SIMONA

SIMONA® Wastewater Piping Systems

Safe and efficient solutions in plastics

GLOBAL THERMOPLASTIC SOLUTIONS

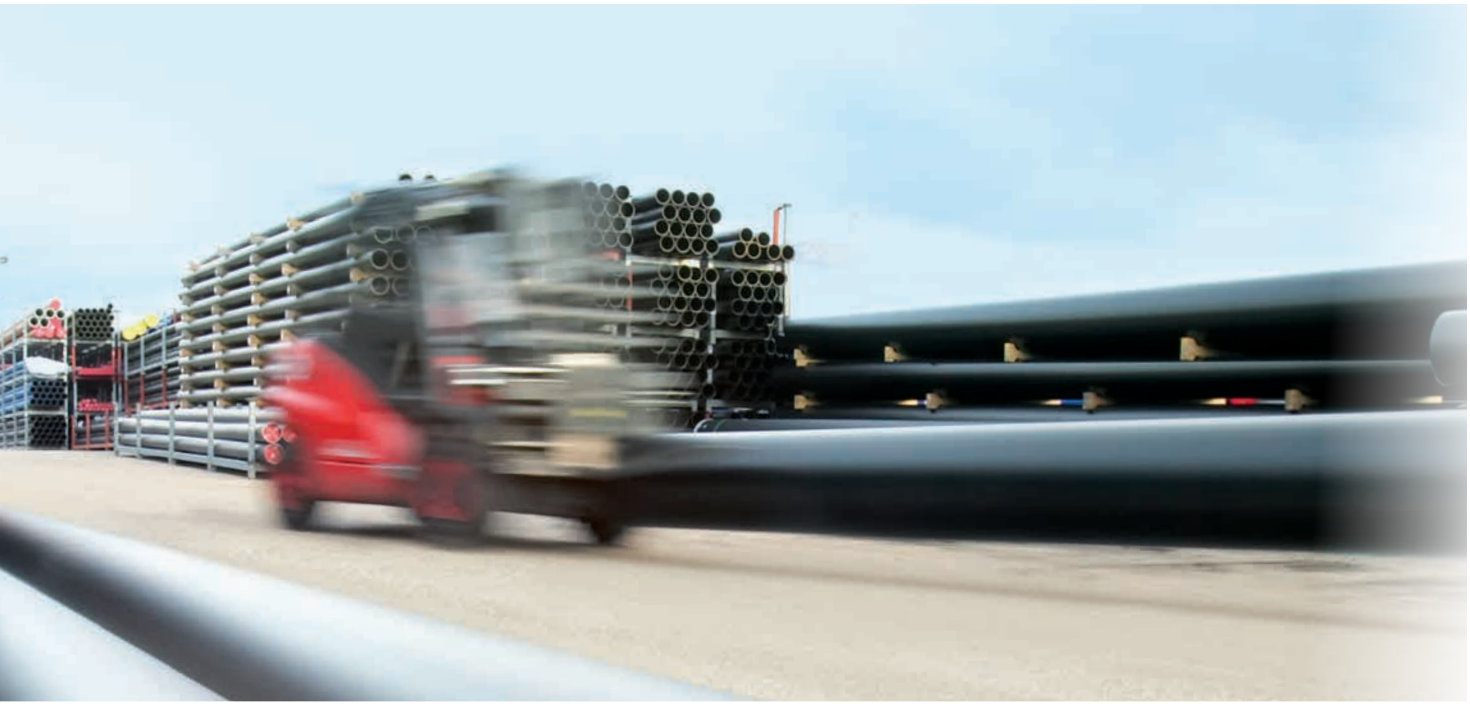
Content

System meets safety – Wastewater piping solutions by SIMONA

SIMONA is acknowledged as one of the leading producers and development partners in the field of thermoplastics. We are able to offer you best-in-class solutions tailored to your applications: in the chemical processing industry, in the water, energy and commodities supply sector as well as in the field of mobility, construction and environmental technology. What is more, our operations span the globe.

Meeting all the requirements of modern wastewater disposal, SIMONA offers a comprehensive range of innovative end-to-end piping systems made of premium-quality plastics – the perfect solution for open or trenchless installation or rehabilitation projects. From project development to on-site planning, our team of experts can assist you all the way with tailor-made consulting services.

SIMONA® Wastewater Piping Systems combine excellent flexibility and durability with outstanding functionality. Installation is simple and cost-effective thanks to their low weight and reliable joining methods. In contrast to conventional materials, they are capable of transporting wastewater safely without discharges and uncontrolled seepage.



Main causes of damage to sewage systems

- Root penetration
- Corrosion
- Leaking socket connections
- Ruptures
- Incrustations

SIMONA® Wastewater Piping Systems are designed to combat these risks – effectively and over an extended period of time. This offers you as a customer greater certainty with regard to planning and expenditure.

Piping systems made of plastic

Owing to the favourable bend radii, pipelines can also be installed along winding roads. Therefore, in contrast to methods applied when using rigid pipe materials, there is no need for expensive pipe fittings or shaft structures to deal with changes in the direction of the pipeline.

Benefits of plastics

- Low weight
- Superior flexibility prevents pipe rupture
- Excellent interior and exterior corrosion resistance
- Permanently integral, watertight connection by means of welding
- High abrasion resistance
- Elimination/reduction of need for cleaning and flushing
- Favourable hydraulic properties due to low wall roughness
- Notch and crack resistance

Comprehensive product range

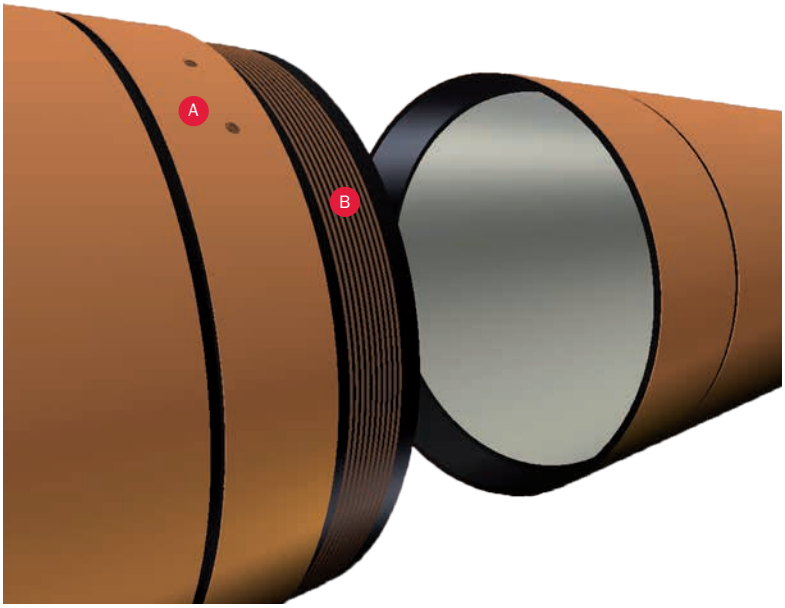
Alongside an extensive range of versatile pipes, SIMONA's end-to-end portfolio of products for wastewater disposal includes fittings, electrofusion sockets, service pipe components and various shaft structures.

SIMONA is an acknowledged system supplier

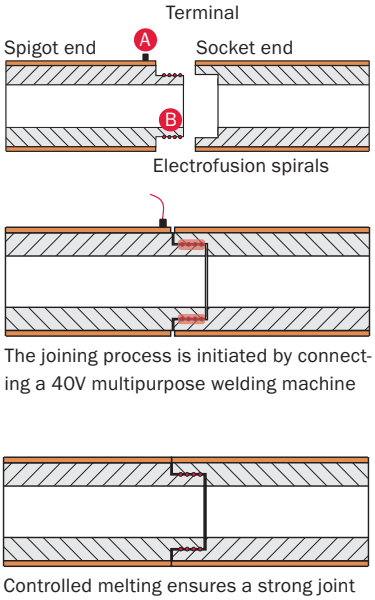
and one-stop manufacturer of piping systems designed for sustained efficiency and reliability in the field of wastewater disposal.

SIMOFUSE® – Intelligent joining with integral electrofusion system

SIMOFUSE® is designed for the fast, simple and cost-effective installation of pipes, particularly in areas that are difficult to access. Two steps is all it takes to create an absolutely tight welded joint: bring the pipe sections together and join with a standard welding machine – for an instant, permanent bond.



How it works



The joining process is initiated by connecting a 40V multipurpose welding machine

Controlled melting ensures a strong joint

SIMOFUSE® Pipe Modules come with a machined socket and spigot end as standard, into which special electrofusion spirals have been incorporated. This ensures a perfect fit without the need for tedious geometric adjustments.

What is more, the pipe with integral electrofusion joints is supplied as a ready-to-use component – no need for time-consuming preparations prior to welding. As the socket connection is perfectly flush, no recesses on the pipe support are required.

Combining the benefits of a large weld zone and excellent fit, SIMOFUSE® produces perfect joints in compliance with DVS Guideline 2207. The result is a strong, permanently integral welded joint without the need for elastomer-based sealants.

Key benefits

- No weld bead (neither on the inside nor on the exterior)
- Greater efficiency during pipe installation due to optimised joining cycles with reduced weld and cooling times
- High weld quality thanks to large weld zone and high joining pressure
- Integral, permanently tight connection eliminates risk of root penetration
- Reduction of joint width thanks to integral electrofusion spirals in the spigot end, which expands when heated to produce a perfect fit within socket end

Open-trench installation

Open-trench pipe laying with sand bed and trench boxes (PE 100 grey/UV-stabilised; d 710, SDR 17.6)

Key benefits

- Ready for installation:
  - No peeling of pipe end
  - No pre-heating to reduce annular gap between socket and spigot end
  - Independent of dimension; single weld procedure for each pipe connection area
- No recesses and no post-compaction of pipe support thanks to flush design of socket connection

Trenchless rehabilitation

Rehabilitation using short-pipe relining method via shaft installation (PE 100; d 800 mm, SDR 17, module length 700 mm)

Key benefits

- Perfect for relining in sewage systems, with no increase in outer pipeline circumference (as in the case of external electrofusion sockets)
- Strong pipe connection due to integral electrofusion joints
- Efficient joining even in cramped conditions

PAS 1075 – Acknowledged quality standard for PE 100 RC Pipes in trenchless installation

PAS 1075 (= Publicly Available Specification) is a consultative document that outlines requirements applicable to PE pipes that are installed by means of alternative pipe laying methods and whose service life spans a period of at least 100 years.

