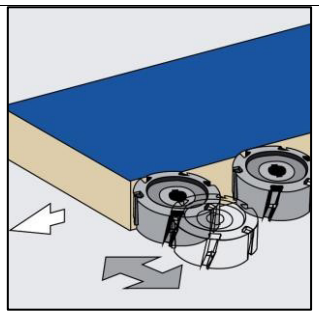
Dimensioning — edge banding



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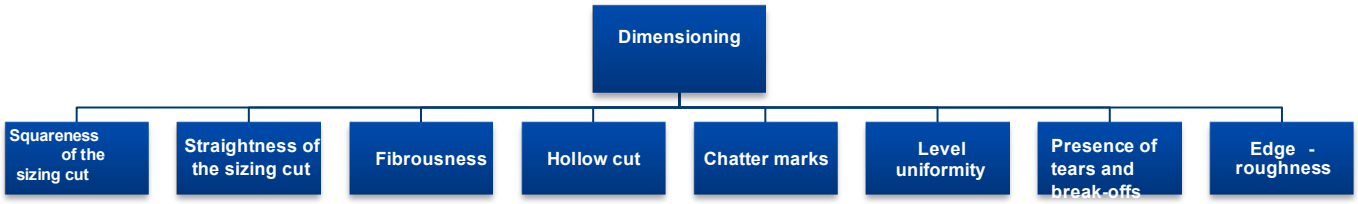
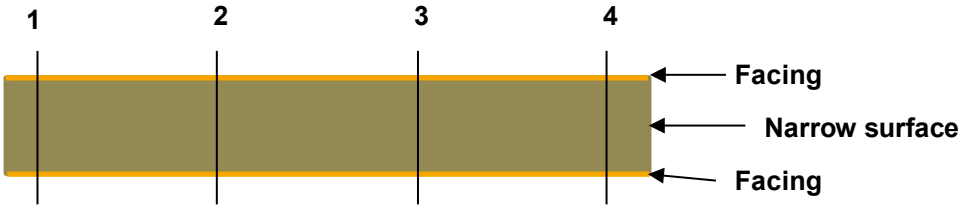


1. Squareness of the sizing cut

What?	Quality feature	Squareness of the sizing cut
	Definition	The angle between the formatted narrow surface and the workpiece surface (covering layer side) must be 90° after the formatting of the narrow surface with a joint trimmer or double chipper. Any angular deviations from the setpoint angle (= 90°) are not acceptable.
How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement — precision control square Theoretical — objective: • Coordinate-measuring device • Height-measuring device

Measurement method	An angle must be measured only in combination with both trimming motors (double chipping unit and joint trimmer). This measurement must also be performed over several workpieces (minimum two) with the same setting with MDF material and a workpiece height of 60 mm. Light gap measurement — precision control square: Measurement of the angle between the narrow surface and the top of the workpiece over the height of the narrow surface. The lower and upper cutting surfaces must have the same level (workpiece height of 60 mm required). The squareness must be checked on at least the following four measuring lines.  Figure 1: Measuring the squareness of the sizing cut Coordinate-measuring device: Automatic check of the squareness in comparison with a CAD model. Height-measuring device: Check of the squareness with the height measuring device.
Decision criteria	The tolerance of the squareness for a carrier material with a workpiece thickness of 60 mm is: ± 0.05 mm. Light gap measurement — precision control square: The width of the light gap that forms is evaluated. There must be no significant light gap (light gap approximately 0) between the measuring instrument and the workpiece.

2. Straightness of the sizing cut

What?		
	Quality feature	Straightness of the sizing cut
	Definition	Assessment of the sizing cut with regard to the straightness of the narrow surface, relative to the workpiece length. The straightness for formatting is determined primarily by a closed glue joint or functional layer. If not straight, the gluing process can result in uneven or open joints. In addition, during alternating trimming, the straightness is influenced by the impacts when the trimmer is inserted.

How?	Measuring instrument	Pragmatic — subjective: • Haptic testing (finger test) • Light gap measurement — straight edge/precision control square Theoretical — objective: • Coordinate-measuring device
	Measurement method	Haptic testing (finger test): In haptic testing, the person performing the test moves their fingertips over the surface of the narrow surface to strengthen the perception of unevenness. Light gap measurement — straight edge/precision control square: To determine the deviations, a precision control square for light gap measurement is placed on the surface of the carrier material with an angle leg and the straightness of the narrow surface is measured. The straightness or flatness of the sizing cut can thus be assessed. When measuring the light gap with a precision control square, it can be seen in the backlight whether there are straight or non-straight sections on the narrow surface. Special attention must also be paid to impacts from alternating trimming.
	Decision criteria	The straightness must be within a tolerance zone (demarcated by two parallel planes) of ± 0.05 mm. Light gap measurement — straight edge/precision control square: The width of the light gap between the formatted narrow surface and the precision control square must be visually assessed and no significant light gap (light gap approximately 0) must be visible. Coordinate-measuring device: The straightness must be within a tolerance zone of ± 0.05 mm.

3. Fibrousness

What?	Quality feature	Fibrousness of the narrow surface
	Definition	When the narrow surface is processed and chips created, fibrous surfaces can form due to chips, cells or cell components not being completely separated from the material. This can be influenced by the shape of the blade, the blade wear and the fiber cutting direction. The severity of such effects can vary with different carrier materials.

How?		
	Measuring instrument	Pragmatic — subjective: • Visual and haptic testing (finger test) • Measuring magnifier Pragmatic — objective: • Reference sample (e.g. in the form of images) Theoretical — objective: • Digital microscope • USB microscope
	Measurement method	Particular attention must be paid to the following aspects: • MDF: fibers protruding over the entire narrow surface • Chipboards: fibers and loose chip pieces in the middle layer • Solid wood: torn pieces of fiber, especially in the edge area Visual and haptic testing: The workpieces are checked visually and haptically over the entire formatted narrow surface. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x magnification): As with the visual check, a measuring magnifier can also be used to more clearly identify protruding fibers. Digital microscope/USB microscope: As with the visual check, a microscope can also be used to more clearly identify protruding chips or fibers. In addition, the results can be measured and documented with images.
	Decision criteria	There must be no significantly visible and/or haptically noticeable protruding chips or fibers over the entire narrow surface.

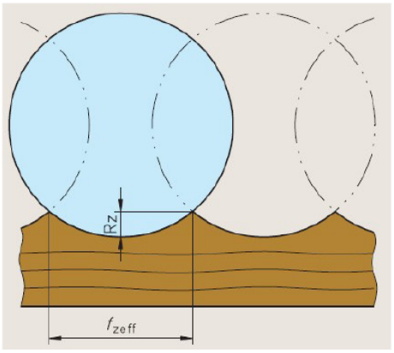
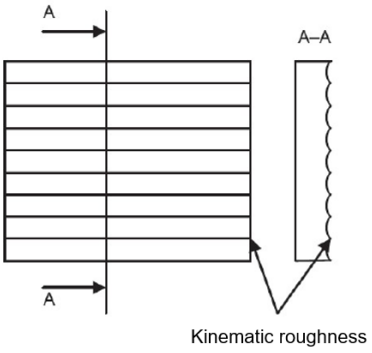
4. Hollow cut

What?		
	Quality feature	Hollow cut
	Definition	The shape and position of the hollow cut are the basis for air-tight edge banding. A hollow cut is created over the height of the narrow surface both for joint trimming and for double chipping. The hollow cut creates a narrow glue joint.

How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement with precision control square/straight edge • Feeler gauge Pragmatic — objective: • Coordinate-measuring device • Height-measuring device
	Measurement method	To check the hollow cut, MDF carrier materials with a height of min. 38 mm should be used. Light gap measurement with precision control square/straight edge: To determine the deviations, a precision control square for light gap measurement is placed on the surface of the carrier material with an angle leg and measured against the narrow surface. The hollow cut can thus be assessed. When measuring the light gap with a straight edge, the shape of the hollow cut can be seen in the backlight. Height-measuring device: The workpiece must not be warped to ensure that the hollow cut can be measured correctly with the height-measuring device.
	Decision criteria	The hollow cut must always be centered (symmetrically) over the height of the narrow surface. Hollow cut created = 0.067 mm (40-mm MDF panel; 4014021260) Hollow cut created = 0.017 mm (20-mm MDF panel; 4014021260)

