

prod.info

SIMONA[®] PE

September 2012



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	SIMONA worldwide (addresses)	



1 Introduction

Extruded PE semi-finished parts supplied by SIMONA are categorised as high-density polyethylenes, i.e. they have a specific weight in excess of 0.94 g/cm³.

1.1 Properties of SIMONA[®] PE Semi-Finished Parts

SIMONA® PE Semi-Finished Parts have a number of outstanding properties:

- High toughness (also at low temperatures)
- Low density (compared to other materials)
- High chemical resistance
- High corrosion resistance
- Good sliding properties
- Anti-adhesive properties, thus no incrustation
- High wear resistance
- Long service life
- Physiological safety
- Very low water absorption
- Universal application
- Excellent electrical insulation properties
- Good fabrication and processing capability
- High UV stability (PE-HWU/PE 100)

1.2 Applications for SIMONA[®] PE Semi-Finished Parts

Construction industry

- Concrete moulds
- Formwork for special-purpose concrete
- Window frames (skylights)
- Washbasins

Apparatus, equipment, machines

- Extraction systems
- Drip pans
- Battery cells
- Pickling baths
- Chemical piping
- Ventilators

Storage systems

- Sorting boxes
- Transport pallets
- Packaging elements
- Toolboxes
- Shelves

Automotive industry

- Boot linings
- Motorcycle fenders
- Moulded seats
- Stone chip guards

Uses where physiological safety is required

- Inserts in deep freezes
- Stackable crates for cold stores
- Refrigeration truck linings
- Moulds, e.g. for ice cream, chocolate, cheese
- Prostheses and orthotic devices



2 Product range

2.1 Semi-finished parts PE

		SIMONA [®] PE-HWU	SIMONA [®] PE 100	SIMONA [®] PE-HWST	SIMONA [®] PE-HML 500
xtruded s	heets (size/thickness)				
	2,000 x 1,000	0.8 - 50	1 - 50	0.8 - 40	3 - 15
\sim	3,000 x 1,500	1.5 - 50	2 - 40	2 - 30	4 - 12
$\langle \rangle$	4,000 x 2,000	3 - 50	5 - 40	3 - 30	
Ŷ	Colours	black	black	natural	natural
Pressed sh	eets (size/thickness)			,	
100000 011	2,000 x 1,000	10 - 200	10 - 200	10 - 150	
\sim	4,120 x 2,010	10 - 150	10 - 150	10 - 150	
$\langle \rangle$	6,200 x 2,010	15 - 80	15 - 80	15 - 80	
\checkmark	Colours	black	black	natural	
win-wall e	heets (size/thickness)				
	3,000 x 1,000		54, 58		
\mathbf{S}	Colours		black		
Velding ro					
	Types	0040	0	0	0
	Thicknesses	3 - 7	3 - 5	3 - 5	3 - 4
	Colours	black	black	natural	natural
Solid rode	(length/diameter)				
	1,000	8 - 800	225 - 800	8 - 800	
	2,000	8 - 500	8 - 200	8 - 500	
\sim	4 ft ~ 1,220			6 - 14"	
∇	6 ft ~ 1,830			2 1/4 - 5 1/2"	
Ū.	8 ft ~ 2,440			1/4 - 2"	
	Colours	black	black	natural	
lollow rod	s (length/diameter)			,	
	2,000		110 - 810 [®]		
Q	Colours		black		
Profiles (le	ngth: 5,000)				
	U-profiles (W x H x s)	48 x 46 x 3.5			
		49 x 67 x 4.0			
		49 x 72 x 4.0			
		49 x 112 x 4.0			
s		49 x 132 x 4.0			
н		69 x 92 x 4.0			
W		69 x 134 x 4.0			
		90 x 92 x 4.0			
		92 x 155 x 5.0			
	Colours	black			
	Square pipes (W x H x s)	35 x 35 x 3.0			
s		50 x 50 x 4.0			
н	Colouro				
W	Colours	black			

The sizes specified are standard sizes. Other sizes, thicknesses and colours available on request.

