Recommended Standard Specification
For
Synthetic Webbing
Used For Tie Downs
WSTDA-T-4

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$25.00
This Recommended Standard Specification has been formulated as a guide to users, manufacturers, industry and government to insure the proper design, testing and inspection of webbing used for Synthetic Web Tie Down Assemblies. The existence of this recommended standard specification does not, however, prevent members of the Web Sling & Tie Down Association, Inc. and other manufacturers from manufacturing or selling products not conforming to this standard.
This Recommended Standard Specification applies to Nylon and Polyester synthetic webbing used in the manufacturing of synthetic web tie downs and recommends the construction, identification and marking of such webbings.

The exclusion from this Recommended Standard Specification of synthetic webbing of different synthetic materials and capacities is not intended to preclude their use and shall not be interpreted in this manner.

Synthetic webbing made from materials or construction other than those detailed in this Recommended Standard Specification shall be used in accordance with the recommendations of the webbing manufacturer, tie down fabricator or qualified person. The specifications contained in this Recommended Standard Specification for Synthetic Webbing used for Tie downs were formulated under the auspices of the Web Sling & Tie Down Association, Inc. This Recommended Standard Specification is intended to assist manufacturers of webbing and tie downs, to serve as a guide to governmental and other regulatory bodies responsible for the selection of synthetic webbing used in tie downs.

Safety is the paramount consideration involved in the use of any synthetic webbing for tie down purposes. This standard does not purport to address all safety concerns, if any, associated with the use of synthetic webbing or tie downs. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of the regulatory limitations prior to use. The appropriate synthetic webbing shall be selected by the user for their specific applications. Users shall be knowledgeable about federal, state, provincial, local, and industry regulations applicable to web tie downs constructed of synthetic webbing.

MANDATORY AND ADVISORY RULES

Mandatory rules are characterized by the use of the word “SHALL.” If a rule is of an advisory nature, it is indicated by the use of the word “SHOULD” or it is stated as a recommendation.

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CHAPTER 1.0
TERMINOLOGY AND DEFINITIONS
OF SYNTHETIC TIE DOWN WEBBING

SECTION 1.1 PURPOSE

1.1.1 This chapter provides a description and definitions of synthetic webbing for the purpose of securing cargo.

SECTION 1.2 DESCRIPTION

1.2.1 DESCRIPTION

Synthetic webbing used in web tie downs is a high-tenacity narrow fabric woven in a variety of weaves and principally used for tie downs that have to withstand tensile load.

SECTION 1.3 DEFINITION OF TERMS

ABRASION - The mechanical wearing of the webbing surface resulting from frictional contact with other materials or objects.

BINDER - Yarn that is used to hold the two plies together in the tie down webbing.

BREAKING STRENGTH - The load in pounds or kilograms at which the webbing fails while being stretched or pulled (also known as tensile strength).

CATCH CORD - Yarn used to lock and prevent raveling of the weft yarn on needle weaving machinery.

CREEP - Delayed deformation that is time-dependent and is exhibited by material that is subjected to a continuing load. Delayed deformation may be recoverable or non-recoverable following removal of the applied load.

DENIER - A numbering system which expresses the weight in grams of a multifilament yarn that is 9000 meters in length. Lower numbers represent finer sizes of a filament yarn and higher numbers represent coarser sizes of filament yarn.

ELONGATION - The measurement of webbing stretch, expressed as a percentage of the original unloaded webbing length at a given applied load.

FILLING - The yarn running from selvedge to selvedge perpendicular to the warp. Also referred to as weft and/or picks.

HIGH TENACITY - Higher than normal tensile strength with a range of 6.0 to 9.5 grams per denier as compared to regular tenacity of lower than 6.0 grams per denier.

MULTIFILAMENT - A yarn consisting of many continuous filaments or strands, as opposed to a monofilament, which is one strand.
NARROW FABRIC / WEBBING - Any non-elastic woven fabric, 12 inches or less in width, having a selvedge on either side.

NEEDLE LOOM - A weaving machine in which a needle, rather than a shuttle, is used for weft insertion.

PICKS - The yarn running from selvedge to selvedge perpendicular to the warp. Also referred to as weft and/or filling.

RAVELING - The process of undoing or separating the weave or knit of a fabric.

SELVEDGE / SELVAGE - The narrow edge of a woven fabric that runs parallel to the warp.

SHUTTLE LOOM - A weaving machine having a boat-shaped device usually made of wood with a metal tip that carries filling yarns through the shed in the weaving process.

STUFFER - A longitudinal load bearing yarn in webbing. Yarns running in the warp direction through a woven fabric to increase the fabric’s strength and weight.

SURFACE PLIES - Exterior or outside plies of a plied weave, sometimes referred to as face or back ply of the weave.

SYNTHETIC FIBER - Man-made manufactured fibers.

