

INDEX

- Absorption current, 495–497
- Active power, 9, 27
- Air, 81, 82, 225, 226, 347, 370, 488, 515
 - ambient, 276, 313
 - hot, 276, 277
 - water content of, 276
- Air baffles, 331
- Air-cooled machines, 40, 372, 374, 397
- Air ducts, 347, 370
 - clogged, 297
 - insulation bulging into, 370
 - laminations bulging into, 347
- Airgap, 34, 42
- Airgap line, 125
- Alarm checks, 313
- Alternating Current, 162, 374, 421, 461, 511
- Alternator, 3, 146
- Alternator exciter, 312
- Aluminum wedges, 20, 73, 413, 426
- Ammeter, 502, 527
- Amorphous blocking, 357
- Amortisseurs, 21, 73, 74, 253
 - See also* Windings
- Ampere-Biot-Savart Law, 13, 14
- Ampere-turns, 41, 43, 71
- Apparent power, 9, 10, 111, 112
- Armature, 19, 25, 33, 464
- Armature reaction, 41, 126, 145
- Armature winding, 19
- Artificial intelligence monitoring, 185
- Asbestos, 364
- Asphalt-based insulation systems, 140, 365, 373
- Asphalt bleeding/soft spots, 363
- Asphalt-bonded windings, 365
- Asphaltic insulation system, 373
- Asphalt micafolium, 363
- Asphalt migration, 366, 369, 370
- Asphalt windings, 364
- Auxiliary systems, 91
 - hydrogen seal oil system, 94
 - hydrogen system, 92
 - lubrication system, 92
 - stator water-cooling system, 95
- Axial flux, 46, 195
- Babbitt, 81
- Back-of-core burning, 48, 353–355, 385

- Balance rings, 76, 414
 - See also* Centering rings
- Balance weights/bolts, 419
- Bars bottomed in slot, 300
- Bar bouncing, 58
- Bayesian belief networks, 185
- Bearing journals, 81, 417
- Bearing-bolts, 362
- Bearings, 81, 417, 529
 - babbitt, 81
 - bracket-mounted, 87, 452
 - failure of, 230
 - insulation for, 326, 327, 418, 451
 - journal type, 81
 - pedestal type, 88, 327, 452
 - tests of, 327, 529
- Bell-shaped washers, 349, 350
- Belts, 352
 - bands, 352
 - belly, 352
 - compression, 352
- Bent laminations, 343, 346
- B-H curves, 474, 479
- Binder, 371, 495
 - copal, 371
 - epoxy, 371
 - shellac, 371
- Blocking, 356
 - amorphous, 357
 - solid, 357
- Body-mounted design, 410
- Bolt insulation, 336, 484
- Bolts, 318, 349, 419, 449
 - compression, 328, 349
 - core-compression, 285, 349
 - expansion-bearing, 349, 362
- Booties, 277
 - cloth, 277
 - paper, 277
 - rubber, 277
- Bore, cleanliness of, 297
- Boroscope, 289, 387, 430
- Bracket-mounted bearings, 87, 452
- Brass wedges, 72, 426
- Breakdown maintenance, 537
- Breakdown voltage, 372, 374
- Brush-collector performance, conditions
 - affecting, 432
- Brush-rig, 444, 463
- Brush-spring pressure, 442
- Brushes, 79, 445, 463
 - shaft-voltage discharge, 445
- Bulging, 370
 - of the insulation, 370
 - of the laminations, 347
- Bushings, 63
 - high-voltage, 63, 391
 - lead, 391
- Bushing vents, 393
- Bushing well, 392
- Bushing well insulators, 393
- Busses, 112, 173, 264, 387
 - circumferential, 387
- Camera, 286, 289, 395
- Capability curves, 126–129
- Capacitance, 490, 502
- Capacitance mapping, 490
- Capacitive coupler, 210
- Capacitive coupling, 209, 500
- Carbonate byproducts, 458
- Carbon dust, 327, 333, 437, 452, 461
- C-core test, 525
- Centering rings, visual appearance of, 302
 - See also* Balance rings
- Charging current, 497, 498
- Chattock potentiometer, 470
- Chemical cleaning methods, 356
- Circumferential bus insulation, 387
- Circumferential pole slots, 447
- Cleanliness, 355, 397, 401, 461, 465
 - of bore, 297
 - coil, 355
 - of excitation items, 461
 - heat exchange, 397
 - rotor, 401
- Clogged vents, 370
- Cloth booties, 277
- Coil knuckles, 283
- Coils, 69, 72, 355, 518, 519
 - bare, 277
 - cleanliness, 355
 - single-bar, 53, 371
 - ties between, 298
- Collector insulation, 434, 435
- Collector rings, 78, 432, 435
- Commutator brushes, 463
- Commutators, 165, 463

