

PANELING

Tricoya® EXDF Guidelines



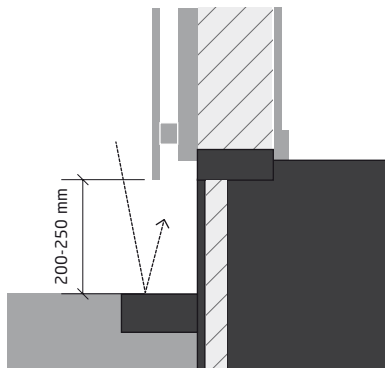
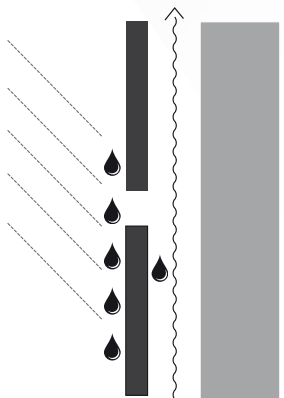
PANEL CLADDING

When considering a rain screen system with panel style cladding, there are certain issues that need to be considered, among which the fixings used to make up the system. The fixing methods to consider for Tricoya ExDF include screw fixings.

JOINTS

Considering the circumstances the Tricoya ExDF is used in, the panels will not expand or shrink more than 0.018 inch/foot (1.5 mm/m) in practice. However, the material will be mounted onto a sub-frame that shows a significant expansion and shrinkage due to changes in temperature and/or humidity, which needs to be taken into account.

Therefore, Tricoya ExDF cladding panels need to be installed with (at least) a 0.20" (5 mm) free space around the edges. When the joint is left open, the sub frame supporting the panels should be protected (full width) by a suitable weather resistant joint tape in case of battens.



SCREW FIXING ON A TIMBER SUB-FRAME

Screw fixing is a traditional form of fixing and is likely to be the least expensive system to be considered as a Tricoya ExDF façade rain screen system. Screws can pass through the cladding panel and into timber battens placed behind the cladding.

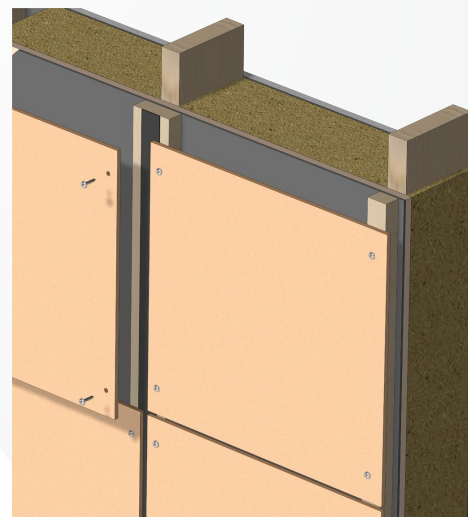
SUB FRAME

Vertical timber battens, no smaller than 1½ x 1½ inch (38 x 38 mm) in section, should be used to support the cladding to the supporting wall or cladding structure. For the outer corner, a corner infill piece can be used to protect and finish the corner of the façade.

For the inner corner, a shadow gap of no less than 0.12" (3 mm) is normally used; with the rear battens masked using a flexible black or dark grey joint cover strip material (flashing).

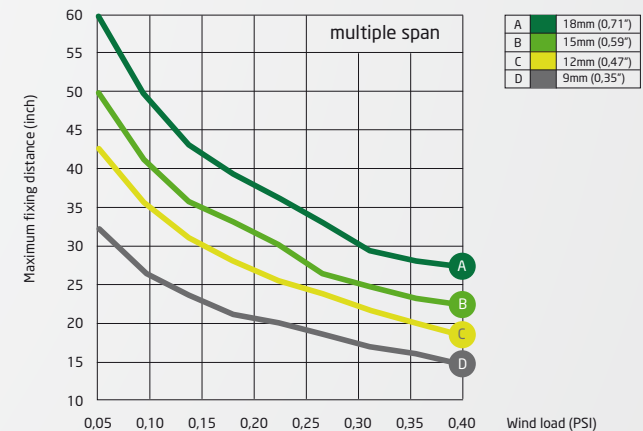
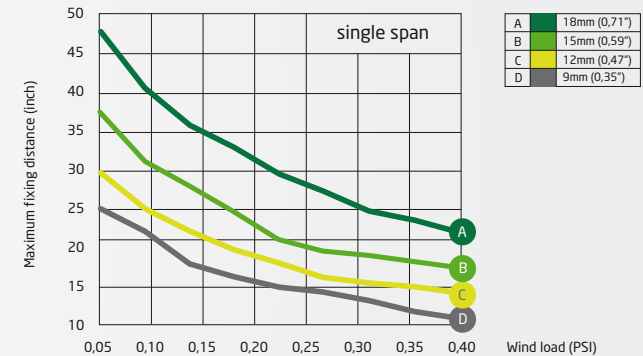
FASTENERS

