SIMONA.report

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SIMONA® SIMOFUSE®

Innovative Electrofusion Welding

At the IFAT 2008 exhibition in Munich SIMONA unveiled an extension of its product range for sewer repairs and the construction of new sewage systems. The company has combined state-of-the-art welding with compact design under the brand name of SIMOFUSE® . The key advantage of this technology: integral electrofusion joints and consistent outside diameters, without any welding flash.

SIMOFUSE® pipe module at IFAT 2008 (PE 100, d = 710 mm, SDR 17)

Production and quality features of PE 80/PE 100 SIMOFUSE® pipe modules

SIMOFUSE® pipe modules are manufactured on state-of-the-art machining production lines. This ensures optimised precision fit for the modules in the socket and tapered end. In a further procedure the electrofusion filaments are inserted into the tapered end of the module. The wires, which are completely integrated into the polyethylene, are thus protected against damage in transit and when laying. The large welding zone in conjunction with a high level of precision fit and optimised welding parameters (welding temperature, time and pressure) ensure a high-quality weld. Internal pressure creep rupture strength tests, pressure tests and bursting pressure tests guarantee and document a consistently high level of material and component quality.

Processing and laying the PE 80/PE 100 SIMOFUSE® pipe modules

The modules are processed according to standardised welding methods based on the DVS 2207 Guideline (Electrofusion Welding). A specially devised mechanical joining system facilitates assembly of the modules. Commercial compact electrofusion socket welding sets are ideal for subsequent welding. The pipe modules are already factory-machined in such a way that elaborate welding preparations on the construction site, such as scraping the welding zone or peeling the pipe ends, are no longer necessary. This speeds up laying and boosts efficiency on the site. Treatment with suitable PE cleaners before welding is completely sufficient.

After completion of the welding process the modules can be subjected to full loading. Consequently, they can easily be drawn or pushed into the pipework being repaired, e.g. when refurbishing damaged sewers. The pipe modules can be structurally sized according to ATV-DVWK-A 127, depending on loads to be expected, in such a way that a service life of 100 years or more is reliably achieved.

SIMOFUSE® ensures a perfect join with optimised precision fit and large welding zones.

Benefits of SIMONA® SIMOFUSE® pipe modules

- Faster installation without any elaborate welding preparation
- No welding flash inside or outside
- No increase in outside diameter
- Minimal space required
- Increased efficiency when laying due to optimised welding cycles with shortened welding and cooling times
- High weld quality due to large welding zones and high joining pressure
- Use of conventional electrofusion welding sets

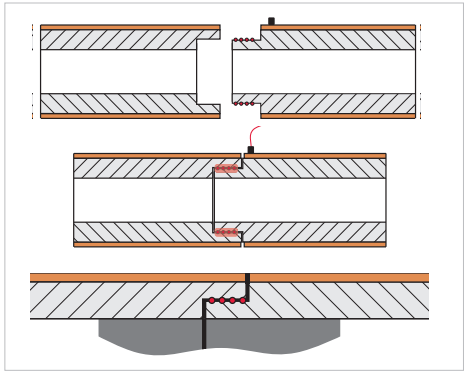

Diagram of the SIMOFUSE® connection technique

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Modular design – devised for repair work

SIMOFUSE® pipe modules are particularly suitable in confined site situations such as in shafts or in narrow working trenches. Owing to customised production, the module lengths can be matched to site requirements and thus allow space-saving placement.

The mechanical system joins the pipes to create a precision fit – commercial electrofusion welding sets ensure permanently watertight seals

Integral electrofusion joints are a crucial advantage in sewer rehabilitation and repair. As opposed to conventional connection methods there are no interfering attachments or constrictions on the interior or exterior. This allows optimum hydraulic adaptation to the cross-section of the existing old pipe. The SIMOFUSE® connection method does not cause any welding flash on the inside of the pipe, so there are no obstructions interfering with sewage flow, thus ensuring excellent protection against encrustation.

Compact design is a major benefit, especially where space is confined.

When new sewer pipes are being installed, the smooth surface of the pipe is an advantage because no recesses have to be made in the floor of the trench to allow for sockets. The new pipe modules are also ideal for laying at a slight gradient (0.5 to 1 per cent).

