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Product Information

PPs

07/92

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1. General information

SIMONA® PPs is a flame retardant polypropylene, made from high molecular isotactic homopolymerisate. The flame retardancy of PPs has been obtained by the use of relatively small amounts of special additives such as organic bromine compounds in combination with antimony trioxide.

1.1 Characteristic properties

- low density
- high chemical resistance (even against solvents)
- high surface hardness
- long durability
- flame retardant according to DIN 4102 B1
- electrical insulation properties
- good workability and processability

1.2 Applications

SIMONA® PPs is suitable for use wherever the requirements are for high chemical resistance (even against solvents) or high temperature stability together with, because of statutory regulations, flame retardancy.

For example
laboratory constructions
suction devices
collecting baths
chemical pipework
drainage channels
fans
electrical switch cabinets
machine coverings
transport pallets

2. Product range

2.1 Sizes and dimensions

	SIMONA® PPs		
Standard colour	grey white (on request)		
	sheet thickness in mm		
extruded sheets			
size	2000 x 1000 mm	3	— 20
	3000 x 1500 mm	3	— 10
	4000 x 2000 mm*	4	— 12
moulded/continuously moulded sheets			
size	2000 x 1000 mm ¹⁾	20	— 50
	4120 x 2010 mm*	on request	
	diameter in mm		
welding wire			
round wire		3	— 4
triangular 90°		4	— 7
triple		5	
pipes	32	—	630
square pipes	35 x 35 x 3 35 x 35 x 4* 50 x 50 x 4 50 x 50 x 6*		

* no stock products - other dimensions on request

¹⁾ IfBt-test certificate covers 2 - 20 mm

2.2 Special moulding compound variations

Further PP materials from the SIMONA range

For laboratory and apparatus construction

SIMONA® PP-C (block-copolymerisate)
increased impact strength even at low temperatures

SIMONA® PP-DWU/DWST
please refer to our product information manual "SIMONA® PP-DWU/DWST"

SIMONA® PP-DWST-CU (natural colour)
chemical resistance against metallic copper and hot copper salt solutions

SIMONA® PP-TV 10/-TV 20/-TV 30/-TV 40
with 10, 20, 30 or 40 % talcum as filler; increased rigidity at higher temperatures

SIMONA® PP-DWU-SK
please refer to our product information manual "Sandwich Construction"
with fabric re-inforcement as the adhesive transmission system for sandwich construction

Electrically conductive

please refer to our product information manual "Electrically conductive plastics"

SIMONA® PP-EL
surface resistance $\leq 10^5$ Ohm

SIMONA® PP-FL-EL
flame retardant, surface resistance $\leq 10^5$ Ohm

Antistatic

This property depends on the relative atmospheric humidity.

SIMONA® PP-AS
surface resistance approx. 10^9 - 10^{11} Ohm, on request also in white

SIMONA® PPs-AS
flame retardant, surface resistance approx. 10^{10} - 10^{11} Ohm, on request also in white

For food industry

SIMONA® PP-DWVL
washing liquor resistant up to approx. 100 °C, physiologically safe

Surface finishing

SIMONA® PP grained
with one-side grained surface

SIMONA® PP-C-Simocart
with one-side fine grained surface

For outdoor use

SIMONA® PP-DWU-UV
with additional UV-absorbers

For container construction where test certificates are required

SIMONA® PP-DWU/DWU-B — SIMONA® PP-DWU-SK/DWU-B-SK

Produced from moulding compounds which have been passed by the Institut für Bautechnik (IfBt), Berlin, for the construction of containers in accordance with the construction and test principles.

