

KÖMASTEEL®

Lining. Printing. Laminating.



Processing guidelines for Steel composite panels



KÖMMERLING®

BU Semi-Finished Products

Processing guidelines for Steel composite panels

| Contents | page |
|--|-------|
| Transportation, storage and handling | 3-4 |
| Machining and non-machining processing methods | 5-7 |
| Routing and folding technique | 8 |
| Fastening and joining technique | 9-17 |
| Surface treatment and imprinting | 18-19 |
| Cleaning and care | 20 |
| General..... | 21 |
| Technical data | 21-22 |

Transportation, storage and handling

KömaSteel is available in the colour white matt. The panels are delivered with a protective foil that prevents damages to the decorative surfaces during transportation, storage and handling. Nevertheless, the composite panels need to be handled with care. Please keep the following suggestions in mind.

- When transporting, loading and unloading, please handle the pallets and products carefully.
- Check the pallets and panels for transportation damage or any damage caused by dampness. Any claims should first be confirmed by the carrier in the letter of consignment before being declared.
- KömaSteel panels that have become wet must be dried before being stored. This prevents possible spotting or corrosion.
- Protect the pallets against rain, splash water and humidity during storage. Condensation should also be avoided. This can develop when cold panels are transported into warm environments, for example.
- KömaSteel panels should be stacked on the ground, with no more than six pallets of the same format on top of one another. Heavier pallets should be placed at the bottom.
- Individual panels must be picked up by two people on the long side – not pulled out. To pick up the panels, all four corners should be grasped.
- Wear gloves when handling the panels. This will prevent the formation of spots or discolouration.

With proper handling, the KömaSteel protective foil ensures that panels are not damaged during the overall progression from transportation to installation. For this reason, the protective foil should be treated with utmost care.

- KömaSteel panels should be stored **no longer than six months**, if possible.
- For longer storage periods: after the protective foil has been removed, the panels should first be wiped with a lint-free cloth that has been moistened with isopropyl alcohol.
- Avoid strong fluctuations in temperature.
- The protective foil is not UV resistant. Therefore, it should always be removed before external use of the panel.
- Make sure that the protective foil does not become partially detached. This could lead to the accumulation of dirt over the course of time.

Machining and non-machining processing methods

Sawing

Saw blade reference Leuco: 50805874

Diameter: 305 mm / thickness: 2.2 mm / drilling 30 mm / Z=80
N° of revolutions: 1,400 to 3,000 rev/min. or as low as possible.

The saw blade upstand should be of 15 to 20 mm or as small as possible. For risk of flying sparks, it is recommended to work without exhaustion. It is recommended not to use vertical saws.

Low immersion depth of the saw blade (less than 15 mm) and high number of revolutions cause higher wear & tear and increase the risk of flying sparks.

Routing

Cutter reference Leuco: 178327

Test was carried out with cutter diameter 10 mm, a diameter of at least 6 mm should be used.

N° of revolutions: 6,000 to 10,000 rev/min, feed: 3 to 5 m/min.

In order to keep cutter wear as low as possible, it is recommended to work with height oscillation. In case of a 4 mm diameter, feed has to be reduced. For risk of flying sparks, it is recommended to work without exhaustion.

The use of cutter plotting devices (e.g. Zünd) is not possible.

Drilling

You can drill KömaSteel panels with twist drills that are normally used for metallic materials (DIN 1412, twist drill) featuring a helix angle of approximately 30°. The point angle can be as high as 110°; the relief grinding angle should not fall below 12°–16°. The cutting speed and feed rate depend on the drilling depth.

For larger component thicknesses, these should be set lower. For boreholes above a diameter of 20 mm, use a two flute cutter with guide pins; for boreholes above a diameter of 40 mm, it's best to use a circle cutter (e.g. quick-helix drill).

For optimal boreholes, the following conditions should be maintained:

High-speed steel (HSS)

Tool geometry:

Point angle: 100°–140°

Drilling without burrs is possible using a spot facing cutter with centring tip.

