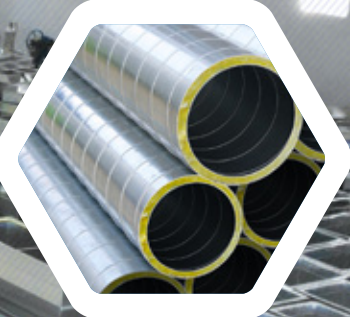
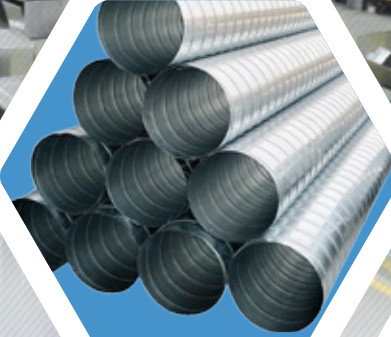


# Round Ducts

## Single & Double Wall



**Assure  
Success  
with  
Customer  
Together**



## ABOUT US

FMC Metal Factory, founded in 2021 in the city of Jeddah, for its Excellence, Engineering, Professionalism, and Experience in the field of fabrication of HVAC duct and its Accessories. The company has been a forerunner in the Construction field with his vast experience, commitment, adoption of new technologies and challenges by emerging as one of a key player. It offers a wide range of services for Supply, Installation, Testing and Commissioning in HVAC field. The group is leading under the supreme guidance of Mr. Mohamed Abdul Rahman Farhat, who has a long life experience in the Saudi market.

### Vision

Our ambition is to amplify the presence of FMC as a recognized company in the field of construction. We aspire to extent our professional services abroad in the coming years.

### Mission

Form valuable long-term relationships with our clients and partners.

Manage large and complex projects.

Be a reliable company.

Compete successfully in the Construction market of the region with high efficiency, professionalism and honesty in order to maintain, our outstanding reputation.

### Objective

Our aim is to enhance the lifestyle of the communities we serve through consistent, timely, efficient and added value delivery of engineered, innovative, and tailor-made technology solutions that never fails to exceed expectations

### Commitment

Constantly strive to ensure that amidst all the projects exists a great deal of passion and commitment to provide quality services and to deliver clients satisfaction.

Maintain leadership in project management capability.

Provide an open and flexible approach towards the needs of our clients by listening and respecting their views and by being ahead of emerging trends.

Deliver superior value through our consistent implementation of advanced methods and state of the art solutions.

### Our Team

FMC's work force is the main asset which represent and implement all projects in professional manors due to the on going training programs that we provide to our, head office employees, engineers, supervisors, technicians, drivers, labors and all of our working force whom reflect their professions on sites.

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**OUR PRODUCTS MAINTAINING THE HIGHEST INTERNATIONAL STANDARDS.**

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## INTRODUCTION

FMC Metal factory equipped with latest technology to meet the growing demands with a prompt action by serving the best quality products, keen to establish themselves a pioneer in the market with the help of its well qualified engineers, skilled technicians and producing the best quality of products. FMC manufactures the ducts and it's accessories compliance to SMACNA and DW/144 construction schedule by adhering to internal QA/QC guidelines to serve with best of the best products. FMC Metal Factory active under ISO Certification for the scope of manufacturing Ducts works, Fittings & Related products which approved by the main Consultants and contracting companies.



# FABRICATION PROCESS


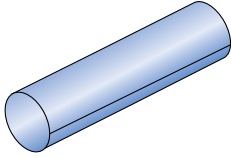
## 1- Straight Spiral Ducts Fabrication:


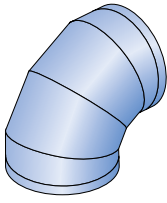
Fabrication of Spiral Circular Ducts shall be based on Drawings provided by the client, by following below Procedures:

- a) The job order will be encoded into the Spiral Duct Machine to produce the Straight Spiral Ducts as per diameters and lengths requested.
- b) Connectors/Joints shall be according to the project specifications (Flanges/Coupling).
- c) For Round **Double Wall** Duct, Liner will be applied between the walls, thickness and density for insulation will be as project specifications.

## 2- Fittings Fabrication:

- a) Individual Duct pieces will be nested on sheets to maximize sheet usage on the Laser machines.
- b) The Job Order for the fittings will be sent to the Laser for cutting and marking the items.
- d) From Laser Cutting machine the individual marked pieces will be removed and taken to the assembly area to produce the fittings (Elbow, Tee, Reducer, etc..).
- e) After completion of fabrication, each item shall be cleaned properly; each item shall be labeled as per below figures.

<b>3</b>	<b>:: Supply Air</b>		
<b>Project:</b>	RESTAURANT		
Job Name: 500-62 - Customer			
Material & Gauge: Galvanised x 0.7		Item Area: 3.2 (sq m)	
<b>Name: Round Pipe</b>			
END 1: 500 (mm)	Swage-Pipe		
END 2: 500 (mm)	Swage-Pipe		
Length / Angle: 2000 (mm)	Insulation:		

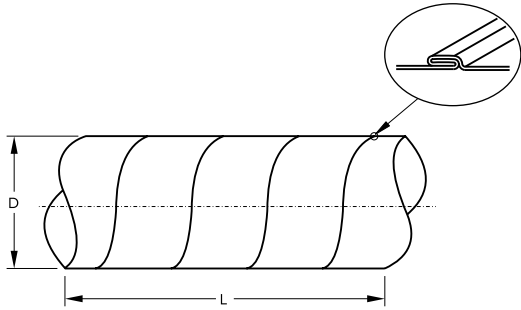
<b>4</b>	<b>:: Supply Air</b>		
<b>Project:</b>	RESTAURANT		
Job Name: 500-62 - Customer			
Material & Gauge: Galvanised x 0.7		Item Area: 1.1 (sq m)	
<b>Name: Segment Bend</b>			
END 1: 500 (mm)	Segment Lock		
END 2: 200 (mm)	None		
Length / Angle: 90	Insulation:		

**Materials Used for Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

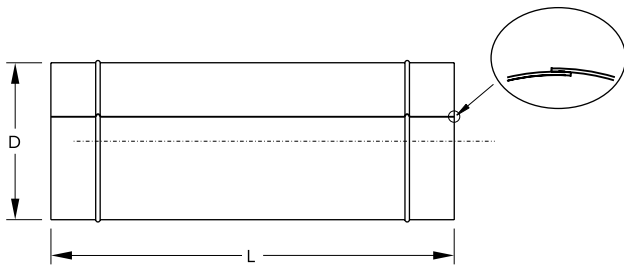
# ROUND DUCT - SINGLE WALL

## Spiral Duct



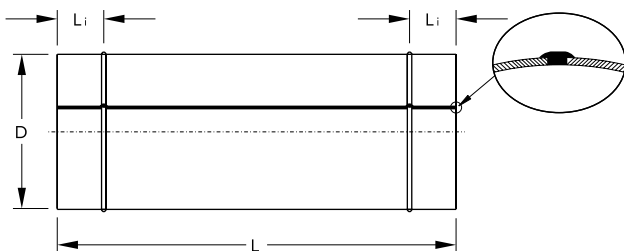
- Standard Length: 3000mm  
Custom Lengths Available
- To ± 10 in. wg (Galvanized)

## Circular Straight Duct - Spot Welded Seam



- L: Standard Length: 1220mm

## Circular Straight Duct - Full Welding Seam



- L: Standard Length: 1220mm  
Custom Lengths Available
- 1.0 mm Minimum Sheet Thickness
- To ± 10 in. wg (Galvanized)

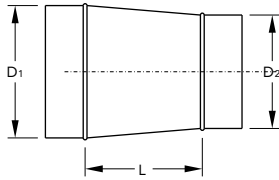
**Materials  
Used for  
Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - SINGLE WALL

