

11"X9"X12"
1.5" CLIMACELL
ISTA 7E WINTER
DESIGN TESTING

October 22, 2019



11"x9"x12" 1.5" ClimaCell ISTA 7E Winter Design Testing	Test No.	1084-03
	Rev	1
	Date	10/22/2019
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1. Scope

Testing of the 1.5" ClimaCell coolers will involve packing the shippers with 3 x 24oz. gel packs and 1 vial carton with 15 x 3mL vials. Once packed, the shippers will be placed in an environmental chamber programmed with an ISTA 7E Winter profile. Upon test initiation, the shipper's internal temperature will be monitored and data collected in 5-minute intervals.

2. Testing Team

Michael Scipione
R&D Director
michael.scipione@temperpack.com

Stephen Conrad
Thermal Engineer
stephen.conrad@temperpack.com

Brynn Browning
Thermal Lab Technician
brynn.browning@temperpack.com

Signatory Approvals:

	Prepared By	Approved By	Released By
Print Name	Yuliana Luna	Michael Scipione	Derric Featherstone
Sign Name	<i>Yuliana Luna</i>	<i>Michael Scipione</i>	<i>Derric Featherstone</i>
Job Title	Associate Packaging Engineer	Director of R&D	Quality Manager
Date	23 OCT 2019	23 OCT 2019	23 OCT 2019



TemperPack

2601 Maury Street
Building 27A
Richmond, VA 23224
temperpack.com



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Revision History

Rev #	Context	Changes By	Date
0	Original publish	Yuliana Luna	10/13/2019
1	Fixed title rendering error	Michael Scipione	10/22/2019

3. Experimental Design

3.1. 1.5" ClimaCell Pack Out

3.1.1. Insulation:	1.5" ClimaCell
3.1.2. Coolant:	3 x 24oz. Gel Pack
3.1.3. Product:	15 x 3mL Vials
3.1.4. Corrugated Insert(s):	4 x Corrugated Sheets 32 ECT (C-Flute) 8" x 6"
3.1.5. Cargo Box Dimensions:	Telescope 5.9375"x3.375"x2"
3.1.6. Void Fill:	Kraft Paper
3.1.7. External Box Dimensions:	(11"x9"x12") RSC





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4. Test Parameters

4.1. Test Profile

ISTA 7E Winter
Tabular Data

<i>Time - Hr</i>	<i>Temperature °C</i>	<i>Time - Hr</i>	<i>Temperature °C</i>
0	14.2	25	8.3
1	13.7	26	8.3
2	12.8	27	7.9
3	12.3	28	7.5
4	11.3	29	7.1
5	10.1	30	6.8
6	9.2	31	6.5
7	8.6	32	6.3
8	7.9	33	6.4
9	7.3	34	6.2
10	7.1	35	6.0
11	6.7	36	5.7
12	6.2	37	5.2
13	5.8	38	5.5
14	5.3	39	5.9
15	4.9	40	6.2
16	4.5	41	5.6
17	4.3	42	4.5
18	4.3	43	3.4
19	4.7	44	3.5
20	5.7	45	4.2
21	6.5	46	4.3
22	7.0	47	4.7
23	7.7	48	5.0
24	8.4		





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4.2. Test Product Load

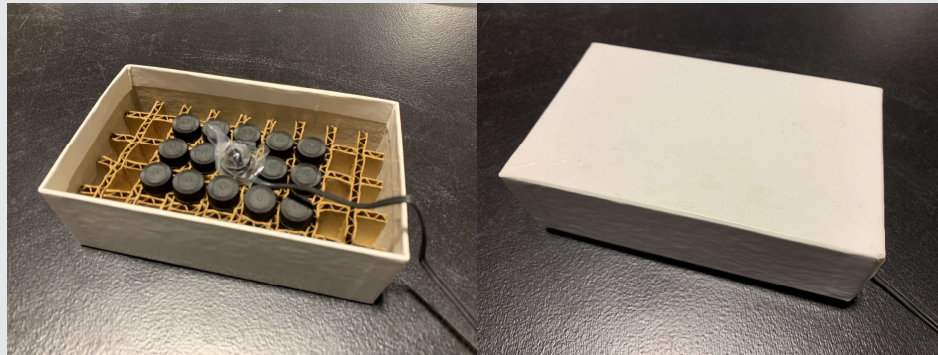


Fig 1: Product Container (15 x 3mL Vials)

4.3. Temperature Staging Requirements.

4.3.1. Coolant

Room Temp Gel packs were conditioned at lab ambient for a minimum of 24 hours.

