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Postal services - Quality of service - Measurement of the transit time of end-to-end services for single piece priority mail and first class mail

Postalische Dienstleistungen - Dienstqualität - Laufzeitmessung "end-to-end" für Vorrangsendungen und Sendungen erster Klasse

Services postaux - Qualité de service - Mesure du délai d'acheminement des services de bout en bout pour le courrier prioritaire égrené et de première classe

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Poštne storitve

Postal services

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

**EN 13850**

May 2002

ICS 03.240

English version

**Postal services - Quality of service - Measurement of the transit time of end-to-end services for single piece priority mail and first class mail**

Services postaux - Qualité de service - Mesure du délai d'acheminement des services de bout en bout pour le courrier prioritaire égrené et de première classe

Postalische Dienstleistungen - Dienstqualität - Laufzeitmessung von Abgang bis Zustellung für Vorrangsendungen und Sendungen erster Klasse

This European Standard was approved by CEN on 16 February 2002.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## Foreword

This document EN 13850:2002 has been prepared by Technical Committee CEN/TC 331 "Postal services", the secretariat of which is held by NEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

Annexes A, B and C are normative.

Annexes D and E are informative.

This standard includes a Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

In the Green paper on postal services in 1992 the European Commission emphasised the need to establish common rules for the development of community postal services and the improvement of quality of service. The Commission identified requirements for quality of service measurement that include:

- independent end-to-end measurement capabilities;
- a focus on cross-border delivery service performance;
- a single, uniform and reliable system for monitoring delivery service performance within the Union.

The Commission acknowledged that the different postal traditions and cultures in Europe would not allow for the establishment of one common unified European measurement system and that national systems should have sufficient degrees of freedom to reflect national needs and peculiarities. On the other hand, they should fulfil a defined set of minimum requirements to satisfy the information interests of the national regulatory authority, postal customers and postal operators themselves.

The objective of the measurement is to estimate the transit time quality of service given to the customer in each European country domestically and cross-border between the European countries.

This European Standard refers to a number of principles and minimum requirements to be applied for the measurement of the transit time of the national and cross-border mail.

## 1 Scope

This European Standard specifies methods for measuring the end-to-end transit time of the domestic and cross-border priority single piece letter mail, collected, processed and distributed by postal service operators. It considers methods using a representative end-to-end sample of all types of single piece addressed letter mail. End-to-end is defined as from the point mail is placed into the collection/acceptance system under the responsibility of the postal operators, to the final delivery point under the responsibility of the postal operators.

The overall transit time quality-of-service result is to be expressed as percentage of mail delivered within  $J + n$  days end-to-end according to the EC postal directive.

This quality of service indicator does not measure the postal operator's overall performance in a way that provides direct comparison of postal service operators, and does not include other service performance indicators than those related to transit time. In particular this European Standard does not measure whether the timing of the last collection of the day meets customer's requirements.

It specifies a set of requirements for the design of a quality of service measuring system for single piece priority mail, involving the selection and distribution of test item sent and received by selected panellists. The sample design gives the specifications for the item to be representative of the real mail flows.

This European Standard relates to the measurement of the so-called "normal" services given to private persons / households and businesses that post mail at street letter boxes, over the counter at post offices, have pick ups at their offices or give their mail directly at postal service operators sorting centres.

For technical reasons this European Standard may not in all parts be suitable for the measuring of very small volumes of mail and for operators with limited coverage.

This European Standard is not applicable for measuring the end-to-end transit time distribution of large bulk mailers' services and hybrid mail, which require different measurement systems and methodologies.

This European Standard includes specifications for the quality control and auditing of the measurement system.

## 2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN ISO 9000, *Quality management systems – Fundamentals and vocabulary (ISO 9000:2000)*.

EN ISO 9001, *Quality management systems – Requirements (ISO 9001:2000)*.

EN ISO 9004, *Quality management systems – Guidelines for performance improvements (ISO 9004:2000)*.

