

MOLEX LINCOLN METAL STRIP PACKAGING STANDARD

1.0 SCOPE

This standard covers the Americas and European Region suppliers' general packaging requirements for traverse wound and pancake coiled metal strip materials.

2.0 PURPOSE

The purpose of this standard is to clearly define to a vendor the preferred packaging requirements for Molex metal strip raw materials.

3.0 REFERENCE DOCUMENTS

3.1 REFERENCE DOCUMENTS

- 2090580042 Individual Metal Strip, Wire, Rod, Bar and Tube Specifications
- ES-40000-7010 General Standard for Pallets
- ES-40000-7012 General Standard for Labeling
- 2090580043 Geometric Conditions and Tolerances for Metal Strips
- 2090580044 Metal Strip Surface Conditions and Requirements

3.2 ORDER OF PRECEDENCE

In the event of a conflict between this standard and selected reference documents above, the order of precedence shall be as follows:

1. Purchase Order
2. Individual Strip or Wire Specification
3. This standard

4.0 DEFINITIONS

P.I.W. (Specific Coil Weight): Pounds per inch of width. This refers to how much a coil weighs based on the width of material (i.e. a 400 P.I.W. coil that is 10 inches wide weighs 4000 lb.). 7 kg/mm is approximately equal to a 400 P.I.W.

Runner: This applies to 4" x 4" construction lumber that the pallet platform is built on. The runners support the weight of the pallet on the floor, and allow the package to be transported by a fork-lift device.

Casting Heat: Unique identity assigned to a singular cast product that will be subsequently processed as a continuous element. Casting heats are frequently characterized by a unique trace number that is assigned to a singular or body of chemical compositions that represent its unique starting identity.

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Master Bar: Material from the same unique casting heat that has been processed as a continuous element to yield homogeneous physical properties. Once broken, the continuous elements must reflect a change in the master bar number while being traceable to the original casting heat number.

Spooling: This term is utilized when wire, which has a cast drawn into it, is wound onto a flanged drum (the spool). The terminology is such that: *Wire is spooled.*

Reeling: The term is utilized when flat wire or slit strip is traverse wound onto a flanged drum (the reel) with the appropriate tension and inter-spacing. The terminology is such that: *Flat wire and strip are reeled.*

Coiling: This term is utilized when a single element of strip or flat wire is layer wound on itself in the same plane with a specific starting inside diameter. This process yields a product that when observed laying flat in a horizontal plane resembles a pancake. Hence the terminology, *"Pancake Coil"*.

Payoff Direction: This term indicates the direction in which the material travels when the package is unwound.

Weld Dogleg: This term refers to butt-welding two strips together. Two strips are welded together at an included angle, resulting in strip camber.

Label Slitting Map: The label slitting map describes what element of the slitter head is located in the master coil. The purpose is for containment and problem solving.

5.0 PROCEDURES

5.1 GENERAL PACKAGING

This document contains the standard minimum requirements for packaging metal strip products supplied to Lincoln but is not all inclusive. The ultimate responsibility for the integrity and suitability of all packaging remains with the supplier. In the event of processing issues, the Molex plant and supplier will work together to document and implement any necessary changes. Refer to the appendices for additional plant requirements and deviations from the General Standard.

