DRIVE • CHANTILLY, VIRGINIA 20151-1209
MAILING ADDRESS: P.O. BOX 221230 • CHANTILLY, VIRGINIA 20153-1230
PHONE: (703) 803-2980 • FAX: (703) 803-3732

SMACNA TESTING & RESEARCH INSTITUTE
TEST REPORT

TEST & VERIFICATION REPORT ON
DURO DYNE "DYNA-TITE CL23" CABLE LOCK SYSTEM

The SMACNA Testing & Research Institute (STRI) verifies Duro Dyne "Dyna-Tite CL23" Cable Lock System (1/8" & 3/16" wire rope) as submitted and described below to be acceptable alternatives to the duct hanger systems prescribed in the HVAC Duct Construction Standards (HVAC-DCS), 2nd Edition 1995, Chapter 4, Tables 4-1, 4-1M, 4-2 and 4-2M subject to the following conditions and limitations:

1. Consistent with the HVAC-DCS requirements, upper attachment of the system directly to structures (without another device transferring the load between the wire rope and structure) shall have an allowable load not more than one-fourth of the wire rope system failure load.

2. Lower attachments, such as illustrated in HVAC-DCS Figure 4-4, shall have a minimum safety factor of two and shall not be used in a manner that would deform the duct shape or cause excessive concentrated loads on ducting.

   With respect to HVAC-DCS Figure 4-4, Duro Dyne "Dyna-Tite CL23" Cable Lock System may be adapted to any of the illustrated support configurations except the two-tier trapeze method in the lower right. This adaptation also applies to the strut channel support in Figure 4-5.

   Wire rope support of trapeze bars for oval duct suspension relative to HVAC-DCS specification S3.18 is acceptable.

   Wire rope passed continuously under round and rectangular duct (with both ends attached overhead) is acceptable provided that duct shape is retained and points of contact with the duct are not overstressed. Use of stress distribution saddles shall be prescribed as necessary.

3. The HVAC-DCS Table 4-1 maximum hanger spacing of 10 feet and Table 4-2 maximum spacing of 12 feet shall be maintained (and decreased as necessary to conform to Duro Dyne "Dyna-Tite CL23" Cable Lock System working load limits).

   Since Chapter 4 of the HVAC-DCS has prescribed uses and limits on duct size for single wire supports and the Duro Dyne "Dyna-Tite CL23" Cable Lock System uses wire rope that have larger load capacity, use is not restricted to the HVAC-DCS diametrical limits for single wires.

4. When Duro Dyne Corporation allows its hanger wire to be in a non-vertical orientation, it shall, in accordance with accepted engineering practice, provide users with adjustments to its working loads and, as necessary to conform to manufacturers recommendations, approve the

method of transfer of loadings to supporting and supported members. This stipulation shall not be construed as preempting any duty of an installer to obtain approval of the support system by an appropriate authority prior to making the installation. The SMACNA HVAC-DCS does not specifically provide for non-vertical hanger systems.

5. Criteria for use of Duro Dyne "Dyna-Tite CL23" Cable Lock System for support of risers is not included in this verification.

Duro Dyne Corporation submitted their "Dyna-Tite CL23" Cable Lock System which consisted of:

1. A "system" with the following components: a galvanized steel wire rope, a preformed loop created and maintained thereon by a manufacturer supplied CL23 Cable Lock (casing, springs, pawls, and pins) and an attachable loop fixing metal grip.

2. Each system was supplied with suitably matched, compatible load rated components with load rating performance data conducted by an accredited testing laboratory.

The SMACNA Testing & Research Institute conducted a comprehensive evaluation of the submittal as an acceptable alternative for use with the SMACNA HVAC Duct Construction Standard – Metal and Flexible, 2nd Edition 1995. This analysis included: minimum and maximum working load ranges that will prevent slip and separation of components of the systems; breaking strength of the wire rope; load test results for wire rope systems and failure load tests.

New York Product Testing & Services Inc.

"Success Through Testing"

DATE:	January 21, 2004
LAB. No.:	04-107942B
CLIENT:	Duro Dyne, Inc.
	81 Spence Street
	Bay Shore, NY 11706
ATTENTION:	Tom Boodhoo
CLIENT'S ORDER NO.:	Pending
MATERIAL:	Ten (10) Dynatite Assemblies
MARKED:	As Below
SUBMITTED FOR:	Tensile Strength

1.0 PROCEDURE:

The assemblies were subjected to tensile with the Dynatite situated as indicated below. Tests were performed at New York Product Testing & Services, Inc. on January 21, 2004.

2.0 RESULTS:

UNIT ID	DESCRIPTION CONFIGURATION	SIZE (inch)	ULTIMATE LOAD (lbs.)
A	Single Loop	1/8	1,560
1	Single Loop	1/8	1,425
2	Single Loop	1/8	1,500
C	Single Loop	3/16	3,480
4	Single Loop	3/16	3,625
5	Single Loop	3/16	3,500
D	Figure 8	3/16	4,000
6	Figure 8	3/16	4,250
B	Figure 8	1/8	1,480
3	Figure 8	1/8	1,575

3.0 CERTIFICATION AND SIGNATURES:

We certify that this report is a true report of results obtained from tests of this material.
Respectfully submitted,
New York Product Testing & Services, Inc.

Al Barbera, Project Engineer

90-8 Colin Drive • Holbrook, New York 11741
Phone (631) 472-7300 • Fax (631) 472-3089

New York Product Testing & Services Inc.

"Success Through Testing"

DATE:	April 08, 2004
LAB. No.:	04-107942F
CLIENT:	Duro Dyne, Inc.
	81 Spence Street
	Bay Shore, NY 11706
ATTENTION:	Tom Boodhoo
CLIENT'S ORDER NO.:	Pending
MATERIAL:	Ten (10) Dynatite Assemblies
MARKED:	As Below
SUBMITTED FOR:	Tensile Strength

1.0 PROCEDURE:

The assemblies were subjected to tensile with the Dynatite situated as indicated below. Tests were performed at New York Product Testing & Services, Inc. on April 08, 2004.

2.0 RESULTS:

UNIT ID	DESCRIPTION CONFIGURATION	SIZE (inch)	ULTIMATE LOAD (lbs.)
1	Single Loop	1/16	350
2	Single Loop	1/16	415
3	Single Loop	1/16	335
4	Single Loop	1/16	385
5	Single Loop	1/16	410
6	Single Loop	3/32	825
7	Single Loop	3/32	915
8	Single Loop	3/32	1,035
9	Single Loop	3/32	1,040
10	Single Loop	3/32	1,000

3.0 CERTIFICATION AND SIGNATURES:

We certify that this report is a true report of results obtained from tests of this material.
Respectfully submitted,
New York Product Testing & Services, Inc.

Al Barbera, Project Engineer

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81 SPENCE ST
BAYSHORE NY 11706

Your most recent Certification is shown below. You may also view this information on UL's Online Certifications Directory at www.ul.com. Please review the text and contact the Conformity Assessment Services staff member who handled your project if revisions are required.

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IFFX
Luminaire Fittings

May 12, 2004

RIZE ENTERPRISES L L C
1ST FL 81 SPENCE ST, BAYSHORE NY 11706

E246601

Luminaire Support Cable Locks, Models KL100, KL200, CL12, CL23.

LOOK FOR LISTING MARK ON PRODUCT