Needless to say, high quality coating finishes require a high performing paint booth system. Paint finishers will tell you that one of the key elements to achieving this is having control of “booth balance.” From the painter's perspective, booth balance is having the proper air flow in the booth, and if there are multiple booth modules, having proper air flow in each booth module and in between booth modules.

Proper air flow means quite a few things – including the amount (cfm) of air going through the booth module, the direction of airflow, and distribution of air through the booth. Having all of that in proper balance will ensure that a high quality finish is more likely to occur; along with properly applied paint – whether it’s manually applied or via automatic paint application equipment.

**Booth Balance has just as much to do with water flow as it does air flow**

In water wash paint booth systems, paint overspray is removed through the interaction of the paint with the booth water – on the flood sheet as well as the booth scrubbing area, which is located in the back section or under section of the booth. This interaction is critical to properly remove the paint overspray from the air and put it into the water. If this scrubbing action does not occur, the paint can exit the stacks and leave the plant – not a good thing. Paint deposits on surrounding areas or on cars in the parking lot will not be received well.

Conversely, pant overspray that does not make its way to the flood sheet and scrubbing area will back up in the booth leading to turbulence in the air flow pattern and redeposit on the object being painted and on booth interior surfaces – again, not a good thing. Paint quality suffers along with booth interior cleanliness.

So, a properly balanced spray booth requires proper air flow **and** water flow. Scrubbing equipment designers refer to something called the “L/G, or “Liquid/Gas Ratio.” This ratio of liquid flow to air flow defines how efficient the scrubber can perform. If the ratio is not within spec, scrubbing efficiency will suffer and either of the two situations described above could occur.

One of the key measuring tools to ensure the booth is in balance is to measure pressure drop across the scrubber. Another way to think of this is measuring the pressure in and out of the booth and comparing the difference. A device called a Manometer is almost always installed in well-designed booth modules to obtain this reading.
What other variables influence scrubbing efficiency?

Listed below are the key variables that can impact the scrubbing efficiency of a paint both scrubber:

- Air flow
- Water flow
- Pressure change across the scrubber (air entry and exit pressure in booth module)
- Paint loading
- Paint particle size
- Scrubber design

What are some signs that the water flow is impacting booth balance?

- **Water flow rates are low** – not always easily observed, but is best checked by routinely inspecting booth water flow areas for less than desired water movement or lack of coverage in areas such as the water walls (flood sheets) or scrubbing chamber entry points. Ultrasonic flow meter devices can also be used to get a handle on flow rate in the booth supply piping and headers.

  If the piping appears relatively clear, check the recirculating pumps for worn impellors. Also look for valves that may have been pinched back too much as an adjustment to increase air flow.

- **Water distribution is poor** – bare spots on the water walls or gaps in the scrubbing chamber will allow for easier exit points for the air (path of least resistance). This will disrupt the desired uniform distribution of air across the booth leading to air turbulence patterns and the potential to impact paint finish quality. Short circuiting of air through water gaps will also bring along paint overspray that will not see chemically treated water – leading to paint deposition in undesired locations including the stacks and surrounding area.

  Gaps in the water walls and scrubbing chamber entry points can be caused by any object that is not large enough to be moved along by the normal water flow velocity. Common culprits include pieces of booth coating materials, gloves, tape, and chunks of paint that have fallen from the grates or booth structure. Minimizing the intrusion of debris into the system will help to keep these areas clear and free flowing.

- **Accumulation of debris in certain areas** – Areas that would normally be flooded with water but now show signs of paint/debris build-up is a sign that water flow may have fallen off.

- **Paint is accumulating in normally dry areas** – If paint overspray is making its way past the scrubber and is building up in the booth under sections, back sections or the stacks – this may be due to inadequate water flow (i.e. the L/G ratio is off) and the paint overspray is not seeing booth water. Some accumulation over time is inevitable – as no scrubbing system is 100% efficient. The question is whether the buildup is occurring more quickly than it should.
How can Galaxy help?

Galaxy understands how water wall paint booth systems function from a mechanical perspective, and we have the expertise and products on the chemical side. Galaxy technical experts can assist with system audits and help to identify key areas in the system that need to be addressed – some of which were described above.

It is also important to recognize that even a system which is initially in perfect balance (i.e. air and water flows are in spec), that without a properly implemented chemical detackification program, deposits can begin to form. As deposits build up in the system, the water flow and air flow rates and patterns will be disrupted ultimately impacting paint finish quality. Maintenance costs will also increase forcing unwanted down time.

Galaxy has the latest state-of-the art technology in paint detackification programs – including paint detackifiers, coagulants, flocculants, and foam control products. Coupled with an average of 25+ years of expertise in the industry, our technical specialists can apply our programs to optimize system performance and keep the system running smoothly for as long as possible.