



# Metric Felt Company

Wool Felt Products and Industrial Textile Conversion Manufacturing

## Adhesive Notes/Recommendations

To obtain an optimal bond:

1. Proper cleaning to reduce surface contamination is the best way to improve the bond of the adhesive.
2. Firm, even pressure across the entire surface improves the bond of the adhesive.
3. Foam tapes allow for greater surface contact than film tapes when adhering to rough or irregular surfaces.
4. To firmly secure edges, apply pressure to the tape from the top down or center out and give extra attention to the edges.
5. Tape should be applied at a temperature between 65°F and 100°F. The tape as well as the application surface should be at ambient temperature.

How do the materials I use affect adhesion?

Adhesion is the force of attraction between two materials or substrates. The strength of attraction is determined by the surface energy of the substrate; the higher the surface energy the greater the attraction, the lower the surface energy the weaker the attraction.

Adhesion characteristics are different on the substrate used. Knowing the substrate used helps to determine the proper adhesive to produce a quality bond. For example, Polypropylene is a low surface energy substrate and would be harder to stick to than a high surface energy substrate like ABS.

The texture of the substrate can also affect the adhesion. Smooth surfaces are easier to bond to than textured or rough surfaces in cases where the surface energy is equal.

## Surface Energy Chart (by Nominal Dyne Level)

### Metals/Minerals

1103 Copper  
 900- Stainless Steel  
 840-Aluminum  
 400-Glass

### High Surface Energy Plastics

47-Phenolic    42-ABS  
 48-Nylon        42- Polycarbonate  
 43- Polyester    38- Styrenes  
 43-Epoxy Paint 39-PVC

### Low Surface Energy Plastics

33- EVA  
 31- Polyethylene  
 29- Polypropylene  
 37-PVA

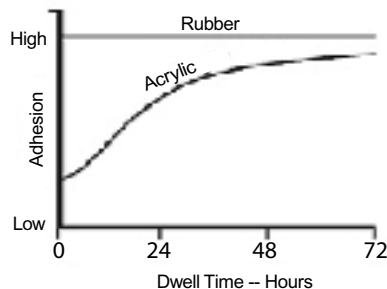
\*note: These values are provided as a guide. Modifications in formulation or process can substantially alter surface energy

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## General Adhesive Characteristics

### Rubber Based

- High initial adhesion
- Some adhesion buildup
- Good shear strength
- Moderate temperature resistance
- Fair UV resistance
- Poor plasticizer resistance
- Poor to good chemical resistant



Rubber-based: A rubber-base adhesive provides the most cost effective product for many applications. Its ability to immediately bond well to various surfaces makes it the first option when using double adhesive foam tape. Rubber-based adhesives provide greater initial adhesion (initial tack), which is important when the need for load bearing is immediate.

Acrylic-based: Pure acrylic adhesives have a propensity to withstand UV exposure better than rubber formulations. Rubber-base will lose its tack more quickly under direct exposure. Acrylic adhesives are resistant to plasticizers such as flexible PVC. Rubber-based will be attacked by the plasticizer and break down to a gooey substance. Acrylic adhesives will typically require more set-up time to create a good bond, generally 24 to 48 hours.

### Application Tests

Whenever possible, we recommend an Application Test be conducted; especially for the following:

- Surfaces with powder coatings – surface energy levels vary.
- UV cured overlays – very difficult to bond to. Surface block-outs may be required.
- Very rough surfaces – could require foam tape\*

*\*Rule of thumb for holding power of foam tape is ½ to 1 lb. per in<sup>2</sup> of tape. Conditions and variables in applications can produce different stresses and affect holding power.*

### Acrylic-Based

- Fair initial adhesion
- Gradual adhesion buildup
- High shear strength
- High temperature resistance
- Excellent UV resistance
- Good plasticizer resistance
- Good chemical resistant

How does surface preparation affect the product's performance?

Dirt, oil, paint, dust, release agents, inhibitors, or other contaminants on the surface of the substrate can interfere with the adhesive and affect the bond. Surface preparation may be required to remove the contaminants and improve the performance of the adhesive. The type of substrate determines the best cleaning method to use in surface preparation.

Three main ways to prepare surfaces are:

1. General cleaning – use detergent and water to clean most surfaces, drying with a clean lint-free cloth. In instances where the surface has only dust or loose particles you can use a clean lint-free cloth alone to prepare the surface.
2. Solvent Cleaning – use a solvent such as acetone or isopropanol.
3. Abrasion – use to remove films, surface treatments and paint; often followed by solvent cleaning.

Note: in applications where tape will be applied to printed or coated materials, masking out the section where the tape will adhere before coating could eliminate the abrasion step and improve the tape's bond. This can be done before coating the substrate or afterward with surface primers.

What other factors will affect adhesion?

There are many factors that could influence the bond between two materials. The following are common factors that would need to be understood to determine the proper material/adhesive combination:

- Temperature
- Ultraviolet light
- Humidity
- Surface coatings
- Chemicals
- Physical stresses
- Time
- Surface contact