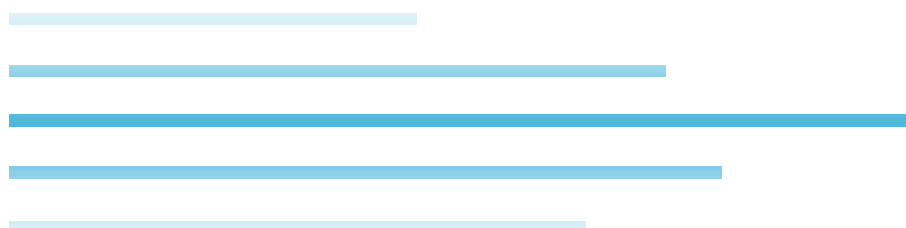


BISFA

The International Bureau For The Standardization Of Man-Made Fibres



Testing Methods for Textured Filament Yarns

2007 Edition

(This edition replaces the 1989 edition)

BISFA



BISFA Avenue E. Van Nieuwenhuysse 6 B-1160 Brussels

Email: SPI@CIRFS.ORG Phone: 322 676 7455 Fax: 322 676 7454



SCOPE

These methods apply to textile textured filament yarns based on polyester and polyamide.

Textile textured filament yarns are mainly being further processed through warp- and weft-knitting and weaving, whilst textured carpet yarns are mainly being further processed through tufting.

Note: that separate booklets apply for untextured yarns and textured filament carpet yarns.

Acknowledgement to the people involved in the revision of the 2007 version

Mr. I. Mikkelsen Trevira
Mr. V. Köln Trevira
Mr. K. Karlsen Trevira
Mr. A. Robinson Advansa
Ms. J. Louwagie University of Gent
Mr. J. Spijkers BISFA

© BISFA 2007

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission from the publisher.

BISFA
Avenue E. Van Nieuwenhuysse 4
B - 1160 Brussels
Belgium
Email: tun@cirfs.org
Website: <http://www.bisfa.org>

CONTENTS

	Page
Scope	2
Introduction	10
Preface	11
Chapter 1 GENERAL RULES FOR SETTLING OF DISPUTES	12
Chapter 2 DEFINITIONS	14
Chapter 3 SAMPLING	23
3.1 General remarks	23
3.2 Taking the consignment sample and the number of containers to be sampled	23
3.3 Taking the laboratory samples for determination of commercial mass	24
3.3.1 Determination of invoice mass and gross mass of the consignment sample	24
3.3.2 Taking packages from the containers of the consignment sample	24
3.3.3 Determination of the net mass of sampled containers	25
3.4 Taking laboratory samples for determination of properties other than commercial mass	25
3.4.1 Packages to be used as laboratory samples	25
Chapter 4 DETERMINATION OF COMMERCIAL MASS	26
4.1 Scope	26
4.2 References	26
4.3 Principle	26
4.3.1 General	26
4.3.2 Conventional allowance	26
4.3.3 Sized or oiled yarns	27
4.3.4 Dyed or spuncoloured yarns	27
4.4 Apparatus, materials and reagents	27
4.4.1 Apparatus and materials	27
4.4.2 Reagents	27

4.5	Test procedure	28
4.5.1	Preparing the laboratory samples and test specimens for determination of commercial mass	28
4.5.2	Drying conditions	28
4.5.3	Determining the mass of the test specimen	29
4.5.4	Cleaning of test specimens	29
4.5.5	Determining the oven-dry mass of the test specimens	29
4.6	Data to be collected	30
4.7	Calculation of results and statistical evaluation	30
4.7.1	Calculation of properties	30
4.7.2	Statistical evaluation	31
4.8	Verification of invoice mass	31
4.9	Presentation of results	31
4.10	Example of verification of invoiced mass	31
4.10.1	General	31
4.10.2	Consignment to be verified	32
4.10.3	Collected data	32
4.10.4	Calculations	34
4.10.5	Verification of invoiced mass	35
Chapter 5	DETERMINATION OF TWIST	36
5.1	Scope	36
5.2	References	36
5.3	Principle	36
5.4	Apparatus	36
5.4.1	Instrument	36
5.4.2	Auxiliary devices	37
5.5	Test procedure	37
5.5.1	Operating conditions	37
5.5.2	Preparing the test specimens and performing the test for single yarns	37
5.5.3	Testing folded yarn	38
5.6	Data to be collected	38
5.7	Calculation of properties and statistical evaluation	39
5.7.1	Calculation of properties	39
5.7.2	Statistical evaluation	39
5.8	Designation of yarns	39
5.9	Presentation of results	40

	5.10 Tolerance	40
Chapter 6	DETERMINATION OF INTERMINGLING	41
	6.1 Scope	41
	6.2 Principle	41
	6.3 Apparatus	41
	6.3.1 Visual testing	41
	6.3.2 Special equipment	42
	6.4 Test procedure	42
	6.4.1 Operating conditions	42
	6.4.2 Preparing the test specimens and performing the test	42
	6.5 Data to be collected	43
	6.6 Statistical evaluation	43
	6.6.1 Laboratory samples	43
	6.6.2 Consignment sample	43
	6.6.3 Number of additional test of laboratory samples	44
	6.7 Presentation of results	44
	6.8 Tolerance	45
Chapter 7	DETERMINATION OF LINEAR DENSITY	46
	7.1 Scope	46
	7.2 References	46
	7.3 Principle	46
	7.4 Apparatus, materials and reagents	46
	7.4.1 Skein winding reel	46
	7.4.2 Balance	46
	7.4.3 Apparatus and materials for cleaning of test specimens	47
	7.5 Test procedure	47
	7.5.1 Operating conditions	47
	7.5.2 Preparing the test specimens and performing the test	47
	7.6 Data to be collected	48
	7.7 Calculation of properties and statistical evaluation	48
	7.7.1 Calculation of properties	48
	7.7.2 Statistical evaluation	48
	7.8 Presentation of results	49