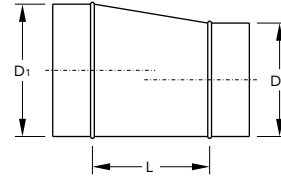
## Concentric Reducer

- $L = D_1 - D_2$
- Minimum Length 100mm, Maximum Length 400mm

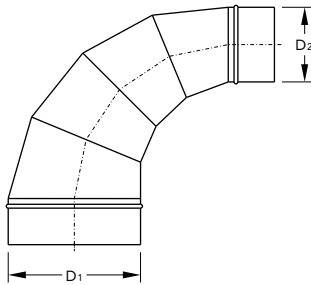


## Eccentric Reducer

- $L = D_1 - D_2$
- Minimum Length 100mm, Maximum Length 400mm

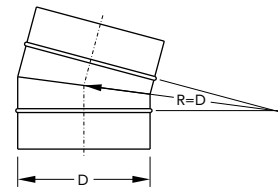


## Reducing Segmented Bend



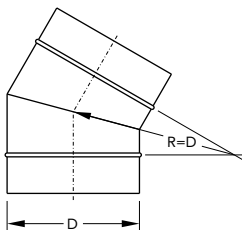
## Segment Bend 15°

- Standard 2-Gore



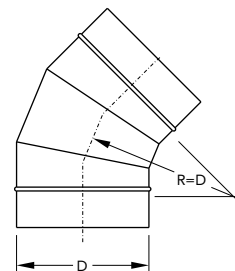
## Segment Bend 30°

- Standard 2-Gore



## Segment Bend 45°

- Standard 3-Gore



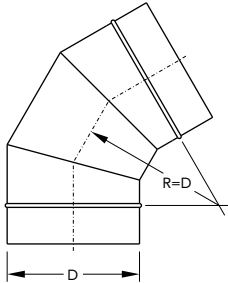
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - SINGLE WALL

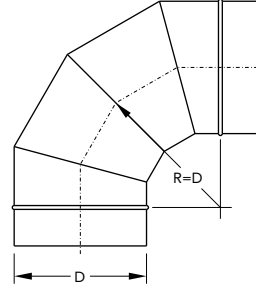
## Segment Bend 60°

- Standard 3-Gore

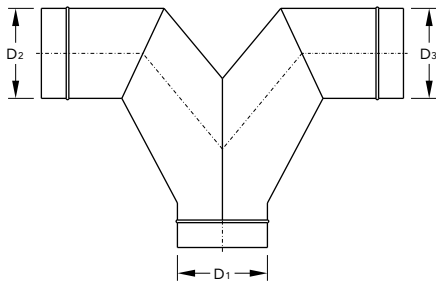


## Segment Bend 90°

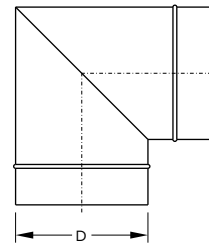
- Standard 4-Gore



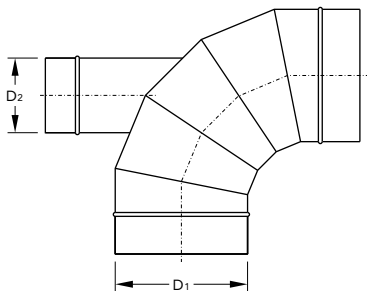
## Twin Segment Bend



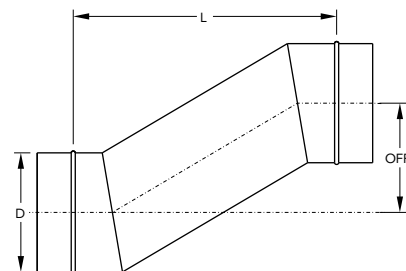
## 2 Segment Bend 90°



## Bend 90° with Branch



## Circular Offset



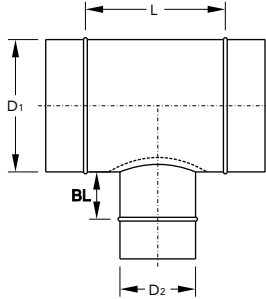
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - SINGLE WALL

## Centric Tee Piece

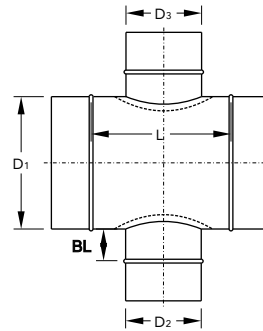
•  $L = D_2 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 650mm	50mm
710 to 1400mm	100mm

## Centric Cross Tee Piece

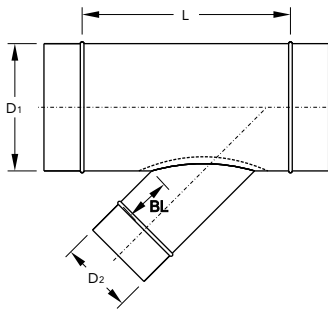
•  $L = \text{the longer of } D_2 \text{ or } D_3 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 650mm	50mm
710 to 1400mm	100mm

## Centric Tee Piece 45°

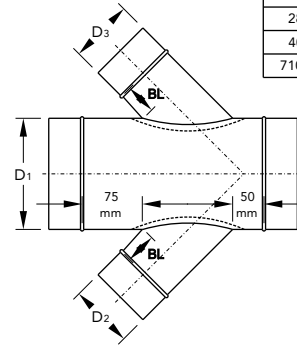
•  $L = D_2 \times 1.5 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 250mm	50mm
280 to 355mm	75mm
400 to 650mm	100mm
710 to 1400mm	150mm

## Centric Cross T - Piece 45°

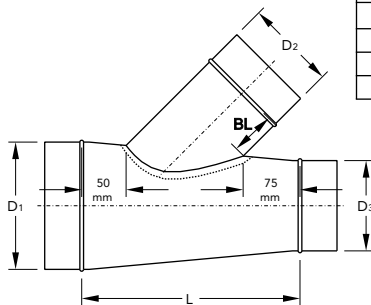
•  $L = \text{the longer of } D_2 \text{ or } D_3 \times 1.5 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 250mm	50mm
280 to 355mm	75mm
400 to 650mm	100mm
710 to 1400mm	150mm

## Reducing Tee 45°

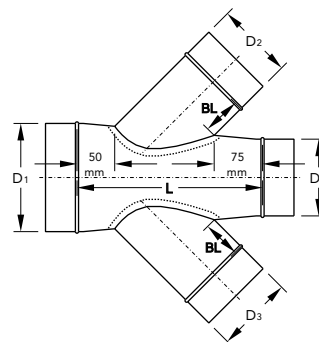
•  $L = D_2 \times 1.5 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 250mm	50mm
280 to 355mm	75mm
400 to 650mm	100mm
710 to 1400mm	150mm

## Reducing Cross Tee 45°

•  $L = \text{the longer of } D_2 \text{ or } D_3 \times 1.5 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 250mm	50mm
280 to 355mm	75mm
400 to 650mm	100mm
710 to 1400mm	150mm

### Materials Used for Ductworks:

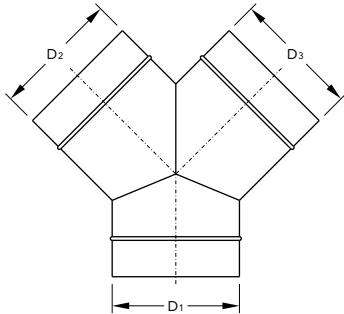
- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.



