



INSULATORS

Insulators made of polyethylene are universally applicable with the installation of pipelines when the carrier pipe runs inside a casing and fit all pipes from 30 mm and upwards.

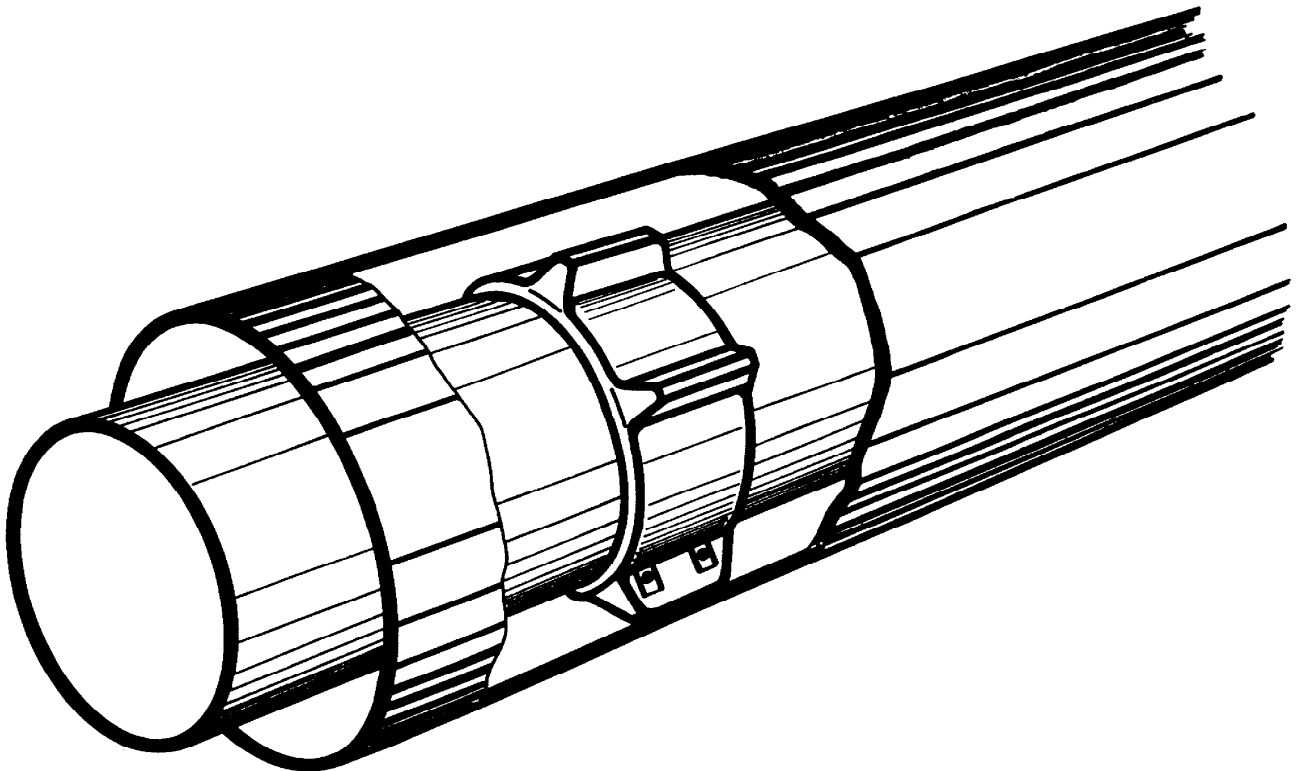
For this comprehensive range of application the *plastic insulators* offer various advantages such as:

- easy installation of the carrier pipe since the polyethylene reduces the friction coefficient to a minimum
- minor friction thus preventing damages to the protective coating and insulation of the pipes
- concentricity of the carrier pipe within the casing due to an extensive range of skid heights
- outstanding insulation characteristics of polyethylene. The insulators conform entirely with the requirements of cathodic protection

Plastic insulators are available in any desired dimension and with many skid heights for all pipes with diameter from 22 mm with skid height from 16 mm.

Insulators for up to +140°C in reinforced plastic, available in same dimensions as standard.

Insulators for district heating pipes with an outside diameter for more than 400 mm and upwards, shall be made of steel.



