

WOODHEAD PUBLISHING IN TEXTILES



Sizing in clothing

Developing effective
sizing systems for
ready-to-wear clothing

Edited by S. P. Ashdown



WP

Sizing in clothing

The Textile Institute and Woodhead Publishing

The Textile Institute is a unique organisation in textiles, clothing and footwear. Incorporated in England by a Royal Charter granted in 1925, the Institute has individual and corporate members in over 90 countries. The aim of the Institute is to facilitate learning, recognise achievement, reward excellence and disseminate information within the global textiles, clothing and footwear industries.

Historically, The Textile Institute has published books of interest to its members and the textile industry. To maintain this policy, the Institute has entered into partnership with Woodhead Publishing Limited to ensure that Institute members and the textile industry continue to have access to high calibre titles on textile science and technology.

Most Woodhead titles on textiles are now published in collaboration with The Textile Institute. Through this arrangement, the Institute provides an Editorial Board which advises Woodhead on appropriate titles for future publication and suggests possible editors and authors for these books. Each book published under this arrangement carries the Institute's logo.

Woodhead books published in collaboration with The Textile Institute are offered to Textile Institute members at a substantial discount. These books, together with those published by The Textile Institute that are still in print, are offered on the Woodhead web site at: www.woodheadpublishing.com. Textile Institute books still in print are also available directly from the Institute's website at: www.textileinstitutebooks.com.

Sizing in clothing

Developing effective sizing
systems for
ready-to-wear clothing

Edited by
S.P. Ashdown



The Textile Institute



CRC Press
Boca Raton Boston New York Washington, DC

WOODHEAD PUBLISHING LIMITED
Cambridge England

Published by Woodhead Publishing Limited in association with The Textile Institute
Woodhead Publishing Limited, Abington Hall, Abington
Cambridge CB21 6AH, England
www.woodheadpublishing.com

Published in North America by CRC Press LLC, 6000 Broken Sound Parkway,
NW, Suite 300, Boca Raton, FL 33487, USA

First published 2007, Woodhead Publishing Limited and CRC Press LLC
© 2007, Woodhead Publishing Limited
The authors have asserted their moral rights.

This book contains information obtained from authentic and highly regarded sources. Reprinted material is quoted with permission, and sources are indicated. Reasonable efforts have been made to publish reliable data and information, but the authors and the publishers cannot assume responsibility for the validity of all materials. Neither the authors nor the publishers, nor anyone else associated with this publication, shall be liable for any loss, damage or liability directly or indirectly caused or alleged to be caused by this book.

Neither this book nor any part may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, microfilming and recording, or by any information storage or retrieval system, without permission in writing from Woodhead Publishing Limited.

The consent of Woodhead Publishing Limited does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific permission must be obtained in writing from Woodhead Publishing Limited for such copying.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation, without intent to infringe.

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library.

Library of Congress Cataloguing in Publication Data

A catalog record for this book is available from the Library of Congress.

Woodhead Publishing ISBN-13: 978-1-84569-034-2 (book)

Woodhead Publishing ISBN-10: 1-84569-034-6 (book)

Woodhead Publishing ISBN-13: 978-1-84569-258-2 (e-book)

Woodhead Publishing ISBN-10: 1-84569-258-6 (e-book)

CRC Press ISBN-13: 978-0-8493-9098-2

CRC Press ISBN-10: 0-8493-9098-2

CRC Press order number: WP9098

The publishers' policy is to use permanent paper from mills that operate a sustainable forestry policy, and which has been manufactured from pulp which is processed using acid-free and elementary chlorine-free practices. Furthermore, the publishers ensure that the text paper and cover board used have met acceptable environmental accreditation standards.

Typeset by SNP Best-set Typesetter Ltd., Hong Kong

Printed by TJ International Limited, Padstow, Cornwall, England

Contents

<i>Contributor contact details</i>	<i>xi</i>
<i>Preface</i>	<i>xvii</i>
1 History of sizing systems and ready-to-wear garments	1
W. ALDRICH, <i>Nottingham Trent University, UK</i>	
1.1 Introduction	1
1.2 The emergence of sizing systems	2
1.3 The beginning of systematic pattern construction and sizing	6
1.4 The impact of fashion on the development of standard sizing for women's ready-to-wear garments	21
1.5 Methods of sizing for the emerging mass production of clothing for men	33
1.6 Sizing for the mass production of clothing in the first half of the twentieth century	38
1.7 Sizing for the mass production of clothing in the second half of the twentieth century	43
1.8 Reflection	48
1.9 Further reading	48
1.10 References	48
2 Creating sizing systems	57
A. PETROVA, <i>Cornell University, USA</i>	
2.1 Introduction	57
2.2 Basis of existing international sizing systems: state of sizing systems in the industry and unification of sizing	60

