FORM 1
AUSTRALIA
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653732

PATENT REQUEST: STANDARD PATENT

We, THE KENDALL COMPANY, being the person(s) identified below as the Applicant, request the grant of a patent to the person identified below as the Nominated Person, for an invention described in the accompanying standard complete specification.

Full application details follow.

Applicant: THE KENDALL COMPANY
a Delaware Corporation

Address: ONE FEDERAL STREET BOSTON MASSACHUSETTS 02110
UNITED STATES OF AMERICA

Nominated Person: THE KENDALL COMPANY
a Delaware Corporation

Address: ONE FEDERAL STREET BOSTON MASSACHUSETTS 02110
UNITED STATES OF AMERICA

Invention Title: "NOVEL TAPE COATING"

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BASIC CONVENTION APPLICATION(S) DETAILS

Application No.	Country	Country Code	Date of Application
546471	United States of America	US	28 June 1990
699052	United States of America	US	13 May 1991

We are not an eligible person described in Section 33 - 36 of the Act.

Dated this 10 day of July 1991

THE KENDALL COMPANY

By: _____
Registered Patent Attorney

9022969 12/07/91

TO: THE COMMISSIONER OF PATENTS,
AUSTRALIA

AUSTRALIA
Patents Act 1990

P/00/008
Section 29 (1)
Regulation 3.1(2

NOTICE OF ENTITLEMENT

(To be filed before acceptance)

I/We Edward Scahill, Jr.

*being authorised by The Kendall Company

of One Federal Street, Boston MA 02110, United States of America

the applicant in respect of an application for a patent for an invention entitled Novel Tape Coating

filed under Application No. 80400/91, state the following:-

Part 1 - Must be completed for all applications.
The person(s) nominated for the grant of the patent:

[~~-~~] ~~*is/*are the actual inventor(s)~~
or
[x] has, for the following reasons, gained entitlement from the actual inventor(s): the nominated person is the assignee of the invention from the inventors

~~*Part 2 - Must be completed if the application is associated with one or more provisional applications.~~
The person(s) nominated for the grant of the patent *is/*~~are:~~

[ ] the applicant(s) of the provisional application(s) listed on the patent request form
or
[ ] entitled to make a request under Section 113 of the Act in relation to the provisional application(s) listed on the patent request form.

Part 3 - Must be completed if the application is a Convention application.
The person(s) nominated for the grant of the patent *is/*~~are:~~

[~~-~~] ~~the applicant(s) of the basic application(s) listed on the patent request form~~.
or
[x] entitled to rely on the basic application(s) listed on the patent request form by reason of the following:

~~*Part 4 - must be completed if the application was made under the PCT and~~ *claims priority.*
The person(s) nominated for the grant of the ~~patent~~ *is/*are:

[ ] the applicant(s) ~~of the~~ application(s) listed in the declaration under Article 8 ~~of the PCT~~
or

(continued over)

[ ] entitled to rely on the application(s) listed in the declaration under Article 8 of the PCT by reason of the following:-

_____

_____

_____

Part 5 - Must be completed if the application is a Divisional application.
The person(s) nominated for the grant of the patent *is/*are:

[ ] the applicant(s)/patentee(s) of the original application/patent
or
[ ] entitled to make a request under Section 113 of the Act in relation to the original application/patent.

Part 6 - Must be completed if the application relates to a microorganism and relies on Section 6 of the Act.
The person(s) nominated for the grant of the patent *is/*are:

[ ] the depositor(s) of the deposits listed hereafter (by number, depositary institution and date)
or
[ ] entitled to rely on the deposits listed hereafter (by number, depositary institution, date, and depositor's name and address) for the following reasons:-

_____

_____

_____

Part 7 - Must be completed if the application is a Convention application, or the application was made under the PCT and the applicant made a declaration under Article 8 of the PCT in respect of the basic application.

[x] Except as stated in the next paragraph, the basic application(s) *listed on the patent request form/*~~referred to in the declaration under Article 8 of the PCT *is/*are~~ the application(s) first made in a Convention country in respect of the invention.

