



# JYSK STANDARD

## Surfaces

### Scope

This standard describes requirements for JYSK products.

### Change-log

Section	Changes
	Standard renamed from "Furniture surfaces" to "Surfaces".
<a href="#">1</a>	Further specification of surface types added.
<a href="#">2.2</a>	Table 2 and Table 3 no longer relevant due to requirement for JYSK 10218 - Product risk assessment and Quality description.
<a href="#">2.3</a>	Defect and features of wood updated.
<a href="#">2.4</a>	Defect and features of artificial wood added.
<a href="#">2.5</a>	Defect and features of metal added.

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## 1 Surface classification

JYSK classifies surfaces using three different classes (A, B & C according to this chapter).

In case of doubt or in borderline cases the classification is by default the higher of the concerned classes ( $A > B > C$ ).

Agreements on classification of specific surfaces on products may be made between supplier and purchaser.

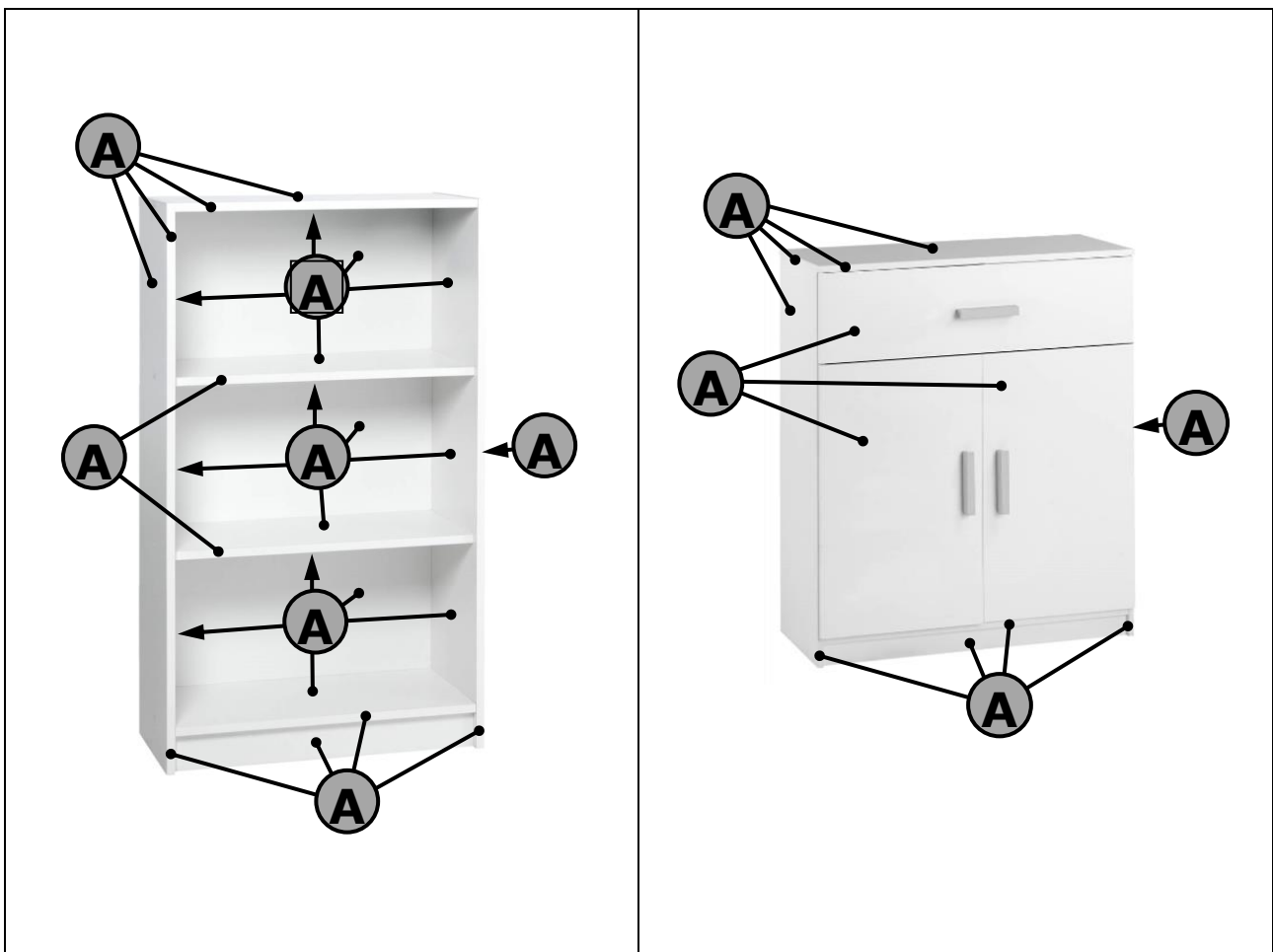
Agreements must be in written form containing relevant and unambiguous documentation to be considered valid.

### A-surfaces:

Surfaces clearly visible during normal use of the product.

#### Examples:

- Apparently visible surfaces **including the backside of dining- and garden chairs etc.**
- Visible furniture legs and aprons.



