

INTERNATIONAL STANDARD

ISO
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Third edition
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Test sieves — Technical requirements and testing —

Part 1:

Test sieves of metal wire cloth

Tamis de contrôle — Exigences techniques et vérifications —

Partie 1: Tamis de contrôle en tissus métalliques



Reference number
ISO 3310-1:1990(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 3310-1 was prepared by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*.

This third edition cancels and replaces the second edition (ISO 3310-1:1982), of which it constitutes a technical revision.

ISO 3310 consists of the following parts, under the general title *Test sieves — Technical requirements and testing*:

- *Part 1: Test sieves of metal wire cloth*
- *Part 2: Test sieves of perforated metal plate*
- *Part 3: Test sieves of electroformed sheets*

Annex A of this part of ISO 3310 is for information only.

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Introduction

As the accuracy of test sieving depends on the dimensional accuracy of the test sieve openings, it was considered necessary in this part of ISO 3310 to keep the tolerances on the apertures in metal wire cloth as close as possible.

Requirements other than tolerances on the apertures, such as requirements for the wire diameter, have not been limited more closely than necessary, since the influence of these criteria on test sieving is of minor importance, and excessively strict requirements may make manufacturing unnecessarily difficult.

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Test sieves — Technical requirements and testing —

Part 1:

Test sieves of metal wire cloth

1 Scope

This part of ISO 3310 specifies the technical requirements and corresponding test methods for test sieves of metal wire cloth.

It applies to test sieves having aperture sizes from 125 mm down to 20 μm , in accordance with ISO 565.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 3310. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 3310 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings.*

ISO 2395:—¹⁾, *Test sieves and test sieving — Vocabulary.*

3 Definitions

For the purposes of this part of ISO 3310, the definitions given in ISO 2395 apply.

4 Designation

4.1 Test sieves of metal wire cloth shall be designated by the nominal size of the apertures of the metal wire cloth.

4.2 Nominal sizes of 1 mm and above shall be expressed in millimetres (mm); nominal sizes below 1 mm shall be expressed in micrometres (μm).

5 Metal wire cloth

5.1 Requirements

Aperture tolerances and wire diameters shall be as specified in table 1 and table 2.

1) To be published. (Revision of ISO 2395:1972.)

Table 1 — Aperture tolerances and wire diameters — Millimetre sizes

Nominal aperture sizes ^{1) w}			Tolerances on aperture size			Wire diameters <i>d</i>		
Principal sizes R 20/3	Supplementary sizes		For any aperture size + <i>X</i>	For average aperture size ± <i>Y</i>	Intermediate tolerance + <i>Z</i>	Preferred sizes <i>d</i> _{nom}	Permissible range of choice	
	R 20	R 40/3					<i>d</i> _{max}	<i>d</i> _{min}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
125	125	125	4,51	3,66	4,09	8	9,2	6,8
	112		4,15	3,29	3,72	8	9,2	6,8
	100	106	3,99 3,82	3,12 2,94	3,55 3,38	6,3 6,3	7,2 7,2	5,4 5,4
90	90	90	3,53	2,66	3,09	6,3	7,2	5,4
	80		3,24	2,37	2,8	6,3	7,2	5,4
	71	75	3,09 2,97	2,22 2,1	2,65 2,54	6,3 5,6	7,2 6,4	5,4 4,8
63	63	63	2,71	1,87	2,29	5,6	6,4	4,8
	56		2,49	1,67	2,08	5	5,8	4,3
	50	53	2,39 2,29	1,58 1,49	1,99 1,89	5 5	5,8 5,8	4,3 4,3
45	45	45	2,12	1,35	1,73	4,5	5,2	3,8
	40		1,94	1,2	1,57	4,5	5,2	3,8
	35,5	37,5	1,85 1,78	1,13 1,07	1,49 1,42	4,5 4	5,2 4,6	3,8 3,4
31,5	31,5	31,5	1,63	0,95	1,29	4	4,6	3,4
	28		1,5	0,85	1,17	3,55	4,1	3
	25	26,5	1,44 1,38	0,8 0,76	1,12 1,07	3,55 3,55	4,1 4,1	3 3
22,4	22,4	22,4	1,27	0,68	0,98	3,55	4,1	3
	20		1,17	0,61	0,89	3,15	3,6	2,7
	18	19	1,13 1,08	0,58 0,55	0,85 0,82	3,15 3,15	3,6 3,6	2,7 2,7
16	16	16	0,99	0,49	0,74	3,15	3,6	2,7
	14		0,9	0,43	0,67	2,8	3,2	2,4
	12,5	13,2	0,86 0,83	0,41 0,39	0,64 0,61	2,8 2,5	3,2 2,9	2,4 2,1
11,2	11,2	11,2	0,77	0,35	0,56	2,5	2,9	2,1
	10		0,71	0,31	0,51	2,5	2,9	2,1
	9	9,5	0,68 0,65	0,3 0,28	0,49 0,47	2,24 2,24	2,6 2,6	1,9 1,9
8	8	8	0,6	0,25	0,43	2	2,3	1,7
	7,1		0,55	0,22	0,38	1,8	2,1	1,5
	6,3	6,7	0,53 0,51	0,21 0,2	0,37 0,35	1,8 1,8	2,1 2,1	1,5 1,5
5,6	5,6	5,6	0,47	0,18	0,32	1,6	1,9	1,3
	5		0,43	0,16	0,29	1,6	1,9	1,3
	4,5	4,75	0,41 0,4	0,15 0,14	0,28 0,27	1,6 1,4	1,9 1,7	1,3 1,2
4	4	4	0,37	0,13	0,25	1,4	1,7	1,2

