



The Importance of Solid Contents in 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 would like to share these discussions 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 water-based duct sealants. Some manufacturers have claimed that a higher solids content alone indicates a superior performing sealant. This is not necessarily a correct statement and we would like to explain why. More specifically, we will discuss the influence that solids content has on the performance of duct sealant.

First, it is important to know what a sealant compound consists of and secondly, how solids contribute to the compound. In general, water-based duct sealants are composed of a binder, filler, thickeners, and other additives.

Binders are the main ingredients that hold the sealant system together and are typically a latex rubber of some sort. As a raw material, a binder is generally a 40% to 60% solid composition.

Fillers are materials such as limestones, talc, fibers, and clays that are used for fill strength and anti-cracking properties. Fillers are almost always 100% solid.

Thickeners come in many different compositions from polymer emulsions to clays and typically account for a small percentage of the total sealant. Solid content can range from 15% for polymer types, up to 100% for clay thickeners.

Additives include preservatives, flame retardants, surfactants, plasticizers, adhesion promoters, pH buffers and anti-freezing agents just to name a few. Additives will vary depending upon the application of the specific sealant. Solid content can vary from 0% to 100% depending on the additive but, as with thickeners, represents only a small percentage of the total sealant composition.

For the sake of this discussion, a solid shall be

defined as anything remaining in the sealant after curing. Non-solids shall be defined as anything that evaporates from the sealant during the curing process. This discussion focuses mainly on the binder and the filler, as they are the main contributors to sealant solid content. If a high solid content was the only requirement for a duct sealant, the manufacturer could increase the filler content until the appropriate solid level was attained. Simple in concept, however the sealant performance will be compromised because an increase of the filler means a decrease in the binder content. Picture it as if the binder were the strings of a fish net. Initially there are enough strings in the net to hold its catch securely. If the number of strings in the net is decreased (binder percentage decreased), then the holes in the net become larger allowing fish to slip between the gaps. The binder is the main "glue" that holds everything together in a sealant. When there isn't enough "glue" to hold everything together, the integrity of the sealant is compromised which can lead to premature failure due to poor water resistance, low tensile strength, lack of flexibility and decreased life span due to UV exposure.

On the other hand, low solids content could be obtained by decreasing the filler content and adding more water to mixture. This can also prove bad since not enough filler can lead to cracking, increased drying time and shrinkage of the cured sealant. If high solids can be bad and low solids can be bad, then what constitutes a quality sealant? The proper balance between binder and filler will ensure that a sealant will perform all the tasks demanded of it such as proper drying time, flexibility, low shrinkage, crack resistance, water resistance and others. When a proper balance is obtained, the solid content becomes somewhat secondary to sealant performance.

Clearly many factors determine the quality of a water-based duct sealant and no single characteristic should be the determining factor for performance. Solids percentage tells little of the sealants performance characteristics since they could be either inexpensive fillers or quality binders.

DUCT SYSTEM INSIGHTS WITH AN ENGINEERING PERSPECTIVE

What really does matter when specifying a duct sealant?



- National Fire Protection Agency 90A and 90B Rating
- Underwriters Laboratories 723 Classification—Surface Burning Characteristics
- UV, water and mildew resistance
- Sealing strength and adhesion to metal surfaces
- Permanent flexibility
- Ease of application and spreadability
- Anti-sagging characteristics
- Durability and minimal shrinkage
- Ability to meet specialty needs for various applications



Ductmate Industries has researched all duct sealants available on the market to formulate our own superior water-based duct sealant—PROseal. PROseal is suitable for low, medium and high-pressure applications with excellent results and definitely stands alone in the duct sealant arena! Ductmate utilizes state-of-the-art metering and measuring equipment to ensure a consistent quality product again and again.

The following comparison takes a look at several of the leading competitors 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 water-based duct sealant on the market?”** We feel confident that PROseal will be your answer!

Sealant Characteristics	Ductmate PROseal	Leading Competitor A	Leading Competitor B
Solids Content	66%	70%	70%
Brush Drag	Good	Good	Extremely High
Viscosity	300,000 cps	211,200 cps	355,000 cps
Water Test Consistency Adhesion	Firm Good	Softens Marginal	Softens Loosens
Accelerated Aging Test Hardening Fading Flexible	Slight Slight Yes	Considerable Slight Cracks	N/A N/A N/A
Flexibility	Excellent	Good	Poor (Cracks)
Odor	Mild	Good	N/A
UL 723 Classification Flame Spread Smoke Developed	0 0	5 0	5 0
Union Manufactured	Yes	No	No