

**REVISED**  
**3RD EDITION**

Revised 6/06 to be in compliance with SMACNA  
HVAC Duct Construction Standards  
Third Edition - 2005

**Construction Standards**  
**Submittal Data**  
**Engineering Specifications and**  
**Assembly Instructions**  
**for**  
**Rectangular Duct Work**  
**and**  
**Round Duct Work**

**LEED - CERTIFIED CONSTRUCTION**  
**Green Building**



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# There is only one Ward Family in the Four Bolt Duct Connector Industry.

The Ward Family was one of the originators of the Four Bolt Industry when it started in our sheet metal shop, Crest Air Inc. almost 25 years ago, and we have been committed to the industry and our customers ever since.

No other four bolt company can offer the technical experience, service or support that the Ward Family has been noted for. It's through this experience and commitment we have compiled these duct construction standards.

Our products, support and **service after the sale** are unsurpassed in the industry.

## After The Sale Services:

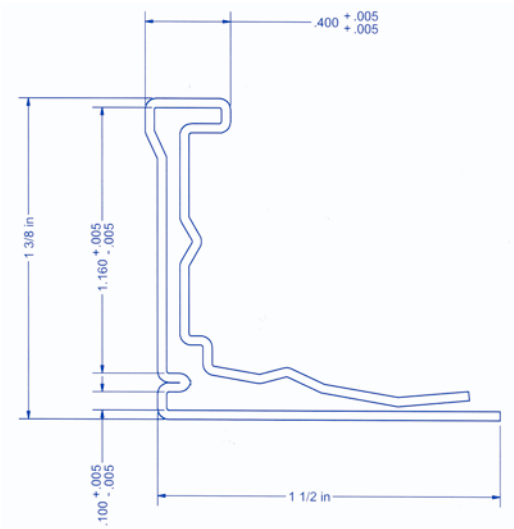
- Assist in preparing submittals
- Assist in analysis of various duct construction options
- Tool repair
- Assist in duct leakage testing
- Assist in shop layout
- Assist in Leed-Certified Construction

These services and other technical services would make C.L. Ward the leader in Sheet Metal Technical Assistance.

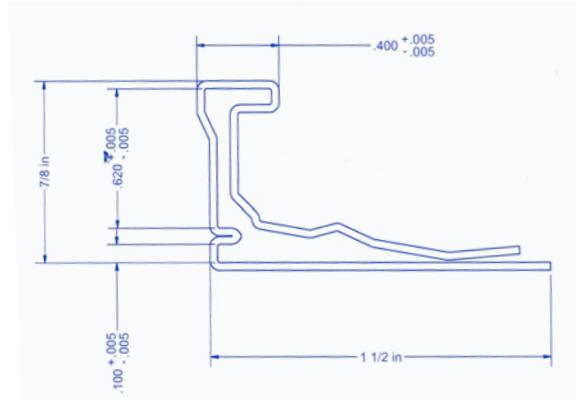


Left to Right: Lou, Craig, Ryan, and Scott

In accordance with the SMACNA Duct Performance Test Standard No. DPT-2005 criteria as described in Chapter 11 of the SMACNA HVAC Duct Construction Standards, Third Edition, 2005. Also, as described in paragraph S1.18 on page 1.3 of the SMACNA HVAC Duct Construction Standards, Third Edition, 2005 the C.L. Ward and Family, Inc. 1 1/4" flange has the rigidity of a SMACNA "J" Classification and the 7/8" flange has the rigidity of a SMACNA "H" Classification.



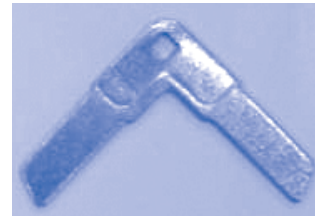
J Connect – Rolled formed from 20 gage galvanized steel.



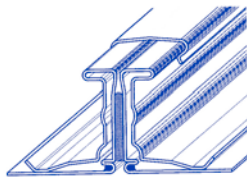
H Connect – Rolled formed from 22 gage galvanized steel.



J Corner – Stamped from 11 gage galvanized steel.  
3/8" x 1" Nut and Bolt packaged with corners



H Corner – Stamped from 11 gage galvanized steel.  
1/4" x 1" Nut and Bolt packaged with corners



Metal Cleat – Rolled formed from 20 gage galvanized steel.  
PVC Cleat – Available.