Screws for face fixing should be made of stainless steel type 304 or 316. The length of the screw should be at least one inch + panel thickness (+ any spacers). If the screw head diameter is at least 0.20" (5 mm) bigger than the hole diameter, it is assumed pull-through will not occur, because the pull-through resistance exceeds the withdrawal resistance.



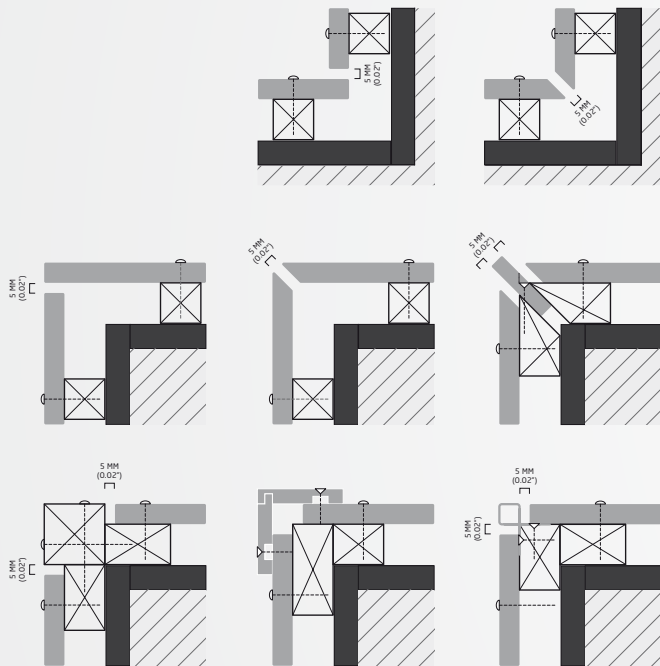
FIXING DISTANCES

The distance between the supports is crucial to the ultimate performance of the Tricoya ExDF cladding panel. As a general guideline, the graphs below depict the maximum fixing distances for the different panel thicknesses, based on the maximum tolerable deflection of the panel (1/200 of the span). The strength of the total system (spacing, number and type of fixing required due to wind loading) must at all times be checked by a licensed engineer.



CORNER DETAILS

Corner solutions for Tricoya ExDF as cladding can be detailed in numerous ways, both with and without incorporating profiles. When a board meets another construction part (or another board) a gap of at least 0.20" (5 mm) should be provided. Depending on the applicable national building code, to which you should refer, cavity barriers may be needed at corners.

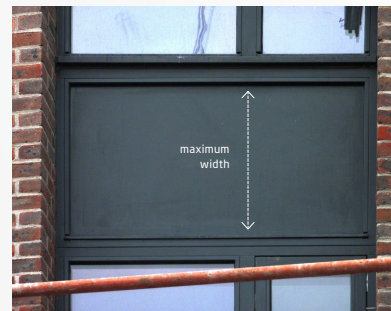


OTHER EXTERIOR APPLICATIONS, FACIA AND SOFFITS

Tricoya ExDF can be used for soffits or fascia finish for roof ends. Although different sub-frames are possible, the application onto battens (timber sub-frame) is the most usual. It is recommended to limit the maximum height of the boards as stated in the table below and to fix the board vertically at two places. The roof lining boards can be fastened visibly with wood screws, or they can be glued onto the sub-frame.