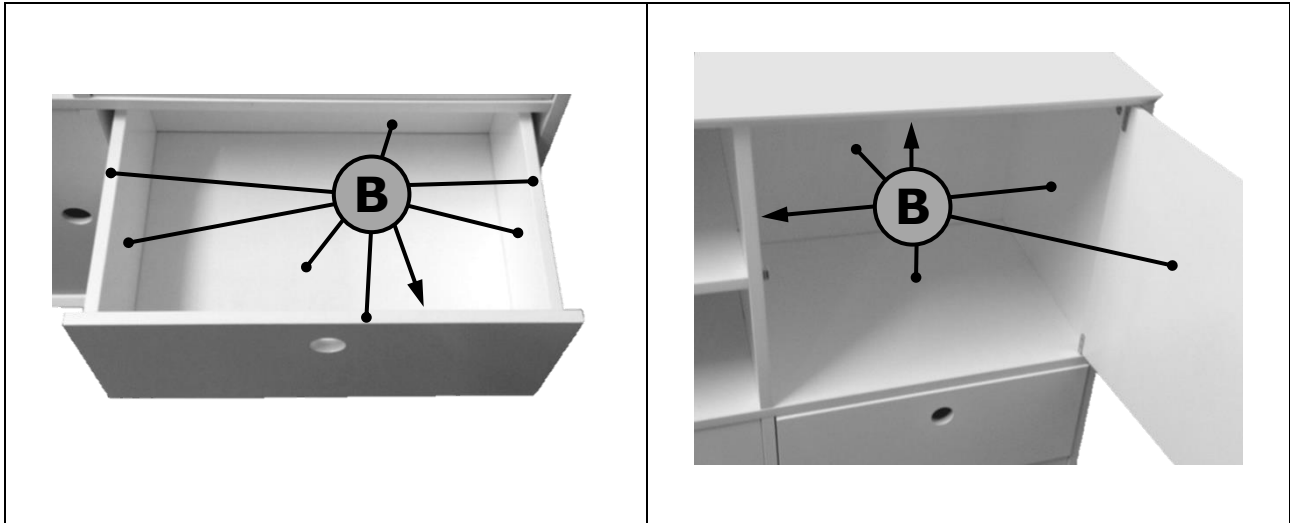
*Illustration: Examples of A-surfaces*

## **B-surfaces:**

Surfaces momentarily visible during normal use of the product.

### **Examples:**

- Internal surfaces in furniture with drawers or doors.
- Internal surfaces in cushion boxes.
- The backside of the recliner part on sun loungers.



*Illustration - Examples of B-surfaces*

## **C-surfaces:**

Surfaces not visible or hidden during normal use of the product.

### **Examples:**

- Hidden surfaces (e.g. the underside of a cushion box or the backside of a drawer that is never visible)
- Surfaces supposed to be placed against a wall
- Downwards orientated surfaces with very low placement

## 2 Surface defects

Surfaces on JYSK products are expected to be without defects.

As defects will never be completely avoidable JYSK operates with thresholds.

Defects whose extent exceeds the specified thresholds are considered valid claims.

Some defects are always unacceptable and hence considered valid claims even when below the specified threshold:

- Defects that spoil the function of the surface  
**Example:** Crack(s) compromising the liquid resistance of specific surfaces - See chapter [6](#)
- Defects estimated to make products unsellable at the "normal price"  
**Example:** Particularly visible defects or a cumulative sum of discrete defects distributed on several surfaces.

Defects may be concentrated in one spot or (except when further specified) be dispersed over an unlimited number of smaller defects.

Coherent defects (e.g. an abraded or polished area) are considered a single "spot defect" meaning that the area is measured collectively using the outer boundaries.

<i>Dirt defects</i>	<ul style="list-style-type: none"> <li>• Smudges / Smears</li> <li>• Fingerprints</li> <li>• Foreign particles</li> </ul>
<i>Physical defects</i>	<ul style="list-style-type: none"> <li>• Chips</li> <li>• Dents</li> <li>• Marks</li> <li>• Crazes</li> <li>• Scratches / abrasion</li> <li>• Polishing (change of gloss)</li> </ul>
<i>Coating defects</i>	<ul style="list-style-type: none"> <li>• Runs</li> <li>• Pinholes</li> <li>• Bubbles</li> <li>• Unintended brush or roller marks</li> <li>• Excess orange peel</li> <li>• Chalking</li> <li>• Permanent fingerprints</li> </ul>
<i>Wood defects</i>	Defects and features of real wood material is specified separately in chapter <a href="#">2.3</a> .

**Examples of phenomena considered defects by JYSK (non-exhaustive list)**

### 2.1 Assessment method

Assessment is performed as a simple visual inspection of products in assembled state under a suitable light. The inspection may be repeated under all common light conditions.

Defects are measured and evaluated according to the specified thresholds for the particular type of defect.

**Note:** An assessment may also be performed in unassembled state but then special care must be given to assess surfaces according to their correct classification on the assembled product!

## 2.2 Thresholds Defect types

When specifying thresholds JYSK distinguishes between two types of defects according to [Table 1](#).

Type of defect:	Definition:
Removable	Defect can be <u>easily</u> removed without the use of aids. By easily removed is meant e.g.: <ul style="list-style-type: none"> <li>Brushing</li> <li>Light rubbing with a finger (<math>\leq 5</math> rubs)</li> </ul>
Permanent	Defects that cannot be easily removed.

**Table 1 – Type of defects**

Thresholds for the two types of defects can be seen in [Table 2](#) and [Table 3](#).

Threshold (Maximums):	Surface classification According to chapter 1		
	A	B	C
<b>Defective area</b> [mm <sup>2</sup> ] for surfaces $\leq 1$ m <sup>2</sup> [mm <sup>2</sup> /m <sup>2</sup> ] for surfaces $> 1$ m <sup>2</sup>	200 ~1 small-fingerprint	200 ~1 small-fingerprint	400 ~2 small-fingerprints
<b>Number of discrete defects</b> Pr. surface for surfaces $\leq 1$ m <sup>2</sup> Pr. m <sup>2</sup> for surfaces $> 1$ m <sup>2</sup>	Few (Maximum 3)	Few (Maximum 3)	-
<b>Length of single defect</b> [mm]	80	80	-
<b>Width of defects <math>\geq 17</math> mm</b> [mm]	1	1,5	2,0

**Table 2 — Thresholds for removable defects**

Threshold (Maximums):	Surface classification According to chapter 1		
	A	B	C
<b>Defective area</b> [mm <sup>2</sup> ] for surfaces $\leq 1$ m <sup>2</sup> [mm <sup>2</sup> /m <sup>2</sup> ] for surfaces $> 1$ m <sup>2</sup>	3,0	4,0	50 Maximum size of single defect: 25 mm <sup>2</sup>
<b>Length of defects</b> [mm] for surfaces $\leq 1$ m <sup>2</sup> [mm/m <sup>2</sup> ] for surfaces $> 1$ m <sup>2</sup>	20	30	-
<b>Length of single defect</b> [mm]	10	15	-

**Table 3 — Thresholds for permanent defects**

## 2.3 Defects and features of wood

When not otherwise specified the following specifications according to [Table 4](#) apply for different wood defects and features for both indoor and outdoor furniture.

Defect/feature:	Surface classification According to chapter 1		
	A	B	C
Cracks Checks Splits Fissures	X	X	≤2,5 mm  ≤4 mm for surfaces never visible to the customer
Wane	≤0,5 mm  X	≤0,5 mm  X	≤2,5 mm  ≤4 mm for surfaces never visible to the customer
Pith	X	X	No threshold
Resin pockets	X	X	Permitted (if not runny)
Bark pockets	X	X	No threshold
Blue stain	X	X	No threshold
Rot	X	X	X
Insect damage	X	X	X
Repairs (e.g. with putty)	X	X	No threshold
X = Not permitted  Threshold: ≤3 [mm²] for surfaces ≤1 m² ≤3 [mm²/m²] for surfaces >1 m²			

**Table 4 – Wood defects and features**

All permitted defects and features are under the assumption that the mechanical integrity of neither the part nor product is compromised.

