RheoVac® Customer Comments and Experiences

Identifying Air In-Leak

Texas plant - A customer asked us to examine their data and report whether the *RheoVac* instrument was working correctly. The probe was reading 350 SCFM air in-leak after coming on-line from a shutdown. Review of the *RheoVac* data and the plant data revealed that the air in-leakage value looked correct. The customer searched for a leak and found a hole the size of a silver dollar in an extraction line. The hole was patched and the air in-leakage fell to 10 SCFM. The water-to-air mass ratio went from 0.2 to 4.8, indicating that there was no excess condenser pressure caused by air in-leakage. Eliminating this large source of air ingress reduced back pressure by more than 1.0" HgA.

Mississippi plant – This plant's *RheoVac* 940 showed air in-leak at 250 SCFM, and the customer was concerned that the instrument reading might be incorrect. Intek verified the proper operation of the *RheoVac* probe. The plant elected to shut down and, upon inspection, discovered that the steam seal piping had fallen off inside the condenser.

Pennsylvania plant - This new customer installed the *RheoVac* instrument and immediately recorded high air in-leakage (106 SCFM) to go with a high back pressure reading (2.6-2.9" HgA). Examination of the *RheoVac* data and plant data indicated the reading was correct, and Intek suggested that the customer search for a large leak. Plant personnel were skeptical, since their extensive leak testing had not turned up anything, but decided that there might be a problem with the expansion joint in the exhaust hood. Eventually the *RheoVac* air in-leak reading rose to 150 SCFM and the unit tripped. After examining the expansion joint during the outage and finding no problem, the engineer moved the *RheoVac* probe to another unit, where, much to his surprise, it seemed to read "correctly." Meanwhile, back pressure on the first unit suddenly dropped, and when the *RheoVac* unit was reinstalled in the line, it gave a low, 5 SCFM air in-leak reading. It came to light that a 6 - 8" combined air heater return level control valve on a pump had been left in a ½ turn open position. Closing the valve brought the air in-leakage, and back pressure, down. Reopening this valve and monitoring the results confirmed that it was indeed the cause of the previously identified large leak. The engineer working on the problem subsequently moved to another plant and purchased a *RheoVac* Sentry system, with multiple probes configured to be self-validating.

Pump Capacity Measurements

Midwest plant - A new customer identified a pump capacity problem during the first two weeks after the *RheoVac* instrument was put in service. On the first of every month, the operating policy was to alternate the in-service pump with the out-of-service pump. The engineer had suspected that one of the pumps did not function as well as the other, but there was insufficient evidence to convince the maintenance department. After the *RheoVac* instrument was installed, the pumps were switched at month end on the weekend. On the following Monday, the performance engineer noticed that the *RheoVac* data indicated significantly decreased pump capacity with the switched pump. They switched the pumps back and the *RheoVac* probe measured an immediate increase in pump capacity. This is one example of how the value of real-time data can help engineers make immediate money saving decisions in the plant.

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Mid-Atlantic plant - A customer runs four pumps (two banks with two pumps each) to keep back pressure down. During validation testing at the plant, it was discovered that the "A" bank was running at half the capacity of the "B" bank. The pumps were examined and the plant identified that one of the "A" pumps was not running. This discovery about their pump capacity was made because they had *RheoVac* probes that accurately measure the volumetric flow rate produced by the condenser exhausting system. Repair of the failed pump was immediately initiated.

West Virginia plant - A customer reported "great results" with the *RheoVac SENTRY* system. During start-up, they were unable to shut down the hogger without losing vacuum. Plant personnel used the *RheoVac* data to determine that the problem was not due to air in-leakage, but due to a failed SJAE. They repaired the SJAE and everything worked well.

Time Saving Experiences

Midwest plant - Many plants do not have air in-leakage problems. The *RheoVac* instrument is used to provide continuous, real-time data to troubleshoot the condenser system. One example is a customer, in Iowa, that was performing maintenance on their shaft seal steam-regulating valve. The maintenance crew left the bypass valve ½ open to maintain proper steam pressure while repairs were being made, but apparently did not tag the valve. The next shift came in and noticed the valve was ½ open, so they shut it. At that point the air in-leakage reading on the *RheoVac* instrument rose from 3 SCFM to 80 SCFM and the shaft steam seal pressure went from 4 to 3 psi. Later, the pressure dropped to 2 psi and air in-leakage increased to 100 SCFM.

The next day, the performance engineers examined the *RheoVac* data and surmised that the shaft seal pressure was low. They asked the maintenance personnel to re-open the valve. The pressure returned to normal, and the air in-leak SCFM reading went back to 3. With the aid of *RheoVac* data, it took only several minutes to resolve the issue, instead of taking several weeks to diagnose the problem.

Midwest plant - "I work for a technical services group. We assist the numerous plants within our company. One plant asked for our assistance in acquiring and installing this equipment. The *RheoVac* instruments are now turned over to the plant for operation and maintenance. I'm highly satisfied with these instruments. We showed the plant how to use the trended data to determine if an air leak is from the combustion air heating system (an oscillating leak with repetitive spikes from the drip receivers draining and filling) or elsewhere in the system. We receive far fewer calls to fix air leaks in their condensing system, since a majority of them are from the combustion heaters."

Southern plant - According to this customer, their plant is at its lowest air in-leakage point in history. Back pressure is down across the board and DO is in specification 80-90% of the time. Before this customer attended the Intek *RheoVac* workshop, DO was in specification less than 50% of the time. He also credited the workshop program with giving him the ability to identify common problem areas. Now when air in-leakage increases, plant personnel begin with the most common trouble areas, make repairs, and use the *RheoVac* data to immediately identify whether the repair solved the problem.

Texas service group – Because he had a *RheoVac* system installed, a customer was able to witness a steam seal pipe break inside of the condenser. The incident was captured by the

recorded *RheoVac* data: air in-leakage suddenly jumped from 190 SCFM to 580 SCFM when the pumps were shifted from a steam driven boiler feed pump to a motor driven feed pump. The continuously recorded *RheoVac* data provides a time-stamped record of events at the plant and makes troubleshooting much simpler.

Dissolved Oxygen

Gulf coast plant - This plant experienced very high dissolved oxygen (measured at the outlet of the condensate pump), with little change in air in-leakage (measured by a *RheoVac* instrument). Examination of the condensate path led to finding a crack in the drain line from the alternate heater. That drain line came into the condenser right above the outlet to the condensate drain. Cold condensate containing high dissolved oxygen was flowing in the drain line, falling to the hotwell, and going directly to the pump, causing the high measured DO.

Trending

New York plant - One of our customers operates two 50 CFM pumps continuously without ever turning them off. In winter, with really cold cooling water, they reach design back pressure and have to bleed air into the condenser to prevent excessively low pressure and choked steam flow. Air in-leak is a critical input to their data acquisition system. They plot it against back pressure or other inputs to "see" events.