**RESISTANCE WELDING**
- Transformer: Transformer KVA x 3,413 x .03 = BTU / hr
- Welding Tips: 3,000 BTU / hr. per tip (chilled water preferably)
- Ignitron Tubes:
  - Size B: 1,800 BTU / hr
  - Size C: 4,500 BTU / hr
  - Size D: 24,000 BTU / hr
  - Size E: 48,600 BTU / hr
- Rectifier: Amps x 3.413 = BTU / hr

**PLATING BATHS**
- Heat Removal (BTU / hr) = DC amps x DC volts x 2.56

**DIE CASTING**
- Zinc:
  - Heat removal (BTU / hr) = M x 95 BTU / lb
  - M = Throughput rate (lbs per hour)
  - Pour at 800°F
  - Remove at 300°F
- Aluminum:
  - Heat Removal (BTU / hr) = M x 325 BTU / lb
  - M = Throughput rate (lbs per hour)
  - Pour at 1,200°F
  - Remove at 600°F

**OTHER EQUIPMENT**
- Air Compressor:
  - no after cooler = 0.1 ton / hp
  - with after cooler = 0.2 ton / hp
- Vacuum Pump = 0.212 ton / hp
- Hydraulics = 0.212 ton / hp x Duty Cycle
- Pump Heat = 0.212 ton / hp

**HEAT EXCHANGERS**
- BTU / hr = U Factor x Area x ∆T
  - ∆T - Set Temperature - Cooling Water
  - U Factors:
    - Shell / tube: (H2O / H2O) = 250
    - (Oil / H2O) = 150
    - Tank:
      - Plate Coil = 100
      - Coil In Tank = 80
    - Plate & Frame: (H2O / H2O) = 1,000

**GENERAL HEAT TRANSFER**
- BTU = C x ∆T x M
  - where C = Specific Heat of Material;
  - ∆T = Temperature Change;
  - M = Mass of Material Processed (lbs or lbs / hr)
METRIC CONVERSION TABLE

- US GPM to Liters / min x 3.785
- LBS / sq.in to kPA x 6.894
- LBS / sq.in to KG / sq.cm x .07031
- CU meters to gallon x 264.17
- CU inches to Liters x .01639
- CU feet to CU meters x .02832
- CU feet to Liters x 28.317
- FL Ounces to CU cm x 29.57
- US gal to Liters x 3.785
- BTU to kilocalorie x .252
- KW to BTUH x 3412
- HP to BTUH x 2545
- HP to KW x .7457
- Ounces to Grams x 28.350
- LBS to KG x .4536
- US tons to KG x 907.2
- Inches to cm x 2.540
- Feet to m x .3048
- Miles to km x 1.609
- Lbs to Ounces x 16

TEMPERATURE CONVERSION

- °F to °C : 
  \[(°F - 32) \times .55 = °C\]
- °C to °F : 
  \[(°C \times 1.8) + 32 = °F\]

 °F  0 = -17.8 °C
   5 = -15
  10 = -12.2
  15 = -9.4
  20 = -6.7
  25 = -3.85
  30 = -1.1
  35 = 1.7
  40 = 4.4
  45 = 7.2
  50 = 10.0
  55 = 12.8
  60 = 15.6

ABBREVIATIONS & EQUIVALENTS, & FORMULAS

- PSI = Pounds Per Square Inch
- GPM = Gallons Per Minute
- EWT = Entering Water Temp
- LWT = Leaving Water Temp
- BTU = British Thermal Unit
- BTU / HR = GPM x 500 x ΔT (water)
- FT H.D. = PSI x 2.31
- 1 Gallon = 8.33 LBS (water)
- 1 Cubic Foot = 7.48 gallons
- 1 Mil thickness = .001"
- 1 Bar = 14.7 PSI

PIPE SIZING GUIDE

- 1/2" = 6 gpm
- 3/4" = 10 gpm
- 1" = 15 gpm
- 1-1/4" = 30 gpm
- 1-1/2" = 40 gpm
- 2" = 70 gpm
- 2-1/2" = 100 gpm
- 3" = 150 gpm
- 4" = 275 gpm
- 6" = 850 gpm
- 8" = 1500 gpm
- 10" = 3000 gpm
- 12" = 5000 gpm

Providing Solutions for Heat Transfer since 1977

PRODUCTS
Temperature Controllers
Portable Chillers
Central Chillers
Pump Tank Stations
Cooling Towers
Filters