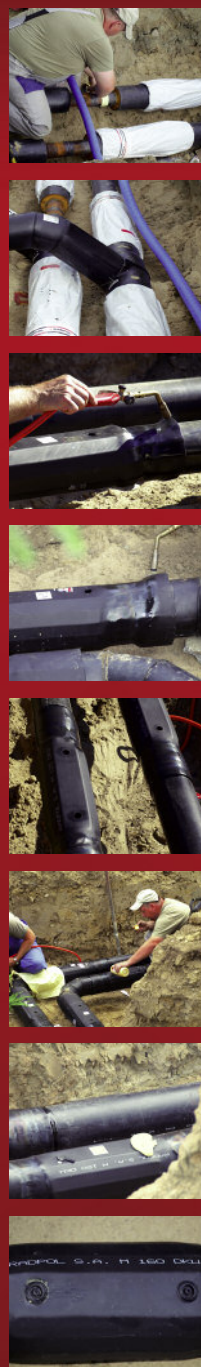




QUALITY PRECISION TECHNOLOGY



PRODUCTS  
FOR PREINSULATED  
PIPELINE SYSTEMS

# Radiation crosslinked heat shrink joints for preinsulated pipeline systems

Heat shrink joints are designed for the reconstruction of the jacket pipe in the joint areas of the preinsulated pipes.

The joints made of radiation crosslinked polyethylene guarantee their high shrink strength and the shape memory. These features are basic for performing reliable, flexible and tight joint which is resistant to temperatures from -55°C to +125°C.

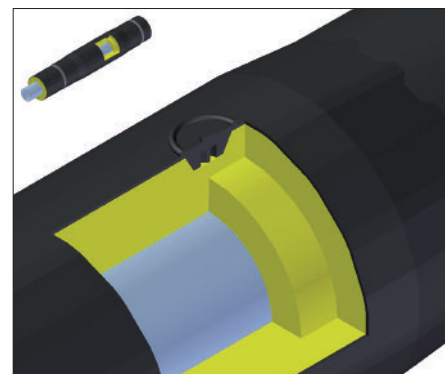
Radiation crosslinked heat shrink joints perfectly reconstruct the jacket of the preinsulated pipe which results in reducing the soil frictional resistance and thus the life length of the joint. They are also highly resistant to stress corrosion. Due to high shrinking strength, ageing resistance and mechanical strength against the soil stress as a result of the thermal elongation in the pipeline, the joints assure reliability and safety of the performed joint.

Random spatial network of hydrocarbon bonds appears in the entire structure of HDPE material exposed to radiation crosslinking process. The crosslinking process restricts the quantity of unbounded molecules in the volume of the material which excludes the fusion of two elements of crosslinked polyethylene.

The foaming holes are the only areas in the heat shrink joint protected against the crosslinking during the production. The remaining part of the heat shrink joint is crosslinked. The non-crosslinked area keeps the initial features of HDPE which allows for welding the plugs.



The unique combination of non-crosslinked (possibility of welding a plug) and crosslinked materials (high shrinking strength, ideal shape imaging, higher mechanical durability) as well as special formula of sealant (hot melt and/or mastic) puts this solution among the most innovative, user friendly and reliable joints for the preinsulated pipelines.



## Properties of joints' and sleeves' material

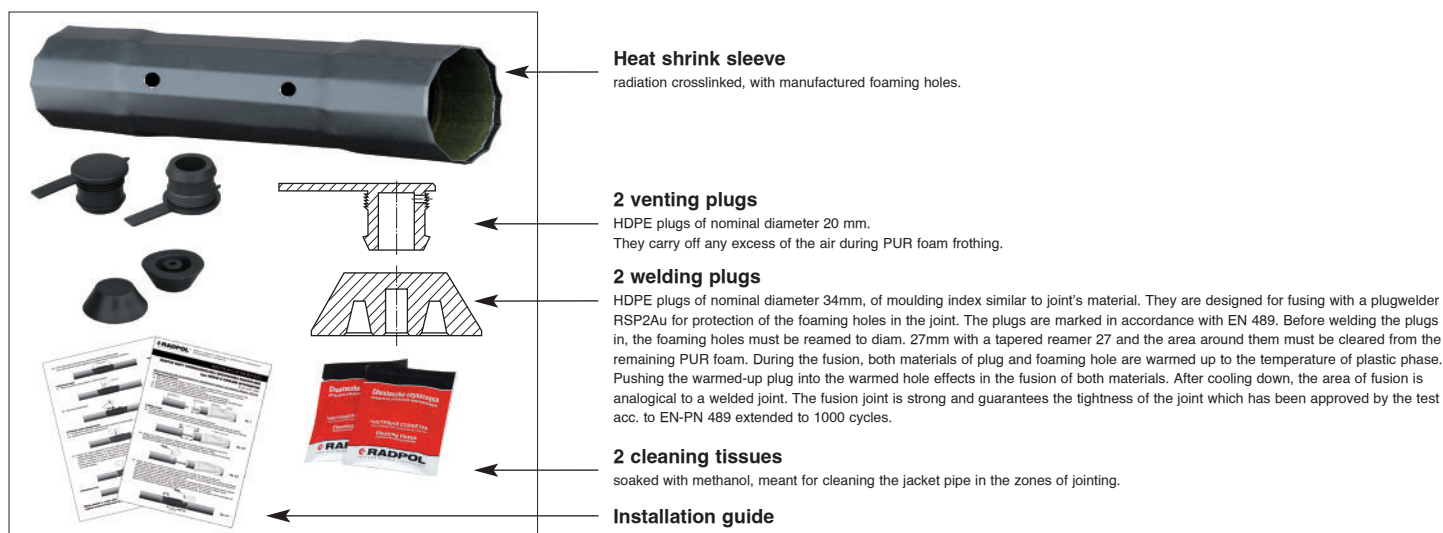
Heat shrink joint is made of black polyethylene of high density, radiation crosslinked.

| Properties                               | Test acc. to norm | Value                   |
|------------------------------------------|-------------------|-------------------------|
| Density                                  | ISO 1183          | 0,955 g/cm <sup>3</sup> |
| Hardness, Shore D                        | ISO 868           | 60                      |
| Tensile strength at break                | ISO 527           | min. 30 MPa             |
| Elongation at break                      | ISO 527           | min. 700%               |
| Heat ageing (150°C, 168 h)               |                   |                         |
| - Tensile strength at break after ageing | ISO 527           | min. 25 MPa             |
| - Elongation at break after ageing       | ISO 527           | min. 600%               |
| Oxidation induction time (210°C)         | EN-728            | min. 20 minutes         |
| Carbon black content                     | ASTM D1603        | 2,2%                    |

### Additional properties:

- high durability of crosslinked material assures the joints' resistance to friction and rupture,
- application of sealant protects the joint area in hard conditions,
- no need of spacers during the installation (no wedges needed),
- minimum quantity of the joint's elements shortens the time of installation which effects in high efficiency of the joint and lowers the costs of it,
- the joints aren't prone to aggressive chemical factors and UV radiation,
- homogeneous layer of the sealant (hot melt and/or mastic) is resistant to soiling and does not peel off when sliding the joint along the preinsulated pipe,
- each joint is wrapped with a white PVC sleeve.

