
**Sizing system and designation for
footwear — Anthropometric basis**

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Foreword

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The main task of technical committees is to prepare national standards. Final Draft Rwanda Standards adopted by Technical Committees are ratified by members of RSB Board of Directors for publication and gazettelement as Rwanda Standards.

DRS 645 was prepared by Technical Committee RSB/TC 29, *Textile and leather technology*.

Committee membership

The following organizations were represented on the Technical Committee on *Textile and leather technology* (RSB/TC 29) in the preparation of this standard.

DIKAM LTD

Gala Attire Fashion LTD

Rwanda Education Assistance Project, Seed Project (REAP)

Rwanda Inspectorate, Competition and Consumer Protection Authority (RICA)

Rwanda Polytechnique-Kigali College (RP/Kigali College)

University of Rwanda/College of Science and Technology (UR/CST)

Rwanda Standards Board (RSB) – Secretariat

Sizing system and designation for footwear — Anthropometric basis

1 Scope

This Draft Rwanda Standard specifies the anthropometric basis, size designation rules and framework requirements for Rwanda size charts for ready-made footwear.

This Standard establishes how footwear sizes are designated using foot measurements, how foot measurement tables and size intervals are created, and how the resulting size designation is used for product labelling, procurement specifications and related industrial applications.

This Standard is applicable to mass-production from teenagers to adults within Rwanda. Age bands are used for sampling, adequacy and interpretation. Rwanda footwear size codes in Annex A are based on foot length, not age labels.

This Standard does not specify footwear design or construction methods, material performance requirements, medical prescriptions or orthopaedic footwear and bespoke.

This Standard is not intended for bespoke or made-to-measure footwear where sizing is defined by individual measurements.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

RS ARS 1569, *The labelling and marking of textiles and household textile articles*

RS ISO 9407, *Footwear sizing — Mondopoint system of sizing and marking*

ISO 7250-1, *Basic human body measurements for technological design — Part 1: Body measurement definitions and landmarks*

ISO 15535, *General requirements for establishing anthropometric databases*

3 Terms and definitions

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

3.1

foot length

straight-line distance from the rearmost point of the heel to the tip of the longest toe, measured in the standing weight-bearing position; the primary control dimension for all footwear families in this document

3.2

foot girth

circumference measurement taken around the ball of the foot at its widest point, used as the secondary control dimension for width fitting classification

3.3

last

three-dimensional form representing the internal volume of a shoe around which the footwear upper and sole are constructed; the geometry of the last determines the internal fit of the finished footwear item

3.4

last length

overall length of the last, which is greater than foot length by the sum of toe allowance and any last-specific allowances; used in manufacture and not used as the basis for size designation under this document

3.5

Mondopoint

unit of shoe size as defined in ISO 9407; provided as informative supplementary information in Annex A alongside the Rwanda size code

3.6

size designation

expression of footwear size by one or more control dimensions and a size code assigned according to this document

3.7

size code

alphanumeric or numeric designation assigned to a footwear size that represents a specified range or value of foot dimensions, primarily foot length, and, where applicable, foot width or other foot measurements, for the purpose of identifying and selecting the appropriate footwear size.

3.8

size interval

defined range of the foot length control dimension assigned to one size designation class

3.9**width fitting**

classification of footwear by foot girth range, supplementing the foot length size designation; expressed as N (Narrow), R (Regular), or W (Wide) in accordance with Clause 6.4 where width-fitting boundaries have been approved

3.10**coverage**

stated extent to which the foot measurement table represents the intended target population of the analysed dataset

3.11**claim of conformity**

statement by an organization that its size designation, labelling and supporting documentation meet the requirements of this document

3.12**toe allowance**

additional length provided between the longest toe and the inner tip of the footwear to accommodate dynamic foot movement and ensure comfort; not included in the foot length dimension

3.13**foot measurement table**

tabular listing of control dimensions and their intervals used to designate sizes for a specified population group

3.14**half size**

size designation representing a foot-length class interval of 2.5 mm, used where the dataset supports finer size graduation within a footwear family

3.15

verification footwear measurement

measurement of a finished footwear item to confirm that the declared foot length range is achievable within the footwear, conducted using a recognized measurement procedure

3.16

measurement uncertainty

parameter characterizing the dispersion of values that could reasonably be attributed to the measurement result; relevant to acceptance of anthropometric data used in Annex A

3.17

bespoke

individual customized or made-to-measure footwear

3.18

teenager

any person whose age is between age 13 to 19

3.19

adult

any person from the age of 20 and above

4 Symbols and abbreviated terms

For the purposes of this standard, Table 1 includes applicable symbols and abbreviated terms.

