access
  pipes entering buildings, 275–6
  through walls and floors, 275–9
  to cisterns, 281
  to stopvalves, 279–80
access to and use of buildings, 10, 128
air gaps, 203–10
air valves, 38
anti-vacuum valves, 211, 213–214, 216–7
approved contractors’ schemes, 4
backfilling trenches, 339–40
backflow prevention (protection), 4, 57, 194, 201–33
backflow protection, 210–33
  to agricultural and horticultural premises, 230–31
  to bidets, WC’s and urinals, 222–4
  to domestic and other premises, 222–7
  to fire protection systems, 231–3
  to industrial/commercial premises, 227–33
  secondary or zone protection, 220–21
backflow protection devices, 203–17
  application of, 222–33
  mechanical types, 210–17
  non-mechanical types, 203–10
  schedules of, 204–5
backflow risk categories, 216–19
backsiphonage, 201
back pressure, 201
benchmark scheme, 140–41
bidets, 223–4
blue water, 361
boiler efficiency, 260–3
boiler heated systems, 88, 101–14
boilers, 137–41
boosted cold water, 66–74
booster pumps, 71–4, 258
building regulations, 5–11, 16, 79, 92–4, 118, 120, 124, 128, 147, 162, 197, 198, 203, 228, 247–57, 258–66, 373

cavitation, 268
central heating combined with hot water, 108–14, 200
check and anti-vacuum valves, 216–7
check valves, 215–7, 225, 231
circulating head, 105
circulating pumps, 105, 141–2
cisterns
  access, 281
  capacities, 38–9
  connections to, 43–6, 329–31
  control valves, 39–42
  feed (and expansion), 137–8
  float operated valves, 39–42
  interposed, 223–4
  large, 45–6
  linked, 45
  protected, 36–7
  requirements, 36–7
  sizing, 188–9
  storage, 36–50
  support, 38
  warning/overflow pipes, 46–50
cold feed pipes, 105–7, 125–6
cold water storage cisterns, 36–50, 137, 329
cold water systems
  boosted (pumped), 31, 66–74
  drinking water, 30, 34–5, 66–75
  direct/indirect, 31–5
  combination boilers, 87–8
  combination type storage heaters, 97–8
  commissioning, 365–6
  common feed and vent arrangements, 128–9
  compartmentation, 373–5
  competent persons (schemes), 8–9
  concealed pipes and fittings, 347–50
  connections to mains, 332–4
  contamination of water, 57, 193, 196, 335
  continuity bonding, 60, 350
  corrosion, 108, 327, 338–9
  cross connections, 194, 198–201
dead legs, 123–4
definitions, 4–5, 12–16, 379–80
discharge pipes, 162–6
disconnection of unused pipes, 372
dishwashers, 225, 257
disinfection of systems, 361–6
distributing pipe (secondary), 123–5
draining valves, 57, 143, 239–2
drinking water, 30, 34–5
drinking water fountains, 225
electrical earthing and bonding, 60, 350
electrical immersion type storage heaters, 98–102
electrical safety, 10–11
electrical work, 10–11
ergy conservation, 9, 258–66
ergy control, 155–8
ergy loss from pipes, 259
expansion joints, 345
expansion relief valve, 162, 172
expansion vessel, 168, 170–71
feed and expansion cistern, 105–7, 125, 137
fire protection and sprinkler systems, 231–3, 350, 369, 376
flanged gate valve, 52
float operated valves, 39–42
float valve oscillation, 272
flow noise, 267–8
flow velocities, 57, 184
fluid risk categories, 201–2, 216–19
flushing and disinfecting, 361–5
flushing primary circuits, 365
flushing WCs and urinals, 248–55
frost protection
  draining down, 57, 143, 239–2
  insulation, 243–5
  outside buildings, 236–8
  to cisterns, 239–40
  to pipes below ground, 235–8
  to pipes entering buildings, 236–7
  to pipes in roof spaces, 239–40
  trace heating, 246
garden supplies, 225, 227
gate valves, 52, 56
graphical symbols, 17–20
gravity circulation, 102–5
grey water, 257–8
heat pump systems, 122
heat pumps, 120–23
hose pipes, 225–7
hose union taps, 225–7
hot store vessels (cylinders), 128–36
capacities, 128
  combination units, 97–8, 134–5
double feed indirect, 131–4