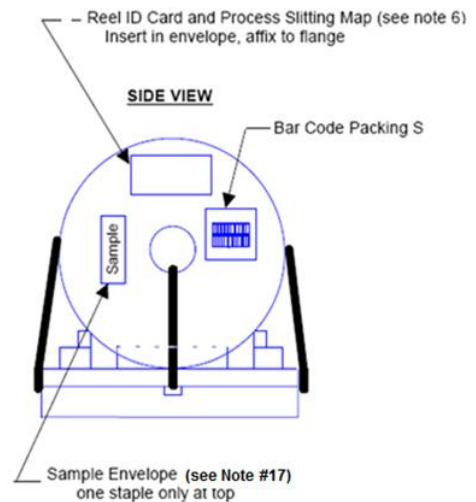
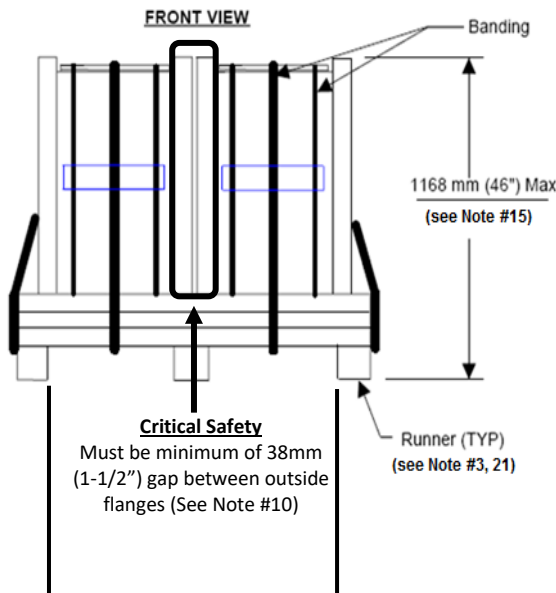
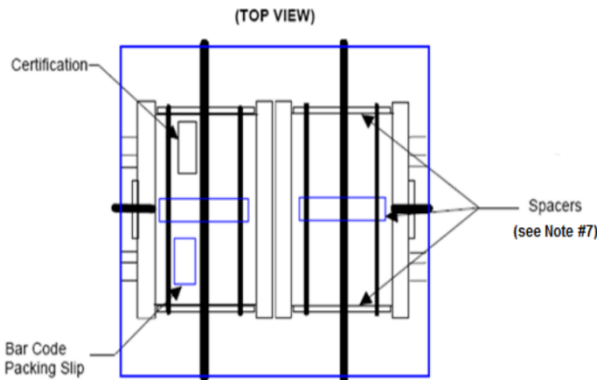
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5.1.1 TRAVERSE WOUND PACKAGING REQUIREMENTS

Minimum Packaging Requirements - Traverse Wound

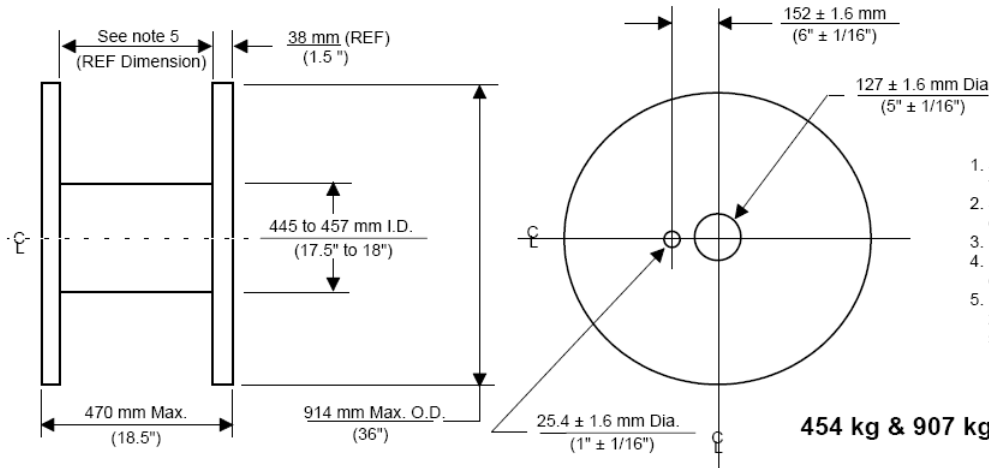
1. Maximum pallet size - 1219mm X 1219mm (48"X48")
2. Minimum width between outside runners - 533mm (21")
3. Minimum runner height - 102mm (4")
4. Maximum center runner width - 76mm (3")
5. Maximum of two reels per pallet
6. There shall be 2 heats maximum per reel
7. Three homasote or wooden spacers shall be placed 90 degrees apart
8. Two bands around each reel
9. Minimum of one band through ID
10. Critical Safety - Outside flanges must be separated between two reels a minimum of 38mm (1-1/2")
11. The minimum distance between the material and the inside surface of the flange must be 3.2mm (1/8")
12. Shrink wrap, then paper cover with payoff direction clearly marked
13. Maximum gross skid weight: 1814 kg (4000 lbs.)
14. Maximum gross spool weight: 907 kg (2000 lbs.)
15. Maximum package height: 1168mm (46")
16. Certification is required on each pallet and an ID label on every reel
17. Attach a 380mm (15") sample in envelope on each reel
18. Reel I.D. card with peel-off backing
19. Stencil supplier name and tare weight by difference on packing slip for each pallet
 - a. Material weight alone
 - b. Pallet weight
 - c. Reel weight
20. Each reel must be slit and welded in the same direction (i.e. burr down/up on both sides of weld)
21. No metal protrusions are allowed on bottoms of runners.



