
International Standard



3310/1

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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

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3310/1 was developed by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*, and was circulated to the member bodies in March 1981.

It has been approved by the member bodies of the following countries :

Australia	Ireland	South Africa, Rep. of
Belgium	Italy	Spain
Brazil	Japan	Switzerland
Canada	Korea, Dem. P. Rep. of	United Kingdom
Egypt, Arab Rep. of	Korea, Rep. of	USA
France	Netherlands	USSR
Germany, F.R.	Portugal	
India	Romania	

No member body expressed disapproval of the document.

This second edition cancels and replaces the first edition (i.e. ISO 3310/1-1975).

This International Standard is a revision of ISO 3310/1-1975 with addition of clause 3.1.2 "Test sieve frame" from ISO 2591-1973, as it is considered desirable to state requirements for the sieve frame alongside those for the sieving medium.

Test sieves — Technical requirements and testing — Part 1: Test sieves of metal wire cloth

0 Introduction

Since the accuracy of test sieving depends largely on the dimensional accuracy of the test sieve apertures, it is considered particularly important to keep the permissible tolerances for the dimensions of apertures in woven wire cloth as close as possible. Other requirements, however, such as for wire diameter in woven wire cloth, 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.

Special importance has been attached to describing test methods appropriate to woven wire cloth in test sieves.

Testing very fine wire cloth presents difficulties, as the number of apertures in a 200 mm test sieve may amount to many thousands. The so-called "handicap method" is considered a reliable and economic test for a first survey of aperture size.

1 Scope and field of application

This International Standard specifies the technical requirements and corresponding examination methods for test sieves of metal wire cloth.

It applies to test sieves having aperture sizes from 125 mm down to 0,032 mm (32 μm). Tolerances for nominal aperture sizes below 0,032 to 0,020 mm (32 to 20 μm) are under study.

2 References

- ISO 3, *Preferred numbers — Series of preferred numbers.*
- ISO 497, *Guide to the choice of preferred numbers and of series containing more rounded values of preferred numbers.*
- ISO 565, *Test sieves — Woven metal wire cloth and perforated plate — Nominal sizes of apertures.*
- ISO 2395, *Test sieves and test sieving — Vocabulary.*
- ISO 2591, *Test sieving*
- ISO 3310/2, *Test sieves — Technical requirements and testing — Part 2: Test sieves of metal perforated plate.*

3 Designation

Test sieves of metal wire cloth are designated by the nominal size of aperture of the wire cloth.

Nominal aperture sizes of 1 mm and above, as well as their associated tolerances and wire diameters, are expressed in millimetres (mm); for aperture sizes smaller than 1 mm, the information is given in micrometres (μm).

