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Product Information
PVC-GLAS

05/97

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1. General information

SIMONA® PVC-GLAS is the name for transparent, extruded sheets and pipes based on uPVC, which contains no softeners, in accordance with DIN 7748. The sheets are covered both sides with a self-adhesive protective film to protect them from surface damage. Characteristic properties of SIMONA® PVC-GLAS are:

- excellent rigidity and dimensional stability
- self-extinguishing (flame retardant up to 4 mm according to DIN 4102, B1)
- good chemical resistance to acids, alkalis and salt solutions
- high light transmission and transparency
- excellent electrical insulating properties, similar to the SIMONA rigid PVC types CAW, MZ and HSV
- odourless and non-toxic
(However, only SIMONA® PVC-GLAS-LZ satisfies recommendation of the BgVV)

1.1 Distinguishing characteristics

Standard SIMONA® PVC-GLAS

Standard SIMONA® PVC-GLAS is a standard, transparent, shockproof rigid PVC based on DIN 16 927, sheet 1. Excellent rigidity and transparency make this material ideal for many applications.

SIMONA® PVC-GLAS-SX

SIMONA® PVC-GLAS-SX is tougher than the other types of SIMONA® PVC-GLAS. We would like to emphasize in particular the excellent thermo-forming properties, even with extreme vacuum forming parts. This type of material guarantees improved stability and good cold bending properties.

SIMONA® PVC-GLAS-LZ

SIMONA® PVC-GLAS-LZ has been specially developed for use in the food industry. According to the recommendations of the BgVV, this type of PVC-GLAS may be used in direct contact with foodstuffs.

SIMONA® PVC-GLAS transparent brown

This smoked version is available for decorative use, e. g. covers, exhibition constructions, displays. The mechanical and processing characteristics are comparable with those of standard PVC-GLAS.

SIMONA® PVC-GLAS opal white

This type of PVC-GLAS contains a white pigment to achieve a specific light diffusion and is mainly used for lighting. Lamps which do not omit UV light should be used and it is further recommended that the distance between the lamp and the PVC-GLAS sheet should be such that the temperature of the sheet will not exceed 60 °C. The mechanical properties are similar to those of standard SIMONA® PVC-GLAS.

1.2 Applications

SIMONA® PVC-GLAS is an ideal material for many applications. The different versions available are specially designed to satisfy different requirements and combine the advantages of rigid PVC (uPVC) with maximum translucency. The high chemical resistance of this material is a particular feature. It can be used economically for chemical and process engineering applications.

The following can be regarded as typical areas where PVC-GLAS can be used:

- pipe systems, e. g. in the chemical and food industry
- panelling
- switch boxes
- vacuum forming parts
- DIY
- file boxes
- shop window displays
- displays
- exhibition constructions
- signs
- advertising
- lamp shades
- stage sets
- TV studios
- templates
- trays/dishes for distribution purposes
- partitions

SIMONA® PVC-GLAS can also be used in installations where it is necessary to monitor the process, e. g. in general engineering and chemical engineering.

2. Product range

	SIMONA® PVC-GLAS Standard	SIMONA® PVC-GLAS brown- transparent	SIMONA® PVC-GLAS opal-white	SIMONA® PVC-GLAS- SX	SIMONA® PVC-GLAS- LZ
sheets (length x width)	thickness of sheets (mm)				
2000 x 1000 mm	0,8 - 15	1 - 6	1 - 4	1 - 4	on request
2440 x 1220 mm	1 - 12	--	--	--	
3000 x 1500 mm	1 - 12	--	2 - 4	--	
welding rod	diameter (mm)				
round wire	Rd 3 - 5	--	--	--	--
triangulaire	TA 80 - 5	--	--	--	--
pipes	6 - 160	--	--	on request	16 - 63

Available on request

Extruded sheets

- PVC-GLAS grained
surface fine grained on one side

Supplied as follows:

welding rod in rolls and 1 m length
pipes in 5 m length

Other dimensions on request

3. Technical information

3.1 Material characteristics

	Test standard	Dimension	SIMONA® PVC-GLAS Standard***	SIMONA® PVC-GLAS -SX
Density	DIN 53479	g/cm ³	1.37	1.33
Tensile-E-Modulus	DIN 53455	N/mm ²	3200	2700
Yield stress	DIN 53455	N/mm ²	72	55
Elongation at yield	DIN 53455	%	3	3
Elongation at tear	DIN 53455	%	11	12
Impact strength	DIN 53453	kJ/m ²	without break	without break
Notched impact strength	DIN 53453	kJ/m ²	2	6
Indentation hardness H358/30	DIN 53456	N/mm ²	140	120
Shore hardness D	DIN 53505	-	83	82
Vicat softening temperature B/50	DIN 53460	K (°C)	345 (72)	349 (76)
Mean thermal longitudinal expansion coefficient	DIN 53752	K ⁻¹	0.8 · 10 ⁻⁴	0,8 · 10 ⁻⁴
Thermal conductivity*	DIN 52612	W/mK	0,159	0.159
Dielectric strength ** Method K 20/P 50	DIN 53481	kV/mm	30	-
Spec. volume resistance Ring electrode	DIN 53482	Ohm · cm	>10 ¹⁵	-
Surface resistance Electrode A	DIN 53482	Ohm	10 ¹⁴	-
Tracking resistance Method KC	DIN 53480	V	>600	-
Dielectric constant at 300 - 1000 Hz at 3 · 10 ⁵ Hz	DIN 53483	-	3.0 2.9	- -
Dielectric loss factor at 300 Hz at 1000 Hz at 3 · 10 ⁵ Hz	DIN 53483	-	0.016 0.01 0.02	- - -

* measured on test specimen 10 mm thick

** measured on test specimen 1 mm thick

*** also valid for PVC-GLAS-LZ, PVC-GLAS transparent brown and PVC-GLAS opal white

The figures indicated are guide values and may vary according to the processing method and the method used to make the test specimen. Unless specified otherwise, these are average values obtained from measurements on extruded sheets 4 mm thick. These values cannot be automatically used for finished parts. The manufacturer/user should check the suitability of our materials for a specific application.

3.2 Combustion behaviour

Standard SIMONA® PVC-GLAS is classified as a flame retardant material, class B1, in accordance with DIN 4102, part 1. The corresponding test reference Z-PA-III 2.810, is available for wall thicknesses up to 4 mm. The ignition temperature is above 390 °C. The oxygen index is 40 %.

The flame retardancy of SIMONA® PVC-GLAS opalwhite has been proved M1 for sheets up to 6 mm thickness according to the french standard NFP 92-501.

SIMONA® PVC-GLAS-SX is to be classified as a normally-combustible material, class B2, according to DIN 4102, part 1.

3.3 Behaviour in outdoor use

Standard SIMONA® PVC-GLAS

Standard SIMONA® PVC-GLAS is not generally suitable for outdoor application. However, the stabilisation of standard SIMONA® PVC-GLAS may be considered adequate in individual cases, depending on the conditions of use.

SIMONA® PVC-GLAS-SX

In principle, this type of material is not suitable for outdoor application.

This also applies to SIMONA® PVC-GLAS-LZ, SIMONA® PVC-GLAS transparent brown and SIMONA® PVC-GLAS opal white.

3.4 Physiological safety

We recommend the use of SIMONA® PVC-GLAS-LZ for those applications where this particular property is required. Standard SIMONA® PVC-GLAS, PVC-GLAS-SX, PVC-GLAS transparent brown and PVC-GLAS opal white do not satisfy the requirements of the foodstuff and consumables legislation.

3.5 Chemical resistance

SIMONA® PVC-GLAS is chemically resistant to aqueous acids, alkalis and salts at ambient temperature. The same applies to alcohols, aliphatic compounds and many oils.

Aromatic compounds and halogenated hydrocarbons, esters and ketones will etch the material. PVC is not resistant to very strong oxidising agents; in this case, there is the risk of stress crack formation at welds and at cold and hot shaped positions.

Mineral acids, such as, for example, sulphuric acid, nitric acid and hydrofluoric acid, will cause PVC-GLAS to discolour within a relatively short period. Its translucency and, therefore, transparency, is then lost. Some clouding of PVC-GLAS may occur, although the material is generally classified as „chemically resistant“; in this case, the transparency is automatically reduced, but is maintained to a certain degree.