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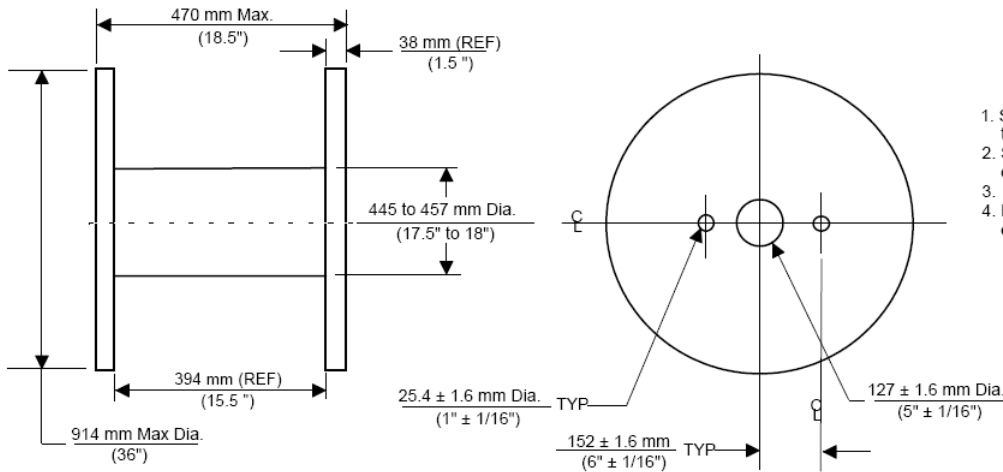
REEL DIMENSIONS AND REQUIREMENTS



SPOOL REQUIREMENTS
(also see 5.0)

1. Spool flanges must be the same diameter to within ± 1.6 mm ($\pm 1/16$ ") of each other.
2. Spool flanges must be concentric, with no detectable flat spots.
3. Wooden spools must be steel rimmed.
4. Flange to core must be perpendicular to each other.
5. For 454 kg (1000 lb.) spool, dimension to be 292 mm Max. (11.5"). For 907 kg (2,000 lb) spool, dimension to be 343 mm Max. (13.5").

454 kg & 907 kg Spools (1000 & 2000 lb)



SPOOL REQUIREMENTS
(also see 5.0)

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3. Wooden spools must be steel rimmed.
4. Flange to core must be perpendicular to each other.

1360 kg Spool (3000 lb)

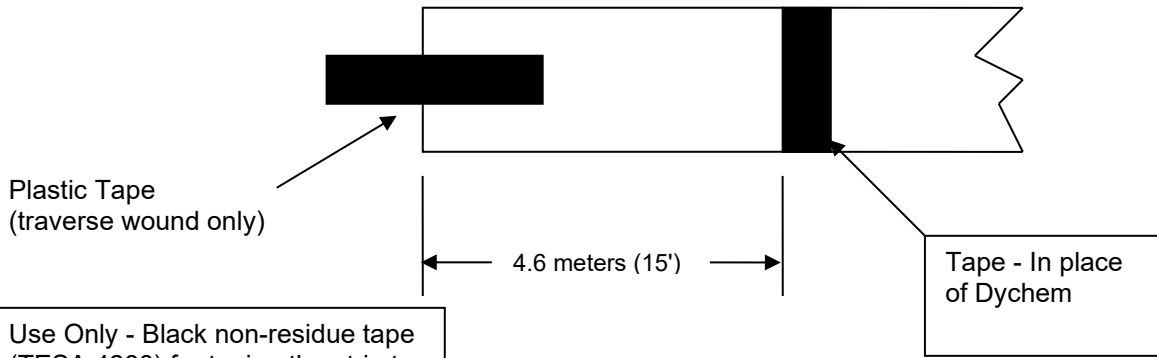
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TRAVERSE WOUND STRIP MARKING INSRUCTIONS

