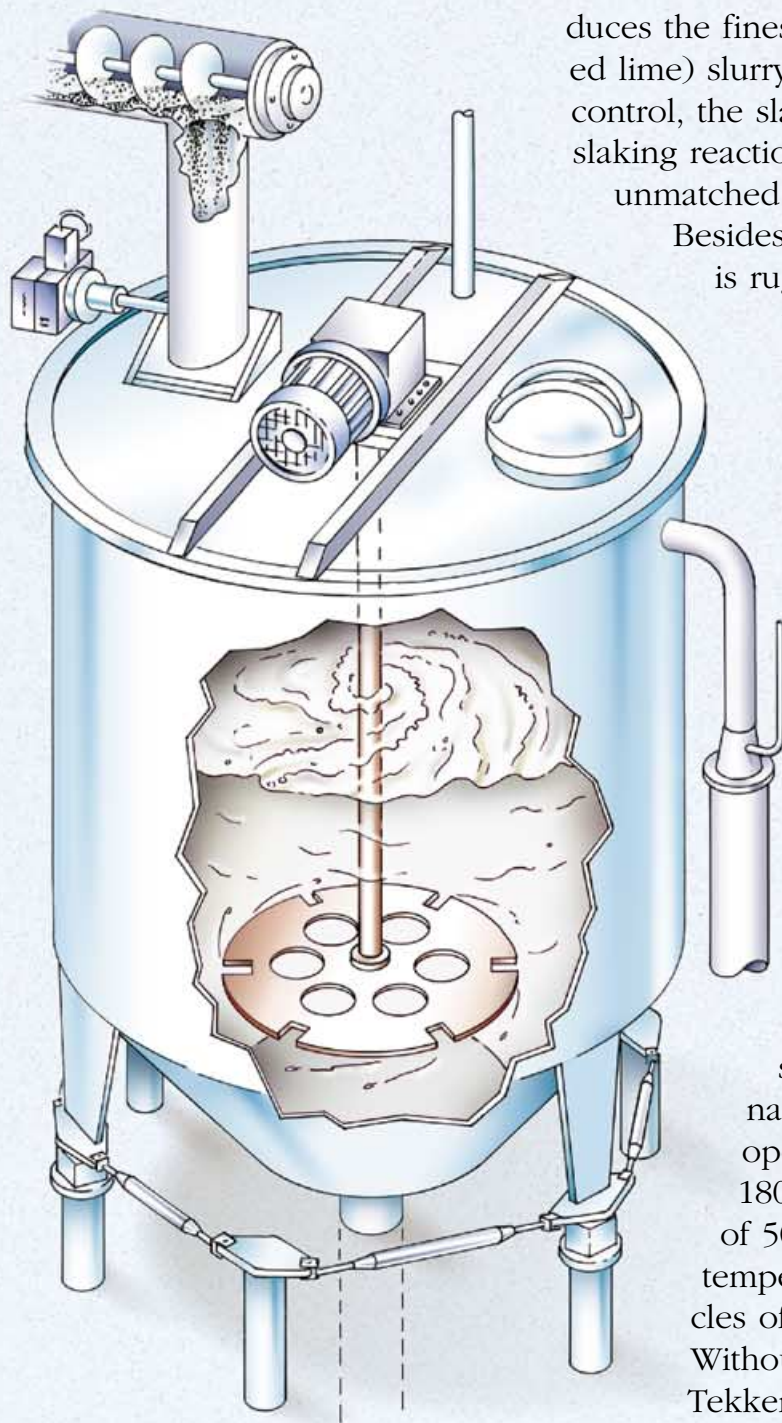


*RDP
Tekkem
Slaker
Systems*



RDP Technologies, Inc.

The RDP Tekkem Slaker



The mechanically simple RDP Tekkem Slaker produces the finest quality calcium hydroxide (hydrated lime) slurry available. By using a precise weight control, the slaker is able to properly control the slaking reaction and dilution to an accuracy unmatched by other slakers.

