

Performance of **PROTECTIVE CLOTHING:**

Global Needs and Emerging Markets

8TH VOLUME

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Portia Yarborough and Cherilyn N. Nelson, Editors

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Foreword

Performance of Protective Clothing: Global Needs and Emerging Markets, Eighth Symposium was held in Tampa, Florida on 13–14 January 2004. ASTM International Committee F23 on Protective Clothing served as sponsor. Symposium chairpersons and co-editors of this publication were Portia Yarborough, Senior Research Chemist, E. I. du Pont de Nemours & Company, Inc., Richmond, VA; and Dr. Cherilyn N. Nelson, Vice President, Fibre and Knitting Technology, Ansell Healthcare Products, Inc., Seneca, SC.

Contents

Overviewviii

SECTION 1: NUCLEAR, BIOLOGICAL, CHEMICAL PROTECTIVE APPAREL

Evaluation of Three Chemical Protective Clothing Materials for Selected Performance Properties—J. O. STULL AND R. E. MCMANUS3

Development of Electronic Textiles to Transport Data and Power in Future U.S. Military Protective Clothing Systems—C. A. WINTERHALTER, J. TEVEROVSKY, P. WILSON, J. SLADE, B. FARELL, W. HOROWITZ, AND E. TIERNEY15

SECTION 2: THERMAL COMFORT

Revised Interlaboratory Study of Sweating Thermal Manikins Including Results from the Sweating Agile Thermal Manikin—M. G. M. RICHARDS AND E. A. MCCULLOUGH27

Development of a Prototype Personal Cooling System for First Responders: User Feedback—D. H. BRANSON, C. A. FARR, S. PEKSOZ, J. NAM, AND H. CAO40

Evaluating the Physiological Performance of a Liquid Cooling Garment Used to Control Heat Stress in Hazmat Protective Ensembles—K. M. SEMENIUK, J-P. DIONNE, A. MAKRIS, T. E. BERNARD, C. D. ASHLEY, AND T. MEDINA51

SECTION 3: PREDICTING PRODUCT PERFORMANCE

Can Laboratory Pre-Treatment of Welders' Protective Clothing Simulate Their Aging Process in Normal Use?—H. MÄKINEN, S. KARKKULA, K. JAAKKOLA, AND P. VON NANDELSTADH63

Development of Non-Destructive Test Methods for Assessing Effects of Thermal Exposures on Fire Fighters' Turnout Gear—P. A. THORPE AND D. A. TORVI74

Comparison of Methods Used to Predict the Burn Injuries in Tests of Thermal Protective Fabrics —G. SONG, R. BARKER, D. R. GRIMES, AND D. THOMPSON	88
Heat Transfer Characteristics of Sports Apparel —J. ZUO AND E. A. MCCULLOUGH	99
SECTION 4: STANDARDS AND TEST METHOD DEVELOPMENT	
Development of a Cooling Capability Test Method for Liquid-Cooled Textile System —H. CAO, D. H. BRANSON, J. NAM, S. PEKSOZ, AND C. A. FARR	111
An Explanation and Comparison of Sweating Hot Plate Standards —E. A. MCCULLOUGH, J. HUANG, AND C. S. KIM	121
Improvements in the Measurement of Cut Protection Performance: Revisions to ASTM F 1790 —P. YARBOROUGH AND P. SCHIFFELBEIN	134
Cut Performance Fundamentals and Norms Harmonization —S. REBOUILLAT AND B. STEFFENINO	139
Progress in the Characterization of the Cutting Resistance of Protective Materials —T. B. N. VU, T. VU-KHANH, AND J. LARA	160
A Study on the Puncture Resistance of Rubber Materials Used in Protective Clothing —C. T. NGUYEN, T. VU-KHANH, AND J. LARA	175
SECTION 5: THERMAL PROTECTIVE ASSESSMENT	
Evaluating Thermal Protective Performance Testing —N. R. KELTNER	191
Effects of Thermal Properties on Skin Burn Predictions in Longer Duration Protective Clothing Tests —D. A. TORVI	205
Effects of Simulated Flash Fire and Variations in Skin Model on Manikin Fire Test —G. SONG, R. BARKER, D. THOMPSON, AND R. GRIMES	218
Novel Approach to Soldier Flame Protection —C. A. WINTERHALTER, R. A. LOMBA, D.W. TUCKER, AND O. D. MARTIN	227
Index	235

