

**SIMONA**



## **SIMONA® PE Ovoid Piping Systems**

For highly fluctuating waste-water flows

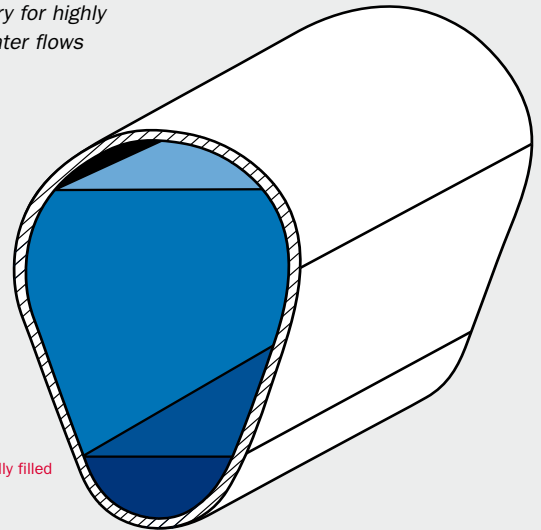
## SIMONA® PE Ovoid Pipes – the patented solution with impressive properties



*The perfect geometry for highly fluctuating waste-water flows*

Discharge with full pipe  
(high discharge flow)

Discharge with pipe partially filled  
(high flow velocity)



Ovoid pipes have become increasingly important in recent years, particularly as the age of ovoid-shaped brickwork and concrete ducts has led to a steady rise in the need for repairs to existing sewage systems. Damage patterns generally take the form of cracks, holes, wear and tear due to abrasion and biogenic corrosion.

Applying a patented manufacturing process, SIMONA produces polyethylene ovoid pipes for the repair of existing brickwork sewage systems and concrete ovoid ducts as well as for the installation of new lines. For the first time, SIMONA® PE ovoid pipes combine the benefits of the proven ovoid shape – high flow velocity for small quantities of water, improved discharge of large quantities of water – with the impressive material and processing properties of polyethylene.

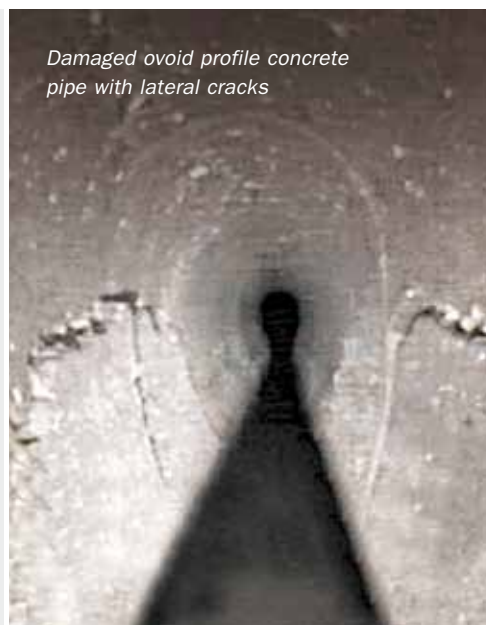
### **High flow velocity and high capacity for back water**

SIMONA® PE ovoid pipes are PE waste-water pipes with an ovoid geometry. If the pipe is partially filled (dry weather discharge), a high flow velocity is achieved at the base of the duct, and hence good hydraulic discharge with a flushing and self-cleaning effect. When precipitation flows are more extensive, the pipe offers a high discharge capacity because the profile becomes wider towards the top.

### Fields of application

SIMONA® PE 80/PE 100 ovoid pipes are used as follows in waste-water disposal:

- Repair of brickwork and concrete sewers with an ovoid shape
- Laying of new waste-water pipes in areas with highly fluctuating waste-water flows and many dry-weather days



*Damaged ovoid profile concrete pipe with lateral cracks*



*Open laying in a bed of sand*

### Standardisation

SIMONA® PE ovoid pipes are manufactured in compliance with all the applicable standards, approvals and guidelines:

- DIN 8074/8075
- Static sizing in accordance with ATV-DVWK A-127 and M-127

The processing and laying of the pipes is based on DVS guidelines DVS 2207 Part 1, DVS 2208 Part 1 and DVS 2212 and the full range of associated standards such as DIN EN 1610 when installing new pipes.

