

# Sealed Package Hole Punch Testing



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**Customer  
Name**  
**1/1/2023**

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# Project Summary

## Project Details

<b>Date</b>	January 1, 2023
<b>Customer Name</b>	Customer Name
<b>Address</b>	123 Main St, Anytown OH, 12345
<b>Contact</b>	Customer Contact Info
<b>Lako Technician</b>	Technician Name
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<b>Project Number</b>	FT-23-0XX
<b>Lako Estimate Number</b>	12345
<b>Order Number</b>	12345

## Supplied Materials

<b>Material</b>	<b>Description</b>	<b>Film Thickness</b>	<b>Package Dimensions</b>
Film 1	Blue Transparent Film, Manufacturer's ID tag	0.003" [0.076 mm]	1" [25.4mm] x 2" [50.8mm] x 3" [76.2mm]

# Project Summary (continued)

## Supplied Materials (continued)

	
<p>Film 1 – As Received</p>	<p>Package 1 – As Received (for reference)</p>

## Supplied Parameters

<p><b>Material</b></p>	<p>Film 1</p>
<p><b>Existing Seal Profile</b></p>	<p>12P</p>
<p><b>Product</b></p>	<p>Product</p>
<p><b>Current Dwell Time</b></p>	<p>Approximately 300 - 500 ms</p>
<p><b>Current Seal Temperature</b></p>	<p>350° F [177° C]</p>
<p><b>Current Hole Punch</b></p>	<p>Hot Punch at 545° F</p>



# Project Summary (continued)

## Scope of Work

The supplied film was cut into 1” strips, then folded and sealed to provide samples for hole punch testing. These samples had holes punched manually using both a hot punch and a mechanical punch. A tensile tester equipped with a hook was used to pull the sample until failure.

Test Steps
Preliminary Setup
Hole Punch Testing

### Equipment used:

	
TMI – Hot-Tack Tester and Seal Tester SL-10 75-50	Mark-10 – ES30 Test Stand and Series 7 Force Gauge

	
Lako HCP Control	Lako HCP Punch

# Results

## Preliminary Setup Testing

### Preliminary Setup Testing Details:

Sample Width	Dwell Time	Pressure
1" [25mm]	500 ms	40 psi

### Preliminary Setup Testing Results:

Material	Temperature	Observations
Film 1	200° F [93° C]	Film did not seal fully
	250° F [121° C]	Film sealed with no distortions
	300° F [149° C]	Film melted

