



## STRETCH CEILING INSTALLATION TRAINING MANUAL

Part 2

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## INTRODUCTION

This is Part 2 of the training manual on stretch ceilings installation.

Part 1 provides description of the most simple and frequent installation cases and explains how to repair stretch ceiling membranes and install additional accessories.

Part 2 that is intended for more experienced installers describes installation of multi-level stretch ceilings, of LED-lit ceilings and of Starry Sky-effect stretch ceilings, and many other things.



Stretch ceiling technology possibilities are vast, and are not limited to what is described in this training manual. We are always ready to share our experience and knowledge with you.

## STRETCH CEILINGS IN LARGE ROOMS

Most of the stretch ceilings installed have an area up to 30 m<sup>2</sup>. However, orders to manufacture stretch ceilings of 100, 200 square meters and larger are placed quite often. There are two methods that can be used to install such ceilings.

### Single-piece installation

When installing large-area stretch ceilings in one piece, you will need an installation team consisting of at least four (4) people rather than the usual two (2). You will also need two or more propane gas heaters and considerably more gas to warm the room and the membrane up. In case of a walk-through room, you will need curtains in doorways to keep the heat; otherwise, it will not be possible to heat the ceiling up.

Account should be taken of the fact that the shrinkage factor applied in case of large ceilings is less than the standard 10%, otherwise it will be physically impossible to stretch the membrane. Therefore, keep in mind the possibility of increased membrane sagging and install longer suspensions for background supports used with accessories installed to reduce stretch ceiling surface distortion (especially, in case of Lacquer finishes).

### Individual sheets installation

All the difficulties above can easily be solved if you divide the large ceiling area into individual sheets of 20-30 m<sup>2</sup> that shall be installed using the №6 separator track (Fig.1)



Fig.1

Use the №15 oval cover strip to hide the gap of the separator track after sheets installation. A smaller individual sheet is less time-consuming and costly to replace in case of a damage than a single-piece of 100-200 m<sup>2</sup>.



## **Solutions to the air circulation problem**

Circulation of the large volume air trapped between the membrane and the rear wall/original ceiling makes stretch ceiling membrane oscillation unavoidable. To solve the problem, you need to ensure free air exchange between the space behind the and the room itself. That can be achieved with ventilation grilles (diffusers) installed in several places. It is preferable to have them installed near doors, windows, and air conditioners.



## **PRINTED STRETCH CEILINGS**

The installation method applied with printed stretch ceilings does not differ from the method used with conventional stretch ceilings. However, installation works themselves require more precision.

It is crucial that the suspended membrane attached to corner clamps is thoroughly and uniformly heated up throughout its entire area. This is especially relevant in case of ceilings printed with regular geometric patterns or ornaments around the ceiling perimeter. Should you fail to heat the ceiling as required, you may end up with distorted printed images caused by non-uniform heating (Fig. 2).

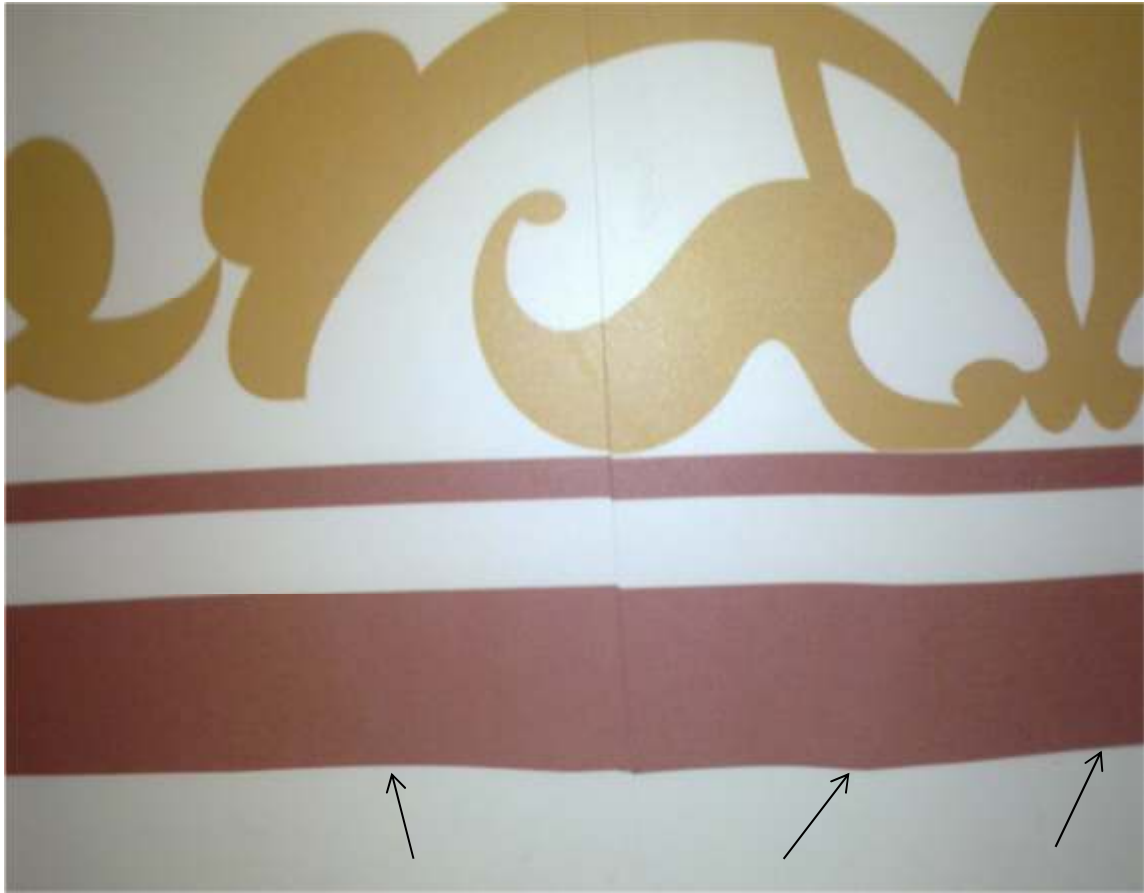


Fig.2

### **Photo-printed Lacquer stretch ceilings**

Special attention should be paid during photo-printed Lacquer stretch ceilings installation.

The point is that the top paint layer of the Lacquer stretch ceiling becomes unstable during heating, which may result in stretch ceiling face surfaces sticking together (Fig. 3).

The face surface of the photo-printed Lacquer stretch ceiling is covered with a special protective film at the time of manufacture. That film protects photo prints from damaging during manufacture and installation.



It is recommended to corner-clamp the membrane with the protective film on and then remove it prior to membrane heating.

At present, SAROS DESIGN have developed a more advanced photo-printing technology for the Lacquer film that helps to avoid stretch ceiling face surfaces sticking together at the time of heating.

Nevertheless, it is still recommended that you continuously pull the membrane sideways at the time of photo-printed Lacquer-finish ceiling installation and hold onto the harpoon during heating and installation.

The larger the ceiling area is the more installers are required to stretch the membrane to prevent its sticking together and to ensure high-quality ceiling installation without any image distortions.



You can only remove any stains or marks from a photo-printed stretch ceiling membrane after it has cooled down to the room temperature!

## Photo-printed Satin stretch ceilings

Using the protective film on photo-printed Satin stretch ceilings is impossible due to the specific nature of this finish. Install a photo-printed Satin stretch ceiling following the procedure for photo printed Lacquer stretch ceilings with the protective film removed prior to installation.



## Photo-printed Matt stretch ceilings

Photo-printed Matt stretch ceiling membranes practically do not stick together during heating due to the specific nature of this finish. The risk of sticking will only appear when using darker shades (black, dark blue etc.), therefore, one needs to be careful when installing such membranes.