3. Technical information

3.1 Material characteristics

	Test standard DIN	Unit	SIMONA® PPs
Density, method C	53479	g/cm ³	0,95
Yield stress, test piece 3	53455	N/mm ²	32
Elongation at yield	53455	%	8
Elongation at break	53455	%	70
Flexural-E-module	53457	N/mm ²	1300
Limit bending stress	53452	N/mm ²	44
Impact strength (small standard test bar)	53453	kJ/m ²	without break
Notched impact strength (U-notch)	53453	kJ/m ²	6
Ball indentation hardness H 132/30	53456	N/mm ²	70
Shore hardness D	53505	—	72
Crystalline melting range calorimetric	52328	K (°C)	433-438 (160-165)
Average thermal coefficient of elongation	53752	K ⁻¹	1,6 · 10 ⁻⁴
Thermal conductivity	52612	W/mK	0,22
Behaviour in fire	4102	—	B 1*
Dielectric strength method K 20/P 50	53481	kV/mm	22**
Volume resistivity annular electrode	53482	Ohm · cm	> 10 ¹⁷
Surface resistance electrode A	53482	Ohm	10 ¹⁴
Tracking resistance method KC	53480	V	> 600
Dielectric constant at 300 - 1000 Hz	53483	—	2,2
at 3 · 10 ⁶ Hz			2,2
Dielectric loss factor at 300 Hz	53483	—	24 · 10 ⁻⁴
at 1000 Hz			18 · 10 ⁻⁴
at 3 · 10 ⁶ Hz			12 · 10 ⁻⁴
Physiological admissibility	BGA	—	no

* maximum sheet thickness 20 mm

** measured on 2 mm thick test pieces

The data given are standard values and can vary depending on method of processing and test piece manufacture. Unless otherwise stated the values are average values obtained from measurements on 4 mm thick extruded or moulded sheets. The data is not applicable to finished products without further information. The processor or user must check on the suitability of our material for a particular purpose.

Moulding material designation (DIN 16 774, state of affairs 12/84)

extruded: FM DIN 16 774 - PP-H, EFH, 95 T 012

moulded: FM DIN 16 774 - PP-H, QFH, 95 T 012

3.2 Combustion behaviour

SIMONA® PPs semi-finished materials show self-extinguishing characteristics because of their high oxygen index (minimum oxygen concentration necessary for burning) which is 28 % for PPs, the ignition temperature for SIMONA® PPs is above 380 °C.

In accordance with DIN 4102, part 1, SIMONA® PPs (test mark PA-III 2.1184 for 2 to 20 mm wall thickness) can be classified as a flame retardant material of class B1. This test certificate loses its validity if PPs is used in connections or if the distance from the surface of another material is less than 40 mm.

3.3 Behaviour in outdoor use

SIMONA® PPs is generally not designed for outdoor use. However, we have had good experience during many years of external use, but without any mechanical load. Like all other high polymer materials polypropylene is damaged by the combination of atmospheric oxygen and UV-rays. Natural coloured materials are at greater risk from this than coloured ones. After a certain period of use colour changes may occur which are often accompanied by a change in the mechanical properties.

3.4 Physiological safety

SIMONA® PPs does not meet the requirements of the foodstuffs and consumables legislation. Foodstuffs must not come into direct contact with PPs.

3.5 Chemical resistance

The nonpolar character of SIMONA® PPs provides this thermoplastic, even at increased temperatures, with

- high chemical resistance
 - against
 - salts (aqueous solutions)
 - acids
 - alkalis
 - alcohols
 - many solvents
 - against
 - grease
 - oil
 - wax

Slight swelling may ensue in case of continuous contact with these media, this generally however has no effect on the usability of the material.

- limited chemical resistance (swelling)
 - against
 - aromatic compounds
 - halogenated hydrocarbons
- no chemical resistance against strong oxidizing agents such as
 - nitric acid
 - chromic acid
 - halogenswith which, especially in the area of welds, there is an increased risk of stress crack formation.

Detailed information can be taken from our "Chemical Resistance"-catalogue.

3.6 Water absorption

SIMONA® PPs only absorbs very small amounts of water and therefore does not swell when immersed in water.

3.7 Service temperature range

Due to its molecular construction one of SIMONA® PPs remarkable features is its rigidity in the upper temperature range. The crystal melt temperature is approx. 160 °C.

- temperature for continuous use 0 °C to +90 °C
- without appreciable mechanical load and with air as the surrounding medium up to +100 °C.

3.8 Resistance against micro-organisms and rodents

SIMONA® PPs is not a food source for:

- micro-organisms
- germs (sulphate reducing)
- moulds
- spores
- gnawing insects
- rodents (gnawing possible)

3.9 Health aspects

Polypropylene consists of the elements carbon and hydrogen in chainform, existing as a polymerisate. Organic bromine and antimony compounds are used to obtain the fire resistance. These are physiological inactive according to toxicological and dermatological tests. Feeding trials with animals and tests on people support this statement.