Frozen gel packs were conditioned at -20°C for a minimum of 24 hours.

4.3.2. Packaging

N/A

4.3.3. Payload

Payload was conditioned at 4°C for a minimum of 24 hours.



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4.4. Data Logging

- 4.4.1. Time Interval: 5 minutes
- 4.4.2. Start Option: Upon activation (no delay)

4.5. Temperature Probes

- 4.5.1. Product: Center 3mL vial probed
- 4.5.2. Ambient: Temperature monitored by the chamber and ambient logger placed inside chamber

4.6. Acceptance Criteria:

The probed vial must stay between 2-8°C for a minimum of 30 hours

5. Packout

- 5.1. Insulation is placed inside a 11"x9"x12" corrugated container
- 5.2. 1 x 24 oz. room temp gel pack placed in bottom of insulated container
- 5.3. 2 x 32 ECT (C-flute) corrugated sheets are placed on top of gel pack
- 5.4. Product is placed on top of corrugated insert
 - 5.4.1. Crumpled paper is used to fill void space
- 5.5. 2 x Corrugated sheets are placed on top of product





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5.6. Place 2 x 24oz. frozen gel packs centered in pack on top of corrugated sheets

5.6.1. Fill void space with crumpled paper

5.7. 1.5" ClimaCell Pack Out

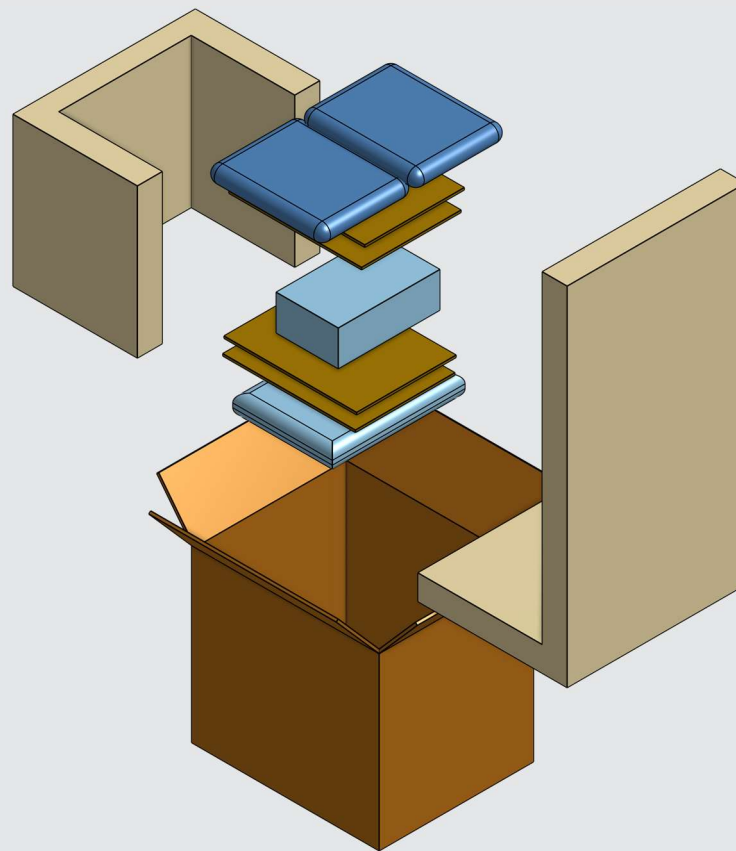


Fig 2: Packout





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6. Test Procedure

- 6.1. The coolant and all packaging components are staged for a minimum of 24 hours prior to test start per Section 4.3
- 6.2. The data loggers are programmed per Section 4.4
- 6.3. The environmental chamber is programmed to the profile outlined in Section 4.1
- 6.4. Assemble sample per Section 5
- 6.5. Place assembled sample into environmental chamber
- 6.6. Start all data loggers and activate the environmental chamber test protocol
- 6.7. Monitor product temperatures and terminate when upper threshold is exceeded
- 6.8. Procedure complete