## UV print

UV-print inks do not change their properties even during heating, so, UV-printed stretch ceilings do not stick together during installation. However, nonuniform membrane heating may cause paint layer cracking and image fading in overstretched areas (close to the harpoon). Therefore, thoroughly pre-heat the suspended membrane before installation; installation shall be done by several installers at the same time (i.e. with several spatulas).



In case a stretch ceiling was transported to the installation site at a temperature below 5°C, leave it unpacked at room temperature for at least 2 hours.

## BACKLIT STRETCH CEILINGS

Backlit stretch ceilings are used both as a decorative design feature and as the main light source of a room creating the effect of daylight-flooded space.

The main problem that might arise during backlit stretch ceilings installation is shadows or dark spots on the light diffuser produced by dust, dirt, wastes, flies etc. entering the space between the stretch ceiling and the rear wall/original ceiling.

Install two stretch ceiling membranes in parallel to each other to avoid any shadows or dark spots cast over the backlit stretch ceiling membrane (Fig. 4):

1. Light diffusing membrane - OT finish
2. Protective membrane.



Fig. 4



*OT-finish backlit ceiling without a protective film*



*OT-finish backlit ceiling with a protective film installed*

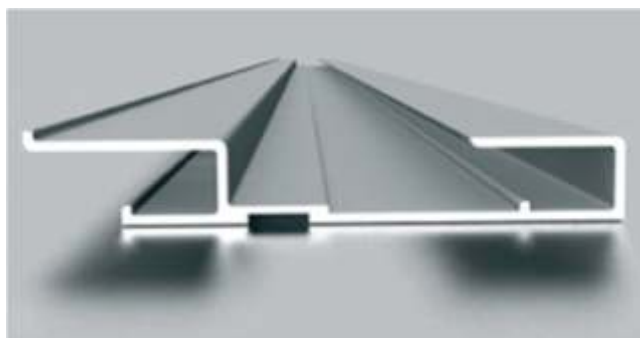


Fig. 5



In case the protective film has been manufactured with seams (because of its large size), our recommendation is to increase the distance between the protective layer and the diffusing film to up to 10 cm to avoid shadows cast by the seams on the diffusing layer. Use the standard wall tracks installed in two lines in parallel to each other.

In case of curved sections, it is also more practical to install two No 2 tracks in parallel to each other. Once you have installed the No 2 tracks, seal the junction between the wall and the tracks and track joints hermetically to render proof against dust, insects etc.



Use special rawplugs (Fig. 6) when attaching the No 2 track to gypsum boards or soft plasterwork, as self-tapping screws installed without rawplugs usually have a small backlash causing fine dust falling over the light diffusing membrane.



Fig. 6

## Installation of light sources for backlit ceilings

There are 2 options for light sources installation in case of backlit ceilings. You can either:

1. Attach fluorescent lamps, LED strips, LED linears or LED light panels to the original ceiling, or
2. Attach an LED strip around the ceiling perimeter.

Attaching fluorescent lamps, LED strips, LED linears or LED light panels to the original ceiling (Fig. 7).



Fig. 7

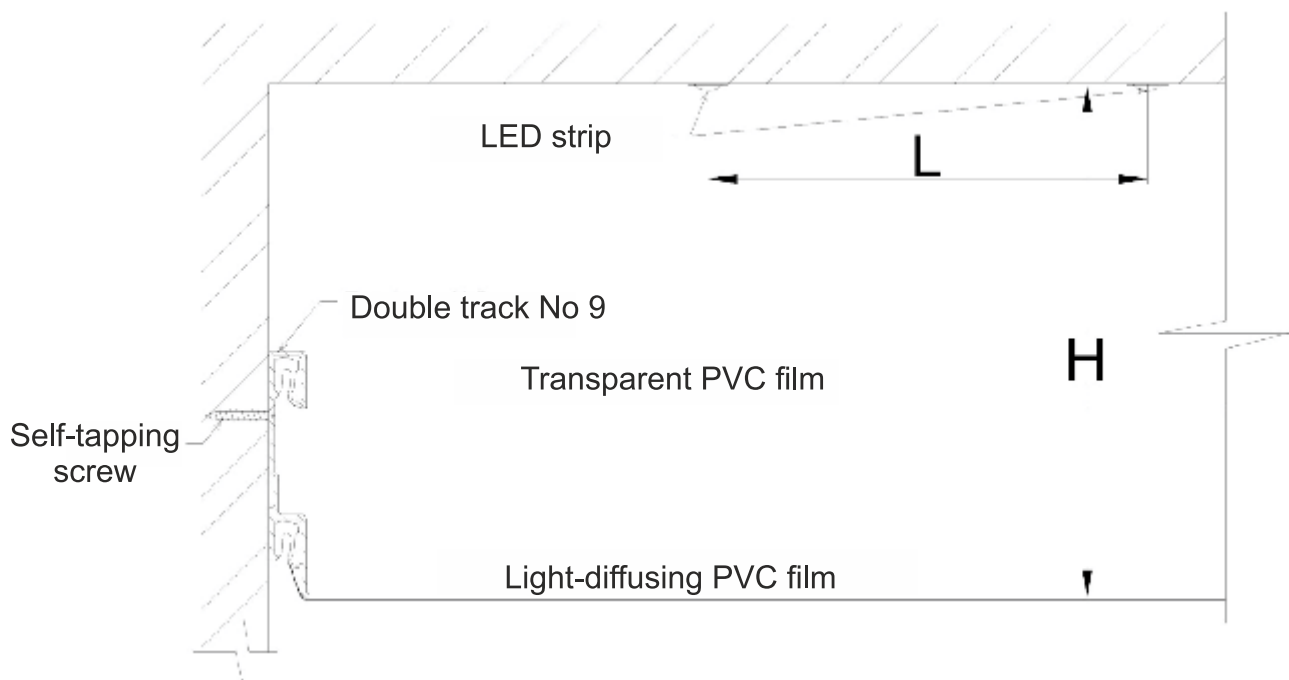
Key installation requirements in case of light sources installation onto the original ceiling:

1. The original ceiling (the ceiling behind the stretch ceiling membrane) must be painted white to ensure better light reflection.
2. The ceiling behind the stretch ceiling membrane must be even. Any cables, girders and other hidden equipment running across the original ceiling, which may cast shadows over the backlit ceiling should be avoided.
3. In order to ensure uniform distribution of light intensity throughout the ceiling and to avoid dimmed areas and shading, it is recommended that you install light sources based on the equation below:

$$L = (0.8 \dots 0.9) H$$

**L** is the distance between the light sources

**H** is the distance between a light source and the light-diffusing ceiling (Fig. 8).



4. Use the translucent OT00 film as the protective membrane.
5. In case the backlit stretch ceiling installed is expected to be the main light source in the room, account must be taken of the fact that the light loss over a semi-transparent film diffuser will make 50%.

Attaching an LED strip around the ceiling perimeter

- This option is more simple compared to the one described above as no preliminary preparation of the space and ceiling behind the stretch ceiling membrane is required.
- The light source is fixed to a track installed between two sheets. The track needs to be degreased before light source installation.

- Material used to manufacture the protective film in this case is not the translucent OT0 film but M01 or S01 that will not only protect the main membrane from any dust and dirt but will also act as an effective reflector (Fig. 9).

