

How a Regenerative Thermal Oxidizer Works

An RTO utilizes a unique regenerative style heat exchanger. This heat exchanger is comprised of ceramic material which can come in the form of saddles or honeycomb blocks. These regenerative heat exchangers can achieve considerably higher thermal efficiencies than a shell and tube or plate style. Efficiencies can be as high as 97%, which can cut natural gas usage by 90%. A 2 tank RTO is made up of two media chambers which act as the heat exchanger. Process exhaust **(1)** passes through one media chamber on its way to the combustion chamber. As this air passes through this chamber, it will absorb the heat from the ceramic media **(4)** and preheat the air stream prior to entering the combustion chamber. The combustion chamber **(5)** is set to a fixed temperature and controlled by a burner or natural gas injection. This fixed temperature will ensure the VOC's in the air stream are converted prior to entering the outlet media chamber. As the process air stream leaves the combustion chamber it will exit through the opposite media chamber **(6)**. When the hot process air, now clean, passes through the exit tank, the ceramic media will absorb the majority of the heat (energy) prior to exiting the system through the stack **(8)**. The air will continue to go in this direction for the duration of the cycle, which is typically 2-4 minutes. After this cycle time has expired, the RTO will switch directions. The outlet tank which has been absorbing the combustion chamber heat is now the inlet tank and releases all of the stored up energy into the process inlet stream prior to reaching the combustion chamber. When the valves shift, the inlet valve **(3)** will become the exhaust and vice-versa with **(7)**. This cycle continues and repeats itself every 2-4 minutes.