# FITTINGS - SINGLE WALL

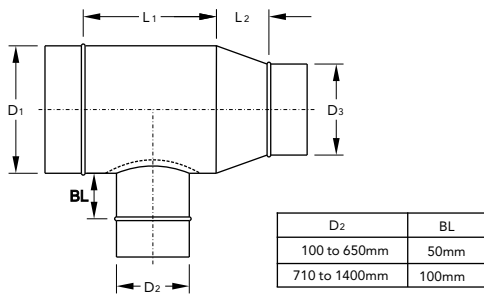
## Y - Tee

- 30°, 45° and 60° available
- $D_1 = D_2 = D_3$



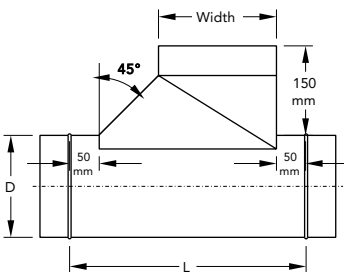
## Centric Tee Piece with Reducer

- $L_1 = D_2 + 150\text{mm}$
- $L_2 = D_1 - D_3$
- Minimum  $L_2$  100mm, Maximum  $L_2$  400mm



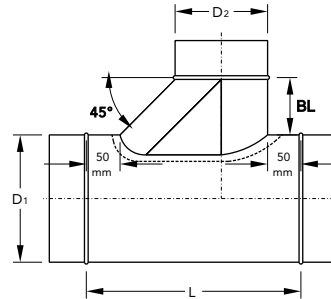
## Rectangular Shoe with Pipe

- $L = \text{Width} + 200\text{mm}$



## Shoe Tee - Offset

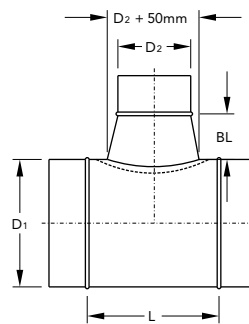
- $L = D_2 + BL + 100\text{mm}$



D2	BL
100 to 200mm	100mm
225 to 355mm	175mm
400 to 650mm	250mm
710 to 1400mm	300mm

## Conical Tee

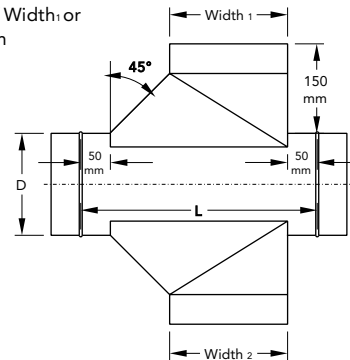
- $L_2 = D_2 + 150\text{mm}$



D2	BL
100 to 200mm	150mm
224 to 400mm	200mm
450 to 650mm	250mm
710 to 1400mm	300mm

## Rectangular Cross Shoe with Pipe

- $L = \text{the longer of Width}_1 \text{ or Width}_2 + 200\text{mm}$



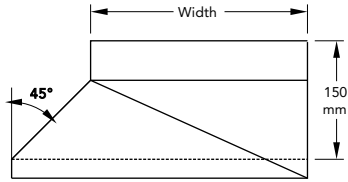
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

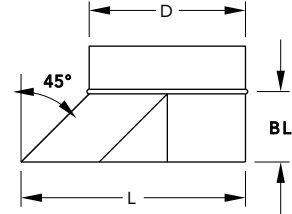
# FITTINGS - SINGLE WALL

## Rectangular Shoe on Pipe

•  $L = \text{Width} + 100\text{mm}$

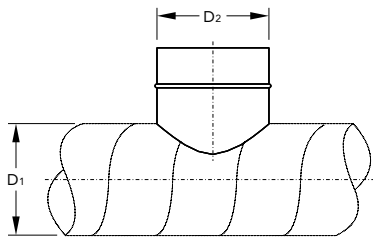


## Circular Shoe on Flat

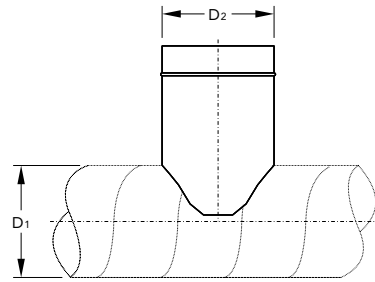


D	BL	L
100 to 200mm	75mm	+75mm
224 to 355mm	100mm	+100mm
400 to 650mm	125mm	+125mm
710 to 1400mm	150mm	+150mm

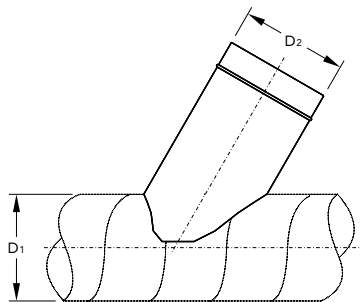
## Collar Saddle



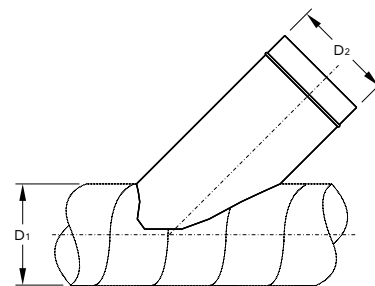
## Branch 90°



## Branch 60°



## Branch 45°

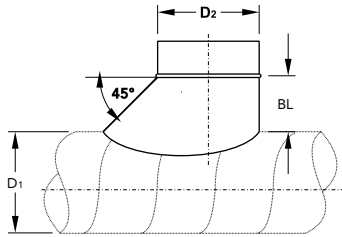


### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

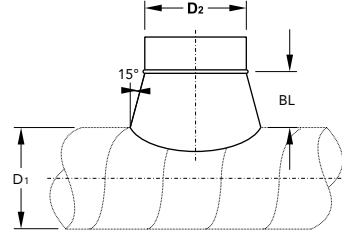
# FITTINGS - SINGLE WALL

## Circular Shoe on Pipe



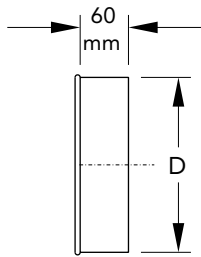
D <sub>2</sub>	BL
100 to 200mm	100mm
224 to 355mm	175mm
400 to 650mm	250mm
710 to 1400mm	300mm

## Conical Branch on Pipe

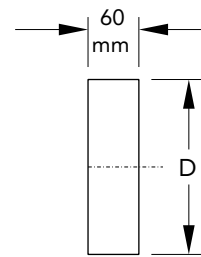


D <sub>2</sub>	BL
100 to 200mm	150mm
224 to 400mm	200mm
450 to 650mm	250mm
710 to 1400mm	300mm

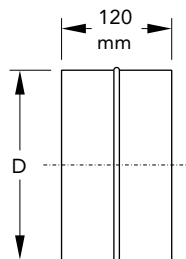
## End Cap Tube (Male)



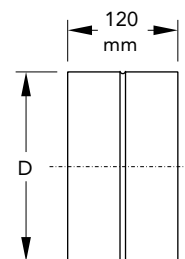
## End Cap Fittings (Female)



## Coupling Pipe



## Coupling Fitting



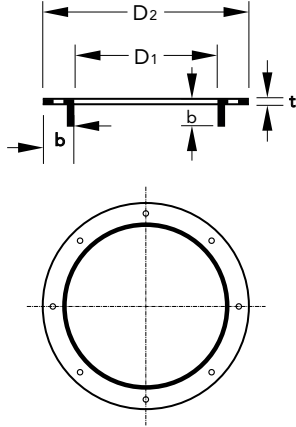
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - SINGLE WALL

