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(54) **Roofing and roofing units for use therein.**

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Description

The invention relates to a roofing of the type comprising a plurality of adjoining roofing units and joining means for joining the roofing units wherein each roofing unit comprises a layer of insulating material, the upper edge zone of which has a depression on at least a portion of its length and/or width, at least one layer of top felt being applied on top of the insulating material, the depth f of the depression of each edge zone being in the range of $t \leq f \leq 4t$, where t is the thickness of a layer of roofing felt, each joining means comprising a long upper strip placed on top of the portion of the top felt which is in the depressed edge zone, the long upper strip substantially entirely filling up the broad depressed area formed by the edge zones of the two adjoining roofing units.

DE 28 42 347 discloses a roofing unit having a depression at a first edge zone and a projection at a second edge zone. The depression of one roofing unit thus cooperates with the projection of the corresponding adjoining roofing unit. The roofing units are, however, not joined by means of a felt-like material and the joints do not provide adequate drainage in case of a slightly pitched roof.

AT-B-343 326 discloses a roofing of the type which comprises a plurality of adjoining roofing units and adjoining means for joining the roofing units, wherein each roofing unit comprises a layer of insulating material, the upper edge zone of which has a depression on at least a portion of its length and/or width. The roofing units may be made of any suitable known materials and may be built up from different layers, for example a sandwich construction with an insulating layer and a waterproofing layer.

DE-A-27 37 614 discloses a roofing element consisting of a lower portion of heat insulating material and a layer of bitumen on the top of it.

DE-A-20 40 718 discloses units comprising an insulating layer with a bituminous felt overlayer.

It is the object of the invention to provide a roofing of the above type where the joints between the individual roofing units are flush with the surface of the roofing units, thereby providing improved drainage, and where the joints are less exposed to the effects of the weather and which have a more pleasant appearance.

The roofing according to the invention is characterised in that the top felt extends a distance s into the depressed edge zone, where s is in the range of $0,2b \leq s \leq 0,8b$ and b is the width of the depressed edge zone and that each adjoining means besides a long upper strip comprises a long lower strip to be applied in a central zone of the broad depressed area so that said long lower strip together with said long upper strip substantially

entirely fill up said depressed area. As a result, the long upper strip of the joining means may substantially flush with the top felt portions in the middle of the roofing units, whereby no recesses are formed in the finished roof surface. Also, no projections are formed which might prevent complete drainage.

According to the invention, the layer of top felt may preferably be glued to the top of the insulating material.

An embodiment of the roofing according to the invention is characterised in that below the layer of top felt, a layer of under felt is placed. It is thereby possible to exploit the special properties of the individual layers of felt, for instance their waterproofness and low temperature fitness.

The insulating layer of each roofing unit may advantageously be made of mineral wool, cellular plastics with open or closed cells or non-flammable materials with cellular structure.

It has also proved advantageous that the width b of the depressed edge zone of the roofing unit is in the range $5 \text{ cm} \leq b \leq 40 \text{ cm}$.

According to the invention, said long lower strip of the joining means may firstly be glued to the depressed area formed by the edge zones of two adjoining roofing units and whereupon said long upper strip of the joining means is subsequently glued to said long lower strip already laid in the depressed area. As a result, the mounting of the joining means and consequently the entire roofing is thereby facilitated.

According to the invention, the long upper strip and the long lower strip of the joining means may jointly advantageously have such thickness that the top surface of the long upper strip substantially flushes with the top surface of the top felt of the central portion of the roofing unit.

The invention is described in greater detail below with reference to the drawing, in which

Figure 1 is a perspective view of portions of two adjoining roofing units according to the invention prior to the mounting of the joining means, and Figure 2 is a perspective view of a joining means according to the invention.

The roofing according to the invention comprises many adjoining roofing units 1, joined mutually by means of joining means 7. Figure 1 shows two roofing units 1 closely abutting each other. Each roofing unit 1 comprises a layer of insulating material 2, the upper edge zone 3 of which is depressed on at least a portion of its length and/or width. At least one layer of roofing felt has been applied, optionally glued, on top of the insulating material. The depth f of the depression of each edge zone 3 is in the range $t \leq f \leq 4t$, where t is the thickness of the roofing felt. In Figure 1 f equals about $2t$.

