

PERFORMANCE SPECIFICATION  
CONTAINER, CARGO  
DOUBLE CONTAINER (BICON) TYPE 2

This specification is approved for use by all Departments and Agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification describes a 9 feet (ft) 9-3/4 inches (in) long by 8 ft wide by 8 ft high (2991 millimeters (mm) by 2438 mm by 2438 mm) (external measurements) reusable International Standards Organization (ISO) compliant double container (Bicon), with double doors at both ends, used for the storage, transportation and distribution of dry cargo.

1.2 Description. Bicons are manufactured to the latest ISO standards and their corresponding amendments as described in this document. Two Bicons, when coupled together, will be an ISO compliant empty shell container with tie downs and will measure 19 ft 10-1/2 in long by 8 ft wide by 8 ft high (6058 mm by 2438 mm by 2438 mm) (external measurements) and will be in accordance with this specification. Throughout this document, two Bicons coupled together are referred to as a 20-foot module.

Comments, suggestions, or questions on this document should be addressed to U.S. Army RDECOM, Tank Automotive Research, Development and Engineering Center, ATTN: RDTA-EN/STND/TRANS MS #268, 6501 E. 11 Mile Road, Warren, MI 48397-5000 or sent by email to [usarmy.detroit.rdecom.mbx.tardec-standardization@mail.mil](mailto:usarmy.detroit.rdecom.mbx.tardec-standardization@mail.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

#### FEDERAL SPECIFICATIONS

TT-C-490 - Chemical Conversion Coatings and Pretreatments for Ferrous Surfaces (Base for Organic Coatings)

#### FEDERAL STANDARDS

FED-STD-595/33446 - Tan 686A  
FED-STD-595/34094 - Green 383  
FED-STD-595/36463 - Gray  
FED-STD-599/37875 - International White, Aircraft White, Insignia White

#### COMMERCIAL ITEM DESCRIPTIONS

A-A-59745 - Zinc-Rich Coatings

#### DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-53072 - Chemical Agent Resistant Coating (CARC) System, Application Procedures and Quality Control Inspection

#### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1366 - Transportability Criteria

(Copies of these documents are available from <https://assist.dla.mil/quicksearch/> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

CODE OF FEDERAL REGULATIONS (CFR)

- 49CFR450 - Coast Guard, Department of Homeland Security, General
- 49CFR451 - Coast Guard, Department of Homeland Security, Testing and approval of containers
- 49CFR452 - Coast Guard, Department of Homeland Security, Examination of containers
- 49CFR453 - Coast Guard, Department of Homeland Security, Control and enforcement

(Copies of these documents are available from [www.fdsys.gov](http://www.fdsys.gov) or U.S. Government Printing Office, P.O. Box 979050, St. Louis, MO 63197-9000.)

ARMY REGULATIONS (AR)

- AR 70-38 - Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions

(Copies of this document are available from <http://www.army.mil/usapa/index.html>.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

ASTM INTERNATIONAL

- ASTM B499 - Standard Test Method for Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals
- ASTM F883 - Standard Performance Specification for Padlocks
- ASTM D3359 - Standard Test Method for Measuring Adhesion by Tape Test

(Copies of these documents are available from [www.astm.org](http://www.astm.org) or ASTM International, P.O. Box C700, West Conshohocken, PA 19428-2959.)

GENERAL MOTORS CORPORATION (GM)

GMW14872 - Cyclic Corrosion Laboratory Test - English

(Copies of this document are available from General Motors North America, c/o Global Engineering Documents, 15 Inverness Way East, Englewood, CO 80112 or [www.ihc.com](http://www.ihc.com) or as directed by the contracting officer.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

- ISO 668 - Containers, Series 1 Freight, Classification, Dimensions and Ratings (DoD Adopted)
- ISO 1161 - Containers, Series 1 Freight - Corner Fittings - Specification (DoD Adopted)
- ISO 1496-1 - Containers, Series 1 Freight - Specification and Testing - Part 1: General Cargo Containers for General Purposes
- ISO 6346 - Freight Containers - Coding, Identification and Marking

(Copies of these documents are available from [www.iso.org](http://www.iso.org) or [www.ansi.org](http://www.ansi.org) or ANSI Customer Service Department, 25 W. 43rd Street, 4th Floor, New York, NY 10036.)

SOCIETY FOR PROTECTIVE COATINGS (SSPC)

- SSPC-SP1 - Specification for Solvent Cleaning
- SSPC-SP10 - Specification for Near White Blast Cleaning

(Copies of these documents are available from [www.sspc.org](http://www.sspc.org) or SSPC Publication Sales, 40 24th St., 6th Fl., Pittsburgh, PA 15222-4656.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials. The Bicon containers and connecting couplers shall be fabricated from materials that are inherently corrosion resistant. The materials shall have no adverse effect on the health of personnel when used for its intended purpose. Toxic chemicals, hazardous substances, or ozone depleting chemicals (ODCs) shall not be used. No radioactive materials, mercury, or cadmium plating shall be used. Care shall be exercised during design and in all

material selection to reduce or eliminate the need for hazardous materials and emissions of volatile organic compounds (VOCs) throughout the product's lifecycle.

3.2.1 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion.

3.2.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs. Used, rebuilt or remanufactured components, pieces, and parts shall not be incorporated into Bicon containers.

### 3.3 Corrosion prevention.

3.3.1 Material deterioration prevention and control. The Bicon containers shall operate for an expected 20-year service life without performance degradation due to corrosion. No actions beyond normal washing, scheduled maintenance (exclusive of paint touch up), repair of accidentally damaged areas (not a result of intended use, deficiency in design, materials, manufacturing or normal wear), and replacement of damaged paint shall be necessary to keep the corrosion prevention in effect. The connecting couplers (see 3.6.3) shall be considered part of the Bicon container and shall also meet the 20-year service life; regardless that normal use of couplers could degrade standard corrosion protection methods.

3.3.1.1 Nuclear, biological and chemical (NBC) survivability. Materials shall be selected which can be decontaminated without degradation when cleaned with Decontamination Solution Number 2 (DS2) (see 6.11). This requirement shall only apply to Bicons that use CARC systems.

3.3.2 Chemical Agent Resistant Coating (CARC) system. Unless otherwise specified (see 6.2), Bicons shall be coated with a CARC system. Except as specified in 3.3.2.1 thru 3.3.2.3, the containers shall be cleaned, pretreated, primed and topcoated in accordance with the coating manufacturer's recommendations for the specific coating system that is used.

3.3.2.1 CARC cleaning and pretreatment. Galvanized steel shall be pretreated with zinc phosphate per TT-C-490.

3.3.2.2 CARC primer. Any welds and heat affected zones in galvanized steel shall be coated by zinc rich primer or thermal spray zinc to restore the zinc finish or provide equivalent protection provided by the zinc. All organic zinc rich coatings shall be in accordance with A-A-59745 with exception that the zinc content shall be 85% or higher by weight in dry film.

3.3.2.3 CARC topcoat. The application of the CARC system shall be performed in accordance with MIL-DTL-53072 on all interior and exterior metal surfaces unless otherwise specified (see 6.2). Topcoat color shall be green 383, Color Number 34094 of FED-STD-595 unless otherwise specified (see 6.2). Topcoat color may also be Tan 686A, Color Number

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33446; Gray, Color Number 36463; or White, Color Number 37875 of FED-STD-595 when specified (see 6.2). The coating system shall be selected to provide resistance to environmental degradation and coating chipping (see 4.5.3.2). The color of interior surfaces shall be Green 383, Color Number 34094 of FED-STD-595 unless otherwise specified (see 6.2). The interior paint color should match exactly to the exterior paint color as the default. If a contrasting interior color is required, it should be applied to the ceiling, floor and both interior side walls; 4 surfaces total. Note: The interior of the cargo door panels should be painted to match the exterior color of the container as the open cargo doors can be folded back against the side walls of the container.

3.3.3 Non-CARC paint. When specified (see 6.2), Bicons shall be coated with a non-CARC paint system. Non-CARC Bicons shall be painted in accordance with best commercial practices for shipping containers, except that the minimum requirements described in 3.3.3.1 thru 3.3.3.3 shall be met.

3.3.3.1 Non-CARC cleaning and pretreatment. Bicons shall be cleaned and pretreated in accordance with SSPC-SP10 such that the surface is a near-white blast cleaned surface, when viewed without magnification. All Bicon surfaces shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter, except for staining. Staining shall be limited to no more than five percent of each square-inch of surface area and may consist of light shadows, slight streaks, or minor discoloration caused by stains of mill scale, or stains of previously applied paint. Before blast cleaning, visible deposits of oil or grease shall be removed by any of the methods specified in SSPC-SP1.

3.3.3.2 Non-CARC primer. A zinc epoxy primer shall be used as a corrosion preventive measure with a minimum wet film thickness of 3.5 mils but not greater than 5.3 mils, and a minimum dry film thickness of 2.0 mils but not greater than 3.0 mils. The zinc content of the zinc epoxy primer shall be a minimum of 65 percent by weight.

3.3.3.3 Non-CARC topcoat. A topcoat shall be applied and shall have a minimum wet film thickness of 5.4 mils but not greater than 13.5 mils, and a minimum dry film thickness of 2.0 mils but not greater than 5.0 mils. Topcoat color shall be green 383, Color Number 34094 of FED-STD-595 unless otherwise specified (see 6.2). Topcoat color may also be Tan 686A, Color Number 33446; Gray, Color Number 36463; or White, Color Number 37875 of FED-STD-595 when specified (see 6.2). The coating system shall be selected to provide resistance to environmental degradation and coating chipping. The color of interior surfaces shall be Green 383, Color Number 34094 of FED-STD-595 unless otherwise specified (see 6.2). The interior paint color should match exactly to the exterior paint color as the default. If a contrasting interior color is required, it should be applied to the ceiling, floor and both interior side walls; 4 surfaces total. Note: The interior of the cargo door panels should be painted to match the exterior color of the container as the open cargo doors can be folded back against the side walls of the container.

3.3.4 Undercoating. When specified, in addition to painting, the underside of the containers shall be coated with Tectyl 121B 2.8 Volatile Organic Content (VOC) (Daubert Chemical Company) or equal to further prevent corrosion (see 6.2).

3.4 Operating and design requirements.

3.4.1 Construction. Unless otherwise specified herein, the container shall meet the requirements of ISO 1496-1, including applicable amendments, for a 1C container. The grappler arm optional feature is not required.

3.4.1.1 Dimensions. The minimum internal dimensions and actual external dimensions and tolerances shall be in accordance with table I. Interior length dimensions from the interior front door surface to the edge of the connector-locking holder device (see 3.6.3) located on the bottom half of the interior of the right door shall be no less than 108.0 in (2743 mm). The external dimensions of two Bicons coupled together as a single container shall be 19 ft 10-1/2 in by 8 ft by 8 ft (6058 mm by 2438 mm by 2438 mm). Unless otherwise specified herein, the minimum internal dimensions, actual external dimensions, tolerances, and diagonal differences of the container shall be in accordance with ISO 668. Each Bicon shall have a minimum storage capacity of 538 cubic feet (15.2 cubic meters) when measured without shelving, decking beams, and rack and cabinet systems.

TABLE I. Bicon dimensions.

	Length	Width	Height
Interior (minimums)	111.22 in (2,825 mm)	93.90 in (2,385 mm)	89.02 in (2,261 mm)
Exterior	117.75 in (+0, -0.079 in) (2991 mm (+0, -2.0 mm))	96.0 in (+0, -0.25 in) (2438 mm (+0, -5.0 mm))	96.0 in (+0, -0.25 in) (2438 mm (+0, -5.0))

3.4.1.2 Weight. The tare weight of an empty Bicon container shall not exceed 3,595 pounds (1,631 kg).

3.4.1.3 Gross weight ratings. The maximum gross weight rating of an individual Bicon shall be a maximum of 26,460 pounds (12,002 kg). The two Bicons coupled as a single container shall have a maximum gross weight rating of 52,920 pounds (24,004 kg).