Technical data

Material Polypropylene has a good friction coefficient due to its waxy surface with good sliding properties. The sliding friction coefficient is approx. 0,2 for PP on steel. In comparison to this, steel on steel is approx. 0,5. Therefore the abrasion is reduced to a minimum. The material is strong and yet flexible and is therefore resistant to stress cracking. Flexibility of the body, stability of the skid form and excellent dielectric insulation are some more of the good characteristics of this material.

Installation Recommended space between the insulators:

- Pipe diameter up to Ø 300 mm in 2,5 m support distance
- Pipe diameter from Ø 300 - 600 mm in 2,0 m support distance
- Pipe diameter more than Ø 600 mm in 1,5 m support distance

Recommended load capacity:

Type PA 0.75 - PA 1.5	85 kg
Type PA 2.0 - PA 3.0	100 kg
Type PA 4.0	200 kg
Type PA 6.0 - PA 12.0	250 kg
Type AZ 1 - AZ 2	200 kg
Type GKO-mk	250 kg

The load capacity data is applicable for a skid height of up to 75 mm. For skid heights above 75 mm, these values need to be multiplied with a factor of 0,75

Type MA	650 kg
Type RGV	1000 kg
Type GKO-gl	4000 kg
Type GKO-gs	14200 kg

All values are calculated for standard pipes. To determine the correct distance for your individual application many other factors have to be taken into consideration, such as carrier pipe wall thickness, pipe length and type of media.

We are happy to help with advices and choice of insulator and type. If it is not possible to find a type and dimension to suit the task at hand, so please state:

- carrier pipe OD
- media pipes material
- length of casing pipe
- media - gas or fluid
- casing pipes inner diameter
- casing pipes material



Insulator rings type PA

**Pipe OD
from 25 mm to 336 mm**



Type PA insulator rings are available for a pipe OD from 25 mm to 336 mm. Consists of two semicircular segments, which is mounted with bolts (incl. delivery).

The type code indicates the carrier pipe ODX in inch and the skid height in mm (e.g. PA 4-38 = carrier pipe 4", skid height 38 mm). The skid height is calculated from the difference in diameter of the carrier pipe and the casing. It is important to consider the actual dimensions, including coatings, rather than the nominal sizes.

Example Media pipe in steel DN 4"
DN 114,3 + 2 mm coating =UD 118,3 mm
Steel casing pipe DN 8"
DN 219,1 - 2xt 6,3 mm = ID 206,5 mm

Ring gap Casing pipe ID 206,5 mm
Media pipe OD 118,3 mm
88,2 mm : 2 = 44,1 mm

Insulator Suitable type = PA 4 - 25

You have to choose a skid height lower than the ring gap, consider the insertion of the carrier pipe to the casing pipe.

A short distance it is necessary to have an air gab at 25-50 mm between casing pipe and the skid.

At longer distance and bigger diameter the air gab must be min. 50 - 100 mm.

Up to type PA 4 the insulator rings have 4 skids; from type PA 6 up to 6 skids are provided.

The following table gives the technical details on available sizes, skid heights pof the various types and carrier pipe diameter.

Sizing chart type PA 0,75 to PA 4

Pipe diameter		Outside pipe diameter		Insulator type	Skid height	Width	Number of segments per ring	Bolt numbers and sizes
mm	"	min. mm	max. mm					
20	0,75	25,0	32,0	PA 0,75	12,0	80	2	4 x M4 x 30
				PA 0,75	21,0			
				PA 0,75	25,0			
				PA 0,75	37,0			
25	1,00	32,0	40,0	PA 1	13,0	80	2	4 x M4 x 30
				PA 1	19,0			
				PA 1	25,0			
				PA 1	34,0			
32	1,25	42,0	48,3	PA 1,25	11,0	80	2	4 x M4 x 30
				PA 1,25	17,6			
				PA 1,25	29,0			
				PA 1,25	40,0			
40	1,50	48,0	54,0	PA 1,5	11,0	80	2	4 x M4 x 30
				PA 1,5	14,5			
				PA 1,5	26,0			
				PA 1,5	36,0			
				PA 1,5	48,0			
				PA 1,5	70,0			
50	2,00	60,0	67,0 ¹⁾	PA 2	16,0	100	2	4 x M6 x 40
				PA 2	25,0			
				PA 2	36,0			
				PA 2	48,0			
				PA 2	55,0			
				PA 2	70,0			
				PA 2	90,0			
				PA 2	110,0			
65	2,50	76,1	82,5 ²⁾	PA 2,5	16,0	100	2	4 x M6 x 40
				PA 2,5	25,0			
				PA 2,5	36,0			
				PA 2,5	48,0			
				PA 2,5	55,0			
				PA 2,5	70,0			
				PA 2,5	90,0			
				PA 2,5	110,0			
80	3,00	88,9	96,0 ³⁾	PA 3	16,0	100	2	4 x M6 x 40
				PA 3	25,0			
				PA 3	36,0			
				PA 3	48,0			
				PA 3	55,0			
				PA 3	70,0			
				PA 3	90,0			
100	4,00	106,6	120,0	PA 4	16,0	100	2	4 x M6 x 55
				PA 4	25,0			
				PA 4	38,0			
				PA 4	55,0			
				PA 4	75,0			
				PA 4	90,0			