- Compression, 350, 352
 - Bands, 352, 353
 - belts, 352
 - bolts, 328, 349, 493
 - plates, 350
- Condensation, 276, 457
 - elimination of, 276
 - water, 327
- Condenser, 26, 27, 434, 435
 - lagging, 26
 - leading, 27
- Condition-based maintenance (CBM), 539
- Conduction current, 495, 497
- Conductivity, 98, 238
- Conductors, 5, 53, 202, 203
 - See also* Stator Bars
- Constant-pressure springs, 435, 442
- Contact film (patina), 433
- Containment area, 276
- Contamination, oil, 196, 233, 356
- Continuous I₂, 135, 192
 - See also* Negative Sequence
- Copal resin binders, 371
 - (*See* Binder)
- Copper braids, 222, 326, 452, 529
- Copper dust, 138, 401, 402, 429, 431
- Copper erosion, 56
- Copper graphite brushes, 326, 452
- Core, 35, 36, 50, 193, 195, 198, 333, 335, 347, 349–353, 466, 467, 469, 484, 525
 - back of the, 38, 353
 - end of the, 195, 351
 - loose, 335
 - pressure-loaded, 335
 - stator, 35, 50, 193, 333, 466, 469
- Core bolts, greasing/red oxide deposits on, 349
- Core-compression bolts, 285, 349
 - failures of, 336
 - insulation, 493
 - insulation test, 493
 - retightening of, 346, 351
- Core-compression fingers, 336
- Core laminations, 36, 278, 343, 347
 - See also* Coreplate
- Coreplate, 35, 47, 338, 343
 - See also* Core laminations
- Corona activity, 371
 - definition of, 371
 - types of, 371
- Corona tests, 376, 500
- Corona-originated powders, 372
- Corrosive liquids, 277
- Cracking, 367, 388, 395, 410, 412, 413
 - fatigue, 349, 393
 - girth, 367, 368
 - stress-corrosion, 143, 457, 458
 - stress-fatigue, 332
 - tooth-top, 411, 412
- Critical speeds, 122, 218
- Cross-slot flux, 58, 66
- Current through forging test, 527
- Current transformer (CT), 394
- Cylindrical rotor, 20, 175
- Damper winding, 421
- DC exciter, 107, 225
- DC field winding, 26, 462
- DC generator armature, 464
- DC generator stator, 464
- De-ionizing system, 98
- Detraining tank, 240
- Dielectric absorption, 495
- Dielectric losses, 364, 503
- Dielectric test, 496
- Diode connections and support hardware, 462
- Direct current, 191
- Discharge brush, 445
 - (*See* Grounding brushes)
- Discharge resistors, 283, 465
- Dissipation factor, 503
- Dissipation factor tip-up, 503
- Dissymmetry effects, 326
- Dry windings, 373
- Duct spacer assemblies, migration of, 348
- Dynamic monitoring, 182
- El-CID test, 469, 470, 474
- Eddy-current heating, 278
- Eddy-current tests, 511
- 18-5 rings, 408, 457
- Electrical angle, 27
- Electrical clearance, 281
- Electric-field concentration, 277, 371, 372
- Electric Power Research Institute (EPRI), 404

- Electric tests, 276, 312, 464, 469, 491, 516
 - See Tests
- Electric tracking, 360, 375, 384
- Electromotive force (emf), 43
- Electrostatic effects, 326
- Electrostatic probe test, 376
- EL/EM-5117-SR, publication, 407, 512
- Embedded stator slot coupler, 211, 376, 501
- End-bells, 421
 - (See Retaining rings)
- End-wedges, 378, 379, 421
- End-windings, 60, 205, 356, 360, 362, 371, 426, 487
 - corona activity, 371
 - expansion-bearing bolts, 362
 - inspection of, 358, 431
 - support assembly, 328, 360, 361
 - support hardware, 362
- Epoxy binder, 371
- Equivalent circuit, 28, 146
- Excitation, 103, 106, 148, 164, 165, 174, 225, 461
 - inspection, 305, 459, 461
 - form for, 305
 - systems, 103, 106, 225
- Exciter-drive motor cleanliness and stator, 465
- Exciter-motor rotor, 465
- Expansion-bearing bolts, 362
- Expert systems, 181, 185–187

