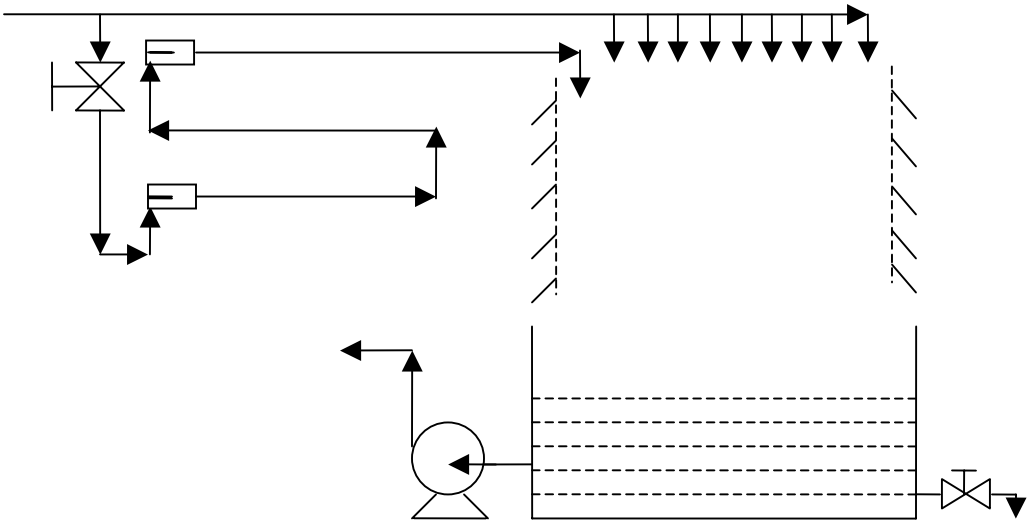
Corrosion Coupon Installation Method

Following steps are required before installation of corrosion coupon:

1) Cleaned the cooling tower & cooling water system by pre – treatment chemicals.
2) After completion of pretreatment give heavy blow down, cleaned all the Algae and Microbiology from the cooling water system.
3) Make a tapping in return line of cooling tower (attach 1inch external threaded nipple) as sketch given below,



4 Cleaning of corrosion coupon as follow :

a) MS, SS and Cu coupon are cleaned by inhibited HCl or **"ALTRET" 3600** and dipping coupon in it for 5 min.
b) Nickel coupon is cleaned by formaldehyde.
c) Now all the coupons are washed with fresh water or running water of cooling tower.
d) After washing, all the coupons are neutralized by 5% sodium carbonate and again wash with water.
e) After neutralization, soaked all coupons in Acetone for 5 min.

5 a) Calculate the surface area of each coupon using following equation:

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Surface Area (A) = $2*[(L*B) + (B*T) + (L*T)] + 3.14\ D * T - (3.14*D^2/2)$

Where, L = Length of the coupon.
B = Width of the coupon.
T = Thickness of the coupon.
D = Diameter of hole in coupon

b) Weigh all the coupons carefully & note the weight as initial weight (W1).

6) Now install the coupons (co-current to water flow) in rack as shown in sketch, other position of installation may crate erosion and deposition problem and it also influence the rate of corrosion and we can't find out accurate corrosion rate.
7) After 30 days (min.) remove the coupons and cleaned by same procedure as above and weigh it again. Final weight is (W2).
8) Calculate the weight loss (Wf) in milligram and find out corrosion rate using following formula:

$$\text{Corrosion Rate} = \frac{\text{Weight loss (mg)} * 365 * 39.4}{\text{Density of metal (mgm/mm}^3\text{)} * \text{Surface area (mm}^2\text{)} * \text{No. of days}}$$

$$= \_\_\_\_\_ \text{ mpy (mils per year)}$$

Density of different metals is as under:

1) Mild steel (MS) :7.86 mgs/mm^3
2) Stainless Steel (SS) : 8.00 mgs/mm^3
3) Copper (Cu) : 8.96 mgs/mm^3
4) Nickel (Ni) : 8.90 mgs/mm^3

Note: Standard limit for Corrosion rate is less than 5 mpy for MS & less than 2 mpy for Copper & SS.

Specimens Dimensions:

1. Length of the coupon :**50 to 100 mm**
2. Width of the coupon :**10 to 25 mm**
3. Thickness of the coupon :**0.8 to 1.6 mm**
4. Hole diameter :**6 to 10 mm**

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