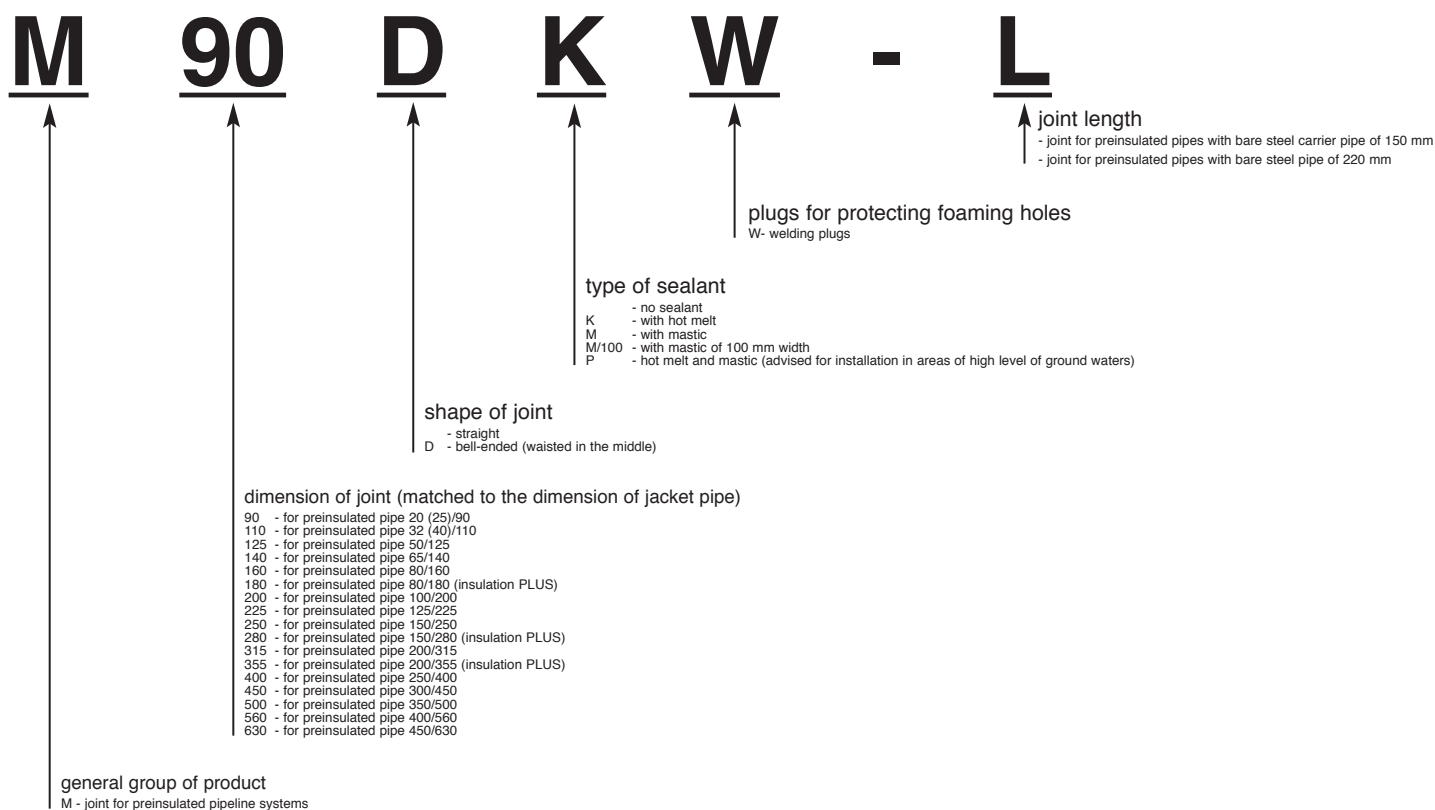
## Content of joint



## Storage

Joints have to be stored vertically in dry and shady places in temperature between +10°C to +70°C.  
Keep away from the direct sunlight regarding to applied hot melt and/or mastic.

## Product code processing



## Properties of mastic

| Properties                                                    | Value                                                                                                         |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Colour                                                        | Black                                                                                                         |
| Peel strength<br>PN-EN 12068 at. C<br>PE/PEX<br>Speed of test | LDPE min. 50N/25 mm<br>HDPE min. 50N/25 mm<br>50 mm/min                                                       |
| Service temperature                                           | -40° do +80°C                                                                                                 |
| Content of solid                                              | ok. 100%                                                                                                      |
| Penetration (cone 150g, 6 sec. 20°C)                          | ok. 60 <sup>1</sup> / <sub>10</sub> mm                                                                        |
| Runoff from Al plate                                          | Max. 2 mm (tested in +70°C after 2h, angle 45°, acc. to PN-B-24009:1997)                                      |
| Changes after ageing in temp. +120°C for 2h                   | Change of surface (gasification, surface cracks, change of surface, loss of surface adhesion) – non-allowable |

## Properties of sealants

### Properties of hot melt

| Properties                                                                 | Value                         |
|----------------------------------------------------------------------------|-------------------------------|
| Melting point PN-EN 1238:2001 (in glycerol)                                | 75 - 95°C                     |
| Melting viscosity<br>PN-ISO 2555:1999, (HBDV, w. 27)                       | 180°C 8500 - 13500 mPas       |
| Peel strength<br>PN-EN 12068 att. C<br>PE/PEX (LDPE,HDPE)<br>Speed of test | min. 125 N/25 mm<br>50 mm/min |
| Resistance to low temperatures                                             | -20°C                         |

## Joint dimensions

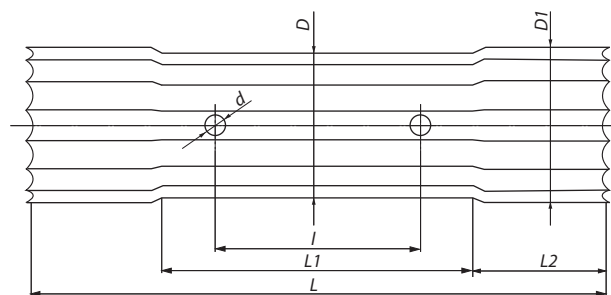
Joints are produced in two versions:

### 1. Bell-ended joint waisted in the middle

Dimensions of joint waisted in the middle for preinsulated pipes

- with 150 mm of bare steel carrier pipe

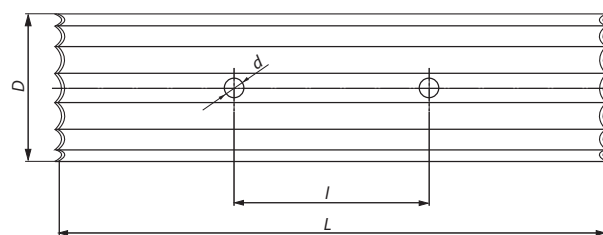
| Joint    | Diameter                     |                             |                                              | Length         |            |           | Foaming holes |                        |
|----------|------------------------------|-----------------------------|----------------------------------------------|----------------|------------|-----------|---------------|------------------------|
|          | Inner diameter of waist part | Inner diameter of bell-ends | Maximum inner diameter after entire recovery | Minimum length | Waist part | Bell-ends | Diameter      | Gauge of foaming holes |
|          | D                            | D1                          |                                              | L              | L1         | L2        | d             | l                      |
| M90D...  | 95                           | 105                         | 77                                           | 650            | 350        | 150       | 20            | 240                    |
| M110D... | 118                          | 128                         | 90                                           |                |            |           |               |                        |
| M125D... | 132                          | 142                         | 110                                          |                |            |           |               |                        |
| M140D... | 146                          | 156                         | 125                                          |                |            |           |               |                        |
| M160D... | 168                          | 180                         | 140                                          |                |            |           |               |                        |
| M180D... | 190                          | 200                         | 140                                          |                |            |           |               |                        |
| M200D... | 208                          | 220                         | 160                                          |                |            |           |               |                        |
| M225D... | 236                          | 250                         | 200                                          |                |            |           |               |                        |
| M250D... | 262                          | 278                         | 225                                          |                |            |           |               |                        |
| M280D... | 290                          | 300                         | 225                                          |                |            |           |               |                        |
| M315D... | 324                          | 340                         | 250                                          |                |            |           |               |                        |
| M355D... | 365                          | 375                         | 338                                          |                |            |           |               |                        |
| M400D... | 415                          | 430                         | 338                                          | 750            |            | 200       |               |                        |
| M450D... | 470                          | 480                         | 338                                          |                |            |           |               |                        |
| M500D... | 530                          | 540                         | 400                                          |                |            |           |               |                        |
| M560D... | 580                          | 590                         | 400                                          |                |            |           |               |                        |



Dimensions of joint waisted in the middle for preinsulated pipes

- with 220 mm of bare steel carrier pipe

| Joint      | Diameter                     |                             |                                              | Length         |            |           | Foaming holes |                        |
|------------|------------------------------|-----------------------------|----------------------------------------------|----------------|------------|-----------|---------------|------------------------|
|            | Inner diameter of waist part | Inner diameter of bell-ends | Maximum inner diameter after entire recovery | Minimum length | Waist part | Bell-ends | Diameter      | Gauge of foaming holes |
|            | D                            | D1                          |                                              | L              | L1         | L2        | d             | l                      |
| M90D...-L  | 95                           | 105                         | 77                                           | 700            | 500        | 100       | 20            | 350                    |
| M110D...-L | 118                          | 128                         | 90                                           |                |            |           |               |                        |
| M125D...-L | 132                          | 142                         | 110                                          |                |            |           |               |                        |
| M140D...-L | 146                          | 156                         | 125                                          |                |            |           |               |                        |
| M160D...-L | 168                          | 180                         | 140                                          |                |            |           |               |                        |
| M180D...-L | 190                          | 200                         | 140                                          |                |            |           |               |                        |
| M200D...-L | 208                          | 220                         | 160                                          |                |            |           |               |                        |
| M225D...-L | 236                          | 250                         | 200                                          |                |            |           |               |                        |
| M250D...-L | 262                          | 278                         | 225                                          |                |            |           |               |                        |
| M280D...-L | 290                          | 300                         | 225                                          |                |            |           |               |                        |
| M315D...-L | 324                          | 340                         | 250                                          |                |            |           |               |                        |
| M355D...-L | 365                          | 375                         | 338                                          |                |            |           |               |                        |
| M400D...-L | 415                          | 430                         | 338                                          | 750            |            | 125       |               |                        |
| M450D...-L | 470                          | 480                         | 338                                          |                |            |           |               |                        |
| M500D...-L | 530                          | 540                         | 400                                          |                |            |           |               |                        |
| M560D...-L | 580                          | 590                         | 400                                          |                |            |           |               |                        |
| M630D...-L | 660                          | 670                         | 400                                          | 850            |            | 175       |               |                        |



### 2. Straight joint

Dimensions of straight joint for preinsulated pipes

- with 150 mm of bare steel carrier pipe

| Joint   | Diameter                       |                                              | Length | Foaming holes |                        |
|---------|--------------------------------|----------------------------------------------|--------|---------------|------------------------|
|         | Inner diameter of central part | Maximum inner diameter after entire recovery |        | Diameter      | gauge of foaming holes |
|         | D                              |                                              |        | d             | l                      |
| M90...  | 105                            | 77                                           | 650    | 20            | 240                    |
| M110... | 128                            | 90                                           |        |               |                        |
| M125... | 142                            | 110                                          |        |               |                        |
| M140... | 156                            | 125                                          |        |               |                        |
| M160... | 180                            | 140                                          |        |               |                        |
| M180... | 200                            | 140                                          |        |               |                        |
| M200... | 220                            | 160                                          |        |               |                        |
| M225... | 250                            | 200                                          |        |               |                        |
| M250... | 278                            | 225                                          |        |               |                        |
| M280... | 300                            | 225                                          |        |               |                        |
| M315... | 340                            | 250                                          |        |               |                        |
| M355... | 375                            | 338                                          |        |               |                        |
| M400... | 430                            | 338                                          | 750    |               |                        |
| M450... | 480                            | 338                                          |        |               |                        |
| M500... | 540                            | 400                                          |        |               |                        |
| M560... | 590                            | 400                                          |        |               |                        |

