



## 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.

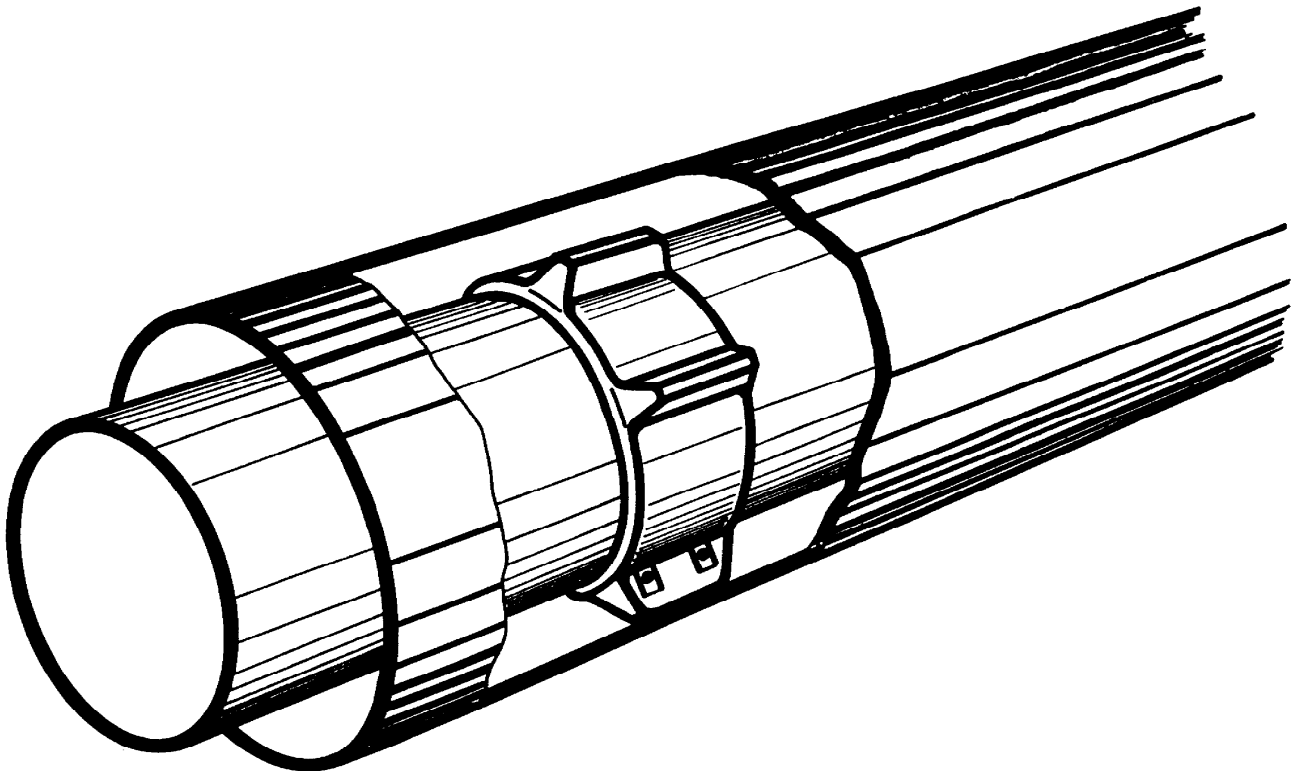
For this comprehensive range of application the *plastic insulators* offer various advantages such as:

- 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 <u>OD 118,3 mm</u> |   |
|                               | $88,2 \text{ mm} : 2 = 44,1 \text{ mm}$ |

**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 <sup>1)</sup> | 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 <sup>2)</sup> | 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 <sup>3)</sup> | 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        |       |                             |                        |

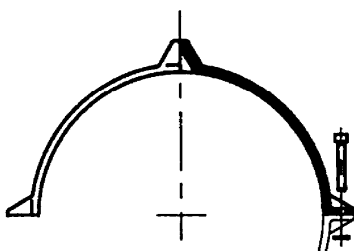
1) max up to OD 75 mm with 4xM6x55 bolts

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

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

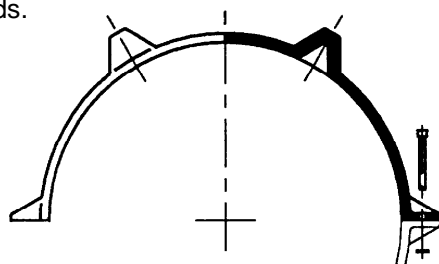
4) max up to OD 127,0 mm with 4xM6x70 bolts