~~[ ] A request has been made under Section 96 of the 1990 Act (or Section 142AA of the 1952 Act) to disregard the following application.~~

~~_____~~

~~_____~~

[x] The basic application(s) *listed on the patent request form/*~~referred to in the declaration under Article 8 of the PCT *is/*are~~ not the first application(s) made in a Convention country in respect of the entire disclosure of the present application. An application, No. 07/403,416 made in United States of America on 09/09/89 disclosed in part the subject matter of the present application. Convention priority from the basic application(s) is only claimed in respect of subject matter first disclosed in the said basic application(s) and not previously disclosed in the earlier application No. 07/403,416

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Signed: Edward Lahelly Date: JUNE 23, 1994

Status: ASST. SECRETARY

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(12) PATENT ABRIDGMENT (11) Document No. AU-B-80400/91
(19) AUSTRALIAN PATENT OFFICE (10) Acceptance No. 653732

(54) Title
NOVEL TAPE COATING

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(56) Prior Art Documents
US 3524779
US 3294609
AU 642887 58641/90 B29C 63/06

(57) Claim

1. A tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a polyolefin layer carrying an adhesive layer on its inner surface and a layer comprising a heat fusible material on its outer surface, or a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer wrap together when heated and thereafter cooled.

2. A tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner

.../2

surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on both surfaces or the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer wrap together when heated and thereafter cooled.

20. A process for externally protecting pipes which comprises the steps of:

(a) cleaning said pipe;

(b) applying primer to said pipe;

(c) wrapping said pipe with the protective coating of claim 1 or 2;

(d) heating said pipe to attain a protective coating temperature ranging from about 225°F to about 325°F; thereafter

(e) cooling said pipe.

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ORIGINAL
COMPLETE SPECIFICATION
STANDARD PATENT

Invention Title:

NOVEL TAPE COATING

The following statement is a full description of this invention including the best method of performing it known to us:-

~~This application is a continuation in part of copending U. S.~~ Serial No. 546,471 which ~~was a continuation~~ in part of U. S. ~~Serial No. 403,416 filed September 6, 1989.~~

The present invention relates in general to protective coatings of tubular objects and specifically to protective coatings of pipes, and even more particularly to inground pipes.

The art is replete with protective pipeline coatings which provide varying degrees of resistance to impact, mechanical penetration, storage, indentation, abrasion, soil stresses and cathodic disbondment. Four major categories of protective pipeline coating are presently employed by the pipeline industry. They are:

(1) Hot Applied coal-tar enamel and asphalt mastics in relatively thick layers (100 mils) and commonly reinforced on the outside with glass or asbestos sheets. While such coatings are reported to represent over half of the plant-applied coatings in the United States, the hazards presented by their use foretell a decreasing popularity of this category. Further, the products show poor impact resistance, poor resist nce to mechanical penetration, poor abrasion resistance, poor stability to soil stress conditions, and are only deemed fair in regard to indentation resistance, pipe bending, cathodic disbonding and resistance to hydrocarbon solvents.

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(2) Extrusion coatings of a thermoplastic resin: (typically 40 mils). In practice, polyethylene has virtually a monopoly in this area. The technique may involve a seamless tubular extrusion over the pipe or a flat die sheet extrusion wrapped over the pipe. In most cases, the polymer is applied to a first-applied mastic layer (e.g. bituminous). These coatings show improved properties in regard to those mentioned above for the Hot-Applied enamel and coal tar coatings except insofar as resistance to hydrocarbon solvents.

(3) Fusion-bonded coatings - A thermoplastic powder is electrostatically applied to hot pipe where it "melts", adheres to the metal and fuses to itself. Only three basic materials have been widely used--polyethylene, vinyl and epoxy powders with only the latter enjoying commercial success in the United States. Chemically, these are, generally, bis-phenol A polymers with epoxy end groups.

The epoxies require a thermal curing to the thermoset form and usually a catalyst is used in the system (e.g. amines, acids, boron halides, etc.). Often times a liquid epoxy primer is used prior to the powder coating. Typically epoxy coatings have been 12-14 mils in thickness to provide at least acceptable resistance to cathodic disbonding, although in M.D. Simpson's paper "External Protection of Steel Pipes Using Epoxy Powder Coatings" (contribution SI) presented at the Second International Conference on the Internal and External Protection of Pipes (in England Sept. 1977) he states (page X2)

"Bitumen coal tar and polyethylene are required to be applied relatively thick, but epoxy powder coatings give excellent protection with only 3 mm of coatings."

Apparently and obviously "3 mm" should be -0.3 MM-(12 mils) nevertheless, this value (i.e. 0.3 MM) still represents a relatively thick coating and its attendant disadvantages, e.g. brittleness and lack of flexibility and stresses at the pipe-epoxy interface.

In order to effect a satisfactory epoxy coating which would have satisfactory resistance to impact, mechanical penetration, indentation, abrasion, soil stresses, and cathodic disbondment it has been accepted that about a 12-14 mil thickness coating is required, which is very costly to produce.