PAS defines a transparent quality standard that complements the proven standards outlined in DIN and DVGW. It determines which PE 100 materials meet the specific requirements and can thus be classified as PE 100 RC.

PAS 1075 categorises pipes into three types regardless of manufacturer, thus enabling users to select pipe types according to practical requirements.

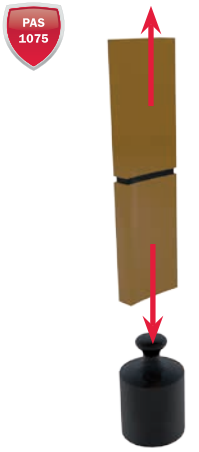
Type 1:
Solid-wall pipes made of PE 100 RC (single skin)

Type 2:
Pipes with dimensionally integrated layers of PE 100 RC (two or three skins)

Type 3:
Pipes in PE 100 RC with an additional outer protective jacket (one or two skins)

All SIMONA® PE 100 RC-Line Pipes meet the requirements of PAS 1075 and are independently tested by TÜV Süddeutschland

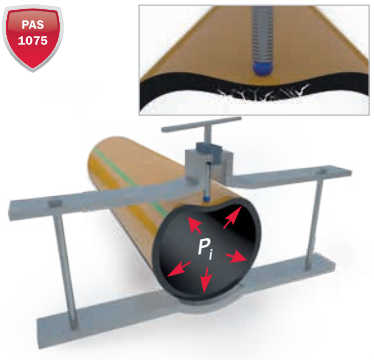
Material tests for high-quality PE 100 RC:



Full Notch Creep Test (FNCT)

This test examines the resistance of the pipe to slow crack growth. The test is performed on the input material as well as on the actual pipe itself. The test specimen, with a full notch (crack initiation), is exposed to a constant load at an elevated temperature and while under the influence of a wetting agent solution. The time is measured until the test specimen ruptures.

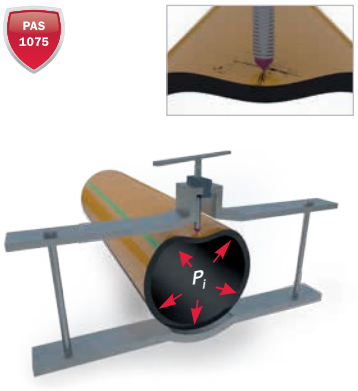
8,760 hrs at 80 °C (on the input material)
3,300 hrs at 80 °C (on the extruded pipe)
4 N/mm²
2 % Arkopal N-100
Comparison: Requirement for standard PE 100 (as per DVS 2205-1 BB1) = 300 hrs



Point load test on solid-wall pipe

Round stones can produce concentrated loads on the interior of the pipe. This causes stress that may eventually lead to cracking. The concentrated load is simulated by using a round stamping device, which allows testing of the outer fibre strain on the interior pipe wall.

8,760 hrs at 80 °C
4 N/mm²
2 % Arkopal N-100



Penetration test on solid-wall pipe

Penetration of sharp objects through the pipe wall (e.g. shards during pipe bursting) can be simulated by using a cylindrical stamp device. The pipe wall must remain intact for the specified period of operation.

Residual wall thickness after 9,000 hrs
> 50 % of original wall thickness

Coextrusion method – added layers, added value

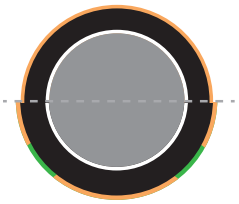
The coextrusion method of production offers several advantages with regard to standard PE 100 and PE 100 RC-Line Multilayer Pipes (Type 2) as well as PE 100 SPC RC-Line Multilayer Pipes with Protective Jacket (Type 3).

Pipes classified as Type 3 include an additional highly abrasion-resistant jacket made of modified polypropylene, which protects them against damage in the form of grooves and notches. Thanks to the coloured functional outer skin featured on PE 100 and PE 100 RC-Line Multilayer Pipes (Type 2), the overall condition and quality of the pipe can be assessed during construction work. Damages to the exterior that constitute more than 10 % of the standard wall thickness can thus be determined by means of visual inspection.

Additionally, a camera can be used to check the condition of the inner pipe (light-coloured interior skin) once the official asset depreciation period has expired. This helps to close the so-called "assessment gap", allowing engineers to determine further operation over the minimum service life of 100 years.

SIMONA® Multilayer Pipes allow the operator full-scale quality monitoring by means of visual inspection – from the day of manufacture and throughout the pipeline's service life.

Type 2:
SIMONA® Multilayer Pipe 3S (three skins)



Type 3:
SIMONA® Multilayer Pressure Pipe with Protective Jacket 2S (two skins with additional protective jacket)

Multilayer pipes

The PE layers of SIMONA® Multilayer Pipes Type 2 are bonded together homogeneously by using the so-called coextrusion method. Additionally, in SIMONA® Multilayer Pipes classified as Type 3 (with a protective jacket) there is no material-based bond between PE and PP. This ensures that the protective jacket can be peeled back from the innerpipe for the purpose of attaching electrofusion sockets.

Indicator layers

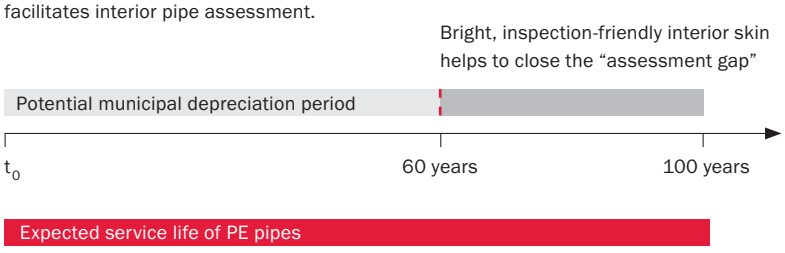
Exterior: coloured indicator layer (10 %) for visual quality assessment at construction site by local inspection authorities (in accordance with DVGW guidelines). The functional layers are designed for full-scale monitoring of the pipe's condition.

Damaged pipe

Examples of non-compliant handling at construction site: damage caused to multilayer pipe (Type 2) by excavator.

Assessment gap

The light-coloured functional skin facilitates interior pipe assessment.



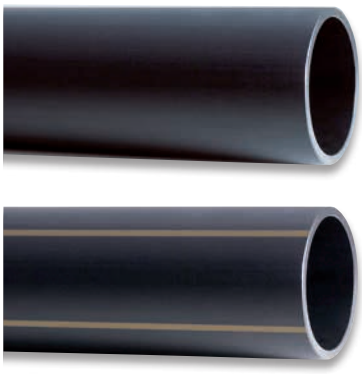
SIMONA® PE 100-Line – Pipes and installation methods

Type of pipe	Benefits

Protection-Level PE 100: + good, **Protection-Level PE 100 RC:** ++ very good

PE 100-Line/PE 100 RC-Line

Standard single-skin pressure pipes made of extruded polyethylene in PE 100 or PE 100 RC.



PE 100:

- Notch resistance
- Low weight
- Minimal incrustation
- High flexibility
- No corrosion
- Greater cost-effectiveness through installation of long sections (30 m)

Protection-Level PE 100: + good, **Protection-Level PE 100 RC:** ++ very good

PE 100-Line 2S or 3S/
PE 100 RC-Line 2S or 3S

Double- or triple-skin pipes made of PE 100 or PE 100 RC with functional layers for full-scale quality monitoring.

PE 100 RC:

Additionally

- Superior stress crack resistance
- High resistance to point loads (e.g. stones, fragments)
- Prepared soil from excavation used as backfill in open-trench installation
- Superior resistance to slow crack growth

Protection-Level PE 100 SPC RC: +++ excellent

PE 100 SPC RC-Line/
PE 100 SPC RC-Line 2S

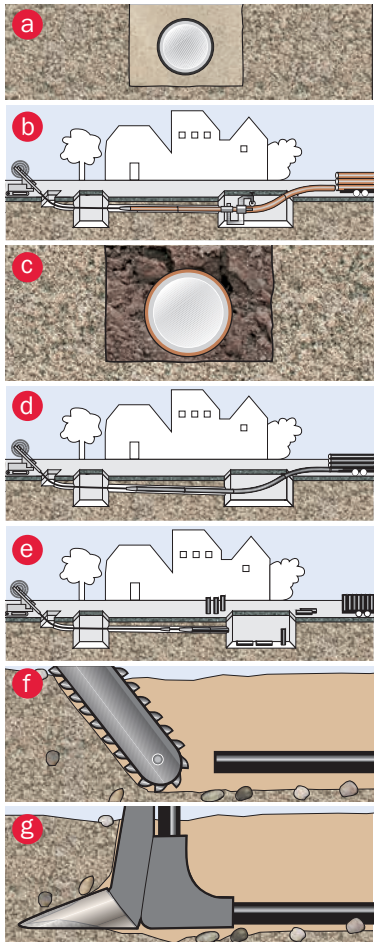
The additional exterior protective jacket made of modified polypropylene (SIMONA® PP Protect) protects the inner pipe against damage during trenchless installation. The inner pipe has the full quality of a new pipe subsequent to installation.

