APPENDIX B
SHELTER TEST DATA SHEET, REVISION B

CONTRACTOR: CONTRACT

NUMBER: TEST REPORT

NUMBER: TEST REPORT

DATE:

PART NUMBER OR NSN:

TENT NAME:

Test	Description (Abbreviated)	Company Tested	Government Lab test report
Temperature Range, Operational	Minus _____to plus ____degrees F.	☐	☐
Temperature Range, Storage	Minus _____to plus ____degrees F.	☐	☐
Erect Time / # of Persons	_____/	☐	☐
Strike Time / # of Persons	_____/	☐	☐
Durability	Withstand _____erect/strike cycles	☐	☐
Field Life	Minimum of _____years	☐	☐
Shelf Life	Minimum of _____years	☐	☐
Wind Load, Steady	Steady wind speed of _____mph for _____minutes and resist rain intrusion	☐	☐
Wind Load, Gusts	Three occurrences of wind gusts to _____mph during minute steady wind speed of __ mph and resist rain intrusion	☐	☐
Rain, Steady	_____inches per hour for ____minutes	☐	☐
Rain, Wind Driven	_____inches per hour for thirty minutes with wind speeds of MPH and with three occurrences of wind gusts to MPH within the same _____minute period	☐	☐
Humidity	Ambient humidity between zero and 100%, regardless of Temperature	☐	☐
Salt Fog	Shall withstand exposure to a salt fog atmosphere for Months	☐	☐
Snow Load	_____pounds per square foot for 12 hours without damage	☐	☐
Delectability/Blackout Test	Five observations with night vision goggles from meters and with the naked eye from _____meters	☐	☐
Condensation	Shall minimize condensation on the inside of the tent that may adversely effect personnel or loss of mission capability	☐	☐
Sunlight	Withstand exposure to direct sunlight for months with material temperatures up to _____degrees F.	☐	☐
Blowing Sand and Dust	Not degraded beyond use in a blowing sand and dust Environment	☐	☐
Insects	Shall resist physical damage from entry of insects from the exterior, including flying insects from penetrating screening mesh diameter of	☐	☐

Mildew and Fungus	Shall not sustain the growth of fungus under any conditions, in accordance with ASTM G-21	☐	☐
Petroleum Resistance	All components shall resist damage by petroleum products such as, but not limited to, diesel fuel and jet fuel	☐	☐
Mechanical Shock and Vibration	In transit bag, shall withstand a simple harmonic motion amplitude of inches, frequency from _____to ____Hertz for hours in each of three perpendicular directions (total test time of _____hours)	☐	☐
Rough Handling/Transit Drop	In transit bag, shall withstand drops from a minimum of feet at _____degrees and at ____degrees F.	☐	☐
Roll	In transit bag, shall withstand a circular synchronous mode at 300 RPM for no less than 45 minutes	☐	☐
Breaking Strength	Fabric breaking strength shall be a minimum of _____lbs in the warp and ____lbs in the fill	☐	☐
Cold Crack	Shall be resistant to cold crack at minus _____degrees F. when tested in accordance with ASTM D2136	☐	☐
Dead Load Seam Strength	Fabric seams shall withstand a lb load for 4 hours at 160 degrees F. and a _____lb load for 4 hours at room temperature	☐	☐
Flame Resistance	In accordance with IAW ASTM-D 6413-99 Standard Test Method for Flame Resistance of Textile (Vertical Test)	☐	☐
Lighting Support	Shall support two fluorescent field light sets or one incandescent bulb for each nine feet of floor length	☐	☐
Mapboard Support	Shall provide connections for the Modular Command Post Map Board and support strap system specified by MIL-B-44381 and 5-4-5531	☐	☐
Ventilation	Shall provide non-powered ventilation to maintain a comfortable interior, with an inside temperature no higher than ambient at ambient temperatures up to 90 degrees F	☐	☐
Electrical Supply Feed Through	The electrical supply feed through shall permit the passage of wire bundles up to 5 inch diameter	☐	☐
ECU Feed Through	The environmental Control Unit (ECU) feed through shall permit the passage of 18 inch diameter ducts (standardized military specification design)	☐	☐
Stovepipe Shield	The stovepipe shield shall permit the passage of a 4-inch diameter stovepipe (standardized military specification design)	☐	☐
Windows	Allows for blackout, outdoor light entry and ventilation	☐	☐
Wrappers, Transport/Storage Covers	Allows for storage and transport of all intended components	☐	☐

