INSTRUCTIONS FOR TESTING

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PREPARATIONS

The samples are pre-conditioned and packed at approximately 30 °C and 30% R.H. Store the unopened packages for a few hours at 23 °C to reach temperature equilibrium. Unpack and condition the samples at 23 °C and 50% R.H. for 12 hours, or longer if necessary, to ensure that the equilibrium moisture content is reached, see instructions in ISO 187.

Check that the testing instrument is calibrated according to the instructions given in the standard method or, if such instructions are not given, according to the instructions given by the instrument manufacturer.

Carry out the test for the property in question.

- Complete the provided form with all the individual measures, mean and standard deviation are calculated automatically. Do NOT enter any non-numerical data, e.g. NA or >100, in the measurement fields, enter these in the comment field.

- Most sets of samples come with one or two spare's, test these in case of any damaged test piece, or if you see exceptional results, in that case delete the erroneous measurement.

NOTE: In case you copy data from another Excel sheet make sure you use the **PASTE SPECIAL** function: **PASTE VALUES** (or the local language wording for this), not doing so creates links to the original file which corrupts the processing of the data.

- Enter the MEASURED temperature and RH, not the assumed standard 23/50. This may give you an indication of the reason for a deviating result or even exceeding the warning or action limits.

- Fill-in all the other data requested, and return the form before the deadline.

1 BASIC PROPERTIES

1.1 THICKNESS

Method: ISO 534

Samples: 12 test pieces 100 mm x 100 mm (2 reserves) are provided for each Level.

Operate the instrument in accordance with ISO 534 and the manufacturer's instructions. Perform one measurement in the centre of each single test piece.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in µm.

1.2 THICKNESS OF CORRUGATED BOARD

Method: ISO 3034

Samples: 12 test pieces 150 mm x 150 mm (2 reserves) are provided for each Level.

Determine the thickness with the marked side up and one value per test piece.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in µm.

1.3 GRAMMAGE

Method: ISO 536

Samples: 20 test pieces 150 mm x 150 mm are provided for Levels 1, 2 and 3, 12 test pieces 148x210 mm² are provide for Level 4

Leave exposed for 24 h to 23 °C and 50% R.H., according to ISO 187. Check the zero setting of the balance. Cut 20 test pieces to the required size. Weigh each piece to your normal precision.

Report: 20 valid results for Levels 1, 2 and 3, 10 valid results for Level 4, their mean and standard deviation calculated to 3 significant figures, express the results in g/m^2.

1.4 MOISTURE CONTENT – OVEN DRYING METHOD

Method: ISO 287

Samples: 100 g sample material is provided for each Level. According to ISO 287 for lightweight papers, a smaller mass of at least 25 g sample material may be used for each measurement.

Open the package and immediately take out at least 25 g sample material from the package and place it in an at 105 °C oven-dried glass container with lid. The mass of the glass container should be known to 0,01 g. Dry the sample material at a temperature of 105 °C. When the testing material is considered to be completely dried, quickly close the container and allow the container to cool in a desiccator.

Weigh the container with the contents until the sample material has reached constant mass. This is reached, when two consecutive weightings do not differ by more than 0,1% in mass.

Determine two times the moisture content for each Level.

Report: 2 valid results, their mean and standard deviation calculated to 3 significant figures, express the results %. Calculate the standard deviation as the absolute difference between the two measurements divided by $\sqrt{2}$.

2 STRENGTH PROPERTIES

2.1 TENSILE STRENGTH – STRAIN AT BREAK

Method: ISO 1924-2

Samples: 12 sheets of 50 mm x 250 mm (2 reserves) are provided for each Level.

Cut from each sheet one test piece (15,0±0,1) mm width. The test span must be (180±1) mm. Operate the instrument in accordance with ISO 1924-2 and the manufacturer's instructions.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, expressing:

- Tensile Strength in kN/m
- Strain at break in %

2.2 TENSILE STRENGTH AFTER IMMERSION IN WATER

Method: ISO 3781

Samples: 12 sheets of 50 mm x 250 mm (2 reserves) are provided for each Level.

Cut the test pieces according to ISO 1924-2, (15,0±0,1) mm width. The test span must be (180±1) mm.

Soak in distilled water at 23 °C, the recommended soaking time for both Level 1 and Level 2 is overnight (approx. 16 hours), to allow a complete water saturation of the sample. After complete saturation, remove the strip, lay it flat on a pad of blotting paper, cover it with a sheet of blotting paper, and press lightly to remove excess water. Remove one test piece each time and immediately after blotting apply the tensile stress as specified in ISO 1924-2. Clamping pressure just sufficient to prevent the test piece from slipping should be applied. Excessively high clamping pressure must be avoided.

Report, 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in N/m.

2.3 TEARING RESISTANCE

Method: ISO 1974

Samples: The package contains sufficient paper for 12 pads of 4 test pieces approx. 100 mm x 90 mm (2 reserves) for each Level.

Select and cut 10 pads of 4 test pieces, so that the tearing direction is in the direction of the arrow. Measure the tearing resistance on 5 pads with the upper side towards the knife, and 5 pads with the bottom side towards the knife.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mN.

2.4 TEAR GROWTH (BRECHT – IMSET)

Method: DIN 53115

Samples: 12 test sheets approx. 60 mm x 90 mm (2 reserves) are provided for each Level.

Measure the tear growth on 10 test pieces with the marked side to the slide. Eliminate measurements with unequivocal slant tears.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mNm/m.

2.5 SHORT SPAN COMPRESSIVE STRENGTH (SCT)

Method: ISO 9895

Samples: 22 test sheets approx. 68 mm x 148 mm (2 reserves) are provided for each Level.

Cut one test piece (15±0,1) mm wide and at least 70 mm long from the middle of each of the 20 sheets and determine the SCT.

Report: 20 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kN/m.

2.6 RING CRUSH TEST (RCT)

Method: ISO 12192

Samples: 12 sheets 70 mm x 172 mm (2 reserves) are provided for each Level.

Cut 10 test pieces 12,7 mm x 152 mm from the middle of each sheet. Measure the thickness of the test piece and determine the dimension of the central island. Place the strips in the sample holder with the marked side outwards. Measure the RCT on 10 test pieces.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kN/m.

2.7 FLAT CRUSH RESISTANCE (FCT)

Method: ISO 3035

Samples: 12 sheets 150 mm x 150 mm (2 reserves) are provided for each Level.

