PROCESSING GUIDELINES

CONTENT

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1 SINTREX® - AT A GLANCE

SINTREX® is a lightweight expanded rigid PET sheet suitable for versatile printing applications.

SINTREX® sheets are made of PET (polyethylene terephthalate), one of the most versatile and promising plastics, already the material of choice in many applications from food packaging to structural foams. PET is noted for its recyclability and well-established recycling options.

The unique, natural white surfaces of SINTREX® make it the ideal product for use in the printing industry. Processing is quick and easy and the printability for all conventional printing technologies is first-rate. The sheets, which feature particularly good weather resistance, are also suitable for outdoor use.

As SINTREX® sheets also have outstanding fire properties, hardly inflammable in accordance with EN 13501-1, they are suitable for a wide range of different applications, especially where special fire regulations are required. Public areas, in particular, often require more stringent preventive fire measures. For example, areas of application for signage and displays include airports, trade shows, shopping centres, public buildings and in shopfitting.

2 AREAS OF APPLICATION

SINTREX® is suitable for applications in many areas of visual communication, for thermoformed industrial components and as a lightweight substitute for wooden boards.

- Signage in indoor and outdoor settings
- POS / POP displays
- Direct-to-substrate digital and screen printing
- Exhibition stands and shop fitting
- Wall cladding and partitions
- Interior design
- Building and renovation industry

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3 TRANSPORT / STORAGE / HANDLING

3.1 Transport

- The forks on the forklift must be adjusted to a suitable width for pallet transportation to ensure sheets are not distorted (risk of permanent damage to the sheets).
- The tensioning straps used to secure the load onto vehicles must always have edge protectors underneath them, be taken over the pallet runners and must not be over-tightened (risk of permanent damage to the sheets).
- Hold cut-to-size sheets only at the edges and use two people to handle large sheets in order to avoid pressure marks on the surface (even when protective film is in place) and also to reduce the risk of static charge.
- Lift thin, printed sheets carefully and do not lift them by just one corner (risk of breakage)
- SINTREX® sheets should never be placed on dirty surfaces to reduce attraction of dust particles due to static.

3.2 Storage

- All SINTREX® sheets must be stored horizontally, tension-free (i.e. remove packing straps from pallet) in a dry place at a temperature of approximately 20 °C.
- Pallets with material packed on them and individual sheets must never be stored outdoors (risk of distortion due to solar heat build-up and changes of surface conditions due to humidity).
- Avoid changes in ambient temperature and humidity.

3.3 Handling of SINTREX® sheets

- Store sheets in the print room for 24 hours prior to printing to acclimatise them.
- Consider the printing technology when handling the sheets: Wear clean gloves, change them frequently and touch the surfaces as little as possible, even when the protective film is still in place. Implement the most modern measures to avoid and dissipate electrostatic charges.
- Avoid carrying large plates with only one person, as the plates could break.

4 PRODUCT CHARACTERISTICS

4.1 Temperature-dependent dimensional changes (thermal expansion, dilatation)

SINTREX® sheets expand in size (length and width) if they are exposed to heat (usually solar heat) and contract in very low temperatures (e.g. after lengthy transportation at sub-zero temperatures). This dimensional change is known as dilatation.

When installing components outdoors or in display cases which are exposed to sunlight, it is essential to make allowances for the dimensional change due to an increase in temperature. The coefficient of linear expansion indicates how much a one-metre long sheet expands when the temperature increases by one Kelvin (1 K is equivalent to 1 °C). For everyday use, a coefficient of linear expansion of 0.07 mm/m*K has proven to be a reliable value for SINTREX® sheets.

In Central Europe a maximum temperature difference of 60 °C (-20 °C in winter and 40 °C in summer) is to be expected. Dark colours will heat up much more in the sun (up to 60 °C) than white or pale colours. Sheets that are installed in non-ventilated spaces (e.g. shop windows) or display cabinets can heat up to a temperature of 80 °C which inevitably results in their distortion. If, for example, a 2 m long SINTREX® sheet is installed on a spring day at a temperature of 20 °C, it will have a core temperature of at least 50 °C in midsummer. This temperature difference of 30 °C will cause the sheet to extend by: 0.07 [mm/m*K] x 2 [m] x 30 [°C] = approx. 4 mm. Allowance must be made for this calculated dimensional change (expansion) when mounting SINTREX® sheets; otherwise the component will be subject to buckling, distortion and detrimental tensions. Please note that this expansion affects not only the length but also the width of a sheet.