© Diameters 640 - 810 mm: available from first quarter of 2013



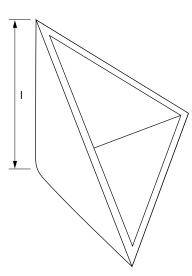
2.2 Pipes, fittings and valves PE

		SIMONA® PE 80	SIMONA® PE 100	SIMONA® PE 100 RC
Pipes				
	Pressure pipes	10 - 1,200	10 - 1,200	10 - 1,200
	CoEx sewer pipes	160 - 630	160 - 630	
68	SPC pipes			90 - 630
	Effluent pipes	50 - 315		
Fittings wi	th short spigots for butt welding			
0	Bends 90°, injection-moulded		20 - 400	20 - 315
	Stub flanges, injection-moulded/machined		20 - 1,200	20 - 315
	Tees, injection-moulded		20 - 500	20 - 315
	Tees with reduced branch, injection-moulded		90/32 - 250/160	
C	Reducers, concentric, injection-moulded/machined		25/20 - 1,000/900	25/20 - 315/250
	Reducers, eccentric, injection-moulded/machined		160/90 - 1,000/900	
	End caps, machined		250 - 800	
	Thread plugs	25 - 95		
Tungs wi	th elongated spigots for butt and electrofusion weldi Elbows 90°, 45°, injection-moulded		32 - 315	
	Bends 90°, injection-moulded		32 - 315	
	Bends 90°, 60°, 45°, 30°, 22°, 11°, seamless		32 - 800	32 - 800
	Bends 90°, 60°, 45°, 30°, welded	90 - 1,200	90 - 1,200	02 000
	Stub flanges, injection-moulded/machined	00 1,200	32 - 630	
	Tees, injection-moulded		32 - 500	
_	Tees, welded	90 - 1,200	90 - 1,200	
A	Tees with reduced branch, injection-moulded	,	63/50 - 315/250	
0	Tees with reduced branch, welded		90/40 - 800/400	
	Tees with reduced branch, welded, reinforced		180/50 - 800/315	
	Branches 45°, injection-moulded		63 - 110	
	Branches 45°, 60°, welded		110 - 630	
	Reducers, concentric, injection-moulded/machined		40/32 - 630/560	
	End caps, injection-moulded/welded/machined	35 - 630	32 - 630	
	Unions, adaptors		20 - 63	
Electrofusi	on fittings/Special fittings			
-1601101031	Electrofusion sockets,		25 - 900,	
-00-	tapping saddles		40/20 - 250/63	
	Double-containment piping systems, shafts, inspection tees, expansion sockets, tank connectors, pipe collar wall seals, etc.	on request		
Flanges				
(C)	PP/steel loose flanges, blind flanges, profiled loose flanges, special flange assemblies, gaskets, accessories	20 - 630	20 - 630	
S	Full-face flanges		63 - 225	
Valves		Metal butterfly valves for	r PE piping systems	

The dimensions specified are based on technical production capabilities.



2.3 SIMONA® Tank Corners



SIMONA® PE-HD Tank Corners, black Wall thickness Edge leng

Wall thickness	Edge length l	Weight	PU
mm	mm	kg/pce	pce
5	150	0.15	4
8	150	0.23	4
10	150	0.28	4

PU = packaging unit

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SIMONA[®] PP-H Tank Corners, grey

Wall thickness	Edge length l	Weight	PU	
mm	mm	kg/pce	pce	
5	150	0.15	4	
8	150	0.22	4	
10	150	0.27	4	

PU = packaging unit

SIMONA® Tank Corners are a versatile solution for structural applications as well as repair purposes.

2.4 SIMONA® Scrapers



SIMONA[®] Scrapers are an indispensable tool within the area of high-quality hot-gas welding.

