

SAFETY AND PERFORMANCE TEST REQUIREMENTS FOR BUNKABLE AND LOFTABLE BEDS, BEDS WITH DRAWERS AND DRAWER UNITS FOR USE UNDER BEDS

The offeror/contractor is responsible for having all applicable performance test requirements performed as specified herein. The Government reserves the right to witness any tests where such inspections are deemed necessary to ensure that the beds meet all test requirements. Therefore, vendors must notify GSA IWACenter by emailing Schedule71@gsa.gov at least three weeks in advance of scheduled testing with the dates and locations of the testing and a point of contact and phone number of the laboratory so that GSA can schedule appropriate timing to witness certain tests.

Worst case determinations and required documentation. If “worst case” beds or bed drawer units are being tested, documentation shall be provided clearly explaining why these units were determined to be “worst case” from all the models being offered. This documentation shall also clearly identify by model number, in a “table” format, the “worst case” units that were tested and by model number, the untested units they represent. This documentation shall be provided by the offeror with the test reports.

General Test Requirements.

1. Scope: Tests in this document are intended to evaluate the safety and performance of beds/drawers designed and marketed for adult dormitory/institutional use. These units include bunk and loft beds and beds that can be configured into bunk beds and/or high/low loft beds, beds with built-in drawers such as captain's beds and 1 and 2 drawer high drawer units designed to be placed or attached under a bed.
2. Test sample: Sample submitted for testing shall be new (not previously used or tested), identical in design, components (including bed deck and connection methods), materials, overall dimensions and component/material dimensions (including thickness/gauge) to the unit that is being offered for contract. Test samples may be unfinished/unpainted. Configurations into which test samples are assembled shall be as marketed and illustrated in the company pricelist/literature/website.
3. “Worst-case” configurations for drawer testing are explained on page 9, and “worst-case” configurations for bed testing are explained in Table 1, footnotes 2 and 6.
4. All tests shall be performed as specified, directly on the bed or “drawer unit” as applicable. Each offered model or unit type of bed or “drawer unit”, in any configuration, shall comply with all applicable test requirements.
5. Testing laboratory: All tests shall be performed by an independent test laboratory accredited to perform these tests, by an accreditation organization that is a member of the International Laboratory Accreditation Cooperation (ILAC). ILAC members include accreditation organizations such as A2LA, IAS and SCC. As an alternative, laboratories performing Group 1 and Group 2 tests and not accredited for these specific tests, must at least be accredited to perform ANSI/BIFMA X5.4 tests; laboratories performing Group 3 tests and not accredited for these specific tests, must at least be accredited to perform ANSI/BIFMA X5.9 tests. A list of test labs that are accredited to perform bed and/or bed drawer unit tests in accordance with the alternative accreditation requirements specified above is included in Purchase Description 3QSAB 11-613A. If you choose to have your products tested by an independent test lab not on this list, you must provide proof of the test lab's accreditation as required above, prior to start of any testing.
6. Bed/drawer drawing(s) and component list: An accurate perspective, PDF drawing(s) of the bed/drawer being tested shall be provided to the test lab with the test sample. Drawing shall identify the manufacturer and model number of the bed/drawer being tested, contain an itemized

list of each bed/drawer component, material(s) each component is made of (including wood species if applicable), dimensions and thicknesses of each component (including spring gauge and steel gauge if applicable), and an illustrated description of method of fastening components together including bolt sizes. In addition, if a component (such as a bed spring or drawer suspension) is sourced from another vendor, the name of the vendor and part number of the component shall be provided in the drawing. A clear and legible copy of the bed/drawer drawing(s) and component list shall be included as part of the Test Report that is provided to GSA and maintained by the contractor for the term of the contract. If components are supplied by a sub-contractor, the sub-contractor's name and component model number(s) shall be provided

7. Laboratory verification of unit being tested: Bed sample verification before testing: Before testing, test lab shall inspect and verify that components on unit being tested (including, but not limited to, spring deck, deck-to-VES attachment hardware, drawer suspensions) are the same as shown in drawings and components lists provided with the test unit. Test lab shall also measure (with tape measure accurate to within 1/32", 1 mm) overall dimensions of the bed and all component parts (including spring deck and deck attachment hardware). This is to verify that the bed and any sub-contractor components submitted for testing are the same as illustrated and described on the drawing and component list required in paragraph 6 above. Discrepancies between the drawings/component list (Par. 6) and the test unit shall be noted as "Before Testing Discrepancies" under LABORATORY VERIFICATION OF UNIT BEING TESTED, in the test report. If no discrepancies are found, this shall be noted in this section of the test report form.

Additional bed sample verification after testing: After testing, test lab shall measure (using a vernier caliper accurate to within 0.0005", 0.013 mm) and record the thickness (e.g. 0.080", 2.0 mm) of the following components. Sections shall be cut and paint removed as necessary to make these measurements. These measurements, with inset photos of where each measurement was made, shall be provided as an attachment at the end of the test report.

- Steel Vertical End Support (VES) uprights
- Bed deck perimeter main support rails/frame
- Spring gauge (for bed with spring deck)
- Bed deck panel/material (for bed with non-spring deck)
- Steel reinforcement sections under steel or plywood bed deck panel
- Deck attachment hardware including hardware such as pins and channels in VES's.

Verification of steel gauges, stated in drawings/component list provided by the bed supplier, shall be made using the Machinery's Handbook (<http://new.industrialpress.com>). Machinery's Handbook used for gauge verification shall be not more than one edition old. When verifying steel gauge and/or steel thickness stated in the drawings/component list, a $\pm 10\%$ tolerance shall be allowed. Discrepancies between the drawings/component list (Par. 6) and the test unit shall be noted as "After Testing Discrepancies" under LABORATORY VERIFICATION OF UNIT BEING TESTED, in the test report. If no discrepancies are found, this shall be noted in this section of the test report form.

Bed drawer unit sample verification before testing: Before testing, test lab shall visually inspect and measure (using a tape measure accurate to within 1/32", 1 mm) overall dimensions of the bed drawer unit and component parts to verify that the bed/drawer unit submitted for testing is the same as the unit illustrated and described on the submitted drawing and component list required in paragraph 6 above. Discrepancies between the drawings/component list (Par. 6) and the test unit shall be noted as "Before Testing Discrepancies" under LABORATORY VERIFICATION OF UNIT BEING TESTED, in the test report. If no discrepancies are found, this shall be noted in this section of the test report form.

8. Test report: Complete, passing test results, in PDF format, recorded on the Test Report Forms within this document, shall be submitted with the offer. All measurements shall be recorded on the forms in metric units. Test reports shall be not more than three (3) years old at the time an offer is submitted.

9. Test Photographs: All photographs shall be clear, in color and minimum 640 x 480 digital jpg format. Images shall be provided electronically with the test report. The first image in the series of images, that shows the entire assembled unit, shall be labeled to identify the manufacturer, model number and test date.

The following photographs shall be provided in the body of each test report for each bed tested.

- Minimum of one photograph of the entire assembled bed unit to be tested, without insulator, pad or any test equipment in the way, taken prior to starting any testing. Photo(s) shall provide a perspective view of the bed, taken from a high enough angle to show the top surface of the top bed deck.
- Minimum of one photograph showing the structure (underside) of the bed deck. On beds with concealed compartments (e.g. lift deck beds), minimum of two additional photographs showing the underside of the lift deck and the interior of the compartment(s).
- Minimum of one photograph showing the entire bed with each test set up on the bed being tested.
- Minimum of one photograph, taken from the same distance and angle, of the tested bed after each test is completed and all test equipment and test padding has been removed.
- Additional photographs shall be taken to clearly show any loss of serviceability.

The following photographs shall be provided in the body of each test report for each bed with drawers or drawer unit tested.

- Minimum of one photograph of the entire assembled bed drawer unit taken prior to starting any testing.
- Minimum of one photograph showing the entire bed drawer unit with each test set up on the unit being tested.
- Minimum of two photographs of the entire assembled drawer unit or bed with drawers taken after all testing is completed. One photo shall show the unit with all drawers closed and one photo shall show the unit with all drawers open. Photos shall show the entire drawer unit or bed with drawers.
- Additional photographs shall be taken to clearly show major changes in structural integrity, as applicable or loss of serviceability as applicable.

