

Index

Note: Figures and Tables are indicated by *italic page numbers*, Glossary items by **boldened numbers**

Access Statements 131, 139, 140, **205**

accessibility

Building Regulations on 11
consultation on 158
and inclusion 6, 8

adaptation 26, **205**

and emergency lighting 75, 103
and exterior lighting 107
lighting design and 98, 193
in transport environments 189

ageing population

illuminance requirements 28, 96
visual performance 28

airports, lighting in 91, 189

Approved Document to Part M
(ADM) 11–12, 19

limitations 11–12

LRV difference recommendations
125, 126, 141

architraves (around doors), colour
and contrast guidance 40,
137–40, 161, 169

Arlington Arts Centre (Mary Hare,
Newbury) 159–64

artificial lighting 46, 47, 50–63
good-practice guidance 99–101

bathrooms, lighting of 85, 87, 93

bedrooms, lighting in 93, 106

blind or partially sighted people
criteria for registration 30, 31,
33

information gathering by 79,
127–8

numbers 30, 31

sleep disorders 70

study of colour and lighting
effects 173–8

study of emergency escape
signage 190–2

study of emergency lighting and
way-guidance systems 182–6

study of lighting needs in
homes 192–4

- 'blind spot' 26
- blindness
 - classification of 30–1, 33
 - legal definition 31
 - personal viewpoint 29
- blue (fluorescent) lamps 57–8, 71
- bollard lighting 84
- British Standards 12–13
 - LRV difference recommendations 125, 126, 141
 - LRV test method 124
- Building Bulletins (for schools) 17, 18
- Building Regulations 10–12
 - on colour and lighting 12
 - Part M 10–12
 - Part T 10
 - see *also* Approved Document to Part M
- Building Research Establishment (BRE), emergency lighting and signage test facility 183–4
- built environment
 - colour in 112–14
 - colour and contrast in 129–49
- bulkhead luminaires 163, 164, 172
- car parks, lighting of 85, 86, 95
- Carrington Building (University of Reading) 164–72
- case studies 150–72
 - Arlington Arts Centre 159–64
 - Carrington Building 164–72
 - The Roundhouse, Camden 151–8
- cataracts 24
 - effect on field of vision 39
- ceilings and walls, colour and contrast guidance 129–31
- central vision loss 36–7
 - example of effects 40
- Chartered Institute of Building Services Engineers (CIBSE), guidance on lighting 14, 18
- chroma (intensity of colour) 117
 - and contrast 121
- Chronically Sick and Disabled Persons Act 9
- circadian 'clock' 69
- circular fluorescent luminaires, wall-mounted 160, 161
- Civic Trust Design Award 153
- colorimeter, LRV measured by 123–4
- colour
 - in built environment 112–14
 - description of 109–10
 - effect on mood 110, 111
 - emotional reaction to 21, 110
 - role in creating inclusive and accessible environment 21–2
 - see *also* chroma; hue
- colour blindness 110, 112
 - test for 112
- colour coding
 - floor levels of building 165, 167, 169
 - lighting pull cords 106
- colour notation systems 114–19
- Colour Palette system 116–17
- colour rendering index 52, **206**
 - listed for various light sources 63
 - threshold for colour identification 82
- colour temperature **206**
 - listed for various light sources 63

- colour vision
 deficiency 110, 112
 effect of visual impairment 28
 comfort, factors affecting 66–7
 Commission for Architecture and the Built Environment (CABE), on inclusive design 5, 6–7
 Commission Internationale de l'Éclairage (CIE)
 colour measurement systems 114, 115, **206**
 colour rendering index 52, **206**
 compact fluorescent lamps (CFLs) 58–9, 63
 example(s) of use 154, 162, 163, 166, 167, 168, 169, 170
 cone photoreceptor cells 25
 and colour blindness 110
 confidence of user, factors affecting 72, 83, 105, 106, 114
 contrast 119–21, 122
 definitions 119, **206–7**
 guidance on 12, 16, 129–49
 reflectance-based definition 119–21
 research project to study 173–8
 role of colour in achieving 21, 119
 role in creating inclusive and accessible environment 21–2
 specifying 'reasonable' contrast 124–5, 126
 control systems
 for artificial lighting 80
 for daylight 101–2
 Correlated Colour Temperature (CCT) **206**
 corridors, lighting of 85, 86, 92, 93
 daylight 48–50
 characteristics 63
 Daylight Factor 48, **207**
 daylighting, good-practice guidance 101–2
 deaf and hard of hearing people
 arts centre design 159–64
 communication for 44–5
 effect of colour and lighting 42–4
 information processing by 28–9
 number in UK 422
 study of colour and lighting effects 179–82
 see also lip-reading; sign language
 Department for Children, Schools and Families guidance 17, 18
 Department for Transport (DfT) guidance 15–16, 141
 diabetic retinopathy 38
 dimmable lighting
 examples 152, 158, 160, 194
 types of lamps available 57, 59, 63
 direction and information
 signage 44
 colour and contrast used 156–7, 161
 examples 43, 44, 157, 162, 167, 168
 lighting of 86, 88, 89, 91
 positioning of 189
 in transport environments 89, 188, 189
 Disability Discrimination Act (DDA) 9–10
 disability glare 68–9, 99, 101, **208–9**

