INTERNATIONAL STANDARD

ISO 12176-3

Third edition
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Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems —

Part 3: Operator's badge

Tubes et raccords en matières plastiques — Appareillage pour l'assemblage par soudage des systèmes en polyéthylène —

Partie 3: Carte d'identification de l'opérateur

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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

ISO 12176-3 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*, Subcommittee SC 4, *Plastics pipes and fittings for the supply of gaseous fuels*.

This third edition cancels and replaces the second edition (ISO 12176-3:2006), of which it constitutes a minor revision.

ISO 12176 consists of the following parts, under the general title *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems*:

— *Part 1: Butt fusion*

— *Part 2: Electrofusion*

— *Part 3: Operator's badge*

— *Part 4: Traceability coding*

Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems —

Part 3:
Operator's badge

1 Scope

This part of ISO 12176 describes the format and the contents of a fusion operator's badge, which is used during the construction of polyethylene (PE) piping systems for the supply of gaseous fuels or water to identify the fusion operator and to activate or deactivate the fusion-jointing equipment.

The objective of this part of ISO 12176 is to achieve international interoperability between the operator's badge and the card-reading equipment of fusion-jointing equipment conforming to ISO 12176-1 or ISO 12176-2. The fusion-jointing equipment is required to read either the bar code or the magnetic-stripe code of the badge and to call up the corresponding data within the equipment in a standard format.

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.

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 7811-2:2001, *Identification cards — Recording technique — Part 2: Magnetic stripe — Low coercivity*

ISO/IEC 7811-6:2008, *Identification cards — Recording technique — Part 6: Magnetic stripe — High coercivity*

ISO/IEC 16390, *Information technology — Automatic identification and data capture techniques — Interleaved 2 of 5 bar code symbology specification*

3 Terms and definitions

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

3.1
fusion operator
person trained to carry out fusion jointing between polyethylene (PE) pipes and/or fittings based on a written procedure agreed by the pipeline operator

NOTE The fusion operator is trained for one or more fusion-jointing procedures, involving the operation of manual and/or automatic fusion-jointing machines.

3.2
competent organization
company authorized by the national authorities or by the pipeline operator to organize training courses for fusion operators and to issue fusion operators' badges

3.3
digit
whole number from zero to nine

3.4
character
whole number from zero to nine or letter or other symbol

NOTE Letters and other symbols are represented by a two-digit number as indicated in Table 2.

4 Data carrier

The fusion operator's badge shall be designed in the form of a bar code card or a magnetic-stripe card.

In the case of a bar code card, the code shall be the “interleaved 2 of 5” type conforming to ISO/IEC 16390.

In the case of a magnetic card, the card shall conform to the requirements for ID-1 given in ISO/IEC 7810. The characteristics of the magnetic stripe shall conform to the International Standards given in Table 1, depending on stripe coercivity. The data shall be stored on track 1.

The card shall not contain physically embossed characters.

Table 1 — Magnetic-stripe characteristics

Attribute	Low coercivity	High coercivity
Stripe properties and encoding method	ISO/IEC 7811-2	ISO/IEC 7811-6
Track location and dimensions	ISO/IEC 7811-2	ISO/IEC 7811-6
NOTE The use of high coercivity is recommended, for reasons of durability.		

Both bar code and magnetic-stripe cards shall contain the same data.

5 Encoding of data

5.1 General

Whatever the type of badge, all data stored on the badge shall be arranged in a single sequential series representing a unique code.

The only difference between the magnetic-card and bar code systems is that the magnetic-card code starts with an identifier, whereas the bar code uses an entrance code and has the identifier at the end.

5.2 Encoding of characters

For encoding a bar code card, all characters shall be taken from the ASCII series unless otherwise specified. The codes actually used, which are obtained by subtracting 32 from the ASCII code, are given in Table 2.

Table 2 — Codes used for basic characters

Codes used for basic characters (ASCII code minus 32)					
0 = 16	3 = 19	6 = 22	9 = 25	“space” = 00	
1 = 17	4 = 20	7 = 23		* = 10	
2 = 18	5 = 21	8 = 24		; = 27	
A = 33	F = 38	K = 43	P = 48	U = 53	Z = 58
B = 34	G = 39	L = 44	Q = 49	V = 54	
C = 35	H = 40	M = 45	R = 50	W = 55	
D = 36	I = 41	N = 46	S = 51	X = 56	
E = 37	J = 42	O = 47	T = 52	Y = 57	

NOTE The codes from 65 up to and including 90 may be used at a later stage for lower-case letters (a to z), if necessary.

For encoding a magnetic card, the seven-bit ASCII coded character set shall be used rather than the six-bit coded character set specified in Table 4 of ISO/IEC 7811-2:2001 and ISO/IEC 7811-6:2008.

For the code on a magnetic stripe, a separator shall be used as the identifier and to separate fields.

The character “; = 27” shall not be used in bar codes as it is used as the separator on magnetic stripes. Bar codes do not need separators.

5.3 Language codes

The language code shall be taken from Table 3.

Table 3 — Language codes

Code	Language	Code	Language
01	English	18	Romanian
02	French	19	Chinese
03	Spanish	20	Russian
04	German	21	Japanese
05	Italian	22	Korean
06	Portuguese	23	Arabic
07	Dutch	24	Hebrew
08	Danish	25	Croatian
09	Norwegian	26	Slovenian
10	Swedish	27	Catalan
11	Finnish	28	Brazilian
12	Greek	29	Lithuanian
13	Turkish	30	Estonian
14	Czech/Slovak	31	Latvian
15	Polish	32	Malaysian
16	Hungarian	33	Macedonian
17	Bulgarian		

5.4 Code structure

The operator's badge shall have an entrance code or identifier followed by a series of data fields. All fields shall be completely filled with the relevant coding; when no data are available or no check is required, the field shall be completed with the necessary number of “0” (zero) digits.