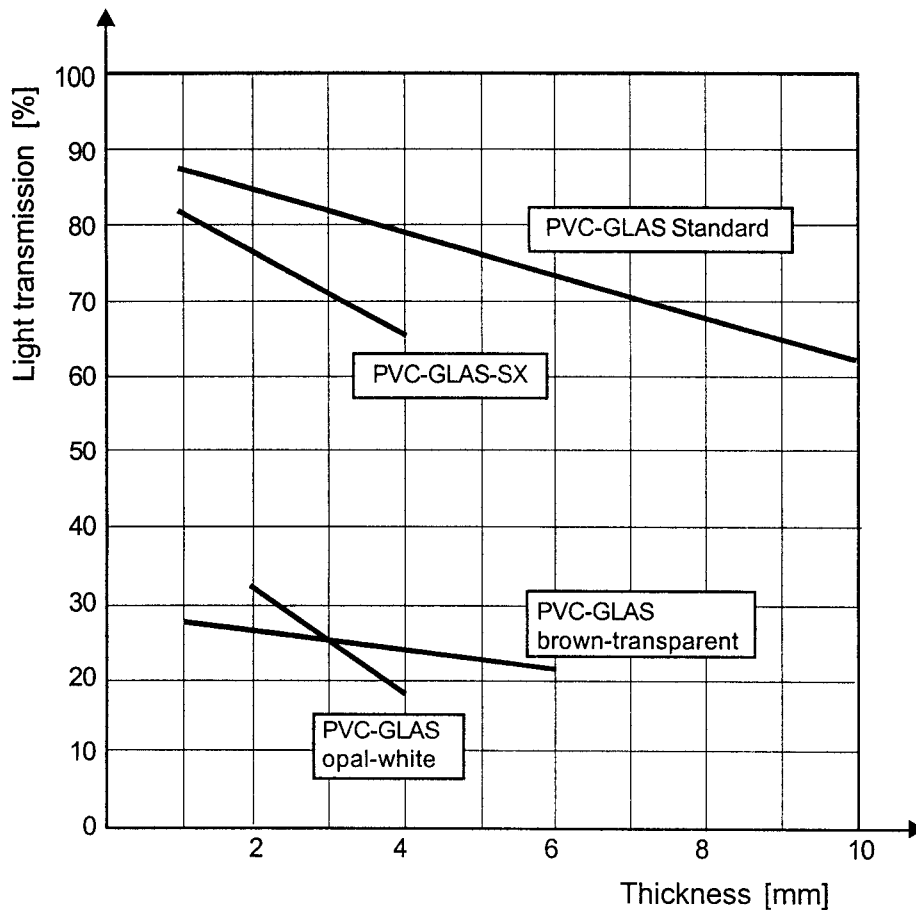
Please consult our „Chemical Resistance“ catalogue for detailed information on chemical resistance.

3.6 Water absorption

Generally speaking, rigid PVC can absorb a certain amount of moisture, which is revealed by the formation of tiny blisters when it is heated up in the vacuum forming machine. In such cases, the material should be dried first for 12 hours at 55 °C in a circulating air oven; storage overnight is sufficient in the majority of cases. As a rule, provided that the sheets are stored in a dry place, pre-drying is not necessary.

3.7 Light transmission

Standard SIMONA® PVC-GLAS has excellent optical properties. For example, the light transmission according to standard light C is 82 % for 4 mm standard PVC-GLAS.



Light transmission of SIMONA® PVC-GLAS

3.8 Service temperature range

SIMONA® PVC-GLAS can be used in a temperature range of 0 °C to 60 °C maximum. Above 60 °C, the creep or short time modulus of elasticity decreases considerably and the material softens relatively quickly. With a protracted period of use beyond the upper temperature limit, the life and function of PVC-GLAS are reduced.

When used below 0 °C with the likelihood of a light shock or impact load, we recommend the use of PVC-GLAS-SK.

In principle, SIMONA® PVC-GLAS can be used in the minus temperature range, but, in this case, the increasing embrittlement of the material must be taken into consideration. Shock or impact loads may lead to brittle fractures.

4. Processing

SIMONA® PVC-GLAS can be easily processed. Practically all the processing and forming methods which are used in connection with thermoplastics are feasible.

4.1 Machining

SIMONA® PVC-GLAS can be machined very well. The sawing and drilling guide values for SIMONA® PVC-GLAS are exactly the same as for those of rigid PVC (e. g. SIMONA® PVC-CAW).

Sawing

Circular saw

Set saw blades should be used. The use of carbide tipped saw blades with alternate teeth improves the cutting performance and considerably lengthens the life of the blade.

Smooth, clean cuts can be achieved if the saw blade only projects slightly beyond the PVC panel to be cut.

Bandsaw

The circulating saw band gives improved heat removal. Bandsaws are particularly suitable for cutting thick PVC-GLAS sheets and pipes and also for making curved cuts.

The blades must be set to cut free.