Helix angle: 30°– 45°, e.g. Extreme 2TM HSS-G

Metal drill DIN 338 from De WALT in Idstein, Germany

Countersinking

Core drills and shell drills for steel should be used for opening pre-drilled boreholes. Countersunk boreholes are rounder than those produced with twist drills. Countersinks for steel are suitable for countersinking flat head screws in KömaSteel panels. In contrast, head and shank counter bores for aluminium are mainly used for countersinking screw heads or for drilling holes through the panel.

Contour cutting

For contour cutting, you can use jig saws, mechanical fret saws, copy milling and CNC machines.

Shearing

Plate shears are highly suitable for cutting KömaSteel panels. Please note that shearing will cause a slight deflection of the cut edge on the impact side. Protection pads attached to the holding-down device of the plate shears should be used to avoid any surface damage.

Punching

You can process KömaSteel of all panel thicknesses with plate punching machines. For a clean cut, please use sharp tools and a minimal cutting clearance. Punching will also cause a slight deflection of the cut edge to occur on the impact side.

Bending

KömaSteel panels can be shaped into different forms using the conventional methods of metal and plastics processing. However, the multilayered structure of the material results in some special attributes that you must take into consideration.

To calculate the minimum bending radius:

$$r = 15 \times t \text{ (t = panel thickness)}$$

You are likely aware of the spring-back effect when bending sheet metal. This is slightly greater for KömaSteel composite panels. Carrying out a test is recommended for serial processing. Protect all visible areas from surface damages during processing; affixing standard plastic foils or inserting 1–2 mm thick polyethylene or plastic strips is recommended.

Bending with a roll bending machine

KömaSteel panels are usually processed on a sheet metal roll bending machine using three or four-roller machines. In this process, please make sure that the feed rollers do not exert too much pressure. Mechanical surface damages can also result from indentations caused by extraneous metal cuttings. Bending rollers which are also used for bending other metals into round forms must be thoroughly clean before processing KömaSteel. In general, we recommend using ground rollers to protect the surfaces.

Routing and folding technique

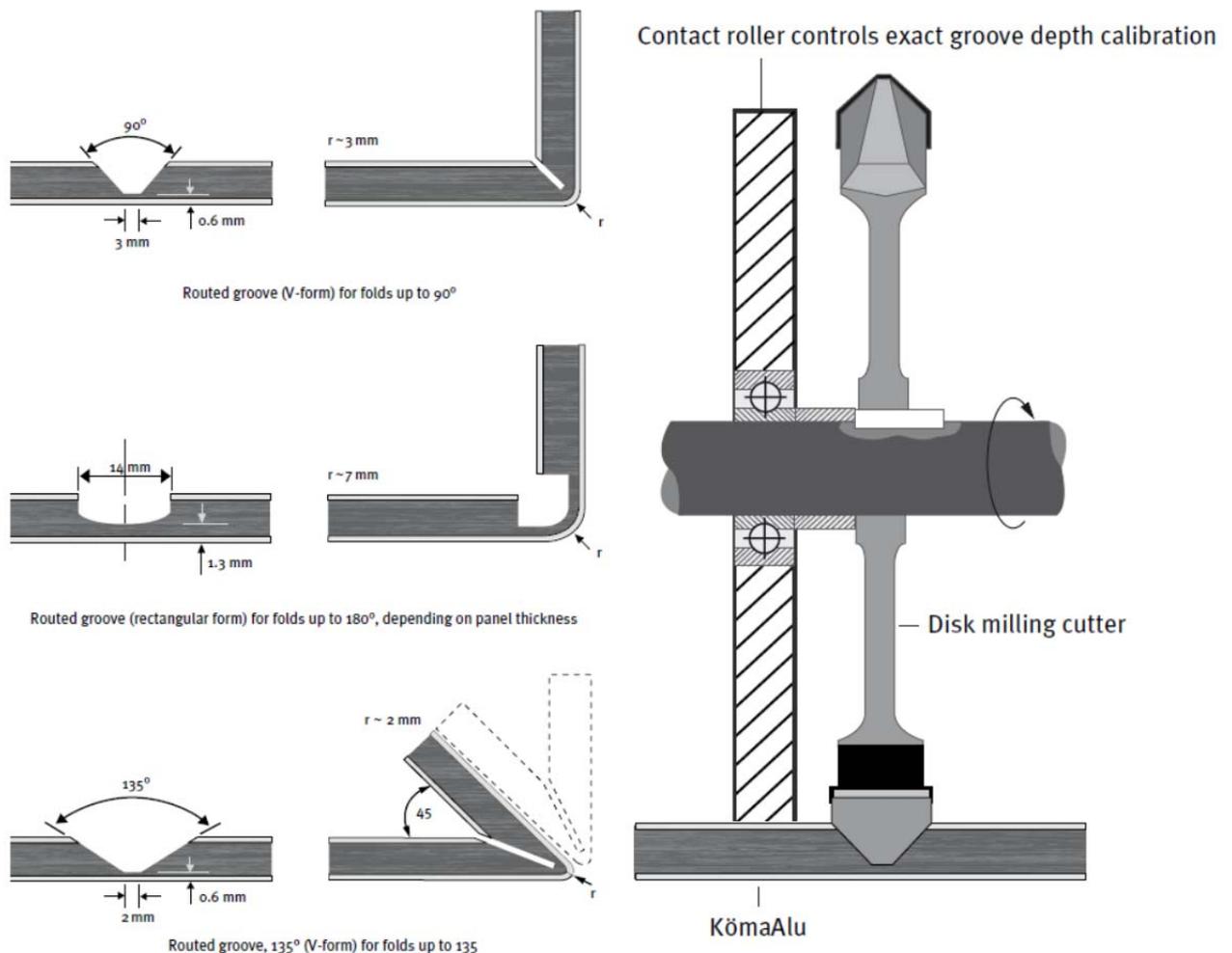
Cutter reference Leuco: 178332 VHW Shank-type cutter

