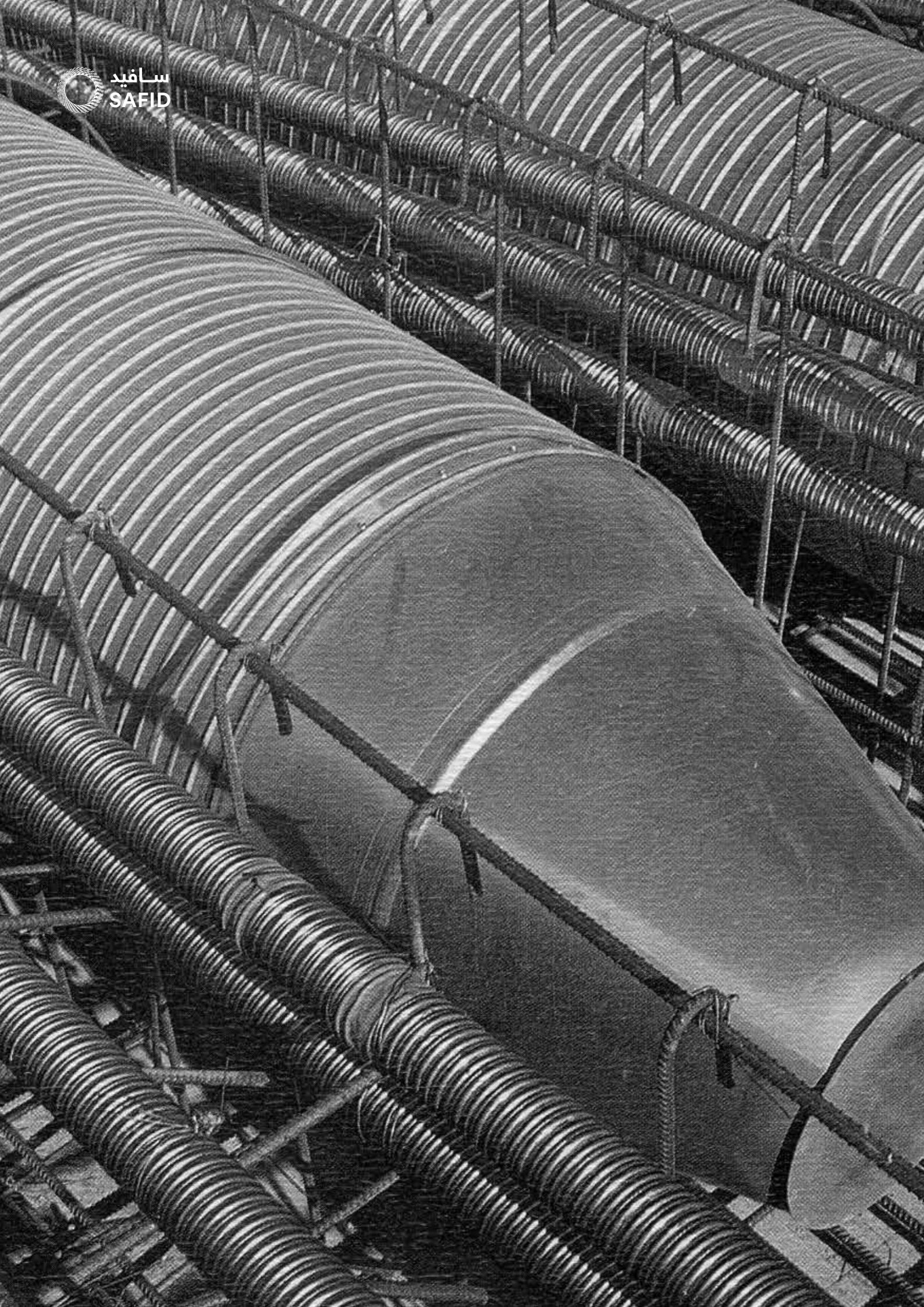


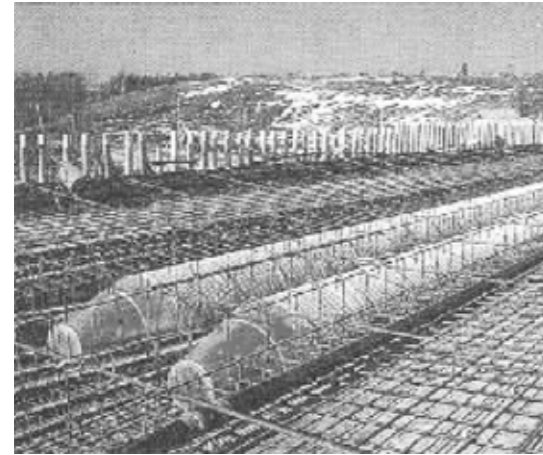
**CORRUGATED VOIDS.**

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# CORRUGATED VOIDS

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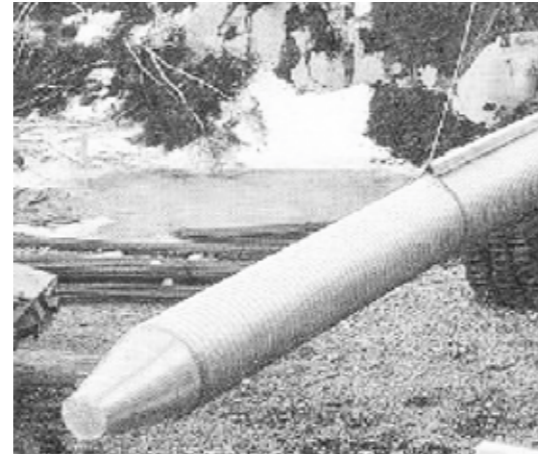


**Description**

The use of void formers in massive concrete may reduce 40% of concrete cost and helps in achieving lighter construction.

Due to the round form and special surface profile of void formers, there is a possibility to use the optimum material thickness and profile depending on the diameter.

Void formers are made of hot dipped galvanized steel (wall thickness 0.53, 0.63, 0.78, 0.93, 1.2 or 1.5mm). The pipe has excellent strength for radial loading and can be transported and transferred at a length as long as 12 meters (with a standard of 6 meters). Humidity and other weather conditions does not damage the pipe, so it can be stored for years without any cover on site. Pipes can also be used as a vertical concrete mould.