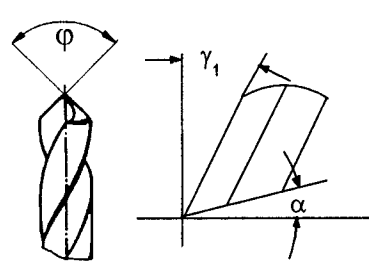
Bandsaws and circular saws

α	Relief angle	(°)	HM 10 - 15
γ^k	Rake angle	(°)	HM 0 - 8
γ^b	Rake angle	(°)	0 - 8
t	Pitch	(mm)	8 - 10
v	Cutting speed	(m/min)	up to 5000

K = Circular saw
B = Bandsaw,
High alloy tool steel blades which are slightly set.
HM = Carbide tipped

Drilling

The usual type of twist drill is sufficient here. If the rake angle of the drill is negative, then this will prevent the drill from sticking and thereby tearing the material. It is better to drill holes with a diameter greater than 20 mm with a double cutting drill with pilot. Bores with a diameter exceeding 40 mm are best made with circular cutters.



Drilling

α	Relief angle	(°)	8 - 10
γ_1	Rake angle	(°)	3 - 5
φ	Point angle	(°)	80 - 100
v	Cutting speed	(m/min)	80 - 120
s	Feed	(mm/r)	0,1 - 0,5

The twist angle b of the drill should be approximately 12 bis 16°.
The thermoplastic material must not stick (high v for thin walled components).

4.2 Shaping

Stamping

Thinner sheets can be readily stamped using ordinary stamping devices. In order to avoid stresses, the lip angle of the stamping die should be between 40° and 55°.

Standard SIMONA® PVC-GLAS: can be stamped up to 2 mm maximum
SIMONA® PVC-GLAS-SX: can be stamped up to 4 mm maximum

Conditioning: If stored at cool temperatures, the material should be held for sufficient time at ambient temperature (minimum 18 °C) before machining, particularly before stamping. This will prevent cold embrittlement.

Cutting with shears

Particular care must be taken that the blades are well sharpened and without defects. The clearance between mobile and stationary blade should amount to a maximum of 0.1 mm. The setting is exactly right when tissue-paper can be cut perfectly.

Up to a sheet thickness of 3 mm we achieved good results with an exactly adjusted blade clearance when cutting with the protective film left on. In workshop use we recommend the removal of the protective film for a short time, in case of sheets 4 mm thick it should generally be removed. In case of a thickness exceeding 4 mm we recommend cutting the sheets with a circular saw. Furthermore this offers the advantage that one does not have to remove the film and therefore the surface of the SIMONA® PVC-GLAS sheet is not scratched.

Attention!

Particularly important!

To protect the surface from scratches, SIMONA® PVC-GLAS is provided with a PE-film. The film crosslinks under intensive sun irradiation, the adhesive polymerises. As it is very difficult to remove the film from sheets with protective film the laminated sheet should not be stored outdoors.

Polar cutter

It has been found in practice that it is not possible to cut several layers of standard PVC-GLAS on the polar cutter without splitting. However, perfect results are achieved with SIMONA® PVC-GLAS-SX.

4.3 Welding

All the SIMONA® PVC-GLAS types can be welded with hot gas welding and heat element butt welding without any problem. Detailed information on the welding parameters is contained in the product information „Welding“.

4.4 Shaping by bending (folding)

Bending or folding should be carried out on machines suitable for that purpose if possible. The smallest bending radius is 2 to 3 times the thickness of the sheet. Through linear heating, stresses build up in the material after cooling which cause a certain amount of distortion in the case of small flange lengths. This distortion no longer occurs with flange lengths of more than 20 times the sheet thickness. The complete section should be heated in the case of short flange lengths.

4.5 Vacuum forming (deep drawing)

All SIMONA® PVC-GLAS types are suitable for vacuum forming. To prevent visual defects, caused by surface defects on the tools used, we recommend the use of sand-blasted aluminium moulds. Tools made from other materials may cause matting of the PVC-GLAS surface.

The vacuum holes should have a diameter of approximately 1 mm.

max. stretch ratio (surface of the sheet to surface of part)	1 : 4
degree of shrinkage positive shaping negative shaping	0,5 - 1,0 % > 1 %
tool temperature	appr. 60 °C
processing temperature on the vacuum forming machine	appr. 180 °C

We recommend removing the protective film from both sides of the sheet prior to vacuum forming in order to achieve a perfect surface to the finished part. The use of release agents may have a detrimental effect on the visual quality of the finished part.