Nominal aperture sizes ¹⁾ <i>w</i>			Tolerances on aperture size			Wire diameters <i>d</i>		
Principal sizes R 20/3	Supplementary sizes		For any aperture size + <i>X</i>	For average aperture size $\pm Y$	Intermediate tolerance + <i>Z</i>	Preferred sizes <i>d</i> _{nom}	Permissible range of choice	
	R 20	R 40/3					<i>d</i> _{max}	<i>d</i> _{min}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2,8	3,55	3,35	0,34	0,11	0,23	1,25	1,5	1,06
	3,15		0,32	0,11	0,22	1,25	1,5	1,06
	2,8		0,31	0,1	0,21	1,25	1,5	1,06
	2,5	2,36	0,29	0,09	0,19	1,12	1,3	0,95
	2,24		0,26	0,08	0,17	1	1,15	0,85
2	2	2	0,25	0,08	0,17	1	1,15	0,85
			0,24	0,07	0,16	0,9	1,04	0,77
	1,8	1,7	0,23	0,07	0,15	0,9	1,04	0,77
	1,6		0,21	0,06	0,14	0,8	0,92	0,68
1,4	1,4	1,4	0,2	0,06	0,13	0,8	0,92	0,68
			0,19	0,05	0,12	0,8	0,92	0,68
	1,25	1,18	0,18	0,05	0,11	0,71	0,82	0,6
	1,12		0,16	0,04	0,1	0,63	0,72	0,54
	1		0,16	0,04	0,1	0,63	0,72	0,54
1	1	1	0,15	0,04	0,1	0,56	0,64	0,48
1	1	1	0,14	0,03	0,09	0,56	0,64	0,48

1) In accordance with ISO 565:1990, table 1.
NOTE — All aperture sizes apply for plain weave.

Table 2 — Aperture tolerances and wire diameters — Micrometre sizes

Nominal aperture sizes ¹⁾ <i>w</i>			Tolerances on aperture size			Wire diameters <i>d</i>		
Principal sizes R 20/3	Supplementary sizes		For any aperture size + <i>X</i>	For average aperture size $\pm Y$	Intermediate tolerance + <i>Z</i>	Preferred sizes <i>d</i> _{nom}	Permissible range of choice	
	R 20	R 40/3					<i>d</i> _{max}	<i>d</i> _{min}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
710	900	850	131	31	81	500	580	430
	800		127	29	78	500	580	430
	710		122	28	75	450	520	380
	630	600	112	25	69	450	520	380
	560		104	22	63	400	460	340
500	500	500	101	21	61	400	460	340
			96	20	58	355	410	300
	450	425	89	18	54	315	360	270
	400		84	16	50	280	320	240
355	355	355	81	16	48	280	320	240
			78	15	47	250	290	210
	315	300	72	13	43	224	260	190
	280		67	12	40	200	230	170
250	65		12	38	200	230	170	
250	250	250	62	11	37	180	210	150
250	250	250	58	9,9	34	160	190	130

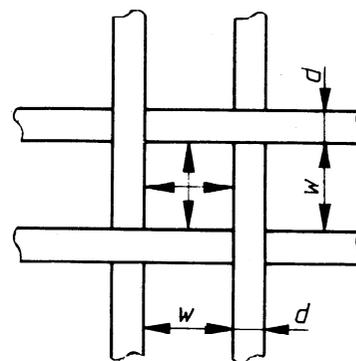
Nominal aperture sizes ¹⁾ w			Tolerances on aperture size			Wire diameters d		
Principal sizes R 20/3	Supplementary sizes		For any aperture size $+X$	For average aperture size $\pm Y$	Intermediate tolerance $+Z$	Preferred sizes d_{nom}	Permissible range of choice	
	R 20	R 40/3					d_{max}	d_{min}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
180	224	212	54	9	32	160	190	130
	200		52	8,7	30	140	170	120
	180	180	50	8,3	29	140	170	120
	160	150	47	7,6	27	125	150	106
	140		44	6,9	25	112	130	95
125	125	125	43	6,6	25	100	115	85
			41	6,3	24	100	115	85
	112	106	38	5,8	22	90	104	77
	100		36	5,4	21	80	92	68
90	90	90	35	5,2	20	71	82	60
			34	5	19	71	82	60
	80	75	32	4,6	18	63	72	54
71	30			4,3	17	56	64	48
63	63	63	29	4,1	17	50	58	43
			28	4	16	50	58	43
	56	53	26	3,7	15	45	52	38
	50			25	3,5	14	40	46
45	45	45	24	3,4	14	36	41	31
			23	3,3	13	36	41	31
	40	38	22	3,1	13	32	37	27
	36			2,9	11	30	35	24
	R'10	36	20	2,8	11	30	35	24
32	19			2,7	11	28	33	23
25	16			2,5	9	25	29	21
20	14	2,3	8	20	23	17		

1) In accordance with ISO 565:1990, table 2.

