

EUROGROUP BELCAIRE'S RECOMMENDATIONS AND UNDERSTANDING FOR DYED NATURAL WOOD VENEERS

It is an inherent characteristic of wood that the color will change over time. Some species darken whilst others fade and become lighter. Grey dyed veneers are usually more unstable especially when exposed to direct sunlight. The finish applied to the veneer is of critical importance to help minimize color change. It is essential that the finish (be it lacquer, varnish, oil, polish etc.) is as UV absorbent as possible to improve the resistance of the finished products to sunlight.

We supply the raw material only, and we strongly recommend to all customers that before ordering they read the relevant sections in the attached recommendations and experiment with sample panels to ensure they choose the correct finish, taking into account the finish look desired and the location in which the veneer is to be used.

The dyed veneers are natural veneer which has been colored and as each tree is different the grain and look may vary from samples provided. The variation in grain is particularly noticeable with the more heavily grained veneers such as Carbalho and Birds Eye Maple. If you require a specific look please let us know and we will do our best to pick veneers that match your requirements as closely as possible, but please be aware that no two pieces of veneer are ever identical.

The white /pale veneers such as F10-000, Arctic White Tulip can be very translucent and they may require white colored under veneering first. Please read the relevant sections in the attached recommendations.

For some veneers, both natural and dyed veneers, slip matching will shine the color back to the viewers eye in the same tone a bit better than a flip or book match, this is because of fiber direction in wood growth. Each craftsman must figure artistically what structure and look they are after when joining veneers.

Please note that we can not accept any liability for discoloration of the veneer we supply except in cases of manufacturing defects.

Technical Recommendations and ways of using natural veneers, pre-dyed and engineered veneers:

The way in which any product is used is decisive if the best result is to be obtained. Therefore, it is advisable to follow the rules set by the characteristics of a natural living product. The production of a manufactured article is always the result of accumulated experience, design and technology which are the personal talents of the product's craftsman. The purpose of the following recommendations is to share the years of experience gained from working together with craftsmen and manufacturers in this field.

The choice: The choice of a natural or pre-dyed veneer is highly important since it must answer the requirements of size as well as the preference (regarding species, structure and color) of the buyer. Normally, the goods in the warehouses are in lots, consisting of "trunks", each of a different character; it is therefore necessary that the customer chooses very carefully, either personally, through trusted personnel, or by providing the supplier with all necessary information to find the materials best suited to the requirements outlined.

At this stage it is beneficial to remember that there are certain natural characteristics in wood that could be considered as defects in some cases, however in actual fact these are features. That is why it is advisable that the product be seen and selected according to one's own requirements.

Characteristics: structure, splay, knots, sapwood, fiddle back or mottled figure, irregular and more or less marked vein, color variation even within the same trunk and anything else specific to the wood species in question.

Defects: (natural veneers): a catalogue of attributes of veneer which the user does not subjectively accept are commonly referred to as "defects". Wood veneer is a natural product and as such its appearance in some cases may be pleasing or displeasing. It is therefore necessary to distinguish true defects from natural characteristics. Defects include: splits, holes, mold, marks resulting from processing, slicing marks from cutting and anything else that has occurred as an external cause to change the appearance. Notice that all of these are not features inherent in the wood species in question.

Defects pre-dyed veneers: Eurogroup Belcaire's pre-dyed veneers are nothing other than natural veneers that has been dyed to a desired color, and as such they possess all of the characteristics in all their effects. The defects may be considered as those occurring in natural wood. An additional defect can only be the lack of penetration of the dye, or on unacceptable color.

Defects engineered veneers: the following should be considered as defects: crocks, processing marks, holes, mold. Non-standard in structure or color in relation to the standard samples. (Outside predetermined margins of acceptability).

Transportation: no precautions are needed except to avoid breakage and exposure to outside weather conditions (sharp variations of humidity) as this could produce molds, with the consequent appearance of stains upon being varnished.

Pollution: the criteria are the same for Natural Wood, Eurogroup Belcaire pre-dyed wood and engineered. It is advisable to avoid expulsion of the wood dust (from sanding) into water courses or drainage as this could cause damage to aquatic plant and animal life.

Health and safety: protect airways and mucous membranes from the sanding dust.

Fire precautions: wood is inflammable, but not spontaneously so.

pH: approximately 7 upon delivery.

