INTERNATIONAL STANDARD

ISO 8116-4

Second edition
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Textile machinery and accessories — Beams for winding —

Part 4:
Quality classification of flanges for weaver's beams, warper's beams and sectional beams

Matériel pour l'industrie textile — Ensouples pour enroulement —

Partie 4: Classes de qualité pour les joues d'ensouples de tissage, d'ourdissoirs et sectionnelles

Reference number
ISO 8116-4:1995(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 8116-4 was prepared by Technical Committee ISO/TC 72, *Textile machinery and allied machinery and accessories*, Subcommittee SC 2, *Winding and preparatory machinery for fabric manufacture*.

This second edition cancels and replaces the first edition (ISO 8116-4:1985), which has been technically revised.

ISO 8116 consists of the following parts, under the general title *Textile machinery and accessories — Beams for winding*:

— *Part 1: General vocabulary*

— *Part 2: Warper's beams*

— *Part 3: Weaver's beams*

— *Part 4: Quality classification of flanges for weaver's beams, warper's beams and sectional beams*

— *Part 5: Sectional beams for warp knitting machines*

— *Part 6: Beams for ribbon weaving and ribbon knitting*

— *Part 7: Beams for dyeing slivers, rovings and yarns*

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— *Part 8: Definitions of run-out tolerances and methods of measurement*

— *Part 9: Dyeing beams for textile fabrics*

Annex A forms an integral part of this part of ISO 8116.

Introduction

In order to be able to compare the different types of beam flanges and their behaviour under load, it is necessary to specify characteristics and load ranges according to which the flanges may be classified after undergoing acceptance testing.

Textile machinery and accessories — Beams for winding —

Part 4:
Quality classification of flanges for weaver's beams, warper's beams and sectional beams

1 Scope

This part of ISO 8116 explains the theoretical relationships and gives directives for practical use, allowing classification of beam flanges.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8116. 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 8116 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 8116-2:1995, *Textile machinery and accessories — Beams for winding — Part 2: Warper's beams.*

ISO 8116-3:1995, *Textile machinery and accessories — Beams for winding — Part 3: Weaver's beams.*

ISO 8116-5:1995, *Textile machinery and accessories — Beams for winding — Part 5: Sectional beams for warp knitting machines.*

3 Principle

In order to ascertain the quality class of a beam flange, it is subjected to a force test.

For this purpose the flange is centrally loaded by means of a press and a test ring with a defined diameter. The bending is determined from the average of the observations (readings) taken from three dial gauges set at 120° to each other and supported on the outer edge of the flange by means of a holding device. The bending under load is thereby determined.

The loading should preferably occur in steps for the reading of intermediate values; this permits determination of the way the deflection behaviour changes with increase of load.

It is also possible to unload the flange after each load step in order to ascertain the degree of permanent deformation. However the dial gauges should not be turned back to zero until maximum load is ascertained.

4 Terminology and dimensions

(See figure 1 and tables 1 to 4)

P test load, in kilonewtons

d_1 outer flange diameter

d_2 outer barrel diameter

D_i inner diameter of the test ring, calculated according to the formula

$$D_i = 0,6\ (d_1 + d_2)$$

D_f measuring diameter

$$D_f = d_1 - 20 \text{ mm}$$

f deflection of the flange under load (bending)

f_{max} maximum admissible deflection value (maximum permissible bending), calculated according to the formula

