DD CEN/TS 15844-5:2010

BSI Standards Publication

Postal services — ID-tagging of letter mail items

Part 5: 4-state encoding specification for small letters

bsi.

...making excellence a habit.™

National foreword

This Draft for Development is the UK implementation of CEN/TS 15844-5:2010.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature. It should be applied on this provisional basis, so that information and experience of its practical application can be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the international organization responsible for its conversion to an international standard. A review of this publication will be initiated not later than 3 years after its publication by the international organization so that a decision can be taken on its status. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards.*

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into an international Standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent to the Secretary of the responsible BSI Technical Committee at British Standards House, 389 Chiswick High Road, London W4 4AL.

The UK participation in its preparation was entrusted to Technical Committee SVS/4, Postal services.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 63260 0

ICS 03.240

Compliance with a British Standard cannot confer immunity from legal obligations.

This Draft for Development was published under the authority of the Standards Policy and Strategy Committee on 31 January 2011.

Amendments issued since publication

Date	Text affected

TECHNICAL SPECIFICATION

SPÉCIFICATION TECHNIQUE

TECHNISCHE SPEZIFIKATION

CEN/TS 15844-5

December 2010

ICS 03.240

English Version

Postal services - ID-tagging of letter mail items - Part 5: 4-state encoding specification for small letters

Traitement automatisé des envois postaux - Chronomarquage des envois postaux - Partie 5: Spécification de codage en code 4 états pour les lettres

Postalische Dienstleistungen - ID-Kennzeichnung von Briefsendungen - Teil 5: Spezifikation der 4-State-Codierung für Standardbriefe

This Technical Specification (CEN/TS) was approved by CEN on 1 December 2008 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TS 15844-5:2010: E

Contents

Page

Foreword 3
Introduction 4
1 **Scope** 5
2 **Normative references** 5
3 **Terms and definitions** 5
4 **Symbols and abbreviations** 5
5 **Usage limitations** 5
6 **Value range limitations** 6
7 **Encoding specification** 6
8 **Printing of the bar code** 7
8.1 **General** 7
8.2 **Optical characteristics of the ink** 7
8.3 **Bar code placement** 8
8.3.1 **Printing directly on domestic items** 8
8.3.2 **Printing directly on cross-border items** 10
8.3.3 **Placement on labels** 11
9 **Reading and interpretation of Postal-4i ID-tags** 11
10 **Conversion to the message and binary representations** 11
Annex A (informative) **Postal-4i ID-tag generator** 12
Annex B (informative) **Examples** 14
Bibliography 15

Foreword

This document (CEN/TS 15844-5:2010) has been prepared by Technical Committee CEN/TC 331 “Postal services”, the secretariat of which is held by NEN.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

NOTE This document has been prepared by experts coming from CEN/TC 331 and UPU, under the framework of the Memorandum of Understanding between the UPU and CEN.

This document, CEN/TS 15844-5, is the CEN equivalent of UPU [1)] standard S18e-5. It may be amended only after prior consultation, between CEN/TC 331 and the UPU Standards Board, in accordance with the Memorandum of Understanding between CEN and the UPU.

The UPU’s contribution to the document was made, by the UPU Standards Board [2)] and its sub-groups, in accordance with the rules given in Part V of the "General information on UPU standards".

This document forms Part 5 of a multi-part CEN/TS 15844, *Postal services — ID-tagging of letter-mail items*. It should be read in conjunction with the main body of the specification, CEN/TS 15844-1. It also relies heavily on Part 4 of the specification, CEN/TS 15844-4.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

---

1) The Universal Postal Union (UPU) is the specialized institution of the United Nations that regulates the universal postal service. The postal services of its 189 member countries form the largest physical distribution network in the world. Some 5 million postal employees working in over 660 000 post offices all over the world handle an annual total of 425 billion letters-post items in the domestic service and almost 6,7 billion in the international service. Some 4,5 billion parcels are sent by post annually. Keeping pace with the changing communications market, posts are increasingly using new communication and information technologies to move beyond what is traditionally regarded as their core postal business. They are meeting higher customer expectations with an expanded range of products and value-added services.

