INTERNATIONAL SAFETY EQUIPMENT ASSOCIATION

ANSI/ISEA 121-2018

American National Standard for Dropped Object Prevention Solutions

be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between drops.

Install test fixture onto fixed anchor point. Attach the anchor attachment to the test fixture in a position that exposes the weakest orientation of the anchor attachment. Attach one end of the test cable to the anchor attachment and the other end to a rigid test weight.

Perform a drop with a test weight equal to the manufacturer's published capacity with a free fall distance of twice the specified tether length allowed by the manufacturer. The test weight shall be released from a point no more than 6 inches (152 mm) horizontally from the center of the fixed anchor point. The test weight shall be orientated in a way that allows the weight to experience a straight fall. Follow this procedure for two additional drops. A total of three drops shall be recorded. (Refer to Figure 1)

4.3.4 Dynamic Test Procedure for Anchor Systems

Each anchor system test sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement or adjustment of the sample. Each test sample shall be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between tests.

Install test fixture onto fixed anchor point. Attach anchor system to the test fixture in a position that exposes the weakest orientation of the attachment point on that system. Attach one end of the test cable to the attachment point on the system and the other end to a rigid weight.

Perform a drop with a test weight equal to the manufacturer's published capacity with a free fall distance of twice the specified tether length allowed by the manufacturer. The test weight shall be released from a point no more than 6 inches (152 mm) horizontally from the center of the cable on the system. The test weight shall be orientated in a way that allows the weight to experience a straight fall. Follow this procedure for two additional drops. A total of three drops shall be recorded. (Refer to Figure 1)

5. Tool Attachments

5.1 Design Requirements

Tool attachments shall be defined by a manufacturer to include specific instructions and guidelines for the minimums and maximums of a tool or type of tool's geometry.

5.2 Performance Requirements

5.2.1 Tool attachments designed to be independently applied directly to a tool shall be dynamically tested. If the tool attachment design refers to a specific size range or geometry, the tool attachment shall be tested and perform to the weakest orientation(s) of that specified range or geometry.

When tested dynamically in accordance with Section 5.3, there shall be no failure of the tool attachment that allows the test weight to be released as a result of any drop.

5.2.2 Tool attachments of multiple components designed to be used as a system shall be applied to the test weight or test fixture and tested as a system. Independent testing of individual system components shall not determine performance of a tool attachment designed to be used as system. If tool attachment design refers to a specific size range or geometry of a tool, the tool attachment shall be tested and perform to the weakest orientation(s) for that range or geometry.

When tested dynamically in accordance with Section 5.3, there shall be no failure of the tool attachment that allows the test weight to be released as a result of any drop.

5.2.3 Tool attachments that are identified by the manufacturer to be integral or exclusive to tethers, regardless of tether type, shall be dynamically tested in accordance with Section 6.3.

When tested dynamically in accordance with Sections 6.3, there shall be no failure of the tool attachment that allows the test weight to be released as a result of any drop.

5.3 Test Requirements

5.3.1 Preparation of Test Samples

Tool attachment samples shall be selected in accordance with Section 8.1 and shall be applied to the test weight or fixture in accordance with manufacturer's instructions and conditioned in accordance with Section 8.2.

5.3.2 Test Equipment

The test equipment shall consist of the following:

a) Tool attachment sample.

b) Test cable of fabricated steel with swaged looped ends measuring a minimum of twice the length of the manufacturers allowable maximum tether length for the tool attachment, plus two feet

c) A rigid weight, weighing a total of the specified test factor listed in test schedule. (See Section 8, Table 1)

d) A test fixture designed and built accordingly to allow installation onto the fixed anchor point.

If a specific tool size range or geometry is detailed for use with the tool attachment, the test weight or test fixture shall mimic that tool's characteristics.

5.3.3 Dynamic Test Procedure

Each test sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement or adjustment of the sample. Each test sample shall be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between drops.

One of the following methods shall be used:

a) Attach one end of the test cable to the connection point on the tool attachment and the other end to the fixed anchor point. The test weight shall be positioned in a way to expose the weakest orientation of the tool attachment.

b) Install test fixture onto fixed anchor point. Attach the tool attachment to the test fixture in a position that exposes the weakest orientation of the tool attachment. Attach one end of the test cable to the tool attachment and the other end to an independent test weight.

Perform a drop with a test weight equal to the manufacturer's published capacity with a free fall distance of twice the specified test tether length allowed by the manufacturer. The test weight shall be released from a point no more than 6 inches (152 mm) horizontally from the center of the fixed anchor point. The test weight shall be orientated in a way that allows the weight to experience a straight fall. Follow this procedure for two additional drops. A total of three drops shall be recorded. (Refer to Figures 2 and 3)

6. Tool Tethers

6.1 Design Requirements

Carabiner or snaphook-type connectors, if used with tool tethers, shall have locking gates and captive eyes.

6.2 Performance Requirements

6.2.1 Tool tethers designed to be independently applied directly to a tool shall be dynamically tested.

When tested dynamically in accordance with Section 6.3, there shall be no failure of the tool tether that allows the test weight to be released as a result of any drop.

6.2.2 Tool tethers of multiple components designed to be used as a system shall be applied to the test weight and tested as a system. Independent testing of individual system components shall not determine performance of a tool tether designed to be used as system. If tool tether design refers to a specific size range or geometry of a tool, the tool tether shall be tested and perform to the weakest orientation(s) for that range or geometry or configuration of tether.

Tool tethering systems with multiple tethers with the same construction need only one tether to be tested to qualify all similarly designed tethers within the same system.

6.3 Test Requirements

6.3.1 Preparation of Test Samples

Tool tether samples shall be selected in accordance to Section 8.1 and shall be applied to the test weight or fixture in accordance with the manufacturer's instructions and conditioned in accordance with Section 8.2.

6.3.2 Test Equipment

The test equipment shall consist of the following:

a) Tool tether sample.

b) A rigid weight, weighing a total of the specified test factor listed in test schedule. (See Section 8, Table 1)

c) Test cable or other ridged device (optional) should be used to lower the fixed anchor point. (Refer to Figure 4)

The test weight shall be designed in a way that it does not interfere with a vertical fall. It shall have a solid eye attached to the center of its longest axis.

6.3.3 Dynamic Test Procedure for Fixed Length Tethers

Each tether sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement of the sample. Each test sample shall be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between drops.

The tether sample shall be anchored to a rigid test structure. If the tool tether is part of an integral assembly, then that assembly shall be mounted to a fixed anchor.

Perform a drop with a test weight equal to twice the manufacturer's published capacity with a free fall distance of twice the specified tether length. The test weight's longest axis shall be positioned vertically and shall be released from a point no more than 6 inches (152 mm) horizontally on center of the fixed anchor point. Follow this procedure for the first drop and then perform two additional drops using a weight equal to the manufacturer's published capacity. A total of three drops shall be recorded.

6.3.4 Dynamic Test Procedure for Extendable and Retractable Tethers

Each test tether sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement of the sample. Each test sample shall be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between tests.

Determine the start point of the dynamic test for each condition.

For extendable tethers, attach one end of the tether to the anchor point of the rigid test structure. Attach the other end of the tether to the test weight that matches the maximum rating of the tether. While that test weight load is supported by the extendable tether, measure the distance from the anchor point to the test weight connection. This will determine the specified tether length.

For retractable tethers, attach one end of the tether to the anchor point of the rigid test structure. Extend the tether to its maximum length. Measure the distance from the anchor point to the test weight connection. This will determine the specified tether length.

Perform a drop with a test weight equal to twice the manufacturer's published capacity with a free fall distance of twice the specified tether length. The test weight's longest axis shall be positioned vertically and shall be released from a point no more than 6 inches (152 mm) horizontally on center of the fixed anchor point. Follow this procedure for the first drop and then perform two additional drops using a weight equal to the manufacturer's published capacity. A total of three drops shall be recorded.
(Refer to Figure 4).