- Fan-baffle, 332
 - support studs, 333
- Fan blades, 414
- Fan hubs, 414
- Fan-rings, visual appearance of, 414
- Faraday's Law, of electromagnetic induction, 13
- Fatigue cracking, 393
- Ferromagnetic, 3
- Field discharge resistor, 465
- Field forcing, 103, 191, 192
- Field voltage, 115, 191
- Field windings, 71, 516, 527
- Fillers, 58, 356, 374, 378, 380
 - ripple, 58, 356, 374, 378
 - slipping out, 380
- Finger-plates, 36
- Flaking, 140, 333, 358
 - paint, 333
 - insulation, 364
- Flashlights, 278, 448
- Floodlight, 288
- Flux, 13, 41, 46, 195, 351
- Flux density, 37, 45, 119, 507
- Flux probe, 526
- Flux shield, 46
- Flux shunt, 47, 351
- Flux test, 338, 469, 477, 479
- Foreign material exclusion, 275
- Foreign materials, 275
- Foreign objects, 275, 277, 278, 331, 454
 - metallic, 277, 278
 - nonmetallic, 288, 366
- Frame, 39, 50, 193, 199, 318, 328, 352, 467, 532
- Frequency, 135, 143, 163, 176, 191, 208, 260, 285, 513, 540
- Fretting/movement at rings' interference-fit surfaces, 410
- Fringe effects, 46
 - core end, 46
- Full load, 43, 170
- Fundamental voltage equation, 119

- Galling, 369
- Gas baffles, 331
- Gas ducts, clogged, 297
- Gas monitor, 284
- Gas release alarm tank, 99, 205
- Generator, 28, 152, 166, 173, 180, 188, 189, 196, 200, 226, 244, 270, 286, 319, 323, 394, 543
 - inspection of, 505
 - turbine, 34, 127, 128
- Generator condition (core) monitor (GCM), 196
- Generator end-brackets, 323
- Generator end-doors, 323
- Generator end-shields, 323, 324
- Girth cracking, 367
- Grading paint, 375
- Greasing, 349, 393
 - on core bolts, 349
- Ground faults, 258, 481
 - detection of, 250

- Grounding brushes, 418, 445
- Grounding cables, 320
- Grounding device, 222, 326, 327, 452, 453, 529
- Groundwall insulation, 54
- Ground insulation, 57, 62, 70

- Hammer, 289, 485
- Hammer method in performing wedge survey, 378
- Hardware, 330, 331, 362, 462
- Harmonic reactance, 29
- Heat run test, 186, 543
- Heat exchangers, 98, 397
 - cleanliness and leaks, 397
 - water-oil, 397
- High-initial-response, 106, 166
- High oxygen system, for stator cooling water system, 99
- High-voltage bushings, 391
- High-voltage tests, 283, 495, 517
- Hollow strands, 55, 237
- Hollow wedge, 289, 377, 379
- Homopolar flux effects, 326
- Hot air, flow of, in eliminating condensation, 276
- Hot spots, 213, 334, 338, 463, 481
- H2 sealant, 393
- Hybrid-cooled generator, 393
- Hydrogen content, 98, 239
- Hydrogen-cooled machines, 256, 398, 441, 515
- Hydrogen-cooled rotor, 515
- Hydrogen coolers, 90, 229, 230, 397
- Hydrogen cooling gas, 40, 69, 90, 91, 118, 203, 215
- Hydrogen cooling system, 92, 226, 457
- Hydrogen desiccant/dryer, 457
- Hydrogen dewpoint temperature, 228
- Hydrogenerators, 20, 326
- Hydrogen pressure, 117
- Hydrogen purity, 228
- Hydrogen seals, 223, 224, 454, 529
 - inner/outer, 446
 - oil system, 94
 - pressure testing of, 447
- Hydrogen sensors, 398
- Hydrogen system, 92, 226, 457
- Hysteresis losses, 19, 31