10. Video(s) of Deck Impact Test (Test B): A clear minimum 640 x 480 video in mov, qt, m4v, mp4, wmv or mpg format, of Test B is required. It is preferred that each of the four impacts be included in a separate video clip, with each clip beginning 5 to 10 seconds before impact and ending 5 to 10 seconds after impact with exception that the clip for the final impact shall continue through removal of the test bag, inspection for damage and measuring for deformation. Within the video, each drop shall be identified both visually with a sign (e.g., Drop Test 1, Drop Test 2), and audibly. Video clip(s) may be uploaded to a "Drop Box" or YouTube for viewing, and access information and passwords needed for viewing the video(s) shall be submitted with the test report. As an alternative, video clips may be copied onto a DVD and mailed to the appropriate contract specialist in the GSA IWACenter. If there is any failure of the bed, an additional video segment, with close-up views, shall be taken to clearly show the failure. Camera shall be positioned to obtain the best vantage point for taking the video to show the test procedure. Camera angle and distance from the bed being tested shall be the same throughout the test except for taking close-ups of damage as applicable. Video(s) shall clearly identify the manufacturer and model number of the bed being tested.

11. Retesting for design, component or component vendor changes: When bed/bed drawer unit design, component (e.g. spring deck, connection hardware, drawer suspensions) or component vendor changes are made during the contract, the entire unit shall be retested and shall meet all test requirements. Accurate electronic versions of all records of design changes and test reports shall be maintained by the contractor for the term of the contract. The contractor shall provide a copy of the test report, covering the bed/bed drawer unit with changes and a description of the changes, to GSA ACO and PCO prior to shipment of units.

12. Periodic Retesting: Notwithstanding changes in design, components, or component vendors (see paragraph 11 above), product(s) shall be retested and new passing test report(s) submitted within seven (7) years of the date of the previous test report(s).

Definitions.

Vertical end support (VES). Support structure at the head and foot of bed (headboard-footboard). Examples of different designs of VES's include open wood frame, wood frame and panel, solid wood panel, open steel frame and steel frame and panel.

Bed. Bunkable or loftable beds (low loft and high loft).

Bed configuration. Arrangements that available bed components can be assembled into such as bunk, low loft or high loft. Worst-case bed configurations are listed in Table 1, Footnote 2/.

Bed deck. Horizontal surface (e.g. sinuous springs, plywood deck, steel deck) with perimeter frame (side rails and end rails) that supports the mattress.

Bed deck type. Rigid or non rigid mattress support surface. Examples of bed deck types are listed in Table 1, Column 1.

Connection method. Type of hardware used to attach bed deck to vertical end supports. Examples of connection methods are listed in Table 1, Footnote 6/.

Drawers. Under bed drawers that are part of the bed such as captain's beds, or 1 or 2 drawer high under bed drawer units that are attached to the bed or are freestanding.

Head and foot ends of the bed. The terms "head" and "foot" ends of the bed are used to differentiate one end of a bed from the other. They are not absolute terms.

Loss of serviceability. The failure of any component to carry its intended load or to perform its normal function. Permanent deformation greater than 13 mm in magnitude will constitute a loss of serviceability. In addition, broken, deformed or disconnected parts, such as springs, links, partitions or other bed components is considered a loss of serviceability.

Series testing. Tests performed on one bed, one test after another.

Tolerances. When other tolerances or a measurement range is specified, the below tolerances do not apply.

Test masses, forces, velocities and time: $\pm 5\%$.

Linear measurements: ± 5 mm.

Angles: ± 1 degree.

Level: Level to within 5 mm/m.

Cycle: Cycle requirements are minimums.

Tests.

Group 1 - Tests required for each bunkable/loftable bed type. Group 1 Tests shall be performed in series (one after another), in alphabetical order (A, B), on the upper deck of one of each bunkable/loftable bed type as defined in Table 1, Footnote 1/. Beds being tested shall be assembled into the "worst case" configuration as defined in Table 1, Footnote 2/. Each type of connection method offered shall be tested. A sufficient number of beds shall be tested so that each offered deck type and each offered connection method is tested at least one time. **NOTE: When beds with lift decks are being tested, Test F (Lift Deck Racking Test) shall be performed first before any other tests.**

- A. Bed End Impact Test (Figure 1).

Purpose of test: To evaluate the durability, structural integrity and rigidity of a completely assembled bed when subjected to this test. Tests A and B shall be performed on the same bed.

Preparation of unit being tested: Assemble bed as required in Table 1, Footnotes 2/, 3/, 4/ and Figure 1. Install the upper bed deck in the uppermost position and install lower bed deck or stabilizer bar as applicable, in the mid-position of the lower VES. Remove any floor glides and place bed on a smooth, rigid, level surface. Block the bed at the floor, on the inside edges of the VES's as shown in Figure 1. Blocking shall be securely attached to the floor and shall not come loose during testing. Blocking shall be of sufficient height but not over 100 mm high, so that during testing the bed does not bounce over the blocking.

Securely clamp or bolt (at four corners) one 600 mm W x min. 19 mm thick plywood "shield" to the face of the "head" and "foot" VES's, centered on the width of each VES. "Shields" shall not shift or come loose during testing. On post-and-rail vertical end support construction, the "shields" shall be mounted to overlap the two uppermost horizontal rails. The top of the "shields" shall be mounted flush with the top edge of the top rail and shall not extend more than 100 mm below the bottom edge of the lower of the two rails. If VES's are "solid" one piece construction without horizontal rails or if VES's have vertical slats/rails, the "shields" shall be 300 to 350 mm high. Cover plywood "shields" with 1.9 - 2.5 mm thick sheet steel, 300 x 300 mm, positioned so steel piece is centered over the impact point. In no case shall the shields be positioned so that they add support or rigidity to the bed assembly (such as by covering the joints between the top and bottom bunk units or the joints between the posts and the cross rails). A new set of shields shall be used for each bed tested (25 impacts per shield maximum). Shields shall not be reused.

Pre-test bed racking measurements: Secure a dial indicator at one corner of the "foot" end of the bed, so that the plunger contacts a flat surface on the outside face of VES. (See note below when testing a high loft bed.) Plunger shall be positioned 90° to the face of the VES, be within 50 mm of the closest outside vertical corner and be level (± 25 mm) with the height of the top edge of the uppermost bed deck. Adjust plunger to allow for the anticipated "racking" movement of the VES. Set the dial indicator to "0". Apply a 200 N horizontal "pushing" or "pulling" force to the face of the VES at the "head" end of the bed at a point opposite (± 25 mm) the contact point of the dial indicator as shown in Figures 7 and 7a. After force has been applied for 1 minute, record racking measurement (AX_1). After measurement has been taken, remove force. Repeat this procedure by moving dial indicator from one "foot" corner of the bed to the other "foot" corner of the bed. Move force application device from one "head" corner of the bed to the other "head" corner of the bed as shown in Figure 7. Record the second racking measurement (AY_1). Calculate and record the average of the two pre-test racking measurements (Ave_1). Remove force application and measurement equipment before testing.

Note: When testing a high loft bed, perform the Pre- and Post-test bed racking measurements (AX_1 , AX_2 , BX_1 , BX_2) on the side of the bed with stabilizer bar(s). Do not perform the Pre- and Post-test bed racking measurements (AY_1 , AY_2 , BY_1 , BY_2) on the side of the bed without stabilizer bar(s). Therefore, mark all AY_1 , AY_2 , BY_1 , BY_2 , Ave_1 and Ave_2 boxes on the report form 'N/A'. Calculate the difference between AX_1 and AX_2 , and BX_1 and BX_2 , and use these numbers to determine 'Pass/Fail'.

Preparation of test apparatus: Suspend two steel masses, 45.5 kg each, with steel chain, cable, rod or bar, 1220 mm above the point of impact as shown in Figure 1. Steel mass shall be either a solid round ball or a series of barbell weights symmetrically bolted together in such a way that the disks will not move in relation to each other upon impact and so that the center weight is larger diameter than the outer weights. An example of this arrangement is shown in Figure 1. Position one suspended mass at each end of the bed. At rest, with the chain/cable/bar/rod perpendicular to the floor, one mass shall just touch the shield at the head and one mass shall just touch the shield at the foot of the bed. These masses shall be located at the center (side to side) of the shield. The vertical center point of the impact mass shall strike the shield 150 mm below the top edge of the shields.

