

Sealed Package Hole Punch Testing



**Customer
Name
1/1/2023**



7400 Ponderosa Rd.
Perrysburg, OH 43552
(419) 662-5256



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Project Summary

Project Details

Date	January 1, 2023
Customer Name	Customer Name
Address	123 Main St, Anytown OH, 12345
Contact	Customer Contact Info
Lako Technician	Technician Name
Lako Contact	+1 (419) 662-5256 7400 Ponderosa Rd, Perrysburg, OH 43552
Project Number	FT-23-0XX
Lako Estimate Number	12345
Order Number	12345

Supplied Materials

Material	Description	Film Thickness	Package Dimensions
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)

	
Film 1 – As Received	Package 1 – As Received (for reference)

Supplied Parameters

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



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

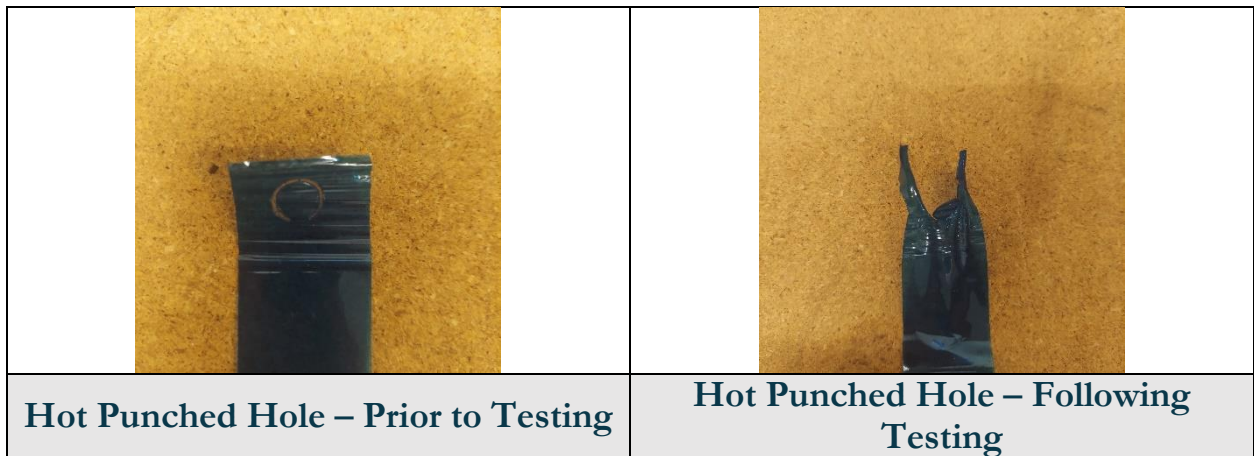
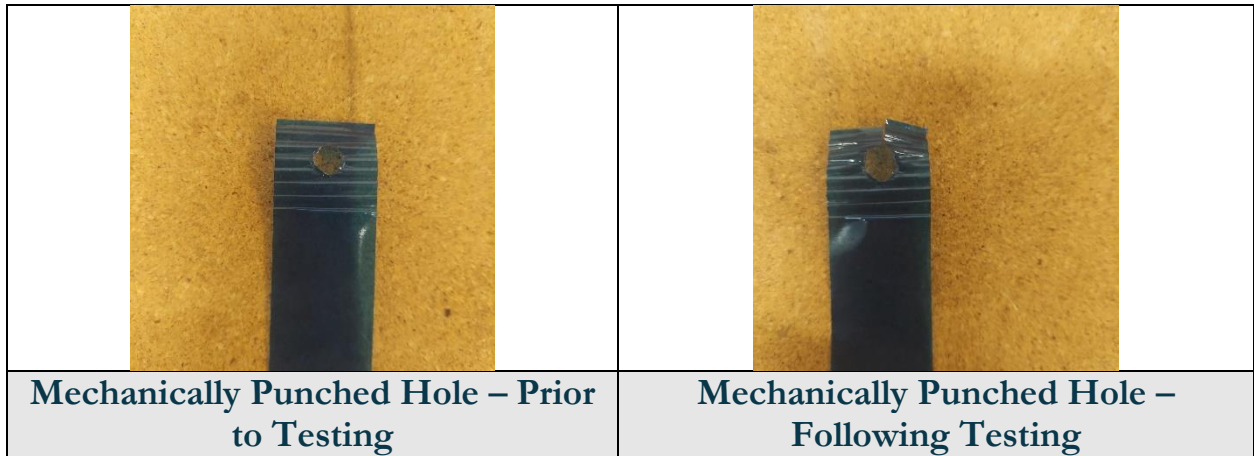
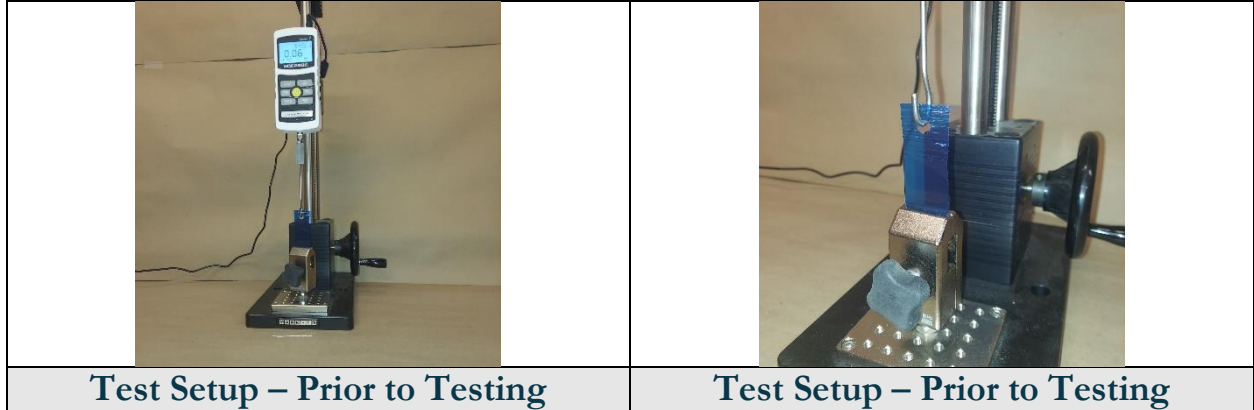
Based on observations from the preliminary testing, the recommended seal temperature is **250°F** [121° C]. Recommended hot punch temperature is **500° F** [260° C].



Preliminary Testing Samples

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 Tool. 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.