2) The UPU's Standards Board develops and maintains a growing number of standards to improve the exchange of postal-related information between posts, and promotes the compatibility of UPU and international postal initiatives. It works closely with posts, customers, suppliers and other partners, including various international organizations. The Standards Board ensures that coherent standards are developed in areas such as electronic data interchange (EDI), mail encoding, postal forms and meters. UPU standards are published in accordance with the rules given in Part VII of the General information on UPU standards, which may be freely downloaded from the UPU world-wide web site (www.upu.int).

Introduction

A general introduction to all parts of the specification is provided in CEN/TS 15844-1. This part deals only with the encoding of ID-tags in the form of a 4-state bar code printed on the front side of small letters. For consistency with Part -4 of the specification, on which it depends, it is arranged under six main headings:

Clause No. Description of content

5 *Usage limitations*: defines limitations on the use of the Postal-4i 4-state encoding of ID-tags specified in this document;

6 *Value range limitations*: defines limitations on the values of data elements used in ID-tags which are to be represented on small letters in the form of a Postal-4i bar code;

7 *Encoding specification*: specifies the construction of a 4-state bar code from ID-tag data elements;

8 *Printing of the bar code*: to allow the association of computer data with a physical item, the ID-tag is printed on the item itself. This clause defines required ink and printing parameters;

9 *Reading and interpretation of Postal-4i ID-tags*: specifies the validation and error correction requirements associated with the reading of ID-tags represented using Postal-4i symbology;

10 *Conversion to the message and binary representations*: describes the correspondence between 4-state bar coded representation and the binary and message interchange representations defined in CEN/TS 15844-1.

These are complemented by two informative annexes, the first providing references to an example implementation of the Postal-4i ID-tag generation algorithm and the second providing a number of example ID-tags, generated using this implementation.

1 Scope

This part of the Technical Specification defines the representation of ID-tags as a Postal-4i symbology 4-state bar code printed on the front side of small letters.

Postal-4i symbology 4-state encoding is the only encoding specification supported by this Technical Specification [3)] for the printing of ID-tags on the front of items.

NOTE Representation in the form of fluorescent BNB bar codes printed on the reverse side of small letters (not flats) is covered in CEN/TS 15844-2 and CEN/TS 15844-3.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CEN/TS 15844-1:2010, *Postal services — ID-tagging of letter mail items — Part 1: ID-tag structure, message and binary*

UPU S48, *Postal-4i: 4-state symbology and its use for the encoding of data on postal items*

3 Terms and definitions

A number of common terms used in this document are defined in the UPU Standards glossary, in documents referred to in normative references and in the bibliography. Definition of frequently used or particularly important terms as well as other terms introduced in this document are given below.

See CEN/TS 15844-1:2010.

4 Symbols and abbreviations

See CEN/TS 15844-1:2010.

5 Usage limitations

The 4-state bar coded representation of ID-tags defined in this part of the specification is intended for use on the front side of small letters in area F1. Printing of ID-tags in this area is allowed only on domestic items and on items addressed to countries in which the delivery post has confirmed willingness to accept items with a 4-state ID-tag in that area.

NOTE 1 Many posts use area F1 for the encoding of routing data, used to support automated sorting of both domestic and incoming cross-border items. The printing of an ID-tag in area F1 on cross-border items to countries which require F1 to be kept clear for this purpose could cause serious disruption to such countries' automated processing systems and could result in misprocessing or substantial delay to the items concerned. It would also be in breach of the UPU letter post regulations. This Technical Specification therefore requires that postal administrations making use of area F1 for ID-tag encoding should take care to avoid such use of area F1 on items addressed to other countries that have not declared their willingness to accept items with an ID-tag in area F1 as standard items.

---

3) References to "this Technical Specification" should be interpreted as references to CEN/TS 15844 as a whole, not only to Part 5.

The specification may be applied to the printing of ID-tags in other areas on the front of items. It shall not be used in area R1 on the reverse side.

