Installation Guidelines

These instructions are applicable to FunderMax MAX Exterior F Quality Phenolic Rainscreen Panels with exposed fasteners. For installations of Modulo ME05 and Max Exterior Lap Siding, please refer to these instructions for Material Handling and General Practices and refer to the brochures for those products for installation specifics.

Please also refer to “Technique Exterior” for more detail on each system.

MATERIAL HANDLING

Manufacturer's Recommendations are to be followed when handling FunderMax Panels. See page 3 of this document “Transport and Handling” for detailed instructions on transport, handling, and storage of panels.

PANEL FABRICATION

FunderMax Panels are intended to be cut to size and drilled under controlled workshop conditions, with field cuts and drilling* kept to a minimum (window openings, corner details, mechanical penetrations etc.).

Tools for field cutting are as follows:
Circular Saw (7 ¼” blade) : 40 tooth laminate type blade , (10” blade); 64 tooth

Drilling : “Brad point” Drill bits perform best- ¼” for (1) fixed point per panel, balance of holes for “sliding points” to be 5/16” for panels up to 9’ in length and 3/8” for panels longer than 9’.

Proper tooling requirements for cutting and shop fabrication are shown in further detail on pages 6-12 of this document.

*For field drilling of holes it is critical that the proper tooling be used. See the last page in this manual and be sure to follow the required “fixed point” and “sliding points”. Using the recommended bit, place the panel on a hard surface and drill through from the face of the panel to the back. To avoid damaging the back side of the panel, drill through the face until the drill bit just begins to penetrate the back side, then flip the panel over and drill in from the back to complete the hole. If damage does occur around the hole on the back of the panel (chipping, etc.) the integrity of the panel is not compromised because our material is non-porous.

INSPECTION OF WALL SUBSTRATE

Prior to installation of panels and substructure, the substrate or sheathing must be inspected by the installing contractor to ensure that it is in good condition. In most cases, an installer beginning their work means they have accepted the substrate. Typically the substrate must be plumb and true with maximum variation of 1/8” in 10', but this tolerance can vary. Refer to the project specifications for your particular project and report any problems to the General Contractor or Owners Representative. Deviations from the specified requirements must be corrected prior to the start of installation.

INSTALLATION/SUBSTRUCTURE/PANEL LAYOUT

Measure the wall to determine exact panel locations and starting points for layout. Mark the positions of subframing members on the wall per the substructure shop drawings when provided. Follow manufacturer's instructions for the correct fasteners, as they may vary depending on wall substrate. Where applicable, follow manufacturer's recommendations for fixed and sliding point fasteners in the aluminum extrusions. Verify actual panel positioning coincides with substructure layout during substructure installation. Correct positioning of the subframing is critical to the quality of the final product, as this directly influences the positioning of the panels on the wall. Errors during this part of the installation can cause significant losses of time later in the installation.

Note: All installations over wood substructure require minimum 1.2mm thick EPDM membrane across the face of the wood and returning 3/8" on each side. Closing the horizontal joints with strapping is also strongly recommended with wood substructure.

PANEL PREPARATION/INSTALLATION

Follow instructions below for "Material Handling". Special care must be taken to allow for expansion and contraction for FunderMax Panels to perform properly. This is achieved through using a "Fixed Point" and "Sliding Points". See the last page of this document for further detail on this topic. It is critical to the performance of the panels that a "centering tool" be used during panel fastener installation. This tool ensures that the fastener is centered within the "Sliding Points", which are slightly oversized holes in the panels. The fixed point will always be ¼" (6mm) diameter, the sliding point is 5/16" (8mm) for panels up to 9' in length, 3/8" (9.5mm) for panels longer than 9'. It is also critical that the center point of the drill hole in the substructure coincides with the center of the hole in the Fundermax Panel. Drill with a centering tool . Installations without centered fasteners in the "Sliding Points" may cause the panels to cup or bow on the walls. During panel installation, Fasteners should be installed from the middle of the panel outwards. Joint spacing between panels must be at least 5/16" (8mm). For concealed fastening, follow manufacturer's instructions for the installation of clips on the backside of panels.

