

1. Ambient temperature of stroller pod in cold environment (insulation)
 - i. Purpose:
 - The purpose of this test is to ensure that the temperature of the stroller pod does not fall below the specification in a cold environment
 - ii. Materials:
 - Closed stroller pod with heat source inside
 - BME Cold Room
 - Thermocouples
 - Temperature sensor of room
 - iii. Procedure:
 - Measure temperature of stroller pod before placing in Cold Room
 - Set the cold room temperature to as cold as possible
 - Place thermocouples inside of stroller pod
 - Place closed stroller pod with heat source inside in Cold Room
 - Let stroller pod sit in room for 20 minutes
 - Remove stroller and collect data from thermocouples
 - Repeat test 3 times to ensure accuracy
 - iv. Pass/Fail Criteria:
 - Pass: The stroller pod will pass if the ambient temperature of the pod with no additional heat added does not fall below 30 F after 20 minutes
 - Fail: The stroller pod will fail if the ambient temperature of the pod with no additional heat added falls below 30 F after 20 minutes

2. Heated seat functionality in cold environment
 - i. Purpose:
 - The purpose of this test is to ensure that the heated seat will function properly by turning on and producing heat in a cold environment
 - ii. Materials:
 - Closed stroller pod with heated seat
 - BME Cold room
 - Temperature sensor of room
 - iii. Procedure:
 - Confirm proper start up and heat production of heated seat prior to placing in cold room, then turn off and let cool down
 - Set the cold room temperature to as cold as possible
 - Place stroller with heated seat into cold room and turn on heated seat
 1. Test the blanket at multiple different temperatures, including the lowest and highest possible
 2. After each temperature change, have each member touch the seat to make sure that it is getting hotter
 - Leave stroller in cold room for 20 minutes
 - Remove stroller and turn off heated seat

- iv. Pass/Fail Criteria:
 - Pass: The stroller will pass the heated seat turns on and produces heat at multiple different heat settings in a cold environment for 20 minutes, with no issues
 - Fail: The stroller will fail if the heated seat does not turn on and/or does not reach the effective temperature in a cold environment for 20 minutes
3. Battery capacity in cold environment
- i. Purpose:
 - The purpose of this test is to ensure that the batteries function in a cold environment
 - ii. Materials:
 - BME Cold Room
 - Temperature sensor of room
 - Voltmeter
 - iii. Procedure:
 - Set temperature of Cold Room to as cold as possible
 - Place unused batteries into cold room for 20 minutes
 - Remove batteries and measure capacity on voltmeter
 - iv. Pass/Fail Criteria:
 - Pass: The battery will pass if the capacity does not fall below 100% after being in the cold room for 20 minutes
 - Fail: The battery will fail if the capacity falls below 100% after being in the cold room for 20 minutes
4. Emergency shutoff of heated blanket
- i. Purpose:
 - The purpose of this test is to ensure that the heated seat will shutoff using the emergency shutoff
 - ii. Materials:
 - Stroller with heated seat
 - iii. Procedure:
 - Turn on heated seat
 - Press emergency shut off
 - 1. Test the stroller at multiple different temperatures
 - iv. Pass/Fail Criteria:
 - Pass: The emergency shutoff will pass if the heated blanket immediately turns off and begins to cool down after activating the emergency shutoff
 - Fail: The emergency shutoff will fail if the heated blanket stays on and/or does not turn off immediately after activating the emergency shutoff

5. Proper system shutdown:
 - i. Purpose:
 - The purpose of this test is to ensure that the system shuts down after pressing the power button
 - ii. Materials:
 - Stroller with heated seat
 - iii. Procedure:
 - Turn on heated seat
 - Press power button
 1. Test the stroller at multiple different temperatures
 - iv. Pass/Fail Criteria:
 - Pass: The stroller will pass if the system immediately turns off and begins to cool down after activating the emergency shutoff
 - Fail: The stroller will fail if the system stays on and/or does not turn off immediately after activating the emergency shutoff

