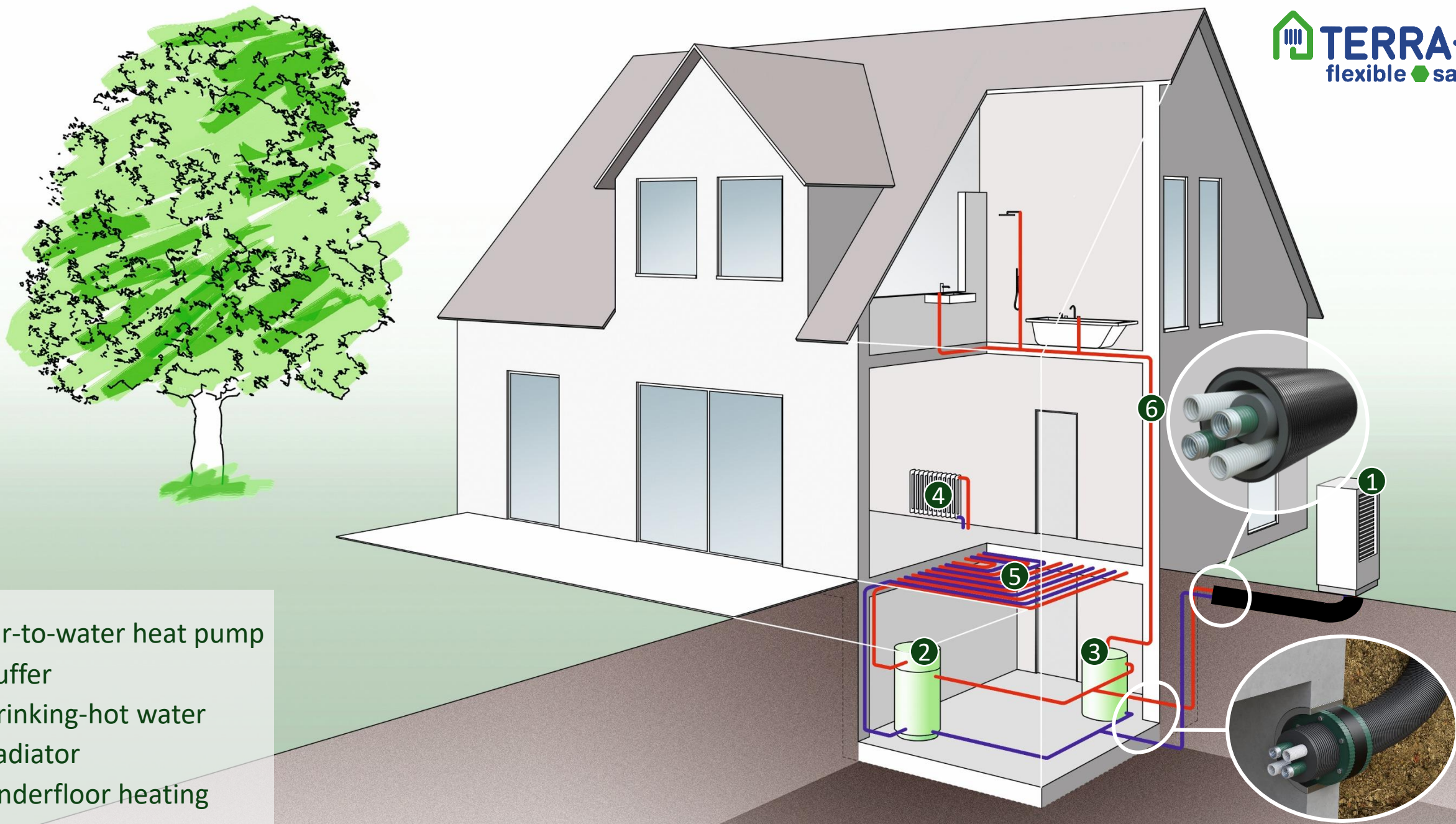


TERRA+

**PRE-INSULATED PIPES
FOR AIR-TO-WATER
HEATPUMPS**
(for usage in the soil)

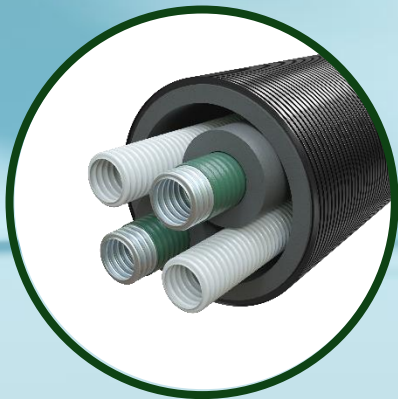




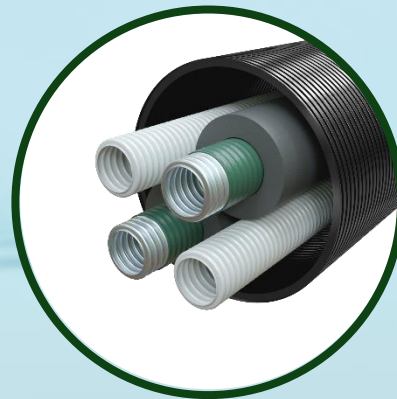
- 1 Air-to-water heat pump
- 2 Buffer
- 3 Drinking-hot water
- 4 Radiator
- 5 Underfloor heating
- 6 Hot water pipe

DIVERSITY OF OPTIONS

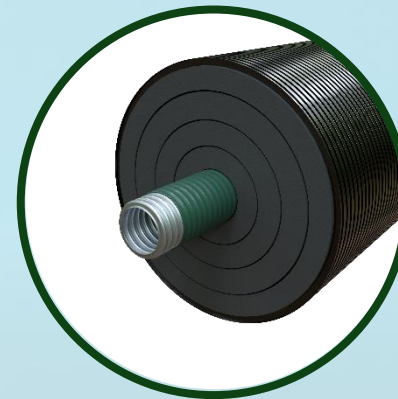
- **4 options** for maximum applications of customers
- HDPE jacket -> corrugated, for maximum flexibility and soil usage (pipe system in accordance with DIN EN 15632)
- X-PE + metallized PET film for even better thermal insulation
- Heat caps included for all options (closed system)



