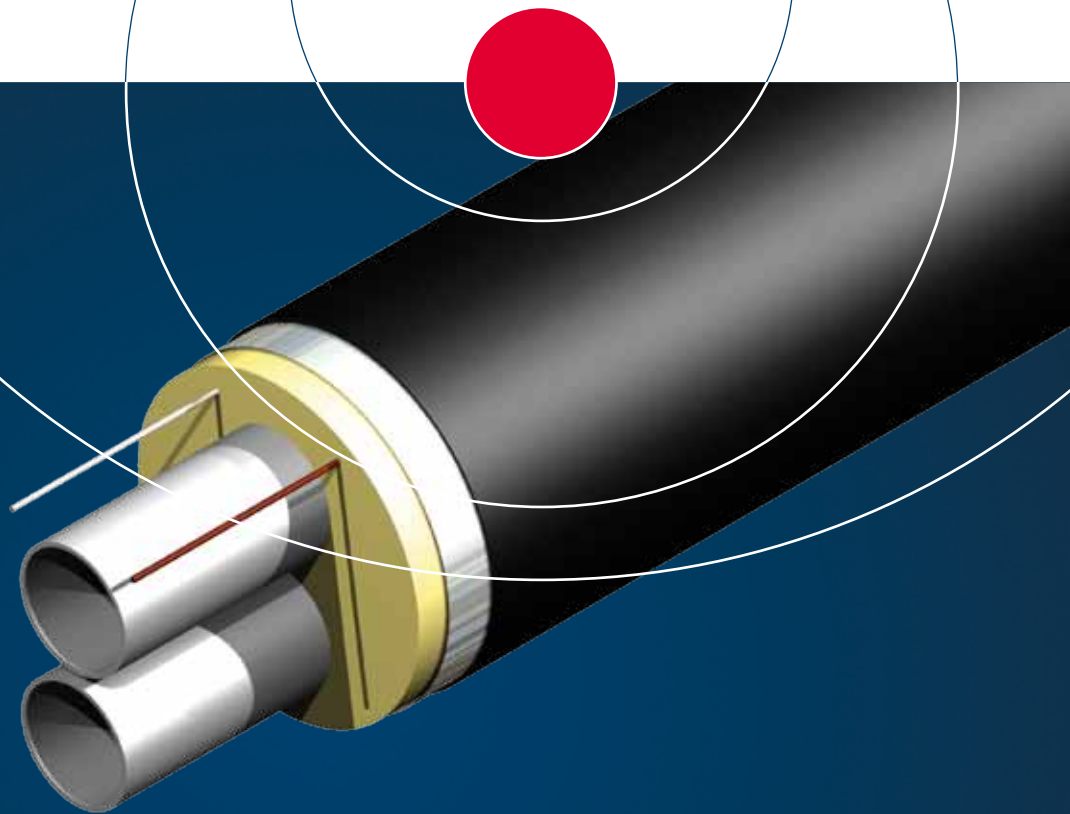


LOGSTOR *TwinPipe* system



Reduces operating costs and CO₂ emissions by as much as 50%

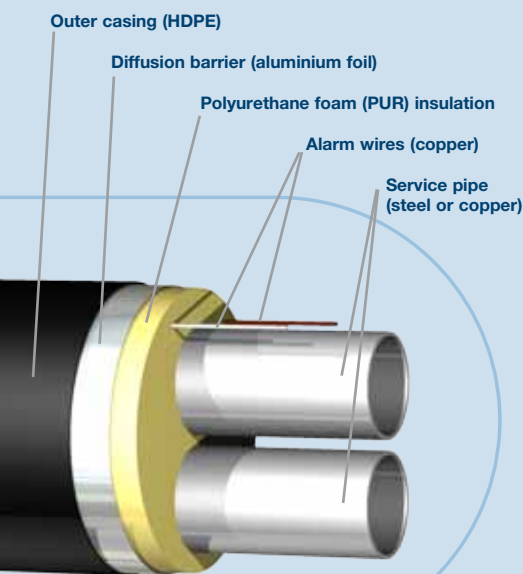
● distributing energy efficiency

LOGSTOR

LOGSTOR *TwinPipe* system

– when energy efficiency is in focus

- Absolute minimum of heat loss
- ROI increases as world energy prices rise
- Lowest possible environmental impact
- Significant savings on operating costs
- Significant savings on civil works costs
- Easier planning and installation
- Lower costs for post-installation civil engineering
- Insulation that ensures consistently high heat retention throughout the service life of the pipe
- Fewer components and joints needed
- All fittings and joints included as an integral part of the system
- Diffusion barrier on pipes with outer casings up to Ø 315 mm, for extra efficiency