$$f_{max} = 4 \times (d_1 - d_2) \times 10^{-3}$$

Dimensions in millimetres

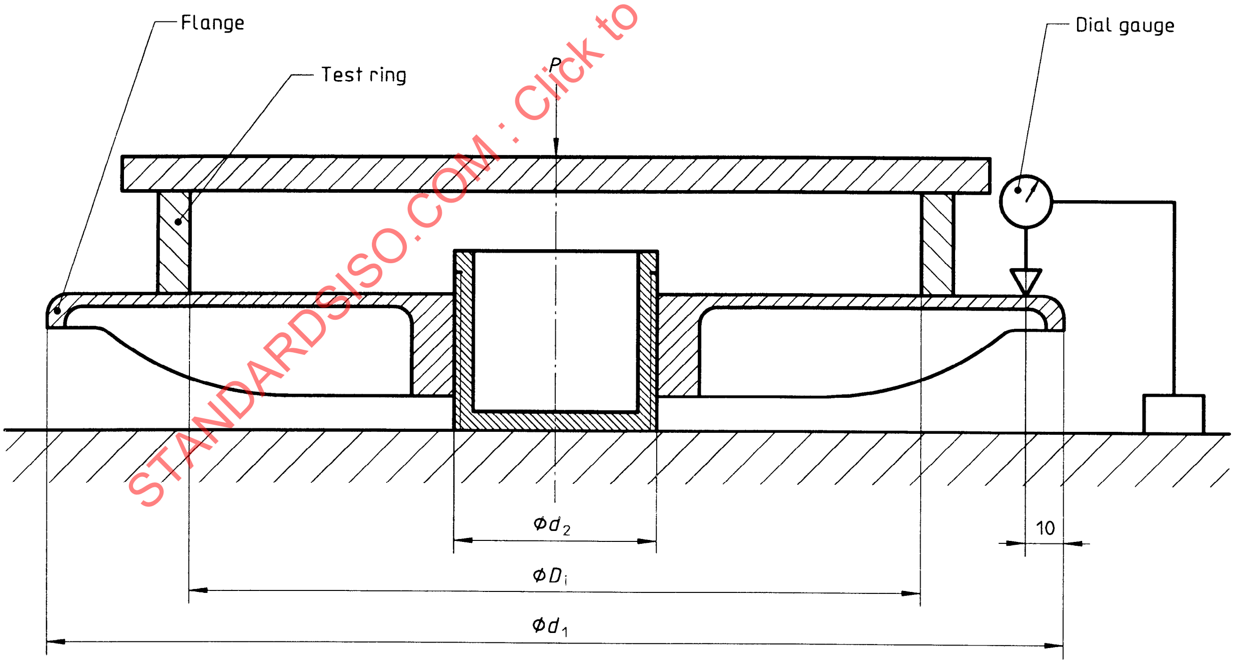

Figure 1

NOTE 1 For the bending f the deflection of the flange is fixed according to a certain angle. The same assessment is therefore valid for all quality classes.

The maximum deflection (f_{max}) was fixed on the basis of the experimental values of filament yarns with low number. For coarser yarns a greater deflection angle may be chosen and agreed upon in practice. These types of yarn normally have lower loading forces and therefore cause smaller deflections.

For this reason the quality class is determined according to the preceding formula.

Table 1 — Weaver's beams, according to ISO 8116-3

Dimensions in millimetres

d_1	d_2	D_i	f_{max}
500	150	390	1,4
600		450	1,8
700		510	2,2
750		540	2,4
800	216	570	2,6
850		640	2,5
900		670	2,7
950	269	700	2,9
1 000		730	3,1
1 250		910	3,9
1 400		1 000	4,5
1 500		1 060	4,9

Table 2 — Warper's beams — Type A and B, according to ISO 8116-2

Dimensions in millimetres

d_1	d_2	D_i	f_{max}
815	300 (320)	669	2,1
		(681)	2
915		729	2,5
		(741)	2,4
1 015		789	2,9
		(801)	2,8
1 250		930	3,8
		(942)	3,7

Table 3 — Warper's beams — Type C, according to ISO 8116-2

Dimensions in millimetres

d_1	d_2	D_i	f_{max}
800	300 (320)	660	2
		(672)	2
(900)		720	2,4
		(732)	2,4
1 000		780	2,8
		(792)	2,8
(1 100)	360	876	3
1 250	400	990	3,4
1 400	450	1 110	3,8

Table 4 — Sectional beams according to ISO 8116-5

Dimensions in millimetres

d_1	d_2	D_i	f_{max}
355	110	279	1
535	185	432	1,4
765	250	609	2,1
(815)		639	2,3
1 015	360	825	2,6

NOTE 2 For a more exact definition of the quality classes, the theoretical behaviour of a centre-bored plate on deflection by bending may be taken as a basis.

This gives:

$$\frac{P}{f} = \frac{4Eh^3}{cd_1^2} = k$$

where

E is the modulus of elasticity of the material used for the beam flange;

c is a correlation factor dependent on $\frac{d_2}{d_1}$;

h is the thickness of the flange near the barrel;

k is a constant.

The formula shows the linearity of the specific values P/f by which the quality classes according to clause 5 are fixed. Any load test thus allows a clear grading according to one of the quality classes.

A comparable evaluation and interpretation of measurements may be made from this basis.

5 Quality classes

The field of quality classes is fixed by specific values as follows:

$$\text{Quality class} = \frac{\text{Loading } P \text{ (kN)}}{\text{Deflection } f \text{ (mm)}}$$

The diagram of the quality classes is given in figure A.1.

Table 5 — Quality classes

Quality class	Limiting values, k kN/mm	Application recommended[1)]
1	$20 \leqslant k \leqslant 50$	Yarn from natural fibres (except for silk) spun yarns from regenerated cellulosic fibres, mixed yarns from natural and man-made fibres having a proportion of mixture up to 67/33
2	$50 < k \leqslant 125$	Filament yarns from regenerated cellulosic fibres (e.g. viscose, acetate, etc.) as well as textile glass yarns and silk yarns
3	$125 < k \leqslant 200$	Man-made filament yarns (e.g. polyamide, polyacrylonitrile, polyolefin, etc.) which are relaxed after the thread-forming spinning operation
4	$k > 200$	Filament yarns as in quality class 3, but unrelaxed

1) In order to determine possible influences caused by material and production conditions, additional tests may be necessary.

For the grading into one of the quality classes the deflection (f) for a certain loading (P) is determined by test. Therefore

$$\text{Test value } X = \frac{\text{Test load } P \text{ (kN)}}{\text{Deflection of the flange } f \text{ (mm)}}$$

The value is compared with the limiting values according to table 5. The grading into one of the quality classes can then be determined.

6 Permissible loading capacity of flanges

By means of the test value X for the determination of the quality class, the maximum permissible loading (P_{max}) of the beam flange can be ascertained according to

$$P_{max} = X f_{max}$$