

*RECOMMENDED STANDARD SPECIFICATION
FOR
SYNTHETIC WEBBING FOR SLINGS*

WSTDA-WB-1



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FOREWORD

This Recommended Standard Specification applies to class 5 and class 7 synthetic webbing used in the manufacturing of synthetic web slings. This standard recommends construction, marking, identification, testing, and inspection of class 5 and class 7 synthetic webbing.

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

Synthetic sling 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, sling fabricator or qualified person. The specifications contained in this Recommended Standard Specification for Synthetic Webbing for Slings 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 web slings, to serve as a guide to the industry involved in the manufacture of synthetic sling webbing, and to serve as a guide to governmental and other regulatory bodies responsible for the selection of webbing used in synthetic slings.

Safety is the paramount consideration involved in the use of any synthetic webbing for sling purposes. This standard does not purport to address all safety concerns, if any, associated with the use of synthetic webbing or slings. 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 synthetic web slings constructed of class 5 and class 7 synthetic sling webbing. The responsibility for training and use shall be by qualified persons designated by the employer.

Figures shown in this Standard are for illustration only and are not intended to represent usage, design, or manufacturing processes.

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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First Published and Copyright 2005
First Revision 2015
Second Revision 2023

SUMMARY OF SUBSTANTIVE CHANGES

WSTDA-WB-1, 2023 REVISION

PAGE	LOCATION	REVISION from PRIOR PUBLICATION (2015)
FOREWORD	First and Fourth Paragraphs	Text revised
1	1.2	Subsection 1.2.1 revised
1 - 2	1.3	Terms and Definitions revised; new Terms added: PICK COUNT; TENSILE LOAD
3	2.3	Subsection 2.3.1 revised; Subsection 2.3.13 revised
4	2.4	Subsection 2.4.1 revised
4	3.3	Subsection 3.3.1 revised to create a new Subsection 3.3.2
5	4.3	Subsection 4.3.1 revised

This Summary of Substantive Changes notes only significant revisions to assist users in identifying key modifications. This Summary is not exhaustive and does not encompass minor editorial adjustments, formatting revisions, or routine housekeeping updates. that do not affect the technical content or the intended use of the standard. The Summary should not be substituted for a thorough reading of the revised standard itself. While diligent efforts have been made to accurately highlight substantive changes, it is possible that certain alterations, although deemed substantive, might not be captured in this summary.

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CHAPTER 1.0

TERMINOLOGY AND DEFINITIONS OF SYNTHETIC SLING WEBBING

SECTION 1.1 PURPOSE

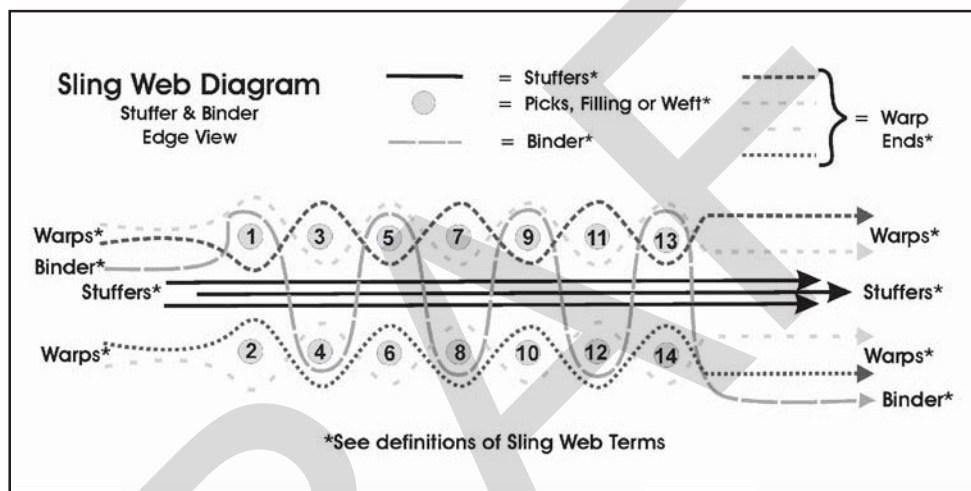
- 1.1.1 This chapter provides a description and definitions that apply to nylon and polyester synthetic sling webbing used as the primary material for synthetic web slings.

