



## A Discussion of Solvent-Based and Water-Based Duct Sealants

From time to time our Engineering Staff addresses customer questions that have a common theme. Ductmate feels that these issues need to be addressed and shared with our customers for the sake of clarity and knowledge, especially on the part of someone who specifies duct products.

Today we would like to address the importance of knowing the difference between solvent-based and water-based duct sealants.

### ***Could a solvent-based duct sealant really ground an airplane?***

Recently it was reported in the August 9th Edition of *The Air Conditioning, Heating and Refrigeration News Journal* that several workers at the Aurora, IL based FAA flight control center were overcome by fumes. The fumes were created by a duct sealant being used to seal a leaking air conditioning unit above the control room. After the sealing began on July 26th, several employees complained of nausea, eye irritation and headaches. Nine people were taken to a local hospital for examination and treatment. All were released within the day however, several flights from O'Hare Airport were delayed because of the confusion.

**Water-based sealants** have been gaining acceptance in the HVAC industry in the last several years, displacing the once more commonly used solvent-based sealants. Water-based sealants offer many of the same attributes without any of the potential hazards associated with solvent-based sealant. The common misconception in the industry is that water-based sealants require an extended curing period in comparison to a solvent-based product. Although this may have been true with earlier produced water-based sealants, it does not pertain to the more advanced water-based sealants presently available. Several water-based products currently on the market can be tested within 24 hours, and fully cured within 72 hours.

Water-based sealants are classified as compounds in which the volatile vehicle, or the part of the compound that evaporates during curing, is water. As a result, water-based sealants are classified as non-hazardous waste materials allowing them to be disposed of in the regular trash or washed down the drain. Clean up is accomplished with the use of a mild soap and water, tools can be washed in any sink with the rinse water going into the drain. Water-based products do not have to be stored and accounted for as a hazardous waste and require no special disposal instructions. As a result, SMACNA has endorsed the use of water-based sealants for all ductwork systems.

The water-based sealant industry has come a long way in the past few years. Water-based sealants can match or exceed

solvent-based sealant performance in all areas. Most quality water-based sealants are capable of being pressure tested after 24 hours. Water-based products are water and UV resistant, making them suitable for outdoor applications. With the exception of a few specialized applications, a water-based sealant can provide the quality, long-lasting seal required of a duct system.

**Solvent-based sealants**, on the other hand, have a volatile vehicle which consists of organic solvents that may include mineral spirits, hexane, heptane and toluene. These materials are considered toxic under Federal Law therefore requiring special handling and proper disposal under an approved hazardous waste program. Most common carriers charge higher fees to transport hazardous materials, as they can require special handling and permits. The evaporation of the volatile vehicle causes heavy odor, toxic fumes and can lead to poor Indoor Air Quality (IAQ). Solvent-based sealants should not be used in or around areas that are inhabited by people as the fumes can cause headaches, nausea and eye irritation. Because of the inclusion of cancer causing chemicals, heavy fume concentrations can cause much more serious health problems as well.

On the positive side, the quick evaporation rate of the volatile vehicle allows a solvent-based sealant to cure faster than the water-based. This can be both good and bad. Although the solvents may reduce curing and installation time, they can also reduce the life of an opened container. The same volatile vehicle which reduces curing time of solvent-based sealants also increases its flammability, forcing contractors to either use up all of an opened container or allow the contents to completely dry before disposing of the container. Solvent-based product clean up requires either mineral spirits or solvent type products. Shops that use solvent-based sealants may pay higher insurance premiums due to the high flammability and toxicity of this product.

### ***Are you concerned about environmental pollution?***

More and more, people have become increasingly concerned with environmental issues when choosing the products that they purchase. We have often heard people speak about ozone emissions, fertilizer runoff, water pollution, toxic waste dumping and the effects each has on the environment. Most of us are conscientious citizens and believe that we can, and should, help to reduce the amount of pollution by carefully examining what we purchase and how we go about our daily lives. Many companies already participate in some type of an environmental management program that helps to save the environment, improves regulatory compliance, increases efficiency and makes good sense.