  energy control, 128, 258
heated by electricity, 136
high performance, 136–7
insulation of, 108, 137, 264–6
single feed indirect, 108–10, 134–5
sizing, 189–93
stratification, 129–30
temperature (thermostatic) control, 128, 147–54
types and grades, 130–7
unvented, 92–5, 117
vented, 117, 131–5
hot water and heating, combined, 108–14
hot water circulation
  gravity, 102–3
  primary, 105–14, 117
  pumped, 108–14
hot water for the less able, 147–54
hot water supply requirements, 128
hot water systems
  boiler heated, 88, 101–4
  choice of, 79–80
  combination boiler, 87–8
  combination type storage heaters, 97–8
direct, 102–3, 105
electric, 98–101
gas fired circulators, 101
heat pumps, 120–3
indirect, 102–3
instantaneous, 81–5
non-pressure or inlet controlled, 95
pressure or outlet controlled, 96–7
sealed, 113–14, 162, 200
single feed indirect, 108–10
solar, 113–20
storage type, 88–123
unvented, 90–4, 168, 170–1
vented, 88–9, 168
water jacketed (primary store), 85–8
hydrants (fire), 58, 342–4
identification of pipes and valves, 353–5
immersion heaters, 98–101, 173, 191
initial procedures, 26–9
inspection of pipes and systems, 356–7
installation of pipes below ground, 335–45
installation of pipes in buildings, 345–50
instantaneous water heaters, 81–5
insulation
  of cisterns, 239, 240
  of hot store vessels, 108, 137, 263–6
  of pipes and fittings, 124, 263–6, 346
  of solar systems, 113–20
interposed cistern, 223–4
isolating valves, 58
joints for pipes
   bolted gland, 325
   brazed, 301–3
   braze welded, 303–4
   capillary solder, 295–6
   compression, 291–4, 315
   detachable, 326
   expansion, 345
   flanged, 310, 318, 322, 325
   lead run, 323
   mechanical, 315
   plain socketed, 322–3
   push-fit (slip-fit) and press-fit, 215, 296–300
   screwed gland, 327
   screwed (threaded), 282–5
   solvent cement, 317–18
   thermal fusion, 310–12
   wiped solder, 328
jointing potable pipework, 350–2
laying underground pipes, 335–44
leakage and leak detection, 369–71
legionella, 193, 197–8
loading units, 174, 176–7
local heating, 246
mains connections, 332–5
maintenance, 73, 366–8, 392
maintenance schedule, 367–8
materials, 6–7, 21–2, 155, 194, 197
materials, in contact with water, 194–7
meters and meter reading, 58–65
mixers (mixing valves), 143–6, 153–4, 200
noise and vibration, 267–74
noise
   cavitation, 268
   flow, 267–8
   in pipes and fittings, 267–8
   in pumps, 272
   in taps and valves, 267–72
   thermal transmission, 273–4
   vapour or air, 273
   water hammer, 270–2
notification and self-assessment, 3–4, 8–9
occupier information
   open safety vent (vent pipe), 105–7, 126–7
   outside taps, 225–8
   overflow pipes, 46–50
pipe disinfection, 361–6
pipe fixings, 245, 284, 289–90, 307, 313–4, 319–21, 326, 346
pipe interrupter, 210, 223, 225–7
pipe joints (see jointing)
pipe sizes, 22–5
pipe sizing
   continuous flow, 177
   design flow rates, 174, 177
   flow rate, 176–7
   flow velocities, 57, 184
   head available, 179, 182
   head loss, 178–82
     permissible, 178–82
     through fittings, 179–82
     through pipes, 179–82
   loading units, 174, 176–7
   pipe length
     effective, 178
     equivalent, 178
     measured, 177
   procedures
     tabular method, 184–7
pipes
   cold feed, 125–6
   concealed, 347–50
   distributing, 123–5
   open safety vent (vent pipe), 126–8
   warning and overflow, 46–50
pipes (and fittings)
   of ABS (acrylonitrile butadiene styrene), 318–19
   of asbestos cement, 326–7
   of copper, 286–303
   of dissimilar materials, 327
   of iron, 320–5
   of lead, 327–8
   of plastic, 305–20
   of PB (polybutylene), 318–19
   of PE (polyethylene), 307–12
   of PE-X (cross linked polyethylene), 318–19
