Physical Testing of Pulp and paper
Method and service list
June 2014
GENERAL CONDITIONS

1.1 Prices
The price of a set of analyses is calculated on request. Discount offers are available on periodically repeated services.

1.2 Delivery times
Delivery times are estimated at the time of receipt of the order.

1.3 Sample storage after testing
Residual test material will be discarded one month after the customer has received the final report.

NOTE! Please indicate on the test instructions if the sample material is to be returned. The cost for this is to be charged to the customer.

1.4 Accredited Analyses
INNVENTIA AB is accredited by SWEDAC in accordance with the requirements in ISO 17025. The accredited testing activity (Chemical analysis, Microbiological analysis, Environmental testing and Physical testing) has the accreditation number 1771:02. The accredited calibration activity (Optical Calibration Laboratory) has the accreditation number 1771:01.

Accredited analyses are in the list indicated by * after the related standard/test method.

1.5 Full confidentiality
The results of an assignment are the sole property of the client placing the order.

1.6 Other analyses and other types of tests
Please contact us to discuss analyses and tests other than those listed.

1.7 Explanation of method designations used in the list
SCAN-C, SCAN-CM etc. refer to SCAN-test Methods. The designation ISO refers to an International Standard, SS-EN refers to an European Standard and SS to a Swedish Standard. The pulp and paper industry are nowadays recommended to use ISO Standards and/or EN Standards for properties related to quality control and thus used in trade.

1.8 Administrative Fee
A basic administrative fee of SEK 1500 is added per commission.
Physical testing of pulp and paper at INNVENTIA

Accredited pulp assessment

- ISO methods for wide acceptance
- Assessing and comparing pulp quality

- Pulp characterisation
- PFI-refining
- ISO lab.sheets

Versatile methods for concept testing with “industrial like conditions”

- Batch volumes of 0.5-2 kg pulp (bd)
  - Fractionation and cleaning (Bauer-McNett, Celleco lab. fractionator, Metso lab. screen TAP03)
  - Refining in Voith LR40 lab. refiner

- Anisotropic sheets using a dynamic and stratified sheet former
- Restrained drying in frames or in a cylinder dryer
- Lab. calandering
Accredited laboratory for paper testing

- Controlled storage of samples
- Controlled climate in the accredited lab
- Traceable procedures/methods and data,
  - Stored 4 years back
- 17 accredited tests
  - Example, thickness, grammage, tensile strength, burst, compressive test (short span test), air permeance

In short words

Pulp and paper testing is one core part of the research projects and commissions performed at the business area Material Processes at Innventia. The testing facilitates 5 laboratories supplying about 80 standard methods of which 25 are accredited. On top of this new methodology is developed to meet the customers’ needs if required. Commissions range from a few properties of a single sample up to full laboratory studies to support the development of new concepts. The expertise for our staff typically includes:

- Knowledge in pulp and paper making processes
- Expertise in lab. stock preparation
  - Especially in fractionation and refining
- Dedicated paper testing
- Both accredited methods and customized lab procedures
- Provider of proficiency testing and round robins
- Skilful use of well-equipped laboratories
- Know-how regarding many different paper products ranging from tissue to corrugated boxes

The main methods are listed below.

June 2014 Peter Hansen
Pulp Testing

**Sampling**
- ISO 638 *: Dry matter content
- ISO 5263-1: Wet disintegration of chemical pulp
- ISO 5263-2: Wet disintegration of mechanical pulps at 20 °C
- ISO 5263-3: Wet disintegration of mechanical pulps at 85 °C

**Stock characterisation**
- ISO 4119 *: Stock concentration
  - pH in suspension
  - Z-potential
  - Charge demand

**Drainability and water retention**
- ISO 5267-1 *: Drainability, SR-number
- ISO 5267-2: Drainability, CSF-number
- ISO 23714, SCAN-C 62: Water Retention Value (WRV)

**Fibre dimensions and shives content**
- ISO 16065-2: L&W Fibretester: length, width, shape factor, Coarseness
- SCAN-CM 6: Fibre fractionation, McNett-apparatus
  - Preparation of fibre fractions in Celleco lab. fractionators
- SCAN-CM 66:05
- TAPPI 275 sp-98: Somerville Shives content 0.10 mm or 0.15mm

**Beating**
- ISO 5264-2 *: Laboratory beating - PFI mill method
- ISO 5264-1: Laboratory beating - Valley beater method (only on special request)
  - Laboratory beating of pulp in Voith lab. refiner LR 40

**Preparation of laboratory sheets**
- ISO 5269-1 *: Preparation of lab.sheets for physical testing acc. to ISO 5270
- SCAN-CM 64: Preparation of lab.sheets with a closed water system
- SCAN-CM27: Preparation of laboratory sheets for determination of light-scattering and light-absorption coefficient, opacity and Y-value
- ISO 3688, SCAN-CM11*:
  - Preparation of lab.sheets with the Dynamic Sheet Former.
  - Preparation of multi-layer sheets, Dynamic Sheet Former
  - FEX drying of sheets
  - Biaxial drying of sheets
ISO 5270 * Testing of general physical properties of lab. sheets (60g/m² or 75 g/m² sheets), (standardised number of test) strength properties, light scattering and air permeance.

