**F -NONMETALLIC STRAPPING**

A. The following polyester cord strapping has been approved for use in trailers or containers for approved loading and securement methods in which the use of polyester cord strapping is specified.

<table>
<thead>
<tr>
<th>Size</th>
<th>ASTM Type</th>
<th>Company/Strap Designation</th>
<th>Strap I.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 1/4&quot;</td>
<td>Type 1 A</td>
<td>Caristrap International CW105WGSD</td>
<td>CW105WGSD</td>
</tr>
<tr>
<td>1 1/4&quot;</td>
<td>Type 1 A</td>
<td>Caristrap International CWW105WOJ</td>
<td>CWW105WOJ</td>
</tr>
<tr>
<td>1 1/4&quot;</td>
<td>Type 1 A</td>
<td>Cordstrap BV CC-105</td>
<td>AAR Cordstrap CC-105</td>
</tr>
<tr>
<td>1 1/4&quot;</td>
<td>Type 1 A</td>
<td>Signode Packaging Systems PW100EH</td>
<td>AAR 11</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>Type 1 A</td>
<td>Tapex American Corp. TEXband 105WXH</td>
<td>AAR TEXband 105 WXH</td>
</tr>
<tr>
<td>1 1/2&quot;</td>
<td>Type 1 A</td>
<td>Tapex American Corp. TEXband 125WXH</td>
<td>AAR TEXband 125 WXH</td>
</tr>
</tbody>
</table>

The strap is to have a minimum break strength* of 3,285 lbs. Joined Strapping is to have a minimum joint strength* of 2,135 lbs. (65% of minimum break strength).

The strap is to be clearly marked with the Strap I. D. in accordance with the strap marking requirements of AAR Circular 42-J, "General Rules Covering the Loading of Carload Shipments of Commodities in Closed Cars", or supplements thereto. The straps are to be tensioned and joined using the correct buckle and tensioning tools in accordance with the manufacturer’s instructions.

It is important that the buckle be applied properly to maintain strap tension. Split and knot the strap on the tensioning side of the buckle after tensioning, when possible, to insure against strap slippage. Use strap hangers or tape to maintain proper strap position.

*See ASTM Standard D3950, Standard Specification for Strapping, Nonmetallic, for information on strapping type and grade, and testing procedures.

B. The following polyester plastic strapping has been approved for use in trailers or containers for approved loading and securement methods in which the use of polyester plastic strapping is specified.

<table>
<thead>
<tr>
<th>Size</th>
<th>ASTM Type*</th>
<th>Company/Strap Designation</th>
<th>Strap I.D.</th>
</tr>
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<tr>
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<td>Samuel Strapping Systems</td>
<td>AAR22</td>
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<tr>
<td>5/8&quot; x .040&quot;</td>
<td>Type IV</td>
<td>Signode Packing Systems Tenax 2040</td>
<td>AAR 11</td>
</tr>
</tbody>
</table>

1. The strap is to have a minimum break strength* of 1,200 lbs.

2. The strap is to be sealed with a friction weld of heat seal joint (seal-less) with a joint strength of 900 lbs. (75% of minimum break strength).

3. The strap is to be clearly marked with the Strap I.D. spaced at not more than five-foot intervals.

*See ATM Standard D3950, Standard Specifications for Strapping, Nonmetallic, for information on strapping type and grade, and testing procedures.
Method E-4 - 58" Diameter Roll Pulpboard on End Using Rubber Mats

This method is for 58" diameter roll pulpboard loaded on end in a 1-1 offset pattern in a trailer or container for intermodal service. Plan the load to equalize the weight on each side of the trailer or container. Since roll weights vary, this will require attention to pre-planning. A balanced load is required for the stability and success of this loading method.

Illustration No. 65:

1. Only the following rubber mats have been evaluated and found acceptable for this loading method:
   - TransMat™ 7513 [3mm (0.125") thick] - Allegheny Industrial Associates
   - TransMat™ 6900 [2mm (0.080") thick], [3mm (0.125") thick] - Allegheny Industrial Associates
   - TransMat™ 8060 [2mm (0.080") thick] - Allegheny Industrial Associates
   - Rubber Restraint Mat BC548™ [2mm (0.080") thick], [3mm (0.125") thick] - Amorim Industrial Solutions
   - Load Grip 5 [2mm (0.080") thick] - NRI Industries
   - Load Lock [3mm (0.125") thick] - RB Rubber Products, Inc.
   - Brown Bear™ - Friction Mat 101 [2mm (0.080") thick], [3mm (0.125") thick] - Circle, Inc.

