certnotes

working together for effective biosafety cabinetry

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A Method for Balancing a Single Blower/Damper Class II BSC

One challenge occasionally encountered in field certification is setting the airflows in Class II, Type A1 or A2 BSC. Most of the time, a small adjustment to blower speed and/or the damper is all that's necessary to achieve the best result.

But every once in a while, it gets more complicated when it appears that every time the speed is adjusted, the balance is off, and every time the balance is adjusted, the speed is wrong. Here is a method for logically setting the speed and balance in a single blower/damper style Class II, Type A1 or A2 using the table and adjustments below.

	Downflow			**Inflow**			**Total**	**Ratio** (Nom./ Act.)
	Velocity	Area	CFM	Velocity	Area	CFM	CFM	
Nominal	_ fpm	_ ft^2	_ cfm	_ fpm	_ ft^2	_ cfm	_ cfm	_
Actual	_ fpm		_ cfm	_ fpm		_ cfm	_ cfm	

1. Adjust speed to bring the inflow to (Current Inflow x Ratio).
2. Adjust balance to bring inflow to nominal inflow.

	Downflow			**Inflow**			**Total**	**Ratio** (Nom./ Act.)
	Velocity	Area	CFM	Velocity	Area	CFM	CFM	
Nominal	71 fpm	7.83 ft^2	*556* cfm	110 fpm	3.40 ft^2	*374* cfm	930 cfm	
Actual								

1. Adjust speed to bring the inflow to (Current Inflow x Ratio).
2. Adjust balance to bring inflow to nominal inflow.

After carefully measuring, we obtain an average downflow of 65 fpm and a calculated inflow of 88 fpm. Since the adjustments in the method are most easily made using a capture hood, it works best to measure downflow first and inflow second. Leave the capture hood in place as the calculations are done, then make the adjustments using the measurements from the capture hood.

We can fill in the values from actual measurements and subsequent calculations as shown below. Note newly entered values are italicized. The actual downflow of 65 fpm x downflow area of 7.83 ft^2 yields the estimated actual downflow volume of 509 cfm. The actual inflow of 88 fpm x inflow area of 3.40 ft^2 yields the inflow volume of 299 cfm. The actual total cfm for the BSC is obtained by adding the estimated actual downflow volume to the actual inflow volume to yield 808 cfm. The ratio of nominal to actual total flow is 930/808 or 1.15.

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	Velocity	Area	CFM	Velocity	Area	CFM	CFM	
Nominal	71 fpm	7.83 ft^2	556 cfm	110 fpm	3.40 ft^2	374 cfm	930 cfm	*1.15*
Actual	*65* fpm		*509* cfm	*88* fpm		*299* cfm	*808* cfm	

1. Adjust speed to bring the inflow to (Current Inflow x Ratio).
2. Adjust balance to bring inflow to nominal inflow.

Now we are ready to make the adjustments.

1. Adjust speed to bring the inflow to (Current Inflow x Ratio).

This means we adjust the fanspeed, to bring the current inflow of 88 fpm to 101 fpm (88 fpm x 1.15). If we are using a capture hood (DIM), the cfm reading for our actual velocity of 88 fpm would be 299 cfm. The cfm reading for our adjustment target of 101 fpm would be 344 cfm.

We adjust the fanspeed until the DIM reading from the capture hood is 344 cfm. Now we are ready to adjust for balance.

2. Adjust balance to bring inflow to nominal inflow.

We adjust the damper until the DIM reading from the capture hood is at the nominal flow of 374 cfm. Remove the capture hood and take the downflow. Everything should be in specification.

This is a nice method on the rare occasions where it is difficult to sort out fanspeed and balance adjustment. It only works on single blower/damper systems. It is not applicable to B1s and B2s. It is not applicable BSCs with separate downflow and exhaust blowers like the Thermo Scientific 1300 Series A2 and Herasafe KS.

We welcome your comments and suggestions for this and future CertNotes. Please visit www.thermoscientific.com/certnotes to make suggestions or to view additional resources for certifiers.

As my very first boss in BSC certification would say “Keep wearing the white hats!”

Best Regards,

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