



**What is new in EN 438:2016**



## Preface

High-pressure laminate (HPL) manufactured in accordance with EN 438 has been used in the construction and furniture sector for decades. The European standard EN 438 defines the material, requirements and properties of HPL.

HPL is a resin and paper-based (cellulose) thermosetting composite material and features a unique, extremely robust, resistant, modern decorative surface. HPL is found in all aspects of our day-to-day lives and can be self-supporting or used bonded to a substrate. The application and usage areas of HPL are extremely diverse and are constantly evolving. This requires regularly updated information about different applications and processing techniques. ICDLI technical bulletins are a valuable source for this knowledge.

EN 438 is regularly reviewed as the standard number for HPL. In this leaflet you will find a list of the changes compared to the last revision.

This document makes no claim of completeness regarding listing the full details of any standards referred to in the text.

All information is based on the current state of technical knowledge, but it does not constitute any form of liability. It is the personal responsibility of the user of the products described in this information leaflet to comply with the appropriate laws and regulations.

For more than 50 years the ICDLI has been the international representative of the interests of European laminate manufacturers. Further information about the ICDLI and the data sheets published up to now can be found at [www.icdli.com](http://www.icdli.com).

This application was compiled by the International Committee of the Decorative Laminates Industry. It considers the conditions of application technology in the European countries. If you have further questions, please contact us:

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## 1. EN 438-1:2016

- The scope was concretized regarding the high-pressure process.
- The definition of High-Pressure Laminate (HPL) was updated. (3.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and “Core Layers” under Terms and Definitions. (3.2 and 3.3)
- Annex A “hygienic, health and safety information” was revised.

## 2. EN 438-2:2016 + A1:2018

- Resistance to surface wear was modified. The Initial Point (IP) is now the only test value. (10.6.3)
- Temperature of the “Resistance to dry heat” was changed from 180 °C to 160 °C. (16.4)
- Test procedure of “Dimensional stability at elevated temperature” was modified. (17)
  - Size of test specimen was changed to  $(200 \pm 0,8)$  mm x  $(50 \pm 1,0)$  mm
- Test procedure of “Dimensional stability at ambient temperature” was deleted. (18)
- Test procedure of “Resistance to wet heat” according EN 12721:2009 was included. (18)
- Picture with the rating scale for the “Resistance to crazing” was included. (24, Figure 18)
- The termination criterion of “Lightfastness test (Xenon arc) was modified. The blue wool is no longer the preferred method. Now the radiant exposer dose will be measured. (27.4)
- Test procedure of “Resistance to cigarette burns” was deleted. (30)
- Test procedure of “Determination of the microscratch resistance” (Method A and B) was included. (30)
- Annex A: “Surface finish and colour influence on surface evaluations” was included.
- Annex B: “Calibration and maintenance of abrasion equipment” was included.
- Annex C: “Measurement of shore A hardness” was included.

## 3. EN 438-3:2016

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and Core Layers” under Terms and Definitions. (3.1.2 and 3.1.3)
- Gloss values were added to the Inspection requirements – surface finish. (6.2.3)
- Modifications in Table 5 – General requirements
  - Criteria for the Resistance to surface wear is only the IP:
    - $\geq 350$  revolutions for HDS, HDF and HDP
    - $\geq 150$  revolutions for HGS, HGF and HGP
    - $\geq 50$  revolutions for VGS, VGF and VGP
  - Temperature of the “Resistance to dry heat” was changed from 180 °C to 160 °C.
  - Values for the “Resistance to cigarette burns” were deleted.
  - Tolerance values for the “Resistance to scratching” were modified:
    - HDS, HDF, HDP:  $\geq$  Grade 3 for smooth finishes;  $\geq$  Grade 4 for textured finishes
    - HGS, HGF, HGP:  $\geq$  Grade 2 for smooth finishes;  $\geq$  Grade 3 for textured finishes

- VGS, VGF, VGP:  $\geq$  Grade 1 for smooth finishes;  $\geq$  Grade 2 for textured finishes
- Annex A: “Addendum to Table 5 relating to test method 25: Scratch resistance” was deleted.