5. Chatter marks

	Quality feature	Chatter marks

What?	Definition	The formatted narrow surface is characterized by wavy processing tracks, which appear as chatter marks. Despite the small (within µm range) chatter mark depth t, they are easy to see with scattered light, as they disperse light falling at an angle and create shadow effects. In the case of tools with multiple blades, the cutting kinematics only represent one blade on the surface produced due to the tolerances. The "shorter" blades contribute to the chipping work, but they are not visible on the workpiece due to their shorter length. In addition, vibrations between the tool and the workpiece can also be a cause (axial runout is decisive).   Kinematic roughness The chatter marks can be determined by the length and depth of the chatter mark.
How?	Measuring instrument	Pragmatic — subjective: • Visual and haptic testing (finger test) • Contact testing (charcoal pencil) + manual measuring • Measuring magnifier Theoretical — objective: • Digital microscope • Profile method • Coordinate-measuring device • Contour-measuring device • Optical (camera system/laser)
	Measurement method	Only MDF or solid wood carrier materials may be used to evaluate chatter marks on a formatted workpiece. Ideally, plastic materials can also be used. Measurement at feed = 20 m/min. There are two different parameters for measuring procedures: Chatter mark length $$Chatter\ mark\ length = \frac{feed\ speed}{Speed\ x\ effective\ cutting\ tooth}$$ $$f_{z_{eff}} = \frac{v_1}{n * z_w}$$

		Chatter mark depth $\text{Level of roughness} = \frac{\text{Chatter mark length}^2}{4 \text{ x tool diameter}}$ $R_z = \frac{f_{z_{eff}}{}^2}{4 * d}$ Visual and haptic testing (finger test): The entire formatted narrow surface of the workpieces is evaluated visually and haptically. In haptic testing, the person performing the test moves their fingertips over the surface of the narrow surface to strengthen the perception of chatter marks. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Contact testing (charcoal pencil) + manual measuring: In order to manually measure chatter marks, they should be highlighted through contact testing. Graphite rods can be used here, for example. The color particles are deposited in the chatter marks when the rods are pressed against the cutting edge surface. If the chatter mark widths are even, multiple marks should be counted to reduce uncertainty when determining the start and end points by averaging. Digital microscope: As with the visual check, a digital microscope (e.g. dark field illumination) can be used to evaluate the chatter marks on the narrow surface. In addition, the chatter mark length and width can be measured and documented with the optimum setting.
	Decision criteria	If wave-like chatter marks are visible without optical aids, the workpiece is immediately considered "not OK."

6. Level uniformity

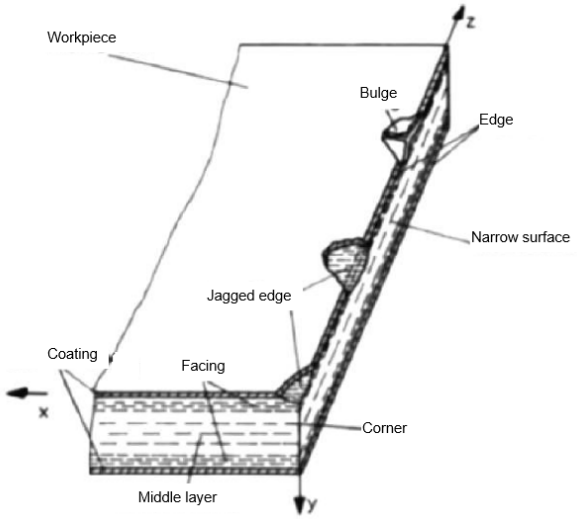
	Quality feature	Level uniformity

What?	Definition	Level uniformity over the workpiece width for the joint trimmer or over the workpiece length of the narrow surface for the double chipper. Tools with several offset sequential trimmers can create small steps and level inconsistencies on the narrow surface in the coverage area of the two cutting segments. The depth of the processing motors relative to each other is particularly important here. When using double chippers, such a transition occurs at the height of the narrow surface, and at the length of the narrow surface when using a joint trimmer.
How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement with precision control square/straight edge • Haptic testing (finger test) Theoretical — objective: • Digital microscope
	Measurement method	Double chipper: measurement on the narrow surface at a workpiece height of min. 38 mm. Joint trimmer: measurement on the formatted narrow surface over the workpiece length. Haptic testing (fingernail test): For the haptic testing, the person performing the test moves their fingertips over the surface against the fibers, especially at the transition, to strengthen the perception ("cat hair effect"). Light gap measurement with precision control square/straight edge: By measuring the light gap with a straight edge or precision control square, any steps on the narrow surface between the cutting surfaces of the two processing motors can be seen in the backlight. Digital microscope: As with light gap measurement, the digital microscope is used at a flat angle and in backlight to examine and document the level uniformity of the narrow surface.
	Decision criteria	In the transition area between the two processing motors, there must be neither a visual projection (contrast change in the overlap area) nor a perceptible transition (step). Double chipper: There must be no recognizable transition in the form of a step over the workpiece height that can be detected visually or with the measuring devices. Joint trimmer: There must be no recognizable transition in the form of a step over the workpiece length that can be detected visually or with the measuring devices.

7. Presence of tears and break-offs

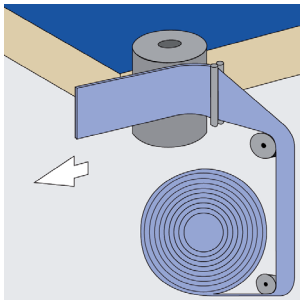
What?	Quality feature	Presence of tears and break-offs
	Definition	When the blade exits at the end of the workpiece, there is a risk of creating tears if the surface can no longer withstand the processing forces. In solid wood, this is especially prevalent when processing in a transverse direction. Parts can flake or tear, especially at points where the tool exits with a cutting direction away from the narrow surface (e.g. in reverse rotation when exiting at the workpiece corners). There is also a risk of transverse edges applied in previous processing steps breaking off.
	Fundamentals	VDI 3414 sheet 1
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Haptic testing (finger test)
	Measurement method	Visual check without tools The sizing cut of the workpieces is visually examined in good lighting (paying special attention to the edge and corner areas). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing (finger test) For the haptic testing, the person performing the test moves their fingertips against the fibers over the narrow surface (especially at the transition) to strengthen the perception ("cat hair effect").
	Decision criteria	There must be no visible or noticeable tears on the entire narrow surface and corners. There must also be no tears or breaks beyond the narrow surface into the covering layer and/or the transverse edge.

8. Edge roughness

What?	Quality feature	Edge roughness of the cutting edge (= edge breaks)
	Definition	In the case of coated panels, parts of the decorative layer may flake, especially when formatting the narrow surface. While the coating is rather hard and brittle, the carrier plate is rather soft. If a force is now exerted on the composite by friction or cutting forces during cutting, this results in different stresses and strains in the components. The edge roughness feature (nicked surface with reference to the edge length) can be divided into the following types: • Construction edge • Bulge • Crack • Jagged edge • Flaking of the decorative layer • Tears in the decorative layer  Figure 2: Edge roughness Breakouts that extend beyond the area of the decorative coating into the carrier material are particularly problematic.
How?	Measuring instrument	Pragmatic — subjective: • Measuring magnifier (5x magnification) • Contact testing Pragmatic — objective: • Reference sample with grading scale (HOMAG Panel Dividing) Theoretical — objective: • Contour-measuring device (EQUAM, form tester) • USB microscope • Digital microscope • Laser measuring system • Optical measuring system MSQ (HOMAG Panel Dividing)

Measurement method	Measuring magnifier: Using a measuring magnifier, the edge area is examined for the different types of edge roughness in 50-mm sections. Contact testing: In order to manually measure edge roughness, it should be highlighted through contact testing. Graphite rods can be used here, for example. The color particles are deposited in the edge roughness when the rods are pressed onto the cutting edge surface, making the characteristics more easily recognizable. Reference sample with grading scale (HOMAG Panel Dividing): Use the HOMAG Panel Dividing reference sample with grading scale from 1–4. Digital microscope: As with a measuring magnifier, a digital microscope can also be used to clearly identify edge roughness. In addition, the results can be measured and documented with images.
Decision criteria	There must be no visually detectable types of edge roughness in the edge area over the entire workpiece length that can be detected using the specified measuring devices.

Gluing — edge banding



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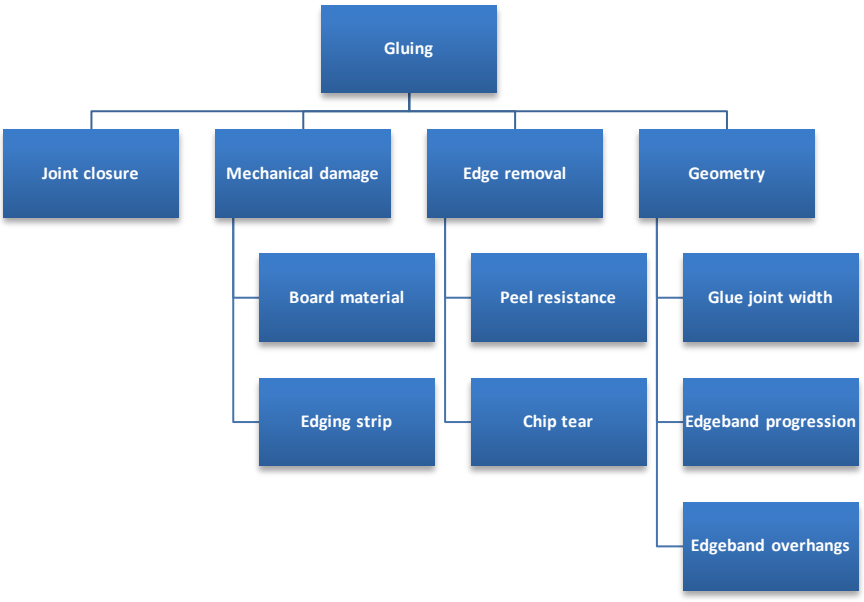