SECTION 1.2 DESCRIPTION

- 1.2.1 Synthetic sling webbing is a high-tenacity narrow fabric closely woven in a variety of weaves and principally used for slings that have to withstand a tensile load of:

Class 5 6800 pounds per inch of width (121.43 kilograms per millimeter of width)

Class 7 9800 pounds per inch of width (175 kilograms per millimeter of width)



SECTION 1.3 DEFINITION OF TERMS

ABRASION The mechanical wearing or scuffing of a surface resulting from frictional movement between two materials or objects.

BINDER Yarn that is used to hold the two plies together in the sling webbing.

BREAKING STRENGTH The load in pounds or kilograms at which the webbing fails while being stretched or pulled.

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

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

DYED (WEBBING) A process of coloring fibers, yarns or fabrics with either natural or synthetic dyes.

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

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

SECTION 1.3 DEFINITION OF TERMS (con't)

HIGH TENACITY A term to describe a material with a higher than normal tensile strength.

MULTIFILAMENT A yarn consisting of many continuous filaments or strands, as opposed to a monofilament, which is one strand.

NATURAL (WEBBING) A fabric that has not gone through the dying process. Can be webbing directly off the loom (loom state) or that has undergone a heat setting process without dye or subsequent chemicals.

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

PICK COUNT The number of filling (weft) yarns per inch or centimeter of fabric.

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 woven or knitted (with lockstitch) edge of webbing formed to prevent raveling.)

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 Fiber made by chemical synthesis.

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

TENSILE LOAD The pulling force being applied expressed in pounds or kilograms.

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.

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, filaments, or material, in a form suitable for knitting, weaving, braiding or otherwise intertwining to form a textile fabric.

CHAPTER 2.0

CONSTRUCTION OF SYNTHETIC SLING WEBBING

SECTION 2.1 PURPOSE

2.1.1 This chapter provides an outline of materials, construction characteristics and identification of nylon and polyester class 5 and class 7 synthetic sling webbing, and identification of the synthetic sling webbing manufacturer.

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

SECTION 2.3 CONSTRUCTION

- 2.3.1 Webbing shall be certifiable to breaking strength, and have uniform thickness and width.
- 2.3.2 Typically sling webbings are constructed as a double layer weave with binders and stuffers (closed tubular with stuffer). Other weaving configurations have proven successful in meeting and or exceeding the break load requirements.
- 2.3.3 Webbing may be woven on a shuttle or needle loom.
- 2.3.4 When needle loom construction is utilized the filling yarn shall traverse the full width of the webbing and shall be held at the knitted edge by a catch cord interlacing with filling yarn. Webbing may be woven with the system 3 catch cord on the latch needle edge or the system 5 catch and lock cord on the latch needle edge.
- 2.3.5 Treated and untreated nylon and polyester webbing, used to fabricate synthetic slings, per class 5 and class 7 rated capacity charts as shown in WSTDA-WS-1, may contain red yarns woven into the core of the webbing to serve only as one of many aids in determining whether and when a sling should be removed from service.
- 2.3.6 Class 5 nylon and polyester sling webbing, treated or untreated, shall have a minimum breaking strength of 6800 pounds per inch of width (121.43 kilograms per millimeter of width).
- 2.3.7 Class 7 nylon and polyester sling webbing, treated or untreated, shall have a minimum breaking strength of 9800 pounds per inch of width (175 kilograms per millimeter of width).
- 2.3.8 Both webbing classes and types may be available in natural or dyed, and in treated or untreated types.
- 2.3.9 **Identification Marker for Fiber Type** Identification marker shall be a color sealed or dyed yarn.
- 2.3.10 **Location of Marker for Fiber Type** Marker shall be located in the center of the webbing on at least one face.

2.3.11	Codes:	<u>Fiber</u>	<u>Color Code</u>
		Nylon	No Marker
		Polyester	Blue Marker

2.3.12 **Identification Marker for Synthetic Sling Webbing Manufacturer** The webbing manufacturer identification markers shall be color sealed or dyed yarns.