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

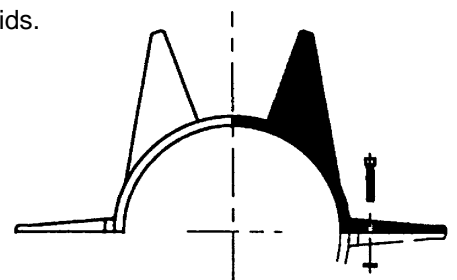


| Sizing chart type PA 6 to PA 12 |    |                       |         |                |             |       |                            |                        |
|---------------------------------|----|-----------------------|---------|----------------|-------------|-------|----------------------------|------------------------|
| 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           | 90,0        |       |                            |                        |
| 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           | 90,0        |       |                            |                        |
| 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          | 90,0        |       |                            |                        |
| 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:

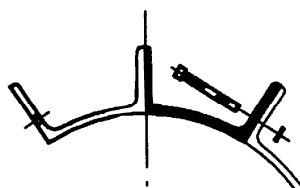
- variable ring diameter
- only two segment sizes are required to assemble OD 98 to OD 385 insulator rings - a decisive edge in stock-keeping

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.

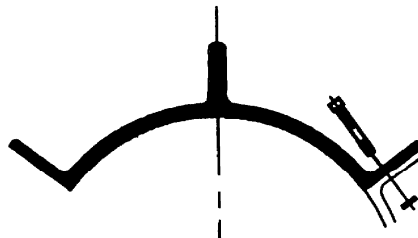
| Sizing chart type AZ 1 |                       |         |                   |                |       |                                   |                          |
|------------------------|-----------------------|---------|-------------------|----------------|-------|-----------------------------------|--------------------------|
| Pipe diameter<br>mm    | Outside pipe diameter |         | Insulator<br>type | Skid<br>height | Width | Number of<br>segments<br>per ring | Bolt numbers<br>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<br>mm    | Outside pipe diameter |         | Insulator<br>type | Skid<br>height | Width | Number of<br>segments<br>per ring | Bolt numbers<br>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+<br>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 +<br>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*

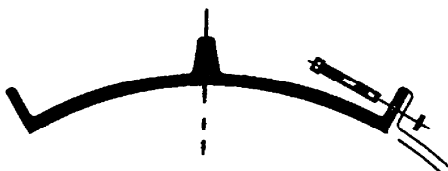
The skid height of the segments is calculated from the difference in diameter of the carrier pipe and the casing pipe. (see ex. by type PA).

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<br>MA 36<br>MA 50<br>MA 67<br>MA 75           | 25,0<br>36,0<br>50,0<br>65,0<br>75,0 | 160      | 3                | 2 x M8 x 70            |
| MA 2/25<br>MA 2/36<br>MA 2/50<br>MA 2/67<br>MA 2/75 | 25,0<br>36,0<br>50,0<br>65,0<br>75,0 | 160      | 3                | 2 x M8 x 70            |

Sectional drawing MA.



Sectional drawing MA 2.

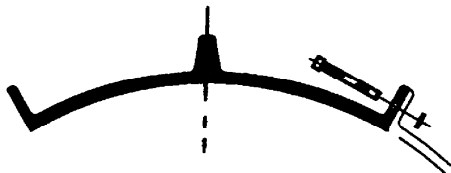




| Sizing chart type MA |                       |         |                                |                          |
|----------------------|-----------------------|---------|--------------------------------|--------------------------|
| Pipe diameter<br>mm  | Outside pipe diameter |         | Number of segments<br>per ring | Bolt numbers<br>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 RGV + 1 segment RGV 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).

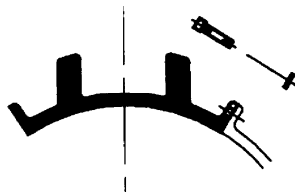
Bolts and nuts included.

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.



| <b>Sizing chart type RGV</b> |                              |                |  |                                   |
|------------------------------|------------------------------|----------------|--|-----------------------------------|
| <b>Pipe diameter<br/>mm</b>  | <b>Outside pipe diameter</b> |                | <b>Number of segments<br/>per ring</b> | <b>Bolt numbers<br/>and sizes</b> |
|                              | <b>min. mm</b>               | <b>max. mm</b> |  |                                   |
| 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

| <b>Sizing chart type GKO</b> |                |                          |               |
|------------------------------|----------------|--------------------------|---------------|
| <b>Outside pipe diameter</b> |                | <b>Type and segments</b> |               |
| <b>Min. mm</b>               | <b>Max. mm</b> | <b>GKO-gl/gs</b>         | <b>GKO-gh</b> |
| 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