SYSTEM 3 AND SYSTEM 5 - Specific weaving techniques woven into the edge of the webbing to reduce raveling.

TENSILE STRENGTH - See Breaking Strength.

TIE DOWN - Any combination of fittings, webbing and tensioners forming an assembly that attaches to vehicle and cargo anchor / attachment points. Tie downs are used for securing articles of cargo to a vehicle or restraining articles of cargo from movement on a vehicle. Reference Recommended Standard for Synthetic Web Tie Downs, WSTDA-T-1.

TREATED WEBBING - Webbing to which a chemical treatment has been applied which offers some degree of protection against an environmental or mechanical hazard.

UNTREATED WEBBING - Webbing without any additional chemical treatment or coating.

WARP - The set of yarn in all woven fabrics that run lengthwise and parallel to the selvedge and is interwoven with the filling.

WEBBING - Fabric that is closely woven in a variety of constructions or patterns.

WEFT - The yarn running from selvedge to selvedge perpendicular to the warp. Also referred to as picks and/or filling.

WOVEN - Refers to a fabric composed of at least two sets of yarns, warp and filling, which is then formed by weaving. It is the interlacing of these sets of yarns.

YARN - A continuous strand of textile fibers or filaments in a form suitable for knitting, weaving or otherwise intertwining to form a textile fabric.
CHAPTER 2.0

CONSTRUCTION OF SYNTHETIC TIE DOWN WEBBING

SECTION 2.1 PURPOSE

2.1.1 This chapter provides an outline of materials and construction characteristics of synthetic tie down webbing.

SECTION 2.2 MATERIALS

2.2.1 Webbing shall be woven from a synthetic yarn that is heat and light resistant.

2.2.2 Yarns may be twisted or flat (not twisted) and composed of commercially available deniers.

2.2.3 Nylon yarn used in the manufacturing of tie down webbing shall be high tenacity, continuous multifilament.

2.2.4 Polyester yarn used in the manufacturing of tie down webbing shall be high tenacity, continuous multifilament.

SECTION 2.3 CONSTRUCTION

2.3.1 DESIGN CONSIDERATIONS

Shall include, but not be limited to, the following:

- Breaking Strength
- Elongation
- Abrasion
- Environment

Polyester webbing is typically used in systems where low elongation and low creep are desirable. Polyester’s higher density allows thinner webbing than nylon (at equal strength). Polyester webbing has better natural resistance to moisture than nylon, although some over coatings allow approximately equal performance of both types. Polyester is generally more resistant to acids than nylon.

Nylon webbing is also used in many applications where shock absorption properties are important because nylon webbing has higher elongation than polyester webbing of the same construction and strength. Nylon webbing has better natural abrasion resistance properties than polyester webbing, although some over coatings allow approximately equal performance of both types. Nylon is generally more resistant to most alkalis than polyester.

2.3.2 Webbing may be woven using a stuffer weave construction technique.

2.3.3 Webbing may be woven on a shuttle or needle loom.

2.3.4 Webbing woven on a needle loom shall be woven with selvedge construction utilizing a System 3 or 5 (or other suitable means as determined by the manufacturer) catch cord on the woven edge.
2.3.5 Webbing shall be certifiable as to tensile strength and have uniform thickness and width, and have selvedges.

2.3.6 Identification Marker shall be a color sealed or dyed yarn.

2.3.7 Markers shall be used to indicate strength rating of webbing as shown in Figures 1 and 2. A clearly discernible, single line marker (either solid or broken), centered on at least one face of the webbing shall indicate a minimum breaking strength of 5000 lbs. per inch of webbing width. See Figure 1.

![Figure 1](image1)

A clearly discernible double line marker (either solid or broken), centered on at least one face of the webbing shall indicate a minimum breaking strength of 6000 lbs. per inch of webbing width. See Figure 2.

![Figure 2](image2)

(Webbing commonly used to secure cargo that will be transported inside a closed vehicle, such as a cargo van, shall be exempt from this requirement.)

2.3.8 All webbing cut pieces shall be sealed by heat, or other suitable means to prevent raveling.
2.4.1 Synthetic tie down webbing may be treated with suitable materials that will impart desirable characteristics such as:

a. Abrasion resistance  
b. Moisture resistance  
c. Sealing to prevent penetration of foreign particles and matter  
d. Increased coefficient of friction  
e. Ultraviolet light resistance

CHAPTER 3.0
STANDARD PROCEDURES FOR TESTING SYNTHETIC WEBBING

SECTION 3.1 PURPOSE
3.1.1 This chapter provides standard procedures for testing synthetic webbing used for tie downs.

SECTION 3.2 TYPES OF TESTS
3.2.1 DESTRUCTIVE BREAKING STRENGTH - A test of the webbing for the purpose of verifying the breaking strength. The webbing shall be tested in a straight line pull until broken.