Cut one test piece of at least 50 cm^2 from the middle of each sheet. Place the test piece with the corrugations parallel to the length of the tester beam to prevent leaning corrugation due to the sideways movement of the platens. Check on leaning corrugation and report this adding "LC" in the comments field.

Report: 10 valid results for the **maximum force** sustained by the test piece before collapse of the fluting (be aware that there might be more than one peak), their mean and standard deviation calculated to 3 significant figures, express the results in kPa.

2.8 FLAT CRUSH RESISTANCE AFTER LABORATORY FLUTING (CMT)

Method: ISO 7263-1

Samples: 12 sheets 200 mm x 50 mm (2 are reserves) are provided for each Level.

Cut 10 test pieces 12,7x152 mm in size from the middle of each sheet, edge strips are not to be used. Determine the CMT crushing value 30 minutes after fluting the sample at 12,5 mm/min using a motor-driven, fixed-platen, flat crush tester with 400 grit sandpaper on the platens.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in N.

2.9A EDGEWISE CRUSH RESISTANCE (ECT) PRE-CUT

Method: ISO 3037

Samples: 12 test pieces 25 mm x 100 mm (2 reserves) of corrugated board pre-cut by the CL to 100 mm x 25 mm are provided for each Level.

Test the pieces with the side of 100 mm parallel to the plates of the crush tester.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kN/m.

2.9B EDGE-WISE CRUSH RESISTANCE (ECT) LAB-CUT

Method: ISO 3037

Samples: 2 sheets of 150 mm x 300 mm are provided for each Level.

Cut at least 10 pieces out of the board of 100 mm x 25 mm with the flutes parallel to the side of 25 mm. Test these pieces with the side of 100 mm parallel to the plates of the crush tester.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kN/m.

2.10 PUNCTURE RESISTANCE

Method: ISO 3036

Samples: 5 test pieces 200 mm x 290 mm (1 reserve) are provided for each Level.

Determine the puncture resistance, two valid results per test piece ensuring that side marked 'Test this side' is uppermost and the arrow is pointing towards the pendulum hub.

Report: 4 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in J.

2.11 SCOTT INTERNAL BOND STRENGTH

Method: ISO 16260, TAPPI T-569

Samples: 3 sheets 150 mm x 200 mm are provided for each Level.

From each sheet, cut one test piece (25,4±0,2) mm wide of sufficient length to fit the preparation device in use (normally they require strips 140 mm to 178 mm long).

Each sheet provides five test pieces, so you have one spare sheet. Do not touch the test area with fingers.

Clean the angular element's metal surfaces that come into contact with the adhesive tape. The adhesive tape shall be according to: FINAT FTM1=15 N/(25,4±0,2) mm.

Check that the instrument is level. Ensure the minimum delay between the sample preparation and the test execution. Determine the internal bond strength, report only those tests where the delamination affected the whole test piece surface. If necessary, increase the pressure when preparing the test piece by using the appropriate distance spacers. Adjust, and verify that the test piece preparation station exerts a pressure of (690±20) kPa (100 psi), the pressing period is (3,0±0,5) s. Use the instrument low range to measure Level 1 and 2 samples, high range to measure Level 3 samples.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in J/m^2.

For instrument measuring in ft·lb: $((ft \cdot lb)/1000) \cdot 2{,}102 = J/m^2$.

2.12 FOLDING ENDURANCE (SCHOPPER)

Method: ISO 5626

Samples: 22 sheets 60 mm x 150 mm (2 reserves) are provided for each Level.

Cut a (15,0±0,1) mm wide test piece, with their long sides parallel to the long side of the sheet, from the middle of each of the 20 sheets. Make 20 determinations, record the number of double-folds and expressed as Log_{10} double- folds.

Report: 20 Log_{10} double-folds, the mean of the Log_{10} results to 2 decimal places and the standard deviation to 3 significant figures.

2.13 FOLDING ENDURANCE (KÖHLER-MOLIN)

Method: ISO 5626

Samples: 22 sheets 75 mm x >100 mm (2 reserves) are provided for each Level.

Cut two (15,0±0,1) mm wide test pieces, with their long sides parallel to the long side of the sheet, from the middle of each of the 20 sheets. Make 20 determinations, record the Log_{10} of double-folds.

Report: 20 Log_{10} double-folds, the mean of the Log_{10} results to 2 decimal places and the standard deviation to 3 significant figures.

2.14 BURSTING STRENGTH, PAPER

Method: ISO 2758

Samples: 12 test pieces approx. 150 mm x 150 mm (2 reserves) are provided for each Level.

Determine the bursting strength, one value per test piece, with its marked side ***downwards*** towards the applied diaphragm pressure.

Please ensure that all tests are performed at the standard pumping speed and that uncompensated burst pressure results are reported.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kPa.

2.15 BURSTING STRENGTH, BOARD

Method: ISO 2759

Samples: 12 test pieces approx. 150 mm x 150 mm (2 reserves) are provided for each Level.

Determine the bursting strength, one value per test piece with its marked side ***downwards*** towards the applied diaphragm pressure.

Please ensure that all tests are performed at the standard pumping speed and that uncompensated burst pressure results are reported.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kPa.

2.17 BURSTING STRENGTH, CORRUGATED BOARD

Method: ISO 2759

Samples: 12 test pieces 150 mm x 150 mm (2 reserves) are provided for each Level.

Determine the bursting strength, one value per test piece with its marked side *downwards* towards the applied diaphragm pressure.

Please ensure that all tests are performed at the standard pumping speed and that uncompensated burst pressure results are reported.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in kPa.

2.18 TENSILE STRENGTH, STRAIN AT BREAK, TEA, TENSILE STIFFNESS

Method: ISO 1924-3

Samples: 12 sheets 250 mm x 50 mm (2 reserves) are provided for each Level.

From each sheet cut one test piece (15,0±0,1) mm width. The test span must be 100±1) mm. Operate the instrument in accordance with ISO1924-3 and the manufacturer's instructions.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, expressing:

- Tensile Strength in kN/m
- Strain at break in %
- Tensile Energy Absorption in J/m2
- Tensile stiffness in kN/m

3 STIFFNESS PROPERTIES

3.1 BENDING STIFFNESS, RESONANCE METHOD

Method: ISO 5629

Samples: 12 sheets approx. 70 mm x 240 mm (2 reserves) are provided for each Level.

Cut 10 test pieces (15,0±0,1) mm wide from the middle of each sheet.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mNm.

