ISO 9241-420:2011-07 (E)

Ergonomics of human-system interaction - Part 420: Selection of physical input devices

Contents

Page

Foreword vii

Introduction ix

1 Scope 1

2 Normative references 1

3 Terms and definitions 1

4 Procedures for selecting equipment -- General considerations 11
4.1 Rationale 11
4.2 Objectives for selection procedures 13

5 Performance criterion 13

6 Methods and aids for selection of devices 14
6.1 Task analysis 14
6.2 Selection based on product description 14
6.3 User tests 14
6.4 Selection based on dominant task primitive(s) with overriding importance 15
6.5 Selecting a keyboard 17

7 Field assessment of input devices 18
7.1 Rationale 18
7.2 Methods 19

Annex B (informative) Tracing test 24

Annex C (informative) Dragging test 26

Annex D (informative) Assessment of comfort 28

Annex E (informative) One-direction tapping test 32

Annex F (informative) Multi-directional tapping test 35

Annex G (informative) Test for mobile text entry (hand-held keyboards) 37

Annex H (normative) Tables for selecting devices in consideration of product description 40

Annex I (informative) Usability test for keyboards 93

Bibliography 94

Tables Annex H Table H.1 -- Correspondence with generic requirements on compact keyboards -- Appropriateness 47

Table H.2 -- Correspondence with generic requirements on compact keyboards -- Operability 47

Table H.3 -- Correspondence with generic requirements on compact keyboards -- Controllability 47

Table H.4 -- Correspondence with generic requirements on compact keyboards -- Biomechanical load 48

Table H.5 -- Functional properties of compact keyboards -- Design of keys of compact keyboards -- Design of keys 48

Table H.6 -- Functional properties of compact keyboards -- Design of keys -- Key legends 48

Table H.7 -- Functional properties of compact keyboards -- Design of keyboard -- Sections and zones 49

Table H.8 -- Functional properties of compact keyboards -- Design of keyboard -- Mechanical design 49

Table H.9 -- Other considerations for compact keyboards -- Electrical properties 50

Table H.10 -- Other considerations for compact keyboards -- Maintainability-related properties 50

Table H.11 -- Other considerations for compact keyboards -- Interdependencies 50

Table H.12 -- Other considerations for compact keyboards -- Documentation 50

Table H.13 -- Correspondence with generic requirements on full-size keyboards -- Appropriateness 51

Table H.14 -- Correspondence with generic requirements on full-size keyboards -- Operability 51

Table H.15 -- Correspondence with generic requirements on full-size keyboards -- Controllability ... 51

Table H.16 -- Correspondence with generic requirements on full-size keyboards -- Biomechanical load 52

Table H.17 -- Functional properties of full-size keyboards -- Design of keys -- Design of keys 52

Table H.18 -- Functional properties of full-size keyboards -- Design of keys -- Key legends 52

Table H.19 -- Functional properties of full-size keyboards -- Design of keyboard -- Sections and zones 53

Table H.20 -- Functional properties of full-size keyboards -- Design of keyboard -- Mechanical design 53

Table H.21 -- Other considerations for full-size keyboards -- Electrical properties 53

Table H.22 -- Other considerations for full-size keyboards -- Maintainability-related properties 54

Table H.23 -- Other considerations for full-size keyboards -- Interdependencies 54

Table H.24 -- Other considerations for full-size keyboards -- Documentation 54

Table H.25 -- Correspondence with generic requirements on mice -- Appropriateness 55

Table H.26 -- Correspondence with generic requirements on mice -- Operability 55

Table H.27 -- Correspondence with generic requirements on mice -- Controllability 55

Table H.28 -- Correspondence with generic requirements on mice -- Biomechanical load 56

Table H.29 -- Functional properties of mice -- Functional properties 56

Table H.30 -- Functional properties of mice -- Button design 56

Table H.31 -- Functional properties of mice -- Considerations of handedness 57

Table H.32 -- Functional properties of mice -- Resolution consistency 57

Table H.33 -- Other properties of mice -- Mechanical properties 57

Table H.34 -- Other properties of mice -- Electrical properties 57

Table H.35 -- Other properties of mice -- Maintainability-related properties 57

Table H.36 -- Other properties of mice -- Health- and safety-related properties 58

Table H.37 -- Interdependencies and documentation of mice -- Interdependency with software 58