Specifications for these rubber mats are in Appendix E of this Loading Guide. The mats are not secured to the trailer floor.

NOTE: Do not reuse rubber floor mats if they have been torn or in any way damaged.

2. The load may be divided into two sections. The nose section will consist of 3 or 4 rolls. Place two mats side by side on the floor at the nose of the trailer. Use the appropriate size mat for the number of rolls being loaded.
   - If 4 rolls are loaded in the nose section, use 4' x 17' mats at the nose.
   - If 3 rolls are loaded in the nose section, use 4' x 14' mats at the nose.

3. If 4 rolls are loaded in the nose section, load the four rolls tightly starting against the nose and using a 1-1 offset pattern. See Sketch 3.

4. If 3 rolls are loaded in the nose section, load the first roll so it is centered in the trailer against the nose. Place void fillers, 3" x (void width) x 48" corrugated fiberboard, 1,500 lbs. minimum crush strength, on either side of the trailer at the nose. Position void fillers so that the crush strength is crosswise to the trailer or container. If using multiple void fillers in tandem, unitize them to restrict independent movement. See Sketch 2. Ladder type lumber side blocking can be used as an alternative to the void fillers provided it is 3" in height and extends a minimum of 48" from the nose of the trailer. Lumber side blocking may also be used as an alternative provided it is 3" in height, extends a minimum of 48" from the nose of the trailer and secured adequately using 12d nails. Load the next two rolls tightly lengthwise against opposite side walls of the trailer as shown in Sketch 2.

5. A minimum of 3 feet of void is required between the lading and the trailer doors. Position the rear section to obtain the proper load weight distribution and maintain the 3' void at the rear of the trailer.

6. The rear section consisting of 4 rolls is loaded using two 4' x 16' mats placed side by side. Position the mats to extend a minimum of 6" beyond the rolls at each end of each mat. Place the rolls on the mats in a 1-1 offset pattern.

7. Unitize the rear section (at trailer doors) with one approved polyester cord strap or one 5/8" x .040" approved polyester plastic strap. Position the unitizing strap at a maximum height of 4' above the trailer floor. Be sure the strap is level. Tension and seal the straps using proper tensioning and sealing tools.

   - If using approved polyester cord strap, a wire buckle with legs (prongs) on the same side of the frame and which has a non-slip surface is required. See Section III F for approved polyester cord strapping.
   - If using a 5/8" x .040" approved polyester plastic strap, a heat seal, a friction weld or metal seals may be used to seal the strap. A minimum joint strength of 900 lbs. is required. See Section III F for approved polyester plastic strapping.

8. Position two strap hangers on each trailer side wall at the rear section as indicated in Sketch 1 to maintain proper strap alignment and prevent straps from slipping out of position. Strap hangers may be solid fiberboard secured by use of adhesive, tape or staples, or looped cord strap secured by staples. Use adhesive or tape which is heat and cold resistant for this purpose. Do not use tape as the strap hanger. If additional strap hangers are positioned on the rolls be sure they are positioned so the strap remains level.

   NOTE: Rolls can be loaded in one section starting at the nose and continuing to the rear of the trailer. Use 4' x 16' rubber mats. Place two mats in the nose of the trailer and two mats at the rear of the load as shown Sketch 4.
Method E-12 - 45" Diameter Roll Paper On End Secured Using 2' Wide Rubber Mats

This loading method is for 45" diameter roll paper loaded on end in a 2-1-2 type of pattern in a trailer or container for intermodal service. The load pattern may vary slightly from the basic 2-1-2 pattern depending on the number of rolls in the shipment and weight distribution requirements. Illustration No. 73 shows the load configuration used for testing this concept. Plan the load to equalize the weight on each side of the trailer or container. Since roll weights vary, this will require attention to pre-planning. A balanced load is required for the stability and success of this loading method.

NOTE: Use trailers/containers with wood floors only.

Illustration No. 73:

1. Only the following rubber mats have been evaluated and found acceptable for this loading method:
   - TransMat™ 6510 [3mm (0.125") thick] - Allegheny Industrial Associates
   - TransMat™ 8060 [2mm (0.080") thick] - Allegheny Industrial Associates
   - Load-Grip III [3mm (0.125") thick] - NRI Industries, Inc.
   - Rubber Restraint Mat BC548™ [2mm (0.080") thick] - Amorim Industrial Solutions
   Specifications for these rubber mats are in Appendix E of this Loading Guide.

2. A 2’ x 12’ rubber mat is placed in the nose of the trailer extending lengthwise down the center of the trailer. The mat is not secured to the trailer floor. The rolls are loaded in one section in a 2-1-2 type pattern starting at the nose of the trailer and going back to within 14’ of the end of the load, about four stacks.