INSTALLATION TEAM

All installation crew members should be familiar with techniques for proper handling, installation, and performance of FunderMax Panels. Much of the responsibility for successful performance and aesthetic of a Rainscreen falls on the installation team. Proper vertical airflow is essential to the function and long term aesthetics of a Rear Ventilated Rainscreen. Installation crews should be aware of this to make sure no obstructions occur in that airflow and that minimum back spacing depths be consistently held. The final product is based on the installer's skill and workmanship. It is imperative that all guidelines be followed without deviation during installation. Quality control during installation is the best way to ensure a proper end result.

THESE INSTRUCTIONS SHOULD BE REVIEWED WITH EACH MEMBER OF THE INSTALLATION TEAM

Guidelines for handling Max Exterior panels

TRANSPORT AND HANDLING

Handle Max Exterior panels with care in order not to damage the edges and surfaces of the high-quality material. In spite of the excellent surface hardness and the installation protection film, the stack weight of Max Exterior panels is a possible cause of damage. Therefore, any form of dirt or dust between the panels must definitely be avoided.

Max Exterior panels must be secured against slippage during transport. When loading or unloading, the panels must be lifted. Do not push or pull them over the edge.

Max Exterior panels must be secured against slippage during transport. When loading or unloading, the panels must be lifted. Do not push or pull them over the edge.

Transport protection films must always be removed from both sides at the same time.

The transport protection film must not be exposed to heat or direct sunshine.

MOUNTING

During the handling and installation of the Max Exterior panels you have to use your individual protection equipment – especially gloves and helmet - adapted to the working process.

STORAGE AND AIR CONDITIONING

Max Exterior panels must be stacked horizontally on flat, stable supports and supporting panels. The goods must lie completely flat.

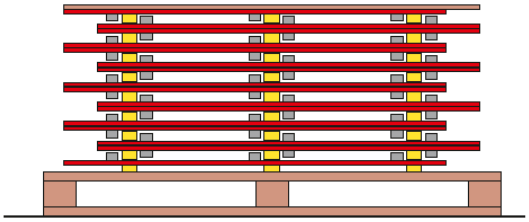


Fig. 1

Cover plates must always be left on the stack. The top cover should be weighted down. After removal of panels, PE films must again be closed over the stack. The same applies, in principle, for cut panel stacks. Incorrect storage can lead to permanent deformation of the panels. Max Exterior panels are to be stored in closed rooms under normal climatic conditions. Climate differences on the two surfaces of a panel are to be avoided. With pre-installed fastening elements, therefore, care is to be taken that the climatic effect is uniform on all sides. Use intermediate layers of wood or plastic.

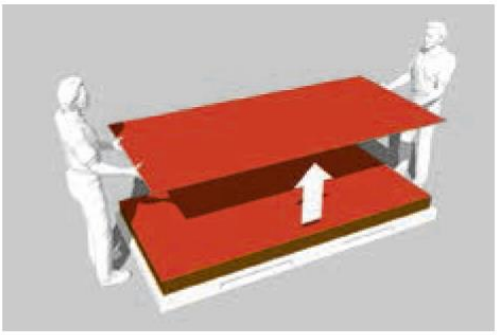


Fig. 2

Fig. 3

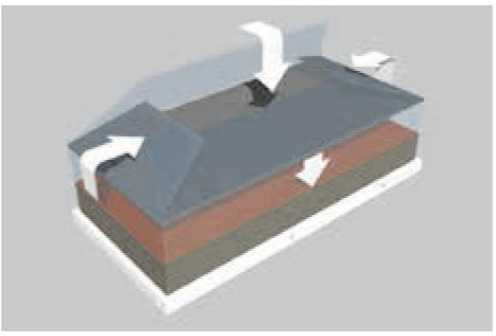


Fig. 4

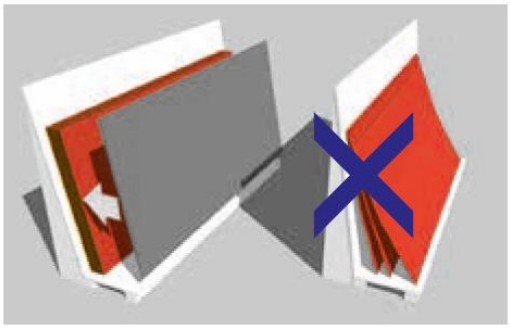


Fig. 5

Hint for final cleaning:

Note that contaminants (e.g. drilling and machine oil, grease, adhesive residues, sunscreen etc), which are put on the surface of the Max Exterior panels during the storage or mounting must be immediately removed . In case of disregarding
no claims concerning the color, finish and surface will be accepted/acknowledged.
Details of correct cleaning of Max Exterior panels are in Technique Exterior, page 89.

http://www.fundermax.at/fileadmin/redakteure/Downloads_ENGLISCH/Technical_Approvals/Exterior_Technik_2019_GB_web.pdf

The processing of Max Exterior panels

General

The surface area of Max Exterior panels is highly resistant. The processing properties of the Max Exterior panels are similar to those for the processing of hardwood.
Hard metal cutting tools have been tested and are indispensable when working with Max Exterior panels. If a long tool life is required, diamond-tipped (DP) tools should be used.

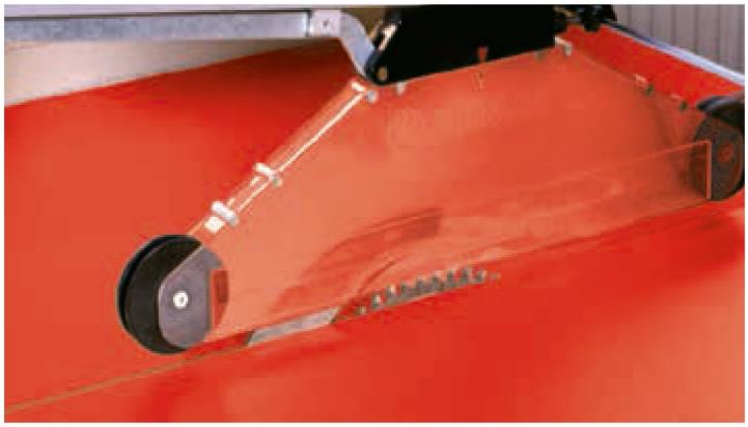
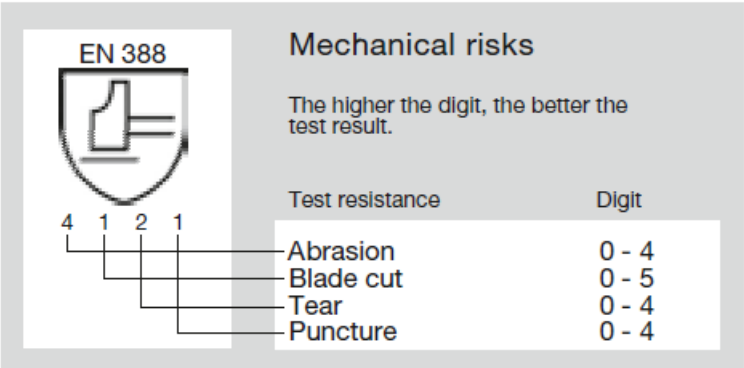


Fig. 1

Sharp blades and smooth functioning are both necessary elements to ensure a faultless processing of the material. Breaking-off, splintering and chipping of the decorative side is a result of incorrect handling or unsuitable tools. Machine tables should be as flat and smooth as possible, so that no chips collect - which can damage the surface area. The same also applies for work surfaces and the controlling of handheld machines.

Safety measures

This is simply a list of the recommended personal protective equipment. The standard required protective equipment for the given field of work should be used (work clothes, safety boots, hairnets,..).