ISO 3534-1:1993, *Statistics - Vocabulary and symbols - Part 1: Probability and general statistical terms*.

ISO 3534-2, *Statistics - Vocabulary and symbols - Part 2: Statistical quality control*.

ISO 10005, *Quality management - Guidelines for quality plans*.

ISO 10007, *Quality management - Guidelines for configuration management*.

ISO 10011-1, *Guidelines for auditing quality systems – Part 1: Auditing*.

ISO 10011-2, *Guidelines for auditing quality systems – Part 2: Qualification criteria for quality systems auditors*.

ISO 10011-3, *Guidelines for auditing quality systems – Part 3: Management of audit programmes*.

ISO 11180, *Postal addressing*.

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For the purposes of this European Standard, the following terms and definitions apply.

### 3.1

#### **accuracy**

closeness of agreement between a test result and the accepted reference value

NOTE 1 The term accuracy, when applied to a set of test results, involves a combination of random components and a common systematic error or bias component. [ISO 3534-1]

NOTE 2 In this standard the accuracy is given by the length  $2\varepsilon$  of the confidence interval at the confidence level 95 % for the parameter being estimated, namely the probability of attaining the specification with respect to the transit time.

### 3.2

#### **aggregation**

compounding of primary data into an aggregate for the purpose of expressing them in a summary form

### 3.3

#### **audit**

systematic and independent examination to determine whether activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives [EN ISO 9000]

### 3.4

#### **average (arithmetic mean)**

sum of values divided by the number of values [ISO 3534-1]

### 3.5

#### **bring service**

mail collection or mail delivery service specifically contracted by the customer

**EN 13850:2002 (E)****3.6****business**

bodies other than households that receive and send mail

**3.7****characteristic**

property which helps to identify or differentiate between items of a given population

NOTE 1 The characteristics may be either quantitative - by variables, or qualitative - by attributes [ISO 3534-1].

NOTE 2 In this standard the population is postal test items and the characteristics are related to type of senders, type of receivers, times and types of induction or delivery, physical aspects of test items, franking, etc.

**3.8****city**

geographically defined area according to national classification systems

**3.9****conformity**

fulfilment of specified requirements [EN ISO 9000]

**3.10****corrective action**

action taken to eliminate the causes of an existing non-conformity, defect or other undesirable situation in order to prevent recurrence [EN ISO 9000]

**3.11****correlation**

relationship between two or several random variables within a distribution of two or more random variables

NOTE Most statistical measures of correlation measure only the degree of linear relationship [ISO 3534-1].

**3.12****correlation coefficient**

ratio of the covariance of two random variables to the product of their standard deviations [ISO 3534-1]

**3.13****country**

territory of a nation with its own government

**3.14****cross-border mail**

mail distributed from one country to another country

**3.15****customer**

natural or legal person having a business relation with a postal operator

**3.16****date of delivery**

date on which a postal item is delivered to the address or to the addressee

**3.17****date of deposit (J)**

day on which a postal item is posted, provided posting takes place before the last collection of that day

NOTE 1 The term date of deposit is used in relation to quality of service measurement. The definition is based on the Postal Directive 97/67/EC.



NOTE 2 Last collection refers to the advertised last time for collection (not the actual time).

### 3.18

#### **delivery point**

physical location at which delivery of postal items by a postal operator takes place and where they leave the operator's responsibility

### 3.19

#### **design factor**

ratio of the variance of the estimator in the given sample design by the variance of the estimator in an elementary sample design of the same size. The design factor is related to a given sample design and estimator

### 3.20

#### **discriminant (characteristic)**

characteristic affecting the outcome

NOTE In this standard a characteristic is discriminant when transit time differs according to the different modes of the characteristic.