After years of handling this material no physiological damage has been caused during production or processing: neither in the raw material industry nor at semi-finished product manufacture nor at processing.

Burning PPs

On burning PPs carbon dioxide, water, soot, low molecular polyolefines and small amounts of salts are produced as well as hydrogen halides from the fire resistant materials. Toxic carbonmonoxide can occur if the combustion is only partial. PPs is not under suspicion of producing dioxin during combustion.

Welding PPs

Under the correct conditions for the material absolutely no damage to health is to be expected. Flame retardant PP however has its own odour which can increase during process. During welding for example the developing fumes can become unpleasant. We therefore conducted some tests with a Dräger gas tracer and appropriate small tubes.

- welding with quick weld nozzle, measured directly beside the nozzle
- extrusion welding, measured at head height of the welder
- fold welding within the seam, measured directly at the blade

All of these measurements resulted in values too low to measure that is below the proof limit of 1 ppm.

Only during extrusion welding has a value of 3 to 4 ppm been measured, at the seam (legally allowed MAK-value: 5 ppm). Extrusion welding of PPs therefore should be the exception.

Precautions

In this respect, as with other technical products, we recommend that the usual hygiene precautions are observed and the vapours produced during treatment and processing are removed as much as possible, especially to prevent inconvenience to the staff.

In special cases, e. g. welding in closed, small rooms (containers as well) sufficient ventilation by suitable methods has to be provided, for example by forced ventilation.

4. Processing

Guidance on:

- machining
- welding
- thermoforming
- gluing

can be obtained from our separate product information manual. Please contact us.

5. Advice

Our Sales and Applications Departments' personnel have many years experience in the processing and use of thermoplastic semi-finished materials. We will be pleased to advise you.

CEE-Safety Data Sheet according to 91/155/EWG

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Trade name: **SIMONA® PPs / PPs pipe / PPs-AS**

11/2000

1. Indications to the manufacturer

SIMONA AG
Teichweg 16
D-55606 Kirn

Phone (0 67 52) 14-0
Fax (0 67 52) 14-211

2. Composition / Indications to components

Chemical characteristics: polymer of propylene with flame protection
CAS-number: not necessary

3. Possible dangers

unknown

4. First-aid measures

General comment: medical aid is not necessary

5. Fire-fighting measures

Suitable fire-fighting appliance: water fog, foam, fire fighting powder, carbon dioxide

6. Measures in case of unintended release

not applicable

7. Handling and storage

Handling: no special regulations must be observed
Storage: unlimited good storage property

8. Limitation of exposition

Personal protective equipment: not necessary

9. Physical and chemical characteristics

Phenotype:

form: semi-finished product
colour: different
smell: not distinguishable

Change of state:

crystallite melting point:
fire point:
inflammation temperature:

160 - 165 °C
not applicable
appr. 360 °C
(value indicated in literature)
0.95 g/cm³

density:

CEE-Safety Data Sheet according to 91/155/EWG

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Trade name: **SIMONA® PPs / PPs pipe / PPs-AS**

11/2000

10. Stability and reactivity

Thermal decomposition: above appr. 300 °C

Dangerous decomposition products:

In case of exceeding temperatures the material develops halogen hydrogen.

Besides carbon black also carbon dioxide and water as well as low molecular parts of PP will develop during the burning process. In case of incomplete burning also carbon monoxide may arise.

11. Toxic indications

During several years of usage no effects being harmful for the health were observed.

12. Ecological indications

No biodegradation, no solubility in water, no effects being harmful to the environment must be expected.

13. Waste-disposal indications

Can be recycled or can be disposed of together with household rubbish (acc. to local regulations).

Waste key for the unused product: EAK-Code 120 105

Waste name: waste of polyolefine

14. Transport indications

No dangerous product in respect to / according to transport regulations

15. Instructions

Marking according to GefStoffV/EG: no obligation for marking

Water danger class: class 0 (self classification)

16. Further indications

The indications are based on our today's knowledge.

They are meant to describe our products in respect to safety requirements. They do not represent any guarantee of the described product in the sense of the legal guarantee regulations.