Measuring veneers: (moisture content 10-12%): the measuring process is carried out electronically therefore the squaring up takes account of the perimeter sizes. Repairs are made for any defective parts present in the veneer (holes, splits and anything that is considered a defect).

Tolerances: (Eurogroup Belcaire pre-dyed woods): slight color variations (8-10 %) may occur from one batch to another. This is due to the varying rates of absorption of the wood itself, which varies from log to log and from species to species. The said range is, however, within customary acceptable limits.

Tolerances: (Engineered Veneer): slight color and structural differences (8-10 %) may occur from one batch to another; this is due to the varying behavior of the natural wood during the processing and production phases. The said range is, however, within customary acceptable limits.

Color control: wood and therefore veneers tend to oxidize over time, which can result in surface color changes. Therefore, in order to compare the color of two veneers, whether natural, pre-dyed or engineered (unvarnished), it will be necessary to sand them first so as to remove the external part which may have oxidized.

Density: see the product specification according to wood species and engineered veneer.

Toxicity: in some wood species there are substances which may contain a certain level of dangerous toxins. During processing, Eurogroup Belcaire's pre-dyed natural woods or engineered veneers lose a certain part of the lymph they contain. The substances added do not exceed the quantity of recommended margins; as a result, these may be considered an improvement with regard to toxic effects.

Storage: wood is able to absorb or lose atmospheric humidity and should be stored in conditions which are neither too dry nor too moist; relative humidity around 50-60 % is ideal. Also, being light-reactive, it should be kept in dark or covered conditions away from direct sunlight. If not, defects such as warping, color variation, breakage and delamination (in engineered veneers) may result.

The selection: before undertaking the joining procedures it is advisable to remove the parts of the veneer which are defective or exhibit some undesirable characteristics.

Moisture content: the moisture content of the veneer should be close to that of the substrate to which it is to be applied (around 12%). Wood has a tendency to swell due to its water absorption properties; the moisture content therefore has a direct effect to the size. If the relative moisture values of the substrate and the veneer are different at the moment of gluing, splitting or wrinkling of the veneer will result. Consequently, filtration of the glue (pore-whitening) can occur. The humidity factor must therefore be closely monitored.

Clipping: during clipping, in order to achieve usable sizes for joining, it is advisable to ensure the cutting blade is as sharp as possible; a poor cut will highlight the joints after veneering.

Joining: in this phase a style or system is selected, which may be book matching, slip matching, end matching, random matching, etc. The joining process is carried out with adhesive paper, stapling with thermosetting glue points, or gluing along the veneer border. It is highly important to remove any residues left by the joining process in the sanding phase. Poor sanding can cause marks to appear during varnishing/finishing stage.

The substrate: the substrate should be suitable for gluing, free from grease or any other substances which may hinder the adhesion of the glues, and with a moisture content and temperature close to the veneer that is to be applied. These help to avoid cracking or delamination of the veneer itself after application. The color of the substrate or base should be similar to that of the veneer in order to circumvent one color showing through after the varnishing process.

Products for overlaying: various types of adhesives can be used consistent with the gluing system adopted: cold-setting gluing (vinyl or similar adhesives), thermosetting gluing (ureic resins or similar). As a rule, thermosetting ureic glues are used which by their nature tend to yellow. With high acid or alkaline content in the glues, the wood or the substrate, may produce a change of color in the veneer immediately during the gluing phase or soon after. The cause of this could be attributed to a rapid change in the pH due to varying values in the different elements (substrate, wood, glue). Therefore, the substrates, veneers and the glues must be "compatible"; the need then arises for research into suitable glues, which should be carried out in collaboration with the glue suppliers themselves.

It is common practice to color the glues to help conceal bleeding through or pore-whitening caused by the penetration of the glue itself across the wood fibers. In such a case, the colorants selected should be compatible with the glue, the dyes or acidic content of the veneer, as well as, with the finishing products (varnish, oil etc.).

In short, careful consideration must be given to the glues used, combined with close collaboration with the suppliers in order to achieve the best technical results; whilst keeping in mind production needs and the final results to be achieved.

Overlaying: the glue should be spread on the base evenly and in small a quantity, it should also be quite viscous to help avoid penetration into porous veneers causing bleeding through or pore-whitening; this could become more obvious during the varnishing stage. Once the veneer has come into contact with the glue application should be done quickly. If for any reason the application time should increase and the veneer, having been glued, begins to buckle or wrinkle, hindering the operations still to be carried out, it is common practice to moisten the veneer on the visible surface with a light spray of water; it should then regain its original flatness.