Dimensions of straight joint for preinsulated pipes

- with 220 mm of bare steel carrier pipe

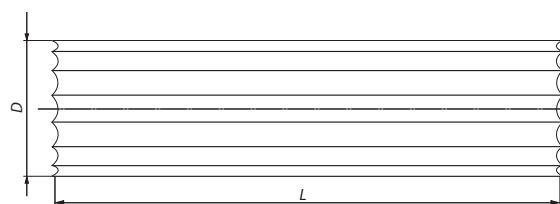
| Joint     | Diameter                       |                                              | Length | Foaming holes |                        |
|-----------|--------------------------------|----------------------------------------------|--------|---------------|------------------------|
|           | Inner diameter of central part | Maximum inner diameter after entire recovery |        | Diameter      | gauge of foaming holes |
|           | D                              |                                              |        | d             | l                      |
| M90...-L  | 105                            | 77                                           | 700    | 20            | 350                    |
| M110...-L | 128                            | 90                                           |        |               |                        |
| M125...-L | 142                            | 110                                          |        |               |                        |
| M140...-L | 156                            | 125                                          |        |               |                        |
| M160...-L | 180                            | 140                                          |        |               |                        |
| M180...-L | 200                            | 140                                          |        |               |                        |
| M200...-L | 220                            | 160                                          |        |               |                        |
| M225...-L | 250                            | 200                                          |        |               |                        |
| M250...-L | 278                            | 225                                          |        |               |                        |
| M280...-L | 300                            | 225                                          |        |               |                        |
| M315...-L | 340                            | 250                                          |        |               |                        |
| M355...-L | 375                            | 338                                          |        |               |                        |
| M400...-L | 430                            | 338                                          | 750    |               |                        |
| M450...-L | 480                            | 338                                          |        |               |                        |
| M500...-L | 540                            | 400                                          |        |               |                        |
| M560...-L | 590                            | 400                                          |        |               |                        |
| M630...-L | 660                            | 400                                          | 850    |               |                        |

## Radiation crosslinked heat shrink sleeve, straight, for preinsulated pipeline systems

Heat shrink straight sleeves are designed for performing joints with a use of pre-foamed half-shells. They are produced for the preinsulated pipes from 90 mm to 560 mm of jacket diameters. PUR half-shells do not make a set with the sleeve. RADPOL can also provide extra pre-sized PUR half-shells for any carrier/jacket pipe combination.

### Sleeve dimensions

| Sleeve    | Diameter         |                                              | Minimum sleeve length L |
|-----------|------------------|----------------------------------------------|-------------------------|
|           | Inner diameter D | Maximum inner diameter after entire recovery |                         |
| TN... 90  | 105              | 77                                           | 650                     |
| TN... 110 | 128              | 90                                           |                         |
| TN... 125 | 142              | 110                                          |                         |
| TN... 140 | 156              | 125                                          |                         |
| TN... 160 | 180              | 140                                          |                         |
| TN... 180 | 200              | 140                                          |                         |
| TN... 200 | 220              | 160                                          |                         |
| TN... 225 | 250              | 200                                          |                         |
| TN... 250 | 278              | 225                                          |                         |
| TN... 280 | 300              | 225                                          |                         |
| TN... 315 | 340              | 250                                          |                         |
| TN... 355 | 375              | 338                                          |                         |
| TN... 400 | 430              | 338                                          |                         |
| TN... 450 | 480              | 338                                          |                         |
| TN... 500 | 530              | 400                                          | 750                     |
| TN... 560 | 590              | 400                                          |                         |



### Joint matching

Match of heat shrink sleeve with hot melt to preinsulated pipe dimensions:

| Sleeve    | Preinsulated pipe dimensions |              |
|-----------|------------------------------|--------------|
|           | Jacket pipe                  | Carrier pipe |
| TN... 90  | 90                           | 20, 25       |
| TN... 110 | 110                          | 32, 40       |
| TN... 125 | 125                          | 50           |
| TN... 140 | 140                          | 65           |
| TN... 160 | 160                          | 80           |
| TN... 180 | 180                          | 80           |
| TN... 200 | 200                          | 100          |
| TN... 225 | 225                          | 125          |
| TN... 250 | 250                          | 150          |
| TN... 280 | 280                          | 150          |
| TN... 315 | 315                          | 200          |
| TN... 355 | 355                          | 200          |
| TN... 400 | 400                          | 250          |
| TN... 450 | 450                          | 300          |
| TN... 500 | 500                          | 350          |
| TN... 560 | 560                          | 400          |

#### Storage:

Sleeves have to be stored vertically in dry and shady places in temperature between +10°C to +70°C.

Keep away from the direct sunlight regarding to applied hot melt and/or mastic.

Non-standard sleeves are supplied for request.

#### NOTE

Sleeves are supplied with the following variety of sealants:

- TN - crosslinked heat shrink sleeve without sealant
- TNK - crosslinked heat shrink sleeve with integrated hot melt
- TNM - crosslinked heat shrink sleeve with integrated mastic
- TNP - crosslinked heat shrink sleeve with integrated hot melt and mastic

Sleeve TNP is designed for application in places of high level of the ground waters.

## Radiation crosslinked heat shrink reduction joint for liquid PUR foaming for preinsulated pipeline systems

Reduction joints are meant for the recovery of preinsulated pipes' jackets of two different diameters. During the design of preinsulated pipeline network, the designers usually use preinsulated steel reducers for the connection of two pipelines of different diameters. Then, there is a need for using two standard joints to connect the preinsulated reducer and the preinsulated pipes. This solution raises the costs of the investment.

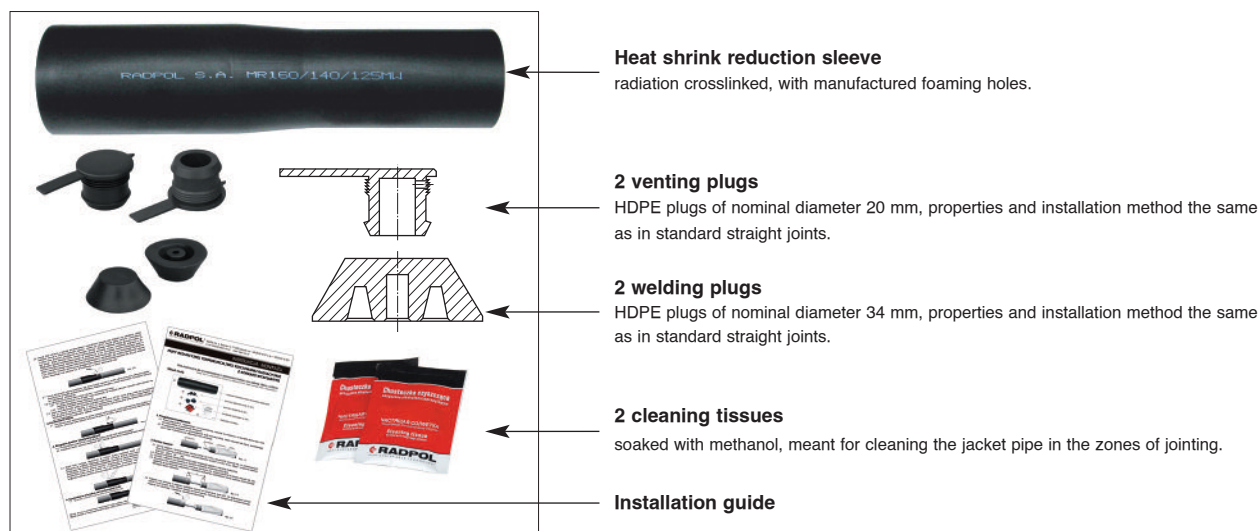
The heat shrink reduction joint is a user-friendly alternative as for it eliminates application of the preinsulated reducer and two standard joints. The other advantage, beside lowering the costs, is shortening the time of construction works. The radiation crosslinked heat shrink reduction joint guarantees performing reliable and tight connection of two preinsulated pipes covering even two-dimension difference due to its shape memory and high shrink strength. The shape and dimension of the reduction joint is closely matched to the preinsulated pipes' diameters which are going to be jointed.

