



INSTRUCTION FOR USE

**ATTENTION NOT VALID FOR VARICOR® 3 MM
PLEASE ASK FOR SEPARATE DOCUMENTATION**

VARICOR®

Contents	Page
1. Properties - Advantages	2
2. Workshop - Storage - Transport	3
3. Sawing	4
4. Milling - Sanding - Finishing - Drilling	5-6
5. Bonding: Varicor® to Varicor® - Colorline - Repair	7
6. Bonding: Varicor® to Other Materials	8
7. Bending	9
8. Edges - Profiles - Wall Connections - Wall Coverings	10
9. How to Install Shaped Parts and Sinks	11
10. Cutouts - Substructure - Equipment Installation	12
11. Details Connections of Worktops / Corner Solutions	13
12. Installing Working Tops	13
13. Cleaning - Care (see www.varicor.com / heading "Planning and Working")	
14. Service	14

1. PROPERTIES - ADVANTAGES

The processing instructions contained in this leaflet are based on a rich background of experience. We are grateful to all those who contributed, and we hope you will succeed in exploiting fully the innumerable possibilities offered by Varicor®.

Varicor® is a solid mineral-based massive material bound to polymer. It offers unique properties:

- It is a homogeneous, compact, dense material workable in three dimensions.
- Its nearly seamless bonding makes for sophisticated aesthetic and creative designs.
- It is the ideal material for customised interior furnishings.
- It remains valuable for a long time.
- It is pleasant to the touch.
- It is hygienic.
- It is safe for use with any kind of food and will not affect flavours.
- It is resistant to water, will not swell or corrode.
- It is insensitive to steam and cooking fumes.
- It is resistant to the alkaline and acid compounds commonly used in households.
- It is largely resistant to chemicals.
- Its impact resistance has been tested by dropping a steel sphere of 450 g under gravity from at least 1 m onto a layer of material of 12 mm thickness.
- It is heat resistant and will withstand even temperatures above 200° C for short periods of time.
- It is hardly inflammable, as defined in conditions B1.
- It can be combined with other materials, such as ceramics, stone, wood, metal, etc.
- Processing it constitutes no health hazard.
- Processing it and the disposal of its residues are without causing environmental pollution.
- It is easy to clean and requires little maintenance.
- Repairs are easy with repair material in matching shades of colour.

You will find Varicor® in rooms used for representative purposes as well as in business environments, in hotels and restaurants, in households, hallways, kitchens and bathrooms.

Varicor®, an accomplished synthesis of material, design, and function.

The information in this brochure is based on our current knowledge and experience. This does not excuse the processor from carrying out his own tests and trials because of the wealth of possible influences when processing and using our products. No legally binding assurance of certain properties or suitability for a particular application may be derived from our information. Any applicable intellectual property rights or existing laws and provisions must be observed by the recipients of our products on their own responsibility.

2. WORKSHOP – STORAGE - TRANSPORT

Hardly any extra workshop installations are needed to process Varicor®. This makes this material so attractive and profitable in use to experienced processors.

2.1 WORKSHOP

- For bonding, both the room and the material should be at a temperature of at least 18 - 20° C.
- The working environment must be kept clean.
- Good lighting is important
- Panel saw
- Spindle moulder
- Handheld circular saw with dust extraction and guide rail ******(1)
- Good handheld router for profiling, 1800 W ******(2) for shank diameters of up to 12 mm., n = 18,000 rpm
- Hard-tipped tools
- Belt sander, also for edge sanding
- Portable sanders with dust extraction ******(3)
- Dust mask provides effective protection from dust
- Heating unit allowing the thermoforming ******(4)

2.2 STORAGE

Varicor® panels are covered with a protective film on the front side.

- Check surfaces on receipt or before processing to confirm the absence of defects (damages, stains, non-matching colour shades of parts to be joined).
- Store panels flat in a horizontal position (Fig. 1).
- Sections can also be stored in a vertical position, provided they are supported on the whole surface, to save space and improve accessibility.
- Store shaped parts so that flats are in a horizontal position.

- Keep Varicor® adhesive set cool. At temperatures below 20° C the hardener and the adhesive have a shelf life of 3 months from the packaging date, at temperatures between 0 and 6° C (refrigerator), the shelf life is extended to six months. Storage at -15° C extends the shelf life to one year. When thawing the adhesive after cold storage, avoid the formation of condensation water; only remove lid after the adhesive match the temperature of use.

- Waste disposal: Cured material is harmless. The waste code No. of the material is 170203 (German Waste Disposal Ordinance).

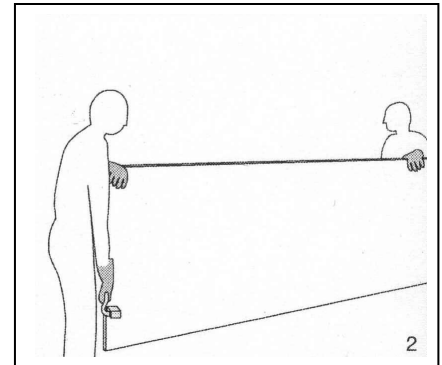
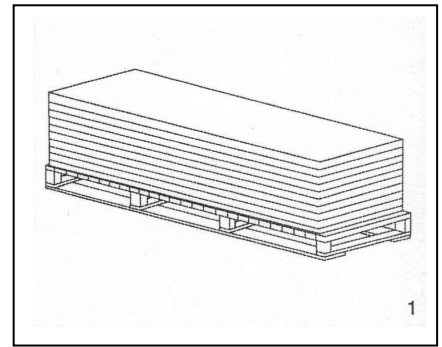
2.3 TRANSPORT

Varicor® has a density of 1.75, i. e. it is a heavy material.

Here are some figures for comparison:

1 m ² of 12 mm Varicor®	21 kg
1 m ² of 12 mm granite	36 kg
1 m ² of 12 mm chipboard	8 kg

- Gloves protect you from injuries caused by edges of cut.
- Transport is easier if you use handheld suction cups ******(5) or lever handles.
- Always transport sheets edgewise (Fig. 2).



2.4 DIMENSIONAL TOLERANCES

The dimensional tolerances listed below are observed in panels delivered:

Length	2504 / 3758	± 10 mm
Width	640 / 800 / 1000	± 4 mm
Thickness	8 / 12 / 19	± 0.4 mm

**** Selected Suppliers**

- (1) Festool, D-Wendlingen: ATF 55 E + FS
- (2) Festool, D-Wendlingen: OF 2000 E
- (3) Festool, D-Wendlingen: Excentric router Rotex
- (4) Elkom, D-Bad Oeynhausen
- (5) J. Bohle, D-Haan: Veribor

3. SAWING

Varicor® is a hard material resistant to water and to mechanical impact. Even when hit by an iron sphere of 450 g falling under gravity from 1 m height, the material (12 mm thick) will not break. Nevertheless, Varicor® has good sawing, milling, drilling and sanding properties.