3.2 BENDING RESISTANCE (7,5°; 15°; 50 MM), CONSTANT RATE OF DEFLECTION

Method: ISO 2493-1

Samples: 12 sheets approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Cut 10 test pieces 38 mm wide and approximately 80 mm long, with the longer side in the direction of the arrow. Measure the bending resistance on 5 test pieces against the upper side, and 5 test pieces against the bottom side, with a bending length of 50 mm and a bending angle of 15° for Level 1 and 2 and of 7,5° for Level 3.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mN.

3.3 BENDING STIFFNES, STATIC (5°; 50MM)

Method: ISO 5628

Samples: 12 sheets approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Cut 10 test pieces 38 mm wide and approximately 70 mm long with the longer side in the direction of the arrow.

Measure the bending resistance until 10 valid test results are achieved. Place the test pieces with the marked side in the direction of the measuring cell. Use for all Levels, a bending length of 50 mm and a bending angle of 5°.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mNm.

3.4 BENDING RESISTANCE (15°, 10MM)

Method: based on ISO 2493-1

Samples: 12 sheets approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Cut 10 test pieces 38 mm wide and approximately 70 mm long with the longer side in the direction of the arrow. Measure the bending resistance on 10 test pieces. Place the test pieces with the marked side backwards in the apparatus (upper side). Use for all Levels a bending length of 10 mm and bending angle 15°.

Report: 10 reading of the results (do not correct for the test length), their mean and standard deviation calculated to 3 significant figures, express the results in mN.

3.5 TSO, TENSILE STIFFNESS INDEX AND ORIENTATION ANGLE

Method: ---

Samples: 12 test pieces A4 (2 reserves) are provided for each Level.

The longer side is parallel to the machine direction (MD).

Determine the TSI and the TSO with the marked side to the measuring head until 10 valid test results are achieved.

Note the grammage of the level when making the settings on the device.

Report: 10 valid results of TSI in MD and CD and of TSO in MD, their mean and standard deviation calculated to 3 significant figures, expressing:

- TSI MD/CD in kNm/g
- TSO in °

3.6 BENDING RESISTANCE (7,5°; 15°; 50 MM), TABER-TYPE TESTER

Method: ISO 2493-2

Samples: 12 sheets approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Cut 10 test pieces 38 mm wide and approximately 70 mm long with the longer side in the direction of the arrow.

Measure the bending resistance on 10 test pieces. Measure each test piece in both directions of deflection with a bending length of 50 mm and a bending angle of 15° for Level 1 and 2 and of 7,5° for Level 3.

After 5 measurements, change the direction in which the bend is made. Record the scale reading (Taber bending moment in Taber units) and calculate the average of both directions for each test piece. Convert the results to bending moment in mNm.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mNm.

4 SURFACE PROPERTIES

4.1 SMOOTHNESS, BEKK

Method: ISO 5627

Samples: 12 test pieces approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Determine the smoothness on 10 test pieces with its marked side turned towards the air flow.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in s.

4.2 ROUGHNESS, BENDTSEN

Method: ISO 8791-2

Samples: 22 test pieces approx. 99 mm x 99 mm (2 reserves) are provided for each Level.

Measure the roughness on 20 test pieces (pressure 1,47 kPa,) with the marked side turned towards the air flow.

Report: 20 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in ml/min.

4.3 ROUGHNESS, PARKER PRINT SURF

Method: ISO 8791-4

Samples: 12 test pieces 100 mm x 100 mm (2 reserves) are provided for each Level.

Measure the roughness on 10 test pieces, with a head pressure of 19,6 kPa, a soft backing and a clamping pressure of 1,0 MPa, with the marked side turned towards to the air flow.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in µm.

4.4 COEFFICIENT OF FRICTION (STATIC AND DYNAMIC)

Method: ASTM D1894, TAPPI T 549

Samples: 22 sheets approx. 120 mm x 300 mm (2 reserves) are provided for each Level.

Cut 2x 10 test pieces (one test piece for the sled and one for the table) according to the standard, with the longer side parallel to the long side of the sheet.

Determine the static and dynamic coefficients of friction after one slide with the marked sides against each other. Place the marked side (top of the stack, face-up) on the table with the arrow in the direction of the sled movement. Mount the next sheet with the marked side (top of the stack, face-up) on the sled.

Determine the static and dynamic COF after one slide with the marked sides against each other.

Report: 10 valid results for static and dynamic friction, their mean and standard deviation calculated to 3 significant figures.

4.5 COEFFICIENT OF FRICTION (INCLINED PLANE)

Method: UNI 9802, DIN 53119-2 and NF Q 03-083

Samples: 22 sheets approx. 120 mm x 300 mm (2 reserves) are provided for each Level.

Cut 2x 10 test pieces (one test piece for the sled and one for the inclined plane) according to the standard, with the longer side parallel to the long side of the sheet. Place the marked side (top of the stack, face-up) on the table, with the arrow in the direction of the sled movement (i.e. downward on the ramp).

Mount the next sheet with the marked side (top of the stack, face-up) on the sled. Determine the coefficient of friction with the marked sides against each other. Read the angle of the plane at the moment that the sled starts to move.

Determine the static coefficients of friction by calculating the tangent of the angle at which sliding began.

Report: 10 valid results for static friction, their mean and standard deviation calculated to 3 significant figures.

4.6 CONTACT ANGLE

Method: ISO 14778

Samples: Level 1 with 1 test piece and Level 2 and 3 with 5 test pieces (2 reserves) at least 20 mm x 150 mm are provided.

Cut the samples to the dimensions to fit on your device. Record these dimensions in the report sheet under remarks.

Clean the Level 1 with a quick drying solvent, e.g. ethanol 96%.

Adjust the device to start measuring immediately after drop-release and with a resolution such that after 0,1 s, 1 s and 10 s a reading can be achieved. Adjust the drop size to 4 µl.

Make 10 measurements for Level 1 and at least 3 measurements for Level 2 and 3 per test piece.

Report: 10 valid results at 0,1 s, 1 s and 10 s, their mean and standard deviation calculated to 3 significant figures, express the results in °.

5 STRUCTURAL PROPERTIES

5.2 AIR PERMEANCE, BEKK

Method: ---

Samples: 12 test pieces approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Insert a rubber gasket with an outer diameter of 45 mm and an inner diameter of 12 mm between the glass plate and test piece (adjust co-axially)

Measurements are to be taken in the middle of each test piece with the marked side turned towards the air flow. Therefore, produce a vacuum of more than 50,66 kPa (= 380 mm_{Hg}) in the vacuum container and measure the time required in s, for the air pressure in the vacuum container to drop from 50,66 kPa (= 380 mm_{Hg}) to 29,33 kPa (**=** 220 mm_{Hg}).