7. Containers

7.1 Design Requirements

7.1.1 Carabiner or snaphook-type connectors, if used with containers, shall have locking gates and captive eyes.

7.1.2 Containers shall have a minimum of a closure system, integral anchor points or integral tethers.

7.2 Performance Requirements

7.2.1 Portable containers designed to transport materials by means of a lifting element shall be dynamically and statically tested.

When tested dynamically in accordance with Section 7.3, there shall be no failure of the container that allows the test weight to be released as a result of any drop and the container shall not be released from the fixed anchor point.

When tested statically in accordance with Section 7.3, the container shall maintain the load for the required period of time and the container shall not be released from the fixed anchor point.

7.2.2 Staged/stationary containers designed to be affixed to an anchor shall be statically tested.

When tested statically in accordance with Section 7.3, the container shall maintain the load for the required period of time and the container shall not be released from the fixed anchor point.

7.2.3 Anchor points that are integral to a container shall be considered as an anchor system and shall be dynamically tested, regardless of container type. They shall meet the performance requirements of Section 4.2 and be tested in accordance with Section 4.3.

7.2.4 Tethers that are integral to a container shall be considered a tool tethering system and shall be dynamically tested, regardless of the container type. They shall meet the performance requirements of Section 6.2 and be tested in accordance with Section 6.3.

7.2.5 Containers that incorporate a closure system for securing items from accidental release shall be statically tested.

When tested statically in accordance with Section 7.3, the container shall maintain the load for the required period of time and the container shall not be released from the fixed anchor point.

7.3 Testing Requirements

7.3.1 Preparation of Test Samples

Container samples shall be selected in accordance with Section 8.1 and conditioned in accordance with Section 8.2.

7.3.2 Test Equipment

The test equipment shall consist of the following:

a) Container sample.

b) A rigid weight, weighing a total of the specified test factor listed in the dynamic test requirement.

c) Fluid weight, weighing a total of the specified test factor listed in the static test requirement.

d) Test cable of fabricated steel with swaged looped ends measuring a minimum of twice the length of the manufacturer's allowable maximum tether length for the attachment point, plus two feet.

e) Static tensile equipment capable of pulling at a uniform rate of 2 inches (51 mm) per minute and which measures force with an accuracy of +/- 3 percent of the specified load.

f) Container static test plate.

7.3.3 Dynamic Test Procedure

Each test sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement of the sample. Each test sample shall be tested within 5 minutes of removal from conditioning. If testing cannot be completed within the allotted time, samples shall be reconditioned between drops.

For portable containers, connect the test sample to a fixed anchor point so that it is oriented in the correct lifting position. Place a rigid weight of twice the manufacturer's published capacity into the container and perform a drop with free fall distance of twice the length of the lifting element (Refer to Figure 5) or twice the manufacturer's

allowable tether length, whichever is greater. Follow this test with 2 additional tests utilizing the same free fall distance and a rigid weight equal to the manufacturer's published capacity for a total of 3 tests on each test sample.

NOTE: If the size of the container does not allow for the rigid test weight to be placed entirely inside for the test an external rigid weight may be used. The static test plate will be placed inside the bag and the external rigid weight will be connected to the anchor point of the static test plate. The total weight of the static test plate and the rigid test weight will be equal to twice the manufacturer's published capacity. (Refer to Figure 5)

7.3.4 Static Test Procedure

Each test sample that requires a static test shall be subjected to one test. For samples requiring a static test, one the following methods shall be used:

a) *Tensile equipment method.* For portable and stationary containers, place the static test plate inside the container and apply the load from the bearing point of the lifting element or mounting point of the container to the center of the container bottom. Subject the container to 5 times the published load at a rate of 2 inches (51 mm) per minute and hold the load for one minute.

b) *Lifting method.* For portable and stationary containers, attach a lifting mechanism to the bearing point of the lifting element or mounting point of the container. Place a load of 5 times the manufacturer's published capacity into the container. Suspend the container so that the load is supported by only the container and hold the load for 1 minute.

7.3.5 Static Test Procedure for Containers with Closure Systems

Each test sample that requires a static test shall be subjected to 1 test. Each test sample shall be tested within 5 minutes of removal from conditioning.

For containers with a closure system, place two times the manufacturer's published capacity of fluid weight inside the container. With the container sitting in the upright position, lift from the bottom of the container so that the container is to flip and send the weight against the closure system. Raise the container into an inverted position. Maintain the load for 1 minute. (Refer to Figure 6)

8. Testing Preparation

8.1 Test Sample Selection

8.1.1 One sample shall be used for each test required within a given precondition. A test refers to single cell within Table 1, (i.e. As identified in cell III-A a tether sample in the dry condition dropped the required 3 times is considered a single test.). That same sample shall be used for every drop within each test. A new sample may be used for each test. A sample may be reused for additional testing under a given precondition.

8.1.2 Samples selected shall be homogeneous and equivalent to the product solution's primary construction.

8.2 Sample conditioning

Test samples shall be conditioned to the parameters established below prior to performing tests:

Condition	Temperature	Time
Ambient Dry	35 to 100 °F (2 to 38°C)	Minimum 2 hours
Ambient Wet, immersed in water	68 +/-4 °F (20 +/- 2°C)	Minimum 2 hours
Cold Dry	-31 +/-4 °F (-35 +/-2°C)	Minimum 2 hours
Hot Dry	113 +/-4 °F (45+/-2°C)	Minimum 2 hours

Table 1. Schedule of Tests

	Test Factor	Condition A (Dry)	Condition B (Wet)	Condition C (Cold)	Condition D (Hot)	
ANCHOR ATTACHMENTS						
I – Dynamic (4.3.3 or 4.3.4)	1:1	1 (x3)	1 (x3)	1 (x3)	1 (x3)	3 drops total in each condition
TOOL ATTACHMENTS						
II – Dynamic (5.3.3)	1:1	1 (x3)	1 (x3)	1 (x3)	1 (x3)	3 drops total in each condition
TOOL TETHERS						
III - Dynamic (6.3.3 or 6.3.4)	2:1 // 1:1	1 (x3)	1 (x3)	1 (x3)	1 (x3)	3 drops total in each condition (1 at 2:1, 2 at 1:1)
CONTAINERS						
IV - Dynamic (Portable) (7.3.3)	2:1 // 1:1	1 (x3)	1 (x3)	1 (x3)	1 (x3)	3 drops total in each condition (1 at 2:1, 2 at 1:1)
V - Static Standard (Portable) (7.3.4)	5:1	1	N/A	N/A	N/A	
VI - Static standard (Stationary) (7.3.5)	5:1	1	1	1	1	
VII - Static inverted (All) (7.3.5)	2:1	1	1	1	1	

9. Markings and Labeling

9.1 General

Each solution shall be marked. The marking shall be:

- on the product itself or on labels attached to the product;
- permanently affixed so as to be visible and legible; and
- provided in at least English.

9.2 Product Label Requirements

The following information shall be included on labeling attached to the solution:

a) Name, trademark or other means of identification of the manufacturer (for all solutions);

b) Product identification (number, date code and/or serial number) (for all solutions);

c) Published capacity (ies), identified by weight (for all solutions)

d) Number of this specific ANSI standard (ANSI/ISEA 121-2018);

e) Tether length (for tool tethers only);

f) Max tether length (for anchor points, attachments and if applicable, containers).

9.3 Instructions for Use

Manufacturers shall provide instructions for use for solutions. At a minimum, the following information shall be given:

a) Necessary warnings of misuse.

b) Limitations on use.

c) Minimum and maximum size for geometry of solutions including but not limited to tool diameter, person size, etc.

d) Inspection details.

e) Clearance distance, if different from max tether length.

