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UV Disinfection System Design for wastewater projects.

Environmental engineers that are tasked with designing an ultraviolet disinfection wastewater system has a few options. The type of system will be based on a number of factors.

The following items are required to properly make the determination:

1. Flow Rates
   1. Peak flow rate. What is the instant peak flow rate? Worst Case Scenario.
   2. No flow rate. Understanding of no flow time periods. Will it decant? We ask this to see how long the lamps will be on. Lamps are usually on as long as there is some flow. The most important issue is that the lamps need to be covered with water. If they burn in the air, the sleeves will foul and the lamps can become damaged.
   3. Average flow rate. What will the system typical see?
2. Location
   1. Is the system indoor or outdoor? What are the environmental conditions of the UV installation site? If outdoors, is there a protective cover over the system? High heat is a consideration.
   2. What is available power?
   3. Does the location have utilities like water or air?
   4. Is it a new system or a retro fit of an existing system? If existing, what are the dimensions?
3. Layout
   1. Will this be a gravity flow **open channel** or will it be **piped** to and from?
      1. Open channel can be piped to and from stainless steel channels with flange pattern or an actual flange. Some contractors prefer actual flanges.
      2. Piping to chambers and Teflon system is often gravity flow, even though it is piped.
   2. What type of redundancy is required? Once known, do you want to have it in series, in parallel or in a U-turn configuration.
   3. Analysis of orientation: horizontal open channel, vertical open channel, chambered disinfection, Teflon tube disinfection.
4. Water Quality
   1. What is the treatment process prior to UV?
   2. Discharge permit in ???/100 ml for fecal coliform or E.coli. 200/100 ml fecal and 126/100 ml E.coli are typical.
   3. Ultraviolet transmittance percentage (UVT %). This is the amount of energy absorbing material in the water. 65% is average.
   4. Total Suspended Solids (TSS)? In mg/liters. <30 mg/l typical.
   5. Biological Oxygen Demand (BOD5) in mg/liters. <30 mg/l typical.
   6. Max mean particle size. <30 micron.
   7. Water temperature range?
   8. Ambient temperature range?
5. Questions regarding Operation Costs
   1. You should know for yearly budgeting: Electrical usage. What is the maximum?
   2. Parts usage. How often do lamps need to be replaced? How much do spare parts cost?
   3. Service. How much service is expected.