QUALITY ASSURANCE FOR TEXTILES AND APPAREL

Second Edition

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SECOND EDITION

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IOWA STATE UNIVERSITY

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Preface

My goals for the second edition of *Quality Assurance* were to update the information and reflect the changes in the textile industry complex, while maintaining an emphasis on incorporating product quality from merchandising and design stages through production, delivery, and retailing stages. Although this book will be useful to practicing professionals, its main objective is to present a holistic and theoretical perspective of textile product quality that will provide a foundation for future professionals in the industry.

Philosophy

The book integrates a traditional textile testing approach with a broader focus on the product and target market and several approaches to managing quality. The book is based on the premise that quality is developed into a product from the idea stage to its delivery to the consumer and reflects the best industry practices to provide products of an identified and consistent quality that meets the customer's needs.

The term *quality* is used differently by the consumer and the industry professional. The industry's concern with quality is based on a combination of three perspectives: identification of product standards and specifications that define in detail the desired appearance, characteristics, and performance of the finished product; consistency between identical products to minimize variations among products; and delivery of products that meet customer needs.

Within the industry, customers are businesses who buy products or materials from suppliers; consumers are the ultimate users of finished textile products. Consumers define quality from many different perspectives—excellence in construction, good performance at a reasonable price, exquisite materials with a good hand, high fashion, good fit and function, attractive or unique detailing, unusual trims, recognized brand, and other characteristics. Retailers, on the other hand, are concerned that the product is suitable for their target market (in terms of fashion, fit, price,

performance, materials, and so on). Thus, quality means different things to the people and businesses involved.

However, there are several aspects of quality that are in agreement—product appeal and satisfactory product performance. Both influence consumer satisfaction with the product. If the product is not appealing, it will not sell; if it fails in some way, consumers will not be happy with it. Consumer satisfaction is an important issue and should be included in product development. Assessment of material interactions in a product is an example of testing that pertains to product development.

The emphasis here is on the product and the consumer and on the characteristics and interactions of the product. This book includes materials analysis as one stage in developing a textile product that meets identified standards and specs based on the needs and expectations of a known target market. This book expands beyond textile testing to include other textile and nontextile materials. It includes information for writing specs and standards for most materials used in apparel and furnishings and some industrial goods. It discusses such critical aspects of textile products as appearance, construction, workmanship, fit, function, size, zones, and material and styling interactions. It describes inspection types and sampling methods. It examines quality management from a textile industry perspective. And, it incorporates a discussion of statistical process control.

The reader should have a basic understanding of textiles, manufacturing techniques, identification and characterization of target markets, statistics, and fashion terminology. Students may need access to books and course materials from these classes to refresh their memories. Access to a product evaluation lab, equipment, and manuals is essential. Products cannot be evaluated without a laboratory. Although some educational institutions may have limited equipment, students should acquire experience with the basic elements involved in evaluating product quality.

The basic elements of materials assessment and inspection include fiber type (qualitative and quantitative), yarn structure, fabrication method, stage of coloration, fabric mass, grain (bow or skew), inspection for patent defects of materials, and selected performance measures (abrasion or strength, colorfastness to cleaning and some use dimensions, dimensional stability, hand or stiffness, and comfort elongation and recovery). Additional material assessments are ideal if time, space, and equipment allow. The basic elements of product assessment include size, appearance, construction, workmanship, interaction of materials (seams, interlinings and support materials, trims, closures) in cleaning and performance, and assessment of patent defects in the product by zone.

Students should work with sample products for an identified target market to gain experience in identifying specs and standards for a specific audience. Without that grounding and orientation, results of textile testing

are difficult to comprehend and apply. Using several identical products will help students see firsthand the minor variations in identical products, gain experience in assessing product consistency of a small sample, and match product characteristics and performance to standards and specs.

Students find that developing standards and specs for products for a specific target market is a challenge, but this experience helps them focus on key elements of the product and the important features from the target market's perspectives. Once they have developed specs and standards, they better understand the results of testing and evaluation and are better able to discuss their product's success or failure.

This book requires the integration of a significant number of concepts and ideas presented in other classes. For this reason, the book is most appropriate for upper-level students who have had experience in the integration of ideas, application of concepts, critical thinking, and problem solving that are applied in quality assurance.

Organization and Features of the Text

The book is organized in four parts. Part I, Understanding Quality Assurance, consists of four chapters and includes a discussion of the perspectives of quality; connects products, quality, and consumers; defines and discusses standards and specifications; describes professional organizations; and introduces concepts related to testing of materials and products.

Part II, Materials Testing, focuses on materials and consists of five chapters. First, materials are specified in terms of characteristics, quality, and performance. Four of the chapters examine how materials are assessed and evaluated in a laboratory. Standard test methods and nonstandard industry techniques are discussed. Photographs of selected equipment are included so that students can relate the equipment to the performance or characteristic being assessed. These photos are included because many educational institutions do not have a complete range of equipment used in testing materials.

In Part III, Product Specifications and Analysis, the focus expands to consider the complete textile product. This part is the most unique component of the book. It consists of four chapters that integrate products with materials and consumers. It includes chapters on developing specs and standards for products, inspection processes, product testing, and taking samples.

In Part IV, Integration and Data Analysis, the two chapters apply quality management to the textile industry complex and discuss statistical process control using selected methods to present and analyze data.

Each chapter includes objectives, key words, review questions, references, tables, illustrations, and photographs. Where appropriate, sample

problems provide students with practice calculating results. Appendices provide sample forms and assessment guides, lists of standard test methods, scientific notation and conversion from one measurement system to another (i.e., inches to centimeters), addresses for equipment manufacturers and testing laboratories, guidelines for ethical behavior for quality assurance professionals, lists of countries with active ISO units, and answers to chapter problems. An index and a glossary will make the book more useful to industry professionals.

Acknowledgments

An endeavor of this magnitude cannot be completed without the help of many people. I thank my colleagues at Iowa State University (faculty, staff, and students) for their support, encouragement, and assistance in refining the concepts. Ruth Glock and Hyun Sook Shin were especially helpful with this second edtion. My experimental subjects (students in my TC 305 and 505 classes) helped clarify ideas and concepts from the first edition.

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