Recommended testing for tactical shelters includes:

Low Temperature Test. TBVD

Example of tests for typical tactical military tents /1 The fully erect shall be placed into an environmental chamber and then soaked for a minimum of 4 hours at –(25) degrees. Heaters will be provided by the Government and used to heat the shelter. The heat will
remain in use at a maximum output to determine the time required for shelter interior temperature stabilization. Thermocouples will be installed at multiple locations within the interior of the shelter to measure and record the temperatures. Calculations will be made to determine the shelter's R-value.

High Temperature Test. The environmental chamber temperature will be adjusted to +(TBVD) degrees F. The shelter shall be heat soaked for a minimum of four hours and maintained at the (TBVD) degree temperature before the government furnished Environmental Control Unit (ECU) will be activated. The ECU will remain in use at the maximum output to determine the time required for shelter interior temperature stabilization. Thermocouples will be installed at multiple locations within the interior of the shelter to measure and record the temperatures. Calculations will be made to determine the shelter's R-value.

Example of tests for typical tactical military tents /1

Detectability. Blackout Test. During testing, five observations wearing night vision current generation US Military goggles (NVGs)
will view the shelter from a distance of 300 meters. Five observers will also view the shelter using the naked eye from a distance of
100 meters. While using the naked eye, there will be no visible man-made light sources around the perimeter of the tent on a moonless night without any low clouds, which could reflect the ambient and man made light sources. The government will determine the type of lighting to be used to illuminate the shelter interior during the test. The light will be suspended on either side of the center of the tent in a location that provides the maximum use of the light sets. Starting at the end wall at the zero position, observers will view the shelter at 45-degree increments while moving around the shelter in a clockwise direction. Observers will complete questionnaires for each observance.

Reflectivity . TBVD Laboratory testing will be conducted to measure the reflectivity of the shelter fabric and support system.

Human Factors. The shelter shall be tested for Setup and Strike times in accordance with the erection/strike procedures in the tent manual. Setup time includes staking the shelter for high wind conditions. Time for setup begins when the shelter transport bags/cases and components are on the ground at the erection site. Time for disassembly ends when components are secures in the transport bags/cases.

Example of tests for typical tactical military tents /1.

The shelter meet human factors requirements for soldier lift; no single component should exceed an 8-person lift (threshold) or desired 4-person lift (objective)

Covers shall be designed so that handles are available for the soldiers to lift the cover without exceeding Human Factors safety limits for male and female soldiers. The safe lifting limits for one to eight male or female soldiers are respectively: 37, 74,
101.75, 129.5, 157.25, 185, 212.75 and 240.5 pounds. These weights are limited to lifts up to 5 feet from the ground and for distances not exceeding 33 feet. Covers shall be designed to be moved by male and/or female soldiers with at least one of them a
5th percentile female in height (61.8 inches tall). All covers shall include markings to indicate the contents and quantity of individual contents of the package. Marking for weight/lift requirements shall be provided on each transport cover, bag and/or container.

Durability. The shelter must be able to withstand erect/strike cycles TBVD without any damage that cannot be repaired and would lead to a failure of one of the above criteria and prevent the shelter from being operational.

