

PD ISO/TS 19408:2015



BSI Standards Publication

Footwear — Sizing — Vocabulary and terminology

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National foreword

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**Footwear — Sizing — Vocabulary and
terminology**

Chaussures — Pointures — Vocabulaire et terminologie



Reference number
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Foreword

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The committee responsible for this document is ISO/TC 137, *Footwear sizing designations and marking systems*.

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[ISO/TS 19408 online survey](#)

Footwear — Sizing — Vocabulary and terminology

1 Scope

This Technical Specification defines terms commonly used for measuring feet and lasts and for determining the size of footwear.

This vocabulary complements ISO 19952, *Footwear – Vocabulary*.

The term “shoe” means all types of footwear.

2 Terms and definitions

2.1 Foot dimensions and shoe sizing

2.1.1

central line of foot

line that connects the centre of the back of the heel (maximum point of the heel curve) and a point in the forefoot area

Note 1 to entry: See [Figure A.1](#) c) and d), and [Figure A.5](#) b).

Note 2 to entry: There are two methods to define the point in the forefoot:

Method 1: at the end of the second toe;

Method 2: in the middle of the tread width of the foot ([2.1.15](#)).

2.1.2

design allowance

additional allowance to the effective shoe length ([2.1.3](#)) added to the forefoot area of the last

Note 1 to entry: See [Figure A.2](#).

2.1.3

effective shoe length

foot length ([2.1.4](#)) plus a toe allowance ([2.2.16](#))

Note 1 to entry: See [Figures A.2](#) and [A.3](#).

2.1.4

foot length

maximum horizontal distance from the centre of the back of the heel (maximum point of heel curve) to the end of the most prominent toe, with the subject standing with the weight of the body equally distributed on both feet, barefoot or wearing thin hose that does not significantly affect the dimensions of the foot

Note 1 to entry: There are different methods to measure the foot length:

Method 1: measured along the inside tangent ([2.1.6](#)) (see [Figure A.1 a\)](#) and b);

Method 2: measured parallel to the central line of foot ([2.1.1](#)). There are two methods of measuring the central line (method 2a and 2b). See [Figure A.1 a\)](#), c) and d).

2.1.5

heel height of shoe

vertical height of the extreme rear end of the heel of the shoe down to the ground plane

Note 1 to entry: See [Figure A.3](#).

Note 2 to entry: Heel height of shoe minus the thickness of the sole in the ball area is equivalent to the “heel height of last” ([2.2.6](#)) see [Figure A.8](#).

2.1.6

inside tangent

vertical plane tangential to the point of maximum inside heel swell and the point of maximum swell at the first metatarsal head

Note 1 to entry: See [Figure A.1 b](#)) and [Figure A.5a](#)).

2.1.7

instep point of foot

intersection of the vertical (normal) plane at a given percentage of foot length with the highest point on the upper (dorsal) surface of the foot

Note 1 to entry: See [Figure A.16](#).

Note 2 to entry: There are different percentages used to mark the instep point:

Method 1: 50% of foot length;

Method 2: 55% of foot length.

2.1.8

joint girth of the foot

anatomic ball girth of the foot

circumference of the foot in a vertical plane around the heads of the first and fifth metatarsal bones

Note 1 to entry: Measurement is made under the same conditions as foot length ([2.1.4](#)).

Note 2 to entry: See [Figure A.4](#).

2.1.9

length grading interval

difference between adjacent whole shoe sizes

2.1.10

linear width (of the foot, of the last)

maximum horizontal distance, o , between the outside swell of the head of the first metatarsal and outside swell of the head of the fifth metatarsal of the foot (see [Figure A.12](#)) or the corresponding points at the last

Note 1 to entry: Measurement of the foot is made under the same conditions as foot length ([2.1.4](#)). There are two methods to obtain the first and fifth metatarsal head points:

Method 1: the inside tangent ([2.1.6](#)) and the parallel line touching the fifth metatarsal [see [Figure A.5 a](#))];

Method 2: the tangent lines which are parallel with the central line of foot ([2.1.1](#)) touching the two points [see [Figure A.5 b](#))].

2.1.11

shoe size

designated size marking of a shoe or last made for a given foot length ([2.1.4](#)) in any given shoe sizing system

2.1.12

shoe width

designated marking indicating the joint/ball girth or width fitting of the footwear or last, usually based on the joint girth or width measurement of the last

Note 1 to entry: Designation can be by letters, e.g. A, B, C, or numbers, e.g.1, 2, 3.

2.1.13

stick width of the foot (or linear width)

perpendicular distance between the first metatarsal head and the fifth metatarsal head

Note 1 to entry: See [Figure A.12](#).

Note 2 to entry: Measurement is made under the same conditions as foot length ([2.1.4](#)). There are two methods to obtain the first and fifth metatarsal head points:

Method 1: the inside tangent ([2.1.6](#)) and the parallel line touching the fifth metatarsal [see [Figure A.5 a](#)];

Method 2: the tangent lines which are parallel with the central line of foot ([2.1.1](#)) touching the two points. There are two methods of central line (method 2a and 2b) [see [Figure A.5 b](#)].

2.1.14

width grading interval

difference between adjacent girth or width fittings within the same shoe size or from shoe size to shoe size

2.1.15

tread width of ball area of foot

the distance b between the maximum swell of the first metatarsal as a point of the foot line touching the ground and the maximum swell of the fifth metatarsal as a point of the foot line touching the ground

Note 1 to entry: See [Figures A.5](#) and [A.12](#).

2.1.16

long heel girth of foot

Note 1 to entry: circumference around the foot passing through the point at the back of the heel where the foot just touches the ground on which the foot stands and the instep point of foot ([2.1.7](#)).

Note 2 to entry: See [Figure A.16](#).