Knots are not considered a defect and are evaluated separately.

## 2.4 Defects and features of artificial wood

When not otherwise specified the following specifications according to [Table 6](#) apply for different artificial wood defects and features for outdoor furniture.

Defect/feature:	Surface classification According to chapter 1		
	A	B	C
Painting mistakes	X	X	No threshold
Pressure marks	X	X	≤4 mm
Sharp edges	X	X	X
Blank spots	X	X	Max Ø5 mm
Scratches	X	X	Max 1 x 100 mm
Repairs	X	X	No threshold
X = Not permitted			

**Table 5 – Artificial wood defects and features**

## 2.5 Defects and features of metal

When not otherwise specified the following specifications according to [Table 6](#) apply for different metal defects and features for both indoor and outdoor furniture.

Defect/feature:	Surface classification According to chapter <a href="#">1</a>		
	A	B	C
Scratches	X	X	Max 1 x 100 mm
Orange peel	X	X	No threshold
Pressure marks	X	X	≤4 mm
Sharp edges	X	X	X
Rust	X	X	X
Paint/powder coating repairs	X	X	No threshold
Other repairs	X	X	No threshold
X = Not permitted			

**Table 6 - Metal defects and features**

## 2.6 Repairs

Generally, repairs must be of matching color to the application spot.



## 3 Appearance

### 3.1 General appearance requirements

There must be no detectable difference of appearance within surfaces or between surfaces supposed to be of same appearance.

A detectable difference is defined as difference that can be detected by the average human observer.

Similar appearing surfaces (including edge bands) are by default considered to be of the same appearance.

The above applies to all A and B surfaces:

- Within a single product.
- On products of same article number.
- On products within the same product series.

The requirement is applicable under all common light sources:

Type of light	Typically used standard illuminant
Daylight	D65
Incandescent light	A
Fluorescent light	F11
LED	Not yet standardized

#### 3.1.1 Assessment methods

When assessing appearance JYSK operates with two different assessment types:

1. *Manual/visual comparison*
2. *Instrumental measurement*

Generally the following guidelines apply:

- *Manual/visual comparisons* are always weighted highest as the immediate surface impression is more important than the value of any measurement.
- *Instrumental measurements* are mainly performed to support claims of differences concluded on basis of a *manual/visual comparison*.

Assessments are carried out by comparing a surface *sample* with one of the following *references* of same appearance:

- Surface on the same article
- Surface on an identical article from the same product order
- Surface on an identical article from another product order
- Surface on another article from the same product series
- A surface on a relevant product sample supplied to JYSK
- A relevant reference sample / swatch

#### 3.1.2 Elaborative comments

##### Surfaces made of wood:

As wood is organic material some differences in e.g. color are expected. Further elaboration on appearance requirements for wood will be published in a separate JYSK-standard.

##### Coverings with patterns:

Requirements are applicable to covered surfaces with patterns (color and texture) as the covering is generally expected to be of the same origin (from the same covering supplier).

## 3.2 Color

### 3.2.1 Visual comparison

Visual inspection of color is performed by comparing two surfaces (*sample* and *reference*):

1. Place the two surfaces beside each other with a maximum distance of 3 cm.  
Surfaces must be orientated equally (e.g. in same direction on the product or for coated surfaces in the production line direction).
2. Surfaces should be viewed in an angle of  $\sim 45^\circ$  from a distance of  $\sim 0,5$  m.  
To counter *metamerism* (i.e. that color differences are visible under some light sources but not under others) the visual comparison should be performed under different light conditions using e.g. a light cabinet.
3. Detectable color difference between the *sample* and *reference* means the product fails to meet the *general appearance requirement* (3.1).

Depending on the extent of color difference further examination may be performed to support the claim of color difference. Examples of further examination:

- Letting one or several observers repeat the comparison.
- Assembling the product to get an impression of the visibility in the full context.

### 3.2.2 Instrumental measurement

If visible color difference is finally concluded an instrumental color measurement can be performed using the following conditions:

#### Tolerance system:

- CIE94 (Generally best for smooth or regular surfaces)
- CMC (Generally the best for textured or irregular surfaces)

#### Standard illuminants (light sources):

- D65 (daylight)
- A (Standard domestic tungsten light)

JYSK tests using a  $10^\circ$  view standard observer

The final value of color difference between sample and reference may be the average of 3-10 measurements.

Tolerance:	Meaning:	Note:
$\Delta E \leq 0,5$ :	A close color match	If $\Delta E$ -values less than 1.0 are found the actual problem may be related to another appearance parameter.
$0,5 < \Delta E \leq 1,0$ :	Slight color difference is present.	
$\Delta E > 1,0$ :	In most cases an unacceptable color difference.	$\Delta E$ -values higher than 1.0 and up to 2.0 may in some cases be acceptable. Since instrumental measurements are carried out only for surfaces failing a visual assessment acceptance of $\Delta E$ -values higher than 1.0 will be <u>extremely rare</u> .

**Table 7 - JYSK interpretation of  $\Delta E$ -values**

$\Delta E \leq 0,5$  is generally considered to confirm a claim of visible difference.

In case of dispute a supplementary instrumental color measurement can be performed at a suitable third-party laboratory.

### 3.3 Gloss

In general layman terms gloss can be described as the shininess of surfaces and indicates how well the surface reflects light.

#### 3.3.1 Visual comparison

Visual assessment of gloss is performed by tilting or rotating surfaces to different angles under a light source while watching how the light is reflected.

The nature of gloss is that significant differences are easily detected while lesser differences are difficult for the human eye to see.