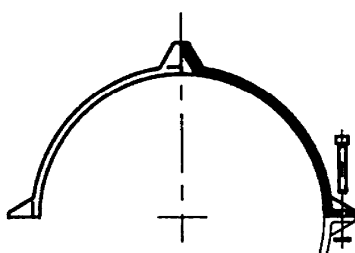
1) max up to OD 75 mm with 4xM6x55 bolts

2) max up to OD 88,9 mm with 4xM6x55 bolts

3) max up to OD 101,6 mm with 4xM6x55 bolts

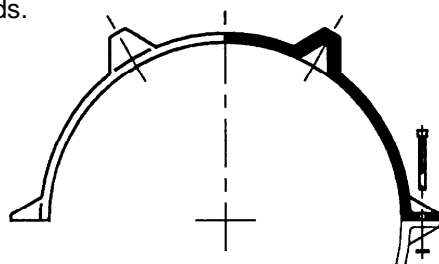
4) max up to OD 127,0 mm with 4xM6x70 bolts

Sectional drawing
PA 0,75 to PA 4.
Insulator with 4 skids.

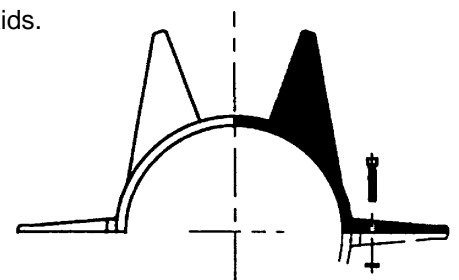


Sizing chart type PA 6 to PA 12								
Pipe diameter		Outside pipe diameter		Insulator type	Skid height	Width	Number of segment per ring	Bolt numbers and sizes
mm	"	min. mm	max. mm					
150	6	160,0	178,0	PA 6	16,0	130	2	4 x M6 x 70
				PA 6	25,0			
				PA 6	38,0			
				PA 6	55,0			
				PA 6	75,0			
				PA 6	90,0			
200	7	193,7	210,0	PA 7	16,0	175	2	4 x M6 x 70
				PA 7	25,0			
				PA 7	36,0			
				PA 7	55,0			
				PA 7	75,0			
				PA 7	110,0			
200	8	221,0	239,0	PA 8	16,0	130	2	4 x M6 x 70
				PA 8	25,0			
				PA 8	36,0			
				PA 8	55,0			
				PA 8	75,0			
				PA 8	90,0			
250	9	244,5	260,0	PA 9	16,0	175	2	4 x M6 x 70
				PA 9	25,0			
				PA 9	36,0			
				PA 9	55,0			
				PA 9	75,0			
				PA 9	110,0			
250	10	276,0	295,0	PA 10	16,0	130	2	4 x M6 x 70
				PA 10	25,0			
				PA 10	36,0			
				PA 10	55,0			
				PA 10	75,0			
				PA 10	90,0			
315	11	298,5	315,0	PA 11	16,0	175	2	4 x M6 x 70
				PA 11	25,0			
				PA 11	36,0			
				PA 11	55,0			
				PA 11	75,0			
				PA 11	110,0			
300	12	323,0	350,0	PA 12	16,0	130	2	4 x M6 x 70
				PA 12	25,0			
				PA 12	38,0			
				PA 12	55,0			
				PA 12	75,0			
				PA 12	90,0			

Sectional drawing
PA 6 - 8 - 10 - 12.
Insulator with 4 skids.