PE 100 SPC RC:

Additionally

- Excellent bonding and shear strength between inner pipe and protective jacket
- High abrasion resistance of PP Protect protective jacket
- No crack propagation from protective jacket to inner pipe
- High resistance of inner pipe (PE 100 RC) to slow crack growth
- Extreme protection against physical damage such as notches, abrasion, wear (PE 100 SPC)

Installation method



PE 100:

Open-trench pipe laying

ⓐ With sand bed up to 0/8
With twice-crushed and screened chipping
Laying with compactible, stone-free materials such as sand or twice-crushed and screened chippings, e. g. equivalent to 2/5 or 5/8 grade up to a maximum of 11 mm (bedding in accordance with DIN EN 1610)

Trenchless pipe laying

ⓑ Swagelining

PE 100 RC:

Open-trench pipe laying

ⓒ Without sand bed

Trenchless pipe laying

ⓓ Relining (Sliplining)
ⓔ Short-pipe relining
ⓕ Milling
ⓖ Ploughing
Laying with prepared, compactible excavated material with a grain size of up to 63 mm (soil classes 3 to 6 as per DIN 18300)

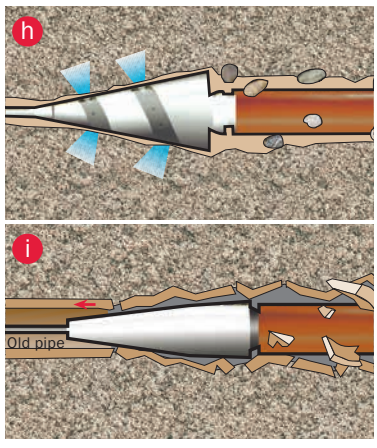
Standards and certifications

PE 100:

- DIN 8074/8075
- DIN EN 12201
- TÜV Süddeutschland certified
- DIBt approval Z-40.23.311 for liquids hazardous to water

PE 100 RC:

- DIN 8074/8075
- DIN EN 12201
- TÜV Süddeutschland certified
- PAS 1075, Type 1 + 2



PE 100 SPC RC:

Trenchless pipe laying

ⓗ Wash-boring
ⓘ Pipe bursting
Installation in all soil types and classes permitted for construction purposes

PE 100 SPC RC:

- DIN 8074/8075
- DIN EN 12201
- TÜV Süddeutschland certified
- PAS 1075, Type 3

Gravity piping systems

Gravity piping systems are designed to transport wastewater without the need for additional pressure, simply by using a gradient. As a system supplier, SIMONA offers all-embracing solutions for environmental applications – from service pipe connection to pumping station.

SIMOFUSE® joining technology provides the basis for a strong and completely tight welded connection. The plastic pipes within this range are highly corrosion-resistant and extremely flexible, thus guaranteeing a long service for the overall sewer system. SIMONA – System meets safety.

Key components

1 SIMONA® PE Sewer Pipe

Sewer pipe in plain black or grey (PE) or coextruded in black/grey (PE CoEx) for connection by means of electrofusion socket or butt welding.
→ p. 14

2 SIMONA® PE Pipe Module SIMOFUSE®

SIMOFUSE® pipe module, single-coloured (PE) or coextruded (PE CoEx); can be joined together by means of an integral electrofusion system (SIMOFUSE®) to create a completely watertight fit.
→ p. 15

3 SIMONA® PE Inspection Shaft SIMOFUSE®

Monolithic system shaft for wastewater systems using homogeneous materials. Customised shaft designs according to project requirements.
→ p. 16

4 SIMONA® PE Shaft Connection SIMOFUSE®

Electrofusible shaft connection to join plastic pipes to concrete shafts/manholes.
→ p. 18

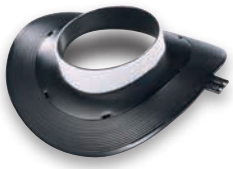
5 SIMONA® PE Sewer Socket

Electrofusion socket for homogeneous welding of pipes and fittings.
→ p. 21

6 SIMONA® PE External Saddle SIMOFUSE®

Electrofusible external saddle for lateral connection of service lines to PE sewer pipes using the open-trench method.
→ p. 22

7 SIMONA® PE Internal Saddle SIMOFUSE®



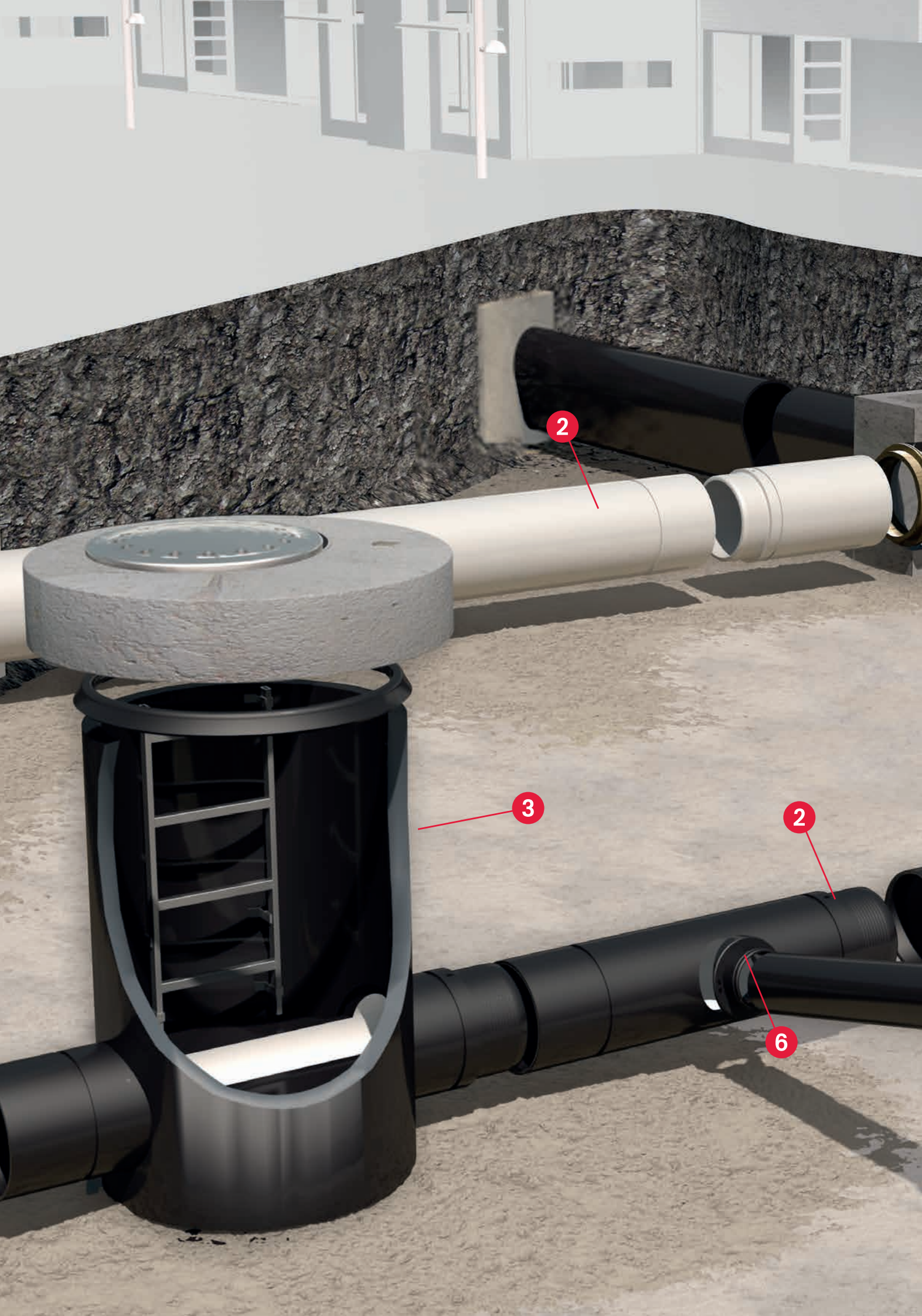
Electrofusible internal saddle for lateral connection of existing service lines made of PVC or stoneware using trenchless rehabilitation methods.
→ p. 23

8 SIMONA® PE Fittings for Gravity Piping Systems

Range that includes all standard fittings required in sewer construction and features the highly efficient SIMOFUSE® joining technology, such as bends (A), branches (B), transition adapters (C) etc. → p. 24

9 SIMONA® PE Ovoid Pipe

Wastewater pipe in an ovoid design for superior dry-weather discharge when the pipe is only partially filled.
→ p. 25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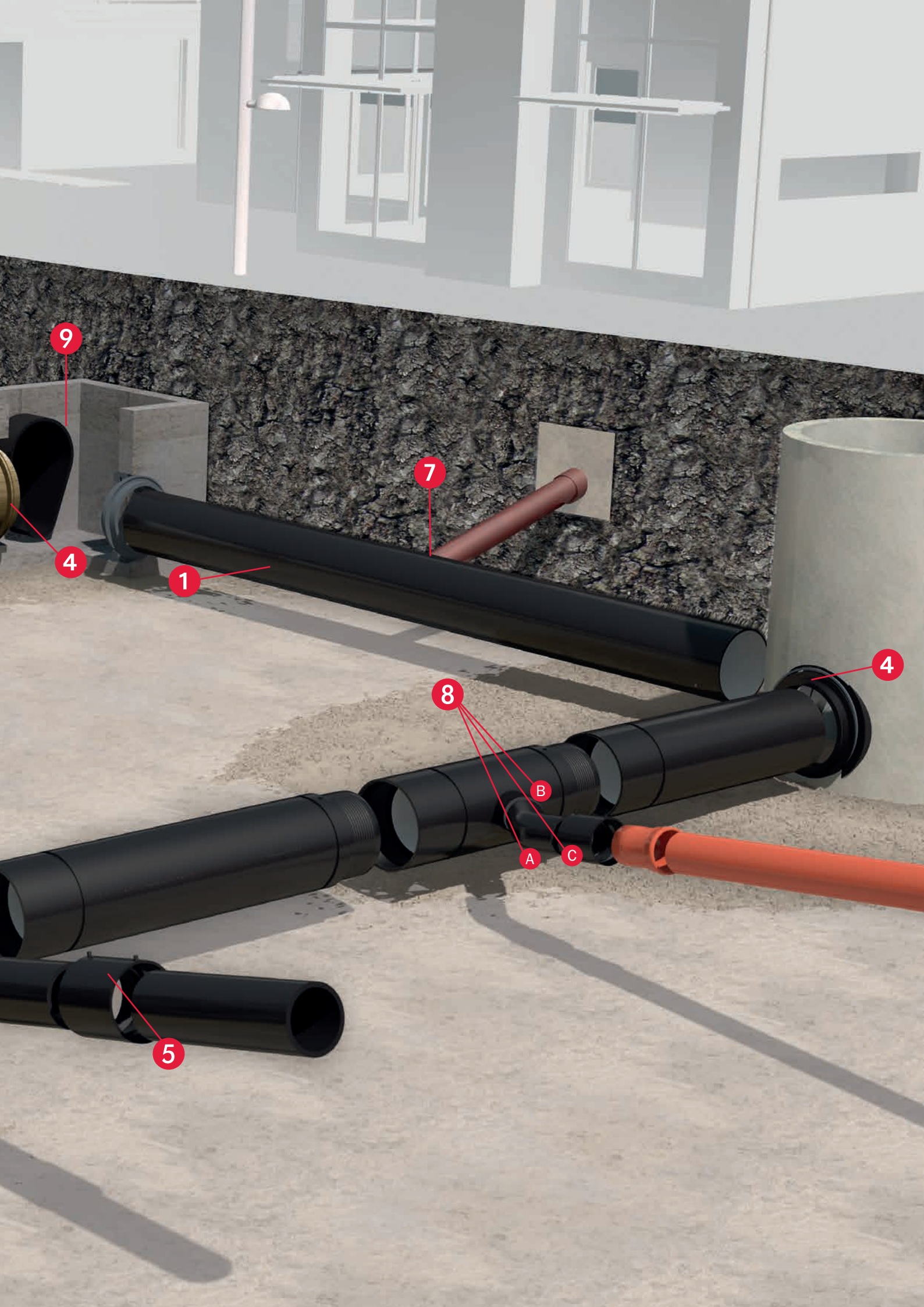
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8
B
A
C
5