**Estimation of dirt and shives**

ISO 5350-1 Estimation of dirt and shives – Inspection of lab. sheets (incl. disintegration and preparation of sheets)

ISO 5350-2 Estimation of dirt and shives – Inspection of mill sheeted pulp

## Paper Testing

### Sample preparation

ISO 187 Standard atmosphere for conditioning and testing
ISO 186 Sampling to determine average quality
ISO 5630-1, 5630-3 Accelerated Ageing
- Calandering in laboratory

### Composition

ISO 536 * Grammage
ISO 534 * Thickness
SCAN-P 88 Structural thickness
ISO 287 Moisture content
ISO 1762 Residue (ash) on ignition at 525 ºC double tests
ISO 2144 Residue (ash) on ignition at 900 ºC double tests
ISO 1762 ISO 2144 Residue (ash on ignition at 525 ºC and 900 ºC, double tests

### Mechanical properties

SCAN-P 77 Fracture toughness (incl. tensile stiffness acc. to ISO 1924-3)
ISO 1924-2 * Tensile strength, stretch and TEA
ISO 1924-3* Tensile strength, strain at break,TEA and tensile stiffness
SCAN-P 20:95 Wet tensile strength and wet tensile strength retention
ISO 15361 Zero-span tensile strength (dry or rewetted)
- TSO (Tensile Stiffness Orientation) by ultra-sonic evaluation
ISO 1974 * Tearing resistance – Elmendorf method
ISO 9895 * Compressive strength – Short span test (SCT)
Tappi T833 Scott Bond
ISO 15754 Z-directional tensile strength
ISO 2758 * Bursting strength of paper
ISO 2759 Bursting strength of board
ISO 5629 ± Bending stiffness – Resonance method
ISO 2493 * Bending resistance
ISO 5626 * Folding endurance
ISO 8226-1  Hygroexpansivity (66 ± 2) % RH
ISO 8226-2  Hygroexpansivity (84 ± 2) % RH

**Surface and structure properties**
ISO 15359  Static and kinetic coefficients of friction – Horizontal plane method, paper-paper e.g. top side MD – bottom side CD
ISO 8791-2 *  Bendtsen surface roughness
ISO 8791-4 *  PPS Print-Surf method & PPS Surface compressibility

**Absorbency and permeance**
ISO 535  Water absorbency, Cobb method
ISO 8787  Capillary rise of water, Klemm method
ISO 5636-3 *  Bendtsen air permeance
ISO 5636-5 *  Gurley air permeance

**Optical properties**
ISO 2470-1  ISO Brightness C/2°
ISO 2470-2  ISO Brightness D/65°
ISO 11475 *  CIE-Whiteness -UV (D65/10°)
ISO 5631-1  L*, a* and b* UV (C2)
ISO 5631-2  L*, a* and b* UV (D65/10°)
ISO 2471 *  Opacity, Y-value
ISO 9416 *  Light scattering and light-absorption coefficients

**Tissue**
EN ISO 12625-3  Tissue, Thickness, bulking thickness and apparent bulk density
EN ISO 12625-4  Tissue, Tensile strength, stretch at break and TEA
EN ISO 12625-5  Tissue, Wet tensile strength
EN ISO 12625-6  Tissue, Grammage
EN ISO 12625-7  Tissue, Optical properties
SS-EN 12625-8  Tissue, Water absorption time and residual water absorption capacity, Basket immersion test method
SCAN P 53  Tissue, Air permeance Gurley method
EN ISO 12625-9  Tissue, Determination of ball burst strength
EN ISO 12625-11  Tissue, Determination of wet ball burst strength
EN ISO 12625-12  Tissue, Tensile strength of perforated lines - Calculation of perforation efficiency

**Corrugated testing**
ISO 12192  RCT, Ring crush method, compressive method paper and board
ISO 3035  FCT, Flat crush resistance, of corrugated fibreboard
ISO 7263  CMT/CMT30
ISO 3037  ECT, Edgewise crush test
ISO 5628  Bending resistance
ISO 3036  Puncture resistance, of board
Contact Persons

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