

How silicone coverage, and adhesive and silicone coating thickness affect release performance

Facts on file

Release performance is affected by a very large number of potential variables. These include the degree of coverage of the silicone coating as well as the thickness of both the coating and the adhesive.

Silicone release coating coverage

The degree of silicone coverage of the base liner is a major factor affecting release. If greater or larger portions of the base are left uncoated or incompletely coated, the adhesive will contact the base, and release values will be both higher and less stable with time.

Coverage measurement – Coverage is easily tested on paper substrates by one of a number of dye stain methods. Essentially, the stain covers the paper and not the silicone. Non-covered areas are easily seen. However, just how complete coverage needs to be to provide acceptable performance is somewhat more subjective. It is not difficult, however, to provide a dye stain “standards” match to release performance. Colorimetric measurement methods are also commonly used to assign a quantitative value to coverage.

Adhesive and silicone coating thickness

Adhesive and silicone coating thickness also affect release force measurement. The greater the thickness of either, the greater their energy-absorbing capabilities as they stretch, and the higher the release forces required. However, for stiff, fairly inelastic examples, the impact may be very small.

Figure 1 shows the impact of silicone coat weight (or layer thickness) on release values for three silicone systems. “A” represents the amount necessary for total coverage; less allows paper fibers to affect release values. Figure 2 shows how adhesive thickness affects release force.

Coat weight measurement – Coat weight measurement is very easy today, thanks to the emergence of benchtop x-ray fluorescence units that accurately measure silicon content. To translate this to coat weight, however, known standard coat weights are required; so the instrument is only as good as its calibration. Neverthe-less, these instruments have wrought a mini-revolution in the silicone release coating industry. Methods of coat weight measurement based on other forms of detection do exist but are not widespread. Methods based on usage can also act as a general check.

Figure 1: Effect of film thickness on release

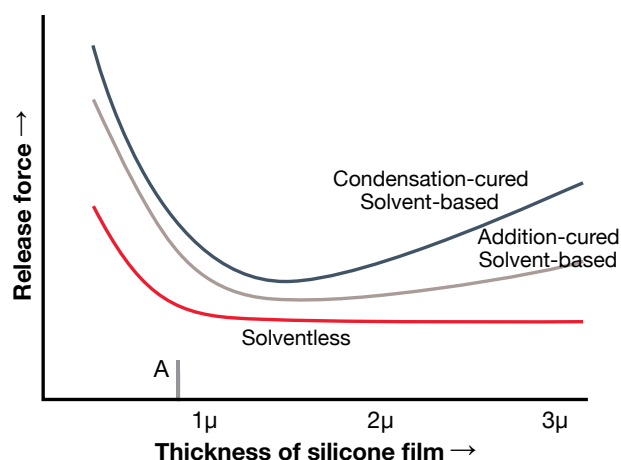
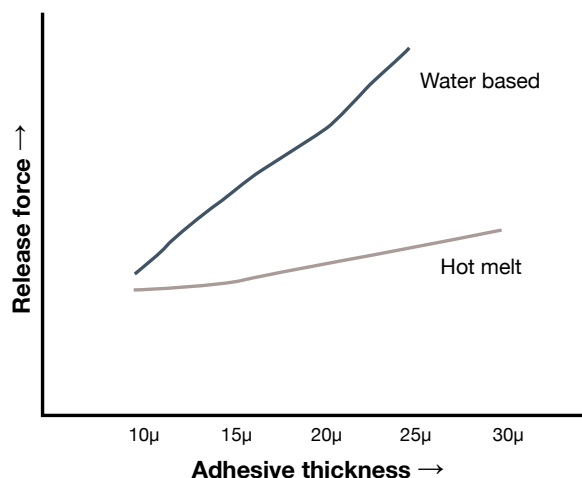


Figure 2: Effect of relative thickness and adhesive type



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Form No. 30-1108-01-0321 S2D