cleanwater1™

Series A-758 Lime Slaking System

Lime is one of the most common and economical chemicals used in the water and wastewater treatment process. The cost of commercial bulk hydrated lime or prepared lime slurry solutions, however, becomes prohibitive for installations requiring a continuous, high volume supply, typically greater than 45 kgs/hr (100 lbs/hr). To help alleviate this cost, on-site slaking or hydration is the ideal solution. The Series A-758 lime slaker provides for reliable, efficient slaking of various grades of quicklime (CaO) at a substantial savings over other slaking methods. Through the pioneering use of paste-type slaking technology, the Series A-758 lime slaker consistently produces a more reactive lime slurry requiring less energy and less operator attention. The compact size and flexible configuration make this pre-engineered system ideal for new and retrofit installations.

Features

Superior Paste-Slaking Process
Utilizing a 2:1 water-to-lime ratio, the A-758 unit slakes lime as paste which provides a number of benefits over the more traditional 4:1 water-to-lime or slurry slaking process. This includes less power, faster slaking, a smaller footprint and, most importantly, a more reactive lime slurry solution.

Saves Power
The 2:1 paste slaking process generates its own slaking heat from the hydration heat of reaction (CaO+H2 0 = Ca(OH)2 + Heat (490 btu/lb)). This avoids the need and expense of an external heat source, internal heat exchangers, and temperature control systems. Additionally, slow speed agitation requires one-half the horsepower of equivalent sized slurry slakers.

Fast Slaking
The low water-to-lime ratio and high self-generating heat of reaction completes the slaking process in approximately five minutes. This short retention time leads to efficient start-stop or batching operation and rapid changes in lime concentration when required.

Compact Size
The 2:1 slaking ratio and short retention time allows for a smaller slaking compartment without bulky insulation or any need for a water jacket. The A-758 lime slaker takes about 20% less floor space than other designs.

More Reactive Hydrate Particles
The intense heat [>82° C(180° F)] generated by the 2:1 slaking ratio subjects the quicklime to steam penetration. The resulting internal pressure promotes the fracturing of the quicklime into smaller, highly reactive particles. This means more surface area for more efficient lime usage.

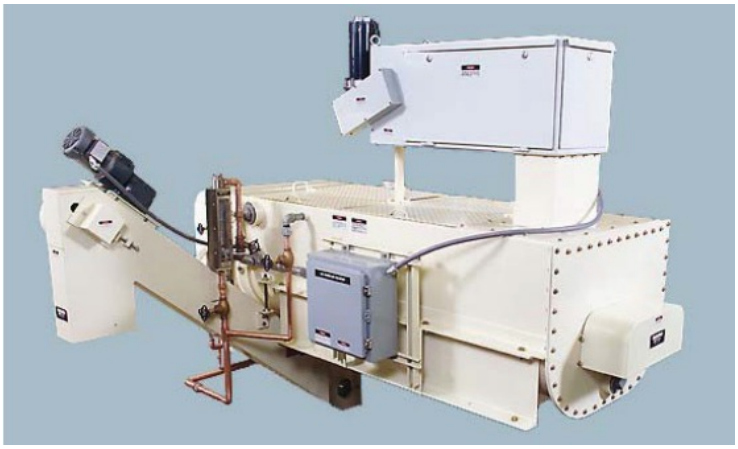
Controlled Consistency
An automatic, torque-actuated water inlet valve provides precise, continuous control of paste consistency and, therefore, the slaking process. Variations in lime quality and feed rate are quickly recognized, and the optimum slaking rate is maintained, without operator intervention.

Integrated System Design
The pre-engineered A-758 lime slaker system is available with a broad range of capacities, capabilities and control options:

- Four different capacities from 450 to 3600 kgs/hr (1000 to 8000 lbs/hr)
- Specific gravity classification or screen-type grit removal technology
- Gravimetric or volumetric belt-type lime feeders or screw-type lime feeder
- PLC or relay logic controls with an optional automatic batching function

Key Benefits

- Saves water, heat and power
- Economical and reliable on-site slaking
- Easy to install, unit is factory pre-tested
- Choice of final slurry concentration
- Flexible controls: manual, flow proportional, and automatic start-stop
- Provides maximum value measured by effective odor control with minimum problems, maintenance and operating cost



