

Protective envelope

Field of technology

[001] This description generally relates to protective envelopes for circular objects such as rolls of cover tape.

Background

[002] In the electronics industry, cover tapes are used to seal electrical components within carrier tapes. Cover tapes are obtained by cutting strips from a sheet and then coiling the strips around a core to form a reel. A problem encountered is that the packaging for new cover tapes do not protect them against physical damage and slackening during transportation or handling. For example, in the case of heat activated cover tapes which do not exhibit adhesive properties before heat treatment, the handling and mounting of the cover tape onto a dispenser often results in the reel becoming slack, possibly even dropping off entirely from the core around which the cover tape is wound. Fluctuating temperatures also cause the cover tapes to expand and contract, leading to unwanted slackening and tightening of the cover tape that leads to the cover tape being undone around the reel. Furthermore, exposure to contaminants during transportation can cause particles such as dust or sand to adhere to the cover tape, leading to problems during use. Also, knocks during transportation may lead to physical damage. Such reels are either returned to the supplier or additional effort is needed to restore the cover tape into a usable state.

[003] US Patent Application Publication Number 2010/0275554 describes a method for packaging cover tapes in which stacks of cover tapes are coaxially arranged and then wrapped in heat shrink film.

[004] It is desirable to find a way to prevent individual reels of cover tape from becoming slack during storage, transportation or when mounting up onto a dispenser. It is also desirable to enable an operator to easily handle and load up a fresh reel of cover tape onto a dispenser during change over, without having the reel of cover tape come loose in the process.

Summary of invention

[005] In one aspect, a protective envelope for a reel of cover tape is provided. The protective envelope is adapted to receive the reel of cover tape from an opening along an edge of the protective envelope and at least partially enclose the received reel of cover tape. The protective envelope comprises openings in opposing sides of the protective envelope so that the reel of cover tape can be mounted on a reel machine while enclosed in the protective envelope.

[006] In another aspect, a protective envelope is provided comprising a pair of sheet members arranged in a spaced face-to-face spatial relation, the sheet members being joined together along a closed edge of the protective envelope and unjoined along an open edge of

the protective envelope for inserting a reel of cover tape inside the protective envelope between the sheet members, wherein each of the pair of sheet members comprises an access opening that extends from the open edge of the protective envelope towards a middle of the sheet member, such that when a reel of cover tape that includes a cover tape wound around a core is inserted into the protective envelope, the access openings expose the core of the reel of cover tape.

[007] In a further aspect, a method of transporting and mounting a reel of cover tape is provided herein. The method comprises the steps of providing a reel of cover tape, the cover tape being wound around a core; providing a protective envelope comprising an opening along an edge of the protective envelope; inserting the reel of cover tape into the protective envelope from the open edge of the protective envelope, openings in opposing sides of the envelope exposing the core of the reel of cover tape; mounting the reel of cover tape onto a reel machine while the reel of cover tape is enclosed within the protective envelope; and removing the protective envelope from the reel of cover tape.

[008] In yet a further aspect, a protective envelope assembly is described comprising a protective envelope as defined herein, and a reel of cover tape inserted into the protective envelope through the opening along the edge of the protective envelope.

[009] It is to be understood that although this invention is discussed in relation to a reel of cover tape, various aspects of this invention can be utilized in conjunction with any type of circular object. Examples of such circular objects that are not cover tapes include reels of fabric, paper, and plastics.

Brief Description of the Drawings

[010] Throughout the specification, reference is made to the appended drawings, where like reference numerals designate like elements, wherein:

[011] FIG. 1 is an isometric view of a protective envelope.

[012] FIG. 2 is an isometric view of a protective envelope containing a reel of cover tape.

[013] FIG. 3 is a top view of a cutting from which the protective envelope may be formed.

[014] FIG. 4A to 4D shows a sequence of steps for mounting a reel of cover tape enclosed in a protective envelope and removing the protective envelope.

[015] The figures are not necessarily to scale. However, it will be understood that the use of a numeral to refer to a component in a given figure is not intended to limit the component in another figure labeled with the same number.

