

SIMONA® PE 100 CoEx pipes

New generation of pipes with superior abrasion resistance



Marine land reclamation – Palm Islands in Dubai.

When materials containing solids are conveyed in pipes, as in marine land reclamation (deposits) or with gravel from gravel pits, the internal surfaces of the plastic pipes are subjected to considerable stresses due to the high level of mechanical friction caused by the mixture of liquid and solids being conveyed.

Both PE 80 and PE 100 pipes are suitable for hydraulic conveyance of solids on account of their good mechanical and hydraulic material properties as well as their resistance to corrosion and incrustation.

Committed to improving these properties and increasing the service life of piping systems in these fields of application, SIMONA AG has now developed a new generation of pipes. Different PE materials are joined together in the melt by applying the coextrusion method.

Pipe design

A PE 100 basic pipe is combined with an inner layer of PE material that has a higher molecular weight. The coextruded, wear-resistant inner layer is integrated into the standardised pipe wall geometry. This

means that as far as size is concerned the pipes meet the requirements of DIN 8074, i.e. they can be combined and processed with the familiar fittings available on the market. Tests (e.g. the internal pressure creep rupture strength test) have demonstrated that the requirements of DIN 8075 are met with regard to strength properties.



Your contact



Thomas Engel
Head of Applications
Technology,
BU Piping Systems

Thomas Engel is a qualified engineer (University of Applied Sciences), specialising in mechanical and process engineering. He has been working for SIMONA AG since 1992. Having initially joined the Applications Technology unit and having then moved on to technical field sales for a short period, Mr. Engel assumed responsibility for fittings product management for several years. In 2009, he was appointed Head of the Applications Technology Department within the Piping Systems business unit. Having expanded the department to create a centralised service unit for pipes and fittings projects, his main focus of responsibility is on the continuous development of technical customer service within this business unit. It covers not only the calculation and sizing of piping systems in the bidding phase but also ongoing project support.

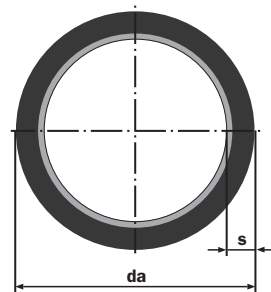
Phone: +49 (0) 67 52 14-722
E-Mail: thomas.engel@simona.de

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Use of the pipes

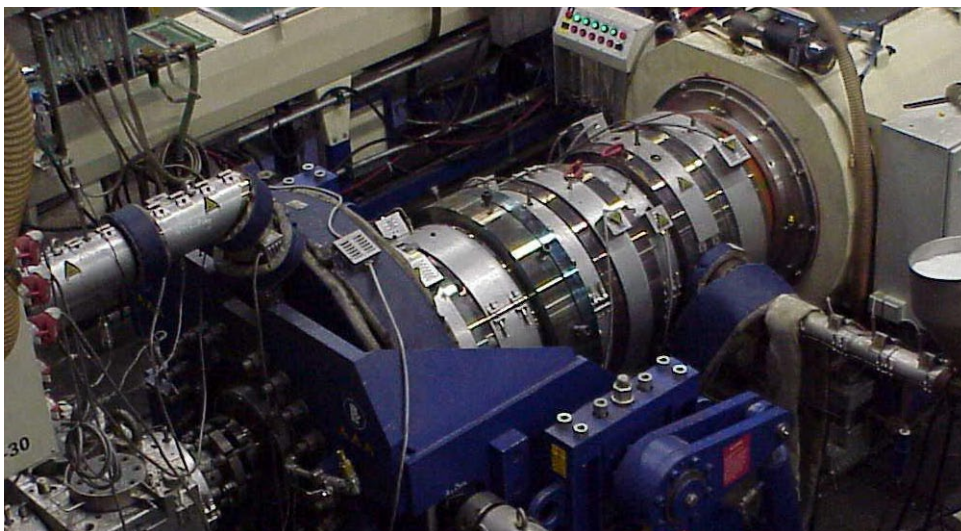
Integral connection of the pipes by means of heated-tool butt welding and electrofusion welding in compliance with DVS guidelines can be performed either by joining them to one another or in conjunction with standardised PE 80 and PE 100 pressure pipes and fittings. This product line is primarily used in the pressure-pipe sector – for hydraulic conveyance of solids. As regards this material combination, the increase in the service life of the piping system is expected to be between 30% and 50%, depending on the material being conveyed.

In an initial production step, pipes were made in OD sizes 315 mm and 355 mm, SDR 17.



*SIMONA® PE 100 CoEx pipe:
Inner layer made of high-molecular-weight
PE with superior abrasion resistance*

Martin Ott
martin.ott@simona.de



Extrusion line for wear-resistant inner layers

Plastics Expertise

Abrasion resistance

Abrasion resistance is a term that describes the resistance of a solid surface to dynamic mechanical stress. This type of stress can be found in pipeline construction, e.g. wherever liquids with a relatively high level of solids have to be conveyed. Here are some examples: the conveyance of sandy soil to create land or build dykes, the conveyance of sand and gravel in gravel pits or the disposal of power plant ash by pumping it through pipelines.