Sectional drawing
PA 7 - 9 - 11.
Insulator with 6 skids.



Insulator rings type AZ

Pipe OD
from 98 mm to 385 mm



Insulator ring type AZ are used for a pipe OD from 98 to 385 mm and consists of several segments, the numbers of segments depends on the carrier pipes OD.

The insulator is mounted with the enclosed bolt and nuts.

The universal applicability of **type AZ** provides two special advantages:

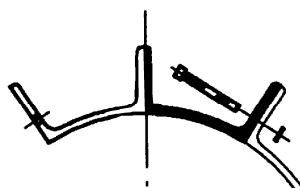
- variable ring diameter
- only two segment sizes are required to assemble OD 98 to OD 385 insulator rings - a decisive edge in stock-keeping

The required skid height is calculated from the difference in diameter between the carrier pipe and the casing. It is important to consider the actual dimensions, including coatings, rather than the nominal size.

The following table gives technical details on available sizes, skid heights, types and carrier pipes diameter.

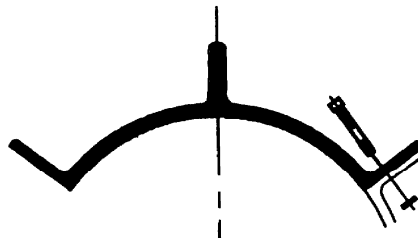
Sizing chart type AZ 1							
Pipe diameter mm	Outside pipe diameter		Insulator type	Skid height	Width	Number of segments per ring	Bolt numbers and size
	min. mm	max. mm					
100	98,0	130,0	AZ 1	16,0	130	3	6 x M6 x 70
			AZ 1	25,0			
			AZ 1	36,0			
			AZ 1	55,0			
			AZ 1	75,0			
			AZ 1	90,0			
125	130,0	172,0	AZ 1	16,0	130	4	8 x M6 x 70
			AZ 1	25,0			
			AZ 1	36,0			
			AZ 1	55,0			
			AZ 1	75,0			
			AZ 1	90,0			
150	173,0	202,0	AZ 1	16,0	130	5	10 x M6 x 70
			AZ 1	25,0			
			AZ 1	36,0			
			AZ 1	55,0			
			AZ 1	75,0			
			AZ 1	90,0			

Snit gennem segment AZ 1.



Sizing chart type AZ 2							
Pipe diameter mm	Outside pipe diameter		Insulator type	Skid height	Width	Number of segments per ring	Bolt numbers and size
	min. mm	max. mm					
200	203,0	230,0	AZ 2	16,0	130	3	6 x M6 x 70
			AZ 2	25,0			
			AZ 2	36,0			
			AZ 2	55,0			
			AZ 2	75,0			
			AZ 2	90,0			
			AZ 2	110,0			
200/250	234,0	268,0	AZ 2	16,0	130	3 AZ 2+ 1 AZ 1	8 x M6 x 70
			AZ 2	25,0			
			AZ 2	36,0			
			AZ 2	55,0			
			AZ 2	75,0			
			AZ 2	90,0			
			AZ 2	110,0			
250	269,0	301,0	AZ 2	16,0	130	4	8 x M6 x 70
			AZ 2	25,0			
			AZ 2	36,0			
			AZ 2	55,0			
			AZ 2	75,0			
			AZ 2	90,0			
			AZ 2	110,0			
300	302,0	350,0	AZ 2	16,0	130	4 AZ 2 + 1 AZ 1	10 x M6 x 70
			AZ 2	25,0			
			AZ 2	36,0			
			AZ 2	55,0			
			AZ 2	75,0			
			AZ 2	90,0			
			AZ 2	110,0			
350	350,0	385,0	AZ 2	16,0	130	5 AZ 2	10 x M6 x 70
			AZ 2	25,0			
			AZ 2	36,0			
			AZ 2	55,0			
			AZ 2	75,0			
			AZ 2	90,0			
			AZ 2	110,0			

Snit gennem segment AZ 2.