## Circular Angle Flange

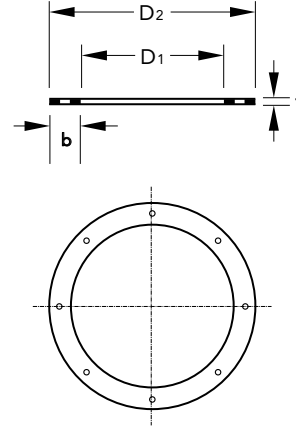
•  $D_2 = D_1 + b$



D <sub>1</sub>	Bolts		b x b x t
	Dim.	N	mm
Up to 125	M6	4	25x25x3
150 to 250	M6	6	30x30x3
280 to 355	M8	8	40x40x4
400 to 500	M8	12	40x40x4
550 to 710	M10	16	40x40x5
750 to 1400	M10	24	50x50x5
Material: Hot Dip Galvanized Steel			

## Circular Angle Flange

•  $D_2 = D_1 + b$



D <sub>1</sub>	Bolts		b x t
	Dim.	N	mm
Up to 125	M6	4	25x3
150 to 250	M6	6	30x3
280 to 355	M8	8	40x4
400 to 500	M8	12	40x4
550 to 710	M10	16	40x5
750 to 1400	M10	24	50x5
Material: Hot Dip Galvanized Steel			

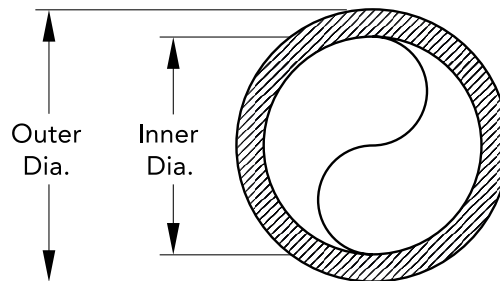
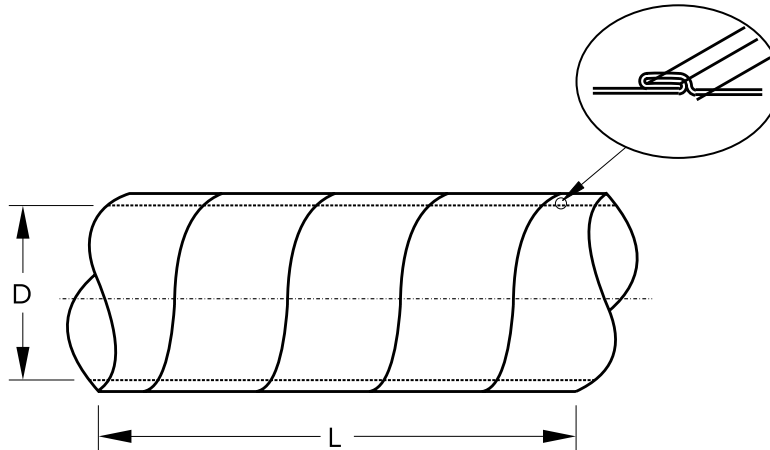
**Customized Dimensions Available as per Customer Request**

**Materials Used for Ductworks:**

- **Galvanized Steel** : (Standard) L.F.O. Complying with ASTM A653 and Having G90 Coating Designation.
  - **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.
- Notes: 1- Circular Angle Flanges are made Hot Dip Galvanized Steel Angle.  
2- Circular Flat Flanges are made Hot Dip Galvanized Steel Sheet.

# ROUND DUCT - DOUBLE WALL

## Spiral Duct



- Standard Length: 3000mm  
Custom Lengths Available
- To  $\pm 10$  in. wg (Galvanized)

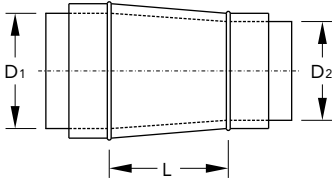
**Materials  
Used for  
Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - DOUBLE WALL

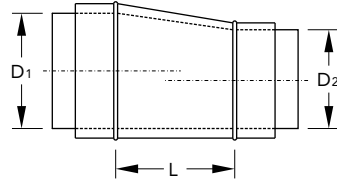
## Concentric Reducer

- $L = D_1 - D_2$
- Minimum Length 100mm, Maximum Length 400mm

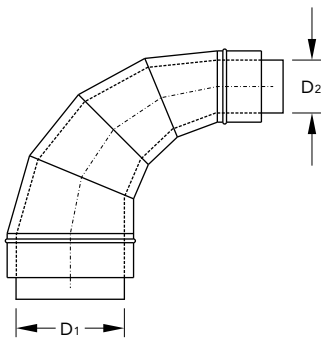


## Eccentric Reducer

- $L = D_1 - D_2$
- Minimum Length 100mm, Maximum Length 400mm

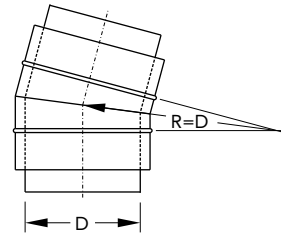


## Reducing Segmented Bend



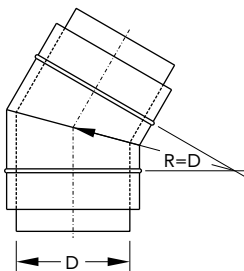
## Segment Bend 15°

- Standard 2-Gore



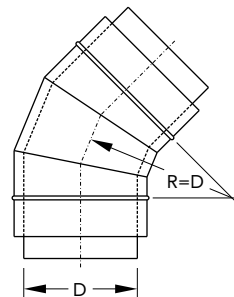
## Segment Bend 30°

- Standard 2-Gore



## Segment Bend 45°

- Standard 3-Gore



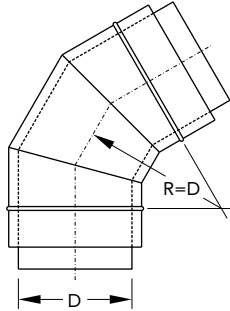
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - DOUBLE WALL

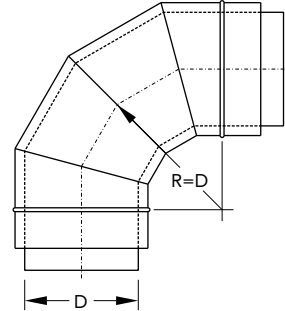
## Segment Bend 60°

- Standard 3-Gore

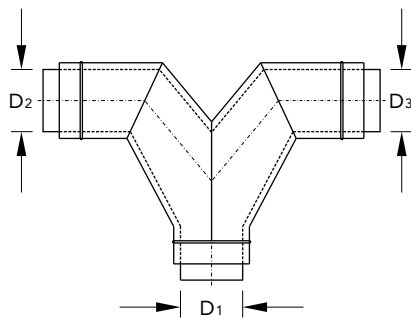


## Segment Bend 90°

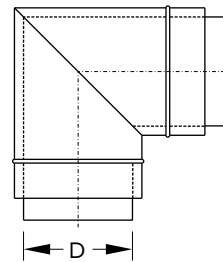
- Standard 4-Gore



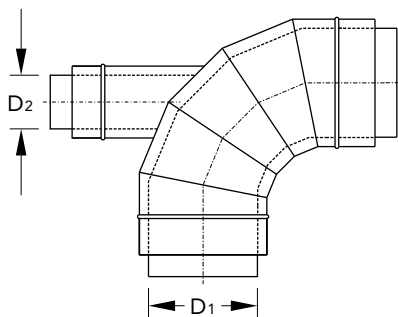
## Twin Segment Bend



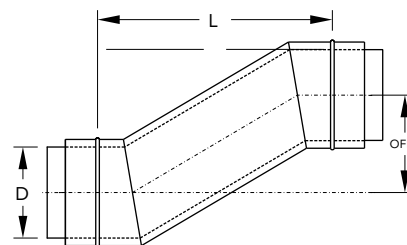
## 2 Segment Bend 90°



## Bend 90° with Branch



## Circular Offset



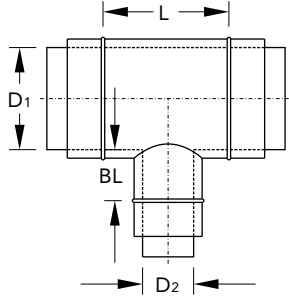
**Materials  
Used for  
Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation or made Hot Dip Galvanized Steel Sheet, Flat Bar.