Examples of weld structure in accordance with DVS, angle of 60 $^{\circ}$ (single V)

Sheet thickness	Welding rod	
mm	Quantity x diameter in mm	
2	1 x 4	
3	3 x 3	
4	1 x 3, 2 x 4	
5	6 x 3	



3 Technical information

3.1 Material specifications

		SIMONA® PE-HWU	SIMONA® PE 100	SIMONA® PE-HWST	SIMONA [®] PE-HML 500
Technical data					
Density, g/cm ³ , DIN EN ISO :	1183	0.955	0.960	0.947	0.954
Yield stress, MPa, DIN EN IS	0 527	22	23	22	28
Elongation at yield, %, DIN E	N ISO 527	9	9	9	8
Tensile modulus of elasticity	, MPa, DIN EN ISO 527	900	1,100	900	1,100
Impact strength, kJ/m ² , DIN	EN ISO 179	no break	no break	no break	no break
Notched impact strength, kJ - DIN EN ISO 179	/m²,	19	30	21	-
- DIN EN ISO 11542-2		-	-	_	18
Ball indentation hardness, N	/Pa, DIN EN ISO 2039-1	40	40	43	-
Shore hardness D, DIN EN IS	SO 868	64	65	64	66
Mean coefficient of linear th DIN 53752	nermal expansion, K ⁻¹ ,	1.8 x 10 ⁻⁴			
Thermal conductivity, W/m \cdot	K, DIN 52612	0.38	0.38	0.38	0.38
Fire behaviour, DIN 4102		normal flammability	normal flammability	normal flammability	normal flammability
Dielectric strength, kV/mm,	DIN IEC 60243-1	47	47	50	44
Specific surface resistance, (Dhm, IEC 60093	1014	1014	1014	> 10 ¹⁴
Volume resistivity (annular e DIN 53482	lectrode), Ohm · cm,	> 10 ¹⁶	> 10 ¹⁶	> 10 ¹⁶	> 10 ¹⁶
Tracking resistance (KC met	hod), V, DIN 53480	600	600	600	600
Permittivity, DIN 53483	at 300 - 1,000 Hz	2.3	2.3	2.3	2.3
	at 3 · 10⁵ Hz	2.3	2.3	2.3	2.3
Dielectric loss factor,	at 300 Hz	< 3 x 10 ⁻⁴			
DIN 53483	at 1,000 Hz	5 x 10 ⁻⁴	5 x 10 ⁻⁴	1 x 10 ⁻⁴	5 x 10 ⁻⁴
	at 3 · 10⁵ Hz	< 3 x 10 ⁻⁴			
Crystalline melting range (calorimetric), K (°C), DIN 52328		399 - 403 (126 - 130)			
Temperature range, °C		-50 to +80	-50 to +80	-50 to +80	-100 to +80
Chemical resistance		exce	llent in contact with ma	any acids, alkalis and s	olvents
Physiologically safe	BfR	v	 ✓ 	v	~
	EU	v	 ✓ 	v	~
	FDA			v	~

The figures are approximate and may vary depending on fabrication processes and how test specimens are made. In general, data specified applies to average values measured on extruded sheets with a thickness of 4 mm. In the case of sheets manufactured by means of pressing, testing is generally performed on sheets with a thickness of 20 mm. Deviations from the values specified are possible if the sheets in this thickness are not available. Please note that this information is not necessarily applicable to products that have undergone downstream processing. The suitability of a material for a specific area of application must be checked by the processor or end user. All technical specifications presented herein are designed merely to provide assistance in terms of project planning. They do not constitute a guarantee of specific properties or qualities.



3.2 Fire behaviour

SIMONA® PE Semi-Finished Parts are normal-flammability construction materials in accordance with DIN 4102 B2.

- Auto-ignition temperature approx. 350 °C
- Oxygen index approx. 18% (minimum oxygen concentration required for combustion)

Please refer to Section 7 for the EC Safety Data Sheet.