END OF REEL IDENTIFICATION

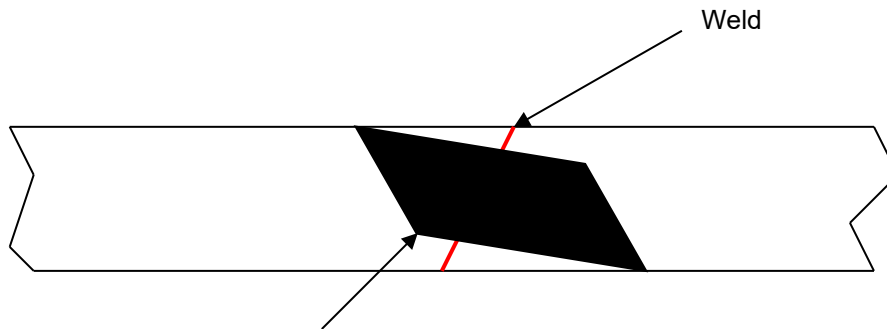
(also see 5.2)



Use Only - Black non-residue tape (TESA 4288) for taping the strip to the reel, end of reel marking, welds, and taping the tails when the reel is completed.

WELD IDENTIFICATION

(also see 5.3)



Tape - In place of Dychem -Tape to span 1.5" MINIMUM on both side of weld joint. Tape needs to be at an angle and across the full material width edge to edge W/O wrapping around the edges. Tape must be on both sides of material strip.

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5.1.2 Minimum Packaging Requirements - Pancake Coils
See Appendix A for Linc-Coil Requirements

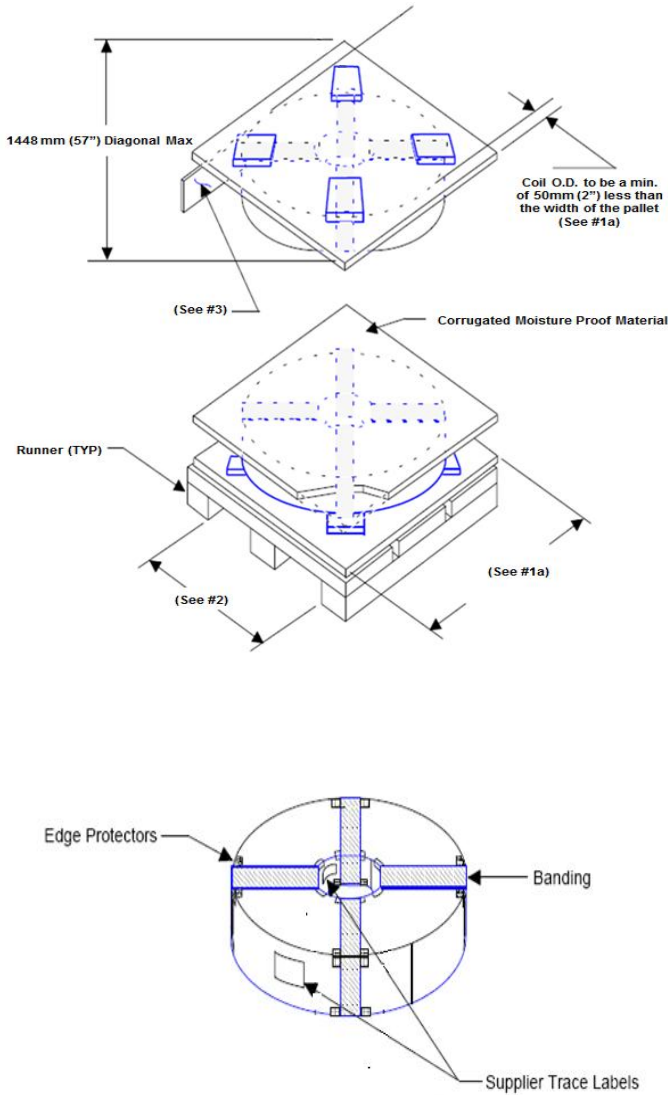
Minimum Packaging Requirements - Pancake Coils