Processed according to drawing AS-370256

N° of revolutions: 5,000 rev/min, feed: 1 m/min.

Necessity to rework the element is least when passing twice through the panel with the cutter.

For risk of flying sparks, it is recommended to work without exhaustion.



Fastening and joining techniques

KömaSteel panels can be joined together using standard processing techniques for metal and plastics. Aluminium, plastic or stainless steel construction components and joining elements may be selected. If the materials are intended for outdoor use, insulating interlayers or appropriate protective coatings should be applied to avoid corrosion.

When using KömaSteel panels outdoors, please allow sufficient expansion room for the panels. In so doing, you will avoid deformations caused by temperature impact. At a temperature difference of 100° C, the **linear thermal expansion amounts to 1.8 mm per meter of length or width**. The minimum gap thus depends on the expected expansion of the panel. Depending on the intended purpose, appropriate fastening constructions may be necessary.

Supplier / manufacturer:

Blind rivets

GESIPA Blindniettechnik GmbH
Nordendstrasse 13–39
64546 Morfelden-Walldorf
Germany
Phone: +49 (0)6105 9620
Fax: +49 (0)6105 962287
E-mail: info@gesipa.com
www.gesipa.com

Gebr. Titgemeyer GmbH & Co. KG
Hannoversche Strasse 97
49084 Osnabruck
Germany
Phone: +49 (0)541 58220
Fax: +49 (0)541 5822490
E-mail: info@titgemeyer.com
www.titgemeyer.com

VVG-Befestigungstechnik GmbH & Co.
Friedrich-Wohler-Strasse 44
24536 Neumunster
Germany
Phone: +49 (0)4321 967171
Fax: +49 (0)4321 967196
E-mail: info@vvg-befestigungstechnik.de
www.vvg-befestigungstechnik.de

Blind rivets, coated

MBE GmbH
Siemensstrasse 1
58706 Menden
Germany
Phone: +49 (0)2373 174300
Fax: +49 (0)2373 1743011
E-mail: info@mbe-gmbh.de
www.mbe-gmbh.com

