INTERNATIONAL STANDARD

ISO/IEC 7811-1

Third edition
2002-09-15

Identification cards — Recording technique —

Part 1: **Embossing**

Cartes d'identification — Technique d'enregistrement —

Partie 1: Estampage

Reference number
ISO/IEC 7811-1:2002(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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

Attention is drawn to the possibility that some of the elements of this part of ISO/IEC 7811 may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 7811-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This third edition of ISO/IEC 7811-1 cancels and replaces ISO/IEC 7811-1:1995 and ISO/IEC 7811-3:1995. The user is encouraged to review the entire standard for revisions and updates. The major changes made during this revision are listed below.

1. The requirements given in ISO/IEC 7811-3:1995 are included in this edition of ISO/IEC 7811-1.

2. Special physical characteristics for embossing formerly detailed in ISO/IEC 7810:1995 have been moved to this standard.

3. Added an informative annex for a test method for embossability.

ISO/IEC 7811 consists of the following parts, under the general title *Identification cards — Recording technique*:

— *Part 1: Embossing*

— *Part 2: Magnetic stripe — Low coercivity*

— *Part 6: Magnetic stripe — High coercivity*

Annexes A and B form a normative part of this part of ISO/IEC 7811. Annex C is information only.

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Identification cards — Recording technique —

Part 1: Embossing

1 Scope

This part of ISO/IEC 7811 is one of a series of standards describing the parameters for identification cards as defined in the definitions clause and the use of such cards for international interchange.

This part of ISO/IEC 7811 specifies requirements for embossed characters on identification cards. The embossed characters are intended for transfer of data either by use of imprinters or by visual or machine reading. It takes into consideration both human and machine aspects and states minimum requirements.

It is the purpose of this series of standards to provide criteria to which cards shall perform. No consideration is given within these standards to the amount of use, if any, experienced by the card prior to test. Failure to conform to specified criteria should be negotiated between the involved parties.

ISO/IEC 10373-1 specifies the test procedures used to check cards against the parameters specified in this part of ISO/IEC 7811.

NOTE Numeric values in the SI and/or Imperial measurement system in this part of ISO/IEC 7811 may have been rounded off and therefore are consistent with, but not exactly equal to, each other. Either system may be used, but the two should not be intermixed or reconverted. The original design was made using the Imperial measurement system.

2 Conformance

A prerequisite for conformance with this part of ISO/IEC 7811 is conformance with ISO/IEC 7810 for the ID-1 size card. An identification card is in conformance with this part of ISO/IEC 7811 if it meets all mandatory requirements specified herein. Default values apply if no others are specified.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 7811. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 7811 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards

ISO 1073-1, *Alphanumeric character sets for optical recognition – Part 1: Character set OCR-A – Shapes and dimensions of the printed image*

ISO 1073-2, *Alphanumeric character sets for optical recognition – Part 2: Character set OCR-B – Shapes and dimensions of the printed image*

ISO 1831, *Printing specifications for optical character recognition*

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

ISO/IEC 7812-1, *Identification cards – Identification of issuers – Part 1: Numbering system*

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ISO/IEC 7812-2, *Identification cards – Identification of issuers – Part 2: Application and registration procedures*

ISO/IEC 10373-1*, Identification cards – Test methods – Part 1: General characteristics tests*

4 Terms and definitions

For the purposes of this part of ISO/IEC 7811, the definition of "identification card" given in ISO/IEC 7810 and the following terms and definitions apply.

4.1
embossing
to raise characters in relief from the front surface of the card

4.2
unused card
card which has been embossed with all the characters required for its intended purpose but has not been issued

4.3
returned card
embossed card after it has been issued to the card holder and returned for the purpose of testing

4.4
identification number
number that identifies the card holder

5 Card characteristics

Special attention shall be paid to the characteristics of the material affecting its suitability for this purpose, particularly in respect to its ability to resist crushing and collapsing of the embossed parts when operating in imprinters.

Cards shall be made of PVC (polyvinyl chloride) and/or PVCA (polyvinyl chloride acetate) or materials having equal or better performance such as polyesters, polyethylenes and polycarbonates.

NOTE Refer to machine manufacturer instructions regarding card construction requirements for achieving embossed character relief heights in compliance with this part of ISO/IEC 7811. At the time of publication there was no agreed test method for verifying the suitability of card structures for embossing. See Informative Annex C.

5.1 Card warpage

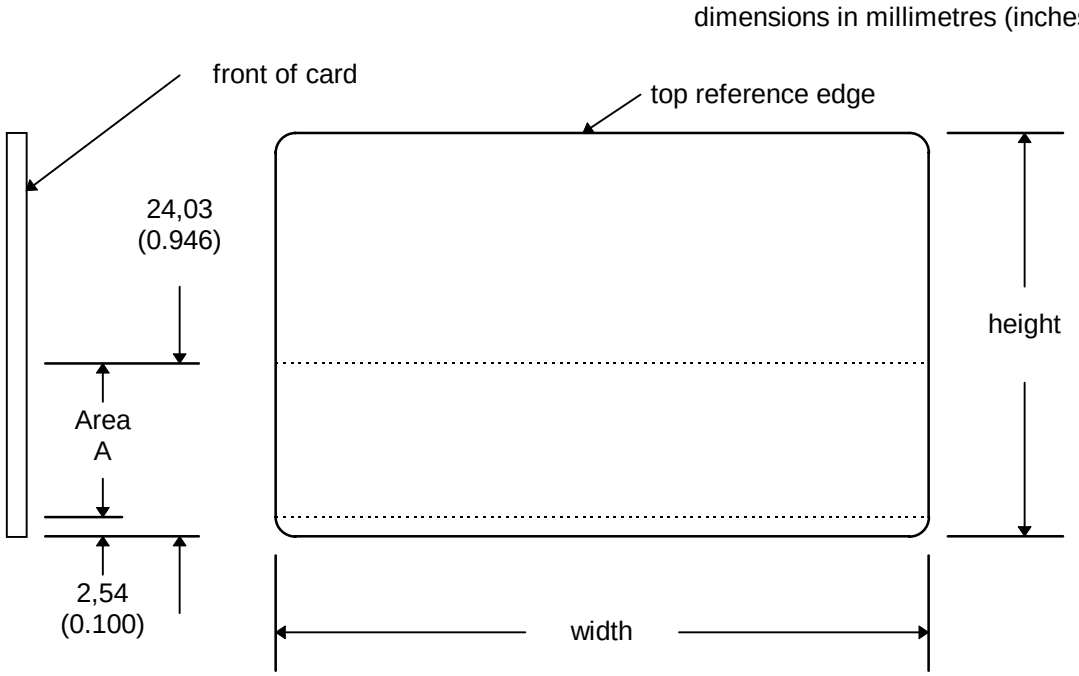
When lying convex side up on a flat rigid surface, the maximum distance from the flat surface to any non-embossed portion of the convex side of an embossed card immediately prior to issue shall not be greater than 2,5 mm (0.10 in) including the card thickness.

NOTE The amount of card warpage depends on the card material and the embossing technique used.

5.2 Surface distortions

No raised area shall exceed 0,51 mm (0.020 in) on the front of the card in the area A as shown in Figure 1.

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Width		Height	
maximum	minimum	maximum	minimum
85,90 (3.382)	85,47 (3.365)	54,18 (2.133)	53,92 (2.123)

Figure 1 — Embossed card dimensions

5.3 Card width and height

All points on the edges of the embossed card in the finished state, except for the rounded corners, shall fall between two concentric, similarly aligned rectangles as defined in Figure 1 for maximum height and width, and minimum height and width.

NOTE 1 Card width and height tolerances given here are different than those in ISO/IEC 7810 to account for changes in card size due to embossing.

NOTE 2 All identification card standards use the top edge of the card as the reference edge for dimensions, except for this embossing standard which, for historical reasons, uses the bottom edge of the card as the reference.

6 Visually and machine readable characters

6.1 Character set and type font

The numeric characters of one of the following type fonts shall be used for embossed characters intended for visual and/or machine reading, either directly from the card or from card imprints (see annex A):

– ISO 1073-1, OCR-A, Sizes I and IV;
– ISO 1073-2, OCR-B, Sizes I and IV;
– Type font Farrington 7B as described in Annex B.

NOTE To ensure system compatibility in the choice of font, the attention of intending users is drawn to the necessity of agreement with their potential interchange partners.

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Print specifications are given in ISO 1831.

6.2 Character spacing

The centreline to centreline character spacing shall be 3,63 mm ± 0,15 mm (0.143 in ± 0.006 in).

6.3 Character height

Maximum height at the printing surface of the embossed characters, encompassing centreline skew and character misalignment shall be 4,32 mm (0.170 in).