3. Two 2’ x 14’ mats are placed at the rear of the load running lengthwise of the trailer with one mat 12” from each sidewall. Position mats so they will extend 2” - 3” beyond the end of the lading. The mats are not secured to the trailer floor.

4. Load the remaining rolls into the trailer with the last three stacks in a 2-1-2 pattern as shown.

5. Unitize the last three stacks (five rolls) using one 1½” x 0.031” steel strap or one approved polyester cord strap using the correct buckle in accordance with manufacturers instructions. (see Section III F for approved polyester cord strapping). Tension and seal the straps using proper tensioning and sealing tools. Use strap hangers or tape to maintain proper strap alignment and prevent straps from slipping out of position.

6. Leave a minimum of 3 feet of void space between the lading and the trailer doors.

Note: Do not reuse rubber mats if they have been torn or otherwise damaged.
Method E-18 - Split Loads of 58" Diameter Roll Pulpboard on End Using 3' Wide Rubber Mats

(If loading split loads of 58" diameter roll pulpboard on end in trailers having large metal plates approximately 9' in length at the nose use Method E-19)

This method is for split loads of 58" diameter roll pulpboard loaded on end in a 1-1 offset pattern in a trailer or container for intermodal service. A maximum of 8 rolls may be loaded in a trailer or container using this method. The loads generally consist of 7 or 8 rolls loaded in two sections in the trailer or container. Plan the load to equalize the weight on each side of the trailer or container. Since roll weights vary, this will require attention to pre-planning. A balanced load is required for the stability and success of this loading method.

Illustration No. 77B:
1. Only the following rubber mats have been evaluated and found acceptable for this loading method:
   - TransMat™ 7513 [3mm (0.125") thick] - Allegheny Industrial Associates
   - TransMat™ 6900 [2mm (0.080") thick], [3mm (0.125") thick] - Allegheny Industrial Associates
   - TransMat™ 8060 [2mm (0.080") thick] - Allegheny Industrial Associates
   - Rubber Restraint Mat BC348™ [2mm (0.080") thick], [3mm (0.125") thick] - Amorim Industrial Solutions
   - Load Grip 5 [2mm (0.080") thick] - NRI Industries
   - Load Lock [3mm (0.125") thick] – RB Rubber Products, Inc.
   - Brown Bear™ - Friction Mat 101 [2mm (0.080") thick], [3mm (0.125") thick] - Circle, Inc.

Specifications for these rubber mats are in Appendix E of this Loading Guide.

NOTE: Do not reuse rubber floor mats if they have been torn or in any way damaged.

2. The nose section will consist of 3 or 4 rolls. Place the first mat on the floor at the nose, centered in the trailer as shown in Sketches 2 & 3. Use the appropriate size mat for the number of rolls being loaded.
   - If 4 rolls are loaded in the nose section, use a 3' x 17' mat at the nose.
   - If 3 rolls are loaded in the nose section, use a 3' x 14' mat at the nose.

3. If 4 rolls are loaded in the nose section, load the four rolls tightly starting against the nose and using a 1-1 offset pattern. See Sketch 2.

4. If 3 rolls are loaded in the nose section, load the first roll so it is centered in the trailer against the nose. Place void fillers, 3" x (void width) x 48" corrugated fiberboard, 1,500 lbs. minimum crush strength, on both sides of the first roll between roll and trailer walls. Position void fillers so that the crush strength is crosswise to the trailer or container. If using multiple void fillers in tandem, unitize them to restrict independent movement. See Sketch 3. Lumber side blocking can be used as an alternative to the void fillers provided it is 3" in height, extends a minimum of 48" from the nose of the trailer and is secured adequately using 12d nails. Ladder type lumber side blocking may also be used as an alternative provided it is 3" in height and extends a minimum of 48" from the nose.

5. Load the next two rolls tightly lengthwise against opposite side walls of the trailer as shown in Sketch 3.

6. A minimum of 3 feet of void is required between the lading and the trailer doors. Position the rear section to obtain the proper load weight distribution and maintain the 3' void at the rear of the trailer.

7. The rear section consisting of 4 rolls is loaded using two 3' x 14' mats. The mats are positioned at the opposite side walls of the trailer. Position the mats to extend a minimum of 6" beyond the rolls at each end of each mat. Place the rolls on the mats in a 1-1 offset pattern. See Sketches 2 & 3.

8. Unitize the rear section (at trailer doors) with one approved polyester cord strap or one 5/8" x .040" approved polyester plastic strap. Position the unitizing strap at a maximum height of 4' above the trailer floor. Be sure the strap is level. Tension and seal the straps using proper tensioning and sealing tools.