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in s.

5.3 AIR PERMEANCE, BENDTSEN

Method: ISO 5636-3

Samples: 22 test pieces approx. 140 mm x 210 mm (2 reserves) are provided for each Level.

Make a measurement in the middle of each test piece (pressure 1,47 kPa), with the marked side turned towards the air flow.

Report: 20 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in ml/min.

5.4 AIR PERMEANCE, GURLEY

Method: ISO 5636-5

Samples: 12 test pieces approx. 70 mm x 99 mm (2 reserves) are provided for each Level.

Make a measurement in the middle of each test piece with the marked side turned towards the air flow.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in s/100 cm^3.

6 OPTICAL PROPERTIES

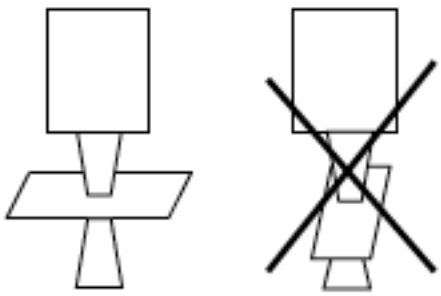
6.0 GENERAL

Each sample pack is made of a pad of paper to be tested and a printed cover sheet. Remove the cover sheet before performing the measurements.

The cover sheet has a protective function and shall not be tested.

The samples are sufficient large for all common instruments, and have been cut in such a way that their dimensions are different in MD and CD, so that they are always measured as indicated in the figure hereafter.

Place the test piece in the position indicated on the cover sheet:



Check that the testing instrument is calibrated according to the instructions given in ISO 2469, ISO 2470-1 and ISO 11475 (with IR3 booklets delivered by an Authorized Laboratory).

Carry out the test, record in the excel sheet all individual valid results, calculate and record their mean and standard deviation.

6.1 RX, RY, RZ, ILLUMINANT C, UV ADJUSTED

Method: ISO 2469

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, use a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the sample pad. Without touching the test area, use the appropriate procedure for the instrument, to measure the reflectance factor Rx, Ry, Rz of the top side of the test piece pad. Read and record the values. Move the measured test piece to the bottom of the pad and measurer Rx, Ry, Rz for the next and similarly for the following test pieces, until 10 valid results.

Report: 10 valid results for each of the Rx, Ry, Rz, their mean and standard deviation with 3 significant figures, express the results in %.

6.2 RX, RY, RZ, ILLUMINANT D65, UV ADJUSTED

Method: ISO 2469

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the D65/10° Illuminant/observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument, Rx, Ry, Rz of the top side of the test piece pad. Read and record the value. Move the measured test piece to the bottom of the pad and measure Rx, Ry, Rz for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results each of the intrinsic reflectance factor Rx, Ry, Rz, their mean and standard deviation to 3 significant figures, express the results in %.

6.3 ISO BRIGHTNESS, ILLUMINANT C, UV ADJUSTED AND EXCLUDED

Method: ISO 2470-1

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level. 2 non-fluorescent samples marked Level 1 and Level 2 and 2 fluorescents samples marked Level 3 and Level 4.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument to measure the intrinsic blue reflectance factor of the top side of the test piece pad with UV(C) adjustment and with UVexcl (420 cut-off filter). Read and record the valid results. Move the measured test piece to the bottom of the pad, measure the next sheet, and the following test pieces until 10 valid results.

Report: 10 valid results of the ISO brightness, UV(C) and UVexcl, their mean and standard deviation to 3 significant figures, express the results in %.

6.4 ISO BRIGHTNESS, ILLUMINANT D65, UV ADJUSTED AND EXCLUDED

Method: ISO 2470-2

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level. 2 non-fluorescent samples marked Level 1 and Level 2, and 2 fluorescents samples marked Level 3 and Level 4.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the D65/10° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument to measure the intrinsic blue reflectance factor of the top side of the test piece pad with UV(D65) adjustment and with UVexcl (420 cut-off filter). Read and record the valid results. Move the measured test piece to the bottom of the pad and determine the intrinsic blue reflectance factor for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results of brightness, UV(D65) and UVexcl, their mean and standard deviation to 3 significant figures, express the results in %.

6.5 OPACITY, ILLUMINANT C, UV ADJUSTED

Method: ISO 2471

Samples: An opaque pad, made of 10 or 20 sheets approx. 100 mm x 150 mm is provided for each Level.

Note: for Level 1 (transparent layer), an additional thick pad (stapled) is supplied to have an opaque infinite backing. This additional pad is not randomized and sheets constituting this pad shall not be measured individually.

Testing: As the samples may contain a fluorescent whitening agent, check that the UV setting of the instrument has been adjusted to conform to UV(C)-conditions.

Remove the protective sheet from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument to measure the intrinsic luminance factor R_∞ of the top side of the test piece pad. Read and record the value to the nearest 0,01% of the reflectance factor.

Remove the top test piece from the pad and, with the black cavity backing this single test piece, measure the luminance factor R_o, for the same area of the test piece. Read and record the value to the nearest 0,01% of the luminance factor.

(These two clauses describe the two independent measurements, which are necessary for the determination of opacity. This text is not intended to imply that the two measurements shall necessarily be made in this order. It depends on the software installed to manage the reflectometer.)

Move the measured test piece to the bottom of the pad. Repeat the measurements of R_∞ and R_o, moving the top test piece to the bottom of the pad after each pair of measurements, until five pairs of measurements have been made.

(This clause implies that measurements of R_∞ and R_o shall be made alternately, but this is not an essential requirement of this procedure. The five measurements of R_o may be made before or after the five measurements of R_∞ if such a procedure is preferred, or the measurements may be made alternately.)

Turn the pad upside down and repeat the same procedure for the other side.

Using the corresponding values of R_∞ and R_o, calculate the opacity as $(R_o / R_\infty) \times 100$ (this calculation may also be done automatically in the software installed to manage the reflectometer)

Report: 10 valid results of the opacity, their mean and standard deviation to 3 significant figures, express the results in %. The overall mean shall be reported (results are not reported separately for each side).

6.6 CIE WHITENESS, ILLUMINANT D65, UV ADJUSTED AND EXCLUDED

Method: ISO 11475

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the D65/10° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument to measure the CIE Whiteness of the top side of the test piece pad with UV(D65) adjustment and with UVexcl (420 cut-off filter). Read and record the valid results. Move the measured test piece to the bottom of the pad and determine the CIE Whiteness for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results of the CIE Whiteness (UV(D65) and UVexcl), their mean and standard deviation to 3 significant figures, express the results in %.

