

# MERRICK

## SERIES 7000 PASTE SLAKERS



Model 7108  
8,000 Lbs/Hr  
(2,630 Kg/Hr)

**Fully Automated Lime Slaking Systems**

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## Lime and Lime Feeding

Lime in its basic form is not commonly used. The final application almost always is that of  $\text{Ca}(\text{OH})_2$ , calcium hydroxide (also known as hydrated lime). For economic reasons, on-site conversion of  $\text{CaO}$ , calcium oxide (also called quicklime or pebble lime) is preferred to purchasing hydrated lime. Quicklime requires only about 75% as much chemical by weight to obtain the same results, which translates to 75% less storage capacity, cost of handling and freight. Additionally, quicklime is less dusty and easier to handle.

Quicklime is normally metered to the slaker by a gravimetric or volumetric feeder. However, because the weight of a given volume may vary 5 to 15% from the average, gravimetric feeders will compensate for changes in material bulk density and provide a more uniform and accurate flow to the slaker. Consideration should be given to the design of the lime storage bin to insure a constant flow of material to the feeder. Quicklime is discharged directly from the feeder into the inlet of the slaker. The lime feed rate is determined manually or automatically by the level of slurry in the slurry surge tank located directly beneath the slaker or by a demand signal from the process (pH, etc.).

## Engineered for Simple Operation

The Series 7000 Paste Slaker incorporates a user friendly, highly accurate microprocessor electronic control for consistent water-to-lime ratios. Series 7000's innovative design eliminates costly mechanical controls, yet still maintains the heat of reaction to achieve slaking temperatures required to produce smaller hydrate particles.

The standing debate regarding the need to sacrifice simple operation and reasonable operating costs to achieve desirable small particle consistency is moot with a simple innovative approach to paste slaking. Simplification is achieved through value added engineering. This approach eliminates expensive, difficult to adjust mechanical components.

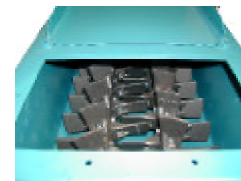
## Theory of Operation

The combining of calcium oxide and water is an exothermic reaction, creating calcium hydroxide and heat. Slaking by employing the correct variables of time, temperature and mixing will cause the lime particle to rupture, exposing micro-particles and effective conversion of the lime to hydrate

Paste slaking utilizes the heat from the chemical reaction in the pug mill to break apart the calcium oxide particles, allowing the micro-particles to be exposed to the hydration process. Temperatures in the paste slaker typically reach the boiling point of water within three minutes and complete slaking within five minutes.

The Paste Slaker combines calcium oxide with water at a water-to-lime ratio of 2 to 2.25:1 by weight. The lime is metered into the slaker pug mill reactor by means of a lime feeder. Water is proportioned by measuring the power consumption variables (torque) required to maintain mixing performance at the specified paste consistency. The power consumption variables are measured, then modified by a Merrick developed control algorithm. The algorithm resides in an industrial microprocessor controller. The CPU determines the output signal to a control valve which continually adjusts the water flow to the slaking compartment. The torque valve's feedback circuit alarms the user of any out of paste consistency condition.

The slaker utilizes two sets of counter rotating mixing shafts to provide proper mixing efficiencies, bringing lime and water into uniform, intimate contact. The paste flows over a weir to the dilution chamber where spray nozzles provide dilution water to separate the lime particles from the grit. The resulting suspension exits the slaker into a grit separator for removal of inert material.



## HOW DOES MERRICK COMPARE TO THE COMPETITION?

FEATURES:	SERIES 7000	COMPETITION
CONTROL METHOD	Electrically Actuated Control Valve by Control Panel PLC	Proprietary Mechanical Torque Linkage and Special Duct Output Gear Reducer
BEARINGS	Outboard, Sealed	Sealed
PASTE CONSISTENCY ALARM	Alarm for Out of Specification Paste Production	Not Available
DRIVE COMPONENTS	Commercially Available Gear Reducer	Proprietary V-Belt Gear Reducer
PASTE CONSISTENCY ADJUST	Electronically Adjustable Setpoint in Control Panel for Varying Lime Quality	Spring Tension Adjustment, No Indication Available
PROPRIETARY COMPONENTS	None	Torque Valve, Valve Linkage, Drive End, Reducer and Paddle Shaft Bearings

# FEATURE BENEFITS

## NO PROPRIETARY COMPONENTS

Merrick uses commercial gears, gear reducers and bearings for low cost and local availability.

## OPTIMUM MAINTENANCE ACCESS

Removable End Doors and Side Door.

## Model 7104 Stainless Steel Slaker

## GRAVIMETRIC OR VOLUMETRIC LIME FEED

Choice of Belt or Screw Type Feeders, including loss-in-weight.

## SUPERIOR CONTROL

An electronically actuated metering valve to controls water flow. By monitoring motor current, a microcomputer continually adjusts water flow and lime feed to maintain desired paste consistency.

## CORROSION RESISTANT PLUMBING

Red brass piping and bronze fittings for corrosion resistance.

## OPTIMUM MAINTENANCE ACCESS

Removable Slaker Covers.