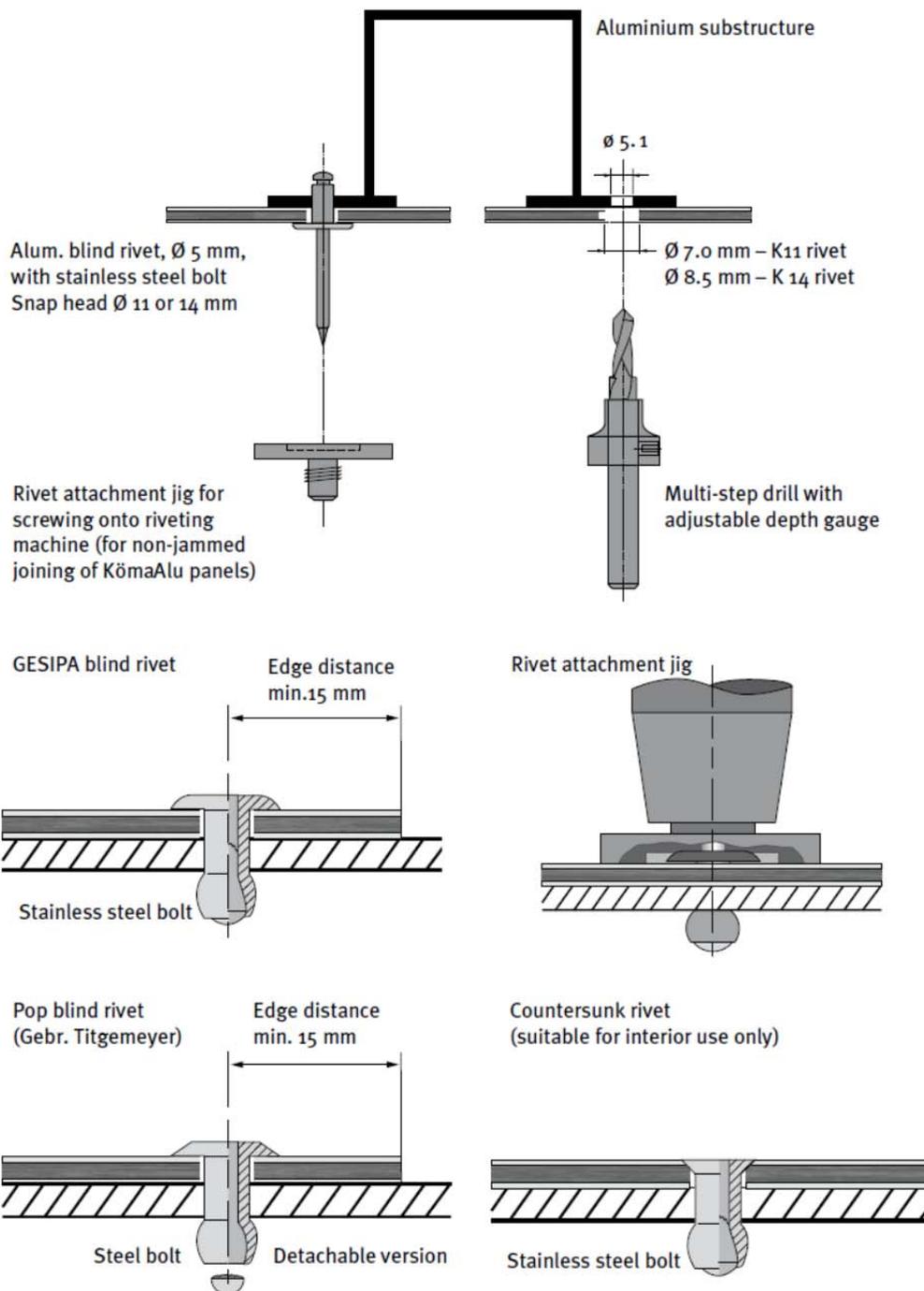
SFS intec GmbH
FasteningSystems
In den Schwarzwiesen 2
61440 Oberursel (Ts.)
Germany
Phone: +49 (0)6171 70020
Fax: +49 (0)6171 700232
E-mail: de.oberursel@sfsintec.biz
www.sfsintec.biz

Multi-step drills

KWO – Werkzeuge GmbH
Im Riegel 1
73450 Neresheim
Germany
Phone: +49 (0)7326 96420
Fax: +49 (0)7326 964210
E-mail: info@kwo.de
www.kwo.de

Riveting

You may use all standard rivet types for steel to join KömaSteel panels with one another or with other materials. In outside or humid locations, stainless steel blind rivets with stainless steel bolts are generally used to avoid rusty streaks. When using steel blind rivets with steel bolts, the bolt should disconnect after riveting (detachable version). Countersunk rivets are suitable for interior use only.



