

Seal Strength Testing



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**Customer
Name
1/1/2023**

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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	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]

Project Summary (continued)

Scope of Work

The supplied film is to be tested for hot tack and ultimate seal strength to determine the ideal temperature to use when producing the sealed packages for the Seal Tooth Profile testing.

Test Step	Test Procedure Performed
Preliminary Setup	N/A
Ultimate Seal Strength Profile	ASTM F88-00
Hot Tack Seal Strength Profile	ASTM F1921-12

Equipment used:



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 temperature range for Seal Strength Profile Testing is **190° F to 280° F** [88° C to 138° C].

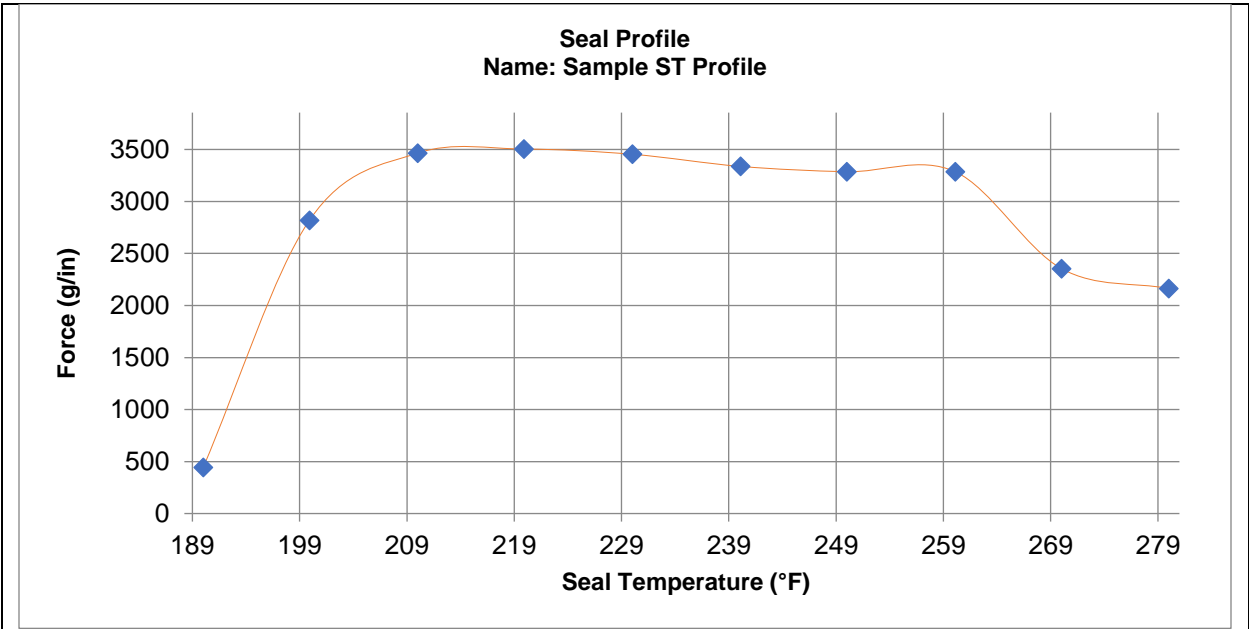


Results (continued)

Ultimate Seal Strength Profile Test

Machine Details:

Title:	Sample Test	Name:	Est 12345 FT-01-023 Sample Test
Machine S/N:	SL10S131102	Date:	01/01/2023 12:00:00 AM
Laboratory Temp:	74°F [23.3°C]	Operator:	XXX
Laboratory Humidity:	45%	Material:	Clear Film 0.003"
Upper Starting Temp:	190.0 °F [88° C]	Lower Starting Temp:	190.0 °F [88° C]
Upper Ending Temp:	280.0 °F [138° C]	Lower Ending Temp:	280.0 °F [138° C]
Seal Length:	1.000 in	Pressure Request:	40.0 PSI
Seal Width:	0.375 in	Jaw Pattern:	Steel Upper/ Steel Lower
Dwell Time:	0.500 sec	Peel Velocity:	0.20 in/sec
Cool Delay:	20.00 sec	Selection Method:	Peak



