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Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method**

1. Handling and Testing of Raw Materials

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1.1 Fiber raw material

Maceration	Internal
Dry matter content	SCAN-CM 39:94
Chip size distribution	SCAN-CM 40:01
Chip thickness and thickness distribution	SCAN -CM 47:92
Basic density, chips	SCAN-CM 43:95
Basic density, disk	SCAN-CM 43:95
Chip bulk density	SCAN-CM 46:92
Brightness of chips	SCAN-CM 59:01, ISO 2470:99
Brightness of disc	SCAN-CM 59:01, ISO 2470:99
Acetone soluble matter	SCAN-CM 49:03
Cyclohexane-acetone soluble matter	SCAN-CM 67:03
Carbohydrate composition, lignin (Klason and acid soluble) and acetone soluble matter	SCAN-CM 71:09 modif TAPPI T 222 cm-00, modif. SCAN-CM 49:03
Metal analyses: Li, Na, K, Cs, Be, Mg, Ca, Sr, Ba, Ti, V, Cr, Mo, Mn, Fe, Co, Ni, Cu, Ag, Zn, Cd, Hg, B, Al, Si, Sn, Pb, P, As, Sb, Bi, S, Se	Internal

1.2 Pigments and coating color

Dry matter content	SCAN-P 39:80
Ignition residue (925°C)	SCAN-P 40:80
pH, aqueous suspension	SCAN-P 48:83
Brightness and color (dry pigment, filler)	SCAN-P 89:03, modif.
Brightness and color (pigment slurry)	SCAN-P 89:03, modif.
Viscosity (Brookfield)	SCAN-P 50:84
Viscosity (Haake)	Internal
Viscosity, capillary viscometer (ACAV)	Internal
Viscosity, extensional viscosimeter (ACAV)	Internal
Viscosity, slit (ACAV)	Internal
Water retention, static, Gradek	Internal
Inorganic components, qualitative (EDS)	Internal
Pigment dispersion	Internal
Solids of immobilisation point	Internal
Abrasion (coated paper)	Internal

2. Characterisation of Pulps

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2.1 General pulp properties

Kappa number	ISO 302:04
Viscosity of pulp	ISO 5351:04
Zeta-potential (pulp)	Internal
Surface charge	Internal
Total charge	Internal
Surface and total charge (package)	Internal
ISO brightness of pulp	ISO 3688:99, ISO 3688:99 modif., ISO 2470:99
ERIC	TAPPI T 567 pm-97
Macro stickies of recycled fibers	Ingede 4 modif.

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2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
Brightness reversion, pc-number	Internal
Wet disintegration	EN ISO 5263:04
Hot disintegration	ISO 5263:04
Somerville shives	TAPPI T 275
Somerville shive removal	Internal
PFI mini shives	Internal
Estimation of dirt and shives, reflected light	ISO 5350-3:97
Estimation of dirt and shives, transmitted light, laboratory sheets	ISO 5350-1
Estimation of dirt and shives, transmitted light, mill sheeted pulps	ISO 5350-2
Pulmac shives	Internal
Dry matter content	ISO 638:78
Moisture content	ISO 287:85, modif.
Drainability, CSF	ISO 5267-2:01
Drainability, SR-number	EN ISO 5267-1:99, Corr. 1:01
Water retention value, WRV	ISO 23714:07 modif.
McNett fractionation	SCAN-M 6:69
Specific filtration resistance (F 48/200)	Internal
Ash (525 °C) (dry samples) Δ	ISO 1762:01
Ash (525 °C), (wet and slush samples)	ISO 1762:01
Initial wet tensile properties	Internal or SCAN-CM 69:09
Fish eyes (Sclereid content)	Internal
pH, aqueous extract	ISO 6588:05
Conductivity, aqueous extract	ISO 6587:92
pH and conductivity, aqueous extract	ISO 6588:05, ISO 6587:92

2.2 Fiber and fines properties, Fractionation

Fiber dimensions, manual	Internal
Fibre analysis, complete, FS-300	Internal
Fibre analysis, basic FS-300	Internal
Fibre wall thickness and fibre width	Internal
Cross-sectional fiber dimensions, SEM	Internal
Dislocations	Internal
Fibre flexibility (Steadman)	Internal
Fibre stiffness (TD&K)	Internal
External fibrillation of fibres	Internal
Internal fibrillation of fibres (Simons)	Internal
EWNN Swelling	Internal
Collection of McNett fractions	Internal
Fines separation with Super DDJ	Internal
Fines washing with Super DDJ	Internal
Fines content (DDJ) (pulp)	Internal
Fines separation (DDJ) (pulp)	Internal
Fibrillar content, apparent (fines sample)	Internal
Specific sedimentation volume (SOT)	Internal
Fibre damage classification	Internal
Sclereid content	Internal
Calculation of bands	Internal
Dimensions of bands (inkl. Fiber length)	Internal
Light microscopy (BF, DF, DIC, Phase contrast, Fluorescence) (h)	Internal
SEM imaging	Internal