Insulator rings type MA

Pipe OD
from 402 mm



Insulator type MA is suitable from 402 mm and upwards. Consists of two segment sizes (MA and MA7") and various skid heights.

Insulator type MA are universal applicable. The following rule is used to determine the composition of suitable insulator rings:

- For every 100 mm of pipe diameter of pipe = 1 segment MA
- For every 50 mm of pipe diameter of pipe = 1 segment MA2

Ex. Mediapipe 559 = 5 segments MA + 1 segment MA2

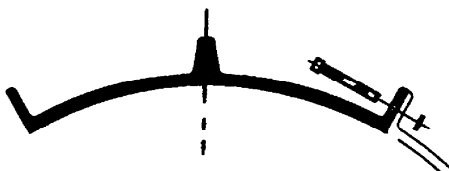
The skid height of the segments is calculated from the difference in diameter of the carrier pipe and the casing pipe. (see ex. by type PA).

Bolts and nuts included.

The following table gives the technical details on available sizes, skid heights of the various types and carrier pipe diameter.

Sizing chart type MA				
Type	Skid height mm	Width mm	Numbers of skids	Bolt numbers and sizes
MA 25 MA 36 MA 50 MA 67 MA 75	25,0 36,0 50,0 65,0 75,0	160	3	2 x M8 x 70
MA 2/25 MA 2/36 MA 2/50 MA 2/67 MA 2/75	25,0 36,0 50,0 65,0 75,0	160	3	2 x M8 x 70

Sectional drawing MA.



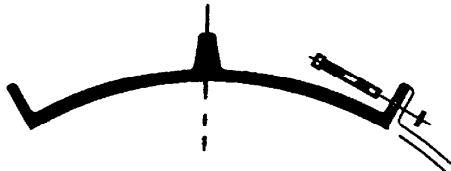
Sectional drawing MA 2.



Sizing chart type MA				
Pipe diameter mm	Outside pipe diameter		Number of segments per ring	Bolt numbers and size
	min. mm	max. mm		
400	402,0	435,0	4 MA	8 x M8 x 70
450	450,0	494,0	4 MA + 1 MA 2	10 x M8 x 70
500	500,0	544,0	5 MA	10 x M8 x 70
550	548,0	599,0	5 MA + 1 MA 2	12 x M8 x 70
600	600,0	653,0	6 MA	12 x M8 x 70
650	654,0	699,0	6 MA + 1 MA 2	14 x M8 x 70
700	700,0	749,0	7 MA	14 x M8 x 70
750	750,0	799,0	7 MA + MA 2	16 x M8 x 70
800	800,0	849,0	8 MA	16 x M8 x 70
850	850,0	899,0	8 MA + MA 2	18 x M8 x 70
900	900,0	949,0	9 MA	18 x M8 x 70
950	950,0	994,0	9 MA + 1 MA 2	20 x M8 x 70
1000	995,0	1044,0	10 MA	20 x M8 x 70
1050	1045,0	1097,0	10 MA + 1 MA2	22 x M8 x 70
1100	1098,0	1149,0	11 MA	22 x M8 x 70
1150	1150,0	1199,0	11 MA + 1 MA2	24 x M8 x 70
1200	1200,0	1249,0	12 MA	24 x M8 x 70

For pipes > 1249 please contact us for specifications.

Sectional drawing MA.



Sectional drawing MA 2.



Insulator rings type RGV

Pipe OD
from 500 mm



Insulator ring type RGV are used from a pipe OD 500 mm. They differ from MA types in having two reinforced load-carrying center skids per segment. The fastening skids (36 mm high) are for connection only. To match the required pipe OD, RGV segments are combined with RGV 2 segments.

High static-load bearing capacity and versatility are the particular advantages of the RGV casing spacers. The following simple method is used to determine the composition of suitable insulator rings:

- for every 100 mm outer diameter of pipe = 1 segment RGV
- for every 50 mm outer pipe diameter = 1 segment RGV 2

Ex: Carrier pipe OD 559 = 5 segments RVG + 1 segment RVG 2

The skid height of the segments is calculated from the difference in diameter of the carrier pipe and the casing pipe. (see ex. by type PA).