Pallet:

1. Maximum pallet size:
 - a. Square – O.D. must be 50mm (2") greater than coil O.D. (25mm (1") clearance per side) and corners of pallet must be chamfered so not to exceed 57" diagonally
 - b. Round – O.D. must be minimum 50mm (2") greater than coil O.D. (25mm (1") clearance per side)
 2. Minimum width between outside runners must be 533mm (21")
 3. Maximum center runner width must be 76mm (3")
 4. Minimum runner height must be 102mm (4")
 5. Wooden pallet shall not be constructed of "green lumber". Preferred fastening method with screws or bolts No metal protrusions on the bottom of the runners are allowed
 6. Cover material using 19mm (3/4") wood secured to pallet
 7. Stencil supplier name and tare weight by difference on packaging slip for each pallet:
 - a. Material weight alone
 - b. Pallet weight
 - c. Coil weight
 8. Certification required each pallet and a packing slip on each coil
 9. 380mm (15") sample in envelope – Must be included in shrink wrap that is around skid so that sample can be easily retrieved without breaking down the entire skid to locate
 10. Do not mix heats from pallet to pallet; one heat per pallet. Pallets must be individually labeled and numbered for each shipment (i.e. pallet 1 of 4, pallet 2 of 4, etc.). The pallet number shall be located on an end pallet runner with the material supplier's name, location where manufactured and tare weight of the pallet
 11. Packing slip must specify net weight of each pallet tag
 12. Wooden block spacers shall be moisture barrier wrapped
 13. Maximum packaging height – 711mm (28")
 14. Maximum gross weight – 1360kg (3000 lbs)
 15. Perforated cardboard discs are acceptable between coils and must be at least 20 - 25mm (.787" - 1") greater than the coil outer and inner diameters
 16. 4mm (.157") or .125" (3.1mm) cardboard strips are acceptable between coils and must be equally positioned in four places and extend minimum 25mm (1") beyond ID and OD of coil
 17. Homosote spacers up to 25mm (1") are acceptable between coils and must extend at least 25mm (1") beyond the ID and OD of coil
 18. Hardboard spacers up to 25mm (1") are acceptable between coils and must extend at least 25mm (1") beyond the ID and OD of coil. These are **mandatory** for heavy gauge material to prevent the edge burr from tearing up the homosote spacers
- Note:** All homosote and hardboard coil spacers should be in the + (Plus) configuration to prevent strip sag between slats

Coils:

19. Coil Outer Diameters:
 - a. Minimum coil OD – 889mm (35")
 - b. Maximum coil OD – 1400mm (55")
20. Coil Inner Diameters:
 - a. Minimum - 300mm (11.8")
 - b. Maximum – 407mm (17")
21. Payoff direction to be clockwise (Notify Lincoln for deviation to run CCW)
22. When supplying multiple coils, payoff to be in same direction



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Appendix A

Linc-Coil Packaging Specifications

Note: The following steps are in conjunction to the requirements in section 5.1.2. Where there is conflict, appendix A takes precedence

1. No center cardboard core if feasible.
2. The “burr” will be down or to the inside of the coil.
3. Round or square cardboard spacers are preferred as this allows us to remove one sheet during processing.
4. Minimum amount of bands to ensure coils are secure.
5. Maximum gross weight of 1360 kg (3000 lbs.)
Note: Skid weights as close to this maximum is desired for our processes to achieve maximum efficiency.
6. Mixing heats is allowed to achieve maximum weight.