Also available in Aluminum, Stainless Steel, Galvaneal, Aluminized and PVC.

BUTYL GASKET		NEOPRENE GASKET	
20	Flame Spread	10	
0	Fuel Contribution	0	
0	Smoke Density	0	
3/16"	Thickness	5/16"	
20 yr	Life Expectancy	Unlimited shelf life	
300 F	Flash Point	–	
None	Compression Set	–	

# INSTALLATION INSTRUCTIONS

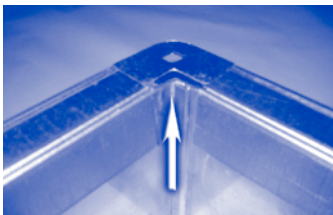
## CUTTING THE CONNECTOR

The connector should be cut with a 3 h.p., 1350 rpm "chop saw" using a metal-tooth blade to insure a clean burr-free edge. An abrasive blade will melt the mastic and leave a burr. Cut the connector with the legs down, cutting through the "spine". The connector should be cut 1-5/16" shorter than the duct dimension.

## ASSEMBLING THE FRAME

With the raised portion of the corner facing the mating corner insert the corners into the shorter connectors using a mallet. Complete the frame by adding the longer connectors.

## SEATING THE FRAME ON DUCT



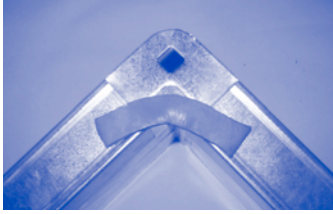
Hammer the completed frame onto the raw edge of duct section starting at one corner and working your way around making sure the duct is seated in the mastic pocket **and the corners of the duct are visible beyond the corners of the frame as shown.**

## SECURING THE FRAME TO DUCT

Secure the frame to the ductwork by using either 10 x 3/4 tek screws or spot welds. On installations where leakage is critical (less than 1%) or static pressures exceeds 3", spot welding or rubber sealant coated tek screws is recommended.

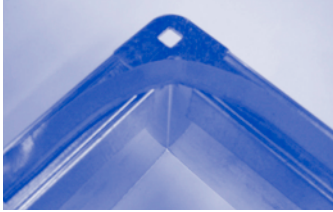
RECOMMENDED SPACING		
STATIC PRESSURE	DUCT SIZE	RECOMMENDED CENTERS
Low Pressure 1/2" to 2"	To 48" 49" to 96" Over 96"	@ corners & centerline @ corners & 24" centers @ corners & 18" centers
Medium Pressure 2" to 4"	To 36" 37" to 72" Over 72"	@ corners & centerline @ corners & 18" centers @ corners & 12" centers
Medium Pressure 4" to 6"	To 30" 31" to 72" Over 72"	@ corners & centerline @ corners & 18" centers @ corners & 12" centers
High Pressure 6" to 10"	To 24" 25" to 60" Over 60"	@ corners & centerline @ corners & 12" centers @ corners & 8" centers

Fastening the frame must start within 3/4" of each end of the flange at the corners.



### GASKET POSITIONING

On one of the mating frames, apply a 2" to 3" strip of gasket to each corner, as shown, **making sure the gasket covers the exposed edge of the ductwork.**



Apply a single strip of gasket around the inside edge of the mating frame, again **making sure the gasket covers the exposed edge of the ductwork.**

**Where leakage requirements are critical, less than 1%, contact C.L. Ward & Family, Inc. for consultation.**

### CLEAT SPACING

In accordance with the following spacing chart, install a piece of metal or PVC cleat over the mating frames.

STATIC PRESSURE	RECOMMENDED CENTERS
1/2" to 2"	24" centerline
2" to 4"	18" centerline
4" to 10"	12" centerline
Over 10"	Continuous

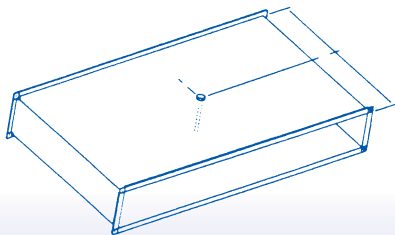
### TIE ROD OPTION CONSTRUCTION

Tie Rods at midpoint of the duct panel are acceptable alternatives to external intermediate duct reinforcement.