Table H.38 -- Interdependencies and documentation of mice -- Interdependency with use environment 58

Table H.39 -- Interdependencies and documentation of mice -- Documentation 59

Table H.40 -- Correspondence with generic requirements on pucks -- Appropriateness 59

Table H.41 -- Correspondence with generic requirements on pucks -- Operability 60

Table H.42 -- Correspondence with generic requirements on pucks -- Controllability 60

Table H.43 -- Correspondence with generic requirements on pucks -- Biomechanical load 60

Table H.44 -- Functional properties of pucks -- Functional properties 61

Table H.45 -- Functional properties of pucks -- Button design 61

Table H.46 -- Functional properties of pucks -- Consideration of handedness 61

Table H.47 -- Functional properties of pucks -- Resolution consistency 62

Table H.48 -- Other properties of pucks -- Mechanical properties 62

Table H.49 -- Other properties of pucks -- Electrical properties 62

Table H.50 -- Other properties of pucks -- Maintainability-related properties 62

Table H.51 -- Other properties of pucks -- Health- and safety-related properties 63

Table H.52 -- Interdependencies and documentation of pucks -- Interdependency with software 63

Table H.53 -- Interdependencies and documentation of pucks -- Interdependency with use environment 63

Table H.54 -- Interdependencies and documentation of pucks -- Documentation 64

Table H.55 -- Correspondence with generic requirements on joysticks -- Appropriateness 64

Table H.56 -- Correspondence with generic requirements on joysticks -- Operability 65

Table H.57 -- Correspondence with generic requirements on joysticks -- Controllability 65

Table H.58 -- Correspondence with generic requirements on joysticks -- Biomechanical load 65

Table H.59 -- Functional properties of joysticks -- Functional properties 66

Table H.60 -- Functional properties of joysticks -- Button design 66

Table H.61 -- Functional properties of joysticks -- Consideration of handedness 66

Table H.62 -- Functional properties of joysticks -- Resolution consistency 67

Table H.63 -- Other properties of joysticks -- Mechanical properties 67

Table H.64 -- Other properties of joysticks -- Electrical properties 67

Table H.65 -- Other properties of joysticks -- Maintainability-related properties 67

Table H.66 -- Other properties of joysticks -- Health- and safety-related properties 68

Table H.67 -- Interdependencies and documentation of joysticks -- Interdependency with software . 68

Table H.68 -- Interdependencies and documentation of joysticks -- Interdependency with use environment 68

Table H.69 -- Interdependencies and documentation of joysticks -- Documentation 68

Table H.70 -- Correspondence with generic requirements on trackballs -- Appropriateness 69

Table H.71 -- Correspondence with generic requirements on trackballs -- Operability 69

Table H.72 -- Correspondence with generic requirements on trackballs -- Controllability 70

Table H.73 -- Correspondence with generic requirements on trackballs -- Biomechanical load 70

Table H.74 -- Functional properties of trackballs -- Functional properties 70

Table H.75 -- Functional properties of trackballs -- Button design 71

Table H.76 -- Functional properties of trackballs -- Consideration of handedness 71

Table H.77 -- Functional properties of trackballs -- Resolution consistency 71

Table H.78 -- Other properties of trackballs -- Mechanical properties 72

Table H.79 -- Other properties of trackballs -- Electrical properties 72

Table H.80 -- Other properties of trackballs -- Maintainability-related properties 72

Table H.81 -- Other properties of trackballs -- Health- and safety-related properties 72

Table H.82 -- Interdependencies and documentation of trackballs -- Interdependency with software 73

Table H.83 -- Interdependencies and documentation of trackballs -- Interdependency with use environment 73

Table H.84 -- Interdependencies and documentation of trackballs -- Documentation 73

Table H.85 -- Correspondence with generic requirements on touchpads -- Appropriateness 74

Table H.86 -- Correspondence with generic requirements on touchpads -- Operability 74

Table H.87 -- Correspondence with generic requirements on touchpads -- Controllability 75

Table H.88 -- Correspondence with generic requirements on touchpads -- Biomechanical load 75

Table H.89 -- Functional properties of touchpads -- Functional properties 75

Table H.90 -- Functional properties of touchpads -- Button design 76

Table H.91 -- Functional properties of touchpads -- Consideration of handedness 76

