INTERNATIONAL STANDARD

ISO 11922-2

First edition
1997-04-15

Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances —

Part 2:
Inch-based series

Tubes en matières thermoplastiques pour le transport des fluides — Dimensions et tolérances —

Partie 2: Série basée sur les inches

Reference number
ISO 11922-2:1997(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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.

International Standard ISO 11922-2 was prepared by Technical Committee ISO/TC 138, *Plastics pipes, fittings and valves for the transport of fluids*.

Together with ISO 11922-1, it cancels and replaces ISO 3606:1976, ISO 3607:1977, ISO 3608:1976 and ISO 3609:1977.

ISO 11922 consists of the following parts, under the general title *Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances*:

— *Part 1: Metric series*

— *Part 2: Inch-based series*

Annex A of this part of ISO 11922 is for information only.

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Printed in Switzerland

Introduction

In the past, International Standards specifying the tolerances to be applied to thermoplastics pipes have covered individual materials separately. The philosophy of ISO 11922 is to combine these already published standards into a single two-part standard covering the tolerances for extruded pipes manufactured from all thermoplastics materials, thus avoiding the need for a standard to be developed for each individual material.

ISO 11922 therefore contains a number of tolerance grades covering the mean outside diameter, the out-of-roundness of the outside diameter, the wall thickness at any point and the mean wall thickness. The bodies responsible for writing the various product and system standards will choose, from the specified tolerance grades, that grade which is suitable for the application and material involved.

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Thermoplastics pipes for the conveyance of fluids — Dimensions and tolerances —

Part 2:
Inch-based series

1 Scope

This part of ISO 11922 specifies tolerance grades for the outside diameter, out-of-roundness and wall thickness of inch-based thermoplastics pipes for the conveyance of fluids and manufactured with nominal outside diameters and nominal pressures in accordance with ISO 161-2[1] (see annex A).

It is applicable to smooth thermoplastics pipes of constant circular cross-section along the whole length of the pipe, whatever the method of manufacture, the pipe material or the intended application.

NOTE — It is intended that the tolerance grades specified in product standards be selected from this part of ISO 11922, taking into account the material and the intended application.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 11922. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this part of ISO 11922 are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3126:1974, *Plastics pipes — Measurement of dimensions.*

3 Definitions

For the purposes of this part of ISO 11922, the following definitions apply.

3.1 nominal outside diameter, d_n: For inch-based series pipe conforming to ISO 161-2, the nominal outside diameter serves as a reference outside diameter, expressed in millimetres, to which the permissible deviations are applied as positive and/or negative values.

3.2 Outside diameter, d_e

3.2.1 mean outside diameter, d_{em}: The measured length of the outer circumference of the pipe divided by π[1], rounded up to the nearest 0,1 mm.

3.2.2 minimum mean outside diameter, $d_{em,min}$: The minimum value of the mean outside diameter specified in the applicable pipe standard. It is equal to the nominal outside diameter d_n, expressed in millimetres.

3.2.3 maximum mean outside diameter, $d_{em,max}$: The maximum value of the mean outside diameter specified in the applicable pipe standard.

3.2.4 outside diameter at any point, d_{ey}: The measured outside diameter through the cross-section at any point of the pipe, rounded up to the nearest 0,1 mm.

3.2.5 out-of-roundness: The difference between the measured maximum outside diameter and the measured minimum outside diameter in the same cross-sectional plane of the pipe.

3.3 Terms relating to tolerances[2]

3.3.1 tolerance: The permissible variation of the specified value of a quantity, expressed as the difference between permissible maximum and minimum values.

3.3.2 permissible deviation: The difference between a permissible limiting value and a reference value.

3.3.3 tolerance grade: In a standardized system of limits and fits, a group of tolerances considered as corresponding to the same level of accuracy for all basic sizes.

3.4 Wall thickness, e

3.4.1 wall thickness at any point, e_y: The measured wall thickness at any point around the circumference of the pipe, rounded up to the nearest 0,1 mm.

3.4.2 minimum wall thickness, $e_{y,min}$: The minimum wall thickness for the pipe specified in the applicable pipe standard.