GLOVES

Non-bevelled cut edges are sharp and pose a risk of injury. To protect against the handling of freshly cut Max Exterior panels, gloves of protection category II with a minimum cut resistance of 2 should be used.

DUST PROTECTION

As with the manufacturing of any other wood, the processing of Max Exterior panels can create dust. For sufficient respiratory protection, dust mask filters for e.g. should work.

PROTECTIVE GOGGLES

As with the manufacturing of any other wood, tightly sealed eye protectors must be worn when working with Max Exterior panels.

HEARING PROTECTION

During the mechanical treatment of Max Exterior panels the sound level can rise to above 80dBA. Please ensure that you have adequate ear protection at all times when working with these materials.

General processing guidelines

When working with Max Exterior panels the ratio between the number of teeth (z), the cutting speed (vc) and the feed rate (vf) must be observed.

	v_c	f_z
	m/s	mm
Saw	40 – 60	0,02 – 0,1
Mill	30 – 50	0,3 – 0,5
Drill	0,5 – 2,0	0,1 – 0,6

CALCULATION OF CUTTING SPEED

vc = D • π • n/60

vc – cutting speed
D – tool diameter [m]
n – tool rotational speed [min-1]

CALCULATION OF FEED SPEED

vf = fz • n • z/1000

vf – feed rate [m/min]
fz – tooth feed
n – tool rotational speed [min-1]
z – number of teeth

CUTTING MATERIAL

Tools with hard blades (e.g. HW-Leitz) can be used. In order to extend tool life, the use of DP-tipped tools (DP polycrystalline diamond) is recommended.

GENERAL ADVICE

If chip removal is not carried out regularly, this can quickly lead to damage of the blade. As a result the required engine power is increased and the tool life will be shortened. If the shavings are too small they will then scrape and eventually blunt the tool, therefore leading to a short tool life. For single cuts, it is imperative that the vibration of the panels is prevented using used panels. Stack height is in compliance with machine capacity.

Tooth forms

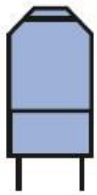


Fig. 2

TR/TR
(Trapezoid tooth/Trapezoid tooth)

Preferred tooth forms for the cutting of hard abrasive laminates.

Fig. 3

FZ/TR
(Flat tooth/Trapezoid tooth)
Tooth form for the processing of laminates and Max Exterior panels.

Fig. 4

WZ/FA
(variable tooth with bevel)
An alternative to FZ/TR tooth.

Fig. 5

HZ/DZ
(Pendulum tooth/Concave tooth)
Tooth forms for excellent and below on machines without scoring units.

Fig. 6

HZ/FA
(Concave tooth with bevel)
Similar use to HZ/DZ only with longer machine life without scoring units.

Cutting

Vertical panel splitting, table and sliding table saws without scoring unit

For circular saw blades with a positive rake angle and saw shaft under the work piece. Due to the positive rake angle, the cutting pressure takes effect using the stable table support.

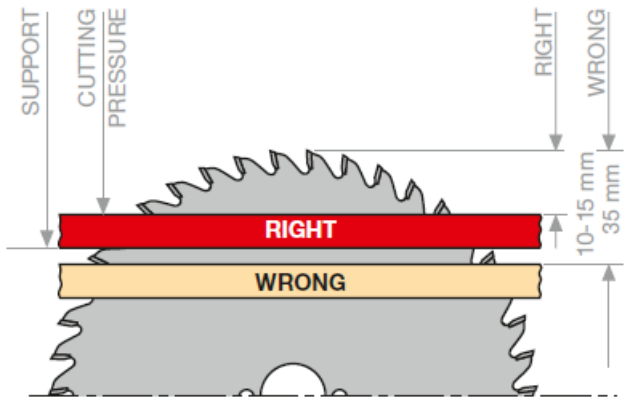


Fig. 1

For circular saw blades with a negative rake angle and saw shaft above the work piece. Through the negative rake angle, the cutting pressure takes effect using the stable table support.