(4) Tape Coating Systems (typically 20-80 mils thick)

This method entails spirally wrapping a corrosion protective tape around a rubber based primer coating, referred to in the art as the innerwrap, followed by applying a second plastic outerwrap tape in a similar fashion as the innerwrap.

Many improvements on this tape coating system involving an inner and an outerwrap, have been advanced all of which have at their essence the primary task of promoting a tight bond thereby creating a coating which insulates the pipe from degradative external forces.

Accordingly, some tapes comprise polyethylene backings with a pressure-sensitive adhesives, or primer-activated adhesive coating thereon. The properties exhibited by these pipe coatings

are similar to those of extrusion coated pipe coatings.

U.S. Patent No. 4,213,486 issued to Samour et al. and assigned to the present assignee, discloses a polyethylene outerwrap carrying a means for effecting bonding to the innerwrap epoxy layer wherein the means may be a hot melt adhesive or a pressure-sensitive adhesive.

U.S. Patent No. 3,874,418 issued to Hielema and assigned to the present assignee discloses:

"A method of coating a pipe and a pipe coated thereby, said method comprising the steps of progressively spirally winding a corrosion protective adhesive coated plastic tape onto the outer surface of the pipe with a spiral overlap, covering the coated pipe by progressively winding a film thereon with a predetermined overlap, and, as the film is wound onto the coated pipe, introducing and distributing under pressure a hot melted adhesive into intimate contact with the surface of the marginal portion of the trailing edge of the film and the surfaces of the overlapped portion along the leading edge thereof and of the portion of the tape immediately adjacent the leading edge of the film."

Still a further advancement in the art of tape coat systems is disclosed in U.S. Patent No. 4,806,400 issued to Sancaktar and assigned to the present assignee, wherein the improvement consists of tapering the opposed edges of the tape to enhance a tighter closure by being less subject to soil stress.

While all the aforementioned tape coat systems provide for successful protective coatings, they still comprise separate layers. Accordingly, the task of the present invention can be described as being directed to improving the present tape pipewrap systems against degradative external forces by providing for a continuous and seamless protective tape coating system.

Brief Description of the Invention

In a first aspect, the present invention provides a tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a polyolefin layer carrying an adhesive layer on its inner surface and a layer comprising a heat fusible material on its outer surface, or a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer wrap together when heated and thereafter cooled.

In a second aspect, the present invention provides a tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on both surfaces or the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer

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wrap together when heated and thereafter cooled.

The present invention also provides a process for protecting tubular articles using the inventive tape wrap system.

Detailed Description of the Invention

As mentioned previously, the present invention relates in general to tape wrap systems and protective coatings for tubular objects and specifically to protective tape wrap systems and coatings for inground pipes.

The novel coating system of this invention comprises a polymeric innerwrap and a polymeric outerwrap. The polymeric innerwrap may comprise an A/B/C layered construction wherein the A layer consists essentially of an heat fusible material from about 0.5 to about 10.0 mils thick; preferred heat fusible materials are ethylene vinyl acetate having a melting point below the application temperature, ethyl methyl acrylate, and low density polyethylene, ethylene vinyl acetate being particularly preferred. The B layer consists essentially of an impact resistant polyolefin material, preferably polyethylene, and most preferably a mixture of low and high density polyethylene from about 5.0 to about 30.0 mils thick; and the C layer consists essentially of an adhesive, preferably a thermosetting adhesive from about 2.0 to about 20.0 mils thick. Exemplary thermosetting adhesives are thermosetting rubber-based adhesives such as butyl rubber, natural rubber and styrene butadiene, as well as Kratons. In still a further embodiment the innerwrap may comprise a layer ranging from about 5 to about 30 mils in thickness and having an A B blend corresponding to the aforementioned description with an adhesive layer C as described above.

The novel outerwrap may comprise an A/B/A or an A/B layer construction corresponding to the aforementioned

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description wherein the A layer is from about 0.5 to about 10.0 mils thick, the B layer is from about 5.0 to about 3.0 mils thick, and the A layer is from about 0.5 to about 10.0 mils thick. In still a further embodiment the outerwrap may comprise a single layer ranging from about 15 to about 30 mils in thickness and having an A B blend corresponding to the aforementioned description.