If using approved polyester cord strap, a wire buckle with legs (prongs) on the same side of the frame and which has a non-slip surface is required. (See Section III F for approved polyester cord strapping.) If using a 5/8" x .040" approved polyester plastic strap, a heat seal, a friction weld or metal seals may be used to seal the strap. A minimum joint strength of 900 lbs. is required. See Section III F for approved polyester plastic strapping.

9. Position two strap hangers on each trailer side wall at the rear section as indicated in Sketch 1 to maintain proper strap alignment and prevent straps from slipping out of position. Strap hangers may be solid fiberboard secured by use of adhesive, tape or staples; looped cord strap secured by staples. Use adhesive or tape which is heat and cold resistant for this purpose. Do not use tape as the strap hanger. If additional strap hangers are positioned on the rolls be sure they are positioned so the strap remains level.
Method E-19 - Split Loads of 58" Diameter Roll Pulpboard on End Using 3' Wide Rubber mats When Stowed in Trailers Having Large Metal Plates Approximately 9' in Length at the Nose

This method is for split loads of 58” diameter roll pulpboard loaded on end in a 1-1 offset pattern for intermodal service in a trailer or container having wood floors with large metal plates approximately 9’ in length at the nose. A maximum of 8 rolls may be loaded in a trailer or container using this method. The loads generally consist of 7 or 8 rolls loaded in two sections in the trailer or container. Plan the load to equalize the weight on each side of the trailer or container. Since roll weights vary, this will require attention to pre-planning. A balanced load is required for the stability and success of this loading method.

Illustration No. 77C:

1. Only the following rubber mats have been evaluated and found acceptable for this loading method:
   - TransMat™ 7513 [3mm (0.125”) thick] - Allegheny Industrial Associates
   - TransMat™ 6900 [2mm (0.080”) thick], [3mm (0.125”) thick] - Allegheny Industrial Associates
   - TransMat™ 8060 [2mm (0.080”) thick] - Allegheny Industrial Associates
   - Rubber Restraint Mat BC548™ [2mm (0.080”) thick], [3mm (0.125”) thick] - Amorim Industrial Solutions
   - Load Grip 5 [2mm (0.080”) thick] - NRI Industries
   - Load Lock [3mm (0.125”) thick] - RB Rubber Products, Inc.
   - Brown Bear™ - Friction Mat 101 [2mm (0.080”) thick], [3mm (0.125”) thick] - Circle, Inc.

Specifications for these rubber mats are in Appendix E of this Loading Guide.

NOTE: Do not reuse rubber floor mats if they have been torn or in any way damaged.

2. The nose section will consist of 3 or 4 rolls and may be loaded in-line or using a 1-1 offset pattern. When loading in-line, place the first mat on the floor at the nose, centered in the trailer as shown in Sketches 1, 2 & 3. When loading using a 1-1 offset pattern, place two mats side by side centered in the trailer as shown in Sketches 4 & 5. Use the appropriate size mat for the number of rolls being loaded. The mats are not secured to the trailer floor.
   - If 3 rolls are loaded in-line at the nose section, use a 3' x 16' mat at the nose.
   - If 4 rolls are loaded in-line at the nose section, use a 3' x 21' mat at the nose.
   - If 3 rolls are loaded using a 1-1 offset pattern at the nose, use two 3' x 14' mats at the nose.
   - If 4 rolls are loaded using a 1-1 offset pattern at the nose, use two 3' x 17' mats at the nose.

3. If 3 rolls are loaded in-line at the nose section, load the first roll so it is centered in the trailer against the nose. Continue loading the remaining 2 rolls in the nose tightly in-line down the center of the trailer. Place void fillers, 3" x (void width) x 48" corrugated fiberboard 1,500 lbs. minimum crush strength, between each roll and the adjacent sidewall. If using multiple void fillers in tandem, unitize them to restrict independent movement. See Sketches 1 and 2.

4. If 4 rolls are loaded in-line at the nose section, load the first roll so it is centered in the trailer against the nose. Continue loading the remaining 3 rolls in the nose tightly in-line down the center of the trailer. Place void fillers, 3” x (void width) x 48” corrugated fiberboard 1,500 lbs. minimum crush strength, between each roll and the adjacent sidewall. If using multiple void fillers in tandem, unitize them to restrict independent movement. See Sketch 3.