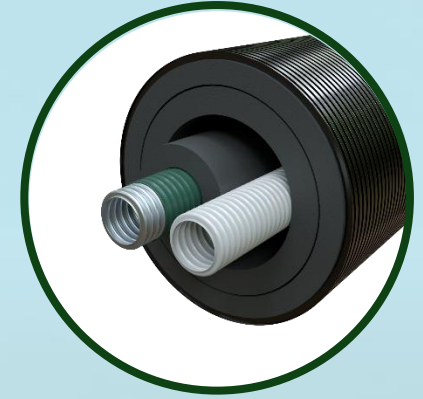
Option 1



Option 2



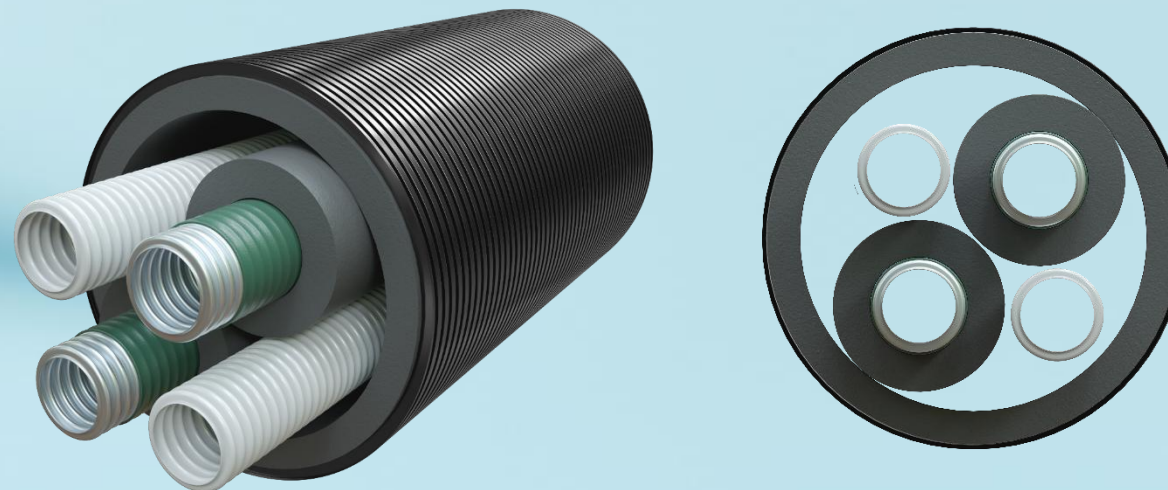
Option 3



Option 4

OPTION 1

- **100% insulation** ($\lambda = 0,03 \text{ W/mK}$)
- 2 x CSST, 2 x conduit
- Dimensions DN25 - DN50
- **Length: 2 – 16m (1m steps)**

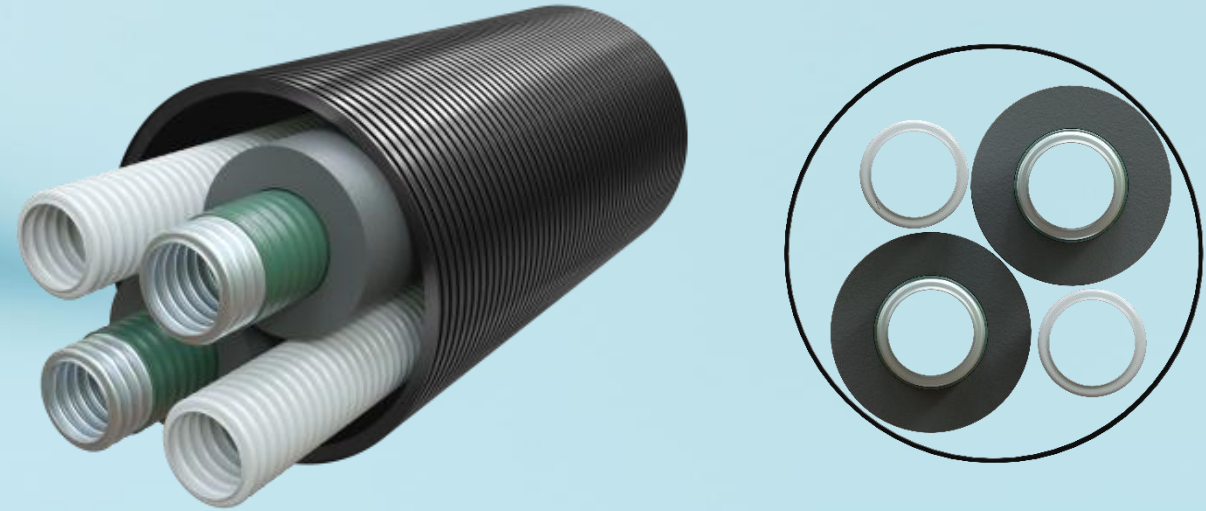


| | Max. length |
|------|-------------|
| DN25 | 104m |
| DN32 | 74m |
| DN40 | 59m |
| DN50 | 45m |

| Pipe dimensions | Insulation-thickness of each SS pipe | Insulation-thickness on black HDPE pipe | Ductwork | Dimension HDPE-pipe (mm) |
|-----------------|--------------------------------------|---|----------|--------------------------|
| DN25 | 12mm | 16mm | 2 x DN32 | 160 |
| DN32 | 16mm | 16mm | 2 x DN32 | 200 |
| DN40 | 18,5mm | 16mm | 2 x DN32 | 200 |
| DN50 | 19mm | 16mm | 2 x DN32 | 250 |

OPTION 2

- **50% insulation** ($\lambda = 0,03 \text{ W/mK}$)
- 2 x CSST, 2 x conduit
- Dimensions DN25 - DN50
- **Length: 2 – 16m (1m steps)**
17m – Max (1m steps)

