

# Hydro Engineering Filtration Equipment Overview

The four steps to solving filtration equipment selection:

1. **Primary solids:** From washing processes there are varying amounts of solids (dirt, sand, silt, clay and even gravel) that are produced. These solids must be collected along with the wastewater in a collection system (pit below ground, or Hydropad system above ground). In wash pad systems where heavy solids are present and an adequately sized primary solids settling pit cannot be used a cone bottom tank set above ground can be used to settle out these solids. A pump located in the wastewater collection pit transfers water to the filtration system or above ground tank. Solids' settling takes time. The general rule is to allow 45 minutes of retention time in the settling chamber. Regular cleaning of the pit or tank must be done. If the solids level reaches the pump (sending water to the next piece of filtration equipment) plugging can occur. Size the settling pit according to the solid load and cleanout frequency.
2. **Secondary solids:** These are the free-floating (suspended) solids that do not readily drop out of the water in a settling pit. An active solids separation filter is called for. Hydro Engineering has a unique Continuous Media Automatic Filtration Unit (CMAFU) that acts like a cartridge filter but does not require change outs. The CMAFU uses paper media 18" wide and 100 yards in length. In the CMAFU the filter paper is drawn across a conveyor system shaped like a hammock (dipped in the center) causing the wastewater to puddle on the paper. Working like a coffee filter the water drains through leaving the solids on top. As the filter paper becomes plugged with solids the puddle depth increases tripping a float switch that activates the conveyor moving the spent media forward and exposing fresh media to the waste stream. The CMAFU is provided with a 5-micron nominal filter paper, other micron sizes are available upon request. By reducing fine solids early in the filtration process maintenance is reduced on finer filtration methods used later in the system. This means less back flushing of media filters. Paper usage by the CMAFU varies depending on application. The CMAFU is limited to 10-gpm flow, additional units may be required in some applications.

Machine selection: CMAFU-2

3. **Oils and grease:** If oil or grease is present it must be removed. Most commonly to less than 50 parts per million (PPM). Consult your local sewer department (POTW) for discharge limitations on oils, grease and hydrocarbons. Free-floating oils can be coalesced and then skimmed. Hydro Engineering uses a high concentration laminar flow coalescing system and active oil skimming (belt skimmers only). For emulsified oils media filtration is required. Hydro's approach to hydrocarbon removal depends on several things. Is the customer using high caustic soaps that emulsify the oils? Are they using solvents? If not, coalescing and skimming should be enough. Where heat, chemistry- soaps, solvents or acid are used oils are emulsified and remain suspended in the water column. It is then more difficult to remove. Hydro's oil adsorbing media (Hydrosorb™) can reduce hydrocarbons to less than 10-PPM. By making multiple passes through a media filled with Hydrosorb, these emulsified oils can be removed.

Machine selection: HE/S1, HE/S1-H, HE/S1-500, HE/S1-500B, HE/S1-500 W/ Hydrosorb-2 option. In existing systems with oil coalescing/skimming present a stand-alone Hydrosorb module can be added.

4. **Heavy metals and Recirculation systems:** This final step can be skipped if no heavy metals are present in systems where filtered water is discharged to sanitary sewer. Where metals must be addressed we use a secondary polishing system utilizing activated carbon. Metals can have both a physical and chemical attraction to carbon. Many different types of carbon are available and can be targeted to the specific metals found in the wastewater. By making multiple passes through the filter media (polishing) we obtain very good metals reduction rates. In recycling situations we use diatomaceous earth (DE) filter media. DE is available in many grades to suit the situation. Our standard DE filters to 2/10ths of one micron. By filtering to this fine level water clarity is optimized and maintenance reduced on pressure washing equipment.

Machine selection: HE/3000, HE/4000, HE/5000, ACF3, HE/7000 and Extreme Clean.