2.1.17

ankle girth

the smallest horizontal girth, i , at the lower leg over the malleolus

Note 1 to entry: See [Figure A.16](#).

2.1.18

calf girth

the maximum horizontal girth, u , in the calf area of lower leg

Note 1 to entry: See [Figure A.16](#).

2.1.19

under knee girth

the smallest horizontal girth, w , below the knee and above calf

Note 1 to entry: See [Figure A.16](#).

2.1.20

short heel girth of foot

shortest circumference, t_1 , around the foot passing through the point at the back of the heel where the foot just touches surface on which the foot stands

Note 1 to entry: See [Figure A.16](#).

2.2 Last dimensions

2.2.1

bottom pattern length of last

last bottom length

the length of the last bottom surface from the heel point [[Figure A.10 a](#)] to the furthestmost prominent point of the bottom surface at the feather line and projected on to the central line

Note 1 to entry: See [Figure A.6](#).

2.2.2

central line of last bottom pattern

designed line at the last bottom that connects the heel point [[Figure A.10 a](#)] and a point in the forepart area of the last

Note 1 to entry: There are three methods to design that line:

Method 1: second point in the forepart area is the prominent point of the last top at the feather line [see [Figure A.10 a](#)];

Method 2: second point is in the middle of the tread width of the last ([2.1.15](#)) [see [Figure A.10 b](#)];

Method 3: the line constructed following [Figure A.14](#).

2.2.3

effective last length

the foot length ([2.1.4](#)) value, measured from the back of the heel curve of the last ([2.2.5](#)) and along the bottom of the last, plus toe allowance ([2.2.16](#))

Note 1 to entry: See [Figure A.3](#) and [A.11](#).

2.2.4

feather line

perimeter (edge) of the bottom pattern of the last

Note 1 to entry: See [Figure A.7](#).

2.2.5

heel (or back) curve of last

profile line of the heel part of the lasts

Note 1 to entry: See [Figure A.6](#).

2.2.6

heel height of last

technical heel height

vertical distance between the underside of the extreme end of the last and the ground plane with the last in its normal orientation

Note 1 to entry: See [Figure A.8](#).

2.2.7

heel seat

that section of the last bottom between the extreme rear point of heel and the point where the waist curve begins, with the last in its normal orientation

Note 1 to entry: See [Figure A.11](#).

2.2.8

heel width

(tread width and linear or swell width) measurement of heel that is a distance of a given percentage of foot length

Note 1 to entry: The foot length of the marked shoe size is selected from the conversion table in ISO/TS 19407. The given percentages of this length are measured. The measured distance of the maximum of heel curve is subtracted from this value. This value is then marked at the central line of the last bottom measured from the back of the heel. A line is drawn perpendicular to the central line up to the lateral and medial feather line.

2.2.8.1

tread width of heel

distance, q , between the two points marked concerning heel width (2.2.8)

Note 1 to entry: See [Figure A.13](#).

2.2.8.2

linear width of heel

distance, r , between the lateral and medial points following the contour of the surface of the bottom

Note 1 to entry: Measured by extending the line concerning 2.2.8 up to the maximum swell of the heel part.

Note 2 to entry: See [Figure A.13](#).

2.2.9

instep point of last

point at the intersection between a plane and the highest point upper (dorsal) surface of the last

Note 1 to entry: See [Figure A.15](#).

Note 2 to entry: There are three methods to define the plane:

Method 1: perpendicular to the central line of the last bottom at 42 % of effective last length;

Method 2: perpendicular to the central line of the last bottom at 50 % of the foot length;

Method 3: perpendicular to the last bottom at the point G1 ([Figure A.14](#)).

2.2.10

joint girth of last

ball girth of last

circumference around the last in the forepart corresponding to the approximate position of the ball joint of the foot

2.2.11

last length

sum of the bottom pattern length of last, d , (2.2.1), measured along the surface of the bottom of the last, maximum of heel curve of the last, a , (2.2.5) and hang over last top, e , with the last in its normal orientation

Note 1 to entry: See [Figure A.6](#).

Note 2 to entry: The dimension, e , can be zero.

2.2.12

last toe height

the maximum distance between the last bottom and the upper surface of the last measured on a line perpendicular to the last bottom plane and at the effective last length (2.2.3)

Note 1 to entry: See [Figure A.11](#).

2.2.13

last toe spring

the vertical distance between the underside of the last at the extreme toe end and the ground plane with the last in its normal orientation

Note 1 to entry: See [Figure A.8](#).

2.2.14

long heel girth of last

girth t_2 from the point of the middle of the heel at the feather line, crossing the instep point, back to the heel point

Note 1 to entry: See [Figure A.15](#).

2.2.15

stick last length

the longest dimension of the last from the heel to the toe with the last in a flat position (without heel height)

Note 1 to entry: See [Figure A.9](#).

2.2.16

toe allowance

the addition to the foot length ([2.1.4](#)) which is necessary to accommodate the dynamic functioning of the foot

Note 1 to entry: See [Figures A.2](#) and [A.3](#).

2.2.17

tread width of the ball area of last

distance, b , between the maximum swell of the first metatarsal as a point of the last feather line and the maximum swell of the fifth metatarsal as a point of the last feather line

Note 1 to entry: See [Figure A.12](#).