3.4.3 maximum wall thickness, $e_{y,max}$: The maximum wall thickness for the pipe specified in the applicable pipe standard.

3.4.4 mean wall thickness, e_m: The arithmetic mean of at least four measurements regularly spaced around the same cross-sectional plane of the pipe, including the measured minimum and maximum values obtained, rounded up to the nearest 0,1 mm.

NOTE — The minimum number of measurements will be specified in the applicable pipe standard. The actual number of measurements will then depend on the fact that the measurement points have to be regularly spaced round the cross-sectional plane and, in addition, have to include both the minimum and the maximum measured values.

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1) The value for π is taken to be 3,142.

2) These definitions are consistent with ISO 286-1[2].

4 Tolerances on outside diameters

4.1 Mean outside diameter

For pipes conforming to ISO 161-2, no relationships are specified or implied between the nominal outside diameter d_n and either the minimum outside diameter $d_{e,min}$ (expressed in millimetres) or the maximum outside diameter $d_{e,max}$ (expressed in millimetres) except that d_n shall lie within, or at either limit of, the range $d_{e,min}$ to $d_{e,max}$. The nominal outside diameter specified in ISO 161-2 therefore serves as a reference mean outside diameter relative to which the permissible deviation may comprise positive (y) and/or negative (z) values. The actual limits on outside diameters for such pipes shall therefore be obtained by choosing, from table 1 of this part of ISO 11922, a tolerance x appropriate to the nominal size, application and material of the pipe, and expressing that tolerance in the form $^{+y}_{-z}$ mm relative to the nominal outside diameter as the reference, where $x = y + z$.

NOTE — In this context, the term "mean outside diameter" is the arithmetic mean of a series of diameter measurements, and not the central (median) value in a range of permissible diameters.

Because $d_{e,min}$ is not directly related to the outside diameter of a pipe as specified in ISO 161-2, the values given in table 1 for tolerance grades F, G and H have been calculated using the same relationship as that used in ISO 11922-1[3] for grades A, B and C, respectively, where the value of the nominal outside diameter, in millimetres, appropriate to the nominal size as specified in ISO 161-2, has been used in place of $d_{e,min}$.

Grade F: For all nominal outside diameters, the tolerance equals $0{,}009d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 0,3 mm and a maximum value of 9,2 mm.

Grade G: For all nominal outside diameters, the tolerance equals $0{,}006d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 0,3 mm and a maximum value of 4,0 mm.

Grade H: For all nominal outside diameters, the tolerance equals $0{,}003d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 0,3 mm and a maximum value of 2,0 mm.

4.2 Out-of-roundness of outside diameter

Three tolerance grades are given in table 2. The tolerance values for each grade are calculated from the nominal outside diameter d_n specified in the applicable product standard, all diameters being expressed in millimetres. The calculation factors used are based on practical experience. Grade P is recommended for coiled pipe, subject to an appropriate relaxation treatment being specified in the product standard.

Grade P: The tolerance equals $0{,}06d_n$, rounded up to the nearest 0,1 mm, and is applicable to nominal outside diameters $\leqslant$ 114,3.

Grade Q: The tolerance equals $0{,}024d_n$, rounded up to the nearest 0,1 mm, with a minimum value of 1,0 mm.

Grade R:

a) For nominal outside diameters $\leqslant$ 75,3, the tolerance equals $(0{,}008d_n + 1)$ mm, rounded up to the nearest 0,1 mm.

b) For nominal outside diameters $>$ 75,3 but $\leqslant$ 244,5, the tolerance equals $0{,}02d_n$, rounded up to the nearest 0,1 mm.

c) For nominal outside diameters $>$ 244,5, the tolerance equals $0{,}035d_n$, rounded up to the nearest 0,1 mm.

NOTE — The applicable pipe standard will specify the point in time at which the out-of-roundness is to be measured, e.g. at the time of extrusion, the time the product leaves the factory or the time of use.

