

SECTION VI

DESIGN PARAMETERS:

Design parameters are based on EPA recommendations. Standard AutoCAD details are provided by American Manufacturing for use by the design engineer.

MEDIA:

Recommended effective size of the media ranges from 1.0-3.0 mm. Coarse material is preferred. Uniformity coefficient should be 3.5 to 4.0 (3.5 preferred) (Teske, 1978; Hines and Favreau, 1975). The media must be carefully placed in the filter to prevent stratification of the material. It should be homogenous throughout its depth. To prevent the media from sifting into the gravel below, several inches of 1/4" to 3/8" pea gravel should be placed on top of the 1/2" to 3/4" size bottom layer of gravel before the media is added.

HYDRAULIC LOADING RATE:

Hydraulic loading rates are dependent on the media size. They should range from 3.0 - 5.0 gpd/sq.ft. based on forward flow. A recirculation rate of 3:1 to 5:1 (recycle:forward flow) is typically used (Hines & Favreau, 1975).

DOSING & DISTRIBUTION:

Each zone will be dosed 48-120 times per day with ideal volumes equaling 1-2 gal/orifice/dose. Flow rate (gpm) per lateral is determined by lateral length, orifice size, orifice spacing and head pressure. All run and rest times are easily adjustable. Orifice shields are required to prevent clogging of the orifice from the outside. Distribution shall be primarily through low-pressure pipe using standard low-pressure distribution design procedures. A hydraulically activated sequencing valve automatically rotates flow through several manifolds. Each sequencing valve is supplied by a duplex alternating submersible pump system controlled by automatic time and level settings.

FILTER ENCLOSURE:

Most large-scale commercial filters are constructed in ground. A typical 30-mil PVC liner is placed over a shallow (2.0") sand-leveling layer. The liner extends up and over the four sidewalls. Sidewalls are supported by 1/2" untreated plywood. All pipes penetrating the liner shall be equipped with an appropriately sized liner boot. Smaller filters are usually made of either prefabricated or poured in-place concrete or masonry walls set on a poured slab. Any portion of exposed filter walls should be well insulated to protect from freezing. Covers may be necessary in severe climates. Buried sand filters are covered with a light filter fabric and several inches (typical 6") of soil with established vegetation (i.e. grass). A sandy loam is recommended.

OPERATION & MAINTENANCE:

Routine O & M is required for all recirculating sand filters. Influent and effluent sampling and analysis is typically required on a periodic basis. Verification of flow rates, run times, rest times, pump & controls operation is standard. Flushing of laterals and measuring of orifice head pressure should be done annually. Normal sludge measurement procedures should be used to determine if a pump out is required.