	PANEL THICKNESS	
	9 mm (0.354")	12 mm (0.472")
Board height ≤	10 inch	15 3/4 inch
Horizontal fixing distance ≤	20 inch	20 inch

PANEL THICKNESS	MAXIMUM PANEL WIDTH
9 mm (0.354")	22 inch
12 mm (0.472")	27 inch
15 mm (0.591")	33 inch
18 mm (0.709")	39 inch

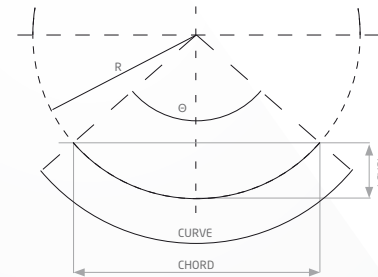


EXTERIOR CEILINGS

Tricoya ExDF is also suited for use in horizontal applications like exterior ceilings (e.g. car ports and overhangs). The fixing systems described in the previous pages can be used:

- cladding boards
- screw fixing on a timber sub frame

DIMENSIONS (MM)	6 mm (0.236")	9 mm (0.354")
Curve	2,440	2,440
Radius (R)	620	977
Angle (θ)	120	145
Chord	1,100	1,900
Level	900	750
Battens (c.t.c.)	300	400
Fixings edge (c.t.c.)	270	300
Fixings intermed. (c.t.c.)	300	300



SIDING

If using the Tricoya ExDF board in a system which resembles wooden siding there are a number of jointing techniques as with regular cladding which can be considered depending on the final appearance of the façade.

Traditionally normal wood siding measures 6 inch wide, with a recommended limit of 7½ inch due to cupping issues. The width of Tricoya ExDF boards is not restricted by these issues and can therefore be wider, leading to a strong visual appeal unobtainable with traditional wood.

Tricoya ExDF is suitable for standard siding types, and in general, the installer should follow the same recommendations for fitting as with traditional wood boarding, requiring no special detailing or tools. As with traditional wood boarding, Tricoya ExDF siding performs best when installed properly on a suitable frame.

Tricoya ExDF panels can be cut, profiled, em-bossed or routed to specified designs without encountering restrictions or issues associated with the instability of traditional cladding products while maintaining its durability. The most popular designs are:

- Open jointed
- Square edge
- Shiplap
- Tongue and Groove

Other designs are of course possible, due to the highly machinable nature of Tricoya ExDF and the absence of grain direction.

HORIZONTAL SIDING

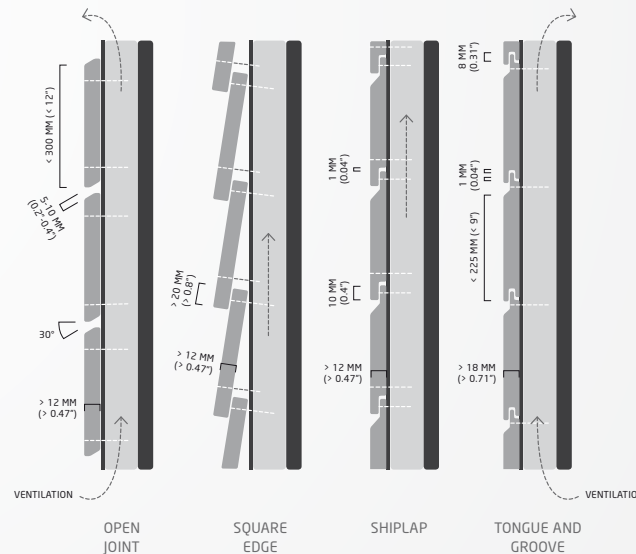
When mounted horizontally, the fixing can be made invisible.

< 12 INCH FACE WIDTH

For horizontal siding not exceeding 12 inch face width, the open joint chamfered boards should have a 0.20" - 0.40" (5 - 10 mm) gap between the boards at the outer face. The vertical overlaps of square and feather edge should be at least 0.80" (20 mm). When choosing a shiplap profile, the minimum vertical overlap can be reduced to 0.40" (10 mm), but there should be at least a 0.04" (1 mm) gap between rebate and board / up stand below (see also the section on joints; page 6).

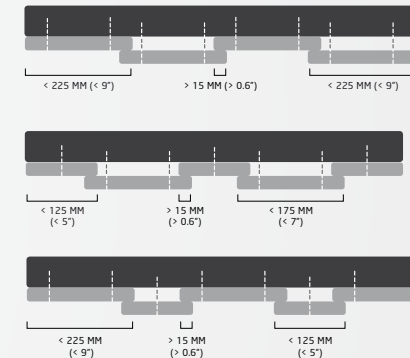
< 9 INCH FACE WIDTH

Horizontal tongue and grooved boards should not exceed 9 inch face width. The depth of the tongue should be at least 0.40" (10 mm), with at least a 0.04" (1 mm) gap between tongue and groove shoulders. The boards should always be installed with the tongue upwards, to prevent water penetrating the profile, causing performance issues with the coating.