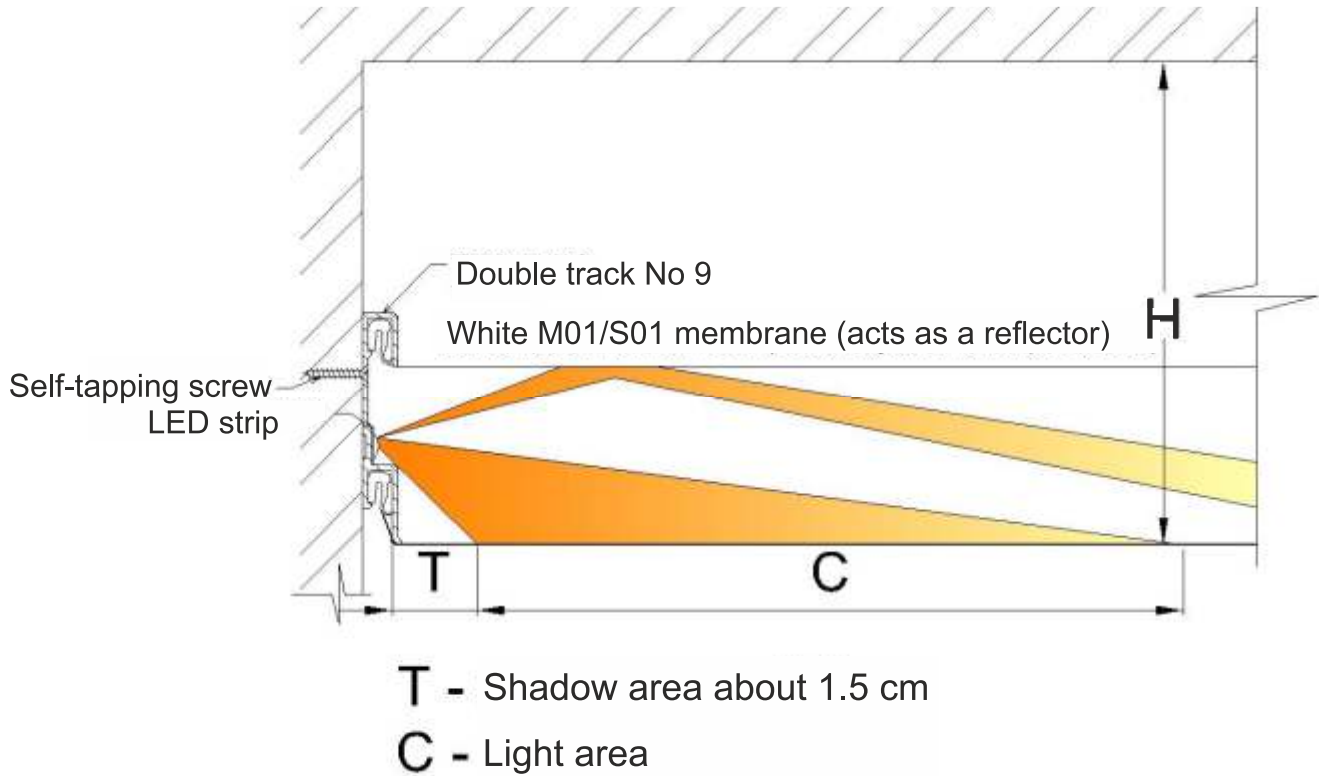


Fig. 9

- One drawback of the method is non-uniform distribution of light intensity over the ceiling. The light is most intensive around the ceiling perimeter fading to the centre (Fig. 10).



Fig. 10

- It is recommended that you use this installation option with ceiling widths up to 2.5 m.



One of the most popular installation options used with backlit ceilings is installation of embedded, surface-mounted or suspended light boxes.

The installation of the light boxes (especially, of large ones) requires a bearing structure to attach light sources and stretch ceiling light-diffusing membranes to.

Recognising the need for such structure, SAROS DESIGN engineered a Grand track intended specifically for light boxes (see Fig. 11), which both serves as a bearing structure and has respective slots for the installation of the light-diffusing membranes. It has a higher rigidity and makes manufacture of larger size light boxes possible.



Fig. 11

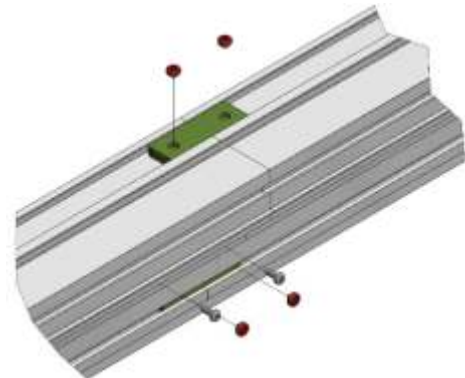
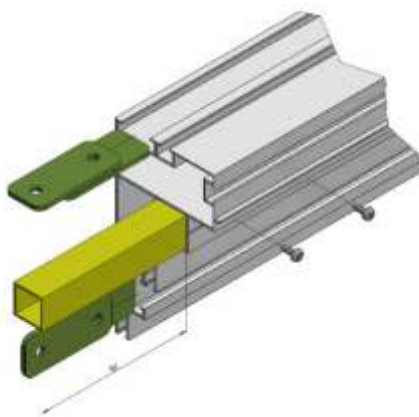
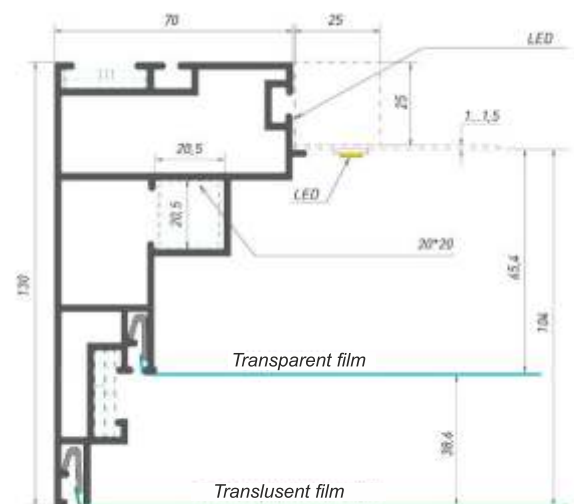
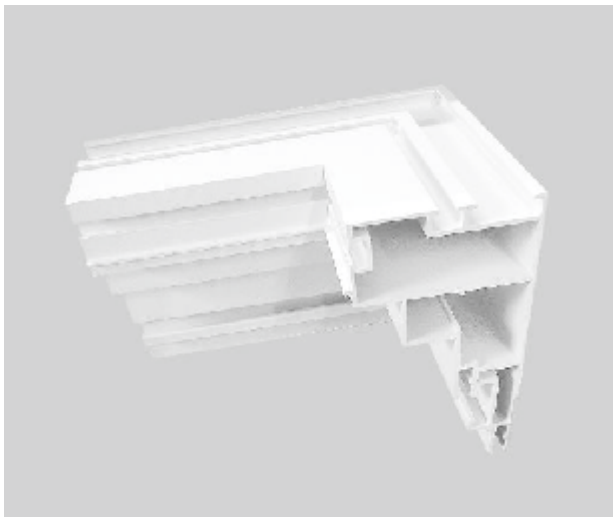
## Installation advantages of the light boxes made using the Grand track:

Installation advantages of the light boxes made using the Grand track:

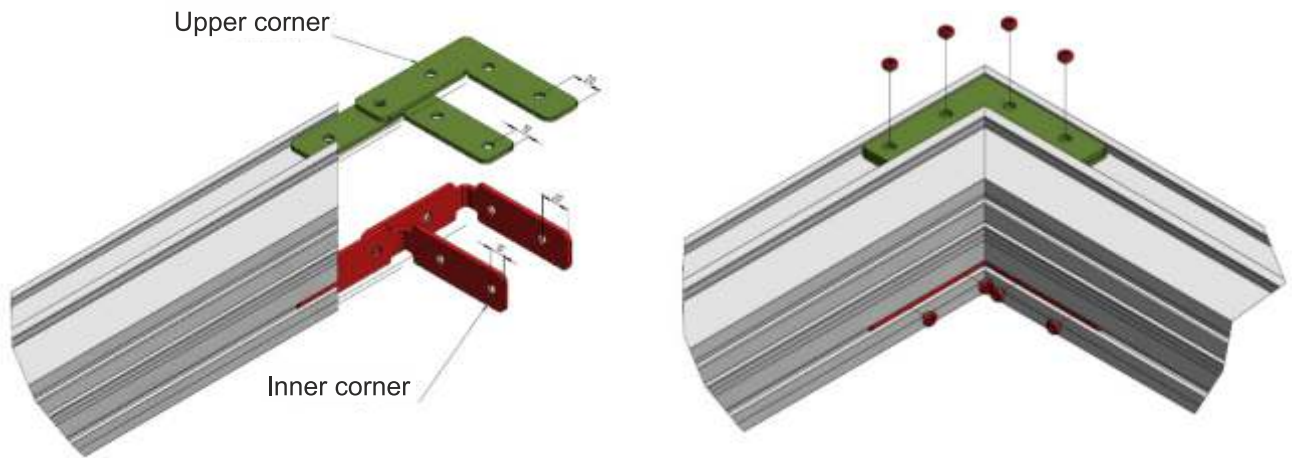
- The exceptionally high quality of the light boxes made using the Grand track in terms of rigidity, surface appearance and accuracy of geometrical dimensions that cannot be ensured when welding using conventional welding procedures;
- The ease and promptness of installation;
- Transportability;
- The low cost of the end product.



The pictures below show how Grand light boxes elements are connected with each other and the arrangement of a Grand light box:







A translucent OT-finish membrane is used as a light box diffuser. A Grand light box structure requires installation of a protective membrane to protect the structure from dust, insects, etc. setting onto it (the protective membrane shall be installed following the backlit ceilings installation procedure).

The light source is either an LED strip or LED modules. For mood lighting, place an LED strip around the box perimeter.

In case the light box is not placed directly onto a surface where an LED strip or board can be secured to, attach an aluminium plate to the top of the light box to install light sources onto it.

The Grand track is supplied unpainted and in a length of up to 6.1 m. For better transportability, the track can be pre-cut to the length required, which should be specified at the time of order.

Tracks with pre-grounded corners are also available at request. Grinding is done at the manufacturing factory using special professional equipment. As a result, connecting joints between tracks look very neat, which is rather important in case of surface-mounted and suspended light boxes.

The rack can also be powder painted in any colour required.

## MULTI-LEVEL STRETCH CEILINGS

Multi-level stretch ceilings are not only an interior design feature. Quite often, in addition to being an eye-catching decoration, they help concealing ventilation ducts, beams, communication wires and cables etc. (Fig. 12).



Fig. 12

The multi-level ceiling installation process can be split into two key stages:

1. Installation of metal structures for different ceiling height levels (Fig. 13)
2. Stretch ceiling membrane installation (Fig. 14)



Fig. 13



Fig. 14

The structures used to install stretch ceilings with different ceiling height levels, which are offered by SAROS DESIGN, can be classified into two basic types:

- Fixed-height structures for different height levels made using Tracks №30, 31
- Adjustable-height structures for different height-levels made based on a combination of Track №8a and №16.

## Fixed-height metal structures

Fixed-height metal structures can be made based on Track № 30 (Fig. 15). This track is used for straight and curved ceiling structures where the ceiling height level changes at 58 mm. Using this track, one can build a structure for a ceiling with different height levels on site or choose a prefabricated ready-to-install structure instead.



Fig. 15

## General operational sequence with Track №30 structures

1. Individual track elements are joined using inserts (pins). The inserts are driven through connections until only a 5-6-mm end protrudes outside (Fig. 16).

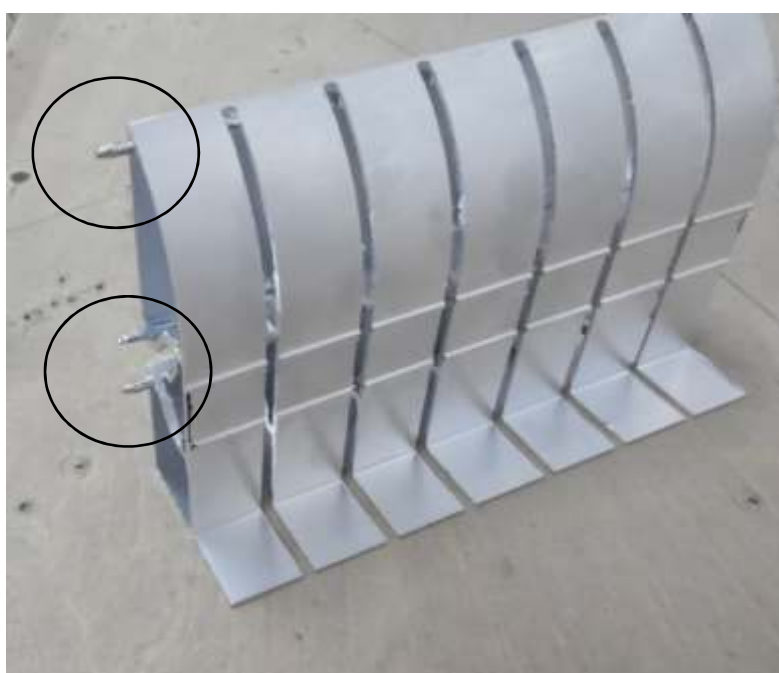


Fig. 16

2. Connection joints between track elements are additionally secured with aluminium bar strips 10-12 cm long and self-tapping screws for metal with pressure pads. It is recommended that each strip is secured with at least four self-tapping screws. Use at least 2 strips per joint (on the front and the back of the track) to ensure secure holding) (Fig. 17).

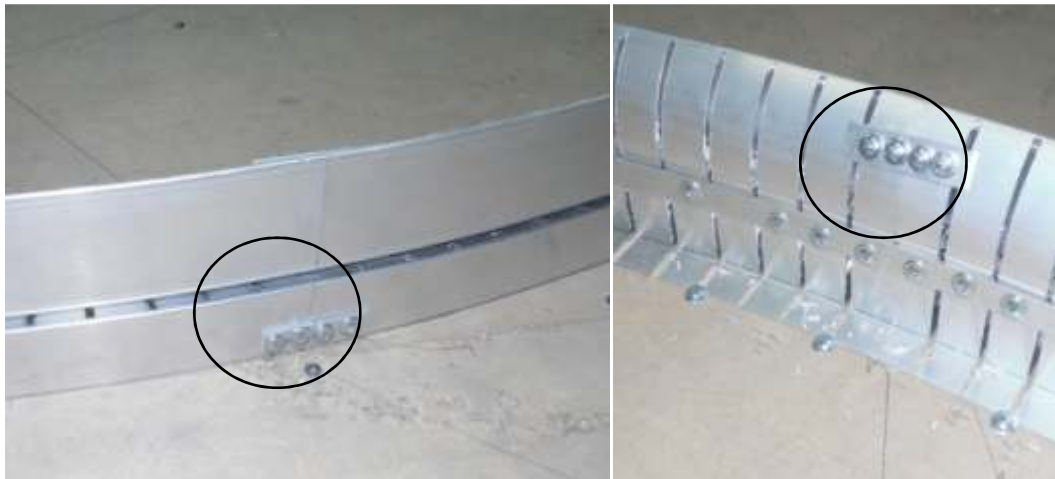


Fig. 17

3. There are two methods to attach a structure made using Track № 30 to the original ceiling:

a. The structure can be attached directly onto the original ceiling. Use the horizontal side flange of the track to secure the structure onto the original ceiling. The method is to be used when the original ceiling is even and with no ceiling height level changes over it.

b. The structure can also be attached using shelf brackets or seat angles. This method is used when the original ceiling deviates considerably from the horizontal plane. Pieces of the track horizontal side flange need to be removed in points where the shelf brackets will be attached. The shelf brackets or seat angles are secured to the original ceiling with a pitch of 40-60 cm following the structure contour. Then the structure is levelled horizontally and is secured with self-tapping screws to the brackets (Fig. 18).



