



# SPIRAL ELBOWS



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## TESTING

### Engineering Report Leakage of Spiral Seam Elbows ORIFLOW Engineering SUMMARY:

Five galvanized steel, spiral seam, elbows were tested for leakage at the following pressures -20 in. wg. (-5000 Pa), -10 in. wg. (-2500 Pa), +10 in. wg. (+2500 Pa), and +20 in. wg. (+5000 Pa) The elbows were fabricated by Jinwwong Technology Ltd., a Korean manufacturer of the equipment that fabricates spiral seam elbows. Three of the five elbows had no measurable leakage while the other two had minimal leakage. All five elbows have a SMACNA leakage class less than 0.025 at +/- 20 in. wg., which is exceptional considering ASHRAE 90.1 requires a maximum leakage class of 3 for round duct systems.

### TEST SPECIMENS:

Five galvanized steel, spiral seam elbows were tested for leakage at pressures of -20 in. wg. (-5000 Pa), -10 in. wg. (-2500 Pa), +10 in. wg. (+2500 Pa), and +20 in. wg. (+5000 Pa). The elbows tested had diameters of 3.6 in. (92 mm), 5.7 in. (145 mm), 9.6 in. (245 mm), 15.6 in. (395 mm), and 19.3 in. (490 mm). All five elbows were fabricated from galvanized steel that was 0.020 inches (0.51 mm) thick.

### TEST METHOD:

Elbows were tested per the following:

- AMCA Publication 511-07 (Rev.8/08), Certified Ratings Program Product Rating Manual for Air Control Devices
- ANSI/ASHRAE Standard 126-2008

Method of Testing HVAC Air Ducts and Fittings

### TEST RESULTS:

Since two of the elbows, the 395 mm and 490 mm elbows, had measurable leakage. These two elbows were covered with soapy water to see where leakage was occurring and verify that the leakage was not from the end caps or the supply line connections. In Figure 4, a picture is shown of the soap bubble test for the 15.6-inch (395 mm) elbow. The end caps and the supply fittings did not show any soap bubbles and therefore all leakage was occurring from the spiral seams.

#### Total Leakage of Elbows Tested (cfm)

Elbow Size (inches) -	Leakage (cfm)			
	20 in.wg.	- 10 in.wg.	+ 10 in.wg.	+ 20 in.wg.
3.6	0.000	0.000	0.000	0.000
5.7	0.000	0.000	0.000	0.000
9.6	0.000	0.000	0.000	0.000
15.6	0.021	0.009	0.010	0.020
19.3	0.011	0.004	0.004	0.011

## SERVING THE HVAC & SHEET METAL INDUSTRIES



# SPIRAL ELBOWS

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Our drivers are courteous and trained to expedite deliveries and off-load material on all jobsites.





# SUPERIOR SPIRAL ELBOWS

Superior's Spiral Elbows can be manufactured in 2" increments from 4" diameter to 24" diameter.



## SHIFTING FROM SQUARE TO ROUND SPIRAL

Here at Superior Duct Fabrication, we think it is important to generate modifications in our work in correspondence to the market's demands. Many consumers are making the shift from square duct to spiral duct due to its potential accelerated production and cost efficiency. With that in mind, spiral elbows, specifically, have become a vast necessity for many contractors, engineers, architects and specifiers whose need for spiral duct has escalated. Superior Duct is proud to offer spiral elbows as a new product available to our customers.



**PAINT OR LEAVE NATURAL FOR EXPOSED INSTALLATIONS.**

## QUICK FACTS ABOUT

### 1.0 TO 1.5 CENTERLINE SPIRAL ELBOW

- Airtight 4-ply lock seam construction
- Meets SMACNA gauge requirements
- Low friction loss
- Meets leakage Class 3 for 10" W.G. Duct construction class in a sample test section. Test data states +/- 20"
- No gores to seal; saves on labor costs
- Spiral Elbows produced automatically from coil
- Production as fast as 18 seconds per piece
- Very little scrap in production of spiral elbows
- Straights on the elbow ends of 2" / 50mm or greater
- 1.0 and 1.5 Centerline radius also available from 4" to 24" diameter
- 45 degree or 90 degree 1.5 Centerline Elbows from 4" to 24" diameter

## SPIRAL ELBOWS FROM COIL AS FAST AS 3 PARTS PER MINUTE

### MANUFACTURING SPIRAL ELBOWS

Superior's Spiral Elbows are formed from a continuous strip of galvanized sheet steel, which utilizes the same 4-ply spiral lockseam in a rolling process. This eliminates the need for welding, sealants, broaching and VOC paint touch-up's. Superior's single form process ensures consistency, quality, and tolerances that are strictly controlled elbow to elbow.

Since the elbows are formed without welding, this allows us to avoid increasing metal gauges in the prevention of burn-through. A 26 gauge spiral elbow has 22% less metal than a 24 gauge elbow, and 36% less metal than a 22 gauge elbow. This means that the production process of these spiral elbows generate a substantial reduction in raw material costs and in addition, have a less negative impact on the environment.

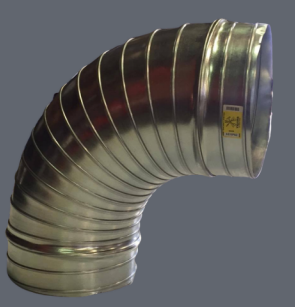
### INSTALLING SPIRAL ELBOWS

Each Spiral Elbow is fabricated for a slip-fit connection within a duct system. A stop-bead is formed 2" back from the ends to ensure proper assembly and alignment. The standard elbows are made "fitting size" (male ends) on both ends for insertion into standard spiral pipe. Labor and time savings are where the value lies when compared to conventional manufacturing processes, which may include stamped/pressed, multiple parts, welding, spot welding, applying sealant to the seams, or complex gored elbows.

**Spiral Elbows currently available in 90-degree and 45-degree configurations**

## EFFICIENCY RATING

An elbow's efficiency is determined by its loss of coefficient rating. The elbow's ability to maintain air flow effectively is numerically represented by this rating. A lower loss pf coefficient rating corresponds with a more efficient elbow. Loss of coefficient testing data for a 90 degree elbow with a radius of 1.5 times the diameter shows a rating 0.18 C. When comparing coefficients in the ASHREA Duct Fitting Database, a comparable stamped elbow has a rating of 0.15 C and a 5-gore elbow displays a rating of 0.24 C.



R/D = 1.5	(C)
Stamped 90° Elbow	(0.15)
Spiral 90° Elbow	(0.18)
5-Gore 90° Elbow	(0.24)
R = Centerline D = Diameter	