Table H.92 -- Functional properties of touchpads -- Resolution consistency 76

Table H.93 -- Other properties of touchpads -- Mechanical properties 77

Table H.94 -- Other properties of touchpads -- Electrical properties 77

Table H.95 -- Other properties of touchpads -- Maintainability-related properties 77

Table H.96 -- Other properties of touchpads -- Health- and safety-related properties 77

Table H.97 -- Interdependencies and documentation of touchpads -- Interdependency with software 78

Table H.98 -- Interdependencies and documentation of touchpads -- Interdependency with use environment 78

Table H.99 -- Interdependencies and documentation of touchpads -- Documentation 78

Table H.100 -- Correspondence with generic requirements on tablets/overlays -- Appropriateness ..79

Table H.101 -- Correspondence with generic requirements on tablets/overlays -- Operability 79

Table H.102 -- Correspondence with generic requirements on tablets/overlays -- Controllability 80

Table H.103 -- Correspondence with generic requirements on tablets/overlays -- Biomechanical load 80

Table H.104 -- Functional properties of tablets/overlays -- Functional properties 80

Table H.105 -- Functional properties of tablets/overlays -- Button design 81

Table H.106 -- Functional properties of tablets/overlays -- Consideration of handedness 81

Table H.107 -- Functional properties of tablets/overlays -- Resolution consistency 81

Table H.108 -- Other properties of tablets/overlays -- Mechanical properties 82

Table H.109 -- Other properties of tablets/overlays -- Legibility and visibility of legends and graphical symbols 82

Table H.110 -- Other properties of tablets/overlays -- Electrical properties 83

Table H.111 -- Other properties of tablets/overlays -- Maintainability-related properties 83

Table H.112 -- Other properties of tablets/overlays -- Health- and safety-related properties 83

Table H.113 -- Interdependencies and documentation of tablets/overlays -- Interdependency with software 84

Table H.114 -- Interdependencies and documentation of tablets/overlays -- Interdependency with use environment 84

Table H.115 -- Interdependencies and documentation of tablets/overlays -- Documentation 84

Table H.116 -- Correspondence with generic requirements on styli and light pens -- Appropriateness 85

Table H.117 -- Correspondence with generic requirements on styli and light pens -- Operability 85

Table H.118 -- Correspondence with generic requirements on styli and light pens -- Controllability . 85

Table H.119 -- Correspondence with generic requirements on styli and light pens -- Biomechanical load 86

Table H.120 -- Functional properties of styli and light pens -- Functional properties 86

Table H.121 -- Functional properties of styli and light pens -- Button design 87

Table H.122 -- Functional properties of styli and light pens -- Consideration of handedness 87

Table H.123 -- Functional properties of styli and light pens -- Mechanical properties 88

Table H.124 -- Other properties of styli and light pens -- Electrical properties 88

Table H.125 -- Other properties of styli and light pens -- Maintainability-related properties 88

Table H.126 -- Other properties of styli and light pens -- Health- and safety-related properties 88

Table H.127 -- Interdependencies and documentation of styli and light pens -- Interdependency with software 88

Table H.128 -- Interdependencies and documentation of styli and light pens -- Interdependency with use environment 89

Table H.129 -- Interdependencies and documentation of styli and light pens -- Documentation 89

Table H.130 -- Correspondence with generic requirements on touch-sensitive screens -- Appropriateness 89

Table H.131 -- Correspondence with generic requirements on touch-sensitive screens -- Operability 89

Table H.132 -- Correspondence with generic requirements on touch-sensitive screens -- Controllability 90

Table H.133 -- Correspondence with generic requirements on touch-sensitive screens -- Biomechanical load 90

Table H.134 -- Functional properties of touch-sensitive screens -- Functional properties 91

Table H.135 -- Functional properties of touch-sensitive screens -- Mechanical properties 91

Table H.136 -- Other properties of touch-sensitive screens -- Electrical properties 91

Table H.137 -- Other properties of touch-sensitive screens -- Maintainability-related properties 92

Table H.138 -- Other properties of touch-sensitive screen -- Health- and safety-related properties ... 92

Table H.139 -- Other properties of touch-sensitive screens -- Interdependency with software 92

Table H.140 -- Other properties of touch-sensitive screens -- Interdependency with use environment 92

Table H.141 -- Other properties of touch-sensitive screen -- Mechanical properties 92