The manufacture of such coatings is well known in the art comprising such well known processes as calendering, extrusion and coextrusion, and as such comprises no part of the present invention. Notably, both the inner and the outerwrap may contain

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additional ingredients performing specific desired functions. As illustrations of such additives mention may be made of fillers such as carbon black, zinc oxide, clays, chalk, whitings, calcium silicate, barium sulfate and the like in order to reduce the cost, increase the specific gravity, and/or to raise the viscosity; plasticizers and softeners such as mineral oil, lanolin, etc.; antioxidants, e.g. aromatic amine antioxidants, substituted phenols, hydroquinone (p-dihydroxybenzene), etc.; curing agents such as sulfur, organic peroxides and the like; accelerators; sequesting agents; biocides such as bactericides, etc.

The general process of producing a tape coating system comprising the novel invention includes well known plant tape coating methods. The pipe may be first preheated to approximately 200°F and then prepared by any of the conventional ways known in the art such as by shot or grit blasting. Primer is then applied to the pipe by way of well known processes such as spraying or brushing. Next, the pipe is coated with the A/B/C or AB/C innerwrap by progressively spirally winding said tape onto the outer surface of the pipe thereby maintaining a marginal overlap. ~~Notably, the innerwrap is applied in such a way that layer C is~~ placed on the pipe while layer A or the AB blend layer is on the outer surface. Outerwrap A/B/A, A/B or single layer blend A B is then applied to cover the coated pipe by progressively winding said tape onto the innerwrap coated pipe with a predetermined overlap. Next, flame or oven heat is applied to the coated pipe to attain ~~a tape temperature ranging from about 225°F to about 325°F. Lastly,~~

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Notably, the innerwrap is applied in such a way that layer C is placed on the pipe while layer A or the AB blend layer is on the outer surface. The specific outerwrap, ie. innerwrap A/B/C, outerwrap A/B or AB blend; or innerwrap AB/C, outerwrap A/B/A, A/B or single layer blend A B; is then applied to cover the coated pipe by progressively winding said tape onto the innerwrap coated pipe with a predetermined overlap. Next, flame or over heat is applied to the coated pipe to attain a tape temperature ranging from about 225°F to about 325°F. Lastly,

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the pipe is cooled by any of the known methods, exemplary of which is water cooling.

The present invention has particular application to small pipe segment patching. However, this application requires minor modifications in the aforementioned general process. First, the outerwrap must be crosslinked prior to pipe application. Crosslinking may be accomplished by any of the well known methods such as chemical, radiation, etc. Second, the inner and/or outerwrap is preferably applied by enveloping the pipe segment in the wrap(s) as opposed to spirally winding although spirally winding is not excluded; and overlapping the longitudinal edges of said wrap(s).

Third, the area to be fused may be protected with a heat resistant sheet prior to applying heat to prevent tape coating dimensional distortion. Said sheet comprises a composition able to resist the heat and flame of a torch for a time sufficient to allow the underlying outerwrap and innerwrap to melt and fuse to each other and to the pipe. Materials which have been found suitable are polyamide film (i.e. "Kapton", trademark of Dupont) and aluminum foil. Other materials which could be used are Kevlar fabric, fiberglass fabric, laminate of fiberglass fabric with aluminum foil, flame resistant cotton, etc. Fiberglass fabric is particularly preferred. Last, flame or oven heat is applied to the coated pipe to attain a tape temperature ranging from about 225°F to about 325°F.

In accordance with this novel process, the outerwrap is

completely heat fused to the innerwrap thereby forming a uniform, continuous, and completely closed protective coating which fully protects against external degradative forces. More specifically, the ethylene vinyl acetate components namely layers A or the A moiety in blend AB are heat fused, thereby creating a tight bond between the inner and outerwrap so as to achieve essentially a one layer seamless coating. Said seamless coating is highly advantageous in that no openings are present which when subjected to external forces create potential portals of entry for pipe corrosion factors. In sum, the present invention provides for a completely closed internal pipewrap environment which advantageously maintains pipe integrity.

Additionally, the present invention is particularly useful for wrapping pipe segments, such as in joining the exposed ends of pipe segments before ground implantation. Notably, during pipe production pipes are cut into particular length to make transportation possible. Pipe coatings are either applied in the plant or in the field. If they are applied in plant the ends are left exposed. Thus before ground implantation the adjoining pipe ends need to be joined and coated. The present invention offers a particularly advantageous joint coating.

The following examples show by way of illustration and not limitation the novel characteristics of the present invention.

Example (Innerwrap)

Layer	Ingredient(s)	Thickness (mils)
A	Ethylene Vinyl Acetate (softening point* 59°C)	4
B	64% Low Density Polyethylene 32% High Density Polyethylene 2.5% Black Concentrate 1.0% Antioxidant/Low Density	11

*as determined by the American Society for Testing and Material D-1525.

