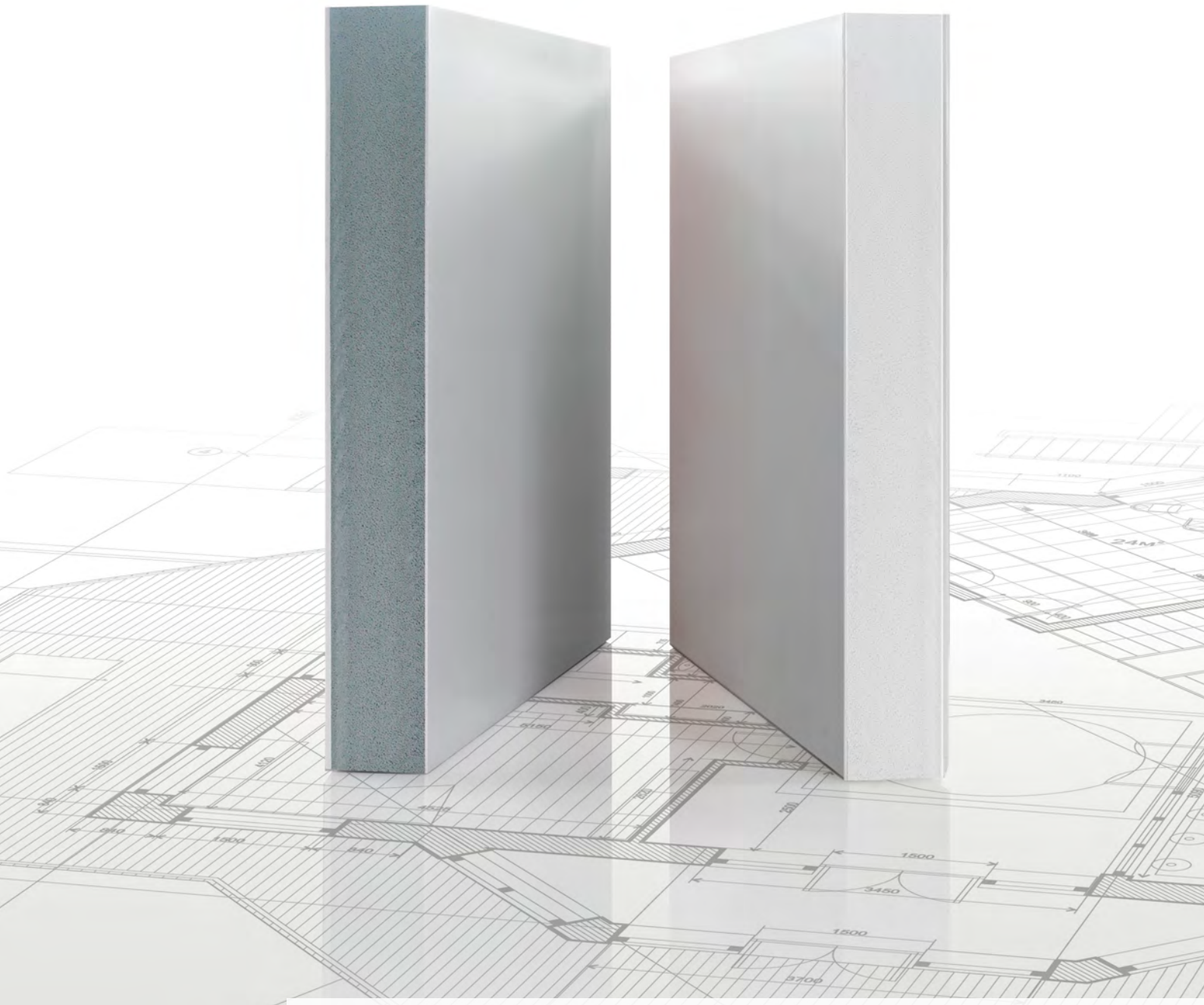
SIMONA



# tech.info

## SIMONA® COPLAST

GLOBAL THERMOPLASTIC SOLUTIONS

# Contents

# 1 General

SIMONA® COPLAST is a composite material made of compact outer skins specially stabilised for outdoor applications and foamed PVC-U (rigid PVC) as a core material. Its mean density is only approx. 0.67 g/cm³, whilst rigidity is high. Sound insulation and thermal insulation are integral features of this material. In addition, the level of flammability is low, as a result of which this material is suitable for a wide range of applications. As the outer skins are made of compact, plasticiser-free PVC, the overall surface quality is considered excellent. This makes the material ideal for use in fields such as advertising, displays, exhibition stand construction, etc.