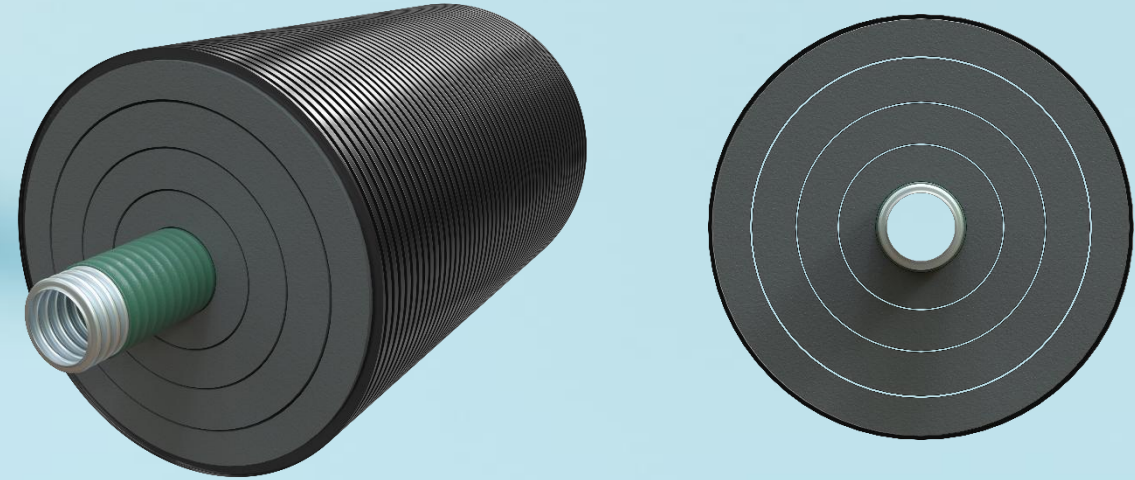


| | Max. length |
|------|-------------|
| DN25 | 104m |
| DN32 | 74m |
| DN40 | 59m |
| DN50 | 45m |

| Pipe dimensions | Insulation-thickness of each SS pipe | Ductwork | Dimension HDPE-pipe |
|-----------------|--------------------------------------|----------|---------------------|
| DN25 | 18mm | 2 x DN32 | 160 |
| DN32 | 18mm | 2 x DN32 | 160 |
| DN40 | 16,5mm | 2 x DN32 | 160 |
| DN50 | 21mm | 2 x DN32 | 200 |

OPTION 3

- 200% insulation ($\lambda = 0,03 \text{ W/mK}$)
- 1 x CSST
- Dimensions DN25 - DN50
- Length: 2 – 16m (1m steps)
17m – Max (1m steps)

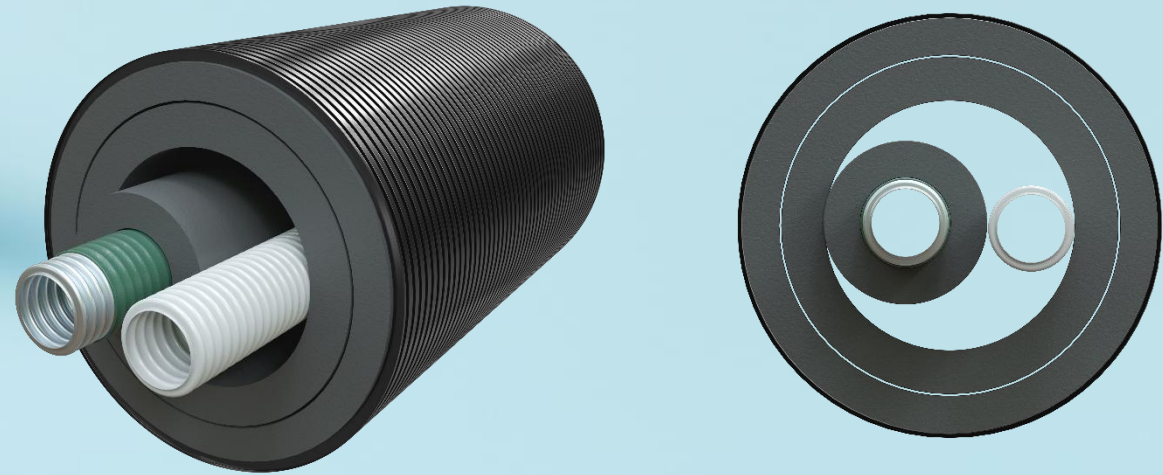


| | Max. length |
|------|-------------|
| DN25 | 104m |
| DN32 | 74m |
| DN40 | 59m |
| DN50 | 45m |

| Pipe dimensions | Insulation-thickness of each SS pipe | Dimension HDPE-pipe |
|-----------------|--------------------------------------|---------------------|
| DN25 | 56mm | 160 |
| DN32 | 52mm | 160 |
| DN40 | 70mm | 200 |
| DN50 | 80mm | 250 |

OPTION 4

- 200% insulation ($\lambda = 0,03 \text{ W/mK}$)
- 1 x CSST, 1 x conduit
- Dimensions DN25 - DN50
- Length: 2 – 16m (1m steps)
17m – Max (1m steps)



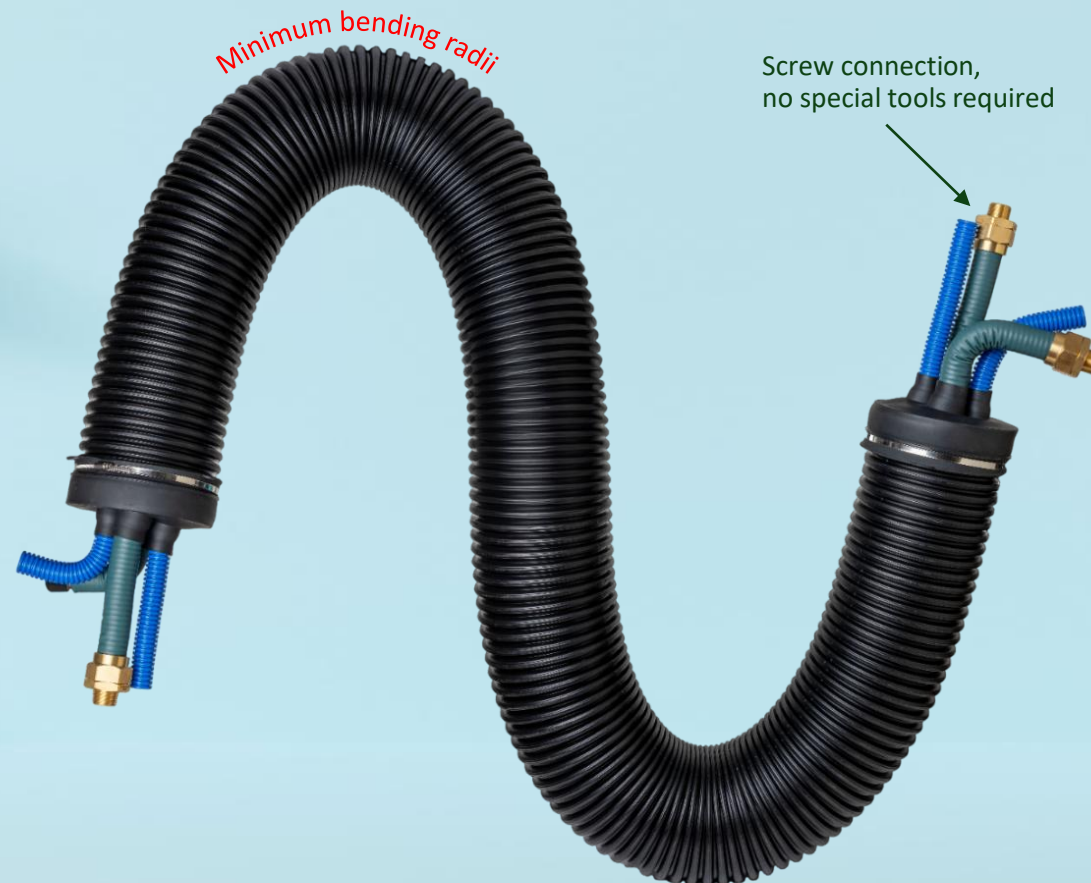
| | Max. length |
|------|-------------|
| DN25 | 104m |
| DN32 | 74m |
| DN40 | 59m |
| DN50 | 45m |