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5.2 LABELING AND IDENTIFICATION

5.2.1 END-OF REEL IDENTIFICATION: TRAVERSE WOUND (See Sheet 5)

5.2.2 LABELING AND IDENTIFICATION: TRAVERSE WOUND AND PANCAKE COILS

Each reel or coil shall have the following information stated on a label(s). Refer to ES-40000-7012 section 5.3 for label application requirements.

(See section 5.1.1 & 5.1.2)

- a) Label Slitting Map (master coil number, weld number, winder number, reel/coil number)
- b) Molex Material Number (also referred to as Molex EDP #, Molex P/N)
- c) Molex Purchase Order number.
- d) Actual net weight of the material.
- e) For pancake coils only, each coil must reference the Molex P/N, supplier master coil number, and supplier cut number, located on the I.D. and O.D. tails of the material strip.

5.2.3 PACKING SLIP: TRAVERSE WOUND AND PANCAKE COILS

A packing slip is required for each shipment, identifying the net weight (kg) of each pallet.

(See sections 5.1.1 & 5.1.2)

5.2.4 CERTIFICATION: TRAVERSE WOUND AND PANCAKE COILS

Certification is required for each shipment and must include.

- a) Molex Document Number and Revision (if applicable)
- b) Molex Material Number (also referred to as Molex EDP #, Molex P/N)
- c) Molex Purchase Order number
- d) Lot number
- e) Quantity (net weight)
- f) Date shipped
- g) UNS Alloy No. and chemical composition
- h) Physical and Mechanical properties (Tier 1: actual variables data) including
 - ❖ Strip width and thickness dimensions (mm)
 - ❖ Tensile (MPa)
 - ❖ Yield (MPa)
 - ❖ % Elongation (%)
 - ❖ Average Grain size (µm)*
 - ❖ Plating finish, composition and thickness
 - ❖ Bending (passing r/t)
 - ❖ Electrical Conductivity (IACS%)
 - ❖ Surface Roughness (Ra, µm)*
- i) Geometric properties (Tier 2: attribute data, ref. 2090580043) including
 - ❖ Edge Burr
 - ❖ Camber
 - ❖ Coil Set
 - ❖ Die Exit Twist*

**: Applicable when called out in the Purchase Order, Individual Metal Strip Specification (or Part Number), or Material Alloy Specification*

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5.3 WELDS

5.3.1 DIMENSIONS AND NUMBER OF WELDS

The following table specifies the maximum number of welds for traverse wound reels based on specific width categories. (See Appendix D)

Strip Width (mm)	454 kg Reel	907 kg Reel	1360 kg Reel
6.35-12.69	8 Welds	16 Welds	24 Welds
12.70-18.99	4 Welds	8 Welds	12 Welds
19.00-25.39	3 Welds	6 Welds	9 Welds
25.40-37.99	2 Welds	4 Welds	6 Welds
38.00-50.79	1 Weld	2 Welds	3 Welds
>/= 50.80	1 Weld	2 Welds	3 Welds

Strip Width (inch)	1,000 lb Reel	2,000 lb Reel	3,000 lb Reel
.250- .499	8 Welds	16 Welds	24 Welds
.500- .749	4 Welds	8 Welds	12 Welds
.750- .999	3 Welds	6 Welds	9 Welds
1.000-1.499	2 Welds	4 Welds	6 Welds
1.500-1.999	1 Weld	2 Welds	3 Welds
>/= 2.000	1 Weld	2 Welds	3 Welds

5.3.2 WELD CRITERIA

- a) Weld thickness will equal the strip thickness at the specified tolerance on the Molex material specification.
- b) Weld width will equal the strip width at the specified tolerance on the Molex material spec.
- c) There shall be no visible voids.
- d) Weld dogleg equals the strip camber to the specified tolerance on the Molex material spec.
- e) Welding process must produce material that bends around a 76 mm (3”) dia. mandrel without any visible cracking.

6 SUMMARY OF CHANGES

5.4.2: Additions of “Actual Variable Data” vs “Attribute Data”.

- Included: Electrical conductivity, surface roughness, edge burr, camber, coil set, plating thickness, UNS Alloy No.
- Added the reference of **2090580043** for new geometric requirements and **2090580044** for surface condition requirements.

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