ISO 9920:2007-06 (E)

Ergonomics of the thermal environment - Estimation of thermal insulation and water vapour resistance of a clothing ensemble

Contents

Page

Foreword v

Introduction vi

1 Scope 1

2 Terms and definitions 1

3 Application of this International Standard 5

4 Estimation of thermal insulation of clothing ensemble based on tables and with values measured on a standing thermal manikin 7
4.1 General 7
4.2 Insulation values of complete ensembles 8
4.3 Ensemble thermal insulation values based on individual garments 8
4.4 Complete ensemble insulation corrected for small differences in composition 8
4.5 Calculation of thermal insulation for clothing ensembles 9
4.6 Calculation of thermal insulation for individual garments 9

5 Estimation of clothing area factor 10

6 Estimation of surface (or boundary) air layer insulation 10

7 Estimation of water vapour resistance 12
7.1 General 12
7.2 Estimation of vapour resistance of clothing ensembles based on tables with values measured on standing thermal manikin 12
7.3 Estimation of vapour resistance of clothing ensemble based on its relation with dry heat resistance 12

8 Influence of body movement and air movement on the thermal insulation and vapour resistance of a clothing ensemble 13
8.1 General 13
8.2 Correction of clothing insulation 13
8.3 Correction of clothing vapour resistance 18
8.4 Activities other than walking 20
8.5 Relative air velocity 20

9 Other factors influencing clothing insulation 22
9.1 General 22
9.2 Posture 22
9.3 Effect of seats 22
9.4 Effect of pressure 22
9.5 Wetting 22
9.6 Washing 22

Annex A (normative) Thermal insulation values for clothing ensembles 23

Annex B (normative) Thermal insulation values for individual garments 46

Annex C (normative) Vapour permeability index values for clothing ensembles 73

Annex D (informative) Measurement of thermal insulation and water vapour resistance of clothing ensembles on a thermal manikin 88

Annex E (informative) Measurement of thermal insulation and water vapour resistance of a clothing ensemble on human subjects 94

Annex F (informative) Different expressions for the thermal insulation of clothing 96

Annex G (informative) Estimation of the heat exchanges for reflective clothing 98

Annex H (informative) Guidance on the determination of the covered body surface area 100

Bibliography 102