PROCESS TECHNOLOGY

ENGINEERING DATA

Metal Heat Exchanger Sizing

Process Technology offers three basic configurations in its standard coil product line:

- Grid Coil
- "U" Coil
- Serpentine Coil

In addition, we also offer custom designed coils including helical and inline configurations.

METRIC CONVERSIONS:
One liter = .264 gallons
One m^2 = 3.2 ft^2
9/5 (°C) + 32 = °F

1 FORMULA FOR STEAM HEATING MEDIA:

$$\frac{\text{Gallons to be heated} \times \text{Temperature rise required (°F)} \times \text{Steam pressure factor (see chart 1)}}{1000} = \text{Square feet of area required for one hour heat-up}$$

$$\frac{A \times B \times C}{1000} = \text{Square feet of area required for one hour heat-up}$$

Calculation process:

Step 1: Determine gallons in tank. Enter this amount at (A).
Step 2: Subtract the ambient temperature (°F) of the solution to be heated from the temperature to which it must be heated (operating temperature). Enter this amount at (B).
Step 3: Locate the steam pressure available at the tank on the Steam Pressure Factor chart below (chart 1) and find the factor number. Enter the factor number at (C).
Step 4: Multiply (A) times (B) times (C) and divide by 1000. This is the square foot area you require for a one-hour heat-up. If more time is available, the coil surface area may be reduced by dividing the square foot area by the heat-up time available (up to 4 hours maximum).

CHART 1

STEAM PRESSURE AVAILABLE/PSI	5#	10#	15#	20#	25#	50#	Above 50#
STEAM PRESSURE FACTOR	.55	.50	.42	.37	.30	.25	Consult factory

2 FORMULA FOR HOT WATER HEATING MEDIA:

$$\frac{\text{Gallons in tank} \times \text{Temperature rise required (°F)} \times 8.33}{100 \times (\text{Hot water temperature °F} - \text{Required tank temperature °F})} = \text{Square feet of area required for one hour heat-up}$$

$$\frac{A \times B \times 8.33}{100 \times D} = \frac{C}{E} = \text{Square feet of area required for one hour heat-up}$$

Step 1: Determine gallons in tank. Enter at (A).
Step 2: Subtract ambient temperature (°F) of solution to be heated from the temperature to which it is to be heated (operating temperature). Enter at (B).
Step 3: Multiply (A) times (B) times 8.33. Enter your answer at (C).
Step 4: Subtract the required solution temperature (°F) from the temperature of your hot water supply. Enter this figure at (D).
Step 5: Multiply (D) by 100 and enter answer at (E).
Step 6: Divide line (C) by line (E) to determine square foot area required. If more time is available, coil surface area may be reduced by dividing the square foot area by the heat-up time available (up to 4 hours maximum).

3 FORMULA FOR COOLING WITH LIQUID MEDIUM:

$$\frac{\text{Volts} \times \text{Amps} \times 3.412}{100 \times (\text{Required tank temperature} - \text{Cooling liquid temperature})} = \text{Square feet of surface area required}$$

$$\frac{A}{100 \times B} = \frac{A}{C} = \text{Square feet of surface area required}$$

This formula assumes that all electrical energy is dissipated in the tank as heat. In more efficient electrochemical conversions, the energy dissipated as heat may be less (consult factory).

Step 1: Determine watts by multiplying voltage times the amperage delivered by the tank rectifier. Multiply this product times 3.412 to determine BTUs. Enter answer at (A).
Step 2: Subtract cooling liquid temperature (°F) from required tank temperature. Enter at (B). Caution: If this number is less than 15, consult factory for assistance in determining proper coil size.
Step 3: Multiply line (B) times 100 and enter answer at (C).
Step 4: Divide line (A) by line (C) to determine square feet of surface area required.

NOTE: These calculations do not take into account surface heat losses. Consult factory for solution temperatures of 170°F or higher. Check heat exchanger solution guide for proper sheath material selection.