6.4 Relief height of embossed characters

Relief height of imprinting character surfaces above the card surface as measured from the non-embossed surface of the card to the highest point on the embossed character is shown in Table 1 for unused cards and for returned cards.

7 Visually readable characters

7.1 Character set and type font

A type font such as the alphanumeric, upper case characters described in ISO 1073-2, OCR-B, Size I, should be used for embossed characters intended for visually reading directly from the card or from card imprints.

7.2 Character spacing

The centreline to centreline character spacing shall be 2,54 mm ± 0,15 mm (0.100 in ± 0.006 in).

7.3 Relief height of embossed characters

Relief height of imprinting character surfaces above the card surface as measured from the non-embossed surface of the card to the highest point on the embossed character is shown in Table 1 for unused cards and for returned cards.

Table 1 — Relief height of embossed characters

Dimensions in millimetres (inches)

	Visually and machine readable characters		Visually readable characters	
	maximum	**minimum**	**maximum**	**minimum**
Unused card	0,48 (0.019)	0,40 (0.016)	0,46 (0.018)	0,36 (0.014)
Returned cards	0,48 (0.019)	0,30 (0.012)	0,46 (0.018)	0,26 (0.010)

NOTE Values in the table show only the limits within which cards will function normally, and do not imply any guarantee of relief height during the valid term for issued cards.

8 Assigned embossing areas

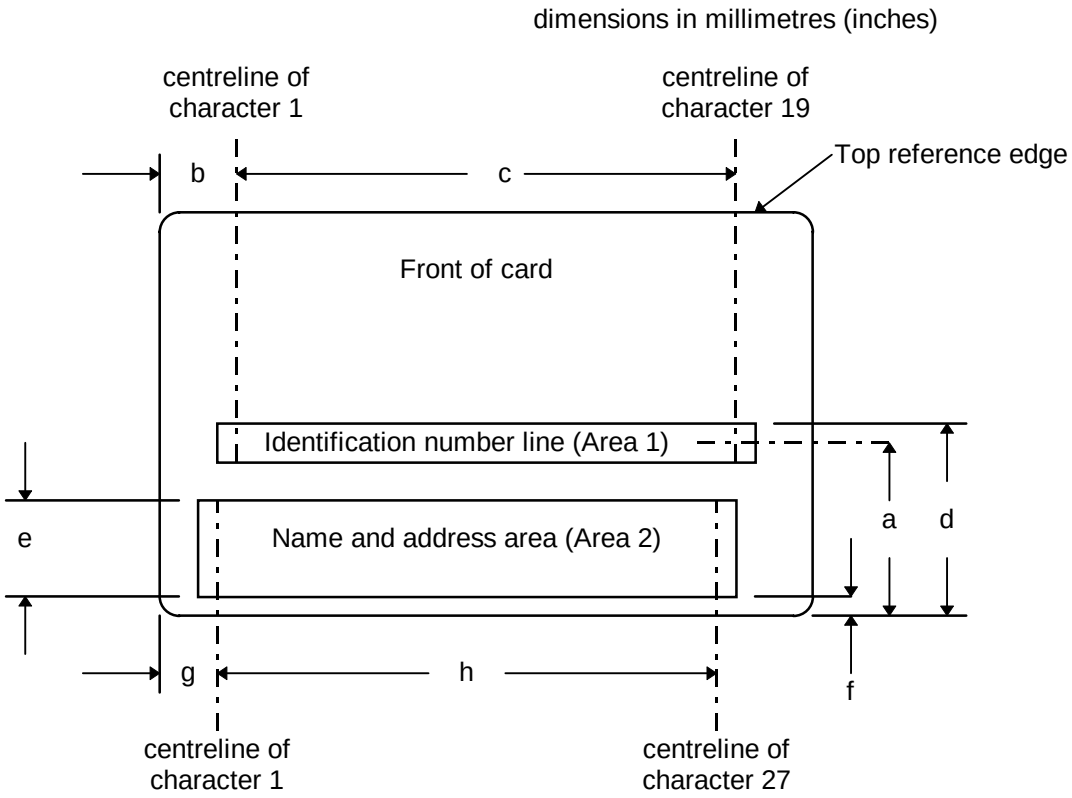
Two areas for embossing shall be assigned to the card as shown in Figure 2.

Area 1 Area reserved for the identification number line according to ISO/IEC 7812. The characters in

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this area and imprints of the area are intended both for visual and machine reading;

Area 2 Area provided for the card holder's identification data such as name, address, and other data which may be required. It is called "name and address area". Data contained in this area of the card or imprinted from the card is only intended for visual reading.



Identification number line (Area 1)		Name and address area (Area 2)	
a	21,42 ± 0,12 (0.843 ± 0.005)	e	14,53 (0.572) maximum
b	10,18 ± 0,25 (0.401 ± 0.010)	f	2,54 (0.100) minimum 3,30 (0.130) maximum
c	65,31 ± 0,76 (2.571 ± 0.030)	g	7,65 ± 0,25 (0.301 ± 0.010)
d	24,03 (0.946) maximum	h	66,04 ± 0,76 (2.600 ± 0.030)

Figure 2 — Assigned embossing area locations and tolerances

8.1 Identification number line

The identification number line provides space for a single line of characters of the type specified in 6.1 and comprises a maximum of 19 character positions at a nominal centreline to centreline spacing of 7 characters per 25,4 mm (1.00 in).

The actual number of utilized (embossed) character positions will depend upon application requirements. The location and tolerances for embossed characters shall be as shown in Figure 2.

NOTE When designing a new system, it is advisable to provide for maximum flexibility of use, i.e.:

— justify the embossed identification number to the left;

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- make allowances for an identification number with maximum length;
- for financial applications if a character position is available, a blank space is recommended to be inserted between the issuer identification and the individual account identifier of the identification number (refer to ISO/IEC 7812).

8.2 Name and address area

The name and address area provides space for four lines of 27 characters each at a nominal centreline to centreline spacing of 10 characters per 25,4 mm (1.00 in) of the type specified in 7.1. Any information embossed in the name and address area should always be embossed as far as possible from the identification number.

The location and tolerances for embossed characters shall be as shown in Figure 2.

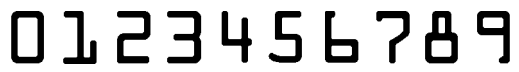
WARNING — Those card issuers who require embossing of four name and address lines should be aware that the imprinted documents produced from their cards may not be acceptable in an interchange environment due to OCR clear area requirements on some types of OCR reading equipment.

NOTE The first character in the name and address area need not be justified to the left. However the use of 27 character positions is based on a 7,65 mm (0.301 in) distance to the edge of the card as shown in Figure 2.

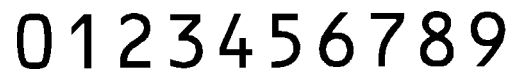
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Annex A
(normative)

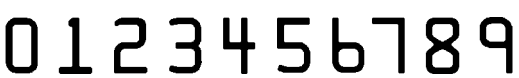
Pictorial representation of numeric data



OCR-A



OCR-B



Farrington 7B

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Annex B
(normative)

Farrington 7B Print specifications

B.1 Character set

The Farrington 7B font consists of numeral characters 0 to 9 inclusive.

B.2 Character dimensions and tolerances — Printed image

Printed images for characters are as shown in Figures B.1 to B.10. Dimensions and tolerances common to all characters are shown in Table B.1. Characters are shown as printed on document and not necessarily as embossed.