Note 2 to entry: There are different methods of measuring:

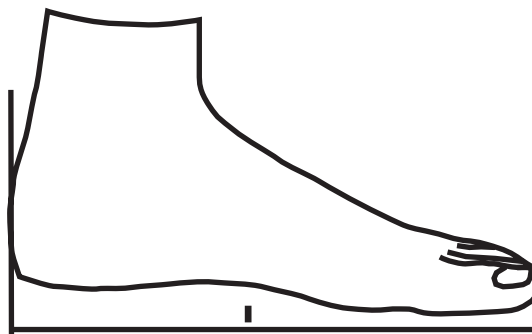
Method 1: the inside tangent ([2.1.6](#)) and the parallel line touching the ball points of the last;

Method 2: the tangent lines which are parallel with the central line of foot ([2.1.1](#)) touching the two points;

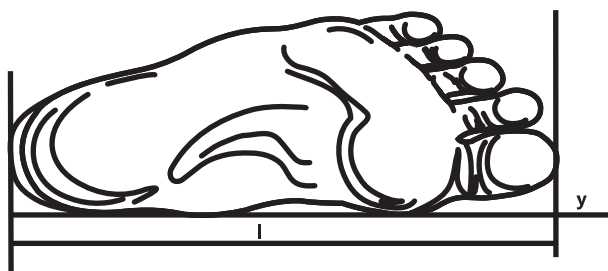
Method 3: this method uses the points E1 and F1 to find these points ([Figure A.14](#)).

Annex A (informative)

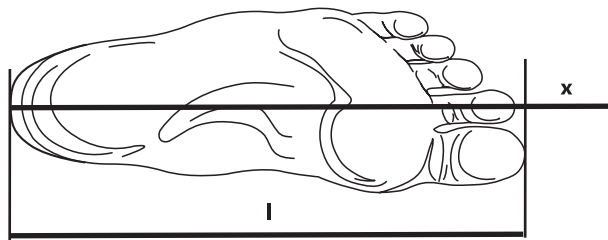
Figures



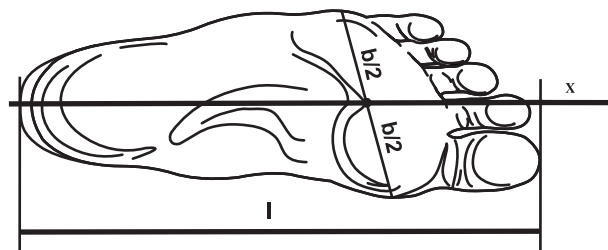
a — Foot length (method 1 and 2)



b — Foot length (method 1)



c — Foot length (method 2 a)



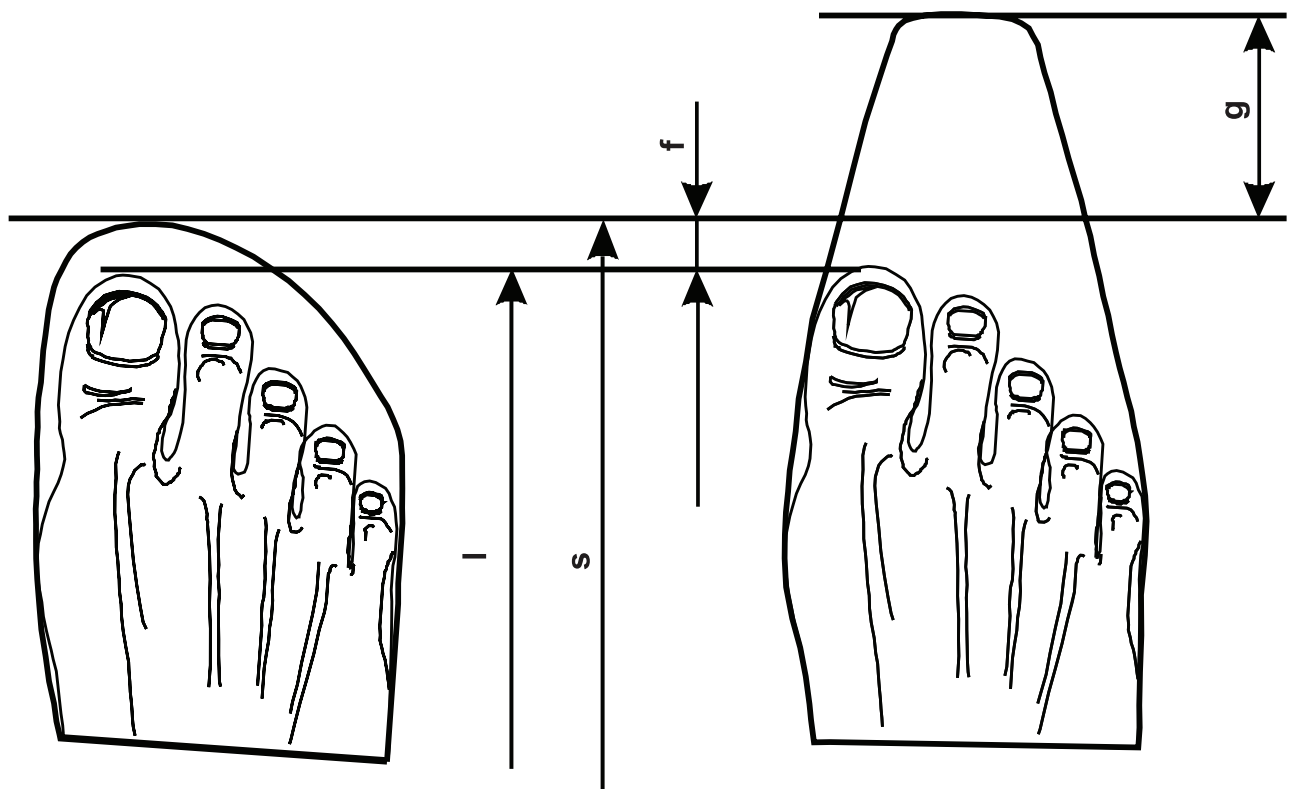
d — Foot length (method 2 b)

Key

l foot length
y inside tangent

x central line
b tread width of the foot

Figure A.1 — Foot length



Key

- l* foot length
- s* effective shoe length
- f* toe allowance
- g* design allowance