9. Joint closure

What?	Quality feature	Joint closure (closed glue joint)
	Definition	Defects or cavities (furrows and accessible cavities) visible on the surface in the glue joint between the panel material and edge material (or between edge material and edge material). In order to create a water vapor-proof coating, the surfaces brought into contact must be fully utilized as a gluing zone.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Measuring magnifier (5x to 10x magnification) • Color penetration process • Contact testing • Colored marker test (water-soluble Edding pen) Theoretical — objective: • Microscope (digital/USB)
	Measurement method	Measuring magnifier (5x to 10x magnification): The two front sides and the top and bottom of the second (produced) workpiece or following workpiece are examined in a well-lit room at an angle of 90° in 5x to 10x magnification. Color penetration process: The visible part of the glue joint must first be cleaned with a special cleaning agent (MarkerR MR79) and then sprayed with permanent red (MarkerR MR68NT). After 3 minutes, the permanent red can be wiped off with a paper towel and the developer (MarkerR MR70) can then be applied. Defects are then shown as red dots on the glue joint. Contact testing/colored marker test: Color particles (e.g. of a graphite pencil or a water-soluble Edding pen) can be deposited into any defects (openings) by pressing the pencil/marker on the visible part of the glue joint. Defects can then be clearly identified and, if necessary, measured. Microscope (digital/USB): As with the visual check, a digital microscope can be used to check that the glue joint is closed. In addition, any defects that occur can be measured (e.g. average value of the defects in 50-mm sections) and documented.
	Decision criteria	The glue joint must be completely closed. There must be no defects or cavities on any glue joint of the workpiece that can be detected using the specified measuring devices.

10. Mechanical damage

10.1 Board material

What?	Quality feature	Mechanical damage to the panel material
	Definition	Damage to the panel material after it has left the dimensioning in defined quality must not be visible. Special attention must be paid to mechanical damage to the panel material caused by the pressure of the gluing roller on the covering layer of the panel material. The feature of mechanical damage to the panel material can be divided into the following types: • Positioned bulges in the covering layer • Flaking and breaks • Serrations
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) Theoretical — objective: • Microscope (digital/USB up to 200x magnification)
	Measurement method	Visual check without tools: The entire workpiece length and the front sides are visually inspected with special attention paid to the panel material. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification): The front sides and the top and bottom of the second or following workpiece are examined in a well-lit room at an angle of 90° in 5x to 10x magnification. Digital microscope/USB microscope: Same as the visual check, but with the support of measuring instruments and the possibility to measure and document errors.
	Decision criteria	There must be no visible damage to the panel material on the entire workpiece in the direct connection (edge area) to the glue joint that can be detected with the specified measuring devices.

10.2 Edging strip

What?	Quality feature	Mechanical damage to the edgeband
	Definition	The magazine (e.g. edgeband guide), the edgeband transport or the pressure zone can cause mechanical damage to the edgeband surface. In addition, the pressure zone can also cause buckling at the front edge after the approach section (point 4). The feature of mechanical damage to the edgeband can be divided into the following types: • "Deformed" edgeband • Edgeband missing/torn/too short • Unevenness in the edge • Dents • Scratch marks • Elongated depressions
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Light gap measurement with straight edge Theoretical — objective: • Digital microscope • USB microscope (200x magnification)
	Measurement method	Visual check without tools: The workpieces are visually evaluated over the entire workpiece length with special attention paid to the edgeband. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification): The top and bottom of the second (produced) or following workpiece are examined in a well-lit room at an angle of 90° in 5x to 10x magnification. Light gap measurement with straight edge: When measuring the light gap with a straight edge, any scratch marks on the surface of the edgeband can be seen in the backlight. Digital microscope/USB microscope: Same as the visual check, but with the support of measuring instruments and the possibility to measure and document errors.
	Decision criteria	There must be no visually perceptible damage on the edgeband over the entire narrow surface in the longitudinal and transverse direction of the workpiece that can be detected with the specified measuring devices.

11.Edge removal

11.1 Peel resistance

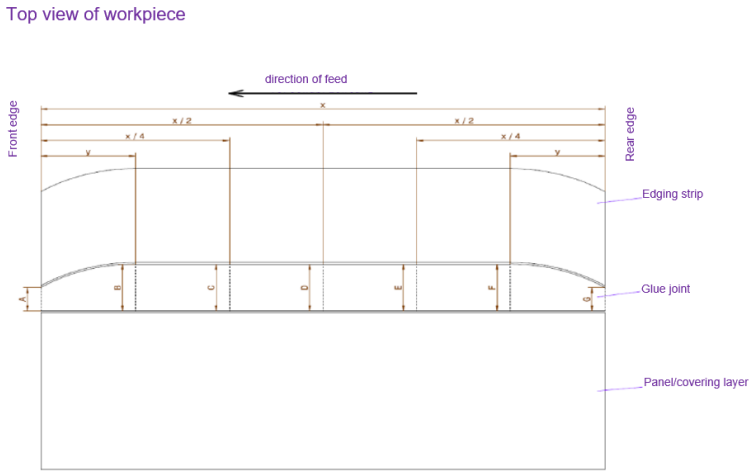
What?	Quality feature	Edge removal — peel resistance
	Definition	The peel resistance describes the average force measured perpendicular to the glue joint per test piece width unit that is required to continuously separate the two joining parts (panel material and edgeband) of a glued test piece.
	Regulations	• DIN EN 1464 • Instructions for the edge removal test
How?	Measuring instrument	Theoretical — objective: • Material-testing machine (e.g. tensile testing machine MPK SPZ 3K)
	Measurement method	Constant peeling of the edgeband with a cross rail feed speed of 100 mm/min and a peeling distance of min. 200 mm. Evaluation of the average peel resistance, ignoring the first and last 10% of the peeling distance.
	Decision criteria	The following average peeling forces in Newton per millimeter of sample width (N/mm) must be achieved: >= 3 N/mm As an alternative to the peeling forces, the test is passed in the event of a substrate breakage (edgeband breaks during the test).

11.2 Chip tear

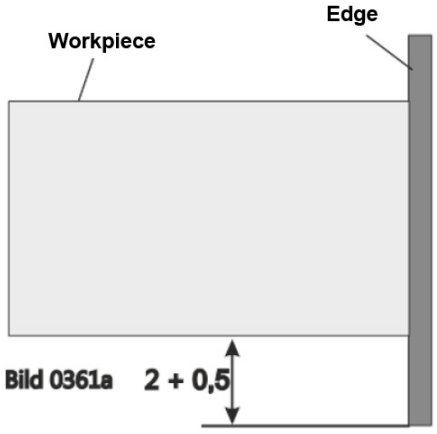
What?	Quality feature	Edge removal — chip tear-off
	Definition	The extent to which the adhesive side of the edgeband is covered with chips is evaluated on the peeled workpiece. This is to assess the strength of the glue joint and the boundary layer between the carrier material and the edgeband.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The chip tear is evaluated on a peeled edgeband. In this evaluation, the extent to which the back of the edgeband is covered with chips is investigated. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	The adhesion must be rated as very good if 100% of the peeled edgeband is covered with adhesive as well as with chips/fibers from the panel material.

12. Geometry

12.1 Glue joint width

What?	Quality feature	Geometry — glue joint width
	Definition	Measurement of the glue joint dimension (top and bottom of workpiece) to determine the glue joint width over the entire workpiece length using defined measuring points. Particular attention must be paid to the buckling at the front and rear edges.
	Regulations	-
How?	Measuring instrument	Pragmatic — objective: • Measuring magnifier (5x to 10x magnification) with thread counter Theoretical — objective: • Microscope (digital/USB with 200x magnification)
	Measurement method	The glue joint must be measured at measuring points A to G (see Figure 1: Measurement of the glue joint width). The arithmetic mean value is calculated from measuring points B to F using the formula $\bar{x} = \frac{B+C+D+E+F}{5}$. The outer measuring points A and G are not taken into account in the calculation of the mean value. These measuring points are particularly influenced by the lift-off and contact pressure of the KAL.  Figure 1: Measurement of the glue joint width
	Decision criteria	• $A\ und\ G \geq 0{,}5 * \bar{x}$ • $\bar{x} - 20\% \leq\ Messwerte\ B\ bis\ F \leq\ \bar{x} + 20\%$ • Difference between top and bottom ± 20% • Measured values A to G should be as small as possible (depending on the raw materials) and B to F must not exceed 0.15 mm when using EVA or 0.1 mm when using PU. Carrier material to be used: chipboard EN 312 P2 38 mm (e.g. Egger P2).