NOTE 2 Usage in other areas on the front is permitted, but could result in interference with, or by, codes placed by other systems and is not recommended.

NOTE 3 Usage on the reverse side, and particularly usage in area R1, could seriously disturb the operation of older systems which are designed to work only with BNB encodings of ID-tags and is not permitted.

6 Value range limitations

The value range limitations defined in CEN/TS 15844-4 apply also to this part of the Technical Specification.

7 Encoding specification

The bar code shall be generated in compliance with UPU standard S48, using the following parameters:

a) format code (f) value: equal to bits 0-3 of the binary ID-tag value, as defined in CEN/TS 15844-1;

NOTE 1 This assists in distinguishing Postal-4i ID-tags from other bar codes which use Postal-4i symbology. See S48 for a definition of the symbology parameters f, l, r, c and n.

b) left synchronisation code (l) value: 010110 (22 decimal);

c) right synchronisation code (r) value: 100110 (38 decimal);

NOTE 2 This also assists in distinguishing Postal-4i ID-tags from other bar codes which use Postal-4i symbology.

d) number of variable data codewords (c) value: 13;

e) bar code length (n):

1) on domestic items: 57 or 75, with 75 being recommended unless the bar code is to be printed in area F1 and it is desired to leave space for the possible printing of a routing code in the same area;

NOTE 3 Either value can be used on domestic items, though only the short (57 bar) version leaves room for a routing code to be printed in the same area. The use of the 57 bar format is not recommended for use in areas other than F1 because its error correction capability is not considered sufficient to support an adequate read rate in positions which could include printing or writing in other inks.

2) on cross-border items, where the bar code is to be printed in area F1, either 57 or 75 as required by the delivery post concerned;

NOTE 4 On cross-border items it is permitted to print an ID-tag in area F1 only on items addressed to countries in which the delivery post has confirmed willingness to accept this. The bar code length used is required to correspond with the expressed preference of the delivery post concerned: those wishing to leave room for the possible printing of a routing code will require use of the 57 bar format; those not making use of area F1 for routing purposes might choose for either format.

3) on cross-border items, where the bar code is to be printed in a location other than F1: 75;

NOTE 5 Though the 75 bar format provides more error protection, the 57 bar format normally results in an adequate read rate in area F1 (where other printing is unlikely). The 57 bar format is not recommended for use in other areas because its error correction capability is not considered sufficient to support an adequate read rate in positions which could include printing or writing in other inks.

NOTE 6 Note that the data string, format code, left and right synchronisation codes and error correction data together add up to 150 bits or 25 6-bit codewords, but that, in the 57 bar version, only 19 codewords are actually

printed. If the bar code is a Postal-4i bar code constructed in accordance with this Technical Specification, the left synchronisation code, which is printed in the third codeword position, will be 010110 (22 decimal) and the right synchronisation code, printed in the third codeword position from the end, will be 100110 (38 decimal). The values of six codewords are recovered, during the reading process, using the error recovery capabilities of the Reed-Solomon decoding algorithm.

f) nominal height of a full bar (h): between 4,0 mm and 5,8 mm;

g) nominal pitch (p): between 1,1 mm and 1,2 mm;

h) a 62-bit input data string consisting of bits 4-53 of the binary ID-tag value, as defined in CEN/TS 15844-1, followed by the tracking indicator value, represented as two bits using the convention: *T = 00*; *F = 01*; *D = 10*; *N = 11*, in turn followed by the last ten bits (bits 54-63) of the binary ID-tag value.