6.7 L*, A* AND B*, ILLUMINANT C, UV ADJUSTED

Method: ISO 5631-1

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the top of the test piece pad. Without touching the test area use the appropriate procedure for the instrument to obtain the three CIE tristimulus values of the first test piece (or CIELAB values if the instrument is designed to report directly in this colour space). Record the L*, a* and b* coordinates (calculated or measured). Move the uppermost test piece to the bottom of the pad and determine the values for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results each of the L*, a* and b* coordinates, their mean and standard deviation to 3 significant figures, express the results in %.

6.8 L*, A* AND B*, ILLUMINANT D65, UV ADJUSTED

Method: ISO 5631-2

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the D65/10° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the top of the test piece pad. Without touching the test area use the appropriate procedure for the instrument to obtain the three CIE tristimulus values of the first test piece (or CIELAB values if the instrument is designed to report directly in this colour space). Record the L*, a* and b* coordinates (calculated or measured). Move the uppermost test piece to the bottom of the pad and determine the values for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results each of the L*, a* and b* coordinates, their mean and standard deviation to 3 significant figures, express the results in %.

6.9 L*, A* AND B*, ILLUMINANT C, UV ADJUSTED (COLOURED PAPERS)

Method: ISO 5631-1

Note: The mentioned method is intended for white or near-white papers

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the top of the test piece pad. Without touching the test area use the appropriate procedure for the instrument to obtain the three CIE tristimulus values of the first test piece (or CIELAB values if the instrument is designed to report directly in this colour space). Record the L*, a* and b* coordinates (calculated or measured). Move the uppermost test piece to the bottom of the pad and determine the values for the next and similarly for the following test pieces until 10 valid results.

Report: 10 valid results each of the L*, a* and b* coordinates, their mean and standard deviation to 3 significant figures, express the results in %.

6.10 L*, A* AND B*, ILLUMINANT D65, UV ADJUSTED (COLOURED PAPERS)

Method: ISO 5631-2

Note: The mentioned method is intended for white or near-white papers

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 100 mm x 150 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the protective sheet from the top of the test piece pad. Without touching the test area use the appropriate procedure for the instrument to obtain the three CIE tristimulus values of the first test piece (or CIELAB values if the instrument is designed to report directly in this colour space). Record the L*, a* and b* coordinates (calculated or measured). Move the uppermost test piece to the bottom of the pad and determine the values for the next and similarly for the following test pieces until 10 valid results. Make 10 measurements.

Report: 10 valid results each of the L*, a* and b* coordinates, their mean and standard deviation to 3 significant figures, express the results in %.

6.11 GLOSS 75°, CONVERGING BEAM

Method: ISO 8254-1

Samples: 7 test pieces 100 mm x 200 mm (2 reserves) are provided for each Level.

Make 5 measurements in the Machine Direction (longer side parallel to the MD), and 5 measurements in the opposing direction, make 5 measurements in Cross Direction and 5 measurements in opposite direction.

Report: 20 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in %.

7 CHEMICAL PROPERTIES

7.1 KAPPA NUMBER

Method: ISO 302

Note: ISO 302 specifies a method for the determination of the Kappa number of pulp. Paper is used for CEPI-CTS samples because ISO 9706 "Information and documentation - Paper for documents - Requirements for permanence" prescribe the use of ISO 302.

Sample: the package contains about 30 g of paper. This quantity is sufficient for two measurements and possibly for one or two additional tests if needed.

Report: 2 valid results, and their mean calculated 3 significant figures to the nearest 0,1 %. Calculate the standard deviation as the absolute difference between the two measurements divided by $\sqrt{2}$.

7.2 PH OF AQUEOUS EXTRACTS

Method: ISO 6588-1 (Cold extraction)

Sample: The package contains about 6 g of paper. This quantity is sufficient for two measurements and possibly for one or two additional tests if needed.

Conductivity of the water should be checked and maintained at <0,1 mS/m. If the individual results differ by more than 0,2 pH-unit, repeat the determination with two additional extracts.

Report: 2 valid results, and their mean calculated to 3 significant figures. Calculate the standard deviation as the absolute difference between the two measurements divided by √2.

7.3 ALKALI RESERVE

Method: ISO 10716

Sample: The package contains about 6 g of paper. This quantity is sufficient for two measurements and possibly for one or two additional tests in case of need.

If the individual results differ by more than 0,07 mol/kg, repeat the determination.

Report: 2 valid results, and their mean calculated to 3 significant figures., express the results in mol/kg. Calculate the standard deviation as the absolute difference between the two measurements divided by √2.

7.4 RESIDUE (ASH) AT 525 °C

Methods: ISO 1762 (525 °C)

Sample: The package contains about 10 g of paper. This quantity is sufficient for two measurements and possibly for one or two additional tests in case of need.

Determine the residue according to the standard.

Report: 2 valid results, and their mean calculated to 3 significant figures, express the results in %. Calculate the standard deviation as the absolute difference between the two measurements divided by √2.

7.5 RESIDUE (ASH) AT 900 °C

Methods: ISO 2144 (900 °C)

Sample: The package contains about 10 g of paper. This quantity is sufficient for two measurements and possibly for one or two additional tests in case of need.

Report: 2 valid results, and their mean calculated to 3 significant figures, express the results in %. Calculate the standard deviation as the absolute difference between the two measurements divided by √2.

8 TISSUE PROPERTIES

8.1A TISSUE SINGLE SHEET THICKNESS

Method: ISO 12625-3

Samples: 12 test pieces (2 reserves) approx. 150 mm x 100 mm are provided for each Level.

Operate the instrument in accordance with ISO 12625-3 and the manufacturer's instructions. Perform one measurement in the centre of each test piece until 10 valid results.

Report: 10 valid results, their mean value with 2 decimal places and standard deviation to 3 significant figures, express the results in mm.

8.1B TISSUE BULKING THICKNESS

Method: ISO 12625-3

Samples: 11 test pieces (1 reserve) containing 8 sheets approx. 150 mm x 100mm, are provided for each Level.

Operate the instrument in accordance with ISO 12625-3 and the manufacturer's instructions. Perform one measurement in the centre of each test piece until 10 valid results.