Example II (Outerwrap)

Layer	Ingredient(s)	Thickness (mils)
A	96% Ethylene Vinyl Acetate (softening point 67°C) 4% White Concentrate	3
B	66-96% High Density Polyethylene 0-30% Low Density Polyethylene 4% White Concentrate	19
A	96% Ethylene Vinyl Acetate 4% White Concentrate	2.5 mils

Coatings prepared by the previously mentioned process and in accordance with example I and II were subjected to Cathodic Disbondment, Impact, and Soil Stress Testing. Prior art tapes comprising an outerwrap with a polyethylene backing and a pressure-sensitive adhesive coated thereon and an innerwrap consisting of polyethylene, prepared in the aforementioned process but omitting both the heating and cooling steps, were used as controls.

The following data illustrates the advantageous characteristics of the novel invention and consequently the

longevity and integrity of a pipe coated with the novel invention.

Table I

Cathodic Disbondment (measured after 30 days)

System	Temperature (°F)	Cathodic Disbondment (inches squared)
Test Sample	140	2.44
Control	140	6.00
Test	70	0.75
Control	70	0.6-0.75

Table II

Impact

(administered and measured in accordance with ASTM G-14 guidelines)

Test Sample	60 in/lb
Control	45 in/lb

Table III

Soil Stress at 90°F

(Disclosed in U.S. Patent No. 4,483,197 issued to Jordan Kellner and assigned to the present assignee herein, incorporated by reference)

Test Sample	No peel back of outerwrap
Control	Outerwrap peeled back

These test results demonstrate the advantageous characteristics and hence resistance to external degradative forces. Specifically, cathodic disbondment is more than 50% decreased at 140°F, which is particularly advantageous given the implantation of pipes in hot temperature regions. The results of impact testing will show an advantage over the control yet the most important soil stress testing shows a highly significant improvement, no peeling of the outerwrap at 90°F. Resistance to soil stress is highly significant since pipeline tape deterioration, corrosion, is mostly caused by soil stress imparted on the inground pipe.

Example III is illustrative of a single layer blend outerwrap.

Example III

Ingredient	%
A - Ethylene vinyl acetate copolymer (softening point 59°C)	35
B - Low density polyethylene blend	59
White concentrate	5
Antioxidant	1

By way of recapitulation, heat fusing polymeric outerwrap tape to a polymeric innerwrap tape by incorporating an heat fusible moiety in both wraps, advantageously prolongs the integrity and hence longevity of ingroand pipes.

Since certain changes may be made without departing from the scope of the invention herein described, it is intended that all matter contained in the foregoing description, including the examples, shall be taken as illustrative and not in a limiting sense.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a polyolefin layer carrying an adhesive layer on its inner surface and a layer comprising a heat fusible material on its outer surface, or a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer wrap together when heated and thereafter cooled.

2. A tape wrap system adapted for protecting tubular articles comprising an inner wrap covering the surface of the article to be protected and an outer wrap placed over said inner wrap, said inner wrap comprising a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive on its inner surface, said outer wrap comprising an impact-resistant polyolefin layer having a heat fusible layer on both surfaces or the inner surface thereof, or a blend of an impact resistant moiety and a heat fusible moiety,

said tape wrap system fusing said inner and outer wrap together when heated and thereafter cooled.

3. The tape wrap system of claim 1 or 2 wherein said inner wrap comprises A/B/C layers and said outer wrap comprises A/B layers or a single AB blend layer as hereinbefore defined.

4. The tape wrap system of claim 1 or 2 wherein said inner wrap comprises AB/C layers and said outer wrap comprises A/B/A or A/B layers or a single AB blend layer as hereinbefore defined.

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5. The tape wrap system of claim 1, wherein the heat fusible moiety is ethylene vinyl acetate.

6. The tape wrap system of claim 5, wherein the impact resistant polyolefin is polyethylene.

7. The tape wrap system of claim 6, wherein the polyethylene is a mixture of high and low density polyethylene.

8. The tape wrap system of any one of the previous claims, wherein the heat fusible moiety is ethyl vinyl acetate.

9. The tape wrap system of any one of the previous claims, wherein the AB blend layer is crosslinked.

10. The tape wrap system of any one of the previous claims, wherein the polyolefin is polyethylene.

11. The tape wrap system of claim 10, wherein the polyethylene is a mixture of low and high density polyethylene.

12. The tape wrap system of claim 1 or 2, having a total thickness from about 10 to about 200 mils.

13. A tape coated article comprising a pipe having the tape wrap system of claim 1 or 2 thereon.

14. The tape coated article of claim 13, wherein said innerwrap comprises layers AB/C as hereinbefore described; and said outerwrap comprises A/B/A, A/B or a single AB blend layer as hereinbefore described.