EXAMPLE The ID-tag with message representation J18CUSA8E6N062315014880T is the 14 880th one issued by USPS (issuer USA) machine number 8E6 (2 278 decimal) with normal priority (N) on 23 June (0623) between 15:00 and 15:10 (150). Tracking is requested (T). This ID-tag has binary representation (separation points introduced every four bits to improve legibility): 0010.0010.0000.0111.0001.1000.1110.0110.0001.1100.1010.1110.1011.1010.0010.0000. The 62-bit value used in bar code generation is derived by dropping the first four bits and inserting the tracking code value 00 ten bits from the end:

0010.0000.0111.0001.1000.1110.0110.0001.1100.1010.1110.1011.100010.0010.0000

Conversion to 4-state form results in:

or, expressed in character notation with F representing a full bar, A an ascender, D a descender and T a timing bar. FDF.DFF.AAD.ATF.ADF.TDA.DFA.TFD.DTD.DTD.DFT.FTA.FDF.FAT.ATT.FAD.TFA.ATA.TAF.ATT.DDT.AFF.DAD.FDF.DFF

8 Printing of the bar code

8.1 General

The resulting bar code shall be printed on the item, in accordance with the specifications in UPU standard S48, except that horizontal skew shall be limited to $\pm$ 2°.

The specifications relate to the finished characteristics of production mail, 99 % of which is required to be within specification. To the extent possible and consistent with acceptable mis-read rates, reading systems should be designed to accommodate items on which the ID-tag does not meet all requirements and should not reject captured ID-tags merely because their specification is not in full compliance with printing specifications. For example, variations in transport speed might cause the pitch of a printed ID-tag to exceed the limit permitted by S48. This should not result in rejection of the ID-tag if the reader is reliably capable of capturing ID-tags with a greater variation in pitch.

8.2 Optical characteristics of the ink

The 4-state encoding of ID-tags shall be printed on small letters using fluorescent ink. It is recommended that this be in accordance with the specifications in the CEN/TS 15844-2 clause on Optical characteristics of the ink. The use of ink with an excitation wavelength of 310-360 nm (peak 315-325 nm) and an emission wavelength with peak at 610-620 nm is permitted as an alternative but its use for the printing of ID-tags in area F1 is not recommended.

NOTE The alternative corresponds with the invisible ink traditionally used by Finland Post and Japan Post. Other posts might also wish to use such inks for aesthetic reasons, particularly if the ID-tag is printed in a location other than area F1 [4)]. However, users are advised that many readers designed for use with the inks specified in CEN/TS 15844-2 are now equipped with blue LED lamps and are unlikely to be able to read ID-tags printed with an ink, like the above specified alternative, that require UV illumination to excite them. This implies that other posts might be unable to read ID-tags printed in the alternative ink. Also, the possibility of interference cannot be excluded: the presence of an ID-tag, printed on an incoming item in one ink, could well interfere with the readability of any ID-tag printed in another ink by the delivery post. It is therefore recommended that tests be conducted, with samples of incoming items, before decisions are taken regarding the choice of ink and reader.

8.3 Bar code placement

8.3.1 Printing directly on domestic items

This subclause applies only to items for which the origin and delivery post are one and the same organisation. For items which enter interchange (i.e. for which the origin and delivery posts are different organisations), 8.3.2 applies.

Postal-4i ID-tags should preferably be printed in area F1 with the centre line of the bar code (10 ± 1) mm from the bottom and the rightmost bar (10 ± 1) mm from the leading edge of the item.

NOTE 1 The horizontal position is defined so as to permit a UPU standard Postal-4i routing code [5)] to be printed to the left of a 57 bar ID-tag.

NOTE 2 If the 75 bar format is used (see Clause 7, e)), there is not enough room to print a routing code in addition to the ID-tag and the horizontal positioning of the ID-tag is less critical.

NOTE 3 Notwithstanding the above, it is recommended that, to allow for skewing of the item, readers be designed to be capable of reading 4-state ID-tags anywhere in the band from 0 mm to 20 mm from the reference baseline of the equipment concerned.

4) In area F1, the area recommended herein, such aesthetic considerations are likely to be of less significance, since the area is not-supposed to be used by mailers and therefore should not contain printing or writing whose aesthetic appearance could be damaged by a visible ink ID-tag.

5) The specification of a UPU standard routing code is under development under UPU standards work item P27.

