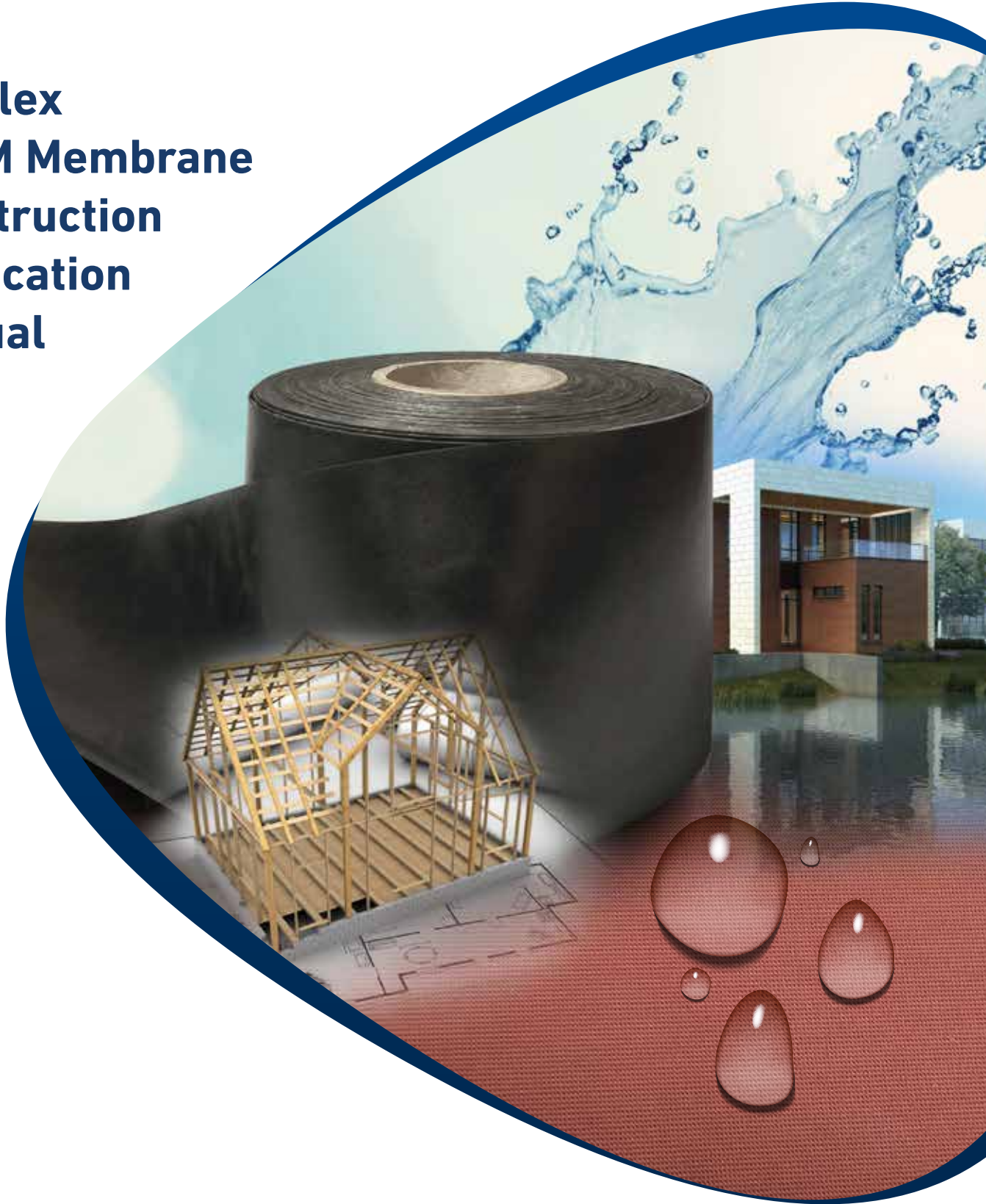




Lineflex EPDM Membrane Construction Application Manual



With you all the way.



A Brand of Aktas Holding.

Lineflex Cover System Application Manual

1. Introduction
2. Shipment / Storage / Membrane
- 3 Ballast system
4. Mechanical fixation
5. Full bonding
6. Garden roofs
7. Welding connections
8. Corne details
9. Pipe details
10. Detail pictures

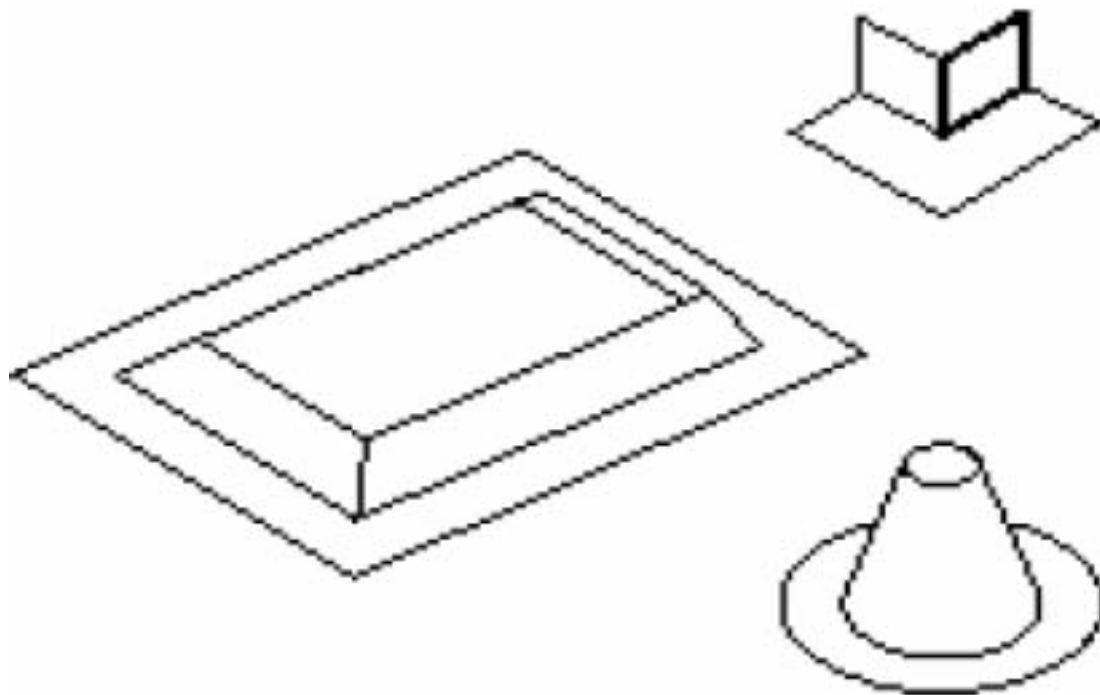
1-Introduction

In membrane laying applications, instructions of Roofers Association established in the relevant country and declarations of manufacturers must be taken into account in general.

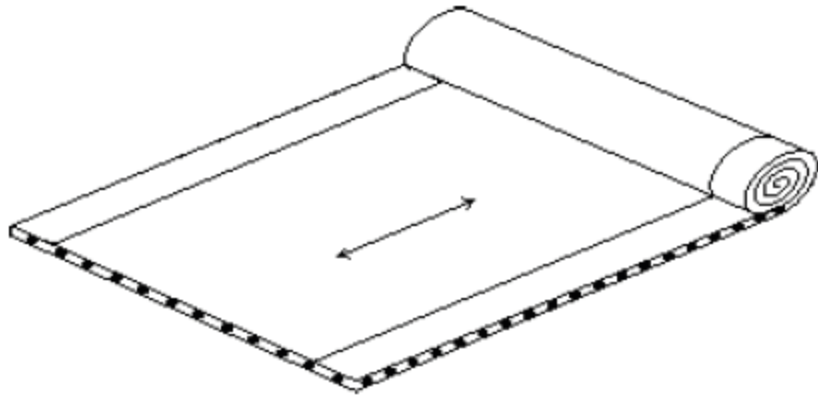
Lineflex is preferred in EPDM (Ethylene Propylene Dien Monomer) synthetic rubber covers, which highly resistant to ambient conditions, and waterproofing works.

Lineflex EPDM covers are laid in an ambient temperature of minimum +5°C.

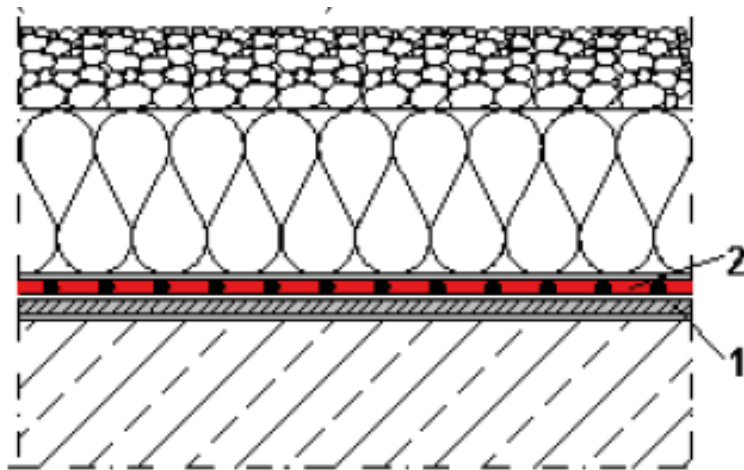
- Surface bonding process must not be conducted with hot bitumens.
- Only Lineflex accessories must be used.
- **Do not mix or dilute Lineflex-EMT adhesive with Lineflex-T Cleaner.**
- All the surfaces on which adhesive will be applied, must be dry, clean and completely free of oil.
- **Thermal welding overlaps must be 30 mm minimum.**
- For internal external corners, pipe downstreams and antenna connections, prefabricated components must be used, and Lineflex form is used for non- standard details.



- Attention must be paid to the prestress values of rollers, which are winded with machine. Rollers must be opened and kept on the ground for a certain period of time in order to relieve pre-stresses on the roller.



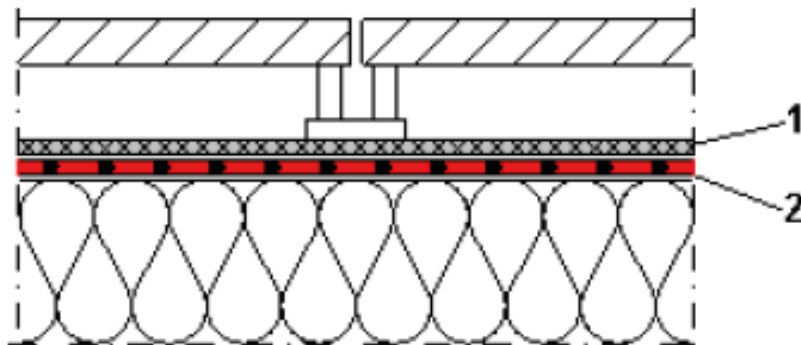
- Geotextile is laid under Lineflex EPDM covers for the coating of rough concrete surfaces. Geotextile thickness varies according to roughness level of the surface.



1. Geotextile

2. Lineflex-EPDM Membrane

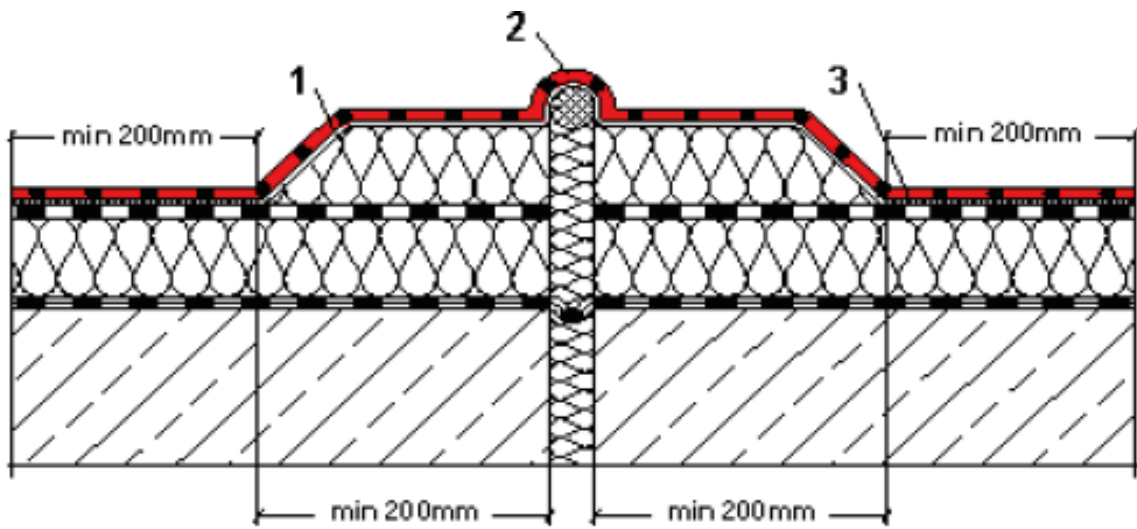
- In areas of use, Lineflex covers must be protected with geotextile.



1. 200 gr/m² Geotextile

2. Lineflex-EPDM Membrane

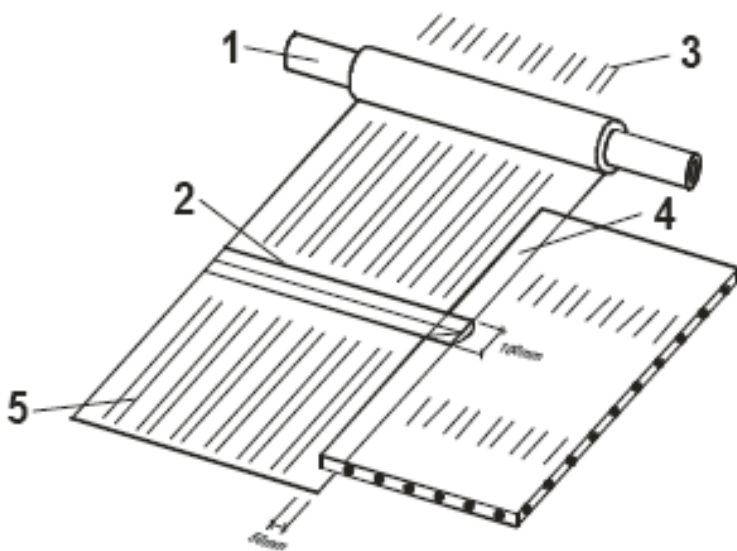
- Building dilatations are implemented as indicated in the drawing below.



1. Unsealed area
2. Lineflex-EPDM Membranes
3. Lineflex adhesive

2- Shipment/Storage/Laying

Lineflex-EPDM membranes are protective against potential mechanical damages on the material. Sizes of the membrane must be in accordance with means of transportation and statics of buildings. Membranes must be sealed on under the other with minimum 45 mm clearance and during this connection, thermal welding must be applied homogeneously by blowing hot water in manner that **TL (ThermoLine)** side band is centred.

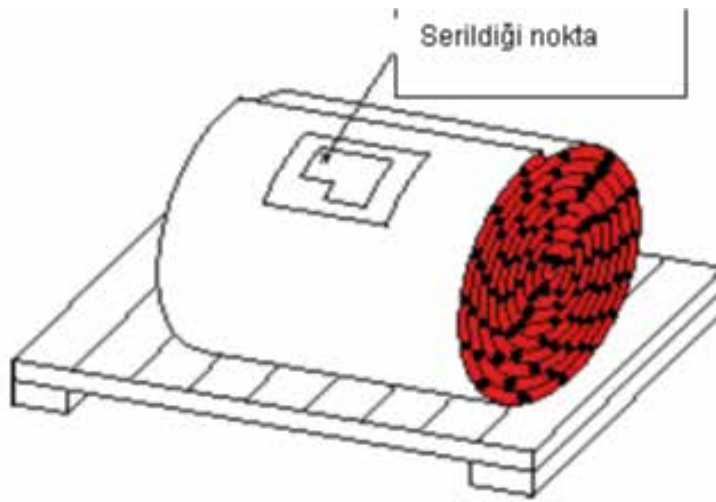


1. DN 100 pipe given as an example
2. Thermal welding band
3. Lineflex adhesive
4. TL (Thermoline)

3-Ballast System

First of all, surfaces (linings) on which Lineflex covers will be laid must be dry, clean, smooth (without dents and protrusions) and free of oil. On the other hand, convex and similar other rough components must be corrected and the surface on which covers will be applied must be prepared for covering operation. Lineflex –EPDM covers must be laid and corrected according to the laying plan prepared in advance.

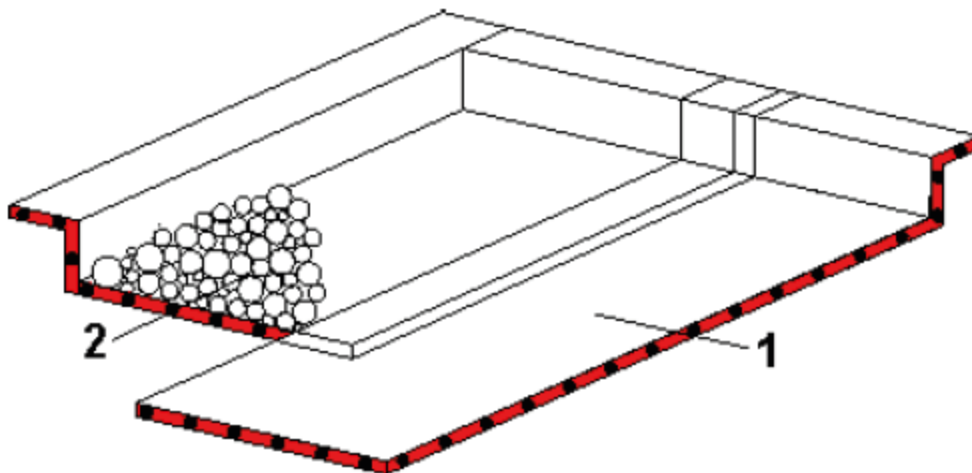
The large panel covers can also be laid easily thanks to the fluctuation created by the air entering under the covers. Overlap width of the membrane must be minimum 35 millimetre and overlaps must be made with thermal welding and homogeneous hot air.



Laying Point

As soon as covers are laid (quickly) they are covered with ballast (for instance gravel 16/32) in accordance with DIN 1055 wind load acceptance conditions. Cover overlap areas are left blank for thermal welding.

Overlaps with ready thermal welding connections are welded homogeneously by blowing hot air or by means of welding robot. A weld defect, which can be visible from the side may occur during this operation, which must be taken into account by the operator.

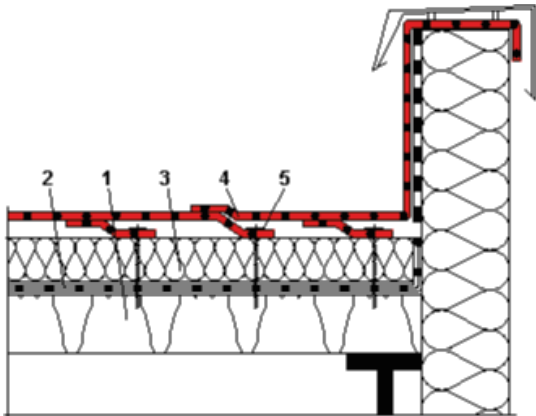


- 1.Lineflex –EPDM Membranes
- 2.Gravel laid on the membrane
- 4. MECHANICAL FIXATION

4-Mechanical Fixation

EPDM strips are fixed to trapeze roof mechanically. EPDM cover rolls are laid on the strips. Strips are fixed on the trapeze sheet by means of the proper materials used for mechanical fixing at certain intervals and in accordance with the requirements specified in DIN 1055 Wind load acceptance section. Fixing components are manufactured in accordance with manufacturer specifications.

Lineflex-EPDM membranes are mechanically fixed on the overlap sections of welding points. They are welded from the centre with hot air in a manner that overlap width is 30 millimetre minimum.



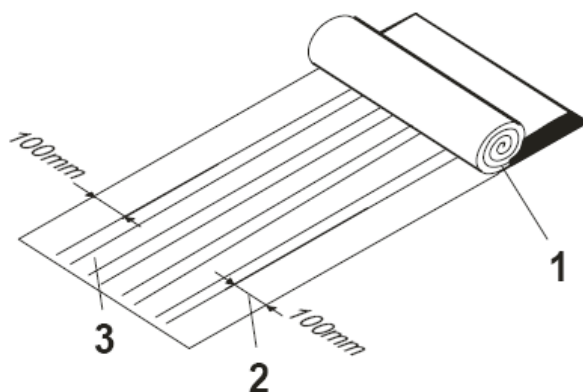
1. Trapeze sheet constituting the framework.
2. Smoke release from high polymer
3. Heat insulation, which occurs visibly
4. Lineflex-EPDM membrane
5. Mechanical fixing

5-Full Bonding

Lower surface, on which Lineflex-EPDM Membrane will be bonded must be dry, flat, clean and completely oil free. If there are convex and other rough components on the surface, the surface must be smoothed. Lineflex-EPDM cover rolls are laid without creases. They are re-winded by means of an auxiliary pipe after pre-stresses and creases are eliminated. Lineflex adhesive is applied on the lower surface. After a waiting period between 5-20 minutes, the roll is opened again and bonded on the concrete surface. Adhesive amount is approximately 50% of concrete surface.

Conditions which pose flying risk as a result of wind effect must be taken into account.

In the area where thermal welding is to be applied on Lineflex cover (on both sides), there must be at least 100 mm, where adhesive is not implemented.



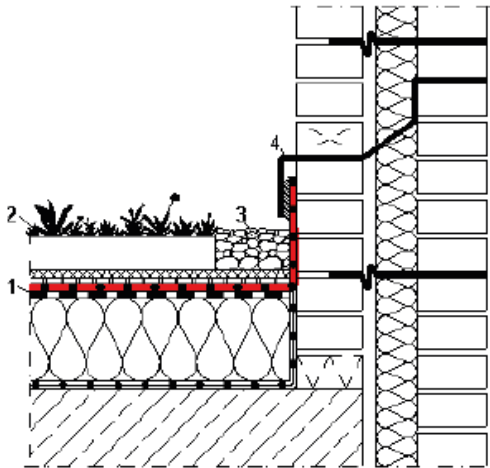
1. Lineflex-EPDM Membrane
2. The area where adhesive is not applied
Area where minimum 100 mm distance is left from the side
3. Adhesive implemented in vertical area

Lineflex –EPDM Membranes are first winded to the adhesion surface, and welding points are connected by applying hot air. Perspiration temperature and speed must be kept constant.

Caution: No voltage must be applied to the system.

6-Garden Roofs

Lineflex-EPDM Membranes are suitable for natural environmental conditions. It is also in compliance with relevant standards (DIN 4062) related to green covered garden roofs.

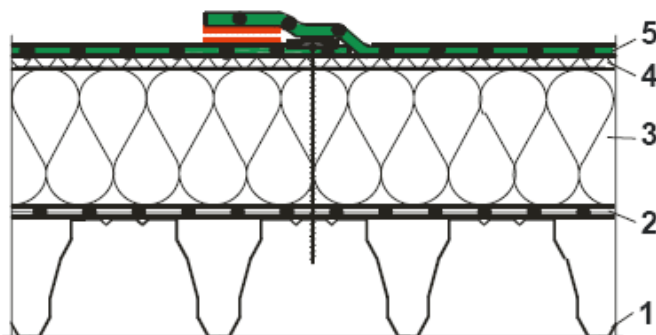


1. Lineflex – EPDM cover
2. Green roof cover
3. The threshold where gravels are filled
4. Cast component

7-Welding Connections Cover Form Components

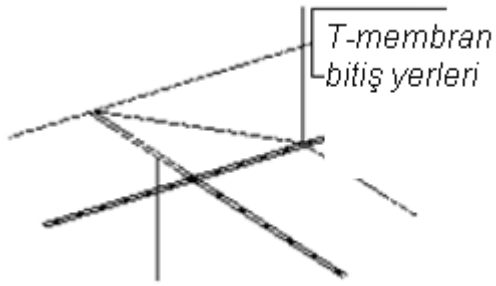
Welding connections of Lineflex-EPDM covers must have minimum 30 mm overlap width. Welding application area must be dry, clean and free of oil. In case of any contamination, welding connection must be cleaned with denature alcohol or water. **Use of solvents or similar cleaning agents is prohibited.**

Prepared welding edges are welded homogeneously by blowing hot air, automatic welding or blow-dry method. Attention must be paid to potential leakage problems on the side. Pressure and temperature ranges suitable for the operation determine the suitable working conditions of the cylinder. Parts are connected with automatic welding support. Incompatibilities in T overlaps and welding points are corrected and lengths are controlled. The purpose of this operation is to prevent the formation of bubbles in the welding point. See the figure:



1. Trapeze sheet in the lower section
2. Vapour chimney
3. Thermal insulation
4. Material providing burning resistance
5. Lineflex-EPDM Membranes with welding edges

Channels and preventing bubble formation (capillary structure)



T-overlap width

The surface is smoothed, overlap and side band lengths are equalized.

Welding Temperatures and Speeds

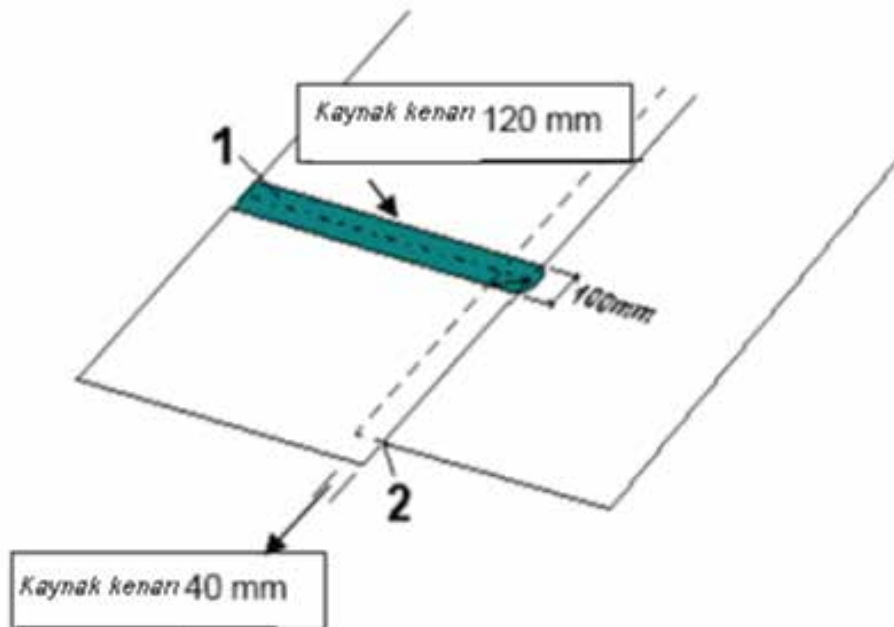
Top and bottom welding edges

- Temperature 450°C speed is approximately 4m/min

Welding edge on Lineflex-EPDM

- Temperature 450°C speed is approximately 3m/min

Welding temperatures/speeds must be within a range, which is in accordance with material temperatures for the external sections; otherwise, welding defects, which can be visible from the side, may occur. Attention must be paid to potential leakage problems on the side.



1. Lineflex-EPDM welding tape

Welding edge with

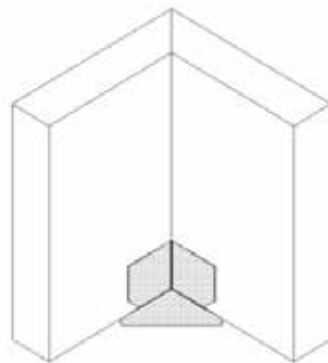
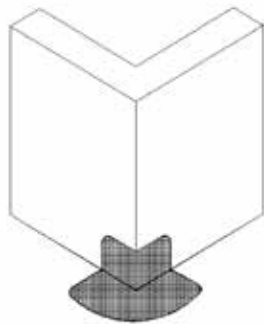
2.40mm width

8-Interior/Exterior Corner and Roof Lighting Details

First Sleeves and prepared detail components must be used.

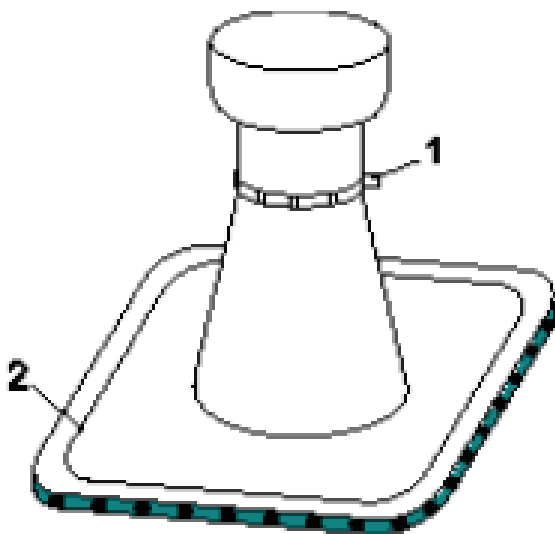
Roof lighting edges are covered with Lineflex-Form. Internal and external corners are covered with prepared detail components or Lineflex-Form.

Lineflex-EPDM structural parts are installed and welded on EPDM top surface homogeneously by blowing hot air or bonded with Lineflex-EMT. Attention must be paid to potential welding defects. Detail edges are closed with a rubber based mastic.



9-Pipe Details

First, pipe cuffs must be connected. Welding edge on the lower section is welded with hot air homogeneously. Upper edge of pipe cuffs is fixed with a pipe clamp or adhesive.



1. Non-rusted pipe clamp

2. 40.mm welding edge

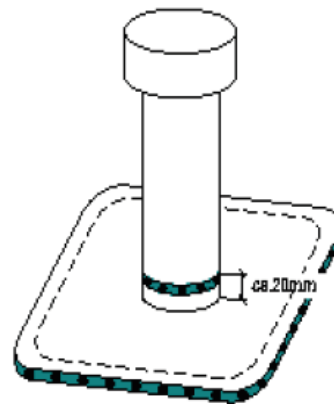
Lineflex EPDM pipe sleeve

Applications Without Pipe Cuffs

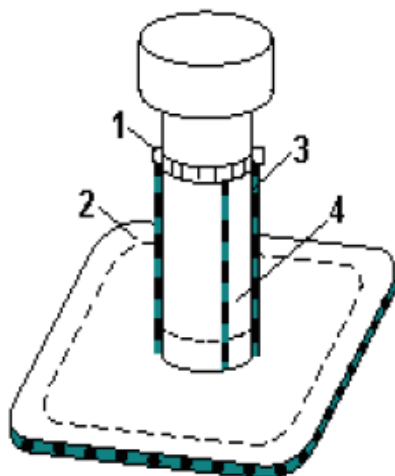
Lineflex-EPDM Cuffs, cuffs, which are approximately sized 1/3 are cut with rotating welding edges and roof leakages are covered. A clamp is placed here in vertical position. Sleeves are welded with surface bracelets by applying hot air from the middle. Connection in vertical position (parapet) is bonded to round corners with on-side adhesive tape. It can easily be bonded on areas of approximately 30 mm width. A non- rusted clamp is placed as top parapet.



Approximately 1/3 detail of diameter

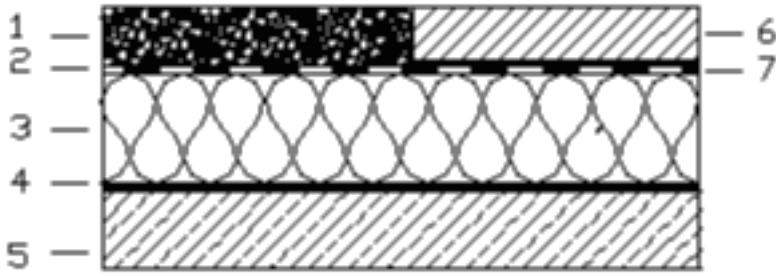


Sleeve connected to welding edge



1. Non-rusted pipe clamp
2. The area where welding edge and sleeve are connected
3. One sided self-adhesive tape
4. 120 mm welding tape

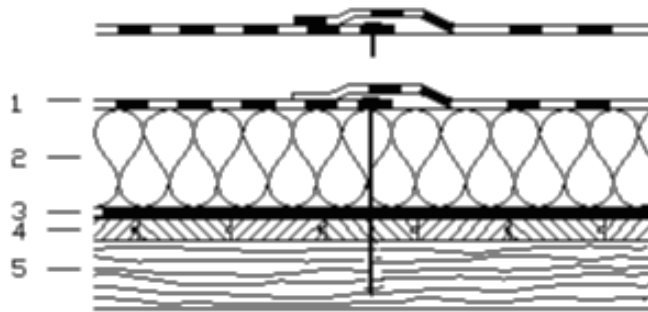
Ballasted Terraced Roof System



- 1. Gravels
- 2. Lineflex EPDM rubber membrane
- 3. Thermal insulation with bituminous coating
- 4. Vapour barrier
- 5. Reinforced concrete
- 6. Concrete slab

Insulation with Lineflex membrane using weights such as gravels or coating on heat-insulated reinforced concrete terraced roofs.

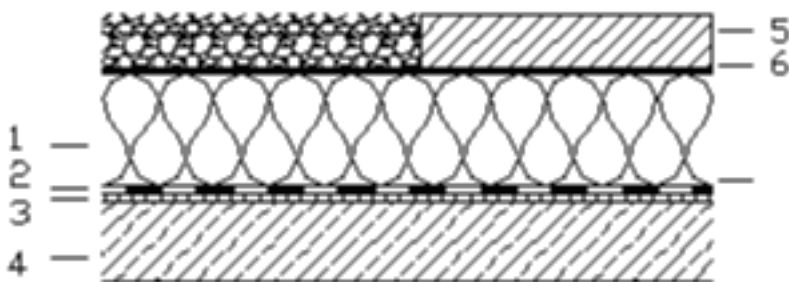
Mechanical Fixing of Wooden Roof



- 1. Lineflex EPDM rubber membrane
- 2. Thermal insulation
- 3. Vapour barrier
- 4. Roof board
- 5. Wooden base

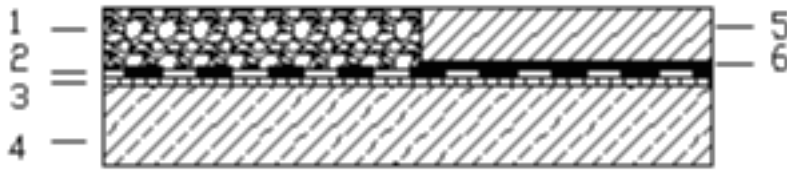
Waterproofing with mechanical fixation of Lineflex EPDM membrane on heat-insulated wooden roof.

Balleted Inverted Roof System (Heat-insulated)



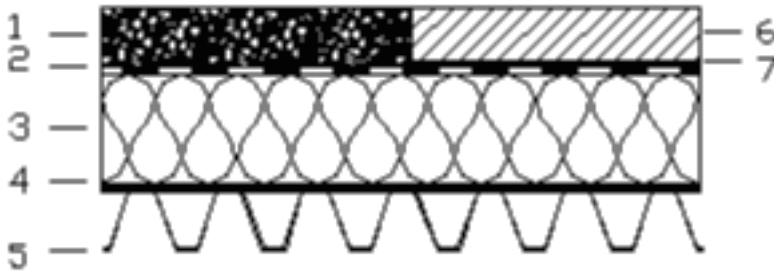
- 1. Gravels
- 2. Lineflex EPDM rubber membrane
- 3. Protective/separating layer
- 4. Reinforced concrete
- 5. Concrete slab
- 6. Protective/separating layer

Ballasted Inverted Roof System (Not Heat-insulated)



- 1. Gravels
- 2. Lineflex EPDM rubber membrane
- 3. Protective/separating layer
- 4. Reinforced concrete
- 5. Concrete slab
- 6. Protective/separating layer

Ballasted Trapeze Roof System



- 1. Gravels
- 2. Lineflex EPDM rubber membrane
- 3. Thermal insulation
- 4. Vapour barrier
- 5. Trapeze sheet
- 6. Concrete slab
- 7. Protective/separating layer

Waterproofing with Lineflex membrane using weights such as gravels or coating on heat-insulated trapeze roofs.

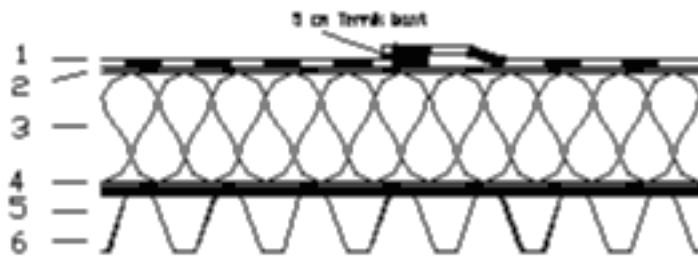
Mechanical Fixation of Trapeze Roof



- 1. Lineflex EPDM rubber membrane
- 2. Thermal insulation
- 3. Vapour barrier
- 4. Steel trapeze profile

Waterproofing with mechanical fixation of Lineflex EPDM membrane on heat-insulated trapeze roof.

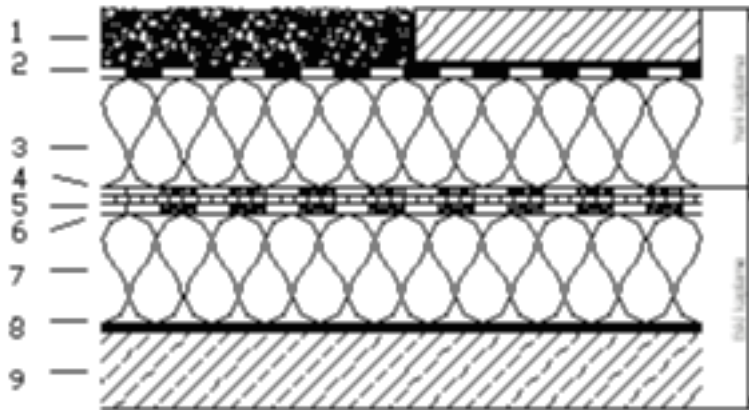
Full Adhesion of Trapeze Roof



1. Lineflex EPDM rubber membrane
2. Partially bituminous adhesion
3. Thermal insulation with bituminous coating
4. Partially bituminous adhesion
5. Vapour barrier
6. Trapeze sheet

Waterproofing with full adhesion of Lineflex EPDM membrane on heat- insulated trapeze roof

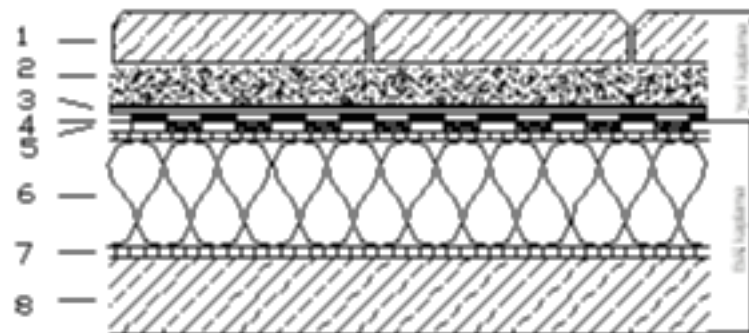
Renovation



1. Gravels / Coating
2. Lineflex EPDM Rubber Membrane
3. Thermal insulation
4. Bitumen-based membrane
5. Bituminous adhesive
6. Bitumen-based insulation
7. Thermal insulation with bituminous coating
8. Vapour barrier
9. Reinforced concrete installation

Waterproofing renovation with mechanical fixation of Lineflex on heat- insulated trapeze sheet construction without additional thermal insulation.

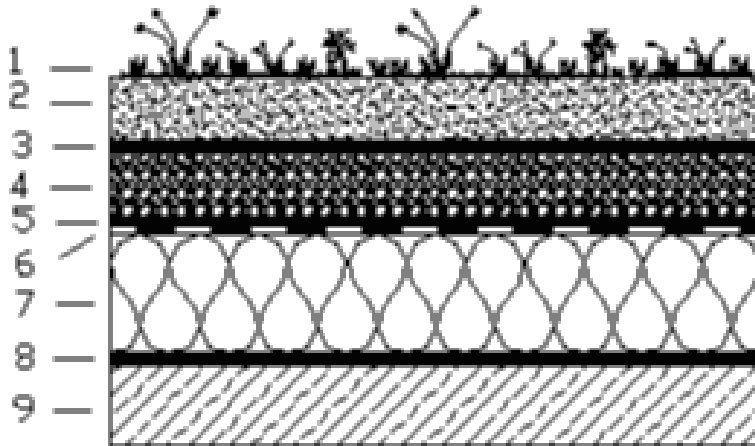
Renovation



1. Lineflex EPDM rubber membrane
2. Existing insulation
3. Partial adhesion
4. Thermal insulation with bituminous coating
5. Partial adhesion
6. Vapour barrier
7. Partial adhesion
8. Steel trapeze profile

Roof renovation with additional thermal insulation:
Waterproofing with Lineflex with additional thermal insulation for renovation of old roofs.

Garden Roofs

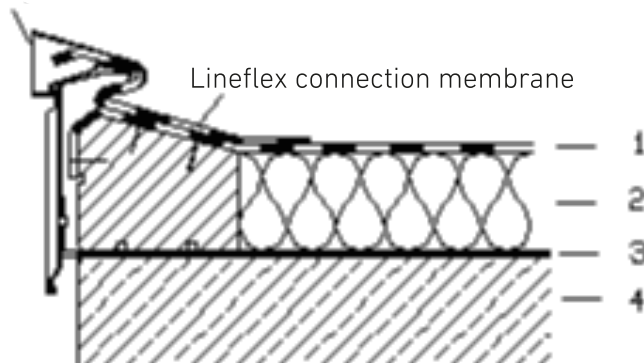


1. Green cover
2. Garden soil
3. Geotextile filter
4. Drainage
5. Protective / Separating later
6. Lineflex EPDM rubber membrane
7. Thermal insulation with bituminous coating
8. Vapour barrier
9. Reinforced concrete

Garden roof application on Lineflex membrane for heat-insulated terraced roofs.

Roof Edge Detail

Aluminium facade sheet

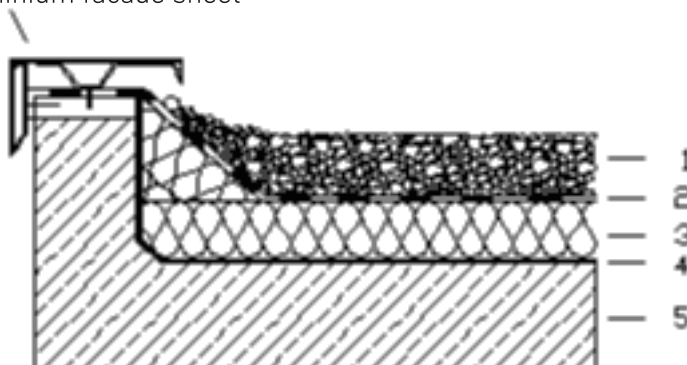


1. Lineflex EPDM rubber membrane
2. Thermal insulation
3. Vapour barrier
4. Reinforced concrete roofing

Roof edge detail with aluminium facade sheet

Roof Edge Detail

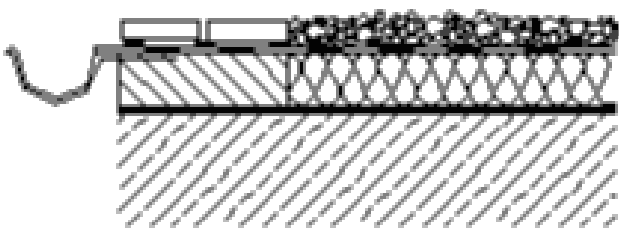
Aluminium facade sheet



1. River gravel
2. Lineflex EPDM rubber membrane
3. Thermal insulation
4. Vapour barrier
5. Reinforced concrete

Roof edge detail with aluminium facade sheet

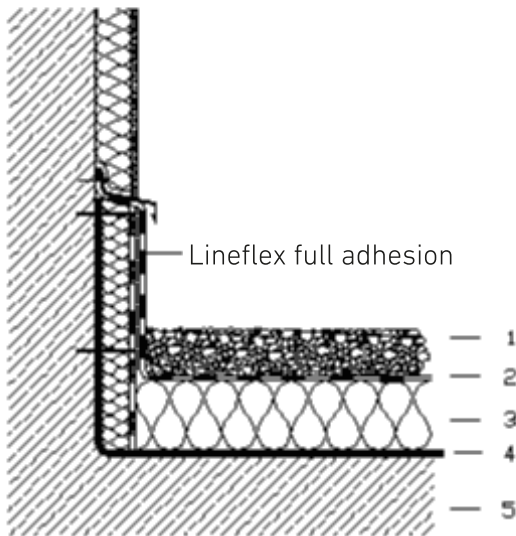
Roof Edge Detail



1. River gravels
2. Lineflex EPDM rubber membrane
3. Thermal insulation
4. Vapour barrier
5. Reinforced concrete

Roof edge detail with aluminium facade sheet

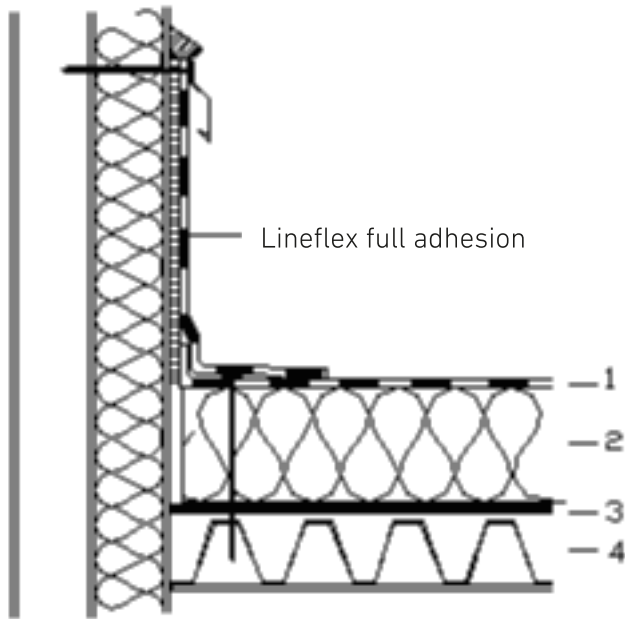
Wall Connection Detail



1. Gravels
2. Lineflex EPDM rubber membrane
3. Thermal insulation
4. Vapour barrier
5. Reinforced concrete roofing

Wall connection for ballasted system.

Wall Connection Detail



1. Mechanically fixed Lineflex EPDM Rubber Membrane
2. Thermal insulation
3. Vapour barrier
4. Steep trapeze profile



With you all the way





Aktaş Holding Headquarters

OSB Ali Osman Sönmez Bulvarı
No: 13/A Nilüfer, Bursa / Turkey
P: +90 224 300 00 00
F: +90 224 300 00 99
E-mail: info@aktasholding.com
Web: www.aktasholding.com

Aktaş Hava Süspansiyon Sist. San. ve Tic. A.Ş.

OSB Ali Osman Sönmez Bulvarı
No: 13/A Nilüfer, Bursa / Turkey
P: +90 224 300 00 00
F: +90 224 300 00 99
E-mail: info@aktasholding.com
Web: www.aktasholding.com

Akizo Yalıtım Sistemleri San. ve Tic. A.Ş.

DOSAB Reyhan Sk. No: 3
Osmangazi, Bursa / Turkey
P: +90 224 261 31 39
F: +90 224 261 31 49
E-mail: akizoinfo@aktasholding.com
Web: www.lineflex.com.tr

Techno Aktaş AD

Kuklen Industrial Zone Area
Kapsida 4101 N1
Kuklen, Plovdiv / Bulgaria
P: + 359 32 279 500
F: + 359 32 279 501
E-mail: info@technoaktas.com
Web: www.aktasholding.com

Changxing Ankeshu

Rubber Technology Co., Ltd.

FaZhan Avenue, West Rihan Road, Changxing
Economic Technology Zone, Huzhou,
Zhejiang Province / China
P: +86 572 665 17 37
F: +86 572 665 17 68
E-mail: sales@ankeshu.com
Web: www.ankeshu.com

LFT Germany

Luftfedertechnik GMBH.

Kruppstrasse 2a. 41540
Dormagen, Cologne / Germany
P: + 49 21 33 263 100
F: + 49 21 33 263 101
E-mail: info@airsprings.de
Web: www.airsprings.de

Aktaş North America Corp.

7095 N. Barry St. Rosemont IL
60018 / USA
P: + 1 877 66 AKTAS (1 877 662 5827)
F: + 1 866 518 3812
E-mail: airtech@aktasna.com
Web: www.aktasna.com