| Pipe dimensions | Insulation-thickness of each SS pipe | Ductwork | Dimension HDPE-pipe |
|-----------------|--------------------------------------|----------|---------------------|
| DN25 | 56mm | 1 x DN32 | 160 |
| DN32 | 52mm | 1 x DN32 | 160 |
| DN40 | 70mm | 1 x DN32 | 200 |
| DN50 | 80mm | 1 x DN32 | 250 |

MAXIMUM FLEX

- Extended CSSTs & conduits for even more flexibility
- Simplified connection to the heat pump or buffer

| Pipe dimensions | Additional length L on each side (Steel pipe wit PE cover + ductwork) |
|-----------------|--|
| DN25 | 25cm |
| DN32 | 25cm |
| DN40 | 30cm |
| DN50 | 30cm |



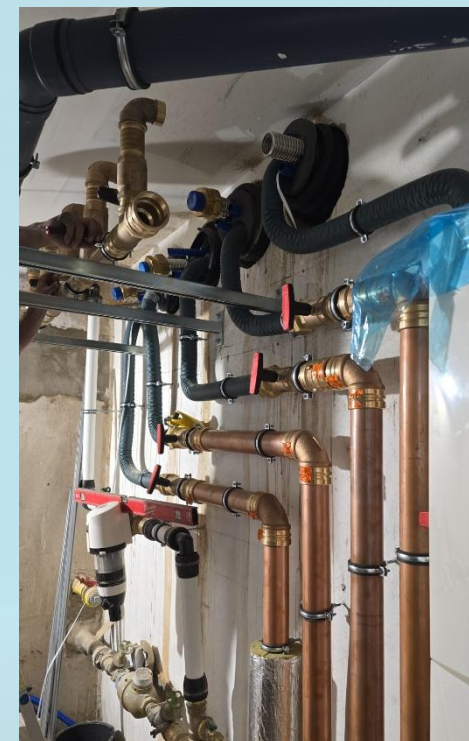
BENDING RADII

- TERRA+: No risk of kinking of the medium pipe
- Bending radii R (recommended):

| OD Jacket | TERRA+ | Competitor 1 | Competitor 2 |
|-----------|--------|--------------|--------------|
| 160mm | 0,3m | 0,60m | 0,60m |
| 200mm | 0,4m | - | 0,80m |
| 250mm | 0,8m | - | - |

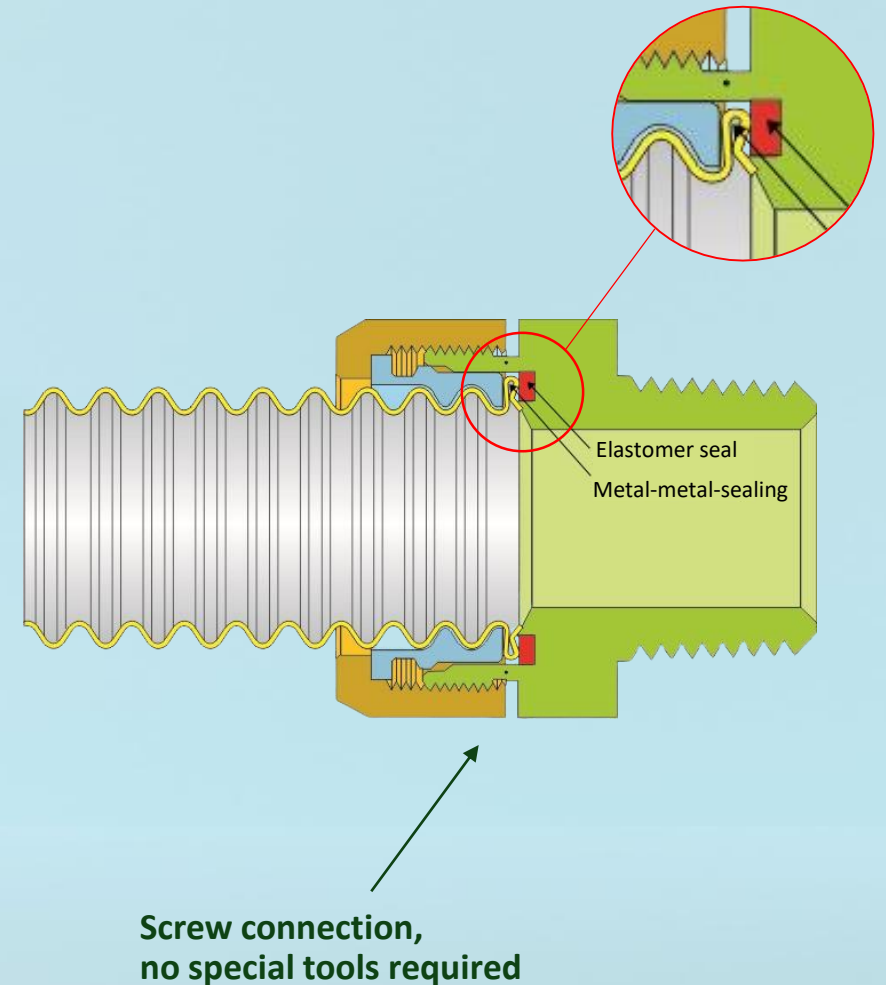


MAXIMUM FLEX



MAXIMUM SAFETY

- Double sealing technology
- Patented technology
- High-temperature resistant elastomer (up to 150°C)
- Pipes factory-tested with helium for 100 % tightness
- High-quality materials used:
 - Stainless steel: 1.4301
 - Brass: CW612N



