# 6.10 Media Filter[40]

## Overview

### Description

Media filters are flow-through treatment systems that remove pollutants from runoff through screening and adsorptive media such as sand, peat, or manufactured media. Types of non-vegetated[41] media filters include: 1) bed filters, such as Austin or Delaware sand filters; 2) proprietary modular cartridge filters; 3) powered filtration systems; and 4) catch basin inserts, also known as inlet filters.

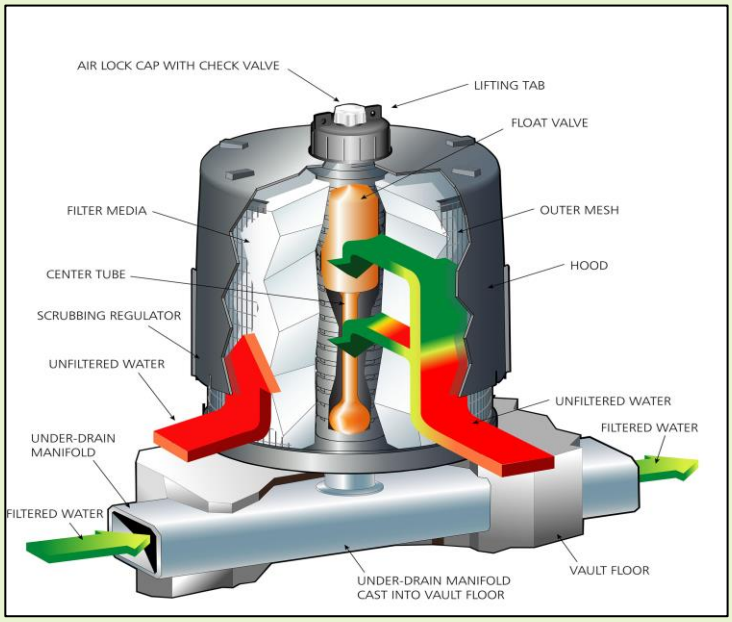


*Figure 6-49. System C Filter Cartridge, Typically Used as Part of Treatment Train (Credit: CONTECH Engineered Solutions)*

**Best uses**
- Limited space
- Underground
- As part of a treatment train (pre-treatment)

**Advantages**
- Less area required
- Customized media
- Customized sizing

**Limitations**
- Not considered LID
- No removal of trash without pre-treatment
- High installation and maintenance costs
- Confined space entry may be required
- Media filtration is allowed only for qualifying "special projects"

Under current Municipal Regional Permit (MRP) requirements, the use of media filters as a stand-alone treatment measure is no longer allowed, except at "Special Projects" that qualify for LID treatment reduction credits (see Appendix K). Media filters may also be used as part of a treatment train, for example, as pre-treatment for a subsurface infiltration system. Because Special Projects are typically dense urban infill projects where LID treatment is infeasible due to space constraints, this section focuses on proprietary cartridge filters, which are suitable for limited space and/or underground applications.

Cartridge filters use cartridges of a standard size that can be filled with various types of manufactured media, individually or in combination, including perlite (expanded volcanic ash), zeolite (natural mineral), granular activated carbon, and granular organic media (such as processed leaves). The media are designed to remove certain types of pollutants. The media cartridges are placed in vaults, manholes, or catch basins. In the unit shown in Figure 6-49, the water flows laterally (horizontally and upwards) into the cartridge,

[40] Note: The proprietary media filters shown are for general information only and are not endorsed by the Countywide Program. An equivalent media filter system may be used.
[41] Vegetated media filters using biotreatment soil media are described in the bioretention, flow-through planter, and tree well filter sections of the C.3 Technical Guidance.

through the media to a center tube, then downward to an underdrain system. The number of cartridges required is a function of the water quality design flow rate and cartridge design operating rate (that is, the surface loading rate).

## Siting

Media filters should be located in areas that can be accessible at any given time for the purpose of operation and maintenance and inspections. Media filter access manholes should not be located in parking stalls because they can't be inspected if a car is parked in the spot. Media filters should also not be located in garages or other areas with limited overhead clearance as large vactor trucks need access for cleaning.

*Table 6-14: Recommended locations for media filters*

| Recommended Locations | Media Filter |
|---|---|
| Parking Lot | ● |
| Roof | |
| Driveway | ● |
| Podium-level | |
| Close to building | ● |
| Away from Buildings | ● |
| Underground | ● |

## *Design and Sizing Guidelines*

- The selected media filter product must be certified by the Washington State Technical Assistance Protocol – Ecology (TAPE) program under the General Use Level Designation (GULD) for Basic Treatment[42]. A list of proprietary media filters currently holding this certification can be obtained from the Department of Ecology's website[43].
- The treatment measure should be sized based on the water quality design flow specified in MRP Provision C.3.d and the cartridge design operating rate for which the product received TAPE GULD certification.
- Consult the manufacturer to determine the proper type of media for the project site and pollutants of concern. Some use combinations of media to address a wide range of pollutants.
- Pretreatment to remove debris and coarse sediment upstream of the media filter is highly recommended. Pretreatment can be provided in a separate upstream unit and/or within the vault containing the cartridges (see Figures 6-48 and 6-49).
- Consider filter head loss when selecting a media filter product. Options may be limited if the site has limited available head or if trying to match up with existing storm drain invert elevations.
- Include provisions for bypassing high flows, either an internal bypass within the treatment measure or an external bypass using a piping configuration with a flow splitter (see Figure 6-51 for an example).
- Inform the contractor that, if there is a product substitution prior to or during construction, he/she must obtain approval from the local jurisdiction for any changes in the selected treatment product or design. The substituted produce must have TAPE GULD certification, and the design calculations must be revised if the design operating rate of the substituted product is different than the originally specified product.