Allowance for temperature changes as well as wind loads (pressure and suction) must be made when designing the fixings.

4.2 Directional dependence of properties (anisotropy)

Due to the extrusion manufacturing process, all SINTREX® sheets are anisotropic. Anisotropy in extruded products means that their characteristics (i.e., bending stiffness) and visual impression in particular lighting conditions are dependent on the direction of manufacture.

The arrows printed on the protection film covering the original sheet indicate the direction of manufacture. To ensure cut-to-size formats have the same level of rigidity and the same appearance, they must be cut from original sheets in the same direction (arrows on the film pointing in the same direction).

On the other hand, bending edges and deep grooves should, wherever possible, run at right angles to the direction of manufacture in order to reduce the risk of breakage.

4.3 Electrostatic charges

SINTREX® sheets are electrically highly insulating. This prevents the material from dissipating any electrostatic charges generated during use (transport, storage, handling, processing). Therefore, measures must be taken to neutralise electrostatic charges in places where they cause adverse effects (e.g. where the sheets are printed).

Electrostatic charges can be created by friction (sheets rubbing against each other in the stack), separation (lifting the sheets off from the stack, removal of the protection film) or induction (movement of the printer head) and even by a change in temperature.

Instructions for preventing and neutralising electrostatic charges:

- Regular checking and regulation of humidity to at least 45 % is particularly critical during cold weather.
- Avoid leaving print room doors open. If necessary, construct an enclosed area for the printing machines in order to create a controlled climate.
- Store sheets in the print room for 24 hours prior to printing to acclimatise them and avoid printing cold sheets.
- Pull off protection film slowly and evenly and blow ionised air onto sheets or cut-out shapes as a last measure immediately before printing.

4.4 Chemical resistance

Before using SINTREX® sheets, it is essential that the user obtains detailed information with regard to their resistance to liquid substances in particular. The chemical resistance is generally dependent on the exposure time, the application temperature, the prevailing pressure, the purity and concentration of the medium, the mechanical load and other influences.

SINTREX® sheets are resistant to many chemicals, for example, weak acids, diluted alkaline solutions, oils, fats, aliphatic and aromatic hydrocarbons.

However, SINTREX® sheets are attacked by concentrated acids, concentrated alkaline solutions, and prolonged exposure to hot water.

More precise information on the resistance of SINTREX® sheets to numerous specific substances is available on request. Please contact our sales offices for the relevant data.

The damage caused by a substance may not be immediately apparent. It may only become obvious after several hours, days or even months, depending on circumstances.

4.5 Waste disposal

SINTREX® is a mono-material PET sheet, which is characterised by its good recyclability. PET is one of the most recycled plastics; it can be repeatedly recycled without altering its basic material properties.

Unfoiled waste from SINTREX® sheets can be used in structural foams for e.g. wind turbines or in yacht construction or in the packaging industry.

5 SURFACE FINISHING

SINTREX® sheets can be used as base material (substrate) for a wide variety of decorative techniques. It is recommended that decorative processes which involve applying heat unilaterally to the sheet (e.g. hot-embossing at around 120 °C) should be undertaken only by experienced fabricators as problems with warping may occur.

5.1 Direct digital printing (Direct-to-substrate printing)

SINTREX® sheets are most frequently printed using direct-to-substrate printing. The protective film, image composition, printing machine, machine operation and numerous environmental influences are decisive for a good print result.

Most flat-bed printers, either with traditional UV lamp curing or LED UV printers are suitable for printing on SINTREX® sheets. Even though it is not possible to guarantee the desired print result in advance because of the many influencing variables, results can still be optimised and many imperfections prevented if the following instructions are observed:

- The climate in the print room must be kept as stable as possible. A temperature of approximately 25 °C and relative humidity of between 45% and 60% are recommended. Ideally, the printing machines should even be located in an enclosed space where ambient conditions are easier to control. Particularly in winter, effective anti-static measures are not feasible when shop doors and windows are open. Whenever possible, the sheets to be printed should be acclimatised to the printing environment for at least 24 hours before they are printed. It is best to put them in place the day before.
- To prevent contaminating the surface of the SINTREX® sheets, clean gloves should be worn for handling. To exclude any possibility of visible pressure marks from hands and fingers after printing, the sheets should be handled by the edges only and even the surfaces of the sheets covered with protective film should be touched as little as possible.
- Ex-works, SINTREX® sheets are covered with protective film on top side. The direction of manufacture and the production data are indicated on the film. However, if this protection film is pulled off too quickly, the separation will create a high electrostatic charge. Electrostatic charge, however, does NOT constitute a fault in the product or manufacture but is due to the extremely low electrical conductivity of the material. Therefore, appropriate measures must be taken to neutralise the electrostatic charge on site during storage, immediately prior to and during printing. Built-in antistatic units on printing machines should be regularly inspected for effectiveness. In addition, blowing ionised air onto the sheets has proved to be a useful method. Caution: Please note that dust particles in the air do not disappear but are deposited somewhere!
- Highly adhesive soiling or contamination is almost impossible to remove without later leaving visible traces on the printed image. This is due to the characteristics of the surface being considerably modified by the cleaning process. If cleaning with a liquid is unavoidable, the correct method is to use isopropyl alcohol (IPA) and a lint-free disposable cloth. The sheet must then be left for fifteen minutes flash-off time between cleaning and printing. The cleaning agent must not be sprayed directly onto the sheet in order to prevent visible blotches on the printed image.
- Always use the media profile intended for the substrate so that the ink limit, linearization, ink application and correction, printing speed, vacuum and dryer performance are coordinated from the start. Rule of thumb: The higher the intensity of the light and the lower the drop spread (‘dot gain’), the more visible

any surface flaws become. Before starting large printing jobs, a trial print run cannot only confirm the suitability of the ink and the selected media profile, but also reveal in advance any deficiencies which only become visible once the sheet is printed.
- It should be noted that any distortion to SINTREX® sheets caused by excessive heat during printing and what is known as 'banding' are excluded from product liability. Similarly, poor ink adhesion and electrical charge with resulting poor print quality are not classed as a material fault.
- If printed SINTREX® sheets are to have a protective laminate applied later on, the ink must be left for 24 hours to dry and cure completely.

Advice for assessing defects:

Even if the whole process appears to have been carried out correctly, obvious defects can make the printed item unusable (unmarketable). The following rule of thumb provides initial guidance to narrowing down the cause of unknown defects:
- Defects that appear on the printed surface irregularly or at right angles to the direction of manufacture of the original sheet are usually caused by the printing process.
- Defects that appear on the printed surface which are regularly spaced or run in the direction of manufacture of the original sheet may be caused by the manufacturing process and should be assessed by technical specialists.

5.2 Screen printing

UV curing inks and, to a lesser extent, solvent-based inks are both well-suited to printing on SINTREX® sheets; thixotropic versions have a slight advantage over liquid varieties. In all cases, new or untried combinations of inks and substrates should be matched to the intended printing process and its expectations before they are approved for serial production.

A 150-31 mesh in combination with 23 grid points is certain to result in a good quality print, although the printed items' area of application (e.g. outdoors), abrasion-resistance or suitability for further processing should be taken into consideration.

The combination of very intensive UV or IR radiation in the drying tunnel (the drying temperature must not exceed 50 °C) can cause discolouration and, if left too long in the tunnel, may lead to warping of the sheets. Care should be taken not to over-cure as this may impair ink adhesion.

5.3 Spray painting | Lacquering

Many applications for SINTREX® sheets call for a precisely defined colour, for example a corporate colour. Besides film lamination, spray painting is particularly suitable for this kind of colouring. In addition, the effective UV stabilizers in topcoats improve weathering resistance and can impede UV damage, so that additional cost for such long-term protection in outdoor applications quickly pays off.

Notes on paints and lacquers

Various colour systems are used for spray painting SINTREX® sheets:
- For indoor use: Water-dilutable single-component systems
- For outdoor use: Two-component PUR paint systems

- Solvent-based spray paint (caution: risk of embrittlement!)
- Acrylate paints, acrylic PVC paints, acrylate PUR paints

Due to rapid technical progress, no specific products or manufacturers are recommended in this publication and only generic designations are given. Each supplier stocks different types of paints specifically formulated for different types of substrates. The responsibility lies with the fabricator for an acceptable outcome. For this reason, it is essential to seek advice from the paint manufacturer's application engineers before using a product for the first time.

Notes

- If necessary, degrease the surfaces. Use only isopropyl alcohol (IPA) for degreasing. Never use acetone, paint thinners or other cleaning agents that may have an adverse effect on the surface itself. Allow surfaces to dry before processing further.
- A primer coat is recommended for most applications and particularly for outdoor use.
- Do not exceed a drying temperature of 50 °C.