Besides being simple, the mechanical design, is rugged and assures years of low maintenance and reliable operation. The RDP Tekkem Slaker has only one moving part inside the reaction tank. That makes maintenance easy and infrequent. There are no bearings or seals located within the tank so all mechanical components are outside of the tank away from dust and steam. Thus maintenance can be done from the outside eliminating the need to access the inside of the tank.

The RDP Tekkem Slaker sealed tank contains dust so the work environment stays clean and safe for personnel.

While the mechanical design is simple, the performance is extraordinary. The RDP Tekkem Slaker safely operates at temperatures in excess of 180°F producing surface areas in excess of 50,000 cm²/gram or operates at lower temperatures to produce larger size particles of calcium hydroxide.

Without any physical changes, the RDP Tekkem Slaker can switch over and become an accurate hydrated lime feed system allowing the use of either calcium oxide (quicklime) or calcium hydroxide (hydrated lime) as the chemical source.

Direct Weight Control

The RDP Tekkem Slaker direct weight control operation, measured by the three point suspension system, avoids the usual slaker problems associated with using volume, flow rate, and torque measuring techniques that only approximate the amount of lime and water to be reacted. Each batch starts with a precise amount of water measured by the three point suspension system. Once the proper amount of water is in the Slaker, lime is added until the desired ratio of water to lime is obtained. The slaking reaction occurs. After slaking, the slurry is diluted with additional water to the desired concentration. Dilution addition, controlled by weight, is made possible by the same suspension system. A precise concentration of calcium hydroxide slurry results.

Turbo Slaking

In applications which require extremely small particle sizes of calcium hydroxide, Turbo Slaking is used. Turbo Slaking uses the warm (+100°F), diluted slurry water for slaking reaction. This hot slurry method begins with a certain quantity of slurry, measured by weight, remaining in the slaker. Calcium oxide is then added to the warm water to start the slaking reaction. A slurry that contains a large portion of extremely fine calcium hydroxide particles results with the advantage of reduced slaking times. Turbo Slaking significantly

reduces the amount of lime required and increases the amount of solids removed when used in settling applications.

Automatic Optimization

Without any operator input, the RDP Tekkem Slaker automatically adjusts to changes in the variables which affect the slaking reaction. By measuring the final slaking temperature, changes in water to lime ratio are adjusted automatically to maintain the desired slaking temperature. If the final temperature begins to decrease, the Slaker will automatically add additional lime to adjust the water to lime ratio and the final temperature will increase. Similarly, if the final slaking temperature increases, the Slaker will limit lime addition and the final slaking temperature will decrease. In this way, the RDP Tekkem Slaker compensates for changes in variables such as water temperature, quicklime reactivity, and quicklime particle size, automatically producing a high quality, consistent, calcium hydroxide slurry containing any desired particle size.

RDP Tekkem Features



The heart of the RDP Tekkem Slaker is the 3 point suspension/load cell system. The system controls both the slaking process

and the dilution step. The suspension/load cell system can accurately control the weight of lime and water to within 0.2%, providing exact stoichiometric control of the entire process.

The system utilizes three load cells to support the entire slaker assembly. By using only three suspension points, the Slaker teeters on all three supports, allowing the slaker contents to be accurately measured without the need for shimming or adjusting each individual load cell.



The slaker inlet connector pipe is specially designed to connect the slaker to the lime feeder. The inlet connector design allows the slaker to float on the suspension system without interference from the lime feeder

The damper valve isolates the slaker from the lime feed system automatically. The damper valve completely seals the slaker during the slaking and dilution stage to contain heat, dust and steam. The resultant seal allows operation at temperatures in excess of conventional slakers, while maintaining a clean, safe environment. The damper valve automatically opens when quicklime is added to the slaker and automatically closes and remains closed at completion of quicklime addition.



The agitation/mixer system consists of an externally mounted motor located on top of the slaker, a vertical shaft and a specially designed impeller. The high level

of mixing energy provides uniform heating of the water and lime particles, crucial in forming a high quality, calcium hydroxide particle. The mixer assembly also provides the necessary agitation during the dilution stage of the process.

The motor and gear reducer are conveniently mounted on top of the slaker away from any dust and steam which allows easy access for maintenance and lubrication.