[42] "General Use" is distinguished from pilot or conditional use designation, and "Basic Treatment" is distinguished from treatment effectiveness for phosphorus removal. Basic treatment is intended to achieve 80% removal of total suspended solids (TSS) for influent concentrations from 100 mg/l to 200 mg/l and achieve 20 mg/l TSS for less heavily loaded influents.
[43] See: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Emerging-stormwater-treatment-technologies#tape

## *Construction and Maintenance Plans*

- Consult the manufacturer for construction and maintenance requirements.
- Additional guidance is included in Chapter 8 and Appendix G of this Guide.

### Installation Requirements

- Consult the manufacturer to determine the installation requirements for a specific product.
- For vault-based media filters, base preparation will be required. Typically, the soil subbase will need to be compacted and a minimum 6-inch layer of crushed rock base material provided. See manufacturer's specifications.
- To avoid excess hydraulic pressure on subsurface treatment system structures:
    - The depth to seasonal high groundwater level should be at least 5 feet from the bottom of the structure.
    - A geotechnical engineer should be consulted for situations where the bottom of the structure is less than 5 feet from the seasonal high groundwater level.

Remember

### Maintenance Considerations for All Treatment Measures

- See Chapter 8 for specific maintenance guidance. Specifically, see Section 8.3.8 for common maintenance concerns.
- A Maintenance Agreement should be provided and should state the parties' responsibility for maintenance and upkeep.
- Prepare a maintenance plan and submit with Maintenance Agreement. Maintenance plan templates are in Appendix G.

## *Typical Design Details*

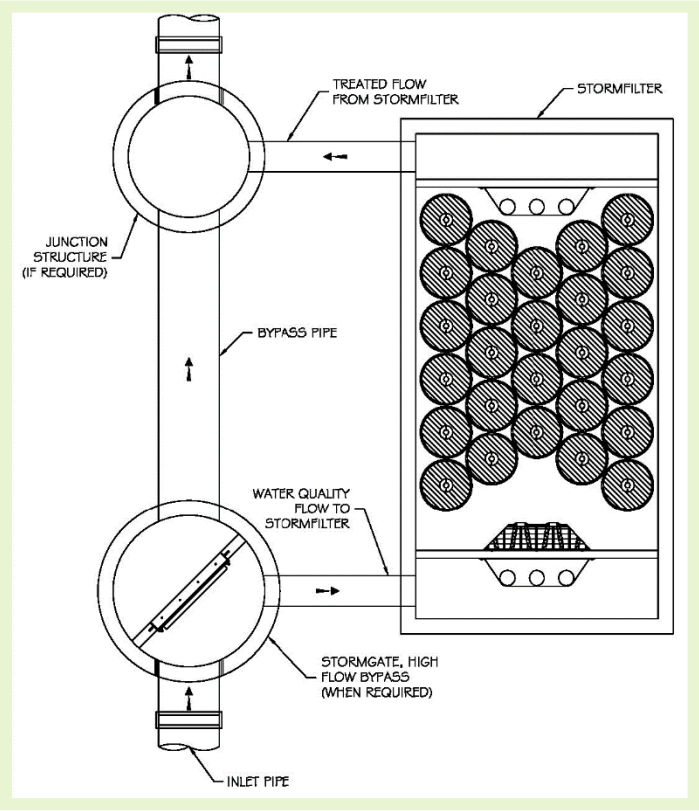


*Figure 6-50. Profile View, Typical Cartridge System Filter Array (Credit: CONTECH Engineered Solutions). Note: The proprietary media filters shown are for general information only and are not endorsed by the Countywide Program.*

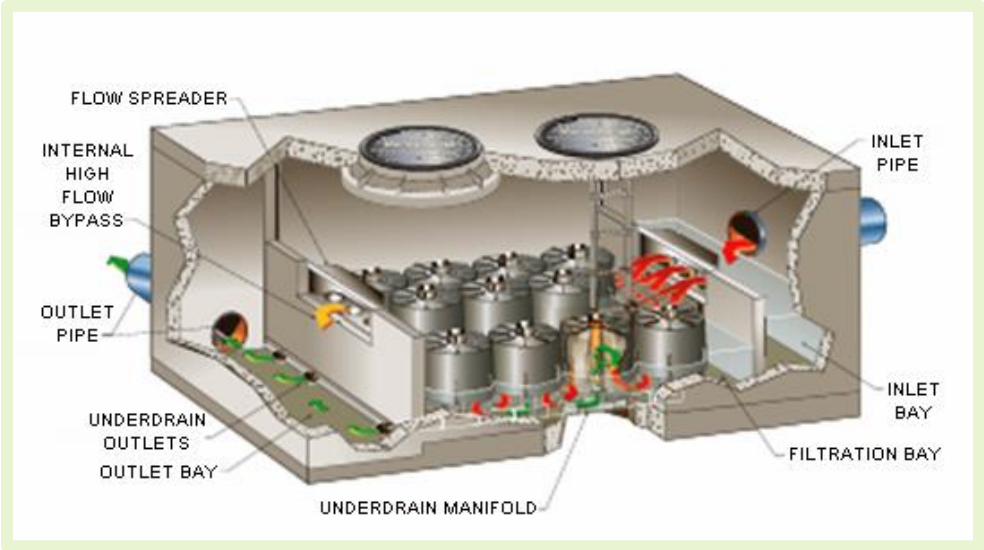


*Figure 6-51. Plan View, Typical Cartridge System Filter Array (Credit: CONTECH Engineered Solutions). Note: The proprietary media filters shown are for general information only and are not endorsed by the Countywide Program.*