TwinPipe district heating systems provide you with significant reductions in CO₂ emissions as well as big savings on purchase costs, civil works and operating costs compared to single pipe systems. It is possible to reduce both operating costs and CO₂ emissions by as much as 50%.

And TwinPipes fitted with a diffusion barrier provide even greater savings.

The LOGSTOR TwinPipe system places both forward and return flow pipes within one single outer casing, encapsulated in the same kind of highly effective polyurethane foam insulation as used in LOGSTOR pre-insulated single pipes. And to maintain its insulation properties unchanged, TwinPipe is available with a diffusion barrier on all sizes up to outer casing Ø 315 mm.

Minimise heat loss

The special TwinPipe design means the heat loss from a TwinPipe system is less than when using a single pipe solution. When also fitted with a diffusion barrier, heat loss is kept consistently low throughout the entire service life of the pipe.

Figure 1 below provides an example of the heat loss over a 30-year period, for lengths of single pipe and TwinPipe of comparable dimensions. The distance between the performance curves clearly shows that use of TwinPipe – with or without a diffusion barrier – significantly reduces heat loss.

The diffusion barrier advantage

LOGSTOR TwinPipe fitted with a diffusion barrier has thermal conductivity levels of lambda 24 or better. The diffusion barrier keeps the foam propellant gases inside the insulation, and prevents any nitrogen or oxygen from the soil or air penetrating into it. This means the pipe retains the same low lambda value throughout its entire service life.

The diffusion barrier provides greatest benefits for district heating pipes with smaller diameters, where the relative heat loss is greatest. This is why TwinPipe is available with a diffusion barrier on pipes with the smallest diameters.

Figure 2 below shows the total heat loss for single pipe and TwinPipe of different dimensions, with and without diffusion barrier. The calculations are based on average insulation performance over the duration of a 30-year service life.

Figure 1 : Example of annual heat loss, with and without diffusion barrier

Parameters: Single pipe Ø 40/110 mm • TwinPipe Ø 40/160 mm • Service pipe: steel • Insulation: Series 1 • Pipe length: 1 m trench • Temperature, flow/return pipe: 120/70°C • Temperature, ambient: 8°C • Operating period: 30 years

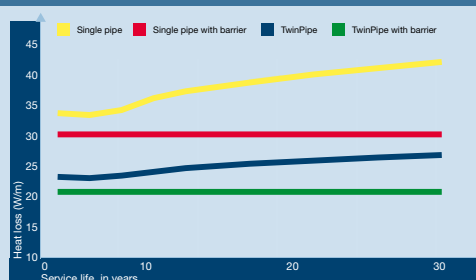
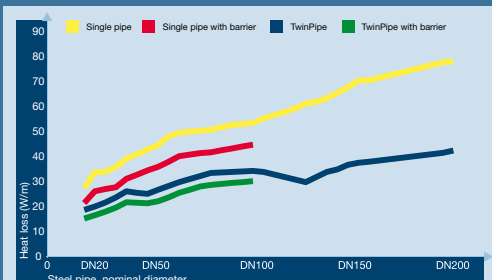


Figure 2 : Heat loss from single pipe and TwinPipe of different dimensions

Parameters: Service pipe: steel • Insulation: Series 1 • Pipe length: 1 m trench • Soil cover: 0.6 m • Thermal conductivity: soil 1.6 W/mK, service pipe 60 W/mK • Distance between single pipe: 0.15 m • Temperature, flow/return pipe: 120/70°C • Temperature, ambient: 8°C • Operating period: 30 years





The advantages of a TwinPipe system differ from one project to the next, and individual assessments are crucial.

For example, the two-in-one TwinPipe configuration results in special requirements when laying the pipe, and is best suited to relatively flat terrain.

For some projects, the initial investment is higher than for single pipe systems. However, this is soon outweighed by the savings on subsequent operating costs.