5.4 Embrittlement of sheets after printing or painting

SINTREX® sheets can break after painting or extensive printing even under moderate loads. In this case, a crack in the brittle paint or printing ink continues into the SINTREX® sheet until it breaks completely (crack propagation). This peculiarity of the material depends on the type of paint or printing ink together with a number of other variables (direction, orientation and speed of the bending load, temperature of the sheet, thickness and density of the sheet).

Users and in particular fabricators and printers of thin SINTREX® sheets are strongly advised to handle printed or spray painted sheets and cut-to-size formats with due care and attention, particularly if the material feels cool to the touch.

6 SHAPING AND MACHINING TECHNOLOGY

6.1 Safety first

In view of the high rotational speed of machining tools, it is essential that all machine-side safety devices are used and are in full working order.

Prescribed personal safety equipment (at least a pair of safety goggles) must be worn at all times during machining operations.

6.2 Milling and CNC processing

SINTREX® sheets are best processed using modern CNC portal milling machines. These should allow for a high tool speed of 50,000 rpm and a fast feed rate of 300 mm/sec. in order to achieve high-grade milled edges.

The single-edge end mills (ø 4 to 6 mm) proposed by machine manufacturers are particularly recommended as they permit the removal of fairly large quantities of chips without overheating.

6.3 Chip-free cutting

The vertical panel cutters available in many graphics businesses are a suitable tool for cutting SINTREX® sheets quickly and accurately. The main advantage of these machines is their chip-free cutting action on stationary sheets (no scratching).

When using guillotine shears, compressed and rounded edges on one side are unavoidable.

6.4 Sawing

SINTREX® sheets can be machined with jigsaws as well as with band and circular saws. A combination of a high cutting speed and a low feed rate has proved most effective. Suitable are machines without a liquid cooling system but fitted with particle and dust extractor units, as commonly used for cutting wood and plastics.

Notes

- Use only jig-saw blades specifically designed for cutting plastics.
- Band saw blades with slightly offset teeth, spaced at 2.5 mm produce a good quality cut but also require a rather low feed rate.
- Circular saw blades with alternating flat and trapezoidal teeth spaced at approximately 10 mm are best for cutting SINTREX® sheets. Clearance angles of 10° to 15° and rake angles of up to 10° are recommended. Cutting speed should be approximately 3000 m/min.

6.5 Punching | Die-cutting

Good results can be achieved by using die-cutting tools with cutting blades made of steel strips set into a board of 15 mm plywood and toothless, micro-polished cutting blades (1.05 x 23.8 mm), bevelled both sides. 10 mm thick foam inlays (hardness 35 shore A) are used as strippers for ejecting the cut part with the cutting blades lying about 1.2 mm beneath the surface of the ejector foam.

SINTREX® sheets should not be punched or die-cut at temperatures below 20 °C. In fact, warming the sheets to about 40 °C will considerably improve the quality of the edges and prevent them from cracking, particularly if cut in printed areas.

6.6 Water jet cutting | Laser cutting

SINTREX® sheets are less suitable for water jet cutting as the density of these sheets is too low and their cell structure is not appropriate. However, water jet cutting with pure water without abrasive and a low starting speed of around 0.5 m/min may produce satisfactory results.

Laser cutting of SINTREX® sheets is not recommended because edges will turn brownish due to the heat generated during laser cutting.

7 THREE-DIMENSIONAL FORMING

SINTREX® sheets are made of thermoplastic material. They can be softened by heating, then formed and will retain their new form after cooling. Depending on the width of the heating zone, large radii are possible as well as three-dimensional shapes, if the entire sheet is heated through completely.

7.1 Cold-bending

SINTREX® sheets of 5 mm thickness can be cold-bent within the intrinsic stretching capabilities of the material and by applying very large radii.

Notes

- The temperature of the sheet must not be below 20°C (warmer is better).
- The minimum bending radius (cold-bending radius) is approximately 100 times the thickness of the sheet (e.g. 500 mm for a 5 mm sheet).
- To make thick and stiff SINTREX® sheets flexible without applying heat, use a horizontal circular saw to cut about ten equally spaced parallel grooves, leaving 1 to 2 mm of material.

7.2 Thermoforming, Hot-folding and bending

SINTREX® sheets can thermoformed by vacuum or mechanical pressure (drape forming) and the surfaces can even be embossed. It should, however, be borne in mind that the air entrapped in the cells limits the shaping, stretching and reproduction of detail. SINTREX® sheets are particularly suitable for large items with

SINTREX® sheets do not need to be pre-dried. It is important that the sheets are thoroughly and evenly heated. Machines with separately adjustable upper and lower heating elements and a pre-blowing device are the most suitable.

