



Technical Specifications for Esco engineered parquet and solid wood flooring. (V2019.1)

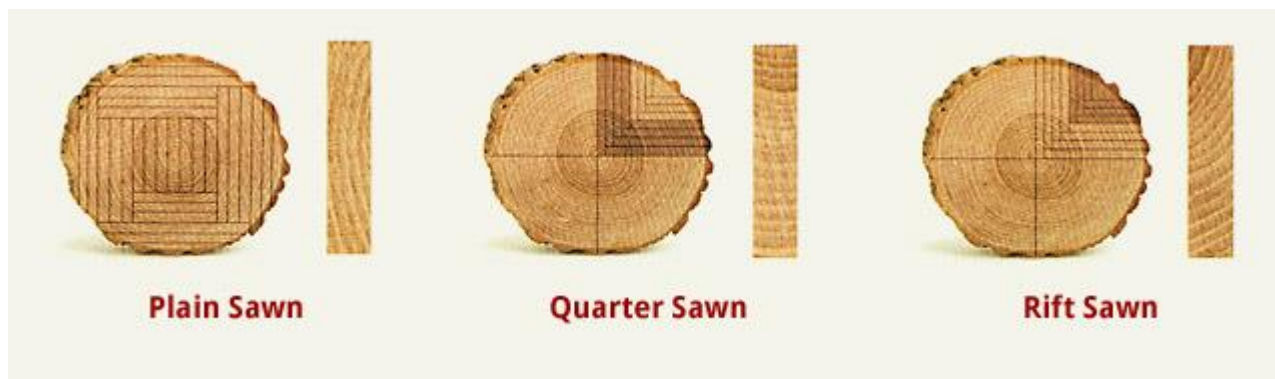
Please read through these specifications carefully. In the case of complaints, claims or dispute these Technical Specifications alongside with General Business Conditions guide the basis for handling such. All ordering customers are informed by written (yearly pricelist, brochure, order confirmation and home/ webpage www.esco-group.eu) where to find these Technical Specifications therefore these Technical Specifications are being automatically accepted by the customer when ordering ESCO Products.

Content

1. Woodtype	page 2
2. Quality control	page 2
3. Woodstyles	page 2
4. Product Emotions	page 3-6
• Bohemia- Chateau- Moravia- Kolonial- Pelgrim- Harfa- Harfa Vintage- Karel IV- Soft Tone	
5. Esco Herringbone	page 6
6. Length	page 6
7. Width	page 6
8. Bevel	page 6
9. Tolerance T&G solid	page 6
10. Toplayer/ wear layer	page 6
11. Filler	page 7
12. Sanding	page 7
13. Brushing and soft brushing	page 7
14. Smoking/ fuming	page 7
15. Machine Polyx HW oil & Polyx top-coating surface	page 7
16. Oxidative Hardwaxoil surface	page 8
17. Side products – joinery	page 8
18. Swelling shrinking of wood	page 8
19. Acclimatisation	page 8
20. Installation	page 8-9
21. Installer and owner/ end consumer responsibility	page 10
22. Advises for construction	page 10
23. Installation guideline for projects	page 10
24. Underfloorheating	page 10
25. Samples and product training	page 10
26. Dutch design – European made	page 10
27. Creative program	page 11
28. Maintenance	page 11
29. Residential warranty 10 years	page 11
30. Commercial warranty 3 years	page 11-12
31. Procedure claims	page 12
32. Certificates	page 12
33. General Buying Conditions	page 13-15

1. Wood type

ESCO CZ Production s.r.o. produces high-quality engineered hardwood oak flooring and solid hardwood oak flooring made of European oak, "Quercus Robur" and "Quercus Petraea". The oak species grows in the northern hemisphere in Europe. Esco and all ESCO suppliers are PEFC and/or FSC certified for durable forest-purchase and production management as well as European CE Declaration of Performance certified. Our products are moisture controlled with a wood moisture content in engineered flooring of 7% +/- 2% and solid 8% +/-2% conform DOP Regulation leaving the Esco factory in the Czech Republic Europe. The oak material used for Esco product Emotions are not sorted out by specific color, structure, grains, texture or types of sawing (rift-quarter-plain). Oak is an organic material from "Mother" nature, the origin of the oak will influence the color variations of the products and cannot be avoided. After installation oak floor will respond to the environment and change over time due to adjustment to the surroundings and circumstances where it is installed. Engineered hardwood flooring is more dimensionally stable than solid hardwood flooring however with both please be aware of the features of oak material in general and advices given by Esco. By applying special treatments in combination with the specific wood-type, wood-style and finishing Esco creates a unique brand identity. For the engineered 3-layer floors ESCO uses a high quality European spruce "Picea" as middle layer and for the engineered Multi 2 layer the under layer is a high quality exterior crossover glued European birch "Betula".



2. Quality control

Quality control starts in the forest with harvesting at the saw-mill (Esco the saw-mill as well as external suppliers) and all products undergo strict quality controls at several steps during the production process and before leaving the factory in Europe at Esco CZ Production s.r.o. All product emotions conform to specifications, tolerances and norms of PEFC and/or FSC, CE Declaration of Performance, NWFAs Industry Guideline of hardwood flooring, German DiBT. Quality check at arrival after transport is mandatory and responsibility of receiver. In the case of deviations contact your Esco supplier or contact Esco CZ Production s.r.o.

The factory production plant is 100% acclimatized to obtain the correct balance in humidity and to regulate the moisture contents of the wooden material. Esco CZ Production s.r.o. advise relative humidity of 45-65%, below 45% up-to min. 30% and above 65% up-to max. 70% is accepted but to be average regulated and controlled as time of exposure to 45-30% and 65-70% must be minimized because with prolonged exposure shape and visual abnormalities can occur. Under 30% and above 70% relative humidity is considered as extreme circumstances and are not covered within warranty. With 5% moisture content, the product will react extreme, but engineered hardwood flooring will not delaminate as cracks and change of dimensions will occur. Solid hardwood flooring with 5% moisture content will react extreme as cracks, change of dimensions will occur. Under 5% moisture content is not covered within warranty. Esco guarantees full traceability from forest control, harvesting till the end product. Esco confirms that the oak top-layers are bonded with PVAC without formaldehyde emissions, the multi 2-layer birch plywood is bonded with phenolic glue and not with urea formaldehyde resin. Consequently, they are perfectly adapted for interior living areas and preserve the indoor air quality and conform the USA CARB norm. Deliveries must be checked on the day of arrival after transport from Esco factory to customer warehouse. When after arrival and quality check at the customer warehouse by customer are no further information or claim regarding moisture content of the product this is automatically taken as confirmed OK meaning that afterwards claims regarding moisture content will not be approved by Esco. For checking the moisture content the customer must use a certificated measure machine which is TÜV calibrated yearly. As these machines also have a tolerance Esco demands a measure by Darrofen for legal cases.