7.9	Tolerance	49
Chapter 8	TENSILE PROPERTIES	50
8.1	Scope	50
8.2	References	50
8.3	Principle	50
8.4	Apparatus	50
8.4.1	Tensile tester	50
8.4.2	Clamps	51
8.5	Test procedure	53
8.5.1	Operating conditions	53
8.5.2	Preparation of test specimen and performance of test	54
8.5.3	Performance of test	54
8.5.4	Number of tests	54
8.5.5	Test deficiencies	54
8.5.6	Modifications to the test procedure	54
8.6	Data to be collected	54
8.7	Calculation of properties and statistical evaluation	55
8.7.1	Calculation of properties	55
8.7.2	Statistical evaluation	55
8.8	Presentation of results	56
8.9	Tolerance	56
Chapter 9	DETERMINATION OF SPINFINISH INCL. CONING OIL	57
9.1	Scope	57
9.2	References	57
9.3	Principle	57
9.4	Apparatus, materials and reagents	57
9.4.1	Apparatus and materials	57
9.4.2	Reagents	58
9.5	Test procedure	58
9.5.1	Preparing the test specimens and performing the test	58
9.5.2	Determining the dry mass of the specimen	59
9.5.3	Cleaning of specimens	59
9.5.4	Drying of test specimens and determining of cleaned dry mass	59
9.6	Data to be collected	59
9.7	Calculation of properties and statistical evaluation	59

	9.7.1	Calculation of properties	59
	9.7.2	Statistical evaluation	60
	9.8	Presentation of results	60
	9.9	Tolerance	60
Chapter 10	DETERMINATION OF CRIMP CONTRACTION		61
	10.1	Scope	61
	10.2	References	61
	10.3	Principle	61
	10.4	Apparatus	61
	10.4.1	A skein winding reel preferable automatic operated	61
	10.4.2	A length measuring stand	62
	10.4.3	A ventilated oven	62
	10.4.4	Tension weights suitable for loading the skeins	62
	10.4.5	Accuracy requirements	62
	10.5	Test procedure	62
	10.5.1	Operating conditions	62
	10.5.2	Preparing test specimens	63
	10.5.3	Development of crimp of the specimens	63
	10.5.4	Mounting of test specimens and performing of test	63
	10.6	Data to be collected	64
	10.7	Calculation of properties and statistical evaluation	64
	10.7.1	Calculation of properties	64
	10.7.2	Statistical evaluation	64
	10.8	Presentation of results	65
	10.9	Tolerance	65
Chapter 11	DETERMINATION OF HOT-AIR SHRINKAGE		66
	11.1	Scope	66
	11.2	References	66
	11.3	Principle	66
	11.4	Apparatus	66
	11.4.1	Skein-winding reel	66
	11.4.2	Length measuring stand	66
	11.4.3	Ventilated oven for temperature up to 250°C	66
	11.4.4	Additional equipment	67
	11.5	Test procedure	67

11.5.1	Operating conditions	67
11.5.2	Preparing the test specimens	67
11.5.3	Measuring the initial length of the test specimens	68
11.5.4	Thermal treatment of the test specimens	68
11.5.5	Measuring the length of the test specimens after treatment	68
11.6	Data to be collected	68
11.7	Calculation of properties and statistical evaluation	69
11.7.1	Calculation of shrinkage	69
11.7.2	Statistical evaluation	69
11.7.3	Number of additional tests of laboratory samples	69
11.8	Presentation of results	69
11.9	Tolerance	70
Chapter 12	DETERMINATION OF BOILING WATER SHRINKAGE	71
12.1	Scope	71
12.2	References	71
12.3	Principle	71
12.4	Apparatus	71
12.4.1	Skein winding wheel	71
12.4.2	Length measuring stand	71
12.4.3	Water vessel	71
12.4.4	Additional means	72
12.5	Test procedure	72
12.5.1	Operating conditions	72
12.5.2	Preparing the test specimens	72
12.5.3	Measuring the initial length of the test specimens	72
12.5.4	Thermal treatment of the test specimens	73
12.5.5	Measuring the length of the test specimens after treatment	73
12.6	Data to be collected	73
12.7	Calculation of properties and statistical evaluation	73
12.7.1	Calculation of properties	73
12.7.2	Statistical evaluation	73
12.8	Presentation of results	74
12.9	Tolerance	74
Chapter 13	THE STATISTICS: TERMINOLOGY AND CALCULATIONS	75
13.1	Definitions	75

13.2 Basic Statistics	76
13.2.1 Individual value	76
13.2.2 Frequency distribution	76
13.2.3 Frequency	76
13.2.4 Arithmetic mean	76
13.2.5 Overall arithmetic mean	77
13.2.6 Variance and standard deviation	77
13.2.7 Coefficient of variation	78
13.2.8 Confidence limits	78
13.2.9 Number of tests	79
13.3 Statistical process control (SPC)	80
13.3.1 Process capability	80
13.3.2 Accuracy index	80
13.3.3 Capability index	80
13.3.4 Quality index	80
Appendix I	83
Appendix II	87