Table 1 — Tolerances on mean outside diameters — Inch-based series

Tolerances in millimetres

Nominal outside diameter d_n	Tolerances		
	Grade F	Grade G	Grade H
10,2	0,3	0,3	0,3
13,5	0,3	0,3	0,3
17,2	0,3	0,3	0,3
21,3	0,3	0,3	0,3
26,9	0,3	0,3	0,3
33,7	0,4	0,3	0,3
42,4	0,4	0,3	0,3
48,3	0,5	0,3	0,3
60,3	0,6	0,4	0,3
75,3	0,7	0,5	0,3
88,9	0,8	0,6	0,3
101,6	1,0	0,7	0,4
114,3	1,1	0,7	0,4
140,3	1,3	0,9	0,5
168,3	1,6	1,1	0,5
193,7	1,8	1,2	0,6
219,1	2,0	1,4	0,7
244,5	2,2	1,5	0,8
273	2,5	1,7	0,9
323,9	3,0	2,0	1,0
355,6	3,2	2,2	1,1
406,4	3,7	2,5	1,2
457,2	4,2	2,8	1,4
508	4,6	3,1	1,5
558,2	5,1	3,4	1,7
609,6	5,5	3,7	1,8
660,4	6,0	4,0	1,9
711,2	6,4	4,0	2,0
762	6,9	4,0	2,0
812,8	7,4	4,0	2,0
863,6	7,8	4,0	2,0
914,4	8,3	4,0	2,0
1 016	9,2	4,0	2,0

Table 2 — Tolerances on out-of-roundness — Inch-based series

Tolerances in millimetres

Nominal outside diameter d_n	Tolerances		
	Grade P	Grade Q	Grade R
10,2	0,7	1,0	1,1
13,5	0,9	1,0	1,2
17,2	1,1	1,0	1,2
21,3	1,3	1,0	1,2
26,9	1,7	1,0	1,2
33,7	2,1	1,0	1,3
42,4	2,6	1,1	1,4
48,3	2,9	1,2	1,4
60,3	3,7	1,5	1,5
75,3	4,6	1,9	1,7
88,9	5,4	2,2	1,8
101,6	6,4	2,6	2,2
114,3	6,9	2,8	2,3
140,3	—	3,4	2,9
168,3	—	4,1	3,4
193,7	—	4,7	3,9
219,1	—	5,3	4,4
244,5	—	5,9	4,9
273	—	6,6	9,6
323,9	—	7,8	11,4
355,6	—	8,6	12,5
406,4	—	9,8	14,3
457,2	—	11,0	16,1
508	—	12,2	17,8
558,2	—	13,5	19,6
609,6	—	14,7	21,4
660,4	—	15,9	23,2
711,2	—	17,1	24,9
762	—	18,3	26,7

5 Tolerances on wall thickness

5.1 Wall thickness at any point e_y

Three tolerance grades are given in tables 3, 4 and 5 which cover minimum wall thicknesses $e_{y,min}$ up to 50 mm (tables 3 and 4) and 46 mm (table 5). The tolerance grade may be specified in product standards.

The tolerance values in tables 3, 4 and 5 are calculated from the relationships given below, where all values are expressed in millimetres, the relationships being based on practical experience of the extrusion of thermoplastics pipes of wall thickness up to 50 mm. The tolerance values specified in table 5 are normally used for pipes which are to be connected by mechanical fittings where it is necessary to have a tight tolerance on the wall thickness to allow compression of the pipe material without the need for extra sealing rings.

Grade T (see table 3):

a) For $e_{y,min} \leqslant 4{,}6$, the tolerance equals $(0{,}1e_{y,min} + 0{,}2)$ mm, rounded up to the nearest 0,1 mm.

b) For $e_{y,min} > 4{,}6$, the tolerance equals $0{,}15e_{y,min}$, rounded up to the nearest 0,1 mm.

Grade U (see table 4): For $e_{y,min} > 3{,}5$, the tolerance equals $0{,}2e_{y,min}$, rounded up to the nearest 0,1 mm.

Grade V (see table 5): For $e_{y,min} \leqslant 46$, the tolerance equals $(0{,}1e_{y,min} + 0{,}1)$ mm, rounded up to the nearest 0,1 mm.

The tolerances obtained for $e_{y,min}$ are used to determine $e_{y,max}$ from the following equation:

$$e_{y,max} = (e_{y,min} + t_y)$$

where t_y is the tolerance for the grade and minimum wall thickness concerned.

