DIN EN ISO 9241-940:2025-01 (E)

Ergonomics of human-system interaction - Part 940: Evaluation of tactile and haptic interactions (ISO 9241-940:2017)

Contents

Page

European foreword ... **3**
Foreword ... **4**
Introduction ... **5**
1 Scope ... **6**
2 Normative references ... **6**
3 Terms and definitions ... **7**
4 Conformance ... **9**
5 How to use ISO 9241-940 ... **9**
5.1 Structure ... 9
5.2 Uses of this document ... 10
5.3 Evaluation in the design and development lifecycle ... 10
5.4 Planning activities ... 11
5.5 Initial assessment ... 11
5.6 Unique aspects of haptic interaction ... 12
6 Types of evaluation methods ... **13**
6.1 General ... 13
6.2 Physical measurements against requirements ... 13
6.3 Inspection by an expert ... 13
6.4 Usability test ... 13
6.4.1 General ... 13
6.4.2 Measurement context ... 13
6.4.3 Evaluation data ... 14
7 Quality of haptic interaction ... **15**
7.1 Quality model ... 15
7.2 Haptic system attributes ... 16
7.2.1 Quality attributes ... 16
7.2.2 Haptic device attributes (see Annex A) ... 16
7.2.3 Haptic user interface attributes ... 17
7.3 Usability attributes ... 17
7.3.1 Context of use (see Annex D) ... 17
7.3.2 Specific usage qualities (see Annex E) ... 18
7.3.3 Human-centred quality (see Annex F) ... 19
7.4 Evaluation matrix ... 19
7.4.1 Types of attributes ... 19
7.4.2 Measures of haptic quality ... 19
8 Guide to the annexes ... **22**
Annex A (informative) **Haptic device attributes** ... **24**
Annex B (informative) **Haptic effect design principles** ... **32**
Annex C (informative) **Haptic effect task elements** ... **37**
Annex D (informative) **Context of use** ... **42**
Annex E (informative) **Specific usage qualities** ... **44**
Annex F (informative) **Human-centred quality** ... **51**
Annex G (informative) **Gesture attributes** ... **60**

Annex H (informative) **Examples of evaluation of device attributes** **70**
Annex I (informative) **Unique aspects of haptic interaction** **82**
Annex J (normative) **Evaluation by usability walkthrough or usability task test** **84**
Bibliography **105**