Figure A.2 — Design allowance



Key

- s* effective shoe or last length
- l* foot length
- f* toe allowance
- h* heel height of shoe

Figure A.3 — Toe allowance

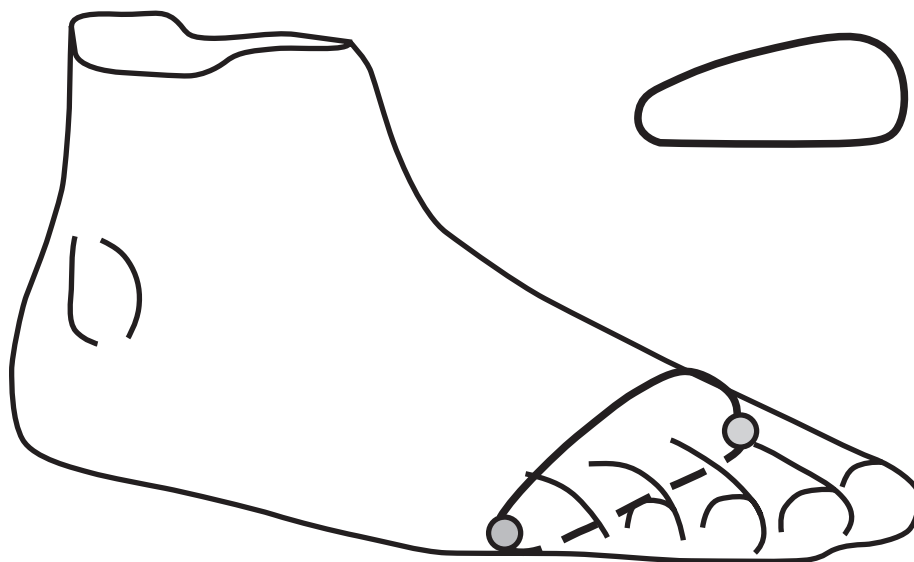
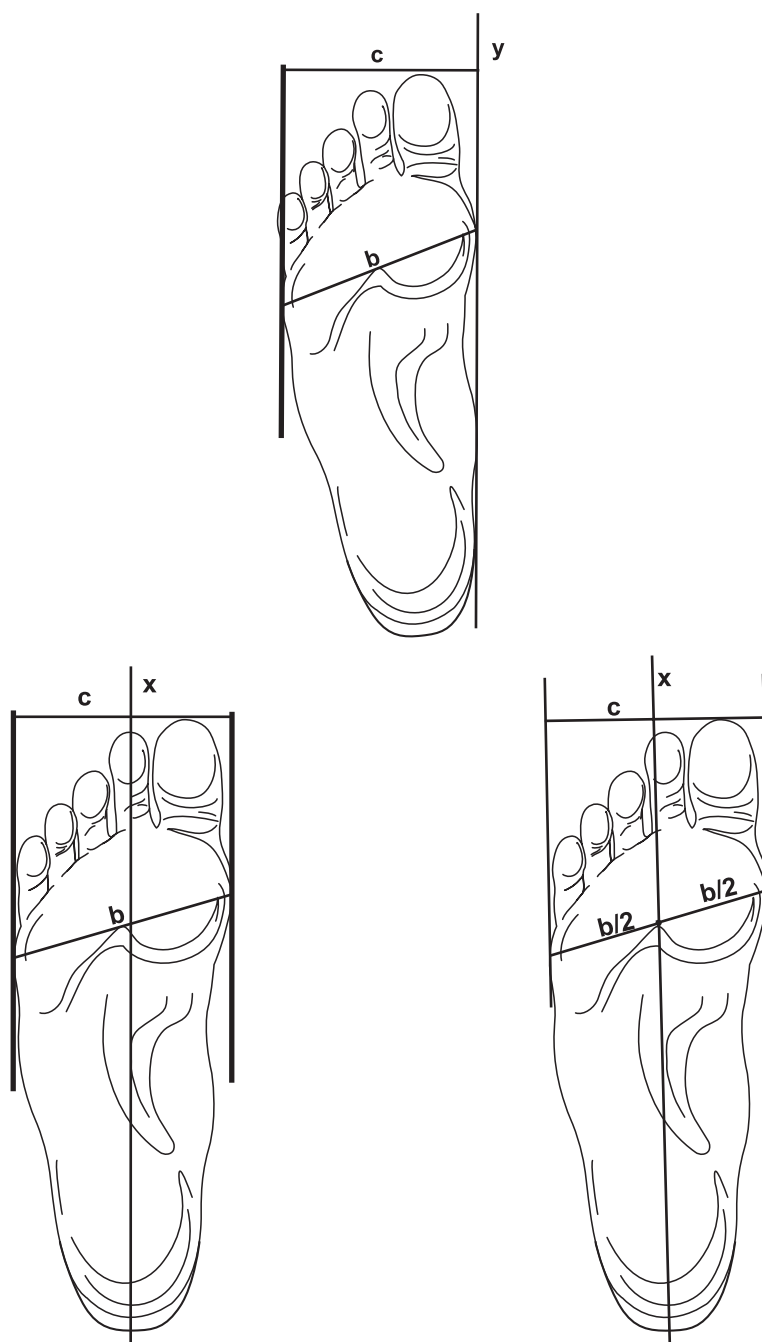