The RDP Tekkem Slaker includes an efficient dust arrestor. The dust arrestor removes the dust and steam generated within the slaker. The dust arrestor is designed to simultaneously minimize maintenance and maximize performance. The dust arrestor tube is conveniently located to allow for easy access without removing the slaker covers.

The dust arrestor tube is at least 3 inches in diameter so there are no small orifices to clog or clean.

The dust arrestor uses fine misting spray nozzles to create suction and to quench the air, removing dust and steam prior to discharge.

The dust arrestor is so effective in removing dust and steam that no seals are required where the mixer shaft enters the slaker tank.

The Lime Slaking Process

Lime Slaking is the process of mixing quicklime (calcium oxide, CaO) with water to form hydrated lime (calcium hydroxide Ca(OH)₂), using excess water to produce a slurry. The reaction of quicklime and water is exothermic and will produce 491 BTUs per pound of CaO and form 1.32 pounds of calcium hydroxide. For most applications, the most efficient use of calcium hydroxide requires an extremely small particle size. Calcium hydroxide is only slightly soluble in water. Therefore, the reaction of calcium hydroxide is a surface phenomenon reaction: the smaller the particle size, the greater the surface area available for reacting. When calcium hydroxide is used as a flocculant to aid in settling, particle size in addition to surface area plays a second and important role. Small particles will be suspended longer and react more efficiently than larger particles that will settle quickly before the reaction is complete.

The two most important variables in controlling particle size are the final slaking temperature and the initial slaking water temperature. The final slaking temperature is managed by controlling the ratio of water to lime. Calcium hydroxide slurry with a surface in excess of 50,000 cm²/gram are obtained by reaching final slaking temperatures in excess of 175°F. These temperatures are obtained by operating the slaker at low water to lime ratios (4:1 or less). Increasing the temperature of the initial slaking water further assists in decreasing particle size and increasing reactive surface area.

Typical Specific Surface Areas of Calcium Hydroxide

Water:Lime Ratio	40°	50°	70°	100°
2.5:1	50,000	52,000	54,000	56,000
	185°	195°	212°	212°
4.5:1	42,000	44,000	51,000	53,000
	135°	170°	190°	200°
7.5:1	35,000	37,000	40,000	47,000
	90°	100°	110°	145°

- Initial Slaking Water Temperature (°F)
- Final Slaking Water Temperature (°F)
- Surface Area (cm²/gr.)

The combination of temperature measurement and precise weight control is the secret of the RDP Tekkem Slaker's success. The temperature probe allows the RDP Tekkem Slaker to automatically maintain the final slaking temperature as changes occur. By directly and accurately controlling the weight of lime and water, the water to lime ratio is adjusted and precise particle size for each individual application is provided. Finally, the Turbo Slaking option increases the initial water temperature to further provide the smallest particle size possible.

Lime Slaking Systems



The RDP Tekkem Slaker produces the highest quality calcium hydroxide slurry available. However, a complete system is required in order to properly handle and feed calcium hydroxide slurry. RDP specializes in providing complete lime slaking systems. The systems are individually designed to provide the proper amount of calcium hydroxide required to meet process objectives. RDP Tekkem Slurry Systems produce a constant slurry concentration by use of the load cell suspension system. Process control and lime addition is easily obtained by simply adjusting the feed rate. The systems are provided with complete instrumentation and control for single source supply and responsibility.

- A bulk Silo is used to receive and store quicklime from bulk truck deliveries. The Silo is equipped with a dust collection loading system capable of receiving lime from pneumatically equipped trucks.
- The Lime Feed System accurately feeds lime to the RDP Tekkem Slaker and provides a continuous flow of lime out of the Silo eliminating bridging.
- The RDP Tekkem Slaker, safely and efficiently slakes the quicklime with water to form a fine particle size, high surface area, porous, chemically reactive calcium hydroxide and dilutes the calcium hydroxide to produce an accurate lime slurry.
- The Slurry Tank is used to store several batches of calcium hydroxide slurry. Proper storage time minimizes scaling and maintenance for pumps, valves and piping.
- Chemical feed pumps deliver the lime slurry to the desired process.
- Systems can be furnished with grit removal screens if required.



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