12.2 Edgeband progression

What?	Quality feature	Geometry — edgeband progression
	Definition	Measurement of the edgeband overhangs and the edgeband progression at the top and bottom of the workpiece over the entire length.
	Regulations	-
How?	Measuring instrument	Pragmatic — objective: • Fitting aid Theoretical — objective: • Caliper gage/depth gage
	Measurement method	Gage: An additional gage can be prepared to evaluate deviations. Caliper gage/depth gage: Measurement of the overhang of the edgeband at the top and bottom of the workpiece over the entire workpiece length and evaluation of the progression over the length for panels without a hold-down device.  Figure 2: Edgeband progression
	Decision criteria	In general, the following specification applies to the use of the correct edgeband: $$Kantenbandhöhe\ [mm] = Plattendicke + 4\ mm$$ Gage: There must be no visible deviations from the workpiece to the gage. Caliper gage/dial gage/depth gage: The tolerance for the edgeband progression is: $$\pm\ 0{,}5\ mm$$

12.3 Edge material overhangs

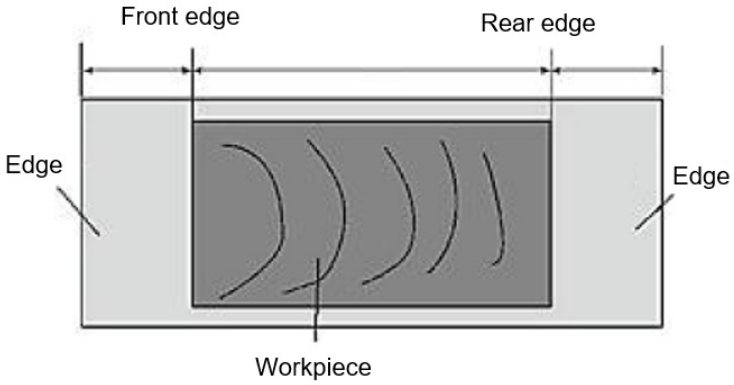
<table>
<tr><td rowspan="4">What?</td><td>Quality feature</td><td>Geometry — edge material overhangs</td></tr>
<tr><td>Definition</td><td>Evaluation and measurement of the edge material overhangs longitudinally to the front and rear edge of a workpiece.</td></tr>
<tr><td>Regulations</td><td>-</td></tr>
<tr><td rowspan="3">How?</td><td>Measuring instrument</td><td>Theoretical — objective:
Caliper gage/depth gage</td></tr>
<tr><td>Measurement method</td><td>Caliper gage/depth gage:
Measurement of the overhangs of the glued edge material at the front and rear edges.
 

Figure 3: Edgeband overhangs</td></tr>
<tr><td>Decision criteria</td><td>Caliper gage/dial gage/depth gage:
The following tolerances apply to the respective procedure:
<table><tr><th>Type of glue</th><th>Front edge</th><th>Rear edge</th></tr><tr><td>Glue joint</td><td>5 mm ± 2.0 mm</td><td>5 mm ± 2.0 mm</td></tr><tr><td>laserTec</td><td>10 mm ± 2.0 mm</td><td>20 mm ± 2.0 mm</td></tr><tr><td>airTec</td><td>20 mm ± 2.0 mm</td><td>30 mm ± 2.0 mm</td></tr></table>Each at 20 m/min feed speed</td></tr>
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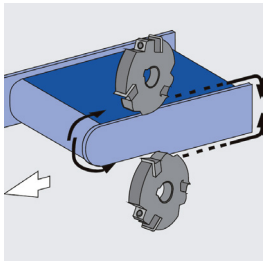
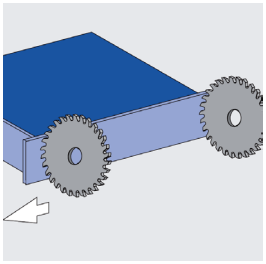
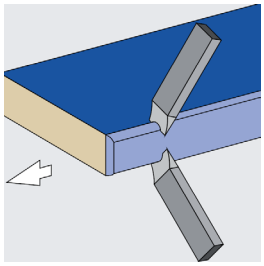
Post-processing — edge banding

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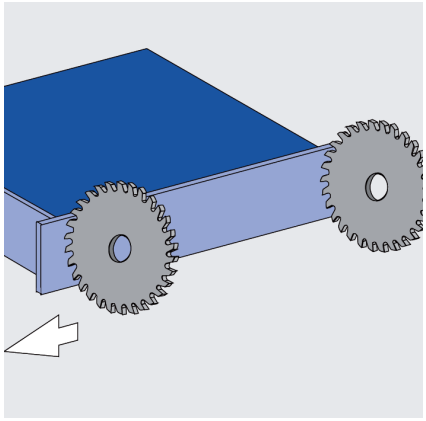
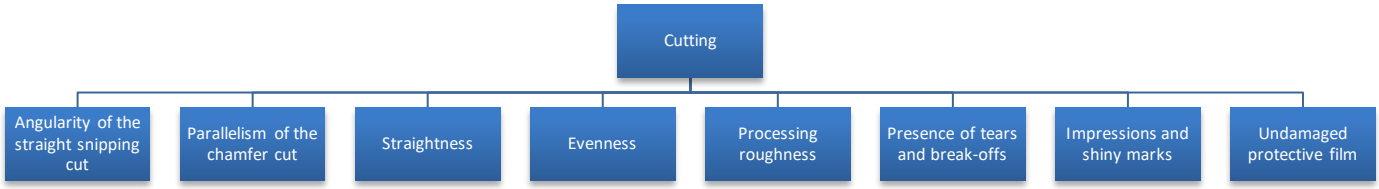
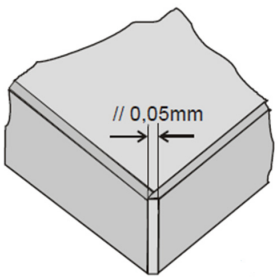
13. Cutting

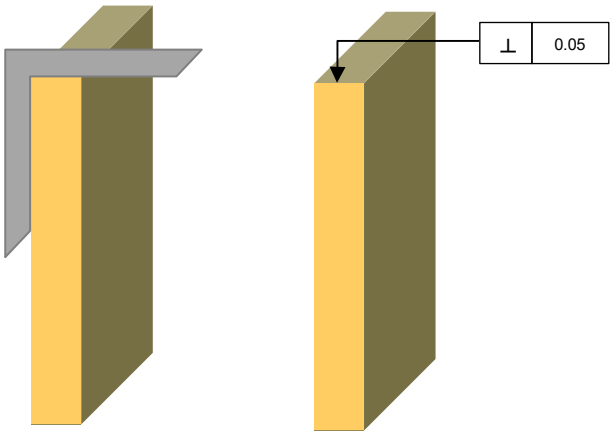



Cutting
Angularity of the straight snipping cut
Parallelism of the chamfer cut
Straightness
Evenness
Processing roughness
Presence of tears and break-offs
Impressions and shiny marks
Undamaged protective film

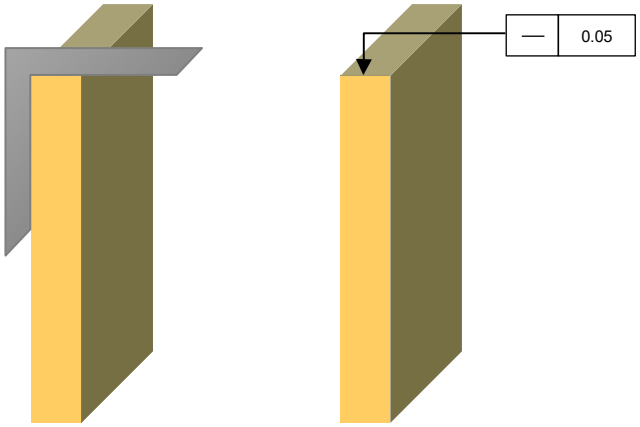
13.1 Parallelism of the chamfer cut

What?	Quality feature	Parallelism of the chamfer cut
	Definition	Evaluation of the parallelism of the chamfer for chamfer snipping. The chamfer thickness must be set according to the edgeband thickness. The two chamfer edges must be at a parallel and equal distance over the entire edgeband height.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) Theoretical — objective: • Digital microscope • USB magnifying glass
	Measurement method	A test sample with a workpiece thickness of >= 38 mm must be used for the assessment of parallelism. Visual check without tools: The parallel progression of the chamfer cut is visually examined in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier: In addition to the visual check, a measuring magnifier can be used to look at the parallel progression more closely as a supportive measure. Digital microscope: For objective and reproducible results, a digital microscope can be used and the parallelism measured and documented.
	Decision criteria	Visual check without tools: There must be no visual deviations in the parallelism of the chamfer over the workpiece height. With tools: The parallelism of the test sample with a workpiece thickness >= 38 mm must not deviate by more than 0.05 mm. 