YOUR DISTRIBUTOR: Chemical Distributors, Inc.
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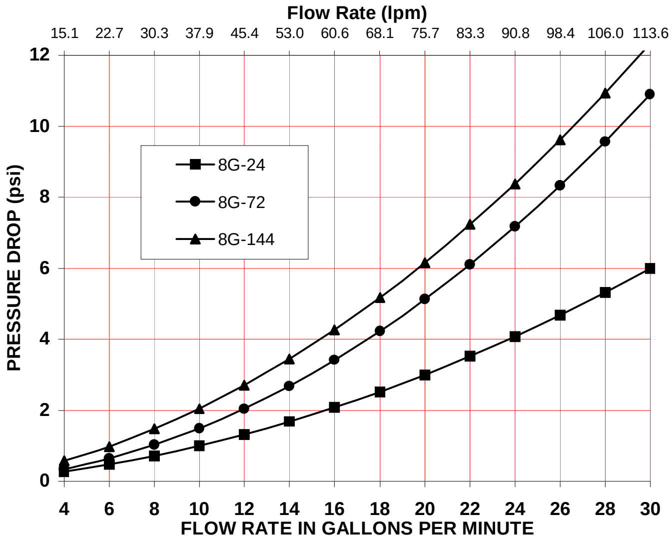
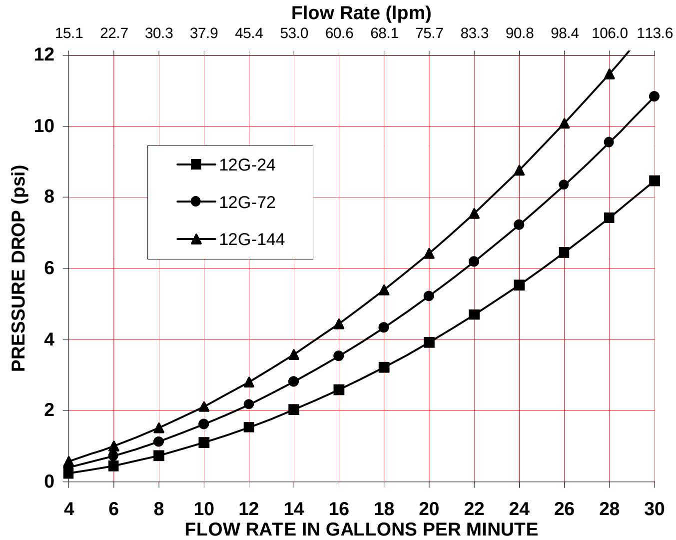
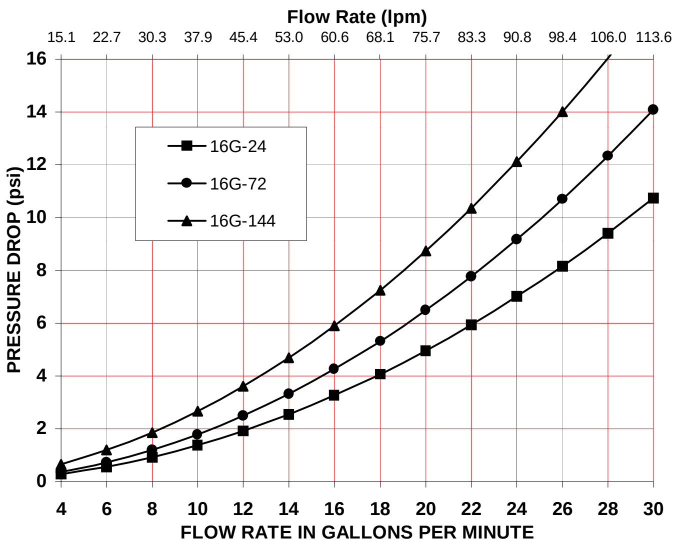
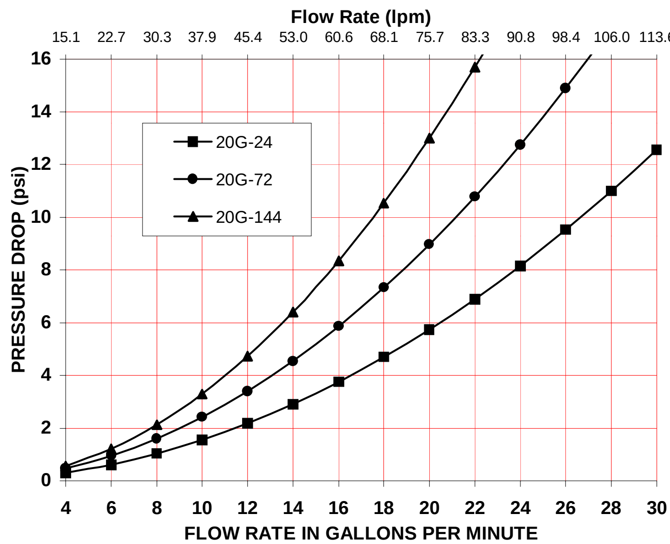
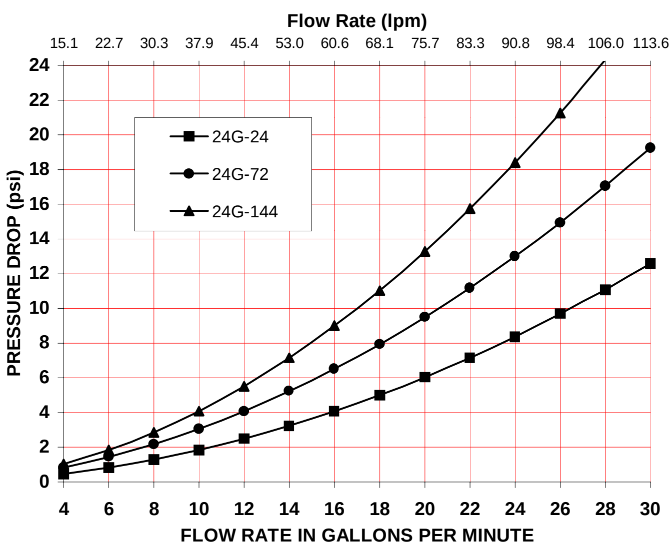
METAL COIL PRESSURE DROP (FOR WATER)

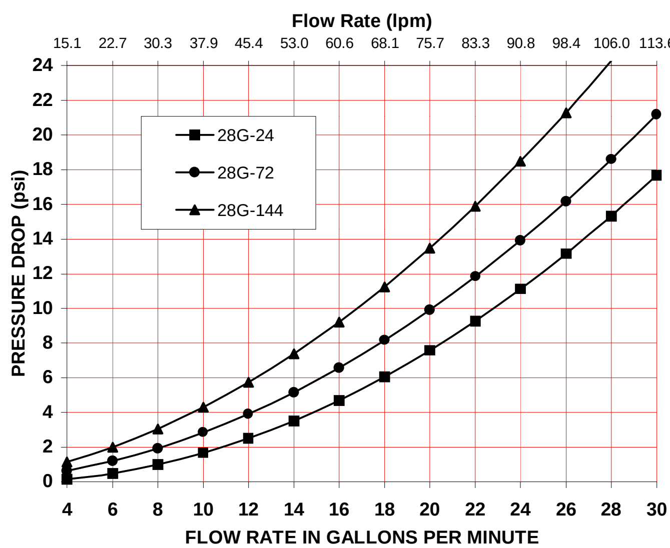












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