

Subject index

a

abrasion 192, 291, 317, 322
 acid capacity 99, 100
 activated carbon 335
 adhering deposits 303
 aeration 328
 aeration cell 312
 aeration elements 201
 aerobic bacteria 240
 alkaline earth salts 159
 alternating mechanical stress 179
 alumina cement mortar lining 296
 ammonia 20, 321
 amount of chloride ions 299
 anaerobic conditions 315
 anodic reaction step 160
 anodising 335
 ASTM test A 262 46
 Atlantic Ocean 158
 atomic energy plant 25, 27
 average composition of seawater 158–159

b

bacterial degradation 312
 Baltic Sea 158, 185, 190–192, 246
 barnacles 231
 bath tubs 294
 Bauch test 291
 bell-and-spigot coupling system 297
 bioactive seawater 214
 biocorrosion 304, 316–317
 biofilm 188, 244, 315, 317
 biofouling 291
 Biological Oxygen Demand 328
 biological settling tanks 312
 biological sewage treatment plant 320, 332
 biological waste water plants 332
 Black Sea 158

boiler wall 19
 boiler water 19–20
 boiler water feed pump 19
 boiling water 50, 67
 boiling water reactor 17, 20, 26, 29–32, 40, 45, 49–50, 56, 62
 bottom deposit 293
 brackish water 172, 182, 184, 201–202, 207, 226, 237, 242
 brazed joints 304
 breakthrough potential for pitting corrosion 168
 bridge pipelines 294
 bromide 336
 brown discolouration 272
 buffering properties 162
 buffer tank 312–313

c

CaCl₂ solution 233, 243
 carbonate 38
 carbon content 51
 carbon dioxide 85
 Caspian Sea 158
 cast-iron drainpipes 294–295
 cathode 292
 cathodic polarisation 218, 222
 cathodic protection 86, 175–176, 179, 187, 207, 211, 230, 234, 237–238, 243, 264, 270, 291, 312
 cathodic reaction step 160
 caustic embrittlement 20
 cement mortar lining 85, 297–298, 317, 320
 CERT test 23, 31–32, 42, 45–46, 53, 58–59, 62
 Chemical Oxygen Demand 331–332, 340
 chloride 336
 chloride-containing waste waters 304

- chloride-induced stress corrosion
 - cracking 244
 - chloride ion content 159
 - chloride ions 166
 - chlorinated seawater 189
 - chlorination 240
 - chlorine treatment 127
 - clamped couplings 304
 - clamping collars 304
 - clarification basin 293
 - cleaning stoppers 294
 - coal fired power station 7
 - coated steel components 292
 - coating material 270
 - cold water pipes 104
 - collars 295
 - concrete 292
 - concrete basins 292
 - concrete buildings 292
 - condenser pipes 193, 241
 - condensers 232
 - constructional steel textiles 292
 - contact corrosion 180, 187–189, 291, 293, 335
 - contact corrosion table 183–184
 - coolants 182
 - cooling circuit 68
 - cooling system 49
 - corrosion current density 182
 - corrosion fatigue (CF) 179, 215, 303
 - corrosion potential 314, 323
 - corrosion rate 316
 - crevice corrosion 104, 110–111, 166, 175, 228, 230–231, 233–234, 236, 238–240, 243, 246, 251, 258, 293, 303–304, 323–324, 326–328, 330–331, 334–335
 - crevice corrosion resistant 325
 - crevice corrosion temperature 236, 245
 - Crevised Bent Beam 40
 - critical crevice corrosion temperature 260
 - critical crevice width 293
 - critical potential 302
 - cyclohexamine 20, 51
- d**
- Dead Sea 158, 161
 - deflection vanes 192
 - degassing 20
 - deicing salt 229
 - density 4
 - deposit 40, 312, 323–324
 - desalination plants 231
 - dewpoint 156
 - differential pressure test 298
 - diffusion bonding 62
 - dirt pans 305
 - dissimilar metal crevice corrosion 233
 - distillation process 10, 321
 - distribution lines 87
 - domestic installations 86–87, 104, 106, 108, 111–112, 125, 141
 - downtime 20
 - drainage 294
 - drain gratings 305
 - drain pipes 294
 - drinking water distribution 86
 - drinking water hygiene 111
 - drinking water installation 86
 - drinking water tanks 84
 - drinking water transport 86
 - drying of activated sludge 335
 - ductile cast-iron pipes 297–298
 - ductile sewer pipes 296
- e**
- ebb tide zone 205
 - elastomer seals 304
 - electrochemical cell 292–293
 - electrochemical series 180
 - electrogalvanisation 305
 - electroplating 335
 - elongation-induced stress corrosion
 - cracking 211
 - EML drainpipes 295
 - erosion 192
 - erosion corrosion 11
 - evaporation 336–337, 340
 - evaporator units 323, 335, 343
 - exposure zone 210
 - extraneous rust 323–324
- f**
- fast neutron 45
 - fat separators 294
 - FeCl₃ test 233, 243, 245
 - Federal Water Resources Act 335
 - feed water pump 25
 - ferrite former 42
 - ferritic stainless chromium steel 320
 - fibre cement pipes 304
 - filters 335
 - final biological stage 312–313
 - flow rate 84, 303, 314–315, 324
 - flue gas desulphurisation plants 321–323, 335–337, 340, 343
 - flue gases 340