Test procedure. From its rest position at the "head" end of the bed, pull one mass out to a 36.5 to 37 degree angle (the center of the mass will be 240 to 250 mm above the point of impact) as shown in Figure 1. Carefully release the mass so that it swings freely, does not wobble and squarely impacts the shield on the VES. Repeat this procedure for the mass at the "foot" end of the bed. Repeat this

procedure so that alternate impacts are made on the “head” and “foot” ends of the bed assembly. Each mass shall strike the bed 25 times, 50 impacts total.

Post-test bed racking measurements: After testing is completed, perform and record the same force and racking measurement procedures that were done before testing (AX_2 , AY_2). Calculate and record the average of the two “post-test” deflection measurements (Ave_2).

Acceptance Level: The difference between bed racking measurements (Ave_1) and (Ave_2) shall be not more than 10 mm and shall be identified as the “A” racking measurement. During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test or from performing bed racking measurements. Not meeting any one of these criteria shall be considered an “overall failure” for this test and be cause for rejection.

B. Deck Impact Test (Figure 2).

Purpose of test: To evaluate the performance and structural integrity of a completely assembled bed when the upper bed deck is subjected to this test. Test B shall be performed on the same bed that Test A was performed on.

Preparation of unit being tested. Bed shall be assembled in the same configuration and blocked in the same manner as done for Test A (Bed End Impact Test). Bolts/nuts shall be tightened and “wedge locks” shall be reseated with suitable mallet before Test B is performed. No bed components may be replaced.

Attach a sheet of cotton duck (minimum 24 oz/yd² Trade #4) insulator, at least 100 mm wider than the test bag diameter, in the center of the bed deck, see Figure 2. Attach a 150 ±5 mm thick, 45 ±5 IFD foam pad, at least 100 mm wider than the test bag diameter, to the top of the bed deck centered over the cotton duck insulator sheet. Attachment method(s) shall keep insulator and foam pad in position during testing but shall not damage or penetrate the deck. A new cotton duck insulator and a new foam pad shall be used for each bed that is tested (4 drops total). The cotton duck insulator and foam pad shall not be reused.

Pre-test bed racking measurements: These racking measurements shall be taken after bed components are re-tightened/reseated. Perform the same “pre-test” force and racking measurement (BX_1 and BY_1) procedures that were done for Test A above. Calculate and record the average of the two racking measurements (Ave_1). Remove force application and measurement equipment before testing.

Pre-test bed deck measurements: Measure and record the vertical distance from the bottom of each deck perimeter frame side rail to the floor, the horizontal distance between the left and right side rails and the vertical distance from the center of the horizontal deck surface (e.g. sinuous springs, plywood deck, steel deck) to the floor. All four measurements shall be taken midway between the VES's. If bed test unit has a structure supporting the deck that precludes taking a measurement from the center of the deck to the floor (e.g. lift deck bed or panel base bed), establish a reference point above the deck for the purpose of taking the “before testing” and “after testing” center deck measurements.

Preparation of test apparatus. A test bag 406 mm in diameter, constructed in accordance with Appendix A in ANSI/BIFMA X5.4, containing sand and/or shot and having a mass of 100 kg shall be used. Attach the bag to a retention device that will permit the test bag to free fall to the foam pad on the bed. Position the test bag so it is centered (head to foot and side to side) over the uppermost deck surface, 610 mm above the top surface of the foam pad.

Test Procedure. Test the upper bed deck. Position test bag as required above and shown in Figure 2, and allow it to free-fall. Repeat this procedure for a total of four (4) impacts.

Post-test bed deck measurements: Measure and record dimensions taken at the same four locations as done before testing. Subtract and record the difference between the “pre-test” and “post-test” measurements at each of these four locations.

Post-test bed racking measurements: After testing is completed, perform the same force and racking measurement (BX_2 and BY_2) procedures that were done before testing. Calculate and record the average of the two “post-test” racking measurements (Ave_2).

Acceptance Level: The difference between bed racking measurements (Ave_1) and (Ave_2) shall be not more than 10 mm and shall be identified as the “B” racking measurement. The difference between the “pre-test” and “post-test” side rail measurements (deformation) at each of the three locations shall be not more than 7 mm. The difference between the “pre-test” and “post-test” measurements from the center of the horizontal deck surface to the floor shall be not more than 15 mm. During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test or from performing bed racking measurements. Not meeting any one of these criteria shall be considered an “overall failure” for this test and be cause for rejection.

C. Deck Static Force Test – This test has been deleted.

Group 2 - Tests required to be performed on single bed versions of bunkable/loftable beds and select bed components. Group 2 Tests may be conducted in any sequence on a series of units being tested. Additional test unit(s) may be used for Group 2 testing.

D. Deck Durability Test - Cyclic (Figure 4).

Purpose: To evaluate the performance, durability and structural integrity of each offered bed deck type, with mounting hardware and VES's of a complete, assembled single bed per requirements in Table 1 when subjected to this test.

Preparation of unit being tested: Assemble bed as required in Table 1, Footnotes 3/, 5/, 6/ and Figure 4. Install the bed deck in the uppermost position in single bed configuration. Remove any floor glides and place bed on a smooth, rigid, level surface. Block the bed at the floor, on the inside edges of the VES's as shown in Figure 4. Blocking shall be securely attached to the floor and shall not come loose during testing. Blocking shall be of sufficient height but not over 100 mm high, so that during testing the bed does not bounce over the blocking.

Attach two separate sheets of cotton duck (minimum 24 oz/yd² Trade #4) insulator, at least 100 mm wider than the loading device diameter, to the top of the bed deck being tested, centered under where each of the loading devices will be positioned, see Figure 4. Attach two separate 52 ±5 mm thick, 45 ±5 IFD, foam pads, at least 100 mm wider than the loading device diameter, to the top of the deck centered over each of the cotton duck insulator sheets. Attachment method(s) shall keep insulators and foam pads in position during testing but shall not damage or penetrate the deck. New cotton duck insulators and new foam pads shall be used for each bed deck that is tested. Insulators and foam pads shall not be reused.

Preparation of test apparatus: Test device shall apply a load of 100 kg through a 305 mm ± 13 mm diameter loading device.

Pre-test bed deck measurements: Measure and record the vertical distance from the bottom of each deck perimeter frame side rail to the floor, the horizontal distance between the left and right side rails and the vertical distance from the center of the horizontal deck surface (e.g. sinuous springs, plywood deck, steel deck) to the floor. All four measurements shall be taken midway between the VES's. If bed test unit has a structure supporting the deck that precludes taking a measurement from the center of the deck to the floor (e.g. lift deck bed or panel base bed), establish a reference point above the deck for the purpose of taking the “before testing” and “after testing” center deck measurements.

Test procedure: Place the loading device centered across the width of the bed and midway between the side-to-side center line of the bed and one VES in “Position A” as shown in Figure 4. Raise the loading device from the bed and lower completely, without impact to the bed so that it takes the entire load without any support from the cycling device, at a rate of 20 to 25 cycles per minute. Test for 75,000 cycles. One cycle is one downward and upward stroke. Reposition the loading device to “Position B” as shown in Figure 4 and perform the test for an additional 75,000 cycles. No parts or links may be replaced during the test. When test is completed raise load head off bed deck surface.

Note: Applying the loads in an alternating sequence to attain a total of 150,000 cycles is an acceptable method of performing this test.

Post- test bed deck measurements: Measure and record dimensions taken at the same four locations as done before testing. Subtract and record the difference between the “pre-test” and “post-test” measurements at each of these four locations.

Acceptance Level: The difference between the “pre-test” and “post-test” side rail measurements (deformation) at each of the three locations shall be not more than 7 mm. The difference between the “pre-test” and “post-test” measurements from the center of the horizontal deck surface to the floor shall be not more than 15 mm. During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test. Not meeting any one of these criteria shall be considered an “overall failure” and be cause for rejection.