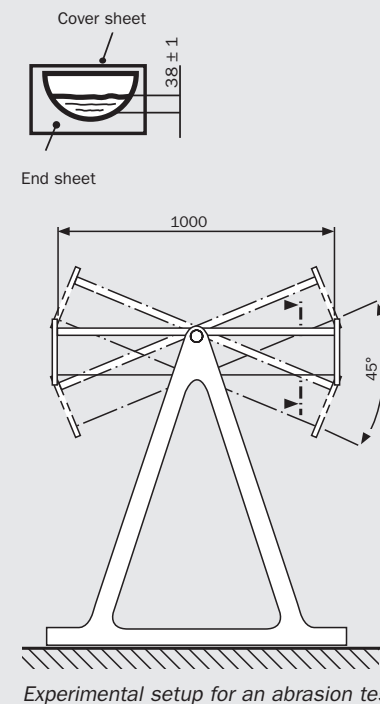
These applications always involve friction between the liquids/solids being conveyed and the interior surfaces of the pipes. The higher the flow velocity and/or the size and roughness of the solids being conveyed, the higher the expected material wear on the pipe surface due to abrasion. The wear resistance of piping systems is also affected by their geometry. The highest rates of wear occurs at deflections such as bends or branches, as is the case in tees for example. The abrasion resistance of different materials can be measured on the basis of DIN 58836 by means of the sand-slurry method or the Darmstadt method in a tipping trough test. In the sewer sector an additional test is performed in which sewers are cleaned with rinsing nozzles at high pressure using sediment inside the pipe. To determine the abrasion resistance of fittings, special pressure pipe

test stands are used which examine a large number of fittings under defined flow conditions with defined solid particles and ratios.

PE pipes are ideal for hydraulic conveyance of solids on account of their good mechanical and hydraulic material properties as well as their high resistance to corrosion and incrustation.

Jürgen Allmann

juergen.allmann@simona.de



Experimental setup for an abrasion test

First multifunctional SIMONA production site in the Czech Republic

Semi-finished products and pipes from Litvinov



Aerial photograph of the SIMONA plant in the Czech Republic

The Czech subsidiary, SIMONA Plast-Technik, began operations in 2008, as SIMONA's first multifunctional production plant. This means Litvinov is producing not only sheets but also pipes and fittings under one roof.

The focus of operations is on the manufacture of standard products and large volumes for customers in Europe, Russia and the

Middle East. In terms of logistics the location is ideal for supplying the Eastern European market. Plant manager Jan Rothe and his team, currently made up of approximately 80 employees, ensure top quality and first-class service.

Many different production options

In Litvinov, pipes are extruded with a diameter of up to 1,000 mm in SDR series 9 to

51. Apart from extrusion lines for pipes and sheets the site also has a plastics workshop, including bending machines that are distributed throughout two production buildings according to sizes. This is where the seamless plastic pipes, which are also produced in Litvinov, are bent into shape, from an outside diameter of 32 mm to 630 mm and with a bending angle of up to 135°. After the bending operation followed



Litvinov pipe store



Litvinov plastics workshop

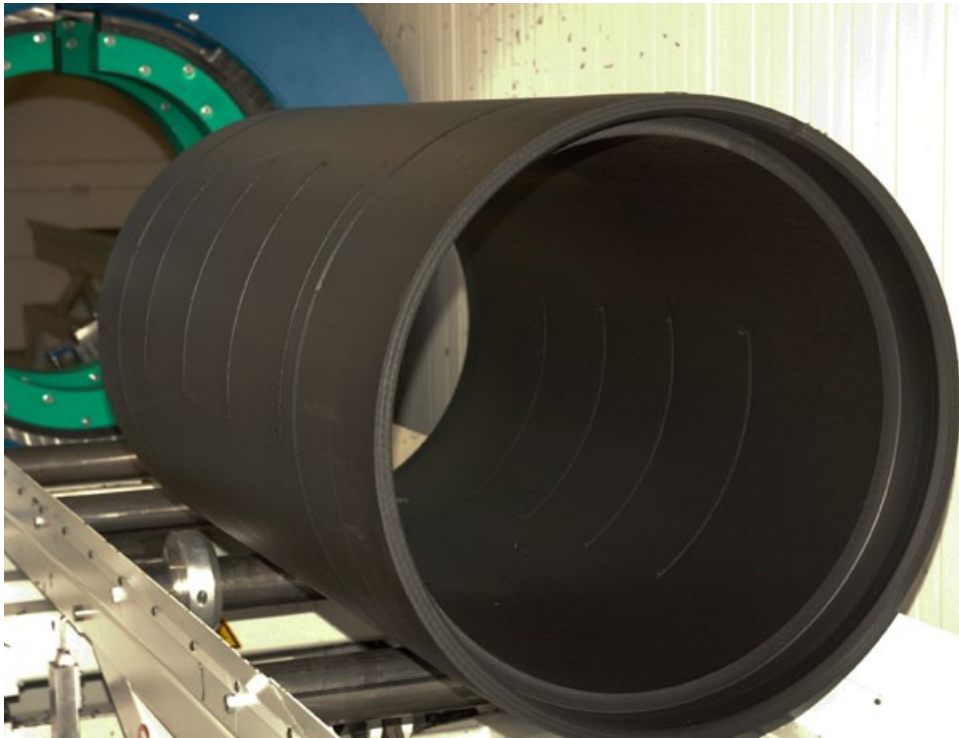
by cleaning, further quality inspections are conducted on the basis of the relevant standards, before the finished bends are placed in storage.