2.3 Fiber furnish composition

Wood species, Scandinavian and Euca	ISO 9184 1-7(1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G 4:90
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Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
Wood species, other than Scandinavian and Euca	ISO 9184 1-7(1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G 5:03
Chemical pulp content (Strelis)	Internal
Qualitative fiber composition	Internal
Quantitative fiber composition	Internal
Softwood/hardwood ratio	Internal
Earlywood/latewood ratio	Internal
Cell type content (fiber, vessel, parenchyma)	Internal
Cell type content (fiber, vessel, parenchyma) and intactness of vessels	Internal
Size distribution of vessels or parenchyma cells	Internal
Vessel picking tendency of hard wood pulps	Internal

2.4 Carbohydrates, lignin and extractives

Carbohydrate composition	SCAN-CM 71:09
Carbohydrate composition, lignin (Klason and acid soluble) and acetone soluble matter	SCAN-CM 71:09 TAPPI T 222 cm-00, modif. SCAN-CM 49:03
Lignin (Klason and acid soluble) and acetone soluble matter	TAPPI T 222 om-02, modif. SCAN-CM 49:03
Carbohydrates/methanolysis	Internal/GC-MS
Acetone soluble matter	SCAN-CM 49:03
Cyclohexane-acetone soluble matter	SCAN-CM 67:03
Uronic acids	Internal
Carbonyl groups	Internal
Carboxyl groups	Internal
Acetone soluble matter (pulp)	SCAN-CM 49:93
Cyclohexane-acetone soluble matter (pulp)	SCAN-CM 67:03
Extractives (fatty and resin acids, sterols, lignans, sterylesters, triglycerides) - spruce	Internal (spruce/others)
Extractives (fatty and resin acids, sterols, lignans, sterylesters, triglycerides) - birch, pine, eucalyptus and others than spruce	Internal

2.5 Analysis of deposits and disturbing substances

Composition of stickies, spots and deposits, for example:	Internal
- qualitative analyses of organic compounds (IR)	
- semi-quantitative analyses of elements (EDS)	
- microscopy	
- microbiology	

2.6 MetalsPretreatment

- Wet digestion	Internal
-Ashing	Internal

Measuring

ICP measurement package 1 - Fe, Mn, Mg, Ca, Cu, Al, Si	Internal (ICP-measurement)
ICP measurement package 2 - Fe, Mn, Mg, Ca, Cu, Al, Si, Co, Cr, Ni, Zn, P, Ti, V	Internal (ICP-measurement)
ICP measurement package 3 - Fe, Mn, Mg, Ca, Cu, Al, Si, Co, Cr, Ni, Zn, P, Ti, V, Ba, Mo, Sr	Internal (ICP-measurement)
ICP measurement package 4 - Na, K, S, Fe, Mn, Mg, Ca, Cu, Al, Si	Internal (ICP-measurement)
Metal analyses: Li, Na, K, Cs, Be, Mg, Ca, Sr, Ba, Ti, V, Cr, Mo, Mn, Fe, Co, Ni, Cu, Ag, Zn, Cd, Hg, B, Al, Si, Sn, Pb, P, As, Sb, Bi, S, Se	Internal (ICP-measurement)

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Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method****2.7 Chlorine, nitrogen, sulphur and their compounds**

Chlorine, total	ISO 11480:97
Chlorine, organically bound, OCl	ISO 11480:97
Chloride or sulphate, water-soluble	ISO 9197:98, ISO 9198:01
Chloride and sulphate, water-soluble	ISO 9197:98, ISO 9198:01
Adsorbable organically bound halogens, AOX removable by washing (dried market pulp)	SCAN-CM 44:97
Nitrogen (Kjeldahl)	Internal
Sulphur, total (pulp, paper, board)	Internal
Sulphur, total (wood, coated paper)	Internal
Sulphur, reducible (paper)	Internal

2.8 Other chemical analyses

Efficiency of washing water-soluble COD	SCAN-CM 45:00 (wet) SCAN-CM 44:97 (dry)
Oxalate (dissolved and precipitated of pulp suspensions)	SCAN-N 39:05 modif.
Bromine, total	SCAN-CM 51:94, modif.
Fluorine, total	SCAN-CM 51:94, modif.
Carboxylic acids (formic, acetic, propionic and butyric acids)	Internal
Alkali solubility	ISO 692:82
Alkali resistance	ISO 699:82

3. Laboratory Refining

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Laboratory refining - Voith Sulzer	Internal
Laboratory beating - PFI 5 points	ISO 5264-2:11, EN 25264-2
Laboratory beating - PFI 4 points	ISO 5264-2:11, EN 25264-2
Laboratory refining - Voith Sulzer or PFI (0+4 SRE-levels, including SR, CSF, WRV, Fiberlength and coarseness, Apparent bulk density, Tensile, Tear, Internal bonding, Gurley air resistance, Optical properties)	

