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(54) Packaged mineral wool products

(57) A mineral wool product compression-packaged in a film of a polyethylene comprising high density polyethylene. Compact packages can thus be made and maintained during transportation and storage with reduced risk of tear or significant creep.

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Description

[0001] This invention relates to the compression-packaging of mineral wool products with polyethylene film.

[0002] It is conventional practice to compression-package mineral wool products having a density of 8 to 80 kg/m^3, often 14 to 40 kg/m^3, by compressing the mineral wool product and wrapping it or otherwise packaging it in a plastic film while compressed.

[0003] The packaged product is usually in the form of a rectangular slab and may be composed of a single batt or a pile of batts. It can also however be in the form of a roll.

[0004] Low density polyethylene (LDPE) film has been conventionally used to compression pack mineral wool products. The normal degree of compression is about 18%, based on the original volume.

[0005] However with low density polyethylene films, there has been the problem that under high degrees of compression the film tends to creep to a large extent after packaging whereby the height or volume of the package increases during storage. Also, the package may burst.

[0006] It is an object of the present invention to compression-package mineral wool products in a plastic film such that these problems are reduced or avoided.

[0007] According to the invention, there is provided a mineral wool product compression-packaged in a film of polyethylene comprising high density polyethylene.

[0008] There is also provided a process of compressing a mineral wool product and packaging the compressed product in a film of polyethylene comprising high density polyethylene.

[0009] Any methods equivalent to known methods for compression-packaging can be used. The plastic film can be applied and sealed after compression but is usually applied prior to compression and then sealed tight after compression.

[0010] In the case that the mineral wool product is composed of a batt or a pile of batts, the polyethylene film is generally applied to the upper and lower surface of the batt or pile of batts before compression. After compression the lower and upper polyethylene films may be laminated together for intance with the aid of hot and cold air followed by end sealing and cutting. It is most usual to use a set of converging conveyor belts which convey the lower polyethylene film, the batt or pile of batts and the upper polyethylene film forward while being compressed. In the case that the mineral wool product is to be packaged in the form of a compressed rolled-up product, the method and equipment described in EP-551,228 can be used.

[0011] The mineral wool product usually has a normal density of 8 to 80 kg/m^3. It can be unbonded but is usually a bonded web of mineral fibres for instance having an organic content of 0.5 to 10% by weight.

[0012] The mineral wool fibres may be ceramic fibres or glass fibers, but are preferably fibres generally known as stone, rock or slag fibres, in which the analysis of the fibre shows an alkali metal content (measured as alkali metal oxide based on total oxides) usually of less than 10% and an alkali earth metal content of usually above 10, 15 or 20%, by weight.

[0013] In contrast to the low density polyethylene films used in the prior art, the present invention involves the use of a film containing high density polyethylene. It preferably has high strength, high modulus of elasticity and low creep. Low and compact rectangular or other packages can thus be made and maintained during transport and storage with reduced risk of tear or significant creep.

[0014] Furthermore, the film preferably has substantially the same strength and elasticity in both directions (so called machine direction and a direction perpendicular thereto). This makes the film more versatile in relation to different packaging machines.

[0015] The polyethylene film may be a laminate but is preferably a single-ply film.

[0016] Preferably it is formed of a blend of low density polyethylene and high density polyethylene generally in a ratio of 6:4 to 9:1 most preferably 7:3 to 9:2. Thus the preferred film is a single-ply film formed of 70 to 80% low density polyethylene and 20 to 30% high density polyethylene.

[0017] The polyethylene blend generally has a density in the range of about 0.93 to 0.94, preferably in the range 0.932 to 0.935.

[0018] The polyethylene blend preferably has a melt temperature in the range of about 120 to 125°C, preferably about 123°C.

[0019] Preferably the film has an enthalpy of about 120 to 135, most preferably 124 to 130 joules/g.

[0020] Preferably the polyethylene blend has a crystallisation temperature of around 102 to 110°C preferably about 107°C.

[0021] The polyethylene blend preferably has a crystallinity of 20 to 45%, most preferably around 25 to 35%.

[0022] The pressure to which the mineral wool product is compressed during packaging is preferably in the range 0.15 to 0.50, usually below 0.35, preferably 0.2 to 0.25 N/mm^2. These are values which are suitable for providing 40% compression.

