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Why is there no reference to relative humidity (RH) in the current ANSI/ESD S20.20-2007 specification?

As an ESD Auditor/Consultant, I have been asked the above question many times. Therefore, I contacted the ESD Association (ESDA) to learn more about this condition ***(reprinted with permission from the ESDA, referencing the ESDA May/June 2008 Threshold™ Newsletter):***

Question:

What is the recommended relative humidity that a room should be kept at for ESD purposes?

Answer:

There are no hard and fast rules or specifications regarding humidity for control of static electricity in the current ESD Program Management Standards. Our standard ANSI/ESD S20.20 -2007 (available for free download from www.esda.org) does not specify a humidity range for applications. While it is pretty well understood that humidity plays a role in the ability to generate, store and dissipate static charge, it is also known to be unreliable as a control mechanism. Certainly, static charge generation is far worse at 10% RH than at 90% RH but significant levels can still be generated at 90+% RH.

Your ESD Control Program must be designed to work at the lowest practical level of humidity you can expect in your environment. The northern tier of US states have cold winters (heating up air dries it out and it is difficult and expensive to replace the moisture) and the interior of factories may see very low RH (measurements of <3% in MN inside a factory and technical "0" RH on the north slope of Alaska have been recorded). If you make a statement in your program about maintaining a certain level of humidity and you are an ISO factory or a military contractor, what are you going to do when the humidity drops below the stated Humidity and Static Control level? Close the doors and send everyone home? This has occurred before with some military contractors that had an RH statement in their Procedures. It is best to avoid this costly error by not making a statement about RH control.

A well designed ESD Control Program and good materials will function correctly at very low RH. There are some different rules for pyrotechnics, ordnance and flammable atmospheres so if you are in any of those industries then RH control may be required. The statements above relate to electronics manufacturing industries.

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As stated in the above article, humidity does play a role in ESD control; however, it should not be solely relied upon as the ONLY ESD mitigation technique.

We, at Skolnik Technical, understand that relative humidity (RH) is very important in reducing static charges, as we have consistently demonstrated using our static field meters, in our "ESD Control" training classes. Although it is frequently overlooked, the most significant, inherent environmental factor in ESD Control is the RH, as humidity control limits the triboelectric charging process. Consequently, we have developed an RH Monitor for companies to incorporate into their ESD Control program, not as the *only* control element, but as *an integral part* of the complete system.

Many customers believe that if the RH level can be easily identified within the work area, then manufacturing / production personnel would be able to effectively ensure and efficiently implement the appropriate ESD mitigation procedures. For instance, our various customers have installed million-dollar, advanced humidification systems in their large production facilities, in order to ensure a humidity range of 30% to 50% at all time. And should this complex system fail, Skolnik RH monitor can serve as a "policeman", alerting personnel of out-of-range conditions, for timely, proper corrective actions.

Other customers with smaller work areas have installed more compact, portable humidifiers. Our RH monitor will conveniently remind them when it is time to turn on the humidifier and/or when to add more water to its tank.

One customer's air washers are on all year-round for the entire building. The RH remains at approximately 45% for most of the time. It even feels like a tropical rain forest inside the building during different times of the year! Our RH Monitor will provide a detailed account of the RH level on a daily basis.

At the other extreme, living in the dry, desert climate of Arizona and New Mexico, various customers prefer not to incur the expense of added moisture to the air. They operate under *Level One ESD Control Procedures* for RH values above 30%. If the RH falls to 25% - 29%, they shift to a *Level Two ESD Control Procedures* with added ionization, etc. And if the RH drops below 25%, they adjust their program to limit work on ESD-sensitive (ESDS) products, etc.

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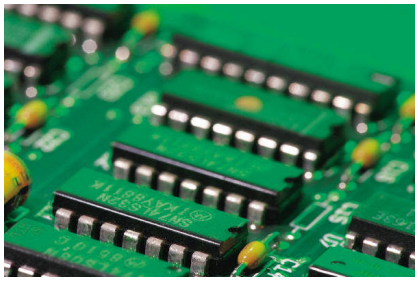
Keeping in mind that FR-4 PCB material acts like a sponge and absorbs humidity, our customers, who are concerned about ESD problems with their ESDS products, are also worried about measling issues with their electronic circuit boards. They bake their boards to remove the moisture, store them in GN2 cabinets, and apply desiccants, etc., in order to keep the moisture OUT of the boards.



Or some customers may use Silicone-based conformal coating material. This material requires a low RH during the cure time. If the RH is too high, a hazy, cloudy, murky appearance will become visible in the coating material.

For these types of applications, 45% is the maximum, desirable RH level in their work area. Therefore, Skolnik RH Monitor not only has a LOW RH Alert setting, but also a HIGH RH Alert setting. For example, if the RH level is suitable, residing between the LOW and HIGH settings, the Green Normal Light will illuminate, indicating that it is acceptable for personnel to work on the electronic boards.

Skolnik AccuHume™ Relative Humidity (RH) Monitor is designed to ensure the desirable RH levels - an integral part of your ESD Control system, it'll effectively & efficiently help you to continually manage and maintain a successful ESD Control Program!

To learn more about our practical, professional RH Monitor, please visit our website at http://www.skolnik-tech.com/Relative_Humidity_Monitor.htm and feel free to contact us for assistance with your purchase. Thank you.

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