4. Preparation and Testing of Laboratory Sheets

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4.1 Preparation of Laboratory Sheets

Wet disintegration	EN ISO 5263:04
Hot disintegration	ISO 5263:04
Preparation of laboratory sheets, 5-12 sheets	EN ISO 5269-1:05
Preparation of laboratory sheets, 13-18 sheets	EN ISO 5269-1:05
Fraction sheets	Internal
Preparation of laboratory sheets with recirculated white water, 4-7 sheets	EN ISO 5269-3:08
Preparation of laboratory sheets with recirculated white water, 8-15 sheets	EN ISO 5269-3:08
Blend sheets	Internal
Filler containing sheets	Internal
Filler containing blend sheets	Internal
Pigment dispersion	Internal
Sheet calendering, Gradek sheet calender	Internal
Preparation of sheets with the dynamic sheet former	Internal
Blend sheets with the dynamic sheetformer	Internal

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Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method**

Pulp drying with the dynamic sheet former
Ash (525 °C) (dry samples) Δ

Internal
ISO 1762:01

4.2 Tensile strength properties

Tensile properties
Tensile index Δ
Stretch at break Δ
Tensile energy absorption index Δ
Tensile stiffness Δ
Elastic modulus Δ
Initial wet tensile properties
Zero span tensile index, rewetted (Pulmac)
Zero span tensile index, dry (Pulmac)
Fracture toughness test
Fracture toughness index
Nominal tensile index
Nominal stretch
Tensile strength after immersion in water
Z-directional tensile strength
Z-directional tensile strength + stress-strain curve

EN ISO 5270:98,
EN ISO 1924-2:94 modif.

Internal or SCAN-CM 69:09
ISO 15361:00
ISO 15361:00
SCAN-P 77:95 modif.

ISO 3781:83, SCAN-P 20:95
TAPPI T541 om-99
TAPPI T541 om-99

4.3 Other strength properties

Tear index Δ
Internal bonding strength
Burst index
Folding endurance

EN ISO 5270:98, ISO 1974:90,
TAPPI T 569:00
ISO 5270:98, ISO 2758:01
EN ISO 5270:98, ISO 5626:93

4.4 Sheet structure

Apparent bulk density Δ
Air resistance, Gurley
Air permeance, Bendtsen Δ
Roughness, Bendtsen Δ
In-plane shrinkage of laboratory sheets
Sheet shrinkage

EN ISO 5270:98, ISO 534:05
EN ISO 5270:98, ISO 5636-
ISO 5636-3:92
ISO 8791-2:07
SCAN-CM 70:09
Internal

4.5 Optical properties

Optical properties of laboratory sheets
ISO brightness
Light scattering coefficient
Opacity
Light absorption coefficient
Optical properties of laboratory sheets
ISO brightness
Light scattering coefficient
Opacity
Light absorption coefficient
Colour CIE L*, a*, h* (C/2°)

ISO 2470-1:09
ISO 9416:09
ISO 2471:08
ISO 9416:09

ISO 2470-1:09
ISO 9416:09
ISO 2471:08
ISO 9416:09
ISO 5631-1:09

4.6 Other properties

Bending stiffness, resonance method
Resistance to bending, L&W, 15°
Formation, Ambertec
Capillary rise, Klemm
Water absorbency, Cobb

ISO 5629:83
ISO 2493:92, SCAN P 29:95
SCAN
ISO 8787:86 modif.
ISO 535:91

5. Testing and Analysis of Paper and Board

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Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method****5.1 Effects of moisture and temperature**

Moisture content	ISO 287:85 modif.
Hysteresis effect of hygroexpansion and moisture content, OPTIDIM	Internal
Hysteresis effect of hygroexpansion, OPTIDIM	Internal
Hysteresis of moisture content, OPTIDIM	Internal
Hygroexpansivity, OPTIDIM	Internal
Wet dimensional stability, OPTIDIM, per hour	Internal
Humidity control cabin without measurement, OPTIDIM	Internal
Hygroexpansion induced curl, (1-4 samples), OPTICUM	Internal
Weiss test cabinet (RH15-95%, T-10-180°C)/day	
Arctest (RH20-95%, T-40-180°C)/day	
Tropical room (RH 30-80%, T-5-60°C)/day	

5.2 Sorption properties

Water absorbency, Cobb	ISO 535:91
Oil absorbency, Cobb-Unger	SCAN-P 37:77
Oil absorbency with nozzle applicator	Internal
Water absorbency with nozzle applicator	Internal
Stain length	Internal
Quick water absorbency (basepaper) STFI	Internal
Hercules Sizing Test	TAPPI T 530:89
Grease resistance, KIT test	TAPPI T 559
Grease resistance	ASTM F 119-82 modif.
Ink absorbency K & N	SCAN-P 70:95
Water absorption time and capacity, tissue paper	ISO 12625-8:06