In order to avoid overstretching and stressing the cell structure, the minimum bending radius should be about twice the thickness of the sheet.

Do not place freshly moulded parts on cold surfaces (metal table tops) and trim shortly after removing them from the mould (risk of distortion).

When bending SINTREX® sheets which are 10 mm, the excess material at the inside of the bend must be removed by making a V-groove. Following this, the outside surface of the bend can be carefully warmed, the leg on one side of the groove folded upwards and the resulting seam bonded. Make the V-groove 1° larger than the required bending angle (e.g. 91° for a 90° angle) so that a slight overbend and thus a dimensionally accurate 90 degree angle can be achieved. A residual thickness of 1 to 2 mm should be retained at the base of the V-groove.

To avoid distortion when dealing with short leg lengths, increase the material length of the leg until the bending process is complete and then trim to size.

8 JOINING AND FIXING

8.1 Gluing

SINTREX® sheets can be glued not only to each other but also to other materials. Due to the variety of adhesives, all with different characteristics, only prior expert advice from the adhesives manufacturer guarantees an optimal choice of adhesive for the particular application in question.

The adhesive manufacturers' processing guidelines must be followed with precision and cleanliness at the workplace is essential. For a perfect bond, the surfaces to be joined must be clean, dry and free of dust and grease.

One- or two-component adhesives based on cyanoacrylate are a good choice for bonding SINTREX® when uniform stress distribution and high tensile and/or shear strength are required.

Acrylic adhesive transfer tapes can also be used in case high bond strength are required to completely other surfaces, i.e., low surface energy plastics, powder coatings, or lightly oiled surfaces typical for machine parts. The optimum type of adhesive tape must, however, be suited to the materials to be joined and the potential loads. The adhesive manufacturers' application engineers provide further assistance on this subject.

Please ensure that either the adhesive retains its elasticity or that full-surface bonding is undertaken when bonding SINTREX® sheets with low rigidity to mechanically more stable metal or mineral materials. This is the only way to deal with the different rates of dilatation in the materials.

8.2 Drilling

SINTREX® sheets can be drilled without any problem using normal twist drills. Particularly good results are achieved if the point angle of the drill bit is approximately 100° and the helix angle is approximately 30°. Do not use liquid cooling but remove the twist drill frequently from deep holes to avoid overheating.

When mounting sheets, round mounting holes are drilled at the centre of the edges and oblong sliding holes milled to the left and right to allow for possible dilatation (dimensional change).

Approximately 20 mm of material should be left between the screw holes and the edge of the sheet.

The distance between centres of mounting holes should be 500 mm in maximum.

8.3 Screwing and stapling

The best method of attaching items to the surface of SINTREX® sheets is to use chipboard screws with a 3 to 4 mm diameter shaft.

Stainless steel facade screws with pre-assembled sealing washers are suitable for fixing outdoor signs to substructures made from wood or metal.

Drill the through holes about 5 to 6 mm wider than the diameter of the shaft and fasten the screws only until the rubber seal fits snugly onto the sheet, sealing the hole but not exerting any pressure on it.

8.4 Welding

The most appropriate process for welding SINTREX® sheets is hot air welding. Preparation of the welding joints and the welding temperature are of particular importance for this process. Other welding technologies (hot plate welding, ultrasonic and high-frequency welding) may be suitable for large volume production.

Notes

- Commercial welding rods can be used for hot air welding.
- Welding joints should, if possible, form an angle of 60°. Thick sheets must be milled on both sides and the components then also welded on both sides.
- The welding speed should not exceed approximately 30 cm/minute.

8.5 Mounting onto substructures

Connection profiles (extrusions) are available for mounting SINTREX® sheets to substructures made from wood or metal. These are based on the clamping principle and are frequently even fitted with sealing gasket strips.

The sheets are fixed through a round mounting hole and several oblong holes which act as sliding points to compensate dimensional changes. Always ensure that large formats are installed with allowance for dilatation.

Special fitting elements may be used for concealed fastening which are invisible from the front. For special constructions and thin sheets, some 10 mm thick off-cuts of SINTREX® glued to the reverse may serve as intermediate supports for the actual fastening elements.