- Impedance measurements, 216, 518, 523
- Inception voltage, 371, 372, 500
- Infinite bus, 25, 29
- Inner/outer hydrogen seals, 446
- Inspection forms, 290
- Inspection frequency, 285
- Inspection tools, 287
 - use of on “as needed” basis, 278
- Insulating paint, 368
- Insulation, 325, 359, 369, 370, 387, 435, 448, 451, 484, 492, 516, 529, 530
 - armor tape, 364, 366, 367
 - asphalt-based, 365, 373
 - balling, 370
 - bearing, 418, 451, 453
 - bolt, 484
 - bulging into air ducts, 370
 - cambric, 364
 - circumferential bus, 387
 - collector, 435
 - condition, 370
 - cracks, 356, 359, 368
 - delamination, 207, 364
 - flaking, 364
 - galling, 369
 - girth cracking, 367
 - necking, 369
 - polyester-based insulation systems, 373
 - puffing, 370
 - resistance, 484, 492, 516, 529, 530
 - tape separation, 367
 - thermoplastic, 365
 - thermosetting, 365
 - tracking, 355, 356, 368, 369
 - between turns, 57
- Insulation resistance (IR), 492, 516, 529, 530
- Insulators, 392
 - bushing-well, 393
 - stand-off, 392
- Integrated discharge energy measurement, 376
- Inter-laminar fretting, 335, 466
- Internal partial discharges, 371, 372
- Ionization, gas or air, 327, 387
- Iron content, in stator cooling water, 240
- Iron dust, 335, 402
- Iron oxide deposits, 334, 349
- Isolated phase bus, 63, 142, 211

- Joint, scarf, 369
- Knuckles of coils, 283
- Lagging condenser, 26
- Lagging power factor, 46, 112, 146
- Lamination, 35, 343, 347
 - bent, 343
 - bent/broken in bore, 343
 - bulging into air ducts, 370
 - loose, 335, 346
 - problems in, 346
- Lauffen-Frankfurt demonstration, 17
- Lead-bushings, 391
- Leading condenser, 27
- Leading power factor, 46, 112, 354
- Leakage current, 495, 497
- Lenz's Law, 13
- Liquid penetrant, 507
- Load angle, 27
- Locking key, 414
- Losses, 30, 31, 131, 140, 141, 166, 174, 252, 261, 484
 - friction, 484
 - load, 42, 328
 - rotor winding copper I^2R , 191
 - stator winding copper I^2R , 202
 - stray, 34
 - windage, 82, 228, 484
- Low oxygen system, for stator cooling
 - water system, 101, 239
- Lubrication system, 81, 92
- Machine rotor, 312
- Machine stator, 19, 312, 469
- Magnetic center, movement off, 326, 433
- Magnetic field, 4
- Magnetic flux, 25, 34, 47, 76, 470
- Magnetic particle inspection (MPI), 506, 507, 512
- Magnetic particles as foreign materials, 277
- Magnetic reluctance, 43, 47, 125
- Magnetic termites, 346, 384
- Magnetizing reactance, 27, 29
- Magneto-motive force (MMF), 21, 25
- Magnetostatic finite element analysis, 46
- Magnetostriction, 336
- Magnets, 3, 4
- Magnifying glass, 292, 326, 418, 452
- Maintenance, condition-based, 539
- Mean time to failure (MTTF), 538
- Mechanical cleaning methods, 356
- Mechanical test, 466, 485, 504
- MegaVars (MVARs or MX), 189, 533
- Mega-Volt-Ampps (MVA), 111
- MegaWatts (MW), 112, 181
- Megger, 276, 387, 402, 439, 529, 530
- Metallic objects, foreign, 277, 278
- Microscopes, 289
- Migration, 346, 347, 379
 - asphalt, 366, 369, 370
 - of duct spacer assemblies, 348
- Mirrors, 278, 361, 379
- Mixed strands, of stator windings, 55, 56, 239
- Moisture in the windings, 207, 457
- Motoring, of generator, 14, 175, 404
- Necking, 369
- Negative-sequence currents, 134, 163, 192, 404
- Negative-sequence voltages, 256, 257
- Neural networks, 185
- Neutral transformer, 283
- Niagara Falls project, 17
- Nipples, 86, 393, 516
- No-load, 25–27
- Nominal voltage, 115, 123
- Nondestructive examinations (NDE), 405, 505
- Nondestructive tests (NDT), 448, 490
- Non-salient-pole construction, 20
- Oils, 81, 86, 87, 89, 92, 94, 141, 142, 223, 224, 230–235, 456, 458
 - contamination of, 196, 233
 - corrosive, 277
 - inspection of used, 417
- On-line partial discharge analysis, 500
- Open-air machines, 334
- Open circuit, 43, 122
- Open circuit saturation curve, 484
- Open circuit test, 210, 492, 516
- Out-of-step protection, 28, 141, 142, 154, 156, 261