SIMONA® PE Sewer Pipe

Supplied in either black or grey (PE) or in a coextruded design, the sewer pipes are joined together by means of electrofusion socket welding or butt welding. Thanks to their additional light grey interior skin, SIMONA® PE CoEx Sewer Pipes offer the benefit of perfect illumination during camera inspection – without any reflections.

Designs
- PE Wastewater Pipes
- PE CoEx Wastewater Pipes

Material
PE 80, PE 100, PE 100 RC, PE CoEx

Colour
- PE (single skin): black or light grey
- PE CoEx (multiple skins): functional light grey interior skin with black or brown exterior skin

Dimensions
- Standard lengths: 6 m to 12 m
- up to 30 m on request

Joining method
- Heated-tool butt welding
- Electrofusion socket welding

Standards and guidelines
- DIN 8074/8075
- DIN EN 12666
- DIN EN 12201
- TÜV Süddeutschland certified

Suitable pipe laying methods
- Open-trench method
- Trenchless rehabilitation – relining or short-pipe relining

1

Product range

SIMONA® PE Sewer Pipes

SDR	Pipe diameter d mm
PE CoEx	
26	280 – 630
17.6	160 – 630
PE 80	
26	160 – 1,200
17.6	160 – 1,200
PE 100	
26	160 – 1,200
17	160 – 1,200

SIMONA® PE Short and Long Pipe Module SIMOFUSE®

SIMOFUSE® Sewer Pipe Modules can be joined together quickly and efficiently by means of an integral electrofusion system in the spigot end to create a completely watertight fit. Alongside single-coloured black or grey designs in PE, SIMONA also produces coextruded pipe modules with an additional light-coloured interior (PE CoEx) that are perfect for camera inspection.

Designs
- PE Wastewater Pipes
- PE CoEx Wastewater Pipes

Material
PE 80, PE 100, PE 100 RC,
PE 100 SPC RC, PE CoEx

Colour
- PE (single skin):
  black or light grey
- PE CoEx (multiple skins):
  functional light grey interior skin with black exterior skin

Dimensions
- d 225 mm to 630 mm:
  0.7 m to 12 m length of module
- d 710 mm to 1,000 mm:
  0.7 m to 6 m length of module
- Other lengths on request

Joining method
- Electrofusion socket welding
- SIMOFUSE®

Standards and guidelines
- DIN 8074/8075
- DIN EN 12666
- DIN EN 12201
- DVS 2207
- Independently monitored by MPA Darmstadt

Suitable pipe laying methods
Short pipe:
- Open-trench pipe laying with/without sand bed
- Trenchless pipe laying – short-pipe relining

Long pipe:
- Open-trench pipe laying with/without sand bed
- Trenchless pipe playing – relining

2

Product range

SIMONA® PE Short and Long Pipe Modules SIMOFUSE®

SDR	Pipe diameter d mm
26	500 – 1,000
17/17.6	355 – 1,000
11	225 – 710

Pressure resistance of min. 2.5 bar, as assessed by MPA Darmstadt for the above-mentioned SDR classes in accordance with DIN EN 12201.
For pressure pipe modules, please refer to page 32.

For detailed product range with assembly instructions, please refer to tech.info “SIMOFUSE® Pipe Joining”.

SIMONA® PE Inspection Shaft SIMOFUSE®

The monolithic inspection shafts made of PE are designed for the installation of a wastewater system in which the materials used are of a uniform composition. The smooth surfaces deliver outstanding hydraulic properties and minimise the risk of deposition or incrustation.

Additionally, as the structure is made of plastic, maintenance and servicing are much more efficient.

Designs
PE system shaft

Material
PE 80, PE 100, PE CoEx

Colour
- PE (single skin): black
- PE CoEx (multiple skins): functional light grey interior skin with black exterior skin

Dimensions
DN 400 mm to 3,000 mm

Joining method
- Heated-tool butt welding
- Electrofusion socket welding
- SIMOFUSE®

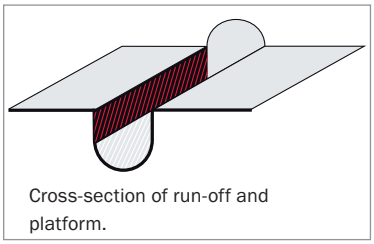
Standards and guidelines
Based on:
- DIN 8074/8075
- DIN EN 12666
- DIN 16961

Customised design
Shaft height, run-off direction, connection type with/without entry ladder/manhole cover, drop manhole structures

Note
Concrete cover and wall thickness according to structural requirements

DIN

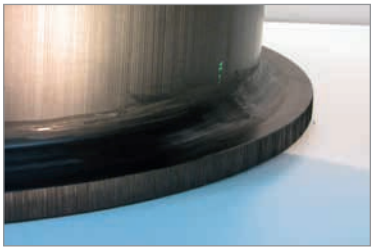
For the purpose of compiling verifiable structural properties, details of the installation conditions are required. Please refer to our questionnaire: **www.simona.de/fb-shaft**



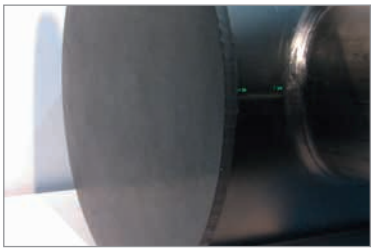
Cross-section of run-off and platform.

A High side walls on run-off prevent flooding of platform at full capacity

B Roughened platform surface prevents slipping during inspection



C System made of identical materials – extrusion seams for completely tight joints



D Tailored to local requirements, e.g. solid base to withstand critical load of ground water

SIMONA® PE Shaft Connection SIMOFUSE® up to d 630 mm

SIMONA® PE Shaft Connections featuring SIMOFUSE® technology are designed to create a high tensile-strength connection between non-pressure piping systems and concrete shafts or brickwork. Grooves positioned around the full circumference of the connection sleeve ensure that it remains firmly in place.

Additionally, an integrated mineral-based sealing tape guarantees a high level of impermeability in the ex-factory concrete shaft connection. In the case of customised Type B shaft connections, the actual length of the structure can be tailored to local brickwork requirements. The shaft connection can be inserted into the concrete formwork without any additional blockout.

Type A: Ex-factory connection

Type B: Installation at construction site

Designs
- PE Shaft Connection SIMOFUSE® Type A
- PE Shaft Connection SIMOFUSE® Type B with pipe collar wall seal

Material
PE 80, PE 100

Colour
Black

Dimensions
- Type A: standard length 135 mm
- Type B: dimensions in accordance with local masonry
- Other lengths on request

Joining method
SIMOFUSE®

Standards and guidelines
Based on DIN V 4034-1:
- Tested pressurised water-tight connection with shafts up to 10.0 mH_2O
- Independently monitored by MPA Darmstadt

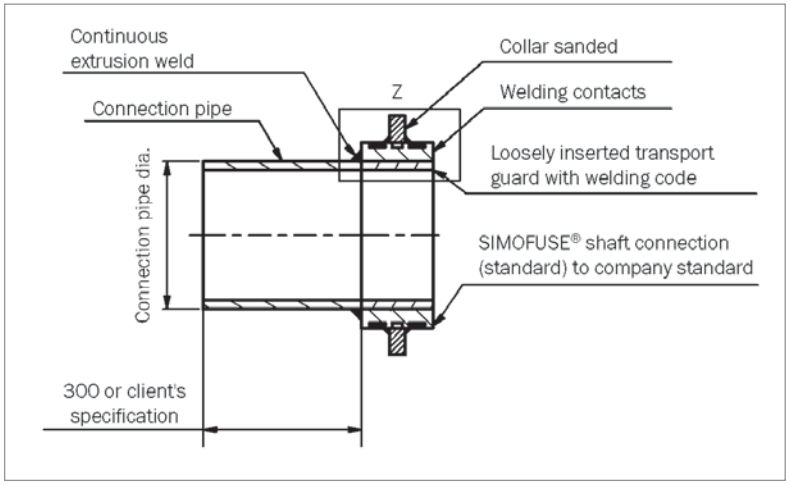
Suitable pipe laying methods
- Type A: ex-factory integration into precast concrete shafts
- Type B: manual installation (on site) in shaft walls and masonry

Note
Shaft connections not suitable as wall ducts

Product range

SIMONA® PE Shaft Connections SIMOFUSE® up to d 630 mm

SDR	Pipe diameter d mm	Overall length l mm
Type A		
26	280 – 630	135
17.6	160 – 630	135
Type B		
26	to 630	customised overall length
17.6	to 630	customised overall length



Type B with extended spigot for installation in brickwork or concrete shafts by the client

Flexible connection of SIMOFUSE® Piping Systems to concrete shaft structures

SIMOFUSE® Pipe Modules that are to be connected to concrete shafts using a PE shaft connection have to be prepared accordingly prior to installation, as they are not designed for direct welding.