Table B.1 — Character dimensions for Farrington 7B font

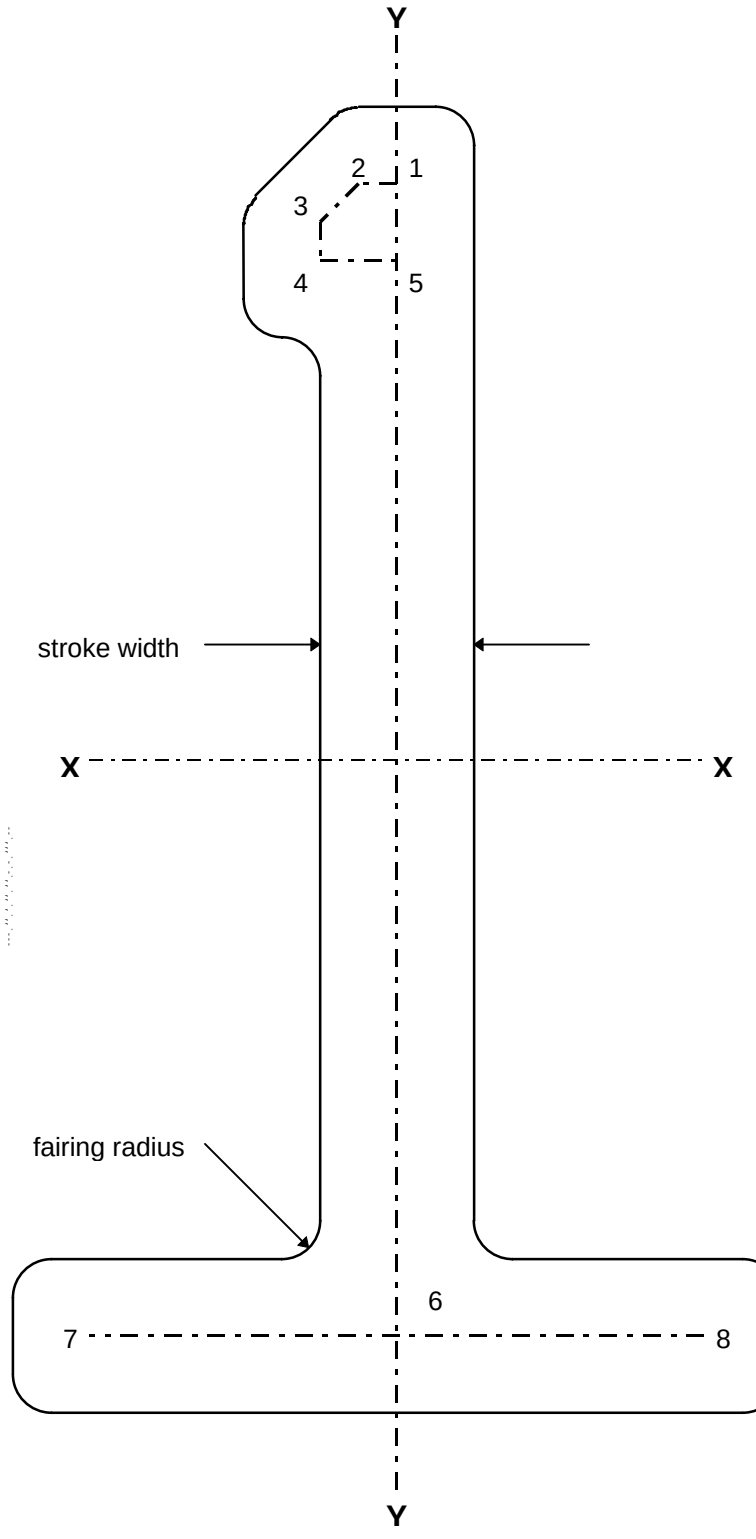
Dimensions in millimetres (inches)

Feature	Dimension/tolerance
Overall character height	4,32 (0.170) nominal
Overall character width	2,54 (0.100) nominal
Stroke width for all characters	0,51 ± 0,25 (0.02 ± 0.01)
Fairing radius for all characters	0,13 ± 0,13 (0.005 ± 0.005)
Tolerances on all character centreline dimensions	± 0,08 (± 0.003)

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dimensions in millimetres (inches)



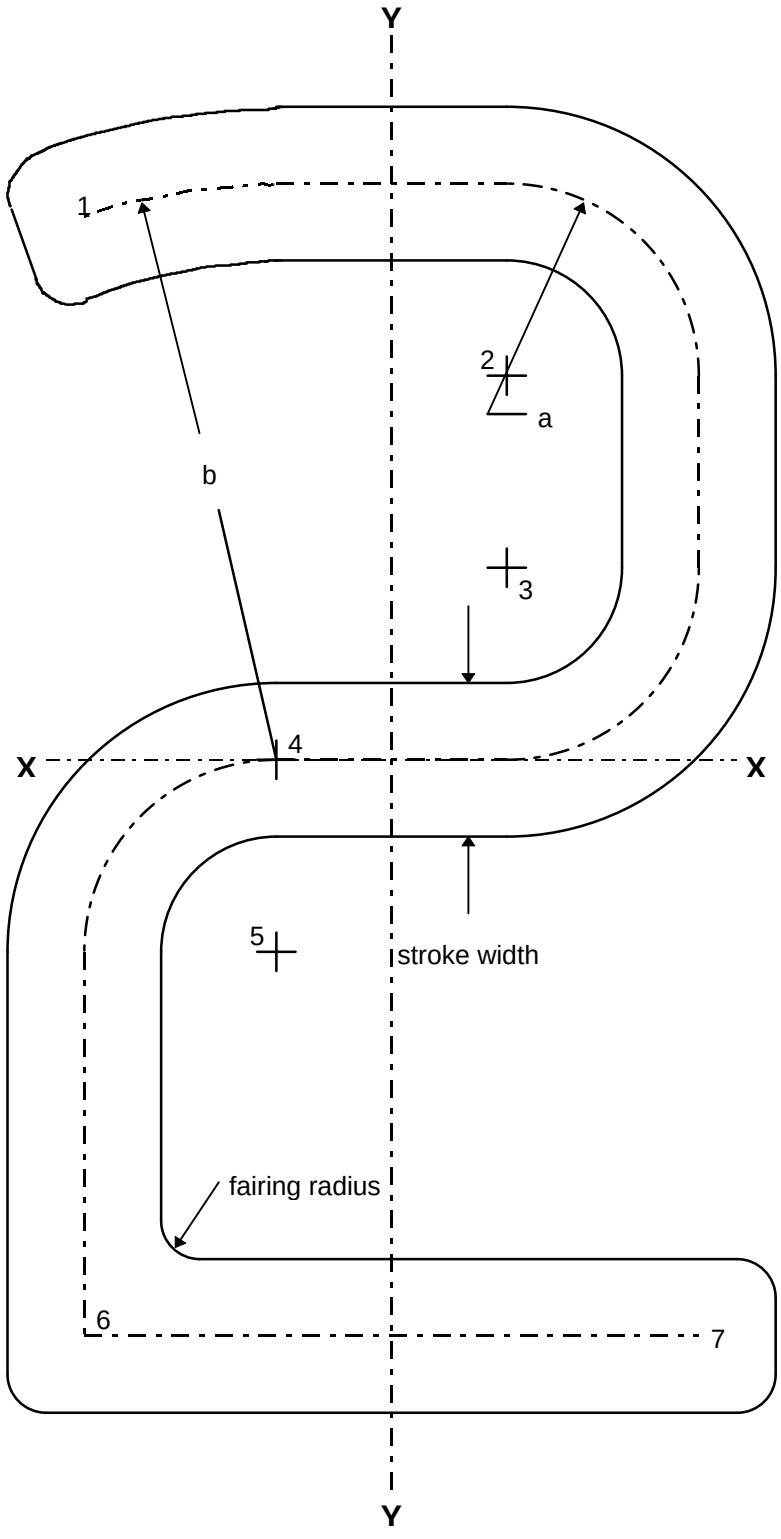
Point number	X value	Y value
1	0,00 (0.000)	+ 1,91 (+ 0.075)
2	- 0,76 (- 0.003)	+ 1,91 (+ 0.075)
3	- 0,25 (-0.010)	+ 1,73 (+ 0.068)
4	- 0,25 (- 0.010)	+ 1,65 (+ 0.065)
5	0,00 (0.000)	+ 1,65 (+ 0.065)
6	0,00 (0.000)	- 1,91 (- 0.075)
7	- 2,032 (- 0.080)	- 1,91 (- 0.075)
8	+ 2,032 (+ 0.080)	- 1,91 (- 0.075)

Figure B.1 — Printed image for Farrington 7B font-1

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dimensions in millimetres (inches)



