**Testing of the Device**

**I.**

**Specification of FAT Lamination Tests**

**Duration of tests:** 2 days

**Lamination circle: 40 – 60 minutes**

**The material for testing of lamination curve:**

* Polycarbonate sheets, layout 3x5
  + Lamination of 64 sheets of driving licenses
    - Front side with text „TEST“
    - Back side with millimetre grid for the control of deformation (these sheets will be printed on offset machine in STC)
  + Lamination of 64 sheets of resident permit (chip + DOVID)
  + 108x relief lamination plates (DL and eID together, only defective plates)
  + 24x small lamination pads Schwan 1,9 mm + 24x small lamination pads Schwan 4,0 mm
* PVC sheets, layout 3x7
  + Lamination of 60 sheets
    - Front side -30 defective sheets from offset printing and 30 defective sheets from digital printing Mimaki (material without control)
    - Back side with millimetre grid (digital printing of Mimaki)
  + 66x large gloss lamination plate,
  + 12x large lamination pad (Schwan 1,9)

**Filling of the laminating press** (maximal filling):

* Polycarbonate sheets (3x5) 8x2x6 = 96 sheets in total
  + Lamination of 384 DL sheets (4 x 96)
    - Front side with a text „TEST“
    - Back side with millimetre grid for the control of deformation
  + 108x the relief lamination plates (DL and eID together, only defective plates)
  + 24x lamination pads small Schwan 1,9 mm + 24x lamination pads small Schwan 4,0 mm
* PVC (3x7) 10x6 = 60 sheets
  + Lamination of 180 sheets (3 x 60)
    - Front side of 120 defective sheets from offset printing and 60 defective sheets from digital printing Mimaki (material without control)
    - Back side with millimetre grid (digital printing of Mimaki)
  + 66x large gloss lamination plate,
  + 12x large lamination pad (Schwan 1,9)

**Requirements of testing**

* Verification of the technical specification
  + Plan parallelism (tin and lead rods will be matrix distributed over the area of each plate and they will be pressed with maximal pressure of laminating press)
  + Homogeneity of temperature fields + velocity of rise and fall of temperature in material; Using temperature pad with thermojunction (measuring of homogeneity in the middle of sheet + comparison of edge and middle sheet in the box + comparison of each plates among each other – always the middle sheet) + comparison of sheet deformation in edge and middle area using millimetre gird (9 sheets will be input)
  + The test of maximal temperature and pressure achievement
  + Verification of compatibility of our cassette with a new laminating press
* Functionality verification
  + Lamination tests with filling of one opening in order to lamination curves optimization, separately for PC material and PVC material (DL with CLI features and eRP with chip module and DOVID)
  + Test of maximal filling of laminating press
* Quality inspection of cards
  + Peel strength by ISO 10373, dynamic bending stress by ISO 10373, dynamic torsional stress by ISO 10373, control of cutting – edges of card, flatness of card etc.), the test of the personalization of CLI security features, visual and microscope inspection of cards, especially an influence of the printed design

**An evaluation of lamination tests and the assumed result**

The evaluation will have two phases. Some of tests will be evaluated immediately and some of test will be evaluated within 10 business days after lamination tests at the Buyer’s facility, the table no.1 below.

Cards will be cut from laminated sheets. These cards will be checked by the quality control standards ISO 7810/10373-1 and ICAO 9303 and they have to meet these standards.

Tab. 1. Tests and their limits

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| --- | --- | --- | --- |
| Č. | Type of test | Place of evaluation (immediately/at Buyer’s facility) | Limit parameters |
| 1 | Plan parallelism | Buyer’s facility | The difference between minimal and maximum measured value on surface should not be over 0,7 um and variability should be maximal ± 0,15 um |
| 2 | Homogeneity of temperature fields and temperature in material | Buyer’s facility | Time differences between measured temperature points distributed over the area of laminating press should not be over 60s at the set temperature/ Maximal difference between slots should not be over ± 3°C / Difference between slots in the same position should not be over ∆≤2,0 |
| 3 | Test of maximum temperature and pressure | immediately | Achievement of maximum temperature and pressure in required time limit. |
| 4 | Cassette compatibility | immediately | New cassette must be used for current laminating press MÜHLBAUER LP 3555 S6, technical drawing in attachment us a backup solution for production continuity. |
| 5 | Visual inspection of laminated sheets | immediately | Visual control of printed design and security features, esp. Local surface with high covering of ink has not be cracked and wrinkled. Texts and printed design must be readable, preservation of colour. All relief features must be preserved (including CLI). Sheets cannot show any features of delamination and deformation. |
| 6 | Measurement of distortion after lamination | Buyer’s facility | The change of parameters of sheet in length and width, it means, the deformation between points AD and BC should be same (∆≤0,3). The ratio between length and width of each image has to be constant. |
| 7 | Peel strength | Buyer’s facility | ISO 7810/10373-1, minimal limit 0,35N/mm. |
| 8 | Dynamic bending and torsional stress | Buyer’s facility | ISO 7810/10373-1 and internal STC limits for these tests: PC cards (across bending: 11000, along bending: 30000, torsional bending: 50000); PVC cards (across bending: 1000, along bending: 2000, torsional bending: 4000) |
| 9 | Personalization | Buyer’s facility | Card samples with personalized data for quality inspection, the quality of CLI/MLI security features have to be same like cards issued nowadays. |
| 10 | Cutting test | Buyer’s facility | Inspection of edges and burrs by ISO 7810 |

**II.**

**Specification of SAT Lamination Tests**

SAT lamination tests will be performed under the same conditions and the Device and test results have to meet the same limit parameters as required when performing FAT lamination tests.