5. If 3 rolls are loaded in a 1-1 offset pattern at the nose section, load the first roll so it is centered in the trailer against the nose. Place void fillers, 3” x (void width) x 48” corrugated fiberboard 1,500 lbs. minimum crush strength, on both sides of the first roll between roll and trailer walls. Position void fillers so that the crush strength is crosswise to the trailer or container. If using multiple void fillers in tandem, unitize them to restrict independent movement. See Sketch 4. Ladder type side blocking may also be used as an alternative provided it is 3” in height and extends a minimum of 48” from the nose of the trailer.

6. Load the next two rolls tightly lengthwise against opposite sidewalls of the trailer as shown in Sketch 4.

7. If 4 rolls are loaded in a 1-1 offset pattern at the nose section, load the four rolls tightly starting against the nose using a 1-1 offset pattern. See Sketch 5.

8. A minimum of 3 feet of void is required between the lading and the trailer doors. Position the rear section to obtain the proper load weight distribution and maintain the 3’ void at the rear of the trailer.

9. The rear section consisting of 4 rolls is loaded using two 3’ x 14’ mats. The mats are positioned at the opposite side walls of the trailer. Position the mats to extend a minimum of 6” beyond the rolls at each end of each mat. Place the rolls on the mats in a 1-1 offset pattern. See Sketches 1 through 5.
Method E-20 - 50" Diameter Printing Paper on End Using 2' Wide Rubber Mats

This loading method is for 50" diameter printing paper loaded on end in a 1-1 offset pattern in a trailer or container for intermodal service. This method was tested in a 102" wide trailer. Plan the load to equalize the weight on each side of the trailer or container. Since roll weights vary, this will require attention to pre-planning. A balanced load is required for the stability and success of this loading method.

Illustration No. XX:

1. Only the following rubber mat has been evaluated and found acceptable for this loading method:

   TransMat™ 8060 [2mm(0.080") thick] - Allegheny Industrial Associates

   Specifications for this rubber mat are in Appendix E of this Loading Guide.

2. Two 2’ x 7’ mats are placed in the nose of the trailer and centered under the first two rolls adjacent each sidewall of the trailer. The mats are not secured to the trailer floor. Five stacks are loaded tightly in one section in a 1-1 offset pattern starting at the nose of the trailer.

3. Two 2’ x 14’ mats are placed at the rear of the load running lengthwise of the trailer and positioned so that they will be centered under the remaining rolls. Position mats so that they will extend 6’ beyond the end of the lading. The mats are not secured to the trailer floor.

4. Load the remaining rolls tightly into the trailer in a 1-1 offset pattern against the previously loaded rolls.

5. Unitize the last two stacks (four rolls) using one 1¼” x 0.031” steel strap or one approved polyester cord strap using correct buckle in accordance with manufacturers instructions. (See Section III F for approved polyester cord strapping). Tension and seal the straps using proper tensioning and sealing tools. Use strap hangers or tape to maintain proper strap alignment and prevent straps from slipping out of position.

6. Leave a minimum of 3 feet of void space between the lading and the trailer doors.

NOTE: Due to the nature of this concept some header damage could occur. If this is considered objectionable, do not use this loading and bracing method.

Do not reuse rubber floor mats if they have been torn or in any way damaged.
Method E-20

50" Diameter Printing Paper on End Using 2' Wide Rubber Mats

Approved Polyester Cord Strap or 1 1/4" x .31" Steel Unitized Strap Around Last Four Rolls Positioned at Midpoint of Roll

Minimum 6" Beyond Rolls

Rubber Mats Extend Minimum 6" Beyond Rolls

Minimum 3' Between Lading and Doors

Illustration No. XX
Method E-20
50" Diameter Printing Paper on End Using 2' Wide Rubber Mats
F - DISPOSABLE INFLATABLE DUNNAGE BAGS

Method F-1 - Case Goods on Slip Sheets Secured with Friction Panels and D.I.D. Bags in Trailers

This load is restricted to slip sheet loads unitized by minimum 90 gauge stretch wrap. Follow manufacturer’s instructions on minimum number of wraps to be used for this application but in all cases use a minimum of 3 wraps for the top and bottom layers and 2 wraps for the center layers.

Illustration No. 78:

1. Units are to be placed in the trailer with a minimum of 4" between them for the placement of 2-ply 48” x 96” disposable inflatable dunnage (D.I.D.) bags. The D.I.D. bags may be either 2-ply disposable paper dunnage bags, 1-ply 48” x 96” disposable paper dunnage bags manufactured by Stopak, Ltd., one trip nylon reinforced urethane dunnage bags manufactured by Vin-tex Sealers, Inc., one trip vinyl dunnage bags manufactured by Centerload Shipping Technologies, Inc. or one trip polypropylene/polyethylene dunnage bags manufactured by Syn-Tex Convertors USA or two Centerload Shipping Technologies 48” x 48” bags at each designated location.