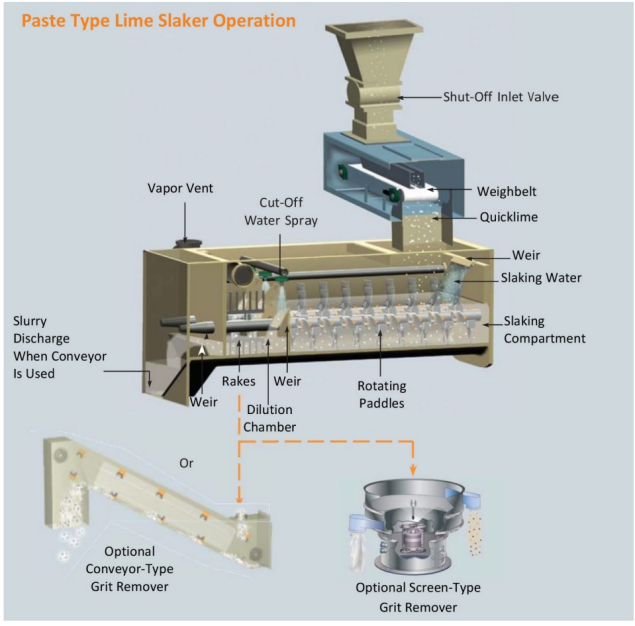
Design And Operation

Water and quicklime (CaO) are fed into the slaker mixing compartment at an approximate 2:1 ratio. The lime is metered by either a gravimetric weighbelt feeder or a volumetric screw or belt-type feeder. Controlling the lime feedrate determines the output of the slaker system. The water flow is automatically controlled by a torque-sensitive water adjusting valve.

In the slaking compartment, two intermeshing paddle shafts, rotating in counter-clockwise directions, mix the quicklime and water into a paste-type composition, controlled by the torque valve to the 2:1 slaking ratio. Any variation in the paste consistency caused by vapor loss, lime quality or size fluctuations, or changes in the lime feed rate, results in a different torque load on the paddle shafts. This causes the torque valve to adjust the water flow to maintain the desired paste consistency.

The paste and entrained inert grit moves forward in a plug-flow fashion. After approximately 5 minutes, the completely slaked lime paste flows over a weir into the dilution compartment. Here water nozzles direct a cut-off spray to dilute the paste into a lime slurry at an approximate 4:1 concentration. This also releases the grit from the lime paste so that it can be removed. Two sets of rotating rakes keep the lime in suspension and help move the grit to the grit separator.

Dust and steam, generated by the exothermic reaction of the lime and water, are drawn off by an integral, water operated vapor-dust arrestor. The steam and dust are condensed and returned to the dilution compartment. Excess steam and water vapor are vented outside of the slaker. A low water pressure switch in the torque valve piping is designed to stop the lime feeder when the supply pressure falls below the minimum operating requirement. This avoids heat build-up due to insufficient slaking water. The feeder automatically restarts when the pressure is restored



Choice Of Lime Feeders

Reliable lime feed is required for proper operation of the lime slaker system. A selection of standard feeders is available to provide accurate CaO feed over a range of up to 20:1. This determines the operating range of the slaker along with lime reactivity.

Series 31-165 Gravimetric Weighbelt Feeder

A microprocessor controller unit that delivers an accuracy better than 1% of set rate over a 20:1 range. It features direct measurement of throughput for inventory control and complete alarm monitoring for any off-feed condition.

Series 32-215 Volumetric Belt-Type Feeder

Simple controls with a quick speed of response for changing feed rates. A no-feed alarm is available as an option.

Series 32-300 Volumetric Screw-Type Feeder

A rugged, heavy duty variable speed feeder with only five moving parts provides low maintenance and simple service.

Choice Of Grit Removers

All quicklime (CaO) contains a small amount of inert grit or unslaked material. To protect lime slurry pumps and piping, it is necessary to remove this grit as the slurry exits the slaker. The A-758 lime slaker is available with a choice of two different grit remover technologies:

Conveyor-Type Grit Remover

Grit particles are separated from the lime slurry based on their specific gravity. An up-flow of water is introduced into the dilution compartment of the slaker. The heavier grit particles fall through this flow to be subsequently removed by the chain and flight scraper. The operator can adjust the water flow to determine the size and amount of grit that is to be removed.

An accurate glass-tube flow meter is used to provide a fine degree of control and repeatability. This system removes virtually all grit down to 10 mesh in size and some portion of finer grit down to 40 mesh. Slurry concentrations up to 18% are achievable. Operation is simple and efficient with very low maintenance.

Screen-Type Grit Remover

In this system, grit particles are separated by size through a vibrating screen separator to provide positive grit removal. The lime slurry discharge passes through a 20 mesh screen (40 mesh optional), where grit is removed through an exit port. The slurry passes through the screen where it is delivered to the process or a stabilization tank.

Slurry concentrations up to 20% are achievable. A high-strength slurry concentration, up to 28% at maximum feed rate, is available with this type of grit remover. This utilizes optional high velocity spray nozzles and a booster pump to decrease the amount of dilution water. This is ideal for installations where storage space is a consideration or in applications where excess water is limited in the process.