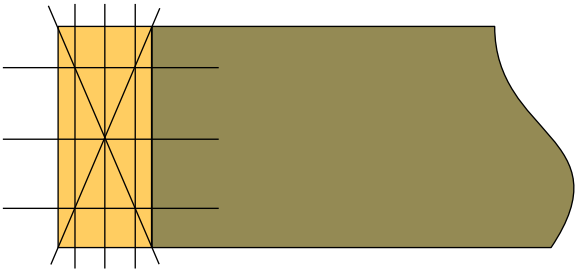
13.2 Angularity of the straight snipping cut

What?	Quality feature	Angularity of the straight snipping cut
	Definition	Evaluation of the squareness of the straight snipping cut for flush and straight snipping. This evaluation applies for all edge materials.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement with precision control square Theoretical — objective: • Digital microscope • Measuring machine (e.g. KMG)
	Measurement method	Light gap measurement with precision control square: To determine the deviations, a precision control square for light gap measurement is placed on the base surface at an angle of 90° with an angle leg to check the angle of the snipping cut with the second leg. The squareness of the snipping cut can thus be assessed.  Figure 4: Angularity of the straight snipping cut Measuring machine (KMG): Automatic check of the squareness in comparison with a CAD model
	Decision criteria	Light gap measurement with precision control square: The angularity of the straight snipping cut must not visually deviate from the precision control square. Measuring machine (KMG): The angularity measurement must not exceed the following tolerances: • Workpiece thickness <= 22 mm ➔ tolerance = 0.05 mm • Workpiece thickness > 22 mm ➔ tolerance = 0.10 mm

13.3 Straightness of the snipping cut (edge material thickness ≤ 3 mm)

What?	Quality feature	Straightness of the snipping cut (edge thickness ≤ 3 mm)
	Definition	Assessment of the straightness of the snipping cut after the flush snipping and straight snipping processes. No surface unevenness must be detectable on the edge of the snipping cut. Straightness applies only to edge materials with a thickness ≤ 3 mm.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement with straight edge Theoretical — objective: • Measuring machine (KMG)
	Measurement method	Only edge materials ≤ 3 mm may be used to assess the straightness. Light gap measurement with straight edge: To determine the deviations, the longitudinal side of a straight edge for light gap measurement is placed on the base surface and the snipping cut is checked. The straightness or flatness of the snipping cut can thus be assessed.  Figure 5: Straightness of the snipping cut Measuring machine (KMG): Automatic check of straightness in comparison with a CAD model.
	Decision criteria	Light gap measurement — straight edge: The straightness of the snipping cut must not deviate visually over the workpiece height; no significant light gap must be visible. Measuring machine (KMG): The straightness measurement of the snipping cut may deviate a maximum of 0.05 mm for an edgeband ≤ 3 mm.

13.4 Evenness of the snipping cut (edge thickness > 3 mm)

What?	Quality feature	Evenness of the snipping cut (edge thickness > 3 mm; solid edges)
	Definition	Assessment of the evenness of the surface of the snipping cut after flush and straight snipping. No surface unevenness must be detectable on the surface of the snipping cut. The evenness applies exclusively to edges with a thickness of > 3 mm, commonly referred to as solid edges.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Light gap measurement with straight edge/precision control square Theoretical — objective: • Measuring machine (KMG)
	Measurement method	The quality feature of evenness can be evaluated only for edges > 3 mm. If possible, the evenness of the snipping cut is measured with a solid edge of 20 x 60 mm, otherwise with the thickest available edgeband. Light gap measurement — straight edge/precision control square: When measuring the light gap with a straight edge, it can be seen in the backlight whether the surface is even or uneven. The surface of the snipping cut should be checked over the eight measuring distances as shown by the lines in the figure.  Figure 6: Evenness of the snipping cut KMG measuring machine: Automatic check of evenness in comparison with a CAD model.
	Decision criteria	Light gap measurement — straight edge: In the back light, the width of the light gap between the solid edge and the precision control square must be evaluated visually at the individual measuring lines and as a whole. No significant light gap should be visible. Measuring machine (KMG): The tolerance of the evenness of a snipping cut is a maximum of 0.05 mm.

13.5 Processing roughness

What?	Quality feature	Processing roughness of the snipping cut
	Definition	When processing with defined blades, the roughness of the surface of the snipping cut is determined by the roughness of the blades (chatter marks, tooth marks, fibers, scratches, etc.) and reflected as cutting tracks on the snipping cut. Here, processing tracks or cutting tracks can appear on ABS and wood edges, whereas PP edges tend to smear.
	Regulations	• VDI guideline 3414 sheet 1
How?	Measuring instrument	Pragmatic — subjective: • Haptic testing (finger test) • Measuring magnifier (5x to 10x magnification) • Light gap measurement with straight edge Theoretical — objective: • Contour-measuring device • Roughness-measuring device • Digital microscope (+ dark field illumination)
	Measurement method	Haptic testing (finger test): In haptic testing, the person performing the test moves their fingertips over the surface of the snipping cut to strengthen the perception of unevenness. Measuring magnifier (5x to 10x magnification): The snipping cuts of the workpieces are evaluated at an angle of 90° with good lighting and a 5x to 10x magnification. Light gap measurement — straight edge: To determine the deviations, the straight edge for light gap measurement is placed on the snipping cut. The processing roughness on the snipping cut can thus be assessed in the backlight.
	Decision criteria	The limit value for the processing roughness of the snipping cut is Rz = 25. Haptic testing (finger test) No significant roughness should be perceptible haptically on the snipping cut. Measuring magnifier No significant roughness must be perceptible with the measuring magnifier on the snipping cut. Light gap measurement — straight edge No significant roughness should be perceptible in the backlight with the straight edge.

13.6 Presence of tears and break-offs

What?	Quality feature	Presence of tears and break-offs
	Definition	Visible and perceptible protruding fibers, tears and cracks in the edgeband over the snipping cut, which, depending on the material, can occur due to the cutting shape, tool wear and the direction of the fiber cut. A distinction is made between two states of tears and breaks: • In the case of plastic edgeband materials (PP & ABS), by edgeband breaking off upward, downward and especially at the corners. • In the case of wood and melamine edgebands, tears occur at the edge areas of the snipping cut.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Haptic testing (finger test)
	Measurement method	Visual check without tools: The snipping cuts of the workpieces are visually examined in good lighting with special attention paid to the edge and corner areas. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing (finger test): In addition to the visual check, the person performing the test moves their fingertips over the surface against the direction of cutting, so that fibers or parts of fibers stand up due to their jagged structure. These fibers get caught in the furrows and grooves of the fingertips, thus increasing the perception ("cat hair effect").
	Decision criteria	Visual check without tools/haptic testing: There must be no visible or haptically perceptible tears over the entire height of the snipping cut. In addition, there must be no tears or break-offs beyond the snipping cut into the covering layer.

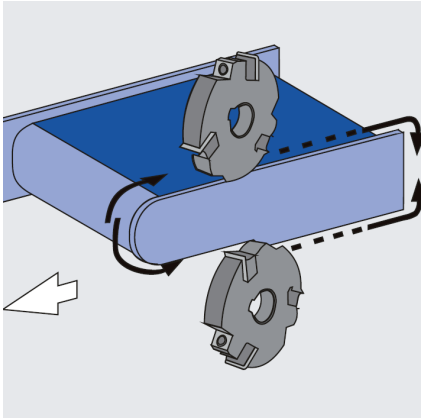
13.7 Impressions and shiny marks during cutting

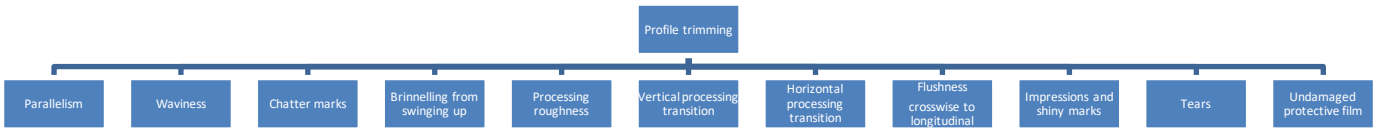
What?	Quality feature	Impressions and shiny marks during cutting
	Definition	Design deviations in the form of pressure points and shiny marks on the edgeband and in the form of friction when the workpieces are traced by the snipping stops (tracing elements). Difference between impressions and shiny marks: • Impressions are created in particular with upright snipping stops by the snipping stop at the front and/or rear edge. • Shiny marks are created by moving snipping stops or the chamfer snipping stop. Note that this effect is intensified in the case of dark, glossy colors.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Haptic testing (finger test)
	Measurement method	Visual check without tools: Workpieces with an edgeband are visually checked in the backlight/scattered light (natural/direct sunlight). Shine is characterized by the intense reflection of light on smooth surfaces. In comparison with the majority of the surface, shiny marks and impressions are recognizable by a change of directional reflection (when exposed to light). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification): A measuring magnifier can be used to examine and evaluate shiny marks or detect impressions more closely. Haptic testing (finger test): Haptically, impressions can be felt in particular on the workpiece in the area of the snipping stops.
	Decision criteria	In the areas where the snipping stops touch or slide on the edgeband, no visible and/or haptically perceptible impressions or shiny marks should be detected using the specified measuring devices.