2.3.13 **Location of Marker for Synthetic Sling Webbing Manufacturer** All double and multiple layer weaves shall be identified for manufacturer's color code in accordance with the following options:

- a. Color code markers located in the stuffer.
- b. Color code markers located between the surface plies.

2.3.14 **Codes** For color coding questions or application for color assignment contact WSTDA.

SECTION 2.4 TREATMENTS

2.4.1 Synthetic sling webbing may be treated with suitable materials that will impart desirable characteristics such as:

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

CHAPTER 3.0

STANDARD PROCEDURES FOR TESTING SYNTHETIC SLING WEBBING

SECTION 3.1 PURPOSE

3.1.1 This chapter provides standard procedures for testing synthetic sling webbing used for nylon and polyester class 5 and class 7 web slings.

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.
- 3.3.2 When requested, webbing shall be abrasion tested in accordance with ASTM D 6770 Standard Test Method for Abrasion Resistance of Textile Webbing (Hex Bar Method).
- 3.3.3 Test specimens shall be from each actual production run.
- 3.3.4 Test results shall be kept on file by the webbing manufacturer.
- 3.3.5 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 slings.

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 is 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 should be inspected by the sling manufacturer for the following conditions:

- a. Width
- b. Thickness
- c. Manufacturing Flaws
- d. Surface Markers

Certified Breaking Strength for conformance with WSTDA-TM-1 Strength and Elongation Recommended Test Method for Sling and Tie Down Webbing

A sling manufacturer may check other parameters, including fiber type and conformance to the webbing manufacturer's pick count.

SECTION 4.4 INSPECTION RECORDS

- 4.4.1 Sling manufacturers should maintain material inspection records.

SECTION 4.5 REPAIR OF WEBBING

- 4.5.1 No repairs of webbing shall be permitted.



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This Recommended Standard Specification has been formulated to assist manufacturers of webbing and web slings to serve as a guide to the industry involved in the manufacture of synthetic sling webbing, and to serve as a guide to governmental and other regulatory bodies responsible for the selection of webbing used in synthetic slings. 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 beyond the scope of this recommended standard specification.

OTHER WEB SLING & TIE DOWN ASSOCIATION PUBLICATIONS

Recommended Standard Specifications for:

- Synthetic Web Slings (WSTDA-WS-1)
- Synthetic Polyester Roundslings(WSTDA-RS-1)
- High Performance Yarn (HPY) Roundslings (RS-1HP)
- Synthetic Webbing for Slings (WSTDA-WB-1)
- Sewing Threads for Slings & Tie Downs (WSTDA-TH-1)
- Synthetic Web Tie Downs (WSTDA-T-1)
- Winches Used With Web Tie Downs (WSTDA-T-3)
- Synthetic Webbing Used for Tie Downs (WSTDA-T-4)
- Interior Van Securement Devices (WSTDA-T-5)
- Load Binders Used with Chain Tie Downs (WSTDA-T-6)
- Strength & Elongation Test Method for Sling & Tie Down Webbing (WSTDA-TM-1)

Operating, Care & Inspection Manuals for:

- Synthetic Web Slings (WSTDA-WS-2)
- Synthetic Polyester Roundslings(WSTDA-RS-2)
- Synthetic Web Tie Downs (WSTDA-T-2)

Download free, single-use copies of the above Standards and Manuals at www.wstda.com

Available for Purchase from Web Sling & Tie Down Association:

Warning Products: Available in English, Spanish and French

- Warning Labels for Web Slings, Roundslings, High Performance Yarn Roundslings, and Tie Downs
- Safety Bulletins for Web Slings, Roundslings, High Performance Yarn Roundslings, and Tie Downs

Illustrated Wall Chart

- Inspection of Web Slings & Roundslings (WSTDA-WSWC-1)

UV Degradation Reports

- UV Degradation Testing Program for Web Slings: Summary Report (2003) (WSTDA-UV-Sling-2003)
- UV Degradation Testing Program for Web Slings: Graphs (Mini Manual) (WSTDA-UV-MM-2005)
- UV Degradation Testing Program for Web Slings: Report (1981, revised 2005) (WSTDA-UVDR-1981)

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