

Editorial



Wolfgang Moyses
CEO
SIMONA AG

Dear Customers,
welcome to the first issue of our technical newsletter "SIMONA.report". This is where we present our company's latest products as well as up-to-date information on the subject of plastics. The newsletter also gives us the opportunity to introduce you to various experts within the SIMONA team. Among the highlights of our first issue are **SIMONA® PP-DWU AlphaPlus** – the new alpha-nucleated polypropylene for semi-finished materials – and **SIMONA® SIMODRAIN® drainage pipe systems** for traffic routes.

"SIMONA.report" is specially designed to meet our customers' requirements and provides up-to-date information. Register at www.simona.de without any commitment. Please visit the "News & Services" section of our website for details about downloading and registration. We hope you enjoy SIMONA.report.

SIMONA® SIMODRAIN®

The first drainage system with EBA approval

Having achieved certification in December 2006, SIMONA is the only company in Germany with EBA-approved drainage systems ("EBA Certificate of Approval No. 21.41 lbZb 010/04 for SIMONA® PE 80 sewer pipes and drainage pipes for use in areas exposed to pressure from railway traffic loads, in sizes DN 160 to DN 450").

The safety and service life of roads and rail networks depends to a large extent on the stability of their earthwork structures. Permanent discharge of water under pressure and in situ water at the structure, which causes the supporting medium to soften and is therefore bound to cause damage to tracks and roads subjected to static and dynamic loads, is absolutely essential. The basic requirement for the reliable performance of a traffic route in the long term is a load-bearing, break-resistant

drainage system to ensure controlled discharge of leakage, surface and stratum water.

Excellent material properties

Polyethylene (PE 80 and PE 100) is an ideal material on account of its proven static and dynamic load-bearing capacity, its high quality and its long-term operational reliability. The SIMONA® SIMODRAIN® polyethylene drainage system meets the high technical standards of Deutsche Bahn. This was confirmed by an independent test institute approved by the EBA (Federal Railways Office).

The ultimate in versatility

Owing to their material properties, SIMONA® SIMODRAIN® polyethylene drainage pipes are not only used in railway and road construction but also in other applications such as tunnel engineering,



Soggy ground is a thing of the past with SIMONA® SIMODRAIN®.

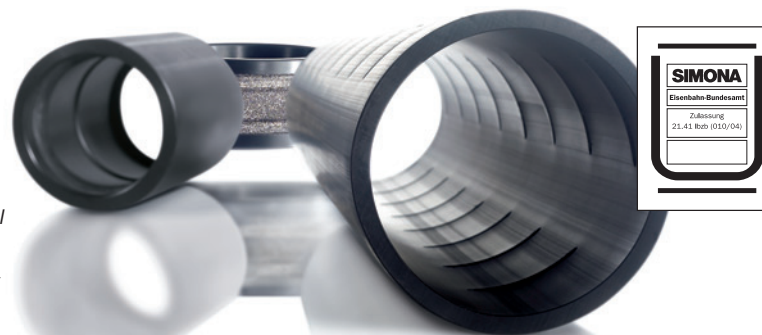
landfill drainage and general supporting soil drainage.

Comprehensive system

With supplementary products from the SIMONA® range of pipes and fittings SIMONA AG is the leading supplier of thermoplastic drainage systems for areas exposed to pressures from railway traffic loads.

For further information about the tasks and functions of drainage systems and about our range of products, please contact Mr. Mario Poes, telephone: +49 (0) 6752 14-484, e-mail: mario.poes@simona.de

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Confirmation by
the German Federal
Railways Office:
maximum reliability
and functionality.

SIMONA® PP-DWU AlphaPlus

New prospects for use in tank and equipment engineering



In SIMONA® PP-DWU AlphaPlus, we have developed extruded sheets with the same first-class properties already known from SIMONA® PP-H AlphaPlus pipes. As a result you have at your disposal a homopolymeric polypropylene which opens up a host of new opportunities within the field of industrial tank and equipment engineering.

Fine microstructure and stable crystalline structure

Owing to the use of special nucleation agents and an adjustment in process technology, we have managed to develop a PP-H with α -crystalline modification.

It offers a number of benefits, even under critical processing conditions, and sets new standards in this market segment.

Increased notched impact strength and enhanced rigidity

SIMONA® PP-DWU AlphaPlus offers you not only increased impact strength but also enhanced rigidity. At application temperatures of up to 100 °C rigidity is much higher than that of other types of PP-H.

What is more, at low temperatures down to 0 °C SIMONA® PP-DWU AlphaPlus has a higher level of resistance to impact than standard PP-H – ensuring greater safety.

Expertise in Plastics

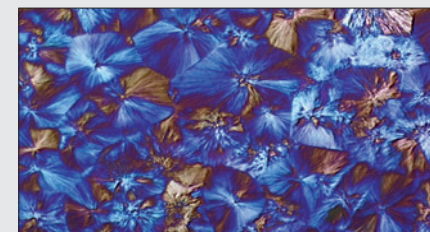
Nucleation

Nucleation refers to the systematic influencing of the crystalline microstructure of thermoplastics during the cooling process by adding crystallisation nuclei.