3.4.1.4 Payload. Container payload is as defined in ISO 1496-1.

3.4.1.5 Doors. Bicons shall have two sets of double doors, located on both the rear end and front end of the container. Doors shall conform to ISO 1496-1 except as specified in this paragraph and in table II. Each door shall have a mechanically attached gasket (seal) capable of meeting all operating environment requirements of 3.5, 3.5.1, and 3.5.2, including conditions of high heat and relative humidity (RH) combined (+140 °F and 95% RH) to provide a weathertight seal. Doors shall be hung on the 96 in (2438 mm) container frame (external width) and shall open to not less than the dimensions specified in table II. Each door shall be provided with a minimum of two exterior heavy-duty, handle operated cam-locking devices with anti-rack provisions, which through lever type action aid in releasing the door seal from the doorframe (two handle operated cam locking devices per door shall make a total of four on each end of the

Bicon). Each locking device handle must be capable of accepting a padlock and security seal. All locking rods (see figure 3) shall be mounted such that they cannot be removed by mechanical means from the exterior side of the container to deter pilfering and gain access to the container contents. Means shall be provided to hold and secure the doors in the full open position and shall be of a material which shall not scrape or chafe the container when the doors are closed. All moving parts of the door locking mechanism and door hinges shall be permanently lubricated. Each door shall swing out a minimum of 270 degrees for ease of loading. The starting position for the door swing measurement shall be at the horizontal centerline of each door while in the closed position. For the purposes of this specification, door handles shall be identified as handle numbers 1, 2, 3, and 4; where handles 1 and 4 are the two outermost handles on each set of double doors and handles 2 and 3 are the two innermost handles on each set of double doors. The distance between the centerline of container door handles 2 and 3, on each set of double doors, shall not be less than 35.5 in (901.7 mm) and not greater than 36 in (914.4 mm) from the bottom of the Bicon (see figure 10). The centerline of door handle numbers 1 and 4, on each set of double doors, shall not be less than 6 in (152.4 mm) and not greater than 8 in (203.2 mm) lower from the centerline of door handles 2 and 3. The height of the door saddle on door handle number 3 shall be a minimum of 4 in (101.6 mm) to permit improved security (see figure 10).

TABLE II. Bicon door opening dimensions.

Height	Width
85.04±0.125 in (2160±3 mm)	92.125±0.125 in (2340±3 mm)

3.4.1.6 Side walls and end walls strength. All Bicon end and side walls, including walls that contain doors, shall meet the ISO 1496-1 strength requirements for side walls.

3.4.1.7 Floor.

3.4.1.7.1 Floor strength. The floor shall be designed and installed to support the container's payload.

3.4.1.7.2 Floor construction. The floor shall be watertight and shall be permanently attached to its bottom side rails and cross members.

3.4.1.8 Roof.

3.4.1.8.1 Roof strength. The roof shall exhibit not more than 1/4 in (6.35 mm) permanent deformation when loaded as described in the ISO 1496-1 roof strength test.

3.4.1.8.2 Roof draining. The roof shall be self-draining. No water shall leak into the assembled 20-foot module or any individual Bicon container, and the roof shall retain not more

than 1/8 in of water when the Bicon is tested in accordance with the ISO 1496-1 weatherproofness test and is level to within 5 degrees.

3.4.1.9 Lifting from top corners. When loaded and lifted as described in the top corner lifting test in ISO 1496-1, no part of the base of the 20-foot module shall deflect more than 1 in (25.4 mm) below the plane formed by the bottom faces of the bottom corner fittings. The container shall be able to be lifted from the top corners without permanent deformation, dislocation, damage to or failure of the containers or connectors. These requirements shall also apply to individual Bicons.

3.4.1.10 Lifting from bottom corners. 20-foot modules shall meet the requirements for lifting from the bottom corners as described in ISO 1496-1.

3.4.1.11 Container strength. 20-foot modules shall meet the requirements of ISO 1496-1 for the following loading conditions:

- a. longitudinal restraint
- b. transverse rigidity
- c. longitudinal rigidity
- d. lifting from fork-lift pockets

3.4.1.12 Seams. Bicon seams shall be sealed with chloroprene/neoprene type sealant where necessary such that the Bicon shall be weathertight.

3.4.1.13 Anti-pilferage provisions. Hinge-pins and screws, bolts, and other fasteners used for securing the hinges and closing devices to the container, and for holding the essential parts of the sides, ends and roof, shall be welded or otherwise secured in such a manner as to prevent access to the interior of the container without leaving visible signs of tampering. Where such welding destroys the protective coating on the items being welded or on other container parts, the protective coating and the surrounding areas shall be restored to the original condition. All locking device handles shall be furnished with provisions for padlocking and customs sealing. When specified (see 6.2), the locking provisions shall include a steel locking bar and security seal system to deter pilfering, and to permit the rapid identification of tampering used to gain access to the container. When connected and when specified (see 6.2), the locking bar shall be secured to both the left and right door locking rod on each set of double doors provided, and the security seal or cable shall be connected to both the locking rod (see figure 3) and the door catch mechanism in lieu of a padlock (the security seal or cable shall be a bright color such that it is easily recognizable when it has been removed and tampering has occurred). All locking rods (see figure 3) shall be mounted such that they cannot be removed by mechanical means from the exterior side of the container to deter pilfering and gain access to the container contents. The Transport Internationale des Routiers (TIR) plate (see 3.8.3) shall be mounted on the interior flange of the secondary door as identified in figure 10 to further deter pilferage from prying. The distance as measured from the bottom of the Bicon to the centerline of the TIR plate shall not be less than 82.5 in (2,095.5 mm) and not greater than 83 in (2,108.2 mm). A padlock protection box shall be provided such that the box shall prevent bolt cutters from being used on the padlock.

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The padlock shall be accessible through the bottom of the box, and the box shall be composed of two sections. The section on the right-hand, or primary door, shall contain a covered protection box with a slotted plate designed to receive the protruding plate attached to the left hand, or secondary door. The left-hand, or secondary door, shall contain a protruding plate with a padlock shackle hole in it, and the protruding plate shall be designed to pass through the slotted plate on the right-hand door. When both doors are closed the protruding plate shall pass through the slotted plate and expose the padlock shackle hole inside the protection box. The padlock shackle shall be able to be passed through the padlock shackle hole in the protruding plate of the left hand, or secondary door; and the padlock shall be able to be secured without tools. The padlock protection box shall be composed of minimum 1/4-in corrosion resistant steel. When specified, (see 6.2) each Bicon shall be provided with a Type P01 captive padlock conforming to ASTM F833 with two keys.

3.4.1.14 Shoring slots. Bicons shall have shoring slots on both interior walls, immediately adjacent to each set of double doors, from floor to ceiling. All shoring slots shall begin inside the Bicon not more than 3-3/4 in (95.2 mm) from the closed-doors to restrain the cargo and prevent it from forcing the door open during sudden stops or tilts of the container during transportation. The shoring slots shall be a minimum of 1-5/8 in (41.2 mm) wide to allow for the attachment of round shoring support bars. The shoring slot shall support loading equal to 0.4 times the maximum permissible payload of an individual Bicon container ( $P_g$  in ISO 1496-1) applied in the longitudinal direction at any point along the shoring slot. Door opening dimensions as specified in 3.4.1.5 shall not be obstructed by the shoring slots.

3.4.1.15 Vertical logistic tracks. Each Bicon shall contain a total of twelve Series E or Series A vertical logistic tracks (see 6.5) which are made of high strength 12-gauge steel. Each set of six vertical logistic tracks shall be individually welded and equally spaced on the Bicon roadside and curbside walls within the limits of the corrugation pitch, and as identified in figure 1. A minimum of 23 1-in (25.4-mm) minimum welds, equally spaced apart, shall be used on each side of each vertical logistic track. The distance from the container floor to the centerline of the first slot from the floor of each vertical logistic track shall be a maximum of 9 in (228.6 mm), and the distance from the container ceiling to the centerline of the first slot from the ceiling of each vertical logistic track shall be a maximum of 9 in (228.6 mm). All vertical logistic tracks shall be one continuous length, and shall correspond with one another and be of the same distance from the floor ( $\pm 0.12$  in) ( $\pm 3.048$  mm).

3.4.1.16 Shelf decking beams and shelving.

3.4.1.16.1 Shelf decking beams and shelving. Each Bicon shall be provided with 6 shelf decking beams. The length of the shelf decking beam shall be adjustable to accommodate variations in the distance between vertical logistic tracks caused by distortion during use. Shelf decking beams, when connected to the Series E or Series A vertical logistic tracks, shall be positively secured in all directions (i.e., right to left, and up and down). The shelf decking beam connection shall have a locking device that secures the shelf decking beam to the Series E or Series A vertical logistic track. This locking device shall allow easy and quick installation and removal of the shelf decking beam without the use of any tools. The decking shelf shall have a

working load capacity rating of not less than 2,000 pounds (907 kg) uniformly distributed over a shelf spanning six shelf decking beams as depicted in figure 2, and connected at the same level to each vertical track. Additional shelf decking beams shall be provided when specified (see 6.2).

3.4.1.16.2 Shelf material. Shelf material shall be a non-absorbing composite material.

3.4.1.16.3 Type 2 Bicon with 1 shelf. When specified (see 6.2), this shelf system shall consist of 1 longitudinal full shelf consisting of two (2) pieces each measuring a minimum of 104.44 in long by 46.5 in wide and shall be 1 in thick. A minimum of six (6) decking and shoring beams shall be included with this shelf system.

3.4.1.17 Tie downs. Bicons shall be provided with top rail, bottom rail, shoring slot tie downs, and recessed floor tie downs per 3.4.1.17.1, 3.4.1.17.2, and 3.4.1.17.3. All tie downs shall be capable of accepting snap hooks or 1-in (25.4 mm) wide metal strapping without tearing the strapping. Adequate clearance shall be provided at the tie down for attachment of a metal hook with adjustable webbing, and with minimum hook dimensions as specified in figure 7. The tie down provisions shall restrain the load without weld failure, permanent deformation, cracking, loosening, or breaking of the provision or its connecting structural components.

3.4.1.17.1 Top and bottom rail tie downs.

3.4.1.17.1.1 Top and bottom rail tie down placement. A total of 24 top and bottom rail loop tie downs shall be provided in each Bicon as depicted in figure 1 and as described in table III. Bicons shall have 6 loop tie downs welded on the top and bottom rails of the roadside and curbside walls for a total of 24 loop tie downs as described in table III. All loop tie downs shall be constructed of 1/2-in (12.7 mm) rod steel and formed into a loop as depicted in figures 1 and 8. All top and bottom rail loop tie downs shall be positioned as shown in figure 1. There shall be a minimum distance of 90-1/4 in (2292 mm) between the inside of each bottom rail loop tie down on each side wall and the inside of the corresponding tiedown on the opposite side wall. The measurement shall be taken parallel to the floor and perpendicular to the end walls.

3.4.1.17.1.2 Top and bottom rail tie down load rating. All top and bottom rail loop tie downs shall withstand a 4,000-pound load at an angle of 45 degrees from the horizontal and 45 degrees from the vertical without permanent deformation.

3.4.1.17.2 Corner post and shoring slot tie downs.

3.4.1.17.2.1 Corner post and shoring slot tie down placement. A total of 20 shoring slot tie downs shall be provided in each Bicon as shown in figure 1 and table III. Bicons shall have 5 shoring slot tie downs on each door side corner post, and they shall be positioned at 15, 30, 45, 60, and 75 ( $\pm 1/2$ ) in (381, 762, 1143, 1524, and 1905 ( $\pm 12.7$ ) mm ) respectively, starting from the floor as shown in figure 1 and table III. Corner post and shoring slot tie downs shall be constructed of 1/2-in (12.7 mm) rod steel and welded to the corner post as shown in figure 1 and as required in 3.4.1.14.

3.4.1.17.2.2 Corner post and shoring slot tie down load rating. All shoring slot tie downs shall withstand a 4,000-pound load at an angle of 45-degrees from the horizontal and 45 degrees from the vertical without permanent deformation.

3.4.1.17.3 Recessed floor tie downs.

3.4.1.17.3.1 Recessed floor tie down placement. A total of 4 recessed floor tie downs shall be provided in each Bicon as depicted in figure 1 and as described in table III. Bicons shall have 2 recessed floor tie downs on each door side. The door side tie downs shall be positioned as close as possible to the innermost face of the door sill.

3.4.1.17.3.2 Recessed floor tie down load rating. All recessed floor tie downs shall withstand a 4,000-pound load at an angle of 45-degrees from the horizontal and 45 degrees from the vertical without permanent deformation.

TABLE III. Configuration of tie downs.

Top Rails	Bottom Rails	Recessed floor	Shoring slot
12 total (6 on curbside wall and 6 on roadside wall).	12 total (6 on curbside wall and 6 on roadside wall).	4 total (Two near each door wall).	20 total (5 each door side corner).

3.4.1.18 Vents. All containers shall have a minimum of two passive ventilating systems comparable to those used on commercial ISO containers. The vents shall be located in upper diagonal corners on opposite walls or doors such that they provide maximum diagonal cross airflow and hot air exhaust, and they shall be designed to deflect rain or spray and prevent water ingress. As a minimum, the external venting surface area of each vent shall be 452 square millimeters (mm<sup>2</sup>) (0.7 square inches (in<sup>2</sup>)) to permit depressurization of the Bicon during air transportation. When specified (see 6.2), vents shall be able to be opened and closed, without tools, from the outside of the Bicon. There shall be no air flow through the vents when they are in the closed position. These opening and closing vents shall be able to lock in place in both the open and closed positions such that they shall remain in their set position.