- Output coefficient, 41
- Over-current, 164
- Over-excited, 112, 175
- Over-fluxing, 119, 140, 190
- Overheated wedges, 193, 426
- Overheating, signs of, 395, 426, 435
- Overspeed, 141, 164
- Oxygen content of stator cooling water, 99, 239
- Ozone, 374
- Ozone meters, 376

- Paper booties, 277
- Parallel path circuits, 52
 - two, 53, 61, 62, 187
 - three, 63
 - four, 62
- Partial discharge (PD), 207, 371, 372, 500, 502
 - internal, 372
 - measurement, 210, 500, 501
 - test for stator windings, 208, 485, 488, 491
- Patina, 433
- Pedestal-type bearing, 88, 325
- Periodic purity checks, 457
- Personal grounds, 283
- Phase connection buses, 387
- Phase droppers, 390
- Phase leads, 63
- Phase-to-phase short circuit, 60, 173, 250, 347
- Phase unbalance, 192, 204
- Phasor, 7
- pH value, of stator cooling water, 240
- Pitted journals, 326, 452
- Planned maintenance, 538
- Polarization index (PI), 493, 494, 516, 517
- Polyester-based insulation systems, 373
- Polyester binder, 371
- Pony (starter) motor, 122, 435
- Positive pressure differential, 276
- Positive pressure in eliminating condensation, 276
- Positive sequence component, 134
- Potential transformers, 171, 190
- Powder deposits, 334, 335, 372, 378
- Power angle, 8, 27, 154
- Power factor, 8, 112, 503
 - test for stator windings, 376
 - tip-up, 376
- Power system stabilizer, 166, 171, 221
- Power triangle, 10
- Predictive maintenance, 538
- Pressing plate, 36
- Pressure tests, 398, 447, 515
 - of hydrogen seals, 447
- Prime mover, 19, 175, 252, 286, 435, 537
- Principle of energy conversion, 15
- Probabilistic risk analysis, 538
- Pulse echo method, 508
- Punchings, 35
 - See also* core laminations
- Pyrolysis products, 196

- Radio frequency monitoring, 208
- Radio frequency test (RIV), 376
- Ratcheting, 137, 533
- Rated hydrogen pressure, 117
- Rated voltage, 115
- Reactance, 27, 29, 113, 144, 159
 - magnetizing, 27, 29
 - synchronous, 29
- Reactive power, 10, 189
- Rebabbiting, 326, 418, 452
- Red oxide deposits on core bolts, 349
- Resistance bridges, 259, 493
- Resistance-temperature-detector (RTD), 118, 182, 255, 313, 330
- Resistors, discharge, 283, 465
- Response ratio, of excitation systems, 107, 163, 165
- Resultant flux, 26, 145
- Retaining rings, 20, 74, 402, 512
 - barrel fit, 75, 410
 - basic designs for, 75, 410, 412
 - body-mounted, 132, 410–412
 - castellated fit, 75
 - moisture on, 457
 - nondestructive examinations of, 405
 - spindle-mounted, 137, 253, 410
 - visual appearance of, 285, 404, 406
- Revolving-field synchronous machine, 19
- Ring ventilation holes, 407
- Ripple fillers, 58, 356, 374, 378
 - oil contamination of, 356
- Roebel transposition, 53

- Rotating magnetic field synchronous machine, 19
- Rotating winding, 461
- Rotor, 19, 22, 64, 68, 72, 79, 80, 84, 159, 212, 213, 215, 224, 255
 - cleanliness, 401
 - hydrogen-cooled, 515
 - inspection of, 401
 - form for, 302
- Rotor winding ground fault, 258
- Round-rotor machine, 469, 525
- RTV, 378
- Rubber booties, 277
- Rule based systems, for AI monitoring, 185
- Run-down operation, 122
- Run-up operation, 122

