

Albright, Stacey A.

From: Chapman, Paul
Sent: Monday, August 10, 1998 11:20 AM
To: McMurray, Roger
Cc: Smith, Leigh Ann; 'zwicker@earthlink.net'; Albright, Stacey A.; Hutchens, James; Dickerson, Joyce
Subject: RJRT Gurley (Model 4110) vs. Tervakoski Gurley (Model 4150) Correlation

Roger,

To follow-up on our phone conversation this morning on the above mentioned topic:

ISSUE:

(1) The current issue is that the RJRT Gurley results are reading lower (from ~ 100 to 300 seconds) than the Tervakoski results. The more dense the paper is (i.e., the higher the reading/the greater the number of seconds), the wider the spread between the two instruments. The less dense the paper is (i.e., the lower the reading/the lower the number of seconds), the narrower the spread. This can be easily observed in the graph provided by Tervakoski included with Barry Black's fax dated Wednesday, 08-05-98.

KNOWN DIFFERENCES BETWEEN THE TWO TEST INSTRUMENTS:

(2) While both RJRT and Tervakoski use Gurley instruments, they are different models. However, the difference in model design is not suppose to impact the reading obtained (after multiplication by the appropriate conversion factors). The specific differences are outlined in the next two paragraphs.

(3) The RJRT Gurley is a Model 4110 equipped with the optional 4320 programmable digital timer. This specific unit was purchased in December, 1997 and is less than 1 year old. It uses a 20 oz. cylinder weight, a 3 inch inner cylinder diameter, and measures the time (in seconds) it takes for either 300 cc's or 100 cc's of air to pass through a 1 sq. in. orifice at 4.88" (of water) pressure drop. If you measure 300 cc's, you can calculate the amount of time that it would take 100 cc's by dividing the 300 cc reading by 3. The 4110 is the traditional model utilized within RJRT since the 1970's. 4110's are the accepted standard instruments for measuring the porosity, air-permeability or air-resistance of sheet-like materials such as papers, wovens, plastics and membranes.

(4) The Tervakoski Gurley is a Model 4150 High Pressure unit. It uses a 5.9 oz. cylinder weight, a 1 inch inner cylinder diameter, and measures the time (in seconds) it takes for either 5 cc's or 10 cc's of air to pass through a 1 sq. in. orifice at 12.2" (of water) pressure drop. If you measure 5 cc's, you can calculate the amount of time that it would take 100 cc's by multiplying the results by 50. If you measure 10 cc's, you can calculate the amount of time that it would take 100 cc's by multiplying the results by 25. These multiplying factors are according to TAPPI T-536 om-96, due to 2.5 times higher pressure drop (i.e., $4.88 * 2.5 = 12.2$). 4150 High Pressure units are the accepted standard instruments for measuring the porosity, air-permeability or air-resistance of materials having low permeability. Typical materials include coated papers, plastics and membranes. High Pressure units are recommended whenever a standard unit (like the 4110) would yield excessive measurement times.

CALIBRATION OF RJRT UNIT CHECKED 08-07-98:

(5) Leigh Ann and I were out on company business Wednesday and Thursday this week (08-05 & 06-98). On Friday, 08-07-98, when I read the fax I saw where Tervakoski thought that perhaps our Gurley unit "doesn't seem to be calibrated properly. Maybe because the unit is so new or something". Their idea seemed logical. I checked the instrument in our lab using the shim provided by Gurley and followed their instructions. The information included with the shim stated that the reading should be 26.7 seconds/100 ml, +/- 5% (which means the average of six measurements are to be within 25.4 to 28.0 seconds). I checked our instrument with one side of the shim facing up for 3 measurements, and then turning it over for 3 measurements. The readings were as follows: 25.5, 25.2, 25.5, 25.5, 25.8, 25.2, for an average of 25.45, within the Gurley-established +/- 5%.

REQUESTED TECHNICAL ASSISTANCE FROM GURLEY 08-11-98:

(6) I called Gurley Precision Instruments (800-759-1844) and talked to Travis Coon, Sales Engineer, and discussed the situation with him. He stated as long as the average of the six measurements were within the +/- 5% of the specified reading for the shim, then the unit is calibrated. Travis did recommend that the oil level within the cylinder be checked to be certain that it is at the scoreline. He also recommended that since ours was measuring lower than Tervakoski then we should check our unit for airleaks. This is easily done by placing a truly non-porous material in the unit (such as a plastic bag), dropping the cylinder and checking the reading after two hours. If no time has run off the clock, then there are no air leaks. If time does run off, then we have a bad gasket. Since the instrument is less than a year old, Gurley will provide the gaskets free-of-charge. Travis will continue to think about our current issue and advise if any answers as to why we are seeing such a difference are determined.

NEXT STEPS & TIMING:

(7) Per our conversation, please check the oil level in the instrument. If you have to adjust the oil level, please re-run the calibration procedures, determine what the shim reads following the adjustment and advise on the results(08-11-98).

(8) Please check to be certain that there are no leaks within our unit. If there are, please contact Travis at Gurley to obtain the new gaskets, and then advise on the results (08-11-98).

As always, thank you very much Roger for your support of our projects!

Paul