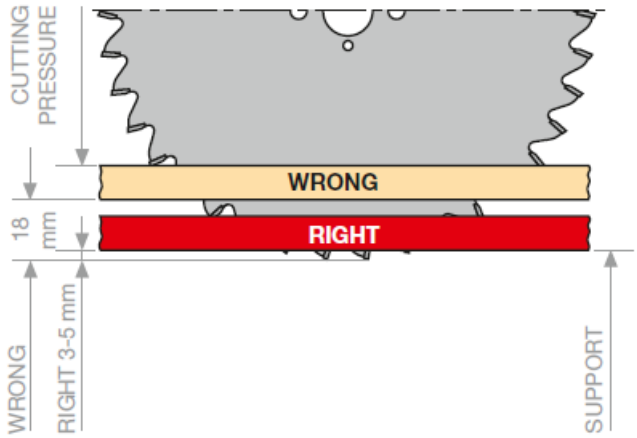


Fig. 2

ADJUSTMENT

- Visible side upwards;
- very narrow saw guide;
- smooth alignment of the Max Exterior panels on the workbench with the saw blade;
- correct blade protrusion.

Depending on the blade protrusion, the entrance and exit angles and therefore the quality of the cutting edges will change. If the upper cutting edges are unclean, the saw blade will need to be adjusted to a higher level. The saw blade must be adjusted to a lower level for an unclean cut of the underside. This is how the best height adjustment is determined.

Sliding table saws and panel splitting machines with scoring unit and pressure beams.

SCORING CIRCULAR SAW BLADE

In order to achieve a good cutting edge quality on the saw exit side, the use of a scoring unit is recommended. The cutting width of the scoring circular saw blade is slightly bigger than that of the main circular saw blade so that the exiting teeth of the main saw no longer touch the cutting edge. As a secure and smooth circulation of the work pieces can only be guaranteed using a pressure device, divided scoring circular saw blades are used on the table and sliding table machines.

Panel splitting unit with scoring aggregate and pressure device.

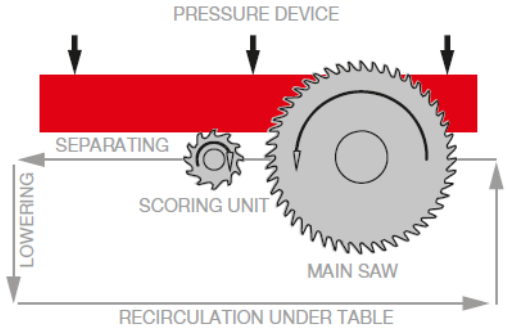


Fig. 3

Operating diagram of the conical scoring circular saw. For the maintenance of tools (always step-by-step), the cutting widths must be aligned with one another.

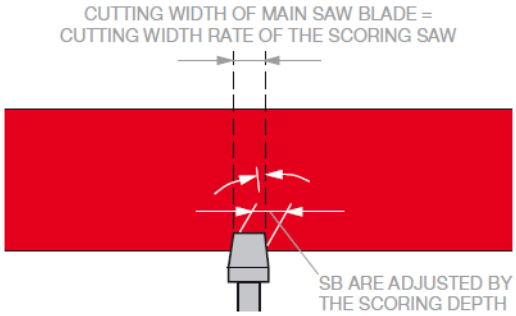


Fig. 4

Cutting with handheld tools

Finely toothed handheld saws are suitable for field cuts. Low set teeth are preferable. The sawing should be done from the panel surface area, where the saw is at an angle of approximately 30° relative to the surface area. For straight cuts with handheld circular saws, a stop bar or guide rail should be used. Saw blades suitable for hard metal use should be used. The sawing takes place from the panel underside using the following tooth forms: Variable tooth for coarse cuttings, flat tooth/trapezoid tooth for clean cuts of Max Exterior panels and panels which are bonded on both sides.

Milling machines – edge processing

We require a bevel or chamfer on the leading edge of all panels. This both prevents chipping during installation and reduces the risk of occupant injury on sharp corners.