Figure 1
Test Set up for Anchor Attachments (Section 4)

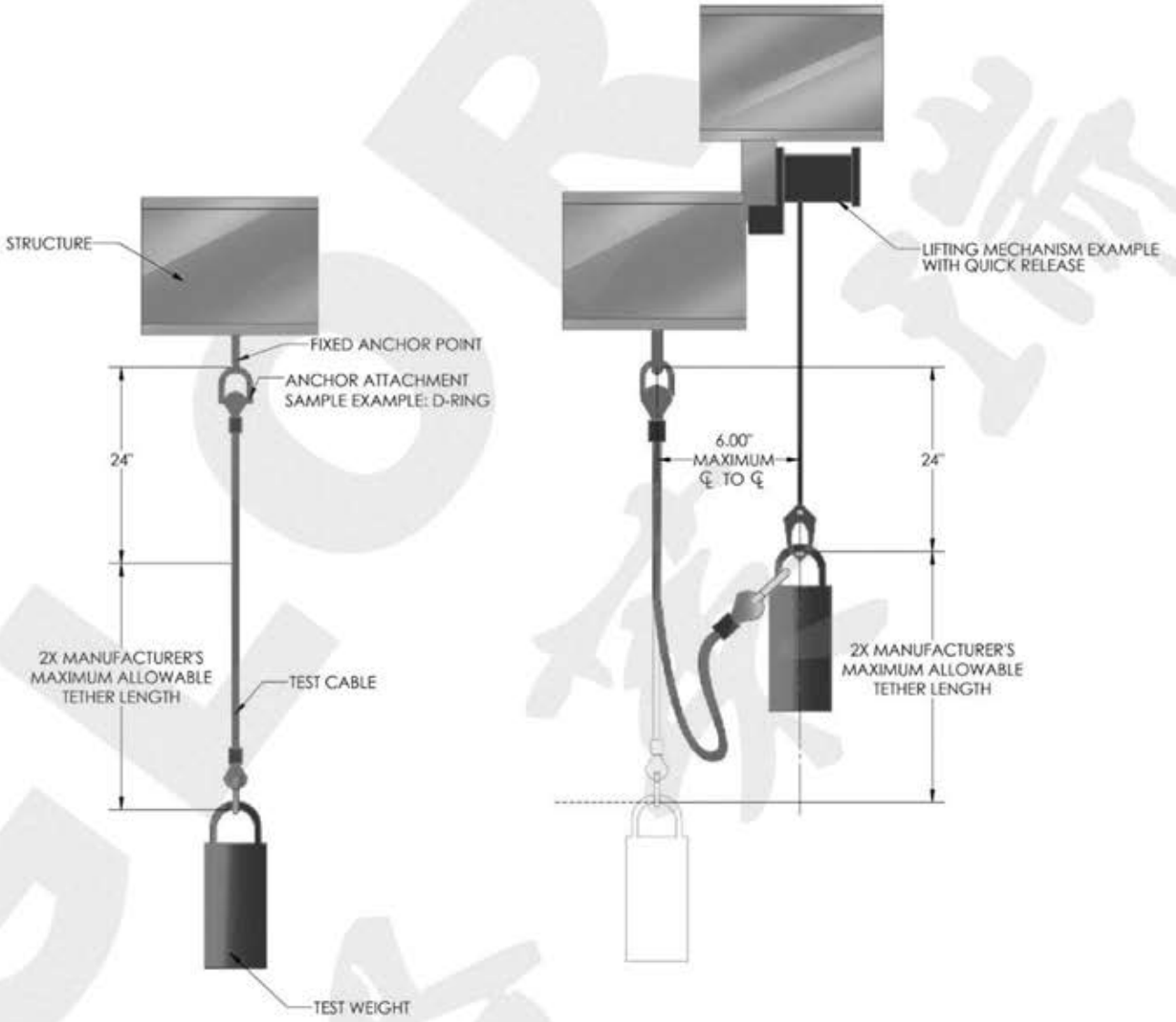


Figure 2
Test Set up for Tool Attachments - Method A (Section 5)