Table 1 — Symbols and abbreviated terms

Symbol or abbreviation	Meaning
mm	Millimetre
cm	Centimetre
FL	Foot length (mm)
FG	Foot girth — ball girth (mm)
MP	Mondopoint

M	Male
F	Female
n	Sample size
N	Narrow — width fitting code
R	Regular — width fitting code
W	Wide — width fitting code
ISO	International Organisation for Standardisation
EN	European Norm/European Standard
ASTM	ASTM International
BS	British Standard
RSB	Rwanda Standards Board
ARSO	African Organisation for Standardisation

5 General requirements

5.1 Measurement basis

All control dimensions used for Rwanda footwear sizing shall be based on anthropometric foot measurement definitions and landmarks in accordance with ISO 7250-1.

NOTE Foot length as defined in ISO 7250-1 measurement item 4.1.28 (foot length) is the basis for all Rwanda footwear size designations. The Mondopoint equivalent is provided as an informative conversion only.

5.2 Target population and dataset basis

The values inserted in Annex A shall be derived from the Rwanda anthropometric dataset produced and approved through the applicable technical review process.

Annex A shall only include population groups for which analysed foot measurement data are available and approved.

5.3 Measurement quality and dataset acceptance

The analysed dataset used to populate Annex A shall be supported by documented evidence of measurement quality, data cleaning, outlier review, and data traceability in accordance with ISO 15535 and the approved project protocol.

Where weighting, correction factors, or exclusion rules are applied, they shall be documented in the technical report supporting Annex A.

5.4 Units and rounding

Unless otherwise stated in Annex A, foot length values in foot measurement tables for footwear shall be expressed in millimetres.

Rounding rules shall be stated and applied consistently across all tables. The standard size interval for foot length shall be 5 mm. Half-size intervals of 2.5 mm are permitted where the dataset analysis supports finer graduation.

NOTE The 5 mm interval is a foot-length class interval and is in accordance with the length grading interval used in Mondopoint size-step practice under ISO 9407. Intervals of 2.5 mm (half-size steps) are permitted for sports and precision-fit footwear categories.

5.5 Table data and traceability

Each Annex A table shall declare at least the following data:

- a) sex;
- b) age band;
- c) dataset version and analysis date;
- d) data source identifier;
- e) sample size;
- f) geographic basis;
- g) weighting status, where applicable;
- h) coverage statement;
- i) size interval width (mm); and
- j) width fitting categories declared.

5.6 Measurement conditions and foot measurement protocol

Foot measurements used to derive Annex A values shall be taken under the following conditions:

- a) participant standing, weight-bearing on both feet (bilateral stance);
- b) measurements taken with bare feet on a flat horizontal surface;

- c) foot length measured using a calibrated Brannock device, foot gauge, or digital scanning system or equivalent calibrated foot measuring device; and
- d) measurements taken at the end of the working day where possible, to capture maximum foot dimensions at peak swelling.

NOTE 1 End-of-day measurement is recommended where feasible because foot dimensions may vary during the day due to activity, load and dependent swelling.

NOTE 2 The measurement uncertainty for foot length measurements should not exceed ± 3 mm for manual devices or ± 1.5 mm for digital scanning systems. Reference: ISO/IEC Guide 98-3 (GUM).

6 Control dimensions and footwear families

6.1 General

For each footwear family covered by this document, the primary and permitted secondary dimension indicators shall be selected in accordance with the provisions of this clause.

Foot length (FL) shall be the primary control dimension for all footwear families. Where a footwear family requires additional fit control, foot girth (FG) shall be used as the secondary dimension for width fitting classification.

6.2 Control-dimension framework

The footwear families and corresponding control dimensions shall be as given in Table 2.