2. The D.I.D. bags are used at three locations in the load, the 3rd and 4th stacks, 6th and 7th stacks and the last two stacks. The illustration shows 11 units in each row in a 102” wide trailer. Other size trailers with varying amounts of units may also be loaded.

3. Friction panels (17 to 23 point solid fibreboard sheets with latex adhesive on both sides or equivalent) are placed between units and side walls at all locations where D.I.D. bags are used. Have the panel sized to fit the size of the units.

4. When the center void filled by the D.I.D. bag is to be larger than 12” after inflation, additional full size void fillers (capable of withstanding a load of 1,500 lbs/sq. ft) are to be placed alongside the D.I.D. bags. D.I.D. bags are to be inflated to 2.0 psi.

5. Plan the load so crosswise void space is minimized. Use appropriate filler material to prevent crosswise movement.

NOTE: Disposable Inflatable Dunnage (D.I.D.) Bags used for load securement are not to be re-used.
Method F-2 - Case Goods Secured with D.I.D. Bags

This method is for case goods unitized on pallets or slipsheets by minimum 90 gauge stretch wrap. Follow manufacturer’s instructions on minimum number of wraps to be used but in all cases use a minimum of 3 wraps for the top and bottom layers and 2 wraps for the center layers. The load tested weighed 45,000 lbs.

Illustration No. 79:

1. Cover rough surfaces or projections of the side wall with fiberboard sheets or other suitable material.

2. Disposable inflatable dunnage (D.I.D.) bags are used to control lengthwise load movement. The D.I.D. bags may be either 2-ply disposable paper dunnage bags, 1-ply 48” x 96” disposable paper dunnage bags manufactured by Stopak, Ltd, one trip nylon reinforced urethane dunnage bags manufactured by Vin-tex Sealers, Inc. or one trip vinyl dunnage bags manufactured by Centerload Shipping Technologies, Inc. or one trip polypropylene/polyethylene dunnage bags manufactured by Syn-Tex Convertors USA.

Sketch 1: This method is used for loads in which the lading is positioned against the front end wall.

3. Disposable inflatable dunnage (D.I.D.) bags are used at two locations in the load, at the 4th and 5th stacks and at the last two stacks. The illustration shows 10 units in 2 rows. Dependent on trailer size and unit weight, varying numbers of units may also be loaded. In any case, the first D.I.D. bag restrains approximately ½ the load. Use D.I.D. bags wide enough to extend from 4” above the floor to the top of the lading. Minimum D.I.D. bag size is one 48” x 96” bag or two Centerload Shipping Technologies’ 48” x 48” bags at each location.

4. Place units in the trailer with a minimum 4” center void between the units where the D.I.D. bags are located. Leave a 24” (approx.) space between the rear of the load and the trailer doors.

5. When the center void filled by the D.I.D. bag is larger than 10” after inflation of the bag, place additional full size void fillers (capable of withstanding a load of 1,500 lbs/sq.ft.) along side the D.I.D. bags. Position the D.I.D. bags 4” above the trailer floor. Inflate the D.I.D. bags to a maximum of 2.5 psi.

6. Plan the load so crosswise space is minimized. Use appropriate void fillers to prevent crosswise movement.

Sketch 2: This method is used for case goods unitized on pallets when there is unfilled lengthwise pallet underhang and/or for case goods unitized on pallets or slip sheets which are loaded away from the front end wall to obtain proper weight distribution.

7. Disposable inflatable dunnage (D.I.D.) bags are used adjacent to every stack in the load. The D.I.D. bags contact the full surface of the units along the center void of the trailer as shown in the illustration. The illustration shows 10 units in 2 rows. Dependent on trailer size and unit weight, varying numbers of units may also be loaded. Use D.I.D. bags wide enough to extend from 4” above the floor to the top of the lading. Minimum D.I.D. bag size is one 48” x 96” bag or two 48” x 48” bags at each location.

8. When the center void filled by the D.I.D. bag is larger than 10” after inflation of the bag, place additional full size void fillers (capable of withstanding a load of 1,500 lbs/sq.ft.) along side the D.I.D. bags. Position the D.I.D. bags 4” above the trailer floor. Inflate the D.I.D. bags to 2.0 psi. Recheck D.I.D. bag pressures after all are inflated, if possible.