3.2.2 ABRASION - A test of the webbing to determine resistance to abrasion.

3.2.3 ELONGATION - A test of the webbing to determine the elongation of the webbing under load.

3.2.4 OTHER - If additional test(s) are required, they shall be specified by the purchaser.

SECTION 3.3 TEST PROCEDURES
3.3.1 Webbing shall be tested for breaking strength and elongation in accordance with the WSTDA TM-1 Strength & Elongation Recommended Test Method for Sling & Tie Down Webbing. Webbing shall be abrasion tested in accordance with ASTM D 6770 Standard Test Method for Abrasion Resistance of Textile Webbing (Hex Bar Method).

3.3.2 Test specimens shall be from each actual production run.

3.3.3 Test results shall be kept on file by the webbing manufacturer.

3.3.4 The webbing manufacturer or an independent testing laboratory shall perform the testing of synthetic webbing for slings.

SECTION 3.4 CERTIFICATION
3.4.1 When certification is required, the company performing the testing shall issue a certification describing the webbing type, part or model number, date, and results of the tests performed.
CHAPTER 4.0

RECOMMENDED OPERATING PRACTICES

SECTION 4.1 PURPOSE

4.1.1 The purpose of this chapter is to provide guidelines for the care, use and inspection of synthetic webbing for tie downs.

SECTION 4.2 ENVIRONMENTAL CONSIDERATIONS

4.2.1 Webbing should be stored in a cool, dry and dark location.

4.2.2 Environments in which synthetic webbing are continuously exposed to ultraviolet light can affect the strength in varying degrees, ranging from slight to total degradation.

4.2.3 Polyester and nylon webbing shall not be used at temperatures in excess of 194 degrees F (90 degrees C) or below minus 40 degrees F (-40 degrees C).

SECTION 4.3 INSPECTION

4.3.1 Webbing shall be inspected by the both the webbing manufacturer and the tie down manufacturer for the following conditions:
   a. Width
   b. Thickness
   c. Manufacturing Flaws
   d. Surface Markers
   e. Fiber Type
   f. Certified Breaking Strength for conformance with WSTDA-TM-1 Strength and Elongation Recommended Test Method for Sling and Tie Down Webbing

SECTION 4.4 INSPECTION RECORDS

4.4.1 Webbing manufacturer and tie down manufacturer should maintain material inspection records.

SECTION 4.5 REPAIR OF TIE DOWN WEBBING

4.5.1 No repairs of webbing shall be permitted.

This Recommended Standard Specification has been formulated as a guide to users, manufacturers, industry and government to insure the proper design, testing and inspection of webbing used for Synthetic Web Tie Down Assemblies. The existence of this recommended standard specification does not, however, prevent members of the Web Sling & Tie Down Association, Inc. and other manufacturers from manufacturing or selling products not conforming to this standard.
Recommended Standard Specifications:

Printed Books
- Synthetic Web Slings: WSTDA-WS-1
- Synthetic Web Slings (Spanish): WSTDA-WS-1S
- Synthetic Polyester Roundslings: WSTDA-RS-1
- High Performance Yarn (HPY) Roundslings: WSTDA-RS-1HP
- Webbing for Synthetic Web Slings: WSTDA-WB-1
- Sewing Threads for Slings & Tie Downs: WSTDA-TH-1
- Web Tie Downs: WSTDA-T-1
- (Spanish) Web Tie Downs: WSTDA-T-1S
- Winches Used With Web Tie Downs: WSTDA-T-3
- Synthetic Webbing Used for Tie Downs: WSTDA-T-4
- Load Binders Used with Chain Tie Downs: WSTDA-T-6
- All Standards In A Three-Ring Binder: WSTDA-ASB

Recommended Test Methods:
- Strength & Elongation Test Method for Sling & Tie Down Webbings: WSTDA-TM-1

Operating & Inspection Manuals
- Synthetic Web Slings: WSTDA-WS-2
- (Spanish) Synthetic Web Slings: WSTDA-WS-2S
- Synthetic Polyester Roundslings: WSTDA-RS-2
- Web Tie Downs: WSTDA-T-2
- Synthetic Web Slings (pocket sized): WSTDA-WS-2PS
- Synthetic Polyester Roundslings (pocket sized): WSTDA-RS-2PS

Illustrated Wall Chart
- Inspection of Web Slings & Roundslings: WSTDA-WSWC-1

UV Degradation Reports

Training CD-Rom
- North America Cargo Securement Standard: WSTDA-CD-TP-2003

Warning Labels
- Web Slings: WSWT-1
- Tie Downs: TDWT-1
- Roundslings: RSWT-1

Safety Bulletins
- Web Slings: WSSB-1
- Roundslings: RSSB-1
- Tie Downs: TDSB-1

All WARNING LABELS and SAFETY BULLETINS are available in three languages; English, Spanish and French

For ordering information and prices, contact the association office or visit our website:

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