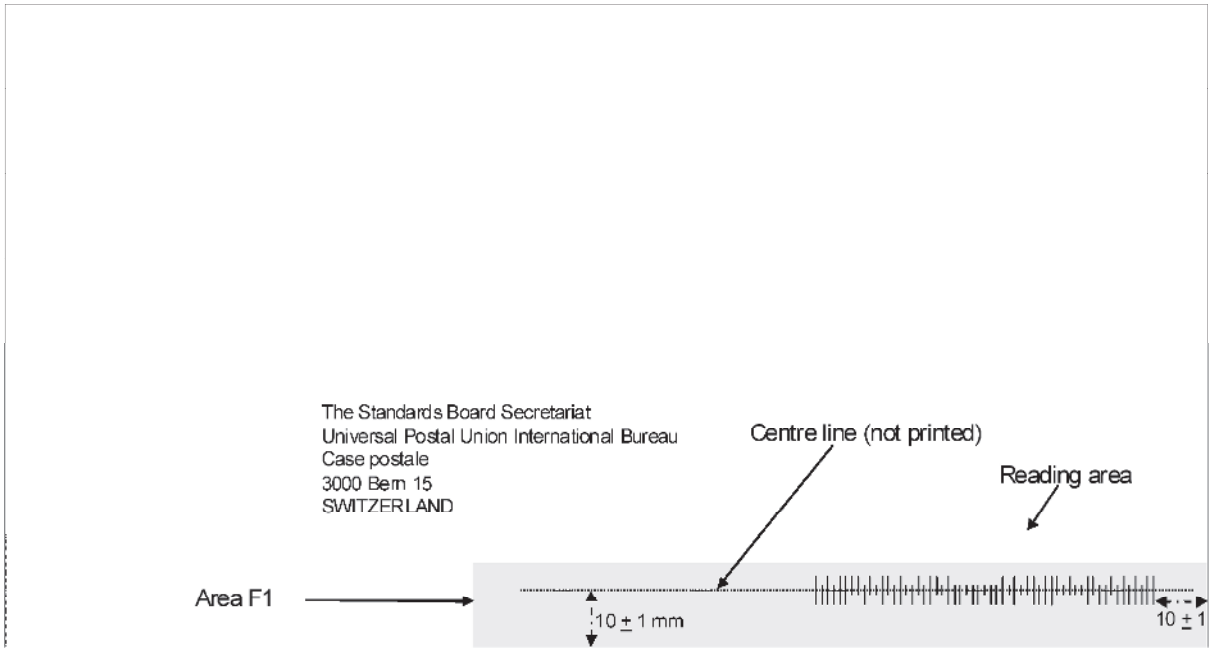

Figure 1 — Illustration of preferred placement (57 bar version; approx. 75 % scale)

Postal-4i ID-tags with 57 bars may alternatively be printed in area F1 with the centre line of the bar code (10 ± 1) mm from the bottom and the rightmost bar between 63 mm and 71 mm from the leading edge of the item.

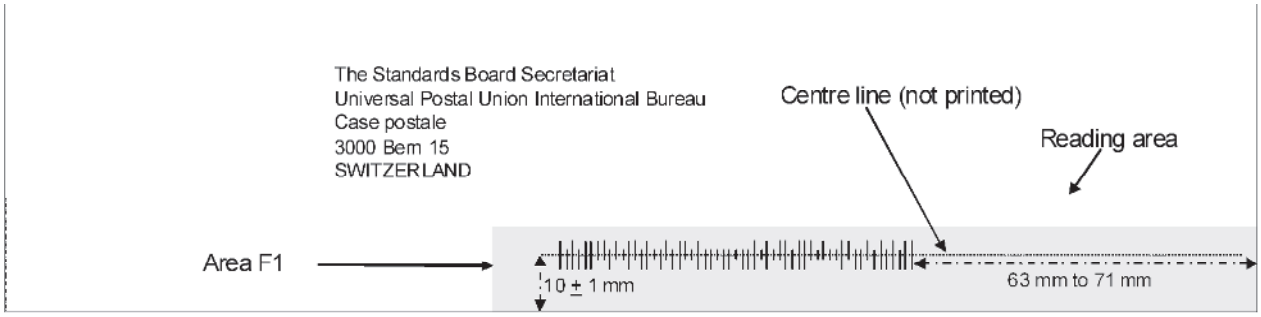

Figure 2 — Illustration of alternative placement (approx. 75 % scale; only lower part shown)

NOTE 4 This alternative horizontal position allows a UPU standard Postal-4i routing code to be printed to the right of a 57 bar ID-tag (see NOTE 1 above). It cannot be used for the 75 bar format, because the complete bar code would not fit within area F1.