#### 4. EN 438-4:2016

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and “Core Layers” under Terms and Definitions. (3.1.2 and 3.1.3)
- Gloss values were added to the Inspection requirements – surface finish. (6.2.3)
- Modifications in Table 3 – General requirements
  - Criteria for the Resistance to surface wear is only the IP:
    - $\geq 150$  revolutions for CGS, CGF
  - Temperature of the “Resistance to dry heat” was changed from 180 °C to 160 °C.
  - Values for the “Resistance to cigarette burns” were deleted.
  - Values for the “Tensile strength” according EN ISO 527-2:1996 were deleted.
- Annex A: “Addendum to Table 5 relating to test method 25: Scratch resistance” was deleted.

#### 5. EN 438-5:2016

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and “Core Layers” under Terms and Definitions. (3.1.2 and 3.1.3)
- Gloss values were added to the Inspection requirements – surface finish. (5.2.3)
- Modifications in Table 3 – General requirements
  - Modification of the abrasion classes:
    - AC1:  $\geq 900$  revolutions
    - AC2:  $\geq 1500$  revolutions
    - AC3:  $\geq 2000$  revolutions
    - AC4:  $\geq 4000$  revolutions
    - AC5:  $\geq 6000$  revolutions
    - AC6:  $\geq 8500$  revolutions
  - Values for the “Resistance to cigarette burns” were deleted.
- Annex A: “Addendum relating to electrostatic properties” was deleted.

## 6. EN 438-6:2016

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and Core Layers” under Terms and Definitions. (3.1.2 and 3.1.3)
- Gloss values were added to the Inspection requirements – surface finish. (5.2.3)
- Modifications in Table 3 – Physical property requirements
  - Edge rating for the “Resistance to wet conditions” was included.
    - $\geq$  Rating 3 for EGS, EDS, EGF and EDF
  - Values for the “Tensile strength” according EN ISO 527-2:1996 were deleted.
- Modifications in Table 4 – Weather resistance requirements
  - Indices for Flexural strength and Flexural Modulus were modified.
    - Index  $D_s$ : 0,80
    - Index  $D_m$ : 0,80
- Annex A: Table A.2 – Examples for typical fire performance of exterior-grade compact laminates was deleted.
- Annex B: Assessment of conformity was deleted.

## 7. EN 438-7:2005

- prEN 438-7:2019 was recalled without replacement.
- EN 438-7:2005 is still significant.

## 8. EN 438-8:2018

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” and “Core Layers” under Terms and Definitions. (3.1.2 and 3.1.4)
- Edge quality (5.2.4.3): Tolerance values for edge chipping were included.
- Modifications in Table 8 – General requirements for pearlescent laminates
  - Edge ratings for the “Resistance to immersion in boiling water” and the “Resistance to crazing” were included.
    - $\geq$  Rating 3 for ACS and ACF
- Annex A – Information on reaction to fire was included.

## 9. EN 438-9:2017

- The definition of High-Pressure Laminate (HPL) was updated. (3.1.1)
  - Typical values: process temperature  $\geq 120$  °C; pressure  $\geq 5$  MPa
- Introduction of “Surface Layer” under Terms and Definitions. (3.1.2)
- Modifications in Table 6 – General requirements for coloured core layer laminates
  - Edge rating for the “Resistance to immersion in boiling water” was included.
    - $\geq$  Rating 3 for BCS
  - Values for the “Resistance to cigarette burns” were deleted.
- Modifications in Table 7 – General requirements for metal reinforced core layer laminates
  - Edge rating for the “Resistance to immersion in boiling water” was included.
    - $\geq$  Rating 3 for RCS and RCF
  - Values for the “Resistance to cigarette burns” were deleted.