5.3 Tensile strength properties

Tensile properties	EN ISO 1924-2:94 modif.
Tensile strength Δ	
Stretch at break Δ	
Tensile energy absorption Δ	
Tensile stiffness Δ	
Elastic modulus Δ	
All tensile properties (without index and elastic modulus)	
All tensile properties (with index and without elastic modulus)	
All tensile properties (with index and elastic modulus)	
All tensile properties (without index and with elastic modulus)	
MD/CD ratio	
Tensile properties, tissue paper	ISO 12625-4:05
Tensile strength	
Stretch at break	
Tensile energy absorption	
Tensile strength after immersion in water	ISO 3781:83, SCAN-P 20:95
Determination of wet tensile strength, tissue paper	ISO 12625-5:05
Fracture toughness test	SCAN-P 77:95
Fracture toughness	
Nominal tensile strength	
Nominal stretch	
Z-directional tensile strength	TAPPI T541 om-99
Z-directional tensile strength + stress-strain curve	TAPPI T541 om-99

5.4 Stiffness properties

Bending stiffness, resonance method	ISO 5629:83
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Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method**

Resistance to bending, L&W, 15°	ISO 2493:92
Bending stiffness, Droop	Internal
Bending stiffness, Taber, 15°	ISO 2493:92
Bending stiffness, 5°	DIN 53121:96
Bending stiffness, four-point method for corrugated board	SCAN-P 65:91

5.5 Compression strength properties

Corrugated medium test (CMT)	EN ISO 7263:94
Ring crush resistance (RCT)	ISO 12192:02
Compressive strength (SCT)	ISO 9895:89
CCT value and CCT index - Corrugated crush test	SCAN-P 42:81
Edgewise crush resistance (ECT)- corrugated board	ISO 3037:94
Flat crush resistance (FCT) - corrugated board	ISO 3035:82
Compression strength of box	Internal
Compression strength of box + stress-strain curve	Internal

5.6 Other strength properties

Tearing resistance Δ	ISO 1974:90
Internal bonding strength	TAPPI T 569:00
Surface strength, wax pick test, Dennison	TAPPI T 459 om-93
Bursting strength	ISO 2758:01
Bursting strength, board	ISO 2759:01
Folding endurance, Schopper, MIT, Köhler-Molin	ISO 5626:93
Picking resistance, IGT	ISO 3783:06
Strength of cracking at fold (heating, folding, tensile strength)	Internal
ISIT passes-to-pick/fail -test	Internal

5.7 Surface properties

Smoothness, Bekk	ISO 5627:95
Roughness, Bendtsen Δ	ISO 8791-2:07
Roughness, PPS	ISO 8791-4:92
Topography, 5 um- 10mm, laserprofilometry	Internal
Topography, area measurement, per hour	Internal
Specular gloss, Hunter, 75° gloss, TAPPI method Δ	ISO 8254-1:99
Calender blackening by image analysis, SC paper	Internal
Contact angle (water), Fibro	Internal
Contact angle, long measuring times, Fibro	Internal
Surface energy with 2 liquids, Fibro	Internal
Surface energy with 3 liquids, Fibro	Internal
Contact angle (other liquids and inks), Fibro	Internal
Friction coefficient, Tumila	Internal

5.8 Structure

Grammage Δ	EN ISO 536:95 modif.
Thickness and apparent bulk density or apparent sheet density Δ	ISO 534:05 modif.
Thickness, bulking thickness and apparent bulk density, tissue paper	ISO 12625-3:05
Thickness of corrugated board	ISO 3034:75
Air permeance, Bendtsen Δ	ISO 5636-3:92
Air permeance, PPS	Internal
Air resistance, Gurley	ISO 5636-5:03
Water vapour transmission rate	ISO 2528:95
Formation, Ambertec	SCAN P 92:09
Formation, Ambertec, CD average/ metre	
Formation, Ambertec, CD profile/ metre	

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Determination	Method
CD Shrinkage profile	Internal
Fibre orientation, NOMURA	Internal
Ash, (525°) Δ	ISO 1762:01
Ash, (900°) Δ	ISO 2144:97
Pore size and density distribution in z-direction by image analysis	Internal
Filler distribution in z-direction by SEM / BSE, 10 layers	Internal
Filler distribution in z-direction based on ash content, 4 layers	Internal
Fines distribution in z-direction, 4 layers	Internal
Starch distribution in z-direction, qualitative	Internal
Embedding, grinding and polishing (for SEM)	Internal
Cross section preparation (microscopy)	Internal
Micrography of cross sections, h	Internal
Water repellency	EN 868:99, Annex A