Automatic Start-Stop Control

The paste-type lime slaker is ideally suited for all types of control systems. In a continuous process, slaker operation remains constant. Lime slurry is continuously discharged while the lime feed rate can be varied to account for flow or process variations. Lime can be gravity flow, directly to the point of application without the need for costly slurry handling equipment. For batching applications, the slaker system can be automatically stopped and started from a single contact closure. The low water to lime ratio ensures a fast start-up to bring the slaker on line quickly. Both long-term (> 8 hours) and short-term (< 8 hours) shutdown modes are operator selectable.

Technical Data

Capacities
450, 900, 1800, and 3600 kg of quicklime per hour (1000, 2000, 4000, and 8000 lbs/hr).

Operating Range
Up to 20:1

Slaking Ratio
Approximately 2:1 water to lime by weight before dilution.

Lime Feeder
Three types of feeders available: Series 31-165 Gravimetric weighbelt feeder; Series 32-215 Volumetric belt-type feeder; and/or Series 32-300 screw-type feeder.

Control Panel
For local or remote mounting. NEMA 12; 230/460 VAC, 3 ph, standard; 115 VAC, 1 ph, optional (not available with 3600 kg/hr (8000 lb/hr) capacity).

Paddle Shaft Mixer Motors
452 kgs/hr (1000 lbs/hr) capacity - 1/2 hp;
900 kgs/hr (2000 lbs/hr) capacity - 1 hp;
1800 kgs/hr (4000 lbs/hr) capacity - 1-1/2 hp;
3600 kgs/hr (8000 lbs/hr) capacity - 2 hp;
Standard is 230/460 VAC, 60 hz, 3 ph.
Single phase motors are available up to 1800 kgs/hr (4000 lbs/hr).

Conveyor-Type Grit Remover Motors
1/4 hp, 230/460 VAC, 60 hz, 3 ph, totally enclosed. Also available in single phase up to 1800 kgs/hr (4000 lbs/hr) capacity units.

Screen-Type Grit Remover
450 kgs/hr (1000 lbs) slaker - 1/3 hp; 900 and 1800 kgs/hr (2000 lbs & 4000 lbs/hr) slakers –1/2 hp; 3600 kgs/hr (8000 lbs) slaker - 2-1/2 hp; All motors are 230/460 VAC, 60 hz, 3 ph, 1200 RPM TENV

Booster Pump Motors (High Slurry Concentration Option)
450 and 900 kgs/hr (1000 and 2000 lbs) slakers - 1/2 hp; 1800 kgs/hr (4000 lbs) slakers - 1 1/2 hp; 3600 kgs/hr (8000 lbs) slaker - 2 hp; All motors are 230/460 VAC, 50/60 hz, 3 ph, TE turbine, all bronze housing. Note: Only available with screen-type grit remover.

Water Requirements Recommended
supply pressure for 450 to 1800 kgs/hr (1000, to 4000 lbs/hr) slakers, 2.7 bar (40 psi) minimum and 5.2 bar (75 psi) maximum; for the 3600 kgs/hr (8000 lbs/hr) slaker, 3.8 bar (55 psi) minimum and 5.2 bar (75 psi) maximum.

Control options
- Manual speed control of feeder via a potentiometer on the control panel.
- Automatic speed control of the lime feeder via a 4-20 mA input signal.
- Automatic batching and automatic system shut-down via optional start-stop configuration.

Dimensions
Complete dimension details can be found in catalog numbers WT.330.100.100.UA.CN to WT.330.100.126.UA.CN.

Total Slaker System Water Input at 40 psi (2.7 bar)

Slaker Size		Conveyor-Type Grit Remover (Max 18% Slurry Concentration)		Screen-Type Grit Remover (Max 20% Slurry Concentration)		Screen-Type Grit Remover (Max 28% Slurry Concentration)	
kg/hr	lbs/hr	lpm	gpm	lpm	gpm	lpm	gpm
450	1,000	57	15	45	12	34	9
900	2,000	91	24	76	20	64	17
1800	4,000	178	47	148	39	125	33
3600	8,000	405	107	360	95	246	65

Shipping and Operating Weights

Includes Slaker, Grit Remover, and Feeder.

Capacities		Shipping		Operating	
kg/hr	lbs/hr	kg	lbs	kg	lbs
450	1,000	1,900	2,400	1,410	3,110
900	2,000	1,330	2,930	1,895	4,180
1800	4,000	1,640	3,620	2,660	5,860
3600	8,000	3,335	7,350	6,160	13,580

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