3.3 Performance in outdoor use

- SIMONA® PE-HWU und SIMONA® PE 100 specially stabilised for outdoor use
- SIMONA[®] PE-HWST suitable solely for indoor use
- SIMONA[®] PE-HML 500 suitable solely for indoor use

However, service life is dependent not only on the actual formula. Other factors include

- fabrication processes
- processing conditions
- the design of fittings

and the resulting states of stress.

SIMONA[®] PE-HWU has produced excellent results in outdoor applications for many years now. By adding special grades of carbon black (approx. 2%), it is possible to very effectively increase the light and weather resistance and counteract the damaging impact of ultraviolet radiation in sunlight in conjunction with atmospheric oxygen.

Outdoor applications north of the main Alpine ridge and below an altitude of 1,500 m above sea level usually allow a life expectancy of 10 years or more for PE-HWU parts.

3.4 Physiological safety

According to Recommendation III by the German "Federal Institute for Risk Assessment" (BfR, previously BgVV) there are no reservations about using SIMONA® PE Semi-Finished Parts for manufacturing commodities as defined by Section 2, paragraph 6, no. 1 of the German Food, Commodities and Feedstuffs Act (LFGB, in the version published on 26 April 2006 in the German Federal Gazette I, p. 945).

All the monomers and additives used are listed in European Directive 2002/72/EC and addenda.

3.5 Chemical resistance

Owing to the non-polar nature of SIMONA[®] PE Semi-Finished Parts, these thermoplastics (at temperatures of approx. 20 °C) display a high level of chemical resistance to the following substances:

- Salts (aqueous solutions)
- Acids
- Alkalis
- Alcohols
- Various solvents
- Fats
- Oils
- Waxes

In continuous contact with these media a small amount of swelling may occur. However, this does not generally affect the operational capability of these materials.



There is limited chemical resistance (swelling) to:

- Aromatic compounds
- Halogenated hydrocarbons

There is no chemical resistance to strong oxidants such as:

- Nitric acid
- Chromic acid
- Halogens

Consequently, there is a higher risk of stress cracks, especially in the region of weld seams.

For detailed information, please refer to our SIMCHEM database on chemical resistance (www.simchem.de).

3.6 Water absorption

SIMONA® PE Semi-Finished Parts generally absorb negligible quantities of water. Therefore, they do not swell when immersed in water.

In the special application of extruder welding, moisture can have an impact on welding results. Due to the geometry (surface area in relation to volume) and the extruder processing conditions, even very small amounts of water can be enough to prevent the welding seam from being made in an optimal manner (see work.info Welding, Section 6 Extrusion Welding).

3.7 Temperature range

The service temperature ranges of SIMONA® PE Semi-Finished Parts are as follows*:

Temperature ranges

	PE
Continuous service temperature	-50 to +70°C
Without any significant mechanical stress in air as the ambient medium	up to +80°C
Crystalline melting temperature	approx. +130°C

* The above figures do not apply to applications in tanks – such cases are subject to special design rules that have to be agreed on an individual basis.

3.8 Resistance to microorganisms

SIMONA[®] PE Semi-Finished Parts do not constitute a source of nutrition for:

- Microorganisms
- Bacteria
- Fungi
- Spores
- Gnawing insects



3.9 Health aspects

As far as its chemical composition is concerned, PE essentially only contains carbon and hydrogen. During combustion – provided there is a supply of atmospheric oxygen – carbon dioxide, carbon monoxide and water are virtually the only substances to be produced, accompanied by very small quantities of soot and lowmolecular-weight volumes of the respective plastics. The ratio of carbon dioxide to carbon monoxide depends largely on the circumstances of combustion – temperature, ventilation and an unobstructed supply of atmospheric oxygen. Consequently, the combustion fumes that develop resemble those of stearin (candle wax).

The general debate about the toxicity of fumes from burning plastics often fails to mention that all combustion fumes have a toxic effect. Therefore, any claim that plastics exposed to fire develop particularly toxic gases is incorrect.