Example of tests for typical tactical military tents /1.:36 cycles

Condensation . The SYSTEM shall minimize condensation on the inside of the tent that may adversely affect personnel or loss of mission capability. TBVD

Sunlight . The SYSTEM shall withstand exposure to direct sunlight for (TBVD) months. Components exposed to direct sunlight or in contact with components exposed to direct sunlight shall tolerate material temperatures TBVD without degradation which affects the ability to setup or strike the tent, reduces the blackout capability of the tent, reduces the ability of the tent to support the required snow load or reduces the ability of the tent to resist rain intrusion.
Example of tests for typical tactical military tents /1.:tolerate temperatures up to 160 °F
Blowing Sand and Dust . The SYSTEM shall not be degraded beyond use in a blowing sand and dust environment.

Insects . The system shall resist physical damage from entry of insects from the exterior, including flying insects from penetrating screening mesh diameter of (TBVD).

Mildew and Fungus . The system shall not sustain the growth of fungus under any conditions in storage or use, which damages or renders the SYSTEM unserviceable.

Mechanical Shock and Vibration/Rough Handling. The system shall withstand vibration and mechanical shock without damage or degradation that affects its operational use. The system shall withstand rough handling by military personnel. Rough handling includes components being stepped on by soldiers, components being dropped or thrown from trucks onto hard ground and tents which have been setup being climbed on by 95th percentile soldiers TBVD./1.

Lighting Support . If applicable TBVD.

Example of tests for typical tactical military tents /1.:
The set of components used to support lights within the tent shall support two fluorescent field light sets or one incandescent bulb for each nine feet of floor length. One light shall be suspended on each side of the center of the tent in a location that provides the maximum use of the light sets. These light sets are already fielded and are in use throughout the Army and are the lights that shall be used with the system for the foreseeable future. The support system shall interoperate with the Electromagnetic hardened military lighting systems as specified by MIL-L-44259. /1.

Mapboard Support. If applicable TBVD.

Example of tests for typical tactical military tents /1.:
The system shall provide connections for the Modular Command Post Map Board and support strap system specified by MIL-B-
44381.and 5-4-5531 /1..

Ventilation . The system shall provide non-powered ventilation to maintain a comfortable interior

TBVD. Example of tests for typical tactical military tents /1.:
The tent shall have sufficient ventilation to prevent hazardous fumes/combustion product build-up from vehicles or equipment
being worked on, or from military standard heaters. Ventilation shall minimize visible interior condensation in any climate when the tent is setup on a dry surface that does not emit water vapor. The tent shall have sufficient warm weather high rate non- powered air exchange in non-blackout, hot or humid conditions to prevent heat build-up over ambient temperatures. The tent shall maintain an inside temperature no higher than ambient at ambient temperatures up to 90 ^{0}F. If roof vents are provided, then they shall be able to be opened and closed from the ground level. The roof vents shall not allow direct light from the tent to escape when viewed with the naked eye from any angle at a minimum distance of 100 feet due to tactical considerations because the tent must be ventilated when being operated under blackout conditions at high temperatures and humidity while operating electronic equipment.

Door/Vestibule Adapter Assembly. TBVD

Example of tests for typical tactical military tents /1.:
The door shall have a minimum opening of 6 ft. 3 in. high and 4 ft. 6 in. wide to accommodate soldiers with backpacks. The door
shall be capable of being sealed against wind, rain, snow, blowing sand and light. The door shall be capable of being opened from either the inside or outside. The door shall be capable of being restrained in either the open or closed position. Doors shall maintain blackout integrity when soldiers are entering or leaving. Each opening shall be capable of attaching to a standard TEMPER vestibule.

ECU Feed-Through. If applicable TBVD

Example of tests for typical tactical military tents /1.:
The Environmental Control Unit (ECU) feed through shall permit the passage of 18 inch diameter ducts. It shall include an ability to seal the outer wall to the duct to prevent water migration, loss of conditioned air, or leakage of outside air into the conditioned space. The interface shall seal against the intrusion of rain, snow, blowing sand, flying/crawling insects and animals when in use and when closed.