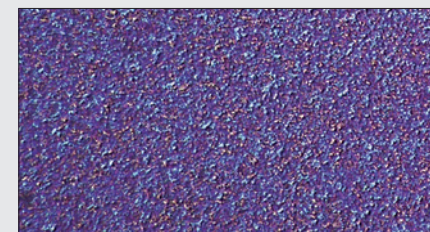
Nucleation agents increase the rate and degree of crystallisation and cause the polymer melt to solidify at an earlier stage. As a result, the diameter of polypropylene spherulites is reduced. This has a crucial influence on the mechanical and thermal properties of a semi-finished product. Appropriate nucleation reduces shrinkage, distortion, subsequent crystallisation and inherent stresses. As a result, the processing properties of the semi-finished product are positively influenced.

In the case of polypropylene, different crystalline forms can also develop during solidification. With appropriate nucleation agents it is possible to systematically adjust the α or β -crystalline modification.

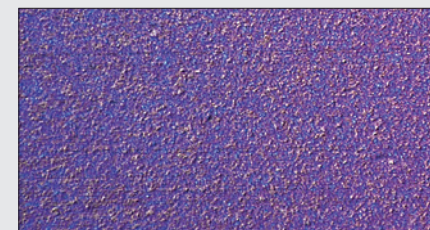
Optical micrographs of PP-H types



PP-H, non-nucleated



PP-H, β -nucleated

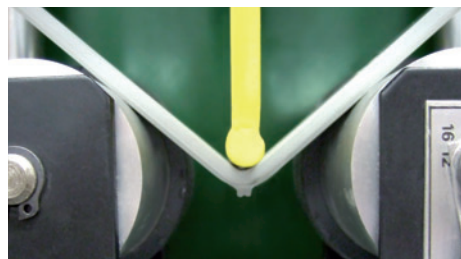


SIMONA® PP-DWU AlphaPlus

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Excellent welding properties

Various methods of welding in plastics processing frequently bring about changes in the morphological state of a material, which, especially in the case of polypropylene, alter the properties of a welded joint and hence the quality of a component. In the joining seam of a butt-welded sheet, for example, a notch develops in which a stress peak can occur when it is subjected to a mechanical load. This concentration of stresses at the notch root of a welded seam may potentially trigger stress cracks when subjected to a tensile load or exposed to chemicals.

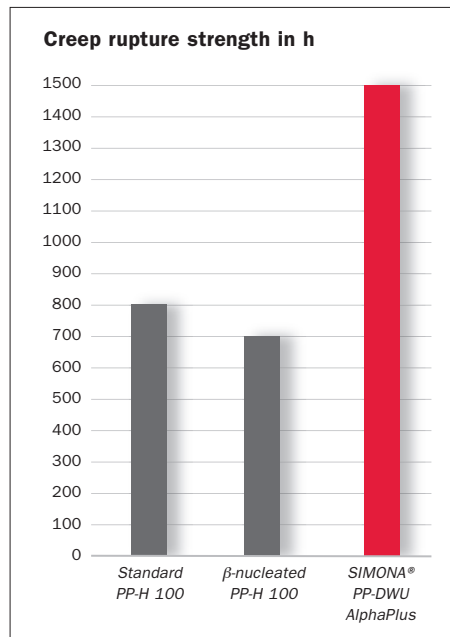


SIMONA® PP-DWU AlphaPlus in a DVS 2203-5 bending test

The fine microstructure of SIMONA® PP-DWU AlphaPlus is thermodynamically stable and thus remains intact in the various methods of welding. The resulting high impact strength greatly reduces the increase in stress at the notch root. A significant increase in potential bending distances is achieved in bending tests.

Increased creep rupture strength

The increased safety of SIMONA® PP-DWU AlphaPlus is also evident from the much improved resistance to slow crack growth. Compared to a weakly α -nucleated standard PP-H with a creep rupture strength of 700 h – 800 h in the Full Notch Creep Test (FNCT), creep rupture strength levels of more than 1,500 h are achieved by SIMONA® PP-DWU AlphaPlus. By comparison, β -nucleated PP-H achieves a maximum creep rupture strength of 700 h. These benefits are also apparent from the internal pressure creep rupture strength test. For example, at a temperature of 95 °C and a stress of 4.4 MPa the creep rupture strength measured for SIMONA® PP-DWU Alpha Plus is over 3,000 h. In the light of the 100 h minimum requirement specified by DIN 8078 this constitutes a considerable gain in additional reserves.



Creep rupture strength of various PP types in an FNCT (Full Notch Creep Test) at 80 °C and 4.0 MPa

Enhanced chemical resistance and stress crack resistance

The fine, stable crystalline structure of SIMONA® PP-DWU AlphaPlus reduces inherent stresses, which has a positive effect on chemical resistance. Especially in critical zones such as welding seams and anchor points, where internal stresses or stresses applied externally occur, resistance in contact with crack-inducing chemicals is increased significantly. Due to its higher creep rupture strength, this material offers greater operational reliability.

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Your contact



Dr.-Ing. Marcus Hoffmann
Project Manager
PP-DWU AlphaPlus

Marcus Hoffmann joined SIMONA AG in 2001 as a project engineer in the R&D department. He was responsible for implementing the PP-H AlphaPlus project for pipes and fittings. Effective from August 2007, Dr. Hoffmann is responsible for new technologies and products.

Mr. Rainer Walter (Dipl.-Ing.) and Mr. Bernhard Westermann (Dipl.-Ing.) played a key role as team members in implementing the PP-DWU AlphaPlus project in terms of process and formula engineering. The project team would like to express its gratitude to the members of staff involved from the specialist departments for their commitment.

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PP-DWU AlphaPlus sheets are also available with polyester and glass fibre fabric. We also stock matching welding rods.