Fig. 18



## Procedure for straight-line structure installation using Track № 30



In case one is to assemble a structure for a ceiling with straight-line ceiling height level changes on their own, one needs to:

1. Make corners (inner and outer)
2. Prepare straight sections of the lengths required.
3. Put all the structural elements together.

### Making inward corners



*To make a straight corner, saw off a 50 cm piece of track and put a mark in the middle.*



*Cut a notch on the back side of the trackpiece keeping the front intact.*



*Bend the piece sawn off at 90 °C*



*Secure the angle using an aluminium strip and self-tapping screws.*



## Making outward corners



*To make a straight corner, saw off a 50 cm piece of track and put a mark in the middle.*



*Cut two notches on the back side at an angle more than 90° keeping 1 cm at the root of the notch. Remove the piece cut.*



*Bend the track piece sawn off at 90 °.*



*Secure the angle using an aluminium strip and self-tapping screws.*

However, to reduce the installation time, you can buy ready-to-install corners and attach them to straight sections (Fig. 18).

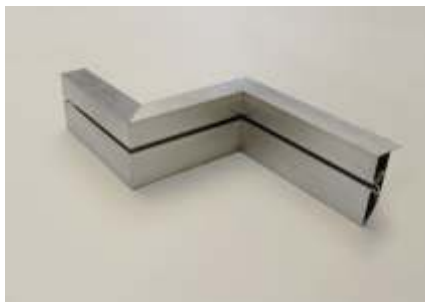


Fig. 18

**!** It is recommended that you use specially cut out ceiling membranes (has to be specified at the time of the order) to avoid inner corner bubbles in case of ceilings with different height levels.

In case different height level ceilings require structures where straight sections are combined with curved corners, you can use ready-made curved corners (R150mm) for the ease of installation (Fig. 19).

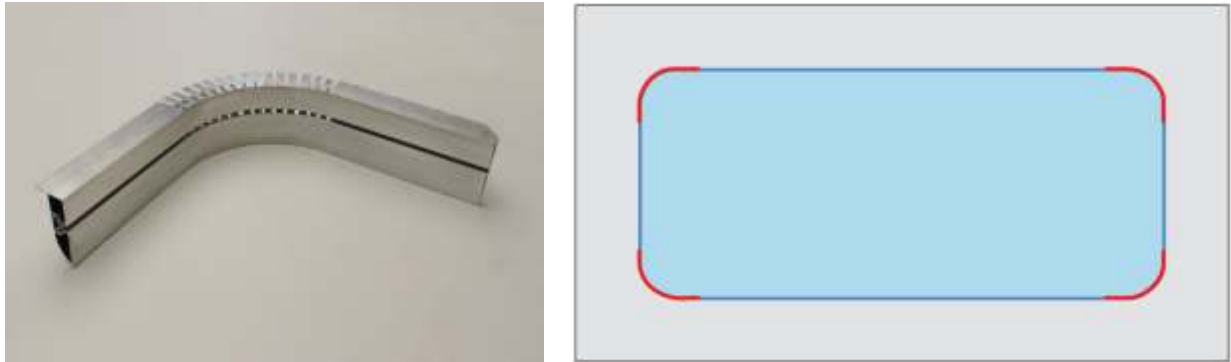
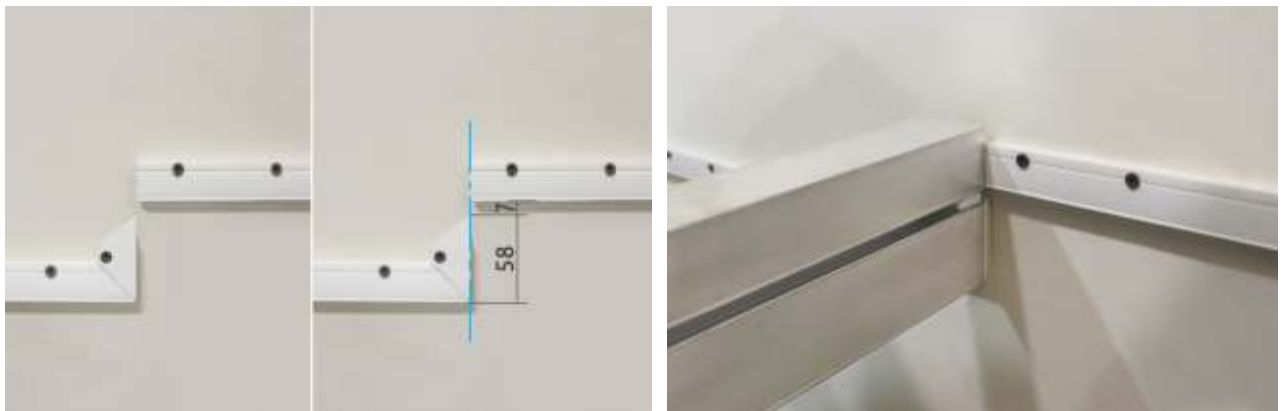


Fig. 19

If a Track № 30-based structure runs against a wall, follow the wall track installation procedure below to produce different height levels:



*The height of a wall track piece cut at 45° is the same as the height of the lower part of the №30 Track (58 mm). The distance between the wall-attached track for the higher level membrane and the wall track piece intended for a lower ceiling height level is 7 mm.*

*Take notice that the wall-attached track for the higher level membrane sits tightly against Track №30.*

## **Assembly of curved structures constructed using Track №30**

Curved structures for installation of different height level ceilings are made from notched Tracks №30.

The notches make it possible to:

- bend the track both ways, i.e. inward and outward;
- connect pieces of different curvature;
- smoothly change curvature of sections.

Combining curved and straight sections provides the possibility to shape your ceiling levels almost in any way required.



When working with a notched track, make sure you secure it with a binding band (aluminium band 15 mm wide and about 2 mm thick). The band is attached to the notched side of the track with self-tapping screws with a pitch of 3 notches (Fig. 20). However, the pitch should be smaller on the ends.

The recommended minimum curve radius of a finished structure is 150 mm.

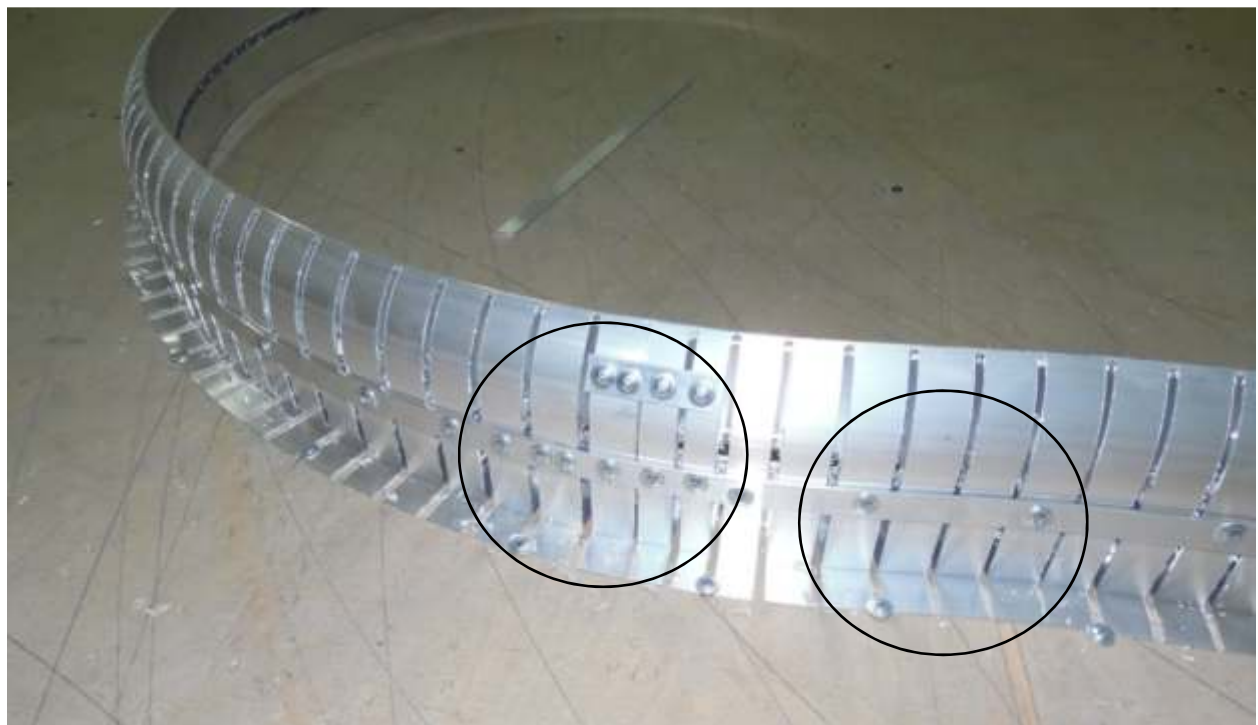


Fig. 20

Structure elements are joined using inserts (pins) with an additional piece of the aluminium binding band (Fig. 21).



Fig. 21

Using notched №30 Tracks, you can construct a curve structure on site by yourself. Otherwise, it is possible to order a pre-fabricated ready-to-install structure. Ordering a pre-fabricated structure significantly improves the rate and quality of installation works, and eliminates the necessity to construct the structure on site. When ordering a ready-to-install structure, all you have to do on the Customer's premises is put pre-fabricated elements together to assemble the structure.

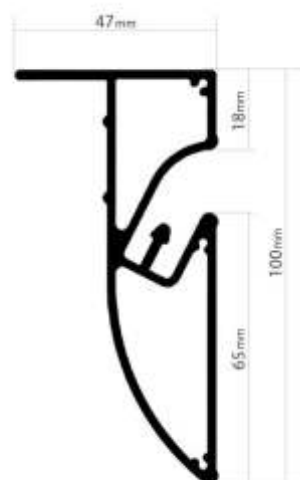
### **Fixed-height metal structures: gapless height level change**

Fixed-height metal structures to ensure gapless ceiling height level changes can be made using Track №31 (Fig. 22).

With Track №31, it is possible to have ceiling height levels in straight and curved structures changing at the height of 65 mm without any installation gap between sheets, i.e. Track No 31 ensures so called gapless ceiling height level change.



Fig. 22



The general assembly and installation procedures for Track №31-based structures are similar to the ones used with Track №30.



When working with Track №31-based structures, remember that it is impossible to de-install stretch ceiling sheets (undamaged).

It is recommended that you use a spatula with a 90° bent edge to insert sheets into tracks (Fig. 23).

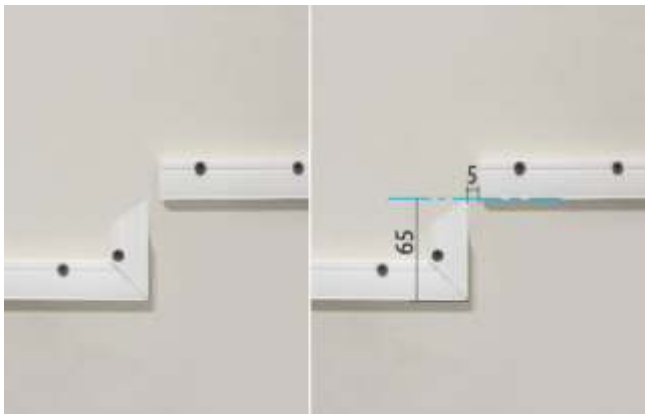


Fig. 23

To ensure more secure fastening of the upper level, it is recommended that you use sheets with visible harpoons for the upper level.

If a Track №31-based structure runs against a wall, follow the wall track installation procedure below to produce different height levels:





*The height of a wall track piece cut at 45° is the same as the height of the lower part of the № 31 Track (65 mm).*



*Take notice that the wall-attached track for the higher level membrane should be attached at a distance of 4-5 mm from Track № 31.*

## **Metal structures for adjustable-height ceiling level changes**

Structures made using Track №8a and №16 (Fig. 24) provide the possibility to have different adjustable-height level changes in straight and curved structures; the minimal ceiling height level change is only 2 cm.

Using the tracks above, you can construct a structure with adjustable ceiling height levels on site; otherwise, you can use a ready-to-install structure.

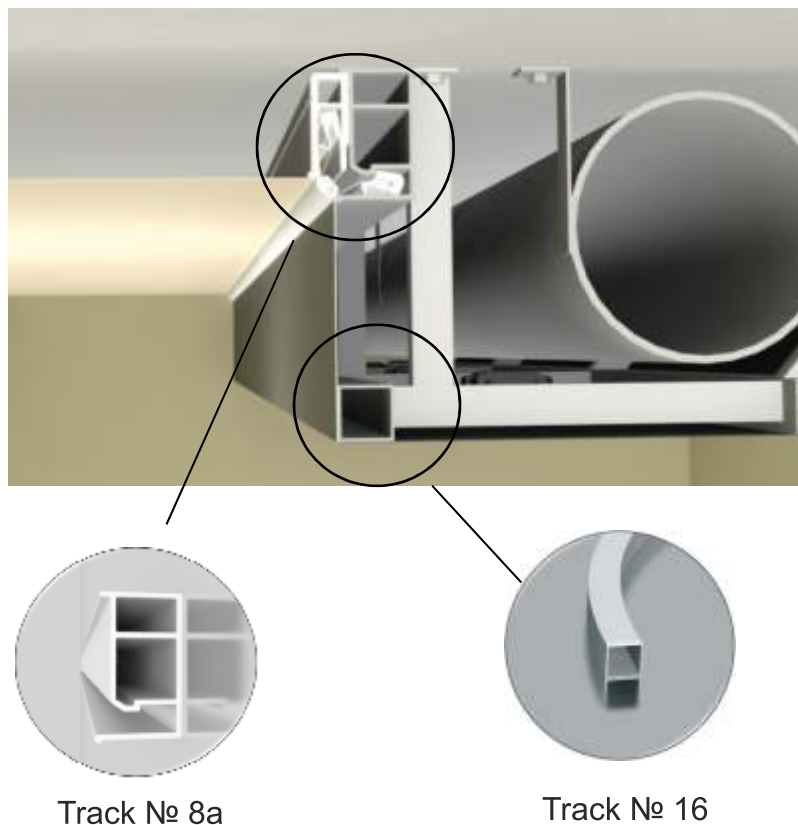


Fig. 24

## General rules of working with Track №8a and №16

In case of a №8A track, attach a plastic №2 wall track to it using self-tapping screws or rivets (Fig. 25).

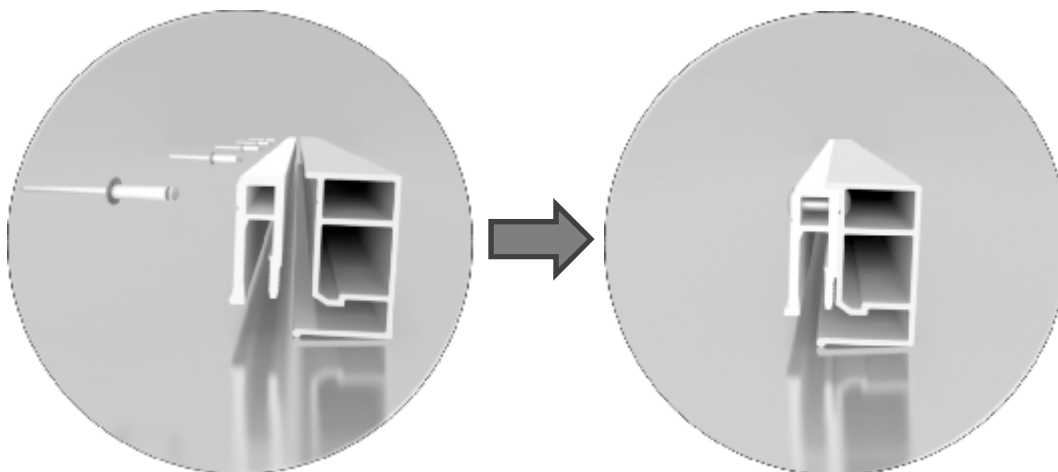


Fig. 25

## Specific aspects of Track №8a/№16 structures assembly and installation

Tracks are available in sections from 1 to 2.5 m (depending on the track type) and can be joined together using special connecting plates (Fig. 26) if required.



Fig. 26

Shelf brackets with respective required shoulder lengths are used to secure the tracks at a certain distance from each other (to secure height level changes) and to attach an assembled structure to the original ceiling (Fig. 27). The distance between the brackets depends on the track type used and the metal structure radius (the larger the radius, the shorter the distance between the brackets should be).



Fig. 27

Use superglue to attach an arched L bar (Fig. 28) to the lower edge of the №16 track to ensure a smooth height level change line (membrane bend). Before that, degrease the track for better adhesion.

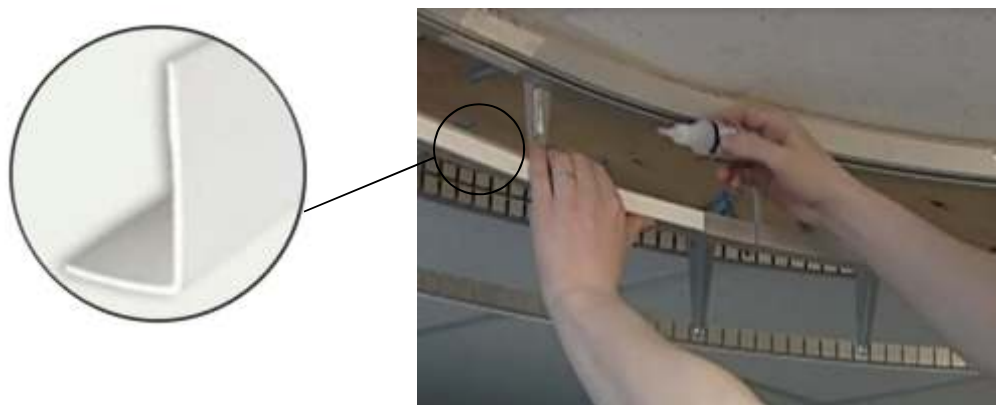


Fig. 28

## Track №8a/№16 structures for straight-line height level changes



Tracks №8A and №16 are used to construct structures for straight-line height level changes. Those tracks are available in sections of 2-2.5 m long.

The distance between shelf brackets is 25-35 cm.

## Track №8a/№16 structures for curved height level changes



A structure for a curved height level change can be assembled using one of the two approaches below:

1. Use notched №8/№8A and №16 tracks (Fig. 29). The notches shall make manual track bending as required by a respective layout possible. The distance between the shelf brackets is 10-15 cm.

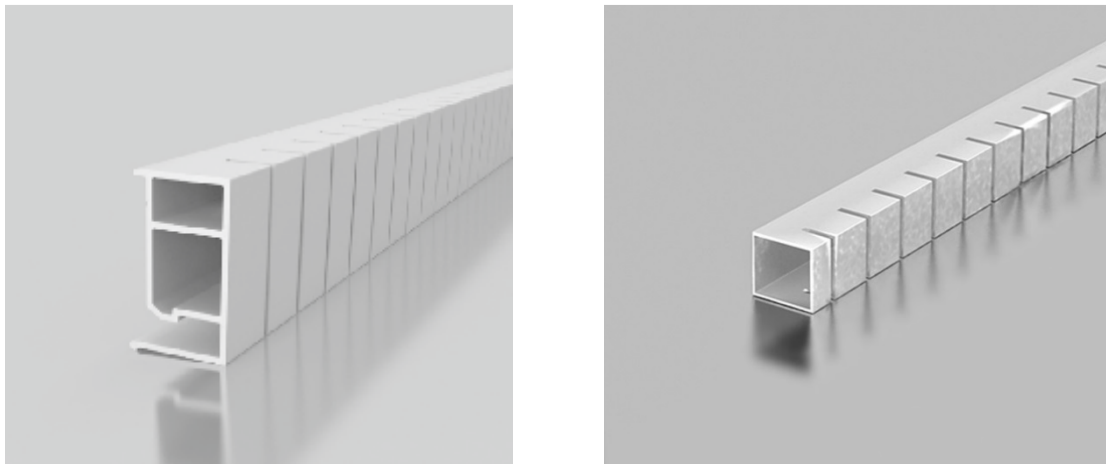


Fig. 29

2. Use semi-finished pieces made from Track №8A and №16 to be further bent with different radii. These Track №8a/№16 pieces are intended for structure installation, and are bent on site as required by your specific ceiling layout. The minimal bend radius is 35 cm. the distance between the shelf brackets is 25-35 cm.

### Wall-adjacent Track №8a/№16 structures

Track №8a/№16-based structures can be installed next to a wall at an angle larger than 90°. Generally, such structures require some on-site fitting.

1. Structure ends need some adjustment to make sure they sit closely to the wall; the ends are cut at an angle required (Fig. 30).



Fig. 30

2. Attach a wall molding to the wall as shown below to secure the lower and upper levels of the ceiling:

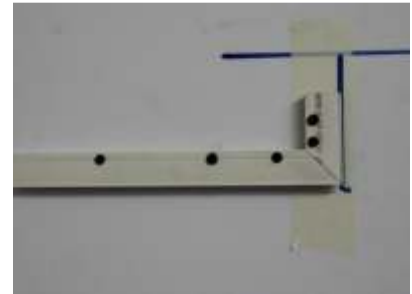




1. Place a №2 track between a cut-to-fit structure end and the wall aligning the track ledge and the structure edges



2. Mark the track installation location using masking tape



3. Vertically attach the track piece pre-cut at 45° to the structure installation location. The piece length is calculated as the structure height minus the track 8A height. Then secure a track for the lower ceiling level.



4. Secure the structure on the wall using shelf brackets. Pre-cut the rear back side of the track to shape an inward corner.



5. Place the corner shaped to the spot where the structure meets the wall



6. Fix the track to the wall



7. Secure the №2 track to the №8A track



8. This picture shows the structure and the correctly attached track. Repeat steps 1-7 above with the opposite side of the structure.



9. Use superglue to attach an L profile to the lower edge of the №16 track.

## Technological constraints related to multi-level structures



Film plasticity causes membrane stretching over inward corners of ceilings with height level changes; so called 'bubbles' might appear (Fig. 31)



Fig. 31

In case of a height level change less than 5 cm, such bubbles are hardly noticeable against carefully pre-constructed structures.

**!** In case you use structures constructed from Track №30 and/or Track №31 for ceilings with different height levels, it is recommended that you use specially cut membranes (should be specified at the time of order).



Fig. 32

**!** In the event the height level change is more than 10 cm, you may add seams to your membrane in order to be able to bend it as required (Fig. 32).

In case of a height level change more than 5 cm, it is recommended that you use the angled installation approach.

## Angled installation method

The angled installation method eliminates the technological constraints arising during installation of multi-level ceilings with inward corners.

The upper level ceiling is of a regular geometric shape (for instance, it is a rectangle or any other polygon). The height level change structure to be installed in this case shall be made with rounded corners. The level change plane shall be at a 45° angle with respect to the vertical axis (Fig. 33 and 34).