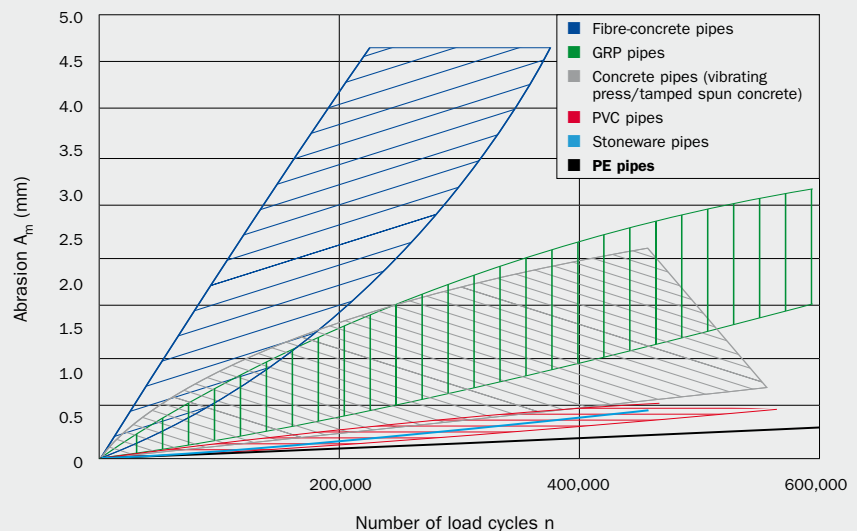
### Benefits at a glance

- High flow velocity
- High load-bearing capacity and strength
- Service life up to 100 years
- Corrosion-resistant
- Not susceptible to cracking, abrasion-resistant
- Excellent chemical resistance
- Low risk of incrustation
- Efficient handling during installation
- Simple connection of saddles
- Absolutely watertight and root-proof, integral and axial-force locking connection

## Quality criteria for a sustainable, economical sewerage system



Levels of abrasion according to the Darmstadt method for pipes made of different materials



Thermoplastic waste-water pipes provide maximum reliability and durability owing to integral connection by welding.

**SIMONA® PE ovoid pipes clearly minimise the causes of damage leading to leaking sewers, e.g. material cracks, fractures (root penetration), incrustations or corrosion, compared to conventional materials. This significantly increases the system's service life and useful life.**

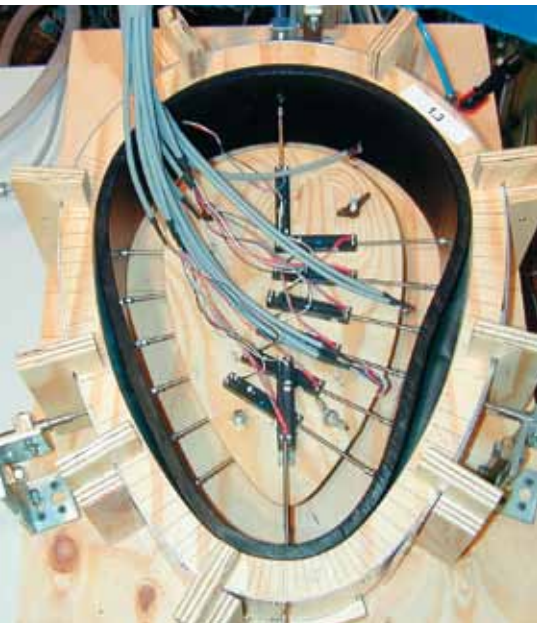
### High abrasion resistance (according to the Darmstadt method)

In some cases, the waste water transported through sewerage systems flows at high velocity. What is more, it may also be polluted with extremely high levels of solids. This leads to a considerable abrasive load, especially at the bottom of the sewers, and hence to pipe wear in the long term. Owing to their high abrasion resistance, PE pipes are ideal for this field of application, as has been demonstrated by tests conducted by the Darmstadt method in comparison with other materials.