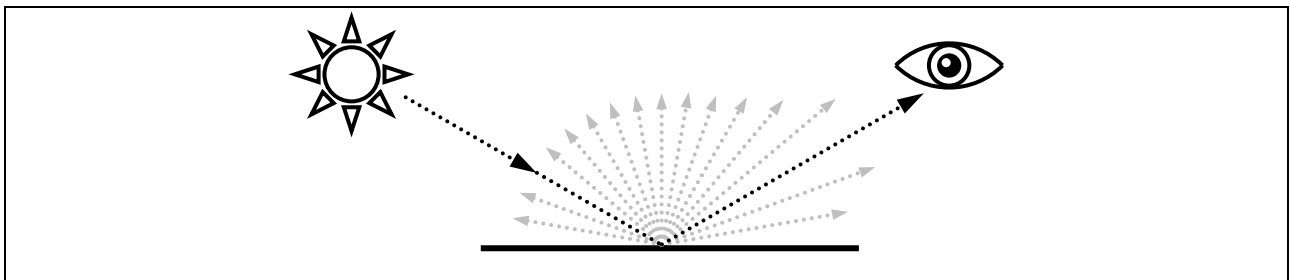
If visible difference is concluded during the visual assessment an instrumental measurement can potentially be performed according to [3.3.2](#).

Before performing an instrumental measurement the visual comparison of gloss must be repeated focusing on each of the parameters described in [3.3.3](#).

#### 3.3.2 Instrumental measurement - Specular gloss

Gloss can be instrumentally measured by testing the specular (mirror-like) gloss of a *sample* and *reference* according to **EN 13722** (preferred) or **ISO 2813**.

**Note:** The methods are not applicable for metallic or pearly surfaces.



**Illustration - Simplified illustration of specular gloss - The specular reflection is in black while diffusion reflections are in grey.**

Conclusions of an instrumental gloss-assessment are made by comparing the results in gloss units [GU].

Differences in test-values between *sample* and *reference* outside the specified tolerances are generally considered to confirm a visible difference.

Gloss value of <i>reference</i> [GU]:	Tolerance [GU]:
<55	±5
≥55-79	±10
≥80	±5

#### 3.3.3 Gloss related parameters

The visual appearance of gloss is in reality it is the sum of several features - some of which interrelate or overlap.

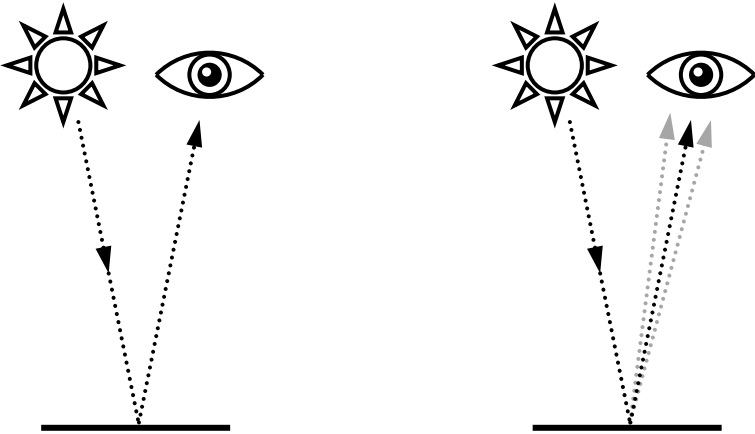

To be able measure and communicate appearance issues (of especially high gloss surfaces) correctly JYSK operates with the parameters *haze* and *distinctness of image*.

The definition and assessment methods for each of the two parameters are further elaborated in their corresponding paragraphs (Haze see [3.4](#), DOI see [3.5](#)).

### 3.4 Haze:

The optical phenomena *reflective haze* is used as a measurable parameter to describe how higher gloss surfaces reflect light.

Reflective haze shows as halos around reflected light and make reflections seem milky or cloudy.

<p><i>Simple graphical representation of the reflective haze phenomena</i></p>	
<p><i>Graphical representation of haze using a single light dot</i></p>	
<p>Haze:</p>	<p>← Lower haze                      Higher haze →</p>
<p>Influence on perceived high gloss-quality:</p>	<p>← Ideal                                      Inferior →</p>

**Illustration: Haze and the general influence on perceived gloss.**

The reason for reflective haze is microscopic imperfections in the surface caused by e.g.:

- Poor coating dispersion
- Wrong drying conditions
- Wrong curing temperature
- Polishing marks
- Microscopic abrasion
- Ageing and oxidization

JYSK does not state specific requirements for haze but the parameter is assessed in relation to fulfilling the *General appearance requirements* ([3.1](#)).

If necessary an instrumental measurement of reflective haze can be performed by comparing test-results of a *sample* and *reference* when measured according to **ISO 13803**.

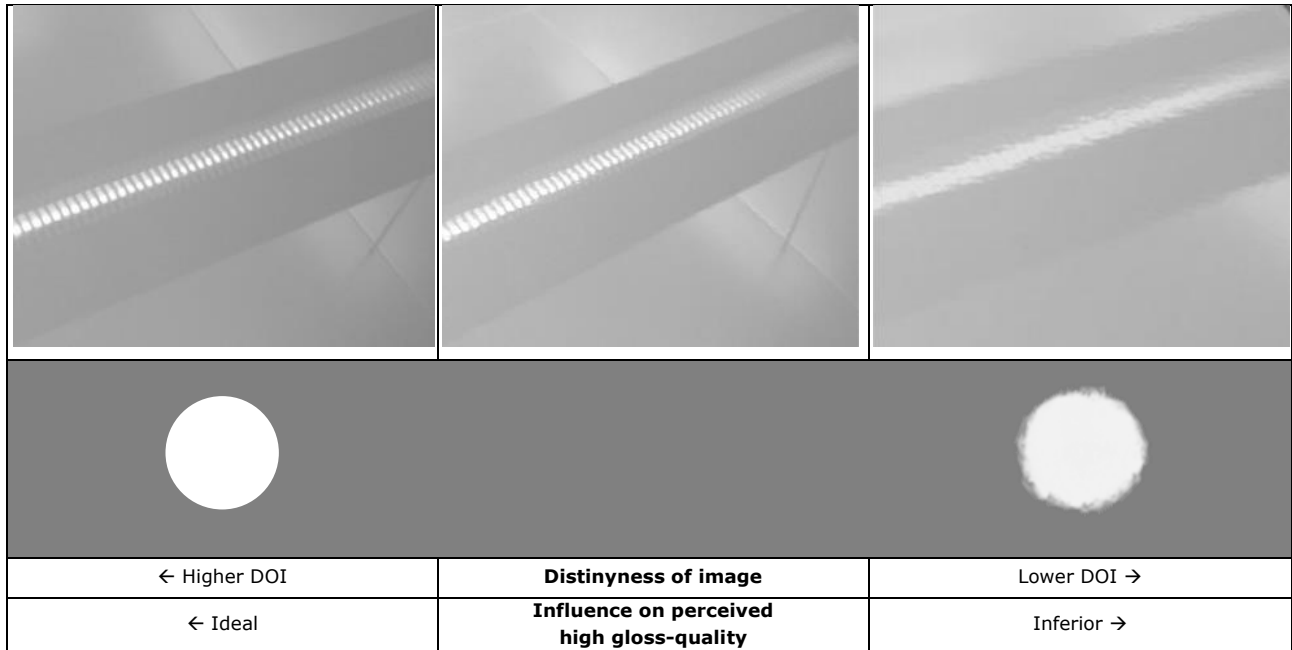
Test results are given in haze units [HU] on a scale ranging from 0-100.