3.1 SAWING (Fig. 3 - 5)

- Check the match of colour shades before cutting Varicor® parts which must be joined. We monitor colour shades by colourimetry.
- Compare production code numbers (red labels) or colour code numbers (yellow labels) to ensure that there will be no mismatch in colour shades.

Example: Colour code numbers (yellow labels):

75. 58. 43
75. 59. 42

Difference: 0 + 1 + 1 = 2 points.
The panels may be bonded together (see also chart below)

Apply water to Varicor® panels and compare; if necessary, produce test bond, sand plane, apply water, and compare.

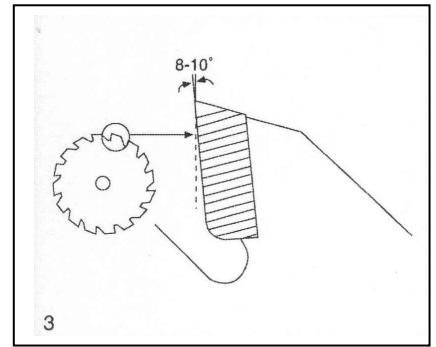
For later inquiries, enclose a piece of approx. 8 cm x 8 cm of the delivery to be matched. Register the production code and colour code with your manufacturing data.

Varicor® is sawed like laminate.

Tools and machines used should have minimum axial and lateral runout.

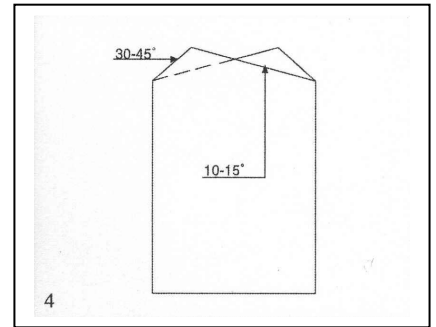
- Joiners' circular saws with sliding table or handheld circular saws should be used.
- **Do not use a jig saw which provokes breakouts at the cutting edges. Those can lead to tension cracks.**
- Use hard-tipped tools for long tool life (approx. 500 m at 12 mm panel thickness).

- Also diamond tipped tools can be used.
- The cutting speed is 40 - 60 m/s; tooth pitch 10 - 16 mm; undercut angle approx. 8 - 10° (Fig. 3).
- A tooth shape particularly suitable is the alternating bevel pattern (Fig. 4) ** (6), (7), (9) for separating panels without breaks and for making precision cuts, e. g. in preparing bond joints.



- Another tooth shape which may be used is the triple chip pattern (Fig. 5) ** (8).
- Holes for electric outlets can be cut out by means of conventional keyhole saws.

Milling and profiling Varicor® means working from the solid material, for Varicor® is homogeneous throughout.



* When using a circular saw with this diameter of the saw blade, a speed of 3000 - 4500 rpm is recommended.

saw blade Ø in mm	cutting width	bore hole in mm	number of teeth
200	2,8	30	64
250	3,2	30	80
300 *	3,3	30	96
350	3,6	30	108
400	4,4	30	120
450	4,4	30	144
500	4,4	30	160

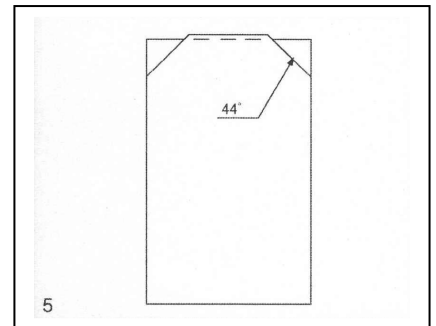


Table for checking the colour match of panels of the same colour

Joint	Production number (red label)	Colour code (yellow label)
plain-coloured panel with plain-coloured panel	Five last digits identical or colour code alternatively	Total difference = max. 3 max. 2 per line pair
granulated panel with granulated panel	Five last digits identical	Colour code does not exist for these finishes

Table for checking the colour match of panels of the same colour bonded to shaped parts. The shaped parts can be glued underneath the panel (UB), be a flush-mounted (EB) or surface-mounted (AL) version

Joint	Production number (red label)	Colour code (yellow label)
plain-coloured panel with plain-coloured shaped part (UB version)	N/A	Total difference = max. 7 max. 4 per line pair
plain-coloured panel with plain-coloured shaped part (AL version)	N/A	Total difference = max. 7 max. 4 per line pair
plain-coloured panel with plain-coloured shaped part (EB version, flush)	N/A	Total difference = max. 3 max. 2 per line pair
granulated panel with granulated shaped part	An identical appearance between the panels and shaped parts in a granulated finish (incl. tubes) cannot be guaranteed. Check components before starting work. A flush-mounted installation of EB-versions is not recommended due to visible differences in colour shades between panels and shaped parts.	

** Selected Suppliers

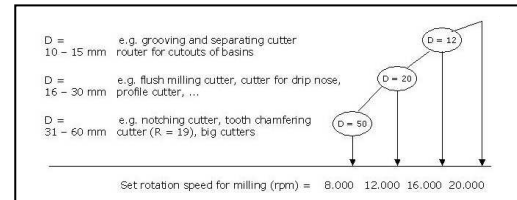
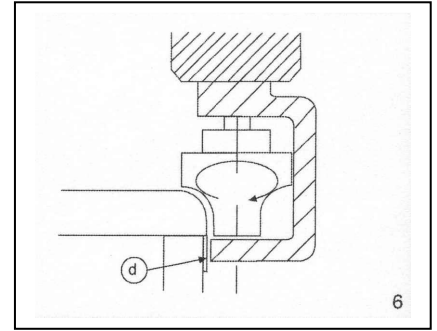
- (6) Agefa GmbH, D-Balingen, 300 x 30 Z 27
- (7) Leuco, D-Horb, 300 x 3,2 x 30 Z 96 for thickness up to 15 mm; 300 x 30 Z 72 for thickness more than 15 mm
- (8) Albin Kraus GmbH, A-Vienna
- (9) Leitz GmbH, D-Oberkochen

MILLING – SANDING – FINISHING - DRILLING

4.1 MILLING

- Spindle moulder, stationary router.
- **Particularly important** is a powerful handheld router (1600 W min.).
- Smooth and rounded edges and corners, e. g. in cutouts, diminish the hazard of notch-induced cracks.
- Hard-tipped woodworking tools ******(6), (7), (8), (9) lend themselves well to milling Varicor®, e.g. turn-plate cutters or permanently tipped tools.
- The right rpm is particularly important for the handling of Varicor® (see table beside).
- Heavy spindles and tool shanks supported in amply dimensioned bearings add to the cutting quality and reduce reworking expenses.
- Damage to stop faces is avoided by applying adhesive tape for protection (d) (Fig. 6), especially in case of stop rings of ball bearings (Fig. 7).