3. Wood-Style (E.S.C.O and Specials)

From the 9 product emotions are 6 available in adjustable wood-styles depending on the dimension chosen. The wood-styles are unique Esco brand gradings that create the Esco identity. The "cosmetics" of the product emotion is superior to the wood-style and therefore the description is not always leading.

The adjustable product emotions are; Chateau, Kolonial, Pelgrim, Harfa, Harfa Vintage, Soft Tone.

The adjustable wood-style are; Elegance, Superb, Classic, Original.

The not adjustable product emotions are; Bohemia, Moravia, Karel IV.

The not adjustable wood-style are; Special Rustic, Special old.

Elegance: Dot-sized knots (practically knot-free), no Sapwood, no pinholes, no insects or surface molding mistakes, natural color variations are allowed, combed grain and different grain flow occasionally permitted, mineral streaks can occur in small amount due to influence oxidative natural process.

Superb: Small open filled knots allowed, closed medium sized healthy knots, no sapwood, no pinholes, no insects or molding mistakes, natural color variations are allowed, combed grain and different grain flow occasionally permitted, mineral streaks can occur in small amount due to influence oxidative natural process.

Classic: Partly Superb style (see above) in combination with bigger rustic circular open filled knots, cross-shaped and other shaped knots unlimited and cracks filled allowed. Closed healthy knots unlimited, in principal no sapwood allowed, no pinholes, insects or molding mistakes, combed grain and different grain flow occasionally permitted, mineral streaks can occur in small amount due to influence oxidative natural process.

Original: Mixture of 85% Classic and 15% Special Rustic.

Special Rustic: Strong rustic and very alive, open filled knots, crack and cross-shaped knots no size limit are allowed, closed healthy knots are allowed, extreme natural color variations are allowed, sapwood allowed, combed grain and different grain flow permitted, no pinholes, insects or molding mistakes, mineral streaks can occur in small amount due to influence oxidative natural process.

Special Old: Special sorted old style oak material. Very alive, open filled and not filled knots, cracks and cross-shaped knots all no size limit, extreme natural color variations are allowed, sapwood allowed, combed grains and different grains flow permitted, no planning mistakes, mineral streaks can occur in small amount due to influence oxidative natural process.

Our wood-styles are graded by hand after machining. Despite constant quality controls one wood-style might contain 5% of another wood-style. Esco does not sort out on color, texture, grains or direction of annual rings.

4. Product Emotions

The Esco program has 9 product emotions and each of them has its unique design, cosmetics and treatment given by the wood-style, color, treatment and by the natural characteristics of oak. All product emotions have their specific logo and name. 80% of the cosmetics for an emotion is made by the special treatment and the oil color highlights this treatment. Esco Emotions are not to compare with products other manufacturers as they have a unique cosmetic.

Product emotions are: Bohemia, Chateau, Moravia, Kolonial, Pelgrim, Harfa, Harfa Vintage, Karel IV and Soft-Tone.

Bohemia

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
x					x				

Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x				x		x	x	x	

Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
				8	3-6 weeks	x	optional		adjustable

Technical highlight: Surface and optic has color variations, surface lines, irregular surface smoothness and incidental rough spots shown by the oil finishing. Smoking treatment highlight surface features extra strong. Sanded surface Esco has his identity and is not to compare to other manufactures. We do not advise sanded products without bevel, if customer chose for it Esco gives no guarantee for the tolerance in thickness and height differences can occur after installation. Max width 225mm width in engineered, 185mm width in solid.-Woodstyle Special Rustic is very wild and hectic.

Chateau

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
X						x	x	x	x
Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
X				x	x	x	x	x	x
Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
x (V4)				8	3-6 weeks	x	optional		adjustable

Technical highlight: Surface and optic has color variations, surface lines, irregular surface smoothness and incidental rough spots shown by the oil finishing. Smoking treatment highlight surface features extra strong. Sanded surface Esco has his identity and is not to compare to other manufactures. We do not advise sanded products without bevel, if customer chose for it Esco gives no guarantee for the tolerance in thickness and height differences can occur after installation. Max width 225mm width in engineered, 185mm width in solid.-Woodstyle is adjustable.

Moravia

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
	X				x				

Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x				x		x	x	x	

Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
				8	3-6 weeks	x	optional		adjustable

Technical highlight: Filled Knots and cracks because of brushing procedure are “deeper” into the surface and therefore high difference. The brushing has a standard tolerance as due to hardness and thickness boards the brushing can be variable. The brushing treatment in combination with the high volume of color parts as pigment increases the gloss degree compared to the other products. Woodstyle Special Rustic is very wild and hectic in color.

Kolonial

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
	X					x	X	x	x

Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x				x	x	x	X	x	x

Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
x	x(*)	x(*)	x	8	3-6 weeks	x	optional	optional	adjustable

(*) oxidative hand oiled

Technical highlight: Filled Knots and cracks because of brushing procedure are “deeper” into the surface and therefore high difference. The brushing has a standard tolerance as due to hardness and thickness boards the brushing can be variable. The brushing treatment in combination with the high volume of color parts as pigment increases the gloss degree compared to the other products. Woodstyle is adjustable.

Pelgrim

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
		x					X	x	x

Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x				x			X	x	x

Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
x	x(*)	x(*)	x	8	3-6 weeks	x	optional	optional	

(*) oxidative hand oiled

Technical highlight: Special knots are filled with ecological fuller and oiled to achieve a 100 years old look. Damages and aging features complete the old appearance, Pelgrim is an old made distressed floor. The filler will sink after oxidative drying process which will take + 3 weeks. Because of the special treatment, the floor has an old-style color variation in “spots” and the surface is irregular, rough and smooth. Woodstyle is adjustable.