A difference of 4 or more haze units [HU] between *sample* and *reference* is generally considered to confirm a claim of visible difference.

### 3.5 Distinctness of image (DOI):

Distinctness of image is a measure of how clearly a reflected image appears on a reflective (higher gloss) surface. Even small differences in DOI between two surfaces are quite easily detected by the average human eye under suitable light conditions. This means that consistency is very important for this parameter.

DOI is especially relevant for coated surfaces and is often closely related to the symptoms of the defect known as *orange peel*.



**Illustrations: Examples of DOI on three different surfaces and graphical representation of DOI using a single light dot.**

Low DOI can have many different causes:

- Unsuitable choice or composition of coating(s)
- Incorrect curing (e.g. too quick evaporation of thinner)
- Incorrect spray gun setup (e.g. wrong pressure or nozzle)
- Wrong coating technique (e.g. incorrect application angle or layer thickness)
- Substrate roughness/waviness
- Brush or roller marks

JYSK does not state specific requirements for distinctness of image, but the parameter is assessed in relation to fulfilling the *General appearance requirements* (3.1).

If necessary an instrumental measurement of DOI can be performed by comparing test-results of a *sample* and *reference* measured with a DOI-meter according to **ASTM D5767**.

Test results of DOI tests are normally given as values on a scale ranging from 0-100 (a perfect smooth surface will have the value of 100).

A difference in rating of 2 or more between *sample* and *reference* is generally considered to confirm a claim of visible difference.

## 4 Surface texture

Surface textures on A and B surfaces must fulfill the *General appearance requirements* (3.1) when assessed using the described methods (4.2).

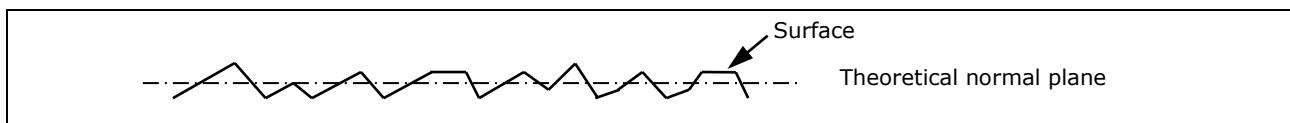
### 4.1 Relevant technical terms

To correctly describe surface textures the following terms are preferred:

**Lay:** The predominant orientation or pattern of the surface texture.

Examples of orientation: Vertical, horizontal, parallel, perpendicular, diagonal or isotropic (non-directional).

**Roughness:** Small irregularities in the surface caused by deviations from the theoretical normal plane. Larger deviations cause rougher surfaces.



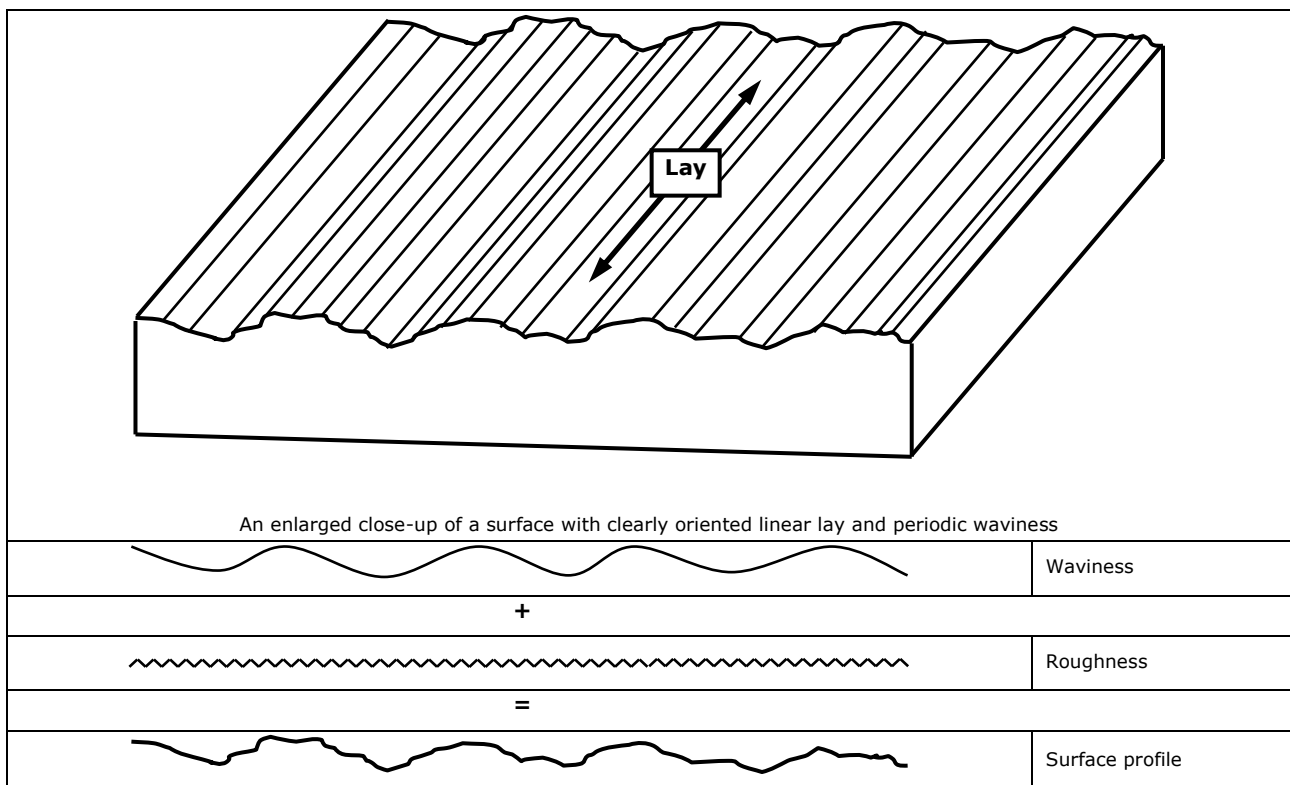
**Illustration - The roughness concept**

**Waviness:** Surface irregularities significantly larger than roughness irregularities.

Waviness may be periodically and can be caused by e.g. vibrations during production.

