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SIST EN 13003-2:2000

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Preje iz paraaramidnih vlaken - 2. del: Preskusne metode in splošne specifikacije

Para-aramid fibre filament yarns - Part 2: Methods of test and general specifications

Para-Aramidfaser-Filamentgarne - Teil 2: Prüfverfahren und allgemeine technische Lieferbedingungen

Fils en fibres de para-aramide - Partie 2: Méthodes d'essai et spécifications générales

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by IBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 1999, and conflicting national standards shall be withdrawn at the latest by October 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

EN 13003 consists of the following parts, under the general title "*Para-aramid fibre filament yarns*" :

- *Part 1 : Designation*
- *Part 2 : Methods of test and general specifications*
- *Part 3 : Technical specifications*

1 Scope

This part 2 of EN 13003 applies to high performance para-aramid fibre filament yarns and defines the methods of test which are to be used for the determination of the properties required for the designation and the specifications which are given respectively in the parts 1 and 3.

This part 2 defines also the general requirements which apply to the specifications for para-aramid fibre filament yarns as listed in the part 3 of the present standard.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

prEN 12562, *Textiles - Para-aramid multifilament yarns - Methods of test.*

EN 13003-1, *Para-aramid fibre filament yarns - Part 1 : Designation.*

EN 13003-3, *Para-aramid fibre filament yarns - Part 3 : Technical specifications.*

EN ISO 1886, *Reinforcement fibres - Sampling plans applicable to received batches (1886:1990).*

EN ISO 1889, *Reinforcement yarns - Determination of the linear density (ISO 1889:1997).*

EN ISO 1890, *Reinforcement yarns - Determination of twist (ISO 1890:1997).*

EN ISO 2062, *Textiles - Yarns from packages - Determination of single-end breaking force and elongation at break (ISO 2062:1993).*

EN ISO 3344, *Reinforcement yarns - Determination of moisture content (ISO 3344:1997).*

EN ISO 10548, *Carbon fibre - Determination of size content (ISO 10548:1994).*

ISO 472, *Plastics – Vocabulary.*

ISO 2859-1, *Sampling procedures for inspection by attributes- Part 1 : Sampling plans indexed by acceptable quality levels (AQL) for lot-by-lot inspection.*

ISO 10119, *Carbon fibre - Determination of density.*

prEN ISO 10618, *Carbon fibre - Determination of tensile properties of resin-impregnated yarns (ISO/DIS 10618: 1994).*

3 Definitions

For the purpose of this European Standard, the following definitions apply :

3.1
qualification testing
evaluation of one or several successive lots of given product to demonstrate that the product meets the requirements of the applicable specification

3.2
acceptance testing
evaluation of a received lot of a given product to demonstrate that lot fulfils the requirements of the applicable specification

4 Yarn characteristics

4.1 Physical properties

The physical properties of the para-aramid fibre filament yarns shall be determined in accordance with the relevant EN material standards which are listed in Table 1 below.

Table 1 - Tests

1	2	3	4
N°	Properties	Units	Test methods
1	Density	g/cm³	ISO 10119
2	Linear density	dtex	EN ISO 1889
3	Finish content (quantitative)	%	EN ISO 10548
4	Twist	-	EN ISO 1890
5	Moisture content	%	EN ISO 3344
Testing of tensile yarn specimens prepared in accordance with EN ISO 2062 and PrEN 12562 [a] or prEN ISO 10618 [b]			
6	Tensile strength	Mpa	[a] or [b]
7	Tensile modulus	Mpa	[a] or [b]
8	Elongation at break	%	[a] or [b]

[a] EN ISO 2062 and PrEN 12562 measured on un-impregnated yarns.

[b] prEN ISO 10618 measured on impregnated yarns.

For assembled aramid fibre filament yarns the determination of the differences in length of the individual yarns shall be determined according to the method described in Appendix A of this standard.

4.2 Visual properties

The para-aramid fibre filament yarns shall be free from oil, grease and other contaminants as well as from partial tow breakage and fluffy debris on the surface of or within the bobbin, which are incompatible with required processing conditions.

4.3 Other properties

Splices

Distinction shall be made between blown splices and bonded splices. Type and number shall be agreed between the yarn manufacturer and the customer.

