

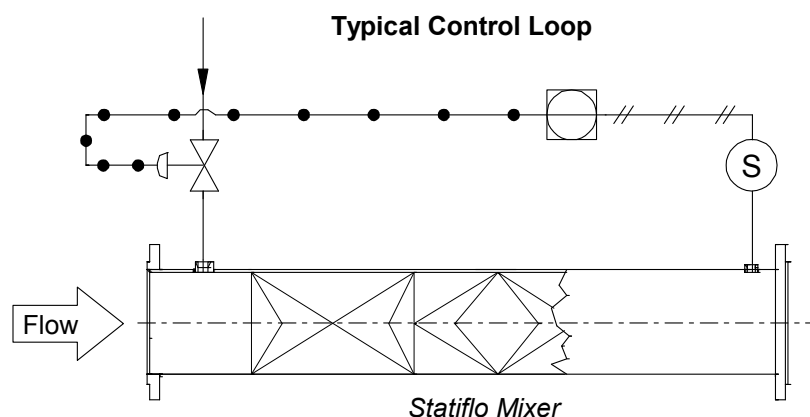
Water & Wastewater Treatment

Disinfection of Drinking Water

PROBLEM

Effective disinfection of drinking water supplies is essential for safe operation. Relying on natural turbulence alone in a pipeline will not guarantee complete mixing of injected sidestream at all times, especially where low flowrate conditions occur and where automatic process control of chlorine residual is implemented. Unreliable sampling and excessive time delays between injection and sampling result in :-

- Underdosing (unsafe operation)
- Overdosing (unsafe operation, wasting chemicals)
- Unstable control of chlorine residual (unsafe operation, wasting chemicals)
- Plant startup difficulties (hunting of process control)



SOLUTION

Statiflo Motionless Mixers are vital components in all inline mixing/process control application systems. Designing the system to achieve representative sampling is essential for accurate and responsive process control of chlorine residual or other critical property. Even the most sophisticated process control equipment will be ineffective if mixing and sampling techniques are not carefully considered.

The *Statiflo Motionless Mixer* ensures complete mixing either at the mixer discharge or at a predetermined downstream location. Complete mixing allows representative sampling from a single point at the pipe wall either from the mixer itself or immediately downstream. The distance between injection and sampling is minimised, the time lag in the control loop is also minimised. Process control is more effective, minimising both overdosing and underdosing of injected sidestream.

Disinfection of Drinking Water

Statiflo Motionless Mixers are available with integral injectors (or bosses for injectors supplied by others) and sample bosses. Special extra low headloss designs are also available for gravity or other difficult systems by using customised mixing elements.

PROCESS SPECIFICATION

In specifying the mixing and control system, care should be taken to distinguish between the important aspects of the process design, which benefit the customer, and irrelevant design features of the mixer, which only benefit the equipment supplier.

DEGREE OF MIX	Must be specified to ensure effective mixing consistent with customer's process expectations. Usually defined as 95% minimum degree of mix or 0.05 variation coefficient.
SAMPLING LOCATION	Essential for complete and proper system design. The specified degree of mix should be achieved at or before this location for reliable representative sampling. Sample drawoff on the mixer housing must be specified for shortest time lag and optimum process control, i.e. above degree of mix to be achieved at mixer discharge.
SAMPLER DESIGN	Should be single drawoff at pipe or mixer housing wall. Multiple sample drawoff, which provides additional mixing in the sample line – compensating for poor mixer performance – should be avoided.
DOWNSTREAM FITTINGS	Mixer performance must be unaffected by downstream fittings (eg. bends, elbows) which are unavoidable in most piping layouts.

Adopting these guidelines will ensure valid comparison and evaluation of different mixer designs and provide the most effective control with minimum chemical dosing. Pressure drop data should always be compared between injection and sampling locations and not simply across the mixers, especially where the degree of mix is different at the mixer discharge, due to differences in operating principles.



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