The limits for e_y shall be expressed as a positive permissible deviation relative to $e_{y,min}$, viz:

$$e_y = e_{y,min}\ {}^{+t_y}_{0}$$

Table 3 — Tolerances on wall thickness at any point — Grade T

Dimensions in millimetres

Minimum wall thickness $e_{y,min}$		Grade T tolerance t_y	Minimum wall thickness $e_{y,min}$		Grade T tolerance t_y
>	⩽		>	⩽	
—	1,0	0,3	25,3	26,0	3,9
1,0	2,0	0,4	26,0	26,6	4,0
2,0	3,0	0,5	26,6	27,3	4,1
3,0	4,0	0,6	27,3	28,0	4,2
4,0	4,6	0,7	28,0	28,6	4,3
4,6	5,3	0,8	28,6	29,3	4,4
5,3	6,0	0,9	29,3	30,0	4,5
6,0	6,6	1,0	30,0	30,6	4,6
6,6	7,3	1,1	30,6	31,3	4,7
7,3	8,0	1,2	31,3	32,0	4,8
8,0	8,6	1,3	32,0	32,6	4,9
8,6	9,3	1,4	32,6	33,3	5,0
9,3	10,0	1,5	33,3	34,0	5,1
10,0	10,6	1,6	34,0	34,6	5,2
10,6	11,3	1,7	34,6	35,3	5,3
11,3	12,0	1,8	35,3	36,0	5,4
12,0	12,6	1,9	36,0	36,6	5,5
12,6	13,3	2,0	36,6	37,3	5,6
13,3	14,0	2,1	37,3	38,0	5,7
14,0	14,6	2,2	38,0	38,6	5,8
14,6	15,3	2,3	38,6	39,3	5,9
15,3	16,0	2,4	39,3	40,0	6,0
16,0	16,6	2,5	40,0	40,6	6,1
16,6	17,3	2,6	40,6	41,3	6,2
17,3	18,0	2,7	41,3	42,0	6,3
18,0	18,6	2,8	42,0	42,6	6,4
18,6	19,3	2,9	42,6	43,3	6,5
19,3	20,0	3,0	43,3	44,0	6,6
20,0	20,6	3,1	44,0	44,6	6,7
20,6	21,3	3,2	44,6	45,3	6,8
21,3	22,0	3,3	45,3	46,0	6,9
22,0	22,6	3,4	46,0	46,6	7,0
22,6	23,3	3,5	46,6	47,3	7,1
23,3	24,0	3,6	47,3	48,0	7,2
24,0	24,6	3,7	48,0	48,6	7,3
24,6	25,3	3,8	48,6	49,3	7,4
			49,3	50,0	7,5