- Safety procedures-electrical clearances, 281
- Salient-pole machine, 20, 21, 525
 - field poles of, 19
- Salient poles, 19, 20, 525
 - condition report, 290
- Scarf joint, 369
- Seal oil coolers, 232, 233, 235
- Seal oil filters, 234
- Seal oil system, 94, 232, 233, 458
- Seal oil tank, 234
- Seal oil vacuum tank, 234
- Seismic supports, 320
- Self-excited excitation system, 22
- Semiconducting paint, 374
- Semiconducting tape, 364, 374
- Series connections, 69
- Shaft bearing currents, 326, 452
- Shaft currents, 221, 326, 418, 452
- Shaft-mounted auxiliary winding, 461
- Shaft-mounted diodes, 461
- Shaft-voltage discharge-brush, 445
- Shaft voltages, 221, 445, 528
 - control of, 326, 451, 452
 - sources of, 221, 326, 528
- Short circuiting rings, 465
- Short circuit ratio (SCR), 118
- Short circuit saturation curve, 125
- Shorting strap, 48
- Shorted turns detection, 215, 517, 519, 523–526
- Shorted turn faults, 428
- Shutdown mode, 121
- Silver graphite, 326, 452
- Site preparation, 275
 - foreign material exclusion, 275
 - inspection frequency, 285
 - safety procedures-electrical clearances, 281
- Skin effect, 132, 192
- Slip rings, 19, 78, 104, 435
 - (*See* Collector rings)
- Slot discharge, 374
- Slot wrapper, 369
 - test, 369
- Solid blocking, 357
- Solid strands, 55
- Solvents, 277, 356
 - corrosive, 277
- Space blocks, 38, 346, 347
- Space heaters, 327
- Spindle-mounted design, 410
- Spinning RSO test, 519
- Split voltage test, 527
- Split-phase, 257
- Spot-heating, 336
- Spring bars, 19
- Spring fillers, oil contamination of, 356
- Spring-loaded fillers, 374
- Springs, 38, 463
 - constant-pressure, 435, 442
 - discoloration of, 435, 442
- Spring washers, 349, 350
- Squirrel cage winding, 353
- Stand-off insulators, 392
- Stationary field synchronous machine, 19
- Stator, 19, 22, 35, 39, 50, 51, 58, 60, 63, 95, 98, 102, 103, 115, 159, 173, 189, 190, 193, 200, 201, 204–207, 211, 235–240
 - description of, 22
 - inspections, 351
 - water-cooled, 381, 386, 488
- Stator core tightness, 466
- Stator high-voltage bushings, 391
- Stator interlaminar insulation tests, 469
- Stator slot coupler, 211
- Stator water-cooling system, 235, 236, 240, 241, 381, 386, 488
- Stator water outlet thermocouples, 313

- Stator wedges, 376
- Stator wedge tightness, 485
- Stator winding ground fault, 183, 485
- Stator windings, 22, 51, 58, 60, 102, 200, 204, 206, 207, 355, 381, 386, 485, 488, 491
 - direct cooling of, 95
 - grading system for, 57, 207
 - indirect cooling of, 70
 - partial discharge test for, 208, 485, 488, 491
 - power factor test, 376
 - tip-up test for, 376
- Steady-state, 7, 143, 165
- Steam cleaning, 356
- Strand insulation, 57
- Stray flux, 34, 39, 46
- Stress concentration, 407, 426
- Stress-corrosion cracking, 143, 409, 457, 458
- Stress-fatigue cracking, 332
- Sub-conductors, 384
- Sub-synchronous resonance, 67, 136
- Sub-Transient, 159
- Sub-transient reactance, 42, 159, 262
- Support assembly, surge-rings, 358
- Support-rings, 359
- Surface discharges, 375
- Surge-rings, 358, 359
 - insulation condition, 359
 - support assembly, 361
 - supports, 359
 - ties to, 359
- Synchronous condenser, 20, 434
- Synchronous impedance, 29, 125
- Synchronous machines, 17, 22, 34
 - construction, 19, 432
 - inspection and test report for, 290
 - operating constraints, 134, 256
 - negative-sequence currents and voltages, 134, 256
 - overspeed, 164
 - volts per hertz (V/Hz), 192
- operation, 22
 - generator operation, 28
 - motor operation, 27
 - no-load operation, 25
 - performance characteristics:
 - V-curves and rating curves, 130
- Synchronous reactance, 29, 145
- Synchronous speed, 117
- Synchro-scope, 123
- Tagging compounds, 256
- Tag procedures, 283
- Tangential expansion forces, 407
- Tape separation, 367
- Tents, 276
- Terminal box current, 328, 391, 393, 394
 - transformer, 394
- Terminals, 63, 77, 115, 129, 387, 437
- Tests, 295, 312, 313, 466, 469, 484, 485, 488, 491, 503, 515, 523, 525, 527, 530, 532
 - bearing, 453, 529
 - bearing insulation, 327, 376
 - core-compression bolts insulation, 493
 - corona, 376, 500
 - dielectric, 496
 - dielectric absorption, 376
 - EI-CID, 469, 470
 - eddy-current, 511
 - electrostatic probe tests, 376
 - embedded stator slot coupler, 376
 - high-voltage, 283, 495, 517
 - hi-pot, 498, 517
 - integrated discharge energy
 - measurement, 376
 - mechanical, 466, 485, 504
 - nondestructive, 285, 404, 490
 - partial discharge, 500, 502
 - polarization index, 493
 - power factor, 503
 - power factor tip-up, 503
 - pressure, 447, 515
 - pressure decay, 488
 - radio frequency, 376
 - slot discharge, 207, 502, 503
 - stator interlaminar insulation, 469
 - thermal stability, 530
 - tip-up, 503
 - vacuum decay, 490
 - winding resistance, 516
- Thermocouple devices, 330
- Thermoplastic insulation systems, 365, 369
 - thermal cycling in, 369
- Thermosetting insulation systems, 370