RADPOL reduction joints' advantage is high resistance to stress corrosion and the molded step-down lowers the soil frictional resistance during the thermal movements of the pipeline.

**Installation of the reduction joint** consists in shrinking down two ends of it and foaming it with the liquid PUR foam and then protecting the foaming holes with the welding plugs. The plugs are welded into non-crosslinked area which results in the fusion of the plug's and the joint's materials. This kind of welding is prone to any moisture leaks and guarantees tightness and long life of the joint.



## Content of reduction joint



### Storage:

Joints have to be stored vertically in dry and shady places in temperature between +10°C to +70°C.  
Keep away from direct sunlight regarding to applied hot melt and/or mastic.

## Joint matching

Match of heat shrink joints with hot melt to preinsulated pipe dimensions:

- preinsulated pipes with 150 mm of bare steel carrier pipe

| Joint           | Preinsulated pipe dimensions |                  |
|-----------------|------------------------------|------------------|
|                 | Jacket pipe                  | Carrier pipe     |
| MR110/90MW      | 110/90                       | 40, 32/25, 20    |
| MR125/110/90MW  | 125/110/90                   | 50/40, 32/25, 20 |
| MR140/125/110MW | 140/125/110                  | 65/50/40, 32     |
| MR160/140/125MW | 160/140/125                  | 80/65/50         |
| MR200/160/140MW | 200/160/140                  | 100/80/65        |

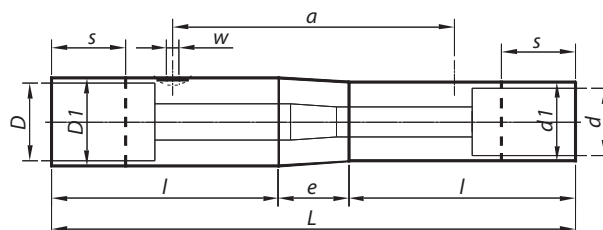
**NOTE:** Heat shrink reduction joint is designed for majority standard welded seamless steel reducers.

Reduction joints are supplied with mastic sealant as standard.  
Other types of sealants are available for request.

- preinsulated pipes with 220 mm of bare steel carrier pipe

| Joint             | Preinsulated pipe dimensions |                  |
|-------------------|------------------------------|------------------|
|                   | Jacket pipe                  | Carrier pipe     |
| MR110/90MW-L      | 110/90                       | 40, 32/25, 20    |
| MR125/110/90MW-L  | 125/110/90                   | 50/40, 32/25, 20 |
| MR140/125/110MW-L | 140/125/110                  | 65/50/40, 32     |
| MR160/140/125MW-L | 160/140/125                  | 80/65/50         |
| MR200/160/140MW-L | 200/160/140                  | 100/80/65        |

**NOTE:** Heat shrink reduction joint is designed for majority standard welded seamless steel reducers.



## Reduction joint dimensions:

Dimensions of joint MR...MW for preinsulated pipes with 150 mm of bare steel carrier pipe

| Joint           | Preinsulated pipe |         | Dimensions of joint |                  |        |               |                |                             |                   |             |
|-----------------|-------------------|---------|---------------------|------------------|--------|---------------|----------------|-----------------------------|-------------------|-------------|
|                 | Input             | Output  | Bigger diameter     | Smaller diameter | Length | Straight part | Step-down part | Gauge of foam-<br>ing holes | Diameter of holes | Shrink area |
|                 | D                 | d       | D1                  | d1               | L      | l             | e              | a                           | w                 | s           |
| MR110/90MW      | 110               | 90      | 125                 | 100              | 650    | 270           | 115            | 305                         | 20                | 120         |
| MR125/110/90MW  | 125               | 110/90  | 140                 | 125              | 700    | 295           |                | 330                         |                   |             |
| MR140/125/110MW | 140               | 125/110 | 160                 | 140              |        |               |                |                             |                   |             |
| MR160/140/125MW | 160               | 140/125 | 180                 | 160              |        |               |                |                             |                   |             |
| MR200/160/140MW | 200               | 160/140 | 220                 | 180              |        |               |                |                             |                   |             |

Dimensions of joint MR...MW-L for preinsulated pipes with 220 mm of bare steel carrier pipe

| Joint             | Preinsulated pipe |         | Dimensions of joint |                  |        |               |                |                         |                   |             |
|-------------------|-------------------|---------|---------------------|------------------|--------|---------------|----------------|-------------------------|-------------------|-------------|
|                   | Input             | Output  | Bigger diameter     | Smaller diameter | Length | Straight part | Step-down part | Gauge of foam-ing holes | Diameter of holes | Shrink area |
|                   | D                 | d       | D1                  | d1               | L      | l             | e              | a                       | w                 | s           |
| MR110/90MW-L      | 110               | 90      | 125                 | 100              | 800    | 345           | 115            | 445                     | 20                | 120         |
| MR125/110/90MW-L  | 125               | 110/90  | 140                 | 125              | 850    | 370           |                | 470                     |                   |             |
| MR140/125/110MW-L | 140               | 125/110 | 160                 | 140              |        |               |                |                         |                   |             |
| MR160/140/125MW-L | 160               | 140/125 | 180                 | 160              |        |               |                |                         |                   |             |
| MR200/160/140MW-L | 200               | 160/140 | 220                 | 180              |        |               |                |                         |                   |             |

# Radiation crosslinked heat shrink bend joint for PUR liquid foaming for preinsulated pipeline systems

Bend joint is designed for changing the direction of the preinsulated pipeline to any angle between 0°-90°. It is meant for jacket pipes of diam. 90 mm to 160 mm. The change of pipeline's direction is necessary during the construction of the pipeline network due to some specific land shape or some obstacles. In this situation the preinsulated bends are installed with the use of two standard joints. Such solution influences much on the cost of the investment.

The alternative solution is a flexible bend joint which allows for re-directing of the pipeline to any angle.