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7. Test Results

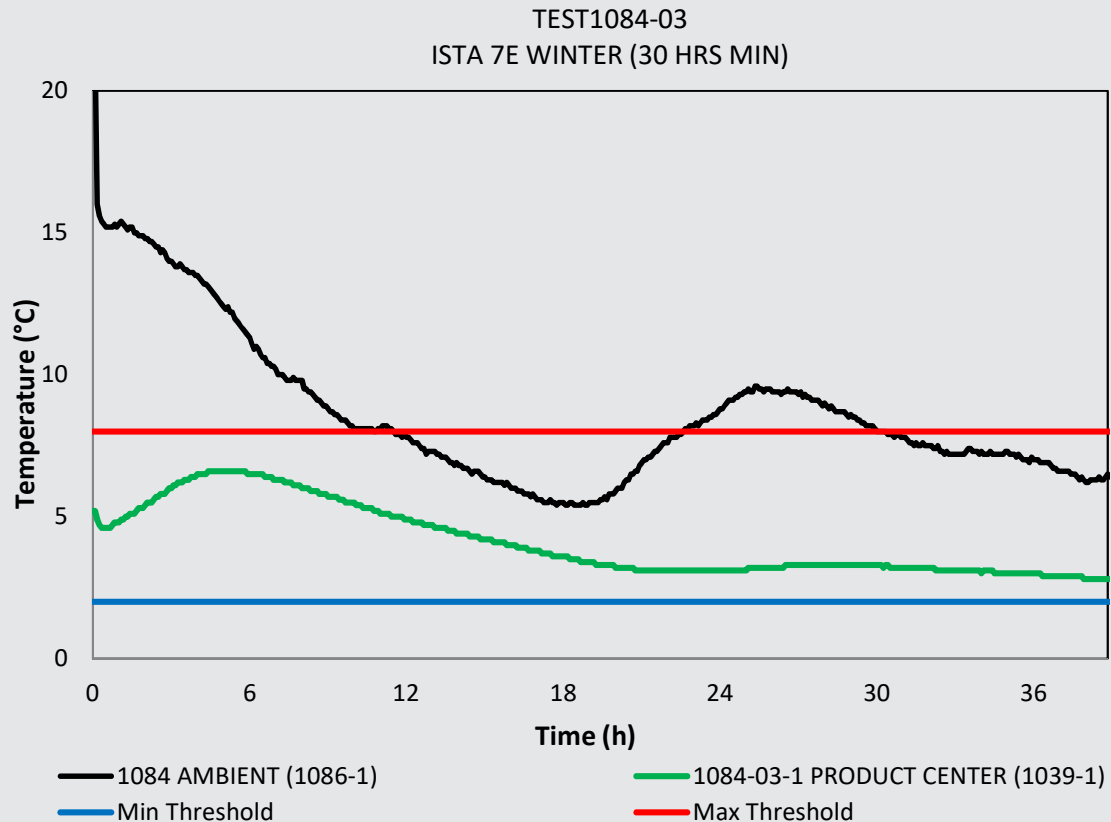


Fig 3: Data Graph

8. Test Outcomes/Conclusion

The (11"x9"x12") 1.5" ClimaCell maintained 2-8°C for 87+ hours, passing the 30+ hour duration requirement.



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9. Disclaimer

All due efforts have been exercised to provide accurate data from resultant tests. Test methods followed standards established by I.S.T.A., as well as private company test procedures. TemperPack assumes no responsibility or guarantees regarding performance other than the presented data. TemperPack assumes no responsibility for alterations to the packages and/or product beyond the tested and reported item(s).