Table 4 — Tolerances on wall thickness at any point — Grade U

Dimensions in millimetres

Minimum wall thickness $e_{y,min}$		Grade U tolerance t_y	Minimum wall thickness $e_{y,min}$		Grade U tolerance t_y	Minimum wall thickness $e_{y,min}$		Grade U tolerance t_y
>	⩽		>	⩽		>	⩽	
3,5	4,0	0,7	19,5	20,0	3,9	35,5	36,0	7,1
4,0	4,5	0,8	20,0	20,5	4,0	36,0	36,5	7,2
4,5	5,0	0,9	20,5	21,0	4,1	36,5	37,0	7,3
5,0	5,5	1,0	21,0	21,5	4,2	37,0	37,5	7,4
5,5	6,0	1,1	21,5	22,0	4,3	37,5	38,0	7,5
6,0	6,5	1,2	22,0	22,5	4,4	38,0	38,5	7,6
6,5	7,0	1,3	22,5	23,0	4,5	38,5	39,0	7,7
7,0	7,5	1,4	23,0	23,5	4,6	39,0	39,5	7,8
7,5	8,0	1,5	23,5	24,0	4,7	39,5	40,0	7,9
8,0	8,5	1,6	24,0	24,5	4,8	40,0	40,5	8,0
8,5	9,0	1,7	24,5	25,0	4,9	40,5	41,0	8,1
9,0	9,5	1,8	25,0	25,5	5,0	41,0	41,5	8,2
9,5	10,0	1,9	25,5	26,0	5,1	41,5	42,0	8,3
10,0	10,5	2,0	26,0	26,5	5,2	42,0	42,5	8,4
10,5	11,0	2,1	26,5	27,0	5,3	42,5	43,0	8,5
11,0	11,5	2,2	27,0	27,5	5,4	43,0	43,5	8,6
11,5	12,0	2,3	27,5	28,0	5,5	43,5	44,0	8,7
12,0	12,5	2,4	28,0	28,5	5,6	44,0	44,5	8,8
12,5	13,0	2,5	28,5	29,0	5,7	44,5	45,0	8,9
13,0	13,5	2,6	29,0	29,5	5,8	45,0	45,5	9,0
13,5	14,0	2,7	29,5	30,0	5,9	45,5	46,0	9,1
14,0	14,5	2,8	30,0	30,5	6,0	46,0	46,5	9,2
14,5	15,0	2,9	30,5	31,0	6,1	46,5	47,0	9,3
15,0	15,5	3,0	31,0	31,5	6,2	47,0	47,5	9,4
15,5	16,0	3,1	31,5	32,0	6,3	47,5	48,0	9,5
16,0	16,5	3,2	32,0	32,5	6,4	48,0	48,5	9,6
16,5	17,0	3,3	32,5	33,0	6,5	48,5	49,0	9,7
17,0	17,5	3,4	33,0	33,5	6,6	49,0	49,5	9,8
17,5	18,0	3,5	33,5	34,0	6,7	49,5	50,0	9,9
18,0	18,5	3,6	34,0	34,5	6,8			
18,5	19,0	3,7	34,5	35,0	6,9			
19,0	19,5	3,8	35,0	35,5	7,0			

Table 5 — Tolerances on wall thickness at any point — Grade V

Dimensions in millimetres

Minimum wall thickness $e_{y,min}$		Grade V tolerance t_y	Minimum wall thickness $e_{y,min}$		Grade V tolerance t_y
>	≤		>	≤	
2,0	3,0	0,4	24,0	25,0	2,6
3,0	4,0	0,5	25,0	26,0	2,7
4,0	5,0	0,6	26,0	27,0	2,8
5,0	6,0	0,7	27,0	28,0	2,9
6,0	7,0	0,8	28,0	29,0	3,0
7,0	8,0	0,9	29,0	30,0	3,1
8,0	9,0	1,0	30,0	31,0	3,2
9,0	10,0	1,1	31,0	32,0	3,3
10,0	11,0	1,2	32,0	33,0	3,4
11,0	12,0	1,3	33,0	34,0	3,5
12,0	13,0	1,4	34,0	35,0	3,6
13,0	14,0	1,5	35,0	36,0	3,7
14,0	15,0	1,6	36,0	37,0	3,8
15,0	16,0	1,7	37,0	38,0	3,9
16,0	17,0	1,8	38,0	39,0	4,0
17,0	18,0	1,9	39,0	40,0	4,1
18,0	19,0	2,0	40,0	41,0	4,2
19,0	20,0	2,1	41,0	42,0	4,3
20,0	21,0	2,2	42,0	43,0	4,4
21,0	22,0	2,3	43,0	44,0	4,5
22,0	23,0	2,4	44,0	45,0	4,6
23,0	24,0	2,5	45,0	46,0	4,7

5.2 Mean wall thickness e_m

Two tolerance grades are given in tables 6 and 7 which cover minimum wall thicknesses $e_{y,min}$ up to 50 mm. The tolerance grade may be specified in product standards.

The tolerance values in tables 6 and 7 are calculated from the following relationships, where all values are expressed in millimetres, the relationships being based on practical experience of the extrusion of thermoplastics pipes of wall thickness up to 50 mm.

Grade W (see table 6)**:** For all minimum wall thicknesses up to 50 mm, the tolerance equals $(0,1e_{y,min} + 0,2)$ mm, rounded up to the nearest 0,1 mm.

Grade X (see table 7)**:** For minimum wall thicknesses greater than 16 mm, the tolerance equals $(0,15e_{y,min} + 0,2)$ mm, rounded up to the nearest 0,1 mm.