Note that in many cases products supplied to JYSK have surfaces on which roughness and waviness is impossible to differentiate with the methods JYSK use.

In these cases all irregularities will simply be characterized as roughness.





**Illustrations - Simplified graphics to support the understanding of surface texture terms**

## 4.2 Assessment method

The assessment of surface texture at JYSK is a simple side by side manual comparison by feel and ear between a *sample* and a *reference*.

The procedure for assessing different surfaces will differ depending on surface type but must always include the three parameters lay, waviness and roughness.

Method	 <p>Feeling with fingertip(s)</p>	 <p>Scratching with a fingernail</p>
How	<p>With light pressure (~20-50 g) slide the fingertip(s) over the surface in a steady circular or linear motion.</p>	<p>With light pressure (~100-200 g) scratch a fingernail in a linear steady motion against the surface.</p>
What to notice	<p><b>Lay:</b> Does the surface feel the same when sliding in different directions?</p> <p><b>Waviness:</b> Is there a noticable pattern?</p> <p><b>Roughness:</b> How high is the friction between finger and surface?</p>	<p><b>Lay:</b> Is the sound the same when scratching in different directions?</p> <p><b>Waviness:</b> Is there a noticable pattern?</p> <p><b>Roughness:</b> What pitch is the sound?</p>

**Table 8 - Methods are available for use in the assessment**

Detectable texture difference in lay, waviness or roughness between the *sample* and *reference* means the product fails to meet the *general appearance requirement* and is a valid claim.

## 5 Resistance to light (UV resistance)

Furniture supplied to JYSK must be sufficiently light resistant to not change appearance at an unacceptably rate even when exposed to harsh light conditions.

JYSK tests the light resistance of A and B surfaces using **EN 15187** in which the color change is graded according to a grayscale after a specific artificial light exposure from a xenon lamp.

Stated requirements do not apply for the following surfaces:

- Untreated wooden surfaces
- Oiled or waxed treatments without pigments on wooden surfaces
- Soap treated wooden surfaces

<b>Humidity control during test:</b>	Yes
<b>Minimum resistance to light:</b> (Blue wool Standard No. 6)	>6 (Better light resistance than the blue wool standard)
<b>Minimum color change rating:</b> (According to ISO 105-A02)	≥4/5 Note the character of the color change. If possible also include a color measurement.

**Table 9 - JYSK resistance to light requirements (indoor furniture)**



## 6 Resistance against cold liquids

Some furniture surfaces must be able to resist application of certain substances to fulfill the intended function.

To simulate the chemical stresses of normal day use JYSK tests for resistance against certain substances using **EN 12720**.

Requirements for resistance against cold liquids apply according to [Table 10](#):

<b>1</b>	Tabletops (e.g. dinner-, office-, coffee-, end- and bed-side tables)
<b>2</b>	Top surfaces on storage furniture with a height less than 160 cm
<b>3</b>	Upwards facing surfaces in open storage furniture (e.g. book cases and room dividers)

**Table 10 – Surface types**

Requirements for resistance against cold liquids can be seen in [Table 11](#):

Test method:	EN 12720			
Minimum rating requirement:	Applied substance:	Duration pr. surface type according to <a href="#">Table 10</a>		
		1	2	3
≥4	Water	24 h	16 h	16 h
	Fat (liquid paraffin)	24 h	24 h	24 h
	Alcohol (ethanol 48% V/V)	6 h	1 h	-
	Coffee	6 h	1 h	-
5	Red wine	2 h	-	-
	Tea			
	Grape Juice			
	Ketchup			
	Mustard			
	Beer (light lager)			
	Cola			

*Applied substances must be according to EN 12720 specifications whenever possible.*

**Table 11 - Requirements for resistance against cold liquids**

## 7 Mechanical properties

Furniture supplied to JYSK must have sturdy surfaces reflecting reliable product quality.

Valid assessment of mechanical surface properties is a highly technical topic and quite complex as it is difficult to perfectly simulate the effects of real-life use in a testing environment.

JYSK evaluates mechanical surface properties on the following testable parameters:

- *Resistance to scratching*
- *Resistance to impact*
- *Adhesion*

JYSK states specific requirements for each of the parameters using standardized test methods. When setting requirements JYSK distinguish between different surface categories and classes as mechanical properties vary greatly depending on the combination of materials used.

Stated requirements are in all cases minimum requirement that may be exceeded.

JYSK reserves the right to test that mechanical properties do not significantly differentiate between product samples and final products using the stated tests – significant differences between samples and actual products are naturally unacceptable even though meeting the minimum requirements.

In some cases parts or areas on products cannot be tested in accordance with the designated test methods due to size or shape - In these cases the supplier must at request supply JYSK with a suitable sample of identical material composition.

### 7.1 Terms for categorization and classification

The following terms apply in relation to mechanical properties:

#### **Substrate:**

A substrate is the underlying material (core layer) of a furniture product.

An example of a substrate could be the MDF in a laminated board.

#### **Coating:**

A surface coating is a material in liquid, pasty, powder or vapor form applied to the surface of a furniture product.

Examples: lacquers, paints or powder coatings.

Metallic coatings such as chrome and zinc are not included in this categorization.

#### **Covering:**

A surface covering is the generic term for foils and laminates applied on a substrate as a face layer on a furniture product. Note that coverings often consist of several layers and materials but are always addressed as one single layer in this context.

Examples: Decorative papers, melamine or high-pressure laminates.

#### **Hardwood:**

Hardwood is wood from angiosperm trees. Examples of hardwoods are ash, birch, elm and oak.

JYSK operates with higher requirements for hardwoods than for softwoods even though some hardwoods are softer than hard softwoods.

Bamboo is considered a hardwood even though technically not within the definition.

#### **Softwood:**

Softwood is wood from gymnosperm trees. Examples of softwoods are cedar, larch, pine and spruce.

JYSK operates with lower requirements for softwood than for hardwoods even though some softwoods are harder than soft hardwoods.