The most suitable extinguishment to combat burning PE is water.

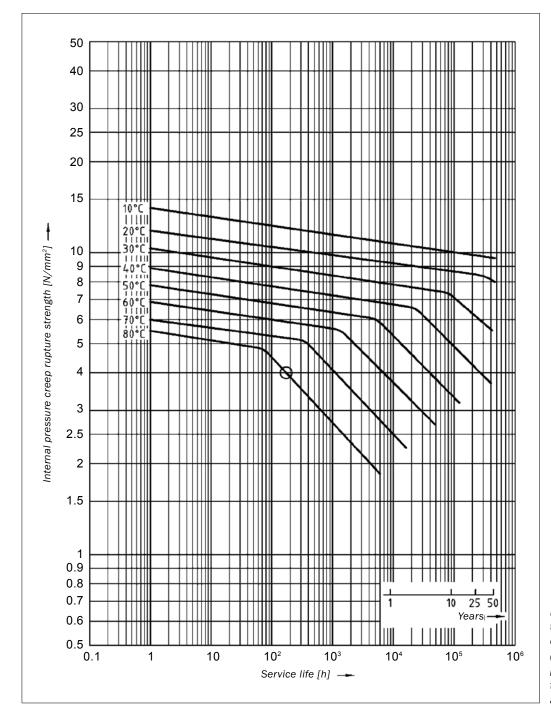
3.10 Tank construction requiring mandatory test certificates

SIMONA® PE 100 has been approved by the German Institute of Building Technology (DIBt) in Berlin for use in tank construction requiring mandatory test certificates.

On the following pages you will find the creep strength data required by DIN 8075 for PE-HD, PE 80 and PE 100 when calculating tanks and components in accordance with DVS Guideline 2205 Part 1. With the aid of this creep curve it is possible to determine the amount of stress for a specified service life and service temperature.

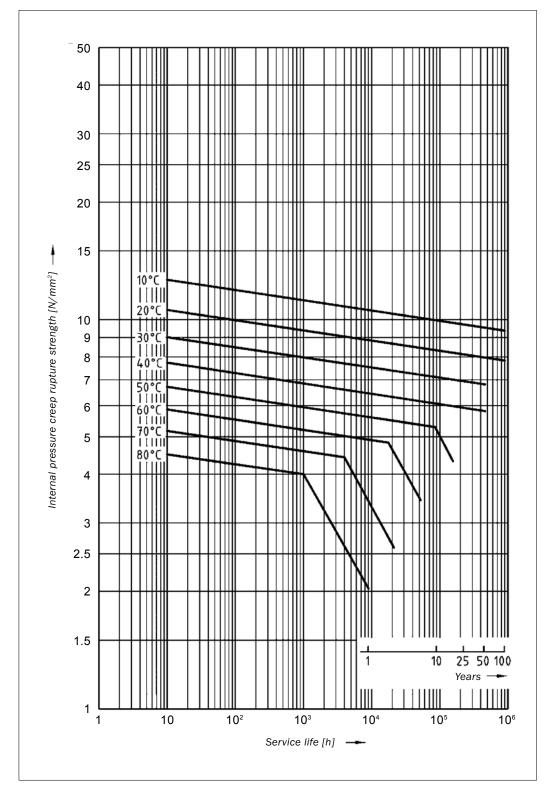
However, the levels of stress that have been calculated in this way do not take into account the actual loads in practice, which are caused by more or less aggressive media and welding methods. These must then be determined separately (see also DVS Guideline 2205 Part 1, Media Lists of the German Institute of Building Technology, Berlin).