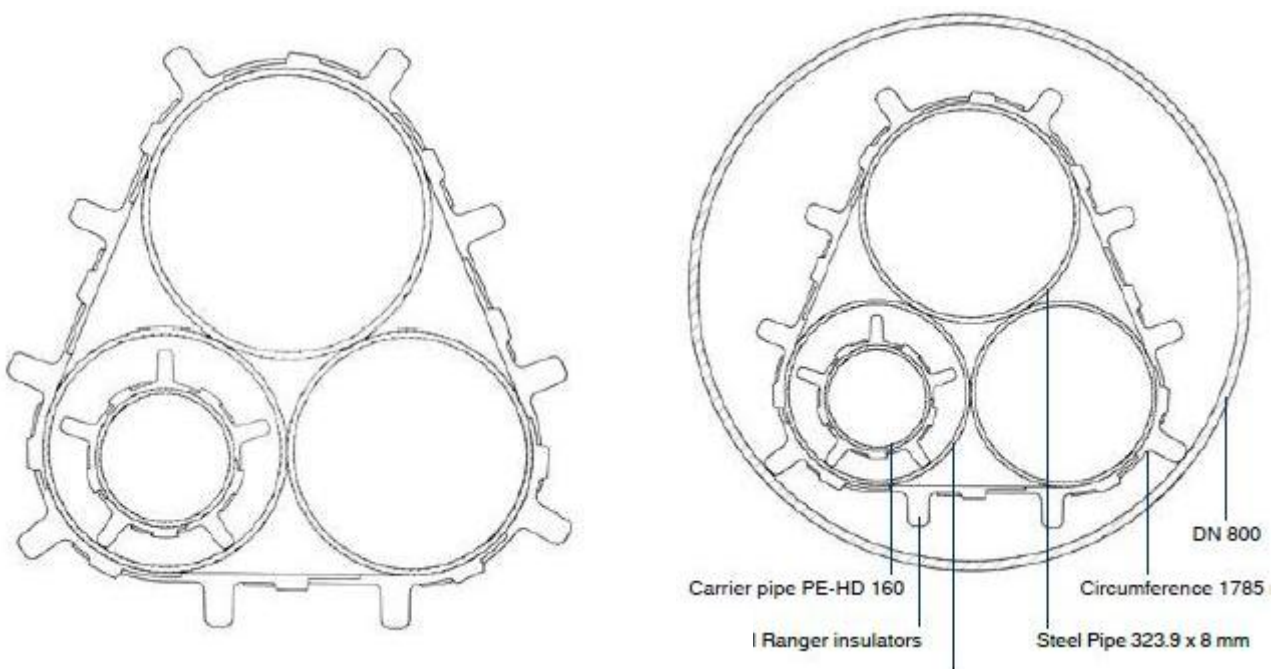
**Insulator rings type Ranger  
for pipe bundling**

**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

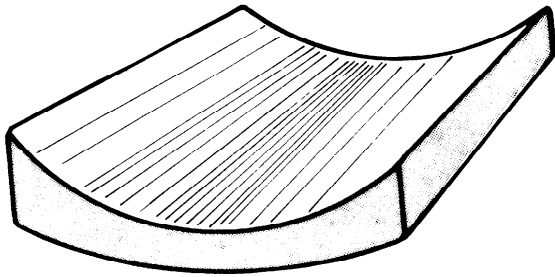
#### Maxi 0,5

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.

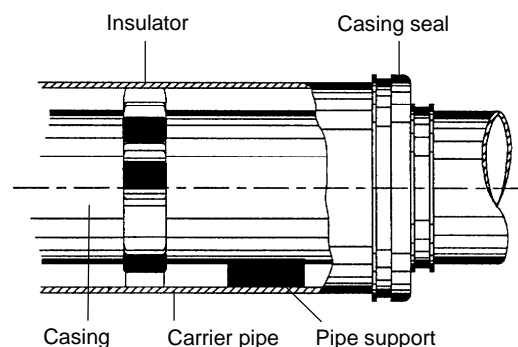
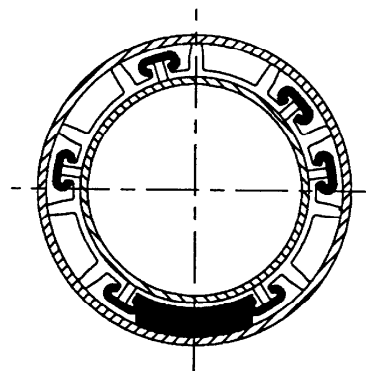
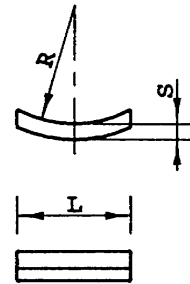
Carrying capacity 500 N / cm<sup>2</sup>

Thickness 0,85 g / cm<sup>3</sup>

### Various types

Are available with rubber lining.

| Sizing chart pipe supports |                               |    |     |              |
|----------------------------|-------------------------------|----|-----|--------------|
| Pipe dia.<br>mm            | Pipe supports dimension in mm |    |     | Weight<br>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

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