- discharge lamps 54–61
 - characteristics 63
 - temperature effects 54–5
- discomfort glare 67–8, **208**
- diversity (of illuminance) 66, **208**
 - emergency lighting 77
- door furniture 139, 140
- doors, colour and contrast guidance 40, 136–40, 169
- downlighters, example(s) of use 97, 154, 166, 167, 168
- Drafts for Development (DDs) 181–9
- educational environments
 - illuminance recommendations 92
 - inclusive design for 17–18
- efficacy (of light source) 53, **208**
 - for various lamps 53, 56
- electrical sockets and switches, colour and contrast guidance 146
- electroluminescent way-guidance systems 75–6, 185, 186
- emergency electricity supply 74
- emergency escape route
 - signage 77–9, 103
 - LEDs incorporated 79, 191
 - lighting of 73, 103, 105
 - positioning of 79, 103, 104, 105
 - standard pictograms 78, 190
 - study of 190–2
- emergency lighting 72–7
 - examples 158, 163
 - good-practice guidance 72, 103–5
 - overhead luminaires 74, 103–4, 158
 - regulations and guidance on 72–3
 - requirements for various locations 77
 - types 73–7
 - see *also* way-guidance systems
- emotional effect of colours 21
- escalators, lighting of 88, 91
- escape-route lighting 74–5, 77, 87, 103–5
- Eulumdat **208**
- European Blind Union (EBU) data 30
- European standards, on accessibility to railway infrastructure 16
- evidence-based research 12, 119, 173–94
- exterior lighting 80–4
 - examples 163–4, 170, 172
 - good-practice guidance 106–7
 - illuminance recommendations 85, 86, 88–9, 92, 93–5
- eye
 - sensitivity loss with age 28
 - structure 23–6
- field of vision 32
 - assessment of 33–4
 - see *also* visual field loss
- fire safety requirements 73
- floor coverings and finishes
 - colour and contrast guidance 132–3, 134–6, 171
 - information markings on 135, 189
- fluorescent lamps 55–9
 - characteristics 63
 - see *also* compact fluorescent lamps; tubular fluorescent lamps

- Frayling, Professor Sir Christopher
(quoted) 4
- functional visual ability 34–5
- furniture, colour and contrast
guidance 148–9, 169, 171
- General Lighting Service (GLS) lamps
52–3, 63
- general vision loss 37–9
- glare
causes 49, 66, 101
effects 40, 49, 66
types 67–9, **208–9**
- Glare Index **208**
- glaucoma 37
effect on field of vision 37
- glossary of terms **205–11**
- GOBO lighting 158, **209**
- good-practice guidance 10–13
artificial lighting 96, 99–101
doors and door furniture 139–40
electrical sockets and switches
146
emergency lighting 72, 103–5
exterior lighting 106–7
floor coverings and finishes 134–6
general lighting 98–9
handrails to steps and stairs 142
illuminance recommendations in
various environments 85–95
lifts 143–4
lighting controls 105–6, 146
natural lighting 101–2
nosings to steps and stairs 141–2
skirtings 135–6
task lighting 102–3
toilets 145–6
walls and ceilings 130–1
- guide rails 148, 149, 189
- Habinteg Housing Association (HHA)
standards 18
- handrails, colour and contrast
guidance 120, 121, 122, 142,
161
- hazards see potential hazards
- health
effect of colour 108–10
effect of lighting 69–71
- Health Building Notes (HBNs)
23–5
- health environments
colour in 109
illuminance recommendations
86–7
inclusive design for 13–15
- health and safety 69–72
- hearing loss 41–5
colour and lighting and 42–4
- high-pressure mercury (MBF)
lamps 59, 63
- high-pressure sodium (SON) lamps
61, 63, 82, 172
- homes, lighting in
design guidance document 19,
194
illuminance recommendations
93
needs of blind or partially sighted
people studied 192–4
- hospitals
colour in 109
lighting of 14–15, 86–7, 100
- housing
illuminance
recommendations 92–3
inclusive design for 18–19
- hue 116–17
and contrast 121