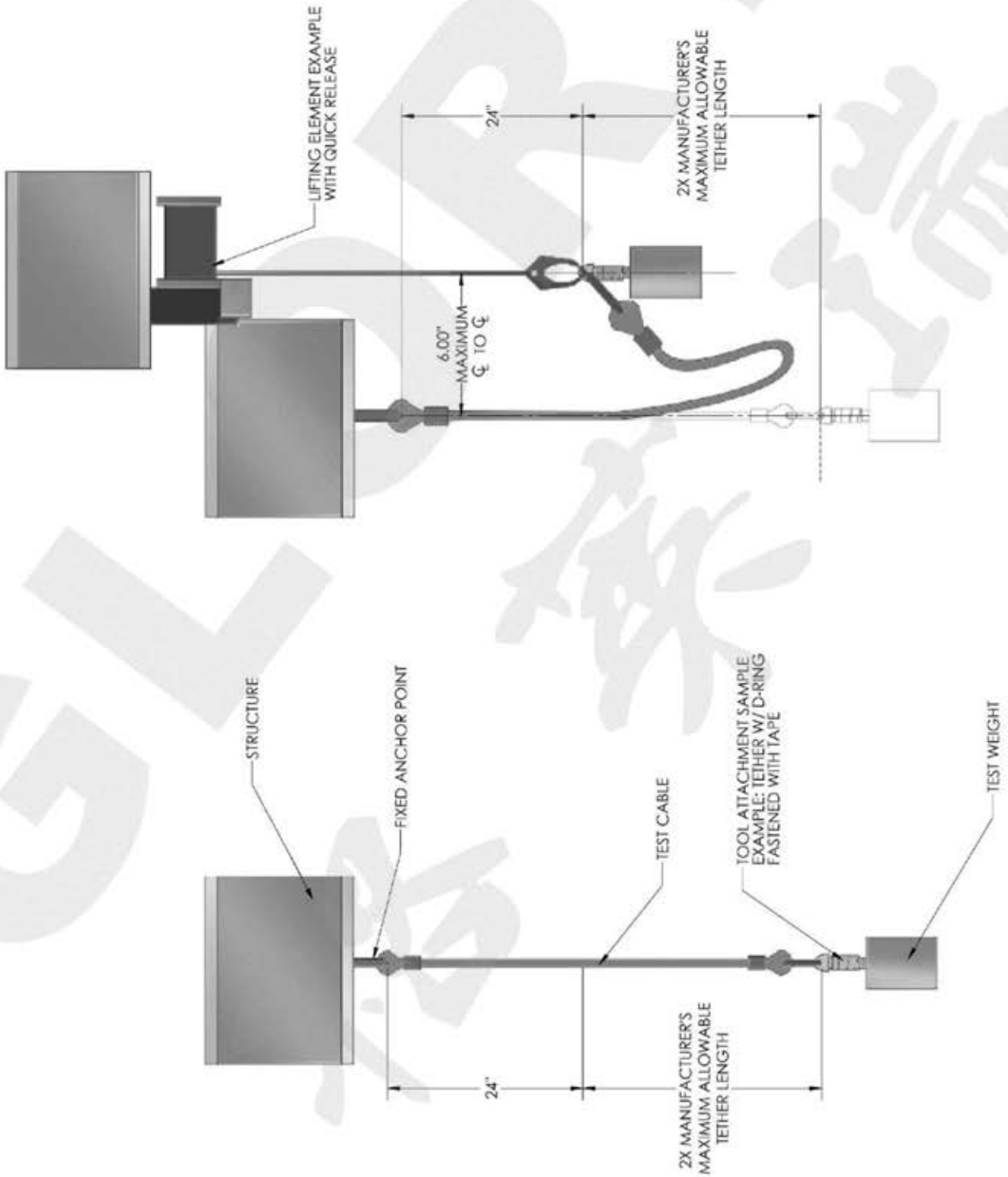
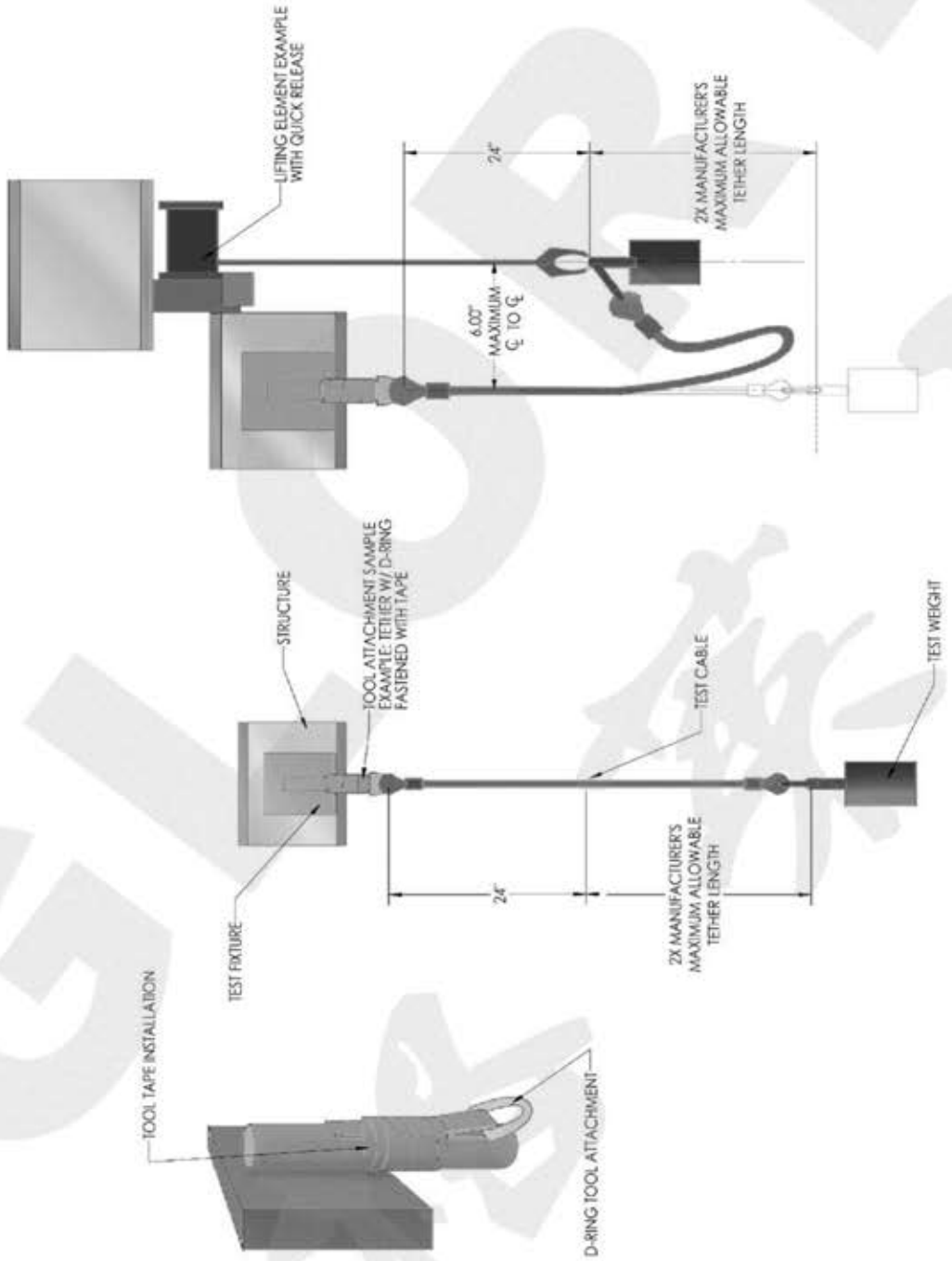


Figure 3
Test Set Up for Tool Attachments - Method B (Section 5)



ANSI/ISEA 121-2018

American National Standard for Dropped Object Prevention Solutions

Secretariat
International Safety Equipment Association

Approved July 2, 2018
American National Standards Institute, Inc.

Figure 4
Test Set up for Tool Tethers (Section 6)

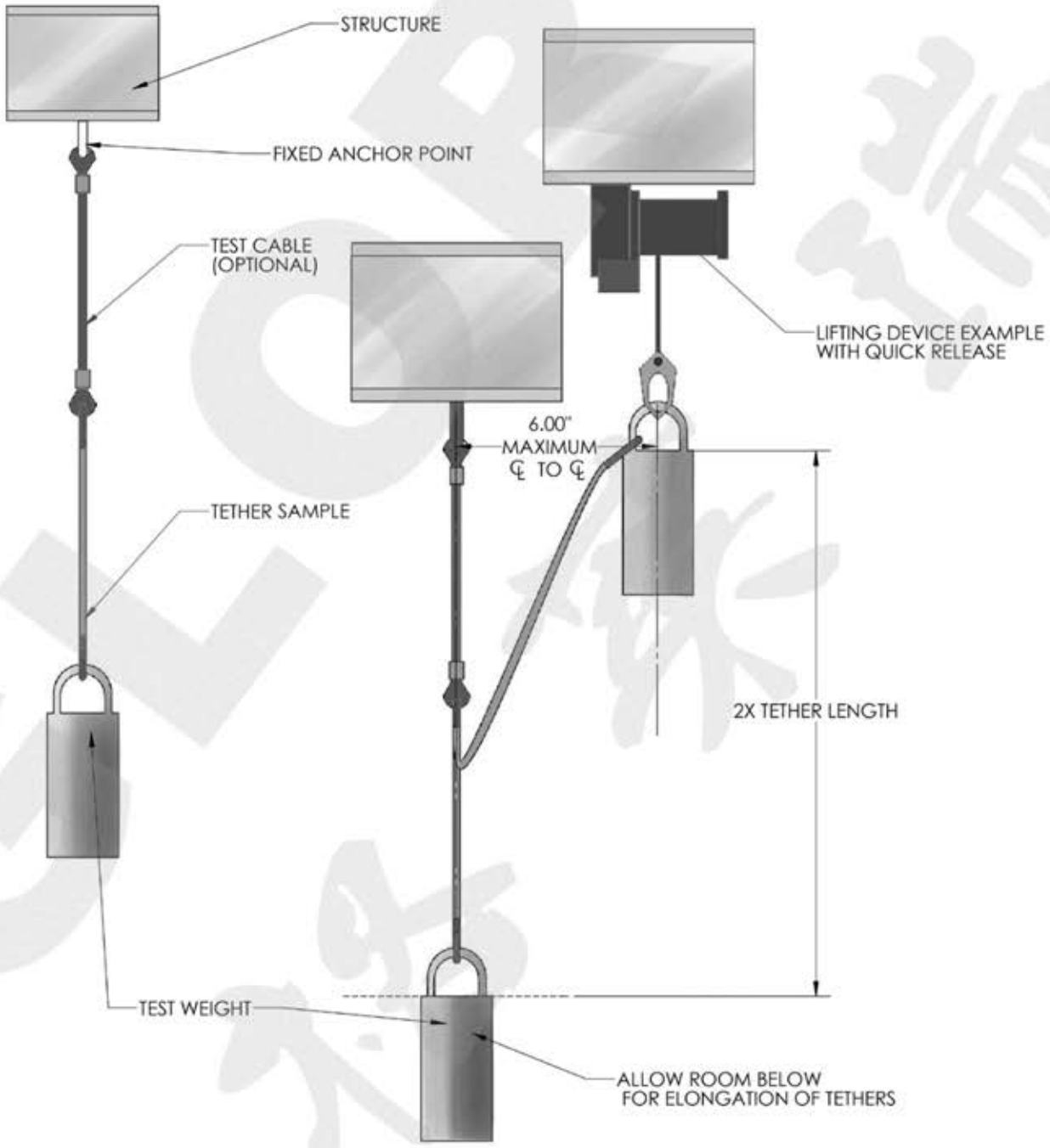


Figure 5
Dynamic Test Set up for Containers (Section 7)