**Concrete Mass Effect on Void Formers**

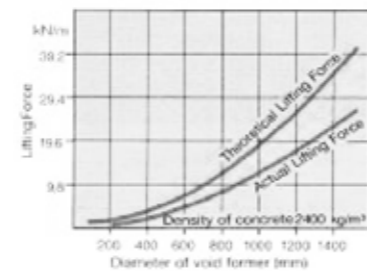
Concrete has the same properties as liquid (2.4 kg/dm<sup>3</sup>) during vibration. Actually vibration pressure does not effect all over, due to surface friction and iron bars in concrete. The active pressure of concrete mass mainly depends on the following factors:

- The speed of concrete casting
- Vibration
- Surface friction of mass
- Temperature of mass and surroundings

The cast pressure usually deforms the void former and the lifting force (see below chart), which affects fixing points and determines the spacing between supports as well as the method of support. The effect of above factors is strongest just before the cast level reaches the center line of the pipe.

The material thickness of void formers varies according to the diameter so that the deformation of the pipe is minimal and in normal condition.

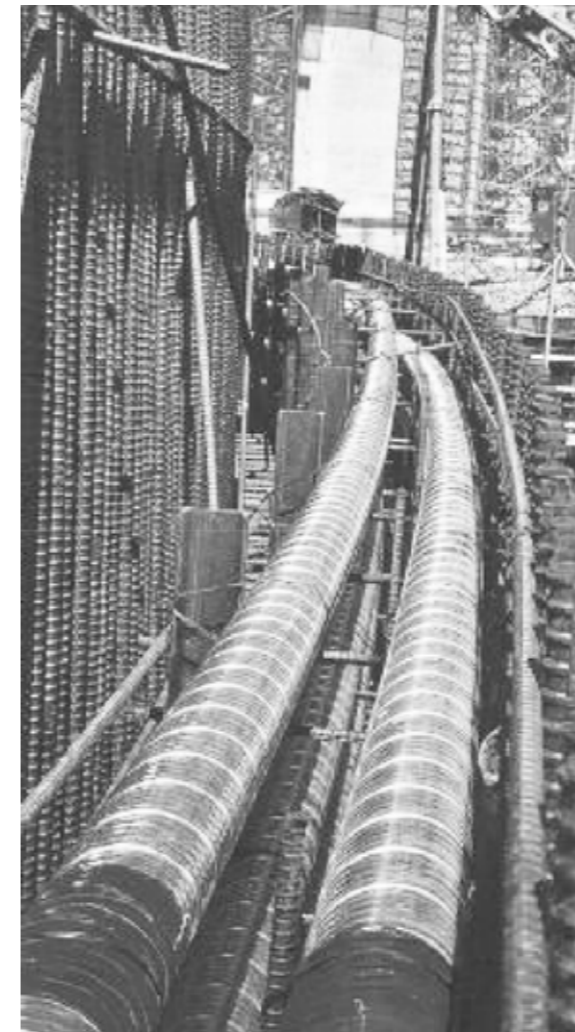
**For more information on concrete casting, please see page 14.**