Figure A.4 — Joint girth of the foot



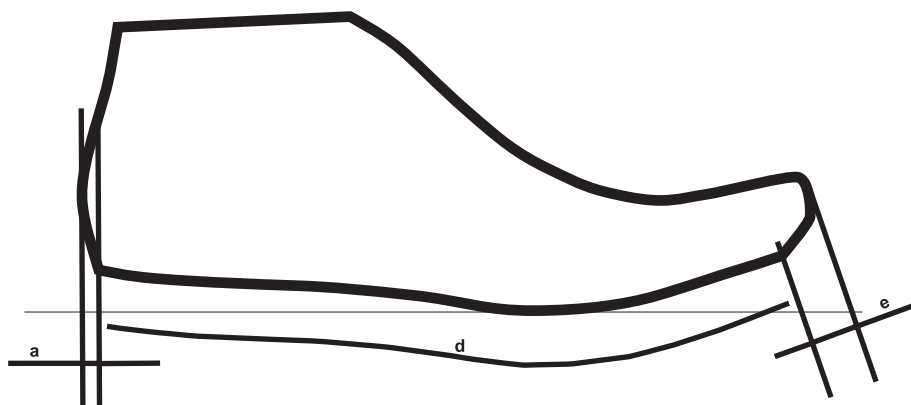
a) — Stick width of the foot (method 1)

b) — Stick width of the foot (method 2a and 2b)

Key

- b* tread width of the foot
- c* stick width of the foot
- x* central line
- y* inside tangent

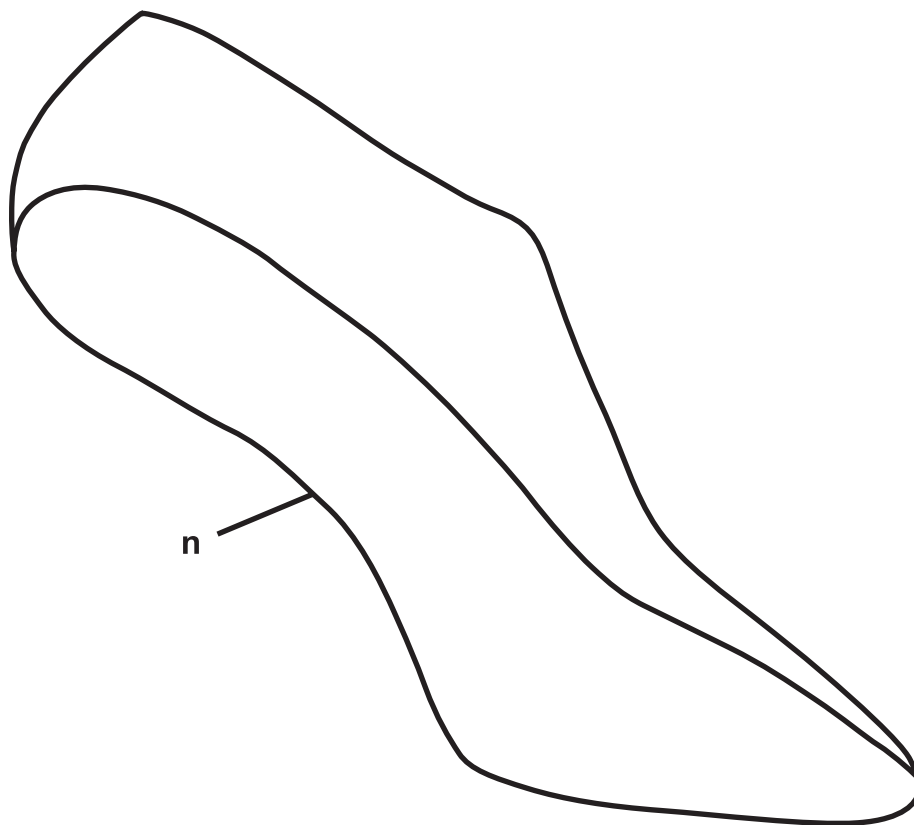
Figure A.5 — Stick width of the foot



Key

- a* maximum of heel (or back) curve
- d* bottom pattern length
- e* hang over last top

