

BOILER INFORMATION BOOK

CHAPTER 1: ELECTRICAL

USEFUL ELECTRICAL FORMULAS	PAGE 1-4
ELECTRICAL ENCLOSURES INFORMATION	PAGE 5-7
CONDUIT AND WIRE SIZES	PAGE 9
WIRE SIZE vs VOLTAGE DROP	PAGE 10
STANDARD COPPER WIRE SPECIFICATIONS	PAGE 11
WIRE CLASSES AND INSULATION	PAGE 12-13
3-PHASE TRANSFORMERS/FULL LOAD CURRENTS	PAGE 14
COPPER WIRE CURRENT CAPACITIES	PAGE 15
AC ELECTRIC MOTOR SPECIFICATIONS AVERAGE	PAGE 16
DC ELECTRIC MOTOR SPECIFICATIONS	PAGE 17
3-PHASE ELECTRIC MOTOR SPECIFICATIONS	PAGE 18
ELECTRICAL NOISE	PAGE 19-22

CHAPTER 2: PIPING

TYPES OF COPPER PIPE	PAGE 23
COPPER PIPE & TUBING DIMENSIONS	PAGE 24
FRICTION LOSS IN PIPE FITTINGS	PAGE 25
WATER DATA & FORMULAS	PAGE 25-26
FRICTION LOSS IN STEEL PIPE	PAGE 27-28
STEEL PIPE SPECIFICATIONS	PAGE 29-36
STEEL PIPE CALCULATIONS	PAGE 37
HEAT LOSS THROUGH BARE PIPE INSULATION	PAGE 38-39
FLANGE RATINGS	PAGE 40
FRICTION LOSS FOR WATER - PIPE	PAGE 41
DESIGN VELOCITIES FOR FLOW OF FLUIDS IN PIPES	PAGE 42

CHAPTER 3: STEAM

STEAM TABLES - SATURATED	PAGE 43
VISCOSITY OF WATER & STEAM	PAGE 45
STEAM TABLES - SUPERHEATED	PAGE 46-47
HOW TO FIGURE COSTS OF STEAM LEAKS	PAGE 49
STEAM PIPE SIZING	PAGE 50
STEAM CAPACITY TABLE LBS/HR	PAGE 51
STEAM LEAK RATE THROUGH OPENINGS	PAGE 52
STEAM TRAPS - OPERATING REQUIREMENTS	PAGE 53
COST OF STEAM LEAKS - FROM STEAM TRAPS	PAGE 54

CHAPTER 4: FUEL OIL

FUEL OIL SPECIFICATIONS	PAGE 55-59
FUEL OIL ANALYSIS	PAGE 60-62
OIL NOZZLE FLOW RATES	PAGE 63-64
VISCOSITY CHART-HEAVY OILS	PAGE 65

CHAPTER 5: FUEL GAS

PROPERTIES OF SELECTED GASES	PAGE 66
PROPERTIES OF PROPANE	PAGE 67
NATURAL GAS CORRECTION FACTORS - PRESSURE	PAGE 68
GAS FLOW METER TABLE - CU/FT/HR	PAGE 69
NATURAL GAS FLOW THROUGH PIPE	PAGE 70
NATURAL GAS FLOW THROUGH VARIOUS ORIFICES	PAGE 71

CHAPTER 6: TEMPERATURE

TEMPERATURE CONVERSIONS - F to C	PAGE 72
FLAME TEMPERATURES vs EXCESS AIR	PAGE 73
TEMPERATURE REDUCTION CAUSED BY AIR	PAGE 74
BOILER FEEDWATER TEMPERATURE HEAT CONTENT	PAGE 75
FACTORS OF EVAPORATION (FEEDWATER)	PAGE 76
HEAT TRANSFER MODES	PAGE 77
TYPE J THERMOCOUPLE CONVERSION TO MV	PAGE 78
TYPE K THERMOCOUPLE CONVERSION TO MV	PAGE 79
RTD PLATINUM PROBES COVERSION TO OHMS	PAGE 80

CHAPTER 7: MISCELLANEOUS

COMMONLY USED BOILER TERMS	PAGE 81
BTU/BOILER CALCULATIONS	PAGE 82
UNITS & CONVERSION FACTORS	PAGE 83-88
COMMON FORMULAS	PAGE 89-91
FLANGE RATINGS	PAGE 92
CONVERSION TABLES - PSI/"H20/"Hg	PAGE 93
METRIC CONVERSION TABLES	PAGE 94
FRACTIONS TO DECIMALS TO MILLIMETERS	PAGE 95
FLAME DETECTOR TYPES	PAGE 96-99
FLOW METER MEASURING DEVICES	PAGE 100
FLOW METER PRESSURE CORRECTION FORMULA	PAGE 101
SOLVENTS - TYPES & CHARACTERISTICS	PAGE 102
PROPERTIES OF SELECTED LIQUIDS	PAGE 104

CHAPTER 8: AIR

COMPOSITION OF AIR	PAGE 105
PROPERTIES OF AIR MEASUREMENT	PAGE 106-108
AIR VELOCITY PRESSURES	PAGE 109
BOILER ROOM AIR SUPPLY - FORMULA	PAGE 110
COMBUSTION AIR BLOWERS/FAN LAWS	PAGE 111
CFM vs PSI FOR NOZZLE SIZES	PAGE 112
AIR VELOCITY IN PIPE	PAGE 113
ALTITUDE vs ATMOSPHERIC PRESSURE (AIR)	PAGE 114
ALTITUDE vs AIR & WATER	PAGE 114

CHAPTER 9: WATER

WATER DATA & FORMULAS	PAGE 115
WATER PIPE SIZING	PAGE 116
BOILER WATERSIDE BLOWDOWN	PAGE 117
BOILER FEEDWATER & DA TANK	PAGE 118
BOILER LOW WATER CUTOUTS	PAGE 119-120
BOILER WATER IMPURITIES - CAUSE & EFFECT	PAGE 121
BOILER BLOWDOWN PROCEDURE	PAGE 122

CHAPTER 10: BOILER DATA

IRI (INDUSTRIAL RISK INSURERS) INFORMATION	PAGE 123-124
FM (FACTORY MUTUAL) INFORMATION	PAGE 125-128
UL (UNDERWRITERS LABORATORIES) INFORMATION	PAGE 129-133
GAS TRAIN LAYOUTS	PAGE 134-135
LOSS PREVENTION DATA - BOILERS	PAGE 136-141
HIGH PRESSURE BOILERS CARE & OPERATION	PAGE 142-147
HOT WATER BOILERS CARE & OPERATION	PAGE 148-150
BOILER INSPECTIONS	PAGE 151-152
TESTING & MAINTENANCE - ASME - CSD1	PAGE 153-160
BOILER TUNING & MAINTENANCE	PAGE 160-162
SAFETY VALVES	PAGE 163-164
SUGGESTED TESTING SCHEDULE	PAGE 165
SAMPLE BOILER LOGBOOK	PAGE 166-169

CHAPTER 11: POLLUTION

COMBUSTION GENERATED AIR POLLUTANTS	PAGE 170-174
ESTIMATED TONS/YR POLLUTANTS - OIL/GAS	PAGE 174-177