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SIMONA® SIMOFUSE® Range of Products

PE 80/PE 100 SIMOFUSE® pipe modules

Available as

- PE CoEx sewer pipes
- PE RC-Line waste-water pipes
- PE SPC sewer pipes
- PE double-containment pipes

	SDR 26	SDR 17.6	SDR 17	SDR 11
da mm	e mm	e mm	e mm	e mm
280		15.9	16.6	25.4
315		17.9	18.7	28.6
355		20.1	21.1	32.2
400		22.7	23.7	36.3
450		25.5	26.7	40.9
500	19.1	28.4	29.7	45.4
560	21.4	31.7	33.2	50.8
630	24.1	35.7	37.4	57.2
710	27.2	40.2	42.1	
800	30.6	45.3	47.7	

Module length L: L = 700 mm to L = 6000 mm. Other lengths on request
One-off production tailored to customers' requirements.

SIMOFUSE® components

- **PE 80/PE 100 pipe modules SIMOFUSE® (integral electrofusion joints)**
- **PE 80 shaft connections SIMOFUSE®**
- **Service pipe connections**
  - PE 80 external saddle SIMOFUSE®
  - PE 80 internal saddle SIMOFUSE®

Ihr Ansprechpartner

Jürgen Allmann
Product Management
Business Unit
Piping Systems

Jürgen Allmann has been employed at SIMONA AG for over 15 years. After joining the company he was initially employed at the Piping Systems unit of the Applications Technology Department, specifically in the fields of landfill engineering and underground pipework construction. After two years spent in Sales he then took charge of Product Management Pipes and Civil Engineering. During that period the product lines of SPC pipes, ovoid pipes, SIMOFUSE® integral electrofusion joints, external and internal saddles for service pipe connections, and the SIMODRAIN® product system for railway drainage systems in areas exposed to pressure from railway traffic loads were developed and launched onto the market. He has been employed in the Piping Systems Business Unit since 2006 and is in charge of the entire area of applications for pipes, civil engineering and industry. Here the field of activities covers not only internal organisation but also further development of piping components and systems.

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SIMONA® SIMOPOR-ULTRALIGHT

Lightweight PVC foam sheets

Foamed sheets made of rigid PVC have been used extensively in the fields of advertising and the construction of displays and trade fair stands for many years. Good mechanical processing capability, uniform satin-finished surfaces and excellent printability with regard to screen, pad and digital processes are among the key requirements within this area.

SIMONA AG's products SIMOPOR, SIMOPOR-LIGHT, SIMOCEL-AS and SIMOCEL-COLOR have a proven track record spanning many years.

Over the last few years – as is also the case in other PVC fields of application – there has been a trend towards lighter-weight materials. That is why density plays a key role in the case of PVC foam products. PVC foam sheets with a thickness of 1 mm and 2 mm have a density of approx. 0.7 g/cm³ to 0.8 g/cm³, whilst with sheet thicknesses from 3 mm to 10 mm the density ranges from approx. 0.5 g/cm³ to 0.6 g/cm³. Until recently there were hardly any densities below 0.5 g/cm³ on the market because the mechanical properties, especially flexural strength and surface quality, tend to deteriorate as density decreases, and surface roughness is higher.

At a low density of only 0.46 g/cm3 SIMONA® SIMOPOR-ULTRALIGHT sheets have good dimensional stability.

The new product SIMOPOR-ULTRALIGHT, which has a density of 0.46 g/cm³, takes due consideration of new requirements. The surface roughness of SIMOPOR-ULTRALIGHT is the same as that of SIMOPOR-LIGHT. Although SIMOPOR-ULTRALIGHT has lower flexural strength than SIMOPOR-LIGHT, that is sufficient to fully meet the requirements of most fields of application, and in digital printing it is even an advantage.

Ideal for the construction of exhibition stands

The properties of SIMOPOR-ULTRALIGHT are largely determined by the foam structure of the sheet: the finer the foam structure, i.e. the smaller the diameter of the individual cells and the more uniform the distribution of cell diameters, the better the flexural properties and surface quality of the sheet. By optimising the formula (see „Expertise in Plastics" box) it has been possible to improve the foam structure of SIMOPOR-ULTRALIGHT substantially.

