

TekniMD® PX Films

Thermoforming Guidelines

TekniMD® PX films are proprietary copolyester films specifically designed to meet the needs of medical device packaging.



Backed by extensive testing, TekniPlex has demonstrated that PX films are a suitable replacement for PETG packaging applications. PX film has been successfully thermoformed on male and female tools that were originally built for PETG. This means that you can easily switch without incurring the cost or lead time associated with tooling modifications. To optimize your thermoforming process and ensure the best part forming, the thermoforming guidelines below should be followed for the TekniMD® PX product line.

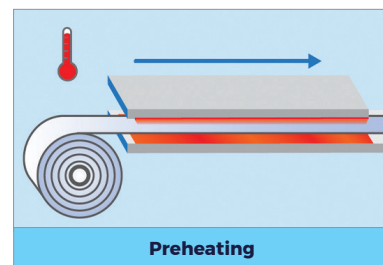
Storage prior-to-use:

TekniMD® PX and PX MED rolls should be stored in their original packaging between 15°C to 35°C (59°F to 95°F) and 30% to 70% relative humidity. The expected product life is two years after the manufacture date on the product label.

Preheating:

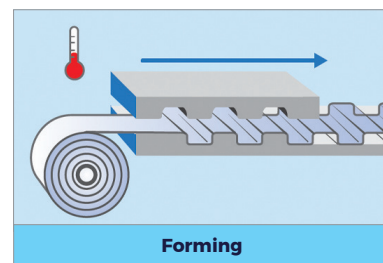
In general, TekniMD® PX films require less heat than PETG films and typically form at temperatures 5°C to 10°C less when compared to PETG. Thinner gauges (<15mil / 381μ) should require slightly less temperature than the thicker films. Preheating with top and bottom heater platens is recommended, and may allow for faster line speeds. Overheating may cause whitening or crystallization of the film.

- 100°C to 135°C (212°F to 275°F) is the typical preheat temperature range for PX films. Preheat temperature will vary based on the thickness of the film and the speed of the line.
- To scope out the optimum forming temperature, vary temperature by starting around 95°C (203°F), increasing upwards by 5°C to 10°C increments until you find the optimum temperature.



Forming:

- To achieve fully-formed parts, avoid cooling the film before forming and ensure you have sufficient vacuum to form the parts.
- Operate with a mold temperature of 20°C to 30°C (68°F to 86°F). Be aware that the chiller temperature set-point may be different than the actual temperature of the mold.
- 5 - 7 bars (72 - 102 psi) of vacuum pressure are recommended for PX films.
- For deeper draws, use a plug assist to improve thickness distribution of your part. Plugs made from syntactic foam, Delrin® or metal can be used.
- Typical plug assist forming cycle steps are:
 1. Film index
 2. Mold closes and plug form engages to approximately 2/3 part depth*
 3. Apply vacuum pressure as soon as the plug reaches full depth
 4. Withdraw plug and stop vacuum
 5. Open mold



*Note that Tekni-Plex has found better results when mold and plug come together simultaneously versus a set-up with lag time where mold comes first and plug follows.

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Cutting guidelines:

Trials have shown that TekniMD® PX films can be cut with conditions similar to those of PETG. The adjustments that are made are typically within the normal process settings that are used with PETG.

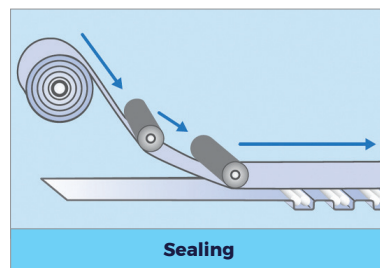
- You may need to make small knife adjustments versus PETG to achieve a deeper cut. In addition, more time, and slightly more pressure may be used to optimize cutting.
- Some customers have reported a need to increase spring tension on blades or slight increase in the pneumatic air pressure on cutting stations to cut properly as compared to PETG.
- When TekniMD® PX and PX MED materials are used, slightly more preventative blade maintenance may be required to maintain a clean cut edge.

Sealing:

Sealing trials conducted with TekniMD® PX films have been shown to successfully seal at the same temperatures, sealing pressure, and sealing time as that of PETG. We recommend utilizing your existing process.

Troubleshooting and optimization:

The primary failure modes seen in the thermoforming of PX films are either the appearance of a white or blueish haze or under-formed parts. The white or blueish haze indicates that too much heat is being applied to the film. Reduce heat and / or decrease dwell time to eliminate the defect.



When too little heat is applied, parts will not form properly:

- Increase heat and/or increase dwell time to improve forming.
- Plug and vacuum timing may also require adjustment to optimize forming.

With TekniMD® PX films, you also have the opportunity to run faster line speeds by increasing the pre-heating temperatures within the higher recommended temperature range and speeding up your line. You may achieve up to 10 - 15% increase in line speeds versus PETG when running PX films at their higher temperature range. If the white or blueish haze appears, back down the temperature and line speed until it disappears.



For additional information, please visit:
tekni-plex.com/healthcare