VERTICAL AND DIAGONAL SIDING

The board designs suitable for vertical siding are (overlapping) square edge, shiplap and tongue and groove. When installing the profiles vertically at least two fasteners per board are necessary. The fixing can therefore only be done visible, with e.g. nails. It is recommended to limit the board lengths to the storey height, and end joints must relate to batten positions. Water penetration at the end grain of vertical battens should be avoided by applying a sealer.



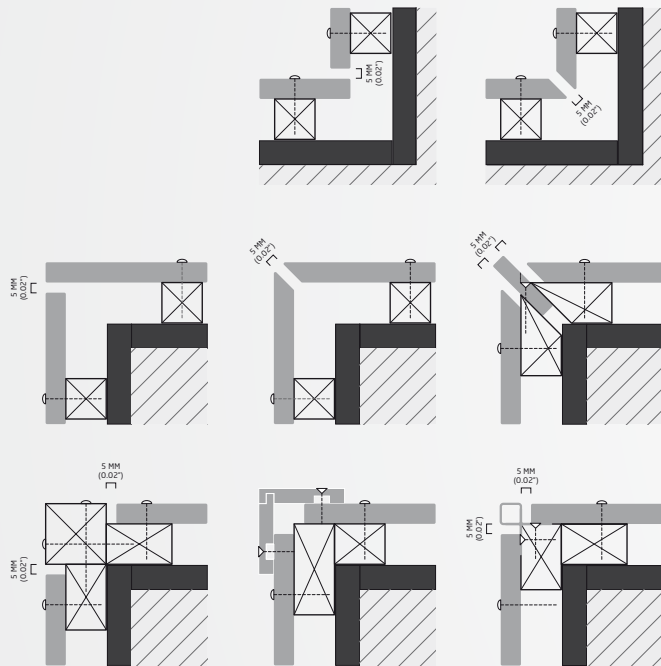
GROOVED PANELS

Full panel utilization width and length can be used and may include design requirements such as routing into the surface to create the impression of traditional joint types or novel artistic design.

Please note that when fixing this type of panel to the sub-frame, it is recommended using a fixing system suitable for panels (see the separate brochure on panel cladding, available via of www.tricoyaexdf.com). In any case, the pull-out strength of the total fixing system of the grooved panel should be checked by an engineer.

CORNER DETAILS

Corner solutions for Tricoya ExDF as cladding can be detailed in numerous ways, both with and without incorporating profiles. When a board meets another construction part (or another board) a gap of at least 0.20" (5 mm) should be provided. Depending on the applicable national building code, to which you should refer, cavity barriers may be needed at corners.



SUPPORTING WALL CONSTRUCTION

Like all siding materials, Tricoya ExDF siding performs best when installed properly on a suitable frame. In applications with the risk of wind-driven rain, a rain screen construction is highly recommended. By fastening the siding to furring strips and providing for flashing and weeps, the desired ventilated air space between siding and sheathing is realized. Maximum spacing for furring strips is 16" on center. Vertical applications require horizontal nailers.

Siding should be fastened to the sub-frame at a maximum of 24" on center when applied over wood based sheathing and 16" on center if installed without sheathing. Do not install siding in direct contact with concrete, masonry, top soil, mulch, patios and/or roofs. Please check your local building codes to verify requirements in your area.

FLASHING

Before installing siding, make sure flashings are installed to prevent moisture from entering wall and roof spaces. Due to the slight acidity of Tricoya ExDF, galvanized, zinc plated, coated steel and copper are not corrosion proof and thus are not recommended to be used.

CAULKING

Use high-performance outdoor approved caulks or sealants to seal gaps around windows, doors, corners, and other exterior joints that are exposed to potential water intrusion. Do not caulk areas that will prevent moisture from escaping the wall cavity (such as under windows and around flashing).

ROOF AND GROUND CLEARANCE

Trim that extends down to a roof or deck requires a minimum of a 2 inch gap to avoid wicking. Trim should be a minimum of 6" above grade.

FASTENERS AND PLACING

Tricoya ExDF can be face fixed (and in some cases secret) onto the wooden sub-frame with ring shank (or other improved) nails or screws (raised head or round head). As Tricoya ExDF is slightly acidic, like most durable woods, it is recommended to use 304 (for general applications) or 316 (for seacoast exposures) stainless steel.

If stainless steel fasteners are not available a lesser alternative is the ACQ approved coated fasteners (typically a proprietary epoxy or ceramic coating). Galvanized or zinc plated metals are not nearly as corrosion proof in an acidic environment and the use of these materials are not recommended.

Stapling is not recommended, nor to drive the nail or screw heads into the wood. T-nails should not be used for external cladding as they offer little resistance to axial withdrawal. Lost head nails should also be avoided as they offer little resistance to pull-through.

Tricoya ExDF can be fastened in the same way as other commonly used wood species. To ensure a durable and lasting fixation, the boards should be fixed with at least 3" clearance to the end of the board (pre drill hole to 0.04" (1 mm) less than the shank diameter or 80% of nail diameter). The minimum distance to the top and bottom edge of the boards is 1".

The recommended point side penetration of nails into the solid wood is at least 1 1/2" (38 mm). If the nail head is at least 2d it is assumed pull-through will not occur, because the pull-through resistance exceeds the withdrawal resistance. Screws have a greater axial strength than nails, and are therefore recommended for use with grooved panels.

PROCESSING

Tricoya® EXDF Guidelines



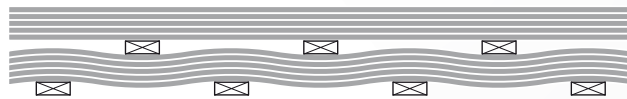
HANDLING AND MACHINING

The handling and machining of Tricoya ExDF is similar to that of MDF – allowing users all the freedom normally associated with MDF. Tricoya ExDF sheets should be stored horizontally and lifted clear off the floor using dry bearers as supports. It can easily be cut, shaped, routed, molded and bored with conventional wood working equipment and tools. Sanding before finishing is often not required, but is dependent on required end finish.

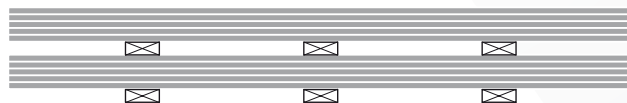
STORAGE AND HANDLING

The method of manufacturing Tricoya ExDF ensures a balanced construction resulting from the uniform distribution of fibers throughout the panel thickness. The maintenance of this inherent flatness is dependent upon the use of correct storage and handling procedures. Without these, boards may develop a permanent set under their own weight, particularly if not adequately supported on a flat pallet or by insufficient bearers during any storage period.

INCORRECT



CORRECT



THE FOLLOWING PROCEDURES ARE RECOMMENDED:

1. Sheets should be stored horizontally in dry conditions and lifted clear of the floor using dry bearers as supports;
2. Where individual bearers are used, they should be of equal thickness and placed at not more than 31" centers for boards of 0.59" (15 mm) thickness and upwards, subject to a minimum of three bearers. A minimum of 4 bearers are required for thinner boards;
3. The bearers supporting successive layers should be in vertical when stacking units;
4. Stacks of boards should have flush sides to minimize damage to protruding edges or over-hanging corners;
5. The storage area should be well ventilated and the conditions should be reasonably dry;
6. To prevent the boards getting wet during storage and on site (and possible discoloration and/or staining), it is recommended that the sheets are covered with a "vapor-open" plastic;
7. As with general storage conditions, storage at the building site should be a minimum of four inches above concrete flooring and one foot above ground, again to prevent possible discoloration and/or staining.

CUTTING AND MACHINING

Tricoya ExDF can easily be cut, shaped, routed, molded and bored with conventional wood working equipment and tools. Tool wear rates on Tricoya ExDF are similar to wear rates on MDF. In general, Tricoya ExDF is denser and slightly more abrasive than common hardwoods. As steel-tipped tools dull quickly, carbide-tipped tools are recommended for normal work on any scale. Diamond-tipped tools may be best for very high volume operations, resulting in less re-sharpening and more consistent cut edges.

Saw blades used for MDF and particleboard are normally satisfactory. Compared to saw blades for solid wood, all types of MDF saw blades require higher clearance and increased tooth angles (consult tool suppliers for further guidance).

One of the prime features of Tricoya ExDF is its clean edge and face machining characteristics. Contoured designs are almost unlimited. However, care must be taken in the selection of profiles, as the presence of sharp corners or narrow sections will alter the uniformity of paint coverage and reduce the resistance of profiled edges to impact damage.

When machining Tricoya ExDF, as with any MDF, cutter angles are important. A large hook angle is required to ensure clean cutting with minimum wear of the cutting tip. A large clearance angle prevents the back of the cutter from rubbing against the machined edges. The increase in both these angles is limited by the requirement to maintain adequate strength at the tool tip. Cutters for all types of MDF are normally supplied with angles in the following ranges: cutting (hook) angle: 10 to 20 ° and clearance angle: 20 to 22 °.

SANDING

Carbide-based abrasives are generally recommended for sanding Tricoya ExDF. A modified "closed coat" abrasive is also recommended. This combines the smoother finishing properties of "closed coat" systems with resistance to fine dust clogging of "open coat" systems.

FACE SANDING

Tricoya ExDF is shipped with a 150 grit final factory finish. This provides an excellent smooth surface, ideally suited to the direct application of most veneers, plastic foils, HPL's and paint coatings. Scuff sanding, with the object of increasing adhesion may be detrimental to surface quality, but may be recommended by adhesive manufacturers depending on the type of laminate. Deep sanding of the faces of Tricoya ExDF with the object of reducing thickness is not recommended. Heavy one-side sanding will unbalance the panel and should be avoided to prevent warping.

EDGE SANDING

Cut edges may require sanding with a 150-240 grit paper. This sanding is useful for cleaning up "fiber nap".

DUST EXTRACTION DURING SANDING

During the sanding operation, Tricoya ExDF produces a very fine light dust, in common with all MDF material. As with all fine dusts, a common sense approach to safe working conditions must be adopted. An efficient dust extraction system is essential during automatic sanding, both for performance and life of sanding belts and operative comfort. A minimum air velocity of 75 - 100 ft/sec (23 - 30 m/sec) is recommended for dust extraction. During hand sanding, the wearing of dust masks is recommended, to protect the operator from inhalation of fine particles.

COATINGS

There is no need to finish Tricoya ExDF from a technical performance perspective, in respect of attributes such as decay resistance and dimensional stability. However, Tricoya ExDF is susceptible to weathering in outdoor circumstances. Uncoated panels used outdoors will weather due to UV and biological processes that take place within the wood fibres and at its surface, which can be avoided by using a high quality UV resistant coating.

Tricoya ExDF is all-natural and non-toxic so mould growth can occur if Tricoya ExDF is left uncoated. Common mould growth can be avoided by using a suitable outdoor primer which addresses mold growth. Blue-stain can be avoided by using a high quality UV resistant coating. This also protects the wood from accidental staining.

The compatibility of Tricoya ExDF with various coating systems compares well with wood in general and it may be finished with commonly used products an application methods. Please note: coating formulations vary from supplier to supplier and, of course, processes vary depending on the application equipment used and end-product design. Despite our excellent record of compatibility, we highly recommend having your coating suppliers involved in the process as they have an in-depth knowledge of their products, application and how to determine the performance of the finished product.

PREPARATION

- The moisture content of the Tricoya ExDF to be coated should be dry (below 8% moisture content);
- The surface to be coated should be clean, dry and free from dust and grease;
- It is recommended to finish the panels on all sides before mounting them, to keep the panels balanced and prevent staining. Fire retardant treated panels must always be coated on both sides;
- It is recommended to round off the corners with a radius of at least 1/8 inch;
- For aesthetic reasons, it is recommended the edges of the panels to be treated with end-grain sealer (white or transparent), before applying the final coating;
- When using a primer, a high quality product that contains resin-bleed blockers and fungicides is recommended.

For detailed information on certain coating suppliers, we refer to the download section of our website, please visit www.tricoyaexdf.com. Please contact your coating supplier for

COATING MANUFACTURER	PRIMER	TOPCOAT	SYSTEM
Sikkens	Rubbol WP 151 2K	150-175 µm (wet) in 1 or 2 layers: - Rubbol WF375 - Rubbol WF387 - Rubbol WF382	Opaque coating
	Rubbol WM 260 1K	150-175 µm (wet) in 1 or 2 layers: - Rubbol WF375 - Rubbol WF387 - Rubbol WF382	Opaque coating
PPG	120 µm (dry) in 2 layers PPG Wood Finishes 152QO	- 40 µm (dry) Sigma S2U (Semi-) Gloss - 50 µm (dry) PPG Wood Finishes 892 QO	Opaque coating
Sherwin Williams	TBD	TBD	TBD
Sikkens	XP 650 Aqua PU Primer 256 2K	150-175 µm (wet) in 1 or 2 layers: - Akzo Nobel Winflex T25 - Akzo Nobel Winflex T35 - Akzo Nobel Winflex T635	Opaque coating