EDGE PROCESSING BY HAND

For the finishing of edges, files are suitable. The file direction moves from the decorative side to the core. For broken edges, fine files, plane files, sand paper (100-150 grain) or scrapers can successfully be used.

EDGE PROCESSING WITH HANDHELD MACHINES

To mill bevels electric hand planes with bevel or bevel grooves can be used. Hand routers are used along with hard metal tools for special tasks (e.g. wash basin recess, Trax-coupling etc.). In order to protect the Max Exterior panel surface areas, the supporting surface of the hand routers should be covered with for e.g. panel parts, no felt! Milling shavings should be carefully removed.

Milling cutter diameter 10-25 mm
Cutting speed vc 1 30-50 m/sec.

We recommend hard metal tipped milling cutters, which are also available with indexable inserts. For a better functioning of your tools, height-adjustable milling cutters are preferable. The sharp edges will be broken down afterwards.

Drilling

Solid hard metal twist or dowel drills are used for drilling. In machining centers, the use of the main spindle instead of the drilling beams for a rpm of 2000 – 4000 min-1 and a feed rate of 1.5 – 3 m/min, is recommended. The exit speed of the drill must be carefully selected so that the melamine surfaces of the Max Exterior panels are not damaged. Shortly before the drill exits the work piece in full diameter, the feed rate must be reduced by 50%. When drilling through-holes, the counter-pressure should be built up using hardwood or equivalent material to prevent breakoffs of the melamine surface.

Fig. 1

For the screwing of blind holes perpendicular to the panel levels, please ensure:

- Tap drill diameter (D) = screw diameter minus approx. 1 screw channel depth.
- Drilling depth (a) = Panel thickness minus 1-1.5 mm
- Screw-in depth = Drilling depth minus 1 mm

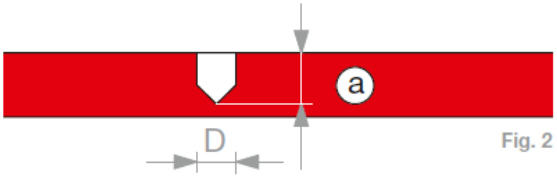


Fig. 2

For screw fittings parallel to the panel level, please ensure:

• The residual thickness (b) of the Max Exterior panels must be at least 3 mm.

• The hole diameter of the drillings parallel to the panel surface must be selected in such a way to avoid any splitting of the compact panels when tightening the screws.

• For screw fittings parallel to the panel surface, metal sheet and chip board screws are suitable.

• In order to ensure respective stability, a minimum depth of engagement of 25 mm is necessary.

Fig. 3

For the drilling of Max Exterior panels, drills for plastics are best suited. This means twist drills with a point angle of ≤ 90°. They have a large gradient and chip space. The sharp drill bits mean that these drills are also very suitable for the drilling of through-holes as they cut cleanly through the underside of the material.

LEITZ-DRILL SHAFT 10 mm

Fig. 5

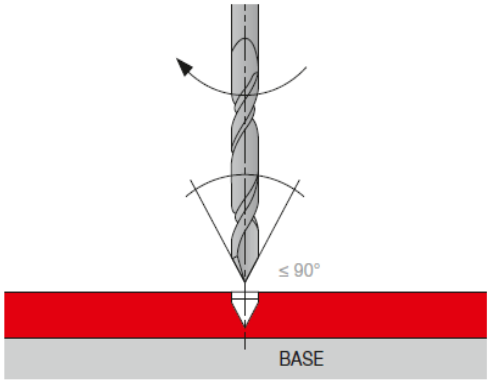


Fig. 4

UNIVERSAL DRILLING OF BLIND AND THROUGH-HOLES.

The following machines are used:

Point-to-Point drilling machines, through feed drilling machines, CNC machining centers, box column drill, inlet-fitting drilling machine, drilling units, hand drills.

Information on the drills: Flat roof drill bits. Shaft diameter identical to blade diameter. Adaptable for shaft-D 10 mm with reducing bush TB 110-0 or PM 320-0-25.