Report: 10 valid results, their mean and standard deviation both divided by the number of sheets in the stack (8), their mean value with 2 decimal places and standard deviation to 3 significant figures, express the results in mm.

8.2 TISSUE TENSILE STRENGTH AFTER IMMERSION IN WATER

Method: ISO 12625-5

Samples: 12 sheets approx. 210 mm x 110 mm (2 reserves) are provided for each Level.

From each test piece cut one test strip (50,0±0,5) mm wide. The test span must be (43,5±1,0) mm (measured from top of the bar to the bottom of the top clamp, see EN 12625-5 for details).

Operate the instrument in accordance with ISO 12625-5 and the manufacturer's instructions at a test speed of 50 mm/min. The soak time for the sample is 15 s with the soaking apparatus lowered immediately before the test is initiated.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in N/m.

8.3 TISSUE RESIDUAL WATER ABSORPTION CAPACITY AND TIME

Method: ISO 12625-8

Samples: Approx. 40 g is provided for each Level. Machine Direction is parallel to the long dimension of the sheets.

From the sample, prepare 5 test pieces by cutting areas of (76±1) mm width and with the length in Machine Direction, sufficient to have a mass of (5,0±0,2) g for each test piece. As several superimposed sheets shall be used to prepare each test piece, make sure that all individual sheets have the same side up. Do not return the sheets when handling them.

Separate the sheets before testing.

Operate the instrument in accordance with ISO 12625-8 and the manufacturer's instructions.

Use a water container large enough for the basket to be fully submerged when lying on its side and de-ionised water to immerse the basket containing the test piece. The water in the container shall be renewed before starting the tests on each sample level.

Report: 5 valid results for both the water absorption and water absorption time, their mean and standard deviation, calculated to 3 significant figures, express the results in g/g and s respectively.

8.4 TISSUE ISO BRIGHTNESS, ILLUMINANT C, UV ADJUSTED

Method: ISO 12625-15

Samples: 10 test pieces + 2 reserves (top+bottom) approx. 80 mm x 100 mm are provided for each Level.

Testing: calibrate the instrument according to the instrument maker's instructions, using a non-fluorescent ISO reference standard Level 3 (IR3). Adjust the UV-content to the C/2° Illuminant/Observer with a fluorescent ISO reference standard Level 3 (IR3).

Remove the coloured protective sheets from the test piece pad. Without touching the test area, use the appropriate procedure for the instrument to measure the intrinsic blue reflectance factor of the top side of the test piece pad with UV (C) adjustment. Read and record the results. Move the measured test piece to the bottom of the pad, and measure the next and the following test pieces until 10 valid results

Report: 10 valid results of ISO brightness, their mean and standard deviation to 3 significant figures, express the results in %.

8.5 TISSUE TENSILE STRENGTH – STRETCH AT BREAK

Method: ISO 12625-4

Samples: 12 sheets approx. 210 mm x 110 mm (2 reserves) are provided for each Level.

Cut sufficient test pieces to enable 10 dry tests to be carried out. Tests must be made in the arrow direction only. It is recommended to measure the tensile strength and stretch with a sample length of at least 150 mm and a test span length of (100±1) mm between jaws. The sample width is (50±0,5) mm if clamps allow. Make the tensile strength measurement using the sample as supplied, i.e. 1 ply, 2 ply.

Report: 10 valid results, their mean and standard deviation calculated to three significant figures, expressing:

- Tensile Strength in N/m
- Stretch at break in %

8.6 TISSUE SOFTNESS HF – TS7 – TS750 – D

Method: EMTEC Tissue Softness Analyser (TSA)

Samples: 12 test pieces (2 reserves) approx. 150 mm x 150 mm are provided for each Level.

Perform the measurements in a quiet atmosphere (no ambient noise) on the indicated side. During handling of samples, do not touch the area. Before measurement, ensure that no creases or other defects exist in the area to be measured. If defects are present in a test piece, replace it by one of the reserve pieces.

Place the test piece in the sample holder, ensure that no creases or similar defects are formed during clamping of the test piece. Use the following settings:

- algorithm: “QA1”;
- side: “Yankee”;
- number of plies: “1”;
- thickness: “310” and “225” [µm] for Level 1 and Level 2 respectively;
- grammage: “20” [g/m^2] for both Levels.

Report: 10 valid results for each of the calculated HF-value, TS7, TS750 and stiffness D (mm/N), their mean and standard deviation with the number of decimals and units as provided by the instrument.

8.7 TISSUE GRAMMAGE

Method: ISO 12625-6

Samples: 12 sheets approx. 200 mm x 200 mm (2 reserves) are provided for each Level.

Leave exposed for 24h to 23 °C and 50% R.H., according to ISO 187. Check the zero setting of the balance. Cut 10 test pieces to the required size. Weigh each piece to your normal precision. Make the grammage measurement using the sample as supplied, i.e. 1 ply, 2 ply.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in g/m^2.

9 PRINTABILITY PROPERTIES

9.1 PICK RESISTANCE, IGT

Method: ISO 3783. For the pendulum model: ISO 3782 (withdrawn)

Samples: 12 test pieces (2 reserves) approx. 35 mm x 340 mm are provided for each Level.

Mount a paper packing.

Set the printing speed (accelerated) to 1,0 m/s for Level 1 and 3,0 m/s for Level 2, adjust the printing pressure to 350 N. Measure the pick resistance on the marked side of 10 test pieces with the marking in the clamp. Use IGT medium viscosity pick test oil for both Level 1 and Level 2.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in m/s.

9.2 PRINT PENETRATION, IGT

Method: NEN 1836-2, IGT W24 “IGT Print penetration”

Samples: 12 test pieces (2 reserves) approx. 50 mm x 330 mm are provided for each Level.

Mount a rubber packing.

Set the printing speed (accelerated) to 1,25 m/s and the printing pressure to 200 N/cm print width. Measure the length of the blot on the marked side with the marking in the clamp. Use IGT print penetration oil for the test.

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in mm.