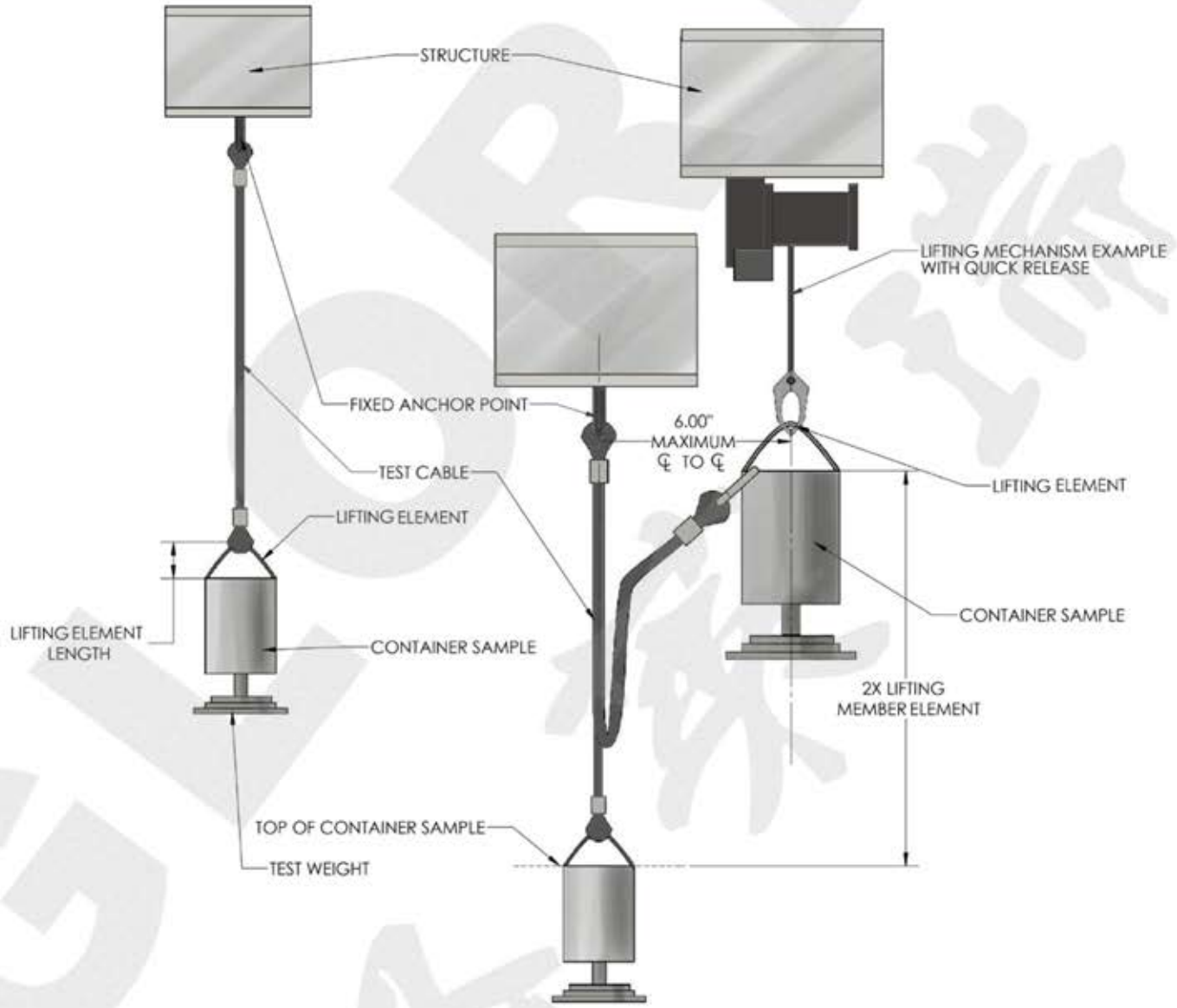
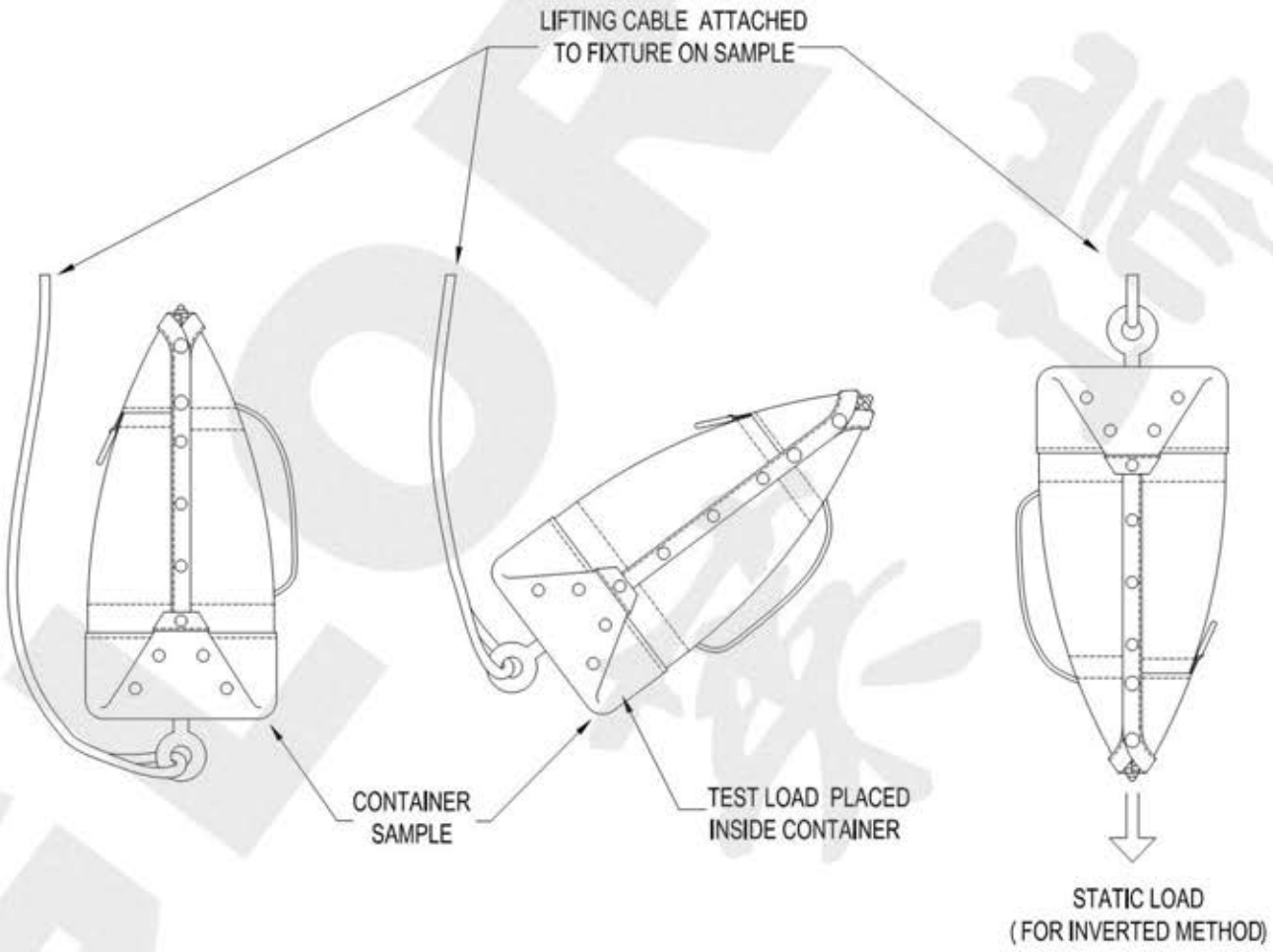


Figure 6
Test Set Up for Stationary Containers (Section 7)



Appendix A
Recommendations, Cautions, Use and Care

(Appendix A is not part of American National Standard ANSI/ISEA 121-2018, but is included for information only.)