3.4.1.19 Manifest box. Two manifest boxes shall be provided on each container. One shall be securely and rigidly fastened to the inside of the right hand door, and one to a flat surface of the outside upper portion of the right hand door as depicted in figure 3. The manifest box on the inside shall not interfere with the shelving area at any level. The manifest box on the outside shall be designed and located in an area that minimizes interference or damage with forklift carriages and backrests being used to lift the Bicon. The manifest box shall be weathertight with a hinge type cover, painted to match the interior or exterior color. The manifest box shall be designed to hold an 8-1/2 in by 11 in by 1-1/4 in thick document (215.9 mm by 279.4 mm by 31.75 mm).

3.4.1.20 Rack and cabinet systems. Rack and cabinet systems shall be provided when specified (see 6.2).

3.4.1.21 Voids, recesses and protrusions. The Bicon container shall be constructed to minimize recesses and voids where moisture can accumulate. No part of the Bicon container shall protrude beyond the outside plane surfaces of the corner fittings.

3.5 Operating environmental requirements. The container shall operate under the following environmental conditions without degradation in performance, material failures, or permanent deformation. The container shall be capable of uncovered long term storage in extreme hot and cold climate, high humidity, blowing sand, dust, heavy snows, mud, soft ground, earthquakes, debris, or combination of the above, as defined in AR 70-38 to include stowage on Pre-Positioning (PREPO) afloat vessels up to 30 months without loss of mission essential functions with routine unit-level (i.e., -10 level) maintenance performed every six months. Mission essential functions shall be defined as being transportable by all modes in 3.7 through 3.7.5, and being able to safely stow a full payload without any damage or deformation.

3.5.1 Storage and transit temperature. The container shall not be damaged by storage or transit in temperature conditions from -40 °F (-40 degrees Celsius (°C)) to +160 °F (+71.1 °C).

3.5.2 Operation in rain. The container shall not exhibit water leakage when subjected to the ISO 1496-1 weatherproofness test.

### 3.6 Interface requirements.

3.6.1 Forklift pockets and relief notches. The container shall have forklift pockets that conform to ISO 1496-1, Annex C. Bicon containers shall have four-way entry, and the entry points shall not interfere with the doors or door height requirements in 3.4.1.5. A relief notch shall be provided along the bottom rail at the corner block on all four sides of each Bicon. The forklift pockets on both the front and rear ends, and the roadside and curbside walls, shall be a minimum 4.0 in high by 14.0 in wide and shall conform to ISO 1496-1. Each pair of forklift pockets shall measure 34.73 in from center to center.

3.6.2 Corner fittings. All eight corner fittings on each Bicon shall be bottom corner fittings as specified in ISO 1161 to permit horizontal coupling between containers. The corner fittings shall be mounted to the container so that the elongated top and bottom apertures are parallel to the side walls of the Bicon.

3.6.3 Connecting couplers, quantity and storage. Each container shall be provided with two connecting couplers. All connecting couplers shall be one-piece assembly units, and all connecting coupler parts shall be capable of being operated and connected to the container without any tools. Each connecting coupler shall be capable of being securely fastened to a single container's corner fitting allowing the connection to be made first to one container and then to another. The currently used coupling is NSN 3040-01-387-4048, although all connecting couplers that meet the requirements specified herein shall be permitted. Bicon connecting

couplers shall meet operating and storage temperature requirements specified in 3.5.1. A connector-locking holder device shall be provided to secure and store two connecting couplers. The device shall be located on the bottom half of the interior of the right door. The depth of the device shall not exceed 4-5/8 in (117.475 mm). The length and width of the device shall be reasonably sized to allow for adequate storage and ease of use, and shall not reduce the specified internal dimensions of the container or interfere with the capability of shelves to be raised up or down.

3.6.4 Bicon coupling and uncoupling. Two Bicons shall be coupled with connectors to form an integral 20-foot module, which is dimensionally equivalent to, and does not violate, ISO envelope requirements for the standard ISO 1C container, unless otherwise specified herein. The coupling process shall not take more than 30 minutes using the connecting couplers provided with the two containers, 2 guides, and one forklift truck to position and assist in the connection.

3.6.5 Convention for Safe Containers (CSC) certification. The container design and each Bicon shall be certified in accordance with 49CFR, Parts 450 through 453.

3.6.5.1 Container stacking. The 20-foot module shall support the following loads representing the load of eight ISO 668 1C containers stacked on top of the 20-foot module:

- a. test force per container, represented by two Bicons coupled together; on all four corners simultaneously shall be 3,767 kN (846,855.3 lbf)
- b. test force per pair of end fittings shall be 1,883 kN (423,315.2 lbf)
- c. superimposed mass represented by the test force shall be 213,360 kg (470,380 lb)

The CSC plate data shall show the 9-high stacking certification.

3.7 Transportability. Individual Bicons and two Bicons coupled together to form an equivalent ISO 1C container, unless specified herein, shall be transportable by air, highway, marine and rail assets as specified herein. The individual container, and two containers coupled together, shall also be capable of being stacked and transported by military and commercial vehicles, and trailers, trains, marine vessels, aircraft, dolly sets, forklifts, and cranes; and shall withstand the impact forces encountered in shipment and loading without damage or permanent deformation.

3.7.1 Air transportability. Two coupled Bicons, and individual Bicons, shall be internally air transportable by C-130, C-5, and C-17 aircraft. Two coupled Bicon containers, and individual Bicons, shall be externally transportable by CH-47, V-22, CH-53, and UH-60 helicopters by sling.

3.7.2 Rail transportability. Two Bicons coupled together as a 20-foot module, and individual Bicons, shall be rail transportable in CONUS and NATO countries without restriction.

3.7.3 Marine transportability. Two Bicons coupled together as a 20-foot module, and individual Bicons, shall be transportable by breakbulk cargo ships, Roll-On/Roll-Off (RORO)

ships; C-8 and larger, Lighter Aboard Ship (LASH); barge carrying ships (SEABEE); Lighter, Amphibious, Resupply, Cargo (LARC)-LX, and larger lighter vessels; Landing Craft Utility (LCU); Landing Craft Mechanized (LCM); Landing Craft Utility (LCU) 1646 and LCU 2000 lighters and the Logistics Support Vessel (LSV); and Army barges and lighters in accordance with MIL-STD-1366. Individual Bicons and two Bicons coupled as a 20-foot module shall withstand, without damage, the shock, rolling and pitching normally experienced in marine transportation on the deck or in the hold of the cargo vessel. Marine transportation shall include, but not be limited to, Vertical Replenishment (VERTREP) missions and Connected Replenishment (CONREP) missions.

3.7.4 Highway transportability. Two Bicons coupled together as a 20-foot module, and individual Bicons, shall be capable of unrestricted highway transport.

3.7.5 Loading and handling equipment. Individual Bicons, and Bicons coupled together, fully loaded, shall be able to be lifted and handled by suitably rated forklifts and cranes so that they may be transported in all the modes described in 3.7 through 3.7.4.

### 3.8 Support and ownership requirements.

3.8.1 Exterior markings. Each Bicon shall be marked in accordance with ISO 6346. Example locations for the required markings are provided in figures 3 through 6, although other locations may be used provided that they conform to ISO 6346 and contain all the required data and information (see 6.2). The location of the other optional markings may be specified at the time of purchase by the customer. If specified at the time of purchase, the contractor may obtain the user's serial numbers from the contracting officer (see 6.2). Unless otherwise specified, the contractor shall stencil in 1-in (25.4 mm) letters on the exterior of the left hand door panel in the area below the CSC data plate, and as shown in figure 3: "CARC" and the month and year the Bicon was painted, using a two digit numerical format.

3.8.2 Interior markings. The owner's code, serial number, and check digit, as defined by ISO 6346, shall be stamped in characters not less than 1/2-in (12.7 mm) high or bead welded in characters not less than 1-1/2 in (38.1 mm) high on the interior surface of the door end top rail (header), within an area of 18 in (457.2 mm) from the left corner post where it shall not be obscured or the number shall be located on the top surface of the curbside rear bottom corner fitting.

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3.8.3 Approval plates. The following plates or plaques shall be obtained from a designated approval authority and attached and displayed as required by the CSC, in accordance with 49CFR450 through 49CFR453:

- a. International Convention for Safe Containers (CSC)
- b. Transport Internationale des Routiers (TIR)
- c. Timber Component Treatment (TCT) Requirements of the Australian Department of Health (if applicable)

Each Bicon shall be affixed with the seal of the approval authority.

3.8.4 Consolidated data plate. The consolidated data plate shall contain:

- a. International Convention for Safe Containers (CSC) data required in 3.6.5
- b. Transport Internationale des Routiers (TIR) markings
- c. Manufacturer's data plate markings

The height of the data plate shall be no less than 250 mm (9.8425 in). The location of the consolidated data plate shall be as depicted in figure 3.

3.8.5 Tank-automotive and Armaments Command (TACOM) data plate. Each Bicon shall contain a TACOM Natick approved data plate with the following information:

- a. the Bicon specification number (MIL-PRF-32410)
- b. TACOM Natick part number
- c. manufacturer's serial number
- d. TACOM assigned National Stock Number (NSN)
- e. model number
- f. contract number
- g. Department of the Army Technical Manual (DATM) number (if applicable)
- h. tare weight in pounds and kilograms
- i. and the manufacturer's name, CAGE, location and date of manufacture with USAU number

3.9 Workmanship. Each Bicon shall have no evidence of cracks, dents, scratches, burrs, sharp edges, pinching hazards, loose parts, missing fasteners, distortions, spatter, foreign material, or any other cosmetic or structural defects which may degrade the performance of the container.

## 4. VERIFICATION

4.1 Classification of inspections. Inspections shall be classified as follows:

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article inspection is required (see 6.2), inspection procedures are carried out on an individual Bicon except for the procedures indicated in table V that are carried out on two Bicons coupled together as a 20-foot module. This inspection shall include the examination of 4.4 and the tests indicated in table V.

4.3 Conformance inspection. Conformance inspection shall include the examination of 4.4.

4.4 Examination. Each Bicon production unit shall be examined for compliance with requirements as specified in table IV. Examination methods include visual and functional inspection, measurement by standard inspection equipment, and inspection of contractor records providing proof or certification that design, construction, processing, and materials conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data. Nonconformance to any specified requirements or the presence of one or more defects shall be cause for rejection.

4.5 Methods of inspection.

4.5.1 Testing criteria. Except as specified herein, any loss of form, fit, or function of the Bicons during testing shall be considered a failure. Expendable items (identified prior to the test) shall retain their function for their intended service life and are not subject to these criteria.

TABLE IV. Classification of defects.

Category	Defect	Method of Examination
<u>Major</u>		
101	Non-CARC paint missing or not as specified (see 3.3.3)	Doc <u>1</u> /
102	Non-CARC cleaning and pretreatment not as specified (see 3.3.3.1)	Doc
103	Non-CARC primer not as specified (see 3.3.3.2)	Doc
104	Non-CARC topcoat missing or not as specified (see 3.3.3.3)	Visual, Doc
105	Undercoating not as specified (see 3.3.4)	Visual, Doc
<u>Minor</u>		
201	Materials not as specified (see 3.2)	Doc
202	Dissimilar metals not effectively insulated from each other (see 3.2.1)	Visual, Doc
203	Used, rebuilt, or remanufactured components, pieces, or parts used (see 3.2.2)	Doc
204	Material deterioration prevention and control not as specified (see 3.3.1)	Doc

TABLE IV. Classification of defects - continued.

Category	Defect	Method of Examination
205	NBC survivability not as specified (see 3.3.1.1)	Doc
206	CARC system missing or not as specified (see 3.3.2)	Doc
207	CARC cleaning and pretreatment not as specified (see 3.3.2.1)	Doc
208	CARC primer not as specified (see 3.3.2.2)	Doc
209	CARC paint missing or not as specified (see 3.3.2.3)	Doc
210	Color not as specified (see 3.3.2.3 and 3.3.3.3)	Visual, Doc
211	Construction not as specified (see 3.4.1)	Visual, Functional, Doc
212	Dimensions not as specified (see 3.4.1.1)	SIE <u>2/</u>
213	Weight not as specified (see 3.4.1.2)	SIE
214	Weight ratings not as specified (see 3.4.1.3)	Doc
215	Doors missing or not as specified (see 3.4.1.5)	Doc, SIE, Functional
216	Side walls missing or not as specified (see 3.4.1.6)	Visual, Doc
217	End walls missing or not as specified (see 3.4.1.6)	Visual, Doc
218	Floor missing or not as specified (see 3.4.1.7)	Visual, Doc
219	Roof missing or not as specified (see 3.4.1.8)	Visual, Doc
220	Seams not as specified (see 3.4.1.12)	Visual, Doc
221	Anti-pilferage provisions missing or not as specified (see 3.4.1.13)	Visual, Functional, SIE
222	Shoring slots missing or not as specified (see 3.4.1.14)	Visual, SIE
223	Vertical logistic tracks missing or not as specified (see 3.4.1.15)	Visual, SIE
224	Vertical logistic track welds missing or not as specified (see 3.4.1.15)	Visual, SIE
225	Shelf decking beams missing or not as specified (see 3.4.1.16.1)	Visual, Functional
226	Shelf material not as specified (see 3.4.1.16.2)	Doc
227	Shelving missing or not as specified (see 3.4.1.16.3)	Visual, SIE
228	Tie downs missing or not as specified (see 3.4.1.17)	Visual, SIE
229	Top and bottom rail tie downs missing or not as specified (see 3.4.1.17.1.1)	Visual, SIE
230	Corner post and shoring slot tie downs missing or not as specified (see 3.4.1.17.2.1)	Visual, SIE
231	Recessed floor tie downs missing or not as specified (see 3.4.1.17.3.1)	Visual, SIE
232	Vents missing or not as specified (see 3.4.1.18)	Visual, Functional, SIE
233	Manifest box missing or not as specified (see 3.4.1.19)	Visual, SIE
234	Rack and cabinet systems not as specified (see 3.4.1.20)	Visual
235	Voids, recesses and protrusions not as specified (see 3.4.1.21)	Visual

TABLE IV. Classification of defects - continued.