**Description**

Post Tensioning Systems are renowned for reliability and performance, most suitable for all applications in post tensioned construction. They embrace the whole spectrum form bridge construction, buildings, to civil applications - above and underground.

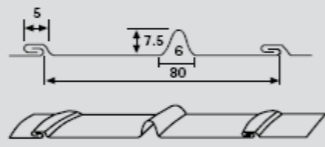
SAFID Void Formers consisting of metal ducts represent the most economical means to create a voice for tensile elements. These thin-walled (0.4mm - 0.53mm), corrugated sheet metal ducts provide a fair secondary corrosion protection with excellent bond behavior between tendon and concrete. Primary corrosion protection is provided by the alkalinity of the grout and concrete.



**PROFILE PKG**




**Dimensions**

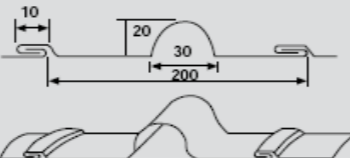


Type: PKG  
Spirally Wound Corrugated Round Duct  
Diameter Range: 315 - 1000 mm  
Thickness Range: 26 - 20 gauge  
Materials: PKG Galvanized Steel

**PROFILE PTRG**



**Dimensions**



Type: PTRG  
Spirally Wound Corrugated Heavy Duty Round Duct  
Diameter Range: 1100 - 1600 mm  
Thickness Range: 16 gauge  
Materials: PTRG Galvanized Steel

**Description**

Standard products are normally manufactured from hot dip galvanized steel coil (as per ASTM A653) lock forming quality grade G-90 coating.

**Dimensions**

**Duct Diameter and Thickness**

Duct Type	Nom. $\varnothing$ d mm	Diameter (mm)		U.S. Gauge	Thickness mm
		Inside	Outside		
PKG	315	315	331	26	0.53
PKG	400	400	416	26	0.53
PKG	500	500	515	24	0.63
PKG	600	600	616	24	0.63
PKG	700	700	716	22	0.78
PKG	800	800	816	22	0.78
PKG	900	900	916	20	0.93
PKG	1000	1000	1016	20	0.93
PTRG	1100	1100	1146	16	1.5
PTRG	1200	1200	1246	16	1.5
PTRG	1400	1400	1446	16	1.5
PTRG	1600	1600	1646	16	1.5

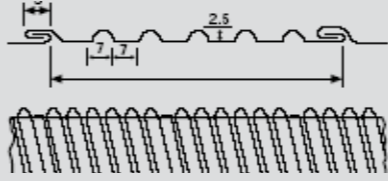
\*Nonstandard sizes are available on request.

**Ordering**

Product Code: PKG - 900

Type   $\varnothing$ d

**Dimensions**



Type: KKG  
Spirally Wound Corrugated Round Duct  
Diameter Range: 63 - 152 mm  
Thickness Range: 28 - 24 gauge  
Materials: KKG Galvanized Steel

**Description**


Standard products are normally manufactured from hot dip galvanized steel coil (as per ASTM A653) lock forming quality grade G-90 coating.