For outdoor use, please note:

- For outdoor use, only steel blind rivets with a 5 mm shaft diameter and snap head diameter of 11 or 14 mm should be used.
- Ensure leeway for the thermal expansion of the panel. To avoid jamming, the hole in the panel should be large enough to allow for the expected expansion.
- With the shaft of the rivet fitting closely to the edge of the hole, the snap head of the rivet must cover over 1 mm of the area surrounding the hole.
- Multi-step drills or drill sleeves with corresponding diameters can be used for centrally drilling holes into the panel and the substructure and for centrally setting the rivet.
- Rivet attachment jigs (rivet attachment gauges) are used for setting blind rivets without jamming – a tolerance of 0.3 mm should be allowed. Make sure to use rivets and rivet attachment jigs that have been produced by the same manufacturer, as the height of the snap head may vary in accordance with DIN 7337.
- The clamping thickness is calculated by using the thickness of the material to be riveted plus an additional value of 2 mm to ensure that the closing head is perfectly formed. In accordance with this clamping thickness, the corresponding shaft length can be determined using tables provided by the rivet manufacturers.
- During riveting, many factors may have an influence on the exact tolerance of the rivets (e.g. rivet head tolerance). Therefore, we recommend completing a riveting test on the panel. Always remove the protective foil in the riveting area prior to riveting.

Screws for outdoor use

Please take the panel's thermal expansion into account when using bolted connections in exterior areas. To avoid jamming, the hole tolerance in the panel should correspond to the size of the expected expansion. To ensure that bolted connections do not jam, it is best to use stainless steel facade screws with sealing washers. Naturally, the screws must also be suitable for the intended substructure. Please follow the manufacturer's specifications here. Use a torque wrench or power screwdriver to attach the screws in such a way that the washer mounted on the plate seals the borehole without exerting any pressure on the plate. Multi-step drills or drill sleeves with corresponding diameters can be used for centrally drilling holes into the panel and the substructure and for centrally setting the rivet.

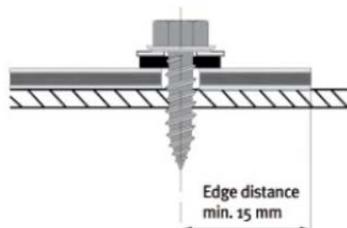
Please be sure to remove the protective foil in the screw area prior to screwing.

Screws for indoor use

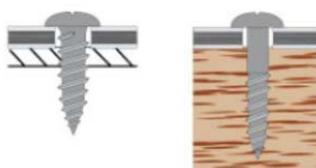
Sheet metal screws as well as wood screws with various head forms are suitable for indoor use. Expansion of the panel is normally negligent, so a tolerance does not need to be factored in. Countersunk screws can be embedded using the conventional countersinking method or by depressing the surface of the panel. When depressing the aluminium surface, the hole diameter in the panel must be larger than the screw diameter.

Screws for interior use – not suitable for exterior use!

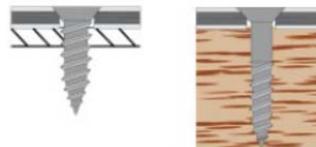
Facade screw,
thread furrowing



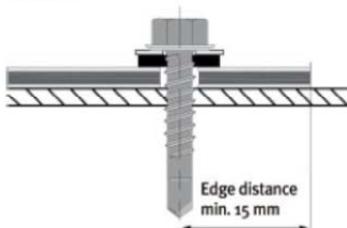
Sheet metal/wood screws with
cross recess



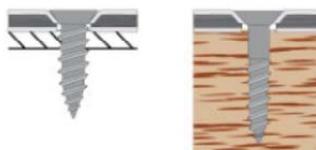
Borehole, countersunk



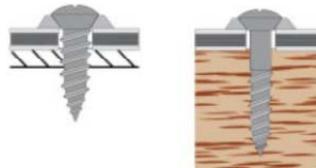
Facade screw,
self-drilling



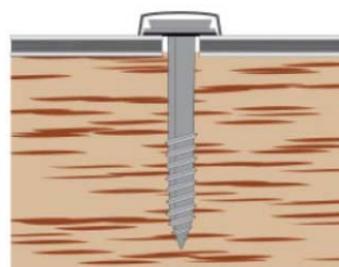
Countersunk head with cover plate,
depressed