- For sizing, the sequence of coarseness is 60 - 80 - 120.
- Fine sanding should be done with sanding paper from P 150 or an even finer coarseness (see table).
- Varicor® sanding dust is finer and has a higher specific weight than wood dust, a fact to be taken into account in designing dust removal systems.
- Do not blow machines clean of dust, but only extract the dust, in order to avoid damage to bearings.
- Wear protective mask.
- Wet sanding is possible in order to avoid dust generation, for instance, when working in-house.
- Gloss can be enhanced further by polishing the surface ******(15).
- Very fine sanding and repeated thorough washing of surfaces with a cleansing milk will improve staining resistance.



4.2 SANDING – FINISHING

- Although Varicor® is hard, it is easy to sand.
- Standard belt sanders as well as portable sanders can be used ******(11), (12).
- Avoid overheating. Do not sand at excessive contact pressures.
- Preferably use silicon carbide as an abrasive ******(10), (16); also corundum abrasive papers and cloths will do. Particularly long service lives can be achieved with zirconium corundum.

- Prior to delivery, we recommend treating the surfaces of an installation finished in dark shades of colour with "Glanz S," a preparation for stainless steel ******(14).
- Sequence of sanding for bonded surfaces see table below. Delivered from factory with surface sanded P 400, i.e. when not further treating the surface (no bonding etc.), the sequence of sanding can respectively be shortened.

Surface finish	Festo	3 M	Jöst (16)
Silky-matt	Brilliant P 150 Brilliant P 180 Brilliant P 240 Brilliant P 320 Brilliant P 400	266 L, 100 micron 266 L, 80 micron 266 L, 60 micron 266 L, 30 micron	Superpad P 150 Superpad P 220 Superpad P 320 Superpad P 400
	Grinding mat Platinum S 800 Apply cleansing mild. Polish by using excentric and felt disk	Grinding mat Platinum S 800 Apply cleansing mild. Polish by using excentric and felt disk	Superpad SG 600 Superpad SG 800 Apply cleansing mild. Polish by using excentric and felt disk
High gloss	as for silky-matt up to P 400 Platinum pad S 600 Platinum pad S 800 Platinum pad S 1200	as for silky-matt up to 30 micron 15 micron 9 micron	as for silky-matt up to P 400 Superpad SG 1200 Superpad SG 1500 Superpad SG 2000 Superpad SG 2500
	Hard felt with polishing compound (10)	Hard felt with polishing compound (10)	Hard felt with polishing compound (10)

The best surface is the one, the end consumer can reproduce repeatedly. For surfaces subject to heavy use we recommend a silky-matt finish. Recommended the cleansing milk which you use yourself - this will enable your customer to replicate the surface finish which you have produced.

** Selected Suppliers

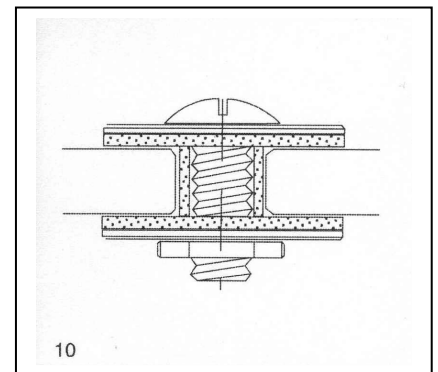
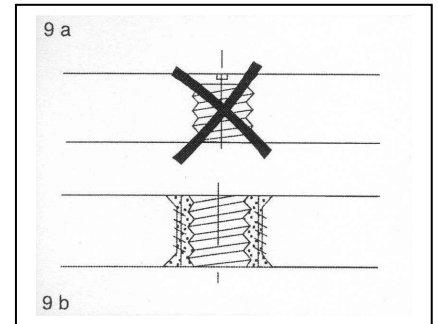
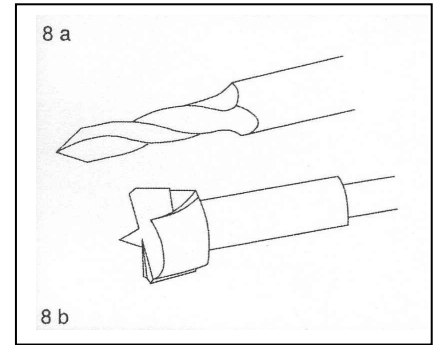
- (10) Festool or 3 M comp., grinding agents (see table above)
- (11) Festool, D-Wendlingen: Belt Sanding Machine
- (12) Festool, D-Wendlingen: Rotex
- (13) Festool, D-Wendlingen: S 800

- (14) HWR Chemie, D-Emmering (Tel.: +49 8141 / 5 10 30): Glanz S
- (15) 3 M Deutschland GmbH, D-Neuss: Polish Paste, type Finesse
- (16) Jöst GmbH, D-Waldmichelbach

4. MILLING – SANDING – FINISHING - DRILLING

4.3 DRILLING

- Use vertical box-column drill, hand-held drill or router.
- Through holes will show no breaks if made at low cutting pressures and with a wooden support at the back-side to avoid splintering.
- For drilling smaller diameters (up to 10 mm), use hard-tipped drill with roof shaped 60° tip ** (6), (7) (Fig. 8 a).
- For drilling larger diameters, use cylinder head drilling machine with two reamers and partly ground short side chamfers, hard-tipped ** (6), (7) (Fig. 8 b).
- Do not cut threads in Varicor®; avoid countersunk head screws (Fig. 9 a).
- Through bore-holes and bores designed to accept screw sockets to be bonded in place should be countersunk slightly and chamfered at the edges (Fig. 9 b).
- Screwing Varicor® panels together:
 - select bore distinctly larger than the screw shank, as in bolting glass parts;
 - install elastic sleeve;
 - use soft clamp (Fig. 10).
 - do not bore any spax screws directly in or through a Varicor® panel



5. BONDING: VARICOR® TO VARICOR® - COLORLINE - REPAIR

Varicor® adhesive, which is made to match the material in structure and colour, allows any kind of combination of pieces. The Varicor® parts are joined almost without gaps.

5.1 BONDING VARICOR® TO VARICOR®

- Bonding of 12 mm Varicor® to 3 mm Varicor® is not possible with Varicor® adhesive because of different expansion coefficients.
- Position bond lines in areas less under mechanical loads. They should not end in cutouts and should be beyond any edges.
- Use Varicor® special adhesive identical in colour.
 - Industrial adhesive: curing time 4 - 5 hours at 18° C minimum.
 - Fast setting adhesive: curing time 1,5 hours at 13° C minimum.
- Observe Varicor® bonding instructions which come with each set of adhesive.
- The finer the surface has been prepared for bonding, the less visible and the more stable the bonded joint will be. The width of the bonding joint should be 0,1 - 0,2 mm. Clearer bonding joints can be avoided by sanding the part to be glued with grain 120. For darker colours use grain 220.
- All parts, also the adhesive, must be at a temperature of at least 18° C. When thawing the adhesive and the hardener after cold storage, avoid the formation of condensation water, which would inhibit curing: Open lid only after the adhesive and the hardener are at the temperature of use.
- Below 18° C, industrial adhesive will dry, but not cure.
- The working environment must be clean and free from dust.
- Cleanse the areas to be bonded with a dry rag free from grease or with compressed air; do not touch afterwards.
- Tape off surface areas underneath the joint (Fig. 11).
- Fill the joint flush with adhesive (Fig. 12).
- Move parts together and fix them (Fig. 13). Leave enough time to let the adhesive cure; leave surplus adhesive in place until it has cured completely.
- Sand down excess adhesive.