As wood is a natural product, it possesses differing characteristics from species to species and from log to log; the hardness, the density, the heat conducting qualities may vary according to the moisture content and the nature of the wood fibers. For example, Birch has a different heat-conducting value from a Tulip wood; Sycamore has a finer texture than Ash.

At this point, at the pressing stage, the need for a whole series of adjustments emerges, which vary according to the wood species being used: pressure and compression, temperatures and pressing times, quantity of glue and cooling of the panels. In general terms, the following average values apply: press pressure 2-4kg/cm², temperature 80-90 °C, pressing time 4-5'. Strong pressure applied to woods with large vessels such as Ash and Oak encourages glue penetration through the veneer (pore-whitening). High temperatures used on highly heat-conducting wood causes scorching and consequent color variation. Another important factor to consider is the cooling of the panel after the application of the veneer. The substrates (particleboard, MDF and others) are agglomerates which are composed of wood and chemical products (glue). When these are exposed to heat, the evaporation of chemical product residues is facilitated, which may be seen on the surface and could penetrate the veneer. It is then advisable to allow these

vapors to evaporate during the cooling phase through free ventilation; refrain from placing anything upon the applied veneer until they have returned to a normal temperature. These residual vapors can cause color variation in veneers and possible deterioration of the colorants/dyes contained within them.

In the case of hollow-core structure substrates it is advisable to make air-holes to relieve pressure which forms at high temperatures within the hollow-core structure itself, this helps avoid fissuring. In the case of burrs or wavy veneers it is recommended to flatten them before application, which involves applying pressure at 85-90 °C for approximately 1-2 minutes to individual sheets and then proceed with the application procedure.

When applying a very light-colored veneer avoid the use of dark colored substrates in case the base color shows through the veneer, changing its color. If this is unavoidable for any reason, we recommend carrying out a double veneer application, setting the fiber of each veneer at right angles to one another.

It is normal to color the glue when applying dark colors or very porous veneers as this helps conceal possible bleeding through. It is advisable, in this case, to refrain from using dyes which, by discharge from the glue, modify the veneer color.

At the varnishing stage, marks of a different tone may appear. In the case of light woods, use colorless glues which are thick, and apply sparingly.

In veneer application a basic rule must be kept in mind at all times, which is that two veneers must never be placed on top of one another with their grains in the same direction, even if this involves applying a veneer to ready-mode plywood. Fractures could occur due to stress imbalance of the two veneers.

Back-overlaying: to avoid bending (cupping) the substrate must be counter-balanced with a veneer having the same dimensional variability and structure as the face veneer. It is not advisable to apply veneers presenting high dimensional variability on exposure to moisture (e.g. burl, crotch) directly to particle boards (e.g. MDF) since cracking and delamination may occur. In this case double application is recommended.

Filling: it sometimes occurs during processing that the substrate to which a layer has already been applied has small fractures or breaks caused by previous working. In these cases, the defects are made good with fillers (in colors to match the woods used), which are glue or synthetic resin-based and are usually commercially available ready-made; otherwise such fillers can be made up using oxides, kaolin and powdered colorants, mixed with fast-setting resins or glues. These are applied using a filling knife and sanded down when thoroughly dry. Where ready-made colored fillers are not available or, in the case of Eurogroup Belcaire's pre-dyed veneers whose colors are difficult to reproduce with oxides etc., a solution is to sand down a veneer of the same color, and create a filler with the wood dust. Insufficient drying or incompatibility between the filler's components and the finishing products could cause marks of a different color tone which will appear after varnishing.

Sanding: it is usually carried out using 100/150 grit sanding paper. Finer or coarser grains will result in greater or lesser absorption of the varnishing products and, respectively, in a more or less intense color of the veneer. Worn sanding paper can cause burn-marks on the veneer from excessive friction by sander. In this case the friction of the abrasive produces heat (burn marks) and consequent color variation. Excessive sanding results in over-reduction of the veneer's thickness, which reveals the part of the veneer in contact with the glue, causing the undesirable effect of pore-whitening or sanding through. For these reasons it is recommended to complement the action of the abrasive, pressure and sander speed, according to the veneer's characteristics.

