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Industrial woven wire cloth — Technical requirements and testing

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Contents

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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 9044 was prepared by Technical Committee ISO/TC 24, *Sieves, sieving and other sizing methods*.

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Industrial woven wire cloth — Technical requirements and testing

1 Scope

This International Standard defines terms regarding metal woven wire cloth for screening purposes and specifies tolerances, requirements and test methods.

It applies to industrial woven wire cloth with square apertures, made of uncoated wire of steel, stainless steel or non-ferrous metals. It does not apply to pre-crimped and pressure-welded wire screens.

It is of limited application to wire cloth used for other applications which may necessitate other requirements.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard 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 2194:1972, *Wire screens and plate screens for industrial purposes — Nominal sizes of apertures.*

ISO 4782:1987, *Metal wire for industrial wire screens and woven wire cloth.*

ISO 4783-1:1989, *Industrial wire screens and woven wire cloth — Guide to the choice of aperture size and wire diameter combinations — Part 1: Generalities.*

ISO 4783-2:1989, *Industrial wire screens and woven wire cloth — Guide to the choice of aperture size and wire diameter combinations — Part 2: Preferred combinations for woven wire cloth.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 aperture width, w: Distance between two adjacent warp or weft wires, measured in the projected plane at the mid-positions (see figure 1).

3.2 wire diameter, d: Diameter of the wire in the woven cloth (see figure 1).

NOTE 1 The wire diameter may be altered slightly during the weaving process.

3.3 pitch, p:

(1) Distance between the middle point of two adjacent wires.

(2) Nominally the sum of the aperture width w and the wire diameter d (see figure 1).

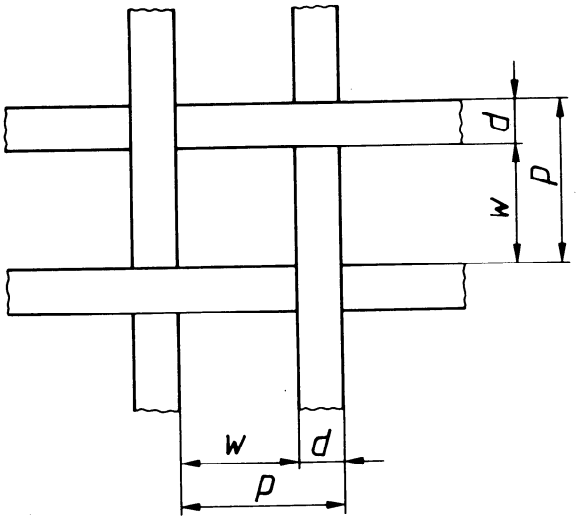


Figure 1 — Aperture width, wire diameter and pitch

3.4 warp: All wires running lengthwise of the cloth as woven.

3.5 weft: All wires running crosswise of the cloth as woven.

3.6 number of apertures per unit length, n: Number of apertures which are counted in a row one behind the other on a given unit length. The unit length may be 1 cm, 1 dm or any other unit of length.

NOTE 2 The designation "mesh", i.e. the number of apertures with a length of 25,4 mm, is obsolete.

3.7 open screening area, A_0:

(1) Percentage of the surface of all the apertures in the total screening surface.

(2) Ratio of the square of the nominal aperture width w and the square of the nominal pitch p $(= w + d)$, rounded to a full percentage value:

$$A_0 = 100 \times \frac{w^2}{(w + d)^2} \quad \ldots (1)$$

3.8 type of weave: Way in which the warp and weft wires cross each other.

NOTE 3 For the purposes of this International Standard, industrial woven wire cloth is manufactured with square apertures in plain or twilled weave (see figure 2).

3.9 firmness of woven wire cloth: The tension existing between the crossing warp and weft wires and which, together with the interlocking, determines the firmness of the wire cloth. It is influenced by the tensile strength of the material, by the relationship of w to d, and by the type of weave.