In case there are more than one layer of roofing felt, the uppermost layer is the top felt layer 5, and the lowermost layer is the under felt layer 4. If there is only one layer of roofing felt, this is also called the top felt layer.

As to the edge zone 3 of the insulating material 2, the top felt layer 5 does not cover this entire zone but only extends a distance s into the zone. s fulfils the requirement $0.2 b \leq s \leq 0.8 b$, b being the width of the edge zone. Preferably s is in the range between $0.35 b$ and $0.5 b$. Particularly advantageously, s is about $0.4 b$. In the case where only one layer of roofing felt is used, the top felt layer 5 extends from the middle portion of the roofing unit 1 and a distance s into the depressed edge zone 3. Here again s is in the range $0.2 b \leq s \leq 0.8 b$, b being the width of the edge zone.

As shown in Figure 2, each joining means 7 comprises a long lower strip 8 as well as a long upper strip 9. The lower strip 8 is to be applied in the central portion of the broad depressed area 10 formed by the depressed edge zones of the two neighbouring roofing units. The long upper strip 9, placed on top of the lower strip 8 and fastened thereto, is to substantially fill up said broad depressed area entirely. The edge portions of the long upper strip are fastened to top felt portions 5a by means of glueing, said top felt portions projecting into the depressed edge zones 3 and thereby into the depressed area 10 formed by said zones.

The roofing may be laid on concrete or steel plates (corrugated), plywood or other self-supporting bases in new buildings or when renovating an existing roof.

The roofing may be divided longitudinally/transversely, optionally diagonally. Each roofing unit 1 may be bevelled so as to be used on round or lopsided roofs.

It has proved practical for the width b of the depressed edge zone 3 of the roofing unit 1 to be in the range $5 \text{ cm} \leq b \leq 40 \text{ cm}$.

The edge zones may have depressions in more than the two levels shown.

The insulating layer 2 may be made of mineral wool, foamed plastics, cellular plastics, compressed glass particles (Foamglas™) or other heavily insulating material. The insulating material may have open or closed cells. The top felt layer is preferably a roofing felt or a roof membrane of conventional construction with for instance reinforcement material and bitumen with different additives, such as talc, polymerization agent or softener. The under felt layer is preferably of the same structure as the top felt layer.

The upper strip 9 and the lower strip 8 of each joining means 7 may be joined, for instance by glueing, to form a unit before being laid into the broad depressed area 10. This is, however, not an

absolute necessity. The lower strip may be placed first, followed by the upper strip. The joining means 7 is preferably fastened by means of glueing to the broad depressed area 10. The fastening may also take place by melting which is the most common method.

The upper strip and the lower strip of the joining means 7 may not necessarily be of the same thickness. Possibly the thicknesses may be selected in such a manner that the surface of the upper strip 9 projects slightly above the top felt layer 5 of the central portions of the roofing units 1 when the strips have been mounted in the entire depressed area 10. However, in the embodiment shown, the upper strip 9 is flush with the top felt layer 5 on the central portion of the roofing unit 1. The conventional production margin are $\pm \frac{1}{2} t$, corresponding to 4 mm.

The protection is not only directed towards the roofing as such but also towards each roofing unit, which will typically have the dimensions $120 \times 240 \text{ cm}$.

The joining means, which are in the form of strips, extend along the roofing units, for instance along their long side as appears from the drawing. A depressed edge zone with projecting top felt layer and under felt layer may also be provided on the short sides of the roofing units, in the same manner as shown in Figure 1.

The invention may be varied in many ways without thereby deviating from the scope of the appended claims.

Claims

1. Roofing of the type which comprises a plurality of adjoining roofing units (1) and joining means (7) for joining the roofing units (1), wherein each roofing unit (1) comprises a layer of insulating material (2), the upper edge zone (3) of which has a depression on at least a portion of its length and/or width, at least one layer of top felt (5) being applied on top of the insulating material (2), the depth f of the depression of each edge zone (3) being in the range $t \leq f \leq 4 t$, where t is the thickness of the felt, each joining means (7) comprising a long upper strip (9) placed on top of the portion (5a) of the top felt (5) which is in the depressed edge zone (3), the long upper strip 9 substantially entirely filling up the broad depressed area (10) formed by the edge zones of the two adjoining roofing units, characterised in that the top felt (5) extends a distance s into the depressed edge zone (3), where s is in the range of $0.2 b \leq s \leq 0.8 b$ and b is the width of the depressed edge zone (3) and that each joining means besides a long upper strip (9)

comprises a long lower strip (8) to be applied in a central zone of the broad depressed area (10) so that said long lower strip (8) together with said long upper strip (9) substantially entirely fill up said broad depressed area (10).