**Ordering**

Product Code: KKG - 63

Type   $\varnothing$ d

**PROFILE KKG**

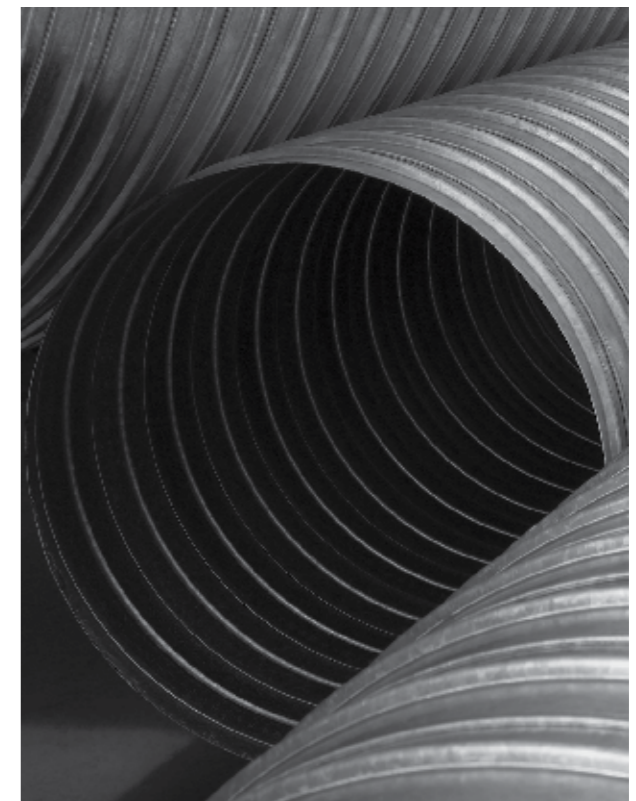


**Dimensions**


**Duct Diameter and Thickness**

Duct Type	Nom. $\varnothing$ d mm	Diameter (mm)		U.S. Gauge
		Inside	Outside	
KKG	63	63	69	24 - 26
KKG	66	66	72	24 - 26
KKG	70	70	76	24 - 26
KKG	71	71	77	24 - 26
KKG	75	75	81	24 - 26
KKG	80	80	86	24 - 26
KKG	90	90	96	24 - 26
KKG	100	100	106	24 - 26
KKG	112	112	118	24 - 26
KKG	125	125	131	24 - 26
KKG	140	140	146	24 - 26
KKG	152	152	158	24 - 26

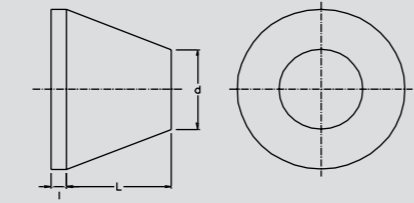
\*Nonstandard sizes are available on request.



**TPR**



**Dimensions**



**Description**

- Reducing End Cap
- To be fitted inside the duct
- Fabricated with continuous or stitch welding

**Ordering**

Product Code: TPR - 900 / 450 / 800

Type \_\_\_\_\_

∅d \_\_\_\_\_

∅d<sub>1</sub> \_\_\_\_\_

L \_\_\_\_\_

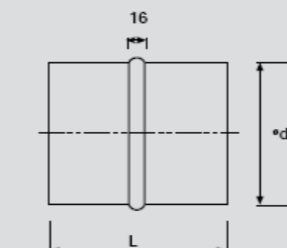
**Dimensions**

Nom. ∅d mm	Thickness mm	∅d mm	L mm	l mm
315	0.78	150	400	70
400	0.78	200	400	70
500	0.78	250	400	70
600	0.78	300	600	70
700	0.93	355	600	100
800	0.93	400	600	100
900	0.93	450	800	100
1000	0.93	500	800	150
1100	1.5	550	800	150
1200	1.5	600	800	150
1400	1.5	700	1000	150
1600	1.5	800	1000	150

\*Nonstandard sizes are available on request.



**Dimensions**



**Description**

- Coupling
- Duct Connector
- Fabricated with continuous or stitch welding


**Ordering**

Product Code: LYR - 900

Type \_\_\_\_\_

∅d \_\_\_\_\_

**LYR**



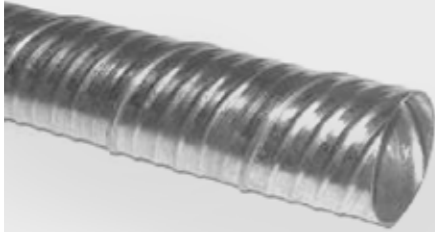
**Dimensions**

Nom. ∅d mm	Thickness mm	L mm	B mm
315	0.93	115	15
400	0.93	157	15
500	0.93	157	15
600	0.93	240	15
700	1.5	240	15
800	1.5	240	15
900	1.5	240	15
1000	1.5	240	15
1100	2.0	240	15
1200	2.0	240	15
1400	2.0	240	15
1600	2.0	240	15

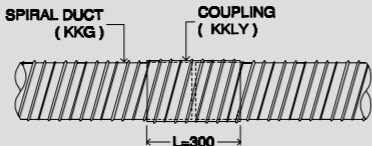
\*Nonstandard sizes are available on request.