For this purpose, the SIMOFUSE® Pipe connection has to be removed to create a smooth pipe end without a SIMOFUSE® Spigot or Socket (Fig. 2). The smooth pipe end is then permanently joined to the shaft connection by means of electrofusion welding (Fig. 3).

The pipe module removed prior to installation is welded to the opposite shaft connection (Fig. 3). Here, too, the smooth pipe end is joined to the shaft connection, while the pipe end with the SIMOFUSE® System can be used for additional pipe installations (Fig. 4).

By applying this method, engineers can react quickly and efficiently to local conditions and proceed with installation work without producing any pipe material waste.

Fig. 1: Connection of SIMOFUSE® Pipe Module to concrete shaft

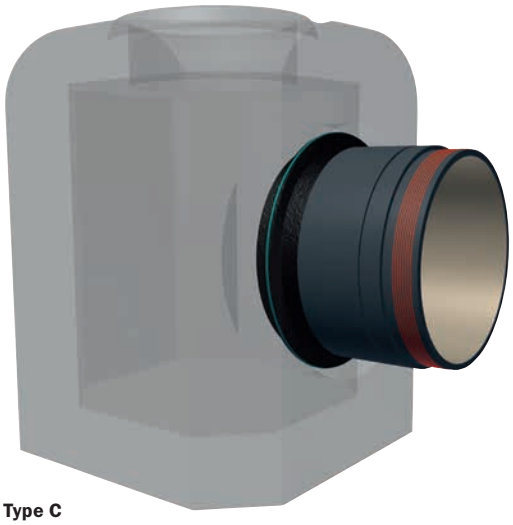
Fig. 2: SIMOFUSE® Spigot end has to be removed before welded to the shaft

Fig. 3: Smooth pipe end is welded to the shaft connection; SIMOFUSE® End previously removed is welded to opposite shaft connection using the smooth end of the pipe

Fig. 4: SIMOFUSE® Spigot end can be used for installation of additional SIMOFUSE® Pipe Modules

SIMONA® PE Shaft Connection SIMOFUSE® for large-diameter pipes from d 710 mm

Large-diameter pipe connections are the perfect choice when it comes to joining pipe dimensions of d 710 mm upwards to concrete structures. The integrated mineral-based sealing tape and the surface finish help to create a high level of impermeability within the ready-made structure and ensure a high tensile-strength connection between the masonry and the pipeline. The additional sections of the pipeline can be joined to the pipe end by using the SIMOFUSE® electrofusion system. Therefore, large-diameter pipes can be installed with maximum efficiency, in many cases without the need for large-pipe electrofusion sockets (depending on pipeline routing).



Type C

Designs
PE Shaft Connection SIMOFUSE® Type C with single-sided spigot or socket end

Material
PE 80, PE 100

Colour
Black or light grey

Dimensions
Dimensions dependent on local masonry

Joining method
SIMOFUSE®

Standards and guidelines
Based on DIN V 4034-1:
- Tested pressurised water-tight connection with shafts up to 10.0 mH_2O
- Independently monitored by MPA Darmstadt

Suitable pipe laying methods
Open-trench method

Product range

SIMONA® PE Shaft Connections SIMOFUSE® Type C from d 710 mm

SDR	Pipe diameter d mm
33	710 – 1,000
26	710 – 1,000
17/17.6	710 – 1,000

Concrete shaft with SIMOFUSE® large pipe connection

View of concrete shaft with SIMONA® PE Shaft Connection SIMOFUSE® Type C

SIMONA® PE Sewer Socket

SIMONA® PE Sewer Sockets are used for the purpose of creating a completely tight joint in conjunction with standard PE 80/100 as well as PE 100 RC-Line and PE 100 SPC RC-Line pipes. In order to achieve a high-quality joint, the pipe ends have to be prepared accordingly prior to welding. Depending on the type of pipe being installed, the existing protective jacket has to be peeled off. Sewer sockets are suitable for open-trench installation.

Designs
Suitable for pipes from SDR 33 to SDR 17

Material
PE 80, PE 100

Colour
Black

Dimensions
d 110 mm to 1,000 mm

Joining method
Electrofusion socket welding

Suitable pipe laying methods
Open-trench method

Note
> d 500 separate welding zones

5

Product range

SIMONA® PE Sewer Sockets

SDR	Pipe diameter d mm
33	110 – 1,000
26	110 – 1,000
17	110 – 1,000

SIMONA® PE External Saddle SIMOFUSE®

PE External Saddles SIMOFUSE® with integral electrofusion spirals are used for the lateral connection of DN 150 service pipes to PE sewer pipes by means of open-trench installation. The integral electrofusion joints create a permanently tight connection with the main sewer.

Material
PE 80, PE 100

Colour
Black

Joining method
SIMOFUSE®

Suitable pipe laying methods
Open-trench installation

Note
Suitable for connection with standard pipes, large-diameter pipes and ovoid pipes

6

Type 1

Type 2

Type 3

Product range

SIMONA® PE External Saddles SIMOFUSE®

Pipe diameter d mm	Feed pipe connection DN
External saddle LF with integral electrofusion socket, Type 1 (PE)	
200 – 560	150
External saddle with socket, Type 2 (PVC/PP)	
280 – 1,000	150
External saddle with integral spigot, Type 3 (PE/PVC/PP)	
280 – 1,000	150

SIMONA® PE Internal Saddle SIMOFUSE®

Electrofusible internal saddles are designed for the lateral connection of existing service pipes made of PVC or stoneware as part of trenchless rehabilitation of the main sewer. Renovation with internal saddles is only performed in conjunction with a hose liner. For this purpose, a needle-felt hose is attached to the felt collar on the internal saddle, thus creating a connection to the service pipe.

Material
PE 80, PE 100

Colour
Black

Dimensions
Strength of 5 mm

Joining method
Integral electrofusion joints

Suitable pipe laying methods
Rehabilitation using trenchless method

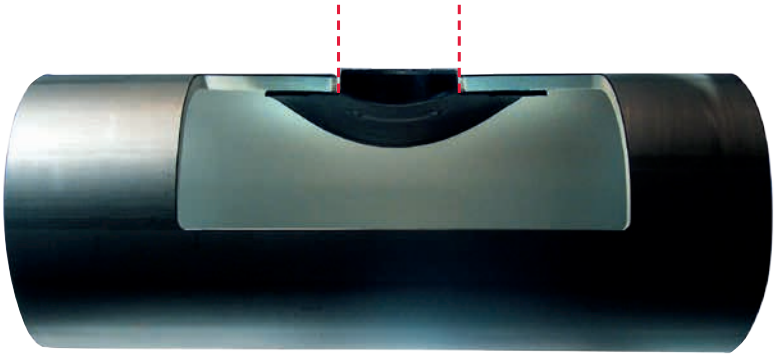
Note
Other dimensions and materials on request

7

Product range

SIMONA® PE Internal Saddles SIMOFUSE®

Pipe diameter d mm	Feed pipe connection DN
280	150
315	150
355	150



Internal saddle with transition to service connection – Felt collar for the purpose of attaching needle-felt hose as part of rehabilitation projects

SIMONA® PE Fittings for gravity piping systems

The range includes standard injection-moulded fittings as well as large-diameter fittings and customised components. Therefore, our overall portfolio encompasses the full range of fittings required for PE sewer pipes.

Designs
Turned or segment-welded PE fittings

Material
PE 80, PE 100, PE CoEx

Colour
- PE (single skin): black or light grey
- PE CoEx (multiple skins): functional light grey interior skin with black exterior skin

Joining method
- Heated-tool butt welding
- Electrofusion socket welding
- SIMOFUSE®

Standards and guidelines
- DIN EN 12666
- DIN EN 12201

Note
- Fittings with smooth interior surface
- The highly cost-effective SIMOFUSE® joining method can be applied to all standard fittings used in pipeline engineering.

8

Product range

SIMONA® Fittings for Gravity Piping Systems

Design	Diameter mm
Bends 90°, 60°, 45°, 30°, 22°, 11°, seamless	32 – 1,000
Bends 90°, 60°, 45°, 30°, welded	90 – 1,200
Tees, welded	90 – 1,200
Branches 45°, 60°, welded	110 – 630
Reducers, eccentric, injection-moulded/machined	160/90 – 1,000/900
Transition fittings for stoneware	150/DN 150
Transition fittings for PVC	160/DN 150
Transition fittings for PP	160/DN 150

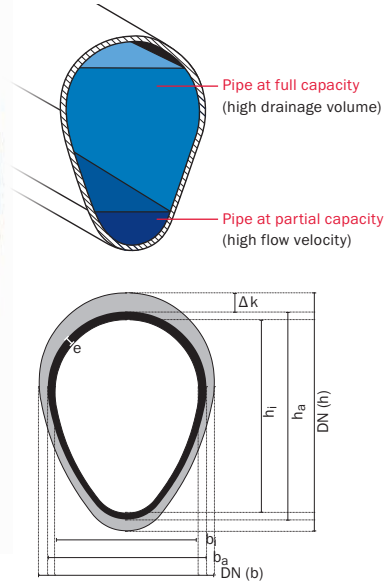
Customised components available on request.

DIN

For detailed information on the product range, please refer to our Gross Price List “Pipes and Fittings PE”.

SIMONA® PE Ovoid Pipes (standard profile)

SIMONA® PE Ovoid Pipes are PE wastewater pipes with an ovoid, i. e. egg-shaped geometry. When the pipe is partially filled (dry-weather drainage), a high velocity of flow is achieved at the bottom, i. e. the invert, of the pipe. As a result, ovoid pipes display very good hydraulic properties with a flushing and self-cleaning effect. When precipitation levels are high, the ovoid shape of the pipe facilitates rapid drainage of large volumes of water.