# FITTINGS - DOUBLE WALL

## Centric Tee Piece

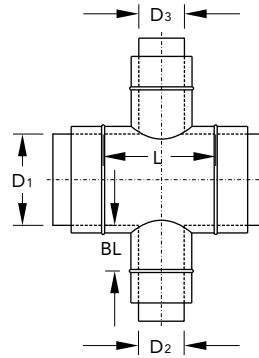
•  $L = D_2 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 650mm	100mm
710 to 1400mm	150mm

## Centric Cross Tee Piece

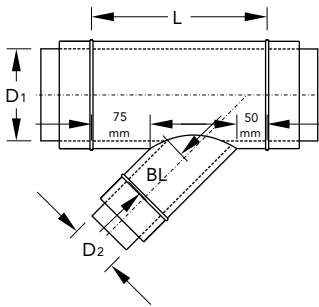
•  $L = \text{the longer of } D_2 \text{ or } D_3 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 650mm	50mm
710 to 1400mm	100mm

## Centric Tee Piece 45°

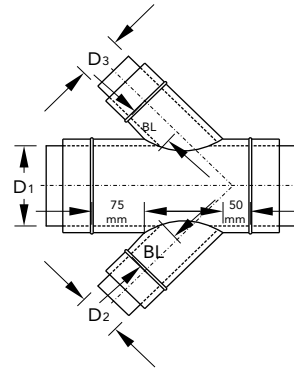
•  $L = D_2 \times 1.5 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 250mm	100mm
280 to 355mm	125mm
400 to 650mm	150mm
710 to 1400mm	200mm

## Centric Cross T - Piece 45°

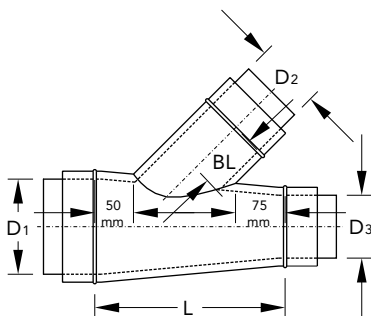
•  $L = \text{the longer of } D_2 \text{ or } D_3 \times 1.5 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 250mm	50mm
280 to 355mm	75mm
400 to 650mm	100mm
710 to 1400mm	150mm

## Reducing Tee 45°

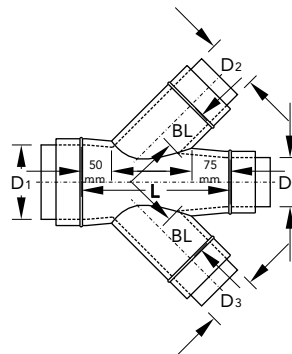
•  $L = D_2 \times 1.5 + 100\text{mm}$



D <sub>2</sub>	BL
100 to 250mm	100mm
280 to 355mm	125mm
400 to 650mm	150mm
710 to 1400mm	200mm

## Reducing Cross Tee 45°

•  $L = \text{the longer of } D_2 \text{ or } D_3 \times 1.5 + 100\text{mm}$



D <sub>2</sub> & D <sub>3</sub>	BL
100 to 250mm	100mm
280 to 355mm	125mm
400 to 650mm	150mm
710 to 1400mm	200mm

### Materials Used for Ductworks:

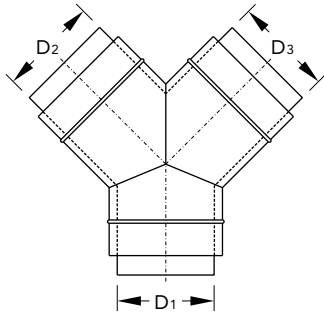
- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.



# FITTINGS - DOUBLE WALL

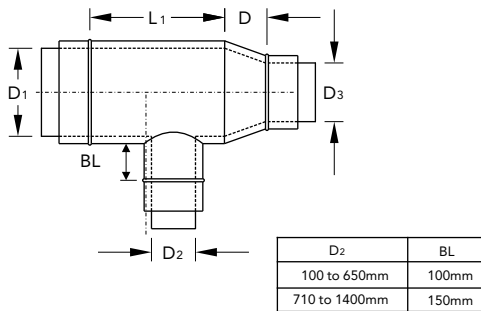
## Y - Tee

- 30°, 45° and 60° available
- $D_1 = D_2 = D_3$



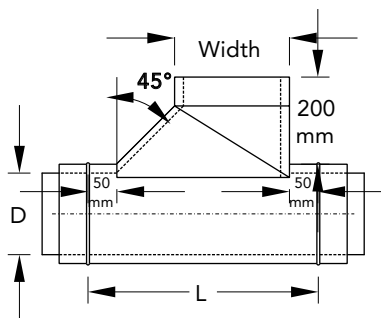
## Centric Tee Piece with Reducer

- $L_1 = D_2 + 150\text{mm}$
- $L_2 = D_1 - D_3$
- Minimum  $L_2$  100mm, Maximum  $L_2$  400mm



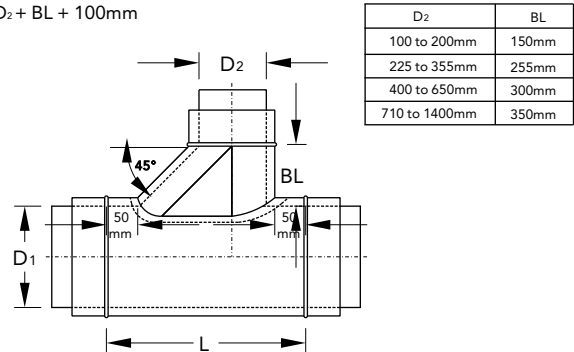
## Rectangular Shoe with Pipe

- $L = \text{Width} + 200\text{mm}$



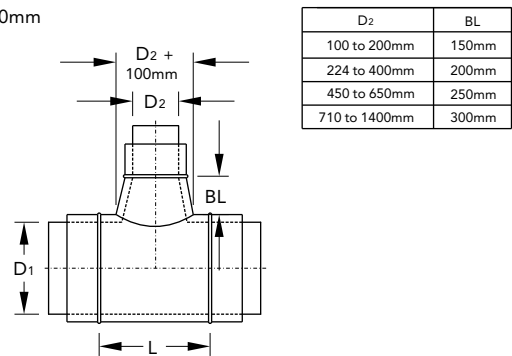
## Shoe Tee - Offset

- $L = D_2 + BL + 100\text{mm}$



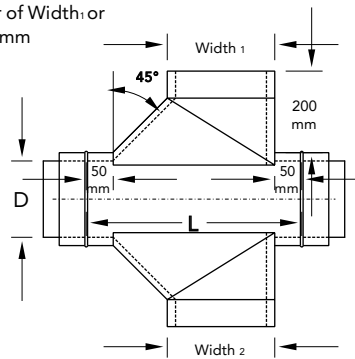
## Conical Tee

- $L_2 = D_2 + 150\text{mm}$



## Rectangular Cross Shoe with Pipe

- $L = \text{the longer of Width}_1 \text{ or Width}_2 + 200\text{mm}$



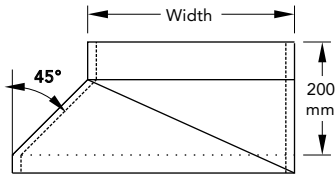
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