## **DUCT SYSTEM INSIGHTS WITH AN ENGINEERING PERSPECTIVE**

The U.S. Environmental Protection Agency (EPA) and other state level regulatory bodies have already established laws with regard to the sheet metal and air conditioning industry. These laws cover such topics as asbestos, clean air, clean water, hazardous materials transportation and occupational safety and health. Under the Clean Air Act, each state is responsible for submitting an operating permit program for approval to the EPA. Some sheet metal shops may already have (or may need) permits to vent emissions from certain operations. The Clean Water Act requires special permitting for Sheet Metal Shops that discharge pollutants into local rivers or streams. Should the shop empty pollutants into a drain that is connected to a municipal water system, they will be required to comply with pretreatment requirements from the local treatment works.

For example, the State of Illinois EPA classifies a hazardous waste as one that is either on the Illinois EPA hazardous waste list or a waste that has the characteristics of ignitability, corrosivity, reactivity or toxicity. In addition, the product containers will also be listed as hazardous waste if they contain more than one (1) inch of residue when they are disposed of. In the EPA's list of top ten ozone reducing activities, two pertain directly to restricting the use of solvent-based products or restricting the use of products that cause fumes.

For more information on environmental laws and Acts, here are several helpful resources:

- U.S. Environmental Protection Agency
- State or Local Environmental Protection Agency
- Indoor Air Quality Information Clearinghouse, EPA
- Toxic Substances Control Act Assistance Information Svc EPA

### **What really does matter when specifying a duct sealant?**

The 1995 Edition of the SMACNA Duct Construction Standards addresses liquid sealants in section 1.7.2 and 1.7.11 and recommends an NFPA 90A rating of a flame spread not exceeding 25 and a smoke developed rating not to exceed 50. All quality duct sealants should conform to the NFPA rating, as well as being UL 723 listed.

### **Other Characteristics to Consider:**

- Sealing strength and adhesion to metal surfaces at all pressures
- Permanent flexibility
- Durability and minimal shrinkage
- National Fire Protection Agency 90A and 90B rating
- Underwriters Laboratories 723 Classification
- UV, water and mildew resistance
- Ease of application and spreadability
- Anti-sagging characteristics

In our efforts to formulate the best duct sealant in the marketplace, Ductmate Industries has researched all the available duct sealants—both solvent and water-based. PROseal is a premium water-based sealant, suitable for low, medium and high-pressure applications with excellent results and definitely stands alone in the duct sealant arena! PROseal has been pressure tested to 15" w.g. after 24 hours with no leakage.

The following comparison takes a look at several of the leading solvent-based products and how they rank versus the Ductmate PROseal. Please take some time to review the chart, digest the discussion and characteristics of a quality duct sealant and then ask yourself;

***“What is the best duct sealant on the market that complies is also environmentally friendly?”***

We feel confident that PROseal will be your answer!



	<b>DUCTMATE PROseal™</b>	<b>United McGill United Duct Sealer™</b>	<b>Hardcast Sure Grip™</b>	<b>MON-ECO 44-50™</b>
Base	Water	Solvent	Solvent	Solvent
Volatile Vehicle	Water	Toluene, Hexane	Toluene, Heptane	Toluene, Hexane
Odor: Wet	Very Mild	Strong	Strong	Strong
Respirator Recommended	None	NIOSH/MSHA Approved	N/A	Dual Cartridge
Flashpoint: Wet	None	-4 F	< - 25 F	- 4 F
Dry Time - To Touch Dry Time - Full Cure	1 Hour 24 to 72 hours	N/A 48 hours	N/A 24 hours	15 minutes 48 hours
Clean Up	Soap & Water	Mineral Spirits Solvent	Mineral Spirits Solvent	Xylol, MEK, Ethylene Chloride
Union Label	Yes	No	No	No
Flexibility	Excellent	Fair	Excellent	Good