ADVANTAGES OVER COMPETITORS

| TERRA+ | Preinsulated X-PE or Multiskin pipes |
|---|--|
| <ul style="list-style-type: none"> • Very flexible, small bending radii | <ul style="list-style-type: none"> • Large bending radii, risk of kinking |
| <ul style="list-style-type: none"> • Connections completely tight due to double sealing technology | <ul style="list-style-type: none"> • Dilatation of the material: leakages in the connection of pipe and fitting can occur |
| <ul style="list-style-type: none"> • Excellent insulation (50%, 100% & 200%) | <ul style="list-style-type: none"> • Insulation of ~50-70% |
| <ul style="list-style-type: none"> • Resistance to high temperature and pressure | <ul style="list-style-type: none"> • Higher temperatures only for a short time |
| <ul style="list-style-type: none"> • High resistance to corrosion | <ul style="list-style-type: none"> • Embrittlement process of the plastic pipes |
| <ul style="list-style-type: none"> • Easy installation and customization | <ul style="list-style-type: none"> • Preparation of the pipes with pipe cutter and heat gun |



Dilatation of PE pipes

- Linear expansion due to heat
- The pipe expands according to the following formula:

$$\underline{\Delta L} = \Delta T * \alpha * L$$

ΔL : Temperature-related change in length in millimeters [mm], ΔT : Temperature difference in Kelvin [K]
 α : Thermal expansion coefficient [mm/(m*K)], L : Pipe length in meter [m]

Example:

L = 10m

| | 10K | 20K | 30K | 40K | 50K | 60K |
|---------------------------------|------|------|------|------|------|------|
| ΔL Stainless steel [mm] | 1,7 | 3,4 | 5,1 | 6,8 | 8,5 | 10,2 |
| ΔL X-PE [mm] | 16,0 | 32,0 | 48,0 | 64,0 | 80,0 | 96,0 |

} TENFOLD increase in expansion

Consequences PE pipe: Linear expansion cannot be absorbed → Pressure/tension on joints → Kinking → **Leakage**

The TERRA+ corrugated stainless steel pipe can expand in the jacket without any problems and absorbs a change in length in the corrugation.

Insulation

- Unfortunately, there are many systems on the market that do not comply with current laws and standards:

➤ **Minimum requirement:**

100% insulation of ID with $\lambda = 0,035 \text{ W/mK}$

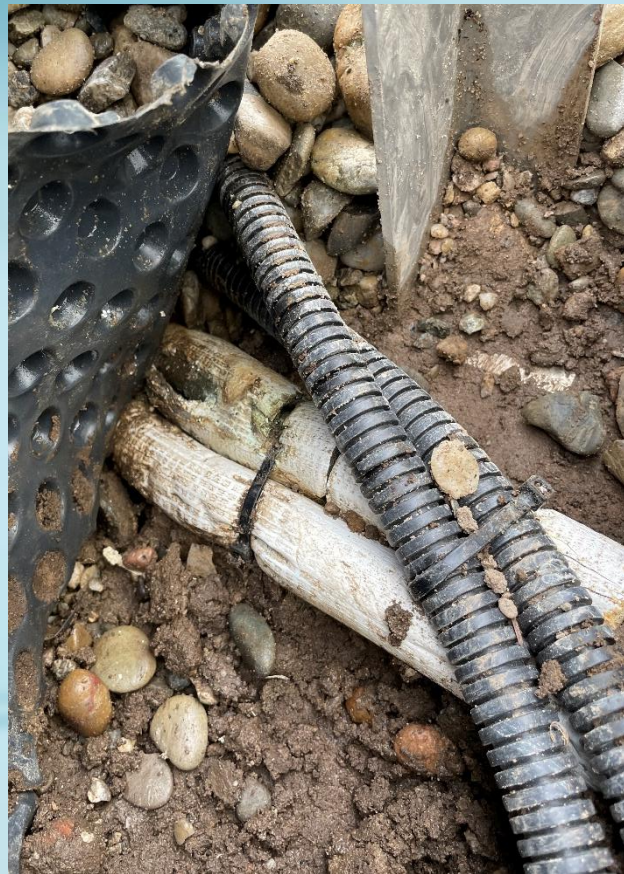
| | | Competitor 1 $\lambda = 0,04 \text{ W/mK}$ | | TERRA+ $\lambda = 0,03 \text{ W/mK}$ | |
|------------------------|----------------------------------|---|---------------------------|---|---------------------------|
| | | <i>OD jacket</i> | <i>Insulation of pipe</i> | <i>OD jacket</i> | <i>Insulation of pipe</i> |
| Competitor 1 (PE-X) | DN 2x32 (same as DN25 TERRA+) | 125mm | 10,25 mm | 160mm | 28 mm |
| | DN 2x40 (same as DN32 TERRA+) | 160mm | 15 mm | 200mm | 32 mm |
| | DN 2x50 (same as DN40 TERRA+) | 160mm | 15 mm | 200mm | 34,5 mm |



These insulation thicknesses are far beyond any legal requirements for laying heat distribution pipes in the ground!