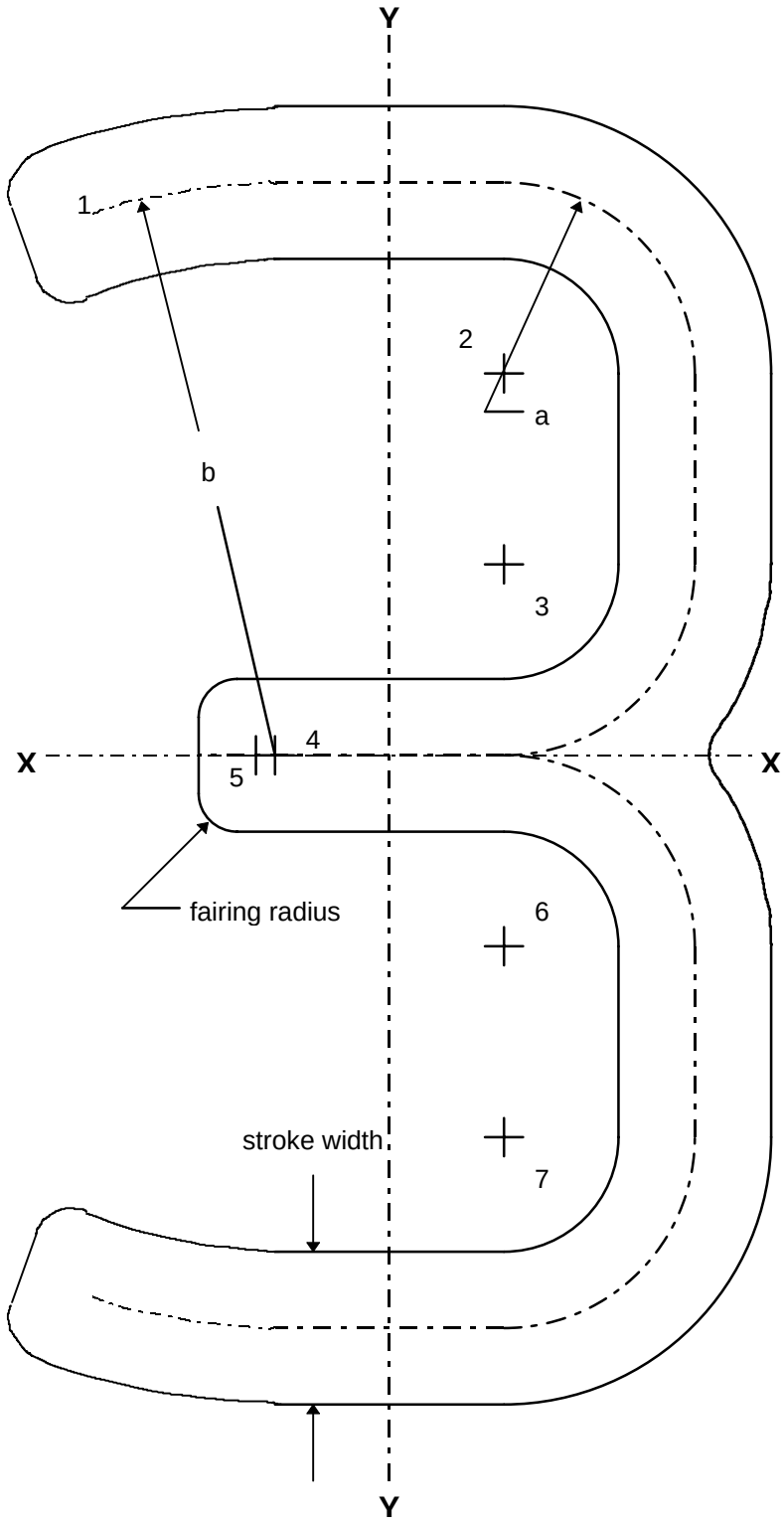
Point number	X value	Y value
1	- 0,98 (- 0.038)	---- ----
2	+ 0,38 (+ 0.015)	+ 1,27 (+ 0.050)
3	+ 0,38 (+ 0.015)	+ 0,64 (+ 0.025)
4	- 0,38 (- 0.015)	0,00 (0.000)
5	- 0,38 (- 0.015)	- 0,64 (- 0.025)
6	- 1,02 (- 0.040)	- 1,91 (- 0.075)
7	+ 1,02 (+ 0.040)	- 1,91 (- 0.075)

Centreline radius	
a	0,64 (0.025)
b	1,91 (0.075)

Figure B.2 — Printed image for Farrington 7B font-2

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dimensions in millimetres (inches)



Point number	X value	Y value
1	- 0,98 (- 0.038)	---- ----
2	+ 0,38 (+ 0.015)	+ 1,27 (+ 0.050)
3	+ 0,38 (+ 0.015)	+ 0,64 (+ 0.025)
4	- 0,38 (- 0.015)	0,00 (0.000)
5	- 0,51 (- 0.020)	0,00 (0.000)
6	+ 0,38 (+ 0.015)	- 0,64 (- 0.025)
7	+ 0,38 (+ 0.015)	- 1,27 (- 0.050)

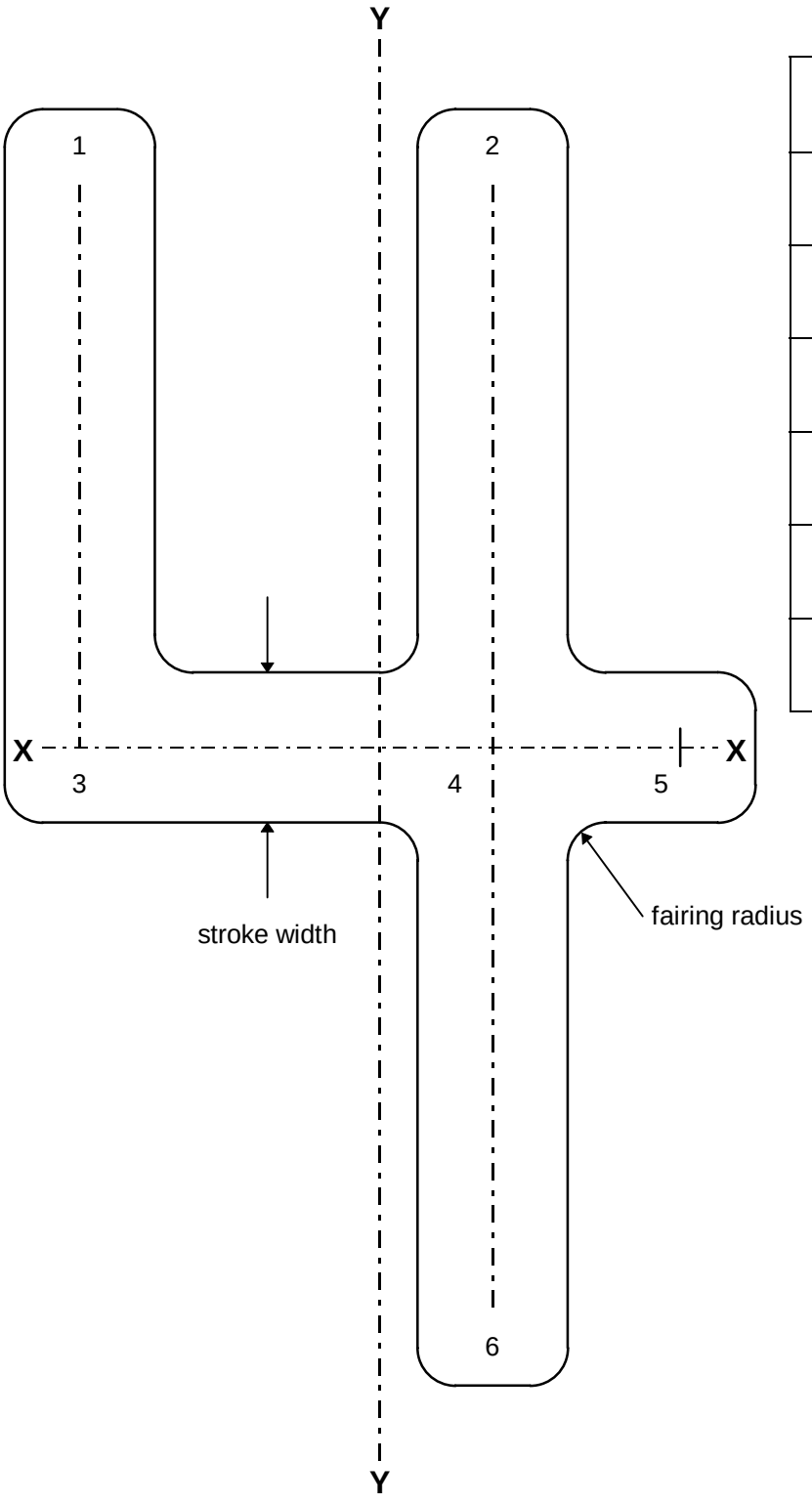
Centreline radius	
a	0,64 (0.025) 4 places
b	1,91 (0.075) 2 places