flue gas scrubbers 322
 fluoride 336
 fluoride concentration 332
 forced-flow pipelines 295
 fouling 157, 196, 200, 207, 210, 215, 231,
 237, 239–240, 243, 260
 free corrosion potential 182
 fuel casing 45
 fuel rod element 25, 28
 fusion line 41

g

galvanic anodes 270
 gas atmosphere 312
 gas bubbles 111
 gaseous impurities 19
 gas pipelines 298
 gas shielded welding 64
 graphite wool 41
 graphitising 226
 gravity-flow sewers 290, 295
 grey cast iron pipes 102
 groundwater 129–131
 groundwater-protected areas 296

h

harbour waters 197
 hardening 44
 hardness values 208
 hard solder 106
 hard solder connection 131
 heat affected zone 27, 32, 40, 45
 heat exchanger 51, 65, 232, 245
 heat exchanger pipes 85, 231
 heat treated zone 34
 heat treatment state 110
 heat treatment temperature 23
 Helgoland 189, 231, 235, 259
 high pressure water 45
 high temperature water 12, 27, 39, 41, 46,
 49, 52–53, 56
 hot-dip coating 305
 hot-dip galvanisation 271–272, 305
 hot-dip galvanised components 305
 hot-dip galvanised pipeline 114, 118, 123,
 133, 136, 141, 305
 hot water pipes 104
 hot water tanks 104
 human consumption 82, 85
 hybrid design 182
 hydrazine 20, 51
 hydroabrasive wear 319, 322
 hydrogen embrittlement 23, 60–61

hydrogen-induced stress corrosion
 cracking 176, 207–208, 211, 234, 237
 hydrogen sulphide 321, 332

i

immersion zone 156, 190–191, 196–197,
 199–202, 204–205, 209–210, 215, 218,
 224–225, 228, 235, 237, 241, 259, 272
 impeller 50
 implosion 193
 impurities 19
 inert-gas-shielded arc welding 303
 influence of the hardness 210
 inhibitors 7
 insulating materials 302
 intergranular corrosion 104, 110, 271,
 303–304
 intergranular stress corrosion cracking 36,
 42, 45–46, 49, 52–53, 59, 300–301
 iodide 336
 Irish Sea 158
 iron anode 228
 iron bracket 292
 iron sulphides 315
 iron-zinc alloy layer 271
 irradiation 44–45