13.8 Undamaged protective film

What?	Quality feature	Undamaged protective film
	Definition	If protective film is present on the edgeband, it must not be ripped or torn by the snipping process and hang down. It is important that the protective film is not damaged. This can occur especially in the case of snipping units with moving snipping stops.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The workpiece is visually inspected at the snipping cut areas in good lighting without any tools. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	Visual check without tools: During this visual check, a distinction is made between two states for visual evaluation: • OK = undamaged protective film and adhesion • NOK = damaged protective film or no adhesion

14. Profile trimming





14.1 Parallelism of profile trimming

What?	Quality feature	Parallelism of profile trimming
	Definition	Evaluation of the vertical profile variant (e.g. radius, chamfer) of profile trimming for parallelism over the entire workpiece height. The parallelism of the vertical profile variant describes the parallel progression of the profile at the same profile width over the workpiece height of the two cutting edges to each other.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) Theoretical — objective: • Digital microscope
	Measurement method	Workpieces with a height of ≥ 38 mm must be used to evaluate parallelism. Visual check without tools/measuring magnifier: The vertical profile gradients of the workpieces are examined for parallelism in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Digital microscope: In addition, a digital microscope can be used for objective and reproducible results.
	Decision criteria	Visual check without tools/measuring magnifier: There must be no visible deviations in parallelism over the entire workpiece height after profile trimming. Digital microscope: The profile variant of the edgeband may deviate up to a maximum of 0.05 mm in its parallelism over the entire workpiece height.

14.2 Waviness

What?	Quality feature	Waviness
	Definition	Waviness caused by cutting refers to uneven parts with wavelengths or surface irregularities. This waviness is caused by the flat area of the tool blades, which can cause a profile (e.g. radius, chamfer) to become too wide and the two edge areas (e.g. the radii) to become wavy. For a precise radius, it is important to use the correct tool for the desired radius.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Light gap measurement — straight edge/precision control square • Measuring magnifier (5x to 10x magnification) Theoretical — objective: • Digital microscope • KMG measuring machine • Contour-measuring device
	Measurement method	Visual check without tools: The straight progressions of the profiles is examined in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Light gap measurement — straight edge/precision control square: To make waviness more easily detectable, a straight edge or a precision control square can be used. Measuring magnifier (5x to 10x magnification): The vertical and horizontal profiles of the workpieces are evaluated at an angle of 90° with good lighting using a measuring magnifier (5x to 10x magnification). Digital microscope: In addition, a digital microscope can be used for objective and reproducible results.
	Decision criteria	Visual/measuring magnifier/measuring magnifier/digital microscope: There must be no visible waviness. Light gap measurement — straight edge/precision control square: The width of the light gap between the edgeband and the straight edge must be evaluated visually. In the case of a straight profile without waves, neither a gap nor waviness must be detectable (e.g. with the straight edge).

14.3 Chatter marks

What?	Quality feature	Chatter marks on the vertical part of the workpiece
	Definition	The trimmed vertical part of the profile trimming is characterized by processing tracks that can appear as chatter marks. In the case of tools with multiple blades, the cutting kinematics only represent one blade on the trimmed surface due to the tolerances of individual blades. The distance between individual chatter marks is created by the tool feed. Due to a missing scraper, these cannot be equalized, and chatter marks thus remain in the vertical part and especially in the corners (ball above and below).
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual and haptic testing (finger test) • Contact testing (+ manual measuring) • Measuring magnifier (5x to 10x magnification) Theoretical — objective: • Digital microscope (dark field illumination/image processing) • Profile method • Measuring machine (KMG) • Contour-measuring device • Optical (camera system/laser)
	Measurement method	Visual and haptic testing (finger test): The vertical part of the entire formatted narrow area is evaluated visually and haptically. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. In haptic testing, the person performing the test moves their fingertips over the surface of the narrow surface to strengthen the perception of chatter marks. Contact testing (+ manual measuring): Graphite rods can be used here, for example. The color particles are deposited in the chatter marks when the rods are pressed against the cutting edge surface. (If the chatter mark widths are even, multiple marks should be counted to reduce uncertainty when determining the start and end points by averaging.) Microscope: In the same way as the visual check, a digital microscope (e.g. dark field illumination) can be used to examine the vertical part of a workpiece for chatter marks. In addition, the chatter mark length can be measured and documented.
	Decision criteria	The chatter marks must be only very faintly pronounced on the entire vertical height of the profiles (e.g. radius, chamfer). In the corners, care must be taken to ensure that the respective profiles progress evenly so that there are no choppers on the profile. With radii, it is particularly important that the corners can be perceived subjectively as a rounding.

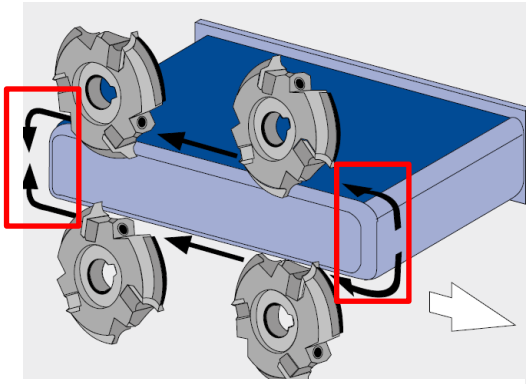
14.4 Brinnelling from swinging up

What?	Quality feature	Brinnelling from swinging up
	Definition	Marks on the profiles (e.g. radii, chamfers) crosswise to the feed direction due to the profile trimmer swinging up and vibrating (e.g. due to insufficient system rigidity). This form of brinnelling occurs only in the horizontal direction due to high friction in wood edgebands.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Contact testing (+ manual measuring) Theoretical — objective: • Digital microscope • KMG measuring machine • Contour-measuring device
	Measurement method	See 14.3 Chatter marks
	Decision criteria	There must be no recognizable brinnelling caused by swinging up.

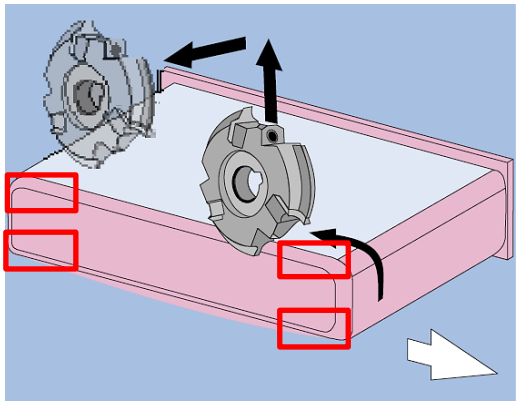
14.5 Processing roughness

What?	Quality feature	Processing roughness (lubricating effect PP)
	Definition	When processing with defined blades, the roughness of the surface of the profile trimming is determined by the roughness of the blades (chatter marks, tooth marks, fibers, scratches, etc.) and reflected as cutting tracks on the profile. Here, processing tracks or cutting tracks can appear on ABS and wood edges, whereas PP edges tend to smear due to their material properties. This can be counteracted with the correct cutting speed/speed/direction of rotation of the tool (clockwise/counterclockwise).
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Haptic testing (finger test) • Measuring magnifier (5x to 10x magnification) • Light gap measurement with straight edge Theoretical — objective: • Contour-measuring device • Roughness-measuring device • Digital microscope (+ dark field illumination)
	Measurement method	See 14.2 Waviness
	Decision criteria	With the specified measuring devices, it must not be possible to detect any visually perceptible processing roughness in the form of cutting tracks and/or smear effects in the profile areas as a whole.

14.6 Vertical processing transition

What?	Quality feature	Vertical processing transition
	Definition	Evaluation of the transition from upper to lower processing in the vertical part. This applies to units in which the vertical part is trimmed using two devices or in separate processing steps (e.g. FK11, FF32 and FK21). Different applications or different settings of the upper and lower units can result in different profile variants (e.g. radius, chamfer) as well as recognizable transitions (e.g. upper radius larger than lower radius).  Figure 7: Vertical processing transition
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Light gap measurement with straight edge/precision control square Theoretical — objective: • Digital microscope • Measuring machine (KMG) • Contour-measuring device
	Measurement method	To evaluate the processing transition of the profile over the height of the vertical narrow surface, the thickness of the panel must be min. 38 mm, otherwise potential errors will not be visible. Visual check without tools: The uniformity of the profile transitions is checked at the vertically trimmed lines/radii in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification)/straight edge/precision control square: A measuring magnifier or a straight edge can be used to identify or examine detected processing transitions in more detail.
	Decision criteria	The progression of the trimmed profiles must be evaluated in the transition of the vertical part. There must be no recognizable transitions in the vertical part. In addition, there must be no overhangs that can be seen and/or felt. A homogeneous progression is a prerequisite for this.