### 3.21

#### **distribution**

process from collecting mail at collecting points through sorting at the distribution centre to delivery of mail items to the addressee

### 3.22

#### **domestic mail**

mail items sent and received within one country

### 3.23

#### **end-to-end (transit time)**

from the point mail is placed into the collection/acceptance system under the responsibility of the collecting postal operator to the final delivery point under the responsibility of the delivering postal operators

### 3.24

#### **estimate**

value of an estimator obtained as a result of an estimation [ISO 3534-1]

### 3.25

#### **estimator**

statistic used to estimate a population parameter [ISO 3534-1]

NOTE In this European Standard, a function of the observed values of test item transit times allowing the estimation of the probability of attaining the specification with respect to the transit time.

### 3.26

#### **expectation**

for a discrete random variable  $X$  taking the values  $x_i$ , with the probabilities  $p_i$  the expectation if it exists, is:

$$\mu = E(X) = \sum p_i x_i$$

the sum being extended over all the values  $x_i$  which can be taken by  $X$  [ISO 3534-1]

### 3.27

#### **field of study**

total mail flow between defined postal areas

NOTE 1 Field of study could be defined for example as:

— Domestic – one operator in one country

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- Domestic – one operator in one part of a country
- Domestic – a group of operators in one country
- Cross-border – one operator to one country
- Cross-border – one operator to a group of countries
- Cross-border – one country to one country
- Cross-border – one country to a group of countries

NOTE 2 Some mail flows between postal operators may not meet the technical requirements in this standard to qualify as fields of study

**3.28****frequency**

the number of occurrences of a given type of event or the number of observations falling into a specified class [ISO 3534-1]

**3.29****geographical coverage**

spread of postal services within a pre-defined geographical area

**3.30****independent performance monitoring organisation**

body charged with the monitoring of the QoS according to the methodology specified in this standard and which body is external to, and having no links of ownership or control with the postal service provider thus monitored

**3.31****independence**

two random variables are independent if their distribution functions are related by

$$F(x, y) = F(x, \infty) \cdot F(\infty, y) = G(x) \cdot H(y)$$

where  $F(x, \infty) = G(x)$  and  $F(\infty, y) = H(y)$  are the marginal distribution functions of  $X$  and  $Y$ , respectively for all pairs  $(x, y)$  [ISO 3534-1]

**3.32****induction**

deposition of mail into the postal network

**3.33****inspection**

activity such as measuring, examining, testing or gauging one or more characteristics of an entity and comparing the results with specified requirements in order to establish whether conformity is achieved for each characteristic [EN ISO 9000 and ISO 3534-2]

**3.34****metered mail**

mail franked by franking machines

**3.35****national and regional holiday**

day with limited postal collection or delivery activities

**3.36****observed value**

value of a characteristic obtained as the result of a single observation [ISO 3534-1]

**3.37****office of exchange**

place where a postal operator accepts cross-border mail from a postal operator of another country

**3.38****on-time performance**

proportion of postal items within a given period of time  $t$  with transit times meeting the specification

*Formal definition:*  $\frac{1}{N(t)} \sum_{i=1}^{N(t)} X_i$  where  $N(t)$  is the total number of postal items inducted during the period,

and  $X_i = 1$  if postal items  $i$  fulfils the specification and otherwise  $X_i = 0$

**3.39****on-time probability**

probability of the event that the transit time  $T$  of a mail item meets the specification  $s$ , i.e. does not exceed the specified number  $s$  of days:

$$\Pr(T \leq s)$$

**3.40****performance indicator**

expression derived from postal transit time statistics and data used to characterise the performance of a postal operator

**3.41****postal catchment area**

postal area served by a domestic sorting centre or by an office of exchange for cross border mail outbound or inbound. Catchment areas may be different for outbound and inbound mail, or for different fields of study

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**3.42****postal area**

one of the parts into which a postal operator's whole territory is divided and which is suitable for characterising postal delivery peculiarities

**3.43****postal service**

services involving the clearance, sorting, transport and delivery of postal items

**3.44****priority item, first class item, A-class item**

letter post item sent with priority by air or by surface and receiving different processing compared to items classified as non-priority