- Three phase current, 253
- Three phase voltage, 11, 52
- Three phase winding, 19, 24, 25, 134
- Through-bolts, 36, 484
- Through transmission method, of ultrasonic testing, 510
- Ties, 357
 - between coils, 298
 - to surge-rings, 359
- Tip-up tests, 503
 - for stator windings, 376
- Tools, inspection, 287
- Torque, 25, 28, 33, 154, 336, 349
- Torque angle, 25, 27, 154
- Torque value, 336, 349
- Torsional vibration monitor, 67
- Tracer gases, 489
- Transformer, 394
 - neutral, 173, 174, 209, 283
 - potential, 140, 171, 256
- Turbine generators, 34, 111, 127, 143, 162, 163
- Turbogenerators, end-windings of, 427
- Turning gear, 79, 80, 121, 401, 429

- Ultrasonic testing, 502, 508
- Under frequency, 192, 260
- Under-excited, 26, 112

- Vacuum-pressure impregnation (VPI), 357, 373
- Vacuum-pressure impregnation (VPI) windings, 373
- V-curves, 130
- Vents, bushing, 393
- Vibration, 34, 37, 50, 198, 199, 205, 218, 220, 264, 467, 487, 504
- Voltage regulators, 106, 107, 172
- Voltage response ratio, 163, 165
- Volts per hertz (V/Hz), 192

- Walking the clearance, 283
- Washers, bell-shaped, 349, 350
- Water condensation, 327
- Water content of air as foreign material, 276
- Water-cooled stator, 91, 115, 182, 205, 235, 381, 386, 488
- Water-cooled windings, 356, 386, 499
- Water heat-exchanger leaks, 398
- Water ingress, 356
- Water-oil heat exchangers, 397
- Water vapor, 327, 364, 433
- Wedges, 58, 72, 376, 421, 426, 485
 - aluminum, 20, 73, 413, 426
 - brass, 72, 426
 - hollow, 289
 - loose, 289
 - overheated, 193, 426
 - slipping out, 300
- Wedge survey, 307
- Winding impedance, 216, 523
- Winding resistance, 516
- Windings, 21, 22, 51, 58, 60, 68, 72, 73, 102, 200, 204, 206, 207, 213, 215, 355, 381, 386, 421, 446, 448, 485, 491, 492, 516, 523
 - armature, 19, 33
 - asphalt, 364
 - asphalt-bonded, 365
 - bloated, 373
 - damping, 21
 - DC field, 462
 - dry, 276
 - moisture in, 207, 457
 - puffy, 373
 - rotating, 461
 - shaft-mounted auxiliary, 461
 - squirrel cage, 73, 539
 - stator, 19, 22
 - VPI, 373
 - water-cooled, 356, 386, 499
- Wormholes, 384
- Wrapper plate, 39

- Yoke, Stator core, 38

- Zero sequence, 134
- Zone-rings, 331, 410, 454