Estimated time required to perform this test in series: 113.3 hours at 22 cycles per minute.

Estimated time required to perform this test in an alternating sequence: 56.8 hours at 22 cycles per minute.

E. Deck Frame Racking Test (Figure 5)

Purpose of this test: To evaluate the performance, durability and structural integrity of each offered bed deck type having a rigid perimeter frame.

Preparation of unit being tested: Position the deck vertically or horizontally (on a flat surface). Restrain the deck along the length of one side rail. VES's are not required to be attached to the bed deck when performing this test.

Pre-test reference point: Establish and mark a reference point (1) at one end of the unrestrained side rail.

Test procedure: Apply an 892 N force to one end of the unrestrained side rail in a direction parallel to the length of the side rail. Maintain this force for 30 minutes. Remove test force. Wait 30 minutes (recovery time) before performing post-test measurement.

Post-test reference point and measurement: Establish and mark a second reference point (2) at the same end of the unrestrained side rail. Measure and record the distance between reference point (1) and reference point (2).

Acceptance level: There shall be no more than 6 mm deformation of the deck after testing as determined by the distance between the two reference points. Measurements exceeding this limit will be considered a failure and shall be cause for rejection.

F. Deck Racking Test for Wood or Metal Beds With Lift Deck . **This test shall be conducted before any other tests are conducted on the lift deck bed.**

Purpose of this test: Determine the amount that a lift deck “racks” or “sags”, under its own weight, when lifted at one corner.

Preparation of unit being tested: Place lift deck bed on a level, rigid surface.

Test procedure: Lift one corner of the lift deck and support it 150 mm above the bed box with a 150 x 12 mm dowel. Using a tape measure, measure the distance between the bottom of the other corner of the lift deck and the bed box.

Acceptance level: The distance measured under the unsupported corner of the lift deck shall be greater than or equal to 100 mm. Not meeting this criteria shall be considered a “failure” and be cause for rejection.

Group 3 - Drawer Tests are required to be performed on each type of bed drawer unit. Bed drawer unit types include beds with built-in drawers such as captain’s beds, units with drawers that can be used under a bed or units with drawers attached underneath a bed. Group 3 Tests may be conducted in any sequence on a series of “drawer units” of one type.

G. Unit Strength Test.

Purpose of test: To evaluate the performance, durability and structural integrity of a bed drawer unit when subjected to this test.

Test: Test the worst case bed drawer unit of each type in accordance with ANSI/BIFMA X5.9, 4 Unit Strength Test, 4.2 Concentrated Functional Load Test, 4.3 Distributed Functional Load Test, 4.4 Concentrated Proof Load Test, and 4.5 Distributed Proof Load Test. The worst case bed drawer unit is the unit within each type, containing the widest drawer(s) with the greatest interior volume. When testing a “stand alone” bed drawer unit designed to slide under a bed, the top of the unit shall be loaded as specified for a “unit top” in the test method. When testing a bed with built in drawers such as a captain’s bed, the bed deck shall be loaded as specified for a “unit top” in the test method. When testing a bed drawer unit designed to be attached under a bed, the bed drawer unit shall be attached under a bed being offered and the top surface of the drawer unit shall not be loaded.

Acceptance Levels: Use 4.2.3, 4.3.3, 4.4.3 and 4.5.3 Acceptance Levels.

H. Drawer Rebound Test.

Purpose of test: To evaluate the performance, durability and structural integrity of the drawer(s) when subjected to this test.

Test: Test the worst case drawer(s) as defined below, in accordance with ANSI/BIFMA X5.9, 12 Rebound Test.

Acceptance Level: Use 12.4 Acceptance Level.

I. Drawer Out Stop Test.

Purpose of test: To evaluate the performance, durability and structural integrity of the drawer(s) when subjected to this test.

Test: Test the worst case drawer(s) as defined below, in accordance with ANSI/BIFMA X5.9, 13 Extendible Element Retention Impact and Durability (Out Stop) Test.

Acceptance Level: Use 13.4 Acceptance Level.

Estimated time per drawer, required to perform this test: 17.9 hours at 14 cycles per minute.

J. Drawer Cycle Test.

Purpose of test: To evaluate the performance, durability and structural integrity of the drawer(s) when subjected to this test.

Test: Test the worst case drawer(s) as defined below, in accordance with ANSI/BIFMA X5.9. Use the appropriate cycle test procedure as applicable for drawer(s) being tested.

15.2 “Cycle Test for Extendable Elements (Drawers) Deeper than Wide That Do Not Swivel”

15.3 “Cycle Test for Extendable Elements (Drawers) Wider than Deep That Do Not Swivel”

Acceptance Level: Use 15.2.3 or 15.3.3 Acceptance Level(s) as applicable.

Estimated time needed per drawer to perform each test: 69.4 hours at 12 cycles per minute.

“Worst-case” drawer(s). If the same model and load capacity drawer suspension is used on all drawers within a unit, the “worst case” drawer in the unit is defined as the widest drawer with the greatest interior volume. If different model/load capacity drawer suspensions are used, the “worst case” drawers are defined as the widest drawer(s) with each different model/load capacity suspension.

e.g. If a drawer unit has two drawers of the same width but one is greater in height (deeper vertically) than the other, and each drawer uses the same model/load capacity drawer suspension, only the drawer of greater height shall be tested.

e.g. If a drawer unit has three different sizes of drawers and each drawer uses the same model/load capacity drawer suspension, only the widest of the three drawer sizes shall be tested. If a unit has three different sizes of drawers and each uses a different model/load capacity drawer suspension, each of the three drawer sizes shall be tested. If different “drawer units” are offered the unit(s) with the “worst-case”

drawers are required to be tested. The “drawer unit(s)” shall be selected so that all worst case drawers are tested. This could mean that more than one “drawer unit” will need to be tested.

e.g. Two types of “drawer units” are offered.

“Drawer unit” one has three sizes of drawers, each using the same “A” model drawer suspension. The widest drawer is 900 mm W.

“Drawer unit” two has three sizes of drawers using different model drawer suspension as follows:

800 mm W drawer – “A” model suspension,

500 mm W drawer – “B” model suspension,

330 mm W drawer – “B” model suspension.

In this case the following “drawer units” and drawers are required to be tested.

“Drawer unit” one, 900 mm W drawer – “A” model suspension.

“Drawer unit” two, 500 mm W drawer – “B” model suspension.

Table 1 - Required bunkable/loftable bed testing

	Group 1 Test A <u>1/</u>	Group 1 Test B <u>1/</u>	Group 1 Test C	Group 2 Test D <u>1/</u>	Group 2 Test E	Group 2 Test F
	Bed End Impact Test Figure 1	Deck Impact Test Figure 2	Deleted	Deck Durability Test - Cyclic Figure 4	Deck Frame Racking Test Figure 5	Lift Deck Racking Test
Bed Configuration/ Test Fixture	Test complete bed in the worst case bed configuration <u>2/</u>	Test complete bed in the worst case bed configuration <u>2/</u>	N/A	Test deck <u>3/</u> in single bed configuration <u>5/</u>	Test bed deck mounted in a test fixture <u>7/</u>	Test each bed with lift deck
Connection Method(s) → Bed Deck Types <u>3/</u> ↓	Test with each type of connection method <u>4/</u>	Test with each type of connection method <u>4/</u>	N/A	Test with "worst case" connection method <u>6/</u>	N/A	N/A
Sinusuous spring deck	X	X	N/A	X	X	N/A
Helical suspended deck	X	X		X	X	
Other non-rigid deck	X	X		X	X	
Steel deck	X	X		X	X	
Plywood deck	X	X		X	X	
Steel mesh/perforated deck	X	X		X	X	
Tubular deck	X	X		X	X	
Other rigid deck	X	X		X	X	

1/ Bed type. One worst case version of each bed type shall be tested. A bed type is defined as a bed having one design of VES where the structural components (frame) are made with material of one type (e.g. hardwood, softwood, steel, composite, plastic), cross sectional dimension and gauge (when applicable). An "open frame" VES is considered to be the same bed type as the same "open frame" VES with decorative panel (e.g. HPL, wood) inserts. VES's made with two different hardwoods (e.g. oak, maple) are considered to be the same bed type.