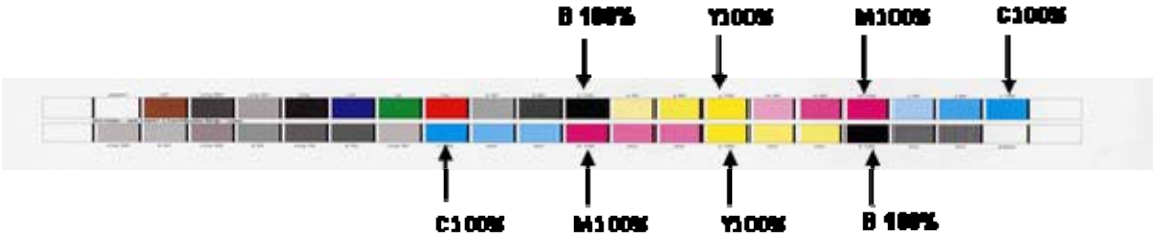
9.5 L*, A* AND B* OF PRINTED PAPER (D50)

Method: ISO 13655

Samples: a pack made of 2 printed papers. Each printed paper contains 2 strips with coloured scales. The 4 Levels are as follows:

- Level 1: Black 100%
- Level 2: Cyan 100%
- Level 3: Magenta 100%
- Level 4: Yellow 100%

Test areas are approx. 10 mm x 5mm.



Principle: Measure L*, a* and b* colour coordinates with the following settings:

- D50 Illuminant, 2° Standard Observer
- Black backing
- Portable spectrophotometers:
    - Geometrical configuration: 45°/0° or 0°/45°
    - Status E – NO polarized filter

Testing: calibrate the instrument according to the instrument maker's instructions. Adjust the UV-content to the D50 Illuminant. Without touching the test area, place one printed sheet on a black backing and measure L*, a* and b* values for the 4 Levels on the 2 strips.

Report: 4 valid results each of the L*, a* and b* coordinates, their mean and standard deviation calculated to three significant figures, express the results in %

9.12 RESISTANCE TO PICKING, DENNISON WAXES

Method: TAPPI T-459

Samples: 7 test pieces at least 50 mm x 340 mm (2 reserves) are provided for each Level.

Heat the end of the selected wax stick in a low flame or by electrical heat element, rotating the stick slowly until several drops of melted wax have fallen, the molten wax should not “bubble” this indicates wax is too hot. The entire surface should be molten wax.

Quickly place the melted end of the wax stick on the surface of the test piece with firm, but not undue, pressure so that the end spreads out to about 20 mm diameter, allow the wax stick to stand vertically on the paper.

Allow the wax to cool for at least 15 minutes and not more than 30 minutes. Place the wooden block with the hole over the stick of wax so that the stick protrudes through the hole; press the

block down firmly with one hand to prevent the paper from wrinkling or tearing, then pull the stick from the sheet with a quick jerk at a right angle to the paper surface.

Examine both, the tip of the wax and the test piece under normal reading illumination without magnification. There must be a definite indication of fibres or coating disturbed to be called a pick or surface rupture.

If the surface is not ruptured, repeat the test, using the same test piece with waxes of ascending numerical order until the surface of the paper test piece blisters, breaks, picks, or lifts. Test a minimum of 5 test pieces. Test only the top marked side (side with the sticker on the packing).

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the results as the highest numerical designation of the wax stick that does not disturb the surface of the paper. Record the type of pick in the remark field (pick, fibre lifting, micro pick, delamination).

10 MISCELLANEOUS PROPERTIES

10.1A WATER ABSORPTION, $COBB_{60}$, PAPER

Method: ISO 535

Samples: 12 test pieces (2 reserves) 150 mm x 150 mm are provided for each Level.

Weigh the dry test piece to the nearest 0,001 g. Determine the water absorbency (Cobb value) of each of the test pieces using the standard method. The water should be in contact with the marked surface of the test piece. Check that the used water is at the same temperature as the laboratory. Total time between initial exposure to the water and final blotting should be **60 s**. The water should be poured off after **45 s**.

The blotting paper should have a grammage of 225-275 g/m² and preferably a Klemm value of about 75 mm. Re-weigh the test piece to the nearest 0,001 g immediately after blotting, preferably after folding the sample with the damp sides inside.

Calculate the gain in moisture for each measurement and recalculate into g/m².

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in g/m².

10.1B WATER ABSORPTION, $COBB_{600}$, BOARD

Method: ISO 535

Samples: 12 test pieces (2 reserves) 150 mm x 150 mm are provided for each Level.

Weigh the dry test piece to the nearest 0,001 g. Determine the water absorbency (Cobb value) of each of the test pieces using the standard method. The water should be in contact with the marked surface of the test piece. Check that the used water is at the same temperature as the laboratory. Total time between initial exposure to the water and final blotting should be **600 s** (10 minutes). Excess water should be poured off after **585 s** (9 minutes 45 s).

The blotting paper should have a grammage of 225-275 g/m² and preferably a Klemm value of about 75 mm. Re-weigh the test piece to the nearest 0,001 g immediately after blotting.

Calculate the gain in moisture for each measurement and recalculate into g/m².

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in g/m².

10.1C WATER ABSORPTION, $COBB_{1800}$, CORRUGATED BOARD

Method: ISO 535

Samples: 12 test pieces (2 reserves) 150 mm x 150 mm are provided for each Level.

Weigh the dry test piece to the nearest 0,001 g. Determine the water absorbency (Cobb value) of each of the test pieces using the standard method. The water should be in contact with the surface of the test piece that is marked. Check that the water used is at the same temperature

as the laboratory. Total time between initial exposure to the water and final blotting should be **1800 s** (30 minutes). Excess water should be poured off after **1785 s** (29 minutes 45 s).

The blotting paper should have a grammage of 225-275 g/m^2 and preferably a Klemm value of about 75 mm. Re-weigh the test piece to the nearest 0,001 g immediately after blotting.

Calculate the gain in moisture for each measurement and recalculate into g/m².

Report: 10 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in g/m².

10.2 DRAINABILITY, SCHOPPER-RIEGLER METHOD

Method: ISO 5267-1

Samples: 1 sheet approx. 24g of dried pulp is provided for each Level.

Soak 24 g of dried pulp (one sheet) at least 4 h in 1200 ml of standard water according to ISO 14487 at 20°C. Dilute to 2000 ml with standard water at 20°C and disintegrate for 60.000 revolutions.

Dilute a sufficient portion of the disintegrated pulp to about 0,22% and determine its concentration by filtering, drying at (105±3) °C and weighing, according to ISO 4119. Dilute the pulp suspension to (0,2±0,002) % concentration. Use standard water according to ISO 14487.Wet the drainage chamber with distilled water at (20,0±0,5) °C and keep it at such a temperature. Take a volume of (1000±5) ml of the pulp suspension and perform the test.

Pour it in the tester and after 5 s release the cone valve. For everything not specified here refer to ISO 5267-1.

Allow no more than 30 minutes from pulp disintegration to test, in order to avoid change in the drainability of the pulp suspension.