5.9 Optical properties

1-5 properties measured	
6-12 properties measured	
13-20 properties measured	
ISO brightness (C/2°) Δ	ISO 2470-1:09
Brightness (D65)	ISO 2470-2:08
Y value (C/2°)	ISO 5631-1:09
Opacity (C/2°) Δ	ISO 2471:08
Light scattering coefficient, s Δ	ISO 9416:09
CIE whiteness, CIE W (C/2°), indoor illumination conditions Δ	ISO 11476:00
CIE whiteness, CIE W (D65/10°), outdoor daylight Δ	ISO 11475:04
Fluorescence component, CIE W (D65/10°), F Δ	ISO 11475:04
Green/red tint, T _w (D65/10°) Δ	ISO 11475:04
CIELAB coordinates, L*, a*, b* (C/2°) Δ	ISO 5631-1:09
CIELAB coordinates, L*, a*, b* (D65/10°)	ISO 5631-2:08
Dominant wavelength, DW/Newsprint (C/2°)	SCAN-G 5:03
Excitation purity, Pe/Newsprint (C/2°)	SCAN-G 5:03
Yellowness (C/2°)	DIN 6167
ERIC	TAPPI T 567 pm-97

5.10 Permanence of paper

Paper for documents - Requirements for permanence (incl. tearing resistance, alkali reserve, kappa and pH value)	ISO 9706:94
Paper and board - Lifespan classes (incl. tearing resistance, tensile strength, stretch at break)	DIN 6738:07
Permanent paper - Requirements and test methods	NEN 2728:06
Colour fastness, Xenotest (incl. ISO brightness)	Internal
Colour fastness, Xenotest (incl. ISO brightness and L*, a*, b*)	Internal

5.11 Others

Estimation of dirt and shives, reflected light	ISO 5350-3:97
Wood species, Scandinavian and Euca, 1 layer	ISO 9184 1-7 (1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G
Wood species, other than Scandinavian and Euca, 1 layer	ISO 9184 1-7 (1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G
Chemical pulp content (Strelis), 1 layer	Internal
Fibre analysis, pulp types and wood species, qualitative, 1 layer	ISO 9184 1-7 (1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G

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Determination	Method
Fibre analysis, pulp types and wood species, quantitative, 1 layer	ISO 9184 1-7 (1-5:90, 6-7:94), SCAN-G 3:90, SCAN-G
Preparation of a cross section for microscopy	Internal
Sheet calendering, Gradek sheet calender	Internal
SEM Imaging	Internal
SEM-EDS (Elements)	Internal
Acid number, Köhler-Hall	Internal
Carbonate content	SCAN-N 32:98, modif.
Starch content	TAPPI T 419 om-91
Fluorine, total	SCAN-CM 51:94, modif.
Bromine, total	SCAN-CM 51:94, modif.
Sulphur, reducible (paper)	Internal

6. Laboratory Printing, Print Quality

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6.1 Test printing

Ink requirement	Internal
Ink requirement, set-off	Internal
Gravure printing smoothness and missing dots, Heliotest and measurement	Internal
ISIT - ink tack build up	Internal
ISIT - ink tack build up, special setting/per hour	Internal
Vessel picking tape analysis	Internal
Special testing of laboratory printing, per hour	Internal

6.2 Print quality analysis

Print gloss	Internal
Print density	Internal
Relative contrast	Internal
Trapping	Internal
Dot gain	Internal
Set-off	Internal
Rub-off	Internal
Print through, Elrepho	Internal
Print through, image analysis	Internal
Bleeding, both directions	Internal
Show through	Internal
Show through, image analysis	Internal
Unevenness of print, mottle	Internal
Void rate of solid print	Internal
Geometrical properties of halftone dots	Internal
Optical properties of halftone dots	Internal
Missing dots (number/unit area)	Internal
Contrast transfer function	Internal
Print sharpness; normal edge width and slope	Internal
Print sharpness; sharpness factor of halftone area	Internal
Pick analysis, tape method (measurement)	Internal
Width of cracking at fold (measurement by image analysis)	Internal
Amount of transferred fountain solution onto the paper (Li) (including 1 fountain solution)	Internal
Measurement of the amount of lint (heatset offset, sheet-fed offset)	Internal

6.3 Printing ink

pH (ink jet)	Internal
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1) A = Area, B = Batch, C = Color, D = Direction, L = Level, M = Meter, P = Testing pair, S = Side, ST= Strip, TP = Trial point, Unmarked = Sample

2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
Surface tension (ink jet)	Internal
Water content (Karl Fischer) (ink jet)	Internal
Elements (e.g. S, Ca, Cu)	Internal
Chemical characterization	Internal

6.4 Fountain solution

pH	SFS 3021:79
Surface tension (static)	Internal
Viscosity	Internal
Conductivity	SFS-EN 27888:94
Amount of transferred fountain solution onto the paper (Li) (incl. one fountain solution)	Internal

