

Resource Development International - Cambodia Ceramic Water Filter Factory - Clay Mix Automatic Water Spray System

Prepared by Engineers Without Borders Australia in Partnership with Resource Development International - Cambodia.

Thanks to Fred Anderson for design and construction of the system, and for his assistance in writing this description.

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Document data:

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Version:

Date: 4 February 2008

File name: RDIC CF Handbook Water Spray System 140108

Introduction

RDIC has developed and implemented an automatic water spray system for its ceramic water filter clay mix system. This is an easily operated system that evenly distributes a set amount of water through the clay mix. The operator also has the ability to adjust the volume should additional water be required during hot conditions by adjusting the level of the overflow pipe.

The system is set up to allow:

- 10 minutes of dry mixing
- 12.5 L of water is sprayed into the mixer
- Then 10 minutes of wet mix occurs before mixing is stopped and the mixer emptied.

Core components of the Clay Mix Water Spray System are:

- The SPRAY PIPE- a length of plastic pipe with holes cut along the length which is fitted to the inside of the clay mixer on the upper back surface to distribute water into the clay mix.
- 2) The MEASURING TANK a 15 L (21cm diameter) length of tubing sealed at the base which holds the preset 12.5L of water needed for a single batch of clay in the mixer. An overflow valve can be tipped to modify the fill height if required.
- The STORAGE TANK a 50L tank that ensures sufficient water is available to fill the storage pipe.
- 4) The STORAGE TANK PUMP located at the bottom of the Storage Tank is used to fill the Measuring Tank.
- 5) The MEASURING PUMP TANK, at the bottom of the Measuring Tank feeds the preset amount of water through the spray pipe to the mixer.
- 6) The FLOAT SWITCH in the measuring tank that sets a circuit to commence pumping, and complete pumping of water. As it empties to floats become exposed. The weight of both floats out of the water will set the switch off.
- 7) The TIMER SWITCH that is preprogrammed to establish different circuits through the mixing cycle.
- 8) The MIXER SWITCH which is a simple manual on/off switch.



Figure 1 Measuring tank (left), Storage tank (right)



Figure 02 Measuring Tank with Floating Switch Visible

The system operates with a timer switch for the water spray system and a manual switch for the clay mixer. The switch operates with a red, orange and green light to tell the operator where the process is up to. The sequence of operation on the following page, details the system.

RDIC Clay Mix Automatic Water Spray System - Sequence of Operation:

Indicator Lights		RED LIGHT Dry Mix	RED+ORANGE LIGHTS Spray Mix	GREEN LIGHT Wet Mix			
System Switches and Pumps	MIXER SWITCH is off. TIMER SWITCH is off. FLOAT SWITCH is on.	The CLAY MIX SWITCH is turned on manually. The TIMER SWITCH is turned on manually.	After 10 minutes the TIMER SWITCH switches to Position 1 and the MEASURING TANK PUMP initiates, pumping water into the mixer through the spray pipe.	The FLOAT SWITCH turns off when the weight of both floats hanging from the string switches the MEASURING TANK PUMP off and starts timer for second half of mixing process.	After 10 minutes, TIMER SWITCH closes circuit 2 or is manually RESET when mixing is complete. This initiates the STORAGE TANK PUMP which fills the MEASURING TANK. The MIXER SWITCH is manually turned off.		When sufficient water is in the MEASURING TANK, the FLOAT SWITCH shifts to its initial position, opening the STORAGE TANK PUMP CIRCUIT and turning off the STORAGE TANK PUMP.
Clay Mixer	Clay mixer is upright and empty. Dry clay mix components are added to the mixer.	Dry ingredients are mixed for 10 minutes	Water is sprayed into the Mixer through the Water Spray Pipe.	The water spray stops. The Clay Mixer continues to mix the wet clay mixture.	Mixing stops. The Mixing Tub is tipped forward to release the clay onto the tarpaulin. The clay is scraped out.	-	Mixing tub is reset for next clay batch.
Water Tanks	The Measuring Tank is filled with 12.5L of water. The Storage Tank is filled with water to approximately 80% capacity.		As the water pumps into the mixer, the water level in the Measuring Tank drops. The floats become exposed as the water drops away and the floats are held by their strings.	The floats remain in place hanging by the string.	Water fills the MEASURING TANK from the STORAGE TANK.		The MEASURING TANK is refilled manually via a pipe connected to the site's water supply.

Diagram of switch circuits through the mix process.