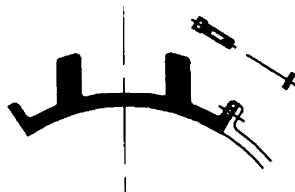
Bolts and nuts included.

The following table gives the technical details on available sizes, skid heights of the various types and carrier pipe diameter.

Sizing chart type RGV

Type	Skid height mm	Width mm	Numbers of skids	Bolt numbers and sizes
RGV	55,0	210	2	2 x M8 x 60
RGV	75,0			
RGV	90,0			
RGV	125,0			
RGV 2	55,0	210	2	2 x M8 x 70
RGV 2	75,0			
RGV 2	90,0			
RGV 2	125,0			

Sectional drawing RGV.



Sizing chart type RGV				
Pipe diameter mm	Outside pipe diameter		Number of segments per ring	Bolt numbers and sizes
	min. mm	max. mm		
500	500,0	535,0	5 RGV	10 x M8 x 70
550	547,0	595,0	5 RGV + 1 RGV 2	12 x M8 x 70
600	596,0	645,0	6 RGV	12 x M8 x 70
650	646,0	699,0	6 RGV + 1 RGV 2	14 x M8 x 70
700	700,0	750,0	7 RGV	14 x M8 x 70
750	751,0	799,0	7 RGV + 1 RGV 2	16 x M8 x 70
800	800,0	850,0	8 RGV	16 x M8 x 70
850	851,0	899,0	8 RGV + 1 RGV 2	18 x M8 x 70
900	900,0	950,0	9 RGV	18 x M8 x 70
950	951,0	999,0	9 RGV + 1 RGV 2	20 x M8 x 70
1000	1000,0	1075,0	10 RGV	20 x M8 x 70
1100	1090,0	1180,0	11 RGV	22 x M8 x 70
1200	1190,0	1290,0	12 RGV	24 x M8 x 70
1300	1291,0	1390,0	13 RGV	24 x M8 x 70
1400	1391,0	1490,0	14 RGV	28 x M8 x 70
1500	1491,0	1590,0	15 RGV	30 x M8 x 70
1600	1591,0	1690,0	16 RGV	32 x M8 x 70
1700	1691,0	1790,0	17 RGV	34 x M8 x 70
1800	1791,0	1890,0	18 RGV	36 x M8 x 70
1900	1891,0	1990,0	19 RGV	38 x M8 x 70
2000	1991,0	2100,0	20 RGV	40 x M8 x 70

For pipes > 2000 please contact us for specifications.

Insulator rings type GKO-mk

**Pipe OD
from 150 mm**



GKO-mk is the latest casing spacer generation. Due to the bolt less wedge system the installation can be achieved quickly and easily. The flexible design ensures suitability for all pipe diameters > 150 mm. If required, an additional support for cable ducts can be installed on the segments.

- Flexible construction
- Non-metallic connection for simple and fast installation
- New wedge connection technology

Shear-secure-tape or similar can be used to improve adhesion on smooth surfaces, or to balance pipe tolerances.

Type	Skid height	Width
GKO-mk	25	130
GKO-mk	36	130
GKO-mk	50	130
GKO-mk	65	130
GKO-mk	75	130
GKO-mk	90	130
GKO-mk	110	130
GKO-mk	125	130

Diameter on mediapipe in mm		Segments per ring
Min	max	
150	180	4
181	230	5
231	280	6
281	330	7
331	380	8
381	430	9



Insulator rings type
GKO-gl standard
GKO-GS heavy load
GKO-GH half segment

Pipe OD
from 400 to 2500 mm



GKO-gl-gs-gh is the latest casing spacer generation. Due to the bolt less wedge system the installation can be achieved quickly and easily. The flexible design ensures suitability for all pipe diameters > 400 mm. If required, an additional support for cable ducts can be installed on the segments.

- Flexible construction
- Non-metallic connection for simple and fast installation
- New wedge connection technology

Shear-secure-tape or similar can be used to improve adhesion on smooth surfaces, or to balance pipe tolerances.