Surface coloring: this is normally undertaken by using chromophores dissolved in water or solvent, or pigments suspended in a synthetic medium (nitrous-based, acrylic and so on).

The application is carried out manually, using air sprays or a roller dyer. These systems have their limits since it is not possible to obtain very transparent colors, and the surface characteristics are consequently not emphasized. In addition to this it is not possible to create the complete color range, as the base color of the veneer affects the final tone obtained and there is not a complete penetration of the colorants; they exclude the possibility of applying veneers of various colors on the same substrate. Such methods therefore limit a modification of the base color and dictate that one remains, broadly speaking, within the color tones of the veneer used.

In the case of coloring with water-based dyes, drying presents additional problems. If it is not carried out perfectly, it will hugely affect the varnishing that is to be carried out. In mass production, it is difficult to reproduce the full color range given that colors change during the different cycles of production, according to the veneer's absorption capacity, the speed of dyeing, the evaporation of the solvent whilst in the machines and the type of sanding previously carried out; these are considerations which affect the level of color penetration. The system of surface coloring is therefore acceptable when a good degree of transparency or color continuity is not required, and further sanding after color application is not called for.

Coloring of the natural veneer in the rough state: by this method the veneer is dyed using special technology when it is still at the rough or pre-processed stage, that is before being applied to the substrate. The colorant therefore penetrates the entire thickness of the veneer whose treatment and application system, sanding and varnishing remains similar to those adopted for natural veneers.

Making good: where there are small sanding-through areas, the defect may be improved (within reason) using the following means: alcohol based felt pens, water or solvent-based colorants, colorants in solvents and nitrous-based resin or tempera-based pencils. Keep in mind that the final tone must be checked after the application of the varnishing product and ensuring the paint product itself and the filler material are compatible. Stains or the paint product failing to dry may result.

Resistance to light: all wood species are light sensitive and change their color on exposure to strong light sources; it is therefore common practice to keep the wood protected during storage as well as the cycles of production. Veneers are normally used to manufacture products for interior environments, not subjected to negative environmental factors (strong light, bad weather, extreme variations of temperature); however, no wood is ever used in its rough state; it is therefore the layer of protective varnish which has to guard the wood from light and physical, chemical or mechanical agents; it must not go yellow over time, it must protect the wood from light and it must be easily absorbed.

The varnishing products on the market are widely varying according to the intended use; in order to achieve the best results, it is recommended to make a precise selection of both the product and the varnishing process so as to avoid excessive color variation or defects of various kinds.

Varnishing: during varnishing, the wood color becomes more intense according to the level of penetration of the varnishing product used. A greater degree of penetration results in a more intense color; a specific final color will result according to the degree of penetration, transparency, color and opaqueness; changing the varnishing product or the varnishing process can result in the same veneer (natural, pre-dyed, engineered) achieving a different final color-tone.

Over time the varnish layer can have a greater or lesser tendency to go yellow and this can also cause color changes. Yellowing is more noticeable on light colored wood species such as Sycamore, Pear or Pine. While it will be less noticeable on dark colored wood species or those which tend to yellow e.g. Walnut, Mahogany, Rosewood.

All wood types when exposed to strong light will change color. This change varies from species to species and even log to log. In the case of Sycamore and Walnut the change is more yellow; Padauk the change leans to slightly more red; in the case of Pear it is browner and so on. Possible discoloration may occur to surface colored wood, pre-dyed or engineered veneers due to exceeding of the limits of resistance to light or to the heat tolerance of the colorants used. It is vital to use varnishes which do not yellow and which contain UV light absorption additives to help protect the wood against light. Keep in mind that the varnish layer tends to act as a defense against light and a thicker layer means greater protection.

While all the wood species, natural, dyed, or engineered that are unvarnished have little resistance, they can, by the use of appropriate varnishes, reach light resistance values that conform with UNI 9427 and depending on Xenotest according to UNI 11341: Sycamore and similar 2-3, Walnut and similar colors 3-4, Mahogany and Rosewood 4-5 (scale 0-5).

