DIN EN ISO 7933:2024-03 (E)

Ergonomics of the thermal environment - Analytical determination and interpretation of heat stress using calculation of the predicted heat strain (ISO 7933:2023)

Contents

Page

European foreword ... **3**

Foreword ... **4**

Introduction ... **5**

1 Scope ... **6**

2 Normative references ... **6**

3 Terms and definitions ... **6**

4 Symbols ... **6**

5 Principles of the predicted heat strain (PHS) model ... **9**

6 Main steps of the calculation ... 10
- 6.1 Heat balance equation ... 10
  - 6.1.1 General ... 10
  - 6.1.2 Metabolic rate, M ... 10
  - 6.1.3 Effective mechanical power, W ... 10
  - 6.1.4 Heat flow by respiratory convection, C_{res} ... 10
  - 6.1.5 Heat flow by respiratory evaporation, E_{res} ... 10
  - 6.1.6 Heat flow by conduction, K ... 10
  - 6.1.7 Heat flow by convection, C ... 11
  - 6.1.8 Heat flow by radiation, R ... 11
  - 6.1.9 Heat flow by evaporation, E ... 11
  - 6.1.10 Heat storage for increase of core temperature associated with the metabolic rate, Q_{eqi} ... 11
  - 6.1.11 Heat storage, S ... 11
- 6.2 Calculation of the required evaporative heat flow, the required skin wettedness and the required sweat rate ... 12

7 Interpretation of required sweat rate ... 12
- 7.1 Basis of the method of interpretation ... 12
  - 7.1.1 General ... 12
  - 7.1.2 Stress criteria ... 12
  - 7.1.3 Strain criteria ... 13
  - 7.1.4 Reference values ... 13
- 7.2 Analysis of the work situation ... 13
- 7.3 Determination of allowable exposure time, D_{lim} ... 13

Annex A (normative) **Data necessary for the computation of thermal balance** ... **14**

Annex B (informative) **Criteria for estimating acceptable exposure time in a hot work environment** ... **22**

Annex C (informative) **Metabolic rate** ... **24**

Annex D (informative) **Clothing thermal characteristics** ... **25**

Annex E (informative) **Computer program for the computation of the predicted heat strain model** ... **27**

Annex F (informative) **Examples of the predicted heat strain model computations** ... **32**

Bibliography ... **33**