Worst case bed type. When bed types with VES's made with the same material but made with components with different cross sectional dimensions are offered, the VES made with the smaller dimension components shall be tested. (e.g. One VES has 50 x 50 mm posts and the other VES has 50 x 38 mm posts; the VES with the 50 x 38 mm posts shall be tested.) When bed types with steel VES's with components of the same cross sectional dimensions but with different gauges are offered, the VES made with the thinner gauge steel shall be tested.

2/ "Worst-case" bed configurations are listed below in descending order. Worst case configuration is at the top of the list.

- Bunked bed
- High loft designed and marketed (as illustrated in the company pricelist/literature/website) to be configured with one stabilizer rail.
- High loft designed and marketed to be configured with two stabilizer rails.
- Low loft designed and marketed to be configured with no stabilizer rails.
- Low loft designed and marketed to be configured with one stabilizer rail.

"Worst-case" bed configuration examples: If an offered bed type is designed and marketed to be configured into a high loft (one stabilizer rail), low loft (no stabilizer rail) and a bunk bed, the bunk bed

configuration is the worst case bed configuration. The high loft bed (one stabilizer rail) is the 2nd “worst-case” bed configuration.

- 3/ Each bed deck type shall be tested. When bed deck types are offered in different sizes the largest (widest and longest) version of the deck shall be tested. e.g. If a deck is available in 36 and 38” wide versions then only the 38” wide version shall be tested. If a deck is available in 76 and 80” long versions then only the 80” long version shall be tested.
 - 4/ Each type of connection method offered shall be tested. Bed decks and connection methods may be tested in any combination on a test bed.
 - 5/ Test shall be performed using any type of VES offered.
 - 6/ “Worst-case” deck to vertical end supports connection methods are listed below in descending order.
 - Hook plate lock/track lock. (Hook into flat plate attached to vertical posts punched to receive hooks).
 - Hook with pins imbedded in wood vertical end supports
 - Hook with pins in steel “u” channel in wood or integral pins in steel vertical end support.
 - Through bolt
 - Wedge lock
- Deck Durability Test-Cyclic worst case connection method examples: If a bed type is offered with a sinuous spring deck with hook plate lock, through bolt and wedge lock connectors, the Deck Durability Test-Cyclic is only required to be performed on the spring deck with hook plate lock connectors. If a bed type is offered with a steel deck with through bolt and wedge lock connectors, the Deck Durability Test-Cyclic is only required to be performed on the steel deck with through bolt connectors.
- 7/ Deck with any connection method may be tested provided the deck structure is the same.

Known sources of supply.

Cotton duck insulator:

McMaster Carr
 P.O. Box 4355
 Chicago, IL 60680-4355
 PH: 630-833-0300
chi.ventas@mcmaster.com
<http://www.mcmaster.com>

Polyurethane foam:

Grand Rapids Foam Technologies, Inc.
 West Michigan Fabrication Operations
 1700 Alpine Avenue NW
 Grand Rapids, MI 49504
 PHh: 616-361-2722
 Fx: 616-361-0465
info@grfoamtech.com
<http://www.grfoamtech.com>

G&T Foam Products Group of Michigan
 1001 76th St SW
 Byron Center, MI 49315
 888.545.3626
 PH: 616-583-1516
 Fx: 616-583-1519
<http://www.foamproductsgroup.com/main.htm>

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**TEST REPORT FORMS
BUNKABLE AND LOFTABLE BEDS,
BEDS WITH DRAWERS AND DRAWER UNITS FOR USE UNDER BEDS**

This report provides results of testing conducted in accordance with General Services Administration Purchase Description 3FNE 99-582E. All measurements shall be recorded in metric units.

Test report #: _____ **Date testing completed:** _____

TEST FACILITY

Test Laboratory Name: _____

Address: _____

Test lab is accredited to perform these tests by: _____

Name of person who performed the tests

Printed _____

Signature _____

Phone Number: _____

Email Address: _____

SAMPLE IDENTIFICATION

Name of bed and/or drawer manufacturer: _____

Name of furniture line tested bed and/or drawer belongs to (If applicable): _____

Style/model number(s) of bed and/or drawer tested: _____

CONSTRUCTION, MATERIAL AND DESIGN

Attach drawing and component listing as required in Paragraph 6 under **General Test Requirements**.

LABORATORY VERIFICATION OF UNIT BEING TESTED.

Note any discrepancies in components as required in Paragraph 7 under **General Test Requirements**.

Before testing: _____

After testing: _____

TESTS PERFORMED

Indicate "Yes" or "N/A" below if test was performed on model identified above that was tested.

Group 1 Bed Tests	Test Performed?	Group 2 Bed Tests	Test Performed?	Group 3 Drawer Tests	BIFMA X5.9 Section(s)	Test Performed?
Group 1 Test A		Group 2 Test D		Group 3 Test G	20/4.2, 20/4.3, 4.4, 4.5	
Group 1 Test B		Group 2 Test E		Group 3 Test H	12	
Group 1 Test C	Deleted	Group 2 Test F		Group 3 Test I	13	
				Group 3 Test J (Drawer deeper than wide)	15.2, 20	
				Group 3 Test J (Drawer wider than deep)	15.3, 20	

TEST PHOTOGRAPHS

Attach applicable test photographs as required in Paragraph 9 under **General Test Requirements**.

TEST VIDEO(S)

Attach applicable bed test video(s) as required in Paragraph 10 under **General Test Requirements**.

Group 1 Test Report Form

A. Bed End Impact Test (Figure 1) Overall Pass ___ Overall Failure ___ N/A ___

No. of cycles completed _____

Bed racking measurements (A)

Pre-test racking measurements	Pre-test racking measurements average $\frac{AX_1 + AY_1}{2} = (Ave_1)$	Post-test racking measurements	Post-test racking measurements average $\frac{AX_2 + AY_2}{2} = (Ave_2)$	Difference between Ave ₁ and Ave ₂ Ave _x - Ave _x = Δ	Requirement Δ ≤ 10 mm	Pass/Fail
(AX ₁)	(Ave ₁)	(AX ₂)	(Ave ₂)		(Δ = "A" racking measurement)	
(AY ₁)		(AY ₂)				

During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test or from performing bed racking measurements.

Note if unit failed and explain why it failed. If unit passed, note any pertinent observations.

B. Deck Impact Test (Figure 2) Overall Pass ___ Overall Failure ___ N/A ___

Bed racking measurements (B)

Pre-test racking measurements	Pre-test racking measurements average $\frac{BX_1 + BY_1}{2} = (Ave_1)$	Post-test racking measurements	Post-test racking measurements average $\frac{BX_2 + BY_2}{2} = (Ave_2)$	Difference between Ave ₁ and Ave ₂ Ave _x - Ave _x = Δ	Requirement Δ ≤ 10 mm	Pass/Fail
(BX ₁)	(Ave ₁)	(BX ₂)	(Ave ₂)		(Δ = "B" racking measurement)	
(BY ₁)		(BY ₂)				

Bed deck measurements (B)

	Pre-test measurements	Post-test measurements	Difference between pre-test and post-test measurements (Δ)	Requirement	Pass/Fail
Vertical distance from bottom of side rail 1 to the floor			(Δ)	Δ ≤ 7 mm	
Vertical distance from bottom of side rail 2 to the floor			(Δ)	Δ ≤ 7 mm	
Horizontal distance between side rails			(Δ)	Δ ≤ 7 mm	
Vertical distance between bottom/top center of spring or platform to the floor/reference point			(Δ)	Δ ≤ 15 mm	

B. Deck Impact Test (continued)

During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test or from performing bed racking measurements.

Note if unit failed and explain why it failed. If unit passed, note any pertinent observations.

