



TemperPack

11"X9"X10" 1.5"
CLIMACELL ISTA 7E
SUMMER DESIGN
TESTING

April 16, 2019



11"x9"x10" 1.5" ClimaCell ISTA 7E Summer Design Testing	Test No.	623
	Rev	1
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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 2 x 3 layers of corrugated followed by 25 x 5mL vials. Once packed, the shippers will be placed in an environmental chamber programmed with an ISTA 7E Summer profile. Upon test initiation, the shipper's internal temperature will be monitored and data collected in 2 minute intervals.

2. Testing Team

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Date	4/16/2019	4/17/19	4/18/2019

Revision History

Rev #	Context	Changes By	Date
0	Original publish	Justin Turner-Gonzalez	3/19/2019
1	Chart formatting	Michael Scipione	4/16/2019



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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:	Payloads 25 x 5mL
3.1.4. Corrugated Insert(s):	6 x Corrugated Sheets 32 ECT (C-Flute) 7.625" x 6"
3.1.5. Cargo Box Dimensions:	Telescope 4.75"x4.75"x2"
3.1.6. Void Fill:	Kraft Paper
3.1.7. External Box Dimensions (I.D.'s):	(11" x 9" x 12") RSC



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4. Test Parameters

4.1. Test Profile

ISTA 7E Summer
Tabular Data

<i>Time - Hr</i>	<i>Temperature °C</i>	<i>Time - Hr</i>	<i>Temperature °C</i>	<i>Time - Hr</i>	<i>Temperature °C</i>
0	28.1	25	30.0	50	30.9
1	29.0	26	30.1	51	30.9
2	29.8	27	29.9	52	30.6
3	30.3	28	29.6	53	30.1
4	30.4	29	29.4	54	29.5
5	29.9	30	28.8	55	28.8
6	29.2	31	28.2	56	28.2
7	28.4	32	27.7	57	27.7
8	27.8	33	27.3	58	27.1
9	27.2	34	26.9	59	26.6
10	26.7	35	26.5	60	26.1
11	26.4	36	26.1	61	25.6
12	26.0	37	25.7	62	25.3
13	25.5	38	25.3	63	25.0
14	25.0	39	25.0	64	25.0
15	24.7	40	24.9	65	25.3
16	24.5	41	24.9	66	26.0
17	24.7	42	25.4	67	26.9
18	25.3	43	26.5	68	27.9
19	26.1	44	27.6	69	28.7
20	27.1	45	28.4	70	29.4
21	28.1	46	29.3	71	29.9
22	28.6	47	29.9	72	30.4
23	29.2	48	30.4		
24	29.7	49	30.7		



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4.2. Test Product Load



Fig 1: Packout 25 x 5mL

4.3. Temperature Staging Requirements.

4.3.1. Coolant

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: 2 minutes
- 4.4.2. Start Option: Upon activation (no delay)

4.5. Temperature Probes

- 4.5.1. Product: Center 5mL 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 11" x 9" x 12" corrugated container
- 5.2. 1 x 24 oz. gel pack placed in bottom of insulated container
 - 5.2.1. Crumpled kraft paper is used to fill void space
- 5.3. 3 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



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- 5.5. 3 x Corrugated sheets are placed on top of product
- 5.6. Place 2 x 24oz. gel packs centered in pack on top of corrugated sheets
 - 5.6.1. Fill void space with crumpled paper

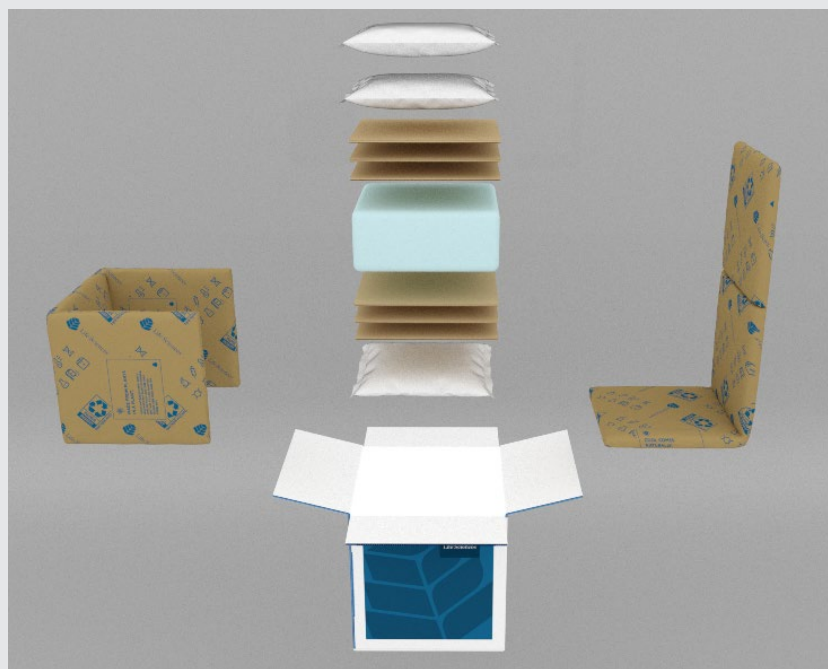


Fig 2: Packout

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 4.4
- 6.2. The data loggers are programmed per Section 4.5
- 6.3. The environmental chamber is programmed to the profile outlined in Section 4.2