Category	Defect	Method of Examination
236	Operating environmental requirements not as specified (see 3.5)	Doc
237	Storage and transit temperature not as specified (see 3.5.1)	Doc
238	Forklift pockets and relief notches not as specified (see 3.6.1)	Visual, SIE
239	Corner fittings not as specified (see 3.6.2)	Visual, Doc
240	Connecting couplers and storage not as specified (see 3.6.3)	Visual, Doc
241	Transportability characteristics not as specified (see 3.7 thru 3.7.5)	Doc
242	Exterior markings not as specified (see 3.8.1)	Visual
243	Interior marking not as specified (see 3.8.2)	Visual, SIE
244	Approval plates not as specified (see 3.8.3)	Visual, Doc
245	Consolidated data plate not as specified (see 3.8.4)	Visual, Doc
246	TACOM data plate not as specified (see 3.8.5)	Visual, Doc
247	Workmanship not as specified (see 3.9)	Visual

1/ SIE = Standard Inspection Equipment

2/ Doc = Documentation

TABLE V. Classification of inspections.

Requirement	Section 3	Section 4	First Article Test	
			Individual Bicon	20-foot module
Material deterioration prevention and control	3.3.1	4.5.2	X	
CARC coating thickness	3.3.2.2, 3.3.2.3	4.5.3.1	X	
CARC coating adhesion	3.3.2.3	4.5.3.2	X	
Non-CARC coating thickness	3.3.3.2, 3.3.3.3	4.5.4.1	X	
Non-CARC coating adhesion	3.3.3.3	4.5.4.2	X	
Side walls and end walls strength	3.4.1.6	4.5.5		X
Roof strength	3.4.1.8.1	4.5.6	X	
Lifting from top corners	3.4.1.9	4.5.7	X	X
Lifting from bottom corners	3.4.1.10	4.5.8		X
Container strength	3.4.1.11	4.5.9		X
Shoring slots	3.4.1.14	4.5.10	X	
Shelf decking beams	3.4.1.16.1	4.5.11	X	
Tie downs	3.4.1.17	4.5.12	X	
Top and bottom rail tie down load rating	3.4.1.17.1.2	4.5.13	X	
Corner post and shoring slot tie down load rating	3.4.1.17.2.2	4.5.14	X	
Recessed floor tie down load rating	3.4.1.17.3.2	4.5.15	X	
Weatherproofness	3.5.2	4.5.16		X
Bicon coupling and uncoupling	3.6.4	4.5.17	X	X
Container stacking	3.6.5.1	4.5.18		X

4.5.2 Material deterioration prevention and control. Conformance to 3.3.1 shall be verified by conducting the following procedure:

- a. All container, container connecting coupler, and Bicon designs shall be evaluated for corrosion prevention and control by the GMW14872, (UB), All, 4 salt sprays per cycle, Method 1/2, Exposure D cyclic corrosion laboratory test for 120 cycles to qualify the system (pretreatment, coating type(s) and coating thicknesses). To evaluate corrosion resistance, a minimum of six test coupons for each material variation and process shall be manufactured with the substrate and coating system that shall be used in production. Test coupons (4 in (101.6 mm) by 12 in (304.8 mm)) shall be scribed through the coating system to the substrate prior to testing. Test coupons shall be fabricated with and without CARC topcoat. There shall be no more than 1 mm scribe creep (measured from one side of the scribe) after scraping with a metal putty knife after 120 cycles of testing. There shall be no blistering and no more than 5 rust spots in any 24 in<sup>2</sup> (15,483.84 (mm<sup>2</sup>)) of test surface. All twelve test coupons of each test variation shall meet these acceptance requirements to be considered an acceptable design.

- b. A minimum of four connector couplings for each material variation and process shall be manufactured with the substrate and coating system that shall be used in production. Connector couplings shall be scribed through the coating system to the substrate prior to testing. Connector couplings shall be fabricated with and without CARC topcoat. There shall be no more than 1 mm scribe creep (measured from one side of the scribe) after scraping with a metal putty knife after 120 cycles of testing. There shall be no blistering and no more than 5 rust spots in any 2 in<sup>2</sup> (1290.32 mm<sup>2</sup>) of test surface. All 8 connector couplings of each test variation shall meet these acceptance requirements to be considered an acceptable design.

Any loss of form, fit, or function shall be considered a corrosion failure. Expendable items (identified prior to the test) shall retain their function for their intended service life and are not subject to these criteria.

4.5.3 CARC system. Conformance to 3.3.2 thru 3.3.2.3 shall be verified by visual inspection and by inspection of contractor records providing proof or certification that materials and processing conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.5.3.1 CARC coating thickness. Top-coat and primer coating thicknesses shall be measured in accordance with MIL-DTL-53072. Nonconformance to 3.3.2.2 or 3.3.2.3 shall constitute failure of this test.

4.5.3.2 CARC coating adhesion. Coating adhesion shall be verified by ASTM D3359 Method B and MIL-DTL-53072. Nonconformance to 3.3.2.3 shall constitute failure of this test.

4.5.4 Non-CARC paint. Conformance to 3.3.3 thru 3.3.3.3 shall be verified by visual inspection and by inspection of contractor records providing proof or certification that materials and processing conform to requirements. Applicable records shall include drawings, specifications, design data, receiving inspection records, processing and quality control standards, vendor catalogs and certifications, industry standards, test reports, and rating data.

4.5.4.1 Non-CARC coating thickness. Top-coat and primer coating thicknesses shall be measured in accordance with ASTM B499 for both wet film and dry film thickness. Nonconformance to coating thicknesses specified in 3.3.3.2 and 3.3.3.3 shall constitute failure of this test.

4.5.4.2 Non-CARC coating adhesion. Coating adhesion shall be verified as described in MIL-DTL-53072 for film builds less than 5 mils. Failure criteria is defined in MIL-DTL-53072.

4.5.5 Side walls and end walls strength. Conformance to 3.4.1.6 shall be verified by conducting the side wall and end wall strength tests in ISO 1496-1. Loading conditions specified for side walls shall be used for both the side wall and end wall tests. After completion of the test,

permanent deformation of the container causing non-conformance to any requirements of this specification shall be cause for rejection.

4.5.6 Roof strength. Conformance to 3.4.1.8.1 shall be verified by conducting the roof strength test in ISO 1496-1. Permanent deformation of the roof of greater than 1/4 in or other permanent deformation of the container causing nonconformance to any requirements of this specification shall be cause for rejection.

4.5.7 Lifting from top corners. Conformance to 3.4.1.9 shall be verified by conducting the top corner lifting test described in ISO 1496-1 on a 20-foot module and on an individual Bicon and measuring deflection of the base. Deflection of the base that that exceeds 1 in (25.4 mm) below the plane formed by the bottom faces of the bottom corner fittings, and permanent deformation, dislocation, damage to or failure of the containers or connectors shall constitute failure of this test.

4.5.8 Lifting from bottom corners. Conformance to 3.4.1.10 shall be verified by conducting the bottom corner lifting test described in ISO 1496-1 on a 20-foot module. Nonconformance to requirements stated in ISO 1496-1 for condition of the container after performing the test shall constitute failure of this test.

4.5.9 Container strength. Conformance to 3.4.1.11 shall be verified by conducting the following tests as specified in ISO 1496-1:

- a. longitudinal restraint
- b. transverse rigidity
- c. longitudinal rigidity
- d. lifting from fork-lift pockets

Failure to conform to requirements stated in ISO 1496-1 for container condition after test completion for each respective test shall constitute failure of the corresponding test.

4.5.10 Shoring slots. A 1-5/8-in (41.275 mm) wide, rigid metal bar is to be inserted in each pair of shoring slot supports so that it runs transversely across the Bicon between the two supports. Loading equal to 0.6 times the payload of an individual Bicon container ( $P_g$  in ISO 1496-1) is to be distributed across the middle 915 mm (3 ft) of the bar such that the load is applied horizontally towards the Bicon's doors. The doors shall be fully opened during this test. This load shall be maintained on the bar for at least 2 minutes. Nonconformance to 3.4.1.14 shall constitute failure of this test.

4.5.11 Shelf decking beams. The shelf decking beams shall meet the working load capacity as specified in 3.4.1.16.1. A 3/4-in (19.05 mm) shelf shall be used for the purpose of conducting this test. The shelf shall span the entire length and width of the Bicon interior. Install the first 3/4-in (19.05 mm) plywood shelf at 2 ft  $\pm$  2 in (609.6 $\pm$ 50.8 mm) from the floor of the Bicon, and then install three subsequent 3/4-in (19.05 mm) plywood shelves equally spaced every 16 in (406.4 mm) above the initial shelf. Uniformly load and secure each shelf with not

less than 2,000 pounds (907 kg). The load shall remain on each shelf for all drop tests. Close the Bicon doors and center a nominal 4 in (101.6 mm) by 4 in (101.6 mm) piece of lumber under the bottom rail of the door end of the Bicon. Raise the opposite side of the Bicon to a height of 12 in (+3/4, -1/4 in) (304.8 mm (+19.05, -6.35 mm)) and then allow it to fall freely onto a concrete surface using the 4 in (101.6 mm) by 4 in (101.6 mm) piece of timber as a pivot. As a minimum, the Bicon lift height shall be measured at each corner of the Bicon. The same procedures shall be completed for each of the sides of a Bicon; with the raised side always on the side opposite the timber. Lift the entire Bicon 12 in (+3/4, -1/4 in) (304.8 mm (+19.05, -6.35 mm)) and then allow the Bicon to fall freely onto a flat concrete surface. Following completion of each individual test, the Bicon and shelves shall be inspected. Permanent deformation, dislocation, damage to, and/or failure of the E or A vertical logistic tracks, welds, shelf decking beams, or related components shall be cause for rejection. Nonconformance to 3.4.1.15 through 3.4.1.16.1 shall constitute failure of this test.

4.5.12 Tie downs. To verify conformance to 3.4.1.17, an interface test shall be conducted on each type of tie down provision using a hook with minimum dimensions as specified in figure 7. Inability of the hook to fully engage with the tie down provision, blocking or restricting movement of the hook by the container wall or post, restriction of strapping adjustment, and tearing or other damage to the strapping shall constitute failure of this test.

4.5.13 Top and bottom rail tie down load rating. Conformance to 3.4.1.17.1.2 shall be verified as follows:

- a. A load of 6,000 pounds shall be applied statically and independently at an angle of 45-degrees from the horizontal and 45 degrees from the vertical, and shall be conducted on each tie down provision; and each tie down provision may be tested individually.
- b. The 6,000 pound load shall be applied statically and independently for not less than 6.0 seconds.
- c. The points used to apply the load to the tie down shall be located so they do not interfere with or reduce the loading on the structural member next to the tie down provisions.

Loads applied to each tie down provision shall be measured with an appropriate measuring device, such as a load cell. Failure of the tie down provisions to perform as specified in 3.4.1.17.1.2 shall constitute failure of this test.

4.5.14 Corner post and shoring slot tie down load rating. Conformance to 3.4.1.17.2.2 shall be verified as follows:

- a. A load of 6,000 pounds shall be applied statically and independently at an angle of 45-degrees from the horizontal and 45 degrees from the vertical, and shall be conducted on each tie down provision; and each tie down provision may be tested individually.

- b. The 6,000 pound load shall be applied statically and independently for not less than 6.0 seconds.
- c. The points used to apply the load to the tie down shall be located so they do not interfere with or reduce the loading on the structural member next to the tie down provisions.

Loads applied to each tie down provision shall be measured with an appropriate measuring device, such as a load cell. Failure of the tie down provisions to perform as specified in 3.4.1.17.2.2 shall constitute failure of this test.

