

## Geyser Pump Training



Industrial Fluid Management, Inc.  
Authorized Sales and Service

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## Geyser Pump Training

- Developed by Dr. Sam Kondo while working in Japan
- US Patent on this air driven pump technology
- Several Hundred installations throughout the US
- Growing interest abroad and worldwide for various pumping applications

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## Geyser Pump Training

- Industrial Fluid Management, Inc. became authorized sales company in 2005
- Offer full installation, installation guidance or sales supports to municipalities, public organizations, engineers, contract op. firms
- Can also provide operational insight as part of Geyser Pump service

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## Geyser Pump Training

- Pump available in 1", 2", 3", 4" and 6"
- All fiberglass molded / PVC other than 6", which is painted steel
- All have own pumping range in gpd
- Developing pump curves based on lift, discharge heads and air volume (scfm)
- Part of IFM role in marketing of Geyser Pump

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## Geyser Pump Training

- Geyser Pump Advantages
- Most economical pumping system for RAS / WAS for plants under 1 MGD
- Pump heavy concentrations of RAS consistently with no additional HP to plant
- Wider range of RAS flowrates (particularly minimum pumping volumes) vs. airlift pump
- Clogging due to heavy concentrations of solids is held to an absolute minimum
- **SIMPLY PUT, GEYSER PUMPS THICKER SOLIDS WITH LESS ENERGY!**

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## Geyser Pump Training Pros and Cons vs. Airlift Pump

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| <ul style="list-style-type: none"><li>• Geyser Pump Pros</li><li>• RAS flow control (meet 10 States Standards for RAS Flowrates)</li><li>• Higher RAS Concentration</li><li>• Less Air Consumption</li><li>• Less Sludge Cavitation</li><li>• Improved Clarifier Performance</li><li>•</li></ul> | <ul style="list-style-type: none"><li>• Std. Airlift Pump - pros</li><li>• Price</li><li>• Simple Installation</li><li>• Low RAS concentration (similar to MLSS)</li><li>• Large Volume of Air</li><li>• Often only returns clear water</li><li>• Contributes to poor clarifier performance</li></ul> |
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## Geysers Pump Training Pros and Cons vs. VFD Sludge

- Geysers Pump
- No additional HP
- Easy Installation
- Cost savings in less air consumption, leads to increased volume of air to biological zone
- Can match GPD Flowrates of VFD Drive Pumps without expensive technology and controls
- Perfect Application for small to medium size plants
- VFD Sludge Pump
- Can produce desired RAS Rates
- May require low frequency and pump rpm, can lead to pump clogging
- May need major plant renovation to install, demolition to existing clarifier
- High installation costs
- High maintenance costs
- Nice to have, but too complicated for small plants

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## Geysers Pump Training

- Choosing the right Geysers Pump
- Need to consider permitted flow rates
- Need to consider average daily flow rates
- Settling characteristics of sludge
- Suction and Static Head pressures and distances that RAS / WAS must travel
- Levels of debris and preliminary treatment ahead of package plant
- Blower capacity, scfm and pressures

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## Geysers Pump Training

- 1" Geysers Pump – up to 4000 gpd
- 2" Geysers Pump – up to 8000 gpd
- 3" Geysers Pump – up to 40000 gpd
- 4" Geysers Pump – up to 90000 gpd
- 6" Geysers Pump – up to 350000 gpd
- Control Flowrates by adjusting the frequency of "strokes"

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## Geyser Pump Training

- There are exceptions to the rule
- High levels of debris (rags, beach whistles, etc)
- High discharge pressures to overcome
- Desludger applications
- All may lead to using larger size pump.
- Note larger pumps have larger air suction holes, less likely for debris to clog

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## Geyser Pump Training

- Geyser Pump can be used to enhance EQ Tank performance
- Simple version – Use wide angle float, 115V blower or solenoid valve on existing airline and Geyser Pump set to gpm of design of package plant
- This buffers the surges of submersible grinders or pumps (usually 50 gpm minimum)
- Plants and biology like consistency