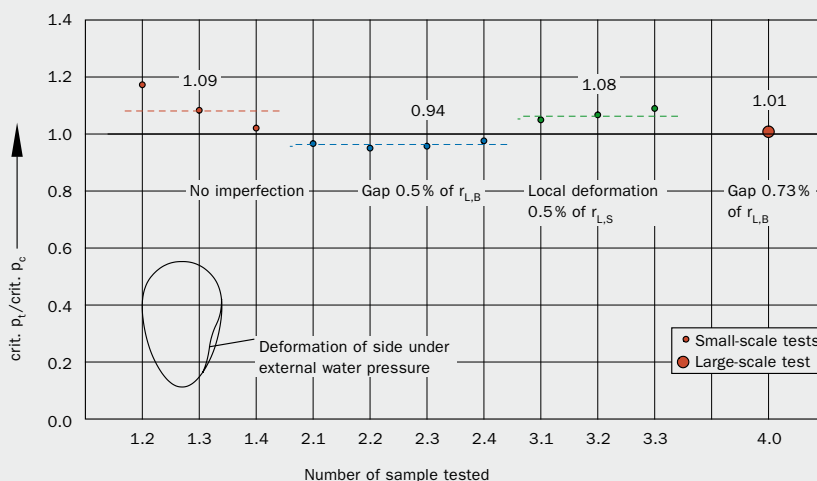
### Long service life

The long service life of PE satisfies the financial requirement that sewerage systems remain efficient for up to 100 years.

One of the most important methods of verifying the lifetime and service life of PE pipes is to determine creep at internal pressure, or "creep" for short. Even after 100 years at a continuous service temperature of +40 °C SIMONA® PE ovoid pipes will show no signs of thermo-oxidative decomposition.



**Buckling test measurements on SIMONA® PE ovoid pipes**



Ratio of buckling loads from tests and associated calculations L = liner, B = bottom, S = side, crit.  $p_t$  = critical buckling load from test, crit.  $p_c$  = critical buckling load from calculation

### Excellent strength

The structural proof of repair work for waste-water ducts and conduits using lining and assembly procedures is obtained in accordance with the ATV-DVWK code of practice "Information Sheet ATV-M-127, Part 2". Such proofs also take into account:

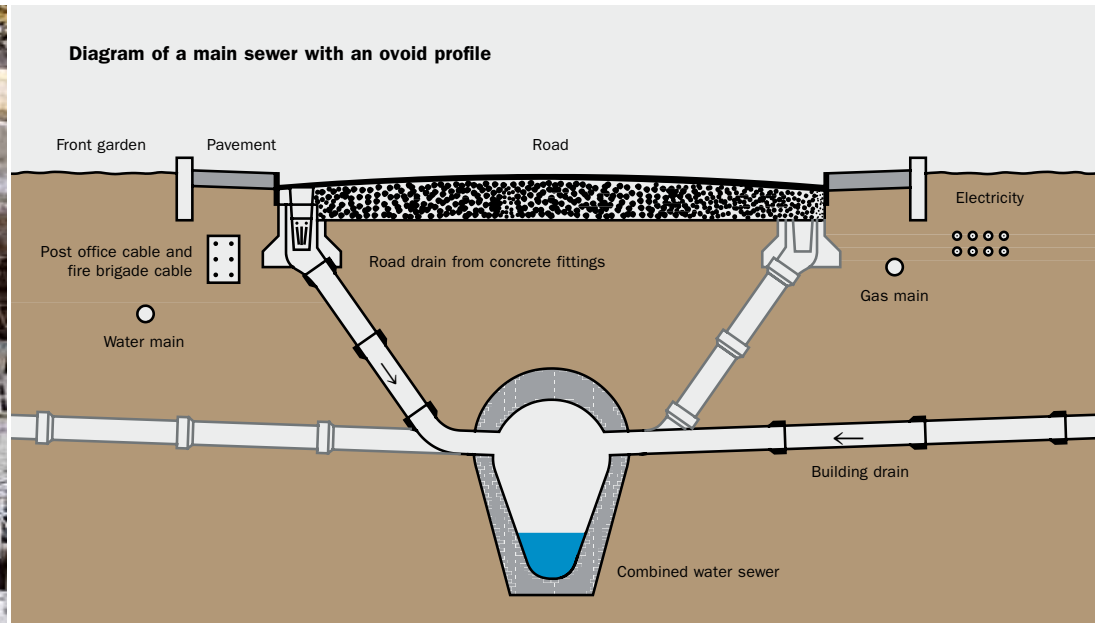
- Imperfections (prior deformations) in embedding the liner in the old pipe
- The strength, durability proof and the stresses and strains proof for the long-term effect of the pressure of water

Buckling tests were conducted on PE ovoid profiles in collaboration with Münster College of Engineering, Bremen University of Applied Sciences and the Institute of Textile Structural and Environmental Engineering.