9. Leave a 24” (approx.) space between the rear of the load and the trailer doors.

Note: Disposable Inflatable Dunnage (D.I.D.) Bags used for load securement are not to be reused.
## APPENDIX C
### NON-METALLIC STRAPPING

### I. Polyester Cord Strapping

The following polyester cord strapping has been approved for use in trailers or containers for approved loading and securement methods in which the use of polyester cord strapping is specified.

<table>
<thead>
<tr>
<th>Size</th>
<th>ASTM Type*</th>
<th>Company/Strap Designation</th>
<th>Strap I. D.</th>
</tr>
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<tr>
<td>1¼&quot; Wide</td>
<td>Type IA Grade 4</td>
<td>Caristrap International CW105WGSD</td>
<td>CW105WGSD</td>
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<tr>
<td>1¼&quot; Wide</td>
<td>Type IA Grade 4</td>
<td>Caristrap International CWW105WOJ</td>
<td>CWW105WOJ</td>
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<td>1¼&quot; Wide</td>
<td>Type IA Grade 4</td>
<td>Cordstrap BV CC-105</td>
<td>AAR CORDSTRAP CC-105</td>
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<td>Type IA Grade 4</td>
<td>Signode Packaging Systems PW100EH</td>
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<tr>
<td>1¼&quot; Wide</td>
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<tr>
<td>1½&quot; Wide</td>
<td>Type IA Grade 5</td>
<td>Caristrap International CWW125WOJ</td>
<td>CWW125WOJ</td>
</tr>
</tbody>
</table>

1. The strap is to have a minimum break strength* of 3,285 lbs.

2. Joined strapping is to have a minimum joint strength* of 2,135 lbs. (65% of minimum break strength).

2. The strap is to be clearly marked with the Strap I.D. in accordance with the strap marking requirements of AAR Circular 42-I, “General Rules Covering the Loading of Carload Shipments of Commodities in Closed Cars.”

3. The straps are to be tensioned and joined using the correct buckle and tensioning tools in accordance with manufacturer’s instructions. It is important that the buckle be applied properly to maintain strap tension. Split and knot the strap on the tensioning side of the buckle after tensioning, when possible, to insure against strap slippage.

4. Use strap hangers or tape to maintain proper strap position.

* See ASTM Standard D3950, **Standard Specification for Strapping, Nonmetallic**, for information on strapping type and grade, and testing procedures.

7/1/02
APPENDIX E

RUBBER MAT SPECIFICATIONS (TYPICAL VALUES)

Supplier: Allegheny Industrial Associates

**TransMat™ 8060**
- Density: ASTM D-297: .80 g/cm³
- Tensile: ASTM D-412: 175 psi
- Elongation: ASTM D-412: 90%
- Hardness: ASTM D-2240: Shore A: 40-60 (points)
- Tear: ASTM D-624: 50 PPI (Die C)
- Compression Properties: ASTM F-36: 100 psi – 15-25%, Recovery 80%
- Coefficient of Friction: ASTM D-1894: 1.3

**TransMat™ 7513**
- Density: ASTM D-297: 46.7 lbs./cubic ft.
- Tensile: ASTM D-412: 200 psi
- Elongation at Break: ASTM D-412: 125%
- Hardness: ASTM D-2240 Shore A: 40-60 (points)
- Tear: ASTM D-624: 50 PPI (Die C)
- Compression Set B: ASTM D-395: 40% max (25% Deflection, 158F/22 hrs)
- Compression Set (Foam): ASTM D3676: 30% max (50% Deflection, 158F/22 hrs)
- Coefficient of Friction: ASTM D-1894: 1.20

**TransMat™ 7010**
- Density: ASTM D-297: 50 lbs./cubic ft.
- Tensile: ASTM D-412: 120 psi
- Elongation at Break: ASTM D-412: 75-105%
- Hardness: ASTM D-2240 Shore A: 35-55 (points)
- Tear: ASTM D-624: 70 PPI (Die C)
- Compression Set B: ASTM D-395: 70% max (25% Deflection, 158F/22 hrs)
- Compression Set (Foam): ASTM D3676: 80% max (50% Deflection, 158F/22 hrs)
- Coefficient of Friction: ASTM D-1894: 1.195

**TransMat™ 6900**
- Density: ASTM D-297: 52 lbs./cubic ft.
- Tensile: ASTM D-412: 100 psi
- Elongation: ASTM D-412: 95% (Die C)
- Hardness: ASTM D-2240 Shore A: 45-55 (points)
- Tear: ASTM D-624: 40 PPI (Die C)
- Compression Set B: ASTM D-395: 40% max (25% Deflection, 158F/22 hrs)
- Compression Set (Foam): ASTM D3676: 30% max (50% Deflection, 158F/22 hrs)
- Compression Properties: ASTM F-36: 100 psi - 20-30%
- Coefficient of Friction: ASTM D-1894: 1.2