Figure B.3 — Printed image for Farrington 7B font-3

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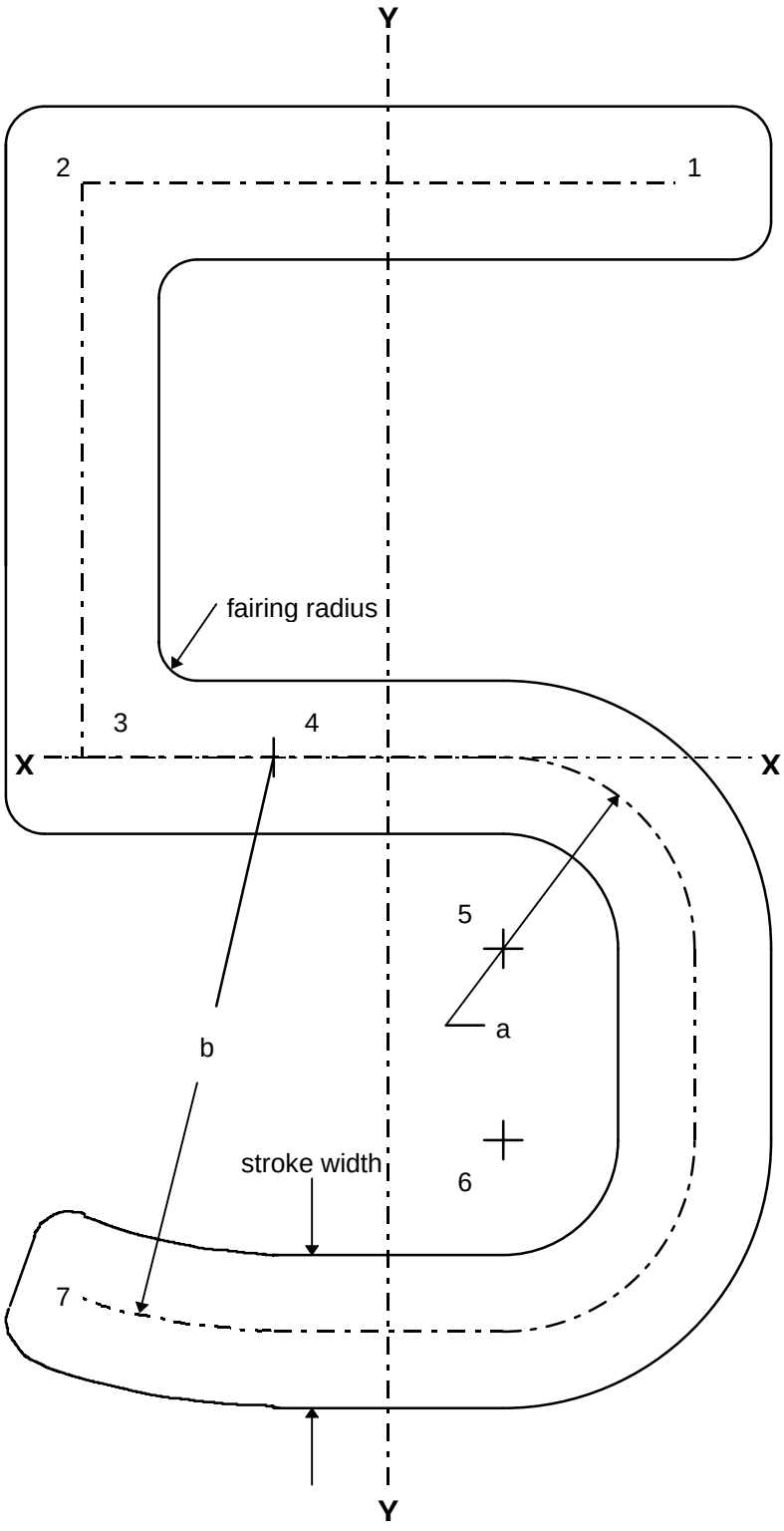
dimensions in millimetres (inches)

Point number	X value	Y value
1	- 1,02 (- 0.040)	+ 1,91 (+0.075)
2	+ 0,38 (+ 0.015)	+ 1,91 (+0.075)
3	- 1,02 (- 0.040)	0,00 (0.000)
4	+ 0,38 (+ 0.015)	0,00 (0.000)
5	+ 1,02 (+ 0.040)	0,00 (0.000)
6	+ 0,38 (+ 0.015)	+ 1,91 (+0.075)

Figure B.4 — Printed image for Farrington 7B font-4

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dimensions in millimetres (inches)



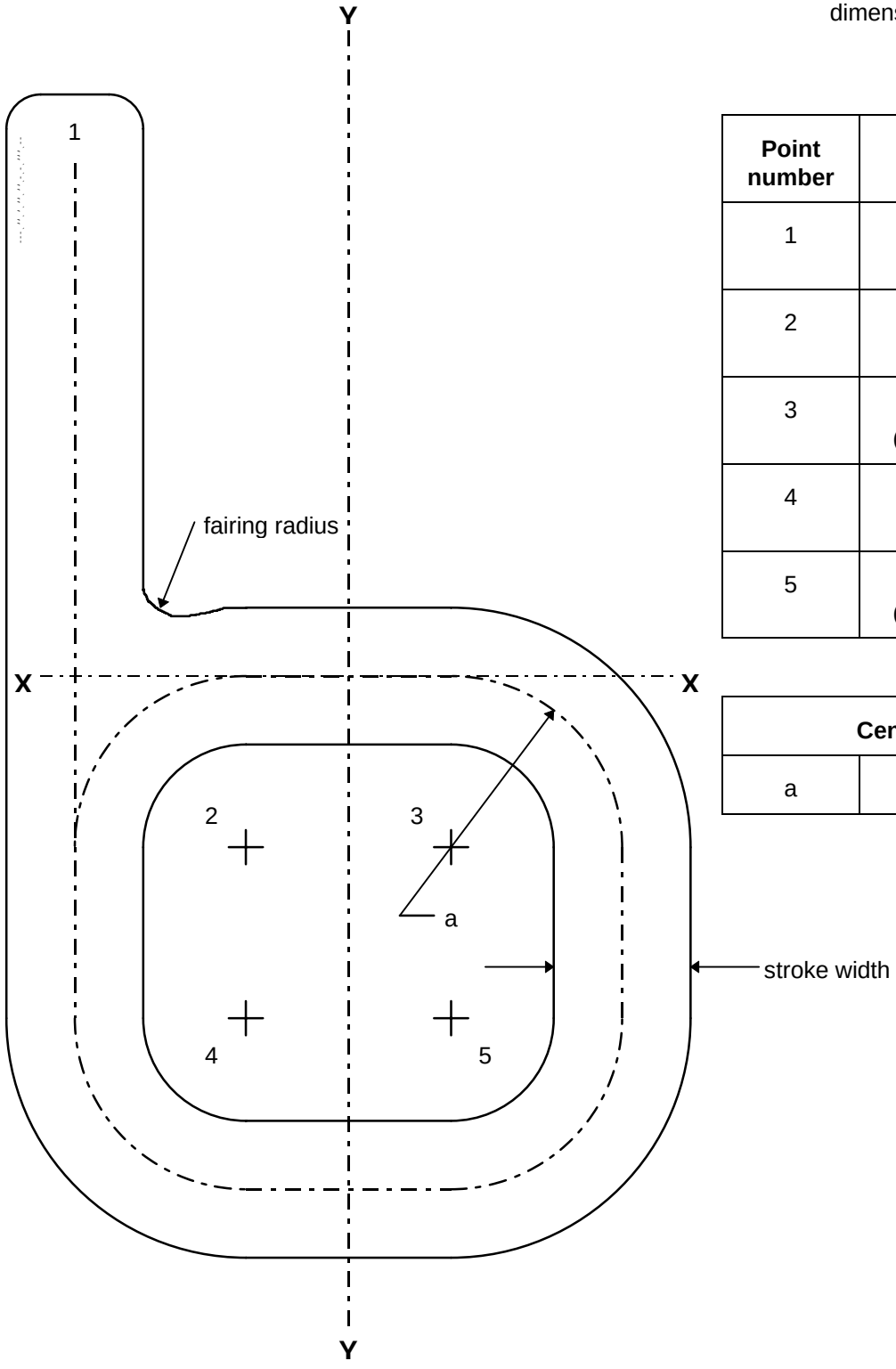
Point number	X value	Y value
1	+ 1,02 (+ 0.040)	+ 1,91 (+ 0.075)
2	- 1,02 (- 0.040)	+ 1,91 (+ 0.075)
3	- 1,02 (- 0.040)	0,00 (0.000)
4	- 0,38 (- 0.015)	0,00 (0.000)
5	+ 0,38 (+ 0.015)	- 0,64 (- 0.025)
6	+ 0,38 (+ 0.015)	- 1,27 (- 0.050)
7	- 0,98 (- 0.038)	---- ----

Centreline radius	
a	0,64 (0.025) 2 places
b	1,91 (0.075) 1 place

Figure B.5 — Printed image for Farrington 7B font-5

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dimensions in millimetres (inches)