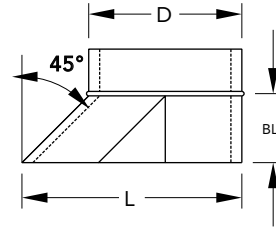
# FITTINGS - DOUBLE WALL

## Rectangular Shoe on Pipe

•  $L = \text{Width} + 100\text{mm}$

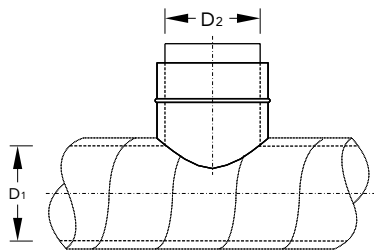


## Circular Shoe on Flat

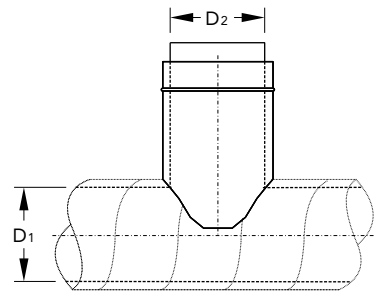


D	BL	L
100 to 200mm	125mm	+125mm
224 to 355mm	150mm	+150mm
400 to 650mm	175mm	+175mm
710 to 1400mm	200mm	+200mm

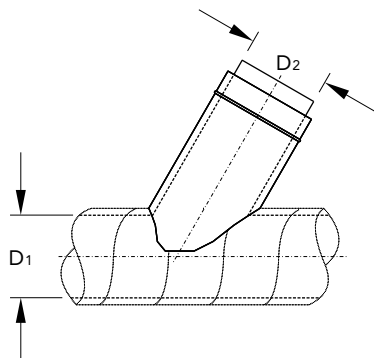
## Collar Saddle



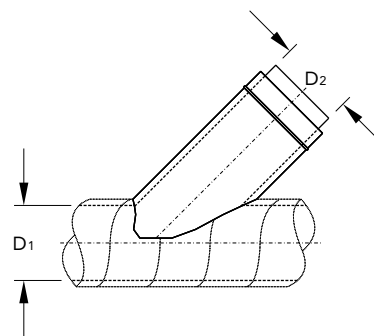
## Branch 90°



## Branch 60°



## Branch 45°

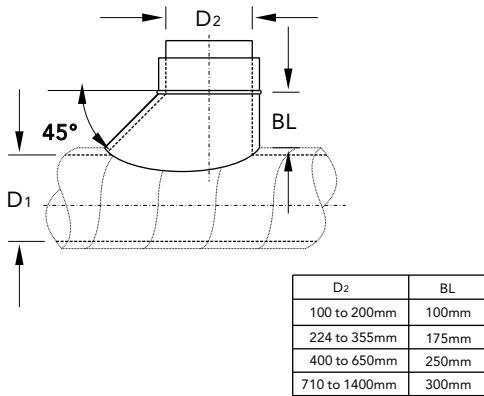


### Materials Used for Ductworks:

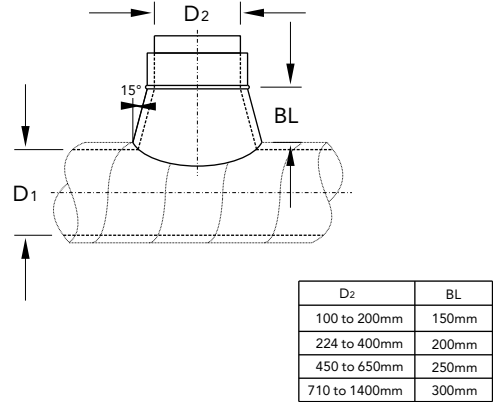
- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - DOUBLE WALL

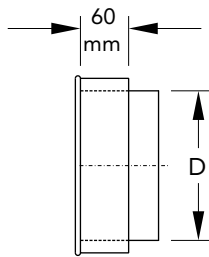
## Circular Shoe on Pipe



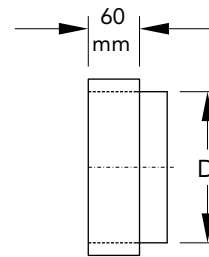
## Conical Branch on Pipe



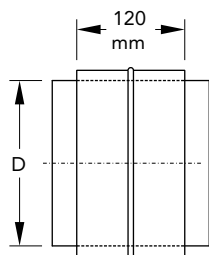
## End Cap Tube (Male)



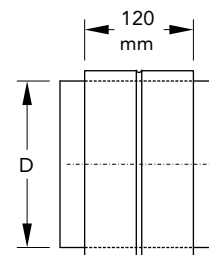
## End Cap Fittings (Female)



## Coupling Pipe



## Coupling Fitting



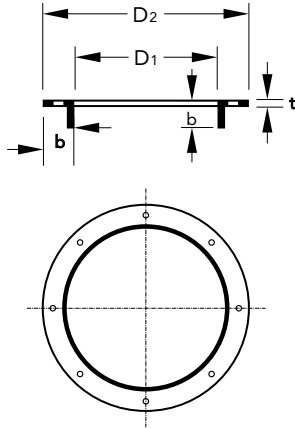
### Materials Used for Ductworks:

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# FITTINGS - DOUBLE WALL

## Circular Angle Flange

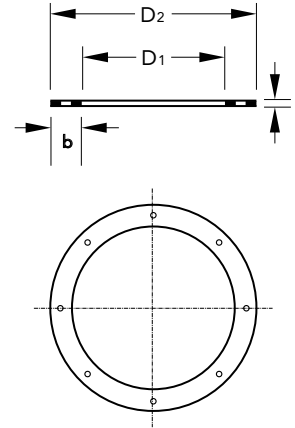
•  $D2 = D1 + b$



D <sub>1</sub>	Bolts		b x b x t
	Dim.	N	mm
Up to 125	M6	4	25x25x3
150 to 250	M6	6	30x30x3
280 to 355	M8	8	40x40x4
400 to 500	M8	12	40x40x4
550 to 710	M10	16	40x40x5
750 to 1400	M10	24	50x50x5
Material: Hot Dip Galvanized Steel			

## Circular Angle Flange

•  $D2 = D1 + b$



D <sub>1</sub>	Bolts		b x t
	Dim.	N	mm
Up to 125	M6	4	25x3
150 to 250	M6	6	30x3
280 to 355	M8	8	40x4
400 to 500	M8	12	40x4
550 to 710	M10	16	40x5
750 to 1400	M10	24	50x5
Material: Hot Dip Galvanized Steel			

**Customized Dimensions Available as per Customer Request**

**Materials Used for Ductworks:**

- **Galvanized Steel** : (Standard) L.F.O. Complying with ASTM A653 and Having G90 Coating Designation.
  - **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.
- Notes: 1- Circular Angle Flanges are made Hot Dip Galvanized Steel Angle.  
2- Circular Flat Flanges are made Hot Dip Galvanized Steel Sheet.