**KKLY**



**Dimensions**



**Description**

- Coupling
- Duct Connector
- Fabricated with spirally wound corrugated round duct

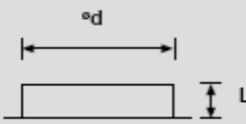
**Ordering**

Product Code:           KKLY - 63

Type                    \_\_\_\_\_

∅d                      \_\_\_\_\_

**Dimensions**



**Description**

- End Cap
- To be fitted inside the duct.
- Fabricated with continuous or stitch welding


**Ordering**

Product Code:           TP - 900

Type                    \_\_\_\_\_

∅d                      \_\_\_\_\_

**TP**



**Dimensions**

Nom. ∅d mm	Thickness mm	Std. L mm
69	0.53	300
72	0.53	300
76	0.53	300
77	0.53	300
81	0.53	300
86	0.53	300
96	0.53	300
106	0.53	300
118	0.53	300
131	0.53	300
146	0.53	300
158	0.53	300



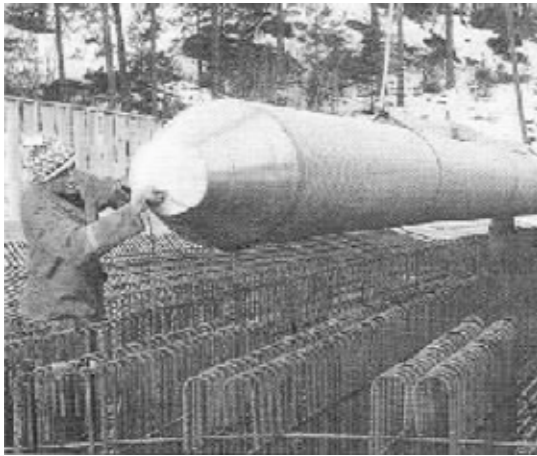
\*Nonstandard sizes are available on request.



**Dimensions**

Nom. ∅d mm	Thickness mm
315	0.78
400	0.78
500	0.78
600	0.78
700	0.93
800	0.93
900	0.93
1000	0.93
1100	1.5
1200	1.5
1400	1.5
1600	1.5

\*Nonstandard sizes are available on request.



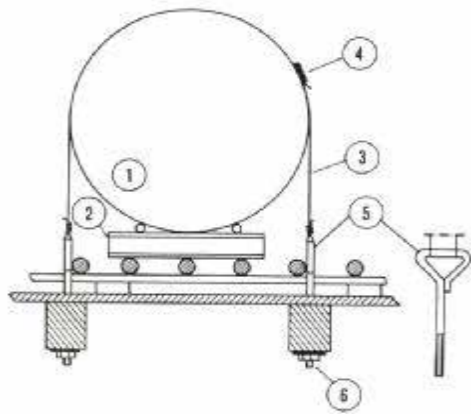
## Installation Sample

### Tools Required:

A band tightener and an adjustable wrench.  
For the bottom plate (6) a nut or mould lock can be used. When the support platform is removed, the loopscrew (5) is cut off from the concrete surface.

Common site installation can be made without any special tools, by binding with 6 mm steel wire or bouble 4 mm steel wire.

### Dimensions



### Legend:

- 1 - Pipe PKG or PTRG
- 2 - Lower Support
- 3 - Band
- 4 - Band Lock
- 5 - Loopscrew
- 6 - Bottom Plate

## Some Hints When Casting Concrete

It is important to keep the lifting and deformation force of concrete as minimum as possible. This is possible by horizontally phased and continuous casting so that the level reaches the center line of pipe. Casting is continued after a short break (no more than 1 hour) up to full level. Then vibration of second casting is limited from joint level of two casting up to top level only.

### Fixing Points of Pipe

Nominal Dia. (mm)	Anchoring Spacing (mm)
315 - 500	1200 - 1000
600 - 1000	1000 - 500
1100 - 1400	500 - 250

### Bending Radius of Pipe

Nominal Dia. (mm)	Pipe Type	Shortest Bending Radius (m)
315	PKG	7
400	PKG	8
500	PKG	10
600	PKG	12
700	PKG	14
800	PKG	15
900	PKG	20
1000	PKG	20
1100	PTRG	22
1200	PTRG	22
1400	PTRG	25