Harfa

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
			X	x		x	X	x	x
Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x				x			X	x	x
Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
				8	3-6 weeks	x	Optional		adjustable

Technical highlights: The cross sawn can be irregular caused by the tolerance in thickness of the boards as also the shape. The cross sawn effect is based on hardness, structure, grains oak surface as also the dimensional shape board. This leads to more and less extreme cross cut lines which are shown by the oil treatment. The soft brushing and cross sawn treatment in combination with the high volume of color parts as pigment increases the gloss degree compared to the other products. Woodstyle is adjustable.

Harfa Vintage

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
			X	x		x	X	x	x
Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x		x		x			X	x	x
Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
				8	3-6 weeks	x	Optional		adjustable

Technical highlights: The cross sawn can be irregular caused by the tolerance in thickness of the boards as also the shape. This leads to more and less extreme cross cut lines which are shown by the oil treatment. Harfa Vintage has less cross sawn effect as the Harfa. The soft brushing and cross sawn treatment in combination with the top coating increases the gloss degree. Woodstyle is adjustable

Karel IV

Sanded	Brushed	Old made	Cross sawn	Soft brush	Special old	Original	Classic	Superb	Elegance
		x	x	x	x				
Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
	x			x			x	x	
Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
				8	3-6 weeks	x			

Technical highlight: Karel IV is really something unique within our product range. European rustic oak with a highly distressed surface structure is mainly being produced by the hand of skilled handcraft men. The woodstyle is Special old style with knots in different shapes and sizes, distressed marks, irregular and regular water stains can occur. Every single board receives a high-quality Hardwaxoil finish and therefore an exclusive and individual look. Karel IV looks 300 years old and is extreme in style and dimension as well as in surface and cosmetics and it has the real back to basic appearance. In solid construction Karel IV is an extreme product without DIN EN norms or tolerances, therefore Esco advises to sell the solid version only with a bigger sample and point out the special optical features to the customers. With solid the height difference can be till 5mm and in engineered till 2mm. The surface is 3 times hand oiled and therefore an end maintaining

after installation is advised but not compulsory. Because the floor is hand oiled the cleaning and maintenance in the first 3 weeks should not be too intensive because the oil must harden out.

Soft Tone

Sanded	Brushed	Old made	Cross sawn	Soft brushed	Special rustic	Original	Classic	Superb	Elegance
				x		x	x	x	x

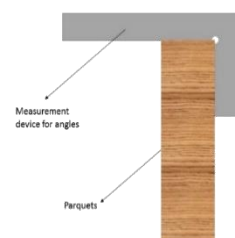
Machine oil +Top coating	Oxidative hand oil	Hydro stain	14mm solid	20mm solid	12mm 3 ply	14mm 3 ply	15mm 3 ply	15mm 2 ply	20mm 2 ply
x		x		x			x	x	x

Herringbone	Chevron	Pattern	Parquesco	Colors	Deliver time	V2 bevel	V4 bevel	No bevel	Filler color
x				8	3-6 weeks	x	optional		adjustable

Technical highlight: After installation Esco recommend first maintenance Osmo 3079 as extra protection. This because the colours are light. The typical oak features colourvariation and these are more noticeable and not to avoid with light colours

5. ESCO herringbone

Esco offer herringbone engineered Multi 2 layer. Due to the size of the boards it is to consider relative deviation. Standard DIN 13226 provides the deviation of the angle 0,2% measured on the head (see the picture below). Before installation it is strictly essential to check and spread the goods. Any doubts on deviations must be reported to ESCO immediately and prior installation.



6. Lengths

ESCO solid wooden flooring is being produced in random lengths. Thickness 20mm: 60 % longer than 1700 mm and 40 % between 400 mm and 1650 mm. The longest lengths can be max. 2500. Esco is depending in the length of the available material so with solid boards it can happen that equal length in one order can happen. Fixed lengths are available upon request; please contact the sales team for more info.

ESCO engineered flooring is being produced in random length. Thickness 12mm, 15mm and 20mm:

3-layer products come in different fix length, max. 4 each order. All lengths are separately packed. 1520mm, 1600mm, 1700mm, 1770mm, 1870 mm, 1920mm, 2120mm, 2400 mm. 2-layer products 15-20mm thickness 15% 700-1200mm and 85% 1495- 2400mm random. Fix length are available upon request, please contact the sales team for more info. Please note that because of technical and quality reason less than 1% of the length can be different as above mentioned. This is not a reason for claim.

7. Widths

Due to our raw-material purchasing system it might occur that widths can differ from the original order. The information about the exact width will be stated in the customer's order confirmation. It is possible to ask for preferred width and ESCO shall do their best to supply, however it cannot be guaranteed. The supplied width shall be stated in the order confirmation. Before the order goes into production customer can contact Esco regarding the change of width, after the order is in production Esco is not able to accept cancellations or changes from the customer's side as Esco produce after order and does not offer stock products.

Esco solid wooden flooring 100-120-150-170-185-205mm

Esco engineered flooring 78-120-155-175-190-225-245mm

8. Bevel

Our products have a standard bevel along two long sides (V2). Optional 4-side beveled(V4) and no bevel (T).

The optional V4 and T bevel can be offered depending on emotion, grading and size. Please ask the sales team Size of the bevel depends on product range and dimensions.

9. Tolerances T&G solid

The tolerances for solid T&G in the area of the head edges are approx. 1 mm to ensure an easy installation of solid wood flooring.
Tongue long side 6.30-6.40mm / Groove long side 6.70-6.80mm Tolerance +- 0.30-0.50mm
Tongue head side 6.90-7.00mm/ Groove head side 6.00-6.10mm Tolerance +- 1.00mm

10. Top-layer/ wear layer

The top-layer engineered of the oak have a tolerance in thickness based on the special treatment and tolerance under-core material used so this is always plus/minus (+-)

11. Filler

For our products, we use ecological filler. Esco has standard color fillers for all emotions/ colors. With creative program customer can change color filler and there are 4 options Light, dark, extra dark, black. This paste will cure within 2-4 days and fill the open knots and cracks. The final color optic is a mix of the color of the filler and oil as the filler will absorb the oil. A special oil-mixture is being used for our product Pelgrim to achieve its special look. This filler takes approx. 20 days to fully cure and sinks into the filled knots. If the filler is not fully cured while installing the floor Esco advises not to touch the filler. With Pelgrim changing color filler is technical not optional. With Soft Tone RAWLOOK the filler has light and dark light basic color after finishing.