# SPIRAL DUCT WALL THICKNESS SCHEDULE

As per SMACNA Standard Third Edition 2015

**Table - 01 Round Duct Gauge Unreinforced Positive Pressure To 2500 Pa**

Diameter mm	Longitudinal Seam	Spiral Seam
100	0.55	0.55
150	0.55	0.55
200	0.55	0.55
250	0.55	0.55
300	0.55	0.55
350	0.55	0.55
400	0.55	0.55
450	0.55	0.55
500	0.70	0.55
550	0.70	0.55
600	0.70	0.55
750	0.85	0.70
900	0.85	0.70
1000	0.85	0.70
1200	1.00	0.85
1300	1.00	0.85
1500	1.00	0.85
1650	1.31	0.85
1800	1.31	1.00
1950	1.31	1.00
2100	1.31	1.00
2250	1.31	1.00
2400	1.31	1.00

**Materials Used for Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# SPIRAL DUCT WALL THICKNESS SCHEDULE

As per SMACNA Standard Third Edition 2015

**Table - 02 Round Duct Gauge for Spiral Seam Duct Under Negative Pressure 500 Pa**

Neg. Pressure 500 Pa	Stiffener Spacing											
	Unstiff.		6.00 m		3.6 m		3.00 m		1.80 m		1.50 m	
Diameter (mm)	GA	R	GA	R	GA	R	GA	R	GA	R	GA	R
100	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
150	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
200	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
250	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
300	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
350	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
400	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
450	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
500	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
550	0.85	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
600	0.85	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
750	1.00	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
900	1.31	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
1000	1.31	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
1200	1.61	NR	0.85	B	0.70	A	0.55	A	0.55	A	0.55	A
1300	1.61	NR	0.85	B	0.70	B	0.70	A	0.55	A	0.55	A
1500	NIA	NR	0.85	B	0.70	B	0.70	B	0.55	A	0.55	A
1650	NIA	NR	0.85	C	0.70	B	0.70	B	0.55	B	0.55	A
1800	NIA	NR	1.00	C	0.85	B	0.70	B	0.70	B	0.55	B
1950	NIA	NR	1.00	D	0.85	C	0.85	C	0.70	B	0.55	B
2100	NIA	NR	1.00	E	0.85	C	0.85	C	0.70	B	0.70	B
2250	NIA	NR	1.00	E	0.85	D	0.85	C	0.70	B	0.70	B
2400	NIA	NR	1.00	E	0.85	E	0.85	D	0.70	C	0.70	B

NOTES:

- a. NIA -Not Applicable
- b. NR - Not Required
- c. R - Reinforcement (stiffener) Class

**Materials  
Used for  
Ductworks:**

- Galvanized Steel : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- Stainless Steel : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# SPIRAL DUCT WALL THICKNESS SCHEDULE

As per SMACNA Standard Third Edition 2015

Table - 03 Round Duct Gauge for Spiral Seam Duct Under Negative Pressure 1000 Pa

Neg. Pressure 1000 Pa	Stiffener Spacing											
	Unstiff.		6.00 m		3.6 m		3.00 m		1.80 m		1.50 m	
Diameter (mm)	GA	R	GA	R	GA	R	GA	R	GA	R	GA	R
100	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
150	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
200	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
250	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
300	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
350	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
400	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
450	0.85	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
500	0.85	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
550	1.00	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
600	1.00	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
750	1.31	NR	0.85	A	0.70	A	0.55	A	0.55	A	0.55	A
900	1.61	NR	0.85	B	0.70	A	0.70	A	0.55	A	0.55	A
1000	1.61	NR	0.85	B	0.85	B	0.70	A	0.55	A	0.55	A
1200	NIA	NR	1.00	B	0.85	B	0.85	B	0.70	A	0.55	A
1300	NIA	NR	1.00	c	0.85	B	0.85	B	0.70	B	0.70	A
1500	NIA	NR	1.00	D	0.85	c	0.85	B	0.70	B	0.70	B
1650	NIA	NR	1.31	E	1.00	c	0.85	c	0.70	B	0.70	B
1800	NIA	NR	1.31	E	1.00	D	1.00	c	0.85	B	0.70	B
1950	NIA	NR	1.31	E	1.00	E	1.00	D	0.85	c	0.85	c
2100	NIA	NR	1.31	F	1.00	E	1.00	E	0.85	c	0.85	c
2250	NIA	NR	1.31	G	1.31	E	1.00	E	0.85	D	0.85	c
2400	NIA	NR	1.61	G	1.31	F	1.00	E	0.85	E	0.85	D

NOTES:

- a. NIA -Not Applicable
- b. NR - Not Required
- c. R - Reinforcement (stiffener) Class

Materials  
Used for  
Ductworks:

- Galvanized Steel : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- Stainless Steel : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

# SPIRAL DUCT WALL THICKNESS SCHEDULE

As per SMACNA Standard Third Edition 2015

**Table - 04 Round Duct Gauge for Spiral Seam Duct Under Negative Pressure 1500 Pa**

Neg. Pressure 1500 Pa	Stiffener Spacing											
	Unstiff.		6.00 m		3.6 m		3.00 m		1.80 m		1.50 m	
Diameter (mm)	GA	R	GA	R	GA	R	GA	R	GA	R	GA	R
100	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
150	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
200	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
250	0.55	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
300	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
350	0.70	NR	0.55	A	0.55	A	0.55	A	0.55	A	0.55	A
400	0.85	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
450	0.85	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
500	1.00	NR	0.70	A	0.55	A	0.55	A	0.55	A	0.55	A
550	1.00	NR	0.70	A	0.70	A	0.55	A	0.55	A	0.55	A
600	1.31	NR	0.85	A	0.70	A	0.70	A	0.55	A	0.55	A
750	1.31	NR	0.85	A	0.70	A	0.70	A	0.55	A	0.55	A
900	1.61	NR	1.00	B	0.85	B	0.85	A	0.70	A	0.55	A
1000	NIA	NR	1.00	B	0.85	B	0.85	B	0.70	A	0.70	A
1200	NIA	NR	1.31	c	1.00	B	0.85	B	0.70	B	0.70	B
1300	NIA	NR	1.31	D	1.00	c	1.00	c	0.85	B	0.70	B
1500	NIA	NR	1.31	E	1.00	c	1.00	c	0.85	B	0.85	B
1650	NIA	NR	1.31	E	1.31	E	1.00	D	0.85	c	0.85	B
1800	NIA	NR	1.31	F	1.31	E	1.00	E	0.85	c	0.85	c
1950	NIA	NR	1.61	G	1.31	E	1.31	E	1.00	D	0.85	c
2100	NIA	NR	1.61	G	1.31	F	1.31	E	1.00	E	0.85	D
2250	NIA	NR	1.61	G	1.31	G	1.31	F	1.00	E	1.00	E
2400	NIA	NR	1.61	G	1.31	G	1.31	G	1.00	E	1.00	E

**Table 3-12M Min. Required Gauge for Spiral Seam Duct Under Neg. Pressure**

NOTES:

- a. NIA -Not Applicable
- b. NR - Not Required
- c. R - Reinforcement (stiffener) Class

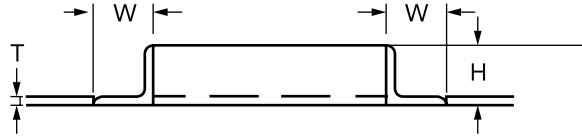
**Materials  
Used for  
Ductworks:**

- Galvanized Steel : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- Stainless Steel : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.



# SPIRAL DUCT REINFORCEMENT

As per SMACNA Standard Third Edition 2015



**Angle Rings**

## ROUND DUCT REINFORCEMENT

Reinforcement Class	Size W x H x T (mm)
A	25 x 25 x 3.2
B	31.8 x 31.8 x 4.8
C	38.1 x 38.1 x 4.8
D	38.1 x 38.1 x 6.4
E	51 x 51 x 4.8
F	51 x 51 x 6.4
G	76 x 76 x 6.4

**Angle Ring Size**

Duct Dia. (mm)	Number of Attachments
150 and under	4
300 and under	6
450 and under	8
750 and under	12
1300 and under	16
1950 and under	20
2400 and under	24

**Ring Attachment Schedule**

**NOTES :**

- Rings may be attached to the duct wall using screws, rivets, or tack welds.
- Companion Flanges used for reinforcement shall be:

Duct Dia. (mm)	Flange Selection
up to 225	25 x 25 x 3.2*
250-300	31.8 x 31.8 x 3.2*
301-601	38.1 x 38.1 x 4.8
650-1200	51 x 51 x 4.8
1201-1500	63.5 x 63.5 x 4.8
1501-2400	76 x 76 x 6.4

**Companion Flange Joints Used As Reinforcement**

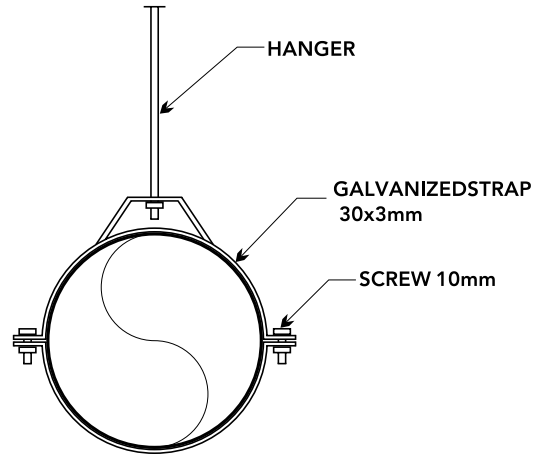
\*Standard rings in 3.21 mm are an acceptable slightly heavier alternative to the specified 3.2 mm thickness rings.