6. Charge on stroller frame/components
 - i. Purpose:
 - The purpose of this test is to ensure that there is no charge on the stroller or the frame of the stroller due to the running of the electrical components
 - ii. Materials:
 - Multimeter
 - Stroller with all components attached
 - iii. Procedure:
 - Run all components on stroller for 5 minutes
 - Turn off system
 - Using multimeter, measure charge on stroller frame
 - iv. Pass/Fail Criteria:
 - Pass: The stroller will pass if there is no charge on the stroller frame after the system has run
 - Fail: the stroller will fail if there is any charge (>0) on the stroller frame after the system has run

7. User interface communicates with system
 - i. Purpose:
 - The purpose of this test is to ensure that the user interface communicates properly with the system
 - ii. Materials:
 - Complete stroller with all components attached
 - iii. Procedure:
 - Turn on/turn off system using user interface

- Change temperature using user interface
 1. Test several different temperatures
 - iv. Pass/Fail Criteria:
 - Pass: The system will pass if the system responds properly to the user interface by turning the system on and off, and changes to the exact temperature told to.
 - Fail: The system will fail if the system does not respond to one or any of the commands told to by the user interface.
8. Final weight of complete system
- i. Purpose:
 - The purpose of this test is to ensure that the complete system (stroller with all components attached) does not weight over 10 pounds more than the initial weight of the stroller with no components
 - ii. Materials:
 - Scale
 - Complete stroller with all components attached
 - iii. Procedure:
 - Measure stroller without system components
 - Measure stroller with all components attached
 - iv. Pass/Fail Criteria:
 - Pass: The stroller will pass if the stroller with all the components attached weighs less than 10 pounds than the stroller without components
 - Fail: The stroller will fail if the stroller with all the components attached weighs 10 or greater pounds more than the stroller without components
9. Battery life
- i. Purpose:
 - The purpose of this test is to test battery life
 - ii. Materials:
 - Complete stroller with all components attached
 - Stop watch
 - iii. Procedure:
 - Turn on stroller and run at highest temperature
 - Start stopwatch and run system until batteries die
 - iv. Pass/Fail Criteria:
 - Pass: The batteries will pass if the battery life is 10 hours on the lowest setting, 4 hours on the highest setting, and 6 hours on a medium setting
 - Fail: The batteries will fail if the battery life is less than the above stated specifications for each setting

10. Air quality (oxygen/CO2/Humidity level) in stroller pod

- i. Purpose:
 - The purpose of this test is to test the air quality inside the air pod while the system is on and running
- ii. Materials:
 - Stroller with all components attached
 - Air quality meter
- iii. Procedure:
 - Turn on system and close stroller pod
 - Place air quality meter inside pod through ventilation space
 - Monitor oxygen/CO2/humidity levels over 20 minutes of system running
- iv. Pass/Fail Criteria:
 - TBD

11. Time for heated seat to completely cool after use

- i. Purpose:
 - The purpose of this test is to test how long it takes for the heated seat to completely cool down after use
- ii. Materials:
 - Stroller with heated seat
 - Stopwatch
- iii. Procedure:
 - Turn on heated seat and run at highest temperature for 20 minutes
 - Turn off heated seat and immediately start stopwatch
 - Run stopwatch until heated seat is completely cool and off
- iv. Pass/Fail Criteria: N/A

12. Ease of movement of stroller with all components attached

- i. Purpose:
 - The purpose of this test is to ensure that the stroller is still easy to move with all the components attached
- ii. Materials:
 - Stroller with all components attached
- iii. Procedure:
 - Have each team member push/pull stroller forward/backward and around in circles on flat ground and rougher terrain (e.g. grass)
 - Have three non-team members push stroller same as above
 - Evaluate the ease of movement of the stroller
- iv. Pass/Fail Criteria:

- Pass: The system will pass if the majority of those who test the movement of the stroller agree that it is easy to move in every direction with components attached
- Fail: The system will fail if the majority of those who test the movement of the stroller agree that it is NOT easy to move in every direction with components attached