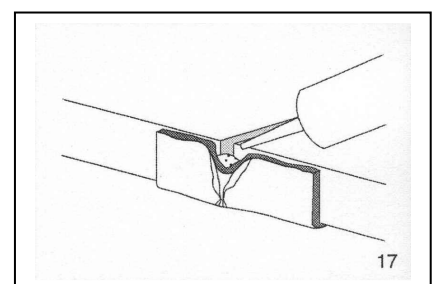
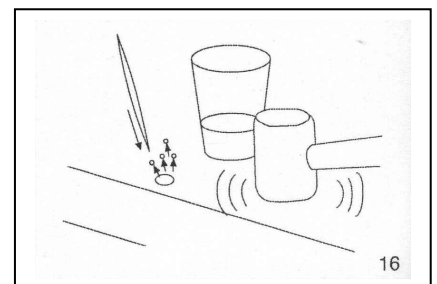
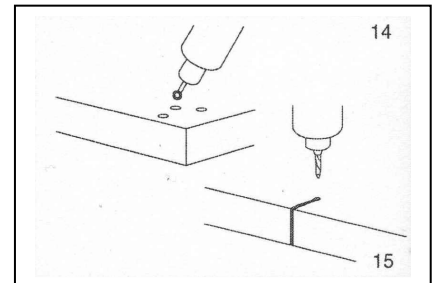
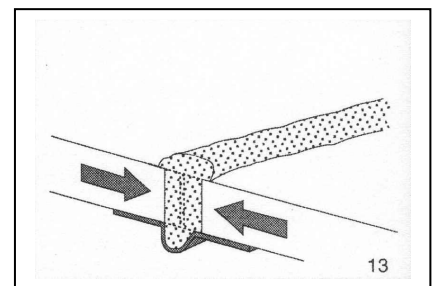
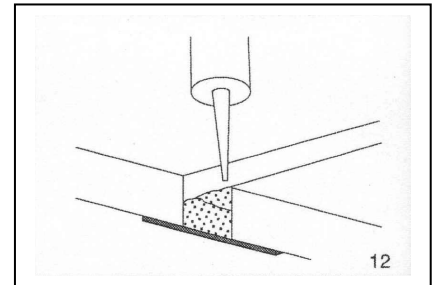
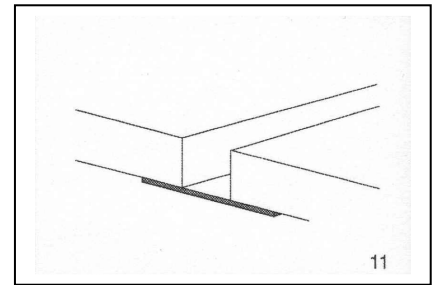
- Use fine abrasive paper and abrasive cloth for fine sanding and gloss matching.
- Support joints by an overlapping substructure to prevent buckling.
- An industry-size package of adhesive is good for two panels and one sink/bowl, approx. 10 - 15 running metres of joint at 12 mm panel thickness.

5.2 COLORLINE DECORATIVE INSERTS

- Colorline allows coloured, flush inserts to be placed in the shades of zinc yellow, flaming red, ultramarine, pure white, graphite black, and the mixed shades.

5.3 REPAIRS

- Repairs are meaningful only if the cause has been removed first.
- Ask for the Varicor® repair set. Order the repair set with detailed production no. or reference pattern. It comes complete with repair instructions. Example: damage, jaggings or cracking.
- Heat repair spot to at least 18° C.
- Bore defect to a lenticular shape and apply fine sanding (Fig. 14).
- Clean defective spot.
- Fill repair material without voids.
- Vent repair material by tapping and by opening air bubbles with a toothpick respectively (Fig. 16).
- After the repair material has cured, sand repair spot and match gloss.
- In case of cracks, look for the causes and remove them, if possible.
 - Find end of crack and stop with hole drilled by 5 mm drill (Fig. 15).
 - Expand crack with fine router to a groove of 5 mm, at least 10 mm in depth in a panel 12 mm thick.
 - If possible, line crack gap with adhesive.
 - Fill groove as specified in repair instructions.
 - Insert a threaded bar 5 mm thick crosswise for reinforcement at the beginning and the end of a crack.
- For treating stains and removing scratches, see Sec. 12.1 and 12.2.
- If repair spots are situated in vertical surfaces, fill repair compound into a kind of bag made of adhesive tape (Fig. 17).



6. BONDING: VARICOR® TO OTHER MATERIALS

Varicor® can be combined with many other materials, such as wood, ceramics, metal, etc.

Use veneer panels, not chipboard, for substructures.

6.1 CHANGES IN LENGTH

Materials change length as a result of changes in temperature, in humidity, or combined changes in temperature and humidity.

Table A on the opposite indicates the increase in length, in mm per m, under the influence of heat, with humidity remaining unchanged, under a temperature rise by 20° C (left column).

If the relative humidity of the air drops from 70 % to 50 %, i. e. by 20 %, the material shrinks in length in mm per m, while the temperature remains unchanged (column on the right).

- The changes in length were measured in the plane of the panel.
- Because of tensions occurring, these length changes must be taken into account when bond joining different materials.
- In structures with different supporting surfaces, any shear forces arising must be accommodated by the substructure.
Provide insulations and expansion joints as required by technical conditions.

6.2 BONDING INSTRUCTIONS

- Carefully observe instructions by the manufacturers of the adhesives used.
- As the Varicor® surface is very dense, it must be absolutely free from grease and dust before the adhesive is applied.
- Dispersion-type adhesives cannot be used.
- If very small parts are to be joined, the adhesive is not required to have elastic properties in the joint. For such applications, quick-curing reaction type adhesives may be used which cure without pressure ** (17), (18).

- To some extent, large surfaces may be bonded together by contact-type adhesives with elastic properties in the joint ** (19), (20). To produce bonds of high strength, venting times must be observed, and the parts to be bonded must be kept under a higher contact pressure. Depending on the type of adhesive used, thermal stabilities are around 70° C to 110° C.

- Oblong, narrow parts, such as veneer panel glued underneath Varicor® panels, are best processed with permanently elastic silicone and PUR sealants with adhesive properties ** (21), (22), (23). They cure under the influence of humidity extracted from the air and retain elastic properties in joints up to 1 - 2 mm thick. Apply adhesive in stripes or dots. With spacers, e. g. stripes of veneer of 1 to 2 mm thickness that are glued directly onto the substructure, there will remain a permanently elastic gluing joint.

- Small inserts of brass or aluminium can be glued into a groove so as to be flush with the surface by means of reactiontype adhesives ** (17), (18). Care must be taken high temperatures will dissolve the bond.

