

CEPI-CTS NEWSLETTER 2021

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Foreword

Welcome to the eighth issue of the CEPI-CTS Newsletter.

2020 has been a very difficult year for all of us. The COVID-19 pandemic has disrupted our very lives, and of course our working routines. We in the CEPI-CTS have strived to carry on all our activities as normally as possible: we believe to have managed to keep delays at a minimum, and we apologise for the inconveniences that have been unavoidable. The pandemic is not over yet, therefore please keep on observing all necessary precautions to fight the spreading of the virus. Stay safe!

In this issue we will show you the recent activities of CEN/TC 172/WG 2 “Paper and board for recycling”; then how, to avoid confusion with the concepts of precision, our statistical terminology has been updated to conform to ISO/IEC 17043:2010 and ISO 13528:2015. We will review two different standards that measure what is apparently the same property. Finally, we will update you on the CEPI-facilitated works on the harmonisation of a European test method to measure parameters that could enable the assessment of the recyclability of paper- and board-based products.

We greatly value your feedback and suggestions to improve the Service: if you have questions, doubts or requests do not hesitate to contact your Distributing Laboratory or myself at the contacts listed on the left.

Fulvio Savagnone
CEPI-CTS Chairman

1976-2021: CEPI-CTS hits its 45th year!

It all started in the mid-Seventies, when a number of comparative testing services run by the foremost European paper research institutes were unified under the umbrella of what was then CEPAC, “Confédération Européenne de l’Industrie des pâtes, papiers et cartons” and its Working Group “Étalonnage”, thanks to the illuminated vision of such scientists as Mr Ramaz (CTP, France), Mr Lemm (BAM, Germany), Mr Fuit (TNO, The Netherlands), Mr Attwood (PATRA, GB) and Mr Luciani (ENCC, Italy).

The name of the Service was then CEPAC Calibration Check Service; its functioning was not much different from today: Co-ordinating, Authorised (today they are called Distributing) and Qualified Labs were the Working Group components.

Reports were almost the same, the real big difference was that samples were not identified with reference values and their Warning and Action Limits. Such important deliverables were introduced in 1992, at the same time that CEPAC merged with EPI to form CEPI (Confederation of European Paper Industries): Swiss and Scandinavian Institutes joined the WG: EMPA and KCL, STFI and PFI brought new impulse to the Service.

CEPI-CTS as we know it today is the result of the work done uninterruptedly during all these years by many dedicated scientists and technicians and it bears the fruit of continual innovations. Many happy returns!

What's going on in CEN/TC 172/WG 2 *(S. Moreau-Tabiche, CTP)*

CEN/TC 172/WG 2 "Paper and board for recycling", comprises 32 experts from 12 countries and has already developed 2 standards: EN 643:2014 "Paper and board — European list of standard grades of paper and board for recycling", and EN 17085:2019, "Paper and board — Sampling Procedures for Paper and Board for Recycling". A draft prEN 17545, "Paper and board — Determination of Composition of Paper and Board for Recycling", should be submitted to formal vote before the end of the year, for a publication planned in the first quarter of 2021.

In addition, a guidance on the application of clause 2.2 of EN 643 is under preparation to assist the users in understanding what is meant by the terms "prohibited materials" when considering used food-contact materials and contaminated articles for personal hygiene. The guide should shortly be registered in the work program, if approved by the WG.

CEPI-CTS terminology aligned with ISO/IEC 17043 and ISO 13528 *(F. Savagnone)*

In the previous issue of the Newsletter we extensively discussed the differences between what CEPI-CTS does (assessing the performance of participating laboratories) and what ISO/TC 6 does (calculate precision figures of a testing method).

To avoid any further confusion, we have aligned our terminology to that of ISO/IEC 17043 and ISO 13528. Therefore as of 2021 our samples will be identified by the **CEPI Assigned Value**, x_{pt} and its Warning and Action Limits will be calculated on the basis of the associated **CEPI standard deviation for proficiency assessment**, σ_{pt} . The same terminology will be used in all our Reports.

Of course all statistical calculations remain the same: the CEPI Assigned Value is the grand-mean of the valid Qualified Laboratories means (after having eliminated outliers with the Cochran and Grubbs tests) and the CEPI standard deviation for proficiency assessment is its associated standard deviation, just as before: consequently **all future data are perfectly coherent to and comparable with the previous ones**.

The two Handbook documents that respectively prescribe and describe the statistics used in the CEPI-CTS are HB 6:1 "Statistical treatment of the measurement data" and HB 6:2 "Operation of the CEPI-CTS and interpretation of the reports". These documents are publicly available: to receive them just contact your Distributing Laboratory or myself at the contacts listed above.

Internal bond strength (Scott type): which standard? *(Pia Schenke, PTS, Daniele Bussini, INNOVHUB)*

The Internal bond strength measured with a Scott-type device is a dynamic method for determining the internal bond strength of a product of pulp, paper or board, used for converting, printing and many other applications, where the material is subjected to stresses such as impulses and impacts which can cause delaminations of the plies.

This method has recently been described in the standard ISO 16260:2016, which defines the internal bond strength as the average potential energy expressed as J/m^2 of surface required to delaminate a specimen under test conditions.

In this method the delamination force is applied very rapidly by the impact of a pendulum, which is much higher than the velocity of tensile strength measurements; indeed Scott Bond do not correlate with Z-direction tensile strength tests.

In ISO 16260:2016 the physical properties of the pendulum impact tester have been updated and detailed with respect to previous National standards such as UNI 9439. In addition, specimen preparation, accessories and testing capabilities have been described in more detail.