7. Calibration Services for Paper Testing

Contacts: Kari Niemi +358 (0)40 5627530 or Kaarina Fagerholm +358 (0)40 8294548

7.1 Calibration service for color measuring instruments

Non-fluorescent reference standard, IR 3, paper pad **Δ**
 Non-fluorescent reference standard, IR 3, plate **Δ**
 Fluorescent reference standard, plate **Δ**
 Fluorescent reference standard, paper pad **Δ**
 Cleaning of plate

7.2 CEPI comparative testing service for intercalibration

One measurement level per property

7.3 Reference material service for instrument checking

One measurement level per property

8. Product Safety

Contacts: Riitta-Maija Osmonen +358 (0)20 722 7477 or Marja Tuominen +358 (0)20 722 7519

8.1 Chemical analyses

Formaldehyde, aqueous extract Δ	EN 1541:01
Glyoxal, aqueous extract	Internal
Metals (Hg, Cd, Pb), aqueous extract	EN 12498:05, EN 12497:05
Metals, Packaging and packaging waste Δ	Internal
Metals, safety of toys	Internal
Metals, Packaging recovery through composting	SFS-EN 13432:01
Fastness of fluorescent whitening agent Δ	EN 648:06
Fastness of colour	EN 646:06
Polychlorinated biphenyls, PCB Δ	SFS-EN ISO 15318:99
Pentachlorophenol, PCP Δ	EN-ISO 15320:03
Phthalates	Internal
Migration tests	Internal
Water-soluble matter	EN 920:00
Nitrogen, aqueous extract (pulp)	SFS 5505:88, modif.

8.2 Sensory evaluation

Off-flavour Δ	EN 1230-2:10
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2) Accredited analyses are marked in the list (**Δ**) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)**Determination****Method**Odour **Δ**

Sensory evaluation, profile

EN 1230-1:10

Internal

8.3 Microbiological tests

Microbiological tests, Product safety Pulp

ISO 8784-1:05 modif.

ISO 7954:87

Microbiological tests, Product safety paper or board

ISO 8784-1:05 modif.

ISO 7954:87

Hemmhof test

EN 1104:05

8.4 Assessments

Supporting documents for declaration of compliance (Paper, Board, Pulp, Composites)

Migration of printing ink in food packaging

9. Wet End Testing

Contacts: Kaarina Fagerholm +358 (0)40 8294548 or Eva Sandås +358 (0)40 7387842

9.1 Wet end testing

Charge (Mütek) (direct titration, process waters)

Internal

Charge (Mütek) (back titration)

Internal

Zeta-potential (pulp)

Internal

Surface charge

Internal

Total charge

Internal

Surface and total charge (package)

Internal

Turbidity

Internal

Chemical oxygen demand, COD_{Cr}

SFS 5504:98

Dissolved organic carbon, DOC

SFS-EN 1484:97

Carbon, total organic, TOC

SFS-EN 1484:97

Metal analyses: Li, Na, K, Cs, Be, Mg, Ca, Sr, Ba, Ti, V, Cr, Mo, Mn, Fe, Co, Ni, Cu, Ag, Zn, Cd, Hg, B, Al, Si, Sn, Pb, P, As, Sb, Bi, S, Se

Internal

Sulphur, total

Internal (ICP)

Sulphate

SFS-EN ISO 10304 (-1:95, -2:97, -3:98)

Fines content (DDJ) (pulp)

SCAN-CM 66:05, Modif.

Fibrillar content, apparent (fines sample)

Internal

Retention values with DDJ

Internal

Fractionation (DDJ) (pulp suspension and white water)

Internal

Retention values (DDJ) (pulp suspension and white water), day

TAPPI T 261:94, modif.

9.2 Analysis of deposits and disturbing substances

Composition of stickies, spots and deposits, for example:

Internal

- microscopy
- qualitative analyses of organic compounds (IR)
- semi-quantitative analyses of elements (EDS)
- microbiology

9.3 Water analysis

pH

SFS 3021:79

Conductivity

SFS-EN 27888:94

pH and conductivity

SFS 3021:79

SFS-EN 27888:94

Alkalinity

SFS-EN ISO 9963-1:96

Acidity

SFS 3005:81

Dry matter content

SFS 3008:90

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2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
Suspended solids	SFS-EN 872:05
Ignition residue (550 °C)	SFS 3008:90
Carbohydrates (white water)	Internal (acid methanolysis)
Carbohydrates (bleaching effluent)	Internal (acid hydrolysis)
Phenolic hydroxyl groups	Internal
Extractives (fatty and resin acids, sterols, lignans, sterylesters, triglyserides)	Internal (spruce process)
Extractives (fatty and resin acids, sterols, lignans, sterylesters, triglyserides)	Internal (other than spruce process)
Starch content	TAPPI T 419 om-91, modif.
Lignin content, (UV-spectroscopy)	Internal
Metal analyses: Li, Na, K, Cs, Be, Mg, Ca, Sr, Ba, Ti, V, Cr, Mo, Mn, Fe, Co, Ni, Cu, Ag, Zn, Cd, Hg, B, Al, Si, Sn, Pb, P, As, Sb, Bi, S, Se	Internal