NOTE 4 The absence of firmness of woven wire cloth is termed "sleeziness".

3.10 mass per unit area, ρ_A: That quantity calculated using the following equation:

$$\rho_A = \frac{d^2 \rho}{618{,}1 \times (w + d)} \quad \ldots (2)$$

where

d is the wire diameter, in millimetres;

w is the aperture width, in millimetres;

ρ is the material density, in kilograms per cubic metre.

Equation (2) gives the calculated mass per unit area, although the actual value can be up to 3 % lower.

NOTE 5 Typical values of ρ for various materials are given in ISO 4783-2. For example, the mass per unit area for plain or carbon steel with a density of 7 850 kg/m^3 can be calculated using equation (2) as follows:

$$\rho_A = \frac{d^2 \times 7850}{618{,}1 \times (w + d)} = \frac{12{,}7 \times d^2}{w + d}$$

Equation (2) can also be used for calculating the wire diameter d when the pitch p is known. In the case of plain carbon steel (ρ = 7 850 kg/m^3),

$$d = \sqrt{\frac{\rho_A p}{12{,}7}} \quad \ldots (3)$$

3.11 cut-to-size piece: Woven wire cloth with defined sides, angles and radii, cut from a roll.

3.12 strip: Woven wire cloth with a defined width, cut from the manufactured width and the length of a standard roll.

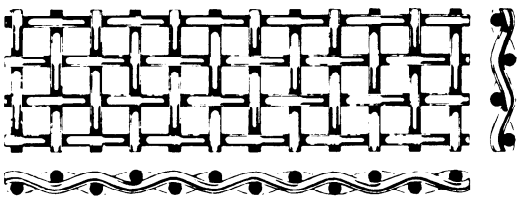
3.13 major blemish: Production defect which significantly affects the aperture size or surface quality of the woven wire cloth.

3.13.1 smash: Major blemish consisting of a complex break-up of the weaving pattern through mechanical damage during the weaving process.

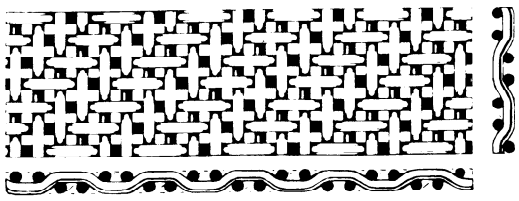
3.13.2 broken shot [weft]: Major blemish consisting of a wide aperture or a line of wide apertures arising from a broken weft wire which has not been removed before laying the next weft wire.

3.13.3 variation in weft count: Major blemish consisting of an irregular weft count over a short length of the woven wire cloth.

3.13.4 draw-over: Major blemish consisting of a short length of cloth containing no weft wires.



a) Plain weave



b) Twilled weave

Figure 2 — Types of weave

3.13.5 creeper: Major blemish consisting of a warp wire which is longer than the neighbouring warp wires.

3.13.6 slack shot [weft]: Major blemish consisting of a weft wire which is longer than the neighbouring weft wires.

3.13.7 burst: Major blemish consisting of a tear of variable length in the cloth.

NOTE 6 Bursts normally occur near the edges.

3.13.8 reed mark; "tramline": Major blemish consisting of a single line of apertures of excessive width in the warp direction.

3.13.9 wide shot: Major blemish consisting of several lines of apertures of excessive width in the weft direction.

4 Requirements

4.1 General

Reference shall be made to ISO 2194, ISO 4782, ISO 4783-1 and ISO 4783-2 for requirements on aperture widths, on the metal wire and on aperture width/wire diameter combinations for industrial woven wire cloth.

4.2 Tolerances on aperture width

NOTE 7 In equations (4) to (6) below, X_i, Y_i, Z_i and w are expressed in micrometres. The suffix "i" denotes "industrial woven wire cloth".