4.5.15 Recessed floor tie down load rating. Conformance to 3.4.1.17.3.2 shall be verified as follows:

- a. A load of 6,000 pounds shall be applied statically and independently at an angle of 45-degrees from the horizontal and 45 degrees from the vertical, and shall be conducted on each tie down provision; and each tie down provision may be tested individually.
- b. The 6,000 pound load shall be applied statically and independently for not less than 6.0 seconds.
- c. The points used to apply the load to the tie down shall be located so they do not interfere with or reduce the loading on the structural member next to the tie down provisions.

Loads applied to each tie down provision shall be measured with an appropriate measuring device, such as a load cell. Failure of the tie down provisions to perform as specified in 3.4.1.17.3.2 shall constitute failure of this test.

4.5.16 Weatherproofness test. Conformance to 3.5.2 and the self draining requirement of 3.4.1.8.2 shall be verified by performing the ISO 1496-1 weatherproofness test with the container level to within 5 degrees. The weatherproofness test shall be completed after all other required ISO 1496-1 tests have been completed. Nonconformance to 3.5.2 and 3.4.1.8.2 shall constitute failure of this test.

4.5.17 Bicon coupling and uncoupling. Conformance to 3.6.4 shall be verified by demonstration. Two Bicon containers shall be coupled with their supplied connectors in the locked position to form an integral 20-foot module in not more than 30 minutes. A maximum of one forklift truck shall be used to position and assist in the connection of the Bicons to form an ISO equivalent 20-foot module. The Bicons shall be uncoupled, after being lifted, in not more than 30 minutes with one forklift truck. The connecting couplers shall be returned to their original storage area in each Bicon container during the 30 minutes.

4.5.18 Container stacking. Conformance to 3.6.5.1 shall be verified by conducting the ISO 1496-1 container stacking test using the following loading conditions:

- a. test force per container, represented by two Bicons coupled together, on all four corners simultaneously shall be 3,767 kN (846,855.3 lbf)
- b. test force per pair of end fittings shall be 1,883 kN (423,315.2 lbf)
- c. superimposed mass represented by the test force shall be 213,360 kg (470,380 lb)

Failure to conform to requirements stated in ISO 1496-1 for container condition after test completion shall constitute failure of this test.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The Bicon covered by this specification is intended for the storage, transportation and distribution of dry cargo. These Bicons are based on commercial designs and manufactured using commercial processes. They are further modified for military unique requirements which are identified within this specification for operation in an extreme environment, under conditions typically found in military operations. Military unique requirements include, but are not limited to the following: NBC survivability; military tie downs, corrosion resistance; storage and transit in temperatures from -40 °F (-40 degrees Celsius (°C)) to +160 °F (+71.1 °C); internally air transportable by a variety of military aircraft; and externally air transportable from a CH-47 helicopter by sling. Further military unique modifications to Bicons may include, but are not limited to the following: field petroleum systems; field hygiene systems; command and control posts; and chapels. Army users will contact the Tank-automotive and Armaments Command (TACOM) Natick Integrated Logistics Support Center (ILSC) - AMSTA-LC-CESI, (508) 233-6002 for Bicon ordering requirements. Other services may also contact the TACOM ILSC for Bicon ordering requirements. CARC green 383, color number 34094 of FED-STD-595 is the default paint requirement for the Bicon described within this specification, and the NSN for this Bicon is 8150-01-609-6544. Other NSNs are available for ordering CARC and additional interior and exterior colors for Bicons manufactured to this specification (see 6.2 and table VI). Contact the Natick ILSC for further guidance and ordering.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this publication.
- b. If required, the specific issue of individual documents referenced (see 2.2.1 and 2.3).
- c. When first article testing is required (see 3.1 and 4.2).
- d. When CARC is required (see 3.3.2)
- e. Exterior color (see 3.3.2.3 and 3.3.3.3).
- f. Interior color (see 3.3.2.3 and 3.3.3.3)
- g. When non-CARC paint is required (see 3.3.3)
- h. When undercoating is specified (see 3.3.4)
- i. When locking bar and security seal or cable is specified (see 3.4.1.13).
- j. When a Type P01 captive padlock conforming to ASTM F833 with two keys is specified (see 3.4.1.13).
- k. When additional shelf decking beams are required (see 3.4.1.16.1).
- l. When a Type 2 Bicon with 1 shelf is specified (see 3.4.1.16.3).
- m. When opening and closing vents are specified (see 3.4.1.18).
- n. When rack and cabinet systems are required (see 3.4.1.20).
- o. Location of optional markings (see 3.8.1)
- p. When serial numbers are specified (see 3.8.1).
- q. Packaging requirements (see 5.1).

6.3 First article inspection. When a first article inspection is required, the item(s) should be a first article production unit. The contracting officer should include specific instructions in acquisitions' documents regarding arrangements for examinations, approval of the first article test results, and disposition of the first article(s).

6.4 Corrosion control methods. Corrosion control can be achieved by a combination of design features as in TACOM Design Guidelines for Prevention of Corrosion in Combat and Tactical Vehicles, March 1988), material selection (e.g. composites, corrosion resistant metal, galvanized steel), organic or inorganic coatings (e.g. zinc phosphate pre-treatment, corrosion resistant plating, E-coat, powder coating) and production techniques (e.g. coil coating, process controls, inspection and documentation). To obtain high level of corrosion resistance/paint adhesion, the manufacturer may want to consider the use of new high performance, "Combat Grade" Powder Coat Primers. These primers can only be applied by approved applicators. The specification controlling both the primers and their application are available upon request from the U.S. Army Tank Automotive Research, Development and Engineering Center (TARDEC), by emailing [usarmy.detroit.rdecom.mbx.tardec-standardization@mail.mil](mailto:usarmy.detroit.rdecom.mbx.tardec-standardization@mail.mil).

6.5 Series E and A vertical logistic tracks. Series E and A vertical logistic tracks are available from, but not limited to, the suggested sources identified below:

ANCRA International, Eastern Region  
3300 Turfway Road, Suite 110  
Erlanger, KY 48018  
Phone (800) 233-5138  
Facsimile (800) 347-2627.

Kinedyne Corporation  
3701 Greenway Circle  
Lawrence, KS 66046-5442  
Point of Contact: Mr. Joe Takacs  
Phone (785) 841-4000  
Facsimile (785) 841-3668.

6.6 Loop tiedown hooks and web assemblies. Web assembly NSN 3990-01-204-3009 with hooks that meet tiedown interface requirements is available from, but not limited to, the suggested sources identified below:

Davis Aircraft Products Co., Inc.  
1150 Walnut Avenue  
Bohemia, NY 11716  
Phone (631) 563-1500  
Facsimile (631) 563-1117

ANCRA International LLC  
4880 W. Rosecrans Ave.  
Horthorne, CA 90250-6614  
Phone (800) 233-5138  
Facsimile (859) 371-1103

Kinedyne Corporation  
3701 Greenway Circle  
Lawrence, KS 66046-5441  
Phone (785) 841-4000  
Facsimile (785) 841-3668

6.7 Locking bar and security seal or cable. When specified (see 6.2), locking bars with security seals or cables are available from, but not limited to, the suggested sources identified below:

American Seals  
P.O. Box 841003  
Pembroke Pines, FL 33084  
Phone (954) 438-8323  
Facsimile (954) 438-8077

PJ Murray Associates, Inc.  
P.O. Box 472627  
Charlotte, NC 28247  
Phone (704) 844-8600  
Facsimile (704) 849-9197

6.8 Disclaimer. Reference herein to any specific commercial company, product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or the Department of the Army (DoA), and will not be used for advertising or product endorsement purposes.

6.9 Bicon Variations. Bicons are available in the variations shown in table VI (see 6.2).

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TABLE VI. Bicon variations (with and without shelves).

<b>Bicon Type</b>	<b>Color</b>	<b>Finish</b>	<b>Part #</b>	<b># of Shelves</b>	<b>NSN</b>	<b>Shelving Description</b>
Type 2	Green 383, or other color as specified (see 6.2).	Non-CARC	5-13-9843-5	None	8150-01-609-6546	No shelves
Type 2	Green 383, or other color as specified (see 6.2).	CARC	5-13-9843-6	None	8150-01-609-6544	No shelves
Type 2	Green 383, or other color as specified (see 6.2).	Non-CARC	5-13-9843-5-1S	1 Shelf	8150-01-609-6551	A Type 2 Bicon with 1 shelf includes 1 longitudinal full shelf consisting of two (2) pieces each measuring a minimum of 104.44 in long by 46.5 in wide by 1 in thick. A minimum of six (6) decking and shoring beams are included with this shelf system (see 3.4.1.16.3 and 6.2).
Type 2	Green 383, or other color as specified (see 6.2).	CARC	5-13-9843-6-1S	1 Shelf	8150-01-609-6557	A Type 2 Bicon with 1 shelf includes 1 longitudinal full shelf consisting of two (2) pieces each measuring a minimum of 104.44 in long by 46.5 in wide by 1 in thick. A minimum of six (6) decking and shoring beams are included with this shelf system (see 3.4.1.16.3 and 6.2).

6.10 Definitions.

6.10.1 Dissimilar metals. For its purpose, this document considers metals dissimilar when two specimens in contact with each other promote accelerated galvanic corrosion (see 3.2.1).

6.10.2 Recovered materials. For the purpose of this document, recovered materials are those materials that have been collected from solid waste and reprocessed to become a source of raw materials, as distinguished from virgin raw materials (see 3.2.2).

6.10.3 Bicon. A Bicon is a rigid metal container that measures 9 ft 9-3/4 in long by 8 ft high by 8 ft wide (2991 mm by 2438 mm by 2438 mm) (external measurements). When two Bicons are coupled and locked together at their corner fittings, they form a 19 ft 10-1/2 in by 8 ft by 8 ft (6058 mm by 2438 mm by 2438 mm) ISO-compatible container. The word Bicon originates from combining the prefix bi, which means double, and the abbreviation or shorthand for container, which is con.

6.10.4 Owner code. The owner code consists of three capital letters of the Latin alphabet such as USA for United States Army, to indicate the owner or principal operator of the container. This code needs to be registered at the Bureau International des Containers in Paris to ensure uniqueness world-wide. The code must be supplied to the contractor by the United States Army.

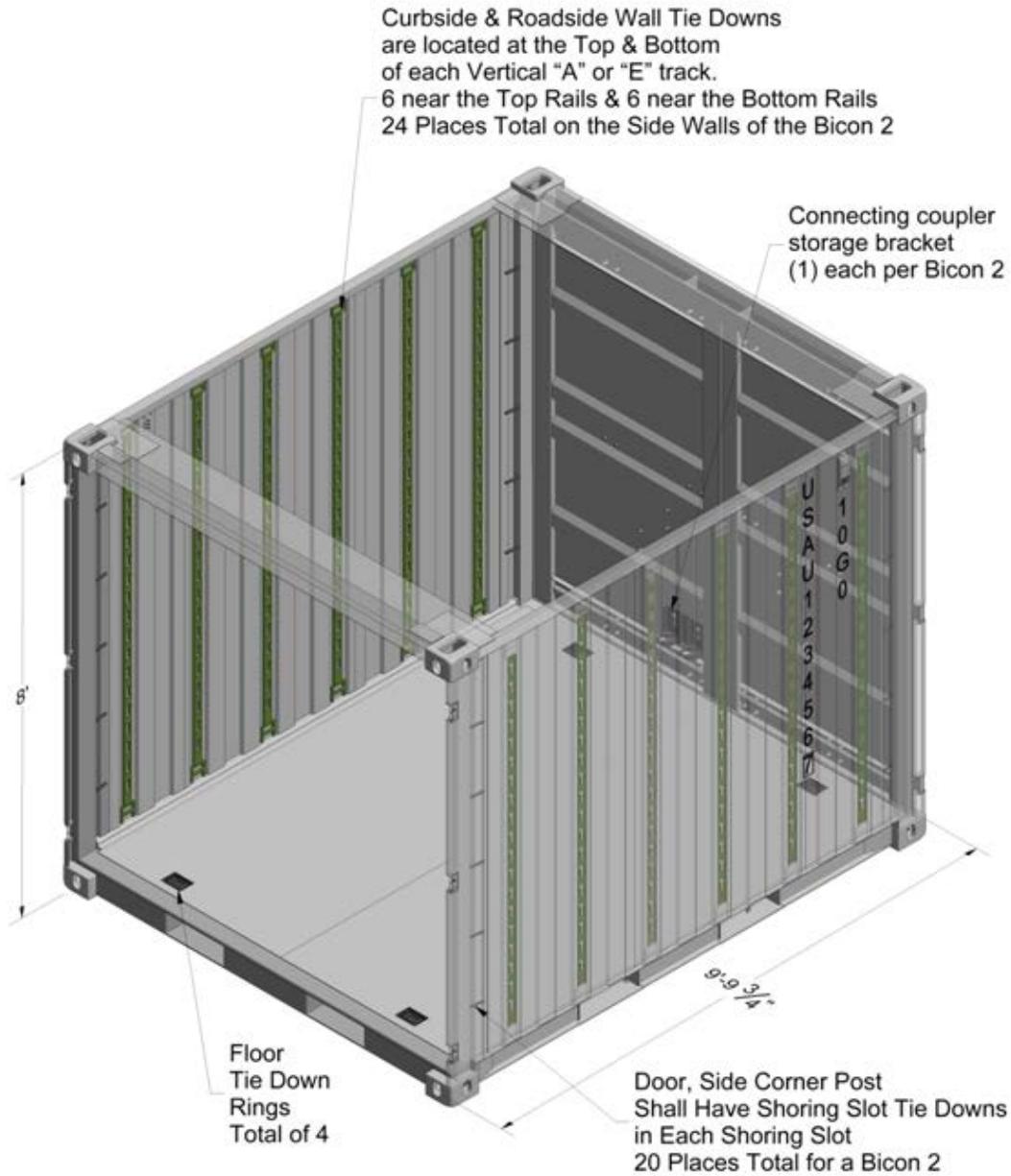
6.10.5 Serial Number. The serial number consists of 6 (Arabic) numeric digits, assigned by the owner or operator, uniquely identifying the container within that owner/operators fleet.

