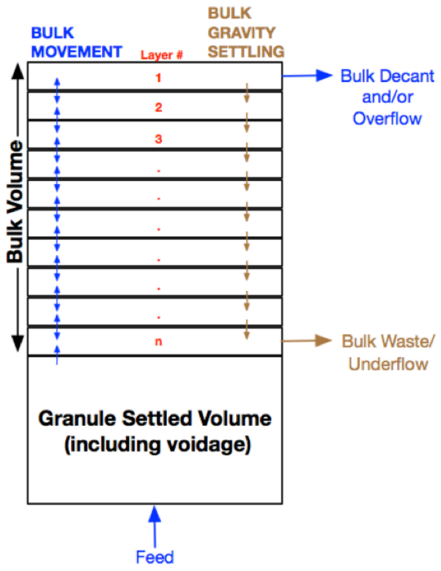
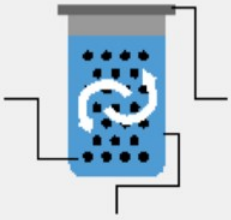
BIOWIN VERSION 5.3

NEW FEATURES + USABILITY IMPROVEMENTS

GRANULAR SLUDGE SEQUENCING TANK

A **Granular Sludge Sequencing Tank** (GSST) element is available to represent this process in BioWin configurations. The modeling approach uses BioWin's one-dimensional dynamic biofilm model to mimic the granular sludge. A one-dimensional layered solids flux model is applied for modeling settling of non-granular flocculent mixed liquor solids during unaerated/unmixed periods. These models are integrated with the general ASDM in a variable volume unit that allows various phases of operation to be specified. The GSST model has been developed to balance pragmatic design elements with mechanistic modeling rigor, to provide quick solution times, and typical process performance predictions.





Granule diameter	0.82 mm
Net TSS Conc	6.97 kg/m3
Granule TSS mass	52963 kg
% TSS in granules	79 %
Granule settled volume	1641.93 m3
Granule settled volume % of total volume	16.42 %
OUR - Total	8.15 mgO/L/hr
Air flow rate	2242.90 m3/hr (20C, 1 atm)
OTR	81.52 kg/hr

	Centre	Surface	Bulk
Ammonia N	31.93	31.93	7.09 mgN/L
Nitrate N	0	0	4.38 mgN/L
Nitrite N	0	0	0.03 mgN/L
Soluble PO4-P	27.41	27.39	6.38 mgP/L
Volatile suspended solids	33083	32915	1148 mg/L
Total suspended solids	43224	42118	1698 mg/L
Dissolved O2	0	0	1.38 mg/L
		pH	7.05

Local kinetic parameters
Local biofilm parameters
Local diffuser parameters
Local settling parameters

Most GSST technology implementations employ a repeated batch-fed process. The microorganisms responsible for the majority of the carbon, nitrogen and phosphorous removal grow in dense granules rather than conventional activated sludge flocs. These granules settle rapidly, eliminating the need for separate settling tanks. The granules have a layered structure that may be more aerobic on the outside and anoxic or anaerobic towards the centre. This structure allows the granular sludge to simultaneously remove carbon, nitrogen and phosphorous from the wastewater in a single reactor/settler.

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BIOWIN VERSION 5.3

NEW FEATURES + USABILITY IMPROVEMENTS

DEFAULT PARAMETER CHANGES

Biofilm Attachment / Detachment Rates

Particulate attachment and detachment rates have a major role in establishing biofilm thickness, dynamics, and system activity, similar to SRT in activated sludge. EnviroSim performed numerous model calibrations of these types of systems to measured BOD, ammonia, NO_x and biofilm growth profiles from full-scale and pilot-scale plants. Through this extensive testing, we have revised the default biofilm attachment and detachment rates.