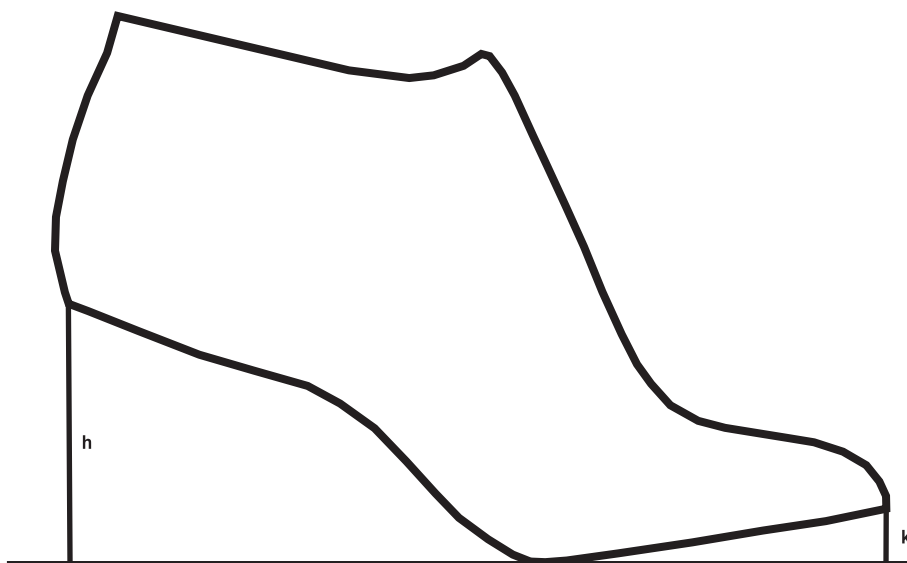
Figure A.6 — Last length



Key

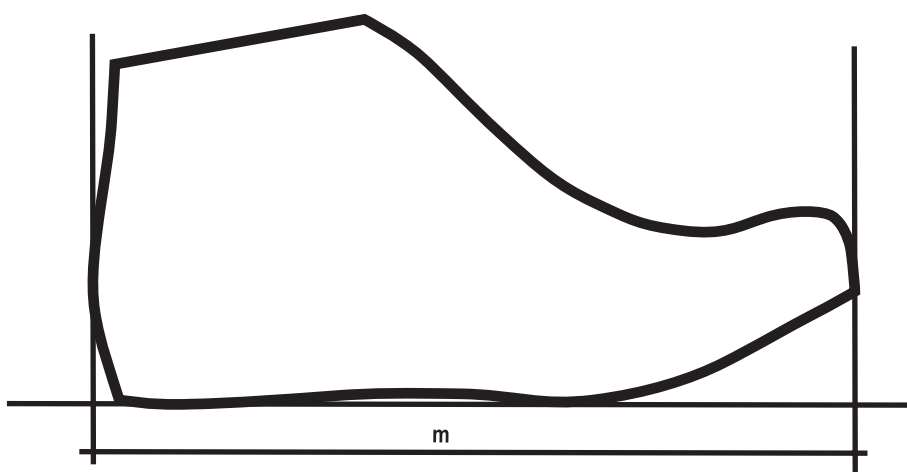
- n* feather line

Figure A.7 — Feather line



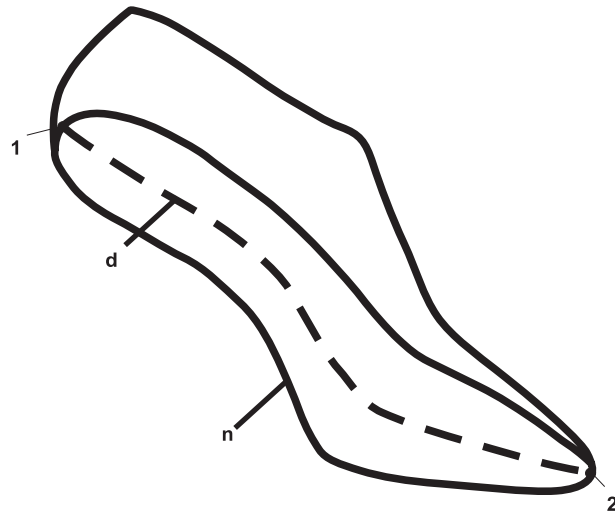
Key
h heel height of last
k toe spring of last

Figure A.8 — Technical heel height and toe spring

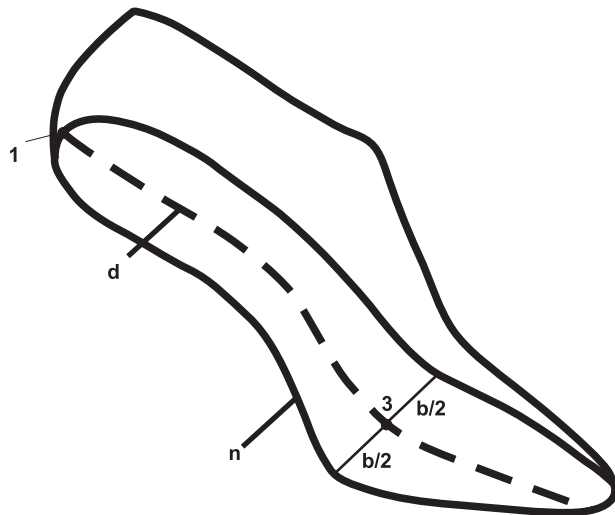


Key
m stick last length

Figure A.9 — Stick last length



a) - Central line of last bottom pattern (method 1)

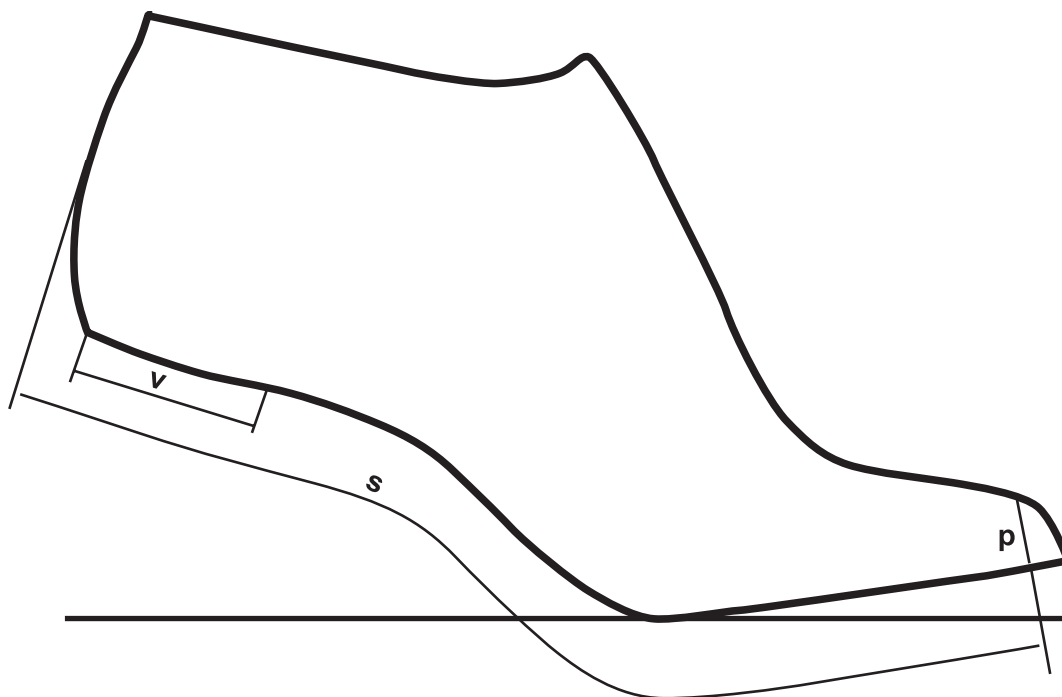


b) - Central line of last bottom pattern (method 2)