Excellent material specifications

SIMONA® SIMOPOR-ULTRALIGHT	
Density, g/cm³, ISO 1183	0.460
Yield stress, MPa, DIN EN ISO 527	> 10
Elongation at yield, %, DIN EN ISO 527	3
Elongation at break, %, DIN EN ISO 527	20
Tensile modulus of elasticity, MPa, DIN EN ISO 527	600
Impact strength, kJ/m², DIN EN ISO 179	15
Shore hardness, D, ISO 868	40
Mean coefficient of linear thermal expansion, K^{-1}, DIN 53752	$0.8 \cdot 10^{-4}$
Thermal conductivity, W/m·K, DIN 52612	0.0709
Surface resistivity, Ω, IEC 60093	$>10^{15}$
Fire behaviour, DIN 4102	Low flammability
Temperature range, °C	0 to +60

Experience of the new product is generally good, and there has been positive feedback, especially in the field of digital printing, from customers and printing press manufacturers. One special type for digital printing, optimised with regard to enhanced brightness and brilliance, is currently undergoing a test phase. Results so far are excellent in terms of ink acceptance, depth of focus on the printed image, and handling in the printing process, whilst the price is highly competitive.

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Range of Products

SIMONA® SIMOPOR-ULTRALIGHT extruded sheets, white, protective plastic film on one side

Thickness	3050 x 2030
mm	kg/piece
3.0	8.5
4.0	11.4
5.0	14.2
6.0	17.1
8.0	22.8
10.0	28.5

Products in various thicknesses are available ex stock. For further information, please contact our Sales Department:
Phone +49 (0) 67 52 14-0
Fax +49 (0) 67 52 14-211
mail@simona.de

At a glance

SIMONA® SIMOPOR-ULTRALIGHT

- Very low density
- Ultra-fine, uniform foam structure
- Good mechanical specifications
- Excellent flatness
- Low surface roughness and good ink acceptance for superb results in printing
- Very good visual appearance and haptics
- Outstanding value

Dr. Wolfgang Frings
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Expertise in Plastics

Foaming Thermoplastics

Nowadays, we encounter thermoplastics not only in the compact form but also in many different types of foam. The reasons for this are evident: with foamed materials it is possible to reduce weight and considerably improve thermal and sound insulation. Ultimately, the development of foamed materials has convincing economic and ecological reasons.

In order to foam thermoplastics, a so-called foaming agent is required. A fundamental distinction is made between physical and chemical foaming agents.

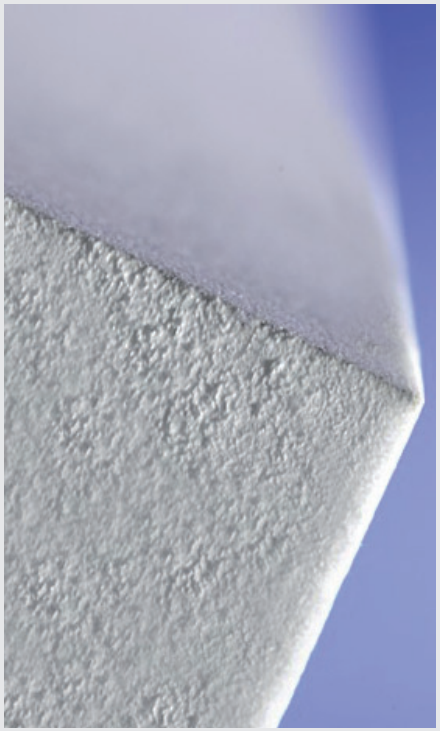
Physical foaming agents are often hydrocarbons with a low boiling point (e.g. butane or pentane). However, gases such as nitrogen and carbon dioxide can also be used in certain processes. During processing, these foaming agents are initially dissolved in the polymer melt at high pressure and in stress relaxation later they resume their gaseous state and finally expand the plastic.

Chemical foaming agents are added to the material being expanded in the form of solid components. They decompose during thermal processing and form gases, usually nitrogen or carbon dioxide, which dissolve in the polymer melt under the prevailing pressures. The polymer melt emerges from the nozzle at the end of the extrusion process. When the polymer melt is subjected to stress relaxation at atmospheric pressure as it emerges from the nozzle, the foaming gases are released again, expanding the material.

The following criteria are applied to assess the quality of foam:

- Open-cell or closed-cell structure (depending on the application, one or the other can be advantageous)
- Size of cells
- Cell size distribution
- Shape of cells

A fine, open-cell foam structure, i.e. small, chiefly circular cells with only minimal differences in diameter, usually produces better qualities of foam. In order to obtain the desired foam structure, it is essential that the foaming agent system is accurately matched to the base polymer.



Fine, open-cell foam structure

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