12. Sanding (Bohemia- Chateau)

Esco always plane the product before further treatment, in the case of sanding Esco wants to create a certain optics which is not to compare with other brands. The optics and surface treatment for sanded products is therefore typical and original. Features after molding can be visual as this makes the sanded product an Esco emotion. Combination of oak structure, sanding and color can influence the result optically and is to accept as Esco works only with ecological products in a rustic hand-crafted style. The surface can have lines, more rough and smooth spots shown by the oil (-and smoking) treatment.

13. Brushing and soft brushing (Kolonial – Moravia – Harfa – Soft Tone – Harfa Vintage – Karel IV)

Depth of brushing depends on the structure and hardness of the wood. This will influence the overall look of the supplied flooring. Moreover, some color variations might occur and cannot be overcome. Combination of oak structure, brushing and color can influence the result optically and is to accept as Esco works only with ecological products in a rustic hand-crafted style.

14. Smoking/ fuming

When smoking oak floors, a certain amount of ammonia is put into the smoking chamber. The tannic-acid of our European oak reacts with the ammonia and might create darkish color and appearance. As not every piece of oak contains the same amount of tannic the color and appearance of smoked oak can vary. A customer's floor therefore can contain oak boards with lighter or darker colors. ESCO products are not fumigated to the core but +- 2mm into the surface. Smoking treatments shows the features of the surface and highlight these extra strong at the product Chateau and Pelgrim. Smoked oak will contain natural color differences and are therefore no reasons for complaints.



15. Machine Polyx Hardwaxoil & Polyx top-coating surface

Applies to all products machine oiled. Bohemia, Chateau, Moravia, Kolonial, Pelgrim, Harfa, Harfa Vintage, Soft Tone.

All color shades inclusive of the final top-coating are being cured through UV and oxygen. Polyx oil is NOT a standard UV oil as it is dried for 80% with UV and 20% by oxygen to obtain the advantages of a high quality ecological finish. The surface is dual-curing and therefore cures further with oxygen and optimizes its features (natural air drying) and therefore also repairable. ~~General~~ In basic ESCO products are ready to install without any end maintenance or use of soaps after installation if the floor is the last building activity, this means limited foot traffic on a finished floor at the construction side. If this is not the case than cover the floor well with protection. Be aware that the protection on top of the floor slow down the oxygen curing process and while covered do not use floor heating (radiant heating). When all construction work is finished take away protection and first cleaning/maintenance is advised with Osmo wax cleaner. ~~or Osmo 3079 (apply very thin).~~

When higher level of protection is required or with specific colors first maintenance Osmo 3079 (apply very thin). The Polyx top-coating closes the surface for 80% against liquids and therefore protects. This top-coating is NOT a lacquer (varnish) but an oil.

Esco has 9 products which means 9 treatments, the oil color finishing highlights the treatment. Treatment has influence on the wear and tear and therefore before making decision on product/ treatment ask the Esco supplier for advice for visual durability of the surface. Because of special treatment and colors, Harfa Vintage and Soft tone as light colors other product emotions it can be to be advised to decide for a first maintaining after installation with Osmo 3079. Esco advise to use Osmo maintenance products as shown on the leaflet in the package, the warranty for the product will not be valid when using other brands of maintenance products. Esco uses the German Osmo products which are to obtain by the official importer in your country or at Esco CZ Production s.r.o

Daily / weekly damp maintenance Osmo Wash & Care (Wischfix) in combination with mop as shown on the maintenance leaflet.

Technical highlight: No first maintenance after installation is required, exceptions when first maintenance is to advise:

- After installation because of construction activities.
- Floor is for commercial use and more extreme foot traffic and required is increase durability .
- Product emotions with light color as Basecoat, Natural White, RawLook, all Harfa Vintage and Soft Tone colors.

Osmo product which is advised for first maintenance and clean is Osmo Wax Cleaner.

Osmo products which are advised for first maintenance to increase durability is Osmo 3079 (apply very thin).

All Esco product emotions surfaces are to repair or to refinish. Please ask the sales team for more advice.

16. Oxidative Hardwaxoil surface

Karel IV is the only flooring product oiled and finished with 3 layers of Hardwaxoil, apply by hand and not machine top coating. After installation, a protected first maintenance is required for extra protection against wear and tear. Esco recommend Osmo 3062 or 3065 HW oil. In first 3 weeks, be careful with maintenance with water as the oil must cure/harden out and get strong. Staircases and nosing and all other hand oiled flooring products we Osmo 3062 or 3065 first maintaining after installation.

17. Side products – Joinery

All our joinery such as stair nosing, stairs etc. are hand-made. Prefinished, ESCO try to deliver these products in the most matching emotion as supplied floor. However, due to different batches of oak, hand-made process such as surface treatment especially smoking treatment, hand oiling, differences in overall look when compared to supplied flooring might occur. This must be considered as it cannot be claimed. As alternative Esco offers, unfinished in combination with cans hand oil and finish after installation with the possibility to influence the color at the spot or to order extra flooring material to manufacture the stairs from this material. In these 2 alternatives, the color variation can be influenced in the work.

18. Swelling and Shrinking of solid Wood 1 strip boards, Herringbone and French Herringbone

Moisture is a crucial factor for swelling and shrinking of oak, therefore always control that indoor humidity is between 45-65% (see issue 1 Wood-type) after installation. These are the best conditions for the oak material and in this environment, you avoid extreme swelling, shrinking or cracking. Not properly acclimated/ conditioned wood flooring may cause excessive expansion, shrinkage, dimensional distortion or structural damage. If the received flooring has different values in moisture content please contact your supplier for advice as this can happen due to transport and storage.

