



# Using Liners in Conjunction with 3M™ VHB™ Extrudable Tape GP

Technical Bulletin

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## Introduction:

3M™ VHB™ Extrudable Tape GP is a high-strength pressure sensitive adhesive that is typically extruded at temperatures between 375-425 °F (190-220 °C). Release liners should be used to protect the adhesive bead when the next assembly step is intended to take place at a different location or at a later time such that the bond line needs to be protected from surface contamination or UV exposure. This could be days to months after the adhesive bead is applied to the first substrate. This document provides guidance for two scenarios:

- Extruding adhesive directly onto a liner
- Extruding adhesive onto a part and then covering the exposed side with liner

## Guidance for applying 3M™ VHB™ Extrudable Tape GP directly to a release liner:

1. **Use a liner that can maintain stability at 375-425 °F (190-220 °C)** - Properties of a few common liner options are listed below. Liner stability should be evaluated through visual (aesthetic) and performance testing of the liner
  - Typical PET (polyester) melting point is ~ 260 °C (500 °F). PET liner was the most stable in 3M testing.
  - Typical polyethylene (PE, HDPE, LDPE, etc.) melting points are between 105-135 °C (220-275 °F)
  - Poly-coated kraft (PCK) liners have a polyolefin coating and likely have similar melting points to PE.
  - Densified kraft (DK) liners can resist greater heats, but roughness on the liner can lead to bubbling due to air entrapment in the paper fibers.
2. **Extruding at lower temperature (~375 °F or 190 °C) can aide in processing.** The lower extrusion temperature can lead to less deformation/wrinkling of the release liner.
3. **Release liners with greater/tighter liner release values showed better stability in 3M tests.** Premium release (low release force) liners may exhibit difficulties in dispensing onto the liner and unintended premature de-bonding of the liner, especially when the adhesive bead is more rounded. This is shown in pictures below – the picture on the left shows liner with good contact to the whole adhesive surface while the picture on the right show premature de-bonding with a lower release liner.

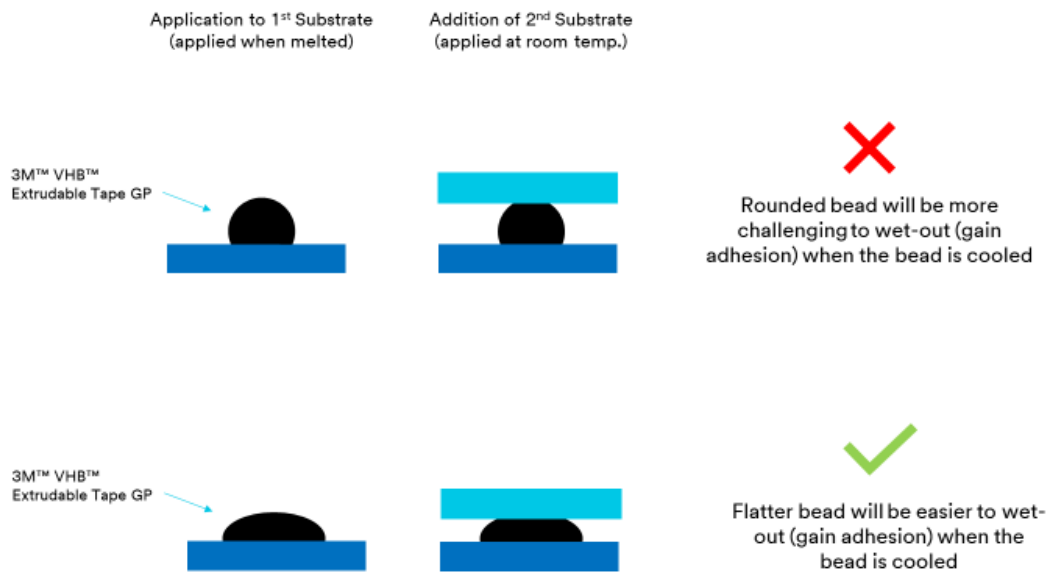


Figures 1-2: Tight liner adhesion on left, premature de-bonding due to low liner adhesion on right

**Guidance for applying release liner to 3M™ VHB™ Extrudable Tape GP after it is extruded:**

Air exposure to 3M™ VHB™ Extrudable Tape GP can reduce the tackiness of the adhesive. Applying a release liner over the exposed adhesive will help the adhesive maintain tackiness.

1. **Design the bead geometry around the part it is being bonded to** – At room temperature, 3M™ VHB™ Extrudable Tape GP will be firmer and less able to wet out (gain adhesion) than when it is extruded at higher temperatures. Formatting the adhesive bead in a way that allows flat contact with the second part can aid the adhesive wet out process (making of the adhesive bond through surface contact). Figure 1 below illustrates this point



If a rounded bead is desirable for the application, a more conformable liner and/or a higher liner release value can help.

2. **Use liner that can withstand the heat of the adhesive** – 3M VHB Extrudable Tape is usually extruded between 375-425 °F/190-220 °C. If applying liner directly after

extrusion, the adhesive can still be at high temperatures so the liner should be tested to verify that it can withstand the heat. Another option is to wait until the adhesive cools.

3M sells a variety of secondary liners that have been tested with 3M™ VHB™ Extrudable Tape GP. Liner release values tested at room temperature and after 70°C conditioning for 3 days are shown below. Liner release can have an impact on how well the liner covers the exposed bonding area. As noted in the general liner application tips, weeks or months of air exposure to 3M™ VHB™ Extrudable Tape GP can reduce the tackiness of the adhesive.

Product Number	Liner Type	Label (LS) or Non-label side (NLS)	Gloss / Matte	3 days aging at 70 °F (21 °C) (AVG Force, g/inch)	3 days aging at 158 °F (70 °C) (AVG Force, g/inch)
4998	58# PCK	LS	Matte	16.4	24.1
		NLS	Gloss	14.3	33.1
4988	83# PCK	Matte	Matte	Not a release surface	Not a release surface
		Gloss (NLS)	Gloss	57.3	56.8
4987	3 mil HDPE	Matte	Matte	Not a release surface	Not a release surface
		Gloss (NLS)	Gloss	17.9	13.3
5002D	2 mil PET	LS	Clear	16.4	8.8
		NLS	Clear	14.4	13.1
4999	55# DK	LS	Gloss	57.2	57.9
		NLS	Semi-Gloss	Not a release surface	Not a release surface
4994	55#DK	LS	Gloss	29.5	75.0
		NLS	Gloss	14.3	19.4

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