A1. Instructions

All instructions, warnings, precautions and limitations given by the manufacturer should always be transmitted to the user and care should be taken to see that such precautions and limitations are strictly observed. Pertinent markings (as defined in ANSI/ISEA 121-20xx, Section 9) should be present and legible. If pertinent information is not present or legible, product should not be used.

The manufacturer of this equipment may impose more stringent restrictions on the use of the products they manufacture. Consult manufacturer's instructions and authorized site personnel.

A2. Load Ratings

Load ratings indicate the capability of tool tether components and *not* the maximum loads for safe working environments or the maximum load that can be safely attached to a person or anchor point. For proper use, consult manufacturer's instructions and authorized site personnel.

A3. Compatibility ratings

For Compatibility of Tool Tethers, Anchor Attachments, Tool Attachments and Containers consult manufacturer's instructions and authorized site personnel. When determining where to connect a tethering system on a native tool or anchor point, consult the manufacturer of that item in addition to the manufacturer of the tethering system component(s).

Prior to use of these solutions the weights of each tool should be known for tethering systems and the combined weights of tool and equipment should be known for containers.

Maximum weight ratings of each component of a tethering system (tool tether, tool attachment and anchor attachment) must be equal or greater than the weight of the tool being tethered.

Tool tethers length, when used with tool attachments and/or anchor attachments must be equal to or shorter than the maximum length indicated by the attachment's markings and instructions.

A tool tethering system is only as strong as its weakest link. The lowest safe working capacity of an individual component of the system is the maximum safe working capacity of the entire system.

A4. Cleaning

Cleaning should be done based on manufacturers' recommendations as some chemicals, cleaners and procedures can affect the integrity of the products.

A5. Inspection

All components (anchor attachments, tool tethers, tool attachments, containers) should be inspected prior to each use for damage or wear due to normal use, drop impacts or contact with sharp objects. If any part is worn or shows signs of wear, it should be removed from service. Consult manufacturer's instructions and authorized site personnel for specific inspection interval and personnel requirements.

A6. Limitation of Protection and Precautions

Users are cautioned that if unusual conditions prevail (for example, higher or lower extremes of temperatures outside the specifications), prolonged exposure to the environment (for example left outside in UV or salt air), exposure to chemicals, or if there are signs of abuse or damage to the components due to high

usage or dropped tools occurrences, the degree of protection may be reduced. Consult manufacturer's instructions and authorized site personnel.

Users should be cautious of how much weight is attached to their person from either a single drop tool or a multi-drop of tools so as not to impact their personal safety. Use of tool tethers and containers should not mitigate other work place safety requirements such as netting, safe working zones, or personal protective equipment (i.e., hard hats) and the awareness of workers below. Not all tools may be tethered and awareness of dropped hardware and miscellaneous items could still be a concern. Users should be aware of area requirements to make the best possible decision regarding the use of tool tethers and containers.

It is essential that the users of this type of equipment receive the proper training and instructions, including detailed procedures for the safe use of such equipment in their work application.

For these precautions, consult manufacturer's instructions and authorized site personnel.

Appendix B
Documentation Examples

(Appendix B is not part of American National Standard ANSI/ISEA 121-2018, but is included for information only.)

Appendix B contains examples of a test report and Declaration of Conformity that may be used to fulfill the requirements of ANSI/ISEA 121-2018, Section 3. All forms are available for download in Adobe Acrobat format on www.safetyequipment.org. Other formats may be used.

B1. Performance Testing Report (1 page)
B2. Declaration of Conformity (1 page)

B1. Performance Testing Report

Article Description:	Test Lab(s):
Manufacturer:	Address: Technician:
Test Report Number	Date Tested:
Test Equipment	
Test Description	

Product Number	ISEA Test	Sample #	Product Capacity	Test Weight and Height	Drop #1	Drop #2	Drop #3	Pass / Fail	Notes
	Tethers: Ambient Dry	1							
	Tethers: Ambient Wet	2							
	Tethers: Ambient Cold	3							
	Tethers: Ambient Hot	4							
	Tethers: Ambient Dry	1							
	Tethers: Ambient Wet	2							
	Tethers: Ambient Cold	3							
	Tethers: Ambient Hot	4							

B2. Declaration of Conformity

Declaration of Conformity to ANSI/ISEA 121-2018, *American National Standard for Dropped Objects Prevention Solutions*

Declaration Number:
Supplier Name and Address:
Product Information (name, model, part number or other information as applicable):

Supplier declares that the above product meets all applicable requirements as stated in ANSI/ISEA 121-2018.

ANSI/ISEA 125-2014 conformity assessment method: ❑ Level 1 ❑ Level 2
For Level 2, information about the ISO 17025-accredited facility in which the product was tested: ❑ The test facility is an independent third party ❑ The test facility is owned or partially owned by an entity within supplier's corporate structure, or within the manufacturing stream for this product, including subcontractors and subsuppliers.
Test report reference (title, number, date):