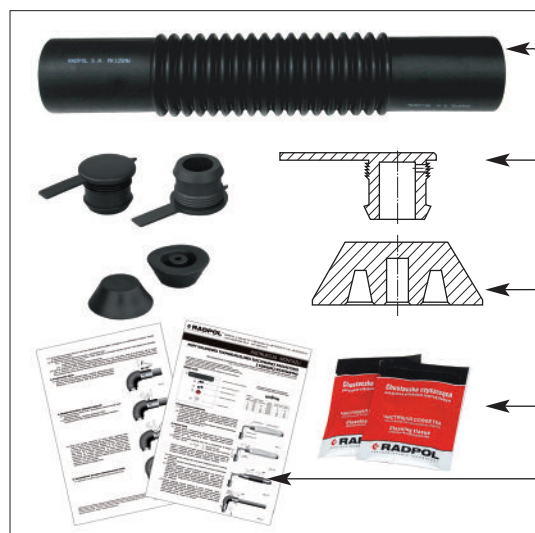
The main advantage of the bend joint is lowering the cost of installation by reducing the quantity of straight joints and steel bends in favour of flexible joint. The bend joint is produced from radiation crosslinked polyethylene which results in shape memory and high shrink strength. These features guarantee performing the reliable and tight bend joint. The warmed up accordion-folded part may be bended to maximum 90°.



## Installation

Before sliding the heat shrink bend, the spacer should be put on the welded steel bend. Then one should warm up the accordion-folded part of the heat shrink bend joint and slide it onto the steel bend. Next steps are similar to installation of standard joints and reduction joints. After shrinking of the joint's ends and foaming the joint, one should fuse in the welding plugs. The plugs are welded into non-crosslinked area which results in the fusion of the plug's and the joint's materials. This kind of welding is prone to any moisture leaks and guarantees tightness and long life of the joint.

## Content of bend joint



### Heat shrink bend sleeve

radiation crosslinked, with manufactured foaming holes.

### 2 venting plugs

HDPE plugs of nominal diameter 20 mm, properties and installation method the same as in standard straight joints.

### 2 welding plugs

HDPE plugs of nominal diameter 34 mm, properties and installation method the same as in standard straight joints.

### 2 cleaning tissues

soaked with methanol, meant for cleaning the jacket pipe in the zones of jointing.

### Installation guide

## Extra accessories

In order to install the heat shrink bend joint properly one should use steel bend of matched dimensions and radius. The steel bends are supplied for request.

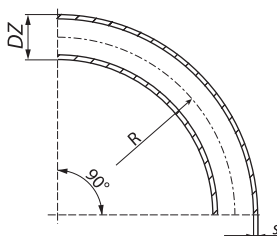


Each steel bend by RADPOL is supplied with a ring spacer. Non-standard steel bends are supplied for requests.

**Storage:** Joints have to be stored vertically in dry and shady places in temperature between +10°C to +70°C. Keep away from the direct sunlight regarding to applied hot melt and/or mastic.

## Joint matching

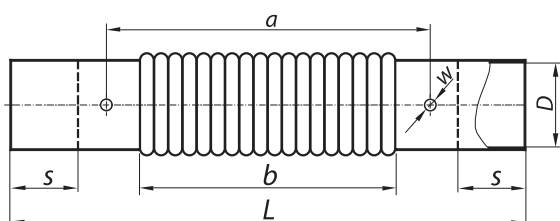
| Joint          | Preinsulated pipe dimensions |              |
|----------------|------------------------------|--------------|
|                | Jacket pipe                  | Carrier pipe |
| <b>MK90MW</b>  | 90                           | 20, 25       |
| <b>MK110MW</b> | 110                          | 32, 40       |
| <b>MK125MW</b> | 125                          | 50           |
| <b>MK140MW</b> | 140                          | 65           |
| <b>MK160MW</b> | 160                          | 80           |



Steel bend dimensions

| Bend joint     | Steel bend                  |                           |                     |                     |
|----------------|-----------------------------|---------------------------|---------------------|---------------------|
|                | Nominal diameter<br>DN [mm] | Outer diameter<br>DZ [mm] | Wall thickness<br>s | Radius of bend<br>R |
| <b>MK90MW</b>  | 20                          | 26,9                      | 2,3                 | 125                 |
|                | 25                          | 33,7                      | 2,6                 | 125                 |
| <b>MK110MW</b> | 32                          | 42,4                      | 2,6                 | 150                 |
|                | 40                          | 48,3                      | 2,6                 | 150                 |
| <b>MK125MW</b> | 50                          | 60,3                      | 2,9                 | 170                 |
| <b>MK140MW</b> | 65                          | 76,1                      | 2,9                 | 180                 |
| <b>MK160MW</b> | 80                          | 88,9                      | 3,2                 | 200                 |

## Heat shrink bend joint dimensions

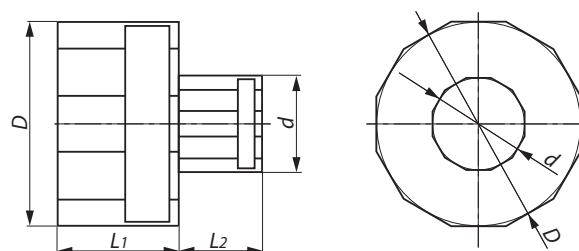


| Bend joint     | Inner diameter | Total length | Diameter of foaming holes | Gauge of foaming holes | Shrinking area | Approx. length of accordion-folded part |
|----------------|----------------|--------------|---------------------------|------------------------|----------------|-----------------------------------------|
|                | D              | L            | w                         | a                      | s              | b                                       |
| <b>MK90MW</b>  | 110            | 840          | 20                        | 535                    | 100            | 400                                     |
| <b>MK110MW</b> | 135            | 895          | 20                        | 590                    | 100            | 455                                     |
| <b>MK125MW</b> | 151            | 925          | 20                        | 610                    | 100            | 485                                     |
| <b>MK140MW</b> | 166            | 930          | 20                        | 610                    | 100            | 490                                     |
| <b>MK160MW</b> | 187            | 930          | 20                        | 610                    | 100            | 490                                     |

## Heat shrink end caps

Designed for insulation of pre-insulated pipes' ends and pre-insulated valves. They seal effectively against moisture leak. They are resistant to UV-radiation, aggressive substances, fungus, mildew.

| End cap | Diameters of pre-insulated pipe [mm] |                | End cap dimensions [mm] |     |     |    |
|---------|--------------------------------------|----------------|-------------------------|-----|-----|----|
|         | Jacket pipe                          | Carrier pipe   | D                       | d   | L1  | L2 |
| REC 75  | 75                                   | 15, 20         | 85                      | 44  | 60  | 40 |
| REC 90  | 90                                   | 20, 25         | 105                     | 45  | 60  | 40 |
| REC 110 | 90, 110                              | 20, 25, 32, 40 | 125                     | 65  | 60  | 40 |
| REC 125 | 110, 125                             | 32, 40, 50     | 140                     | 76  | 60  | 40 |
| REC 140 | 125, 140                             | 50, 65         | 156                     | 95  | 60  | 40 |
| REC 160 | 140, 160                             | 65, 80         | 178                     | 105 | 80  | 50 |
| REC 200 | 180, 200                             | 80, 100        | 220                     | 128 | 80  | 50 |
| REC 225 | 200, 225                             | 100, 125       | 245                     | 155 | 80  | 50 |
| REC 250 | 225, 250                             | 125, 150       | 270                     | 185 | 80  | 50 |
| REC 315 | 280, 315                             | 150, 200       | 335                     | 236 | 80  | 50 |
| REC 400 | 355, 400                             | 200, 250       | 420                     | 290 | 80  | 50 |
| REC 450 | 400, 450                             | 250, 300       | 475                     | 340 | 80  | 50 |
| REC 500 | 450, 500                             | 300, 350       | 520                     | 375 | 100 | 70 |
| REC 560 | 500, 560                             | 350, 400       | 580                     | 475 | 100 | 70 |
| REC 630 | 560, 630                             | 400, 450       | 650                     | 530 | 100 | 70 |



RADPOL offers also end caps for sealing of dehydrating and venting ball-taps in district heating systems.

