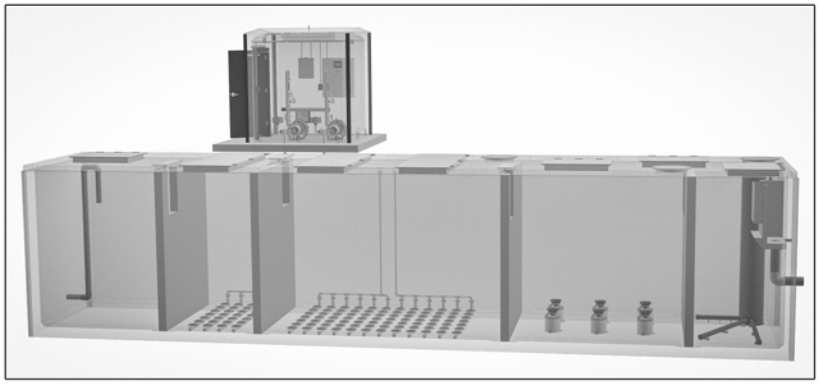
Orenco SYSTEMS *Fact Sheet*

Orenco® Modular MBBR Treatment Systems

Introduction

Moving Bed Biofilm Reactor (MBBR) Treatment Systems combine activated sludge (AS) and fixed-film treatment technology. Orenco has developed modular configurations that provide "plug and play" functionality and a small footprint.

These complete, pre-packaged Modular MBBRs can reliably treat BOD_5, TSS, and TN, often within a single, self-contained unit. They are suitable for large systems, high-strength systems, or systems with more stringent permit limits that may require additional treatment units.



Overview

MBBR systems use an activated sludge process that includes submerged fixed film media known as "carriers." Orenco's modular MBBRs house multiple stages, usually consisting of pre-anoxic chambers, organic reducing chambers, nitrifying chambers, and post-anoxic chambers and often include a secondary clarifier. The media is retained in each chamber or stage by perforated plates or screens. Additional stages and tankage may be included, such as influent primary screening and flow modulation, phosphorus removal, sludge digestion, etc. The need for additional stages or tankage depends on the collection system type, daily and weekly flow variations, final usage and dispersal, and discharge requirements.

The advantages of the Modular MBBR Treatment Systems are that it can be sized to fit into a smaller space, its sludge wasting and recycling needs are considerably less than other activated sludge processes, it's more suitable in applications with highly variable flow characteristics, and the nature of the carryover to the secondary clarifier eliminates sludge bulking. These characteristics make it simpler to operate and maintain than other activated sludge-type treatment processes, such as MBRs, SBRs, and CMASs.

In addition, when coupled with Orenco's AdvanTex® polishing treatment process, pretreatment requirements and long-term O&M needs for Orenco's modular MBBR systems may be reduced.

Pre-Anoxic Chamber – The pre-anoxic chamber reduces the organic load and blends forward flow with nitrified effluent for combined nitrate and BOD_5 reduction.

Organic Chamber – The organic chamber reduces the organic load and prepares effluent for ammonia and TKN conversion in the nitrification chamber.

Nitrification Chamber – The nitrification chamber converts ammonia to nitrate so it can be removed in the post-anoxic chamber.

– Alkalinity-feed appurtenances are typically required for significant ammonia conversion.

– The alkalinity feed is normally attached to the pre-anoxic return line to pace the flow.

Post-Anoxic Chamber – Post-anoxic chambers are included to meet stringent total nitrogen limits when they are required.

– Carbon-feed appurtenances are usually necessary for post-anoxic nitrogen removal.

Secondary Clarifier – The secondary clarifier separates out settleable and floating solids and discharges clarified effluent.

Final Polishing and Disinfection – Final polishing (e.g., AdvanTex) or disinfection are project-dependent and are typically added as necessary.

Dimensions and Construction

Orenco Modular MBBRs are typically sized 10 ft wide and up to 50-ft long and may consist of multiple vessels. The FRP tank structure includes an inner foam layer, which provides greater insulation for retaining internal heat necessary to promote greater bio-activity.