k

knife-line corrosion 106, 110, 304
 knotted steel 292
 Kure Beach 202

l

lakewater 129–130
 lamellar graphite inclusions 294
 leachates 311, 323, 335, 337
 leakproofness 298
 lime deposits 162
 local canalisation systems 296
 local cathodic corrosion protection 293
 local chemistry 14
 long-term studies 241
 low carbon equivalent 195
 low pressure turbine 18

m

macroelements 157, 291
 magnetite scale 6–7, 11, 19
 main biological treatment stage 313
 malleable cast iron fittings 131
 marine atmosphere 156, 204
 marine engineering 236, 242, 244
 maritime applications 239–240

martensitic steels 233, 235
 maximum permissible chloride
 content 300
 mean ebb tide 203–204
 mean flood tide 203–204
 Mediterranean Sea 158, 205
 metal abrasion 323
 MgCl₂ test 42
 microbes 50
 microbiological influenced corrosion 50,
 291
 microbiological slime 231
 microorganisms 240
 mill scale 172
 mixed system 53
 monitoring 53
 mooring posts 201
 morpholine 20
 multiple weld layer joints 32

n

NaCl solution 159, 186, 228, 231–233,
 236, 241, 245–246, 259–260
 neutralisation stage 312–313
 neutral salt content 91, 95
 neutron irradiation 43–44
 nickel plating 56
 nitrate 38, 336
 non-ferrous fittings 131
 non-metallic seal 110
 North Sea 189–192, 196–199, 218–219,
 231, 237, 245–246, 251
 nuclear fuel 50
 nuclear fuel sheath 51
 nuclear reactor 59, 66–67

o

offshore applications 180, 195, 213
 oil refinery 321
 osmosis 334
 oxide scale former 40
 oxygen 85
 oxygen access 157, 196
 oxygen transport 196
 ozone 312–315, 321, 332
 ozone-free water 312
 ozone treatment 127

p

passivation potential 167
 passive layer 332
 passive state 230, 323
 Persian Gulf 158, 205

phosphating 335
 pickling 304, 333–335
 pickling pastes 304
 pipe bends 192
 pipe couplings 295
 pipes 6, 51, 87, 193, 227
 pitch-epoxide resin coating 295
 pitting corrosion 97, 111, 133, 136, 166,
 172, 178, 198, 206–207, 227, 230–231,
 238–240, 271, 292, 300–301, 303–304,
 312–313, 323, 326–328, 330–331, 335,
 337, 340
 pitting corrosion potential 168, 230, 232,
 323, 332, 334
 pitting corrosion resistance 324
 pitting corrosion temperature 245
 pitting index 299
 pitting resistance equivalent 173–175,
 231–232, 235, 238–240, 244–245,
 248–249, 259, 262, 301–302
 plastic pipes 84, 290
 plastic stress loads 211
 PLEDGE model 45
 polarisation 342
 polarisation curve 8
 post weld heat treatment 60
 potato starch separators 294
 Pourbaix diagram 7, 68
 pre-oxidation 24
 pressed fittings 110
 pressure-bearing hulls 228
 pressure vessels 325
 pressurised and boiling water 27
 pressurised water reactor 20, 26, 60
 primary biological stage 312
 propeller 235, 237
 protection current densities 238
 protective film 292
 proton irradiation 44
 public waste water system 290
 pump casings 226
 pump impeller 54, 192–193
 pump materials 317–319, 322
 pumps 227, 237

r

radiation intensity 45
 radioisotope 8
 radioisotope method 8
 radiolysis 53
 reactor conditions 49
 reactor material 45
 reactor water 49, 56, 66