C. Deck Static Force Test – This test has been deleted.

Group 2 Test Report Form

D. Deck Durability Test – Cyclic (Figure 4): Overall Pass ___ Overall Failure ___ N/A ___

Bed deck measurements (D)

	Pre-test measurements	Post-test measurements	Difference between pre-test and post-test measurements (Δ)	Requirement	Pass/Fail
Vertical distance from bottom of side rail 1 to the floor			(Δ)	$\Delta \leq 7$ mm	
Vertical distance from bottom of side rail 2 to the floor			(Δ)	$\Delta \leq 7$ mm	
Horizontal distance between side rails			(Δ)	$\Delta \leq 7$ mm	
Vertical distance between bottom/top center of deck to the floor/reference point			(Δ)	$\Delta \leq 15$ mm	

During and after testing, bed components shall not become disengaged. There shall be no loss of serviceability after performing the test.

Note if unit failed and explain why it failed. If unit passed, note any pertinent observations.

E. Deck Frame Racking Test (Figure 5) Pass ___ Fail ___ N/A ___

	Measured distance	Requirement
Distance between reference point (1) and reference point (2)		≤ 6 mm

F. Lift Deck Racking Test

Pass ___ Fail ___ N/A ___

	Measured distance	Requirement
Distance measured under unsupported corner of lift deck		≥ 100 mm

Group 3 Test Report Form

G. Unit Strength Test (Drawer Unit)

Overall Pass ___ Overall Failure ___ N/A ___

ANSI/BIFMA X5.9, 4.2 Concentrated Functional Load Test

Pass ___ Fail ___

	Pull force measurement	20 Pull Force Test requirement	Pass/Fail
Drawer 1		≤ 50 N	
Drawer 2 (as applicable)		≤ 50 N	
Drawer 3 (as applicable)		≤ 50 N	
Drawer 4 (as applicable)		≤ 50 N	

Note any loss of serviceability.

ANSI/BIFMA X5.9, 4.3 Distributed Functional Load Test

Pass ___ Fail ___

	Pull force measurement	20 Pull Force Test requirement	Pass/Fail
Drawer 1		≤ 50 N	
Drawer 2 (as applicable)		≤ 50 N	
Drawer 3 (as applicable)		≤ 50 N	
Drawer 4 (as applicable)		≤ 50 N	

Note any loss of serviceability.

ANSI/BIFMA X5.9, 4.4 Concentrated Proof Load Test

Pass ___ Fail ___

Note any sudden and major change in structural integrity of the unit or its components.

ANSI/BIFMA X5.9, 4.5 Distributed Proof Load Test Pass ___ Fail ___

Note any sudden and major change in structural integrity of the unit or its components.

H. Drawer Rebound Test Overall Pass ___ Overall Failure ___ N/A ___

ANSI/BIFMA X5.9, 12 Rebound Test

	Pull force measurement	20 Pull Force Test requirement	Pass/Fail	Rebound position measurement	Rebound position requirement	Pass/Fail
Worst case drawer 1		≤ 50 N			≤ 38 mm	
Worst case drawer 2 (as applicable)		≤ 50 N			≤ 38 mm	
Worst case drawer 3 (as applicable)		≤ 50 N			≤ 38 mm	

I. Drawer Out Stop Test Overall Pass ___ Overall Failure ___ N/A ___

ANSI/BIFMA X5.9, 13 Outstop Test

	Pull force measurement	20 Pull Force Test requirement	Pass/Fail
Worst case drawer 1		≤ 50 N	
Worst case drawer 2 (as applicable)		≤ 50 N	
Worst case drawer 3 (as applicable)		≤ 50 N	

Note any loss of serviceability.

