

Coil, coils (continued)
 flow arrangement, 315
 heat emission, 209, 320
 heat transfer surface, 319, 320
 heating, 318
 performance, 320, 321
 cooling, 320
 dehumidification, 321
 heating, 320
 pipe, 209
 rating, 318, 319
 selection, 318
 cooling, 319
 dehumidifying, 319
 heating, 318
 steam, 314
 uses, 313
 water, 314

Coke
 classification of, 469
 estimating consumption, 537
 firing methods, 470
 cold process exhaust, 702
 cold therapy, 89
 Color, piping systems, 12

Combustion, 467
 adjustments, 486, 490, 495
 air inlet, 476, 485
 air required, 479
 analysis, 479
 chamber, 487, 490
 complete, 477
 dew point, 483
 efficiency, 479, 490
 flue gas, 479, 480
 gas, 476
 heat balance, 481
 heat of, 478
 incomplete, 478
 index, 473
 losses, 481
 oil, 473
 perfect, 477
 process, 486, 489, 495
 principles of, 476
 rates, 494, 498, 516
 smokeless, 470
 stoker, 486

Comfort
 air conditioning, 2
 air-conditioning systems, 259, 651, 663
 chart, 70
 design conditions, 167, 168
 line, 2
 summer, 66-70
 zone, 66, 70
 Compartment dryer, 722

Compressor, compressors, 554
 centrifugal, 555
 reciprocating, 554
 refrigeration, performance of, 560, 561
 Condensate, 2, 388, 741
 Condensate return pumps, 375

Condensation, 2, 127
 buildings, 132, 134
 concealed, 134
 control, 134
 cooled structures, 137
 flue gas, 453
 surface, 132
 visible, 132

Condensers, 556, 589
 air cooled, 556
 design data, 555
 evaporative, 589

Condensers (continued)
 water cooled, 556
 Condition line, 32, 199

Conductance, 2, 93, 94
 air space, 93, 99
 building materials, 99-101
 film, 93
 insulators, 99-101, 454
 soil, 94, 95
 surface, 2, 95, 96, 98

Conduction, 2, 47
 drying methods, 722
 electric heaters, 231
 equation, 47
 steady-state solutions, 54

Conductivity, 2, 47, 93, 94, 99-101
 built type insulation, 99
 building boards, 99
 building materials, 99-101
 homogeneous materials, 94
 insulating materials, 99-101, 454
 insulation blankets, 99
 loose-fill insulation, 100
 masonry materials, 100, 101
 plastering materials, 101
 rigid insulation, 100
 roofing construction, 100, 101
 siding materials, 101
 soil, 94, 95
 woods, 101

Conductor, 2
 Conduits for piping, 385, 386
 Connections
 boiler, 374, 406, 412, 507
 heating units, 380

Control, controls
 airborne infection, 83
 aircraft temperature, 666, 667
 automatic, 609
 automobile temperature, 666
 biochemical reactions, 689
 central fan systems, 259, 619
 chemical reactions, 689
 contaminant by exhaust, 699, 701
 corrosion, 733
 crystallization, 689
 dew-point, 689
 high temperature water system, 416
 high velocity systems, 297
 laboratory conditions, 690
 motor, 639
 panel heating, 432
 passenger bus temperature, 665
 passenger car, railway
 temperature, 664
 humidity, 664
 pneumatic systems, 609
 refrigeration, 554, 556, 557
 service water temperature, 759
 ship air conditioning, 669
 slime, 739
 sound, 335
 static electricity, 689
 temperature for machining, 689
 ventilation, 146
 vibration, 352

Control, automatic, 609
 action types, 610
 air flow, 617
 air washers, 621
 applications, 618
 auxiliary equipment, 613
 central fan systems, 619
 components of systems, 610

Control automatic (continued)
 controlled devices, 612
 controllers, 610
 controlling elements, 611
 cooling, 620
 dehumidification, 620
 design coordination, 614
 electric, 609, 611
 electronic, 609, 611
 equipment selection, 614
 floating, 610
 flow, 616
 fuel-burning equipment, 498
 fundamentals, 609
 gas burners, 499
 heating coil, 619, 620
 high velocity systems, 287
 hot water heating, 623
 humidity, 621
 hydraulic, 609
 indicating, 612
 individual room, 618
 measuring elements, 611
 oil burners, 499
 operating, 609
 outdoor air damper, 619
 panel heating, 432
 pneumatic, 609, 611
 preheater coil, 619
 primary, 499
 proportional, 610
 recording, 612
 residential, 626
 size of area, 614
 space conditions, 614
 static pressure, 622
 steam flow, 618
 steam heating, 624
 stokers, 499
 system types, 609
 terminal equipment, 625
 typical system, 622
 unit heaters, 220
 unit ventilators, 215
 valves, 612
 water flow, 617
 zone, 618
 zone systems, 624
 Controllers, 609, 610
 functions, 610
 types, 612

Convection, 2, 47, 51
 equation, 48
 film coefficient, 48
 free, 48-50
 unit conductances, 49, 50

Convactor, convectors, 2, 207, 209-211
 correction factor, 210, 211
 induction, 262, 263
 ratings, 210

Conversion
 burners, 494
 equations, 8, 9
 Coolers, 223, 228, 557

Cooling, 167
 air-conditioning units, 223, 652
 air washer, 579
 atmospheric water, 579
 coil selection, 318, 319
 comfort, 167
 evaporative, 264, 591
 industrial, 167, 581
 load, 167, 261
 calculations, 167, 202
 total, 167
 methods, 652
 performance of coils, 320, 321
 ponds, 580

