Index

A

Acetic acid, 218
All volatile water treatment, 94
Anion effects, 51
Anodic polarization, 181, 186, 195, 243, 246
Austenitic stainless steel, 6, 26, 85, 133

C

Carpenter 20 Cb-3, 30
Chi-phase, 39, 199, 227
Chloride stress corrosion cracking
  Austenitic stainless steels, 54
  Ferritic stainless steels, 34-35, 51-54
Chromic acid, 29
Chromium
  Content and corrosion rate, 181
  Hexavalent and intergranular corrosion, 8, 62
  Chromium carbides, 4, 9, 16, 33, 38, 45, 86, 115, 123, 134, 154, 179, 198, 233-234, 246
  Chromium nitrides, 33, 38, 45, 154, 179, 198
Condensers
  Effect on corrosion rates, 18-22, 27, 62
Copper
  Corrosion of in sulfuric acid, 23
  Copper-copper sulfate—50 percent sulfuric acid test, 25, 41, 158, 160, 163, 176, 195, 211, 228, 231, 239, 245
Copper-copper sulfate—16 percent sulfuric acid test, 16, 26-27, 103, 107, 114, 117, 125, 146, 153, 157, 163, 165, 176, 195, 209, 228, 239
Copper-copper sulfate sulfuric acid test, 1, 27, 42
Copper sulfate sulfuric acid test, 4, 26, 63, 180
Corrosion potentials, 12, 18, 46, 49

D

Denting, 94
Ditch structure, 10, 231
Dual structure, 9, 157, 165, 170
Dynamic strain test, 104, 107, 117

E

18Cr-2Mo ferritic stainless steel, 154
Electrochemical potentiokinetic reactivation (EPR), 103, 107, 114, 117, 120, 129
End grain corrosion, 9
Evaluation criterion, 43-44, 65-68, 147
Evaluation tests, 27-28, 45, 190, 239
Problems, 60-62
When to apply, 58-60
Extra-low carbon (ELC) stainless steels, 5, 180, 198

F

Fatigue cracks, 95
Ferric sulfate sulfuric acid test, 1, 11, 26, 30, 40, 42, 147, 157, 165, 176, 180, 195, 205, 227, 240
Ferritic stainless steels, 1, 6, 26, 32, 34, 37, 42, 154, 179, 197, 233
Flat structure, 157
Fluorides, 88
Formic acid, 160, 174, 215
Furnace sensitized stainless steels, 87-88

G
Grain boundaries
Current flow from, 137, 141
Etching, 138
Grain dropping, 231
Groove structure, 157, 165

H
Hastelloy Alloy C, 27, 30
Carbon content, 30
Hastelloy Alloy C-276, 6, 27
Hastelloy Alloy G, 6, 30
Heat treatment
For sensitizing ferritic stainless steels, 180, 186
To simulate welding, 7, 68-70, 156, 169, 235

I
Inconel Alloy 600, 6, 30-31, 92
Inconel Alloy 625, 6, 30
Incoloy Alloy 800, 6, 30
Incoloy Alloy 825, 6, 30
Intergranular attack, 4, 47, 133, 198
Quantitative measure, 125, 134
Intergranular failure, 171-172
Intermetallic phases, 48-75

M
Martensite, 234, 243
Martensitic stainless steel, 234
Molybdenum carbide, 28-29
Mu-phase, 29

N
Nickel-rich chromium-bearing alloys, 27
Niobium stabilization, 4, 36, 39, 154, 162, 165, 171, 176
Nitric acid—hydrofluoric acid test, 1, 5, 16, 26, 63, 147, 157, 165, 208, 227
Nitric acid test, 1, 4-5, 8-9, 15, 34, 40, 62, 147, 157, 207, 227, 239, 243, 245
Nitrogen
Cause of sensitization, 154
Effect on corrosion rates, 24
Nuclear Regulatory Commission, 87, 89, 91, 95
Nuclear systems, 1, 85

O
Oxalic acid etch test, 1, 9, 26, 73, 103, 114, 117, 147, 157, 163, 165, 176, 202, 231
Screening test, 14
Oxide scale, 14
Oxygen
Effect on corrosion rate, 23
In reactor coolant, 88, 90

P
Passive film, 13
Phosphate water treatment, 93
Piping, 89-90
Pitting corrosion, 56-58, 160, 170, 225
Polythionic acid, 30-31, 75
Potentiostatic tests, 49-51

Quantified tension test, 148-149

Safe ends, 87
Scanning reference electrochemical technique (SRET), 134-135, 141, 143-144
Sensitization
Austenitic stainless steels, 10, 69, 86, 89, 133, 147
By welding, 89
Degree of, 99, 115, 120, 134, 139, 144
Effect of welding variables, 139, 140-141
Ferritic stainless steels, 47, 155, 194, 198
Location of, 134, 143, 147
Sigma-phase, 5, 227
In molybdenum grades, 7-9, 14-15, 26, 39-40, 165
In Type 321, 26
Simplified test program, 77
Sodium chloride, 219, 227
Stabilization, 198
Steam generators, 92
Step structure, 9, 231
Stress corrosion cracking
Austenitic stainless steels, 54, 86-87, 91
Ferritic stainless steels, 160
Hastelloy Alloy C, 56
Inconel Alloy 600, 54, 92
Influence of sensitizing, 56, 87, 90
Influence of stress level, 90
Intergranular, 87, 89, 100, 104, 107, 143, 147
Sulfuric acid, 47, 217
Plus hydrofluoric acid, 219, 227
Plus nitric acid, 219
Sulfuric acid etch test, 202, 227
Surface preparation, 76

Time of testing, 50
Titanium carbide, 41, 165, 194, 199, 243
Titanium nitride, 41, 194, 199
Titanium stabilization, 4, 26, 36, 39, 154-155, 163, 165, 171, 176, 183, 197, 233
26Cr-1Mo ferritic stainless steel, 154, 179, 197
29Cr-4Mo ferritic stainless steel, 179
Type 405, 233
Type 409, 233
Type 410, 233

Wastage, 93
Water chemistry, 93
Weld heat affected zones, 133
Weldments
Evaluation, 70-73
Welds
Ductility, 155, 175
Intergranular corrosion, 161, 179, 235
Preferential attack, 73
Wick test for stress corrosion cracking, 200, 222

Zero solids water treatment, 95