   of PP (propylene copolymer), 318–19
   of PVC-C (chlorinated polyvinyl chloride), 314, 317
   of PVC-U (unplasticised polyvinyl chloride), 312, 317
   of stainless steel, 291, 304–5
   of steel, 282–5
pipes outside buildings, 27–8, 57–8
pipes passing through fire walls, 350, 374–6
pipes passing through structural members, 347–50
plastics pipes, 305–20
plug cock, 51
pneumatic pressure vessel, 66, 70–3
pressure (expansion) relief valve, 162
pressure flushing cisterns, 248
pressure flushing valves, 250–1
pump booster, 71–3
  circulating, 141
pump room 73–4
pumped systems, 31, 66–73, 108–14
rainwater, 198–9
reduced pressure zone valve (RPZ valve), 210–13
safe hot water temperatures, 147–54
scale control, 260
secondary backflow protection, 220–1
secondary circulation, 123–5
self assessment, 8
self-closing taps, 256
servicing valves, 54–6
showers, 143, 145–6, 147, 200, 223–5
sizing
  cold water storage, 188–9
  discharge pipes, 165–6
  hot and cold pipes, 174–88
  hot water storage, 189–93
  sprinkler systems, 394–6
solar heating, 113–20
spherical plug valve, 56
spray taps, and aerators, 256
sprinkler systems, 378–96
stagnation of water, 194, 197–8
sterilization of pipework systems, 361–6
stopvalves, 50–4, 279–80
storage cisterns, 36–50, 384
storage type water heaters, 88–97
stratification, 129–30, 190–3
supplementary water heating, 114
surface boxes, 229, 280, 342–4
systems of cold water, 31–5, 57–8, 376–96
systems of hot water, 79–125
taps and valves, 30, 50–57, 141–53, 256
temperature relief and heat dissipation, 160–2
temperature relief valves, 161, 162
testing of pipes and systems, 353, 357–60, 391–2
thermostatic control, 145–6, 153–4, 157–60
under pressure tapping machine, 332
thermo-isulated insulation, 246
thrust on mains, 340–6
trench excavations, 336–40
valve chamber, 58, 342–4
valves
  air, 58
  anti-vacuum, 211, 213–15
  chambers and surface boxes, 58, 342–4
  check, 215–27, 225
  check and anti-vacuum, 211, 213–14, 216–17
  combination tap, 143
  double check, 216
  draining, 57, 143, 239–2
  expansion relief, 162, 172
  float operated, 39–42
  for sprinkler systems, 389–90
  for the disabled, 147–53
  gate, 52, 56
  hydrant, 58, 342–4
  identification, 353–4
  isolating, 56, 58
  marker posts and indicator plates, 344
  mixing, 143–6, 153–4
  pipe interrupter, 210, 223, 225–7
  plug cock, 51
  pressure flushing, 250–1
  pressure limiting, 168
  pressure reducing, 167
  reduced pressure zone valve (RPZ valve), 210–13
  screwdown, 51
  servicing, 54–6
  spherical plug, 56
  stop, 50–4, 279–80
  temperature relief, 160–2
  vacuum breaker (see anti-vacuum valve)
  washout, 58
  warning pipes and overflow pipes, 46–50
  washing machines, 225, 257
vent pipe, 105–7, 126–7
vented hot water system, 89, 168
vent pipe, 105–7, 126–7
type AA air gap, 203, 206–7
type AB air gap, 207
type AG air gap, 207–8
type AUK1 air gap, 208–9
under pressure tapping machine, 332
urological function, 223, 248–55
vent pipe, 105–7, 126–7
urological function, 223, 248–55
urinals (see also WCs and urinals), 223, 248–55
under pressure tapping machine, 332
vented hot water system, 89, 168
vent pipe, 105–7, 126–7
urological function, 223, 248–55
urinals (see also WCs and urinals), 223, 248–55

Index
water
  conservation, 4
  drinking, 30
  economy, 247–57
  meters, 58–65
  pressure, 57, 167–8
  softeners, 73–7
  supplies, 26–8
water closets (WCs) and urinals, 223, 248–56
water jacketed tube heaters, 85–8
water level control, 172–3

water quality (preservation of), 194
water regulations, 2–5, 14–15, 89, 95, 197–8, 203, 267
water systems, 31–5, 57, 66
water systems outside buildings, 57–8, 335–44
water treatment, 73–8
workmanship, 8
zone or secondary backflow protection, 220–1