Key

- d length of last bottom
- N feather line
- b tread width of last
- 1 heel point at the feather line
- 2 prominent point of the last top at the feather line
- 3 middle point of the tread width

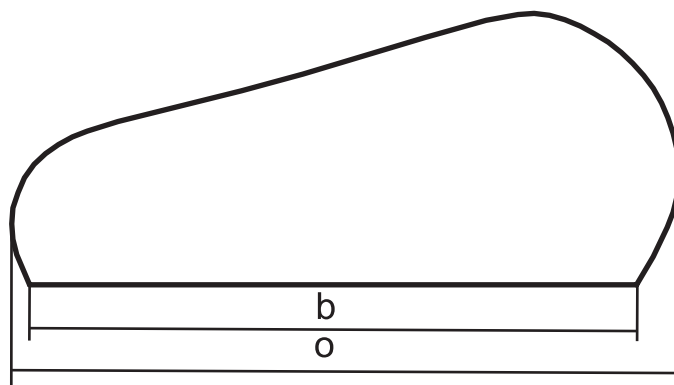
Figure A.10 — Central line of last bottom pattern



Key

- v* heel seat
- p* toe height
- s* effective last length

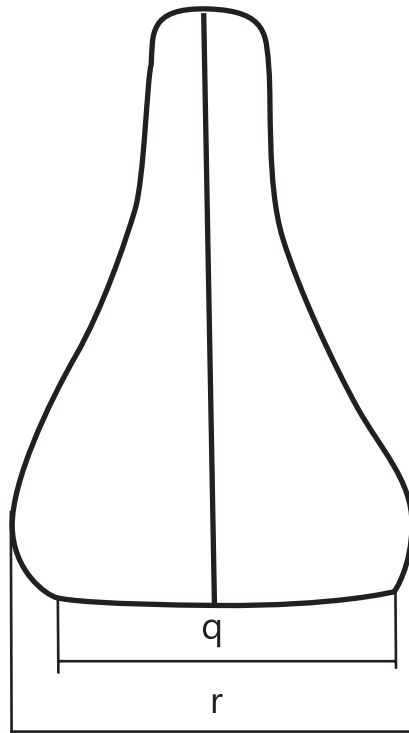
Figure A.11 — heel seat of last and toe height



Key

- b* tread width of foot or last
- o* linear width of foot or last

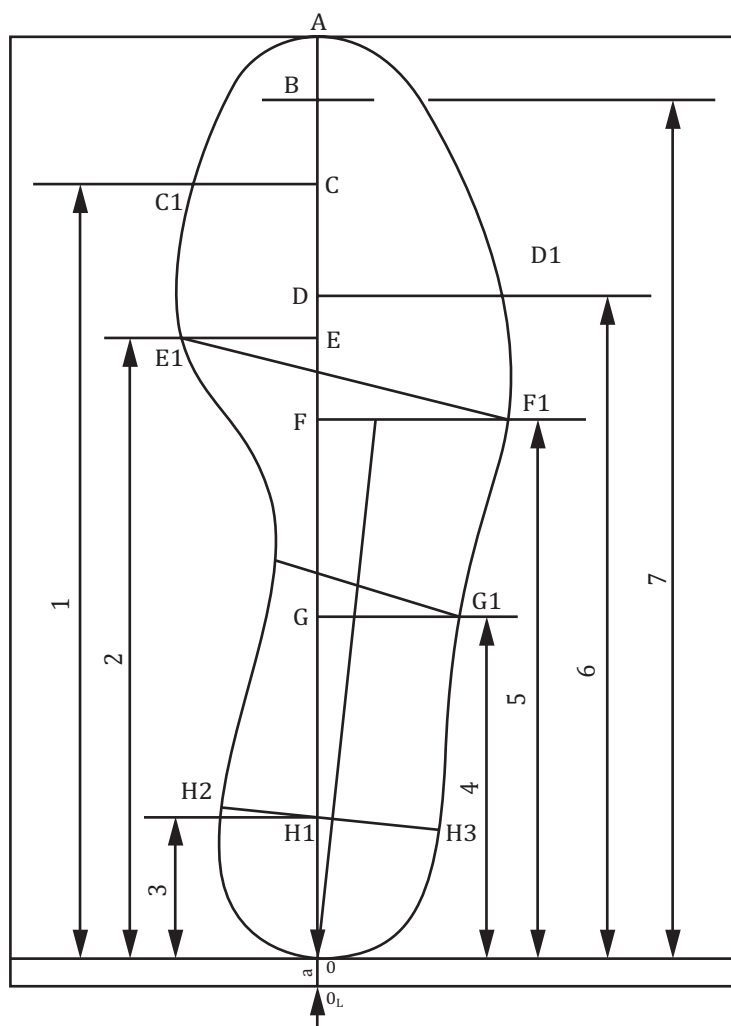
Figure A.12 — linear width and tread width of the ball area of foot or last