5 Quality inspection

The tests to be performed on a lot (or batch) of para-aramid fibre filament yarn will be different depending whether they are for a reception lot or a production lot.

One production lot is obtained by a fabrication campaign of limited duration in time on basis, for example, on the basis of one given amount of raw material.

One reception lot, as received by a customer can be made from one part or the whole of one production lot. It may also originate from several production lots. (See also EN ISO 1886 : Definitions)

5.1 Sampling and criteria for acceptance

In the context of this standard, the sampling method by ATTRIBUTES is proposed , though it is also possible to use the sampling by variables.

The evaluation of a lot of para-aramid fibre filament yarn is based on the sampling that is described in the standard EN ISO 1886 or ISO 2859-1 and on the acceptance quality level (AQL) of 1.5 % for the physical properties and 2.5 % for the visual properties.

Depending on the circumstances, the control for the evaluation of a lot, may be either with a "normal" inspection level (for the qualification of a product or in the case of problems), or with a "reduced" inspection level, when a minimum of 3 successive controls have given an acceptable result.

Tables 2 and 3 show the procedure for inspection by attributes with the normal test plan (Table 2) and the reduced test plan (Table 3).

Table 2 - Test plan - normal inspection acc. ISO 2859-1 (Level II)

Number of elementary units in batch N	Sample size n_1	Acceptance criteria AQL 1,5		Acceptance criteria AQL 2,5	
		A	B	A	B
2 until 8	2	0	1	0	1
9 until 15	3	0	1	0	1
16 until 25	5	0	1	0	1
26 until 50	8	0	1	0	1
51 until 90	13	0	1	1	2
91 until 150	20	1	2	1	2
151 until 280	32	1	2	2	3
281 until 500	50	2	3	3	4
501 until 1 200	80	3	4	5	6
1 201 until 3 000	125	5	6	7	8
3 201 until 10 000	200	7	8	10	11

A : Batch is acceptable if the number of non conforming units is equal to or less than the number given.

B : Batch is unacceptable if the number of non conforming units is equal or greater than the number given.

NOTE For batches or more than 10 000 elementary units, sampling shall be the subject of an agreement between the yarn manufacture and the customer.

Table 3 - Test plan - reduced inspection acc. ISO 2859-1 (Level II)

Number of elementary units in batch N	Sample size n_1	Acceptance criteria AQL 1,5		Acceptance criteria AQL 2,5	
		A	B	A	B
2 until 25	2	0	1	0	1
26 until 50	3	0	1	0	1
51 until 90	5	0	1	1	2
91 until 150	8	0	2	0	2
151 until 280	13	0	2	1	3
281 until 500	20	1	3	1	4
501 until 1 200	32	1	4	2	5
1 201 until 3 000	50	2	5	3	6
3 201 until 10 000	80	3	6	5	8

A : Batch is acceptable if the number of non conforming units is equal to or less than the number given.

B : Batch is unacceptable if the number of non conforming units is equal or greater than the number given.

NOTE For batches or more than 10 000 elementary units, sampling shall be the subject of an agreement between the yarn manufacture and the customer.

5.2 Testing at manufacturer

The manufacturer shall ensure that the shipped product meets a given specification. Therefore he has to define a quality control system which will generally include process control (SPC) and testing of final and semi products with adequate test frequency.

On the basis on the knowledge of the process and implementation of SPC, possibly combined by the use of automated production equipment, the testing at the manufacturer will generally be done using a reduced sampling compared with this that used for the reception of lots, with a trend toward testing of process variables in place of testing on product itself.

5.3 Certificate

The supplier may at the request of the customer issue a certificate for any shipment. This can be :

- a certificate of conformance : which is a document conforming that the material has been controlled and meet the requirements of the specification ;
- a certificate of analyse : which, beside the statement here above also includes the test result on the applicable material ;
- a draft of a certificate of analysis is given in Appendix B of this standard.

6 Mode of delivery

6.1 Packaging

Unless otherwise explicitly specified, the para-aramid fibre filament yarns shall be shipped in boxes, adequately supported and protected to prevent damage during normal transit and storage.