How to determine light resistance: to give a value of light resistance expressed in terms of a time frame is virtually impossible. Wood or manufactured articles which contain wood are exposed to rays emitted from light sources which are not quantifiable and vary according to the type, the intensity, the length of exposure and the environmental conditions. For example, rays of sunlight filtered through a glass window change intensity according to the degree of altitude of the sun, if it shines vertically rather than horizontally, if it is direct or reflected, and so on. The weather conditions need to be taken into consideration. It is not possible to establish a point of reference relating to rainy days as opposed to cloudy ones etc. As for artificial light sources, such as sun lamps, halogen lights, neon and so forth, the argument is virtually the same, in that every light source emits a different kind of light wave, either shorter or longer, and they are positioned at differing distances and angles from the manufactured item. The method of measuring light resistance according to the UNI 11341 or similar international standards, consists in subjecting a partially covered substrate in a controlled environment (humidity and temperature, etc.) to exposure to one kind of light emitted from a particular light source for a predetermined time (20, 30, 40 hours and so on). Upon uncovering the concealed area and observing the tonal variations between the two a value which expresses resistance to light is obtained. With regards to the standards methods mentioned (UNI 11341 and UNI 9427), the values are expressed in a scale of 0-5 (0 = least, resistance, 5 = greatest resistance).

Dyes: where it is desired to retouch the color of a natural, Eurogroup Belcaire pre-dyed veneer or engineered veneer, water-soluble dyes can be used. Application can be done by spray or roller, taking care that the moisture content of the veneer does not exceed 12 % before the application of the varnishing product. Solvent-based dyes, with or without a binding agent, can be used, taking care that they do not change the transparency of the veneer.

Woods with deep or marked pores: Ash, Oak, Walnut, engineered veneers and so on. In the case of the woods where deep or marked pores occur naturally, it is advisable to remember that incorrect filling of these pores with the varnishing product can cause silvering or pore-whitening. This means that it is essential to use low-viscosity (liquid) varnishes which are quite slow-drying, especially for the first coat; this allows the varnish to penetrate deeply and to help the release of the air contained in these deep pores.

Moisture content of wood: should not be above 12% at the time of varnishing.

Primers and finishing products: nitrous-based products, polyurethane, water-based acrylic and so on; in particular, on light and pastel-colored woods, use non-yellowing products with UV absorbing additives.

Protective film: on dyed woods or engineered veneers a non-yellowing protective layer should be used for light colored woods; avoid using protective layers for dark woods on lighter colors. Protective layers for dark woods are used to create a film on woods with a higher oil content such as Rosewood, Teak, etc. during the process of applying polyester. Non-oily wood species such as Mahogany, Anegre, Tulip, Birch, Sycamore and so on or woods treated with water-soluble dyes or solvent based colorants, may be varnished by polyester processing, without first being treated with a protective layer. However, it is recommended to apply a protective layer to avoid possible incompatibility between the polyester (peroxide) and some colorants. Such incompatibility may cause color changes, for example the color combination red-black-orange in which the red is incompatible, results in loss of red in the base color. Always use protective layer products which dry fairly slowly to avoid pore-whitening.

Naturally-dried polyester: on light or pastel colors use clear polyester paraffin varnishes which do not tend to turn pink or green, and which do not cause opalescence or stains on drying.

Varnishes for UV ray drying: use products which do not change the wood color and limit, as much as possible, UV ray exposure. In the varnishing process, before drying, the pores of the wood must be completely filled with the varnishing product as to replace the air within the pores. This procedure is sometimes compromised by work practices which aim to accelerate the production times and to limit the amount of varnishing product used. In the UV drying process there are very short drying times. If alterations are made between the machinery speed, paint quantity and light intensity, the varnishing product improperly or incorrectly applied will not penetrate or adhere sufficiently and as a result pore-whitening, opalescence, white stains and blisters etc. will result.

Re-varnishing: it is sufficient to remove the layer of varnish by sanding and to get back to bare wood and start the new varnishing procedure. Again, in the case of color changes caused by exposure to light or an incorrect varnish layer, sanding thoroughly will return the wood to its original color.

Note: with regards to UV drying varnishes, it is not possible to add UV ray absorbers since they impede the drying process. This factor makes these products less efficient as protection for the wood against light.

These recommendations are solely the result of our experience and consequently are not binding. It is up to the users to evaluate their usefulness based on their own experience. Taking into account the technical production cycles and the finished result which is desired.

Eurogroup Belcaire is always on hand to deal with any of their customers' requirements to help solve problems or find new solutions, whether to do with color, wood species, texture or the technology to be applied.