For a cylindrical pipe, the minimum value of e_m equals the value of $e_{y,min}$, and the tolerance obtained thus determines the positive permissible deviation of e_m from $e_{y,min}$.

The limits for e_m shall therefore be expressed as:

$$e_m = e_{y,min}\ ^{+t_m}_{0}$$

where

$e_{y,min}$ is as specified in the applicable pipe standard, in millimetres;

t_m is the tolerance value from table 6 or 7, as applicable, in millimetres.

6 Measurement of dimensions

All measurements of outside diameter and wall thickness shall be made in accordance with the method specified in the applicable pipe standard, or in accordance with ISO 3126.

Table 6 — Tolerances on mean wall thickness — Grade W

Dimensions in millimetres

Minimum wall thickness $e_{y,min}$		Grade W tolerance t_m	Minimum wall thickness $e_{y,min}$		Grade W tolerance t_m
>	≤		>	≤	
—	1,0	0,3	25,0	26,0	2,8
1,0	2,0	0,4	26,0	27,0	2,9
2,0	3,0	0,5	27,0	28,0	3,0
3,0	4,0	0,6	28,0	29,0	3,1
4,0	5,0	0,7	29,0	30,0	3,2
5,0	6,0	0,8	30,0	31,0	3,3
6,0	7,0	0,9	31,0	32,0	3,4
7,0	8,0	1,0	32,0	33,0	3,5
8,0	9,0	1,1	33,0	34,0	3,6
9,0	10,0	1,2	34,0	35,0	3,7
10,0	11,0	1,3	35,0	36,0	3,8
11,0	12,0	1,4	36,0	37,0	3,9
12,0	13,0	1,5	37,0	38,0	4,0
13,0	14,0	1,6	38,0	39,0	4,1
14,0	15,0	1,7	39,0	40,0	4,2
15,0	16,0	1,8	40,0	41,0	4,3
16,0	17,0	1,9	41,0	42,0	4,4
17,0	18,0	2,0	42,0	43,0	4,5
18,0	19,0	2,1	43,0	44,0	4,6
19,0	20,0	2,2	44,0	45,0	4,7
20,0	21,0	2,3	45,0	46,0	4,8
21,0	22,0	2,4	46,0	47,0	4,9
22,0	23,0	2,5	47,0	48,0	5,0
23,0	24,0	2,6	48,0	49,0	5,1
24,0	25,0	2,7	49,0	50,0	5,2

Table 7 — Tolerances on mean wall thickness — Grade X

Dimensions in millimetres

Minimum wall thickness $e_{y,min}$		Grade X tolerance t_m	Minimum wall thickness $e_{y,min}$		Grade X tolerance t_m
>	≤		>	≤	
16,0	16,7	2,7	32,7	33,3	5,2
16,7	17,3	2,8	33,3	34,0	5,3
17,3	18,0	2,9	34,0	34,7	5,4
18,0	18,7	3,0	34,7	35,3	5,5
18,7	19,3	3,1	35,3	36,0	5,6
19,3	20,0	3,2	36,0	36,7	5,7
20,0	20,7	3,3	36,7	37,3	5,8
20,7	21,3	3,4	37,3	38,0	5,9
21,3	22,0	3,5	38,0	38,7	6,0
22,0	22,7	3,6	38,7	39,3	6,1
22,7	23,3	3,7	39,3	40,0	6,2
23,3	24,0	3,8	40,0	40,7	6,3
24,0	24,7	3,9	40,7	41,3	6,4
24,7	25,3	4,0	41,3	42,0	6,5
25,3	26,0	4,1	42,0	42,7	6,6
26,0	26,7	4,2	42,7	43,3	6,7
26,7	27,3	4,3	43,3	44,0	6,8
27,3	28,0	4,4	44,0	44,7	6,9
28,0	28,7	4,5	44,7	45,3	7,0
28,7	29,3	4,6	45,3	46,0	7,1
29,3	30,0	4,7	46,0	46,7	7,2
30,0	30,7	4,8	46,7	47,3	7,3
30,7	31,3	4,9	47,3	48,0	7,4
31,3	32,0	5,0	48,0	48,7	7,5
32,0	32,7	5,1	48,7	49,3	7,6