



Shrink Sleeve Guide

General

DuPont Teijin Films' Mylar[®] 867 is a ready-to-shrink polyester film, manufactured to retain a high degree of elastic strain energy which can be released by heating the film above 75°C, the glass transition temperature for PET polyester film. Once heated the film will shrink in excess of 70% in one direction only. Both sides of the film are receptive to a variety of inks and solvents, particularly THF, which is used widely to seam film into sleeves.

Reel Ordering, Handling and Storage

Mylar[®] 867 is produced in thicknesses of 45 and 50 µm, and to standard lengths as defined in the table below.

Thickness	Allowable Lengths / m
45µm	3000, 6000
50µm	3000, 6000

Reels should be stored on the delivery pallets until required. The reels should be lifted using proprietary slings and lifting equipment and should not be left to rest directly on the ground as the weight of the reel can cause crushing, creasing or flat areas through the film reel which can lead to problems during printing.

It recommended that the film is stored away from direct sunlight and preferably at a temperature below 35°C. Additionally, we recommend that film reels be used within six months of purchase.

Processing

Printing

The mechanical properties shown below highlight that Mylar[®] 867 has very different mechanical properties in each direction. (TD – Transverse Direction, MD – Machine Direction) Tensile properties in the Machine Direction are lower than those of normal PET film since the film has not been oriented in this direction. For this reason extra care should be exercised with regards to snatching of untensioned film, particularly during press start up or turreting.

Property	45µm		50µm	
	MD	TD	MD	TD
Yield stress / MPa	42	90	45	90
Ultimate tensile strength / MPa	40	250	50	250
Elongation to break / %	>400	45	>400	60

Drying temperatures need to be maintained such that the film temperature does not exceed 50°C. Additionally, because of the lower yield stress, the printing press line tension should be carefully monitored to ensure that necking down of the film does not occur.

Solvents retained after printing cannot only lead to unpleasant odours but also to embrittlement of the film. Mylar[®] 867 is less susceptible to this embrittlement than many other shrink films but it is strongly recommended that printing process conditions which minimise solvent retention are chosen.

Any slitting operations performed after printing should be conducted using sharp blades. Failure to do so can result in the formation of a thickened and raised edge. Due to the tougher nature of shrinkable PET polyester films, knife wear rates will be higher than when slitting standard polyester films.

Seaming

In this operation one of the outer layers of the Mylar[®] 867 is solvated using an appropriate solvent such as THF and then, after a controlled evaporation time, the film is pinched together to form a continuous tube or 'lay-flat'. Pressure applied by the nip rollers should be carefully controlled as high pressures can cause problems, in particular plastic deformation of the film may occur with the result that the lay-flat can be difficult to open in the sleeving process or crease marks will be visible on the finished sleeved article.

Peel strengths of overlap joins made using THF will typically yield values in excess of 1400 g/25mm, with destruct bonds being routinely achieved.

Listed below are some alternative solvents to THF. THF is the preferred solvent for Mylar[®] 867 but substitution of alternative solvents or combination of THF with other solvents listed below have been shown to product acceptable seams. Careful experimentation should be conducted to ensure that no 'whitening' of the seam area occurs during shrinking or storage. The quality of the seaming solvent should be carefully considered as impurities can lead to a variety of seam related defects. Similarly if a retarder is used to increase the solvation time, care needs to be exercised to ensure that this solvent does not remain in the finished article.

Solvent	Comments
Tetrahydrofuran (THF)	Standard seaming solvent
THF + n-hexane (20:1)	n-hexane used as a retarder
1,3-dioxolane	THF alternative
1,2-dichloroethane	chlorinated solvent
Methylacetate	slow solvent
Cyclohexane	retarder

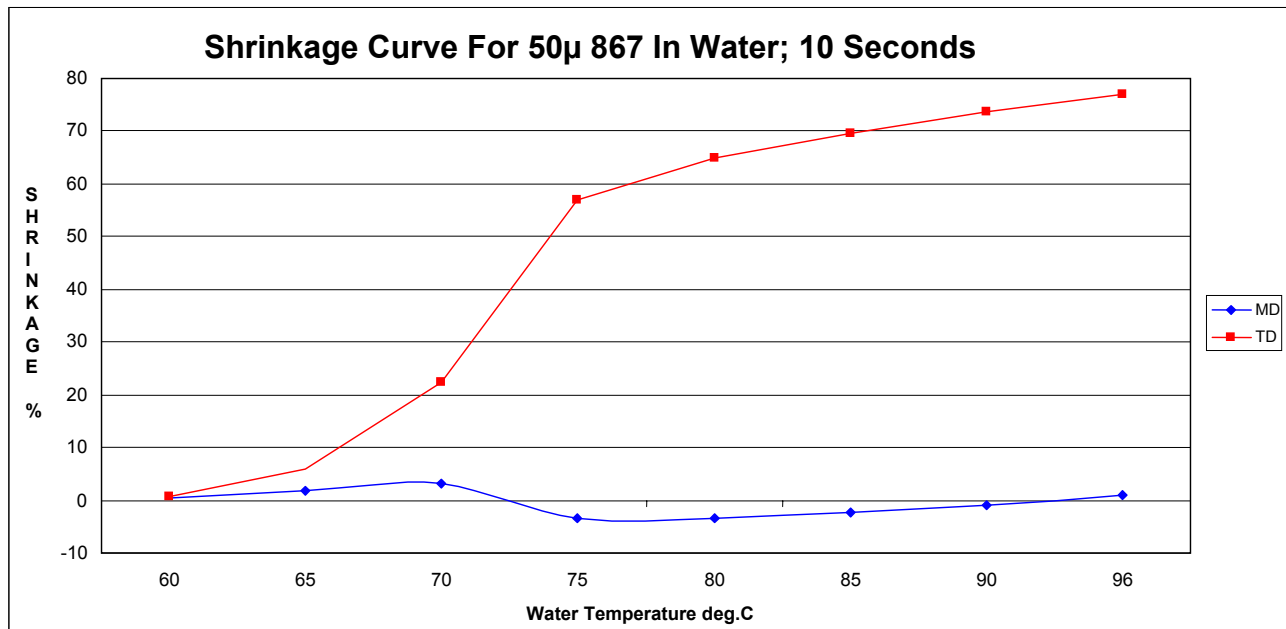
Excessive use of solvents can lead to the lay-flat becoming welded together internally or externally. If the solvent bead is too wide and extends beyond the seam overlap the fault may be seen during the seaming operation. The more subtle effect is a time-dependent diffusion mechanism, which may take several days to

occur and therefore may not be identified at the conversion stage. High retained-solvent levels arising from the printing stage can also produce similar effects, particularly on the inside of the layflat.

Sleeving

Application of the sleeve over the bottle should be performed using established sleeving techniques.

Shrinkage around the chosen article can be induced using either steam or ambient tunnel equipment. Although ultimately shrinking by the same amount, measurements of film shrinkage taken in water will tend to show a shift in the curve to lower temperatures for a given shrinkage when compared to measurements taken in air. This effect is due to plasticisation of the film by the water. Unless otherwise stated ALL measured shrinkages for Mylar® 867 are measured in water for an immersion time of 10 seconds.



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'Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, see "DuPont Teijin Films Medical Caution Statement", H-50102-1-DTF.'

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