4.2.1 No aperture size shall exceed the nominal size by more than the value X_i. It is the maximum permissible deviation of a single aperture measured in one direction (warp or weft), and is calculated using the formula

$$X_i = \left[\frac{2w^{0,75}}{3} + 4w^{0,25} \right] \times 2 \qquad \ldots (4)$$

but with a maximum value of $X_i = w$.

A line of apertures exceeding the value X_i is deemed to be a major blemish (see 3.13.8 and 3.13.9).

4.2.2 Y_i is the tolerance of the arithmetical mean value of the aperture widths measured in both warp and weft directions. The arithmetical average aperture size shall not deviate from the nominal size by more than $\pm Y_i$, where

$$Y_i = \left[\frac{w^{0,98}}{27} + 1,6 \right] \times 1,5 \qquad \ldots (5)$$

4.2.3 Z_i is the arithmetical mean of X_i and Y_i:

$$Z_i = \frac{X_i + Y_i}{2} \qquad \ldots (6)$$

4.2.4 Not more than 6 % of the total number of apertures shall have sizes between "nominal + X_i" and "nominal + Z_i".

As on the basis of experience, negative deviations of single aperture widths do not affect the screening process, values for Z_i and X_i have only positive deviations.

Values for tolerances on aperture width are given in table 1 and a diagrammatic explanation is given in figure 3.

Table 1 — Tolerances on aperture width

Tolerances expressed as a percentage

Nominal aperture width, w	Tolerances[1] on aperture width, w, for woven wire cloth made of stainless steel or non-ferrous metals (except copper and aluminium)			steel, copper or aluminium		
mm	$+X_i$	$\pm Y_i$	$+Z_i$	$+X_i$	$\pm Y_i$	$+Z_i$
16	12	5	9	14	6	10
12,5	13	5	9	15	6	10
10	14	5	9	16	6	11
8	15	5	10	18	6	12
6,3	16	5	10	19	6	12
5	17	5	11	20	6	13
4	18	5	12	22	6	14
3,15	20	5	12	23	6	14
2,5	21	5	13	25	6	15
2	23	5	14	27	6	16
1,6	24	5	15	29	6	17
1,25	26	5	16	31	6	18
1	28	5	17	33	6	19
0,8	30	5	18	36	6	21
0,63	33	5	19	39	6	22
0,5	36	5	21	42	7	24
0,4	39	6	22	46	7	26
0,315	42	6	24	50	7	28
0,25	46	6	26	55	7	31
0,2	50	6	28	60	8	34
0,16	55	7	31	66	8	37
0,125	61	7	34	73	9	41
0,1	67	7	37	80	9	45
0,08	74	8	41	89	9	49
0,063	83	9	46	99	10	55
0,05	93	10	51			
0,04	100	11	56			
0,032	100	13	56			
0,025	100	15	57			
0,02	100	17	59			

1) A reduction in the size of the tolerance values is envisaged for the next periodical review of this International Standard.