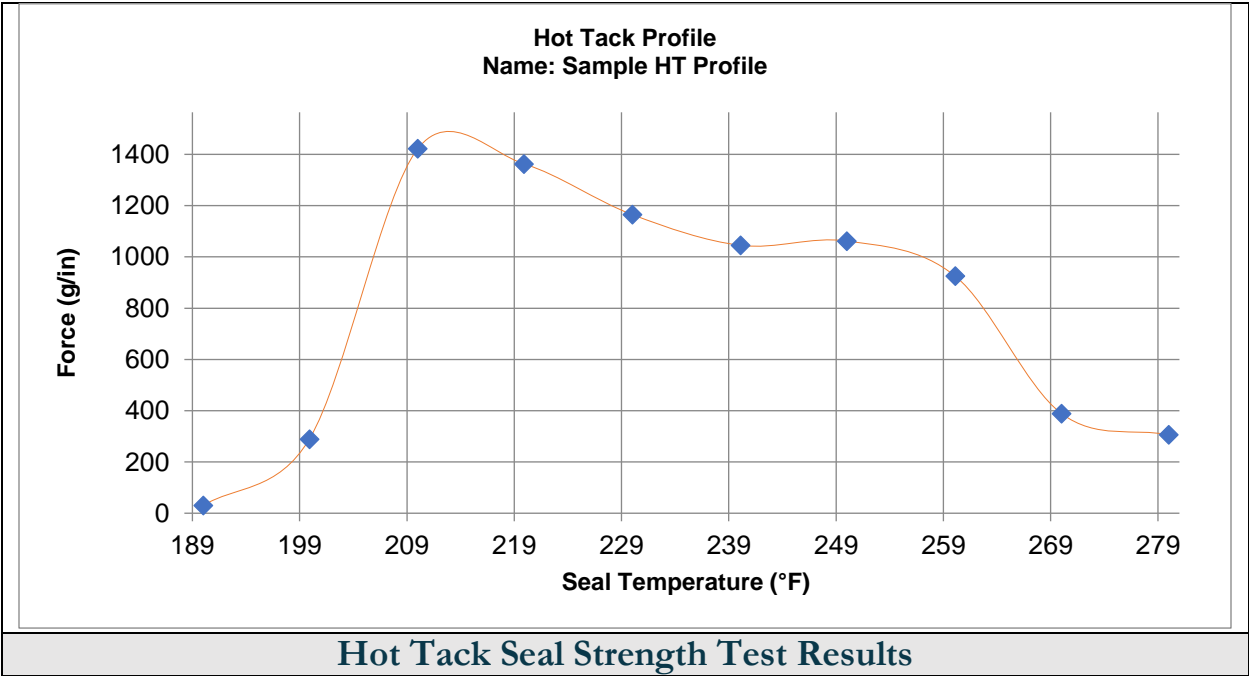
Ultimate Seal Strength Test Results

Results (continued)

Hot Tack Seal Strength Profile Test

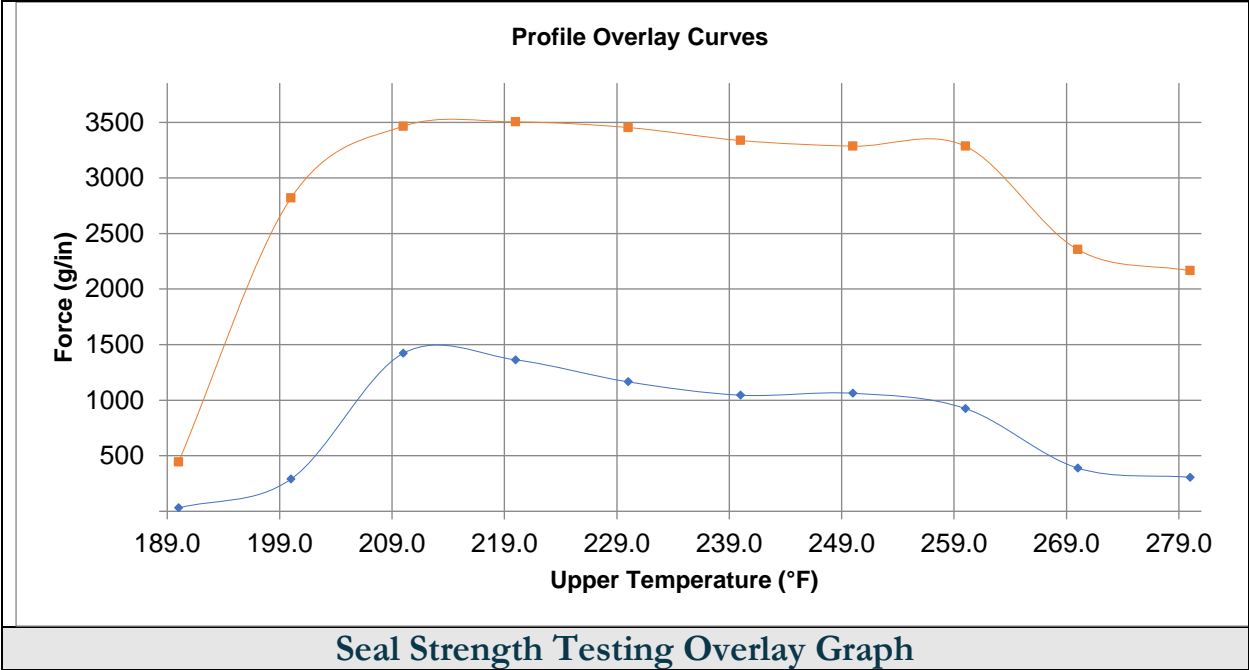
Machine Details:

Title:	Sample Test	Name:	Est 12345 FT-01-023 Sample Test
Machine S/N:	SL10S131102	Date:	01/01/2023 12:00:00 AM
Laboratory Temp:	74°F [23.3°C]	Operator:	XXX
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Upper Starting Temp:	190.0 °F [88° C]	Lower Starting Temp:	190.0 °F [88° C]
Upper Ending Temp:	280.0 °F [138° C]	Lower Ending Temp:	280.0 °F [138° C]
Seal Length:	1.000 in	Pressure Request:	40.0 PSI
Seal Width:	0.375 in	Jaw Pattern:	Steel Upper/ Steel Lower
Dwell Time:	0.500 sec	Peel Velocity:	0.20 in/sec
Cool Delay:	Immediate	Selection Method:	Peak



Results (continued)

Seal Strength Testing Overlay Graph and Sample Photos



Tested Ultimate Seal Strength Samples



Tested Hot Tack Seal Strength Samples

Conclusion

Ultimate Seal Strength Profile Test

The tested film had the highest strength around 220 °F [104° C]. The drop-off in strength was very large as the sealing temperature was reduced below 210° F [99° C], but the strength didn't seem to drop-off much as the temperature increased until reaching 260° F [127° C].

Hot Tack Seal Strength Profile Test

The tested film had the highest strength around 210° F [99° C]. The drop-off in strength was very large as the sealing temperature was reduced below 210° F [99° C]. While a noticeable reduction in seal strength as sealing temperature was increased, it was not a major reduction until the seal temperature reached 260° F [127° C].

Based on the test results, the optimal seal temperature range is approximately 210° F [99° C] to 220° F [104° C].

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.