Table A

	Changes in temp.	Changes in humidity
	from 10° C to 30° C	from 70% to 75 % rel. h.
	mm	mm
	m · 20° C	m · 20 % rel. h.
Varicor®	1.0	0
Acrylic glass (clean)	1.4	2
Veneer panel	0.002	0.7
Brass	0.4	0
Aluminium	0.5	0
Glass	0.1	0
Tiles	0.2	0

** Selected Suppliers

(17) Loctite, D-Munich: type 422

(18) Henkel KGaA, D-Düsseldorf: Blitz matic superglue

(19) Henkel KGaA, D-Düsseldorf: Pattex 90° C

(20) Henkel KGaA, D-Düsseldorf: Pattex Spezial 110° C

(21) Henkel KGaA, D-Hanover: Sista F 109

(22) Sikaflex, D-Stuttgart: Sikaflex 252

(23) Kleiberit, D-Weingarten: Suprakraft PUR 566

7. BENDING

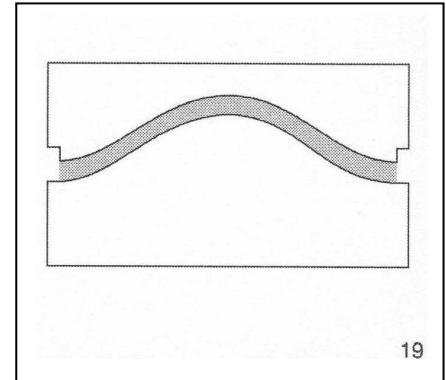
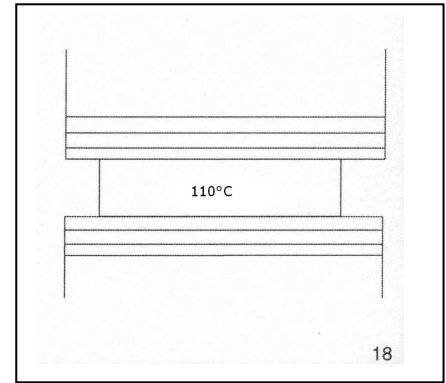
- Preheat heating plates to 110 ° C
**(24)
- Check, the stripes to be bended for breakouts or other damages and remove them if necessary.
- Heat Varicor® between flexible heating plates (Fig. 18).

Heating time:

8 mm panels, approx. 10 min.,
12 mm panels, approx. 14 min.

Please carefully observe the heating times: heating times that differ from the above mentioned (too short or too long) can lead to cracks or break of the material during the bending process.

- For deformation, place heated Varicor® strips into the bending form. Avoid a jerky buckling (Fig. 19).
- Leave Varicor® in the mould to cool; do not quench.
- The workpiece must be able to slide in the mould in accordance with its change in length. Do not clamp it.
- Bent parts spring back some 5 % after taking it out of the mould. Make bending mould narrower by this amount.



Limits to inner bending radius in hot bending at 110°C		
Thickness of sheets in mm	8 mm	12 mm
Heating time	10 minutes	14 minutes
Dekors:		
Bright plain + marbled colours	90 - 100 mm	160 - 180 mm
Dark plain colours	160 - 180 mm	250 - 280 mm
Bright fine granulated colours	125 - 150 mm	200 - 220 mm
Dark fine granulated colours	160 - 180 mm	300 - 320 mm
Bright coarse granulated colours	150 - 170 mm	250 - 280 mm
Dark coarse granulated colours	200 - 250 mm	400 - 450 mm

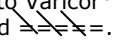

8. EDGES – PROFILES – WALL CONNECTIONS – WALL COVERINGS

Varicor® offers an unlimited variety of design possibilities, provided it is installed and processed properly.

8.1 PROTECTING EDGES / SURFACES

- Protection against scratches: Panel surfaces are delivered ex works ready for use with machine grinding of 400. They are covered with a protective film.
- To protect panels, air cushion foils should be used in further processing steps and for later packaging.
- Use screw clamps only with plastic caps or protective pads. Clamps with cork pads have been found to function satisfactorily ******(25).

8.2 DESIGNING EDGES (Fig. 20, 21)

- (a) When bonding Varicor® to Varicor®, the bond joint is marked .
- (b) When bonding Varicor® to strips of veneer panel or some other material by means of elastic adhesive, the bond joint is marked xxxx. ******(21), (23). For product information, see Sec. 6.2.
- (c) Elastic joint gaps between Varicor® and any other material must be closed over a width of 2 - 3 mm; these seals are marked  ******(21), (23).
- (d) Narrow edge bands, after having been glued in place, can be sanded flush in a single moulding step.
- (e) Preprofile preglued edge (splash edge) and glue in place; remould and sand afterwards, if necessary. Alternatively, the edge can be profiled by means of a router espec. designed for making flood rims ******(2), (8).
- (f) Full coverage in the handle area has been found to be effective, esp. in the field of kitchen counter tops.

For marbled colour shades and coarse granulated patterns, we recommend bonding a mitred joint between horizontal and vertical surfaces.

8.3 PROFILES, RECESSES

- Use rounded profiles (no sharp edges) at points subjected to mechanical loads to prevent notching and the risk of breaking, see also Sec. 10 (Fig. 22).
- Sand or chamfer all Varicor® edges, also those installed in invisible places.
- Design supporting substructures so that they will not buckle. Use overlapping instead of butt joints.

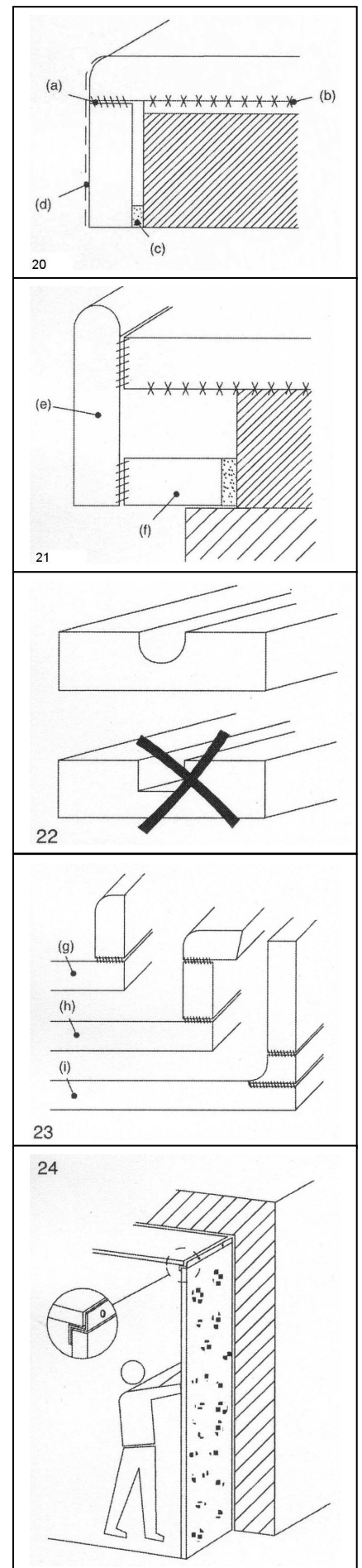
8.4 WALL CONNECTIONS OF VARICOR®

- Fig. 23 shows three possibilities of making wall connections with Varicor® (g), (h), (i).

8.5 WALL COVERINGS

- e. g. on rear walls in niches.
- Bond Varicor® to frame or directly onto the wall, and attach frame to wall, with PUR or silicone sealant as adhesive ******(23).
 - Do not fasten by wedges. Leave expansion joint of 3 mm.
 - Seal joints and edges with silicone sealant resistant to moulding.
 - In the case of wall-high coverings on bondable substrates apply individual patches of adhesive. Please ask your adhesive supplier ******(21), (23) which adhesive is suitable for the particular substrate. The adhesives must remain permanently flexible with a joint which is at least 2 mm thick. Secure the upper edge with a form-fit section. Length variations arising from temperature changes cause stresses which can result in detachment of the coverings with major temperature differences. Corner joints/butted joints should be bonded and sealed such that they are permanently flexible (shown in Fig. 24: Wall side).

- Note: Varicor® has a high resistance to vapour diffusion, which must be taken into account in the "building physics" measures taken.



**** Selected Suppliers**
(25) E. Dünnemann, D-Wagenfeld: Klemmsia clamps

9. HOW TO INSTALL SHAPED PARTS AND SINKS

Varicor® will reveal all its fascinating characteristics only in combination with the skills of an experienced craftsman.

For better replacement, shaped parts of version UB or EB should be installed at least 30 mm from the wall socket.

9.1 GLUEING BUILT-IN-SINKS WITH A 15° ANGLE (Fig. 25)

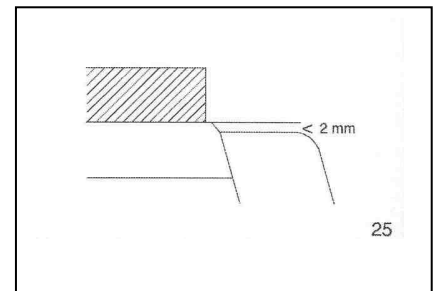
Working Steps:

- Clamp template (a) in place. Pre-mould cutout with handheld router (b) with hard-tipped tool of **10 mm diameter and 30 mm stop ring** (Fig. 26).
- Then use 15° cutter for remoulding; the tool should penetrate to a depth of max. 14 mm. For fine moulding, increase depth until the sink fits in a sufficiently low position. Chamfer lower edge of the moulded surface with coarse abrasive paper (Fig. 27).
- Check to see whether the shaped part fits; if not, rework as necessary.
- Prepare adhesive and apply to the bottom edge of the shaped part and the upper edge of the panel. Next, let shaped part sink in place under its own weight. Do not retension with clamps, as this would produce peak stresses. Use adhesive strip to prevent adhesive from running out.
- After adhesive has cured, remould with ground cutter along the edge of the template, which has not yet been detached (Fig. 28).
- Shouldering the edge of the sink (c) avoids visible differences in colour shade if the panel and the sink are of the same plain colour.
- If necessary, line drip area next to the edge of the shaped part with a piece of Varicor® or a multiplex panel.
- For information about matching gloss, see Sec. 4.2.
- When sinks are to be flush-mounted, the 15° cutter must penetrate only so much as to leave the upper edge of the sink flush with, or slightly above, the surface of the working top. In this case, there is no need to rework with ground cutter as shown in Fig. 28. This kind of installation is more sensitive to differences in colour shades and only recommended for bicoloured applications.
- Templates for all EB versions can be obtained from SPECTRA Division.

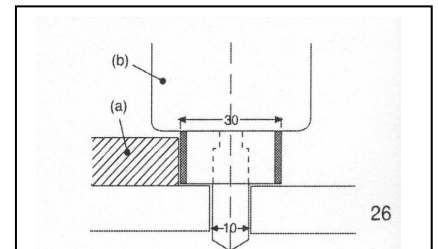
9.2 KITCHEN SINKS AND BASINS WITH BONDING EDGES FOR INSTALLATION FROM BELOW

Working Steps:

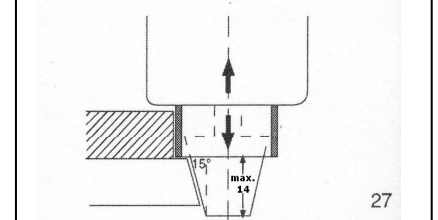
- The distance between two cutouts must be at least 80 mm.
- Use pencil to sketch planned position of the sink on the bottom side of the sheet; use template that you prepared before (the axes of the sink are indicated by notches on the rear).
- Pre-mill cutout for the basin to approx. 3 mm less than the interior dimensions of the basin.
- Fix position of basin with four small wooden blocks attached with quick curing adhesive to the bottom side of the sheet next to the top outer edge of the basin.
- Bond basin in place after removing pencil lines in the region of the joints before glue is applied.
- If more than one basin is to be installed in the same panel, the bonding step should be combined for several basins.
- Prepare clamping device for fixing basins (Fig. 29), use clamping unit made up of a pair of blocks joined by means of an M 12 threaded bar as the clamping element. The clamping element is run through the drain hole (Fig. 30).
- Protect workpiece and fixture from a adhesive runs by inserting plastic film.
- Apply adhesive tape (d) to the inside edge of the basin to protect the surface (Fig. 31).
- Bond basin in place with Varicor® adhesive; observe instructions for use that are attached to the adhesive.
- Leave system to cure in a flat position before further working.
- Match edge of basin, e.g. by $r = 12.7$ mm ovolo (Fig. 31).
- Remove adhesive strip.
- For matching surface finish and gloss, see Sec. 4.2.



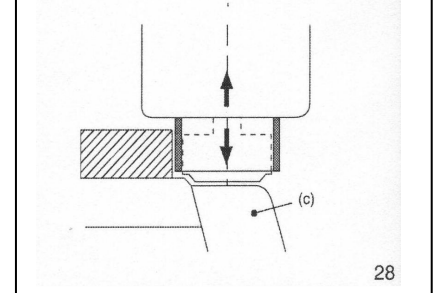
25



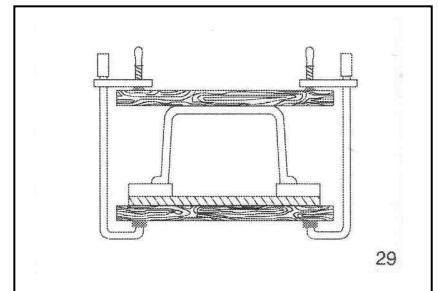
26



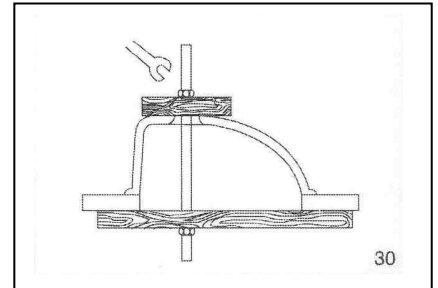
27



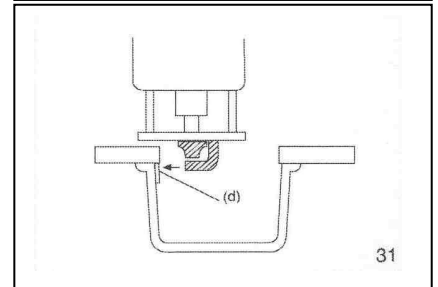
28



29



30



31

10. CUTOUTS – SUBSTRUCTURE – EQUIPMENT INSTALLATION

Varicor®'s extreme flexibility in use truly allows interior designs to be tailored to any specific demand.