LEITZ-DRILL HW-SOLID, Z2 Fig. 6

DRILLING OF BLIND HOLES

In particular dowel holes in cabinetry. Particularly suitable for the tear-free drilling of blind holes in visible quality as well as the processing of panel materials. Not suitable for through-holes!

The following machines are used:

Point-to-Point drilling machines, through feed drilling machines, inlet fitting drilling machines, drilling units, CNC machining centers.

Information on the drill:

Roughing geometry with extremely clean cut. Model HW-solid with highly wear resistant HW varieties. High stability and long service life. Polished chip space for minimal friction and feed force.

Pre-punching ensures better control for hand drilling.

Diamond-tipped drills are not suitable for Max Exterior panels.

MBE VHM FAÇADE DRILL Fig. 7

MBE VHM FACADE DRILL

MBE-ARTICLE NO.: 1360702 – 8 mm
MBE-ARTICLE NO.: 1360703 – 8,5 mm
MBE-ARTICLE NO.: 1360704 – 10 mm

HELP FOR CENTERING DRILL

Helps at primary drilling in the substructure
SFS Article No.: 1320658

HELP FOR CENTRING DRILL Fig. 8

Fasteners must be centered within the holes in the panel for FunderMax panels to perform properly. Do not overtighten fasteners.

Tips for Improved Machining on your CNC Router

We require a bevel or chamfer on the leading edge of all panels. This both prevents chipping during installation and reduces the risk of occupant injury on sharp corners.

FIXING PANELS ON A MACHINE TABLE

There are basically two ways to fix or tension Max Compact Exterior panels on machine tables depending on the type of processing to be performed:

a.) Fixing by means of suction cups
When milling to size or edging both sides of a panel section, it is recommended to fix the panel in place using suction cups at specific points.

NOTICE: The proper distance between the suction cups must be observed!

b.) Fixing by means of MDF protective boards
When milling to size, edging one side, making perforations or free-form milling a panel section, it is recommended to fix the panel in place using MDF protective boards (protective boards can be used several times).

The following applies for both options: It must be ensured that the suction cups provide sufficient holding power for the work to be performed. If the suction cups do not provide sufficient fixing or tensioning power, the suction cup seals (e.g. the sealing rings) must be checked.

SPACING OF THE SUCTION CUPS

As a rule, the material being processed should not be subjected to any vibrations. Therefore, it is important that the suction cups are placed at an appropriate distance from the freely protruding panel edge based on the thickness of the panel.

The following applies: the more suction cups and the smaller the distance from the free protruding edge of the panel, the cleaner the milling pattern. As a rule of thumb, suction cups should be placed in the area to be processed in a grid of max. 300 mm with a maximum distance from the free protruding edge of the panel of no more than 30 mm. The best results are achieved by using an MDF protective board (e.g. 19 mm thick), as this enables a full-surface fixing of the Max Compact Exterior panel on the machine table with suction cups.

CHOICE OF MACHINING TOOL

Generally speaking, Max Compact Exterior panels can be machined with solid carbide (VHM) and diamond (PCD) milling tools. The basic prerequisites for a clean milling pattern and a long service life are vibration-free tool holders and spindles. NOTE: The ball bearings must be properly maintained!
Diamond tools have proven particularly suitable for processing a large amount of panels or a high number of running meters. Smooth-running milling cutters with a shank diameter of min. 10 mm in combination with straight continuous DIA cutting edges (2+1 knife) are especially suitable for format milling.

It is essential that the feed rate and the cutting speed be adjusted for the specific job and cutter based on the material being processed. We recommend always consulting the tool supplier first.

CLAMPING SYSTEM OF THE MILLING TOOL

It is essential that the spindle be centered in the chuck to ensure the smooth running of the milling cutter. The more centered and play-free the milling cutter can be clamped in place, the better the result. Most machines are equipped with common tool holders such as collets, hydro grips or shrink chucks.

For the professional CNC machining of larger jobs, a Hydro Grip tool holder or shrink chuck is recommended as they guarantee the best tool clamping. It is important to ensure the proper maintenance of all moving parts such as plain or ball bearings in order to avoid vibrations in every direction!