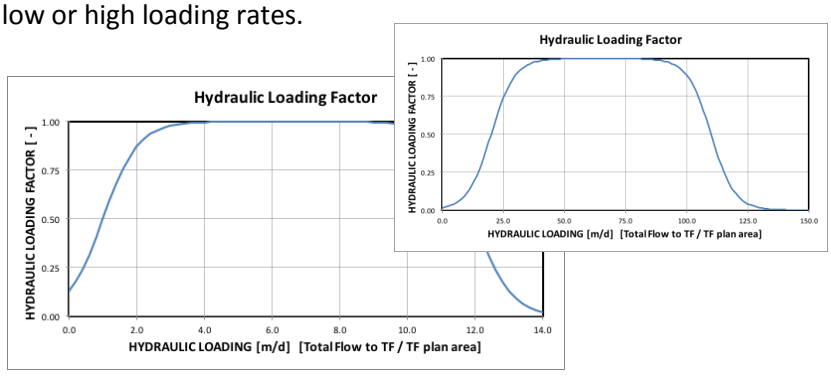
OHO Dissolved Oxygen Half Saturation Coefficient

In full-scale systems, lower levels of mixing intensity as well as other non-idealities often result in some degree of denitrification occurring at low DO levels. To reflect this with its default parameter set, ***in BioWin 5.3 the default OHO K_{DO} has been increased from 0.05 mgO_2/L to 0.15 mgO_2/L***.

ELEMENT ENHANCEMENT - TRICKLING FILTER

Hydraulic loading may impact the area available for gas transfer. If the wetting rate is too low then not all of the media will be "wet" so the gas transfer area will be reduced. On the other hand, if the hydraulic loading rate gets too high then it is possible that the air spaces between the media become filled with liquid, which also will reduce the available gas transfer area. The **Hydraulic Loading Factor** attempts to account for these less-than-optimal conditions. The **Hydraulic Loading Factor** is determined by a two-sided continuous switching function.

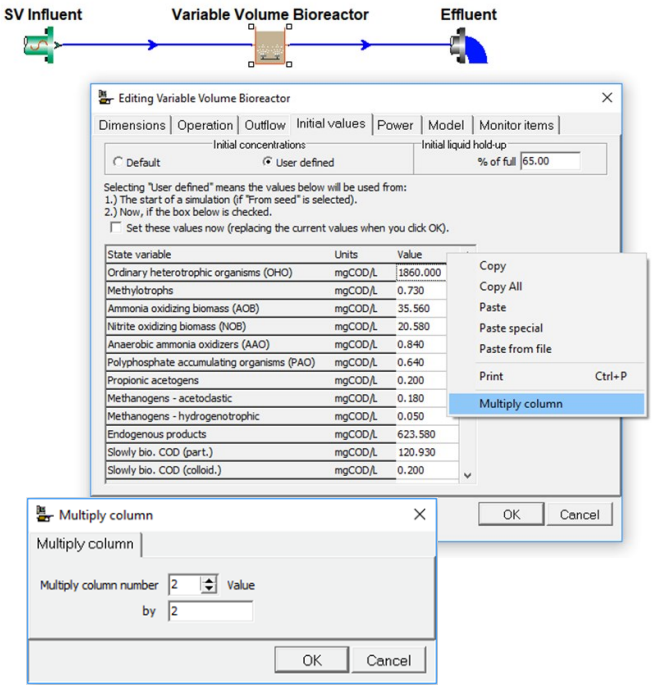
In BioWin 5.3 we improved the continuous switching function of the **Hydraulic Loading Factor**so that the trickling filter more accurately calculates the available area for gas transfer at extreme low or high loading rates.



USABILITY FEATURE

Multiply a Column by a Factor

Users may now multiply a column of values by a factor. This is done by right clicking on the "Value" column and selecting "Multiply column" from the pop-up window. In the example below, the initial state variable concentrations in a variable volume bioreactor are multiplied by a factor of 2 to increase the starting concentrations in the mixed liquor.



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