6.10.6 Check Digit. The check digit consists of one (Arabic) numeric digit that follows the serial number, and provides a means of validating the recording and transmission accuracies of the owner code and serial number.

6.11 DS2 reference. For more information related to DS2, see TB 43-0199.

6.12 Subject term (key word) listing.

Connecting couplers  
Corner fittings  
Corner post  
End walls  
Forklift pockets  
Shoring slot  
Side walls

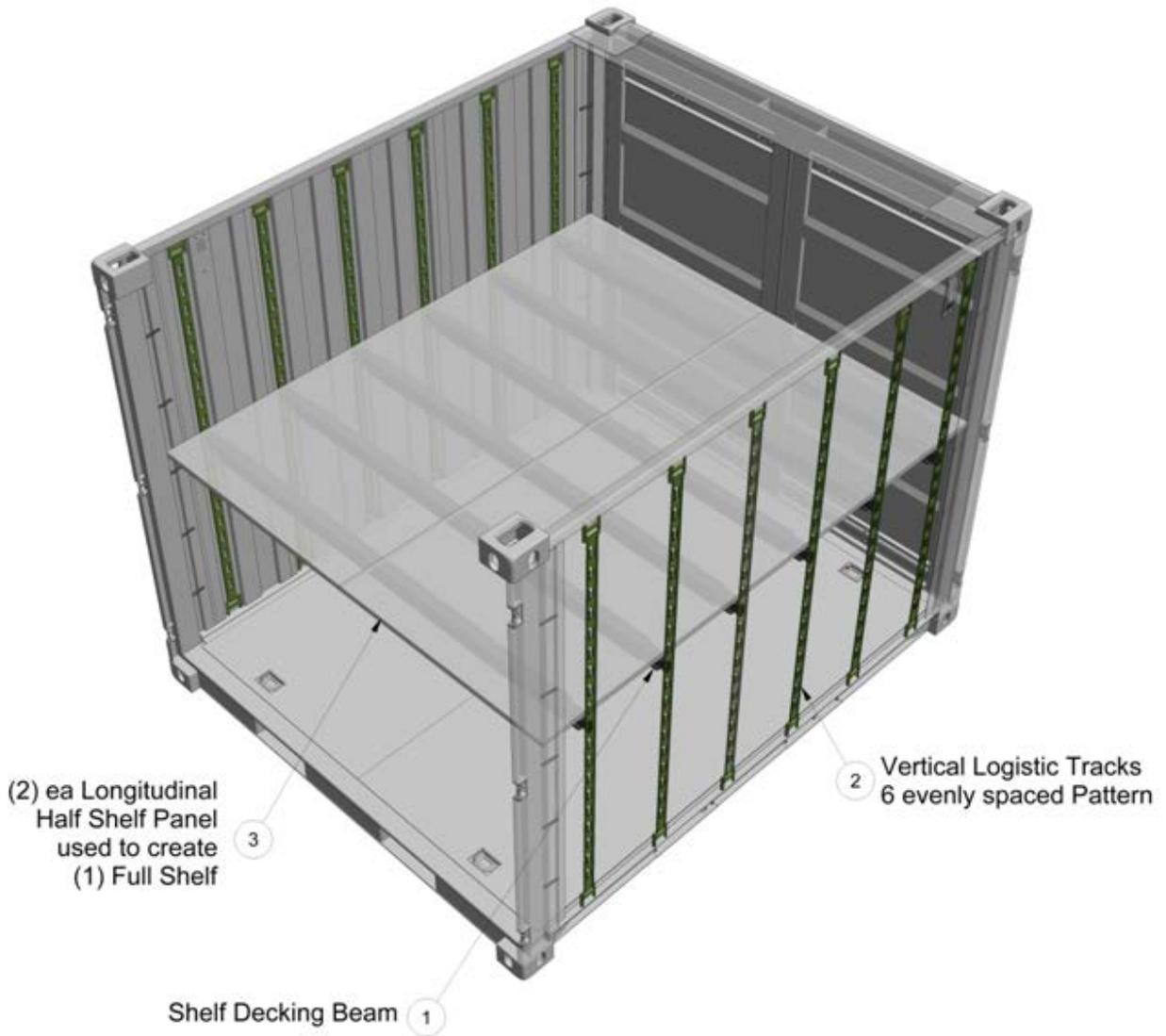


NOTES:

1. See 3.4.1.14, 3.4.1.17, 3.4.1.17.1 and 3.4.1.17.2 for more detail.
2. Bicon 2 (44) total tie downs on walls plus (4) recessed tie downs in floor.
3. Tie downs shall be positioned as close as possible to the innermost face of the door sills. Locations shown in the figure are approximate.

FIGURE 1. Tie down loop positions for Bicon type 2.

Components of Decking System	
Item No.	Description
1	Shelf-decking beams
2	Vertical logistic tracks “A” or “E” type with 4 in (102 mm) slots spacing
3	(2) each longitudinal half shelf panels used to create one full shelf



NOTE: See 3.4.1.15 and 3.4.1.16 for more details.

FIGURE 2. Bicon shelf decking support system.

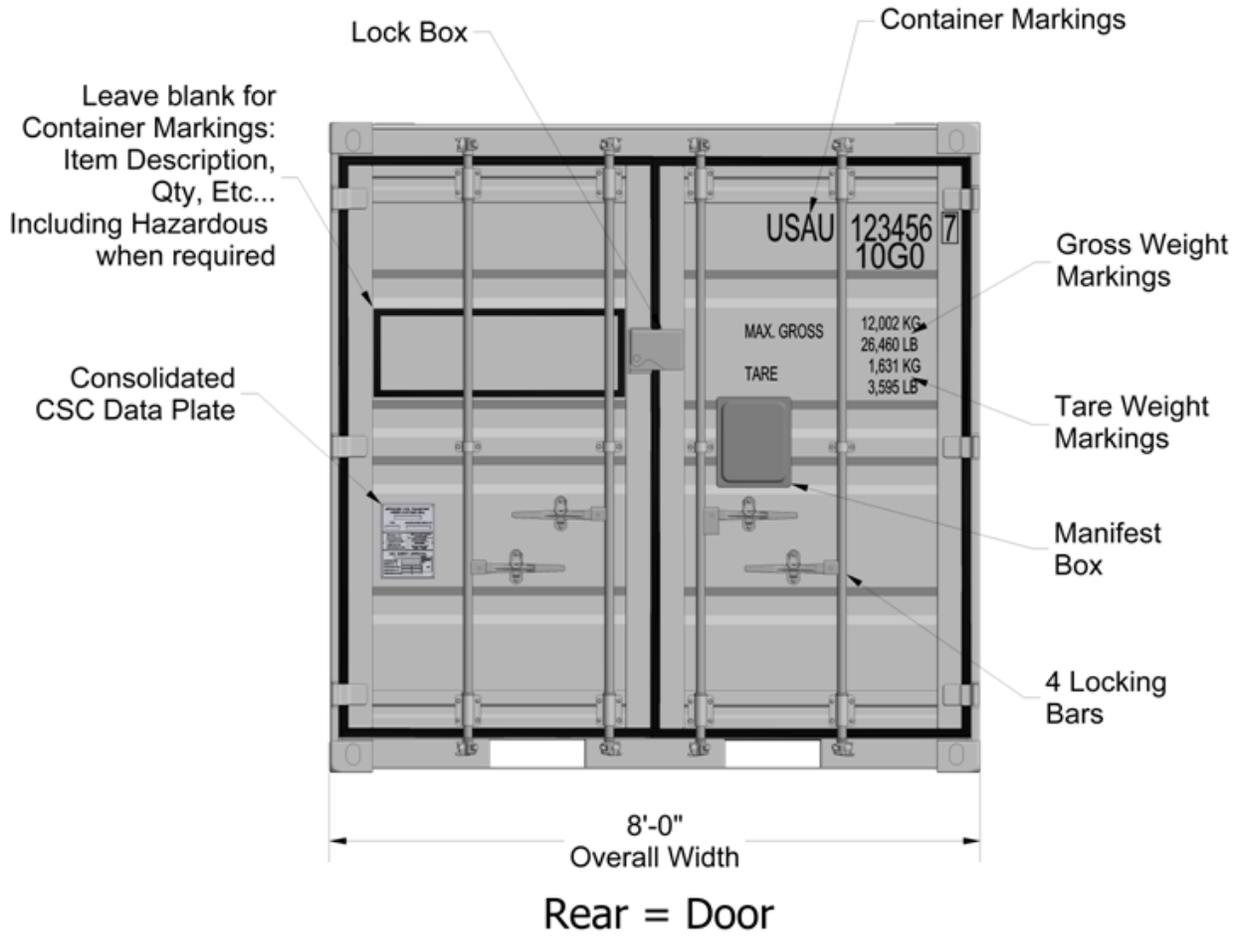


FIGURE 3. Bicon 2 markings example.

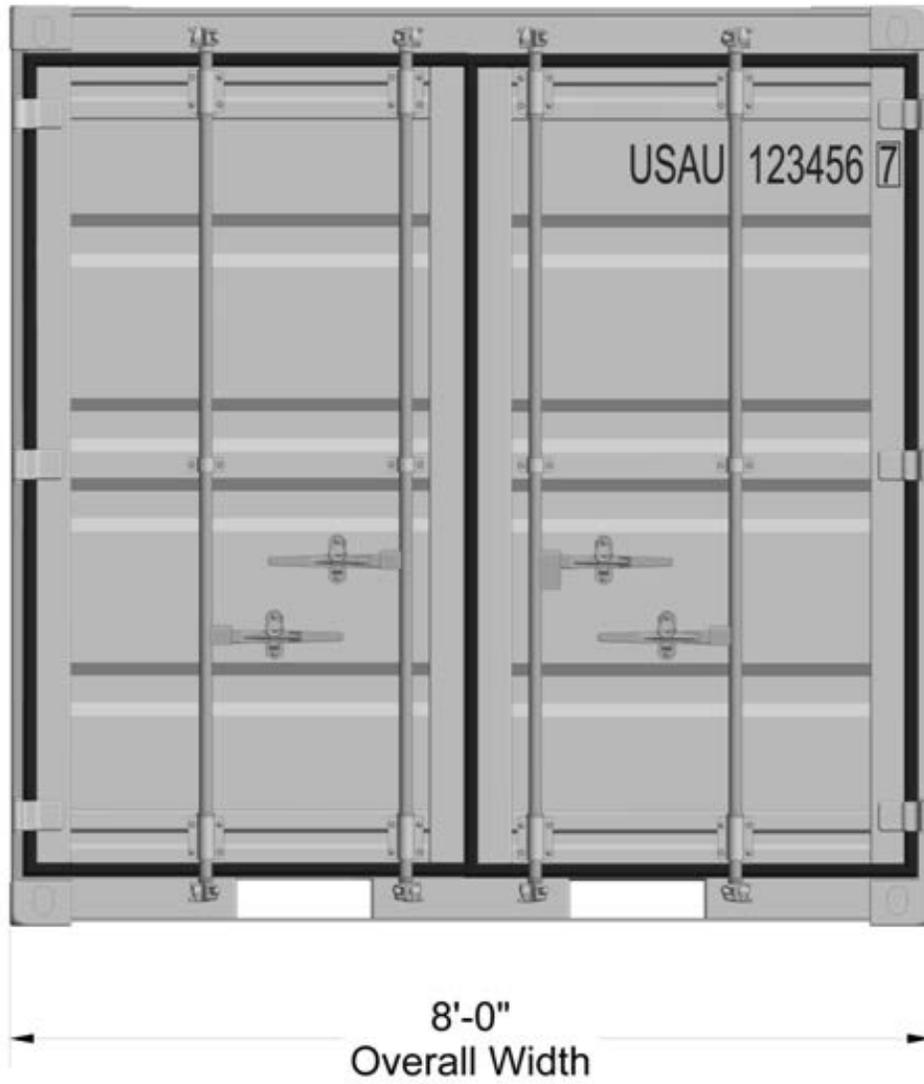


FIGURE 4. Front end view of Bicon 2 marking example.