Any decision about installing a TwinPipe system should therefore be based on careful consideration of all the

parameters involved. One way of doing this is via the calculation feature available at www.logstor.com



Greater reliability – and savings on civil works

Save on civil works

TwinPipe systems are particularly advantageous in projects where only limited space is available. Trenches can be kept narrower and don't have to be as deep as for single pipe systems. This is because the branch pipes are installed at the same level as the main TwinPipe run. The benefits include substantial savings on installation costs.

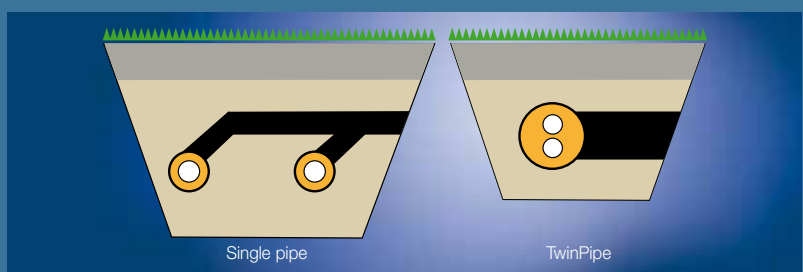
This is particularly important in locations that are paved over.

Fewer joints, greater dependability and lower installation costs

A TwinPipe system involves only half as many joints as a comparable single pipe system. This means fewer components and results in lower installation costs as well as significantly cutting down on any likelihood of operating interruptions during the service life of the system.

This, combined with the benefits of the well-known LOGSTOR joint systems, which eliminate the use of pre-insulated branch joints, results in further savings and greater operational reliability throughout the system.

Trench



Single pipe system

Single pipe system with pre-insulated branch joints
10 welds
10 joints



Single pipe system with welded, shrinkable or steel branch joints
10 welds
4 joints



TwinPipe system

TwinPipe system with pre-insulated branch joints
6 welds
3 joints



TwinPipe system with welded, shrinkable or steel branch joints
2–4 welds
1 joint





LOGSTOR TwinPipe is the most efficient solution available for small and medium-scale transmission and distribution piping. The system includes components that ensure cost-effective installation, including standard joints, bends and transitions between lengths of single pipe and TwinPipe.

To ensure the necessary stability, the two service pipes are locked together using special fixing bars placed at the end of all straight sections. This limits any expansion that might take place where the laid pipe changes direction, and helps do away with any need for special sections to absorb expansion and reduce stress and tension in the pipe.

More detailed information is available in the LOGSTOR manual at www.logstor.com.



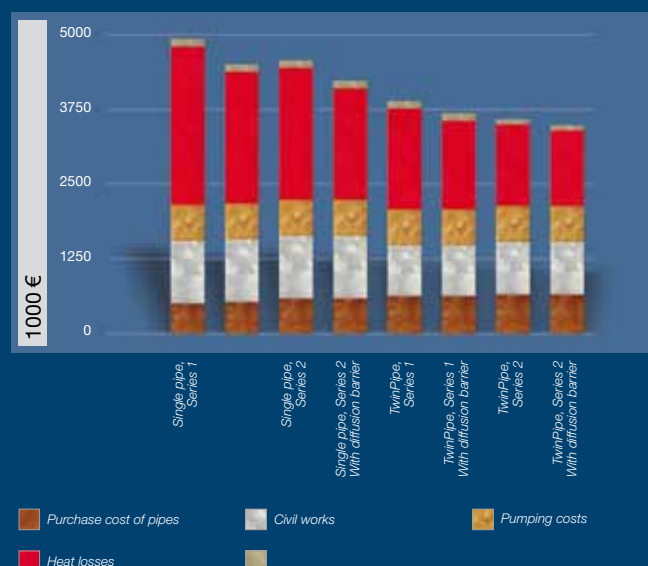
Service life costs and CO₂ emissions both reduced

LOGSTOR has more than 20 years of experience in the development, manufacture and installation of pre-insulated twin pipes. The sum total of all this practical experience has been integrated into the LOGSTOR TwinPipe system of today. The results add up to significant advantages and benefits – both financial and environmental.