Key

- q tread width of heel
- r linear width of heel

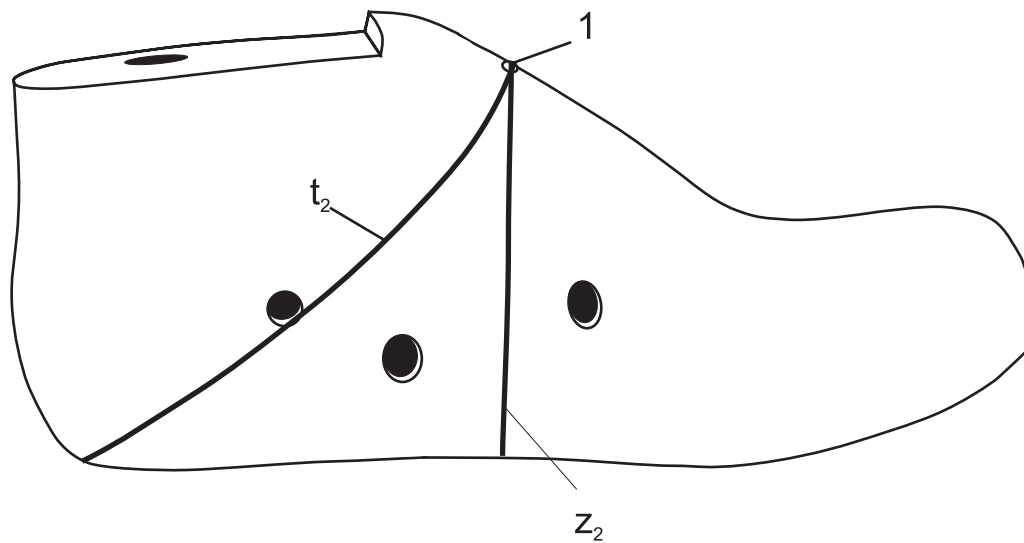
Figure A.13 — Tread width and linear width of heel



Key

- 1 = $90\% \times L - a$
- 2 = $72,5\% \times L - a$
- 3 = $18\% \times L - a$
- 4 = $41\% \times L - a$
- 5 = $63,5\% \times L - a$
- 6 = $78\% \times L - a$
- 7 = $100\% \times L - a$
- L = foot length

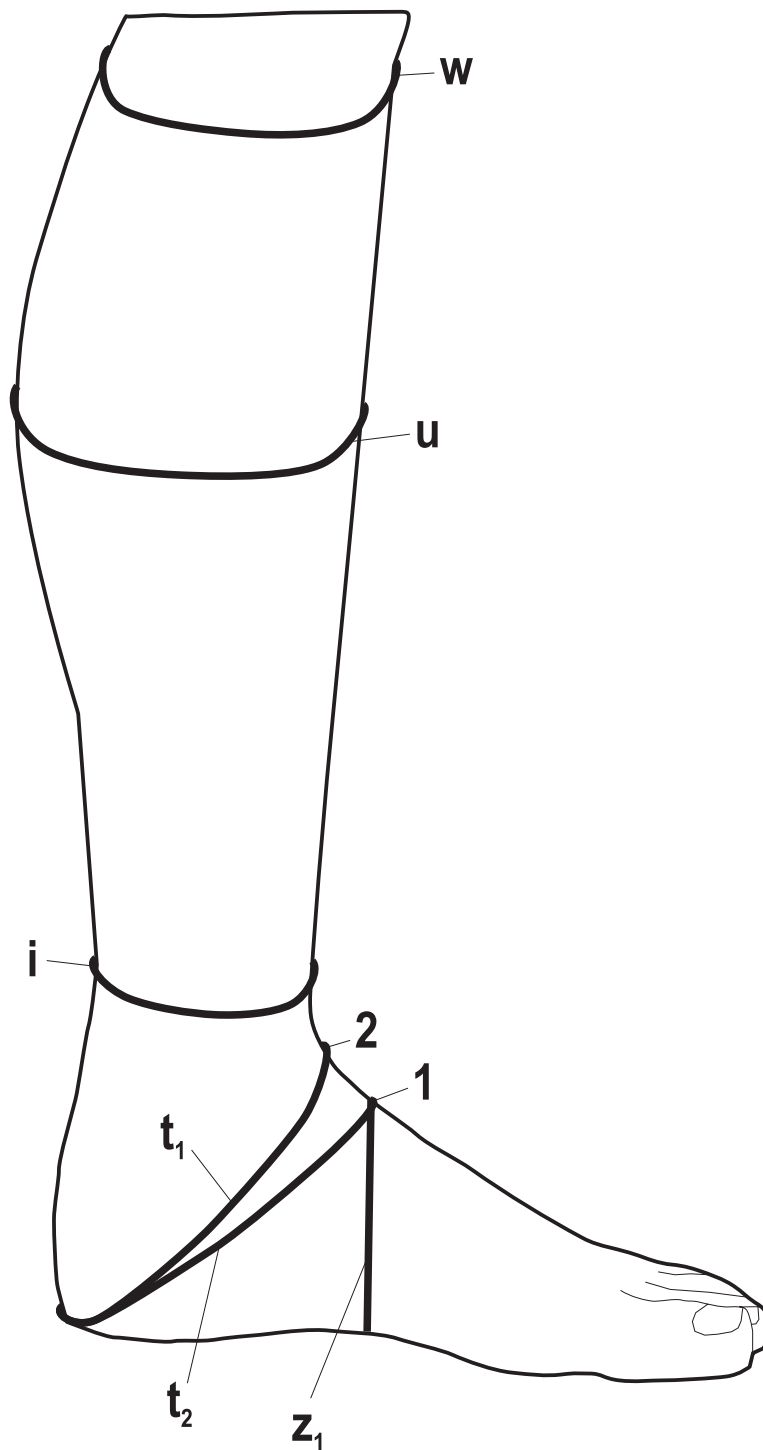
Figure A.14 — Method 1 to define the ball points E1 and F1



Key

	Parts/positions
t_2	long heel girth of last
1	instep point of last
Z_2	instep girth of last

Figure A.15 — Long heel girth of last t_2



Key

- t_1 short heel girth of foot
- t_2 long heel girth of foot
- 1 instep point of foot
- 2 throat position
- i ankle girth
- u calf girth
- W under knee girth
- Z_1 instep girth of foot

Figure A.16 — Lower leg dimensions

Annex B (informative)

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- [1] ISO/TS 19407, *Footwear - Sizing - Conversion of major sizing systems*
- [2] ISO 19952, *Footwear — Vocabulary*

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