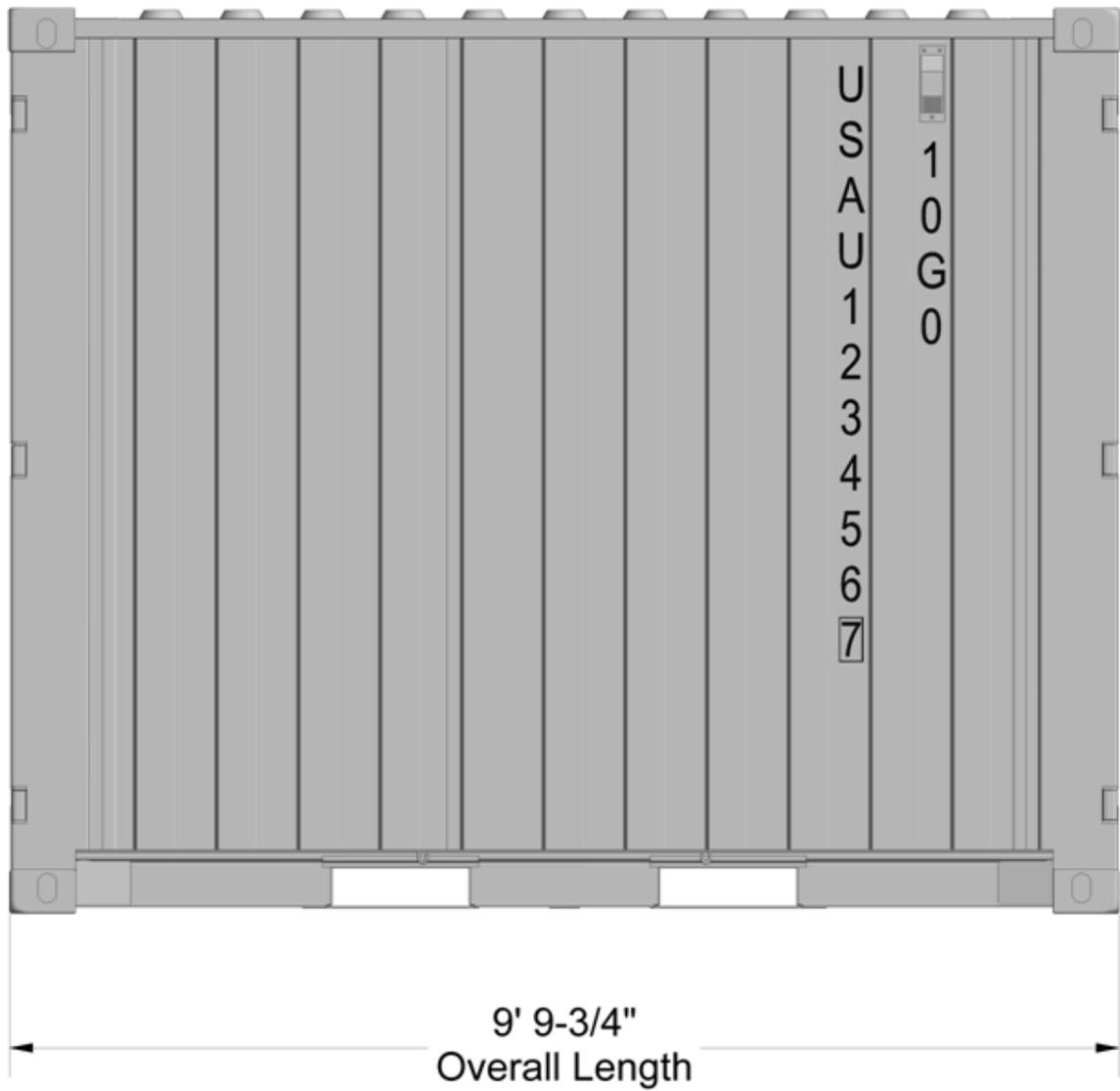


FIGURE 5. Curbside view of Bicon 2 marking example.

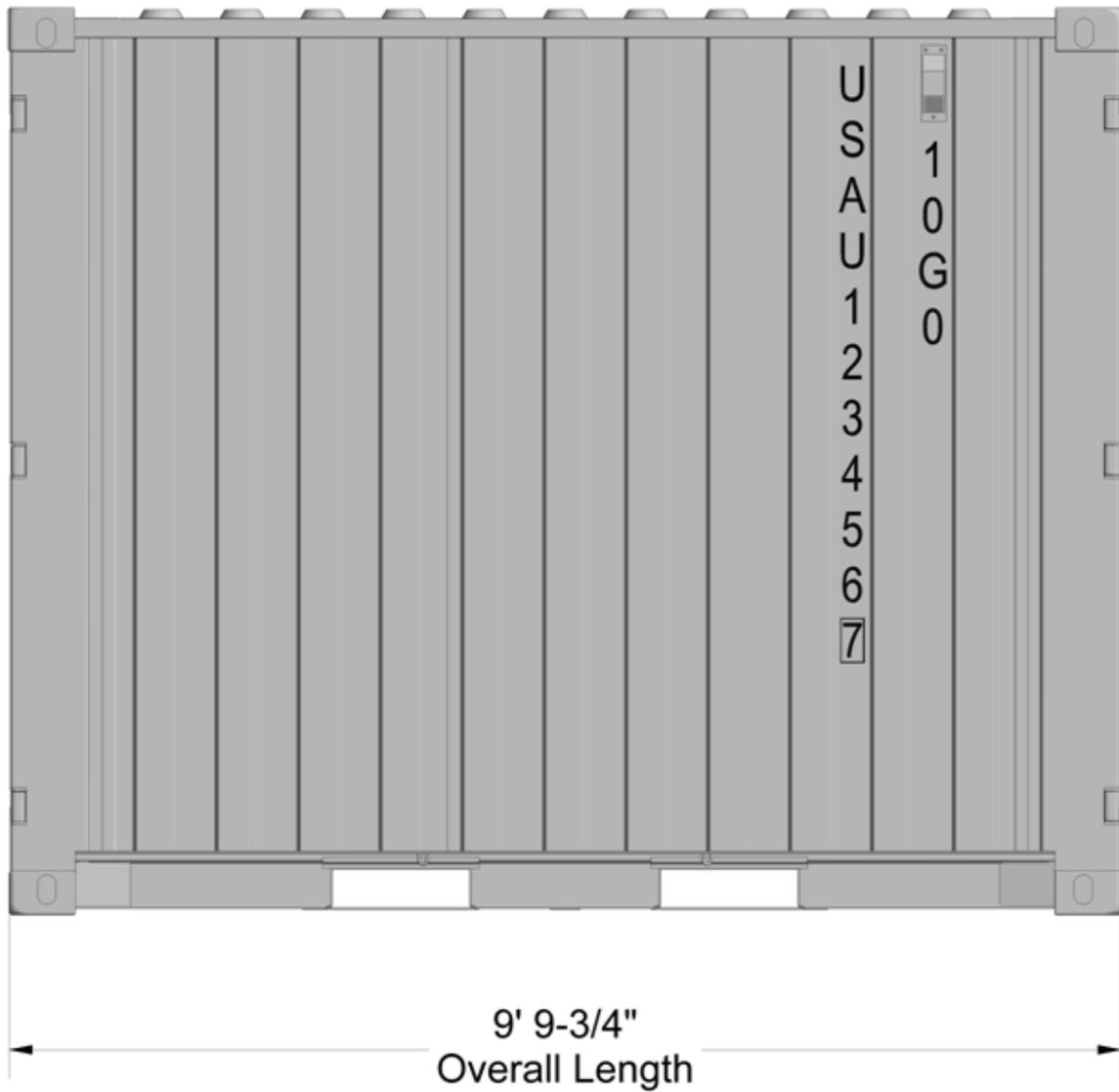


FIGURE 6. Roadside view of Bicon 2 marking example.

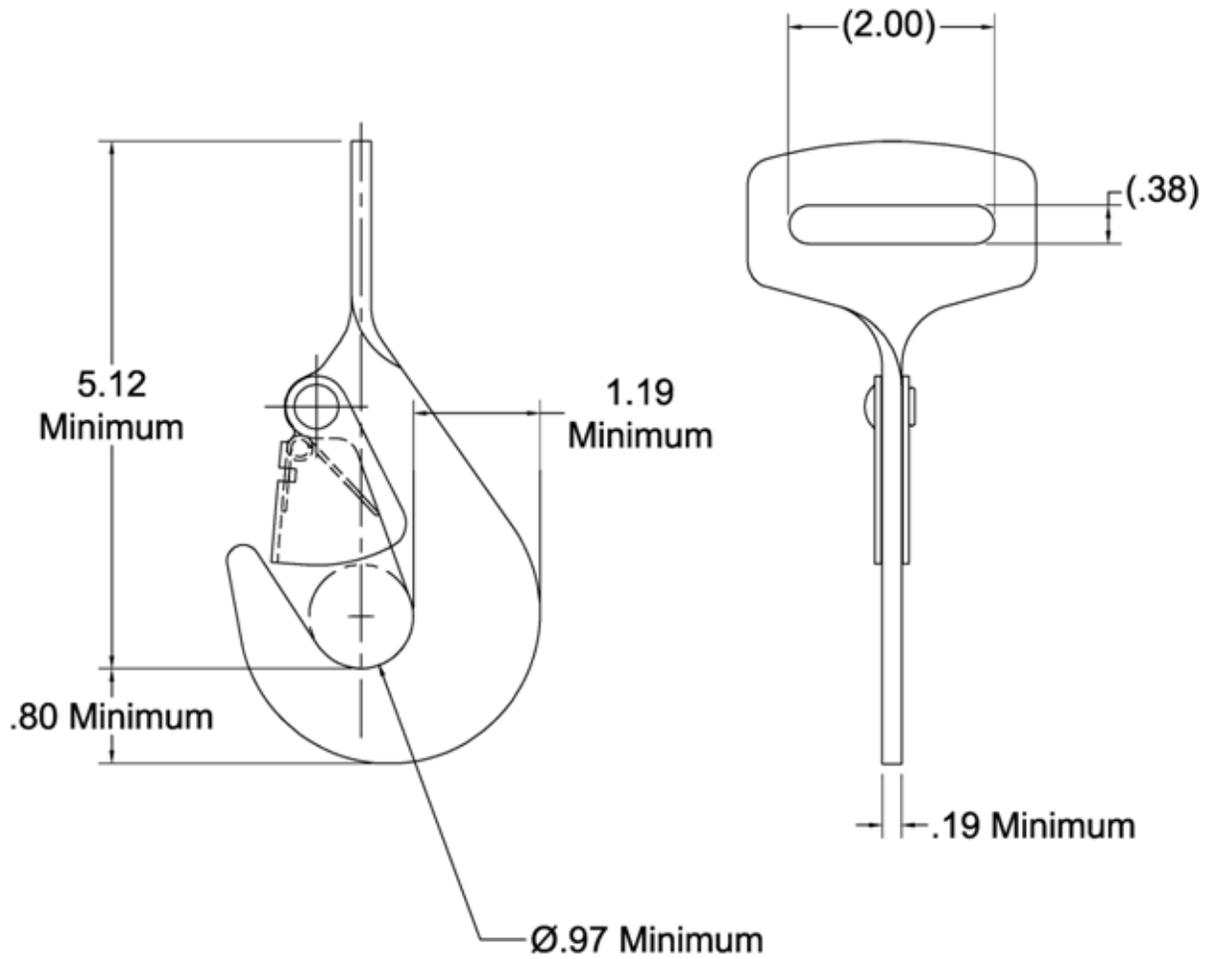
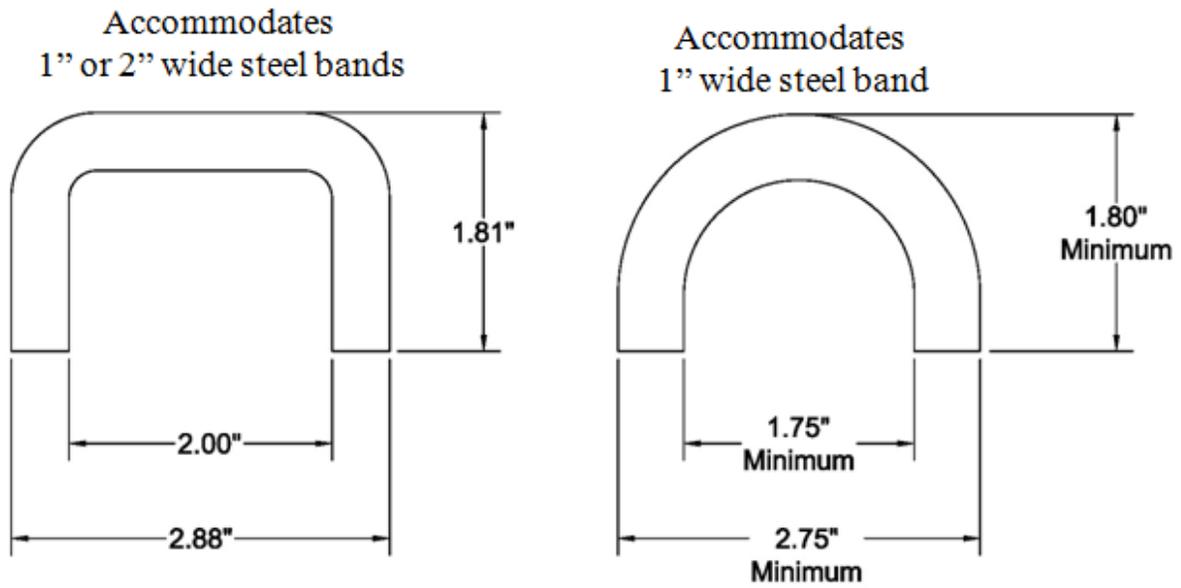


FIGURE 7. Snap hook interface dimensions.