Lowest possible service life costs

Calculations of the service life costs for district heating systems clearly show that the largest single cost stems from heat loss. This makes it a good investment to prevent this expensive heat loss from occurring.

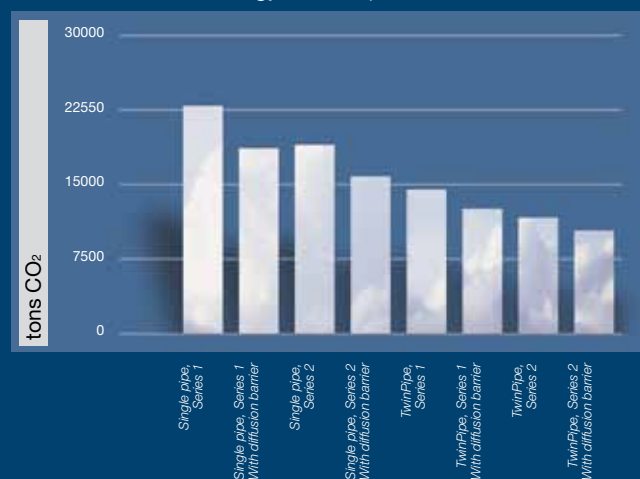
As the example shown here indicates, a TwinPipe system – whether fitted with a diffusion barrier or not – is an exceptionally good investment, provided the installation parameters are appropriate.



Lower energy loss, less environmental impact

The fundamental advantages of using district heating systems – responsible use of energy and low environmental impact – are now high on many political agendas.

LOGSTOR TwinPipe systems provide exceptional levels of energy efficiency, enabling you to cut the CO₂ emissions from your district heating system to the absolute minimum and make a visible contribution to reducing the climate problems that stem from our energy consumption.



Assumptions for calculations:

Heat effect of the system: 4 MW • Temperature, flow/return: 120/70°C • Pump energy: 1% of heat supply • Energy source: natural gas • Energy price: EUR 0.05/kWh • Price of electricity: EUR 0.10/kWh • Effective interest rate: 4% • Service life: 30 years • Calculation method: EN 13941

The pipe system includes:

2 x 1000 m DN 150 • 2 x 1000 m DN 100 • 2 x 2000 m DN 80 • 2 x 500 m DN 40, straight pipes (5 consumers, 250 kW each) • 2 x 5000 m Ø 20 mm SteelFlex (200 consumers, 10 kW each)

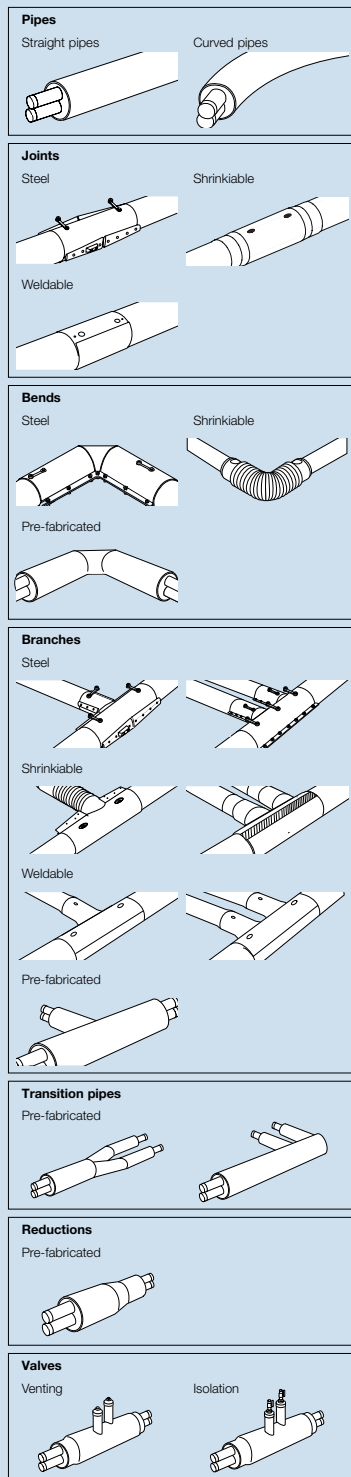
| | Type of pipe | Series 1 (dimensions) | Heat retention (W/mK) | Heat loss (W/m) | CO ₂ emissions with natural gas (kg/metre/year) |
|----|---------------------------------------|-----------------------|-----------------------|-----------------|--|
| A. | TwinPipe with diffusion barrier | DN 40/160 | 0.024 | 20.56 | 43 |
| B. | TwinPipe without diffusion barrier | DN 40/160 | 0.027 | 24.70 | 52 |
| C. | Single pipe with diffusion barrier | DN 40/110 | 0.024 | 29.62 | 62 |
| D. | Single pipe without diffusion barrier | DN 40/110 | 0.027 | 37.48 | 79 |