The buckling tests took place in two sections with modules measuring  $w/h = 340 \text{ mm}/475 \text{ mm}$ . In total there were 11 buckling tests (ten small-scale tests with a module length  $L$  of 110 mm and one large-scale test with a module length  $L$  of 2200 mm) with four different imperfection approaches.

The tests demonstrated that use of Information Sheet ATV-M-127-2 for calculating the stability of ovoid profiles under external water pressure is suitable for old pipe states I and II.

## Perfect for trenchless and open laying



**SIMONA® PE ovoid pipes make it possible to perform repairs either by applying the trenchless or the open method when laying new pipes. SIMONA® ovoid pipes are integrally connected to one another by heated-tool butt welding to make them absolutely watertight.**

### **Trenchless laying**

Trenchless laying of SIMONA® PE ovoid pipelines by means of the closed method is used when repairing damaged brickwork and concrete sewers with an ovoid shape.

### **Advantages of trenchless laying**

- Construction work performed with minimal impact on developed and paved surfaces
- Construction time shortened by the elimination of expensive excavation and backfilling work
- Reduction in civil engineering and re-cultivation costs
- Flow of traffic maintained as far as possible
- Use of existing routes



*Open laying in a bed of sand*



*Clamping device for welding*



*Shaft connection*

### **Open laying in a bed of sand**

The supporting and bedding-in of pipes are crucial to the stability and service life of the pipeline. When plastic pipes are being laid, the pipeline zone must be filled with stone-free, compactable material (preferably 0/2 sand) in accordance with DIN EN 1610 and then be compacted. The soil has to be compacted in such a way that the pipe is protected against external loads. Generally, the excavated material has to be replaced.

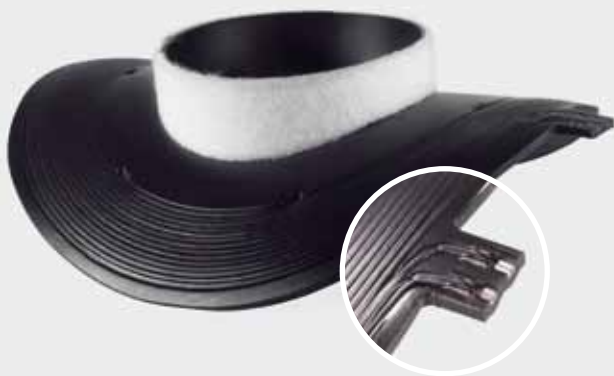
### **Excellent weldability**

With SIMONA® PE ovoid pipes it is possible to make absolutely watertight and root-proof, integral and axial-force locking connections by welding. For a permanent connection we recommend heated-tool butt welding.

### **Inlets and pipework connections**

For side inlets and connecting drains from buildings SIMONA offers an extensive range of fittings as well as electrofusion solutions (building drains, external and internal saddles) for simple connection to PVC pipes, sewer pipes, stoneware pipes and concrete pipes.

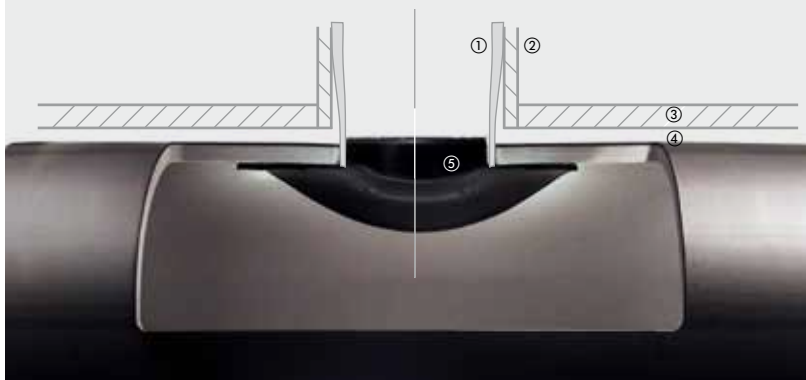
## Perfection: electrofusible service connection saddles