SIMONA® COPLAST-AS features top-quality white outer skins and a white foam core.

SIMONA® COPLAST-AS-X has a grey foam core.

Other types of SIMONA® COPLAST:

- COPLAST-COLOR with coloured outer skins
- COPLAST-AR-X with anti-slip properties
- COPLAST-AS(-X)-FR with low flammability

## 1.1 Properties

### 1.1.1 Advantages over compact PVC sheets

- Reduced basis weight (g/m²) at same thickness
- Lower thermal conductivity
- Oscillation- and vibration-absorbent
- Very easy to process

### 1.1.2 Antistatic effect

Plastics are good insulators. They have the property of attracting and retaining particles of dust and dirt on account of static, which is disadvantageous for some applications. To take due account of this fact, SIMONA®COPLAST-AS and SIMONA® COPLAST-AS-X are antistatically treated, the aim being to reduce dust attraction as far as possible and minimise the influence on paintability, gluability and other processing steps. The antistatic effect can be achieved in two ways:

1. Antistatic agents applied to the surface at a later stage only have a superficial effect, become exhausted and virtually disappear when the surface has been wiped down.

2. With COPLAST-AS(-X) the antistatic agent acts from inside, i. e. it is not simply applied externally but automatically replenishes itself from the centre of the sheet whenever necessary. The antistatic agents used by SIMONA act by creating a hydrophilic coating on the surfaces to be protected, which ensures that static is discharged. Consequently, the antistatic effect remains intact until the end of the service life of the sheets.

If the surface is dirty and has to be cleaned, a dry cloth or washing water or methylated spirits can be used. The antistatic effect will be automatically restored from inside once the surface has been cleaned. With regard to its mode of action, the antistatic agent has been selected so that the amount reaching the surface is just sufficient to provide the antistatic effect. That is why the surface is not expected to become smeared in the course of time.

Conductivity depends on ambient humidity. In dry air the measurements tend to be around $10^{12}$ ohms, whilst in a humid atmosphere the figures reached can be anything up to $10^{9}$ ohms.

## 1.2 Areas of use

**Electrical engineering**

- Control cabinets and meter cabinets
- Cable ducts
- Control panels

**Construction sector**

- Heat and sound insulation
- Ducts for air-conditioning and ventilation systems
- Window reveals
- Façades

**Advertising sector**

- Signs
- Displays
- Banner advertising
- Exhibition stands
- Photograph lamination

**Other**

- Traffic signs
- Transport containers
- Modelmaking
- Laboratory equipment
- Furniture construction

## 1.3 Product range

You will find detailed information on the current product range of SIMONA® COPLAST and our other products at www.simona.de.

A member of our Sales department will be pleased to advise you:

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Fax +49 (0) 67 52 14-211
sales@simona.de

# 2 Technical information

## 2.1 Material specifications

**Technical data**

| | | SIMONA® COPLAST-AS | SIMONA® COPLAST-AS-X |
|---|---|---|---|
| Density, g/cm³, DIN EN ISO 1183 | | 0.67 | 0.67 |
| Tensile modulus of elasticity, MPa, DIN EN ISO 527 | | 1,100 | 1,100 |
| Yield stress, MPa, DIN EN ISO 527 | | 18 | 18 |
| Elongation at yield, %, DIN EN ISO 527 | | 3 | 3 |
| Flexural moduls of elasticity, MPa, DIN EN ISO 178 | | 1,400 | 1,400 |
| Impact strength, kJ/m², DIN EN ISO 179 | | 19 | 19 |
| Shore hardness, D (15 s), DIN EN ISO 868 | | 70 | 68 |
| Fire behaviour | DIN 4102 | B2 normal flammability (own assessment without test certificate), B1 low flammability for 10 mm on request | B2 normal flammability (own assessment without test certificate), B1 low flammability for 3 – 8 mm on request |
| | NF P 92-501 | M1 for 10 mm on request | – |
| Mean coefficient of linear thermal expansion, $K^{-1}$, ISO 11359-2 | | $0.83 \times 10^{-4}$ | $0.83 \times 10^{-4}$ |
| Thermal conductivity, W/m · K, DIN 52612 | | 0.068 | 0.068 |
| Spec. surface resistance, Ohm, DIN IEC 60093 | | ≤ $10^{12}$ | ≤ $10^{12}$ |
| Service temperature range, °C | | 0 to +60 | 0 to +60 |
| Physiological safety | BfR | No | No |
| Food conformity | EU | No | No |
| | FDA | No | No |

All specifications are deemed to be approximate values in respect of the specific material and may vary depending on the processing methods used. 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. In the case of backed sheets, all technical specifications relate to the non-backed base sheets. Information presented herein is not necessarily applicable to other products (e.g. pipes, solid rods) of the same material or products that have undergone downstream processing. Suitability of materials for a specific field of application must be assessed by the party responsible for processing or the 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. For further information, please contact our Technical Service Centre at tsc@simona.de.