**3.45****probability distribution**

function giving the probability that a random variable takes any given value or belongs to a given set of values [ISO 3534-1]

**3.46****quality**

totality of characteristics of an entity that bear on its ability to satisfy stated and implied needs [EN ISO 9000]

**3.47****quality assurance**

all the planned and systematic activities implemented within the quality system and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality [EN ISO 9000]

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**3.48****quality control**

operational techniques and activities that are used to fulfil requirements for quality [EN ISO 9000 and ISO 3534-2]

**3.49****quality evaluation**

systematic examination of the extent to which an entity is capable of fulfilling specified requirements [EN ISO 9000]

**3.50****random sample**

sample of  $n$  items taken from a population of  $N$  items in such a way that each item in the population has a strictly positive probability of being selected

**3.51****random variable**

variable that may take any of the values of a specific set of values and with which is associated a probability distribution [ISO 3534-1]

**3.52****real mail**

postal items sent by customers

**3.53****real mail flow**

number and types of postal items distributed end-to-end by postal operators

**3.54****real mail study**

studies on real mail flows or real mail characteristics

**3.55****rural**

cities and communes with less than a specified number of inhabitants

**3.56****sample**

one or more sampling units taken from a population and intended to provide information on the population [ISO 3534-1]

**3.57****service standard**

standard that specifies requirements to be fulfilled by a service, to establish its fitness for purpose

**3.58****single piece mail**

postal items posted and distributed individually

**3.59****sorting centre**

place where the main sorting of mail is done

**3.60****stamped mail**

postal items paid for with postage stamps

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**3.61****standard**

document, established by consensus and approved by a recognised body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context

NOTE Standards should be based on the consolidated results of science, technology and experience, and aimed at the promotion of optimum community benefits [EN 45020].

**3.62****stratification**

division of a population into mutually exclusive and exhaustive subpopulations (called strata) which are thought to be more homogeneous with respect to the characteristics investigated than the total population [ISO 3534-1]

**3.63****study domain**

subpopulations for which separate results can be appropriate

NOTE Study domains could be defined for example by geographic segmentation or by product

**3.64****test item**

postal item produced in the test measurement system for the purpose of measuring real mail performances. Test items shall be representative of real mail

**3.65****test period**

period of time under which measurement has been carried out and for which the results are presented in a separate test report

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**3.66****time of delivery**

time when a postal item is delivered at its delivery point

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**3.67****transit time**

number of days elapsed between induction and delivery of mail item as calculated in 4.2.3

**3.68****transit time distribution**

transit time of a mail item is random and therefore it is modelled as a random variable; the set of probabilities of any event concerning the random variable transit time of a mail item forms its probability distribution

**3.69****urban**

cities, including their outskirts, with not less than a specified number of inhabitants

**3.70****variance**

measure of dispersion, which is the sum of the squared deviations of observations from their average divided by one less than the number of observations [ISO 3534-1]

**3.71****weight**

value to compensate for the difference between the distribution of characteristics in the measurement system compared to real mail

## 4 Transit time as a quality of service indicator

### 4.1 General

The system for measuring the distribution of the end-to-end transit time of mail items shall be robust and shall give statistical measures at a defined level of accuracy.

All measurements shall refer to the end-to-end transit time.

The sample design shall be representative of real mail flows.

The measuring system shall provide one annual figure for each relevant field of study.

The measuring methodology shall be objective and shall be audited.

There shall be consistency between cross-border and domestic measuring methods.

If the field of study is composed of several study domains, it is the overall quality of service measurement for the field that shall comply with the requirements of this European Standard.

The field of study shall be used consistently throughout the measuring.

If for a field of study an operator is defined as one operator or a group of co-operating operators, this group should be used consistently.

When the field of study is a group of countries, this group should be used consistently in the measurement.

### 4.2 Calculation and presentation of transit time

#### 4.2.1 Measurement unit

The transit time of a postal item shall be measured in units of days and expressed as  $(J + n)$  days.  $J$  is the date of deposit provided posting takes place before the published last collection time at the point of induction of the mail.