EXTRACTION

The extraction or the extraction power must be adjusted accordingly for the material being processed to ensure that all the shavings are optimally removed.

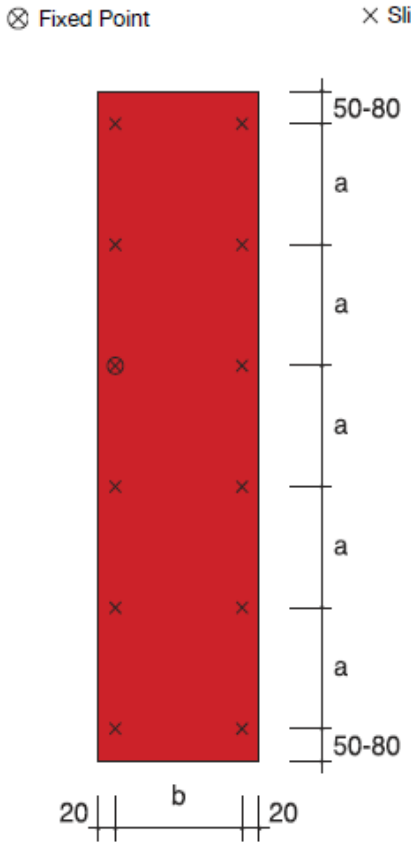
If the extraction is not strong enough, there is a risk of heat development. This is due to shavings that remain between the cutter and the panel edge. High friction occurs at this point because the cutter can not eject the material any further. This can lead to burn marks on the panel edge.

CNC MACHINING BY FUNDERMAX

FunderMax has their own machining center - Compact Elements. We are happy to machine Max Compact Interior, Max Compact Exterior, Max HPL and m.look panels to your specifications. Simply contact our customer service center for more information.

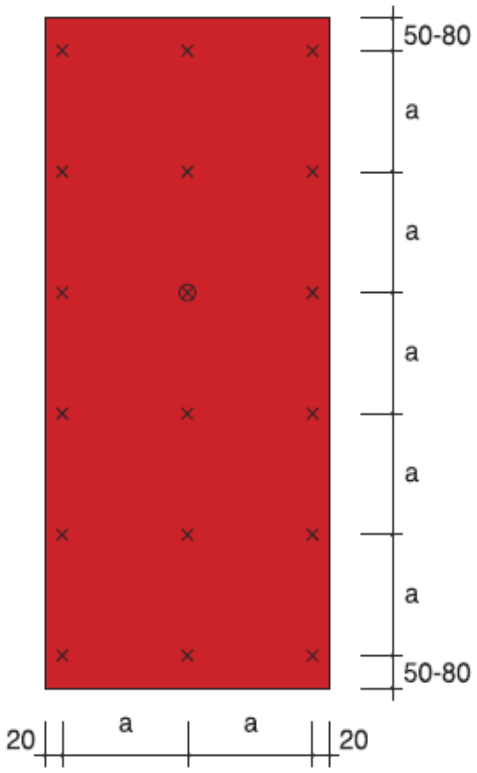
We recommend at least 8hp on the motor driving your CNC spindle.

Fastening



Single span panel

Fig. 14



Double span panel

Fig. 15

It is essential that fastenings are made from non-corrosive materials.

Max Exterior Installation screw (Fig. 16) with torx wrench 20 made of stainless steel CrNiMo 17122 Material no. 1.4401 V4A.
Lacquered head on request.
Diameter of drill hole in Max Exterior
Sliding points: 8 mm or as required
Fixed points: 6,0 mm

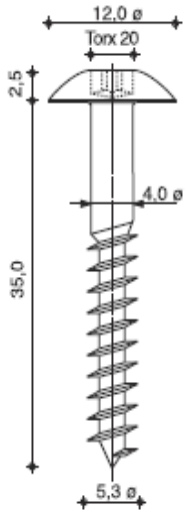


Fig. 16