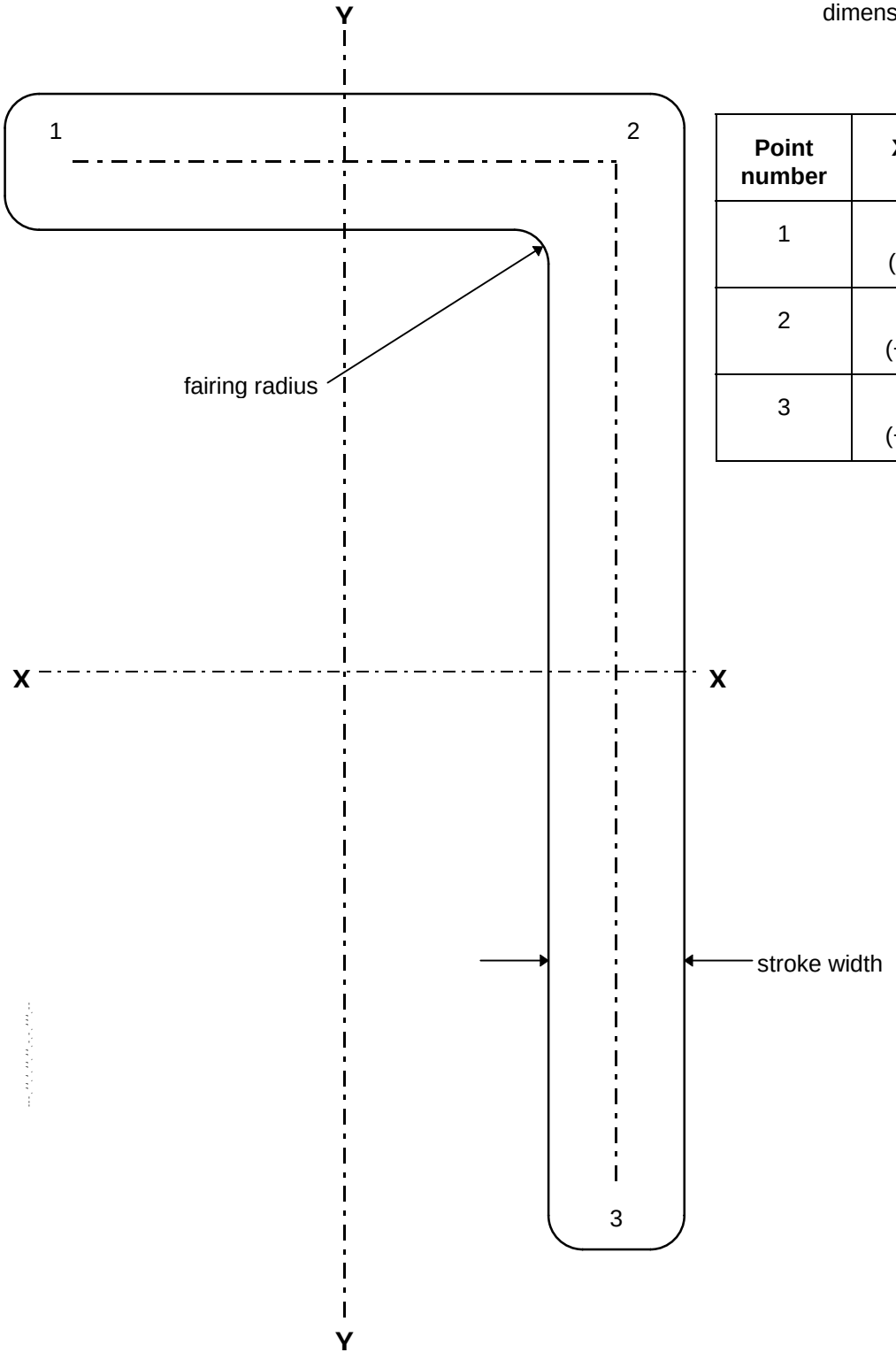
Point number	X value	Y value
1	- 1,02 (- 0.040)	+ 1,91 (+ 0.075)
2	- 0,38 (- 0.015)	- 0,64 (- 0.025)
3	+ 0,38 (+ 0.015)	- 0,64 (- 0.025)
4	- 0,38 (- 0.015)	- 1,27 (- 0.050)
5	+ 0,38 (+ 0.015)	- 1,27 (- 0.050)

Centreline radius	
a	0,64 (0.025) 4 places

Figure B.6 — Printed image for Farrington 7B font-6

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dimensions in millimetres (inches)

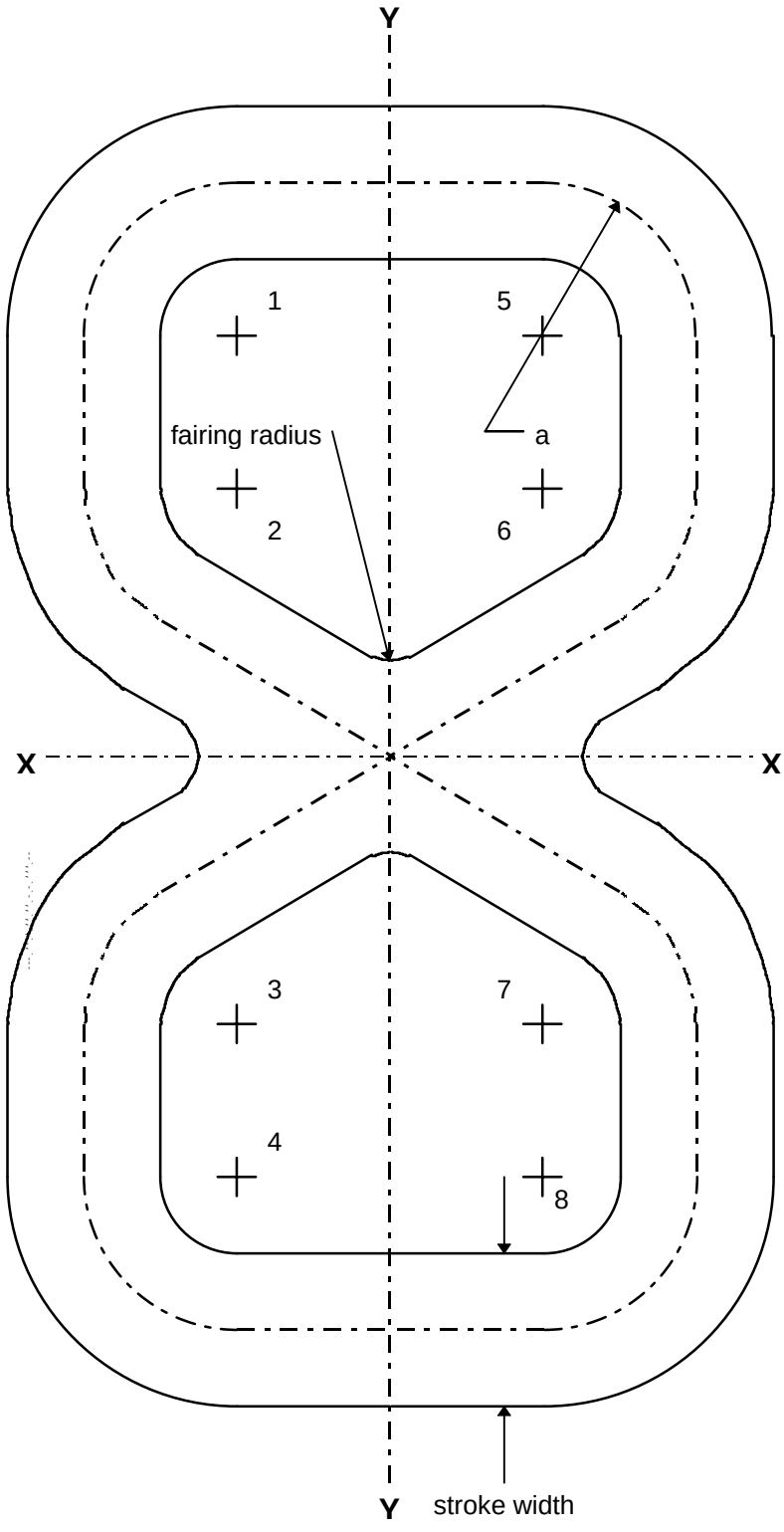


Point number	X value	Y value
1	- 1,02 (- 0.040)	+ 1,91 (+ 0.075)
2	+ 1,02 (+ 0.040)	+ 1,91 (+ 0.075)
3	+ 1,02 (+ 0.040)	- 1,91 (- 0.075)

Figure B.7 — Printed image for Farrington 7B font-7

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dimensions in millimetres (inches)