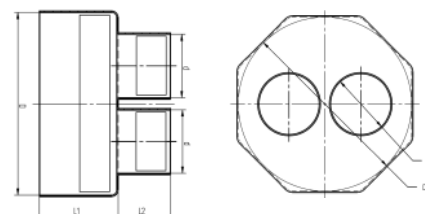
| End cap   | Diameters of pre-insulated pipe [mm] |              | End cap dimensions [mm] |     |    |    |
|-----------|--------------------------------------|--------------|-------------------------|-----|----|----|
|           | jacket pipe                          | Carrier pipe | D                       | d   | L1 | L2 |
| REC 125 Z | 125                                  | 50           | 140                     | 95  | 70 | 40 |
| REC 140 Z | 140                                  | 65           | 156                     | 105 | 70 | 40 |
| REC 160 Z | 160                                  | 80           | 178                     | 128 | 70 | 40 |
| REC 200 Z | 200                                  | 100          | 220                     | 155 | 70 | 40 |

Non-standard end caps are supplied for requests.

**Storage:** End caps have to be stored in dry and shady places in temperature between +10°C to +70°C. Keep away from the direct sunlight regarding to applied mastic.

## Crosslinked heat shrink double end caps

| END-CAP          | Diameters of pre-insulated pipe [mm] |              | End cap dimensions [mm] |    |    |    |
|------------------|--------------------------------------|--------------|-------------------------|----|----|----|
|                  | jacket pipe                          | Carrier pipe | D                       | d  | L1 | L2 |
| REC 2x25(40)/125 | 125                                  | 15, 20       | 140                     | 50 | 60 | 40 |
| REC 2x33,7/140   | 125, 140                             | 20, 25       | 156                     | 45 | 60 | 40 |



## Repair kit, based on heat shrinkable tape (RTN) and closing tape (RTZ)

The heat shrink repair kit is used for reconstruction of mere breakage of heating pipeline and for insulation of pre-insulated joints. It also may be used as protective layer against corrosion in steel pipelines. Kit's elements are made of crosslinked polyethylene. They are covered with sealant, so called binder, which prevents moisture leak and guarantees high resistance to ripping and shearing which effects in steady protection of the preinsulated pipe joints. They are also highly resistant to changing weather conditions, liquid tension, UV-radiation, fungus, mildew. It also plays a role of cathodic protection.

The tape shall be put spirally on the whole joint's length, which is about 700 mm. The coils shall be wound in helical way with a shift of a half width of tape.

| Product code      | Tape dimensions [mm] |           |                  |        |
|-------------------|----------------------|-----------|------------------|--------|
|                   | width                | thickness | binder thickness | length |
| RTN x 150-1,2/0,8 | 150                  | 1,2       | 0,8              | 30     |
| RTN x 200-1,2/0,8 | 200                  | 1,2       | 0,8              | 30     |
| RTN x 250-1,2/0,8 | 250                  | 1,2       | 0,8              | 30     |
| RTN x 300-1,2/0,8 | 300                  | 1,2       | 0,8              | 30     |

At the ends of tape layer one should make an extra protection coil to avoid any de-sealing in case of end's rip. Next, one should strengthen the ending coil with RTZ closing tape (patch).



RTN tape match for preinsulated pipe reconstruction

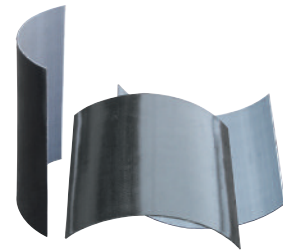
| Jacket pipe | Tape type                                                                            | Tape length | Tape type                                                                             | Tape length | Tape type                                                                             | Tape length | Tape type                                                                             | Tape length |
|-------------|--------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|-------------|---------------------------------------------------------------------------------------|-------------|
| mm          |                                                                                      | mm          |                                                                                       | mm          |                                                                                       | mm          |                                                                                       | mm          |
| 90          | RTN x 150-1,2/0,8<br>(for joint reconstruction<br>of jacket pipe diam.<br>90-140 mm) | 3400        | RTN x 200-1,2/0,8<br>(for joint reconstruction<br>of jacket pipe diam.<br>160-225 mm) | 2700        | RTN x 250-1,2/0,8<br>(for joint reconstruction<br>of jacket pipe diam.<br>160-225 mm) | 2500        | RTN x 300-1,2/0,8<br>(for joint reconstruction<br>of jacket pipe diam.<br>250-400 mm) | 2300        |
| 110         |                                                                                      | 4100        |                                                                                       | 3300        |                                                                                       | 3000        |                                                                                       | 2700        |
| 125         |                                                                                      | 4600        |                                                                                       | 3700        |                                                                                       | 3400        |                                                                                       | 3000        |
| 140         |                                                                                      | 5200        |                                                                                       | 4100        |                                                                                       | 3700        |                                                                                       | 3300        |
| 160         |                                                                                      | 5900        |                                                                                       | 4700        |                                                                                       | 4200        |                                                                                       | 3700        |
| 180         |                                                                                      | 6600        |                                                                                       | 5200        |                                                                                       | 4700        |                                                                                       | 4100        |
| 200         |                                                                                      | 7300        |                                                                                       | 5800        |                                                                                       | 5200        |                                                                                       | 4600        |
| 225         |                                                                                      | 8200        |                                                                                       | 6500        |                                                                                       | 5800        |                                                                                       | 5100        |
| 250         |                                                                                      | 9100        |                                                                                       | 7200        |                                                                                       | 6400        |                                                                                       | 5600        |
| 280         |                                                                                      | 10200       |                                                                                       | 8000        |                                                                                       | 7200        |                                                                                       | 6300        |
| 315         |                                                                                      | 11500       |                                                                                       | 9000        |                                                                                       | 8000        |                                                                                       | 7100        |
| 400         |                                                                                      | 14500       |                                                                                       | 11400       |                                                                                       | 10200       |                                                                                       | 8900        |

**Storage:** Tapes have to be stored in dry and shady places in temperature between +10°C to +70°C. Keep away from the direct sunlight.