4 Metal wire cloth

4.1 Requirements

Table 1 — Aperture tolerances and wire diameters

Values in millimetres

Nominal aperture sizes <i>w</i>				Tolerance on aperture size (see 4.1.1)			Wire diameters (see 4.1.2)		
Table 1 of ISO 565		Table 2 of ISO 565		Maximum tolerance for any one aperture + <i>X</i>	Tolerance for average aperture size ± <i>Y</i>	Inter- mediate tolerance + <i>Z</i>	Preferred size <i>d</i>	Permissible range of choice	
Principal sizes R 20/3	Supplemen- tary sizes R 20	Principal sizes R 20/3	Supplemen- tary sizes R 40/3					<i>d</i> _{max}	<i>d</i> _{min}
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
125	125	125	125	4,51	3,66	4,09	8	9,2	6,8
	112			4,15	3,29	3,72	8	9,2	5,8
			106	3,99	3,12	3,55	6,3	7,2	5,4
	100			3,82	2,94	3,38	6,3	7,2	5,4
90,0	90,0	90,0	90,0	3,53	2,66	3,09	6,3	7,2	5,4
	80,0			3,24	2,37	2,80	6,3	7,2	5,4
			75,0	3,09	2,22	2,65	6,3	7,2	5,4
	71,0			2,97	2,10	2,54	5,6	6,4	4,8
63,0	63,0	63,0	63,0	2,71	1,87	2,29	5,6	6,4	4,8
	56,0			2,49	1,67	2,08	5	5,8	4,3
			53,0	2,39	1,58	1,99	5	5,8	4,3
	50,0			2,29	1,49	1,89	5	5,8	4,3
45,0	45,0	45,0	45,0	2,12	1,35	1,73	4,5	5,2	3,8
	40,0			1,94	1,20	1,57	4,5	5,2	3,8
			37,5	1,85	1,13	1,49	4,5	5,2	3,8
	35,5			1,78	1,07	1,42	4	4,6	3,4
31,5	31,5	31,5	31,5	1,63	0,95	1,29	4	4,6	3,4
	28,0			1,50	0,85	1,17	3,55	4,1	3
			26,5	1,44	0,80	1,12	3,55	4,1	3
	25,0			1,38	0,76	1,07	3,55	4,1	3
22,4	22,4	22,4	22,4	1,27	0,68	0,98	3,55	4,1	3
	20,0			1,17	0,61	0,89	3,15	3,6	2,7
			19,0	1,13	0,58	0,85	3,15	3,6	2,7
	18,0			1,08	0,55	0,82	3,15	3,6	2,7
16,0	16,0	16,0	16,0	0,99	0,49	0,74	3,15	3,6	2,7
	14,0			0,90	0,43	0,67	2,8	3,2	2,4
			13,2	0,86	0,41	0,64	2,8	3,2	2,4
	12,5			0,83	0,39	0,61	2,5	2,9	2,1
11,2	11,2	11,2	11,2	0,77	0,35	0,56	2,5	2,9	2,1
	10,0			0,71	0,31	0,51	2,5	2,9	2,1
			9,50	0,68	0,30	0,49	2,24	2,6	1,9
	9,00			0,65	0,28	0,47	2,24	2,6	1,9
8,00	8,00	8,00	8,00	0,60	0,25	0,43	2	2,3	1,7
	7,10			0,55	0,22	0,38	1,8	2,1	1,5
			6,70	0,53	0,21	0,37	1,8	2,1	1,5
	6,30			0,51	0,20	0,35	1,8	2,1	1,5
5,60	5,60	5,60	5,60	0,47	0,18	0,32	1,6	1,9	1,3
	5,00			0,43	0,16	0,29	1,6	1,9	1,3
			4,75	0,41	0,15	0,28	1,6	1,9	1,3
	4,50			0,40	0,14	0,27	1,4	1,7	1,2
4,00	4,00	4,00	4,00	0,37	0,13	0,25	1,4	1,7	1,2
	3,55			0,34	0,11	0,23	1,25	1,5	1,06
			3,35	0,32	0,11	0,22	1,25	1,5	1,06
	3,15			0,31	0,10	0,21	1,25	1,5	1,06
2,80	2,80	2,80	2,80	0,29	0,09	0,19	1,12	1,3	0,95
	2,50			0,26	0,08	0,17	1	1,15	0,85
			2,36	0,25	0,08	0,17	1	1,15	0,85
	2,24			0,24	0,07	0,16	0,9	1,04	0,77
2,00	2,00	2,00	2,00	0,23	0,07	0,15	0,9	1,04	0,77
	1,80			0,21	0,06	0,14	0,8	0,92	0,68
			1,70	0,20	0,06	0,13	0,8	0,92	0,68
	1,60			0,19	0,05	0,12	0,8	0,92	0,68
1,40	1,40	1,40	1,40	0,18	0,05	0,11	0,71	0,82	0,6
	1,25			0,16	0,04	0,10	0,63	0,72	0,54
			1,18	0,16	0,04	0,10	0,63	0,72	0,54
	1,12			0,15	0,04	0,10	0,56	0,64	0,48
1,00	1,00	1,00	1,00	0,14	0,03	0,09	0,56	0,64	0,48

4 Metal wire cloth

4.1 Requirements

Table 1 (concluded)

Values in micrometres

Nominal aperture sizes w				Tolerance on aperture sizes (see 4.1.1)			Wire diameters (see 4.1.2)		
Table 1 of ISO 565		Table 2 of ISO 565		Maximum tolerance for any one aperture $+ X$	Tolerance for average aperture size $\pm Y$	Inter- mediate tolerance $+ Z$	Preferred size d	Permissible range of choice	
Principal sizes R 20/3	Supplemen- tary sizes R 20	Principal sizes R 20/3	Supplemen- tary sizes R 40/3					$d_{\max}$	$d_{\min}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
710	900	710	710	131	31	81	500	580	430
	800			127	29	78	500	580	430
	710			122	28	75	450	520	380
	630			112	25	69	450	520	380
	560			104	22	63	400	460	340
500	500	500	500	101	21	61	400	460	340
	450			96	20	58	355	410	300
	400			89	18	54	315	360	270
355	355	355	355	84	16	50	280	320	240
	315			81	16	48	280	320	240
	280			78	15	47	250	290	210
	250			72	13	43	224	260	190
	224			67	12	40	200	230	170
250	200	250	250	65	12	38	200	230	170
	180			62	11	37	180	210	150
	160			58	9,9	34	160	190	130
	140			54	9,0	32	160	190	130
	125			52	8,7	30	140	170	120
180	125	180	180	50	8,3	29	140	170	120
	112			47	7,6	27	125	150	106
	100			44	6,9	25	112	130	95
	90			43	6,6	25	100	115	85
	80			41	6,3	24	100	115	85
125	71	125	125	38	5,8	22	90	104	77
	63			36	5,4	21	80	92	68
	56			35	5,2	20	71	82	60
	50			34	5,0	19	71	82	60
	45			32	4,6	18	63	72	54
90	40	90	90	30	4,3	17	56	64	48
	36			29	4,1	17	50	58	43
	32			28	4,0	16	50	58	43
	28			26	3,7	15	45	52	38
	25			25	3,5	14	40	46	34
63	22	63	63	24	3,4	14	36	41	31
	20			23	3,3	13	36	41	31
				22	3,1	13	32	37	27
				21	3,0	12	32	37	27
				20	2,9	11	30	35	24
45		45	45	20	2,8	11	30	35	24
				19	2,7	11	28	33	23
				—	—	—	25	—	—
				—	—	—	25	—	—
				—	—	—	25	—	—
32		32	32	—	—	—	22	—	—
				—	—	—	22	—	—
				—	—	—	20	—	—