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- 6.4. Frozen gel packs are benched until they reached -10°C
- 6.5. Assemble sample per Section 5
- 6.6. Place assembled sample into environmental chamber
- 6.7. Start all data loggers and activate the environmental chamber test protocol
- 6.8. Monitor product temperatures and terminate when upper threshold is exceeded
- 6.9. Procedure complete





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7. Test Results

7.1. 1.5" ClimaCell Pack Out

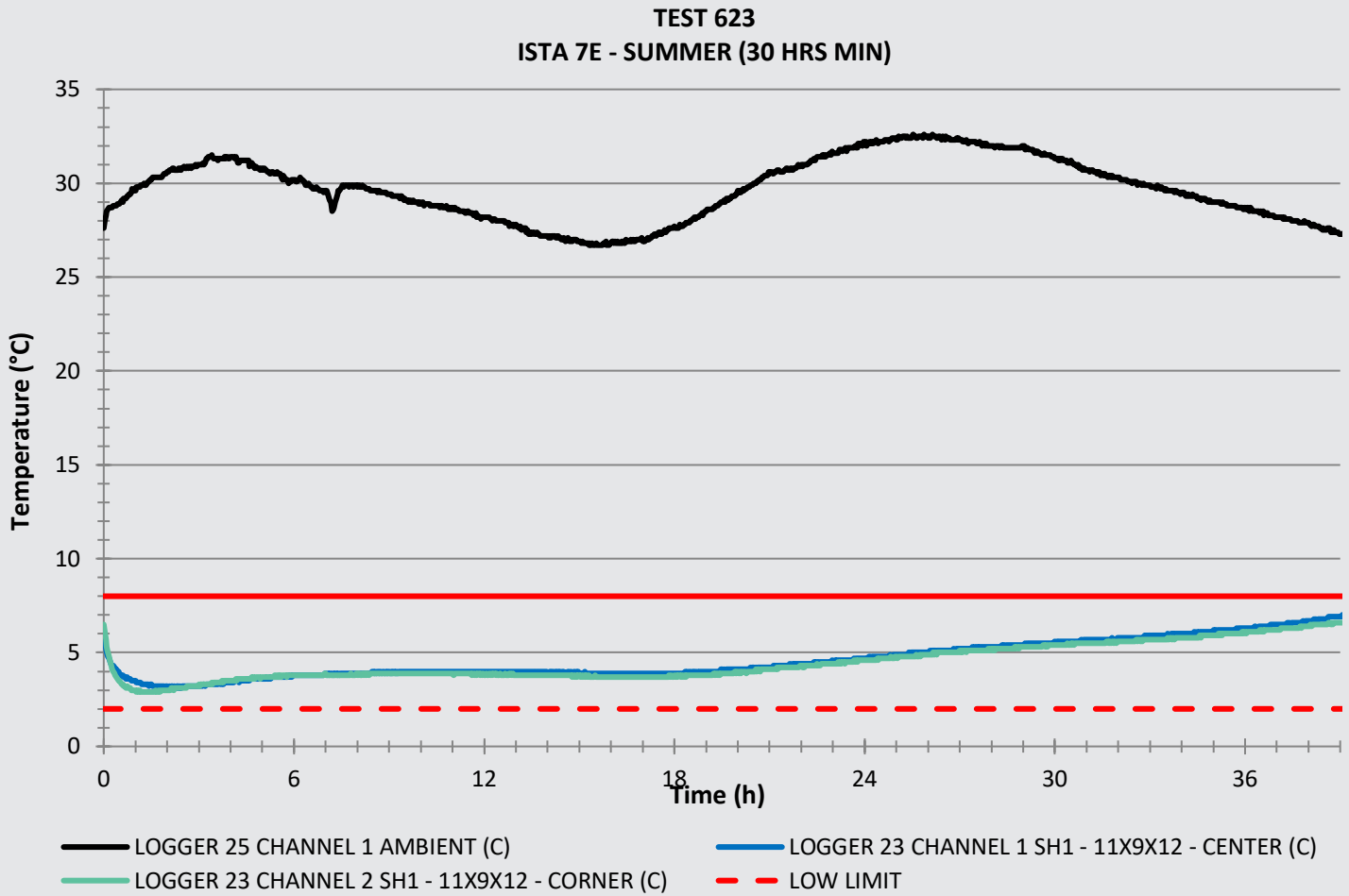


Fig 3: Results 11" x 9" x 12"



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8. Test Outcomes/Conclusion

1.5" ClimaCell maintained 2-8°C during the entirety of the test (40.33 hours), passing the 30+ hour duration requirement.

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).