In the set of codes for the operator's skills, two codes (64 and 128) shall be left unused for further updating of this part of ISO 12176. These unused codes shall not be used for any other purpose.

The number of characters given in Table 4 shall be considered as fixed; this means that the code structure cannot be shortened. Empty spaces in a field shall be filled with zeros in front (i.e. on the left-hand side) of the characters already in the field.

Table 4 — Code structure

Field	Information	Code	
		Magnetic card	Bar code
Identifier	Code indicating that the information concerns an operator's badge	Z2,MSA, (at start of code)	One single-digit numeric character, Z Content = checksum + 2 [a] (at end of code)
Entrance code	Code indicating the number of digits used in the next field to identify the operator (for bar codes only)		One single-digit numeric character, N Maximum value 6
Operator's badge number	Operator's personal identification code	Six alphanumeric characters, AAAAAA;	Twelve numeric digits representing six alphanumeric characters, AAAAAAAAAAAA (ASCII figure minus 32)
Expiry date	Expiry date of badge (month and year)	Two two-digit numeric characters with a separator in the middle, BB;BB;	Two two-digit numeric characters, BBBB
Country	Country where badge was issued (country code in accordance with ISO 3166-1)	One three-digit numeric character, CCC;	One three-digit numeric character, CCC
Competent organization	Organization that issued the batch (codes to be defined at national level)	Two alphanumeric characters, DD;	Four numeric digits representing two alphanumeric characters, DDDD (ASCII figure minus 32)
Skills	List of authorized tasks (one or more can be indicated by adding the applicable code-numbers together): 1: Electrofusion, manual 2: Electrofusion, automatic 4: Butt fusion, manual 8: Butt fusion, automatic 16: Socket/saddle fusion 32: Induction fusion 64: See 5.4 128: See 5.4 256: Responsible person	Three numeric characters, EEE;	Three numeric characters, EEE
Language	Language of operator (language code in accordance with Table 3). Determines language of display on control unit.	One two-digit numeric character, FF	One two-digit numeric character, FF

[a] See 5.5 for the calculation of the checksum.

5.5 Checksum and identifier (only for bar codes)

The value of the checksum (control character) shall be calculated as follows:

1) Addition of the numerical values of the odd positions in the message read from left to right, followed by multiplication of the total thus obtained by a factor of 3;

2) Addition of the numerical values of the even positions in the message read from left to right;

3) Addition of the odd and even totals of stages 1 and 2;

4) Determination of the checksum, i.e. the smallest figure which, when added to the total obtained in stage 3, gives a multiple of 10.

The value of the identifier shall be calculated by adding 2 to the checksum determined in stage 4. If this value is 10 or higher, then subtract 10 from it. This digit is placed in the 30th position of the bar code when read from left to right.

5.6 Examples of codes

An example of a bar code is given in Table 5.

Table 5 — Example of a bar code

Structure	**NAAAAAAAAAAAABBBBCCCDDDDEEEFFZ** Encoding: 2 of 5 interleaved	
Example	**300000041424312017564039002030**	
Entrance code	3	Number of characters used in the next field
Operator's badge number	000000414243 (ASCII figure minus 32)	IJK
Expiry date	1201	December 2001
Country	756	Switzerland
Competent organization	4039 (ASCII figure minus 32)	HG
Skill	002	Electrofusion jointing, automatic
Language	03	Spanish
Identifier	0	Checksum + 2

An example of a code on a magnetic card is given in Table 6.

Table 6 — Example of a magnetic-card code

Structure	**Z2,MSA,AAAAAA;BB;BB;CCC;DD;EEE;FF**	
Example	**Z2,MSA,IJKLMN;12;01;756;HG;002;03**	
Identifier	Z2,MSA	In accordance with ISO 13950
Operator's badge number	IJKLMN	IJK LMN
Expiry date	12;01	December 2001
Country	756	Switzerland
Competent organization	HG	HG
Skill	002	Electrofusion jointing, automatic
Language	03	Spanish

Annex A
(normative)

Interactive interface with fusion-jointing equipment

A.1 The fusion-jointing equipment shall be activated by a software programme adaptable to the purchaser's requirements. The programme shall react to data stored in the operator's badge in a predefined way, as follows:

— activation of fusion-jointing equipment;

— activation of language programme;

— storage in memory;

— verification of data;

— blocking of machine;

— setting of alarm (audio or visual);

— filling in fusion-jointing report.

A.2 If a field contains only zeros, no validation check is necessary for that field; if a field that implements an action contains only zeros, the programme shall identify it with a special sign (which shall be different from the sign for a field indicating that the badge is invalid, because it is beyond the expiry date for instance).

Identifier: For activation of the fusion-jointing machine.

Entrance code: Information for decoding the bar code.

Operator: Stored in the memory of the fusion-jointing machine.

Date: Verified and acted on.

Country: Stored in the memory of the fusion-jointing machine.

Organization: Stored in the memory of the fusion-jointing machine.

Skill: Verified and acted on.

Language: Determines the language used on the display of the control unit (if the language requested by the badge is not available in the machine, the most recently used language shall remain active).

Bibliography

[1] ISO 12176-1, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 1: Butt fusion*

[2] ISO 12176-2, *Plastics pipes and fittings — Equipment for fusion jointing polyethylene systems — Part 2: Electrofusion*

[3] ISO 13950, *Plastics pipes and fittings — Automatic recognition systems for electrofusion joints*

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