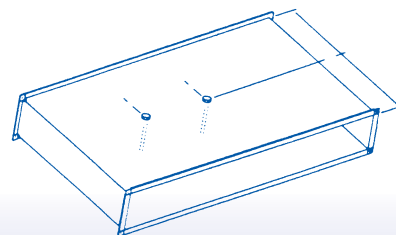
The C.L. Ward & Family Inc. Duct Construction Standards have been prepared in accordance with the SMACNA HVAC Duct Construction Standards, Third Edition, 2005.

The Tie Rod Loc has been used for the testing as described in Chapter II of the SMACNA Standards.

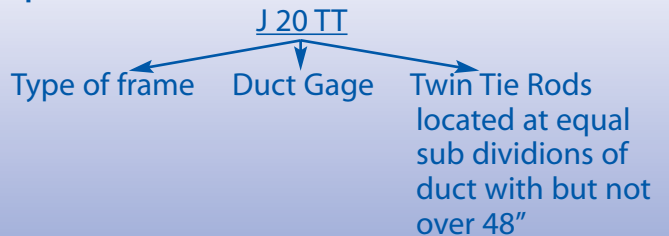
The drawings below show the Tie Rod Loc being attached to the duct wall alone as the reinforcement for the panel.



Example:



Example:



# C.L. WARD & FAMILY INC. DUCT CONSTRUCTION STANDARDS

## Issue No. 1

The following paragraphs are reprinted from the SMACNA Duct Construction Standards 1995 edition. C.L. Ward & Family feels that these are important.

### DUCT SYSTEMS DESIGN

A duct system is an assembly whose primary function is to convey air between specified points. A duct system may contain ducts under positive and negative pressure. Air velocities will vary within system.

Generally speaking, duct strength, deflection, and leakage are more functions of pressure than of velocity. In conventional systems, noise, vibration, and friction loss are more related to velocity than to pressure.

**Because total pressure is less downstream than upstream, a duct construction classification equal to the fan outlet pressure (or to the fan total static pressure rating) can not economically be imposed on the entire duct system.**

Pressure in duct near room air terminals is nearly always below 1/2" water gage.

### Reinforcement ARRANGEMENTS

The basic elements of duct construction consists of duct wall(s), transverse joints, and reinforcements at, or between, joints and supports. All of those form an integrated combination for each pressure class and duct size. Each size in a pressure class has a minimum duct wall thickness and a minimum specification for joints, reinforcements, etc.

### DUCT CONSTRUCTION AND INSTALLATION STANDARDS

**Each duct system shall be constructed for the specific duct pressure classifications shown on the contract drawings. Where no pressure classes are specified by the designer, the 1" water gage pressure class is the basis of compliance with these standards, regardless of velocity in the duct, except when duct is variable volume: All volume duct upstream of VAV boxes has a 2" basis of compliance when the designer does not give a pressure class.**

### LEED - CERTIFIED CONSTRUCTION

Green Building, is building that includes features of reducing operating costs.

Using CL WARD Four Bold Flange for the transverse duct connection and CL WARD SuperSeal to seal the longitudinal seams and duct wall penetrations will meet SMACNA Class A Seal Class. SMACNA Class A Sealing will result in increased energy efficiency and reduced operating costs.

Additional credits for increasing the energy efficiency are also available when insulating the sheet metal ductwork.

There are also credits available for the use of recycled material. Domestic galvanized steel (sheet metal ductwork) normally has a minimum of 25% recycled materials. This can be verified by requesting this information from the producing mill.

The little recycling effect on the butyl gasketing should not be considered, as the efficiency of the gasketing is more effective for the sealing of the systems.

It is important to note that CL WARD Sealants & Adhesives meet LEED Requirements. LEED EQ Credit 4.1 requires that all adhesives and sealants used on the interior of the building shall comply with South Coast Air Quality Management District (SCAQMD) Rule #1168. All CLWARD water based sealants, adhesives and coatings have zero VOC and comply with the requirements for Low-Emitting materials for indoor environmental quality, credit 4.1. These products include SuperSeal, SuperSeal-Fiber, EcoSeal, CLWARD Adhesive and CLWARD Adhesive HV. CLWARD BUtyl gaskets also meet these requirements, as well as CLWARD SuperSpray pressurized cylinder spray adhesives.

## DUCT SEALING COMMENTARY

Duct must be sufficiently airtight to ensure economical and quiet performance of the system. It must be recognized that airtightness in ducts cannot, and need not, be absolute (as it must be in a water piping system). Codes normally require that ducts be reasonably airtight. Concerns for energy conservation, humidity control, space temperature control, room air movement, ventilation, maintenance, etc., necessitate regulating leakage by prescriptive measures in construction standards. Leakage is largely a function of static pressure and the amount of leakage in a system is significantly related to system size. Adequate airtightness can normally be ensured by **A** selecting a static pressure, construction class suitable for the operating condition, and **B** sealing the ductwork properly.

STANDARD DUCT SEALING REQUIREMENTS		
SEAL CLASS	SEAL REQUIREMENTS	applicable STATIC PRESSURE construction CLASS
<b>A</b>	Class A: All transverse joints, longitudinal seams, and duct wall penetrations	4" w.g. and up
<b>B</b>	Class B: All transverse joints, longitudinal seams only	3" w.g.
<b>C</b>	Class C: transverse joints only	2" w.g.

In addition to the above, any variable air volume system duct of 1" and 1/2" w.g. construction class that is upstream of the VAV boxes shall meet Seal Class C.

## DUCT SEALING COMMENTARY (NEW CONCEPT)

The 1985 SMACNA HVAC Air Duct Leakage Test Manual introduced the new concept of defining duct leakage as a function of the **pressure in the duct** and the **surface area of the duct**. This allowed the introduction of a Leakage Class (amount of leakage [CFM/100 sq. ft.] when the pressure equals 1" w.g.) that could be used to calculate, and predict a far more accurate leakage rate for systems of various size and configurations. A further analysis of the data available indicated that this approach is superior to the more common approach of specifying leakage as a percent of system air flow rate.

The total leakage of a system in CFM can be calculated by multiplying the calculated Leakage Class Factor times the duct surface area: **Leakage CFM = Leakage factor x sq. ft. of Ductwork.**

APPLICABLE LEAKAGE CLASSES				
DUCT CLASS	1/2", 1", 2" w.g.	3" w.g.	4", 6", 10" w.g.	
SEAL CLASS	C	B	A	UNSEALED CLASS
LEAKAGE CLASS	24	12	6	48
1/2" SP	15	7	4	30
1"	24	12	6	48
2"	37	19	9	75
3"	50	25	12	
4"		30	15	
6"		40	19	
10"			27	

1/2" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
	23-30"	H-26	H-26	H-26	H-26	H-26	H-26
	31-48"	H-24	H-26	H-26	H-26	H-26	H-26
	49-54"	H-22	H-26	H-26	H-26	H-26	H-26
	55-60"	H-22	H-24	H-24	H-26	H-26	H-26
	61-72"	H-20	H-22	H-24	H-24	H-24	H-24
	73-84"	H-18	H-22	H-24	H-24	H-24	H-24
	85-96"	J-18	H-20	H-22	H-22	H-22	H-22
	97-108"	J-18T	J-18	J-18	H-18	H-18	H-18
	109-120"	J-18T	J-18T	J-18T	J-18	H-18	H-18
	121-132"		JT-18TT	JT-18TT	JT-18TT	JT-18	JT-18
	133-144"		JT-18TT	JT-18TT	JT-18TT	JT-18	JT-18

1/2" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
	54"-Down	0.032	0.032	0.032	0.032
	55"-60"	0.04	0.04	0.032	0.032
	61"-72"	0.05	0.04	0.04	0.04
	73"-84"	0.05	0.04	0.04	0.04
	85"-96"	0.063	0.05	0.05	0.05
	97"-108"			0.071	0.071
	109"-120"			0.071	0.071

1" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
	20" dn	H-26	H-26	H-26	H-26	H-26	H-26
	21-30"	H-26	H-26	H-26	H-26	H-26	H-26
	31-42"	H-22	H-24 / H-26	H-26	H-26	H-26	H-26
	43-48"	H-20	H-22 / H-24	H-24	H-26	H-26	H-24
	49-60"	H-20	H-22	H-24	H-24	H-24	H-24
	61-72"	H-18	H-18 / J-24T	H-22	H-24	H-24	H-24
	73-84"	J-18	H-18 / H-22T	J-20	H-22	H-22	H-22
	85-96"		J-18 / J-20T	J-18	J-20	H-20	H-20
	97-108"		J-18T	J-18T	J-18	J-18	J-18
	109-120"		J-18T	J-18T	J-18	J-18	J-18
	121-132"		JT-18TT	JT-18TT	JT-18TT	JT-18	JT-18
	133-144"		JT-18TT	JT-18TT	JT-18TT	JT-18	JT-18

1" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
	30"-Down	0.032	0.032	0.032	0.032
	31"-42"	0.04	0.032	0.032	0.032
	43"-60"	0.05	0.04	0.04	0.04
	61"-72"	0.071	0.05	0.04	0.04
	73"-84"			0.05	0.05
	85"-96"			0.063	0.05

2" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
	12" dn	H-26	H-26	H-26	H-26	H-26	H-26
	13-18"	H-24	H-26	H-26	H-26	H-26	H-26
	19-26"	H-24	H-26	H-26	H-26	H-26	H-26
	27-30"	H-22	H-24	H-26	H-26	H-26	H-26
	31-36"	H-20	H-24	H-24	H-26	H-26	H-26
	37-42"	H-20	H-22	H-24	H-24	H-26	H-26
	43-48"	H-20	H-22	H-22	H-24	H-24	H-24
	49-54"	H-24T	H-20	H-20	H-24	H-24	H-24
	55-60"	H-22T	H-20	H-20	H-22	H-24	H-24
	61-72"	H-22T	J-22T	J-20	H-22	H-22	H-24
	73-84"		J-22T	J-20	J-20	J-22	J-22
	85-96"		J-20T	J-22T	J-18	J-20	J-22
	97-108"		JT-18T	JT-18T	JT-18T	J-18	J-18
	109-120"		JT-18T	JT-18T	JT-18T	JT-18	J-18
	121-132"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18
	133-144"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18

2" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
	26"-Down	0.032	0.032	0.032	0.032
	27"-30"	0.04	0.032	0.032	0.032
	31"-36"	0.05	0.04	0.032	0.032
	37"-42"	0.063	0.04	0.04	0.04
	43"-48"	0.063	0.05	0.04	0.04
	49"-54"	0.071	0.063	0.04	0.04
	55"-60"		0.071	0.04	0.04
	61"-72"			0.05	0.04

3" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
	12" dn	H-26	H-26	H-26	H-26	H-26	H-26
	13-18"	H-24	H-24	H-26	H-26	H-26	H-26
	17-22"	H-22	H-24	H-24	H-26	H-26	H-26
	23, 24"	H-22	H-24	H-24	H-26	H-26	H-26
	25, 26"	H-22	H-24	H-24	H-26	H-26	H-26
	27, 28"	H-20	H-22	H-24	H-26	H-26	H-26
	29, 30"	H-20	H-22	H-24	H-26	H-26	H-26
	31-36"	H-18	H-20	H-22	H-24	H-26	H-26
	37-42"	H-18	H-20	H-22	H-24	H-24	H-26
	43-48"	J-18	H-24T	H-20	H-22	H-24	H-24
	49-54"	H-22T	J-24T	H-24T	H-22	H-24	H-24
	55-60"	H-20T	J-22T	H-22T	H-20	H-22	H-24
	61-72"		J-22T	H-22T	J-20	J-22	J-24
	73-84"		JT-20T	JT-20T	J-18T	J-20	J-22
	85-96"		JT-18T	JT-18T	JT-18T	J-18	J-20
	97-108"		JT-18T	JT-18T	JT-18T	JT-18	JT-18
	109-120"		JT-18T	JT-18T	JT-18T	JT-18	JT-18
	121-132"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18
	133-144"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18

3" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
	12"-Down	0.032	0.032	0.032	0.032
	13"-26"	0.04	0.04	0.032	0.032
	27"-30"	0.05	0.04	0.032	0.032
	31"-36"	0.063	0.05	0.032	0.032
	37"-42"	0.063	0.05	0.04	0.032
	43"-48"		0.063	0.04	0.04
	49"-54"			0.04	0.04
	55"-60"			0.05	0.04

4" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
10" dn	H-26	H-26	H-26	H-26	H-26	H-26	H-26
11,12"	H-24	H-26	H-26	H-26	H-26	H-26	H-26
13,14"	H-22	H-24	H-26	H-26	H-26	H-26	H-26
15,16"	H-22	H-24	H-26	H-26	H-26	H-26	H-26
17-20"	H-22	H-24	H-24	H-26	H-26	H-26	H-26
21,22"	H-20	H-24	H-24	H-26	H-26	H-26	H-26
23-30"	H-20	H-22 H-24	H-24	H-26	H-26	H-26	H-26
31-36"	H-18	H-20 H-22	H-22	H-24	H-26	H-26	H-26
37-42"	H-22T	H-24T	H-20	H-22	H-24	H-26	H-26
43-48"	H-22T	H-24T	H-24T	H-22	H-24	H-24	H-24
49-54"	J-20T	H-22T	H-24T	J-20	H-22	H-24	H-24
55-60"	J-20T	J-22T	J-24T	J-20	J-22	H-24	H-24
61-72"		JT-20T	JT-22T	J-18	J-20	J-22	J-22
73-84"		JT-18T	JT-20T	JT-20T	J-18	J-20	J-20
85-96"		JT-18T	JT-20T	JT-20T	JT-18	J-20	J-20
97-108"		JT-18T	JT-18T	JT-18T	JT-18	JT-18	JT-18
109-120"		JT-18T	JT-18T	JT-18T	JT-18	JT-18	JT-18
121-132"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18	JT-18
133-144"		JTT-18TT	JTT-18TT	JTT-18TT	JT-18	JT-18	JT-18

4" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
12"-Down	0.032	0.032	0.032	0.032	0.032
13"-26"	0.04	0.04	0.032	0.032	0.032
27"-30"	0.05	0.04	0.032	0.032	0.032
31"-36"	0.063	0.05	0.032	0.032	0.032
37"-42"		0.063	0.04	0.032	0.032
43"-48"			0.04	0.04	0.04
49"-54"			0.05	0.04	0.04
55"-60"				0.05	0.05

6" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
10" dn	H-22	H-26	H-26	H-26	H-26	H-26	H-26
11,12"	H-22	H-24	H-24	H-24	H-26	H-26	H-26
13,14"	H-20	H-22	H-24	H-24	H-26	H-26	H-26
15-18"	H-20	H-22	H-24	H-24	H-26	H-26	H-26
19-22"	H-20	H-22	H-24	H-24	H-26	H-26	H-26
23,24"	H-20	H-22	H-22	H-24	H-26	H-26	H-26
25-28"	H-18	H-20	H-22	H-24	H-24	H-24	H-24
29,30"	H-18	J-24T	H-22	H-24	H-24	H-24	H-24
31-36"	J-20T	J-24T	H-20	H-22	H-24	H-24	H-24
37-42"	J-20T	J-22T	J-22T	H-20	H-22	H-22	H-22
43-48"		J-22T	J-22T	J-20	J-22	J-22	J-22
49-54"		JT-20T	JT-22T	J-18	J-20	J-22	J-22
55-60"		JT-20T	JT-22T	J-18	J-20	J-22	J-22
61-72"		JT-18T	JT-20T	JT-16	J-18	J-20	J-20
73-84"		JT-18T	JT-18T	JT-16	JT-18	JT-18	JT-18
85-96"		JT-16T	JT-18T	JT-16	JT-16	JT-18	JT-18
97-108"		JT-16TT	JT-18T	JT-16	JT-16	JT-18	JT-18
109-120"		JTT-16TT	JTT-16TT	JTT-16TT	JT-16	JT-18	JT-18
121-132"		JTT-16TT	JTT-16TT	JTT-16TT	JT-16	JT-16	JT-16
133-144"		JTT-16TT	JTT-16TT	JTT-16TT	JT-16	JT-16	JT-16

6" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
12"-Down	0.04	0.032	0.032	0.032	0.032
13"-24"	0.05	0.05	0.032	0.032	0.032
25"-28"	0.063	0.05	0.04	0.04	0.04
29"-30"	0.071	0.05	0.04	0.04	0.04
31"-36"		0.071	0.04	0.04	0.04
37"-42"			0.05	0.05	0.05
43"-48"					0.063

10" W.G. Static pos or neg	SHOP STANDARDS <b>RECTANGULAR DUCT REINFORCEMENT</b>						
	Duct Dimen.	6'	5'	4'	3'	2 1/2'	2'
8" dn	H-22	H-24	H-24	H-26	H-26	H-26	
9",10"	H-20	H-22	H-24	H-26	H-26	H-26	
11",12"	H-20	H-22	H-24	H-26	H-26	H-26	
13",14"	H-18	H-20	H-22	H-24	H-26	H-26	
15-18"	H-18	H-20	H-20	H-24	H-24	H-26	
19",20"	H-18	H-18	H-20	H-22	H-24	H-24	
21-24"	H-18	H-18	H-20	H-22	H-24	H-24	
25-28"	J-22T	J-18	H-18	H-22	H-24	H-24	
29",30"	J-22T	J-18	J-18	H-22	H-24	H-24	
31-36"		J-22T	J-18	J-20	H-22	H-24	
37-42"		J-20T	J-18	J-18	J-20	J-22	
43-48"		J-18T	J-22T	JT-18	J-18	J-22	
49-54"		JT-18T	JT-20T	JT-18	J-18	J-20	
55-60"		JT-18T	JT-20T		JT-18	J-20	
61-72"		JT-18T	JT-18T		JT-18	JT-18	
73-84"		JT-16T	JT-18T		JT-16	JT-18	
85-96"			JT-16T			JT-16	
97-108"			JT-16T			JT-16	
109-120"			JT-16T			JT-16	