This table shows calculations of the annual heat loss and CO₂ emissions for a 1-metre length of LOGSTOR pipe with Series 1 insulation, at operating temperatures of 120°C and 70°C on the flow/return pipes, respectively.

Calculation method used is EN 13941.

A comparison between the values in installation types A and D represents a saving of more than 45%.

Components



Technical data – TwinPipe

| | |
|---|--|
| Service pipe * | Longitudinal welded steel pipe, P235TR1, P235TR2 according to EN10217-1, or P235GH according to EN 10217-2 |
| Insulation | Polyurethane foam (PUR), using cyclopentane as blowing agent |
| Diffusion barrier | Aluminium foil Optional up to Ø 114.3-114.3/315 mm |
| Outer casing | High-density polyethylene (HDPE) |
| Alarm wires | Copper |
| Guaranteed insulation performance with diffusion barrier | λ 0.024 W/mK |
| Guaranteed insulation performance without diffusion barrier | λ 0.027 W/mK |
| Continuous operating parameters | 30 years at 140°C and 25 bar |
| Joining method | Gas or TIG welding |
| Hot tapping possible | Yes |

| Steel pipe | | | Outer casing | | Wall thickness mm | Lengths available m |
|---------------------|-------------------|-------------------|-----------------------------|-----------------------------|-------------------|---------------------|
| Nominal diameter mm | Outer diameter mm | Wall thickness mm | Outer diameter, Series 1 mm | Outer diameter, Series 2 mm | | |
| 20 | 26.9 | 2.6 | 125 | | 3.0 | 12 |
| 20 | 26.9 | 2.6 | | 140 | 3.0 | 12 |
| 25 | 33.7 | 2.6 | 140 | | 3.0 | 12 |
| 25 | 33.7 | 2.6 | | 160 | 3.0 | 12 |
| 32 | 42.4 | 2.6 | 160 | | 3.0 | 12 |
| 32 | 42.4 | 2.6 | | 180 | 3.0 | 12 |
| 40 | 48.3 | 2.6 | 160 | | 3.0 | 12 |
| 40 | 48.3 | 2.6 | | 180 | 3.0 | 12 |
| 50 | 60.3 | 2.9 | 200 | | 3.2 | 12 |
| 50 | 60.3 | 2.9 | | 225 | 3.4 | 12 |
| 65 | 76.1 | 2.9 | 225 | | 3.5 | 12 |
| 65 | 76.1 | 2.9 | | 250 | 3.6 | 12 |
| 80 | 88.9 | 3.2 | 250 | | 3.6 | 12 |
| 80 | 88.9 | 3.2 | | 280 | 3.9 | 12 |
| 100 | 114.3 | 3.6 | 315 | | 4.1 | 12 & 16 |
| 100 | 114.3 | 3.6 | | 355 | 4.5 | 12 & 16 |
| 125 | 139.7 | 3.6 | 400 | | 4.8 | 12 & 16 |
| 125 | 139.7 | 3.6 | | 450 | 5.2 | 12 & 16 |
| 150 | 168.3 | 4.0 | 450 | | 5.2 | 12 & 16 |
| 150 | 168.3 | 4.0 | | 500 | 5.6 | 12 & 16 |
| 200 | 219.1 | 4.5 | 560 | | 6.0 | 12 & 16 |
| 200 | 219.1 | 4.5 | | 630 | 6.6 | 12 & 16 |

* TwinPipes are also available with service pipes made of hard copper.

The LOGSTOR FlexPipe range also includes TwinPipes in which the service pipes are made of soft copper, alu/PEX or PEX.

LOGSTOR TwinPipes meet or exceed the requirements prescribed in EN 15698-1.

● distributing energy efficiency

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