Designs
PE Ovoid Pipe

Material
PE 80, PE 100

Colour
Black

Dimensions
- Standard lengths: 0.7 m to 2.5 m for standard crosssections (DIN 4263)
- Other lengths on request

Joining method
Heated-tool butt welding

Standards and guidelines
- Tolerances based on DIN 8074/8075

Suitable pipe laying methods
- Open-trench installation with sand bed
- Trenchless rehabilitation of brickwork and concrete sewers with an ovoid shape

Note
All values specified in the table are based on theoretical calculations. The actual ovoid pipes to be deployed will depend on the condition of the existing pipe as well as structural calculations.

Product range

SIMONA® PE Ovoid Pipes, standard (in mm)

Standard profile DIN 4263 b/h	Outside diameter b_a/h_a	Wall thickness e	Inside diameter b_i/h_i	Annular space Δk
500/750	458/692	17	423/657	58
	466/700	21	423/657	50
	487/721	31	423/657	29
600/900	558/841	17	523/806	58
	567/850	21	523/806	50
	577/860	27	523/806	40
700/1,050	657/990	19	618/951	59
	667/1,000	24	618/951	50
	679/1,012	30	618/951	38
800/1,200	724/1,125	22	698/1,081	74
	753/1,136	27	698/1,081	63
	767/1,150	34	698/1,081	50
900/1,350	854/1,288	24	805/1,239	62
	867/1,300	30	805/1,239	50
	882/1,315	38	805/1,239	35

Pipes with 1,000 / 1,500 mm standard profile on request. Outside and inside diameter are approximate sizes; deviations possible.

DIN

For further information, please refer to the brochure “SIMONA® PE Ovoid Pipe Systems”.

Ausklappseite geschlossen

Pressure piping systems

In the case of pressure piping systems, wastewater is transported by means of internal pressure within the pipe. High-quality pipes equipped with protective jackets are designed for efficient trenchless installation, while double-containment pipes prevent groundwater pollution in drinking-water protection areas. SIMONA offers sustainable solutions from a single source – from main sewer to treatment plant.

Our SIMOFUSE® technology has been adapted and refined for use in pressure piping systems. With an operating pressure of up to 8 bar, wastewater is transported through the pipe safely without any leakage. SIMONA – System meets safety.

Key components

1 SIMONA® PE 100-Line/PE 100 RC-Line Wastewater Pressure Pipe

Single-skin pressure pipe for new-build or rehabilitation projects.
→ p. 30

2 SIMONA® PE 100-Line/PE 100 RC-Line Wastewater Pressure Pipe

Double- or triple-skin pressure pipe for full-scale quality monitoring.
→ p. 30

3 SIMONA® PE 100 SPC RC-Line Wastewater Pressure Pipe

Pressure pipe with increased resistance to stress cracking and additional protective jacket for trenchless installation.
→ p. 31

4 SIMONA® PE Pipe Module SIMOFUSE® Pressure

SIMOFUSE® connection technology for pressure applications. Newbuild or rehabilitation projects using underground wastewater pressure pipes and overground pressure piping systems.
→ p. 32

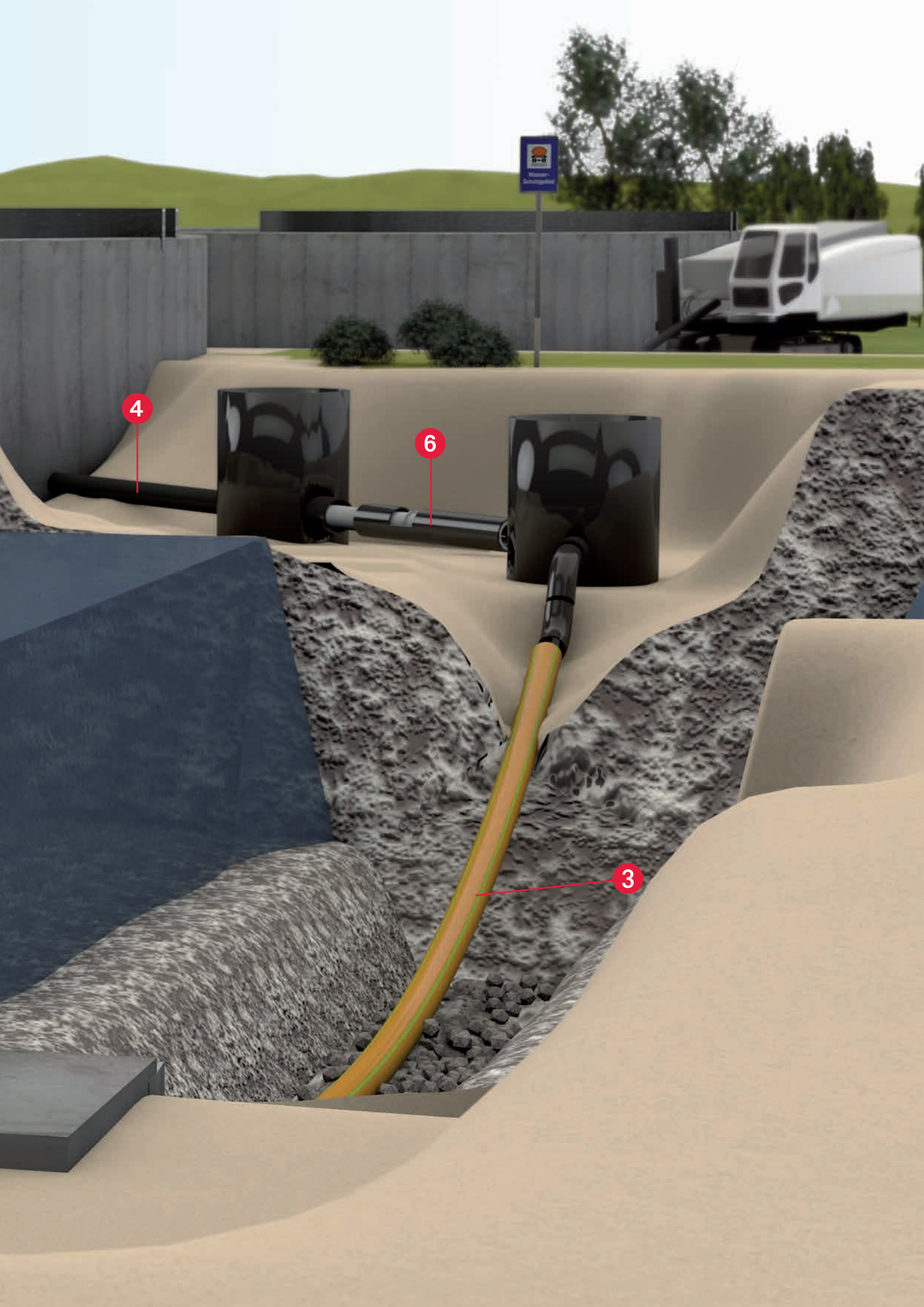
5 SIMONA® PE Pressure Fittings

System components for various pressure ratings, including seamless bends (A), tees with reduced branch (B), full-face flanges (C), special flanges (D) and wall ducts (E).
→ p. 33

6 SIMONA® PE Double-Containment Pipe

Double-containment piping system with leakage detection for the transport of substances that are hazardous to water. Substance-carrying pipe made of PE or PP depending on requirements.
→ p. 34


2
1
5
C
E
D
B
A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SIMONA® PE 100-Line and PE 100 RC-Line Wastewater Pressure Pipe

SIMONA® PE 100-Line Wastewater Pressure Pipes excel in combining low weight with outstanding flexibility and high abrasion resistance. The PE 100 RC-Line pipes are stress crack resistant and capable of withstanding significant concentrated loads. The brown exterior and light-coloured interior indicator skins ensure that any damage to the pipe can be located and assessed quickly and efficiently.

Designs
- PE Wastewater Pressure Pipes
- PE RC Wastewater Pressure Pipes

Material
PE 100, PE 100 RC

Colour
- PE 100/PE 100 RC (one skin): black/black with brown stripes
- PE 100/PE 100 RC, 2S (two skins): black with light grey functional interior skin or coloured functional exterior skin
- PE 100/PE 100 RC, 3S (three skins): black with light grey functional interior skin and coloured functional exterior skin

Dimensions
- Standard lengths: 6 m to 12 m
- Up to 30 m on request

Joining method
- Heated-tool butt welding
- Electrofusion socket welding
- SIMOFUSE®

Standards and guidelines
- DIN 8074/8075
- DIN EN 12201
- DIBt approval Z-40.23.311
- PAS 1075 Type 1 (PE 100 RC single skin)
- PAS 1075 Type 2 (PE 100 RC multiple skins)
- TÜV Süddeutschland certified

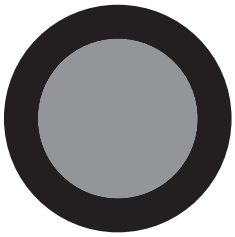
Suitable installation methods
See page 8/9

DIBt approved

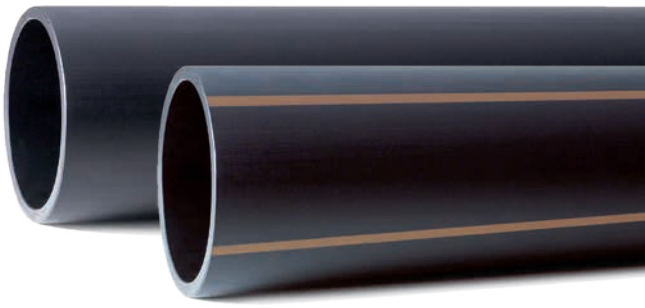
PAS 1075

For details of product range, with order numbers, please refer to the Gross Price List “Pipes and Fittings PE”.