vi	Contents	
2.3	Proposed methods for creating sizing systems	63
2.4	Changing and adjusting sizing systems	80
2.5	Future trends	83
2.6	Sources of further information and advice	84
2.7	References	84
3	Sizing standardization	88
	<i>K.L. LABAT, University of Minnesota, USA</i>	
3.1	Introduction	88
3.2	Standardization of sizes	91
3.3	Standardization of size designations	98
3.4	International sizing standards	100
3.5	Future trends	102
3.6	Sources of further information and advice	103
3.7	References	104
4	Sizing systems, fit models and target markets	108
	<i>J. BOUGOURD, University of the Arts London, UK</i>	
4.1	Introduction	108
4.2	The apparel product development and production processes	108
4.3	Marketing	109
4.4	<i>A priori</i> segmentation	114
4.5	<i>A posteriori</i> segmentation	126
4.6	Target marketing	129
4.7	Fit models	130
4.8	Fitting futures	143
4.9	References	146
5	Pattern grading	152
	<i>N.A. SCHOFIELD, University of Wisconsin-Stout, USA</i>	
5.1	Introduction	152
5.2	Historical background	153
5.3	Grading process	157
5.4	Examination of the relationship between grade rules and associated body measurements	171
5.5	Grading assumptions that are the actual basis for grade rules	179
5.6	Comparison of standard graded bodice with regression findings	184
5.7	Goals of grading	189

5.8	Conclusions and implications	192
5.9	Future trends and possibilities	194
5.10	Sources of further information and advice	197
5.11	References	198
6	Function, fit and sizing	202
	H. DAANEN and P. REFFELTRATH, <i>TNO Defence, Security and Safety, The Netherlands</i>	
6.1	Introduction	202
6.2	Human performance in clothing systems	203
6.3	Fit	206
6.4	Thermal aspects of fit	214
6.5	Conclusions	217
6.6	Sources of further information and advice	217
6.7	Acknowledgements	218
6.8	References	218
7	Communication of sizing and fit	220
	J. CHUN, <i>Yonsei University, South Korea</i>	
7.1	Introduction	220
7.2	Communications from manufacturer to consumer	221
7.3	Communications from consumer to manufacturer	233
7.4	Impact of new technologies	238
7.5	Future trends	239
7.6	Sources of further information and advice	240
7.7	References	243
8	Mass customization and sizing	246
	S. LOKER, <i>Cornell University, USA</i>	
8.1	Introduction	246
8.2	Strategies and technologies for mass-customized sizing	249
8.3	Body measurement selection and application	256
8.4	Future trends	258
8.5	Sources of further information and advice	260
8.6	References	262
9	Materials and sizing	264
	D. BRANSON and J. NAM, <i>Oklahoma State University, USA</i>	
9.1	Introduction	264
9.2	Fit judgment framework	265
9.3	Non-stretch materials	267

viii	Contents	
9.4	Stretch materials	268
9.5	Effect of material properties on fit and sizing	270
9.6	Fit assessment	272
9.7	Future trends	273
9.8	Sources of further information and advice	275
9.9	References	275
10	Sizing for the military	277
	<i>W. TODD, Naval Air Warfare Center Aircraft Division, USA</i>	
10.1	Introduction	277
10.2	Fit and sizing for protection of the military wearer for the mission threat	278
10.3	Military sizing systems	289
10.4	Sizing for military populations	292
10.5	Getting the right size at the right time and right place	296
10.6	Future trends	301
10.7	Acknowledgements	303
10.8	Sources of further information and advice	303
10.9	References	305
11	Sizing and clothing aesthetics	309
	<i>VAN DYK LEWIS, Cornell University, USA</i>	
11.1	Introduction	309
11.2	Fashion	309
11.3	Size and scale	310
11.4	Fit, size and re-forming the body	313
11.5	Size as a spectacle	314
11.6	Menswear and scale	316
11.7	The perfect body	319
11.8	Beauty, the individual and the fashion image	320
11.9	Conclusions	325
11.10	References	326
12	Sizing for the home sewing industry	328
	<i>S. ASHDOWN, L.M. LYMAN-CLARKE and P. PALMER, Cornell University, USA</i>	
12.1	Introduction	328
12.2	The development of the home sewing pattern industry	329
12.3	The development of sizing for the home sewing pattern	332
12.4	Measurements and sizes of paper patterns	335
12.5	Altering patterns to fit	342

12.6	Summary and future trends	343
12.7	Sources of further information and advice	345
12.8	References	346
13	Production systems, garment specification and sizing	348
	S. ASHDOWN, L.M. LYMAN-CLARKE, J. SMITH and S. LOKER, <i>Cornell University, USA</i>	
13.1	Introduction	348
13.2	Quality control and specifications	349
13.3	Preproduction: design and pattern making	350
13.4	Preproduction: prototypes and development of size specifications	353
13.5	Preproduction: fabric testing and approval	354
13.6	Preproduction: marker making	356
13.7	Spreading	358
13.8	Cutting and bundling	360
13.9	Interfacings and sewing	362
13.10	Finishing and labeling	366
13.11	Prevention of errors	367
13.12	Distribution	368
13.13	Future developments	370
13.14	Sources of further information and advice	372
13.15	Acknowledgements	374
13.16	References	374
	<i>Index</i>	<i>377</i>