- ICI Paints
 - colour notation system 116–17
 - as sponsor of Project Rainbow 177
- illuminance **209**
 - emergency lighting 74, 77
 - guidance on 14–15, 16
 - recommendations for various environment 85–95
 - relationship with light reflectance value and luminance **209**
 - task lighting 102
- incandescent lamps 51–4
 - characteristics 63
 - limitations 53–4
- inclusion, and accessibility 6, 8
- inclusive design
 - benefits 8
 - for educational environments 17–18
 - examples 7, 153–4
 - for health environments 13–15
 - for housing 18–19
 - legislation on 9–10
 - meaning of term 4–5
 - principles 5–8
 - regulations on 10–12
 - standards on 12–13
 - for transport environments 15–17
- inclusive environments and spaces, features 7
- Inclusive Mobility* guidance
 - document 16, 140–1
- information gathering and processing 28–9, 42
- information-gathering strategies, by blind or partially sighted people 127–8
- International Protection (IP) rating of luminaires 64–5
- Ishihara (colour blindness) test 112
- junctions (ceilings/walls/floors), highlighting of 21, 113, 131, 169
- kitchens, lighting of 85, 93
- legislation 9–10
- Lifetime Homes standards 18
- lift cars, doors and landings
 - colour and contrast guidance 143–4
 - lighting of 85, 87, 90
- light
 - artificial 46, 47, 50–63
 - natural 46, 47–8, 48–50
- light-emitting diodes (LEDs) 61–2, 63
 - in emergency escape signs 79, 191
 - in emergency lighting and way-guidance systems 75, 76, 158, 183, 185, 186
 - example(s) of use 152, 158
- light pollution 81
- Light Reflectance Value (LRV) 122, **210**
 - in colour notation system 117
 - contrast expressed in terms of 119–21, 124–5, 126
 - LRV difference
 - recommendations 125, 126
 - measuring 122–4
 - relationship with illuminance and luminance **209**
 - use of LRV differences in practice 128–9

- light sources, artificial 50–63
 characteristics 63
 hot-to-touch 66, 100
 publications on 51
- light-therapy lamps 70–1
- lighting
 designing for inclusive and
 accessible environment 96–107
 external 80–4
 guidance on 14–15, 16
 provision for exterior areas 83–4
 role of 19–20
- lighting controls 79–80
 colour and contrast guidance
 146
 good-practice guidance 105–6
 illumination of 105
 need for 96
 types 80, 106
- lighting fittings *see* luminaires
- lip-reading
 effect of colour and contrast 130
 effect of lighting 28–9, 43, 44,
 65, 98, 99
 study of colour and lighting effects
 180–1
- listed building 150, 151
- localised lighting 97
- low-mounted way-guidance systems
75–6
- low-pressure sodium (SOX) lamps
60–1, 63, 82
- luminaires 64–6, **210**
 ingress rating 64–5
- luminance 122, **209**
 relationship with illuminance and
 LRV **209**
- luminous reflectance factor **210**
- lux (unit of illuminance) **209**
- macula 25
- macular degeneration 36–7
- maintenance (of luminaires and
 lamps) 101
- Mary Hare charity 159
- melatonin 70
 suppression of production 70, 71
- mercury discharge lamps 54, 59,
63
 example(s) of use 153, 155, 169,
 170
- mesopic vision 26
- metal-halide lamps 59–60, 63
 example(s) of use 153, 155
- mood, effect of colour 110, 111
- Munsell colour system 118
- Natural Colour System
 (NCS) 115–16, 176
- natural light 46, 47–8, 48–50
 see also daylight
- natural lighting, good-practice
 guidance 101–2
- ‘night blindness’ 39
- Nightingale, Florence (quoted)
108
- nosings on stairs and steps, colour
 and contrast guidance 122,
 140–2, 161
- obstacles 147–8
 colour and contrast
 guidance 148–9
- optic nerve 23, 26
- overhead luminaires (emergency
 lighting) 74, 103–4, 158, 184,
 185
 in smoke-filled environments 76,
 183, 186