**TransMat™ 6510**
- Density: ASTM D-297: 40 lbs./cubic ft.
- Tensile: ASTM D-412: 75 psi
- Elongation at Break: ASTM D-412: 60%
- Hardness: ASTM D-2240 Shore A: 20-60 (points)
- Tear: ASTM D-624: 20 PPI (Die C)
- Compression Set B: ASTM D-395: 20-30 (25% Deflection, 158F/22 hrs)
- Compression Set (Foam): ASTM D3676: 20-30 (50% Deflection, 158F/22 hrs)
- Compression Properties: ASTM F-36: 100 psi - 25-35%, 200 psi - 40-50%, 300 psi - 50-60%, 400 psi - 60-70%
- Coefficient of Friction: ASTM D-1894: 1.083
### Rubber Mat Specifications (Typical Values)

**Supplier: NRI Industries, Inc.**

**Load Grip**
- **Thickness:** 1/8" and 1/4"
- **Weight:** 17 grams per cubic inch Avg.
- **Tensile Strength:** ASTM D-412: 677 psi Avg.
- **Durometer Hardness:** ASTM D-676, Shore Type: 80 I Avg.

**Load-Grip II**
- **Density:** 74.8 lb/cu.ft. (Max.)
- **Tensile:**
  - ASTM D-412: 100 psi Min. - machine direction (Die C)
  - 150 psi Min. - across machine direction
- **Elongation at Break:** ASTM D-412: 100%
- **Tear:**
  - ASTM D-624: 25 PPI - both directions
- **Hardness:**
  - ASTM D-2240 Shore A: 40 ± 10
- **Compression Set B:**
  - ASTM D-395: 60% (24 hrs @ 21C)
- **Coefficient of Friction:**
  - TAPPI TB16OM-92: 0.9

**Load-Grip III**
- **Density:** 69 lb/cu.ft. (Max.)
- **Tensile:**
  - ASTM D-412: 250 psi Min. - with grain (Die C)
  - 150 psi Min. - across grain
- **Elongation at Break:**
  - ASTM D-412: 30% Min. - with grain (Die C)
  - 60% Min. - across grain
- **Tear:**
  - ASTM D-624: 60 PPI - with grain (Die B)
  - 100 PPI - across grain
- **Hardness:**
  - ASTM D-2240 Shore A: 50 ± 10
- **Compression Set B:**
  - ASTM D-395: 50% (22 hrs @ room temp.)
- **Coefficient of Friction:**
  - TAPPI TB16OM-92: 0.7

**Load-Grip V**
- **Tensile:**
  - ASTM D-412: 5.3 (768.5) with grain Die C
  - 3.3 (478.5) across grain
- **Elongation:**
  - ASTM D-412: 18% with grain
  - 74% across grain
- **Tear:**
  - ASTM D-624: 35 (199.5) – with grain (Die B)
  - 53 (302.1) – across grain
- **Hardness:**
  - ASTM D-2240: 79 Shore A
- **Coefficient of Friction:**
  - ASTM D-1894: 1.15

7/1/02
Supplier: Amorim Industrial Solutions

Rubber Restraint Mat BC548
- Density: ASTM D-3676: 52 lbs./cubic ft.
- Tensile: ASTM D-412: 185 psi
- Elongation at Break: ASTM D-412: 100%
- Tear: ASTM D-624: 75 PPI (Die C)
- Compression Set: ASTM D-395: 32% max (25% Deflection, 158°F/22 hrs)
- Compression Properties: ASTM F-36: 100 psi - 15%,
  400 psi - 45%
- Coefficient of Friction: ASTM D-1894: 0.965

Supplier: RB Rubber Products, Inc.

Friction Mat
- Density: ASTM D-3676: 64.59 lbs./cubic ft.
- Tensile: ASTM D-412: 327.6 psi
- Elongation at Break: ASTM D-412: 83.1%
- Tear: ASTM D-624: 149.2 (16f/in.)
- Coefficient of Friction: ASTM D-1894: .980

Supplier: Circle, Inc.

Brown Bear™ Friction Mat 101
- Density: ASTM D-3676: 52 lbs./cubic ft., minimum
- Tensile: ASTM D-412: 200 psi, minimum, with grain
- Elongation at Break: ASTM D-412: 125%, minimum, with grain
- Tear: ASTM D-624: 85 ppi, minimum, with grain
  150 ppi, minimum, across grain
- Coefficient of Friction: ASTM D-1894: 0.965