Authorized Signature _____

Name (printed) _____

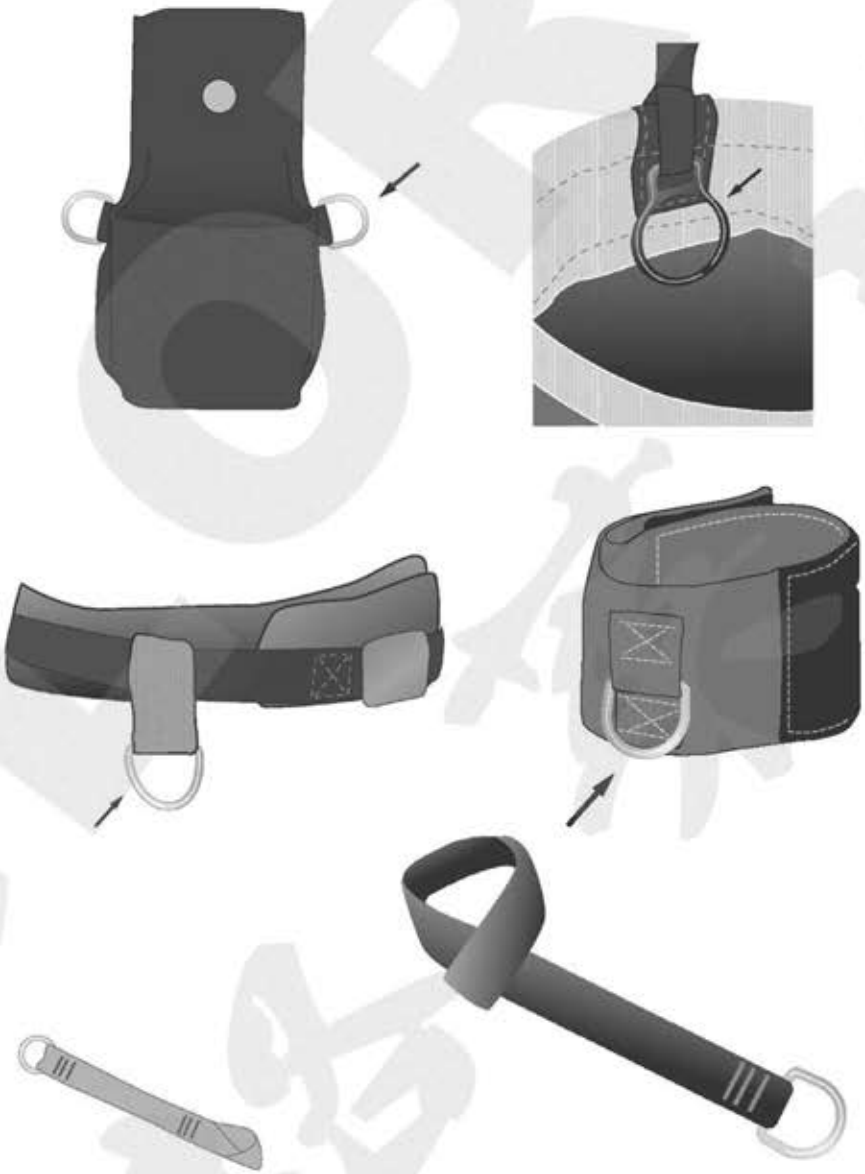
Title (printed) _____

Date _____

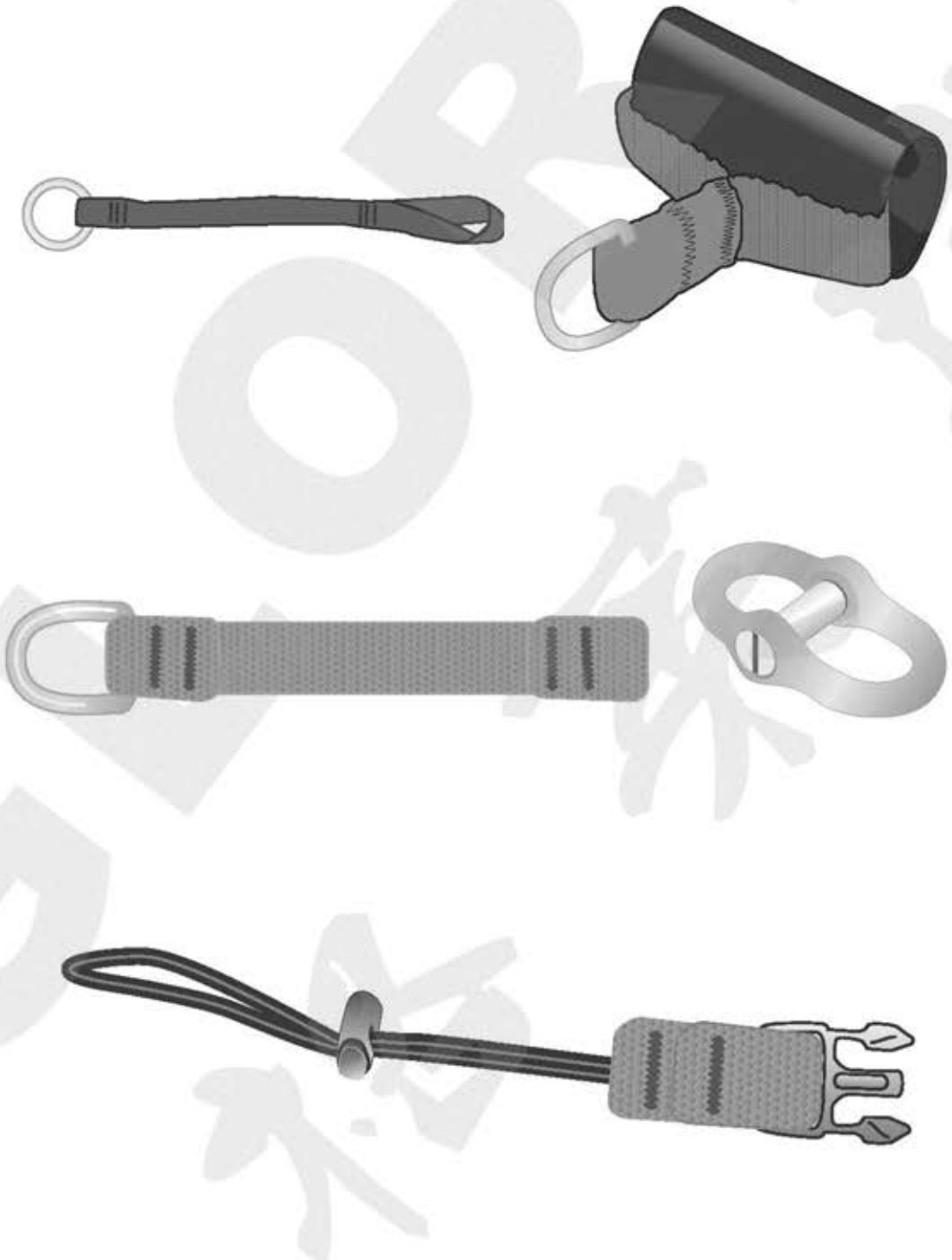
Appendix C
Examples of Product Illustrations

(Appendix C is not part of American National Standard ANSI/ISEA 121-2018, but is included for information only.)

The illustrations below are examples of configurations described in this standard. Other configurations may be acceptable.



C1. Examples of Anchor Attachments



C2. Examples of Tool Attachments (Uninstalled)

American National Standard

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus and other criteria for approval have been met by the standards developer. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered and that a concerted effort be made toward their resolution. The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he/she has approved the standards or not, from manufacturing, marketing, purchasing or using products, processes or procedures not conforming to the standards. The American National Standards Institute does not develop standards and will in no circumstance give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretation should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

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C3. Examples of Tool Attachments (Installed)

C4. Examples of Tool Tethers Uninstalled

C5. Examples of Tool Tethers Installed

C6. Examples of Portable Containers

C7. Examples of Stationary Containers

Foreword (This Foreword is not part of American National Standard ANSI/ISEA 121-2018)

The International Safety Equipment Association (ISEA), in conjunction with industry stakeholders, has developed this standard to establish design, testing and performance criteria for active systems used to prevent dropped objects in the workplace. This standard is the first of its kind to address equipment used to tether and/or contain hand tools, components, structure and other objects from falling from at-heights applications. This standard was prepared by members of ISEA's Dropped Objects working group with the following companies as members at the time of the approval of the standard: 3M Company, Ergodyne, Guardian Fall Protection, Hammerhead Industries, Ty-Flot and West Coast Corporation.

Struck-by falling objects kill hundreds of individuals each year and injure tens of thousands more. Increasing numbers of employees are finding themselves ascending to heights to complete their work often directly over or adjacent to their colleagues, by-standers and other individuals at lower levels. Protective equipment, such as hard hats, have long been available to minimize the effects of struck-by incidents only after an object has fallen. Preventative measures such as netting and toe boards are also a mitigating practice for this this risk, however there are challenges to these solutions and they do not entirely prevent incidents. Active controls utilized to prevent falling objects by tying them off or containing them while at heights are a rapidly growing practice. Recognizing the benefit of these active prevention practices, it is the mission of this group to create guidance for this equipment.

This standard refers to these active dropped object prevention controls and outlines four categories of equipment; Anchor Attachments, Tool Attachments, Tool Tethers, and Containers. The standard is limited to the identified scope as and offers further guidance in the appendices that follow. Utilization and use of the equipment outlined in this standard may differ between manufacturers offering it and employers using it.

Suggestions for the improvement of this standard are welcome. They should be sent to the ISEA, 1901 N. Moore Street, Suite 808, Arlington, VA 22209; e-mail standards@safetyequipment.org.

This standard was processed and approved using consensus procedures prescribed by the American National Standards Institute. The following organizations were contacted prior to the approval of this standard. Inclusion in this list does not necessarily imply that the organization concurred with the submittal of the proposed standard to ANSI.