2. Roofing as claimed in claim 1, characterised in that the layer of top felt is glued to the top of the insulating material.
3. Roofing as claimed in claim 1, characterised in that below each layer of top felt (5), a layer of under felt (4) is placed.
4. Roofing as claimed in claims 1, 2 or 3, characterised in that the insulating layer (2) of each roofing unit (1) is of mineral wool, cellular plastics with open or closed cells or non-flammable materials with cellular structure.
5. Roofing as claimed in one or more of the claims 1-4, characterised in that the width b of the depressed edge zone (3) of the roofing unit (1) is in the range $5 \text{ cm} \leq b \leq 40 \text{ cm}$.
6. A method of forming roofing as claimed in claim 1, characterised in that said long lower strip (8) of the joining means (7) is firstly glued to the depressed area (10) formed by the edge zones (3) of two adjoining roofing units (1), and that said long upper strip (9) of the joining means (7) is subsequently glued to said long lower strip (8) already laid in the depressed area (10).
7. Roofing as claimed in one or more of the claims 1-5, characterised in that the long upper strip (9) and the long lower strip (8) of the joining means (7) have jointly such a thickness that the top surface of the long upper strip (9) is substantially flush with the top surface of the top felt (5) of the central portion of the forming unit (1).

Patentansprüche

1. Eindeckung von der Art, die mehrere aneinandergrenzende Eindeckungskörper (1) und Verbindungseinrichtungen (7) zum Verbinden der Eindeckungskörper (1) aufweist, wobei jeder Eindeckungskörper (1) eine Isolierschicht (2) aufweist, deren obere Randzone (3) an mindestens einem Teil ihrer Länge und/oder Breite eine Vertiefung aufweist, wobei mindestens eine Schicht aus Deckdachpappe (5) auf dem Isoliermaterial (2) angebracht wird, die Tiefe f der Vertiefung jeder Randzone (3) im Bereich $t \leq f \leq 4 t$ liegt, wobei t die Dicke

der Dachpappe ist, jede Verbindungseinrichtung (7) einen langen oberen Streifen (9) aufweist, der auf demjenigen Teil (5a) der Deckdachpappe (5) angeordnet wird, der sich in der vertieften Randzone (3) befindet, der lange obere Streifen (9) den von den Randzonen der beiden aneinandergrenzenden Eindeckungskörper gebildeten breiten vertieften Bereich (10) im wesentlichen vollständig ausfüllt,

dadurch gekennzeichnet,

daß sich die Deckdachpappe (5) eine Strecke s in die vertiefte Randzone (3) hinein erstreckt, wobei s im Bereich von $0,2 b \leq s \leq 0,8 b$ liegt und b die Breite der vertieften Randzone (3) ist, und daß jede Verbindungseinrichtung außer einem langen oberen Streifen (9) einen langen unteren Streifen (8) aufweist, der in einer mittleren Zone des breiten vertieften Bereiches (10) anzubringen ist, so daß der lange untere Streifen (8) zusammen mit dem langen oberen Streifen (9) den breiten vertieften Bereich (10) im wesentlichen vollständig ausfüllt.

2. Eindeckung nach Anspruch 1, dadurch gekennzeichnet, daß die Schicht aus Deckdachpappe auf die Oberseite des Isoliermaterials geklebt ist.
3. Eindeckung nach Anspruch 1, dadurch gekennzeichnet, daß unter jeder Schicht aus Deckdachpappe (5) eine Schicht aus Unterdachpappe (4) angeordnet ist.
4. Eindeckung nach den Ansprüchen 1, 2 oder 3, dadurch gekennzeichnet, daß die Isolierschicht (2) jedes Eindeckungskörpers (1) aus Mineralwolle, offen- oder geschlossenzelligem Zellkunststoff oder nicht entflammaren Materialien mit Zellstruktur besteht.
5. Eindeckung nach einem oder mehr der Ansprüche 1-4, dadurch gekennzeichnet, daß die Breite b der vertieften Randzone (3) des Eindeckungskörpers (1) im Bereich von $5 \text{ cm} \leq b \leq 40 \text{ cm}$ liegt.
6. Verfahren zur Herstellung einer Eindeckung nach Anspruch 1, dadurch gekennzeichnet, daß der lange untere Streifen (8) der Verbindungseinrichtung (7) zunächst mit dem durch die Randzonen (3) der beiden aneinandergrenzenden Eindeckungskörper (1) gebildeten vertieften Bereich (10) verklebt wird, und daß der lange obere Streifen (9) der Verbindungseinrichtung (7) anschließend auf den bereits in dem vertieften Bereich (10) liegenden langen unteren Streifen (8) geklebt wird.

