

**Entry inspection of
baled recovered paper for deinking
(1.06, 1.08-1.11, 2.01, 2.02, 2.05 and 2.06)****1 Preliminary remark**

The time available in a paper mill for entry inspection of the recovered paper delivered is relatively short. At the same time, however, the quality of the raw material recovered paper is of major importance to the production process as a whole. This is taken into account by the way in which entry inspection is performed and by the quality parameters to be examined by the procedure. This method does not provide an exhaustive description of entry inspection in its entirety, i.e. routine measures such as verifying the correctness, weight etc. of incoming recovered paper are not being dealt with.

The method is used for entry inspection of baled recovered paper. The necessity to split up baled recovered paper into several mobile units and difficult access to the bale core make quality control of baled recovered paper a rather tedious task and impede statistically substantiated representative sampling with regard to sample size and sampling method.

Any shipment of a particular recovered paper grade is thus considered as an indivisible entity whose quality is usually assessed by means of inspection of selected bales. Should the random sample show any quality deficiencies justifying rejection, the entire shipment is to be rejected.

This method is to be used for paper grades 1.06, 1.08-1.11, 2.01, 2.02, 2.05 and 2.06 (formerly D21-D39, E12, J11, J19) or comparable grades delivered in baled form. Relevant control parameters have been kept general and may thus be tailored to specific requirements of the various paper grades and specific operational needs.

The following quality parameters are to be analysed: general condition at the time of delivery, odour(s), mould and rotting, moisture, age and composition of delivery (proportion of various wanted and unusable materials).

2 How to perform the recovered paper entry inspection**2.1 General**

Unless otherwise stated, the following descriptions refer to inspection of one bale.

Depending on the quality feature to be analysed, at least one bale is to be selected at random from a particular delivery to be inspected. The bales are to be unloaded in such a way that five sides per bale are visible and accessible.

Quality assessment on the outer surface of the unopened bale is not permissible unless the outer surface itself constitutes a quality feature.

There is no set timing and sequence of inspection steps, since there are both quality parameters which may be analysed by means of surface inspection of the unopened bale and parameters which require the bale to be opened.

2.2 Sampling from bale

The required sample size largely depends on the frequency of a particular attribute to be analysed (e.g., a constituent feature of recovered paper composition or moisture) in the bale or the delivery as a whole and the sampling method used. A sufficient sample size has to be taken to be able to analyse the quality feature in question. In addition, samples have to be taken at random and in a suit-

able form. Accordingly, sample composition, e.g., must not be influenced by the person taking the sample and no material loss be incurred. Two methods suited for obtaining samples are the core drill method and the bale-opening method. Several bales of one delivery may be assessed collectively as a mixed sample.

2.2.1 Core drill method

The bale to be sampled is being punctured with a core drill in the direction of compression. Depending on the type of core drill used (diameter and length of boring rods), a sufficient sample size may be obtained with a single boring operation. If, however, the core drill measures only half the length of the bale, two borings – at two diametrically opposed points on the right and left – in the direction of compression are required. The core drill is to be operated according to applicable operating instructions. Core drill sampling does not affect stackability of the bales.

2.2.2 Bale-opening method I

The bale to be sampled is opened and split up so as to obtain several clods and gain access to the bale core. The bale is to be sampled at various points with individual clods being used as samples. Total sample size should not be inferior to 30 kg.

2.2.3 Bale-opening method II

The bale to be sampled is opened and the material evenly spread so as to obtain a closed surface of at least 30 m² of roughly the same layer thickness. Quality assessment is performed in the same way as in the case of unbaled recovered paper (cf. INGEDE Method 7 “Entry inspection of unbaled recovered paper for deinking (D39)”).

2.3 Condition at the time of delivery

An assessment of the general condition of delivered recovered paper requires close-up inspection from all angles of the bale to be sampled. The following assessment criteria are to be considered:

- Stackability
- Compliance with dimensions

- Compression quality (no voids, “same” consistency)
- Compliance with wiring directives
- Particle size (e.g., in the case of shredded material).

2.4 Odour, mould and rotting

The bale sample is to be subjected to close-up inspection from all angles. Particular attention is to be paid to untypical odours and indications of mould and rotting.