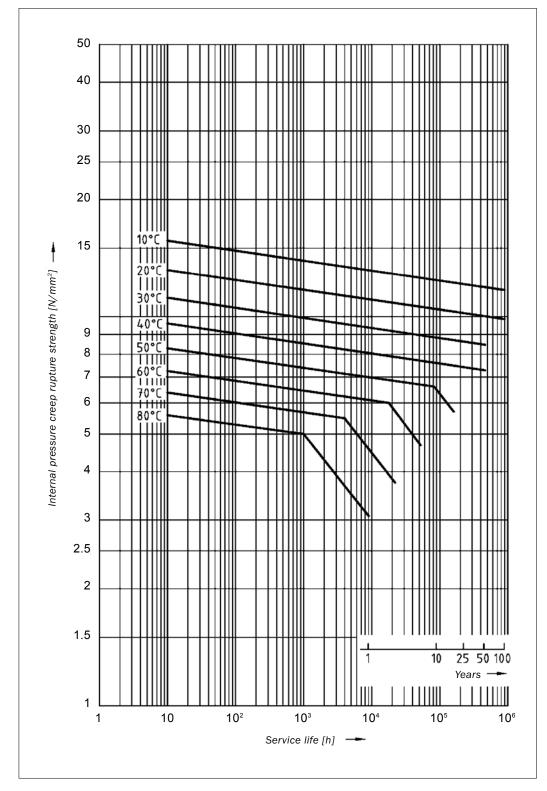
Reference characteristics of internal pressure creep rupture strength (minimum curves) for pipes made of PE-HD for non-pressurised applications





Reference characteristics of internal pressure creep rupture strength (minimum curves) for pipes made of PE 80





Reference characteristics of internal pressure creep rupture strength (minimum curves) for pipes made of PE 100

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4 Processing information

For further information on processing, please refer to our work.infos:

- Welding
- Thermoforming, Vacuum Forming, Deep-drawing, Hot-forming, Bending
- Machining
- Adhesive Bonding
- Lining and Composite Construction

Please feel free to contact us: Phone +49(0)67 52 14-383 Fax +49(0)67 52 14-738 marketing@simona.de www.simona.de



5 Storage

General information on how to store SIMONA[®] Semi-Finished Plastic Parts

- SIMONA[®] Semi-Finished Plastic Parts should always be stored in a building devoid of moisture, sudden temperature fluctuations and direct sunlight.
- Packaging straps should, where possible, be loosened after transport. If the packaging is new, steel straps should preferably not be used.
- Exposure to a heat source from one side should be avoided.
- PVC products, welding rods and electrically conductive plastics should be protected against moisture.
- Non-UV-stabilised materials should be protected against direct sunlight.
- For storage, it is advisable to use plastic film to protect against dust.
- Sheet products should be stored on a sturdy, flat pallet that provides ample support and is at least as large as the size of the sheet. Single sheets should be stored horizontally.

- A liner (made of cardboard for example) placed between the pallet and the semi-finished plastic parts is recommended.
- If a block of pallets is assembled one on top of the other, we recommend placing a pallet upside down in between in order to improve load distribution.
- Special caution is required with blocks if the sheets are thin and/or foamed material is being stored.

Under such conditions long-term storage of SIMONA[®] Semi-Finished Plastic Parts will be no problem.



6 Legal note and advice

Legal note

Upon publication of a new edition all previous editions shall become void. The authoritative version of this publication can be found on our website at www.simona.de.

All information furnished in this publication reflects our current scope of knowledge on the date of publication and is designed to provide details of our products and potential fields of application (errors and omissions excepted, including typographical mistakes). This shall not be deemed as constituting the provision of legally binding guarantees or warranties as to specific properties of the products or their suitability for specific areas of application.

We shall assume no liability for the application, utilisation, processing or other use of this information or of our products. Furthermore, we shall assume no liability for any consequences related thereto. The purchaser is obliged to examine the quality and properties of these products; he shall be responsible in full for selecting, applying, utilising and processing said products as well as applying any information relating thereto, which shall also include all consequences associated with such actions. Third-party property rights shall be observed accordingly.

We provide warranty for the faultless quality of our products within the framework of our Standard Terms and Conditions of Sale.