Rounded head screw with tapered
washer



Wood screw with washer and plastic cap



Plastic caps for facade screws

KU-FA Kunststoff-Fabrikation- und Vertrieb GmbH
Obere Espen 2
57334 Bad Laasphe / Germany
Phone: +49 (0)2754 37 450
Fax: +49 (0)2754 8119

Multi-step drills

KWO – Werkzeuge GmbH
Im Riegel 1
73450 Neresheim / Germany
Phone: +49 (0)7326 96420
Fax: +49 (0)7326 964210
E-mail: info@kwo.de
www.kwo.de

Facade screws

EJOT Baubefestigungen GmbH
In der Stockwiesen 35
57334 Bad Laasphe / Germany
Phone: +49 (0)2752 9080
Fax: +49 (0)2752 908731
E-mail: bau@ejot.de
www.ejot.de

Facade screws, coated

MBE GmbH
Siemensstrasse 1
58706 Menden / Germany
Phone: +49 (0)2373 174300
Fax: +49 (0)2373 1743011
E-mail: info@mbe-gmbh.de
www.mbe-gmbh.de

SFS intec GmbH
FasteningSystems
In den Schwarzwiesen 2
61440 Oberursel (Ts.) / Germany
Phone: +49 (0)6171 70020
Fax: +49 (0)6171 700232
E-mail: de.oberursel@sfsintec.biz
www.sfsintec.biz

Adhesive / velcro tapes

Double-sided adhesive tapes (e.g. 3M VHB heavy-duty joining systems) can be used for lower tensile and transversal strength requirements. Velcro tapes (e.g. available under the SCOTCHMATE™ brand name) are particularly suitable for detachable joints. Suitable joining tapes are also marketed under the Dual Lock™ brand.

Supplier / manufacturer:

3M Deutschland GmbH
Carl-Schurz-Strasse 1
41453 Neuss / Germany
Phone: +49 (0)2131 140
Fax: +49 (0)2131 142649
www.3m.com

Sealing adhesives

You can also produce high-strength, elastic bonds with specific single component sealing adhesives. These are used in outdoor areas, e.g. for fastening parts of minor static importance.

Supplier / manufacturer:

Sika Bond-T2 (polyurethane basis)
Sika Chemie GmbH
Stuttgarter Strasse 139
72574 Bad Urach / Germany
Phone: +49 (0)712 59400
Fax: +49 (0)712 5940321
www.sika.de

Metal adhesives/universal adhesives

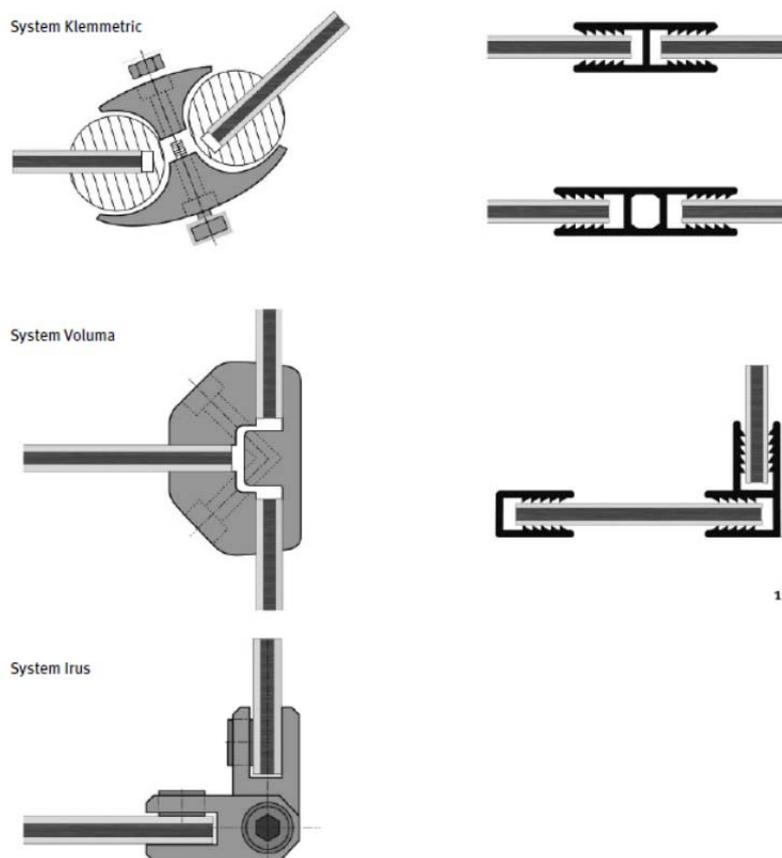
Depending on the application, commercially available metal or universal adhesives are suitable for indoor use, exhibition stand structures and machine construction.