PVC may absorb some moisture if stored for any length of time; this can be recognised by the formation of tiny blisters on the surface of the vacuum formed part. This can be remedied by drying the sheets first for 12 hours at approximately 55 °C.

In order to achieve uniform vacuum forming results, the sections must always have the same direction of extrusion.

The strength of PVC-GLAS depends greatly on temperature.

Additional stresses introduced by vacuum forming may cause a certain embrittlement of the material which may adversely affect the finished part, particularly for stamping and machining. One possible remedy is to change the vacuum forming parameters (increasing the heating time a lower heating temperature and slower cooling) or machining at a higher temperature.

4.6 Thermo-forming

Unlike vacuum forming, where the sheets are clamped in a frame, with thermo-forming the sections are heated in an oven without a retaining device. Depending on the extrusion direction of the PVC-GLAS sheet, a reduction in length in the direction of extrusion or an increase in size at right angles to the direction of extrusion can be seen. We recommend carrying out preliminary tests in order to determine the subsequent processing conditions. Sections to be thermo-formed should be heated in a circulating air oven which can be regulated.

PVC-GLAS can be shaped easily in the temperature ranges 110 to 130 °C and above 170 - 180 °C.

We recommend as a guide for the heating time: 3 times the sheet thickness (mm) = heating time in minutes. If possible, the protective film should be removed before heating. It should be ensured that the sections are heated through uniformly in order to reduce the reorientation of the macromolecular structure after cooling. Detailed information on vacuum forming is contained in our product information manual entitled „Vacuum forming, Thermo-forming, Bending“.

4.7 Bonding

Because of the polarity of the material, SIMONA® PVC-GLAS can be bonded relatively simply, achieving a high degree of adhesive strength.

The instructions provided by the adhesive manufacturer concerning the pretreatment of the surface of the joint should always be followed.

The following adhesives can be used:

Solvent adhesives

These are mostly based on tetrahydrofuran (THF) or methylene chloride. These adhesives are used exclusively for bonding PVC-GLAS/PVC-GLAS and other PVC materials to each other and produce transparent joints.

2-component reaction adhesives

These mainly consist of epoxy resin (EP), acrylate (PMMA) or polyurethane (PUR). Generally speaking, PUR 2-component adhesives are stronger than EP or PMMA adhesives and they produce very strong joints. This type of adhesive is ideally suited for joining PVC-GLAS with „foreign“ materials such as stone, metal, ceramic, wood, etc. The joints are clearly visible as 2-component adhesives usually have their own colour.

1-component reaction adhesives

These usually consist of cyano-acrylate. These reaction adhesives produce bonded joints which reach their final strength within a very short time. The joints are transparent.

Adhesive tapes

These usually produce joints which are not very strong and are mainly used as an assembly aid. Adhesive tapes are not transparent as a rule.

4.8 Surface treatment

Printing

Like rigid PVC, SIMONA® PVC-GLAS can be printed on using inks suitable for rigid PVC. The silk screen method is the method most frequently used. The surface to be printed must be clean and free from grease.