Either shape below is acceptable and designed to accommodate the snap hook shown in figure 7.



NOTE: See 3.4.1.17 for more details.

FIGURE 8. Loop tie down steel to have safe working load of 4000 lbs and tested not breaking at 6000 lbs.

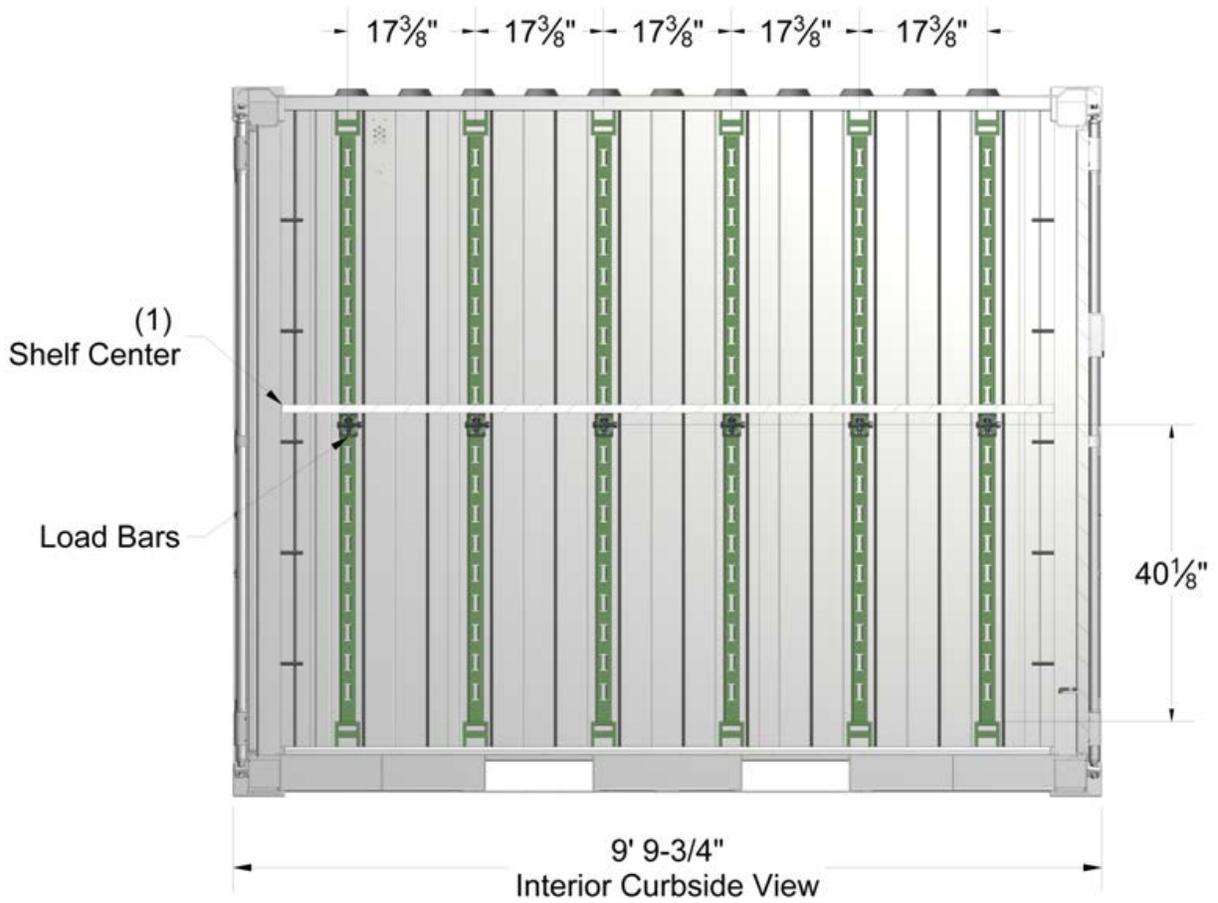


FIGURE 9. “E” track placement (6 evenly spaced).

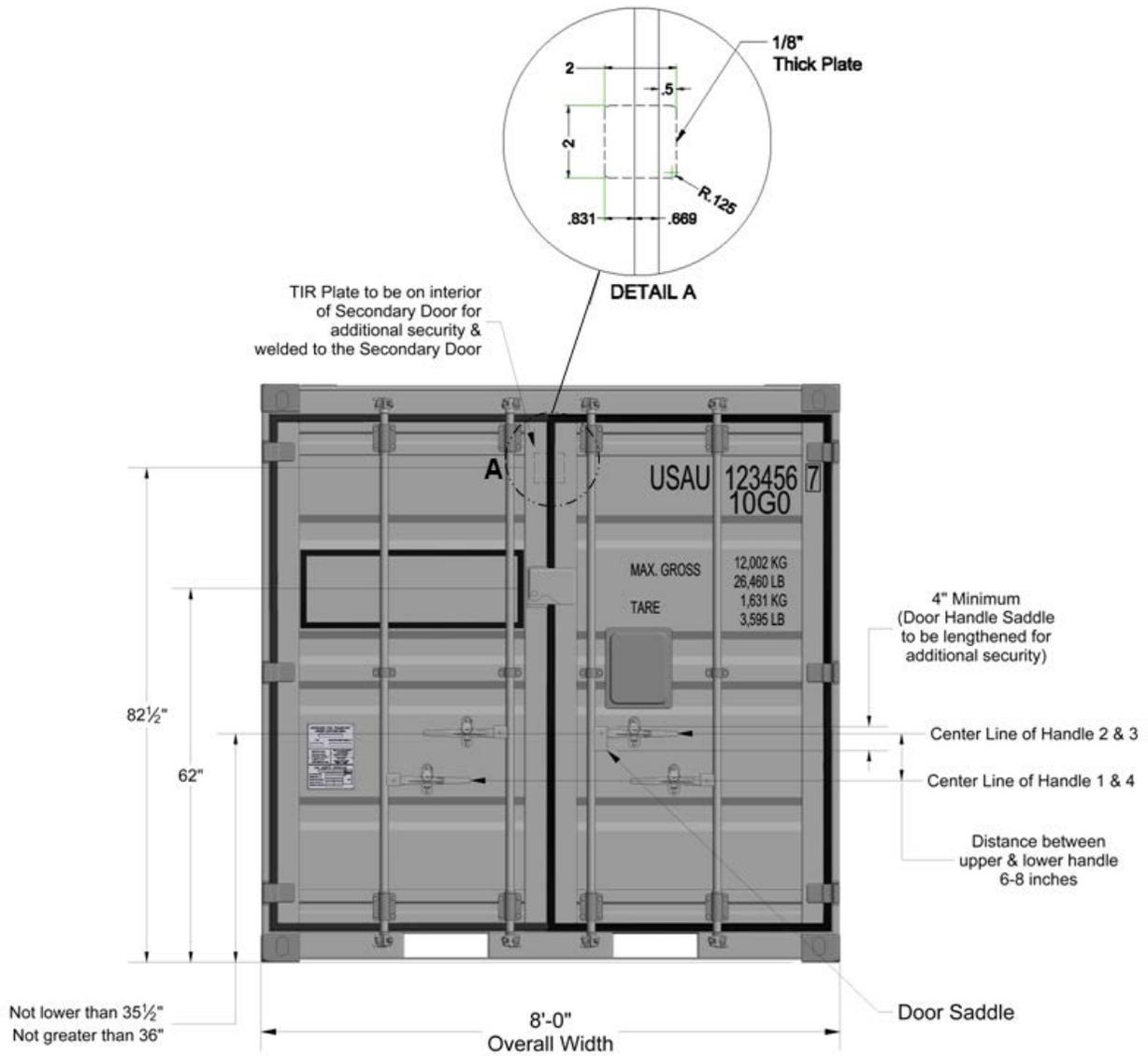


FIGURE 10. Door hardware changes.

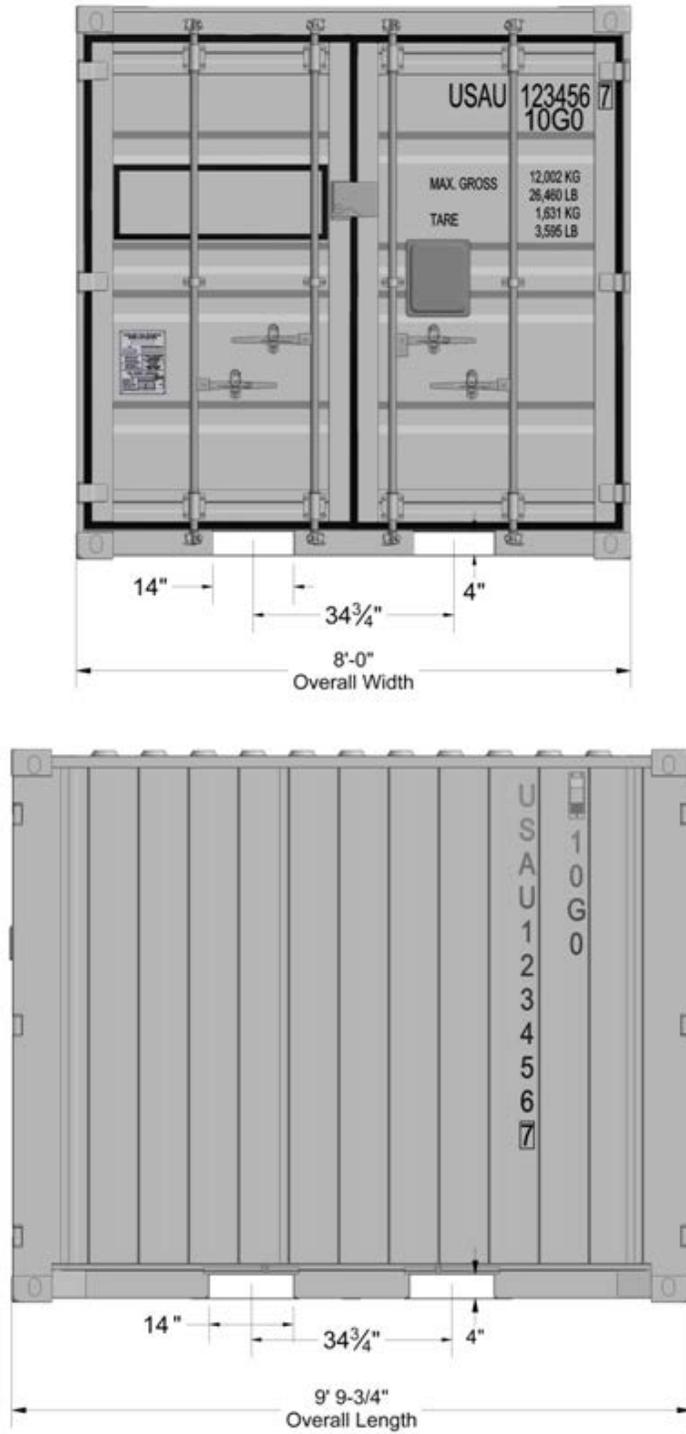


FIGURE 11. Fork lift pockets.

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Custodians:

Army - AT  
Navy - SA  
Air Force - 11

Preparing activity:

Army - AT

(Project 8150-2013-001)

Review Activities:

Army - SM, MT  
Navy - AS, CG  
Air Force - 03, 69  
DLA - DH  
NGA - MP

Civil Agencies:

GSA - FAS  
USDA - FGI

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.