- redox potential 168, 323, 340, 342
 Red Sea 158
 reinforcing steel 292
 repassivation 168
 reverse osmosis 245, 334
 ribbed steel 292
 river water 160
 rod electrode 65
 rotating disc electrode 255
 rotor 10
 round robin test 14–16
 round steel 292
 rubber-sealed joints 304
 rust formation 22
 rust perforation 272
 rusty water 87, 91, 97, 101
- s**
- salt content 159
 sanitary equipment 294
 saturation index 85, 101
 Schikorr reaction 7
 sealing collars 295
 sealing cushions 298
 seawater desalination 160, 227–228, 237,
 241, 245, 264, 334, 343
 seawater pumps 263
 secondary cycle 20
 semi-finished product manufacturer 58
 separators for light liquids 294
 sewage sludge 323–324, 328–332, 339
 sewer gas 304
 sewer pipes 296, 298
 sewer slime 305
 sewer systems 294, 305
 shaft couplings 296
 shallow pit corrosion 132, 172, 179, 198,
 207, 228
 sheet pilings 201, 203–204
 shipbuilding 193, 243–244
 shipbuilding steels 194, 195
 shot peening 304
 silver hard solder 106
 sleeveless drainpipes 295, 304
 sliding gates 294
 sludge tanks 304, 325
 solder 106, 110–111
 spheroidal graphite 316–317, 319
 splash zone 156, 196, 199–202, 204–205,
 207–208, 210, 215, 224–225, 228–229,
 238, 272
 spray galvanisation 272, 305
 stainless steel screws 293
- standard electrochemical series 180
 steam boiler system 20
 steam impurities 18
 steam turbine 10, 25
 steel boiler 20
 steel constructions 295
 steel mats 292
 steel pipes 87
 steel reinforcement 292
 steel tank 6
 steep slopes 296
 Strauß test 54
 stray current 84
 stress corrosion cracking 166, 176–178,
 209–211, 227, 231, 233–234, 237, 244,
 251–252, 258, 303, 320–321, 323,
 329–331, 335, 340, 343
 stress corrosion cracking test method 40
 stress intensity factor 18
 submarines 228
 suction scrapers 293
 sulphate 38, 336
 sulphate doping 14
 sulphate-reducing bacteria 208, 211, 214,
 240, 315–316, 321
 sulphate-resistant concrete 316
 sulphide ions 214
 sulphur impurities 14
 superferrites 231
 superficial contaminants 333
 superheated steam tube 11
 support grid 25
 surface cleaning 10
 surface finishing 333
 surface roughness 317, 333
 surface treatment 333, 335
 susceptibility to biocorrosion 333
 susceptibility to pitting corrosion 341
 synthetic ash mixture 22
 synthetic seawater 183, 186, 200, 207,
 211–213, 216–223, 226–227, 231, 234,
 252, 255, 258, 270
- t**
- tapping saddle pieces 296
 tap water 98, 105, 113–116, 125–126,
 132–137
 tarnishes 304, 334
 thermal-sprayed zinc coatings 272
 tidal zone 156, 190–191, 196–197,
 199–201, 203–205, 210, 224–225, 228,
 238, 240–241, 272
 traffic areas 294

transgranular stress corrosion
 cracking 36, 38, 42
transpassive 340
transpassive dissolution 337
turbine 20, 25, 51
twisted steel 292

u

underground waste water sewers 290

v

valves 227
vapour pressure 4

w

waste incineration plants 337
waste water 293, 299
waste water evaporator units 335, 337,
 339
waste water facilities 299
waste water installations 299, 303–305
waste water pipelines 290, 297, 312, 325
waste water pumps 294, 316–317
waste water sewers 299
waste waters with chloride 303
waste water temperature 290
waste water treatment 313, 335

waste water treatment plants 292,
 304–305, 317, 323, 325, 327, 334
water chambers 226
water heating systems 108
water purity 25
water quality 84
water tanks 86
wear 317, 322
weldability 195
welded connections 171
welded pipe joints 215
welding 303
welding defects 304
welding seams 205
weld metal 17, 36, 41, 49
weld seam corrosion 108
wet oxidation 328–332, 329, 341
wet oxidation unit 339
wide pitting corrosion 91, 123

z

zinc anodes 207–208, 211, 213, 228, 230,
 234, 271
zinc coating 112, 112–113, 271, 305
zinc layer 113, 115, 123–124, 128–129,
 141
zinc plating 272
zinc removal rate 113