NOTE The footwear family control dimension assignments in Table 2 are aligned with ISO 9407.

Table 2 — Footwear families and control dimensions

Footwear family	Primary control dimension mm	Secondary control dimension mm	Application note
Open shoes and sandals	FL	FG - optional	Foot girth may be omitted for open constructions where strap adjustment provides width accommodation.
Closed shoes		FG - width fitting	Width fitting shall be declared where the product range includes more than one width category. Reference: RS ISO 9407.
Ankle boots			Ankle girth may be stated as a supplementary dimension for fitted shaft constructions.
Calf and knee boots			Calf girth shall be stated as a supplementary dimension for fitted shaft constructions.
Sports and athletic footwear			Width fitting shall be declared. Half-size intervals of 2.5 mm are recommended for sports footwear.

School shoes and work footwear (non-protective)			The applicable width fitting category shall be fixed in the relevant procurement or product specification.
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6.3 Supplementary dimensions

Where a product specification requires additional fit-control dimensions such as ankle girth, calf girth, or instep height, those dimensions shall not replace the primary foot length control dimension but shall be stated as supplementary dimensions in the product specification or procurement document.

6.4 Width fitting categories

Where approved width-fitting boundaries are available, width fitting may be declared using categories approved. Width-fitting categories shall be derived from the approved dataset and documented in the supporting technical report.

In this committee-circulation draft, Annex A reports A–E categorical width-grade distribution as fit-context evidence only. These A–E values shall not be treated as normative millimetre-based width boundaries unless an approved width-conversion and validation method is adopted.

Table 3 indicates the categories of width fitting: Narrow, Regular, Wide and Extra Wide.

Table 3 — Possible width fitting categories

Code	Category	Description (foot girth)
N	Narrow	Foot girth below the lower approved width-fitting boundary for the relevant foot-length class
R	Regular	Foot girth within the approved Regular width-fitting range for the relevant foot-length class
W	Wide	Foot girth above the upper approved width-fitting boundary for the relevant foot-length class
XW	Extra Wide	Foot girth significantly above the upper approved width-fitting boundary for the relevant foot-length class, exceeding the range specified for the Wide width category.

6.5 Size intervals

The size intervals applied to foot length in Annex A shall be in accordance with Table 4.

Table 4 — Standard size intervals for foot length

Footwear application	Standard interval mm	Half-size interval mm	Reference
Standard adult footwear (all families)	5	2.5 (optional)	RS ISO 9407

Sports and athletic footwear	5	2.5 mm (recommended)	RS ISO 9407
Children's footwear (age band 13-19, where applicable)	5	2.5 mm (recommended)	RS ISO 9407
Width fitting foot girth intervals	[insert from dataset]	[insert from dataset]	See bibliography
NOTE A 5 mm foot-length class interval is used as the Rwanda national standard interval. It corresponds to the length grading interval commonly applied in Mondopoint practice under RS ISO 9407, and is widely used in Africa-facing sizing systems.			

6.6 Last allowance — informative guidance

The relationship between foot length and last length is outside the normative scope of this document. Manufacturers are referred to ISO 17709.

NOTE Typical last allowances are 12 mm to 20 mm added to foot length depending on footwear category (casual: 12-15 mm; dress: 10-12 mm; sports: 15-20 mm; boots: 15-20 mm). These are informative reference values only.

7 Size designation system

7.1 General

A Rwanda footwear size designation shall comprise:

- a) a Rwanda size code uniquely identifying one row of Annex A; and
- b) the corresponding declared foot length range in millimetres.

Where width fitting is declared, the width fitting code (N, R, or W) shall form part of the full-size designation.

7.2 Population and age-band identifiers

For Annex A, the following population identifiers shall be used:

- a) M for male population groups; and
- b) F for female population groups.

NOTE The age-band identifiers shall be 13-19, 20-25, 26-35, and 36-60. Reference: ISO 15535 on age stratification requirements for anthropometric databases.

7.3 Code construction

The Rwanda footwear size code shall be expressed in the following form for the committee-circulation Annex A tables, as defined in Table 5: RW-FW-[sex]-[length class], where RW denotes the Rwanda sizing framework; FW denotes footwear; [sex] denotes the applicable sex-specific foot-measurement chart, using F for female and M for male; and [length class] denotes the foot-length class in millimetres used in Annex A.