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## Geyser Pump Training

- EQ tank- advanced design
- For new construction or retrofit
- Use 6" and 4" in series from EQ tank
- Install Geyser Pumps in 2' diameter pipes installed outside of EQ tank
- Existing EQ concrete tank feeds 6", which feeds 4" with overflow return to EQ tank
- Provides consistent flow throughout day
- Improves treatment of package plant
- Reduce organic loading by efficiently aerating EQ tank. EQ becomes PreAeration Tank

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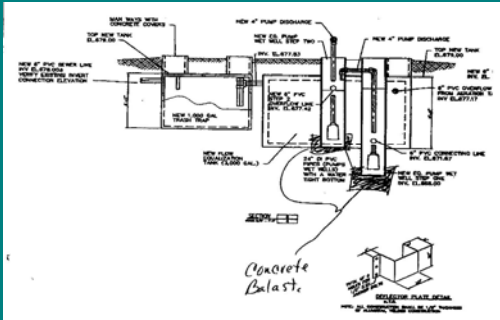
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## Geyser Pump Training




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## Geyser Pump Training

- Installation Recommendations
- Bell of Geyser Pump must be above elevation of diffusers if using common airline
- Suction side of Geyser pump can extend up to 3' below bell of Geyser pump
- Riser and lateral piping must be secure to minimize pipe sway and jumping
- Consider small, isolated blower for Geysers when using on/ off aeration or deep clarifiers

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## Geyser Pump Training

- Installation, Cont'd
- Suction side of Geyser Pump w/ extension pipe. Cut on angle or install cross with standpipe
- Bell should be at least 12" above clarifier hopper
- Extension pipe / cross minimum 6" above bottom of hopper
- Can also install a suction header system for flat bottom clarifiers or anoxic mixing tanks

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## Geyser Pump Training

- Installation, Cont'd
- Securing riser and lateral piping critical
- In tank supports are best, SS brackets and clamps above the Geyser Pump. Unistrut or additional clamps on lateral required
- Use cross installation with standpipe when tank entry is not an option. Still needs good support and clamps on lateral with this installation

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## Geyser Pump Training

- Importance of RAS Control and how Geyser Pump Improves it
- Clarifiers require time for solids / liquid separation
- This separation leads to concentrated settled sludge
- This concentrated sludge needs to be returned consistently, under control and design flowrates
- Consistent sludge return is the key to package plant operation

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## Geyser Pump Training

- Airlift pumps cannot consistently provide this. Airlifts either require high volumes of air and RAS flowrates to accomplish solids return. Clogging occurs when operations achieve optimum treatment solids concentrations
- High flowrates hydraulically washout the clarifier and reduce settling time of clarifier
- Clogged airlifts reduce treatment efficiency of aeration tank. Good settling bugs are stuck in clarifier. Solids go septic, lead to ammonia

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## Geyser Pump Training

- Geyser Pump gives operator options and allows plants to meet 10 States Standards for RAS flowrates. (50%-150% of average daily flow)
- Geyser Pumps can reach the lower limits of this range without clogging. Airlifts often far exceed the upper limits of this standard. VFD pumps and controllers can be maintenance nightmares for small plants.
- Leads to increased settling times of clarifiers, which lead to higher concentrations of MLSS, RASSS and higher MCRT, which is needed to achieve proper BOD and ammonia removal with extended aeration package plants.