Cooling (continued)
 residential, 651
 sensible, 265
 spray, 580
 effect of wind, 580
 make-up water, 588
 size of equipment, 588
 winter freezing, 589
 systems, 259, 591, 651, 663
 towers, 581
 atmospheric, 581
 design, 582-585
 location, 588
 maintenance, 588
 mechanical, 581
 operation, 588
 performance, 582-585
 piping, 753
 selection, 587
 tropical conditions, 85
 units, 223
 component parts, 223
 control, 227, 230
 definitions, 223
 defrosting, 229
 design, 223
 performance, 223, 228
 ratings, 227, 229
 remote, 224, 225
 sound insulation, 228
 types of, 229
 water, 579, 585
 water piping, 753
 Copper elbow equivalents, 396
 Copper tube dimensions, 438
 Core area, 267, 632

Corrosion, 732
 air ducts, 743
 atmospheric, 735, 743
 boilers, 739
 cathodic protection, 744
 coal storage equipment, 743
 cold water, 733
 condensates, 735, 741
 flue gas, 483
 flues, 743
 heating systems, 739
 hot water, 739
 industrial exhaust systems, 712, 713
 minimizing condensate, 741
 pipe, 740, 743
 prevention, 712, 735
 refrigerating systems, 741
 underwater, 740

Cost of air conditioning, 654, 727
 amortization, 727
 condenser water, 731
 first, 727
 fixed charges, 727
 heating, 731
 interest, 728
 installed, 728
 insurance, 729
 labor, 730
 maintenance, 729
 owning and operating, 727, 730
 rent, 729
 service, 729
 taxes, 728
 refrigeration equipment, 730
 water, 730

Crack length
 method, 140
 used for computations, 162

Crystallization
 control rate of, 689
 Cylinder dryer, 722

D

Dalton's rule, 15
 Damper, dampers, 239, 259, 267, 277, 278, 307, 471, 613, 619
 Darcy formula, 36
 Decibel, 2, 335
 Declination of sun, 2
 Definitions, 1-6
 Defrosting, 229

Degree day, 2
 for cities, 529, 638
 formula for, method, 535
 industrial, 538, 539
 operating unit, 539
 unit fuel consumption, 535, 536

Degree of saturation, 5, 14, 17

Dehumidification, 2, 594, 601
 air-conditioning units, 225
 air washers, 594
 coil selection, 313, 319
 comparison of methods, 601
 control, 620, 621
 definitions and methods, 601
 elevated pressure, 606
 equipment, 594, 601, 603
 performance, 602, 605, 606
 estimating loads, 607
 liquid methods, 601, 602
 moisture load, 607
 ships, 669
 solid methods, 602, 603
 vapor transfer, 607
 Dehumidifying agents, 601
 adsorbents, 601
 desiccants, 601
 Dehydration, 2
 Density of air, 1
 Design conditions
 summer, 168, 170-175
 winter, 152-157

Desiccants
 solid, 602

Dew point
 apparatus temperature, 167, 199
 flue gas, 483, 743
 temperature, 5, 15
 Dichlorodifluoromethane, 542-544, 559, 560

Diffusivity, thermal, 2

Direct
 expansion coils, 315
 fired unit heater, 213
 indirect heating unit, 2
 radiator, 5
 return system, 2, 397
 Distribution of air (see *Air distribution*), 237, 267, 664, 667

District heating, 383
 condensate return, 388
 meters, 389
 pipe insulation, 388
 piping, 385, 387, 388
 conduits for, 385
 inside, 388
 sizes, 385
 tunnels, 387
 steam requirement, 383
 Domestic oil burners, 487

Door, doors
 coefficients of transmission, 124
 leakage, 140, 141
 natural ventilation, 145

Down-feed
 one-pipe riser, 2, 4, 356

Down-feed (continued)
 steam heating, 2, 358
 system, 2, 355

Draft, drafts, 2, 515
 available, 515, 516, 519
 calculations, 515
 chimney, 515
 control, 471
 factors, 515
 forced, 515
 general equation, 515
 head, 2
 industrial chimneys, 516
 natural, 142, 515
 regulation, 471
 regulator, 489
 residential chimneys, 519
 requirements, 471, 516, 522
 appliances, 522
 theoretical, 515

Drawing symbols, 9-12
 Drip, drips, 2, 358, 379
 Drum dryer, 722

Dry air, 1
 composition, 13, 478
 filters, 325
 properties of, 16
 velocity, head, 290
 Dry-bulb temperature, 5
 Dry cooling coils, 313, 320
 Dry return, 5, 355

Dryer, dryers, 721
 cabinet, 722
 calculations, 721
 compartment, 722
 cylinder, 722
 drum, 722
 rotary, 722
 spray, 725
 tunnel, 722

Drying, 2, 689, 715
 agricultural, 723
 application of hygrometry, 719
 calculations, 721
 chart, 716, 718
 conduction, 722
 constant rate period, 716, 717
 convection, 722
 critical moisture, 715
 effect of air velocity, 717
 equations, 717
 equilibrium moisture, 715
 equipment, 721
 example, 723
 external conditions, 716
 factors influencing, 715
 falling rate period, 718
 internal conditions, 716
 mechanism of, 715
 methods, 721
 conduction, 722
 convection, 722
 radiant, 721
 periods, 716
 problem, 723
 radiant, 721
 systems, 715
 terminology, 715
 tobacco, 723

Duct, ducts, 239, 283
 air velocities in, 292, 293, 296, 297, 704, 711
 approaches to outlets, 277
 area change, 291
 attenuation, 344
 circular equivalents, 287-289