9 CLEANING

In principle, the surfaces of SINTREX® sheets are ready for use. To ensure optimum adhesion of paints, adhesives and adhesive films, surfaces must be carefully cleaned to remove all dust, grease and finger marks before attempting any decorative process.

Notes

- Only isopropyl alcohol (IPA) may be used for cleaning the surface of the sheet. Methylated spirit should not be used due to adhesion impairing additives.
- Wipe with lint-free cloths and take a fresh cloth frequently.
- Stubborn dirt (e.g. felt pen marks) can be removed using scouring pads. A slight loss in gloss on the surface is to be expected.

9.1 Hazards associated with cleaning

Most substances used for cleaning are harmful! Contact with the skin and the eyes as well as accidental ingestion can lead to health problems. Many cleaning agents are also flammable and may only be used in well-ventilated spaces and far from heat or sources of ignition.

All liquid cleaning agents except IPA must be tested for suitability before use. Often they either leave residue (including methylated spirit), make the surface matt (especially acetone) or cause brittleness in the material (many solvents contain a high proportion of aromatic constituents).

Caution: Grinding and sanding cause irreversible changes to the surface.

Wiping or cleaning with liquid antistatic agents prevents the creation of new static charge and the attraction of dust particles for a certain time. These products leave behind a 'protective coat' which has an adverse effect on the adhesion of paints and adhesives. Liquid antistatic agents should not be used until all other stages of processing have been completed.

10 PRODUCT SAFETY AND COMPLIANCE

10.1 SINTREX® product safety

Within the scope of the intended use, SINTREX® rigid foam sheets do not present a hazard to people or the environment.

Please note that people susceptible to respiratory problems may experience respiratory irritation if particles or fumes are inhaled or dust swallowed during handling and processing or when working in confined spaces without adequate ventilation.

A safe use instruction sheet describing SINTREX® sheets with regard to safety requirements is available from our sales offices.

10.2 REACH regulation / RoHS directive

SINTREX® sheets meet the requirements of the REACH regulation and do not contain any banned substances; none of the substances identified on the candidate list of "substances of very high concern" (SVHC) are present in a concentration above 0.1% w/w.

Furthermore, SINTREX® sheets do not contain HFC, halogenated foaming agents, and any of the restricted substances listed hereafter; none of the maximum concentration values tolerated are exceeded:

Lead (0,1 %)

Mercury (0,1 %)

Cadmium (0,01 %)

Hexavalent chromium (0,1 %)

Polybrominated biphenyls (PBB) (0,1 %)

Polybrominated diphenyl ethers (PBDE) (0,1 %)

Bis(2-ethylhexyl) phthalate (DEHP) (0,1 %)

Butyl benzyl phthalate (BBP) (0,1 %)

Dibutyl phthalate (DBP) (0,1 %)

Diisobutyl phthalate (DIBP) (0,1 %)

4,4’-isopropylidenediphenol (Bisphenol A)

4,4’-sulphonyldiphenol (Bisphenol S)

4,4’-dihydroxydiphenylmethane (Bisphenol F)

11 FURTHER INFORMATION

11.1 Responsibility of the user

The information in this publication is based our most recent data and is, in our opinion, reliable. However, no guarantee can be given as to the accuracy of the information neither for every application nor for the results arising from their use.

The user or fabricator remains at all times responsible for ensuring that the materials and processes are appropriate and economically viable for the type of application and its location and that they comply with the local laws and regulations.

Technical knowledge and skills as customary in trade and industry, a normally developed capacity to make judgements as well as knowledge and observance of the applicable regulations appertaining to work safety and hygiene are assumed.

In the interests of the relevance and impartiality of this publication, 3A Composites has made the decision not to recommend any particular ancillary products or materials or their manufacturers; instead all references are purely generic. This leaves the purchaser free to obtain products from a supplier he or she trusts.

11.2 Information and sources of ancillary products

Based on decades of experience, the application engineers at 3A Composites have compiled a collection of sources for the supply of machinery, tools and auxiliary products which have proved effective in processing and working with SINTREX® sheets. This information is constantly evolving and does not claim to be complete nor to guarantee technical or economic suitability for every individual field of application. For these reasons this compilation is distributed to customers only on request and without any legal liabilities.

Finally, it must also be mentioned that the ancillary products suggested in the above compilation are not being offered for sale by 3A Composites and that 3A Composites accepts no liability whatsoever for the quality of the products or services mentioned. In addition, their manufacturers and suppliers have no commercial relationship with and are not in any way dependent on 3A Composites.

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