10.1 CUTOUTS

- Do not saw cutouts in Varicor®, but cut them with a handheld router; the corners must have a radius of at least 15 - 20 mm.
Do not use a jigsaw.
- Use template for cutout corners together with 30 mm stop ring and 10 mm groove.
- Round off the top edge of the cutout with 3 mm radius, chamfer the bottom edge with abrasive paper of coarseness 180 .
- Leave at least 80 mm of solid material between adjacent cutouts (Fig. 32).
- Support the sides of cutouts by bars.
- Cutouts made for hot top platforms or involving major changes in cross section need to be reinforced in the jeopardized cross sectional area by a 5 - 6 mm threaded bar section bonded with Varicor® adhesive to the rear of the Varicor® panel (Fig. 33).
- Reinforcements should be made to overlap at the joints or should be connected with screw sockets.

10.2 SUBSTRUCTURES

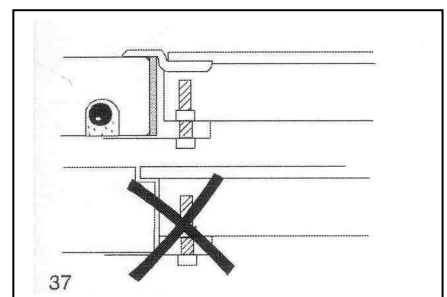
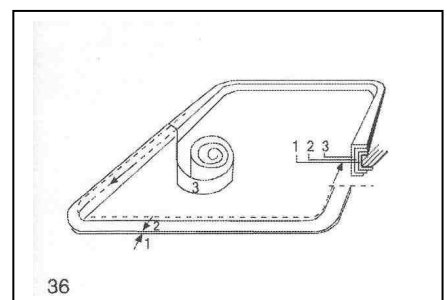
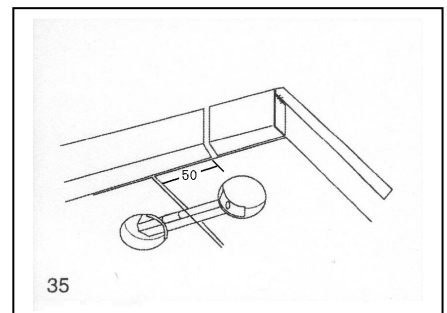
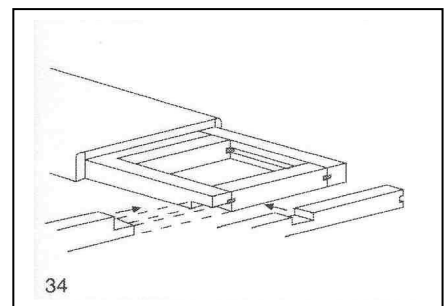
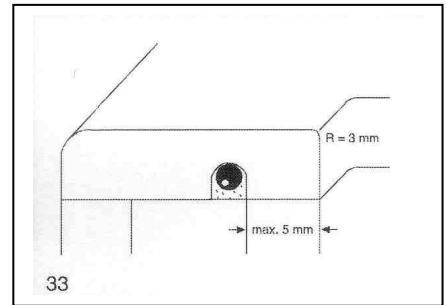
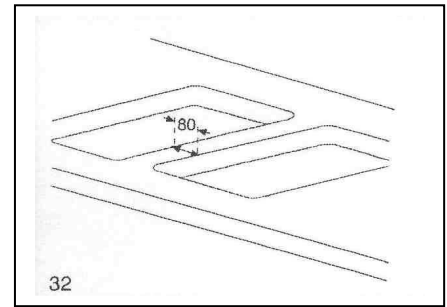
- Horizontal surfaces should be made of Varicor® panels at least 12 mm thick.
- For reinforcement, and to establish a connection with base units etc., bond strips of veneer board or frame substructures under the panel. See also Sec. 5, 6, and 8 (Fig. 34). **Do not use chipboard or MDF.**
- Install longitudinal bars and crossbars so as to match the modular dimensions of the base units; install crossbars and longitudinal bars by tongue-and-groove joints. The distance between the support strips must not exceed 600 mm.
- The substructure must be designed so that panels will not buckle during transport, installation, and in use: **Overlap and glue bars in place instead of producing butt joints, especially in corners and projections** (Fig. 34).
- Several Varicor® top panels are joined to the substructure by means of commercial working top connectors. The Varicor® butt joints are bonded together (Fig. 35). See Sec. 5.1.
- Always support bonded Varicor® by means of overlapping substructure.

- Install one crossbar each in the substructure right and left of each cutout.
- In the region of corner joints with base units containing rotating racks, use substructure of veneer panel over the entire area supported on lateral base units. In addition, attach support strips to the walls.
- Connect the working top to the base units with a few screws. Drill elongated hole into the top, and use washers with the screws.

10.3 INSTALLING HEATERS, DISHWASHERS, REFRIGERATORS

- Observe instructions for installation by the respective manufacturers. Should they differ from our recommendations, consult us. When installing heating or refrigerating equipment, provide for sufficient thermal insulation.
- Precision sand and round off the edges of cutouts to $r = 3$ mm, the corners of cutouts to $r = 15 - 20$ mm, in order to avoid notch induced cracks.
- Apply heat-reflecting, heat-dissipating adhesive aluminium strip ** (28), (29) in several layers to the edges of cutouts (Fig. 36). Leave 3 mm of space all around.
- Avoid bonding joints in zones subjected to temperature cycles.
- Do not install hot tops flush with the surface** (Fig. 39). Hot tops made of glass ceramics with a metal frame and electric hot tops of lying-on version can be installed in combination with Varicor® panels.
- Gas-fired hot tops and extremely hot tops should be raised by means of Varicor® strips (Fig. 38).