Note on applying and processing bonding agents and adhesive tapes:

It is important to observe the manufacturer's guidelines. Bonding agents and sealing compounds do not adhere to the KömaSteel plastic core or the cut edges. If KömaSteel panels are fully glued to other materials on one side, the different expansion properties of the materials may result in deformation of the laminates.

Clamping

Clamp connections are mainly used for shopfitting and display construction. Steel or plastic clamps are particularly suitable for KömaSteel panels. Usually, they consist of two parts – with the clamping effect achieved by bolting. Aluminium profiles are particularly suitable as connectors or impact-resistant frames. Inevitable tolerances lead to different levels of holding force. However, you can obtain a uniform and solid profile fit by pressing the profile sides together before inserting the panels. Butt joint, corner and end profiles are available for panel thicknesses of 3, 4 and 6 mm (fig. 1). Request the stock list, as necessary.



Supplier / manufacturer:

System Klemmetric:

KlemProducts
Gesellschaft für Ausstellungstechnik mbH
Talangerstrasse 3 a
82152 Krailing / Munich - Germany
Phone: +49 (0)89 8577280
Fax: +49 (0)89 8561410
E-mail: info@klemproducts.com
www.klemproducts.com

System Voluma:

MERO – TSK International GmbH & Co. KG
Max-Mengeringhausen-Strasse 5
97084 Würzburg / Germany
Phone: +49 (0)931 66700
Fax: +49 (0)931 6670409
E-mail: info@mero-tsk.de
www.mero.de

System Irus:

Irus-System
Kirchstrasse 15
78176 Blumberg / Germany
Phone: +49 (0)7702 3685
Fax: +49 (0)7702 9045
www.irus-system.com

Surface treatment and imprinting

Varnishing enamelled KömaSteel surfaces in polyester lacquer quality

Enamelled KömaSteel surfaces are already pre-treated and primed in the factory. Continuous processes are subject to regular quality controls. This creates the optimal preconditions for varnishing.

We recommend the following work steps: first clean the panels with methylated alcohol. Then sand all surfaces – it is best to use abrasive paper for wet sanding with the grain size 360. Before varnishing, remove any abrasive dust with a non-lint cloth moistened in ethyl alcohol.

Please follow the manufacturer's specifications for building up the topcoat. In the case of accelerated drying, the KömaSteel panel should not be exposed to temperatures higher than the maximum permissible material temperature of 70 °C. Avoid deformations by professionally securing and/or storing the panels during the drying process.

On the exposed plastic core – e.g. on cut edges – varnish will only adhere in an inferior manner. Organic solvents can damage the panel bond if they come into contact with the cut edges for longer periods of time.

KömaSteel panels that are lacquered or varnished at a later stage have limited topcoat elasticity. Therefore, they should not be bent or folded, in order to avoid damages to the lacquer in the bending areas.

Silk-screen printing on KömaAlu surfaces in polyester lacquer quality

Enamelled KömaSteel panels are highly suitable for silkscreen printing procedures. Before printing, remove the protective foil and clean the surface with an ethyl or isopropyl alcohol-moistened, lint-free cloth. Please note that the alcohol may not be poured directly onto the panel. Do not use methylated alcohol, as this could dissolve the lacquer coat. Before beginning the printing process, wait 10 to 15 minutes after cleaning in order to ventilate the alcohol.

Practical experience shows that the stove enameling and printing ink may exhibit composition differences, even within a single grade. One should therefore test the adhesion before every application.