Notes

- 1 The nominal sizes of apertures are taken from ISO 565, table 1 with series R 20/3 as principal sizes and R 20 as supplementary sizes and table 2 with series R 20/3 as principal sizes and R 40/3 as supplementary sizes of preferred numbers given in ISO 3.
- 2 Sizes below 40 μm are based on series R'20 and R'40/3 given in ISO 497.
- 3 Tolerances for nominal aperture sizes below 45 μm are under study.
- 4 All aperture sizes apply for plain weave but for aperture sizes of 63 μm and smaller, twilled weave is permissible.

4.1.1 Aperture tolerances

4.1.1.1 The aperture tolerances X , Y and Z as given in columns 5, 6 and 7 of table 1 apply separately to the warp and weft directions and are based on the so-called "handicap" type of survey (see 4.2). They apply to the aperture sizes as measured on the centre lines of the aperture (see figure 1).

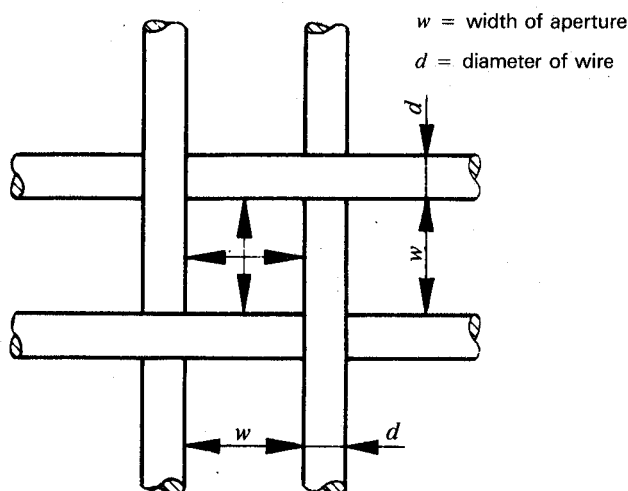


Figure 1

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

$$X = \frac{2(w^{0.75})}{3} + 4(w^{0.25})$$

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

$$Y = \frac{w^{0.98}}{27} + 1.6$$

NOTE — These formulae apply only where X , Y and w are expressed in micrometres.

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

$$Z = \frac{X + Y}{2}$$

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

4.1.2 Wire diameter

4.1.2.1 The wire diameters given in table 1 apply to woven wire cloth mounted in a frame.

4.1.2.2 The wire diameters given in column 8 of table 1 are preferred nominal sizes and are particularly recommended.

The nominal sizes of the wire diameters specified in national standards may, however, depart from these values within the limits of $d_{\max}$ and $d_{\min}$ (columns 9 and 10). These limits define a permissible range of choice, approximately $\pm 15\%$, about the nominal values given in column 8. Only preferred wire sizes for nominal apertures below $32\ \mu\text{m}$ are listed in table 1 owing to the difficulty of stating maximum wire sizes without taking tolerances into account.

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

4.2 Test methods

Every aperture in the metal wire cloth in a test sieve shall be eligible for inspection for compliance with the requirements listed in sub-clause 4.1.

When a sieve has 20 apertures or less, all apertures shall be measured. In other cases the examination shall proceed in stages from a survey of general condition, to a methodical scrutiny of individual apertures, and finally to measurement of aperture size for compliance with the tolerances.

Aperture size, as requested in tests 2, 3 and 4 below, shall be measured accurately on equipment with a precision 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

For this purpose the sieve cloth shall be viewed against a uniformly illuminated background. If obvious deviations from sub-clause 4.1, for example weaving defects, creases, wrinkles, foreign matter in the cloth, are found, the sieve is unacceptable.

Test 2 — Examination of apertures for tolerance X

The observer shall carefully and methodically examine the appearance of all the openings, in order to detect oversize apertures. Apertures whose width deviates by about 10 % of the average value are apparent to the unaided eye of a skilled observer. By this method, known as the "handicap 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 easily possible to detect sequences of large apertures, and local irregularities in the weaving, appearing as distortions of the apertures.

If one 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 "

Those apertures whose width is between the limits of "nominal + Z " and "nominal + X " (see 4.1.1) shall be counted or their