- In extreme cases, leave additional expansion joints in the whole structure when designing heating and refrigeration counters.
- Insulate substructure in the region of the door of the dishwasher against steam, moisture, and temperature cycling, e. g. by means of an aluminium strip ** (26), (27). Also a double layer of Varicor® has an insulating effect. This solution is advisable esp. when the draining area is positioned above the dishwasher.
- On top of dishwashers, coat the complete bottom side of the Varicor® panel with STYRODUR, STYROFOAM, STYROPOR or an equivalent material with the lamination on the machine side so as to cover the whole area. Or use a holohedral substructure.**



** Selected Suppliers
(26) 3 M Deutschland GmbH, D-Neuss: soft aluminium adhesive strip, type 425
(27) Beiersdorf AG, D-Hamburg: tesametal 4500

11. DETAILS WORKTOP CONNECTIONS / CONNECTIONS OF CORNER SOLUTIONS / 12. INSTALLING WORKING TOPS

11.1 DETAILS WORKING TOPS AND CORNER SOLUTIONS

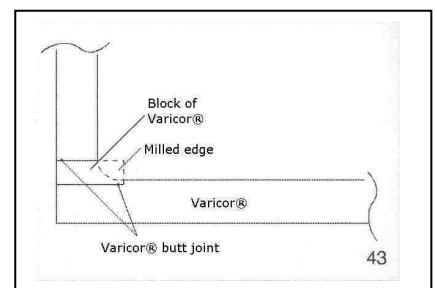
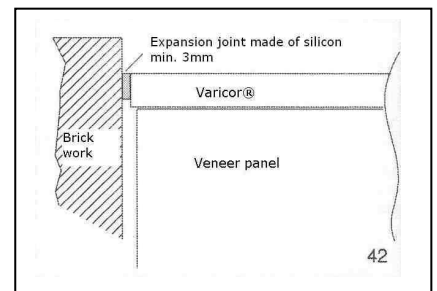
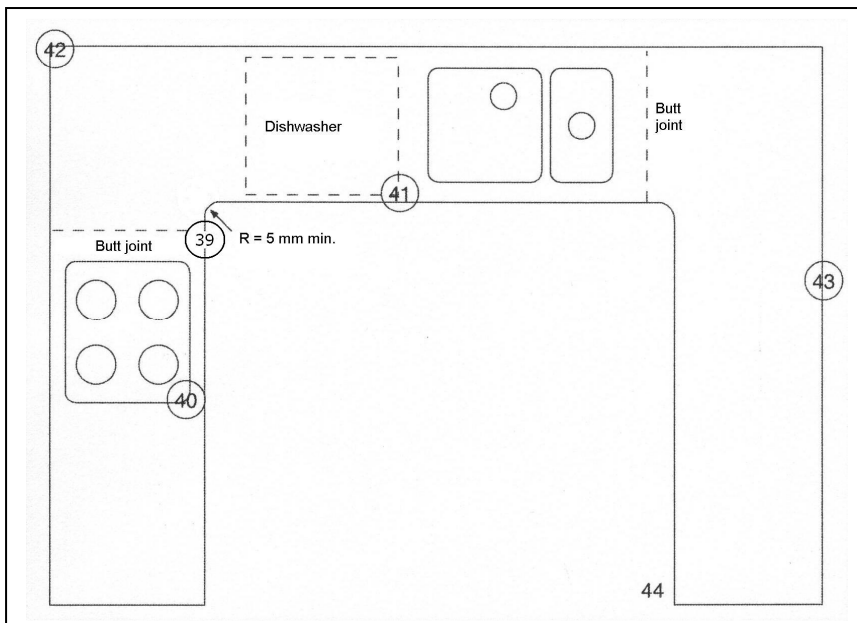
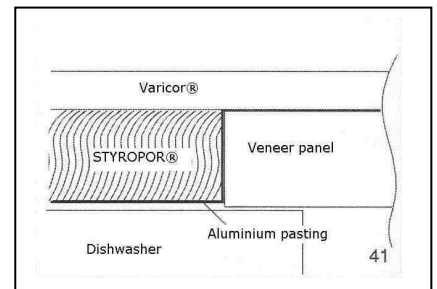
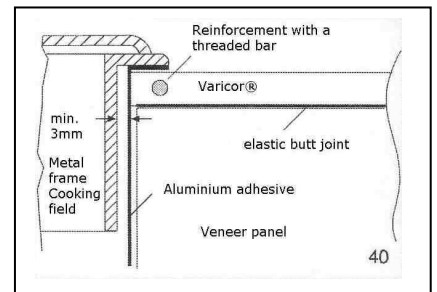
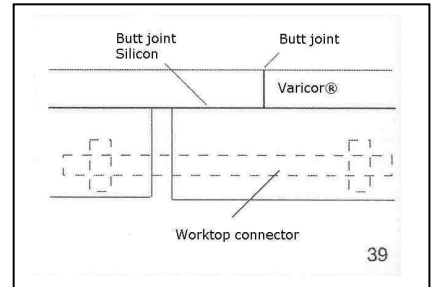
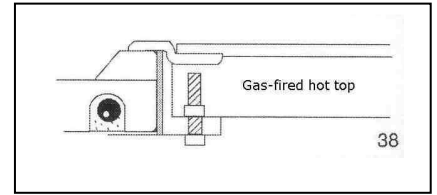
Varicor® incorporates all prerequisites for perfect results, functionally as well as aesthetically. Follow the recommendations outlined below for results in using this most attractive material of which you can be justly proud.

12.1 INSTALLING WORKING TOPS

- Balance temperature.
- Keep at least 3 mm space between the edge of a Varicor® working top and the walls (Fig. 42).
- Use stress-free, plane supports to prevent buckling.
- Prepare edges to be glued as described under chapter 6 "Bonding".
- Test good fit of bond joint in the "dry" state.
- Install expansion joints at critical points in buildings still settling.
- First bolt (fix) one of the two working tops to the base units.

- Then position the other part of the working top to a distance of 3-4 mm; at the same time, apply adhesive tape to seal the joint downward and sideways to prevent adhesive from running off, which would ruin the bond with the base units.
- Fill a large amount of adhesive into the joint.
- Press the parts of the working tops together, e. g. by means of a connector, until adhesive is forced out. Let adhesive cure thoroughly before resanding.
- Bolt the substructure of the other half of the working top to the base units without inducing stresses.
- Grind off excess adhesive and polish surface.
- Match gloss.
- Finish by applying cleansing milk and using a sponge cloth.
- Hand maintenance instructions to customer.

Details see Fig. 39 – 43.



14. Service

Our customer-oriented approach, high skill levels, many years of experience and long-term business relations are your guarantee of having chosen the right partner in us:

- Individual, personal advice
- Project-related customer servicing by our highly qualified Varicor® technical representatives
- Skilled support and advice during the development of customised mouldings and solutions
- Clarification of technical questions and challenges by Varicor®'s in-house application engineer
- Own after-sales service staff
- Marketing and advertising support
- Practical, professional product and processing trainings
- Detailed technical and product-specific information and literature

Varicor® processing tools

- CNC files on disk (on request)*

Varicor® planning aids

- Tender texts*
- CAD files of technical drawings

Certificates

- Copies of certificates available on request.

You will also find a list of the certificates under the heading "Planning and Working/ Technical Data" on our website.



All data are available as download versions under the heading "Planning and Working" on our our website www.varicor.com / English