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## Geyser Pump Training

- Village of Weston 0.280 MGD plant with 4 0.070 MGD plants in parallel.
- Geyser Pumps installed in Tanks 1 & 2
- MLSS concentrations increased from 1500 to over 3000 mg/l
- RASSS concentration increased from 2000 mg/l to nearly 6000 mg/l
- SVI dropped from 300 to below 100

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## Geyser Pump Training

- Weston Tanks 1 and 2 before



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## Geyser Pump Training

- Weston Tanks 1 & 2 After



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## Geyser Pump Training

- Desludger Application – Simple dewatering system for sludge handling @ wastewater treatment plants
- Utilize Geyser Pumps to pump RAS to dewatering system with dewatering bags
- Plus Cationic Polymer, necessary for quick dewatering and reduce filter bag fouling
- Improves plant performance by routine wasting practices vs. massive pumping (less shock to the plant by uncontrolled wasting practices)

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## Geyser Pump Training

- Polymer, Dewatering Agent
- Sludge is slurry of organics, solids and water
- Contains numerous charges that keeps water in
- Polymer, long chained molecules that tie up charged solids, which releases water

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## Geyser Pump Training

- IFM can assist with design, installation, startup and technical assistance with Geyser Pumps and Wastewater Treatment Applications
- Can utilize dewatering systems with Geyser Pumps
- IFM can assist with determining optimum solids inventory and wasting schedules

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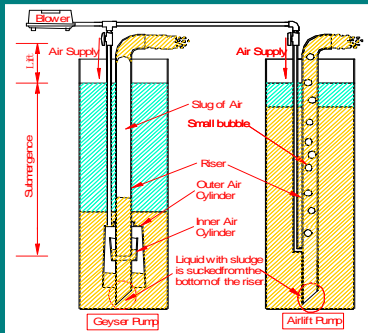
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## Geyser Pump Training




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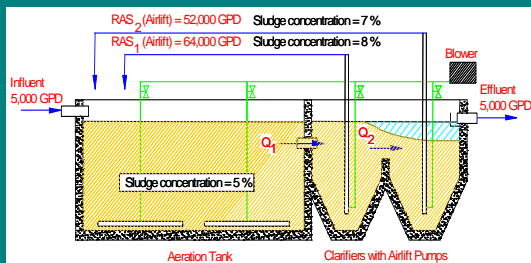
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## Geyser Pump Training




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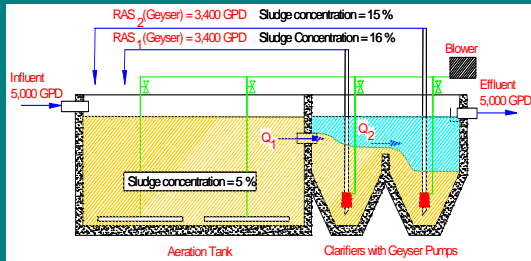
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## Geysers Pump Training




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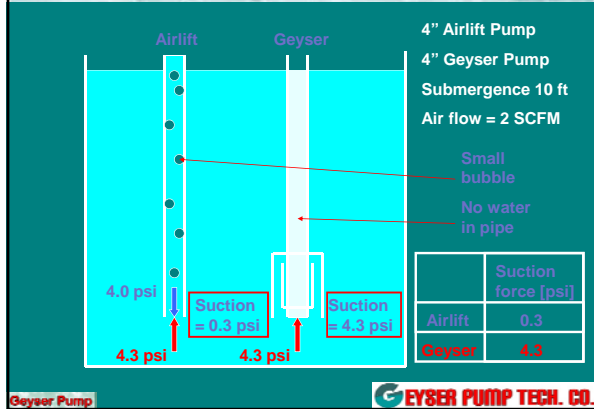
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### Stronger Suction by Geysers Pump




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## Geysers Pump Training

- Conclusions
- Geysers Pump is economical and simple method to get more out of your plant
- Applications have shown improvements in CBOD5, TSS, NH3-N removal at many plants
- Call IFM with any questions regarding plant improvements
- **SIMPLY PUT, GEYSERS PUMPS ARE ANOTHER OPERATOR TOOL THAT IMMEDIATELY IMPROVES PLANT PERFORMANCE!**

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## Geyser Pump Training

- Questions / Comments
- Demonstration unit
- Field Trials

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