*Terminals of the heating coil for integral connection to the main sewer by means of electrofusion.*

*Cross-section: connection of internal saddle, inlet and SIMONA® main sewer*

- |  |  |
|--|--|
| ① New transition to the existing drain | ③ Old pipe                               |
| ② Existing drain                       | ④ Annular space                          |
|  | ⑤ Internal saddle for service connection |



**Tailored precisely to SIMONA® PE ovoid pipes, electrically weldable SIMONA® internal and external saddles are the perfect choice when it comes to connecting the building drains to the main sewer.**

### **SIMONA® internal saddle for service pipe connection**

With an electrofusible internal drain connection we have succeeded in developing a product which allows fast, cost-effective and traffic-friendly rehabilitation of drain connections by means of the trenchless method, without any nuisance to the residents.

As a result, the open-trench method of elaborate and cost-intensive repairs has become a thing of the past. Connection to building drains made of concrete, PVC or stoneware is achieved with the help of a layer of felt that is thermally integrated into the connection collar. This serves as a primer for a strong connection to glueable building drains using resin-impregnated, needled felt tubes.

### **Benefits**

- Integral repair of drains with an absolutely tight leakproof fit in repaired waste-water pipes
- Suitable for faster, more cost-effective trenchless repair
- Connection of the inlet to conventional materials such as PVC, stoneware or concrete by using fabric/resin components
- Electrofusion based on DVS guidelines



*Terminals of the heating coil for integral connection to the main sewer by means of electrofusion.*

*SIMONA® external saddle for service pipe connection welded to a PE 80 ovoid pipe*



### **SIMONA® external saddle for service pipe connection**

The SIMONA® external saddle for service pipe connection is a solution for efficient, electrically weldable homogeneous connection of drains to PE sewer pipes when installing new pipes or conducting repairs. The connection is made from the outside by applying the open method. Welding to the main sewer and to the building drains is performed by means of an internal, i.e. integral, heating coil in accordance with DVS.

The drain connection takes the form of a socket or an elongated spigot for electrofusion welding and thus allows direct connection without any offset. The external saddle is designed in such a way that it is simple to connect standard pipes, large-format pipes or special sizes such as ovoid ducts.

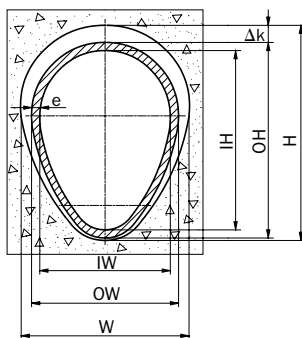
Using special tools, a precise connection bore is made in the pipe. Subsequently, the saddle is mounted and welded in place.

### **Benefits**

- Variable design for connecting to standard pipes, large-format pipes and ovoid pipes
- Simple connection to the main sewer and drain
- Absolutely tight integral connection
- Electrofusion conforming to DVS guidelines
- In addition, standardised transitions to sewer pipes by means of socket connection or welded joint

# Product range for SIMONA® PE Ovoid Piping Systems

## PE Ovoid pipes (standard profiles)

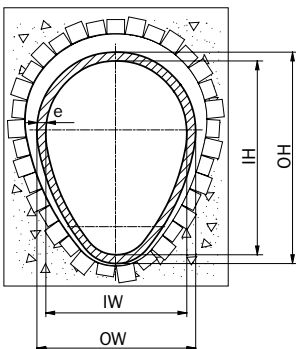


### Ovoid pipes (standard profiles)<sup>①</sup> (in mm)

Standard profile <sup>②</sup> DIN 4263 W/H	Outside diameter <sup>③</sup> OW/OH	Wall thickness <sup>④</sup> e	Inside diameter IW/IH	Annular gap <sup>⑤</sup> 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
700/1050	657/990	19	618/951	59
	667/1000	24	618/951	50
	679/1012	30	618/951	38
800/1200	724/1125	22	698/1081	74
	753/1136	27	698/1081	63
	767/1150	34	698/1081	50
900/1350	854/1288	24	805/1239	62
	867/1300	30	805/1239	50
	882/1315	38	805/1239	35

Pipes with 1000/1500 mm standard profile on request.