Detailed Description

[016] In one aspect, a protective envelope is provided to protect the integrity of the cover tape prior to use. The cover tape is packaged in the protective envelope so that it does not become loose either during transportation, or during the process of mounting the tape onto a machine, or due to fluctuations in temperature. The envelope also helps to protect the cover tape from physical damage caused by impacts that lead to dents, cuts, scratches and fraying in the tape, and reduces exposure to contaminants such as dirt, chemicals and moisture that may be present during transportation. Further, the envelope is adapted to enable an operator to easily mount the reel of cover tape onto the spindle of a dispenser while the cover tape is still enclosed within the envelope, and once mounted, to enable the operator to easily remove the envelope so that the cover tape is ready for immediate use. This enables every reel of cover tape to be protected and properly wound up to the time when it is ready for use.

[017] Referring to FIG. 1, there is shown a protective envelope 10 having a pair of opposing sides 12, 14 that are the walls or sheet members of the protective envelope and that at least partially cover a reel of cover tape to be enclosed. Opposing sides 12, 14 may be arranged in a spaced face-to-face spatial relation. The shape of the opposing sides 12, 14 can be that of any polygonal shape or a circular shape. Opposing sides 12, 14 are joined together along at least some of its peripheral edges 16. It is unjoined along an open edge of the protective envelope to define an opening 18 for inserting a reel of cover tape inside the protective cover between the opposing sides 12, 14. In other words, the opening 18 is defined between the opposing sides 12, 14 at a section along the edge of the protective envelope 10 where the opposing sides 12, 14 are not joined together. The opening 18 may be made large enough to receive the reel of cover tape, thereby giving access into an interior compartment 19 located between the opposing sides 12, 14. The reel of cover tape, when inserted, is located in the interior compartment 19.

[018] Further openings are defined in the opposing sides of the protective envelope. In one embodiment, when a reel of cover tape is enclosed within the protective envelope, the openings in the opposing sides of the protective envelope expose a core of the reel of cover tape, the cover tape being wound around the core. These openings may serve as access openings through which part of the enclosed reel of cover tape is visible for inspection and accessible for mounting onto a reel machine. Referring to FIG. 1, opening 20 in the opposing side 12 and opening 21 in the opposing side 14 of the protective envelope 10 are defined such that the centre of a reel of cover tape to be enclosed is partially exposed even while it is enclosed. The openings 20, 21 in the opposing sides 12, 14 may be formed by cutting out a section of each of the opposing sides 12, 14 to define an access opening which extends from the opening 18 towards a central portion 22 of each of the opposing sides 12, 14 of the protective envelope 10. The openings 20, 21 expose the core of an enclosed reel of cover tape on both sides, the core comprising either a hollow centre or a core in the form of a paper or plastic ring around which a strip of cover tape is wound, so that the cover tape can be readily mounted onto the spindle of a dispenser even while being enclosed in the protective envelope.

[019] In one embodiment, the protective envelope is adapted to be removed from the reel of cover tape after the reel of cover tape is mounted on a reel machine. Referring to FIG.

1, the openings 20, 21 in the opposing sides 12, 14 are configured such that they enable the protective envelope to be removed from the reel of cover tape after the reel of cover tape is mounted on a reel machine. In one embodiment, removal occurs without lacerating any part of the protective envelope. In another embodiment, the openings in the opposing sides of the protective envelope is formed by cutting out a section of each of the opposing sides to define an isolated hole at a central portion that does not extend to the opening, such as a matching circular cut in the middle of both opposing sides of the envelope. In this embodiment, the protective envelope will be lacerated when it is removed from the reel of cover tape.

[020] The dimensions of the protective envelope are not restricted and can vary according to the dimensions of the reel of cover tape to be enclosed. In one embodiment, the protective envelop is adapted to receive a reel of cover tape from an opening along an edge of the protective envelope and to fully enclose the received reel of cover tape. In another embodiment, the protective envelope partially encloses a reel of cover tape to be enclosed. In one example, the length as indicated by arrow 24 is approximately 300 mm, while the width as indicated by arrow 26 is approximately 295 mm. In another example, the length as indicated by arrow 24 is approximately 230 mm, while the width as indicated by arrow 26 is approximately 222 mm. The diameter of the reel of cover tape may determine one or more dimensions of the protective envelope. In some embodiments, each strip of cover tape to be wound into a reel may be less than 100 m, between 100 m to 800 m in length, or between about 200 m to 600 m in length, and have a circular configuration having a diameter between the range of 10 mm to 200 mm or more.