Solid wood is “working” within certain tolerances of +/- 3%. This means that if the humidity in e.g. a room is changing the width and thickness of a solid floor plank (depending on direction of annual rings) can change. Our products are being delivered with a wood moisture content of +/- 8 %. This equals approx. the climate (humidity) in European households.

Possible problems which might occur by having incorrect conditions are:

- Swelling and shrinking
- Deformation up to 1 mm on 50 mm
- Drying cracks
- Angle on the heads 0,3mm up to on 50mm width
- Long side deformation (twisting) up to 4 mm on 1000 mm length

Furthermore, we are not having any influence on the growth or annual rings which are having effects on swelling or shrinking of the wood. As there is no uniformed EU-regulation for producing solid wood flooring in wider size 1 strip boards our products differ in length, width and tolerances to standard products such as parquet. Esco products are available in solid and engineered, the cosmetics/look/emotion is 100% the same and in this way Esco offers an alternative to solid if needed.

19. Acclimatization

The goods should be stored within the room it will be installed in for 2-3 days to adapt to its climate/environment.

20. Installation

Esco hardwood flooring should be stored within the room of installation, it will be installed 2-3 days after adapting to its climate/environment. Appropriate temperature and humidity conditions are defined as those conditions to be experienced in the building after occupancy. The foil package is made for this acclimatization process as it has mini ventilation holes. Advice: the floor is the last to install, make sure that the room/building and surroundings are clean and dry and that all other construction works have been finished. ESCO engineered products are suitable for glue down on concrete and anhydrite sub floor, nailing method on sub floor and floating installation. Solid wood floors are suitable for glue down on concrete or anhydrite sub floor or nailing method on sub-construction.

Before installing check, the conditions such as moisture, product emotion, color, dimensions, the subfloor construction, air temperature, relative humidity, crawl space, room conditions and area circumstances which can harm or pollute the flooring. The building must be structurally completed and enclosed and the crawl space and basements are well ventilated and dry.

- **Floating installation concrete sub-floor:** Moisture content testing concrete subfloor without floor heating under/max 2,5% Gravimetric method (1.30% Carbide method)). Moisture content testing anhydrite without floor heating under/ max. 0,5% Gravimetric method both must be minimum 30 days old, must be clean, dry, smooth, flat-structurally, sound- free of squeaks, flat free of protruding fasteners, have proper vapor retarder, have

proper underlayment, air temperature must be +/- 18°C (64.4 F) and relative humidity between 45-65% (see issue 1. Wood type and 2. Quality control). Glue applied on the upper side of the tongue, we recommend e.g. PVAC glue. Dilatation must be around the room and all the hard parts, the size-thickness depends on the type of flooring, plot sizes and dimensional changes as over floating installation usually the max area without dilatation in width is approx. 5x6 m. Any squeak and popping sounds related to floating installation is not considered as manufacturer's defect and will not be covered by our warranty. The dilatation of the final flooring must be used everywhere, where there is a dilatation of the base layer and on the perimeter of the floor and around all the rigid building structures. e.g. walls, pipes from the heaters, staircases, just all fixed building structures that do not freely move. The combination 3-layer construction, longer length of the boards and room circumstances can cause slight bowing in the length and is to accept.

- **Floating installation wooden sub-floor:** Moisture should be no more than 3% difference in moisture content between properly acclimated wood flooring and sub-floor. The sub-floor must be 20mm in thickness or thicker exterior plywood installed with long edges at the right angle to the floor joists and staggered so that the end joints in adjacent panels break over different joints. floor joist system must be properly nailed, concrete sub-floor must be clean, dry, smooth, flat-structurally, sound-free of squeaks, flat, free of protruding fasteners, have proper vapor retarder, have proper underlayment, air temperature must be +/- 18°C (64.4 F) and relative humidity between 45-65% (see issue 1. Wood type and 2. Quality control). Glue applied on the upper side of the tongue, we recommend e.g. PVAC glue. Dilatation must be around the room and all the hard parts, the size-thickness depends on the type of flooring, plot sizes and dimensional changes as over floating installation usually the max area without dilatation in width is approx. 5x6 m. . Any squeak and popping sounds related to floating installation is not considered as manufacturer's defect and will not be covered by our warranty. The dilatation of the final flooring must be used everywhere, where there is a dilatation of the base layer and on the perimeter of the floor and around all the rigid building structures. e.g. walls, pipes from the heaters, staircases, just all fixed building structures that do not freely move. The combination 3-layer construction, longer length of the boards and room circumstances can cause slight bowing in the length and is to accept.
- **Glue-down concrete sub-floor:** Moisture content testing concrete subfloor without floor heating under/ max 2,5% Gravimetric method (1.30% Carbide method) and with floor heating under/ max 2.0% Gravimetric method (0.85% Carbide method). Moisture content testing anhydrite without floor heating under/ max. 0,5% Gravimetric method and with floor heating 0.3% Gravimetric method. Both must be minimum 30 days old, if necessary proper vapor retarder recommends by adhesive manufacturer before applying adhesive is advised to be used. Sub-floor must be clean, dry, smooth, flat-structurally, flat, sound-free of squeaks, free of protruding fasteners, air temperature +/- 18 °C (64.4 F), relative humidity between 45-65% (see issue 1. Wood type and 2. Quality control). Advised adhesive concrete sub-floor can be flexible Silane, Polyurethane, Epoxies. Read technical specifications of adhesive manufacturer for how to use the adhesive. Moisture sealing along with the adhesive is always recommended. The dilatation of the final flooring must be used everywhere, where there is a dilatation of the base layer and on the perimeter of the floor and around all the rigid building structures. e.g. walls, pipes from the heaters, staircases, just all fixed building structures that do not freely move.
- **Glue-down wooden sub-floor:** Moisture to be no more than 2% difference in moisture content between properly acclimated wood flooring and sub-floor. The sub-floor must be 20mm in thickness or thicker exterior plywood installed with long edges at the right angle to floor joists and staggered so that the end joints in adjacent panels break over different joints square edged, kiln dried coniferous lumber, laid diagonally over joist system and properly nailed. If necessary proper vapor retarder recommends by adhesive manufacturer before applying adhesive, sub-floor must be clean, dry, smooth, flat structurally, sound-free of squeaks, free of protruding fasteners, air temperature +- 18 °C (64.4 F), relative humidity between 45-65% (see issue 1. Wood type and 2. Quality control). Advised adhesive wooden sub-floor can be flexible Silane, Polyurethane, Epoxies. Read technical specifications of adhesive manufacturer for how to use the adhesive. Moisture sealing along with the adhesive is always recommended. The dilatation of the final flooring must be used everywhere, where there is a dilatation of the base layer and on the perimeter of the floor and around all the rigid building structures. e.g. walls, pipes from the heaters, staircases, just all fixed building structures that do not freely move.
- **Nailing down sub-floor:** Moisture to be no more than 2% difference in moisture content between properly acclimated wood flooring and sub-floor. The sub-floor must be 20mm in thickness or thicker exterior plywood installed with long edges at the right angle to floor joists and staggered so that the end joints in adjacent panels break over different joints square edged, kiln dried coniferous lumber, laid diagonally over joist system and properly nailed. If necessary proper vapor retarder recommends. When used beams the distance between the sub-construction beams MUST NOT exceed 45 cm to avoid bending of the floor planks. Our solid wood planks are easy to install due to the higher tolerances at tongue and groove. Before installation the goods have to be checked thoroughly. Any squeak and popping sounds related to nailing down is not considered as manufacturer's defect and will not be covered by our warranty. We only recommend 14-20mm solid, 15mm – 20mm Engineered multi 2-layer for this way of installation. The dilatation of the final flooring must be used everywhere, where there is a dilatation of the base layer and on the perimeter of the floor and around all the rigid building structures. e.g. walls, pipes from the heaters, staircases, just all fixed building structures that do not freely move.