## 7.2 Surface categories and classes:

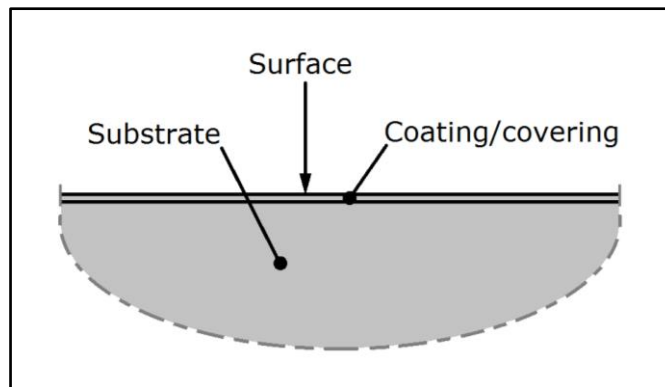
In relation to mechanical properties of furniture surfaces JYSK operates with the following categories:

- *Coated substrate*
- *Covered substrate*
- *Unprotected wood*

The categories and underlying classes are further defined in the following paragraphs:

### Coated and covered surfaces:

Coatings and coverings lay on top of the substrate acting as both a protective and decorative layer on the furniture product.



*Illustration - Coated and covered surfaces*

### Coating classes:

Two classes exist as softwood substrates often limit mechanical properties of coatings:

<b>Class 1</b>	Coating on substrates of solid softwood
<b>Class 2</b>	Coating on all substrates except solid soft wood

### Covering classes:

within the covered substrate category three classes exist:

<b>Class 1</b>	Covering including layer(s) infused with melamine-resin e.g. Melamine Faced Board (MFB), Low Pressure Laminate (LPL) or High Pressure Laminates (HPL)
<b>Class 2A</b>	Covering with pattern and/or textured surface e.g. decorative paper with wood imitation print or foil with texture
<b>Class 2B</b>	Covering with solid color and smooth surface e.g. decorative paper with solid color

**Note:** Wooden veneers are considered substrates not coverings.

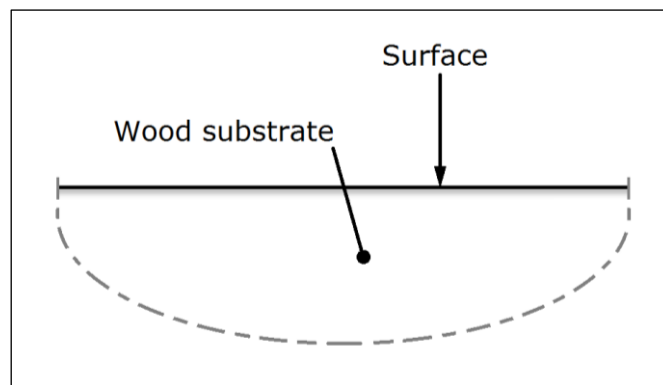
## **Unprotected wood:**

Some furniture is designed to have surfaces of wooden substrates (e.g. solid wood, glued wood or veneer) without coatings, or with coatings that at best offer only slight mechanical protection. For such unprotected wood surfaces the mechanical properties mostly depend on the characteristics of the wooden substrate itself.

Examples of coatings with low mechanical protection:

- Stained wood without further coating
- Oil and wax treatments.
- Soap treatments

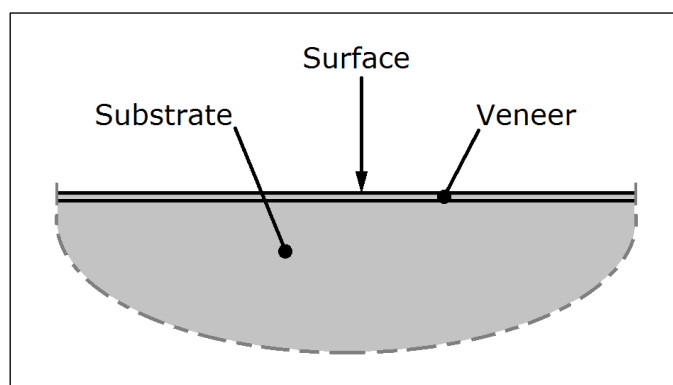
Often in common for the finishes are that the coating to a large degree is absorbed into the substrate instead of layering on the top of the surface.



**Illustration - Unprotected wood**  
**(The gradient near the surface symbolizes absorbed coating)**

The unprotected wood category is split into two classes as expectations regarding mechanical requirements are differentiated by JYSK between softwood and hardwood.

In some cases the unprotected wood is a veneer layer. An unprotected veneer is in this context considered a solid wood substrate and is subject to the usual requirements of the category and class dependent on wood type.



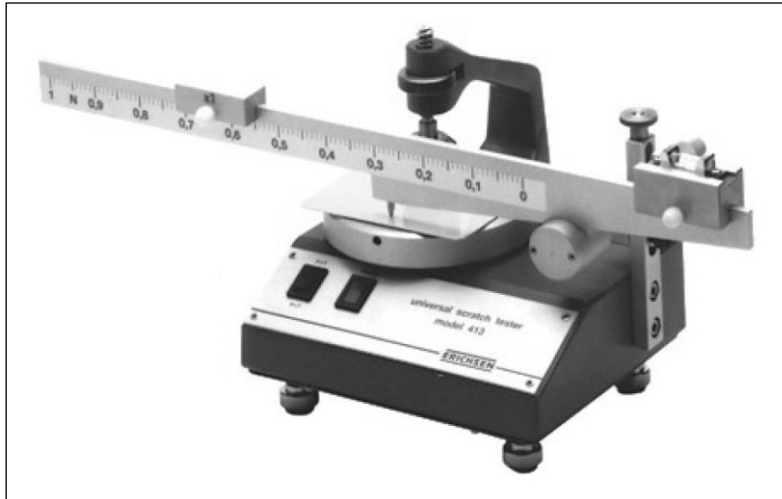
**Illustration - The case of unprotected veneer**

### 7.3 Resistance to scratching:

Scratch resistance is the ability of surfaces to withstand perpendicular application of forces in the direction of the surface. The scratch resistance highly coincides with the hardness of the surface material but also depend on parameters such as friction, roughness, elastic spring-back and visual appearance.

JYSK tests scratch resistance according to **EN 15186 - Method B (circular method)**.