15. The tape coated article of claim 12, wherein said innerwrap comprises layers A/B/C as hereinbefore described; and said outerwrap comprises A/B layers or a single AB blend layer as hereinbefore described.

16. The tape coated article of claim 14 or 15, wherein the heat fusible moiety is ethyl vinyl acetate.

17. The tape coated article of claim 16, wherein the AB blend layer is crosslinked.

18. The tape coated article of claim 14 or 15, wherein the polyolefin is polyethylene.

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19. The tape coated article of claim 18, wherein the polyethylene is a mixture of high and low density polyethylene.

20. A process for externally protecting pipes which comprises the steps of:

(a) cleaning said pipe;

(b) applying primer to said pipe;

(c) wrapping said pipe with the protective coating of claim 1 or 2;

(d) heating said pipe to attain a protective coating temperature ranging from about 225°F to about 325°F; thereafter

(e) cooling said pipe.

21. The process of claim 20, wherein the pipe is first preheated.

22. The process of claim 20, wherein wrapping comprises first spirally wrapping said innerwrap wile maintaining a marginal overlap and second spirally wrapping said outerwrap layer over said innerwrap layer while maintaining a marginal overlap.

23. The process of claim 20, wherein wrapping comprises first spirally wrapping said inner wrap while maintaining a marginal overlap and second spirally wrapping said outerwrap sheet around the surface of a portion of said pipe and overlapping the longitudinal edges of said outerwrap sheet and applying heat to fuse said outerwrap to said innerwrap.

24. The process of claim 20, wherein wrapping comprises first wrapping said innerwrap sheet around the surface of a portion of said pipe and overlapping the longitudinal edges of said innerwrap, and second wrapping said outerwrap sheet around the surface of a portion of said pipe and overlapping the longitudinal edges of said outerwrap sheet and applying heat to fuse said outerwrap to said innerwrap.

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25. The process of claim 20, wherein the AB blend layer is crosslinked before wrapping said layer onto said pipe.

26. The process of claim 25, wherein a heat resistant film is applied to the outerwrap prior to heat fusing to prevent dimensional distortion.

27. The process of claim 26, wherein the heat resistant film consists of fiberglass.

28. A process for externally protecting pipes, comprising the steps of:

(a) cleaning said pipe;

(b) applying primer to said pipe;

(c) wrapping said pipe with the tap wrap system of claim 1 or 2;

(d) heating said pipe to attain a protective coating temperature ranging from about 225°F to about 325°F; thereafter

(e) cooling said pipe.

29. The process as described in claim 28, wherein the pipe is first preheated.

30. The process as described in claim 28 wherein the heat fusible moiety is ethyl vinyl acetate.

31. The process as described in claim 30, wherein the polyolefin is polyethylene.

32. The process as described in claim 31, wherein the polyethylene is a mixture of high and low density polyethylene.

33. A protective tape coating produced by the process of claim 20.

34. A protective tape coating produced by the process of claim 24.

35. A protective tape coating produced by the process of claim 25.

36. A tape wrap system substantially as hereinbefore described with reference to the examples.

37. A tape coated article substantially as hereinbefore

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described with reference to the examples.

38. A process for externally protecting pipes substantially as hereinbefore described with reference to the examples.

DATED this 9th day of August 1994

THE KENDALL COMPANY

Patent Attorneys for the Applicant:

F.B. RICE & CO.

L.S.

ABSTRACT

A tape wrap system adapted for protecting tubular articles comprising an innerwrap covering the surface of the article to be protected and an outerwrap placed over said innerwrap, said innerwrap comprising an impact-resistance polyolefin layer carrying an adhesive layer on its inner surface and a layer comprising an heat fusible material on its outer surface, or a single layer comprising a blend of an impact resistant moiety and a heat fusible moiety carrying an adhesive layer on its inner surface, said outerwrap comprising an impact-resistant polyolefin layer having an heat fusible layer on both surfaces or the inner surface thereof, or a singular layer comprising a blend of an impact resistant moiety and a heat fusible moiety; said tape wrap system fusing said innerwrap and outerwrap together when heated and thereafter cooled.