Overview

This Special Technical Publication (STP) contains papers that address a range of topics related to the performance of protective clothing for government and industrial workers, first responders, and civilians. These papers were presented at the Eighth International Symposium on the Performance of Protective Clothing, held in Tampa, Florida on January 13–14, 2004. The theme of the eighth symposium sponsored by ASTM committee F23 was “Global Needs and Emerging Markets.”

Advancements have been made in the field of protective clothing based on new fabric and garment technologies. This symposium was designed to expand the awareness of safety professionals, industrial hygienists, manufacturers, suppliers, and end users regarding the application of standards and performance specifications in the development of protective clothing. The symposium also provided a forum for the exchange of ideas on new and emerging industrial needs for protective clothing.

There were over one hundred registered participants from the U.S., Canada, Asia, and Europe. The attendees included research scientists, engineers, apparel and materials manufacturers, industrial safety professionals, and private industry consultants. ASTM committee F23 chairman, Jeffrey O. Stull, opened the symposium with a keynote address focused on global standards for protective clothing.

Oral presentations of the technical papers were arranged into six main topic areas:

- Nuclear, biological, and chemical protective apparel
- Thermal comfort
- Protective clothing for the food industry
- Predicting product performance
- Standards and test method development
- Assessment of thermal protection

A poster session and reception were also held to promote networking among the attendees.

The papers in this volume are separated into five sections. In the Nuclear, Biological, Chemical Protective Apparel section, information is shared on how to effectively evaluate material choices for chemical protective apparel using established test methods. The latest developments in the field of electronic textiles and their use in protective apparel assemblies for hazardous or combative environments are described.

Worker comfort as a critical aspect of protective clothing is detailed in the Thermal Comfort section. Improvements in testing and measurement of thermal and evaporative resistance as it relates to worker comfort are shown. Methods to accurately simulate and measure human perspiration using a thermal manikin are described. The results of a wear trial with personal cooling systems for first responders are presented. The study outlines the benefits of using cooling vests with apparel for protection from hazardous materials.

Technical papers in the Predicting Product Performance section outline various factors that influence the performance of protective apparel. For optimum worker benefit, protective garments should be designed to provide a high level of protection without limiting the workers’ performance on the job. Nondestructive test methods for predicting the service life of the apparel are described.

The intent of the Standards and Test Method Development section is to share ways to improve existing test methods and to review data for establishing new test methods. Part of the focus of the standards committees' work is to ensure test methods remain relevant for the industry. As new materials and protective technologies are developed, it is important to ensure the standards and test methods are capable of accurately measuring and defining the performance of the product.

The section on Thermal Protective Assessment highlights modeling, manikin testing, and the performance of various clothing systems for providing thermal protection. Skin burn prediction techniques were investigated for assessing thermal hazards and risks. The results of a thermal characterization study using a manikin are presented. A comparison of the performance of clothing systems is made in order to develop a novel approach to soldier flame protection.

On behalf of ASTM, we thank all of the reviewers for their time and effort in reviewing the technical papers. The quality of this publication is reflected in the high professional standards of the reviewers. I wish to personally extend special thanks and recognition to the ASTM editorial staff and the staff managers for their hard work. We also thank the committee F23 members for their support and contributions to the symposium.

These proceedings contribute to the current body of knowledge relating to protective clothing performance. ASTM committee F23 will continue to provide forums to discuss current and future protective apparel trends along with real world application of existing standards. We look forward to your participation in future symposia.

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