After installation, if you choose to protectively cover the floor, cover the floor completely and with a radiant floor heating turn off the heating off. Ask for technical recommendations at manufacturer of adhesive for covering a glued down floor. Use a covering material with a vapor perm rating of 1 perm or more to avoid trapping moisture on or within the floor. Any covering should be taped, using a low-adhesion tape, to base or show moldings. Do not tape to finished flooring. When taping paper or sheets together, tape them to each other, not to the floor. Esco does not take any responsibility and liability for external conditions, materials or circumstances concerning the sub-floor and installation work.

21. Installer and owner/ end consumer responsibility

Before installation, installer and/or end-consumer must inspect all materials carefully:

- Building must be structurally enclosed and completed, outside doors/windows must be in place as all concrete, masonry, plastering, and drywall and paint must be completed.
- Check the flooring product, wood-style- color- lengths- width- quantity- package, to be sure the correct product has been delivered in good order and condition. Do NOT install if the floor is not acceptable.
- Installer should pre-sort out the boards on color and grading to achieve an even and nice-looking result. Boards with optical obvious imperfections should be trimmed and used for hidden places or discarded.
- Installer and end-consumer take notice/reads the maintenance and technical information flyer.
- Installer is aware of the Esco technical specifications for solid and engineered hardwood flooring.
- Installer takes the responsibility to determine if the constructions-site and sub-floor conditions are structurally acceptable for Esco wood flooring installation.

- Installer is responsible for the correct m2 ordered and must take into notice waste in cutting in % as waste due to smaller imperfections in the oak , product mother nature, which are not to avoid and can be max 5% of the m2.

After this, by installing the product the installer and end-consumer approve and accept the product. Claims after installation regarding color, wood-style, length, width, packaging/damaging, are not accepted by Esco CZ Production s.r.o. Esco does not accept any responsibility for the installer's lack of performance, quality of installation and labor. To achieve an even and nicer look we recommend pre-sorting the wood planks (in wood-style, annual rings, and lengths).

Possible damages have to be claimed immediately. By installing the floor, it is being accepted!

ESCO CZ Production s.r.o. does assume no liability for the condition of the subfloor (moisture content of subfloor, installation conditions e.g.). Subfloors in new buildings should undergo a moisture measurement according to national regulations.

22. Advices for construction

Esco advises not to install the floor too early in the time frame of total construction as the floor can be damaged or polluted by construction work activities. Dust, intensive construction activities and dirt can damage or pollute the floor in an extreme way as the floor is produced for regular normal usage. Therefore, take notice of following:

- Install the floor when all other activities are finished and the rooms are clean without extreme construction activities to avoid extreme dirt on the floor.
- When the floor is installed and there are still activities cover the floor so it is protected.
- While the floor is being covered no floor, heating can be used.
- After finishing the construction activities, the cover can be removed and it is recommended to clean and maintain (if needed see issue 15) the floor with Osmo products before using.

Esco only advises Osmo products to be used for maintaining and cleaning. All other products are not to be used and therefore only for the risk of the customer. Warranty will not be valid anymore (see issue 28)

23. Installation guideline for project floors

Esco offers at projects with certain volume a personal advice and guide service for fitters, building supervisors and cleaning staff in terms of maintenance and cleaning while building and installing. Also, Esco offers technical trainings at the factory for all professionals dealing with the installation and maintenance. Please ask the sales team for more information.

24. Under-floor heating

ESCO engineered parquet is suitable for wet construction under-floor heating. But the following subjects **MUST** be respected:

- Thermal conductivity E 12523:2000 3-layer 0,134 W/m. K.
- Thermal conductivity CSN EN 12664:2000 2-layer 0,104 W/m. K.
- The humidity in the room is between 45-65 %.
- The solid wood moisture content is 8 +/- 2%, the engineered wood moisture content 7 +/- 2%.
- No carpets as it will block the heat flow.
- With dry construction underfloor heating a conductor between underfloor heating and the floor is mandatory. Electrical floor heating you have in many types and most have a rapid change of temperature, which always results in temperature differences. It is important that the material is chosen based on quality and durability. In case of gluing, the screed (= in this case the conductor) must have properties of underfloor for gluing, i.e. minimum strength in tension perpendicular to the underfloor of 1 MPa. This ensure the stability of glued floor in case of dimensional changes. In case of floating installation(I personal would not recommend) to add e.g alu foil approved for use between floor heating and wooden flooring as conductor. The temperature as Technical Specifications ESCO, which is temperature does not exceed 40C from bottom and 29C on top floor. The power of the heating is very important. Do not exceed 100 W/m2.
- Thermal conductivity CSN EN 12664:2000. The floor surface temperature shall not exceed 29 °C, due to convenience of user and health reasons is recommended not to exceed 26 °C. Extended period of high surface temperature under low air humidity causes drying out of the wood and it is also unhealthy. This natural process should be avoided by controlling the relative air humidity at level 45 % - 65%. Suitable glue for installation must be used. It is recommended to use polyurethane or Silane based glues. Avoid using alcohol based glues for this purpose Reaction to shrinkage or cracking of wood must be immediate. If those effects occur, please set your air humidity into proper value. Long term effects of dry air or exceed temperature cannot be covered by guarantee.
- With a water-heating system the temperature shall not exceed 40 °C.
- The floor must be heated slowly. Concrete floor must be dry (up to 2,0 % MC – gravimetric method), this takes approx. 30 days. Afterwards a test trial of floor heating (approx. 21 days) before installation must be undertaken and must be according to the guide line and instructions of manufacturer of the floor heating system (ČSN 492120). After concrete floor was tested for floor heating, floor heating must be switched off and Esco products can be installed and only when moisture of concrete is max 2,0% (0,85 CM%), 0,3% (0,3 CM%) for anhydrite screeds or less. Water temperature: Every day max 5° degrees up and max up to 35° degrees. In winter time, the floor heating can be reduced and not switched off till surface temperature is 15-18° degree, when Esco product is installed, please temper the under-floor heating for at least 3 days for 15-18° degree and after this process the heating can be heated more.
- Suitable glue for installation must be used (also in T&G).
- If the under-floor heating is the main heating system the floor **MUST** not be installed floating and must be installed by gluing to substrate. We strongly recommend to also glue in T&G all 4 sides.
- If the floor is overheated in dry air condition, the wood moisture content can go below 5%. ESCO then can assume no liability for the floor.
- Humidity below 30% or above 70 % is considered to be extreme conditions. In such conditions the floor can react extreme (cracking, cupping, e.g.)

If the above stated subjects are in doubt or not adhered to the floor can deform due to extreme swelling and shrinking, crack e.g. Solid wood floors for under-floor heating are suitable only at a thickness of 14 mm, however it must be accepted that bigger gaps between the boards will/might occur as small cracks.

Wide boards 225mm and 245mm engineered multi-layer are more sensitive for influence of under-floor heating. Generally wooden flooring will always react but narrow sizes show less reaction than wider boards (in %). Therefore, it might happen, depending on the circumstances, that the board will “work/react” and dry in slightly which can lead to microscope openings between boards or to slight cupping.

25. Samples and product training

Floor samples are ONLY representation of the requested finish and due to their size cannot always show all characteristics of later supplied flooring. It is not possible to show examples of wood-styles and eventually upcoming natural wood colors in just one small floor sample. We therefore recommend getting informed in our showrooms or in showrooms of our business partners. Differences in the look of the surface between sample and supplied flooring are caused by hardness, figures, grains of the oak material, oil and surface treatment. Therefore, it is not technically possible to avoid these differences. At least 1 m² of the supplied order has to match the sample. Esco offers free of costs product trainings to understand the technical and sales concept. For this reason, Esco recommends this for every sales person which sells Esco products once a year to do so to keep their knowledge up-dated. Esco does not take responsibility for all misunderstandings or claims caused by lack of interest and or lack of knowledge of the products.

26. Dutch Design – European made

ESCO CZ Production is processing Dutch Design, European made. All materials used come from Europe. All our products are produced in our factory in the Czech Republic. By us produced solid wood floors AND our multilayer products emotions are identical in cosmetics and color as the same raw-material (European oak) is used for production as well as the total production treatment.

27. Creative Program

ESCO Creative Program allows our customers to design their own desired floor by applying extras such as hand-scraped bevel, distressing, 4-side bevel, smoking treatment, fix length or a color tone from a different range to be applied to another one. There are many more other options, please, contact our sales team for more info. Subject to availability.

28. Maintenance

Wood floors are a long-term investment that, correctly maintained, will last the lifetime of the home. Proper maintenance is required (please read maintenance flyer in each package).

- Use floor protector pads on chairs' legs, tables' legs and any other furniture's legs.
- Use standard air vacuum cleaner (do not use vacuum with a beater bar/brush).
- Use rugs at all entrances to help trap grit and absorb moisture (rugs can cause color differences after certain time caused by light exposure).
- DO NOT use extreme wet mops, ammonia and dust cleaners.
- DO NOT move heavy furniture over the floor without lifting as scratches can occur.
- DO NOT clean or maintain with steam excessive water.
- Pet nails need to be trimmed regularly.
- All shoes, especially high heels, should be kept in good repair.
- Be especially attentive to potential spill areas, dishwashers/sinks/icemakers/stovetops/household plants/Christmas tree stands and so on.

Use only Osmo cleaning and maintenance products. If other cleaning and maintenance products are used Esco CZ Production s.r.o. gives no warranty. Routine daily/weekly basic dry maintenance vacuuming and lightly damp mopping water + Osmo Wash and Care (shake and mix with water 1:10). For stubborn stains or when floor "looks" dry as well as wear spots use Osmo Liquid Wax cleaner (shake and use pure by using clean cloth to apply). Always avoid standing water.

29. Residential warranty 10 years

Esco engineered flooring must be installed by professional installers guided by the Esco technical specifications. Failures to install accordance with these guidelines and specifications will void this warranty. Esco warrants, under normal residential conditions, correctly installed and proper maintenance, its surface will not wear for 10 years from the date of purchase. Esco engineered flooring must be used under normal residential traffic conditions and all care and maintenance instructions as in Esco technical specifications and Osmo Guidelines must be followed for warranty to be valid. Using other products is not approved by Esco and may damage the floor and void the warranty. Esco sole liability on any claim see GTC 2018 issue 8.