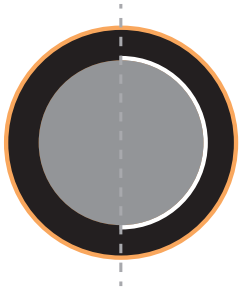
1 SIMONA® PE 100-Line/PE 100 RC-Line



Type 1:
SIMONA® Pressure Pipe, single-skin



2 SIMONA® PE 100-Line/PE 100 RC-Line 2S oder 3S



Type 2:
SIMONA® Multilayer Pressure Pipe

Product range

SIMONA® PE 100-Line and PE 100 RC-Line

SDR	Pipe diameter d mm
PE 100/PE 100 RC, single skin (with stripes)	
26	40 – 1,200
17	32 – 1,200
11	10 – 800
PE 100/PE 100 RC, 2S or 3S multiple skins	
17	90 – 630
11	90 – 630

SIMONA® PE 100 SPC RC-Line Wastewater Pressure Pipe

SIMONA® SPC RC-Line Protective-Jacket Pipes are coextruded multilayer pipes. They consist of a PE 100 RC inner pipe (DIN 8074/8075) and an additional protective jacket made of highly abrasion-resistant polypropylene. The PP pipe jacket protects the inner pipe against dangerous notches or scratches. Therefore, the inner pipe has the full quality of a new pipe even once it has been laid by means of trenchless installation.

Design
PE SPC RC-Line Wastewater Pressure Pipes

Material
PE 100 RC, PP Protect (modifiziert)

Colour
- Single skin: black with coloured protective jacket (with green stripes)
- Two skins, 2S: black with light grey interior surface and coloured protective jacket (with green stripes)

Dimensions
- Standard lengths: 6 m to 12 m
- Up to 30 m on request

Joining method
- Heated-tool butt welding
- Electrofusion socket welding
- SIMOFUSE®

Standards and guidelines
- DIN 8074/8075
- DIN EN 12201
- DIN 53769-1 ≥ 5N/mm²
- PAS 1075 Type 3 (protective-jacket pipe)
- TÜV Süddeutschland certified

Suitable pipe laying methods
Fully approved for installation in all soil types and classes permitted for construction purposes

Note
PP protective jacket is pre-machined at the pipe ends ready for heated-tool butt welding

3 SIMONA® PE 100 SPC RC-Line

Type 3:
SIMONA® SPC RC-Line Pressure Pipe with Protective Jacket

3 SIMONA® PE 100 SPC RC-Line 2S

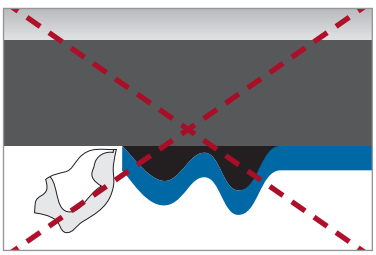
Type 3:
SIMONA® SPC RC-Line Multilayer Pressure Pipe with Protective Jacket

Product range

SIMONA® PE 100 SPC RC-Line

SDR	Pipe diameter d mm
17	90 – 630
11	90 – 630

The pipe jacket made of SIMONA® PP Protect offers superior protection against physical damage and abrasion, as well as preventing crack propagation from the protective jacket to the inner pipe.



The excellent bonding and shear strength between the inner pipe and the protective jacket ensures that the pipe is not damaged by stones in the ground. This also prevents the protective jacket from sliding up the pipe.

SIMONA® PE Pipe Module SIMOFUSE® Pressure

SIMOFUSE® Pressure pipe modules are designed for projects involving underground wastewater pressure pipes. The SIMOFUSE® connection system ensures efficient installation, particularly in cramped conditions. What is more, the welded joint can reliably withstand an operating pressure of up to 8 bar (at a service temperature of 20°C).

Designs
- PE Wastewater Pressure Pipes
- PE CoEx Wastewater Pressure Pipes

Material
PE 80, PE 100, PE 100 RC, PE CoEx

Colour
- PE (single skin): black or light grey
- PE CoEx (multiple skins): black with light grey functional interior skin

Dimensions
- d 225 mm to 630 mm: 0.7 m to 12 m length of module
- d 710 mm: 0.7 m to 6 m length of module
- Other lengths on request

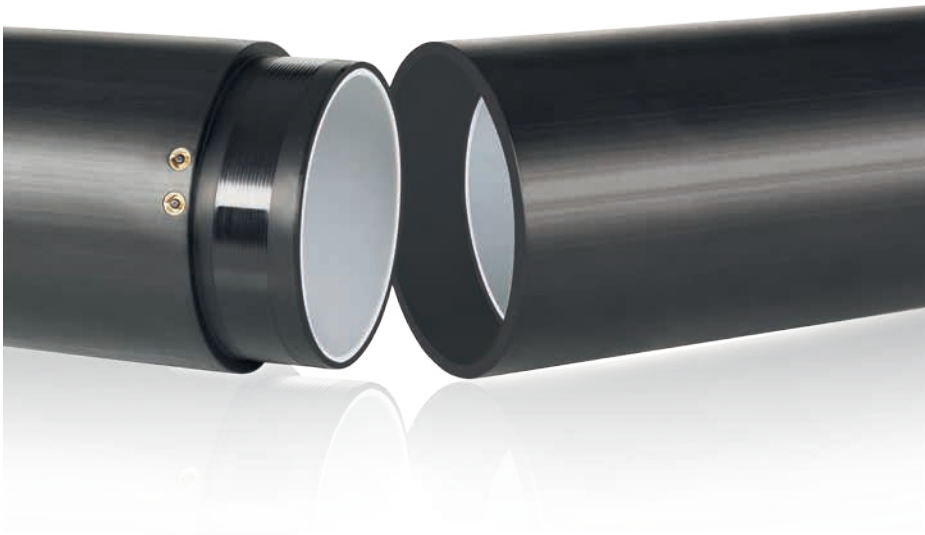
Joining method
- SIMOFUSE®

Standards and guidelines
- DIN 8074/8075
- DIN EN 12201
- DVS 2207
- Independently monitored by MPA Darmstadt

Suitable pipe laying methods
- Trenchless rehabilitation
- Open-trench method

Note
PE 100 pipe module SDR 11 pressure-resistant up to 8 bar; SDR 17 pressure resistant up to 5 bar

4

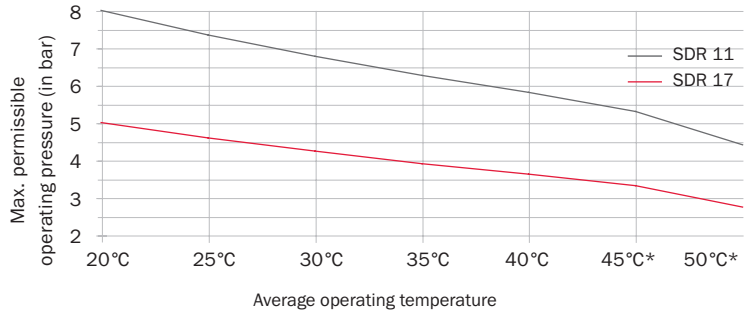


Product range

SIMONA® PE Pipe Modules SIMOFUSE® Pressure

SDR	Pipe diameter d mm
17	400 – 710
11	225 – 710

Temperature-dependent pressure load for PE 100 pipe modules SIMOFUSE®
Safety factor (SF) = 1.25; water, without substances hazardous to water A_2 = 1.0; service life: 50 years



* Commencement of thermal aging:
Restriction of service life to 25 years at 45 °C and 20 years at 50 °C

SIMONA® PE Pressure Fittings

PE fittings for pressurised applications can be exposed to full pressure loads (up to PN 16). The range includes fittings with short and elongated spigots. Alongside standardised products, we also offer customised fittings tailored to specific requirements.

Designs
- Fittings (PE) for various pressure ratings

Material
PE 100, PE 100 RC, PE CoEx

Colour
- PE (single skin): black or light grey
- PE CoEx (multiple skins): black with light grey functional interior skin

Joining method
- Heated-tool butt welding
- Electrofusion socket welding
- SIMOFUSE®

Standards and guidelines
- DIN EN 12201
- TÜV Süddeutschland certified

Note
- Fittings with smooth interior surface
- Pressure load tested up to 16 bar
- Special fittings up to 25 bar on request

Product range

SIMONA® PE Pressure Fittings

Design	Diameter mm
Bends 90°, 60°, 45°, 30°, 22°, 11°, seamless	20 – 1,200
Tees equal/with reduced branch, reinforced	20 – 800
Stub flanges	20 – 1,200
Loose flanges	20 – 1,200
Full-face flanges, injection-moulded	63 – 225
Special flanges	250 – 1,000
Reducers, concentric/eccentric	20 – 1,000
Branches 45°, 60°, reinforced	63 – 800
Electrofusion socket, pressure	20 – 1,000

For details of product range, with order numbers, please refer to the Gross Price List “Pipes and Fittings PE”.

SIMONA® PE Double-Containment Pipe for substances hazardous to water

SIMONA® Double-Containment Piping Systems ensure that any wastewater discharged from the carrying pipe is safely retained in the protective pipe. Inspection systems installed within the associated shaft/manhole structures can be used to detect the problem and dispose of the wastewater. Additionally, the space between inner pipe and protective pipe can be tested for watertightness during operation. SIMONA® Double-Containment Piping Systems can be used in both pressure- and gravity-based applications. Alongside inspection shafts for double-containment pipes, SIMONA also supplies the full range of double-containment pipe fittings required in this field.