10" W.G. Static pos or neg	SHOP STANDARDS <b>ALUMINUM RECTANGULAR DUCT REINFORCEMENT</b>				
	Duct Dimen.	5'	4'	2 1/2'	2'
8"-Down	0.04	0.032	0.032	0.032	
9"-12"	0.05	0.04	0.032	0.032	
13"-18"	0.063	0.063	0.04	0.032	
19"-26"	0.071	0.063	0.05	0.05	
27"-30"			0.05	0.05	
31"-36"			0.063	0.05	

## C.L. Ward Spiral Flange Round Duct Reinforcement

REINFORCEMENT CLASS B Size (W x H x T) 1-1/4 x 1-1/4 x 3/16		5'-0" STIFFENER SPACING SPIRAL SEAMED DUCT POSITIVE AND NEGATIVE PRESSURE			
Duct Dia.	2" Duct Gage	4" Duct Gage	6" Duct Gage	10" Duct Gage	
4"-18"	28	28	28	28	
19"-24"	28	28	28	26	
25"-30"	28	28	26	24	
31"-36"	28	28	26	24	
37"-42"	28	26	24	22	
43"-48"	28	26	24	22	
49"-54"	28	24	24	22	
55"-60"	26	24	22		
61"-66"	26	24	22		
67"-72"	26	24			
73"-84"	24				

REINFORCEMENT CLASS B Size (W x H x T) 1-1/4 x 1-1/4 x 3/16		10'-0" STIFFENER SPACING SPIRAL SEAMED DUCT POSITIVE AND NEGATIVE PRESSURE			
Duct Dia.	2" Duct Gage	4" Duct Gage	6" Duct Gage	10" Duct Gage	
4"-18"	28	28	26	26	
19"-24"	28	26	24	24	
25"-30"	28	26	24	22	
31"-36"	28	24	22	22	
37"-42"	26	24	22	20	
43"-48"	26	22	22		
49"-54"	24	22			
55"-60"	24	22			
61"-66"	24				
67"-72"	24				

In accordance with SMACNA Duct Performance Test Standards #DPTS-2005 as described in the HVAC Duct Construction Standards, Third Edition - 2005, the C.L. Ward & Family, Inc. SpiralFlange for round duct connection system and round duct reinforcement meets the requirements of a SMACNA B Reinforcement Class.

### Hanger Systems Engineering Information

ALLOWABLE LOADS FOR TRAPEZE HANGER AND ANGLE IRON			
DUCT CLASS	18 GA. TRAPEZE	16 G. 1 1/2 x 1 1/2 ANGLE	16 GA. 1X1 ANGLE
18"	850	150	80
24"	850	150	75
30"	840	150	70
36"	830	130	60
42"	810	110	40
48"	780	80	
54"	735		
60"	680		
66"	600		
72"	520		
78"	400		
84"	275		

The above calculations assume that a hanger rod is 6" max. distance from side of duct. If the rod is 2" away, the allowable load increases significantly, approximately 70%.

Call CL Ward & Family for more engineering assistance.

APPROXIMATE WEIGHT OF UNLINED SHEET METAL DUCT WORK - 5 FT. SECTIONS					
TYPICAL DUCT SIZE	24 GA.	22 GA.	20 GA.	18 GA.	16.GA.
36/24	64	76	83	119	135
42/24	70	85	100	131	150
48/24	76	93	110	143	160
60/30	96	116	137	178	200
72/36	115	140	164	214	240
84/48	140	171	201	261	300
96/48	153	186	219	285	200

Above weights are stated in lbs.

PROJECT \_\_\_\_\_

LOCATION \_\_\_\_\_

ENGINEER \_\_\_\_\_

SUBMITTED BY \_\_\_\_\_

DATE \_\_\_\_\_