#### 4.2.2 Continuity of measurement

The measurement system shall be continuous. It shall cover all months, weeks and days of the year in accordance with the definition of the measurement unit. All periods of the year shall be included as well as Christmas, Easter and summer holiday periods.

Non-functioning of the postal operator and days of strikes or industrial disputes shall not be discounted. However in case of "force majeure" events, deduction of corresponding period may be considered in agreement with the national regulatory authority, and shall be indicated in the reporting.

Test items shall be posted on all seven days of the week, in proportion to real mail. Either Saturday or Sunday posting can be excluded if there is no collection by the operator on these days.

#### 4.2.3 Calculation of the transit time

For the purpose of this European Standard, transit times for domestic and cross-border mail shall be calculated according to a five-day working week calculation rule; whereby Saturdays, Sundays, and national holidays in the country of delivery are subtracted, in accordance with B.1.

For domestic mail, the transit times may, in addition, be calculated according to the weekend collection and delivery pattern provided, in accordance with one of the calculation rules of B.2, if required by the national regulatory authority.

Test mail items with imprecise dates of deposit or delivery shall always be excluded from the calculations.

Published regional holidays may be subtracted in the calculation of transit time, by agreement with the national regulatory authority.

For purposes other than this European Standard, the operator can apply any other calculation rule. In this case no references shall be made to this European Standard.

#### 4.2.4 Service performance indicators

The following indicators shall be used in the presentation of the service performance result:

##### 4.2.4.1 On-time performance

The percentage of postal items delivered within the defined service standard. The result shall be presented as the percentage of postal items arriving by  $J + n$ , whereby  $J$  represents the day of deposit and  $n$  the number of qualifying days for the service standard.

All reports shall state the level of on-time performance accuracy achieved in the test period.

##### 4.2.4.2 Cumulative distribution of delivery days

The cumulative percentage of mail delivered within a given period, from  $J + 1$  to  $J + 10$ . All postal items delivered up to  $J + 30$  shall be considered in the calculations. Postal items not delivered by  $J + 30$  can be excluded.

## 5 Methodology

### 5.1 General

The methodology shall be based on test mail representative of the real mail and shall provide indicators that are representative of the real mail transit time quality of service in the period measured.

The test mail method shall consist of a process in which panellists acting as senders post test items into the postal operators' mail network and register date and time of posting, to the destination of panellists acting as receivers who register the day of delivery.

The use of test items shall allow for precise end-to-end measurement. These test items may - but do not have to - contain electronic chips or other advanced technology that can be monitored throughout the whole journey of each test item to allow for more detailed diagnostic analysis of the transit time. The organisation operating the measuring system shall take steps to ensure that the diagnostic system does not introduce biases in the end-to-end measurement system.

Senders and receivers shall be spread all over the field of study in order to fulfil the specifications of stratification and geographical coverage. The sending and receiving process shall be organised in order to fulfil the specifications of the sample design and the test mail shall be manufactured in order to fulfil the specifications of mail characteristics.

The panel of senders and receivers shall be independent of postal service operators and shall be managed according to the International Chamber of Commerce / ESOMAR International Code of Marketing and Social Research Practice including its attachment. Measurement shall be carried out by an independent performance-monitoring organisation.

### 5.2 Representative sample design

The sample design shall be representative of the postal flows and of the discriminant characteristics of the real mail. This can be realised either by a strict proportionality of the test mail flows with respect to the real mail flows, or by an over-representation or an under-representation of some strata or flows, in return for weighting a posteriori, allowing to restore the proportionality.

### 5.3 Real mail studies

Real mail studies for domestic and cross-border mail measurement shall be implemented prior to the set up of the test mail measurement system in order to obtain the information needed for the sample design.

The real mail studies shall:

- collect statistics on single piece real mail flows and mail characteristics, according to the minimum information requirements of the statistical design. The estimation of the following weights as a minimum is mandatory: