

# CONTRAFAST® High Rate Sludge Thickening Softener

The CONTRAFAST® clarifier is a high rate sludge thickening softener. Utilizing a combination of internal and external sludge recirculation and tube settling clarification, the CONTRAFAST® unit process is capable of running at rise rates of 6 gpm/sq.ft. and higher. This is over 4 times the rate typically used for conventional lime softening clarifiers. In addition, the CONTRAFAST® unit produces sludge with more than 20% solids by weight, eliminating the need for a sludge thickener. Therefore the combination of the high rise rate, and the elimination of the separate thickener, reduces the total process footprint. The entire process takes place in a single vessel, greatly simplifying installation.

Raw water combined with recirculated sludge and treatment chemicals enter the center draft tube. There they are mixed and recirculated within the reactor by the variable speed impeller. The impeller aids in accelerating solids formation and densifying the sludge. A high-velocity upflow port prevents settling in the reactor and transfers the water to the settling chamber. The water passes under a baffle and continues upward through the settling tubes and into the effluent collection launder. The dense sludge settles to the basin floor where it is continually scraped and further thickened, until it is removed from the unit.

Single units are designed with nominal capacities of 175, 350, 700, and 1,400 gpm. Custom units can be designed to virtually any size or flowrate. Siemens scope of supply includes the internal mechanism, steel basin, spiral stairway, external sludge recirculation pump, and sludge blowdown valves and controls. Filters, chemical feed and sludge handling equipment are options easily added to the system.



Contrafast® Pilot Plant

## Applications

- Lime softening
- Silica reduction
- Cooling tower make-up
- Cooling tower blowdown
- Heavy metals removal
- Zero liquid discharge
- Backwash waste recovery

## Midwestern USA, Power Plant - Cooling Tower Blowdown

### Objectives: High Rate Clarification, Silica Removal & Solids Densification

Table 1: Power Plant Performance Summary: Operating Rates: 5.5, 7.1 & 9.1 gpm/sq.ft.

Parameter	Influent Quality	Effluent Quality (avg)	Percent Removal
pH	7.6–8.4	10.0–11.0	n/a
Temperature	74–101° F	-----	n/a
Turbidity	78–154 NTU	< 10.0 NTU	>90%
TSS	62–87 mg/L	10 mg/L	>83%
Alkalinity (Total)	188–300 mg/L as CaCO <sub>3</sub>	60 mg/L as CaCO <sub>3</sub>	n/a
Hardness (Total)	1200–1700 mg/L as CaCO <sub>3</sub>	<50 mg/L as CaCO <sub>3</sub>	96%–99%
Calcium	760–1140 mg/L as CaCO <sub>3</sub>	<20 mg/L as CaCO <sub>3</sub>	97%–99%
Magnesium	240–680 mg/L as CaCO <sub>3</sub>	<20 mg/L as CaCO <sub>3</sub>	92%–99%
Silica (Total)	141–191 mg/L as SiO <sub>2</sub>	<30 mg/L as SiO <sub>2</sub>	79%–91%

Solids	TSS (% by weight)	5-minute Settling Volume
Blowdown	29% (avg)	>95%

## Ames, IA - Ground Water Softening & Iron Removal

### Objectives: High Rate Softening & Solids Densification

Table 2: Ames WTP Performance Summary: Operating Rates: 5.6 & 8.8 gpm/sq.ft.

Parameter	Influent Quality	Effluent Quality (avg)	Percent Removal
pH	7.4–7.9	9.5–10.0	n/a
Temperature	52° F	-----	n/a
Iron	3.27–5.94 mg/L	< 0.2 mg/L	94%–99%
Manganese	0.382–0.450 mg/L	< 0.03 mg/L	92%–100%
Turbidity	38–56 NTU	< 5 NTU	>90%
TSS	-----	< 10 mg/L	n/a
Alkalinity (Total)	240–288 mg/L as CaCO <sub>3</sub>	60 mg/L as CaCO <sub>3</sub>	n/a
Hardness (Total)	340–380 mg/L as CaCO <sub>3</sub>	165 mg/L as CaCO <sub>3</sub> *	50%–60%
Calcium	240–288 mg/L as CaCO <sub>3</sub>	70 mg/L as CaCO <sub>3</sub>	70%–80%
Magnesium	80–120 mg/L as CaCO <sub>3</sub>	90 mg/L as CaCO <sub>3</sub>	15%–25%

\*Targeted hardness

Solids	TSS (% by weight)	5-minute Settling Volume
Blowdown	35% (avg)	>95%

Siemens  
Water Technologies  
600 Arrasmith Trail  
Ames, IA 50010  
Phone: 515.268.8400  
Fax: 515.268.8500

© 2009 Siemens Water Technologies Corp.  
GF-CN-DS-0109  
Subject to change without prior notice.

CONTRAFast is a trademark of Siemens, its affiliates or subsidiaries.

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.