[0023] The batt or pile of batts is preferably compressed during the packaging step by greater than 10 or 15% in volume (generally height), more preferably by greater than 20%. Some products may be compressed by up to about 95% in volume. However most products are generally compressed by more than 40 or 50% in volume. Preferably, substantially the entire compression is released when the plastic film is removed.

[0024] The following are examples of the invention. In these, the film is formulated from 75% low density polyethylene and 25% high density polyethylene having the following properties:

Density:	0.932 kg/dm^3
Melt temperature:	126°C
Enthalpy:	124 to 130 joules/g
Crystallisation temperature:	107°C
Crystallinity:	42%

Example 1

[0025] Six mineral wool batts having a density of 30 kg/m^3 and dimensions of 960 x 600 x 100 mm are made into a pile with a nominal height of 600 mm. This pile was then wrapped in the above described polyethylene film having a thickness of 40 μm. The thus wrapped pile was compressed 18% and sealed around the edges to give a tightly packaged product having a maximum height of 492 mm. 15 such packages were made and stored for 28 days after which the height was measured again. It was found that the height of the 15 packages had crept up by about 30 mm.

[0026] As a control, another group of 15 packages were made under the same conditions but using normal low density polyethylene film having a thickness of 60 μm. After storage for 28 days it was found that the height of these packages had crept up by at least 45 mm.

Example 2

[0027] 8 mineral wool batts having a density of 30 kg/m^3 and dimensions 960 x 600 x 100 mm were made into a pile having a nominal height of 800 mm. This pile was wrapped with the above described film having a thickness of 60 μm. The thus wrapped product was compressed 40% and sealed around the edges to give a tightly packaged product having a maximum height of 480 mm. 30 such packages were made and stored for 28 days after which the height of the packages was measured again. It was found that the height of the packages had crept up by about 30 mm.

[0028] As a control, another group of 30 packages were made under the same conditions but using normal low density polyethylene film having a thickness of 70 μm. After storage for 28 days, it was found that the height of these packages had crept up at least 70 mm.

Claims

1. A mineral wool product compression-packed in a plastic film characterized in that the plastic film comprises high density polyethylene.

2. A mineral wool product according to claim 1 wherein it is compressed by between 15 and 95% in volume.

3. A mineral wool product according to claim 2 wherein it is compressed by between 15 and 50% in volume and, before compression, had a density of 8 to 80kg/m^3.

4. A mineral wool product according to claims 1, 2 or 3 wherein the polyethylene film is a film of a blend of low density polyethylene and high density polyethylene in a ratio of 6:4 to 9:1, preferably 7:3 to 9:2.

5. A mineral wool product according to any one of claims 1 to 4, wherein the polyethylene blend has a density in the range of 0.93 to 0.94, preferably in the range of 0.932 to 0.935.

6. A mineral wool product according to any one of claims 1 to 5 wherein the polyethylene blend has a crystallinity of 20 to 45%, preferably 25 to 35%.

7. A process of packaging mineral wool product comprising compressing the product and packaging the compressed product in a plastic film characterised in that the plastic film is a film of polyethylene comprising high density polyethylene.

8. A process according to claim 7 wherein the mineral wool product is compressed by between 15 and 95% in volume.

9. A process according to claim 8 wherein the mineral wool product has a density of 8 to 80 kg/m^3 before compression, and is compressed by between 15 and 50% in volume.

10. A process according to any one of claims 7 to 9 wherein the mineral wool product is compressed under a pressure of 0.15 to 0.50 N/mm^2, preferably 0.2 to 0.25N/mm^2.

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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 8103

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	DE 34 44 897 A (BAYER AG) * the whole document *	1-4,7-10	B65D85/16
A	DE 40 05 541 A (ROCKWOOL INT) * abstract; claims *	1-3,7-10	
A	DE 40 26 807 A (ROCKWOOL MINERALWOLLE) * abstract * * column 1, line 59 - line 61 *	1,7	
A	EP 0 735 090 A (MITSUI PETROCHEMICAL IND) * claims *	1,4-6	
A	GB 937 807 A (DU PONT) * page 1, line 54 - page 2, line 5 *	1,4-7	
A	FR 2 642 082 A (COEXTIBLE SA) * page 6, line 7 - line 17; claims 1,7,8 * * abstract *	1,4	
A	WO 94 28064 A (EXXON CHEMICAL PATENTS INC ;AGARWAL PAWAN KUMAR (BE))		TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	13 March 1998	SERRANO GALARRAGA, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
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P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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