Skid heights: 36-50-65-75-90-110-125 mm

Width: 225 mm

Sizing chart type GKO			
Outside pipe diameter		Type and segments	
Min. mm	Max. mm	GKO-gl/gs	GKO-gh
400	440	3	1
441	490	4	
491	540	4	1
541	625	5	
626	659	5	1
660	749	6	
750	854	7	
855	959	8	
960	1067	9	
1068	1199	10	
1200	1330	11	
1331	1440	12	
1441	1540	13	
1541	1660	14	
1661	1800	15	
1801	1910	16	
1911	2042	17	
2043	2150	18	
2151	2270	19	
2271	2400	20	
2401	2500	21	

GKO-gl



GKO-gs



GKO-gh



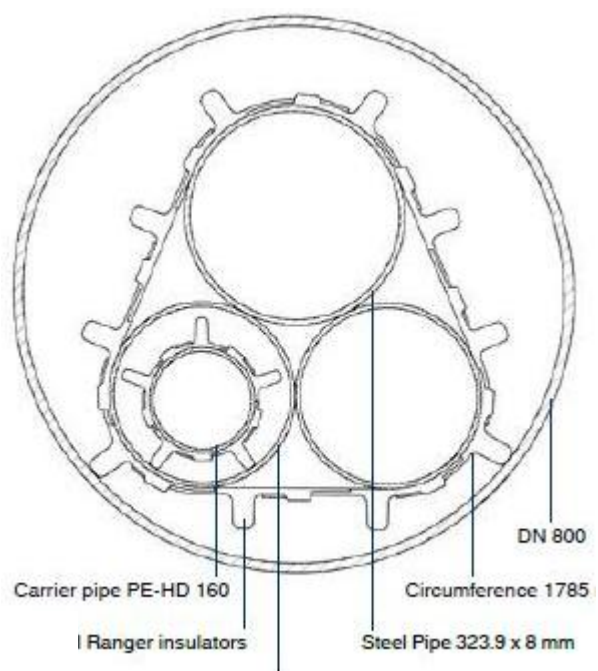
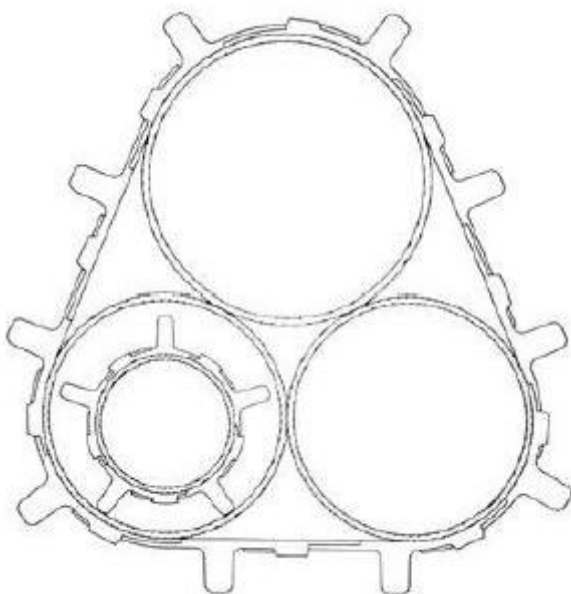
**Insulator rings type Ranger
for pipe bundling**

**Pipe OD
from 80 mm**



The insulators with boltless plug-in connection are suitable for pipe bundles and individual solutions. The flexibility of the insulator allows for extreme bends, and the high number of skids provides the bearing and load distribution inside the casing pipe.

- Significant cost savings compared to constructions with steel insulators
- Quick and easy assembly
- Individual solutions



Insulator rings type Ranger for pipe bundling

**Pipe OD
from 80 mm**

Technical data

Non-metallic insulators type Ranger are highly suitable for pipelines requiring cathodic protection. With just six different segments sizes - micro, mini, medi, maxi og maxi 0,5 - all pipe diameters from DN 15 upwards are covered.