[021] Although in FIG. 1 the openings 20, 21 in the opposing sides 12, 14 of the protective envelope 10 are shown to be U-shaped, it is not particularly limited to any shape, and may be a rectangular, triangular or ovoid shape. In one embodiment, when a reel of cover tape is enclosed within the protective envelope, the openings in the opposing sides of the envelope exposes a core of the reel of cover tape, the cover tape being wound around the core. In one example, the length of the opening 20 as indicated by arrow 28 is 155.5 mm while the width of the opening 20 as indicated by arrow 30 is 90 mm. In another example, the length of the opening 20 as indicated by arrow 28 is 115.5 mm while the width of the opening 20 as indicated by arrow 30 is 90 mm.

[022] Referring again to FIG. 1, edges 16 of the opposing sides 12, 14 are joined together by side walls. The width of each side wall 32 as indicated by arrow 34 is not particularly limited and can vary according to the width of the reel of cover tape to be enclosed. In one example, it may be 10 mm; in another example, it may be 50 mm. In certain embodiments, the protective envelope may expand along a thickness direction of the protective envelope when inserting a reel of cover tape inside the protective envelope; and collapse along the thickness direction of the protective envelope when removing the reel of cover tape from the inside of the protective envelope. In this embodiment, the edge 36 opposing the opening 18 is not be joined so that the protective envelope is easily collapsible. In this manner, the protective envelope is recyclable by flattening it for storage or reuse. In other embodiments, the edge 36 that is not joined may be replaced by a side wall 32.

[023] In FIG. 2, there is shown a protective envelope 10 containing a reel of cover tape 40 having a core 42 that is inserted into the opening 18 until it is fully enclosed in the protective envelope 10. The core 42 and a portion 44 of the cover tape is exposed through the opening 20, 21. The visibility and accessibility of the core 42 through the opening 20, 21 enables an operator to mount the reel of cover tape onto a dispenser while it is still enclosed in the protective envelope.

[024] In one embodiment, the protective envelope is adapted to enclose the reel of tape sufficiently tightly to reduce any loosening of the tape in the reel of cover tape when transporting the reel of cover tape or when mounting the reel of cover tape on a reel machine. For example, the protective envelope may be dimensioned to enclose the reel of cover tape snugly. Referring to FIG. 2, the width as indicated by arrow 26 can be selected such that the width of the enclosure defined within approximately fits, or it may be less than, the diameter of the reel of cover tape. In this manner, the protective envelope presses onto the reel of cover tape so that the loose end of the tape as well as the exposed surfaces of the reel of cover tape is held firmly in place, thereby reducing the possibility that the reel of cover tape becomes slack. Furthermore, increasing the contact between the reel of cover tape and the protective envelope results in the reel of cover tape being frictionally held in the protective envelope so that it does not fall out.

[025] The protective envelope may be made from a single sheet that is cut into a suitable shape 50 that includes tabs 52 as shown in FIG. 3, and then folded along lines 54 and glued along tabs 52 to form the protective envelope. The sheet may be made from any material. In some embodiments it is preferable that the material has sufficient rigidity to withstand rough handling. Both stiff and flexible materials may be used. To thermally insulate the reel of cover tape, the material used may be a thermally insulating material. In another embodiment, the protective envelope comprises a material selected from any one or more of card stock, paper board and an organic polymer. Card stock is a low cost and flexible material, whereas paper board is a stiffer material offering greater protection. Any type or combination of organic polymer can be used to tune the properties of the protective envelope to suit the environment that the reel of cover tape will be exposed to during transportation and storage.

[026] In one aspect, a method of transporting and mounting a reel of cover tape is provided. A reel of cover tape that is wound around a core is inserted into a protective envelope comprising an opening along an edge of the protective envelope. The protective envelope comprise openings in opposing sides of the envelope exposing the core of the reel of cover tape when the reel of cover tape is enclosed in the protective envelope. The reel of enclosed cover tape is then mounted onto a reel machine while the reel of cover tape is enclosed within the protective envelope. The protective envelope is then removed from the reel of cover tape. In one embodiment, the method is carried out with a protective envelope having openings in opposing sides of the protective envelope that extend from the open edge of the envelope to a central portion of the envelope

[027] FIG. 4A to 4D shows the sequence of loading a protected reel of cover tape 56 onto a machine and removing the protective envelope. As shown in FIG. 4A, a reel of cover

tape 56 is carefully inserted into the protective envelope 10 via the opening 18 of the protective envelope, and then pushed into the envelope until it is securely enclosed. The protected reel of cover tape 56 may be stored or delivered, as required. Next, as shown in FIG. 4B, a user mounts the protected cover tape 56, with the protective envelope 10 attached, onto the spindle 58 of a reel machine 110, such as a tape and reel machine, that acts as a dispenser for the cover tapes. Once mounted, the protective envelope can be removed from the cover tape by pulling it away from the spindle of the reel machine, in the direction shown by arrow 60 as shown in FIG. 4C. Finally, the mounted reel of cover tape as shown in FIG. 4D is ready to be used.

