Cargo Securement Equivalent Means of Securement
49 CFR 393.102(c)

Effective Date: January 1, 2014

Manufacturer Name: Stinger Inc.
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Karl Matlack
President
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THIS DOCUMENT MUST BE CARRIED BY THE DRIVER OF THE SUBJECT COMMERCIAL MOTOR VEHICLE, AND PRESENTED UPON THE REQUEST OF ANY LEGALLY AUTHORIZED ENFORCEMENT OFFICIAL.

This document authorizes operation of the Stinger Automatic Load Securement System (ALSS) as a CMV in Interstate Commerce under the cargo securement conditions set forth in the attached engineering document. Failure to comply with the requirements of the specific cargo conditions as identified in the attached document may result in cargo securement violations of any inspected load.

Engineering Document

Effective Date: January 1, 2014

Engineering Firm: Diedrichs & Associates
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Diedrichs & Associates hereby certifies the operation of the Stinger ALSS under scenarios as described has been evaluated to meet cargo securement performance requirements as identified in:

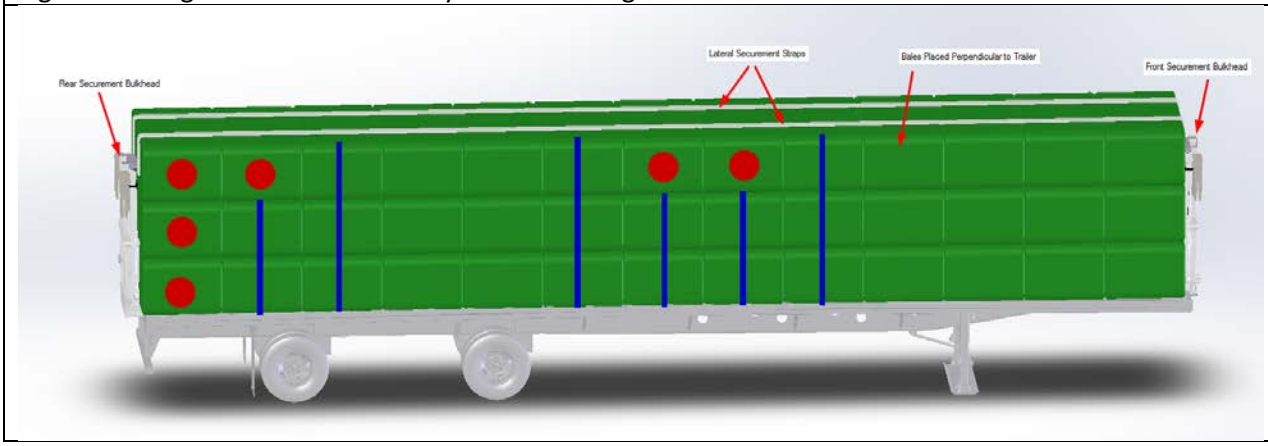
- FMCSA 49 CFR 393.102 (a) – Tests conducted on the Stinger ALSS demonstrated performance under the following conditions, applied separately:
  - (i) 0.8 g deceleration in the forward direction
  - (ii) 0.5 g acceleration in the rearward direction
  - (iii) 0.5 g acceleration in the lateral direction
- FMCSA Enforcement memo – TECHNICAL REVIEW of Industry Cargo Securement Practices for Baled Hay and Straw – Dated June 7, 2008.
  - (a)(1)(i) – Loads that are secured according to conditions of the TECHNICAL REVIEW are exempt from the aggregate load limit requirements of 393.106(d).
  - (e)(2)(i) – V-bars are not required. The Stinger ALSS front and rear strap support arms provide a bearing surface that captures the top front and top rear bales.
  - (e)(2)(ii, iii, iv) – Two longitudinal tiedowns secure the load at anchor points about 48" apart. No crossing of the tiedowns is required with the Stinger ALSS.
  - (e)(2)(v) – The Stinger ALSS provides hydraulically-adjustable tensioning of the tiedown straps. Tiedown tension is locked via hydraulic counterbalance valves which are integral to the hydraulic tensioning cylinders.
  - (e)(2)(vi) – Lateral tiedowns are not required as the Stinger ALSS and friction between bales provides a clamping force between front and rear bulkheads to control lateral bale shifting.
- FMCSA 49 CFR 393.102 (c) (1) – The load is immobilized, such that it cannot shift or tip to the extent that the vehicle's stability or maneuverability is adversely affected.

(See reverse side for Conditions of Operation)

Conditions for Operation:

- The Stinger ALSS is designed for hauling jumbo bales of hay, straw, or stover.
  - Bales sizes are approximately 3’ x 3’ x 8’ or 3’ x 4’ x 8’ or 4’ x 4’ x 8’
- Bales are loaded with major axis (long dimension) perpendicular to the trailer length.
- The trailer should be fully-loaded with bales stacked full height along the entire length.
  - If a full load is not possible for any reason the following lateral strapping is also required.
    - One lateral strap over each of the following rows of bales.
      - All rows of bales that are not full height.
      - The first full height row of bales next to any partial height row.
    - Operators should try to have the fewest number of partial height rows requiring lateral strapping for the most secured load.
- Prior to movement of the trailer:
  - Bales must be unitized together via clamping force of the rear bulkhead
  - The load securement straps must be over the top of the load as shown in figure 1.
- Longitudinal load securement straps must be:
  - 4 inch webbing with at least a 4,000 lbs. WLL (Working Load Limit)
  - In compliance with FMCSA 49 CFR 393.104
- Lateral load securement straps must be:
  - 2 inch webbing with at least a 2,000 lbs. WLL (Working Load Limit)
  - In compliance with FMCSA 49 CFR 393.104

Figure 1: Stinger ALSS Trailer in Fully-Loaded Configuration



Blue lines indicate required lateral straps if bales marked with red circles were left off the load.

References:

- U.S. Department of Transportation
  - Federal Motor Carrier Safety Administration
    - Technical Review of Cargo Securement Practices (Dated September 28, 2007)
    - Memorandum – Technical Review of Cargo Securement Practices, Rev 1 (Dated July 7, 2008)
- Volpe Study
  - “Evaluation of Cargo Securement on the Transportation of Agricultural Commodities”
- U.S. Code of Regulations
  - Chapter 49 CFR 393 Sub-Part 1: Protection Against Shifting and Falling Cargo
- Innovative Vehicle Testing Ltd.
  - Straw Bale Load Securement Research and Test Report (Dated October 2004)