NOTE 5 The 57-element code has a nominal length of 64,8 mm, so its leftmost bar will be between 127,8 mm and 135,8 mm from the leading edge. It can, however, vary in length between 61,9 mm and 67,8 mm. In the latter case, the leftmost bar will be at most 138,8 mm from the leading edge – just within area F1. The bar code will therefore fit on envelopes that meet the minimum size requirements for standardised items (140 mm minimum). On envelopes of 127 mm (USPS minimum) in length, the complete bar code will fit only if (a) the first bar is positioned 63 mm from the leading edge and (b) the minimum allowed pitch (1,1 mm) is used.

The 75 bar format may alternatively be printed elsewhere on the item (i.e. not in area F1).

8.3.2 Printing directly on cross-border items

This subclause applies only to items for which the origin and delivery post are different organisations. For items which do not enter interchange (i.e. for which the origin and delivery posts are the same), 8.3.1 applies.

Postal-4i ID-tags shall not be printed on the reverse side of items which enter interchange.

Postal-4i ID-tags may be printed in area F1 on items which enter interchange only in accordance with the declared agreement of the delivery post concerned to accept such items as standardised items and only subject to the constraints specified on such acceptance:

NOTE 1 It is extremely important to avoid the printing of ID-tags in area F1 on items addressed to countries that have not declared a capability to accept such use of area F1. On such items, the presence of an ID-tag in area F1 could seriously disrupt processing by the delivery post, resulting in increased costs and significantly reduced quality of service. The items concerned would not count as standardised items and the delivery post would be fully entitled to assess additional charges for their processing.

a) where acceptance is specified as subject to use of the 57 bar format printed at the right side of area F1, only the 57 bar format may be used. The ID-tag shall be printed in area F1 with the rightmost bar (10 ± 1) mm from the leading edge of the item;

   NOTE 2 This corresponds to the recommended position on domestic items (see Figure 1 in 8.3.1). The horizontal position is defined so as to permit a UPU standard Postal-4i routing code to be printed to the left of a 57 bar ID-tag.

b) where acceptance is specified as subject to use of the 57 bar format printed at the left side of area F1, only the 57 bar format shall be used. The ID-tag shall be printed in area F1 with the rightmost bar between 63 mm and 71 mm from the leading edge of the item;

   NOTE 3 This corresponds to the alternative position on domestic items (see Figure 2 in 8.3.1). The horizontal position is defined so as to permit a UPU standard Postal-4i routing code to be printed to the right of a 57 bar ID-tag.

c) where acceptance is specified as subject to use of the 57 bar format without constraint as to horizontal positioning, only the 57 bar format may be used. The ID-tag shall be printed in area F1 with the rightmost bar either (10 ± 1) mm or between 63 mm and 71 mm from the leading edge of the item;

d) where acceptance is specified as being without constraint as to the length of the bar code (57 or 75 bars), either length of bar code may be printed in area F1 with the rightmost bar (10 ± 1) mm from the leading edge of the item.

In all the above cases, the ID-tag should be printed with the centre line of the bar code (10 ± 1) mm from the bottom of the item.

NOTE 4 Notwithstanding the above, it is recommended that, to allow for skewing of the item, readers be designed to be capable of reading 4-state ID-tags anywhere in the band from 0 mm to 20 mm from the reference baseline of the equipment concerned.

The printing of Postal-4i ID-tags on the front of cross-border items in areas other than F1 is permissible, but not recommended.