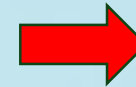
Insufficient insulation

- Effects:



Insufficient insulation

- Not approved for installation in the ground:
 - Corrugated pipe with 14 mm insulation



ACCESSORIES



- **Male threaded fittings**

- DN25: R 1"
- DN32: R 1" & 1 ¼"
- DN40: R 1 ¼" & 1 ½"
- DN50: R 1 ¼" & 2"



- **Female threaded fittings**

- DN25: Rp 1"
- DN32: Rp 1" & 1 ¼"



- **Female threaded fittings
(loose nut and flat gasket)**

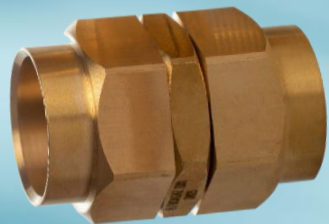
- DN25: G ¾" & G 1"
- DN32: G 1 ¼"
- DN40: G 1 ½"
- DN50: G 2"



- **Copper compression fittings
(on request)**

- DN25 x 22mm x 28mm
- DN32 x 22mm x 28mm x 35mm

ACCESSORIES



- **Couplings**

- DN25 x DN25
- DN32 x DN32
- DN40 x DN40
- DN40 x DN40



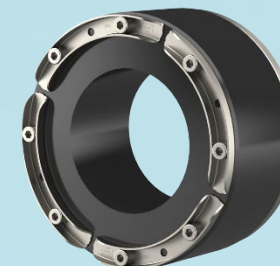
- **PE end-caps for all options (Water and dust cap)**

- OD HDPE-jacket:
 - 160mm
 - 200mm
 - 250mm



- **Gas-tight protective cap (water- und gastight)**

- Options:
 - DN25: V1 & V2
 - DN32: V1 & V2
 - DN40: V1
 - DN50: V1



- **Wall seal**

- for all OD's
- Core drilling:
 - 160mm jacket: 200mm
 - 200mm jacket: 250mm
 - 250mm jacket: 300mm

TERRA+ IN NUMBERS

- High-quality insulation through the combination of air, closed-cell PE, and metallized foil
- Tables (Option 1, DN32):

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|----------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN32 Option 1 | 200mm | CSST | 0,4m | 1,45 W/m |
| Competitor PE-pipe | 200mm | PE | 0,9m | 2,90 W/m |
| | | Difference: | 56% | 50% |

| | |
|----------------------------|------------------------|
| Difference kWh/m | 0,00145 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 72,65 € |
| Pipe length 10m: | <u>726,52 €</u> |

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN32 Option 1 | 200mm | CSST | 0,4m | 1,45 W/m |
| CSSST 13mm insulation | | CSST | | 3,24 W/m |
| | | Difference: | | 55% |

| | |
|----------------------------|------------------------|
| Difference kWh/m | 0,00179 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 89,64 € |
| LeiPipe length 10m: | <u>896,40 €</u> |

TERRA+ IN NUMBERS

- Tables (Option 1, DN40):

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN40 Option 1 | 200mm | CSST | 0,4m | 1,61 W/m |
| Competitor PE-pipe | 200mm | PE | 1m | 3,19 W/m |
| | | Difference: | 60% | 49% |

| | |
|----------------------------|------------------------|
| Difference kWh/m | 0,00158 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 78,85 € |
| Pipe length 10m: | <u>788,47 €</u> |

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN40 Option 1 | 200mm | CSST | 0,4m | 1,61 W/m |
| CSST 13mm insulation | | CSST | | 3,77 W/m |
| | | Difference: | | 57% |

| | |
|----------------------------|--------------------------|
| Differenz kWh/m | 0,00216 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 107,78 € |
| Pipe length 10m: | <u>1.077,77 €</u> |

TERRA+ IN NUMBERS

- Tables (Option 3, DN40):

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN32 Option 3 | 160mm | CSST | 0,4m | 1,14 W/m |
| Competitor PE-pipe | 140mm | PE | 0,45m | 1,60 W/m |
| | | Difference: | 11% | 28% |

| | |
|----------------------------|------------------------|
| Difference kWh/m | 0,00046 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 22,75 € |
| Pipe length 10m: | <u>227,52 €</u> |

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN32 Option 3 | 200mm | CSST | 0,4m | 1,14 W/m |
| CSST 13mm insulation | | CSST | | 3,24 W/m |
| | | Difference: | | 65% |

| | |
|----------------------------|--------------------------|
| Difference kWh/m | 0,00210 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 104,70 € |
| Pipe length 10m: | <u>1.046,97 €</u> |

TERRA+ IN NUMBERS

- Tables (Option 3, DN40):

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN40 Option 3 | 200mm | CSST | 0,4m | 1,14 W/m |
| Competitor PE-pipe | 175mm | PE | 0,6m | 1,84 W/m |
| | | Difference: | 33% | 38% |

| | |
|----------------------------|------------------------|
| Difference kWh/m | 0,00070 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 35,20 € |
| Pipe length 10m: | <u>352,01 €</u> |

| | OD jacket | Material pipe | Bending radius | Temperature spread |
|-----------------------------|-----------|--------------------|----------------|--------------------|
| | | | | 10K |
| TERRA+ DN40 Option 3 | 200mm | CSST | 0,4m | 1,14 W/m |
| CSST 13mm insulation | | CSST | | 3,77 W/m |
| | | Difference: | | 70% |

| | |
|----------------------------|-------------------------|
| Difference kWh/m | 0,00263 |
| Euro/kWh | 0,38 |
| Service life | 15 Jahre |
| Additional costs/m: | 131,64 € |
| Pipe length 10m: | <u>1316,36 €</u> |

HEAT LOSS

- High-quality insulation thanks to the combination of air/X-PE and metallized foil
- Table:
- Medium: Water/Etyhlene glycol

| Type | Insulation (mm) | OD jacket (mm) | Bendig radius (m) | Heat loss (W/m) | | |
|------------------------|-----------------|----------------|-------------------|-----------------|------|------|
| | | | | 5K | 7K | 10K |
| TERRA+ Option 1 (DN25) | 28mm | 160 | 0,3 | 0,65 | 0,91 | 1,3 |
| Competitor 1 (DN25) | 27mm | 160 | 0,5 | 1,96 | 2,74 | 3,91 |
| TERRA+ Option 2 (DN32) | 18mm | 160 | 0,3 | 0,98 | 1,37 | 1,95 |
| Competitor 1 (DN32) | 15mm | 160 | 0,6 | 3,72 | 5,2 | 7,45 |

PRESSURE LOSS

- CSST: 1.4301
- Medium: Water
- Temperatur: 50°C
- Density: 994,030 kg/m³
(= 0,994 g/cm³)
- *Recommended values from the HP manufacturer :*
 - Flow rate:
0,3 – 0,7m/s
 - Pressure loss:
100-200mbar of overall length

| Heating capacity: 6 kW | | | | | | | | | | |
|------------------------|------|-------|------|--------|------|--------|------|--------|------|--------|
| | | | DN25 | | DN32 | | DN40 | | DN50 | |
| Δ T | l/h | l/s | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m |
| 5K | 1041 | 0,289 | 0,58 | 5,28 | 0,35 | 1,47 | 0,22 | 0,43 | 0,13 | 0,11 |
| 6K | 868 | 0,241 | 0,49 | 3,67 | 0,29 | 1,02 | 0,19 | 0,30 | 0,11 | 0,07 |
| 7K | 744 | 0,207 | 0,42 | 2,70 | 0,25 | 0,75 | 0,16 | 0,22 | 0,09 | 0,05 |
| 8K | 651 | 0,181 | 0,37 | 2,07 | 0,22 | 0,58 | 0,14 | 0,17 | 0,08 | 0,04 |
| 9K | 578 | 0,161 | 0,32 | 1,63 | 0,19 | 0,45 | 0,12 | 0,13 | 0,07 | 0,03 |
| 10K | 521 | 0,145 | 0,29 | 1,32 | 0,17 | 0,37 | 0,11 | 0,11 | 0,07 | 0,03 |

| Heating capacity: 8 kW | | | | | | | | | | |
|------------------------|------|-------|------|--------|------|--------|------|--------|------|--------|
| | | | DN25 | | DN32 | | DN40 | | DN50 | |
| Δ T | l/h | l/s | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m |
| 5K | 1388 | 0,386 | 0,78 | 9,39 | 0,46 | 2,61 | 0,30 | 0,77 | 0,17 | 0,19 |
| 6K | 1157 | 0,321 | 0,65 | 6,53 | 0,39 | 1,82 | 0,25 | 0,53 | 0,15 | 0,13 |
| 7K | 991 | 0,275 | 0,56 | 4,79 | 0,33 | 1,33 | 0,21 | 0,39 | 0,12 | 0,10 |
| 8K | 868 | 0,241 | 0,49 | 3,67 | 0,29 | 1,02 | 0,19 | 0,30 | 0,11 | 0,07 |
| 9K | 771 | 0,214 | 0,43 | 2,90 | 0,26 | 0,81 | 0,17 | 0,24 | 0,10 | 0,06 |
| 10K | 694 | 0,193 | 0,39 | 2,35 | 0,23 | 0,65 | 0,15 | 0,19 | 0,09 | 0,05 |

| Heating capacity: 10 kW | | | | | | | | | | |
|-------------------------|------|-------|------|--------|------|--------|------|--------|------|--------|
| | | | DN25 | | DN32 | | DN40 | | DN50 | |
| Δ T | l/h | l/s | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m |
| 5K | 1735 | 0,482 | 0,97 | 14,68 | 0,58 | 4,09 | 0,37 | 1,20 | 0,22 | 0,29 |
| 6K | 1446 | 0,402 | 0,81 | 10,19 | 0,48 | 2,84 | 0,31 | 0,83 | 0,18 | 0,20 |
| 7K | 1239 | 0,344 | 0,70 | 7,48 | 0,41 | 2,08 | 0,27 | 0,61 | 0,16 | 0,15 |
| 8K | 1084 | 0,301 | 0,61 | 5,73 | 0,36 | 1,59 | 0,23 | 0,47 | 0,14 | 0,11 |
| 9K | 964 | 0,268 | 0,54 | 4,53 | 0,32 | 1,26 | 0,21 | 0,37 | 0,12 | 0,09 |
| 10K | 868 | 0,241 | 0,49 | 3,67 | 0,29 | 1,02 | 0,19 | 0,30 | 0,11 | 0,07 |

| Heating capacity: 12 kW | | | | | | | | | | |
|-------------------------|------|-------|------|--------|------|--------|------|--------|------|--------|
| | | | DN25 | | DN32 | | DN40 | | DN50 | |
| Δ T | l/h | l/s | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m | m/s | mbar/m |
| 5K | 2082 | 0,578 | 1,17 | 21,13 | 0,69 | 5,88 | 0,45 | 1,72 | 0,26 | 0,42 |
| 6K | 1735 | 0,482 | 0,97 | 14,68 | 0,58 | 4,09 | 0,37 | 1,20 | 0,22 | 0,29 |
| 7K | 1487 | 0,413 | 0,83 | 10,78 | 0,49 | 3,00 | 0,32 | 0,88 | 0,19 | 0,21 |
| 8K | 1301 | 0,361 | 0,73 | 8,25 | 0,43 | 2,30 | 0,28 | 0,67 | 0,16 | 0,16 |
| 9K | 1157 | 0,321 | 0,65 | 6,53 | 0,39 | 1,82 | 0,25 | 0,53 | 0,15 | 0,13 |
| 10K | 1041 | 0,289 | 0,58 | 5,28 | 0,35 | 1,47 | 0,22 | 0,43 | 0,13 | 0,11 |

HEAT LOSS

- CSST: 1.4301
- Medium: Water/Etyhlene glycol

○ **Formula for calculating options 1 & 2:**

$\Delta T = ((\text{flow temperature} + \text{return temperature}) / 2)) - \text{temperature soil}$