[028] The reel of cover tape as described herein refers to tape that is used with carrier tape, generally for the purpose of transporting electronic parts. Cover tape is typically composed of a multi-layer structure comprising a barrier film layer and a heat-seal layer. The barrier film layer may comprise resins such as polyethylene terephthalate (PET), polyethylene naphthalate (PEN), polyvinyl chloride (PVC) and mixtures thereof. While the resin comprising the heat seal layer is not particularly limited, the heat seal layer may comprise resins such as olefins, styrenes and mixtures thereof. Single or multiple intermediate layers can be present in the cover tape.

[029] Although the present invention has been described with particular reference to preferred embodiments illustrated herein, it will be understood by those skilled in the art that variations and modifications thereof can be effected and will fall within the scope of this invention as defined by the claims thereto now set forth hereinbelow.

Claims

1. A protective envelope adapted to receive a reel of cover tape from an opening along an edge of the protective envelope and at least partially enclose the received reel of cover tape, the protective envelope comprising openings in opposing sides of the envelope so that the reel of cover tape can be mounted on a reel machine while enclosed in the protective envelope.

2. The protective envelope of Claim 1, wherein the protective envelope is adapted to enclose a reel of cover tape sufficiently tightly to reduce any loosening of the cover tape in the reel of cover tape when transporting the reel of cover tape or mounting the reel of cover tape on a reel machine.

3. The protective envelope of any of Claims 1 to 2, wherein the protective envelope is adapted to be removed from the reel of cover tape after the reel of cover tape is mounted on a reel machine.

4. The protective envelope of any of Claims 1 to 3 being adapted to receive a reel of cover tape from an opening along an edge of the protective envelope and fully enclose the received reel of cover tape.

5. The protective envelope of any of Claims 1 to 4, wherein when a reel of cover tape is enclosed within the protective envelope, the openings in the opposing sides of the envelope expose a core of the reel of cover tape, the cover tape being wound around the core.

6. The protective envelope of any of Claims 1 to 5, wherein the openings in opposing sides of the envelope extend from the opening along the edge of the protective envelope towards a central portion of the protective envelope.

7. The protective envelope of any of Claims 1 to 6, wherein the opposing sides of the protective envelope comprise a pair of sheet members arranged in a spaced face-to-face spatial relation.

8. The protective envelope of any of Claims 1 to 7 adapted to be collapsible along a thickness direction of the protective envelope.

9. The protective envelope of any of Claims 1 to 8 being made from one or more of a card stock, a paper board, and an organic polymer.

10. A protective envelope assembly comprising:
the protective envelope of any one of Claims 1 to 9; and
a reel of cover tape inserted into the protective envelope through the opening along the edge of the protective envelope.

11. A protective envelope for enclosing a reel of cover tape comprising:
a pair of sheet members arranged in a spaced face-to-face spatial relation, the sheet members being joined together along a closed edge of the protective envelope and unjoined along an open edge of the protective envelope for inserting a reel of cover tape inside the protective envelope between the sheet members, wherein each of the pair of sheet members comprises an access opening that extends from the open edge of the protective envelope towards a middle of the sheet member, such that when a reel of cover tape that includes a cover tape wound around a core is inserted into the protective envelope, the access openings expose the core of the reel of cover tape.

12. The protective envelope of claim 11 being adapted to:
expand along a thickness direction of the protective envelope when inserting a reel of cover tape inside the protective envelope; and
collapse along the thickness direction of the protective envelope when removing the reel of cover tape from the inside of the protective envelope.

13. A method of transporting and mounting a reel of cover tape comprising the steps of:
providing a reel of cover tape, the cover tape being wound around a core;
providing a protective envelope comprising an opening along an edge of the protective envelope;
inserting the reel of cover tape into the protective envelope from the open edge of the protective envelope, openings in opposing sides of the envelope exposing the core of the reel of cover tape;

mounting the reel of cover tape onto a reel machine while the reel of cover tape is enclosed within the protective envelope; and
removing the protective envelope from the reel of cover tape.

14. The method of claim 13, wherein the openings in opposing sides of the envelope extend from the open edge of the envelope to a central portion of the envelope.