- partially sighted people
 - criteria for registration 30–1, 31, 33
 - numbers worldwide 30
- perception of colour and light 23–8
- peripheral retina 25
- peripheral vision loss, example of effects 40–1
- photoluminescent strips and signs 46
- photoluminescent way-guidance systems 76, 185
- photopic vision 26
- poor vision
 - effects 32
 - factors affecting 32
- potential hazards 147–8
 - colour and contrast guidance 148–9, 160–1
- powered way-guidance systems 75–6, 104–5
 - study of 185, 186
- Project Crystal 43–4, 179–82
 - colours used for backdrops 181
 - outcome 182
 - ‘real world’ test facility 180, 181
- Project Rainbow 173–8
 - aim and purpose 174, 175–6
 - colour notation system used 116, 176
 - colours used in tests 176–7
 - doors and 139
 - evidence-based information obtained 176
 - field-of-vision assessment in 34
 - information-gathering strategies and 127
 - laboratory tests 177
 - logo 174
 - LRV difference recommendations based on 125
 - obstacles and 147–8
 - ‘real world’ tests 177–8
 - as source of guidance 1, 12, 174, 178
 - stairs and 142
- projecting obstacles 147–8
- railway stations and infrastructure
 - guidance covering 15–16, 141
 - illuminance recommendations 88–91
- RAL colour-matching system 118–19
- ramps and steps, lighting of 83, 85, 89, 92, 93
- reception desks, lighting at 87, 99, 166, 167
- reflectance factor **210**
- reflection factor **210**
- reflective surfaces (walls and floors) 130, 131, 132–3, 143
- reflectometer, LRV measured by 123–4
- regulations 10–12
 - see *also* Building Regulations
- research projects 173–94
 - emergency escape signage 190–2
 - emergency lighting and way-finding systems 182–6
 - lighting needs in homes 192–4
 - Project Crystal 43–4, 179–82
 - Project Rainbow 1, 173–8
 - transport environments 187–90
- retina 23, 24–5
- retinitis pigmentosa 38–9
- roads, lighting of 81, 86, 94
- rod photoreceptor cells 25

- Roundhouse, Camden 151–8
- Royal Institute of British Architects (RIBA), on inclusive design 5
- Royal National Institute of Blind People (RNIB), on effects of visual field loss 36, 37, 38, 39, 40
- Royal National Institute for Deaf People (RNID) data 42
- safety aspects of lighting 71–2
 exterior lighting 82–3
- schools, inclusive design for 17–18
- scotopic vision 26
- security lighting 95
- shadows 41, 49
 reduction of 65
- shift work, health effects 70
- sign language 41–2, 44, 98, 130
 study of colour and lighting effects 180–1
- signage *see* direction and information signage; emergency escape route signage
- skirtings, colour and contrast guidance 133–6, 160
- smoke-filled environments, study of emergency lighting and way-guidance systems 185–6
- Snellen Chart 30, 32–3
- Society of Light and Lighting (SLL)
 Code of Lighting 96
 design guides 96
- sodium discharge lamps 60–1, 63, 82, 172
- spectrophotometer, LRV measured by 124
- sports environments, lighting of 92, 93
- stairs
 colour and contrast guidance 140–2, 169
 lighting of 86, 87, 89, 92, 93
 stand-by lighting 74
 standard maintained illuminance (SMI) **210**
- standards 12–13
- steps and ramps, lighting of 83, 85, 86, 89, 92
- surface finishes (floors and walls)
 colour and contrast guidance 130, 131, 132–3, 145
 role in inclusive design 20
- tactile ground-level surfaces 148, 149
- tapping rails 148, 149
- task lighting 66, 67
 good-practice guidance 102–3
- Thomas Pocklington Trust (TPT)
 design guidance document 19, 194
 study on lighting needs in homes 192–4
- ticket counters (in transport facilities), lighting of 91, 190
- toilets
 colour and contrast guidance 144–6, 161, 162, 169–70, 171
 floor coverings in 136
 lighting of 57–8, 85, 87, 90
- traffic routes, lighting of 81, 85, 86, 94–5
- transport environments
 colour and contrast guidance 141
 illuminance recommendations 88–91

- transport environments (*cont'd*)
 - inclusive design for 15–17
 - study of colour and lighting design 187–90
- travelators, lighting of 88, 91
- tubular fluorescent lamps 55–8, 63
 - example(s) of use 153, 156, 158, 160, 162, 163, 166
- tungsten–halogen (TH) lamps 53, 63
 - example(s) of use 152, 155, 158, 160, 163, 194
- ‘tunnel vision’ 37

- uniformity (of illuminance) **211**
- uplighters
 - exterior 84
 - interior 61
- urban centres, lighting of 95
- usability
 - Building Regulations on 11
 - and exterior lighting 81–2

- veiling reflections 43, 69, 99
- vision assessment 33–4
 - reasons for undergoing 34
- visual ability 29–35
 - classification of 31–2
 - factor affecting 32

- visual acuity 32
 - assessment of 32–3
 - in criteria for registration as blind/partially sighted person 33
- visual comparison, LRV measured by 123
- visual contrast see contrast
- visual disability **211**
- visual field loss
 - illustration of effects 40–1
 - types 35–9
- visual handicap **211**
- visual impaired people see blind or partially sighted people
- visual impairment **211**
 - colour vision affected by 28
 - functional classification of 35
- visual system, adaptation of 26

- walls, surface finishes 130
- walls and ceilings, colour and contrast guidance 129–31
- way-guidance systems 75–6, 104–5
 - research project studying 182–6
- wheelchair-accessible toilets 106, 169–70, 171
- windows, benefits 49, 50
- workplaces, lighting of 95