○ **Formula for calculating options 3 & 4:**

$\Delta T = \text{Flow temperature} - \text{temperature soil}$

| Heat loss W/m - TERRA+ Variante 1 | | | | | | | | | | | |
|-----------------------------------|------|------|------|------|------|-------|-------|-------|-------|-------|---------------|
| $\Delta T / K$ | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | U-Wert [W/mK] |
| DN25 | 1,30 | 2,60 | 3,89 | 5,19 | 6,49 | 7,79 | 9,09 | 10,39 | 11,68 | 12,98 | 0,1298 |
| DN32 | 1,45 | 2,89 | 4,34 | 5,79 | 7,23 | 8,68 | 10,12 | 11,57 | 13,02 | 14,46 | 0,1446 |
| DN40 | 1,61 | 3,23 | 4,84 | 6,45 | 8,07 | 9,68 | 11,29 | 12,91 | 14,52 | 16,14 | 0,1614 |
| DN50 | 1,93 | 3,87 | 5,80 | 7,73 | 9,67 | 11,60 | 13,54 | 15,47 | 17,40 | 19,34 | 0,1934 |

| Heat loss W/m - TERRA+ Variante 2 | | | | | | | | | | | |
|-----------------------------------|------|------|------|-------|-------|-------|-------|-------|-------|-------|---------------|
| $\Delta T / K$ | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | U-Wert [W/mK] |
| DN25 | 1,61 | 3,22 | 4,83 | 6,44 | 8,05 | 9,65 | 11,26 | 12,87 | 14,48 | 16,09 | 0,1609 |
| DN32 | 1,95 | 3,90 | 5,86 | 7,81 | 9,76 | 11,71 | 13,67 | 15,62 | 17,57 | 19,52 | 0,1952 |
| DN40 | 2,44 | 4,88 | 7,31 | 9,75 | 12,19 | 14,63 | 17,07 | 19,51 | 21,94 | 24,38 | 0,2438 |
| DN50 | 2,62 | 5,25 | 7,87 | 10,49 | 13,11 | 15,74 | 18,36 | 20,98 | 23,61 | 26,23 | 0,2623 |

| Heat loss W/m - TERRA+ Variante 3 | | | | | | | | | | | |
|-----------------------------------|------|------|------|------|------|------|------|------|-------|-------|---------------|
| $\Delta T / K$ | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | U-Wert [W/mK] |
| DN25 | 0,92 | 1,84 | 2,77 | 3,69 | 4,61 | 5,53 | 6,46 | 7,38 | 8,30 | 9,22 | 0,0922 |
| DN32 | 1,14 | 2,29 | 3,43 | 4,58 | 5,72 | 6,87 | 8,01 | 9,16 | 10,30 | 11,45 | 0,1145 |
| DN40 | 1,14 | 2,27 | 3,41 | 4,54 | 5,68 | 6,81 | 7,95 | 9,09 | 10,22 | 11,36 | 0,1136 |
| DN50 | 1,24 | 2,48 | 3,72 | 4,96 | 6,20 | 7,44 | 8,68 | 9,92 | 11,15 | 12,39 | 0,1239 |

| Heat loss W/m - TERRA+ Variante 4 | | | | | | | | | | | |
|-----------------------------------|------|------|------|------|------|------|------|------|-------|-------|---------------|
| $\Delta T / K$ | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | U-Wert [W/mK] |
| DN25 | 0,87 | 1,74 | 2,61 | 3,48 | 4,34 | 5,21 | 6,08 | 6,95 | 7,82 | 8,69 | 0,0869 |
| DN32 | 1,06 | 2,11 | 3,17 | 4,23 | 5,29 | 6,34 | 7,40 | 8,46 | 9,51 | 10,57 | 0,1057 |
| DN40 | 1,07 | 2,14 | 3,21 | 4,28 | 5,36 | 6,43 | 7,50 | 8,57 | 9,64 | 10,71 | 0,1071 |
| DN50 | 1,17 | 2,35 | 3,52 | 4,70 | 5,87 | 7,05 | 8,22 | 9,40 | 10,57 | 11,74 | 0,1174 |

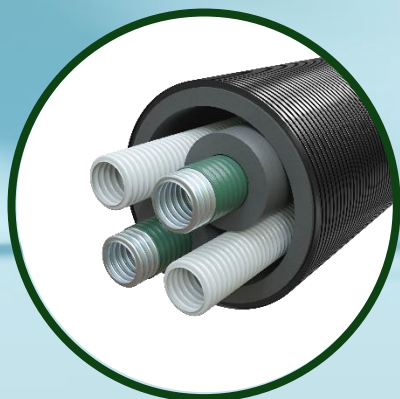
WEIGHTS

| DIM | Kg/m |
|------|------|
| DN25 | 2,75 |
| DN32 | 3 |
| DN40 | 4 |
| DN50 | 5 |

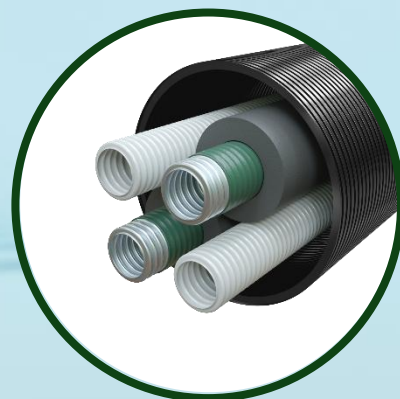
| DIM | Kg/m |
|------|------|
| DN25 | 2,5 |
| DN32 | 2,75 |
| DN40 | 3,5 |
| DN50 | 4,5 |

| DIM | Kg/m |
|------|------|
| DN25 | 2 |
| DN32 | 2,5 |
| DN40 | 3 |
| DN50 | 4,5 |

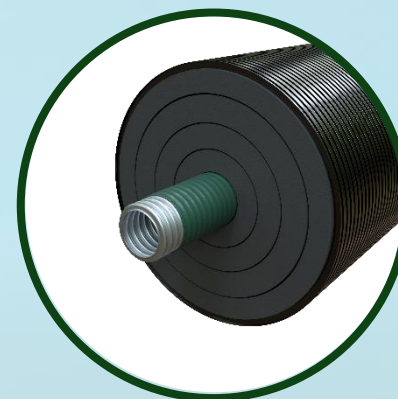
| DIM | Kg/m |
|------|------|
| DN25 | 2 |
| DN32 | 2,5 |
| DN40 | 3 |
| DN50 | 4,5 |



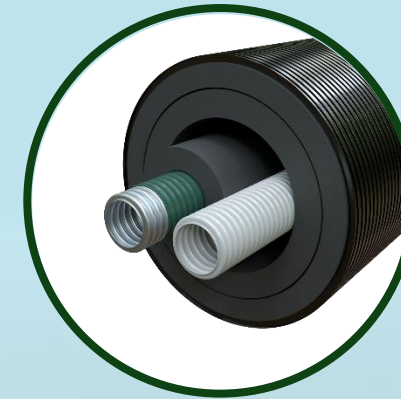
Option 1



Option 2



Option 3



Option 4

**If you have any
further questions,
please contact us 😊**

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