There are different factors which can affect the measurement, the most important being the adhesive tape, the material of the metal angle platens, the cutting of sample specimen, the contact pressure, the pressing time and the position of the additional weight on the pendulum which determines the measuring range (see Table 1).

| | TAPPI T569 om-14 | ISO 16260:2016 |
|----------------------------------------------------|---------------------------------------------|---------------------------------------------------------------|
| Contact pressure in kPa | 345 690 ± 21 1034 ± 34 | 400 ± 13 690 ± 20 1035 ± 34 |
| Pressing time in s | 3 | 3 ± 0,5 |
| Adhesive tape | | |
| - Width in mm | 25,4 ± 0,8 | 25,4 ± 0,2 |
| - Thickness in mm | 0,15 | - |
| - Peel adhesion, ASTM D 3330 | 45 oz/in | - |
| - Peel adhesion, FTM 1 | - | 15 N/25,4 ± 0,2 mm |
| Metal angle platens | Aluminium (supplied by the manufacturer) | Aluminium, alloy EN AW 6060 T66 Rz ≤ 3,8 μ m=11,3 ± 2 g |
| Anvil | - | Rz ≤ 3,8 μm |
| Pendulum length in mm | - | 228,6 ± 0,2 |
| Pendulum impact point on the aluminium angle in mm | - | 21 ± 0,2 |
| Sample width dimension in mm | 25,4 ± 0,1 | 25,4 ± 0,2 |

Table 1: Differences between the standards

It is known that on earlier mechanical Scott Internal Bond Tester instruments that use removable weights to increase the range of the pendulum the upper and lower ranges do not agree. The weight addition shifts the pendulum's centre of percussion, thereby affecting both its range and internal vibrational losses. To correct this problem, later instruments use an extrapolated lower range scale when extending the range of the instrument.

As reported in ISO 16260:2016, while correlations and agreement with low range scale data (without additional pendulum weights) are straightforward, it is not possible to correlate electronic instrument test results with data taken on a mechanical instrument that is in the high range configuration. Causes include the different internal energy losses (friction, oscillation).

This is actually an issue because there are still many classic mechanical Scott devices in use, even if some of them can no longer be maintained and repaired by the manufacturer. According to a survey carried out in May 2020 within the Qualified Laboratories of the CEPI-CTS, all the laboratories still have an older version of Scott Bond tester, which do not fully conform to the ISO standard. Out of 11 answers received, 8 laboratories have the original Scott Bond Tester Model B manufactured by Precision Scientific. It is not totally known which type of instruments is predominant in the European industries. CEPI-CTS aims to collect much info about that in the next months.

As a consequence, for those old type instruments, the Test Method TAPPI/ANSI T 569 om-14 can be used as a reference, which includes specification for both mechanical and electronic instruments.

Since we assume that the number of newer devices will increase in the future, we also have to act and consider whether we will issue the values determined according to TAPPI and ISO as separate reports in the future.

Harmonising a European method to test recyclability *(Daniele Bussini, INNOVHUB)*

A working group consisting of experts from the technical paper associations, technical institutes and national paper industry associations, facilitated by CEPI, have co-created the first Draft Harmonised European method to measure the main

parameters of recyclability of paper- and board-based materials and other cellulose fibre-based products, founded upon current knowledge and technology.

The proposed test method defines a laboratory procedure emulating the most relevant phases (low density pulping, screening, sheet formation) of a typical paper mill dedicated to the recycling of the most common grades of paper and board. In particular it defines the main parameters to measure in order to verify the recyclability of paper-based materials and products:

- the ease at which the fibres can be separated in a standard device;
- the potential to form sheets from the recovered fibres without significant disturbances;
- the visual appearance of such sheets;
- the level of coarse and fine rejects;
- the level of fragmentation of disturbing materials (adhesives, metals, plastic films);
- the presence of suspended or dissolved materials resulting from non-paper components in the tested sample.

The test method provides useful and quantifiable information to identify critical components and to drive the eco-design of paper products but it does not assess their recyclability. It defines the procedure to obtain the quantifiable parameters which can be used as a basis of such assessments.

The draft was redacted in consultation with paper institutes, paper industry associations and the main stakeholders in the paper value chain during October and November 2020 and was presented at the Paper & Beyond 2020 conference. The full text is under finalisation.

The test method will be reviewed on a yearly basis in open consultation, based on experiences gathered from its application as well as on further industrial tests on new and emerging materials.

Come meet us and share technical ideas!

Every year CEPI-CTS organises a Technical Meeting to discuss paper-testing issues that are relevant to the Service and a Technical Workshop to have a hands-on experience on selected technical topics.

Both the Technical Meeting and the Workshop are open to the public: they are therefore a unique occasion to discuss state-of-the-art technical matters with scientists and technicians from the most important European research institutes that manage a proficiency testing scheme that has no equal in the world with regards to scientific soundness, scope of availability of tests, efficiency, number of satisfied clients and last but not least, historical tradition.

The 2020 CEPI-CTS Technical Meeting and Workshop should have been held at INNOVHUB in Milan, Italy, but due to the COVID-19 pandemic the meeting was held remotely one the web. Nevertheless, INNOVHUB's scientists gave very interesting presentations on recyclability of cellulose-based materials and on compostability according to ISO 13432, two hot topics in the framework of the circular economy.

To make your attendance even more fruitful, we will strive to organise such meetings in correspondence with national or international fairs, conferences and so on. We will adequately publicise our next Technical Meeting and Workshop, don't miss this opportunity!

What they say about us

"This service allows us to compare the measurements of our equipment with other labs and thus consolidate our results."

Guilloré PDM Industries – SWM Intl.