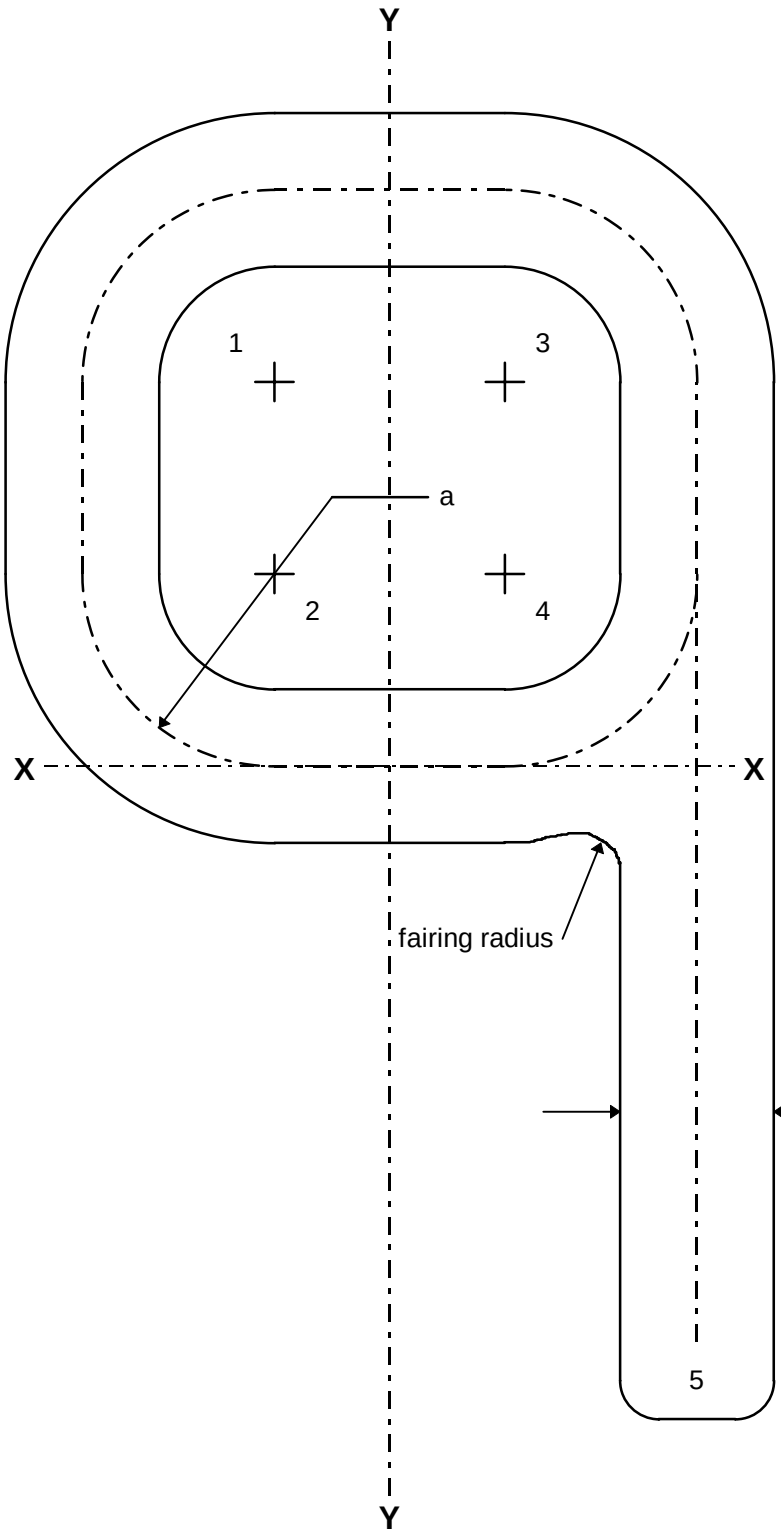
Point number	X value	Y value
1	- 0,51 (- 0.020)	+ 1,35 + (0.055)
2	- 0,51 (- 0.020)	+ 0,88 (+ 0.035)
3	- 0,51 (- 0.020)	- 0,88 (- 0.035)
4	- 0,51 (- 0.020)	- 1,35 - (0.055)
5	+ 0,51 (+ 0.020)	+ 1,35 + (0.055)
6	+ 0,51 (+ 0.020)	+ 0,88 (+ 0.035)
7	+ 0,51 (+ 0.020)	- 0,88 (- 0.035)
8	+ 0,51 (+ 0.020)	- 1,35 - (0.055)

Centreline radius	
a	0,51 (0.020) 8 places

Figure B.8 — Printed image for Farrington 7B font-8

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dimensions in millimetres (inches)



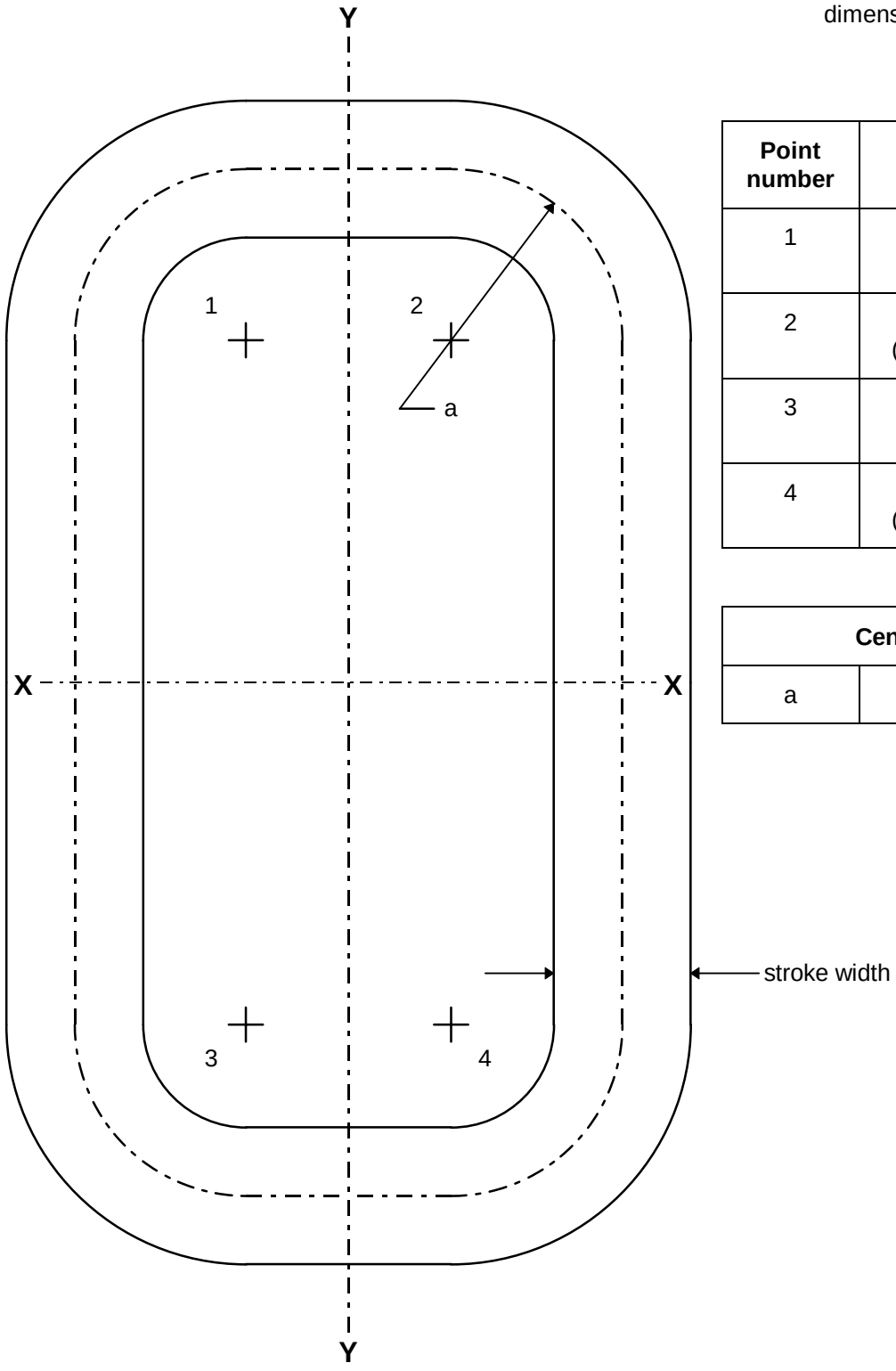
Point number	X value	Y value
1	- 0,38 (- 0.015)	+ 1,27 (+ 0.050)
2	- 0,38 (- 0.015)	+ 0,64 (+ 0.025)
3	+ 0,38 (+ 0.015)	+ 1,27 (+ 0.050)
4	+ 0,38 (+ 0.015)	+ 0,64 (+ 0.025)
5	+ 1,02 (+ 0.040)	- 1,91 (- 0.075)