Jan Rothe

jan.rothe@simona-cz.com

New slotting line with pipe end processing

Endless possibilities for your drainage projects



Production of short-pipe modules, OD 630 mm x 37.4 mm, with special slotting

Alongside premium-quality welded joints, with an integral and axial-force locking connection, push-on connections are a common method of joining in pipeline construction.

They are normally used when the mechanical demands made of the connection system are not particularly high. Push-on connections often take the form of a separate

socket system (interconnecting sockets or sleeve sockets) or sockets directly integrated into the pipe.

New push-on connection

After developing its SIMOFUSE® range (integral electrofusion joints) SIMONA has now designed a new integral push-on connection to be used in the field of surface drainage. By comparison with conventional



Short-pipe modules, OD = 630 mm x 37.4 mm, at the construction site prior to laying



CNC milling machine

push-on connections its advantage is that there is no increase in the overall diameter of the pipe, so when the pipes are laid in trenches there is no need to rework the trench subgrade afterwards. For combined production of slotted drainage pipes with integrated push-on connections a new CNC milling machine was installed in Ringsheim. SIMONA developed this machine specially for pipe processing, in close collaboration

with the supplier. Apart from the intended increase in the capacity of the existing perforating and slotting lines, this line is designed in such a way that it allows not only additional socket production but also special perforations. The sizes that can be processed range from an outside diameter of 90 mm to 800 mm for short-pipe modules and pipes with a length of up to 6.0 m.

Production launch

The first challenge for the machine, which features 14 programmable axes (put into operation in January 2011), was the production of short-pipe modules with OD 630 mm x 37.4 mm and a length of 1.2 m. Apart from the push-on connection, slots had to be milled with a width of 3.5 mm and a length of 300 mm. At present, the main focus is on the production of slotted drainage pipes with integrated push-on connections and a standard slot width of 10 mm.

The design of the milling line allows other pipe processing operations that go beyond this standard. SIMONA has thus opened up new potential applications for its customers.

Martin Stoll

martin.stoll@simona.de

Project report

Railway line drainage with SIMONA® drainage pipes



Open drain trench with 2/3 slotted SIMODRAIN® pipe

BLS Netz AG boasts a total rail network length of more than 900 km in Switzerland. Direct proximity to Lake Thun and Lake Brienz and small differences in altitude regularly cause the groundwater level to rise and penetrate the trackbed. To prevent the trackbed from being destabilised, the existing drainage system made of concrete pipes was renewed with SIMODRAIN® drainage pipes.

Initial situation

The BLS Netz AG railway line had to be renewed after over 30 years of service. In connection with permanent way renewal, the existing drainage system, made of concrete pipes in an open drain trench along the railway line, and the cross drainage to a navigational canal also had to be modernised.

Task

According to the requirements of RTE 21110 (Railway Technical Code of Practice, Switzerland, regulating the roadbed, including the ballast bed), the piping system required for railway line drainage in the roadbed and ballast has to meet the figures specified by the operator, e.g. a clear water inlet opening of at least 100 cm² and a minimum slot width of 6 mm. To ensure reliable operation of such a drainage system over a period of decades, demanding static, dynamic and mechanical requirements also have to be met. The gradient requirements are 0.65 to 11.05‰.

Solution

This construction project was realised with SIMONA® SIMODRAIN® drainage pipes having an OD of 250 mm, SDR 21, and 10 mm

slotting, specially developed for traffic route drainage. These extruded smooth-wall pipes meet the requirements made of such a system; thanks to their large water inlet area, they have no trouble handling the specified 100 cm². Using a special slot geometry and arrangement, and delivering the excellent hydraulic properties associated with PE, the drainage provided by the system is exceptional. What is more, this product is designed for the long term. End-milled slotting avoids undercuts, and hence deposits and incrustations. In addition, SIMONA® SIMODRAIN® pipes are very easy to rinse, thus making them the perfect choice for BLS Netz AG.

Jörg Kellerhals

joerg.kellerhals@simona-ch.com



Geotextile jacket round the filter gravel bed



Site installations and pipe storage area next to the railway line in service



Standard-compliant pipelaying in the drain trench

Publication details

SIMONA AG

Teichweg 16, 55606 Kirn, Germany

Responsible for content

Eric Schönel
Phone: +49 (0) 67 52 14-997
E-Mail: eric.schoenel@simona.de

Editor-in-Chief of this issue

Bianca Glöckner
Phone: +49 (0) 67 52 14-213
E-Mail: bianca.gloeckner@simona.de

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