J. Drawer Cycle Test Overall Pass ___ Overall Failure ___ N/A ___

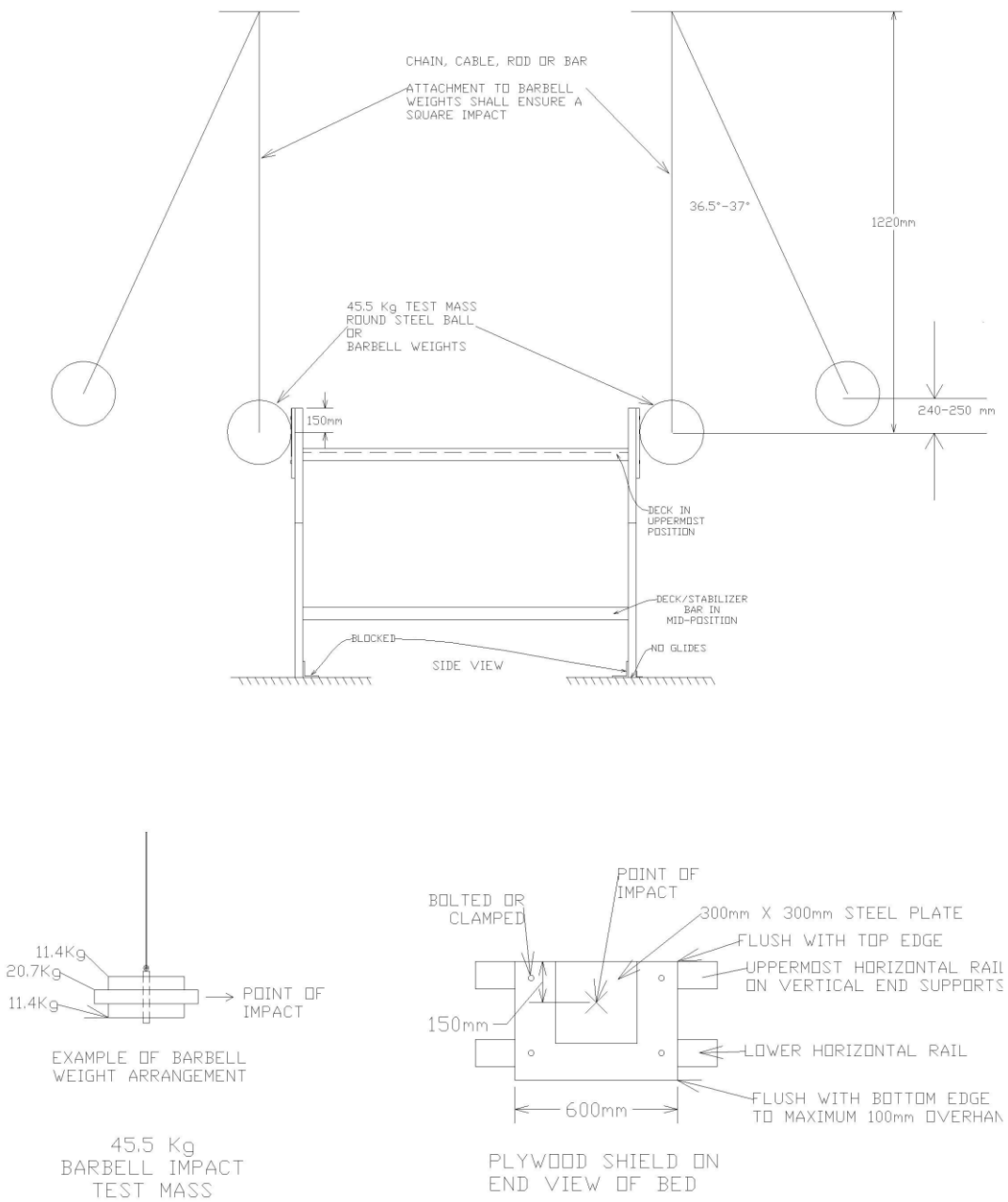
ANSI/BIFMA X5.9

15.2 Cycle Test for Extendable Elements Deeper than Wide That Do Not Swivel

15.3 Cycle Test for Extendable Elements Wider than Deep That Do Not Swivel, as applicable

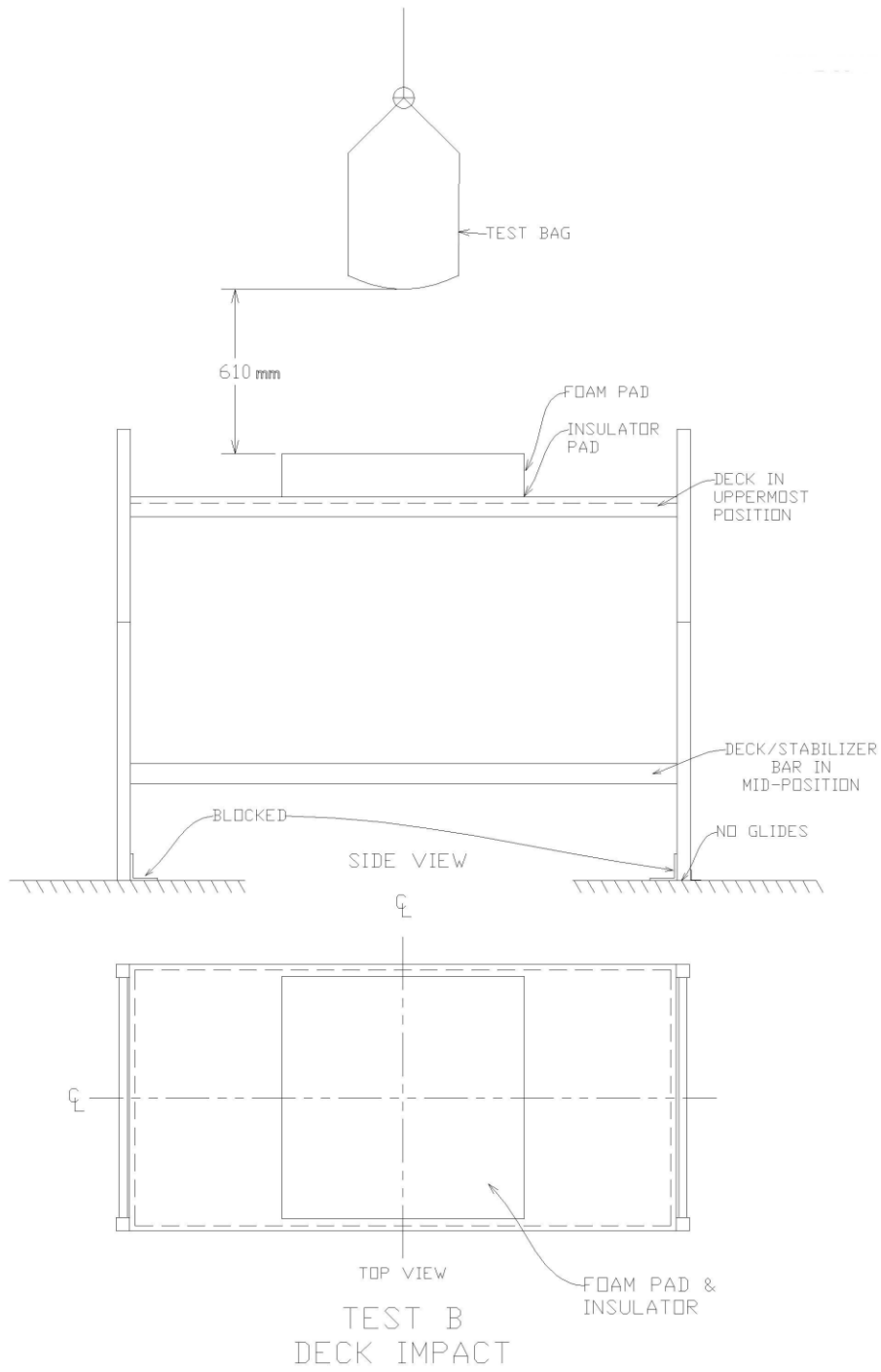
	Test performed (15.2 or 15.3)	Pull force measurement	20 Pull Force Test requirement	Pass/Fail
Worst case drawer 1			≤ 50 N	
Worst case drawer 2 (as applicable)			≤ 50 N	
Worst case drawer 3 (as applicable)			≤ 50 N	

Note any loss of serviceability.