Table 5 — Rwanda footwear size code structure

Field	Symbol	Value	Example
Country code	RW	Fixed prefix	RW
Article type	FW	Footwear	RW-FW
Population group	[Sex]	F (female) or M (male)	RW-FW-F
Length class	[Length class]	Foot-length/Mondopoint class in mm (e.g., 220, 225, 240)	RW-FW-F-240
Width fitting (optional, where TC-approved)	[N/R/W]	Added as suffix only where approved	RW-FW-F-240-R

EXAMPLE RW-FW-F-240 denotes Rwanda footwear size code for the female chart at foot-length class 240 mm.

Age bands are retained as dataset data for sampling, adequacy and technical interpretation.

7.4 Foot-dimension disclosure

The full-size designation accompanying a Rwanda footwear size code shall disclose the applicable foot length range in millimetres, and foot girth range where width fitting is declared.

EXAMPLE RW-FW-F-230 / FL 230–234 mm / FG 218–226 mm, where width fitting is declared

7.5 Mondopoint — Informative declaration

The Mondopoint equivalent may be declared as supplementary informative information alongside the Rwanda size code. It shall not replace the foot length range declaration.

EXAMPLE RW-FW-F-230 / FL 230–234 mm / FG 218–226 mm, where width fitting is declared

NOTE Mondopoint values are informative only. For the calculation method, refer to RS ISO 9407. This informative declaration aids market cross-referencing.

7.6 Half-size designation

Where half sizes are used, the serial number shall reflect the half-size subdivision. The foot length range for a half size shall be 2.5 mm.

EXAMPLE RW-FW-M-255 (full size: FL 255–259 mm) and RW-FW-M-255H (half size: FL 257–259 mm).

7.7 Additional short forms and market size expressions

Any additional short code or market size expression used for stock control or retail display shall not replace the Rwanda size code and declared foot-length range and, where applicable, width-fitting information when conformity to this document is claimed.

NOTE 1 A consumer-facing market label, such as Rwanda Size 240, Mondopoint 240, EU/UK/US equivalent, or another retail expression, may be used in addition to the Rwanda footwear size code, provided that the Rwanda footwear size code and declared foot-length range remain traceable in the technical file and remain the controlling reference for conformity.

NOTE 2 Conversion to EU (EN 13402-3), UK, US (ASTM), JP (JIS S 5037 Mondopoint), or other systems is informative only. See Annex B.

NOTE 3 For the Draft standard provisional Annex A table, footwear size codes use the form RW-FW-[SEX], [Mondopoint length class] for traceability to approved pilot analytical dataset.

8 Construction of Rwanda foot measurement tables and intervals

8.1 Derivation principles

Annex A tables shall be derived from the approved Rwanda anthropometric dataset using sound statistical principles in accordance with ISO 15535.

8.2 Statistical basis

The derivation record for each Annex A table shall document:

- a) the descriptive statistics used;
- b) any weighting basis applied;
- c) treatment of outliers, missing data, and exclusions;
- d) interval design logic and size interval width; and
- e) rounding rules and coverage calculation method.

NOTE For foot length interval design, a 5 mm interval should be assessed against a coverage target of ≥ 90 % of the relevant population group. If a 5 mm interval does not achieve 90 % coverage within a reasonable number of sizes, a 2.5 mm (half-size) interval may be adopted. Reference: RS ISO 9407.

8.3 Coverage and reporting

Each Annex A table shall declare the intended target population and a coverage statement based on the analysed dataset.

Where a quantified coverage ratio is calculated, the method used shall be stated in the supporting technical report.

NOTE Coverage target ≥ 90 % of the relevant population group is recommended, in accordance with international practice for national sizing systems. Reference: RS ISO 9407; ISO 17709

8.4 Width fitting derivation

Where foot girth in millimetres is available and approved, width-fitting boundaries should be derived from the bivariate distribution of foot length and foot girth. Where only coded width-grade categories are available, the categories shall be interpreted according to the approved data-capture and classification method and shall not be converted into millimetre-based boundaries unless a validated conversion method is approved.