Laminating / photo mounting

You can laminate the entire surface of KömaSteel panels with cast or calendered self adhesive foils – using either manual or machine-based processes. The foil can also be exchanged later – the lacquer coating will not be stripped.

KömaSteel is also highly suitable as a base for photo mounting. It enables adhesive film or dispersion glue to be mounted without any problems. Before adhering the foil or photo, make sure the panels are clean and free from dust and grease.

Cleaning and care

Cleaning and maintaining enamelled surfaces

To ensure that the decorative surfaces of KömaSteel panels last for many years, they should be cleaned regularly and professionally. Dirt and aggressive deposits are removed, allowing surfaces to be returned to their original aesthetic finish.

Cleaning intervals depend on the local environmental conditions and the degree of soiling. Cleaning can either be conducted manually or with suitable cleaning equipment. Do not use abrasive cleaning pads for lacquered surfaces. In this context, we recommend that you complete a preliminary cleaning test beforehand on an inconspicuous part.

Another important tip: do not clean sun-heated surfaces (> 40 °C). Due to quick drying, there is a greater risk of blemishes or streaks forming.

Cleaning agents

Information about neutral cleaning agents for organically coated or anodically oxidized aluminium components can be obtained from the Gesamtverband der Aluminiumindustrie (GDA – German Aluminium Industry Association).

GDA – Gesamtverband der
Aluminiumindustrie e. V.
Am Bonnhof 5
40474 Düsseldorf / Germany
Phone: +49 (0)211 47960
Fax: +49 (0)211 4796408
E-mail: information@aluinfo.de
www.aluinfo.de

Published data sheets “Surface 02, 03, 012, 015”

It is important to follow the manufacturer’s cleaning and safety regulations.

Unsuitable cleaning agents

Never use strongly alkaline cleaning agents such as potassium hydroxide, sodium carbonate or sodium hydroxide – nor should strongly acidic products or abrasive household scrubbing and cleaning agents be used, which can dissolve the lacquer film.

General

Protect bare edges against corrosion.

Technical data

| Specification | Norm | Unit | Value |
|------------------------|------|-------------------|-------|
| Steel Cover Layer | | mm | 0,30 |
| Weight, thickness 2 mm | | kg/m ² | 6,3 |
| Weight, thickness 3 mm | | kg/m ² | 6,6 |
| Weight tolerance | | g/m ² | ±200 |

Technological values

| | |
|-------------------------------|-----------------------------|
| Alloy / cover plate condition | unalloyed steel, galvanized |
|-------------------------------|-----------------------------|

Core

| | | |
|---------------------|-------------------|--------------------------------|
| Material Density | g/cm ³ | PE-LD Recycling 0,95 – 0,96 |
|---------------------|-------------------|--------------------------------|

Surface

| | | |
|--|----------|-----------------------------------|
| Lacquering | | Modified polyester lacquer system |
| Hardness (pencil hardness) | | H |
| Gloss level matt panel side (Measuring angle 60°) | ISO 2813 | 20 to 40 (±10) |
| Coat thickness polyester lacquer | | µm 20(±2) |
| Material topcoat and backcoat | | Polyester |

Technical data

| Specification | Norm | Unit | Value |
|-------------------------|----------------------|------|-------|
| Tolerance levels | | | |
| Length tolerance | DIN 16927/ISO11833-1 | mm | -0/+2 |
| Width tolerance | DIN 16927/ISO11833-1 | mm | -0/+2 |
| Thickness tolerance | DIN 16927/ISO11833-1 | mm | ±0,15 |
| Diagonal tolerance | DIN 16927/ISO11833-1 | mm | 3 |

Mechanical properties

| | | | |
|----------------------------------|--|----------------------|--|
| Flexural rigidity E*I | | kNcm ² /m | 2700 |
| Modulus of elasticity in flexure | | Mpa | 25000 |
| Thermal transmittance (U) | | W/m ² K | 5,61 |
| Temperature resistance | | | -50°C to +85°C |
| Coefficient of linear expansion | | mm/m | 1,8 at 100°C temperature difference |

Note:

All other specifications are valid for every thickness. You may obtain a warranty certificate from your contact partner in the Pirmasens facility.