## 2.2 Fire behaviour

Owing to its high chlorine content of approx. 50 %, PVC only contains half as many combustible constituents as other compound plastics (PE, PP, PS, etc.). That is why it is self-extinguishing, i. e. burning PVC extinguishes itself when the ignition source is removed. The "self-extinguishing" property is also evident from the so-called oxygen index (LOI: Limiting Oxygen Index). This indicates the minimum oxygen concentration required for combustion.

## 2.3 Performance in outdoor use

Both outer skins of SIMONA® COPLAST-AS(-X) display excellent stabilisation for outdoor use. The results of artificial weathering (QUV-A test as per DIN EN ISO 4892-3) show that – provided this material has been processed in a manner suitable for plastics – it can be used outdoors over an extended period of time.

We have positive empirical evidence obtained throughout a period of well over five years in a Central European climate north of the main Alpine ridge up to an altitude of 1,500 m above sea level. However, in all cases we must point out that all materials tend to weather outdoors in the course of time and colour changes are inevitable.

SIMONA® COPLAST-AS(-X) sheets expand when exposed to heat and contract when they cool down (for coefficient of linear thermal expansion, refer to Section 2.1 Material specifications and 3.7 General structural information).

## 2.4 Physiological safety

SIMONA® COPLAST does not meet the requirements of the German Food, Commodities and Feedstuffs Act (LFGB), EC Regulation 1935/2004 or EU Regulation 10/2011.

## 2.5 Environmental and health aspects

Owing to its high chlorine content of approx. 50 %, PVC exposed to fire at temperatures above 400 °C emits carbon dioxide, carbon monoxide, carbon and hydrogen chloride, but no vinyl chloride monomer. Additionally, no high concentrations of dioxins have been found so far in fires involving PVC. To date, there are no known cases of smoke inhalation causing death due to hydrogen chloride – the cause has almost always been carbon monoxide. Nevertheless, as with any smoke contamination, a doctor must be consulted after inhalation of PVC fumes.

All PVC semi-finished products are provided with special stabilisation systems in order to achieve smooth processing and good long-term properties. For decades, SIMONA has only been using systems that do not contain cadmium or lead.

**Processing PVC**
Under material-compatible conditions no health hazards whatsoever are to be expected. There is no need to take special account of any odours that arise.

When machining, PVC “sawdust” can be emitted into the ambient air, especially when using blunt tools and consequently high temperatures. A distinction is made between “relatively safe” coarse dust and fine dust. This dust can enter the lungs along with inhaled air; fine dust in particular can cause respiratory disorders. The MWC (Maximum Workplace Concentration) for dust is currently 6 mg/m$^3$ air.

# 3 Processing instructions

## 3.1 Machining

SIMONA® COPLAST is very easy to machine. The approximate figures for sawing and drilling SIMONA® COPLAST are virtually the same as for standard rigid PVC.

**Sawing (band saw, circular saw)**

| | | SIMONA® COPLAST |
|---|---|---|
| Lead angle | | 10 – 15° HM |
| Rake angle | | 0 – 5° HM |
| Rake angle, band saw | | 0 – 8° |
| Tooth pitch | | 2 – 8 mm |
| Cutting speed | Circular saw | to 4,000 m/min |
| | Band saw | to 2,000 m/min |

When processing on circular saws we recommend using carbide-tipped blades with an alternating tooth system in order to prevent partial splintering of the outer skins. High circumferential speeds and low rates of forward feed are ideal.

**Drilling**

| | SIMONA® COPLAST |
|---|---|
| Lead angle | 8 – 10° |
| Rake angle | 3 – 5° |
| Nose angle | 80 – 110° |
| Cutting speed | 30 – 80 m/min |
| Forward feed | 0.1 – 0.5 mm/rev |

### Cutting with guillotine shears

Cutting SIMONA® COPLAST with the aid of guillotine shears is not to be recommended because the material would be squashed, resulting in permanent deformation.