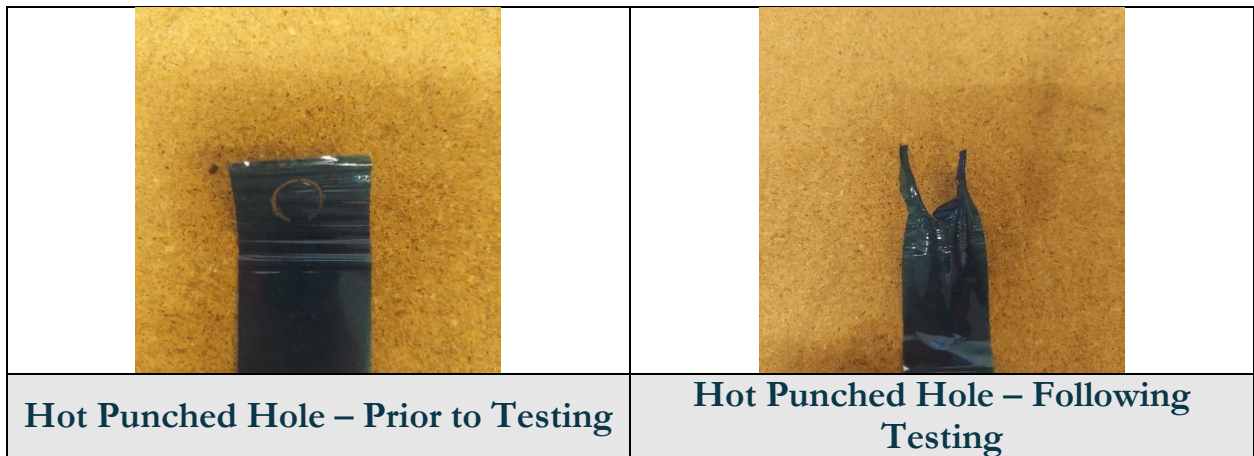
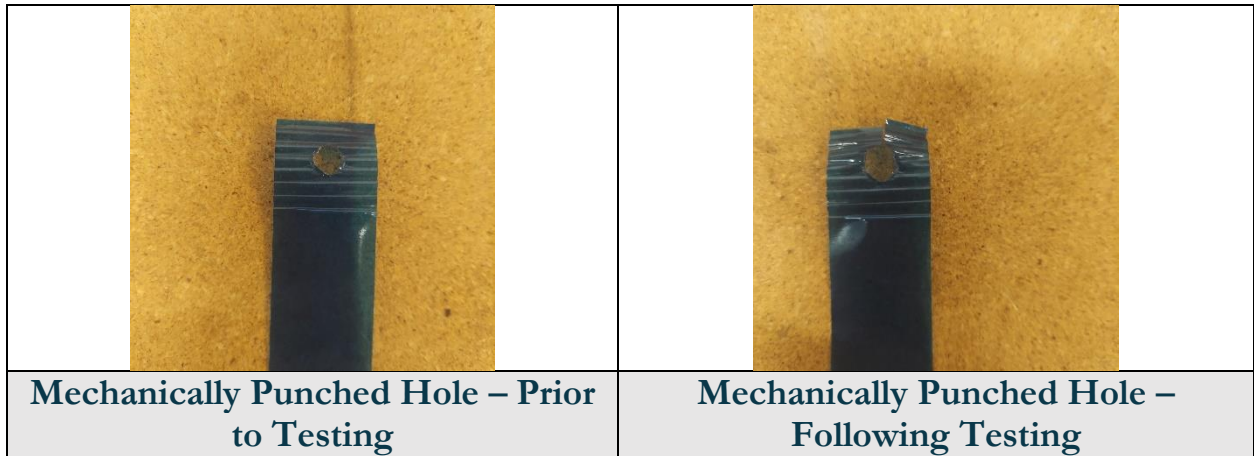
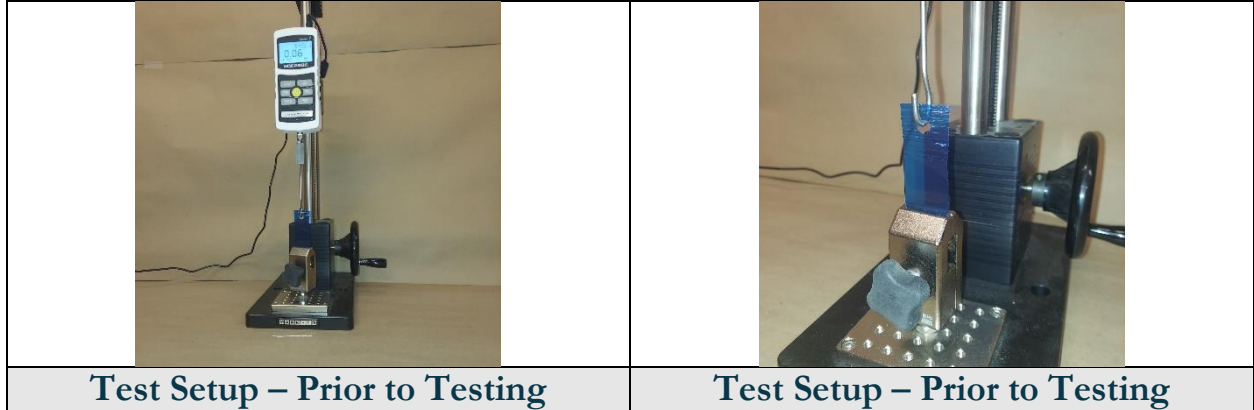
Based on observations from the preliminary testing, the recommended seal temperature is **250°F** [121° C]. Recommended hot punch temperature is **500° F** [260° C].





# Results (continued)

## Hole Punch Testing



# Results (continued)

## Hole Punch Testing (continued)

Material	Punch Method	Test #	Peak Force (lbf)
Film 1 (sealed)	Hot Punch at 500° F [260° C]	1	46.69
		2	47.01
		3	46.48
		4	45.73
	Mechanical Punch	1	8.11
		2	7.54
		3	6.38
		4	7.26

## Conclusion

### Hole Punch Testing

The hot punch holes were significantly stronger than the mechanically punched holes.

All testing was completed at LAKO. Equipment and operating conditions vary greatly between the LAKO lab and the client's facility and can be expected to account for some variation in the results achieved at LAKO.