American Wind Energy Association
CH2M
Chevron BP
Chevron Phillips Chemical Company
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We-Energies
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Appendices

American National Standard for Dropped Object Prevention Solutions

1. Scope

This standard establishes minimum design, performance, testing and labeling requirements for solutions that reduce dropped objects incidents in industrial and occupational settings. Dropped objects include hand tools, instrumentation, small parts, structural components and other items that have to be transferred and used at heights. These objects have the opportunity of becoming dropped objects potentially resulting in struck-by injury or fatality or damage to equipment. This standard focuses on preventative solutions actively used by workers to mitigate these hazards.

The scope of this standard includes tethering systems subsequently installed to the tools and anchors after original manufacture. The primary tools (hand tools, fasteners, power tools) and primary anchors (human body, lifts, structure) are considered native ends to the system and are specifically excluded from this standard.

This standard does not address passive preventative solutions such as netting, barricades and toe boards, nor does this standard address protective solutions for dropped objects that minimize damage from falling objects including head protection, foot protection, and eye protection. This standard also does not address hoisting or lifting requirements for material handling. These solutions are described in other standards, if applicable.

2. Definitions

Anchor: The beginning point (human body or structure) at which a tether is attached and is relied upon to prevent a tool from dropping.

Anchor attachments: Solutions that are applied to anchors being used at height to create secure connection points for tool tethers and that which are not integral to that anchor. (See Appendix C)

Anchor system: Any product that contains an integral anchor point or group of products that can be assembled or installed together as an anchor attachment.

Captive eye: A feature of a carabiner or snaphook-type connector that prevents the connector from being removed.

Closure system: System designed to secure items from inadvertently being removed from the container.

Connector: A component or element that is used to couple parts of the system together.

Container: A bucket, tool bag or similar device used to hold or transport tools or other equipment. (See Appendix C)

Container static test plate: A fixture such as a steel plate that is smaller than the footprint of the bottom of the container.

Dynamic test: A test where a shock load is exerted by using a test weight falling from a specific height.

Extendable tether: A tether that extends without a distinct stopping point when stretching.

Fixed anchor point: The primary anchoring point in a tethering system used for static and dynamic testing.

Fixed length tether: Tether with a distinct stopping point when stretching.

Free fall distance: The vertical distance travelled by the tool or the test mass from the start of a fall to the initiation of an arrest force.

Fluid weight: A volume of nominal 1-inch steel ball bearings that is equivalent to the desired test weight.

Integral: Not removable from any component, subsystem, or system without damaging any of its elements or using a special tool.

Lifting element: Integral or structural component(s) on the container used for lifting.

Locking gate: A closure mechanism on the gate of a connector that will prevent the inadvertent opening of the gate of the connector when in use.

Maximum total drop distance: The farthest possible dropping distance of a tool on a given tool tether at maximum extension, per the stated test requirements.

Retractable tether: A device with a self-managing tether where the tether is automatically drawn back into a housing.

Retrofit: Installation of a new attachment point on a tool or other object not integral to that object.

Rigid weight: Weights that, when assembled into one single unit, cannot separate or move in relation to each other during testing.

Shall: In this standard, use of the word "shall" indicates a mandatory requirement.

Should: In this standard, use of the word "should" indicates a recommendation.

Static Test: A test where a constant force is applied and held for a specific time.

Test Factor: A ratio to determine the test weight or load used to qualify a product's capacity.

Tool: An object protected from falling.

Tool Attachments: Solutions that are applied to tools being used at height to create secure connection points for tool tethers and that which are not integral to that tool. (See Appendix C)

Tool Tether: A length of material with at least one connector on each end that will connect a tool to an anchor. (See Appendix C)

3. Compliance

3.1 General

3.1.1 Demonstration of conformity to the requirements of this standard shall be in accordance with ANSI/ISEA 125-2014, *American National Standard for Conformity Assessment of Safety and Personal Protective Equipment*. The manufacturer shall select the level of conformity assessment claimed, and such level shall be clearly indicated in any claim, in any form, that references compliance with ANSI/ISEA 125-2014.

3.1.2 Manufacturers shall not claim compliance with any part of the requirements of this standard and shall not use the name or identification of this standard in any statements regarding their respective products unless the product conforms fully to this standard.

3.2 Documentation

3.2.1 Dropped object solutions shall be tested to verify compliance with the requirements specified in this standard. At a minimum, the information found in the Performance Testing Report (Appendix B1) shall be maintained by the manufacturer.

3.2.2 A Declaration of Conformity shall be developed for all models for which manufacturer's claims of compliance with this standard are made. At a minimum, the information found on the form in Appendix B2 shall be provided.

NOTE: A product solution with design parameters equivalent to a compliant product solution may be considered compliant if variations do not affect the integrity of the product's design or performance.

3.2.3 The issuer of the Declaration of Conformity shall have procedures in place to ensure the continued conformity of the product, as delivered or accepted, with the stated requirements of the declaration of conformity. The issuer of the Declaration of Conformity shall have procedures in place to re-evaluate the validity of the Declaration of Conformity, in the event of:

a) changes significantly affecting the design or specification of the product;

b) changes in the standards to which conformity of the product is stated;
c) changes in the ownership or structure of the supplier, if relevant; or
d) relevant information indicating that the product may no longer conform to the specified requirements.

4. Anchor Attachments

4.1 Design Requirements

Anchor attachments shall be defined by a manufacturer to include specific instructions and guidelines for the minimums and maximums of the anchor size and/or geometry.

4.2 Performance Requirements

4.2.1 Anchor attachments designed to be independently applied directly to a fixed anchor or person shall be dynamically tested. If the anchor attachment design refers to a specific size range or geometry, the anchor attachment shall be tested and perform to the weakest orientation(s) of that specified range or geometry.

When tested dynamically in accordance with Section 4.3, there shall be no failure of the anchor attachment that allows the test weight to be released as a result of any drop.

4.2.2 Anchor attachments that are identified by the manufacturer to be an anchor system shall be dynamically tested in accordance with Section 4.3.

Anchor attachments of multiple components designed to be assembled into or installed as an anchor system shall be applied to the test fixture and tested as a system. Independent testing of individual system components shall not determine performance of an anchor attachment designed to be used in an anchor system.

If the anchor system design refers to a specific size range or geometry the anchor system shall be tested and perform to the weakest orientation(s) for that range or geometry.

When tested dynamically in accordance with Section 4.3, there shall be no failure of the anchor system that allows the test weight to be released as a result of any drop.

Anchor systems with multiple anchor points with the same construction need only one anchor point to be tested to qualify all similarly designed anchor points within the same system.

4.2.3 Anchor attachments that are identified by the manufacturer to be integral or exclusive to tethers, regardless of tether type, shall be dynamically tested in accordance with Section 6.3.

When tested dynamically in accordance with Sections 6.3, there shall be no failure of the anchor attachment that allows the test weight to be released as a result of any drop.

4.3 Test Requirements

4.3.1 Preparation of Test Samples

Anchor attachment samples shall be selected in accordance with Section 8.1 and shall be applied to the test fixture in accordance with the manufacturer's instructions and conditioned in accordance with Section 8.2.

4.3.2 Test Equipment

The test equipment shall consist of the following:

a) Anchor attachment sample.

b) Test cable of fabricated steel with swaged looped ends measuring a minimum of twice the length of the manufacturers allowable maximum tether length for the anchor attachment or system, plus two feet.

c) A rigid weight, weighing a total of the specified test factor listed in test schedule. (See Section 8, Table 1)

d) A test fixture designed and built accordingly to allow installation onto the fixed anchor point.

If a specific fixed anchor or person's size range or geometry is detailed for use with the anchor attachment, the test fixture shall mimic that fixed anchor or person's characteristics.

4.3.3 Dynamic Test Procedure for Independent Anchor Attachments

Each anchor attachment test sample that requires a dynamic test shall be subjected to a minimum of 3 drops without replacement or adjustment of the sample. Each test sample shall