### Nails and screws

SIMONA® COPLAST is extremely tough. This makes it possible to insert nails and screws into the material without having to pre-drill. Nevertheless, to avoid stresses in the sheet when inserting nails or screws we recommend pre-drilling.

## 3.2 Welding

### 3.2.1 Hot-gas welding

To weld SIMONA® COPLAST, we recommend using round rod made of SIMONA® PVC-CAW, diameter 3 – 4 mm.

**Hot-gas welding**

| | SIMONA® COPLAST |
|---|---|
| Temperature | approx. 340 °C |
| Air flow | approx. 40 l/min |

When hot-gas welding SIMONA® COPLAST, partial yellow discoloration at the edge of the seam cannot be ruled out. However, this effect does not have any negative influence on the mechanical properties of the seam.

### 3.2.2 Butt welding

**Heated-tool butt welding**

| | SIMONA® COPLAST |
|---|---|
| Temperature | 180 °C |
| Warming pressure | 0.75 p/cm² |
| Welding pressure | 2 kp/cm² |
| Welding factor | 0.5 – 0.7 |

**Fold welding**

| | SIMONA® COPLAST |
|---|---|
| Optimum penetration depth | ¾ wall thickness |
| Temperature | 180 °C |

Important: penetration times are shorter than with solid rigid PVC.

## 3.3 Gluing

SIMONA® COPLAST can be just as easily glued as SIMONA® materials SIMOPOR, PVC-CAW, PVZ-MZ-COLOR or PVC-GLAS. Glued bonds to PVC produce high-strength connections due to the high polarity of the polymers. However, attention must always be paid to the adhesive manufacturer's instructions regarding pretreatment of the surfaces of the items being joined.

### 3.3.1 Types of adhesive

The following adhesives can be used:

**Solvent-based adhesives**
Usually based on tetrahydrofuran (THF) or methylene chloride. Solvent-based adhesives are only suitable for bonds between COPLAST and other PVC materials.

**Contact adhesives**
Frequently based on polychloroprene, nitrile rubber or other synthetic rubbers. Contact adhesives are ideal for flat surfaces, even with other materials such as wood, assuming mechanical and thermal stress is moderate.

**2-component reactive adhesives**
Chiefly based on epoxy resin (EP), PMMA or PUR. PUR-based 2-component adhesives are generally tougher than EP or PMMA-based ones and produce high-strength bonds. This type of adhesive is ideal for joining SIMONA® COPLAST to different materials such as stone, metal, ceramics, wood, etc.

**1-component reactive adhesives**
Usually based on cyanoacrylate (e. g. superglue). These reactive adhesives produce adhesive bonds that reach their ultimate strength within a very short space of time.

**Adhesive films**
We recommend baseless adhesive films made of dispersion adhesives for laminating SIMONA® COPLAST with photographic paper, posters or the like.

**Adhesive tapes**
Adhesive tapes produce bonds with a low level of strength; they are mainly used for assisting assembly or for flat bonds without any mechanical or thermal stress.

## 3.4 Printing

SIMONA® COPLAST can be printed using PVC-compatible printing inks in the same way as rigid PVC. Screen printing is the process used most frequently. Our sheets have been tested for their printability, including ink adhesion and scratch resistance, by well-known screen-printing ink manufacturers. However, owing to varying requirements, the results obtained do not mean that there is no need to conduct your own preliminary tests.

## 3.5 Surface treatment

**Lacquering**
The adhesion of lacquers to SIMONA® COPLAST is excellent. PVC, acrylic or PUR-based lacquers should be used. All current application techniques can be used.

**Coating**
SIMONA® COPLAST can be coated with self-adhesive foils, decorative foils or other foils made of different materials.

**Flocking**
SIMONA® COPLAST can also be flocked. By flocking it is possible to achieve plushy, highly attractive surfaces. Flocked products are frequently used for packaging up-market consumer goods.

## 3.6 Backing

**Sealing cut surfaces**

The water absorption of SIMONA® COPLAST is so minimal that neither swelling nor flaking of the outer skins is to be expected. Only in the exposed voids of the cut close to the surface is any accumulation of moisture to be expected. This can be prevented by taking one of the following precautions:

- Apply liquid reaction resins (e. g. containing pigments and thickeners)
- Apply lacquer/paint that is suitable
- Apply water glass
- Iron on edging strips
- Glue on strips of rigid PVC

**Polishing**

Although it is generally possible to polish SIMONA® COPLAST, it should be borne in mind that the outer skin of this material is relatively thin. Removal of surface material may cause the cell structure to become visible.