NOTE For this committee-circulation draft, Annex A reports A–E categorical width-grade distribution as fit-context evidence only.

8.5 Half-size intervals

Where the dataset analysis indicates that a 5 mm interval produces insufficient coverage for a specific population group, a 2.5 mm half-size interval may be adopted for that population group. The choice shall be documented and justified in the supporting technical report.

8.6 Use of approved values only

Illustrative tables, workshop examples, or unapproved analytical outputs shall not be inserted into Annex A.

9 Normative size charts

9.1 Role of Annex A

Annex A constitutes the Rwanda footwear size-chart framework and, once populated with approved analysed values, the normative technical specification for size designation under this document.

9.2 Chart content

Each Annex A table shall define:

- a) Rwanda size code;
- b) foot length range in millimetres;
- c) foot girth range in millimetres and N/R/W width-fitting categories;
- d) Mondopoint range (informative);
- e) units;
- f) width fitting category code and boundaries; and
- g) mandatory data.

9.3 Completion condition

No claim of conformity to the Rwanda footwear size charts shall be made until the relevant Annex A tables have been populated with approved analysed values.

10 Marking, labelling and procurement use

10.1 Footwear marking

Where width fitting is declared on the basis of approved width boundaries, the width fitting code shall also be marked.

Minimum label information shall include:

- a) Rwanda size code;
- b) foot length range in millimetres;
- c) foot girth range in millimetres and width fitting code (N, R, or W), where width fitting is declared;
- d) target population group and age band; and
- e) Mondopoint equivalent (informative), where the manufacturer chooses to include this.

NOTE 1 The Mondopoint declaration on labelling is informative and voluntary. Its inclusion is encouraged for footwear destined for export to Asian markets where the Mondopoint system is widely used.

NOTE 2 Labelling language and care symbol requirements follow RS ARS 1569.

10.2 Procurement specifications

Where procurement specifications reference this document, they shall state the footwear family, target population group, age band, and required Rwanda size designation including width fitting category where applicable.

10.3 Informative mappings

Any mapping to other footwear size systems is informative in accordance with Annex B and is not to be used as the basis for a conformity claim.

11 Claim of conformity

11.1 General

An organization claiming conformity with this document shall maintain a technical file that includes:

- a) the size designation system used, including width fitting categories applied;
- b) the applicable Annex A table and row;
- c) labelling samples or label artwork;
- d) documented evidence that supplied footwear conforms to the declared foot length range, using the verification method of RS ISO 9407 or an equivalent recognized procedure;
- e) width fitting category documentation, where declared; and
- f) the version or date of this Rwanda Standard and the dataset version underlying the Annex A values used.

NOTE RS ISO 9407 and ISO 7250-1 specify a marking and conformity method based on last length. Where foot-length-based verification is used, the measurement procedure should be documented in the technical file. Reference for verification methodology: RS ISO 9407 or a recognized measurement procedure.

Annex A (normative)

Rwanda footwear Mondopoint length-class size chart

A.1 General

Footwear Mondopoint length-class size-code table generated from approved analytical dataset for the Anthropometric Study. The primary sizing basis is measured foot length, max (L, R), binned to 5 mm Mondopoint length classes.

The table is regenerated from the latest final analytical basis and applies the $N \geq 10$ publication threshold for committee-facing length-class cells. Length classes below this threshold remain in the controlled analytical record as descriptive-only cells and are not published as standalone Annex A size-code rows.

NOTE Rwanda footwear size codes and chart values are assigned for traceability; no conformity claim is made until approval through the applicable RSB standards-development process and closure or formal bounding of publication conditions.

A.2 Footwear Mondopoint length-class chart

Table A.1 gives the footwear length-class chart regenerated from the latest final analytical basis. Foot length is the primary control dimension. Width information is reported as A-E categorical fit distribution only and shall not be interpreted as raw foot breadth in millimetres.