9.4 Papermaking chemicals

Dry matter content	SCAN-P 52:84, modif.
pH, aqueous suspension	Internal
Density	Internal
Viscosity (Brookfield)	Internal

10. Microbiology

Contacts: Gun Virtanen +358 (0)20 722 5222 or Satu Salo +358 (0)20 722 7121

10.1 Microbiological tests

Sporeforming bacteria	ISO 8784-1:05 modif
Bacteria total count and sporeforming	ISO 8784-1:05 modif., DIN 54378
Anaerobic bacteria	Internal
Bacteria, molds/yeasts total count and pH	DIN 54379, ISO 6588
Chemical residue test (Photobacterium test), solid sample	Internal
Chemical residue test (Photobacterium test), water sample	Internal
Hemmhof test	EN 1104:05
Identification of microbes (mini API)	Internal
Identification of microbes (Riboprinting)	Internal
Also other microbiological tests available	

10.2 Investigations and assessments

Hygiene mapping of processes
 Microbiology assessments
 Hygiene training

11. Analysis of Recovery Process Streams

Contacts: Mia Tehomaa +358 (0)40 7712058 Mikko Laitinen +358 (0)40 1407609 or Jorma Torniainen +358 (0)40 8294669

11.1 Black Liquor

Dry matter content	SCAN-N 22:96
Ash (700°C)	Internal
Ratio of inorganic/organic matter	Internal
Fibre content	SCAN-N 22:96

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2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
Density	Internal
Tall oil (soap)	Internal
Carbon, hydrogen, nitrogen	ASTM D 5373, subcontr.
Residual alkali	SCAN-N 33:94
Na, K, S	SCAN-N 37:98
Ca, Mg, Fe, Mn, Al and Si	SCAN-N 38:10 modif.
Na, K, S, Ca, Cu, Fe, Mg, Mn and Si	SCAN-N 38:10 modif.
Ca, soluble	SCAN-N 38:10 modif.
Ca, Mg, Fe, Mn, Al, Si, Cr, Co, Ni, P, Ti, V, Zn	Internal
Ca, Mg, Fe, Mn, Al, Si, Cr, Co, Ni, P, Ti, V, Zn, Ba, Mo, Sr	Internal
Chlorine, total	Internal
Nitrogen (Kjeldahl)	SFS 5505:88, modif.
Carbonate	SCAN-N 32:98
Oxalate, total	Internal
Sulphur, total	Internal
Sulphur compounds	
- sulphide	SCAN-N 31:94
- sulphite + thiosulphate	Internal
- sulphate	Internal
Volatile organic compounds	Internal
- dimethylsulphide, dimethyldisulphide	
- methanol, ethanol, acetone, 1-propanol	
Turpentine components (a-pinene, b-pinene, D ³ -carene)	Internal
Lignin content	Internal
Polysaccharides	Internal
Heat value	Internal
Boiling point rise, BPR	Internal
Swelling	Internal
Viscosity, dynamic	Internal
Viscosity, kinetic	Internal

11.2 White and Green Liquor

ABC-titration (total, active and effective alkali, pH-value)	SCAN-N 30:85
Sulphur, total	SCAN-N 5:83
Sulphur compounds	
- sulphide	SCAN-N 31:94
- sulphite + thiosulphate	Internal
- sulphate	SCAN-N 6:85
Chloride	SCAN-N 4:78
Carbonate	SCAN-N 32:98
Na and K	Internal
Ca, Mg, Fe, Mn, Al and Si	Internal

11.3 Tall oil

Acid number	SCAN-T 11:72
Resin acids	SCAN-T 14:78
Soap content	TAPPI T 689 om-93
Ash (625°C)	SCAN-T 4:66
Water content (Karl Fischer)	Internal
Density	Internal
Lignin content	Internal
Fibre content	Internal

11.4 Condensate

Sulfur (total)	Internal
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2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
TRS compounds (DMS, DMDS)	Internal
Methanol + Ethanol	Internal
Turpentine components (a-pinene, b-pinene, D3-carene)	Internal
Water content (Karl Fischer)	Internal
Ca, Mg, Fe, Mn, Al and Si	Internal
11.5 Solid recovery samples (soap, lime, lime sludge, burnt lime, grit, green liquor sludge, fly ash, scalings)	
Ignition loss (1000 °C)	Internal
Degree of causticizing	Internal
Available lime (burnt lime sludge)	SCAN-N 25:81
Carbonate	SCAN-N 32:98, modif.
Ash (575°C)	ISO 1762:01, modif.
Calcium in soap	Internal
Ca, Mg, Fe, Mn, Al and Si	Internal (ashing+ICP-measurement)