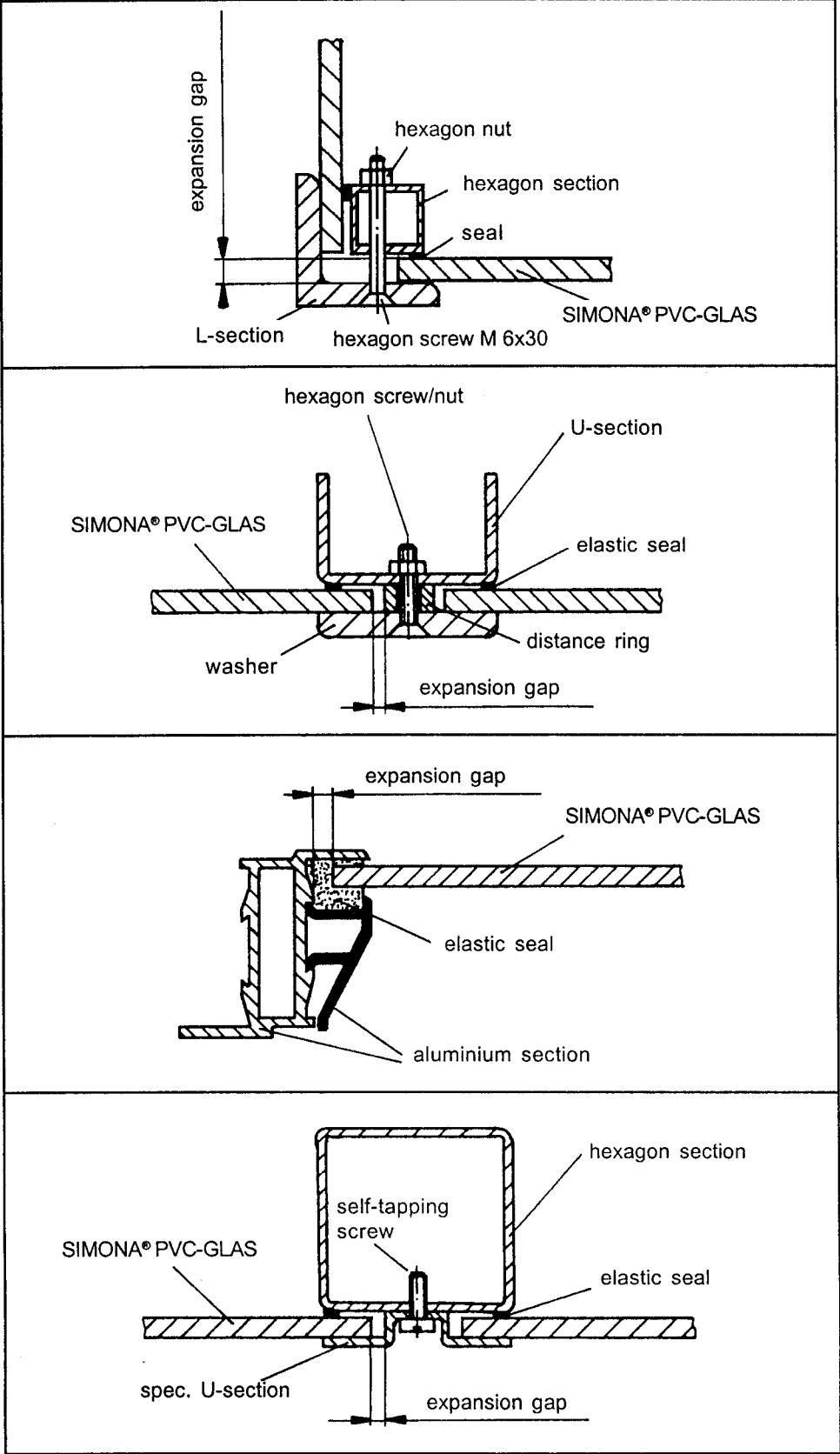
Lacquering

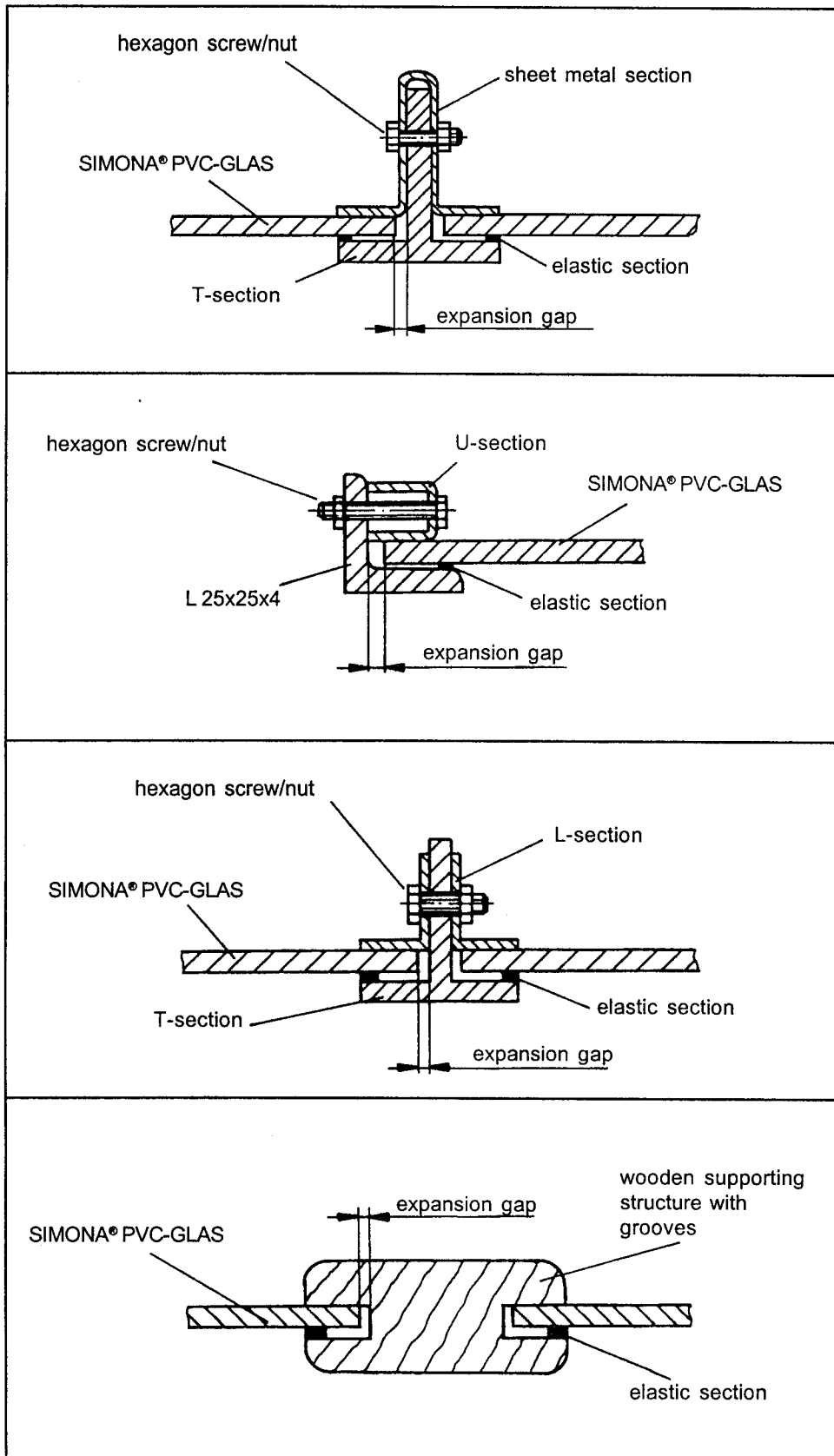
The adhesion of lacquer on SIMONA® PVC-GLAS is excellent. Preferably, PVC, acrylic or PUR-based lacquers should be used. All the normal application methods can be used.

Cleaning

Under no circumstances may PVC-GLAS surfaces be cleaned with solvents (e. g. acetone, cyclohexanone, tetrahydrofuran, methylene chloride). We recommend the use of a soft soap solution, alcohols or petroleum ether depending on the degree and nature of the contamination.

4.9 Assembly instructions for SIMONA® PVC-GLAS sheets





SIMONA[®] PVC-GLAS expands in heat and contracts as the temperature falls (coefficient of the thermal expansion: $\alpha = 0.8 \cdot 10^{-4} \text{K}^{-1}$). Therefore, if PVC-GLAS sheets are fastened by screws, then the holes are to be drilled approximately 10 % bigger than the diameter of the screw used. To prevent unacceptable stresses being transferred to the PVC-GLAS sheets when the screws are tightened, the use of elastomer washers is very much recommended. Under no circumstances should so-called snaprings or metal washers be used.

Rule-of-thumb: Per meter and 10 °C temperature difference an expansion of 0.8 mm can occur in each direction.

5. Advice