The table in this annex reproduces the footwear size-chart outputs generated from approved analytical dataset. Rwanda footwear size codes have been assigned for traceability. Annex A presents rounded standards-facing values: foot-length ranges are outward-rounded to whole millimetres; P50 values are rounded to the nearest whole millimetre; width-grade and coverage percentages are rounded to whole percentages. Half-step indicative shoe-size values such as 22.5 cm are retained because they represent size classes, not analytical decimal precision. Footwear width is presented as categorical A-E distribution only and is not a raw millimetre width table unless and until an approved width-conversion validation is completed. These codes and values are not used for public conformity claims until approved through the applicable RSB standards-development process.

Table A.1 — Footwear Mondopoint length-class chart - Analytical basis, published cells with $N \geq 10$ (22 rows)

Rwanda size code	Sex	Mondopoint length class mm	Foot length class mm	Foot length P50 mm	Indicative shoe size cm	Width A %	Width B %	Width C %	Width D %	Width E %	Cell N	Cell share %
RW-FW-F-220	F	220	220	220	22	5	5	43	33	14	21	4

Rwanda size code	Sex	Mondopoint length class mm	Foot length class mm	Foot length P50 mm	Indicative shoe size cm	Width A %	Width B %	Width C %	Width D %	Width E %	Cell N	Cell share %
RW-FW-F-225	F	225	225	225	22.5	13	17	33	27	10	30	6
RW-FW-F-230	F	230	230	230	23	9	20	32	29	10	69	13
RW-FW-F-235	F	235	235	235	23.5	14	28	29	26	4	86	16
RW-FW-F-240	F	240	240	240	24	10	32	34	22	1	97	18
RW-FW-F-245	F	245	245	245	24.5	10	35	30	22	3	69	13
RW-FW-F-250	F	250	250	250	25	22	40	28	10	0	68	13
RW-FW-F-255	F	255	255	255	25.5	17	35	41	7	0	29	5
RW-FW-F-260	F	260	260	260	26	28	40	28	2	2	43	8
RW-FW-F-265	F	265	265	265	26.5	46	27	27	0	0	11	2
RW-FW-M-230	M	230	230	230	23	0	50	20	30	0	10	2
RW-FW-M-235	M	235	235	235	23.5	14	36	21	21	7	14	3
RW-FW-M-240	M	240	240	240	24	4	33	41	11	11	27	5
RW-FW-M-245	M	245	245	245	24.5	3	14	48	31	3	29	6

Rwanda size code	Sex	Mondopoint length class mm	Foot length class mm	Foot length P50 mm	Indicative shoe size cm	Width A %	Width B %	Width C %	Width D %	Width E %	Cell N	Cell share %
RW-FW-M-250	M	250	250	250	25	4	32	41	19	5	79	15
RW-FW-M-255	M	255	255	255	25.5	22	35	27	10	6	63	12
RW-FW-M-260	M	260	260	260	26	21	42	27	10	0	77	15
RW-FW-M-265	M	265	265	265	26.5	18	42	28	10	2	60	11
RW-FW-M-270	M	270	270	270	27	38	38	20	5	0	64	12
RW-FW-M-275	M	275	275	275	27.5	44	37	14	5	0	43	8
RW-FW-M-280	M	280	280	280	28	67	11	15	7	0	27	5
RW-FW-M-285	M	285	285	285	28.5	55	27	0	9	9	11	2
NOTE "Cell share (%)" indicates the proportion of the published analytical cohort falling within the relevant Annex A foot-length class. It is not the same as the statistical coverage ratio used in size-system evaluation.												

A.3 Width-grade technical note

Footwear width information was captured as coded Mondopoint-style width grades. The numeric component was converted to millimetres for length-class analysis, while the alphabetic component was retained as a categorical width-fit indicator.

Direct raw foot-breadth-in-millimetres analysis is limited unless an approved width-grade conversion table is confirmed. The A-E width-grade percentages in Table A.1 are therefore categorical fit evidence only and shall not be treated as a normative millimetre-based width boundary.

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- [1] ISO 20685-2:2015, *Ergonomics — 3-D scanning methodologies for internationally compatible anthropometric databases — Part 2: Evaluation protocol for surface shape*
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- [4] EN 13402-3:2017, *Size designation of clothes — Size labelling based on body measurements and intervals*
- [5] EN ISO 17709:2004, *Footwear — Sizing — Vocabulary and terminology*
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