Segment sizes and skid heights:

Micro

For pipe diameters from 21 mm to approx. 80 mm

Mini

For pipe diameters from 40 mm to approx. 140 mm

Midi

For pipe diameters from 110 mm to approx. 460 mm

Medi

For pipe diameters from 400 mm to 660 mm

Maxi

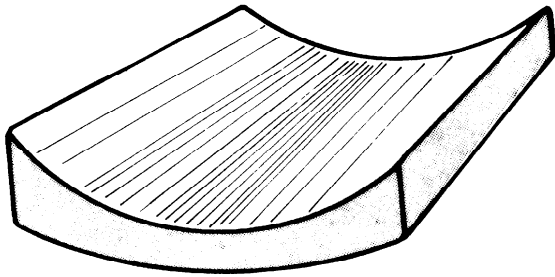
For pipe diameters from approx. 400 mm and upwards

Maxi 0,5

For pipe diameters 390-500 mm

Sizing chart							
Segments	Diameter in mm						
	Micro	Mini	Midi	Medi	Maxi	Maxi + 0,5	Maxi 0,5
3	21-29	46-62	104-141		325-395		195-235
3+1x0,5						390-460	
4	29-40	62-83	138-188	390-494	426-546		235-300
4+1x0,5						450-550	
5	38-49	77-104	172-235	495-625	532-682		275-365
6	46-60	92-125	207-282	600-750	638-819		
7	55-69	107-145	241-329	700-890	745-955		
8	61-80	123-166	276-376	800-1000	851-1092		
9		138-187	310-423	900-1140	957-1228		
10		153-205	344-470	1000-1290	1064-1365		
11		169-228	379-517		1170-1502		
12		184-249	413-564		1276-1838		
13					1383-1775		
14					1489-1911		
15					1595-2048		
16					1702-2184		
17					1808-2321		
18					1914-2457		
19					2020-2594		
20					2127-2731		
21					2233-2867		

Pipe supports



Support for larger carrier pipes

Especially larger carrier pipes can be supported by pipe supports made of polyethylene.

The pipe support is made in accordance to the skid height of the insulator ring and it will prevent contact between the carrier pipe and the casing - also at extreme load from the carrier pipe.

Material

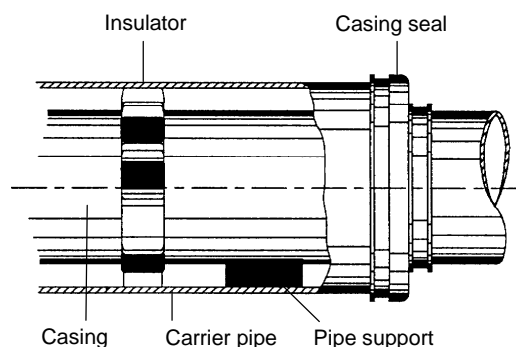
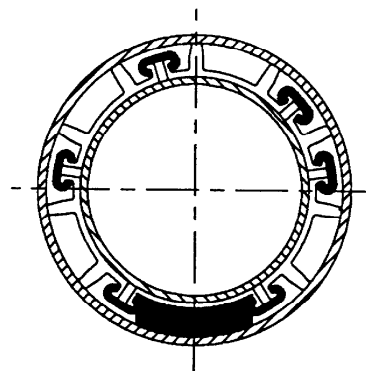
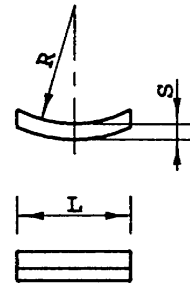
Black polyethylene has the strength as polyethylene on coated steel pipes.

Carrying capacity 500 N / cm²
 Thickness 0,85 g / cm³

Various types

Are available with rubber lining.

Sizing chart pipe supports				
Pipe dia. mm	Pipe supports dimension in mm			Weight kg
	R	s	L	
Til 150	90	16	130	0,1
		25		0,2
		36		0,3
175-300	160	16	250	1,1
		25		1,3
		35		1,8
		55		2,5
		75		3,5
		90		4,0
350-500	260	25	300	2,2
		35		3,0
		42		3,5
		50		4,0
		65		5,5
		75		6,5
		90		8,0
550-700	360	25	300	3,0
		35		4,0
		42		4,5
		50		5,5
		65		7,0
		90		10,5
750-900	460	25	500	5,9
		35		8,0
		42		9,3
		50		11,0
		65		13,5
		90		18,5
950-1100	570	25	500	7,6
		35		9,5
		42		11,8
		50		13,0
		65		17,0
		90		26,0
1150-1400	710	25	600	12,0
		35		18,0
		42		19,2
		50		21,0
		65		26,7
		90		37,0



Forbehold mod tekniske ændringer

09-16-211