Electrical Supply Feed Through. If applicable TBVD

Example of tests for typical tactical military tents /1.:
The electrical supply feed-through shall permit the passage of an electric wire or bundle of wires up to 5 in. diameter through the
tent wall. It shall include an ability to seal the outer wall to the wires to prevent water migration and minimize the exchange of air between inside and outside. The feed-through shall seal against the intrusion of rain, snow, blowing sand, flying/crawling insects and animals when in use and when closed.

Stovepipe Shield. If applicable TBVVD

Example of tests for typical tactical military tents /1.:
A stovepipe shield shall permit the passage of a 4-inch diameter stovepipe, through the roof of the tent. The shield shall provide separation between the stovepipe and tent fabric to insure that contact with, or proximity to, a stovepipe with surface temperatures of 600 ^{0}F do not damage the fabric. The shield shall provide a seal around the stovepipe to

minimize the intrusion of rain or snow or the release of light when the stovepipe is present and shall keep the fabric in contact with the outer edge of the shield at a temperature lower than 160 ^{0}F. The shield shall have a cover to close the opening when not in use and the cover shall be able to
be opened and closed from the ground level. The cover shall be retained in the open position to prevent it from contacting or otherwise being damaged by the hot stovepipe. The stovepipe opening centerline shall be located no less than 48 inches, measured horizontally, from the side walls, end walls or liner partitions. The location of the stovepipe shall insure that the associated stove shall not obstruct the free movement of personnel through the doors either in the tent walls or liner partitions and that hot stove surfaces shall not impose unnecessary safety hazards.

System Color Characteristics . If applicable TBVD
Example of tests for typical tactical military tents /1.:
Exterior color of all fabric components shall be green or tan. Interior facing sides of the liners and tent fabric shall be a light color, to reflect light. All hardware, findings, plastic components, fastener tape, webbing, grommets, rope slips and guy rope, etc., which are visible from the tent exterior, shall approximate the tent color or shall be black. All support system components shall approximate black or dark gray color. All components shall have a dull finish to reduce reflectance. The specular gloss of the exposed side of the tent shall be less than 2.0 on the face side. Standard color samples should be requested from the contracting officer. The fabric shall match the standard sample when viewed under filtered tungsten lamps that approximate artificial daylight and that have a correlated color temperature of 7500 ^{0} Kelvin (K) +/- 200^0 K, with illumination of 100 +/- 20 foot candles, and shall be a good match to the standard sample under incandescent lamplight at 2300^0 K +/- 200^0 K

Flame Resistance . The fabric (roof, walls, floor, liner) shall be flame resistant, self-extinguishing and shall have no flaming melt drip or molten pieces when exposed to flame or heat. The system shall be tested IAW ASTM-D 6413 – Standard Test Method for Flame Resistance of Textiles (Vertical Test). All fabric components shall be self-extinguishing within 2.0 seconds after exposure to the flame source for 12 seconds in both the warp and fill directions. The damaged char length shall be less than
50% of the sample length of 12 inches.

Field Life. If applicable TBVD

Example of tests for typical tactical military tents /1.:
The system shall have a minimum field life of three (3) years. No part of the tent shall be degraded beyond use by the environmental conditions. The system shall not suffer any reduction in capability due to the effects of weathering over the three year field life of the system. The system is expected to have a typical usage of 28 erect/strike cycles per year during peacetime operations

Shelf Life . If applicable TBVD

Example of tests for typical tactical military tents /1.:
The tent shall have a minimum shelf life of 10 years. No part of the tent shall be degraded beyond use by storage while wet or dry. All parts of the tent system shall be resistant to the deteriorating effects of rot, fungus, mildew or corrosion. The tent components shall not suffer any loss of strength, increased water permeability or light emissivity due to storage and transportation at temperatures as low as -60 °F or as high as 180 °F. The tent shall be able to be setup after storage at these temperatures with no damage or degradation or loss of operational use. This requirement applies to new tents still in their original crates.

/1. Performance requirements, product specifications, capacities and thresholds are to be vendor determined. Testing to determine compliance in accordance with MIL-STD-1472 Human Engineering is recommended.