TEST A
BED END IMPACT

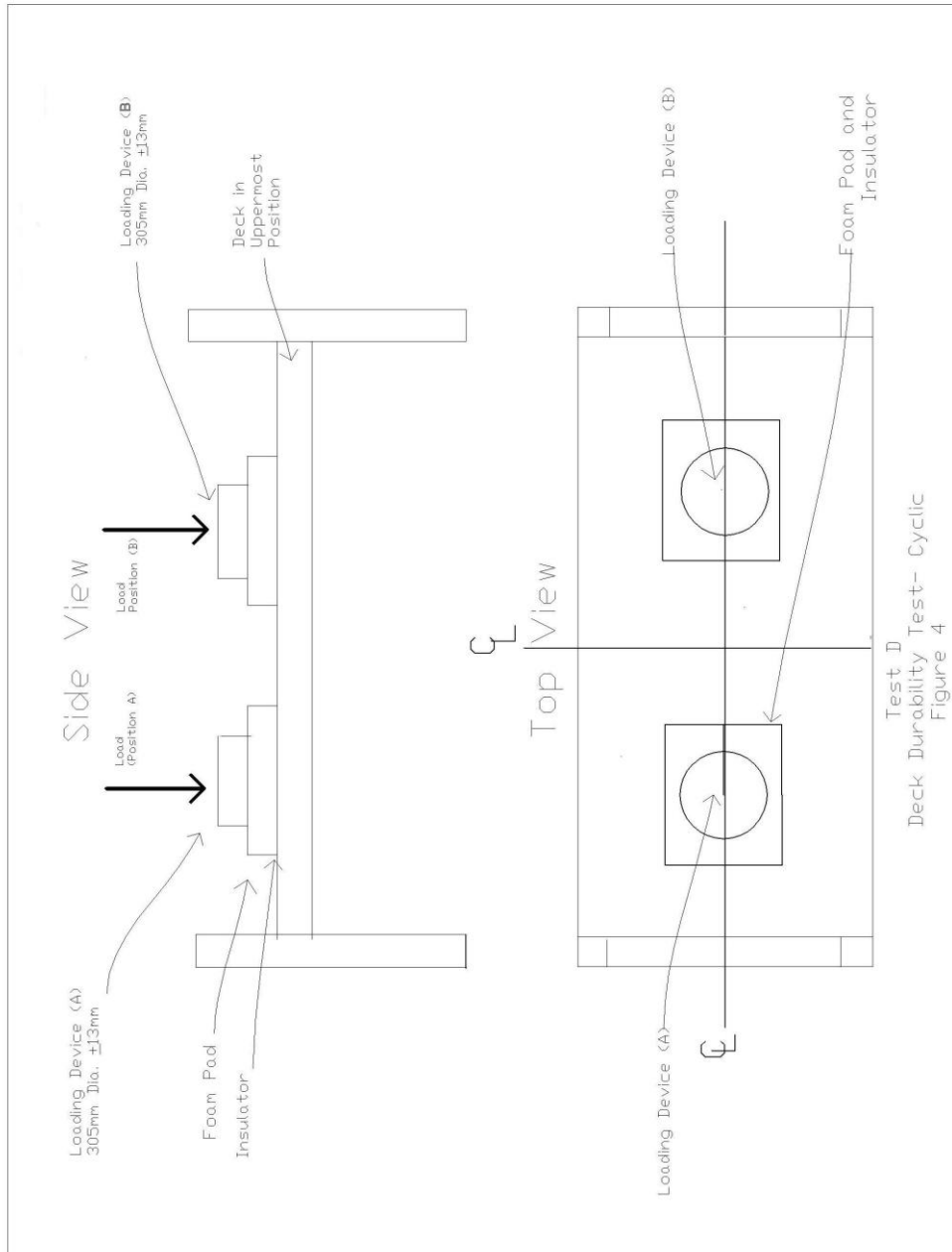
FIGURE 1

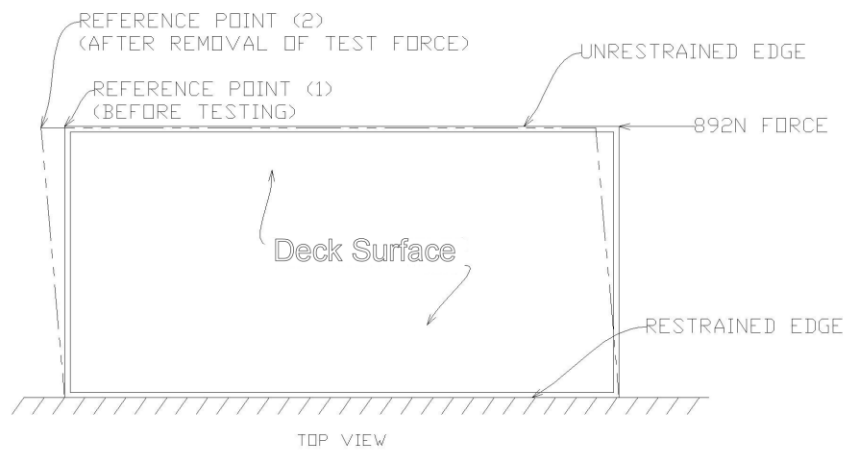


TEST B
DECK IMPACT

FIGURE 2

TEST C HAS BEEN DELETED

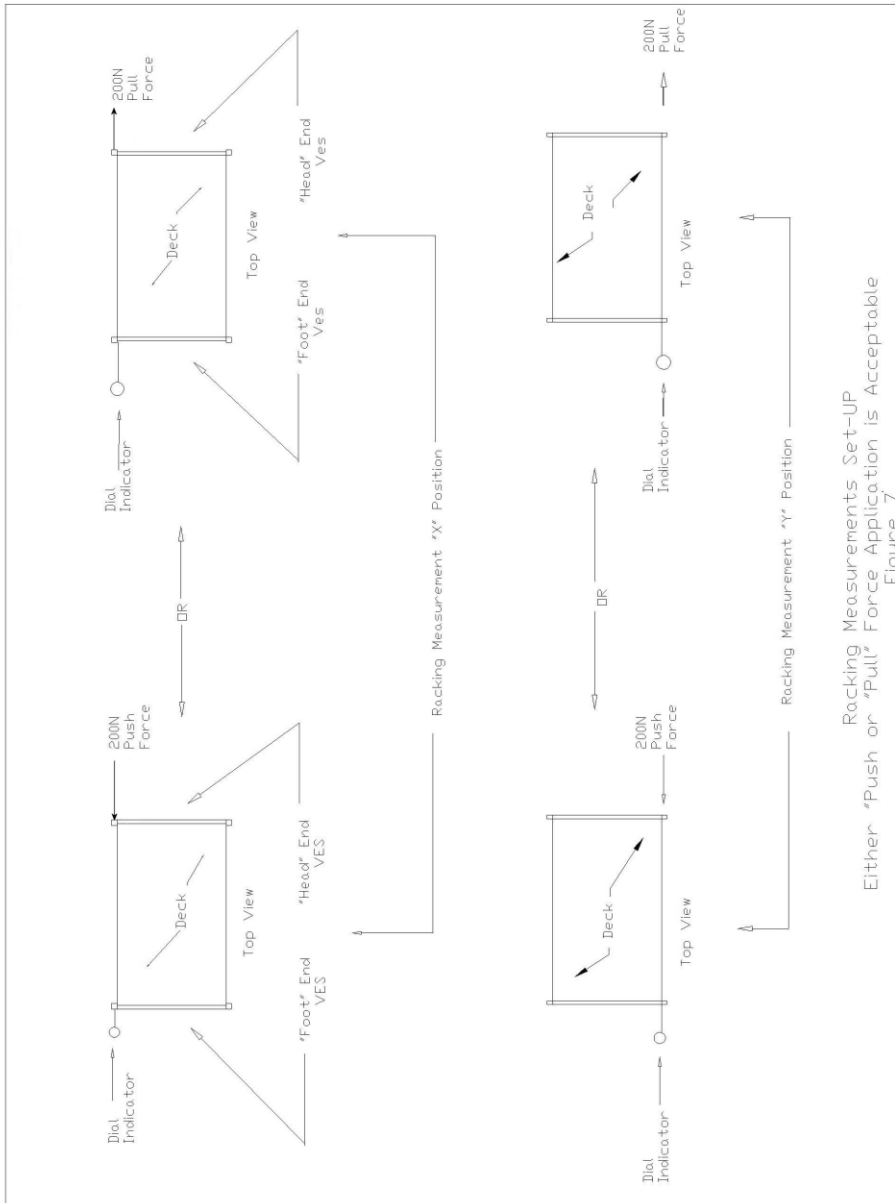




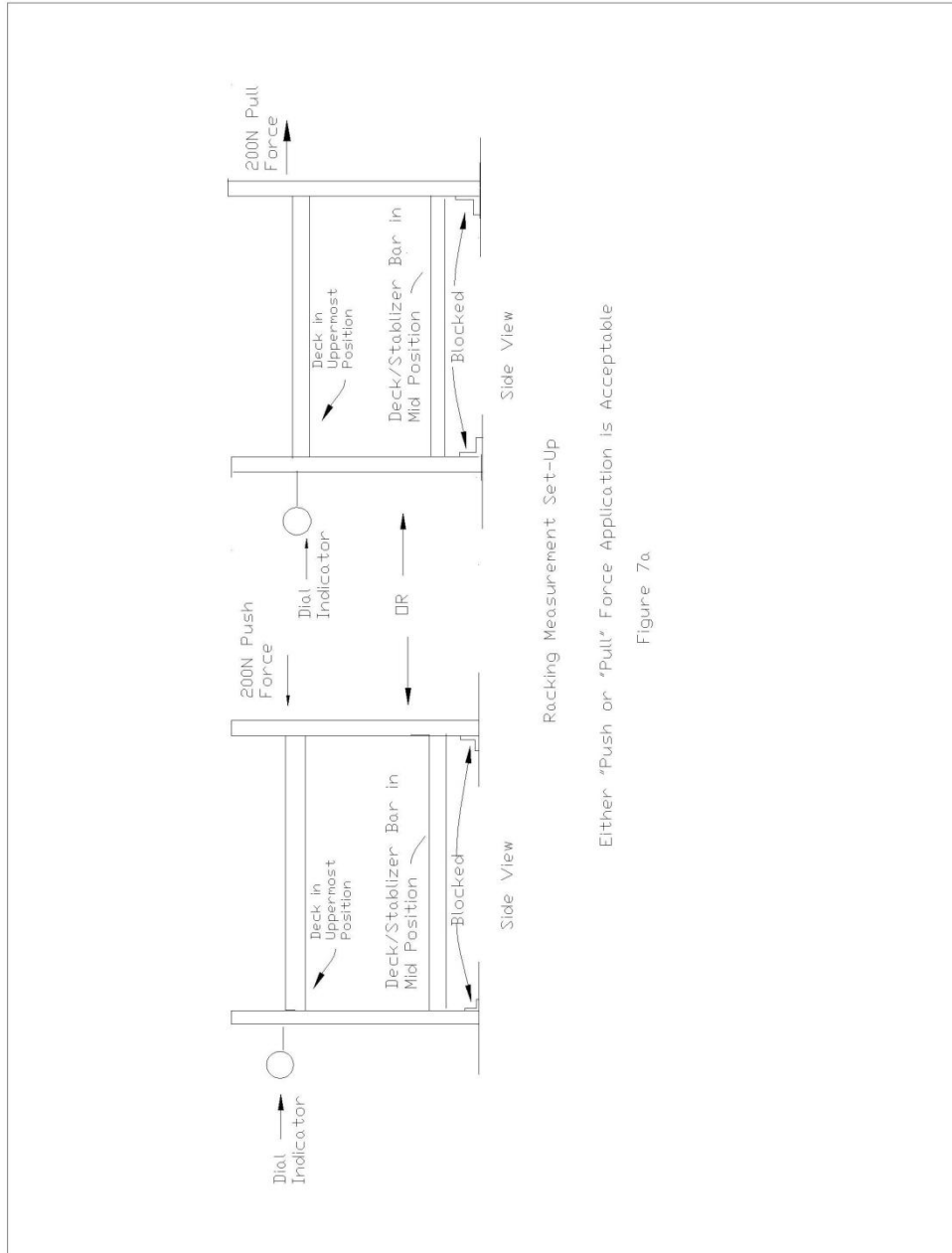
TEST E
DECK FRAME RACKING

FIGURE 5

FIGURE 6 HAS BEEN DELETED



Racking Measurements Set-UP
 Either "Push" or "Pull" Force Application is Acceptable
 Figure 7



Either "Push or "Pull" Force Application is Acceptable

Figure 7a