NOTE — All aperture sizes apply for plain weave. Aperture sizes of 63 μm and smaller apply also for twilled weave.

5.1.1 Aperture tolerances

5.1.1.1 The aperture tolerances X , Y and Z as given in table 1 and table 2, columns 4, 5 and 6, apply to the aperture sizes as measured on the centre lines of the aperture (see figure 1) in both the warp and the weft directions.



w is the aperture size
 d is the wire diameter

Figure 1

5.1.1.2 No aperture size shall exceed the nominal size by more than X , where

$$X = \frac{2w^{0,75}}{3} + 4w^{0,25} \quad \dots (1)$$

where X and w are expressed in micrometres.

5.1.1.3 The average aperture size shall not depart from the nominal size by more than $\pm Y$, where

$$Y = \frac{w^{0,98}}{27} + 1,6 \quad \dots (2)$$

where Y and w are expressed in micrometres.

5.1.1.4 Not more than 6 % of the total number of apertures shall have sizes between "nominal + X " and "nominal + Z ", where

$$Z = \frac{X + Y}{2} \quad \dots (3)$$

When a sieve has less than 50 apertures, not more than 3 apertures shall fall within the limits of "nominal + X " and "nominal + Z ".

5.1.2 Wire diameter

5.1.2.1 The wire diameters given in table 1 and table 2 apply to metal wire cloth mounted in a frame.

5.1.2.2 The nominal wire diameters given in table 1 and table 2, column 7, are preferred.

The nominal wire diameters specified in national standards may, however, depart from these values within the limits d_{\max} and d_{\min} (columns 8 and 9). These limits define the permissible range of choice, approximately 15 %, about the nominal values given in column 7.

5.1.2.3 The wires in a test sieve shall be of a similar diameter in the warp and the weft directions.

5.2 Test methods

Every aperture in the metal wire cloth in a test sieve shall have the same probability of being inspected for compliance with the requirements listed in 5.1.

For sieves having 20 apertures or less, measure all apertures. For sieves having more than 20 apertures, carry out the examination in the following stages: a survey of the general condition of the wire cloth, a methodical scrutiny of individual apertures, and finally measurement of aperture sizes for compliance with the tolerances.

In tests 2, 3 and 4 below, measure the aperture sizes using appropriate equipment having a precision of reading of at least $2,5 \mu\text{m}$ or $1/10$ of the intermediate tolerance for the nominal aperture concerned, whichever is greater.

Test 1 — Examination of general condition of the wire cloth

View the wire cloth against a uniformly illuminated background. If obvious deviations from uniformity of appearance are found, for example weaving defects, creases, wrinkles, and foreign matter, the sieve is unacceptable.

Test 2 — Examination of apertures for tolerance X

Carefully and methodically examine the appearance of all the apertures in order to detect oversize apertures for subsequent measurement.

Apertures whose width deviates by about 10 % of the average value are apparent to the unaided eye of a skilled observer. By this method, it is probable that all oversize apertures exceeding the average value by about 10 % or more will be detected. At the same time it is possible to detect sequences of large apertures and local irregularities in the weaving which appear as distortions of the apertures.

If any aperture is found to be oversize by more than the maximum permissible deviation X , the sieve is unacceptable.

Test 3 — Assessment of apertures exceeding the intermediate limit of "nominal size + Z "

Count the number or determine the proportion of apertures whose widths are between the limits of "nominal + Z " and "nominal + X " (see 5.1.1) from representative sample regions. If the number or proportion of apertures determined is greater than the limits given in 5.1.1.4, the sieve is unacceptable.

Test 4 — Measurement of average aperture size and average wire diameter

After a sieve has been found to be acceptable in accordance with tests 1 to 3, carry out measurements of the average aperture size and wire diameter on sample regions as follows.

Measure the average aperture size over at least 10 apertures, if available, in each direction (warp and weft) of at least two sample regions on the woven wire cloth.

If the average aperture size and wire diameter determined are not in accordance with the appropriate values given in table 1 and table 2, the sieve is unacceptable.

6 Test sieve frame

By preference, it is recommended that the 200 mm round frame be used as far as possible, especially for metal wire cloth up to 1 mm nominal aperture size. A smaller round frame may be appropriate for very fine sieves and for very small quantities of ma-