## PE Ovoid pipes (special profiles)



### Ovoid pipes (special profiles)<sup>①</sup> (in mm)

Outside diameter <sup>③</sup> OW/OH	Wall thickness <sup>④</sup> e	Inside diameter IW/IH
635/915	25	585/865
645/925	30	
655/935	35	
650/995	25	600/945
660/1005	30	
670/1015	35	
865/1170	25	815/1120
875/1180	30	
885/1190	35	

#### Material

PE 80, PE 100 to DIN  
8074/8075

#### Colour

Black (other colours on  
request)

#### Dimensions

For standard cross-sections  
(DIN 4263)  
Standard length: 0.7 – 2.5 m

#### Connection

Heated tool butt welding,  
push-on connection with  
integral socket

#### Connection

Connection of internal and external  
saddles for building drains

#### Note

Suitable for repairing brickwork  
and concrete sewers with an  
ovoid profile and for laying new  
pipes.

<sup>①</sup> The dimensions indicated in the tables are theoretical values. When planning and ordering, please bear in mind that the delivery times can vary, depending on the geometry and type of connection. The ovoid pipes actually to be used depend on the state of the existing pipework and on structural analyses.

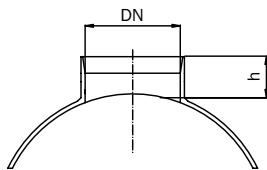
<sup>②</sup> The dimensions indicated can be used in standard profiles in accordance with DIN 4263. It is also possible to use them in different profiles or brickwork ducts.

<sup>③</sup> The manufacture of ovoid profiles is based on DIN 8074 in the permissible limiting dimensions of mean outside diameters W/H.

<sup>④</sup> The manufacture of ovoid profiles is based on DIN 8074 in the permissible limiting dimensions of wall thicknesses.

<sup>⑤</sup> The size of the annular space varies according to the stated tolerances as well as actual wall thickness.

PE 80 Internal saddle for service pipe connection



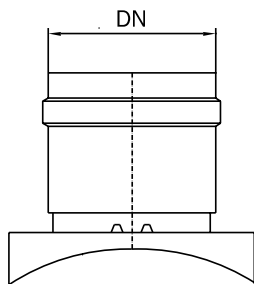
PE 80 Internal saddle for service pipe connection

Ovoid pipe	Drain connection	Collar height
OW/OH mm	DN	h mm
458/692 – 882/1315	150	25

Different dimensions and materials available on request.

<b>Material</b> PE 80	<b>Type</b> With covered filaments integrally welded into the saddle. Connection collar with thermally integrated layer of felt serving as a primer for a strong connection to glueable service pipe connections using resin-impregnated, needled felt tubes.	<b>Note</b> Suitable for repairing building drains by means of trenchless laying.  Service connection saddles must be used for standard and special ovoid profiles.
<b>Colour</b> Black		
<b>Welded joint</b> Electrofusion		

PE 80 External saddle for service pipe connection



PE 80 External saddle for service pipe connection

Ovoid pipe	Drain connection
OW/OH mm	(DN)/(OD) mm
458/692 – 882/1315	150/160

Different dimensions and materials available on request.

<b>Material</b> PE 80	<b>Type</b> Socket (DN) Pipe nozzle (OD)	<b>Note</b> Suitable for electrically weldable connection of building drains to PE sewer pipes when laying new pipes by means of the open method.  Service connection saddles must be used for standard and special ovoid profiles.
<b>Colour</b> Black		
<b>Welded joint</b> Electrofusion		

# Always at your service

## SIMONA advisory service

On request our staff at the Technical Service Centre will assist you with

- planning and contracting, e.g. tender modules,
- structural analyses for buried pipes and shafts,
- issues concerning professional welding, laying and accessories for hire,
- customised products,
- theoretical and practical training sessions
- and further documentation.

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