NOTE 5 The 4-state ID-tag encoding defined herein may also be printed in other locations on the front of items; however, except in case of explicit bilateral agreement, it is unlikely that these will be readable by other postal handling organisations and could cause interference with or be interfered with by systems in use by other posts.

NOTE 6 The use of areas other than F1 is not controlled. For example, as at the date of preparation of this Technical Specification, area F3 was known to be in use, for the placement of domestically defined BNB bar codes, by at least two posts.

8.3.3 Placement on labels

Subject to the provisions regarding Placement on labels in CEN/TS 15844-4, it is permissible to print the ID-tag on a label applied to the item. The 57 bar format should be used. The positioning of the resulting bar code shall comply with 8.3.1 or 8.3.2 above, as appropriate to the case.

NOTE It is recommended that use of labels be limited to exceptional cases, for example when the item concerned already had an ID-tag but this could not be read. Except in the case of area F1, where labels can be used to cover previous encoding which could interfere with an ID-tag or routing code, the use of labels on the front of small letters is not recommended due to the high risk of obscuring part of the delivery address.

9 Reading and interpretation of Postal-4i ID-tags

The specification given in UPU standard S48 shall be followed. If the captured bar code corresponds to a Postal-4i ID-tag it should:

1) have format code (f) value: 0010 or 0011 (decimal 2 or 3);

2) have left synchronisation code (l) value: 010110 (22 decimal);

3) have right synchronisation code (r) value: 100110 (38 decimal);

4) a length of 57 or 75 bars;

5) a median full bar height (h) of between 4,0 and 5,8 mm;

6) an average pitch (p) of between 1,1 mm and 1,2 mm;

7) and should yield a 62-bit data string which complies with the specification in Clause 7, h).

Particular attention should be paid to avoiding that a BNB or other bar code is erroneously interpreted as a 4-state bar code that conforms with this Technical Specification.

NOTE 1 Though usage of area F1 is subject to the letter post regulations and the provisions of this Technical Specification, it remains possible that an incoming item is found to have a routing code or other bar code, in area F1, that does not conform to this Technical Specification. Care is required to avoid erroneously interpreting other codes as 4-state ID-tags. Since area F1 is required to be free of encoding other than a 4-state ID-tag (which is permitted only if the delivery post has agreed to ID-tag use in F1), any other bar code found in the area can be obscured by overlabelling it.

NOTE 2 Cross-contamination tests have shown that there is a possibility that BNB bar codes could in first instance be interpreted as 4-state bar codes. Though the inclusion of synchronisation codewords in the error protection mechanism assists in detecting such errors, there remains a small probability that, even after error correction, the value obtained appears to be a valid ID-tag data value with the required synchronisation data. To limit the risk of error, it is recommended that consideration be given to rejecting captured values which show a combination of a high proportion of apparently full bars and a high use of the error correction capacity of the specification.

As noted in 8.3, the use of a 57 bar Postal-4i ID-tag in area F1 can be combined with the printing, by the delivery post, of a routing code in the same area. Systems should preferably be designed to permit the routing code to be printed to the left of the ID-tag (recommended layout) or to the right of the ID-tag (alternative layout). In principle, the two bar codes should be separated by a gap of at least 5 mm. Care should nevertheless be taken to avoid misinterpreting ID-tags that, through poor equipment adjustment or malfunction, are printed too close to, or overlapping with, a routing code.

10 Conversion to the message and binary representations

The specification given in the corresponding clause of CEN/TS 15844-4 shall be followed.

Annex A
(informative)

Postal-4i ID-tag generator

This informative annex provides references to and an explanation of **one possible** Perl [6] implementation of the algorithm to generate a Postal-4i ID-tag. This implementation is intended **only** as an example which can be read and understood and as a possible basis for the validation of other implementations and is therefore aimed at intelligibility rather than efficiency. It is almost certainly **not** the most efficient algorithm for use in any practical ID-tag generator.