Esco warranty does not cover the following conditions, residential exclusions:

- Scratches, damage caused by accidents, neglected maintenance, everyday wear, abnormal wear, heavy and or concentrated foot traffic, house pets, spiked heel shoes, sand, grit, abrasive substance, heavy objects or furniture rolled or dragged across the surface.
- Insect infestation after products have left the Esco factory.
- Loss of gloss, losing oil or dry stains caused by improper maintenance.
- Damages caused by failure to support furniture with the floor protectors made of non-staining or non-pigmented hard plastic.
- Squeaking, crackling, popping or such kind of noises.
- Splinter or chips on the edge of boards caused by moving heavy objects across the floor.
- Color variations, shade of texture of the floor purchased can be different as seen at sample or picture brochure.
- Color variations in oak, shade of texture, grains, structure of oak, sanding treatment, brushing treatment have direct influence on the purchased floor color.
- Wooden flooring will change color caused by normal day light and maintenance over time, this is to accept and is normal reaction. Rugs/carpets should be periodically moved to minimize this effect. Color boards will react separate due to fact described in Woodtype issue 1 that material is mix of oak from different regions. This feature will create a natural look of the floor and is to accept.
- The floor must be controlled in an environmentally structure, perfect circumstances are air humidity level 45-65% (min. and max. limits are 30-70%) and room temperature between 16-26°C (60F-80F). Esco advises a use of a humidifier or dehumidifier.
- Knot holes, worm holes, splits, heartwood, mineral streaks, and any imperfections in the surface of the floor.
- Damage due to water saturations including but limited to building leaks, plumbing leaks or overflows, leaks from dishwasher, refrigerator ice making units, wet or swamp basements/crawlspace, concrete sub-floors that have not been cured, plywood sub-floors with excessive moisture, etc.

- Esco engineered flooring has been manufactured in accordance with accepted industry standards which permit a defect tolerance not to exceed 5%. The defect may be of a manufacturing or natural type.
- Split, cracks, in the flooring used in environments that are excessively dry or humid (< under 30% > above 70%)
- Prior to installation of any flooring, the installer must determine that the job-site environment and the sub-surfaces involved meet or exceed all requirements as stated in the installation instruction. We cannot accept any responsibility for job failure resulting from and associated with sub surface or job-site environment, climate and deficiencies.

30. Commercial warranty 3 years

Esco engineered flooring must be installed by professional installers guided by the Esco technical specifications. Failures to install accordance with these guidelines and specifications will void this warranty. Esco warrants, under normal commercial conditions, correctly installed and proper maintenance, its surface will not wear for 3 years from the date of purchase. Esco engineered flooring must be used under normal residential traffic conditions and all care and maintenance instructions as in Esco technical specifications and Osmo Guidelines must be followed for warranty to be valid. Using other products is not approved by Esco and may damage the floor and void the warranty. Esco sole liability on any claim see GTC 2018 issue 8.

Esco warranty does not cover the following conditions, commercial exclusions:

- Scratches, damage caused by accidents, neglected maintenance, everyday wear, abnormal wear, heavy and or concentrated foot traffic, house pets, spiked heel shoes, sand, grit, abrasive substance, heavy objects or furniture rolled or dragged across the surface.
- Insect infestation after products have left the Esco factory.
- Loss of gloss, losing oil or dry stains caused by improper maintenance.
- Damages caused by failure to support furniture with the floor protectors made of non-staining or non-pigmented hard plastic.
- Squeaking, crackling, popping or such kind of noises.
- Splinter or chips on the edge of boards caused by moving heavy objects across the floor.
- Color variations, shade of texture of the floor purchased can be different as seen at sample or picture brochure.
- Color variations in oak, shade of texture, grains, structure of Oak, sanding treatment, brushing treatment have direct influence on the purchased floor color.
- Wooden flooring will change color caused by normal day light and maintenance over time, this is to accept and is normal reaction. Rugs/carpets should be periodically moved to minimize this effect. Color boards will react separate due to fact described in Woodtype issue 1 that material is mix of oak from different regions. This feature will create a natural look of the floor and is to accept.
- The floor must be controlled in an environmentally structure, perfect circumstances are air humidity level 45-65% (min. and max. limits are 30-70%) and room temperature between 16-26°C (60F-80F). Esco advises a use of a humidifier or dehumidifier.
- Knot holes, worm holes, splits, heartwood, mineral streaks, and any imperfections in the surface of the floor.
- Damage due to water saturations including but limited to building leaks, plumbing leaks or overflows, leaks from dishwasher, refrigerator ice making units, wet or swamp basements/ crawlspaces, concrete sub-floors that have not been cured, plywood sub-floors with excessive moisture, etc.
- Esco engineered flooring has been manufactured in accordance with accepted industry standards which permit a defect tolerance not to exceed 5%. The defect may be of a manufacturing or natural type.
- Split, cracks, in the flooring used in environments that are excessively dry or humid (< under 30% > above 70%)
- Prior to installation of any flooring, the installer must determine that the job-site environment and the sub-surfaces involved meet or exceed all requirements as stated in the installation instruction. We cannot accept any responsibility for job failure resulting from and associated with sub surface or job-site environment, climate and deficiencies.

31. Procedure claims

- Claims must be reported by written to Esco CZ Production s.r.o sales department (information www.escogroup.eu)
- Claims can only be reported by the customer who purchased the goods directly at Esco Production s.r.o.
- Department of claims will hand over a claim- form to be filled in by customer to obtain all technical information.
- Customer needs to return the claim-form filled in completely.
- Department of claims will analyze and judge the claim and will inform customer within 7 working days.

32. Certificates

All Esco Products:

- CARB norm Composite Wood Products Ultra low emitting Formaldehyde Resins under section 93120.3 title 17 California Code of Regulations.
- Allgemeine Deutsche Bauaufsichtliche Zulassung DiBT (German Construction Regulation)
- TÜV chain of Custody PEFC CSN EN 45011:1998 CFCS 1004:2006 Revision 3
- European CE Declaration of Performance CSN EN 13226
- Thermal conductivity CSN EN 12664:2000
- Resistance Test Engineered Hardwood flooring Protocol 016-14P EN
- Slipperiness test DIN 51130 angle till 35
- Slipperiness test CSN EN 1339
- Fire resistance Cfl.S1 and Dfl.S1