## Closing tape (RTZ)

Closing tape is designed for strengthening the ends of crosslinked heat shrink RTN tape after repair of pre-insulated pipe joints. Applicable also for repairs of surface damages of polyethylene pipelines or steel pipelines. It also serves as an anticorrosive protection of joints and welds Closing tape is covered with sealant, so called binder, which prevents moisture penetration. Closing tape has major mechanical features: it is prone to friction and ripping, easily adjusts to the repaired surface.

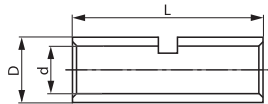
| Product code    | Tape dimensions |            |                |                       |
|-----------------|-----------------|------------|----------------|-----------------------|
|                 | Width (mm)      | length (m) | thickness (mm) | binder thickness (mm) |
| RTZ 150-1,2/0,8 | 150             | 10         | 1,2            | 0,8                   |



## ZCS 4 connector

Copper connection with partition for alarm systems connections

| Wire cross-section [mm²] | Product code | Packing [pcs] | Dimensions [mm] |     |    |
|--------------------------|--------------|---------------|-----------------|-----|----|
|                          |              |               | D               | d   | L  |
| 4                        | ZCS 4        | 100           | 4,8             | 3,1 | 20 |



## Tapered reamer

Tapered reamer of 27 mm in diameter is used for making holes for safety plugs.



## Plugwelders. Straight and angular.

Straight **RSP 2a** and angular **RSP 2aU** plugwelders are used for fusion of the welding plugs into the joints' foaming holes. RADPOL supplies the plugwelders with teflon heads for simultaneous heating of the hole and the plug. The device has a temperature regulator and a heating timer. Power of 600 W.



## PUR liquid foam for crosslinked joint insulation

Sets of PUR liquid foam contain two compounds  
- polyol (compound A) and isocyanate (compound B).  
They are supplied as sets matching each joint size.



### PUR liquid foam matching

| Joint type | Jacket pipe | Carrier pipe | Foam type    |
|------------|-------------|--------------|--------------|
| M90...     | 90          | 20, 25       | Kit PUR 1    |
| M110...    | 110         | 32, 40       | Kit PUR 2    |
| M125...    | 125         | 50           | Kit PUR 3    |
| M140...    | 140         | 65           | Kit PUR 4    |
| M160...    | 160         | 80           | Kit PUR 5    |
| M180...    | 180         | 80           | Kit PUR 2+3  |
| M200...    | 200         | 100          | Kit PUR 6    |
| M225...    | 225         | 125          | Kit PUR 7    |
| M250...    | 250         | 150          | Kit PUR 8    |
| M280...    | 280         | 150          | Kit PUR 2+6  |
| M315...    | 315         | 200          | Kit PUR 9    |
| M355...    | 355         | 200          | Kit PUR 6+7  |
| M400...    | 400         | 250          | Kit PUR 8+9  |
| M450...    | 450         | 300          | 2x kit PUR 9 |
| M500...    | 500         | 350          | *            |
| M560...    | 560         | 400          | *            |

\* For request – please contact RADPOL Export Dept.

| Joint type      | Jacket pipe | Carrier pipe   | Foam type   |
|-----------------|-------------|----------------|-------------|
| MR110/90MW      | 110/90      | 40,32/25,20    | Kit PUR 2   |
| MR125/110/90MW  | 125/110/90  | 50/40,32/25,20 | Kit PUR 3   |
| MR140/125/110MW | 140/125/110 | 65/50/40,32    | Kit PUR 4   |
| MR160/140/125MW | 160/140/125 | 80/65/50       | Kit PUR 1+2 |
| MR200/160/140MW | 200/160/140 | 100/80/65      | Kit PUR 1+5 |

The same sets can be applied for joints with other sealants: MR..W,MR..KW, MR..PW

| Joint type | Jacket pipe | Carrier pipe | Foam type   |
|------------|-------------|--------------|-------------|
| MK90MW     | 90          | 20, 25       | Kit PUR 2+3 |
| MK110MW    | 110         | 32, 40       | Kit PUR 4+5 |
| MK125MW    | 125         | 50           | Kit PUR 2+6 |
| MK140MW    | 140         | 65           | Kit PUR 4+6 |
| MK160MW    | 160         | 80           | Kit PUR 5+8 |

| Joint type | Jacket pipe | Carrier pipe | Foam type    |
|------------|-------------|--------------|--------------|
| M90...-L   | 90          | 20, 25       | Kit PUR 3    |
| M110...-L  | 110         | 32, 40       | Kit PUR 4    |
| M125...-L  | 125         | 50           | Kit PUR 5    |
| M140...-L  | 140         | 65           | Kit PUR 2+3  |
| M160...-L  | 160         | 80           | Kit PUR 3+4  |
| M180...-L  | 180         | 80           | Kit PUR 7    |
| M200...-L  | 200         | 100          | Kit PUR 4+6  |
| M225...-L  | 225         | 125          | Kit PUR 5+6  |
| M250...-L  | 250         | 150          | Kit PUR 5+8  |
| M280...-L  | 280         | 150          | 2x kit PUR 6 |
| M315...-L  | 315         | 200          | *            |
| M355...-L  | 355         | 200          | *            |
| M400...-L  | 400         | 250          | *            |
| M450...-L  | 450         | 300          | *            |
| M500...-L  | 500         | 350          | *            |
| M560...-L  | 560         | 400          | *            |

\* For request – please contact RADPOL Export Dept.

| Joint type        | Jacket pipe | Carrier pipe   | Foam type    |
|-------------------|-------------|----------------|--------------|
| MR110/90MW-L      | 110/90      | 40,32/25,20    | Kit PUR 3    |
| MR125/110/90MW-L  | 125/110/90  | 50/40,32/25,20 | 2x kit PUR 1 |
| MR140/125/110MW-L | 140/125/110 | 65/50/40,32    | Kit PUR 1+3  |
| MR160/140/125MW-L | 160/140/125 | 80/65/50       | Kit PUR 2+4  |
| MR200/160/140MW-L | 200/160/140 | 100/80/65      | Kit PUR 8    |

The same sets can be applied for joints with other sealants: MR..W-L,MR..KW-L, MR..PW-L

### Storage and transport:

The components of the foam sets should be stored in tightly-closed containers in temperature between +10°C and +25°C. Keep them away from moisture and direct sunlight. They should be transported in closed vehicles ensuring the temperature +10°C to +30°C.



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**RADPOL**<sup>®</sup>  
HEAT-SHRINKABLE TECHNOLOGY

RADPOL S.A.  
Batorego St., 14  
77-300 Cztuchów, Poland  
tel. +48 59 834 22 71  
fax +48 59 834 25 51  
export@radpol.com.pl  
www.radpol.com.pl