The implementation makes use of the three packages gf, rs and p4i, documented in S48, Annex A [7], which can be used to generate generic Postal-4i symbology bar codes. It comprises one additional package, tag4i, together with a simple example main programme which illustrates its use.

Package tag4i, which can be downloaded from http://www.upu.int/en/activities/standards/support-and-downloads.html as file Tag4i.pm, complements the three packages documented in S48, Annex A for the specific case of Postal-4i ID-tags. It has one main externally callable subroutine, tag4i::gen which takes, as arguments, the message representation of the ID-tag to be encoded and the desired bar code length (57 or 75 bars). This subroutine uses the following internal subroutines:

— **calcstring** generates the 62 bit binary data string for supply to the Postal-4i bar code generator in package p4i;

— **d2b** is a crude decimal to binary converter. It has two parameters: the value to be converted and the required length of the binary string. If the latter is zero, the minimum length string is returned;

— **verifyinput** checks that manually entered input data are valid, recursively asking for corrected values until a valid ID-tag value is provided. This assumes that data to be encoded is supplied interactively; adaptation would be needed were this not to be the case.

The main programme, provided in file "S18d Perl example of a programme which can be used to generate S18d-10 ID-tags" [8] on http://www.upu.int/en/activities/standards/support-and-downloads.html illustrates usage of package tag4i. The supplied test procedure first generates the first bar code example in Annex B and then enters a loop, requesting the user to enter new data values. The loop is terminated on entry of control-Z. Results are placed in a file postal-4i barcode.xml which can be opened using Microsoft Word. The generated bar code pictures can be copied and pasted into other applications.

The code is written on the assumption that package gf will be found in a file called **Galoismath.pm**; package rs in a file called **Reedsolomon.pm**; package p4i in a file called **Postal4i.pm** and package tag4i in a file called **Tag4i.pm**. Usage of other file names would require editing of the “use Galoismath”, “use Reedsolomon”, “use Postal4i” and “use Tag4i” statements in the code. It is also possible to put all the code in a single source file. In that case, the “use …” statements need to be removed.

---

6) Perl is an acronym for Practical Extraction and Report Language. Perl was designed for the processing of text files, for the extraction of information from them and for the printing of reports based on that information. However, it has been developed into a widely supported general-purpose programming language aimed at ease of use rather than elegance. The language syntax is similar to that of C, but it combines features of several other languages, particularly sed, awk and sh, It supports both procedural and object-oriented (OO) programming, has powerful built-in support for text processing, and has a large collection of third-party modules.

7) These packages can be found under the area of http://www.upu.int/en/activities/standards/support-and-downloads.html which is dedicated to S48 code. The relevant files are Galoismath.pm, Reedsolomon.pm and Postal4i.pm.

8) This is the same programme as that referenced by CEN/TS 15844-4.

Usage of the referenced implementation requires prior installation of a Perl interpreter. The one used for testing was the Windows XP version 5.8.0.804 of the ActivePerl interpreter published free of charge on www.activestate.com by ActiveState Corp. Running on a Pentium M 2,0 GHz processor under Windows XP Professional 5.1.2600, the implementation takes approximately 2,5 ms to generate an ID-tag.

Annex B
(informative)

Examples

The following examples (printed in black, rather than fluorescent, ink) were generated using the example implementation referred to in Annex A. In each case, the example shows the bar code in both 57 and 75 bar format, followed by the OCR data (message based) representation of the data used to generate it.

The first example is that given in Clause 7 of the body of the standard.

(J) J18CUSA8E6N062315014880T

The next three show the effect, on the bar code, of incrementing the serial number.

(J) J18CUSA8E6N062315014881T

(J) J18CUSA8E6N062315014882T

(J) J18CUSA8E6N062315014883T

The next example is like the previous one, but uses issuer code USB rather than USA.

(J) J18CUSB8E6N062315014883T

The last two examples use format J18D, which supports a pure serial number, rather than a serial number within a date/time interval.

(J) J18DUSA8E6N000000000000T

(J) J18DUSA8E6N000000000001T

Bibliography

[1] UPU Standards glossary

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™