7. Eindeckung nach einem oder mehr der Ansprüche 1-5, dadurch gekennzeichnet, daß der lange obere Streifen (9) und der lange untere Streifen (8) der Verbindungseinrichtung (7) zusammen eine solche Dicke aufweisen, daß die Oberseite des langen oberen Streifens (9) mit der Oberseite der Deckdachpappe (5) des Mittelteils des Eindeckungskörpers (1) im wesentlichen bündig ist.

Revendications

1. Couverture de toit du type qui comprend une pluralité d'éléments de couverture (1) adjacents et des moyens de réunion (7) pour réunir les éléments de couverture (1), sachant que chaque élément de couverture (1) contient une couche de matériau isolant (2) dont la région marginale supérieure (3) présente une dépression sur une partie au moins de sa longueur et/ou de sa largeur, au moins une couche de feutre de dessus (5) étant appliquée sur le dessus du matériau isolant (2), la profondeur f de la dépression de chaque région marginale (3) étant dans la plage $t \leq f \leq 4t$, expression dans laquelle t représente l'épaisseur du feutre, chaque moyen de réunion (7) comprenant une longue bande supérieure (9) placée sur le dessus de la partie (5a) du feutre de dessus (5) qui se trouve dans la région marginale en dépression (3), la longue bande supérieure (9) remplissant presque complètement la large zone en dépression (10) formée par les régions marginales de deux éléments de couverture adjacents, caractérisée en ce que le feutre de dessus (5) s'étend sur une distance s dans la région marginale en dépression (3), s étant compris dans la fourchette $0,2 b \leq s \leq 0,8 b$ et b représentant la largeur de la région marginale en dépression (3), et en ce que chaque moyen de réunion comprend, à côté de la longue bande supérieure (9), une longue bande inférieure (8) devant être appliquée dans une région centrale de la large zone en dépression (10) de telle sorte que ladite longue bande inférieure (8) associée à ladite longue bande supérieure (9) remplisse presque totalement ladite large zone en dépression (10).
2. Couverture de toit selon la revendication 1, caractérisée en ce que la couche de feutre de dessus est collée sur le dessus du matériau isolant.
3. Couverture de toit selon la revendication 1, caractérisée en ce que, en dessous de la couche de feutre de dessus (5), est placée une

couche de feutre de dessous (4).

4. Couverture de toit selon la revendication 1, 2 ou 3, caractérisée en ce que la couche isolante (2) de chaque élément de couverture (1) est faite de laine minérale, de matière plastique alvéolaire à cellules ouvertes ou fermées ou de matériaux non-inflammables à structure cellulaire.
5. Couverture de toit selon une ou plusieurs des revendications 1 à 4, caractérisée en ce que la largeur b de la région marginale en dépression (3) de l'élément de couverture (1) se situe dans la fourchette $5 \text{ cm} \leq b \leq 40 \text{ cm}$.
6. Procédé de fabrication d'une couverture de toit telle que revendiquée à la revendication 1, caractérisé en ce que ladite longue bande inférieure (8) du moyen de réunion (7) est tout d'abord collée à la zone en dépression (10) formée par les régions marginales (3) de deux éléments de couverture (1) adjacents, et en ce que ladite longue bande supérieure (9) du moyen de réunion (7) est ensuite collée à ladite longue bande inférieure (8) qui se trouve déjà dans la zone en dépression (10).
7. Couverture de toit selon une ou plusieurs des revendications 1 à 5, caractérisée en ce que la longue bande supérieure (9) et la longue bande inférieure (8) du moyen de réunion (7) ont ensemble une épaisseur telle que la surface de dessus de la longue bande supérieure (9) est sensiblement affleurante avec la surface de dessus du feutre de dessus (5) de la partie centrale de l'élément de couverture (1).