Report: 5 valid results, their mean and standard deviation calculated to three significant figures, express the result in SR units.

10.3 RELATIVE HUMIDITY OF THE TESTING ROOM

Method: ---

Samples: the package contains a foil and paper sheet, which have been weighed by the Co-ordinating Laboratory under well-defined conditions.

Weigh the foil and the conditioned paper sheet separately to an accuracy of 0,001 g and record the results on the form provided. Measure and record the temperature and relative humidity in the testing room on the weighing occasion. The relative humidity is calculated using the following formula (format for use in a spreadsheet):

(((Client paper - CL paper) - (Client foil - CL foil))/ Paper moisture factor) + Sample RH

The paper moisture factor has been determined to be 0,002 for the test paper when used in a relative humidity of (50±6) %.

10.4 FIBRE LENGTH AND WIDTH

Method: ISO 16065-2

Sample: about 2 g of air-dried pulp are provided for each Level.

Soak the samples in tap water for at least 4 h. Disintegrate the sample for 15.000 revolutions in approximately 2000 ml of tap water, thus reaching a stock concentration of about 1 g/l. If you are unsure of the stock concentration, perform determination of stock concentration (a single measurement should be enough.)

Stir well before taking a sample from the suspension. Perform the measurements (according to the manufacturer's instructions.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, expressing:

- Fibre length in mm
- Fibre width in µm

10.5 PEEL ADHESION, 180°, 300 MM/MIN – 20 MIN/24H

Method: FINAT FTM 1

Samples: 6 test pieces approx. 70 mm x 300 mm (1 reserve) are provided for each Level.

From each of the 5 sheets cut two stripes (25,0±0,1) mm wide and minimum (175±0,1) mm long, with its long side parallel to the long side of the sheet.

Important: use a lint-free tissue and ethanol (96%) or acetone to clean the glass plates. The glass plates should have no damage or contamination.

Remove the backing material and glue the test piece carefully on the glass plate. Roll the FINAT standard pressure roller (2 kg) twice over the sample. Measure the first 5 test pieces after 20 minutes and the second 5 test pieces after 24 h with a speed of 300 mm/min and a testing angle of 180° over a minimum peel distance of 100 mm.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in N/25mm.

10.6 LOW SPEED RELEASE FORCE

Method: FINAT FTM 3

Samples: 6 test pieces approx. 70 mm x 300 mm (1 reserve) are provided for each Level.

From each of the 5 sheets cut one strip (50,0±0,1) mm wide and minimum (175±0,1) mm long, with its long side parallel to the long side of the sheet.

Important: use a lint-free tissue and ethanol (96%) or acetone to clean the glass plates. The glass plates should have no damage or contamination.

Glue the test piece with double sided tape on the glass plate. Prior, the facing material may be peeled from the release substrate. Store them for 20 h under a pressure of 6,86 kPa (70 g/cm²). After 4 h conditioning measure the low speed release force of the 5 test pieces with a speed of 300 mm/min and a testing angle of 180° over a minimum peel distance of 100 mm.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in cN/50mm

10.7 LOOP TACK MEASUREMENT

Method: FINAT FTM 9

Samples: 6 test pieces approx. 70 mm x 300 mm (1 reserve) are provided for each Level.

From each of the 5 sheets cut one strip (25,0±0,1) mm wide and minimum (175±0,1) mm long, with its long side parallel to the long side of the sheet.

Important: use a lint-free tissue and ethanol (96%) or acetone to clean the glass plates. The glass plates should have no damage or contamination.

Remove the backing material, and form the strip into a loop (adhesive surface outside). Position the loop into contact with the glass plate at a speed of 300 mm/min. When full contact over the glass plate has been achieved, immediately reverse the direction of the machine at a speed of 300 mm/min.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in N.

10.8 DRAINABILITY, “CANADIAN STANDARD” FREENESS METHOD

Method: ISO 5267-2

Samples: 1 sheet approx. 24g of dried pulp is provided for each Level.

Soak 24 g of dried pulp (one sheet) at least 4 h in 1200 ml of standard water according to ISO 14487 at 20°C. Dilute to 2000 ml with standard water at 20°C and disintegrate for 60.000 revolutions.

Take a sufficient portion of the disintegrated pulp and determine its concentration by filtering, drying at (105±3) °C and weighing, according to ISO 4119. Dilute the pulp suspension to (0,3±0,01) % concentration. Use standard water according to ISO 14487.

Wet the freeness tester with distilled water at (20,0±0,5) °C and keep it at this temperature. Take a volume of (1000±5) ml of the prepared pulp suspension and perform the test.

For everything not specified here refer to ISO 5267-2.

Allow no more than 30 minutes from pulp disintegration to freeness determination to avoid change in pulp freeness.

Read the volumes to the nearest 1 ml for values below 100 ml, to the nearest 2 ml for values between 100 ml and 250 ml, and to the nearest 5 ml when exceeding 250 ml.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in ml.

10.9 GREASE RESISTANCE (KIT-TEST)

Method: TAPPI T 559

Samples: 7 test pieces approx. 140 mm x 210 mm (2 reserve) are provided for each Level.

Testing side is the marked side. Do not touch the test area with bare fingers.
Drops of different test solutions (various mixtures of castor oil, toluene and n-heptane = KIT numbers 1-12) are applied to the test surface, the excess is removed after 15 s and the surface is examined for penetrated test liquid in the form of full-surface or local/spot darkening. The grease resistance is expressed by the highest number of the KIT solution where no darkening is visible.

Note that the stock solutions can be stored for a maximum of 6 months.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the results in [KIT-rating].

10.10 PEEL ADHESION, 90°, 300 MM/MIN – 20 MIN/24H

Method: FINAT FTM 2

Samples: 6 test pieces approx. 70 mm x 300 mm (1 reserve) are provided for each Level.

From each of the 5 sheets cut two stripes (25,0±0,1) mm wide and minimum (175±0,1) mm long, with its long side parallel to the long side of the sheet.

Important: use a lint-free tissue and ethanol (96%) or acetone to clean the glass plates. The glass plates should have no damage or contamination.

Remove the backing material and glue the test piece carefully on the glass plate. Roll the FINAT standard pressure roller (2 kg) twice over the sample. Measure the first 5 test pieces after 20 minutes and the second 5 test pieces after 24 h with a speed of 300 mm/min and a testing angle of 90° over a minimum peel distance of 100 mm.

Report: 5 valid results, their mean and standard deviation calculated to 3 significant figures, express the result in N/25mm.