**Materials Used for Ductworks:**

- **Galvanized Steel** : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation.
- **Stainless Steel** : (Optional) Complying with ASTM A240M / A480M, Grade 304, 304L, 316 & 316L.

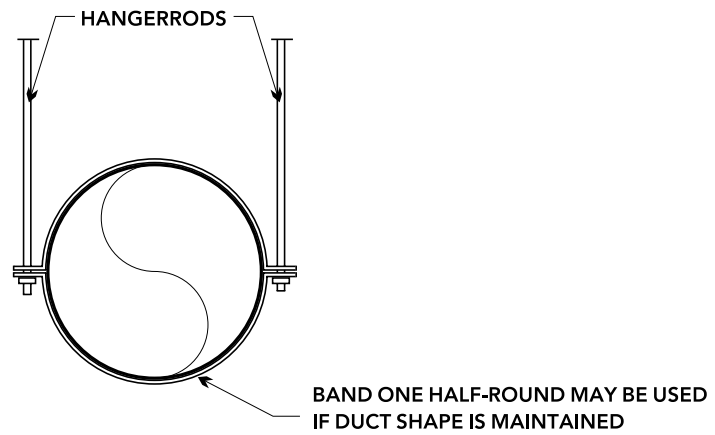
# DUCT SUPPORTS

## Single Rod



## Double Rod

HANGERS MUST NOT DEFORM DUCT SHAPE



**Materials Used for Ductworks:**

- Galvanized Steel : (Standard) L.F.Q. Complying with ASTM A653 and Having G90 Coating Designation. or made Hot Dip Galvanized Steel Sheet, Flat Bar.

# APPENDIX A

## Galvanized Sheet Thickness Tolerances

Gage	Thickness in Inches			Weight				Thickness in Millimeters		
	Min.	Max.	Nom.	Min lb/sf	Nom. lb/sf	Max. lb/sf	Nom. kg/m <sup>2</sup>	Min.	Max.	Nom.
33	.0060	.0120	.0090	.2409	.376	.486		.1524	.3048	.2286
32	.0104	.0164	.0134	.4204	.563	.665		.2642	.4166	.3404
31	.0112	.0172	.0142	.4531	.594	.698		.2845	.4369	.3607
30	.0127	.0187	.0157	.5143	.656	.759	3.20	.3188	.4783	.3988
29	.0142	.020	.0172	.5755	.719	.820		.3569	.5169	.4369
28	.0157	.0217	.0187	.6367	.781	.881	3.81	.3950	.5550	.4750
27	.0172	.0232	.0202	.6979	.844	.943		.4331	.5931	.5131
26	.0187	.0247	.0217	.7591	.906	1.004	4.42	.4712	.6312	.5512
25	.0217	.0287	.0247	.8407		1.167		.5274	.7274	.6274
24	.0236	.0316	.0276	.9590	1.156	1.285	5.64	.6010	.8010	.7010
23	.0266	.0346	.0306	1.0814		1.408		.6772	.8772	.7772
22	.0296	.0376	.0336	1.2038	1.406	1.530	6.86	.7534	.9534	.8534
21	.0326	.0406	.0336	1.3263		1.653		.8296	1.0296	.9296
20	.0356	.0436	.0396	1.4486	1.656	1.775	8.08	.906	1.106	1.006
19	.0406	.0506	.0456	1.6526		2.061		1.028	1.288	1.158
18	.0466	.0566	.0516	1.8974	2.156	2.305	10.52	1.181	1.441	1.311
17	.0525	.0625	.0575	2.1381		2.546		1.331	1.591	1.461
16	.0575	.0695	.0635	2.342	2.656	2.832	12.96	1.463	1.763	1.613
15	.0650	.0770	.0710	2.6481		3.138		1.653	1.953	1.803
14	.0705	.0865	.0785	2.8725	3.281	3.525	16.01	1.784	2.204	1.994
13	.0854	.1014	.0934	3.4804		4.133		2.162	2.5823	2.372
12	.0994	.1174	.1084	4.0516	4.531	4.786	22.11	2.523	2.983	2.753
11	.1143	.1323	.1233	4.6505		5.394		2.902	3.362	3.132
10	.1292	.1472	.1382	5.2675	5.781	6.002	28.21	3.280	3.740	3.510
9	.1442	.1622	.1532	5.8795		6.614		3.661	4.121	3.891
8	.1591	.1771	.1681	6.4874	6.875	7.222		4.040	4.500	4.270

### NOTES:

- Based on ASTM A924/924M-94, Standard Specification for General Requirements for Sheet Steel, Metallic Coated by the Hot-Dip Process (formerly ASTMA525); and ASTMA653/A653M-94, Standard Specification for Sheet Steel, Zinc-Coat (Galvanized) or Zinc-Iron Alloy Coated (Galvanized) by the Hot-Dip Process.
- Tolerances are valid for 48 in. and 60 in. wide coil and cut length stock - other dimensions apply to other sheet widths and to strip.
- The lock forming grade of steel will conform to ASTM A653 (formerly ASTM A527).
- The steel producing industry recommends that steel be ordered by decimal thickness only. Thickness and zinc coating class can be stenciled on the sheet. The gage designation is retained for residual familiarity reference only.
- Minimum weight in this table is based on the following computation:  
Minimum sheet thickness minus 0.001 in. of G60 coating times 40.8 lb. per sf. per in. plus 0.0369 lb./sf of zinc. G90 stock would be comparably calculated from:  
 $(t - .00153 \text{ in.}) 40.8 \div 0.05564 = \text{minimum weight.}$   
However, scale weight may run 2% (or more) greater than theoretical weight. Actual weight may be near 40.82 lb. per sf per in.
- G60 coating, per ASTM A653 and ASTM A90, has 0.60 oz/sf (triple spot test) total for two sides. 0.59 oz/sf of zinc equals 0.001 in. 1 oz is 0.0017 in. and is 305.15 g/m<sup>2</sup>.  
G90 coating is 0.90 oz/sf (triple spot test), or 0.00153 in. Magnetic gage measurement of zinc coating may have 15% error.
- ASTM D2092, Practice for Preparation of Zinc-Coated Galvanized Steel Surfaces for Paint, includes mill phosphatizing.
- ASTM A755 is the Specification for Sheet Steel, Metallic Coated by the Hot-Dip Process and Prepainted by the Coating Process for Exterior Building Products. Other information is available from the National Coil Coaters Association, Philadelphia, PA.
- Much chemical and atmospheric corrosion information is available from ASM International in Metals Park, Ohio and from NACE International in Houston, TX.  
A principle international standard is ISO 3575, Continuous Hot-Dip Process, Zinc-Coated Carbon Steel Sheet of Commercial, Lock Forming and Drawing Qualities.





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