The objective of the test is to find the minimum load producing a continuous visible scratch mark. The load is applied with a motor driven turntable apparatus on a hemispherical diamond scratching-tip of specific geometry.



*Illustration - Example of scratch testing apparatus*

The visibility of created scratches is evaluated under a certain light source within a viewing cabinet. The final result is the average of three samples.

#### 7.3.1 Additional categories for resistance for scratching

Two additional categories exist in relation to scratch resistance requirements:

##### High gloss surfaces:

A specific category exists for high gloss surfaces as they are very vulnerable to scratches.

Test requirements for the high gloss category apply to all high gloss surfaces (horizontal or vertical) independently of material or function of the surface.

##### Exposed surfaces:

Some surfaces must be more scratch resistant due to high scratch exposure.

Surfaces within the exposed surface category include the following:

- Tabletops (e.g. dinner-, office-, coffee-, end- and bed-side tables)
- Top surfaces on storage furniture with a height less than 160 cm.
- Upwards facing surfaces in open storage furniture (e.g. book cases and room dividers).
- Seats

Exposed surface requirements apply only when the material based requirement is lower.

The exposed surface requirement does not apply for surfaces of unprotected softwood.

## 7.3.2 Requirements per surface category and class:

<b>Test method:</b> <b>EN 15186 - (Method B)</b>  <b>Test requirement</b> Minimum acceptable load to produce a continuous surface scratch [N]  Applies to the following surfaces according to chapter <a href="#">1</a> : <ul style="list-style-type: none"><li><b>A</b> - All</li><li><b>B</b> - Upwards facing</li></ul>	High Gloss surfaces		
	≥0,7 N		
	Coated substrate		
	Class 1		Class 2
	≥0,6 N		≥0,8 N
	Covered substrate		
	Class 1	Class 2A	Class 2B
	≥1,4 N	≥0,8 N	≥0,5 N
	Unprotected wood		
	Softwood		Hardwood
	≥0,6 N		≥1,0 N
	Exposed surfaces		
≥1,0 N			

**Table 12 - Requirements per surface category and class**

The following flowchart must be used to apply the correct scratch resistance category:



## 7.4 Resistance to impact

JYSK tests for impact resistance as impacts are very likely to occur during normal usage of any furniture.

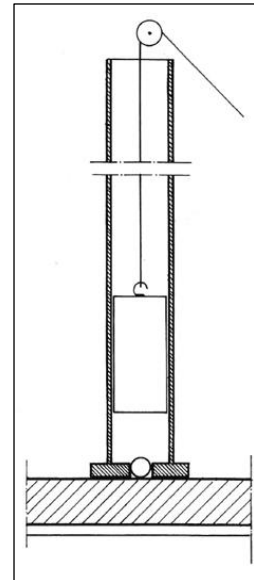
The chosen test method evaluates the characteristics of underlying substrates, which is only slightly addressed when testing for resistance against scratches.

JYSK tests resistance to impact with **ISO 4211-4** using one single drop height per test.

The impact resistance is evaluated by dropping a steel-weight onto a steel-ball (of specific diameter and hardness) which is positioned on the test surface.

After the steel-ball has been impacted by the steel-weight the test surface is assessed and rated according to a descriptive numerical rating code.

The diameter of the impact mark on the surface is measured and recorded.



**Illustration - Example of impact testing apparatus**

<b>Test method:</b> <b>ISO 4211-4</b> Using specified drop height  <b>Test requirement:</b> <ul style="list-style-type: none"> <li>• Rating <math>\geq 4</math></li> <li>• Impact mark <math>\leq 5</math> mm</li> </ul> Applies to the following surfaces according to chapter 1: <ul style="list-style-type: none"> <li>• <b>A</b> - All</li> <li>• <b>B</b> - Upwards facing</li> </ul>	Coated substrate	
	Class 1	Class 2
	15 mm	50 mm
	Covered substrates (all classes)	
	50 mm	
	Unprotected wood	
	Softwood	Hardwood
	15 mm*	50 mm*
	(*) for unprotected wood with no protective layer JYSK considers the rating of $\geq 4$ applicable if the wooden surface does not crack to show open fibers.	

**Table 13 - Requirements per surface category and class**

## 7.5 Adhesion

Coatings and coverings on furniture supplied to JYSK must be sufficiently adhered to the underlying substrate(s) of the product.

*Adhesive failures* (structural failure between layers) and *cohesive failures* (structural failure within layers) are both considered adhesion failures by JYSK.

JYSK tests for adhesion using the cross cut adhesion method according to **ISO 2409**.

The resistance to separation is measured by classifying the visual appearance of the surface after creation of a specific cross cut pattern.

The required adhesion depends on the composition of materials.

<b>Test method:</b> <b>ISO 2409</b> - Cross cut adhesion  <b>Test requirement pr. surface type:</b> Maximum rating permitted	Coating	
	Class 1	Class 2
	≤1	≤2
	Covering	
	Class 1	Class 2 A & B
	≤2	≤1

**Table 14 - Requirements per surface category and class**





## 8 Resistance to scuffing from metal

Scuffing is the tendency of a surface to create and retain marks from abraded material.  
Tendency to scuffing is a critical and unwanted characteristic on furniture surfaces.

A particularly well-known problem is the tendency to make scuff marks from metal objects.

To show sufficient resistance to scuffing the following surfaces to be able to pass testing according to [8.1](#):

- Tabletops (e.g. dinner-, office-, coffee-, end- and bed-side tables)
- Top surfaces on storage furniture with a height less than 160 cm.
- Upwards facing surfaces in open storage furniture (e.g. bookcases and room dividers).
- Seats

Scuffing-object:			Material requirement:	
<b>Hard</b>	Stainless steel tableware (e.g. teaspoon)		Chromium content	Cr>10,5%
<b>Soft</b>	Copper-nickel coin (Must be clean)		Must be CuNi25 E.g.: <ul style="list-style-type: none"> <li>• 2 €</li> <li>• 1/2/5-DKK</li> <li>• 10/20/50-Groszy</li> <li>• 5-złotych</li> <li>• British 50p</li> </ul>	

**Table 15 – Scuffing objects**

<b>Application</b>	Manually apply the scuffing-object onto the tested surface in a smooth flowing motion.
<b>Contact point</b>	Any edge or surface of the scuffing-object may be used.
<b>Applied pressure</b>	Application of the object should hard as possible without scratching or otherwise deforming the surface.

**Table 16 – Scuffing methods**

## 8.1 Test procedure