Designs
- PE 100 Double-Containment Pipe
- PE CoEx Double-Containment Pipe
- PE 100 RC-Line Double-Containment Pipe

Material
PE 100, PE 100 RC, PE CoEx

Colour
- PE 100 Inner pipe: black (PE 100)
  Outer pipe: black (PE 100/ PE 100 RC
- PE CoEx Interior: light grey (PE CoEx)
  Outer pipe: black (PE 100)

Dimensions
Standard lengths: 6 m to 12 m

Joining method
- Simultaneous welding
- Cascade welding
- SIMOFUSE®

Standards and guidelines
- DIN 8074/8075
- DIN EN 12201

Suitable pipe laying methods
- Open-trench pipe laying with sand bed (PE 100)
- Open-trench pipe laying without sand bed (PE 100 RC)

Product range

SIMONA® PE Double-Containment Pipes

SDR	Internal pipe diameter d mm	SDR	External pipe diameter d mm
PE 100			
17	90 – 500	26	160 – 800
11	90 – 500	17	160 – 900
PE CoEx			
17.6	160 – 630	26	250 – 900
	160 – 560	17	250 – 1,000

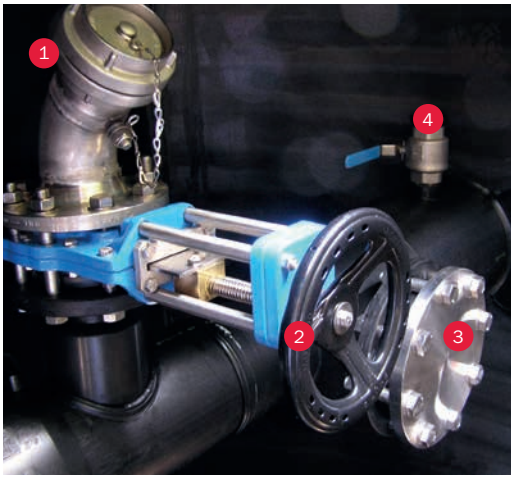
Background information: guidelines on wastewater management

ATV – Abwassertechnische Vereinigung: In the case of highly restricted water protection zones, the provisions set out by ATV (Abwassertechnische Vereinigung) stipulate that standard systems for wastewater transport and collection shall be complemented by an additional protection system to be deployed in the event of any leakage. In this context, the choice of piping system in water protection zones is dependent on the hazard potential. This may be determined, for instance, by an independent assessment of local geological and hydrological conditions or the current water situation.

DIN

Inspection and joining solutions for double-containment piping systems

Single-skin piping systems with integrated monitoring devices offer no direct protection in the event of leakage. SIMONA® Double-Containment Pipes, by contrast, are highly reliable systems in drinking-water protection zones governed by specific regulations for the purpose of protecting water and the environment against hazardous substances. Even in the event of a rupture, the substances are safely transported through the exterior pipe rather than being discharged into the environment.



1. Flushing connection
2. Gate valve
3. Inspection port, pressure pipe
4. Test connection for leakage containment space

Shaft transition from double-containment pipe with monitoring devices

Joining techniques

Simultaneous welding:

1. The outer faces of the two pipes are heated simultaneously by means of a heating tool.
2. The pipes are then pressed together under force.

This creates a strong bond with a weld bead.

Cascade welding:

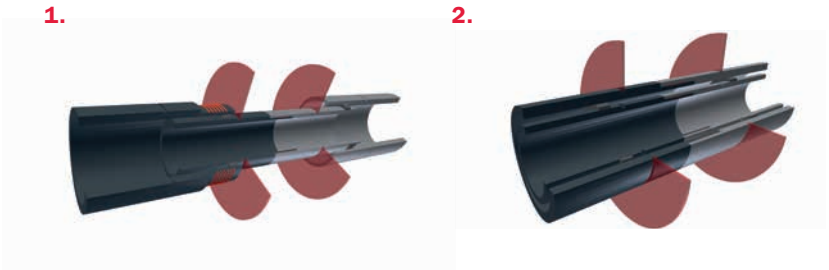
1. First, the substance-carrying pipes are joined together by means of heated-tool butt welding/electrofusion welding.
2. Subsequently, the protective pipes are brought together to encase the inner pipes and then connected by means of an electrofusion socket.

SIMOFUSE®:

Both pipes have a spigot end with integral electrofusion spirals (i.e. filaments) as well as a socket end.

1. First, the substance-carrying pipe and then
2. the protective pipe are welded together by means of the SIMOFUSE® electrofusion system to create a high tensile-strength bond.

This creates a tight connection without a weld bead.



Note: Pipes depicted in different colours to improve illustration of welding zone.

SIMONA® PE Shaft Installations and Ventilation Systems

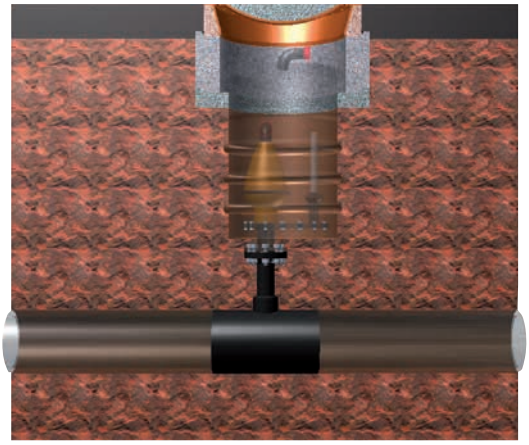
SIMONA also offers a range of high-quality thermoplastic components for shaft installations and is a one-stop supplier of end-to-end systems. Fittings made of PE combine state-of-the-art engineering with permanent corrosion protection. Thanks to their impact strength and excellent welding properties, they are the perfect solution for a wide range of applications.

As the various materials can be mixed and matched, system components tailored to the required pressure ratings can be incorporated within the concrete shafts. Both monolithic and modular thermoplastic shaft systems meet the full range of requirements with regard to wastewater handling in state-of-the-art shaft structures.

1. Air-input and venting in concrete shaft

Consisting of:

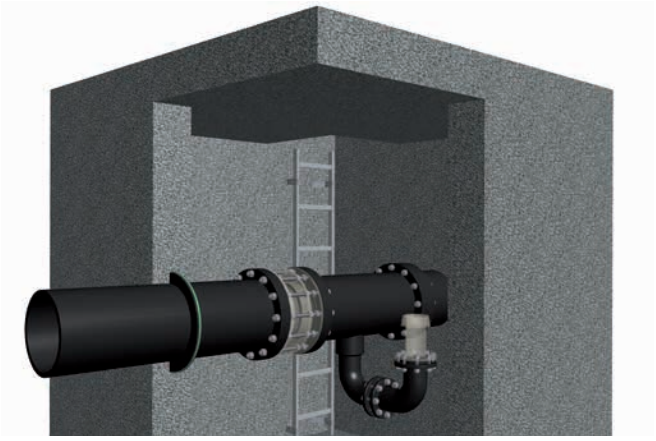
- Pressurised watertight and high tensile-strength SIMONA® Wall Duct
- SIMONA® Special Flange Assembly for connection to metal valves in accordance with nominal widths
- Adapter and dismantling joint (stainless steel or coated)
- SIMONA® Tee (reduced branch) capable of withstanding full-pressure loads and
- Full-face flange for connection to venting valves



2. Venting without shaft

Consisting of:

- SIMONA® Tee (reduced branch) and
- Full-face flange for connection to venting valves



3. Concrete shaft with discharge unit

Consisting of:

- Watertight, high tensile-strength SIMONA® Wall Duct
- SIMONA® Special Flange
- Adapter and dismantling joint (stainless steel)
- SIMONA® Tee (reduced branch) for discharge

4. Monolithic PE inspection shaft

Consisting of:

- SIMONA® All-Thermoplastic Shaft with reinforced concrete cover, including homogeneous joints and customised shaft installations in accordance with project requirements.

Services

As a customer, you always take centre stage: from project development to materials procurement and on-site planning, we are committed to providing the very best assistance and advice. Our long-standing experience is your gain.

Consulting service

We have channelled considerable resources into technical consulting and would be delighted to share our know-how with you. We offer global consulting services, headed by highly qualified staff at our Technical Sales Support unit and within our field sales organisation – from project planning and product selection to on-site assistance tailored to your applications.

Customised pipes and fittings

Alongside our standard product range, we offer a premium-class package of specialist solutions:

- Pipes in various lengths for a range of joining methods
- Special pipe sizes adapted to the standard nominal diameters of other materials
- Pipes with non-standard properties such as electrical conductivity or low flammability
- Customised fittings as system components for your applications

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pipingsystems@simona.de

Project planning

We advise project planners and contractors on the selection of suitable materials and products as well as on the most efficient methods of installation. It would be a great pleasure for us to assist you in addressing all technical issues related to your specific project, e. g. pipe laying methods, structural calculations or joining technology.

Structural analysis

We carry out structural analyses for

- underground pipes,
- landfill drainage pipes and traffic routes as well as for
- shafts,
- rectangular and cylindrical tanks and
- ventilation systems.

On-site consulting

We are happy to provide active support at all stages of your project. Our qualified engineers will assist you on site throughout your construction project and also advise you on technical matters subsequent to completion.

Training

We also offer a range of training courses and seminars for customer personnel – organised at your premises or at our Technology Centre in Kirn.

SIMONA accessories

SIMONA offers a comprehensive range of equipment and accessories for professional processing and welding of piping systems.

Drawing on many years of experience and first-class technical expertise, our highly qualified team looks forward to advising you. The joining technology on offer within this area is available for hire or sale.

Rental welding machines

- Workshop machines
- Socket welding machines
- Butt welding machines
  (depending on size also available with CNC technology)

Accessories for heated-tool butt welding

- Logging unit to record welding data
- Internal pipe debeader (d 90 – d 500 mm)

Accessories for electrofusion socket welding

- Rotary peeling devices (d 32 – d 500 mm)
- Manual pipe scrapers

Equipment for electrofusion welding

Various types of lightweight 40 V all-purpose machines available:

- With logging and barcode input
- With additional manual input option
- With barcode input, manual input and GEO data collection

Special service
SIMONA® SPC RC-Line Pipes are supplied with pre-machined ends ready for heated-tool butt welding.

SIMOFUSE® (integral electrofusion welding)

- Clamping tools
- Hydraulic devices

Stripping tools for SPC RC-Line pipes

SIMONA stripping tools have been specially developed for use on construction sites. Using the stripping tools, the protective jacket is easily removed from the welding area ready for subsequent processing. Thus, the pipes can be welded in accordance with the relevant DVS welding guidelines.

Silicone heating mats

To facilitate detachment of the protective jacket from the inner pipe, we recommend using silicone heating mats at low processing temperatures (< 15 °C).

SIMONA welding videos:
www.youtube.com/simonakunststoffe

SIMONA worldwide

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