## 3.7 General structural information

When using SIMONA® COPLAST in outdoor applications, i. e. where temperatures are constantly changing, attention must be paid to the thermal change in length. The mean coefficient of linear thermal expansion is 0.83 x $10^{-4}$ $K^{-1}$, which means that for every linear metre and 10 °C of change in temperature the material will undergo a change in length of 0.83 mm.

Example:

| | |
|---|---|
| Sheet | 1 x 1 m |
| Installation temperature | +20 °C |
| Summer temperature | +50 °C |
| Winter temperature | –10 °C |
| Change in length | ± 2.4 mm |

In the case of white SIMONA® COPLAST and designs with back ventilation, temperatures are not likely to exceed 50 °C in our climatic zone. The darker the colour, the higher the temperatures absorbed. Even a light grey colour develops heat that is close to 60 °C, the temperature limit for using SIMONA® COPLAST. Light-coloured sheets absorb less heat. If sheets are exposed to the weather, the thermal change in length is therefore less and service life is longer because the heat and UV stabilisers are protected.

The most favourable means of mounting COPLAST sheets is a frame made of slotted tubing or channels in which the sheets can neither touch each other nor slip out. Please always provide fasteners with slots, preferably with spacers in order to prevent heat accumulation.

When fastening PVC sheets with screws the holes should be drilled approx. 10 % larger than the screw diameter being used. In order to ensure that no undue stresses are transferred to the sheets when the screws are tightened, it is urgently recommended that elastomer washers be used. Under no circumstances should so-called snap rings or metal washers be used.

The connection of sheets can be performed both by hot-plate welding and rod welding (see Section 3.2 Welding). Another possibility is, for example, to make a slot in the two sheets being joined and glue them together with a matching strip of PVC (e. g. 2 mm thick). If only one side is glued, the other side can absorb the change in length.

# 4 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.

# 5 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 provide warranty for the faultless quality of our products solely within the framework of our Standard Terms and Conditions of Business and only within the scope specified therein.

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.

## 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 shall only be liable for cases of intent or gross negligence. Under no circumstances shall we be held liable for the correctness or completeness of information you have provided or the advisory/consulting services rendered by us on the basis of such information. 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 Centre look forward to advising you on all issues relating to the processing and application of semi-finished thermoplastics.

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# 6 EC safety data sheet

according to 1907/2006/EC Article 31

Trade name: **SIMONA® COPLAST-AS, SIMONA® COPLAST-AS-X**

**1. Identification of substance/preparation and company**

- Manufacturer details:
  SIMONA AG
  Teichweg 16
  55606 Kirn
  Germany
  Phone +49 (0) 67 52 14-0
  Fax +49 (0) 67 52 14-211

**2. Hazards identification**

- Unknown

**3. Composition/Information on ingredients**

- Chemical characteristics: polymer of vinylchloride foamed
- CAS number: not applicable

**4. First-aid measures**

- General comment: medical aid is not necessary
- First-aid measures: none
- Routes of exposure: none
- Symptoms /effects: none

**5. Firefighting measures**

In case of fire please use gas mask and breathing equipment independing 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
- Hazard warning notice: not applicable

**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: storable for an unlimited period

**8. Exposure controls/Personal protection**

- Special design of techn. processing facilities: not required
- Tolerance levels: none
- Exposure assessment: none
- Respiratory protection: not required
- Eye protection: not required
- Body protection: not required

**9. Physical and chemical properties**

- Phenotype:
  Physical state: semi-finished product, solid state
  Colour: white
  Odour: not applicable
- Change of state:
  Flash point: not applicable
- Other remarks:
  Density: 0.67 g/cm³

**10. Stability and reactivity**

- Thermal decomposition: above appr. 200 °C
- Hazardous 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.
- Use of stabilisers: none
- Exothermic reactions: none
- Notices regarding state of aggregation: none
- Conditions to be avoided: none
- Substances/media to be avoided: none

**11. Toxicological information**

No hazardous effects on health were observed over several years of usage.

**12. Ecological information**

No biodegradation, no solubility in water, no hazardous 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 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 information**

No dangerous product in respect to/according to transport regulations

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

**15. Regulatory information**

- Marking according to GefStoffV/EG: no obligation for marking
- Water danger class: class 0 (self classification)
- Domestic requirements to be observed: 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.

# SIMONA worldwide

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