Our sales personnel and applications engineers have had many years experience with the use and processing of thermoplastic semi-finished products. We will be pleased to advise you.

**Printability of
SIMONA® PVC-U sheets**

Adhesive strength and scratch resistance of possible one-component inks of **Marabu/Tamm** on printing material of **SIMONA/Kirn**
February 1996

Material	Vorreinigung	Maraplast		Maragloss		Maraspeed		Marasprint		Marastar		Marasoft		Libragloss	
		D		GO		SL		SP		SR		MS		LIG	
		H	K	H	K	H	K	H	K	H	K	H	K	H	K
SIMOPOR	PSV	+	+	+	+			+	+	+	+	+	+	+	+
SIMOCEL-AS	PSV	+	+	+	+	+	+	+	+	+	+	+	+	+	+
SIMOCEL-COLOR	PSV	+	+	+	+	+	+	+	+	+	+	+	+	+	+
COPLAST-AS	PSV	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PVC-GLAS	PSV	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PVC-D	PSV	+	+	+	+	+	+	+	+	+	+	+	+	+	+
PVC-GAW		+	+	+	+	+	+	+	+	+	+	+	+	+	+
Surface finish		matt		gloss		good silk gloss		silk gloss		bright gloss		silk gloss		gloss	
Covering power		high		good		medium		medium		good		good		medium	
Drying		fast		fast		very fast		fast		very fast		very fast		fast	
Resistance				can be vacuum formed		can be vacuum formed		can be vacuum formed, good weather resistance, suitable for outdoor use		can be vacuum formed, good solvent resistance, good weather resistance, suitable for outdoor use		can be vacuum formed, good weather resistance, suitable for outdoor use		can be vacuum formed, suitable for outdoor use	