14.7 Horizontal processing transition

What?	Quality feature	Horizontal processing transition
	Definition	Evaluation of the transition from the trimming of the upper and bottom edges of the workpiece (fine trimming or multi-trimming) to the profile trimming of the front and rear workpiece contour. This applies to units that only process the front and rear workpiece contours (e.g. FK30). Unwanted transitions can occur in the case of profile trimming of the front and rear workpiece contour (e.g. due to incorrect line points, incorrect pressures, incorrect mechanical settings). The profile trimming contour must correspond to the contour of the longitudinal edge. In addition, damage to the covering layer (especially in the area of the corners) must be avoided.  Figure 8: Horizontal processing transition
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Light gap measurement with straight edge/precision control square Theoretical — objective: • Digital microscope • Measuring machine (KMG) • Contour-measuring device
	Measurement method	Same as Chapter 14.6 Vertical processing transition.
	Decision criteria	The progression of the trimmed profile (e.g. radius, chamfer) must be evaluated in the transition of the horizontal part. Transitions or overhangs in the horizontal part must not be noticeable or perceptible with the defined measuring instruments. A homogeneous progression must be achieved. In addition, damage to the covering layer, especially in the corners, is not permitted.

14.8 Flushness between the transverse and longitudinal edges

What?	Quality feature	Flushness between the transverse and longitudinal edges
	Definition	In the case of workpieces with glued longitudinal and transverse edges, a transition occurs between the two edgebands after profile trimming. This is located in the area of the profile outfeed to the transverse edge. For an accurate profile outfeed, it is important to use the exact tool for the desired profile.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual and haptic testing (finger test) • Light gap measurement with straight edge/precision control square Theoretical — objective: • Digital microscope • Contour-measuring device • Measuring machine (KMG)
	Measurement method	Visual and haptic testing (finger test): The workpieces are evaluated in the area of the transition from the longitudinal edge to the transverse edge in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. In addition, haptic testing must be performed.  Figure 9: Flushness between the transverse and longitudinal edge Light gap measurement with straight edge/precision control square: A straight edge can be used to identify or examine detected processing transitions in more detail.
	Decision criteria	An existing overhang can be compensated by shrinkage after around seven days of storage. Visual and haptic testing (finger test): There must be no clearly visible or haptically perceptible overhang at the transition from the longitudinal to the transverse edge. Light gap measurement with straight edge/precision control square: At the transition from the longitudinal to the transverse edge, no significant overhang must be visible in the form of a light gap. Digital microscope/contour measuring device/measuring machine (KMG): Overhang tolerance ± 0.05 mm.

14.9 Impressions and shiny marks during profile trimming

What?	Quality feature	Impressions and shiny marks during profile trimming
	Definition	Design deviations in the form of pressure points and shiny marks on the edgeband when tracing the workpieces due to detector rollers and sliding shoes of the profile trimming units (tracing elements). Difference between impressions and shiny marks: • Impressions are created especially in rolling tracing (detector rollers) due to the starting pressure/impact and the more selective load of detector rollers. This is especially common with soft edgeband material (e.g. paper). • Shiny marks are created by a sliding stop pad on the front side and through the lateral tracing on the narrow surface. Note that this effect can be intensified in the case of dark and glossy colors.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification) • Haptic testing (finger test)
	Measurement method	Visual check without tools: The edgebands of the workpieces are visually checked in the backlight/strip light (natural/direct sunlight). Shine is characterized by the intense reflection of light on smooth surfaces. Shiny marks and impressions are visible due to the directional reflection (light incidence). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier: A measuring magnifier can be used to examine and evaluate shiny marks or detect impressions more closely. Haptic testing (finger test): Haptically, impressions can be felt in particular on the workpiece in the area of the snipping stops.
	Decision criteria	In the areas where the tracing rolls or slides on the edgeband, no visible or perceptible impressions or shiny marks should be detected using the specified measuring devices.

14.10 Tears (for wooden edges)

What?	Quality feature	Tears (for wooden edges)
	Definition	Visible and perceptible pronounced chips, fibers, tears and cracks in the edgeband material in the profile area, which, depending on the material, can occur due to the cutting shape, tool wear and the direction of the fiber cut. During profile trimming, tears occur exclusively with edge material made of wood (especially woods with long fibers). This can be counteracted by a change in synchronous trimming.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Haptic testing (finger test)
	Measurement method	Visual check without tools: The trimmed profiles of the workpieces are examined in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing (finger test): In addition to the visual check, the person performing the test moves their fingertips over the surface against the fiber, so that fibers or parts of fibers stand up due to their jagged structure. These fibers get caught in the furrows and grooves of the fingertips, thus increasing the perception ("cat hair effect").
	Decision criteria	Visual check without tools/haptic testing: There must be no visible or haptically perceptible tears over the entire trimmed profile.

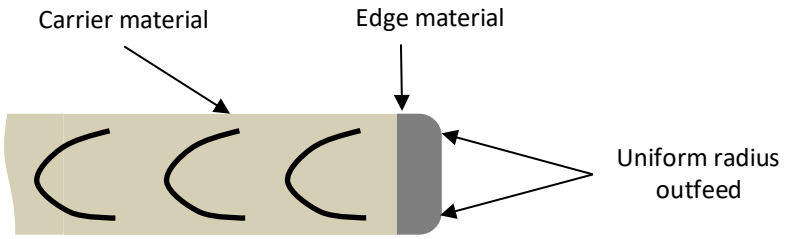
14.11 Undamaged protective film

What?	Quality feature	Undamaged protective film
	Definition	If protective film is present on the edgeband, it must not be ripped or torn by the profile trimming and hang down. It is important that the protective film is not damaged. This can occur when inserting the unit on the workpiece surface, especially in the case of films with low adhesion.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The workpiece is visually inspected at the profile trimming areas in good lighting without any tools. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	Visual check without tools: A distinction is made between two states for the visual check (visual evaluation): • OK = undamaged protective film and adhesion • NOK = damaged protective film and/or no adhesion

15. Profile and glue joint scraper

15.1 Profile scraper

15.1.1 Uniformity of profile outfeed

What?	Quality feature	Uniformity of the profile outfeed
	Definition	A uniform profile outfeed toward the center of the narrow surface takes into account an identical design of the upper and lower profiles. The respective specifications according to the workpiece drawing and the tool profile suitable for the edge material are used as a basis.  Figure 10: Example — uniform radius outfeed
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Measuring magnifier (5x to 10x magnification) • Caliper gage/depth gage Theoretical — objective: • Digital microscope
	Measurement method	Measuring magnifier (5x to 10x magnification) See chapter 14.2 Caliper gage/depth gage: A depth gage can be used to measure the depth of the respective profile at a minimum of four measuring points over the entire workpiece length and compare it with the opposite profile. Digital microscope: See chapter 14.2
	Decision criteria	With the specified measuring instruments, a homogeneous profile progression in the direction of the narrow surface must be ensured. In addition, the upper and lower profiles must not deviate from each other (max. 10% deviation). Examples: 1 mm radius ➔ max. deviation 0.1 mm (= 10%) or 3 mm chamfer ➔ max. deviation 0.3 mm (= 10%)

15.1.2 Surface quality

What?	Quality feature	Surface quality
	Definition	There should be no processing tracks in the form of trimming tool chatter marks on the upper and lower horizontal parts of the profiles after the profile scraper processing.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Haptic testing
	Measurement method	Visual check without tools: The profiles of the workpieces are visually examined for surface quality in good lighting by means of mirrors in the backlight. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing: In haptic testing, the person performing the test moves their fingertips over the surface of the horizontal profile to strengthen the perception of chatter marks.
	Decision criteria	In the horizontal part, no chatter marks and/or processing tracks must be visible and/or haptically perceptible over the entire length after the profile scraper processing. A noticeably smooth surface over the entire length must be achieved.

15.1.3 Stress whitening

What?	Quality feature	Stress whitening
	Definition	Plastic edges tend to produce "stress whitening" and matt surfaces during scraper processing. In addition, the color fastness suffers, especially with dark edgebands. During scraper processing, stress whitening can form on the cutting surfaces of the edgebands and appears as an undesirable white or gray shimmer. In order to counteract stress whitening, the recommended chip thickness (chapter 15.1.4) must be set.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The profiles of the workpieces are visually examined for their tendency to stress whitening in good lighting by means of mirrors in the backlight. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	Visual check without tools: The color difference between the surfaces of the drawn profiles and the narrow surface must be as small as possible. Stress whitening must not be visually noticeable.