12. Environmental and Process Water Analyses

Contacts: Mia Tehomaa +358 (0)40 7712058, Mikko Laitinen +358 (0)40 1407609 or Jorma Tornainen +358 (0)40 8294669

12.1 General water analyses

pH	SFS 3021:79
Conductivity	SFS-EN 27888:94
pH and conductivity	SFS 3021:79 SFS-EN 27888:94
Dry matter content	SFS 3008:90
Total Suspended solids (TSS)	SFS-EN 872:05
Ignition residue (550 °C)	SFS 3008:90
Alkalinity	SFS-EN ISO 9963-1:96
Acidity	SFS 3005:81
Turbidity	Internal
Adsorbable organically bound halogens, AOX Δ	EN-ISO 9562:04
Chemical oxygen demand, COD _{Cr}	SFS 5504:98
Dissolved organic carbon, DOC	SFS-EN 1484:97
Carbon, total organic, TOC	SFS-EN 1484:97
Surface tension	Internal
Chlorine Compounds	SFS-EN ISO 10304 (-1:95, -2:97, -4:99)
- Chloride, Chlorate or Chlorite	SFS-EN ISO 10304 (-1:95, -2:97)
Bromide	SFS-EN ISO 10304 (-1:95, -2:97, -3:98, -4:99) modif.
Fluoride	SFS 5505:88
Nitrogen, (Kjeldahl)	SFS-EN ISO 10304-2:97
Nitrogen Compounds	
- Nitrate	
- Nitrite	
Phosphorus, total	Internal (ICP)
Sulphur, total	Internal (ICP)
Sulphate	SFS-EN ISO 10304 (-1:95, -2:97, -3:98)
Oxalate (total, water sample)	SCAN-N 39:05
Oxalate (soluble, water sample))	SCAN-N 39:05
Metal analyses: Li, Na, K, Cs, Be, Mg, Ca, Sr, Ba, Ti, V, Cr, Mo, Mn, Fe, Co, Ni, Cu, Ag, Zn, Cd, Hg, B, Al, Si, Sn, Pb, P, As, Sb, Bi, S, Se	Internal
Different measurement techniques (FAAS, GFAAS, ICP-AES)	Internal
ICP package 1 - Fe, Mn, Mg, Ca, Cu, Al, Si	Internal

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2) Accredited analyses are marked in the list (Δ) 3) Q = Quoted on request

Contacts (e-mail: firstname.lastname@vtt.fi)

Determination	Method
ICP package 2 - Fe, Mn, Mg, Ca, Cu, Al, Si, Co, Cr, Ni, Zn, P, Ti, V	Internal
ICP package 3 - Fe, Mn, Mg, Ca, Cu, Al, Si, Co, Cr, Ni, Zn, P, Ti, V, Ba, Mo, Sr	Internal
ICP package 4 - Na, K, S, Fe, Mn, Mg, Ca, Cu, Al, Si	Internal
Extractives/group sum, water (spruce)	
Extractives/group sum + GC-MS, water (other wood species)	

12.2 Analysis of solid samples

pH (aqueous extract)	Internal
Adsorbable organically bound halogens, AOX	EN-ISO 9562:04, modif.
Carbon, hydrogen, nitrogen	ASTM D 5373, subcontr.
Chlorine, total	ISO 11480:97, modif.
Chlorine, organic	ISO 11480:97, modif.
Sulphur, total	Internal
Phosphorus, total	Internal
Nitrogen (Kjeldahl)	SFS-EN 13342:00

12.3 Analyses related to combustion

Ash (815°C) (solid fuel)	DIN 51719
Volatile matter (900°C)	DIN 51720
Heat value	Internal
Specific analyses concerning black liquor (see Black Liquor)	

13. Microscopy Accessories

Contacts: Eva Sandås +358 (0)40 7387842, Raija Lahtinen +358 (0)4890233 or Päivi Turunen +358 (0)40 8220668

13.1 Preparation of microscopic stains

Graff-C stain	100 ml, SCAN-G 4:90
Lofton Merrit stain	100 ml, SCAN-G 4:90
Herzberg stain	100 ml, SCAN-G 4:90
Sudan orange stain	100 ml, Internal
Toluidine blue stain	100 ml, Internal
Kongo red stain	100 ml, Internal
Sirius red	100 ml, Internal
Acredine Orange stain	100 ml, Internal
Iodine-Kaliumiodine stain for starch	100 ml, Internal
Simons stain	100 ml, Internal
Other stains also available	

13.2 Other

Preparation of glass knives	20 pcs, Internal
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