SIMOCEL-AS

Foamed rigid PVC sheet with a density of approx. 0,75 g/cm³. The antistatic formulation decreases static charge and virtually eliminates dust attraction. SIMOCEL-AS can easily be printed and is therefore used predominantly for the production of sign and display panels, etc. (SIMOCEL-AS is destined for inside use). SIMOCEL-AS satisfies the regulations conc. flame retardancy for use for exhibition work and similar applications. Apart from standard white colour SIMOCEL-AS can also be supplied in black, green, red, blue, yellow and grey.

COPLAST-AS

Two solid covering layers with high-quality surfaces sandwich the foamed core of COPLAST-AS. The covering layers (white) are stabilised for outdoor use and the light weight foamed core accounts for the low density of approx. 0,70 g/cm³. The antistatic formulation decreases static charge and virtually eliminates dust attraction. COPLAST-AS has proved eminently suitable for panels, cladding, laminating of photos and the manufacturing of doors and window panels.

PVC-GLAS

Sheets made of PVC-GLAS combine the advantages of rigid PVC with max. light transmission (up to 89 % depending on thickness). SIMONA® PVC-GLAS sheets satisfy the regulations conc. flame retardancy. SIMONA® PVC-GLAS is also available tinted, grained, translucent, in high impact resistant form and for food use. It is therefore suitable for many applications. To prevent soiling PVC-GLAS sheets are coated on both sides with a protective foil.

PVC-D

PVC-D has been specifically developed for use by the printing industry. This solid, rigid PVC sheet offers good impact strength and can be processed by all methods used traditionally for thermoplastic sheets. The smooth surface facilitates particularly accurate screen printing. PVC-D satisfies the regulations concerning flame retardancy. The DS type, with increased impact strength, is particularly suitable for the production of blanked parts.

Legend: H = Adhesion of scotch tape + = good - = insufficient
K = Scratch resistance

Ink grades for long-term outdoor use:

Marastar SR

As per blue scale DIN 16 525, the light fastness of the pigments used is situated in the area of 7 - 8 (superb to excellent). Therefore, only the 21 basic colour shades of Marastar SR can be used for an outdoor use over several years. A mixture with printing lacquer, transparent mass and other colour shades, especially to brighten these basic colours with white, greatly reduces the light and weathering fastness and thus should not be done (please ask for Marastar SR technical data sheet). With regard to an outdoor use over several years, an overpainting with the printing lacquer Marastar SRL/UV must be carried out. This lacquer protects the colour film and contains special UV-absorbers which absorb a large part of the UV light.

Our indications only count for applications with screen printing. For colour and lacquer we recommend a fabric between 68T and 77T.

These indications are given to our best knowledge and conscience, but no commitments can be derived thereof. Due to the different behaviour of printing materials, which indeed may show differences from charge to charge in respect to their printability even within a grade, our inks are only sold on the condition that the suitability for the application in question under consideration of the requirements - material, printing conditions - have been tested prior to printing.

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

Page 1 of 2

Trade name: **SIMONA® PVC-GLAS / PVC-GLAS pipe /
SIMONA® PVC-GLAS-LZ**

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 vinylchloride
CAS-number: not necessary

3. Possible dangers

unknown

4. First-aid measures

General comment: medical aid is not necessary

5. Fire-fighting measures

In case of fire please use gas mask and breathing equipment independent of circulating air.
Fire residues must be disposed of according to the local instructions.

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

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

Page 2 of 2

Trade name: **SIMONA® PVC-GLAS / PVC-GLAS pipe /
SIMONA® PVC-GLAS-LZ**

11/2000

9. Physical and chemical characteristicsPhenotype:form: semi-finished product
colour: transparent
smell: not distinguishableChange of state:crystallite melting point: 80 °C
fire point: FIT 390 (values indicated
inflammation temperature: SIT 455 in literature)
density: 1.37 g/cm³**10. Stability and reactivity**

Thermal decomposition: above appr. 200 °C

Dangerous decomposition products:

Besides hydrochloric acid also carbon dioxide and water will develop during the burning process. In case of incomplete burning also carbon monoxide and traces of phosgene 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 polyvinylchloride

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.