

# **Industrial Hygiene Testing Respiratory Protection from Chemtronics<sup>®</sup> Konform<sup>®</sup> AR Spraying Processes**

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## **Executive Summary**

Chemtronics<sup>®</sup> - an acknowledged industry leader for providing cleaning, protection and repairing solutions for the electronics, telecommunications and critical environments markets – produces Konform<sup>®</sup> AR as part of a line of polymeric conformal coatings for electronic assemblies. Konform<sup>®</sup> AR is an acrylic coating that provides fair elasticity and general protection in a one part coating that is easy to apply and remove while providing high dielectric strength and abrasion resistance. Conformal coatings such as Konform<sup>®</sup> AR can help insulate electronic assemblies from high voltage arcs and shorting as well as mediate current bleed between circuits.

Konform<sup>®</sup> AR is applied by either a paint-on system or aerosol can, both of which are applied directly to the parts being coated. Testing was conducted to determine the effectiveness of a Sentry Air Systems 30-inch wide Ductless Spray Hood (SS-330-DSH) in protecting an operator from exposure to n-Propyl Acetate and n-Butyl Acetate found in Konform<sup>®</sup> AR during its aerosol application process. Both n-Propyl Acetate and n-Butyl Acetate have been known to irritate the eyes, skin and upper respiratory system, which may result in headaches, drowsiness and narcosis.

When preparing this test, a Sentry Air Systems (SS-330-DSH) unit was configured using a spray pre-filter (SS-330-SPF), a HEPA filter (SS-300-HF) and a 10 lb. activated carbon filter (SS-310-CF). This type of configuration is typically used for aerosol-delivered conformal coating applications. The spray pre-filter and HEPA filter are used to help control aerosol overspray particulate, while the activated carbon filter helps mitigate chemical fumes found in the coating spray.

To simulate typical electronic assemblies being coated, several circuit boards were prepared for the test. During testing one full can of Konform<sup>®</sup> AR was used over the course of approximately 25 minutes, during which time air was sampled at four locations within the lab space to determine representative exposure levels. Sample locations included, 1) the inlet of the hood 2) the outlet of the hood 3) the operator's breathing zone 4) the ambient air in the lab.

***Test results indicated a filter effectiveness of better than 99.7% contaminant removal for the two coating components tested, n-Propyl Acetate and n-Butyl Acetate.***

During testing, the interior hood concentrations for n-Propyl Acetate and n-Butyl Acetate were approximately 50 parts per million (PPM) - roughly 20% of OSHA's specified permissible exposure limit (PEL). Additionally, the acetate concentration at the filter outlet was below the 0.5 PPM detection limit. This concentration was likely considerably lower, however increasing the analysis' accuracy is not feasible at this time.

It is important to note that the odor threshold for n-Butyl Acetate is very low at approximately 0.007 PPM, meaning an average person could expect to notice acetate odor at around 0.01 PPM. It is also likely that most people will find acetate odor unbearable between 1.0-5.0 PPM, even though this is well below the established maximum safe exposure level. The net effect is that applications involving acetate mixtures will likely have a noticeable odor, as it is generally not be feasible to completely remove all acetate odors.

Even with minimal lingering acetate odors, test results confirmed that a Sentry Air Systems (SS-330-DSH) unit with appropriately configured filters greatly mitigates potential operator exposure to hazardous acetate fumes, and is more than adequate for applications involving Konform<sup>®</sup> AR.

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