15.1.4 Scraper chip form

What?	Quality feature	Scraper chip form
	Definition	The form of the scraper chip over the entire drawn line of the profile must be evaluated in order to prevent brightening or stress whitening, to smooth out the chatter marks of the trimming and to achieve an optimum result.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Haptic testing Pragmatic — objective: • Caliper gauge • Micrometers
	Measurement method	Haptic testing: The uniform thickness and width progression of the drawn chip is checked haptically over the entire length of the workpiece. Caliper gage/micrometer: Measurement of the chip thickness and chip width over the entire length; this applies to the upper and lower chip.
	Decision criteria	Haptic testing: Depending on the edgeband material, a smooth chip (as far as possible) of the same thickness and width over the entire length must be achieved. In addition, the chip should curl or roll up as little as possible. Caliper gage/micrometer: The following measurement tolerances apply for the chip thickness: Target chip thickness = 0.1 mm up to 0.15 mm (Exception: PMMA target chip thickness = 0.06 mm to 0.08 mm)

15.1.5 Impressions and shiny marks during profile scraping

What?	Quality feature	Impressions and shiny marks during profile scraping
	Definition	Design deviations in the form of pressure points and shiny marks on the edgeband when tracing the workpieces due to detector rollers and sliding shoes of the profile scraper unit (tracing elements). These depend on the material properties as well as on the tracing pressure, starting impact, lift-off, lubricant application, planer layout and crowning of the edgeband material. Difference between impressions and shiny marks: • Impressions are created especially in rolling tracing (detector rollers) due to the starting pressure/impact and the more selective load of detector rollers. This is especially common with soft edgeband material (e.g. paper). • Shiny marks are created during sliding tracing (sliding shoe), for example, during tracing of the front side. Note that this effect is intensified in the case of dark and glossy colors.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification)
	Measurement method	Visual check without tools (well-lit room): The edgebands of the workpieces are visually checked in the backlight/scattered light (natural/direct sunlight). Shine is characterized by the intense reflection of light on smooth surfaces. Shiny marks and impressions are visible due to the directional reflection (light incidence). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification) A measuring magnifier can be used to examine and evaluate shiny marks or detect impressions more closely.
	Decision criteria	In the areas where the tracing rolls or slides on the edgeband, there must be no visible and/or perceptible impressions or shiny marks that can be detected with the specified measuring devices.

15.1.6 Uniform processing

What?	Quality feature	Uniform processing
	Definition	In the case of uniform processing, it must be ensured that there are no dents or steps over the entire workpiece length, and that there is a homogeneous image. In the case of double/triple roller tracing in particular, this must be ensured at the front and rear edges. This can be influenced in particular by the tracing pressure and lift-off.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools (well-lit room): The edgebands of the workpieces are visually checked in the backlight/scattered light (natural/direct sunlight). Shine is characterized by the intense reflection of light on smooth surfaces. Steps and dents are visible due to the directional reflection (light incidence). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	Visual check without tools: The profile (e.g. radius, chamfer) and especially the front and rear edges must have no visually perceptible steps and/or dents over the entire workpiece length.

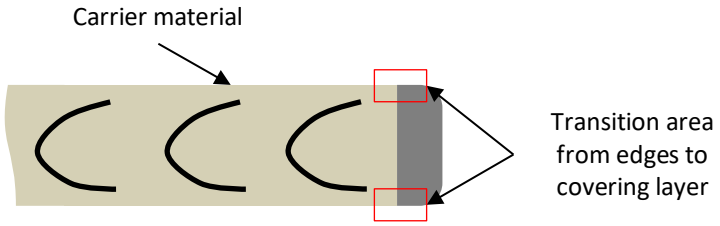
15.1.7 Waviness

What?	Quality feature	Waviness
	Definition	Waviness caused by vibrations due to lack of rigidity and a profile variant that is too deep (e.g. radius, chamfer) in the direction of the narrow surface. These can occur especially as starting vibrations in the area of the front edge as a result of lift-off. This waviness can also be influenced by tracing pressure, lift-off and chip thickness (large radius and thick chip → waviness increases). In order to counteract waviness, the recommended chip thickness (chapter 15.1.4) must be set.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check Pragmatic — objective: • Dial gauge • Caliper gauge
	Measurement method	Visual check: The progression of the vertical and horizontal profiles of the workpieces is examined in good lighting. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Dial gage: A dial gage is attached to the unit (default value 0.5–0.7 mm) in order to determine the lift-off of the profile scraper unit. Caliper gage: The caliper gage is used to measure the chip thickness and chip width according to Chapter 15.1.4.
	Decision criteria	Visual check: There must be no visible waves over the entire horizontal length of the profiles.

15.1.8 Chip tear at the rear edge

What?	Quality feature	Chip tear at the rear edge
	Definition	An exact chip tear of the drawn chip at the rear edge must be ensured especially for longitudinal processing. The requirements for an optimal chip tear are the standards of the quality feature of the scraper chip form as defined in chapter 15.1.4.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The workpieces are examined in good lighting, paying special attention to the rear edge. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds.
	Decision criteria	Visual check without tools: The chip at the rear edge should be torn off flush. In addition, there must be no visible tear-off points or break-off points in the form of paint defects or stress whitening.

15.1.9 Transition from the edge material to the covering layer

What?	Quality feature	Transition from the edge material to the covering layer
	Definition	A homogeneous transition from the edge material to the covering layer of the carrier material, especially in the area of the glue joint, must be achieved. This applies to both the upper and lower transitions.  Figure 11: Transition from the edge material to the covering layer
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Haptic testing • Measuring magnifier (5x to 10x magnification)
	Measurement method	Haptic testing: In haptic testing, the person performing the test moves their fingertips over the surface of the transition from the edge material to the covering layer to strengthen the perception of unevenness. Measuring magnifier (5x to 10x magnification): The transitions from the edge material to the covering layers of the workpiece are evaluated at an angle of 90° with good lighting and a 5x to 10x magnification.
	Decision criteria	The transitions from the edge material to the covering layers of the carrier material must be flush. There must be no step or overhang that is visible and/or haptically perceptible with the measuring devices. In addition, the covering layer must not be damaged in this transition.

15.2 Glue joint scraper

15.2.1 No damage to the covering layer

What?	Quality feature	No damage to the covering layer
	Definition	Visible damage to the covering layer due to the glue joint scraper drawing too deep. This damage can occur in the form of break-outs, damage or scratches or a change in the surface structure. Attention must be paid in particular to the areas of the front and rear edges, which must be identical.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Haptic testing (finger test)
	Measurement method	Visual check without tools: The transitions between the carrier material surfaces and the edge material are visually examined in good lighting with special attention paid to the front and rear edges. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing (finger test): In addition to the visual check, the person performing the test moves their fingertips over the drawn surface to feel any damage to the covering layer haptically.
	Decision criteria	There must be no visible and/or haptically perceptible damage to the covering layer over the entire drawn surface.

15.2.2 No glue residue in the area of the glue joint

What?	Quality feature	No glue residue in the area of the glue joint
	Definition	Visible glue residue in the area of the joint, which has not been removed by the glue joint scraper. In addition, attention must be paid to any minimum residual overhangs of the edge material.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check • Haptic testing • Measuring magnifier
	Measurement method	Visual check without tools: The transitions between the carrier material surfaces and the edge material are visually examined in good lighting with special attention paid to the front and rear edges. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Haptic testing (finger test): In addition to the visual check, the person performing the test moves their fingertips over the drawn surface to feel any damage to the covering layer haptically. Measuring magnifier (5x to 10x magnification): A measuring magnifier can be used to examine and evaluate detected glue residues more closely.
	Decision criteria	There must be no visible or haptically perceptible glue residue or minimal edgeband overhangs over the entire drawn surface/glue joint.

15.2.3 Shiny marks with the glue joint scraper

What?	Quality feature	Shiny marks with the glue joint scraper
	Definition	Surface damage in the form of shiny marks on the covering layer when tracing the workpieces due to the tracing pads of the glue joint scraper unit (tracing elements). These depend on the material properties as well as on the tracing pressure, starting impact, lift-off, lubricant application, planer layout and warping of the surface. Shiny marks are created during sliding tracing (sliding shoe). Note that this effect is intensified in the case of dark, glossy colors.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools • Measuring magnifier (5x to 10x magnification)
	Measurement method	Visual check without tools (well-lit room): The covering layers of the workpieces are visually checked in the backlight/scattered light (natural/direct sunlight). Shine is characterized by the intense reflection of light on smooth surfaces. Shiny marks and impressions are visible due to the directional reflection (light incidence). Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds. Measuring magnifier (5x to 10x magnification): A measuring magnifier can be used to examine and evaluate shiny marks or detect impressions more closely.
	Decision criteria	In the areas where the tracing rolls or slides on the edgeband, there must be no visible and/or perceptible impressions or shiny marks that can be detected with the specified measuring devices.

15.2.4 Undamaged protective film

What?	Quality feature	Undamaged protective film
	Definition	If protective film is present on the covering layer, it must not be ripped or torn by the glue joint scraper and hang down. It is important that the protective film is not detached. This can occur especially when inserting the unit on the workpiece surface and/or in the case of films with low adhesion.
	Regulations	-
How?	Measuring instrument	Pragmatic — subjective: • Visual check without tools
	Measurement method	Visual check without tools: The workpiece is visually inspected at the profile trimming areas in good lighting without any tools. Visual deviations are considered errors if they are visible to the naked eye from a viewing distance of 50 cm within 30 seconds
	Decision criteria	Visual check without tools: A distinction is made between two states for the visual evaluation: • OK = undamaged protective film and adhesion • NOK = damaged protective film and/or no adhesion