Advice

Our applied technical advice is given according to our best knowledge and is based on the information you have provided and the state of the art known to us at the time such advice is furnished. The advice shall not constitute a guarantee or warranty of specific characteristics or qualities and shall not establish an independent contractual legal relationship.

We are only liable for intent or gross negligence. Any information provided by us shall not release you from your obligation to conduct your own assessments and evaluations.

We reserve the right to update information without notice as part of our continuous research and development programme.

Our sales staff and members of the Technical Service Center look forward to advising you on all issues relating to the processing and application of semi-finished thermoplastics.

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7 EC Safety Data Sheet (page 1)

in accordance with 1907/2006/EC Article 31

Trade names: SIMONA® PE-HWU, PE 100, PE-HWST, PE-HML 500

1. Identification of substance/preparation

and company

Manufacturer details:

SIMONA AG

Teichweg 16

D-55606 Kirn

Phone +49(0)675214-0

Fax +49(0)675214-211

2. Hazards identification

none known

3. Composition/information on ingredients

- Chemical characteristics: polymer of ethylene
- CAS number: not required

4. First-aid measures

- General information: no medical aid required
- First-aid measures: none
- Routes of exposure: none
- Symptoms/effects: none

6. Accidental release measures

- Person-related measures: none
- Environmental protection measures: not applicable
- Cleaning equipment: not applicable
- Unsuitable cleaning products: not applicable

7. Handling and storage

- Handling: no special regulations to be observed
- Storage: storage for an unlimited period

8. Exposure controls/personal protection

- Special design of technical processing systems: not required
- Exposure limit values: none
- Exposure measurement procedures: none
- Respiratory protection: not required
- Eye protection: not required
- Body protection: not required

5. Fire-fighting measures

- Suitable extinguishing media: water mist, foam, fire extinguishing powder, carbon dioxide
- Hazard warning notice: not applicable



7 EC Safety Data Sheet (page 2)

in accordance with 1907/2006/EC Article 31

Trade names: SIMONA® PE-HWU, PE 100, PE-HWST, PE-HML 500

9. Physical and chemical properties

	PE-HWU	PE 100	PE-HWST	PE-HML 500
Appearance	solid state, semi-finished part			
Colour	black	black	natural	natural
Odour	not applicable	not applicable	not applicable	not applicable
Crystalline melting range	126 - 130°C	-	126 - 130°C	130 - 135°C
Flash point	not applicable	not applicable	not applicable	not applicable
Ignition temperature	~ 350°C	-	-	-
Density	0.955 g/cm ³	0.960 g/cm ³	0.947 g/cm ³	0.954 g/cm ³

10. Stability and reactivity

- Thermal decomposition: above approx. 300 °C
- Hazardous decomposition products: Combustion is accompanied not only by soot but also by carbon dioxide, water and low-molecularweight constituents of the PE; carbon monoxide may be produced if combustion is incomplete
- Use of stabilisers: none
- Exothermic reactions: none
- Notices regarding the physical form: none
- Conditions to be avoided: none
- Substances/media to be avoided: none

11. Toxicological information

During extensive use of this product over many years there have been no reports of any harm to health.

12. Ecological information

Non-biodegradable, insoluble in water, no detrimental effects on the environment are to be expected.

- Mobility: not applicable
- Accumulation: not applicable
- Eco-toxicity: not applicable

13. Disposal considerations

Can be recycled or disposed of with household refuse (observe local regulations).

- Waste code for unused product: EWC Code 120 105
- Designation of waste: polyolefin waste

14. Transport information

No hazardous product as defined by transport regulations.

- Notice/symbol transport containers: none
- Special marking for containers: none

15. Regulatory information

- Labelling according to GefStoffV/EC: no labelling obligation
- Water pollution classification: Class 0 (self-classification)
- Specific national requirements: none

16. Other information

This information solely describes the safety requirements of the product(s) and is based on our current state of knowledge. It does not give any assurance concerning the product(s) described within the meaning of statutory warranty regulations.

09/2012 prod.info SIMONA® PE SIMONA



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