

Low Maintenance Makes Large Bubble Compressed Air Mixing a Winner for Loveland

By Steve Frank, WEF Fellow

ALL PHOTOS COURTESY STEVE FRANK



A mixing system installed in a Loveland, Colorado, water reclamation facility relies on large bubbles to keep solids suspended and on the move to where they need to go.

GREAT MIXING, LOW MAINTENANCE, AND ENERGY savings: That's what Loveland (Colorado) Water Reclamation Facility Manager Joe Creaghe likes about the large bubble compressed air mixing system that was integrated into his plant in 2019.

"It's simple. The large bubble compressed air mixing system fires short, controlled bursts as often as I tell it to—twice a minute, once every three minutes, whatever. The air bubbles resuspend the solids, and they go where they're supposed to go before settling. The best thing about this

system is the low maintenance," Creaghe said. "And it also saves on power."

He pointed out that the most common equivalent to the large bubble compressed air mixing system is mechanical mixers. These systems typically require at least two out-of-basin maintenance cycles a year. This means loss of treatment system time, loss of tank volume, and maybe a permit violation during the maintenance period. Maintenance people generally consider the task a pain in the posterior.



Joe Creaghe sits at the SCADA workstation, at the Loveland Water Reclamation Facility, preparing to tell the system what tanks to create bubbles in, when to create them, and for how long to release the air.

“The problem with mixers is you have hair, mop heads, and other debris that collect on the mixer shaft. To clean the mixers, the basin must be emptied, mixers have to be removed from the process tanks with a crane, rags have to be removed, the seals must be changed, the oil changed; it’s a mess,” Creaghe said.

“There’s none of that with the large bubble compressed air system. It has two, 30-horsepower compressors. They need an oil change and a new air filter once a year. Take one offline, change the oil and filter, and restart it. Done.

“It’s that easy. No process tanks have to be emptied to do the job, and the submerged pipes and nozzles that are part of the system don’t need to be touched either,” he said. Only one compressor runs at a time, so the other one is always available as a back-up.

The EnviroMix large bubble compressed air mixing system works like this: The operator tells it through SCADA which zones in which tanks to mix and how often. The compressor runs, sends air to a storage and distribution tank, and the SCADA system tells the large bubble system when, where,

Design + Expertise

WE’RE COMMITTED TO YOUR VISION.
Our products are designed to meet your filtration needs. From filters that accept high-efficiency filter cartridges to filter bags, our products deliver superb performance at an exceptional value.



**ROSEDALE
PRODUCTS INC.**

Call or write us today for more information.
800.821.5373 • RosedaleProducts.com

©2020 Rosedale Products Inc.

The stationary system eliminates mechanical mixers and the out-of-basin maintenance required to keep them running. The system also uses less power.



and for how long to fire. An air bubble about the size of a softball is released and moves to the surface, resuspending solids in the tank.

Another feature that Creaghe likes is the insignificant oxygen transfer (low ORP) environment, which enables the large bubble air mixing to work in anaerobic, anoxic, and aerobic applications. Even though the large bubble is made up of air, the oxygen in the bubble remains in the bubble and doesn't transfer to and aerate the surrounding mixed liquor.

The Loveland plant is rated at 12 mgd (capacity) and typically processes about 6 mgd. It has 13 people in technical services (maintenance) and nine operators.

The large air bubble system handles mixing for 14 baffled anaerobic and anoxic zones. It also helps Loveland meet Colorado Department of Public Health and Environment Regulation 85 effluent nutrient limits.

"We're typically at 13 mg/L for total inorganic nitrogen (the limit is 15 mg/L) and 0.2 mg/L for phosphorous (the

OUR WORLD IS CHANGING.
OUR PASSION REMAINS THE SAME.

Serving our clients throughout Colorado, New Mexico, and Wyoming

carollo
Engineers...Working Wonders With Water®

303-635-1220 | carollo.com

Precious resources. Powerful insights. A future we build together.

CDM Smith water experts bring powerful insights and smart decisions to help manage precious resources and build a more resilient future.

Learn more about water partnerships at:
cdmsmith.com/Client-Solutions/Focus-Areas/Water

CDM Smith® cdmsmith.com

Pipes and nozzles installed in the tank before (left) and after water is added.



limit is 1.0),” Creaghe said.


Loveland estimates the increased energy efficiency of the large bubble mixing system helps it save about \$45,000 a year in energy costs. They installed the BioMix™ Compressed Gas Mixing System as part of a biological nutrient removal plant expansion in 2018 and integrated it into its treatment scheme in 2019. Large bubble mixing eliminated the need for 18 mechanical mixers.

The city says it has significantly reduced the nitrogen and

phosphorous levels it discharges to the Big Thompson River, and its effluent quality now is higher than the quality of the source water it treats to become drinking water.






Steve Frank is a WEF Fellow and Executive Vice President of emergency communications firm SDF Communications in Arvada, Colorado. He can be reached at SDFcomm@q.com or 303.957.7459.



JDS-HYDRO
CONSULTANTS, INC.

*Consulting Engineers for Municipalities
and Special Districts*

- * Water System Planning and Design
- * Wastewater System Planning and Design
- * Reuse/Recharge Planning and Design
 - * Regulatory Permitting
 - * Grant and Funding Assistance
- * Hydraulic and Hydrologic Engineering
- * Construction Management and Observation

Colorado Springs

5540 Tech Center Drive, Suite 100
Colorado Springs, CO 80919
Phone (719) 227-0072 • Fax (719) 471-3401
www.jdshydro.com

VITA-D-CHLOR™

**Responsible
Dechlorination Made Easy**



800.322.6646
info@vita-d-chlor.com