## LOW MAINTENANCE DRIVE

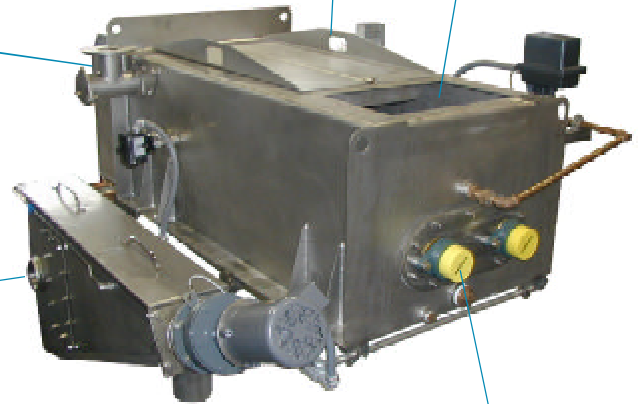
Gear-to-gear drive eliminates chains that require maintenance. Drive has slip clutch to prevent gear damage.

## DUST CONTROL

Removable hydraulic jet dust and vapor remover.

Paste Discharge

Lime Inlet



Grit Discharge

## EFFICIENT GRIT REMOVAL

Auger type grit remover eliminates grit down to 40-50 mesh. Vibrating Grit Screen optional.



## PROTECTED BEARINGS

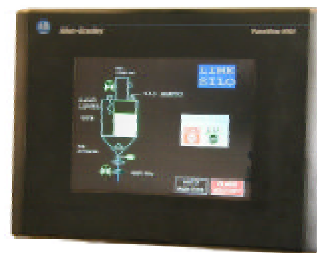
MERRICK engineers designed the inlet water reservoir to be full slaker height. This "barrier" of fresh water prevents any slurry from coming into contact with the shaft bearing and eliminates premature failure of the bearings due to the corrosive effects of lime. The bearings are also isolated from the heat generated by exothermic reaction in the lime slurry. Offset bearing with drip shields provide optimum protection.

## ENGINEERING SPECIFICATIONS

CAPACITIES	ELECTRICAL REQUIREMENTS	WATER REQUIREMENTS 18% SLURRY STRENGTH
<ul style="list-style-type: none"> <li>400, 1000, 2000, 4000 and 8000 lb/hr of calcium oxide (Quicklime or Pebble Lime)</li> </ul> <p><b>RANGE</b></p> <ul style="list-style-type: none"> <li>10:1 of design rating (15:1 for 7100 Slaker)</li> </ul> <p><b>SPECIFIC SURFACE</b></p> <ul style="list-style-type: none"> <li>Water controls provide the smallest particle size of any slaker</li> </ul> <p><b>CONTROLS</b></p> <ul style="list-style-type: none"> <li>Water controls are microprocessor based to provide accurate positioning of the electronic water valve proportional to paste consistency</li> </ul> <p><b>GRIT SEPARATION</b></p> <ul style="list-style-type: none"> <li>Screen type.</li> <li>Inclined screw type (standard offering)</li> </ul>	<ul style="list-style-type: none"> <li><b>7100 (400 lb/hr)</b> – 230/460 volt, 3 Ph, 60Hz, 1/3 hp mixing motor; 1/4 hp grit separator motor</li> <li><b>7101 (1000 lb/hr)</b> – 230/460 volt, 3 Ph, 60 Hz, ½ hp mixing motor, 1/4 hp grit separator motor</li> <li><b>7102 (2000 lb/hr)</b> – 230/460 volt, 3 Ph, 60 Hz, 1 hp mixing motor, 1/4 hp grit separator motor</li> <li><b>7104 (4000 lb/hr)</b> – 230/460 volt, 3 Ph, 60 Hz, 1-½ hp mixing motor, 1/4 hp grit separator motor</li> <li><b>7108 (8000 lb/hr)</b> – 230/460 volt, 3 Ph, 60 Hz, 2 hp mixing motor, 1/4 hp grit separator motor</li> <li>Consult factory for HP for vibrating grit screen</li> </ul>	<ul style="list-style-type: none"> <li><b>7100</b> – 10 gpm at 40 psig</li> <li><b>7101</b> – 20 gpm at 40 psig</li> <li><b>7102</b> – 30 gpm at 40 psig</li> <li><b>7104</b> – 50 gpm at 40 psig</li> <li><b>7108</b> – 110 gpm at 40 psig</li> </ul> <p><b>MATERIALS OF CONSTRUCTION</b></p> <ul style="list-style-type: none"> <li><b>PUG MILL/ GRIT SCREW COMPARTMENT</b> – 3/16" carbon steel on 400 and 1,000 lb/hr models. Remainder 1/4" carbon steel</li> <li><b>COVERS</b> – 11 gauge HRS hinged and removable</li> <li>Carbon steel finish is universal primer with high temperature epoxy top coat. 304 or 316 stainless steel is optional</li> </ul>



Merrick Slakers Can Utilizes PLC and Merrick MC<sup>3</sup> Microprocessor Touch Screen Controls. Merrick Controls Can Be Configured to Run All Storage Silo Functions



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