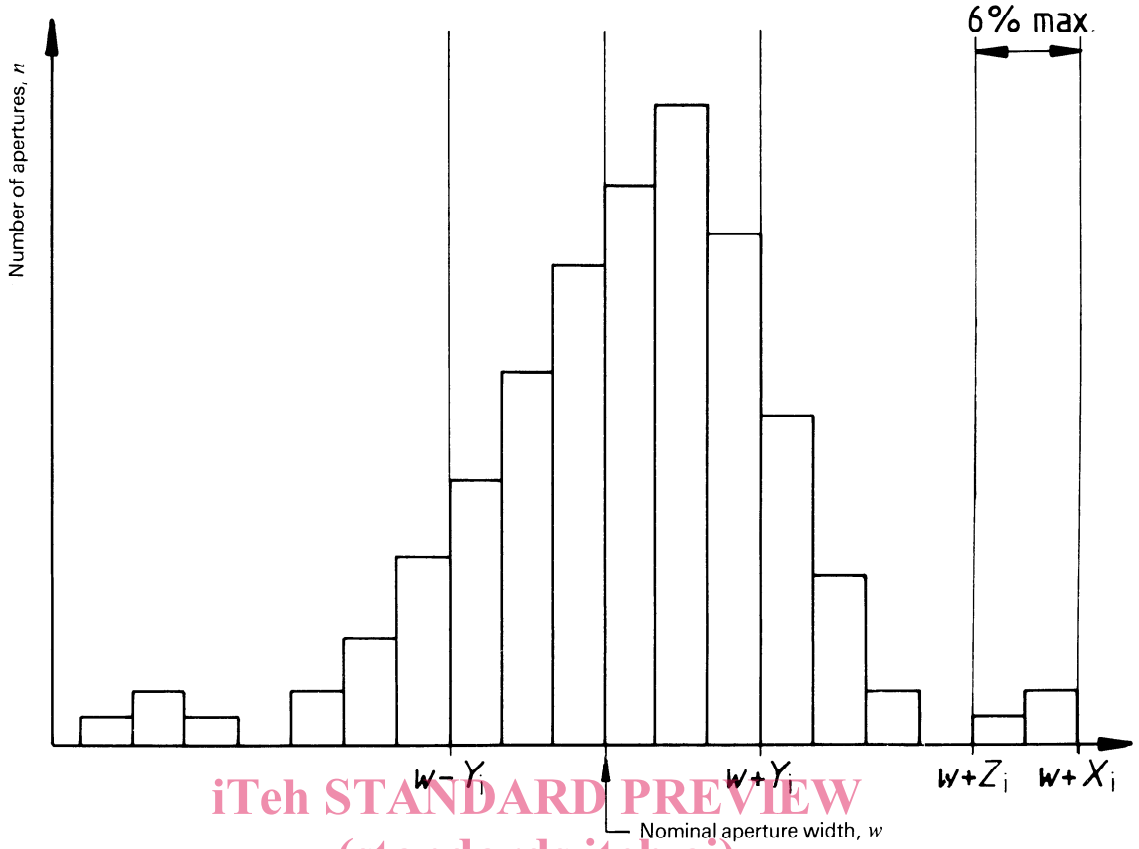


Figure 3 — Diagrammatic explanation of X_i, Y_i and Z_i ranges

4.3 Permissible number of weaving blemishes

4.3.1 Woven wire cloth cannot be woven commercially without it having some weaving blemishes. The weaver and customer shall come to an agreement on the number and nature of weaving blemishes which are permissible per unit area of cloth. The percentage of yield of the cloth shall be agreed on with the customer and will vary according to the size of the piece of wire cloth.

4.3.2 Unless otherwise agreed, the number of major blemishes as given in table 2 is permitted.

Table 2 — Permissible number of major blemishes

Nominal aperture width, w mm	Maximum number of major blemishes per 10 m²
$1 \leqslant w \leqslant 16$	5
$0{,}25 \leqslant w < 1$	10
$0{,}125 \leqslant w < 0{,}25$	12
$0{,}063 \leqslant w < 0{,}125$	18
$w < 0{,}063$	20

4.3.3 For cut-to-size pieces, the permissible number of weaving blemishes and their positions shall be agreed on with the customer. Otherwise, the permissible number of weaving blemishes in cut-to-size pieces shall be determined from table 2.

4.3.4 Minor weaving blemishes which do not produce oversize openings or which do not significantly affect the surface quality of the woven wire cloth shall, unless otherwise specified, be acceptable.

4.4 Cutting tolerances for cut-to-size pieces

The dimensions of cut-to-size pieces shall be specified together with the permissible deviations.

Unless otherwise agreed, a cutting tolerance of $\pm$ 0,5 % shall be allowed. At least the dimension of one pitch measurement ($p = w + d$) is permitted.

NOTE 8 If woven wire cloth is requested in pieces with right angles, it is probable that warp and/or weft wires will be cut across, and there is a possibility of edge wires falling out of the cloth.