Centreline radius	
a	0,64 (0.025)

Figure B.9 — Printed image for Farrington 7B font-9

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dimensions in millimetres (inches)



Point number	X value	Y value
1	- 0,38 (- 0.015)	+ 1,27 (+ 0.050)
2	+ 0,38 (+ 0.015)	+ 1,27 (+ 0.050)
3	- 0,38 (- 0.015)	- 1,27 (- 0.050)
4	+ 0,38 (+ 0.015)	- 1,27 (- 0.050)

Centreline radius	
a	0,64 (0.025)

Figure B.10 — Printed image for Farrington 7B font-0

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B.3 Character spacing and alignment

Table B.2 — Character spacing and alignment

Character spacing	7 characters per 25,4 mm (1 in) minimum
Horizontal separation between adjacent characters	0,38 mm (0.015 in) minimum
Vertical misalignment between adjacent characters	2,03 mm (0.080 in) maximum
Skew of characters	3° maximum
Total line skew shall not exceed the limits of the print zone defined in clause 8	

B.4 Printing characteristics for imprinted forms (see ISO 1831)

B.4.1 Ink density

For optimum performance, the ink (carbon) density of the printed character shall be such that its reflectance is not more than 20% of the average reflectance of the form on which the character is printed. At worst, the ink density of the printed character must be such that its reflectance is not more than 60% of the average reflectance of the document on which the character is printed.

Reflectance is measured with an incident illumination of 45° and a viewing angle of 90° to the surface of the form, and using an aperture of measurement 0,20 mm^2 (0.0003 in^2) on the document.

Acceptable voids and acceptable extraneous marks as defined in B.4.2 and B.4.3 are exceptions to the ink density requirement.

B.4.2 Voids

A void is any area within the maximum stroke width dimension of a printed character in which the reflectance exceeds 60% of the average reflectance of the document on which a character is printed. Voids are acceptable provided they can be entirely contained within a circle of 0,25 mm (0.01 in) diameter, there is a minimum separation of 0,71 mm (0.28 in) centre to centre between the voids, and the resulting minimum effective stroke width dimension is not less than 0,20 mm (0.008 in). Unacceptable voids are not allowed.

B.4.3 Extraneous marks

An extraneous mark is any mark within either the printing or clear zone, but not within the printed character area, in which the reflectance is less than 60% of the average reflectance of the document on which the marks occur. Extraneous marks are acceptable provided they can be entirely contained within a circle of 0,25 mm (0.010 in) diameter, and there is a minimum separation between the marks of 0,71 mm (0.028 in) centre to centre. Unacceptable extraneous marks are not allowed.

B.4.4 Imprinting

Deformation of the form surface as a result of imprinting shall not exceed 0,13 mm (0.005 in).

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Annex C
(informative)

Embossability

C.1 Scope

The purpose of this test is to determine if the card material is suitable for embossing (see ISO/IEC 7811-1). The embossability of a card depends on the characteristics of the materials used in the card construction. Some card structures have shown poor embossing quality, such as cracks on or around the embossed characters and low relief height.

C.2 Apparatus

The impact apparatus is shown in Figure C.1 and comprises the following:

a) card support anvil made of steel and mounted to a rigid, heavy base. A vent hole of at least 5 mm (0.2 in) diameter is to be provided at the bottom of the anvil to allow air to escape during the impact;
b) cylindrical dart made of steel and supported in a bearing;
c) impact mass made of steel and supported in a guide bearing with friction no greater than 0,45 N (0.1 lb);
d) portions of the apparatus that contact the card must have a hardness of Rc = 50-55 (Hv = 513-595) (Hb = 481-560) and surface finish of Ra = 0,2 ± 0,06 µm (7.9 ± 2.4 µin);
e) height gauge accurate to 0,01 mm (0.004 in) with a measuring probe surface area of at least 50 mm^2 (0.8 in^2).

C.3 Procedure

Pre-condition sample cards to the test environment of ISO/IEC 10373-1 4.1 for 24 hours before testing. Conduct the test under the environment defined in ISO/IEC 10373-1 4.1.

Place the test card under the cylindrical dart centreline at least 20 mm (0.8 in) from any sample edge or previous impact test area. Lift the impact weight to the height specified in the base standard. Drop the impact weight onto the cylindrical dart as it rests on the sample card. Inspect the impact area for cracks; they will usually appear in the shoulder of the depression. At least 2 impact test areas should be used to determine whether cracking occurs.

Place the test card on a flat rigid surface with the deformation side up and apply a force of 4,5N ± 0,5N (1 lbf ± 0.1 lbf) to the top of the deformation to cause the card to flatten against the rigid surface.

Using the height gauge, measure the height of the deformation area relative to the surface of the card.

C.4 Test report

The test report should state the drop height, deformation height, and whether any cracking occurred.

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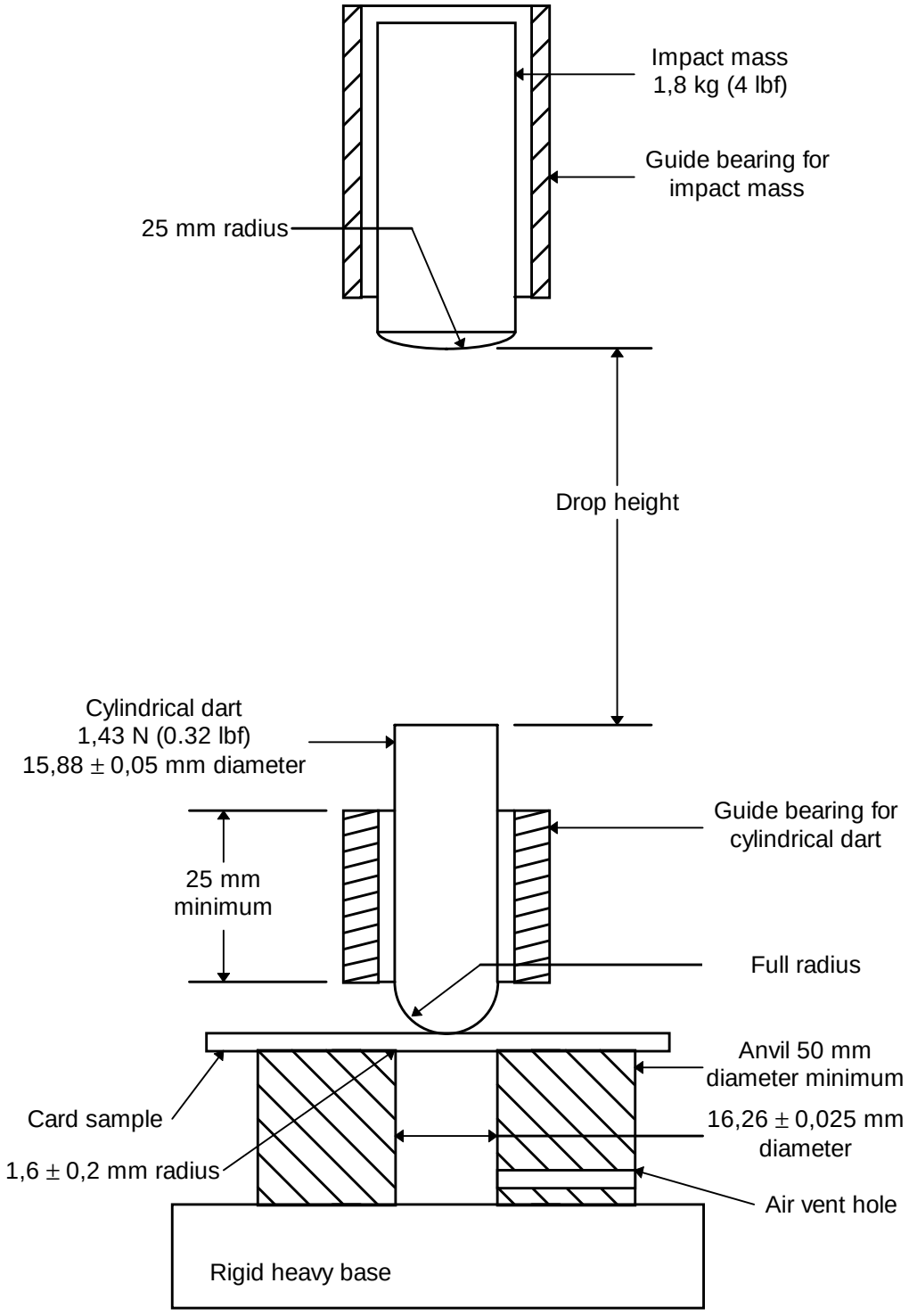


Figure C.1 — Embossability test apparatus

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