

Granular Media Filtration Skids

Carollo Engineers' granular media filtration skids may be operated independently to evaluate the filtration process, or integrated with other pilot units to evaluate a complete conventional treatment train. The filter skids feature a rugged metal outer frame, which is polymer coated to provide a durable finish to minimize corrosion. The frame also facilitates crating, transport, and set up.

Filter Columns

Carollo's standard skid includes three filter columns, which are 4 inches in diameter and 14 feet tall. The column height allows the flexibility to operate in gravity-feed filtration mode, or in pressure filtration mode, using the on-board feed pumps. The 4-inch column diameter provides performance representative of full-scale filters, while minimizing the volumetric flow of the water required. Carollo designed the filter skids to test a wide range of hydraulic

Carollo's filter skids offer the following benefits:

- ▼ Provide adequate filter height for either gravity or pressure filtration mode.
- ▼ Include a backwash water storage tank to optimize chemical dosing during backwashing.
- ▼ Provide continuous monitoring of relevant data for complete filtration evaluation.

loading rates (i.e., in the range of 2 to 17 gpm/sq ft). The filters are flanged at approximately the middle of the column to allow convenient disassembly for transport.

The columns allow a wide range of filter media types and depths (as high as 8 feet) to be evaluated.

A media retention plate is used for media support to eliminate the inconvenience of a gravel support system, and also to be more representative of full-scale underdrain systems. The backwash protocol may include both air and water at a wide range of flow rates to optimize backwashing conditions, and to ensure restoration of appropriate clean bed head loss. Each skid includes a backwash water storage tank to allow optimization of the chemical dosing strategy of the backwash water (i.e., chlorination, polymer addition, etc.).

Instrumentation

The filter effluent turbidity is monitored by dedicated turbidimeters on each filter column. Filter effluent particle counts are monitored by a single particle counter, which samples the three filters in sequence via a sampling manifold with solenoid valves. Samples are automatically collected from each filter effluent, based on an adjustable timing scheme. Because a single particle counting instrument is used, data variability among instruments is eliminated. Another benefit of this approach is that all relevant data are collected

with the minimum amount of instrumentation. This approach also reduces maintenance requirements on the skid and provides greater reliability. A pressure transducer is used to monitor head loss development during filter runs.

Data may be acquired using Carollo's remote data acquisition and control (RDAC) system, or using an on-board RDAC. This system stores and handles data in convenient formats for easy download and analysis.



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Design Criteria		
	Value	Additional Information
Maximum Flow Rate	4.5 gpm	
Maximum Flow Per Filter	1.5 gpm	
Filters		
Type	-	4-inch-diameter columns, 13-foot height
Number	3	
Filtration Mode	-	Gravity feed or pressure filtration (one feed pump per filter)
Hydraulic Loading Rate Range	2 to 17 gpm/ft ²	
Media Support Type	-	Media retention plate
Backwash		
Type	-	Air and/or water wash
Air Supply	-	On-board compressor (with 5 micron filter)
Backwash Water Tank Volume	20 gal	

Technical Specifications	
Skid Weight	750 lbs
Skid Dimensions (L x W x H)	80 in x 30 in x 168 in (85 in for shipping)
Electrical Requirements	208 VAC, 3 Phase, 30 A (WYE connection) Optional transformer requires 480 V, 3 Phase (Delta connection)
Influent, Effluent, Overflow Connections	1-inch Cam Lock
Typical Rental Fee	\$1,500 per month