2.5 Moisture

The sample taken from the bale to be inspected is to be subjected to a series of sensory tests to detect potential traces of excessive moistening. If there are any such indications, the exact moisture content of the sample is to be determined. If the moisture content can be analysed only by using part of the sample, the sample is to be split up in a correct and suitable way.

2.6 Age

At least one sample newspaper of legible appearance date is to be picked at random from each of the five accessible sides of the bale to be sampled. Alternatively, in the case of opened bales, one sample newspaper of discernible appearance date may be taken from 5 different points of the bale.

Dating of the newspaper is then performed by establishing the difference between appearance date and sampling date. Average age corresponds to the mean of all samples taken from the bale. It is indicated in complete months and usually rounded up. The average age is determined independent of mass proportions.

If the recovered paper delivery contains but a minor proportion of newspapers, the above dating method may also be extended to magazines and the like.

2.7 Composition

Recovered paper composition is determined by means of taking samples. Measurements on the outer surface of an unopened bale is not permissible.

Samples are to be taken from inside the bale (chapter 2.2), their composition is to be determined gravimetrically. Measuring accuracy should not be inferior to 0.1 % related to the total sample size. Recovered paper composition is to be indicated in weight per cent related to the sorted sample size (air-dry).

Analysis of recovered paper composition is performed on the basis of three main categories:

- Proportion of wanted papers
- Proportion of unsuitable paper and board
- Proportion of non-paper material.

Operational instructions are to provide for the sorting criteria governing allocation of components to one of the above main categories. Measuring results as well as the average bale weight and sample size are to be recorded in a common test report (cf. Table 1).

Grade:	Date: xx-xx-xxxx
Bale weight: kg	Sample weight: kg
Peculiarities:	
Category	Mass fraction
Component	%
Wanted papers	86,0
Wood-free graphic papers	54,0
Wood-containing graphic papers	32,0
Unsuitable paper and board	10,0
Paper board containers and packaging papers	6,0
Laminated papers and paper board	3,0
Others	1,0
Non-paper material	4,0
Glass, sand, stones, building rubble	2,0
Textiles	1,0
Others	1,0
Total	<u>100</u>

} for these components a total parameter is also sufficient

Table 1: Exemplary test report for an analysis of recovered paper composition

3 Explanatory comments

3.1 Selection of bales

One method of random bale selection is commonly known as the “lottery method”: the bales in the delivery vehicle are assigned a specific position number. Thus, e.g., all bales are (mentally) numbered consecutively – beginning with 1 in the first row below – in opposite direction of motion. Subsequently, ticket numbers are selected at random by means of an electronic (e.g. computer) or mechanical (e.g. ticket box, dice) random

sequence generator. The bale whose position number turns out to be identical with the number of the ticket drawn is the one to be inspected. Depending on varying on-site conditions such as, e.g., different means of transport (train or truck), this method has to be modified accordingly.

3.2 Assessment of moisture content

It is to be pointed out in this context that due to atmospheric influences and recovered paper storage both prior and subsequent to baling, the moisture content in the bale core may differ from that on the bale surface.

3.3 Accuracy of weighing results

Due to the required weighing accuracy, results obtained provide reliable information as to the percentage by mass of a particular category correct to one decimal behind the decimal point. To enhance measuring accuracy, highly sensitive scales may be used and/or the sample size be increased (cf. Table 2).

age of a particular delivery, but as an indication of protracted storage which mainly effects deinkability of offset-printed papers (newspapers in particular). As a consequence, dating is usually required or possible only for grades of a high newspaper content ($\geq 40\%$) and grades consisting of unshredded recovered paper.

3.4 Age

The term "age" as used in this context is not to be understood as the mass-related average

Table 2: Examples of weighing accuracy

Sample quantity	1 % mass fraction	Scales reading	Weighing accuracy	Measuring uncertainty
300 g	3 g	0.3 g	0.1 %	$\pm 0.05 \%$
3,000 g	30 g	3 g	0.1 %	$\pm 0.05 \%$
30,000 g	300 g	30 g	0.1 %	$\pm 0.05 \%$
3,000 g	30 g	1 g	0.03 %	$\pm 0.017 \%$
10,000 g	100 g	3 g	0.03 %	$\pm 0.015 \%$

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