SRTmaster^{TM} FAQs

Do you have a question about *SRTmaster*^{TM} that hasn't been answered here? Please contact us for further assistance.

Why is maintaining constant solids retention time (SRT, or sludge age) important?

Optimum activated sludge performance can only be achieved by maintaining a constant food to microorganisms (F/M) ratio, and SRT is a function of that ratio.

How is SRT control accomplished?

It is usually accomplished by wasting a fraction of the flow returning from clarifiers to the aeration basins.

How is SRT calculated?

SRT is calculated by dividing the mass of solids under aeration by the mass of wasted solids.

How is the mass of solids under aeration calculated?

By multiplying the mixed liquor TSS concentration by aeration volume.

How is mass of wasted solids calculated?

By multiplying the waste sludge TSS concentration by wasted sludge flow.

Why are solids in clarifiers not included in the equation?

Solids in clarifiers are not participating in the BOD and ammonia removal process. Normally the average daily change of biomass in clarifiers should be close to zero. If it is significantly different from zero, *SRTmaster*^{TM} detects this abnormality and alerts operators.

Why are solids in the effluent not counted as wasted?

The mass of these solids is negligible compared to the mass of solids wasted through the waste line.

Can SRT control be accomplished by wasting flow from mixed liquor channel or from aerators?

Yes, it can be. The advantage of this method is that only flow measurement is required. However, compared to wasting of return activated sludge, this method has the following problems:

- waste sludge transmission systems (pipes and waste pumps) and recycling systems (recycle pipes and pumps) have to be significantly larger

- the sludge processing facility has to be oversized as well
- the operational cost of waste sludge transport and processing is increased
- Stable sludge mass loading of the sludge processing facility is impossible using this method

Thus, despite its simplicity, it is a very expensive SRT control method.

Why is automatic SRT control better than traditional SRT control?

- Automatic SRT control takes into account all changes of solids, both under aeration and in the waste stream, during the entire day, rather than taking a snapshot of it once a day.
- Negative effects of lab errors are significantly minimized, and SRT calculation errors are avoided.
- TSS sampling is reduced by 70-90%.
- Significant improvements in sludge thickening can be achieved by maintaining the desired feed mode of the thickening facilities.

What is so unique about the SRTmaster^{TM} control algorithm?

SRTmaster^{TM} has the following unique features:

- Each control algorithm is tuned before delivery using a customized computerized model of the customer's activated sludge process
- The unique sensor fault detection algorithm detects problems with the sensors and prevents the use of faulty data
- A special algorithm provides stable solids mass loading on the sludge thickening facility
- By maintaining mixed liquor concentration within the specified range, *SRTmaster^{TM}* guarantees that clarifiers will never be overloaded
- By maintaining mass of wasted sludge within the specified range, *SRTmaster^{TM}* guarantees that a wasted sludge thickening facility will be never overloaded
- The controller automatically notifies operators about potential problems and suggests possible solutions using fuzzy logic methodology combined with non-parametric statistics

What is the advantage of using SRTmaster^{TM} vs. a generic SRT formula control?

Use of a regular SRT formula for calculating waste flow causes these following well-documented problems:

- Slow adjustment of the activated sludge process to the changes in SRT set point and influent characteristics, and therefore deterioration of the activated sludge process performance
- Significant variations in waste flow and waste mass, which have a detrimental effect on sludge thickening
- If a sensor provides a faulty signal, this signal causes generation of a faulty waste flow signal, which is further amplified when a Dynamic SRT formula is used.

In addition, it has been shown that sludge settleability is often affected by mixed liquor suspended solids concentration in larger degree than by SRT. A combination of MLSS and SRT controls utilized by *SRTmaster™* is the best method for the waste control strategy.

After the SRTmaster™ is installed, how long does it take to notice improvements?

If the SRT target is selected properly, improvements in wasted sludge thickening are observed fairly quickly. It takes considerably longer to see improvements in the activated sludge process due to the specifics of the biological process.

Does SRTmaster™ change waste flow in response to the diurnal flow and solids fluctuation?

No. Although every change in solids concentration caused by diurnal flow fluctuation is included in the calculations, the SRT controller changes waste flow to maintain a constant, long-term F/M ratio. A change in food mass over 24 hours cannot be compensated for by similar changes in biomass because growth of biomass is fairly slow. Therefore, instantaneous F/M and SRT values may still change significantly over 24 hours. Operators of activated sludge processes that are subject to shock and toxic loading should consider this fact and choose the SRT target conservatively. A proper control of return sludge flow can help to reduce diurnal variation of instantaneous SRT.

How does SRTmaster™ know the volume under aeration?

Aeration tank volume is preprogrammed using customer information. An operator enters the number of aeration tanks in service into the menu. Upon physical change of the number of aeration tanks in service, operators should update menu settings. If the operators forget to do so, the *SRTmaster™* detects the change in solids under aeration and in waste stream and alerts the operators.

How many SRT controllers does a plant need?

One controller per sludge wasting point (one per train).

Does the SRTmaster™ automatically enter the SRT target?

No. An operator enters the SRT target (set point) into the menu.

How is the SRT target selected?

Manual selection of the SRT target and range of mixed liquor suspended solids (MLSS) concentration is a tedious process that usually requires considerable time, effort and activated sludge process expertise. Ekster and Associates have developed a unique methodology of selecting the best SRT and MLSS range, and offers recommendation of SRT set points as an optional service. Alternatively, *OPTImaster™* updates SRT and DO set points automatically on a regular basis.

What if the desired wasting pattern is a combination of continuous and intermittent modes such as wasting continuously during the weekdays and the termination of wasting on weekend?

SRTmaster^{TM} can handle any desired wasting pattern.

What if waste flow or wasting time has to be temporarily changed, as for a dangerously high sludge blanket level?

An operator can override the set point, waste flow, or wasting time calculated by the *SRTmaster*^{TM}. The mass of wasted solids in a manual mode will still will be included into the controller calculations when automatic waste mode is reinstated.

What happens if one of the meters suddenly provides faulty readings?

SRTmaster^{TM} detects the abnormality and alerts operators. It also automatically changes the control algorithm.

What if the PID controller of the actuator fails?

The SRT controller detects the abnormality and alerts operators.

What happens if the SRT controller (PC or stand-alone embedded controller) fails?

The waste flow set point will not change, eliminating short-term negative effects of such a failure. Restarting the PC or embedded controller is required.