



**COLORADO**  
Department of Public  
Health & Environment

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November 13, 2015

Mark Stewart  
Product Manager Hydrotech Filtration  
I. Kruger Inc.  
4001 Weston Parkway  
Cary, NC 27513

Subject: Acceptance of the Kruger Hydrotech Discfilter for Biofilm Processes as an Alternative Technology for Use in Domestic Wastewater Treatment Works in Colorado

Dear Mr. Stewart:

The Water Quality Control Division (the Division) has received and reviewed information for the Hydrotech Discfilter in accordance with section 1.8.0 of *Design Criteria for Domestic Wastewater Treatment Works Policy WPC-DR-1* (wastewater design criteria). The filter design is accepted for use as an alternative technology subject to the design criteria in Table 1. This acceptance is not intended as a third-party certification of the technology.

This acceptance addresses the following item:

- Hydrotech Discfilter for solids capture to produce effluent meeting secondary standards for total suspended solids (TSS) for wastewater following a biofilm treatment process (e.g., moving bed biofilm reactor) using Hydrotech SC woven polyester filtration media. A filter unit consists of a single center drum having multiple discs with up to 14 compartments of dual filter panels completing a full disc.

This acceptance applies only to the Hydrotech Discfilter following a biofilm treatment process as described above and does not constitute construction approval for installation in domestic wastewater treatment facilities. **Review and approval for the design of any domestic wastewater facility proposing to use this technology will be further reviewed on a site-specific basis by the Division** as required by Section 22.11(1) of the *Site Location and Design Approval Regulations for Domestic Wastewater Treatment Works 5CCR 1002-22* (Regulation 22) and the Colorado Water Quality Control Act (Act), Section 25-8-702, C.R.S. which states in part that: “No person shall commence the construction of any domestic wastewater treatment works or the enlargement of the capacity of an existing domestic wastewater treatment works, unless the site location and the design for the construction or expansion have been approved by the division.”

Any modifications to the physical attributes or characteristics of this treatment technology must be submitted to this office for review and acceptance by the Division prior to sale in Colorado. This condition includes changes made to the filter media or manufactured filter model (e.g., filter media, piping, mechanisms). For any changes to the process or equipment following the issuance of this letter, the Division will review any additional third party verification reports and issue a revised acceptance letter, or denial, as appropriate.



**Table 1. Design Criteria for Kruger Hydrotech Discfilter with a Biofilm Process:**

Design Criteria
<ol style="list-style-type: none"><li>1. The purpose of this acceptance is for media filters with the purpose of solids capture from domestic wastewater following an upstream biofilm treatment process to produce effluent meeting secondary standards (i.e., 30-day average effluent TSS and BOD <math>\leq</math>30 mg/L and 7-day average effluent TSS and BOD <math>\leq</math>45 mg/L). Pretreatment processes must be incorporated into the site-specific process train, as required, to ensure that the design influent to the media filter does not exceed a maximum of 400 mg/L TSS and the soluble BOD removal processes are before the media filter.</li><li>2. Design loading rate must not exceed:<ol style="list-style-type: none"><li>A. Peak hour hydraulic loading of 3.3 gpm/SF.</li><li>B. Peak hour solids loading (lb/day/SF) value calculated as the total suspended solids (TSS in mg/L) divided by a factor of 25.0 [(mg/L)/(lb/day/SF)]. For example, the maximum solids loading rate is 10.0 lb/day/SF for an influent TSS of 250 mg/L.</li><li>C. Filter area to be used in the loading calculations is the nominal submerged area, calculated for each disc as a portion of the total nominal filter media area on both sides of a disc. The nominal submerged area is 16.6 SF/disc for series 1700, 39.2 SF/disc for series 2200, and 53.2 SF/disc for series 2600.</li></ol></li><li>3. Design must include sufficient polymer dosing capacity to the influent to the media filter. The design must consider TSS loading, polymer feed rates/ratios, process controls, and adequate polymer mixing with the wastewater. Polymer feed pumps must have a design capacity to deliver polymer at a rate of up to 30 g polymer/kg TSS and include ability to deliver a variable dose at lower feed rates.</li><li>4. Design for existing facilities must include testing or analysis (e.g., filter influent TSS and BOD, particle size analysis, anticipated loading, lab tests, bench tests, and/or pilot testing) performed to evaluate filter effectiveness and the need for pretreatment for the expected wastewater characteristics. For proposed facilities, the Process Design Report must demonstrate a conservative design basis.</li><li>5. For facilities where ambient temperatures can be below freezing, the filter unit design must include adequate cold weather provisions such as heat trace lines and/or installation in a temperature-controlled enclosure.</li><li>6. The design must identify how the Hydrotech Discfilter alarm signal will notify operators of high level alarm activations when the facility is attended and unattended.</li><li>7. The design must indicate where and how both the backwash trough outlet (i.e., backwash water) and the bypass overflow (i.e., emergency overflow) is redirected (e.g., to headworks, clarifier, by pipe, channel, pump).</li><li>8. Design Redundancy: Filter installations must have at least two filter units (i.e., single center drum with multiple discs) installed to provide treatment at the peak hydraulic and solids loading capacities (e.g., two units each with 50% design capacity). With the largest unit out of service, the remaining units must be sufficient to contain the peak wastewater flow without overflow of the filter unit tank or basin. Each filter unit must have a dedicated backwash pump installed and the site must maintain at least one shelf spare. A redundant polymer feed pump must be maintained (i.e., either installed or available at the site).</li></ol>

9. **Manufacturer Review.** A review letter issued by the manufacturer indicating the installation was designed in accordance with manufacturer recommendations must be included with the site-specific design submittal. The manufacturer's review may not supersede criteria in this acceptance. The manufacturer's review may not be substituted for all required engineering documentation and calculations stamped and signed by a Colorado licensed Professional Engineer.

**Additional Operations and Maintenance Criteria**

1. An Operations and Maintenance (O&M) Manual must be provided for all installations and be available for review by the Division during compliance inspections.
  - A. Individual operations plans must establish backwash procedures and durations to ensure solids removal from both 'in' and 'on' the media.
  - B. Individual operations plans must include scheduled inspections and assessments of the cloth condition as an operational safeguard. This plan for scheduled inspections and assessments should include a routine visual inspection at least monthly, and a more detailed assessment of the cloth condition at least annually. Inspection frequencies may change with time as media condition changes and performance experience is gained.
2. **Spare Parts:** Filter panels equal to one full disc must be kept onsite, in addition to design redundancy noted above.

Please be aware that any point source discharges of water from treatment facilities are potentially subject to a discharge permit under Colorado's State Discharge Permit System. Any point source discharges to state waters without a permit are subject to civil or criminal enforcement action.

As part of this review, the Division has evaluated the following documents:

- November 4, 2015 Submittal from I. Kruger Inc. for the Hydrotech Discfilter for solids capture following the biofilm process and various additional correspondences.

Please direct any further correspondence regarding this acceptance to:

David Kurz, P.E.  
Colorado Department of Public Health and Environment  
Water Quality Control Division  
4300 Cherry Creek Drive South  
Denver, CO 80246

If you have any questions or comments, please contact David Kurz at [david.kurz@state.co.us](mailto:david.kurz@state.co.us) or 303-692-3552.

Sincerely,

David Kurz, P.E.  
Lead Wastewater Engineer  
Engineering Section  
Water Quality Control Division  
Colorado Department of Public Health and Environment