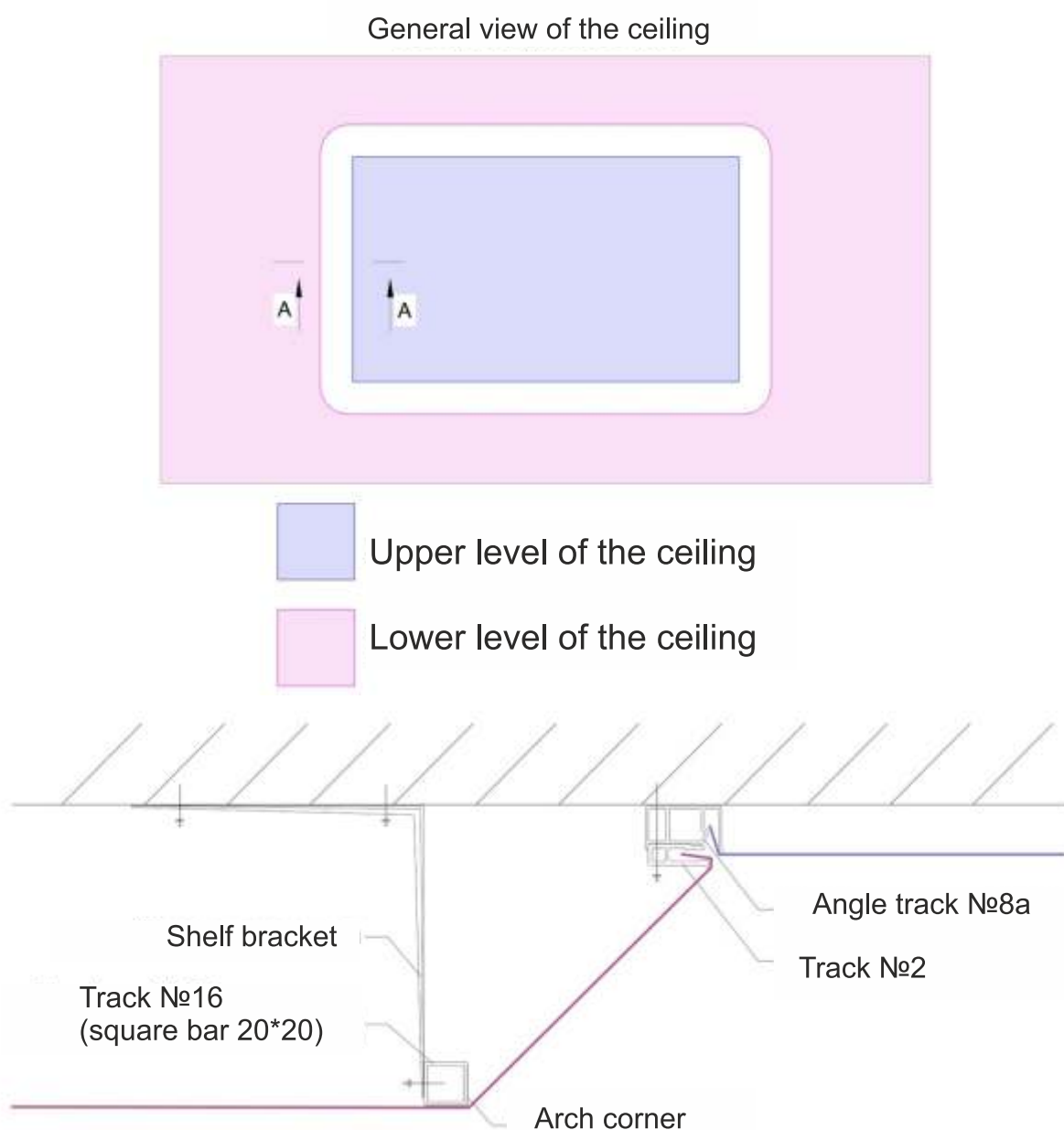


Fig. 33



Fig. 34

This kind of structure arrangement produces neatly looking inward corners without bubbles when installing multi-level ceilings with height level changes (Fig.35)



Fig. 35

There is no need to specify the bend in the drawing when ordering a stretch ceiling to be installed based on the angled installation method, as no additional material is required. The shrinkage factor should be reduced from standard 10% down to 5-7%.

When measuring the lower ceiling level, only inner cut dimensions (i.e. upper ceiling level dimensions) should be taken into account, whereas the bend size and geometry can be neglected.

## Pre-fabricated customized structures

Customized structures (Fig. 36) pre-fabricated in SAROS DESIGN workshops based on customer's drawings is the most reliable approach as the structure shall be made using special equipment (machine bending to a radius specified, argon welding) and shall be in full compliance with respective drawings.

To install such a structure on site, you will only need to secure it to the original ceiling in several points, which reduces the installation time considerably.



Fig. 36

The main advantage of pre-fabricated structures is that it is possible to install both the structure and stretch ceiling membranes in one visit, as no measuring is needed at the end of installation in case structure assembly and installation are carried out strictly in compliance with the respective requirements specification.

A pre-fabricated structure can be cut into pieces for convenience of transportation.

## Ordering multi-level ceilings. Special considerations

When placing an order for a multi-level ceiling with height level changes, one needs to specify level change heights and sides intended for membrane bend. We recommend attaching a layout specifying the sides and level change heights (Fig. 37).



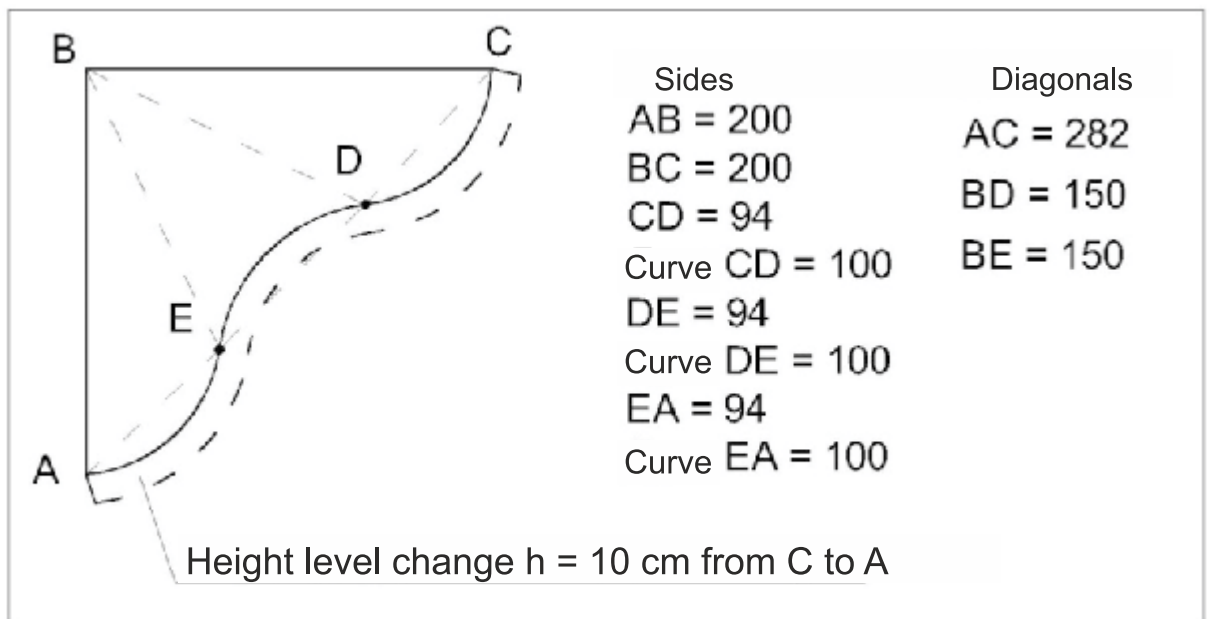


Fig. 37

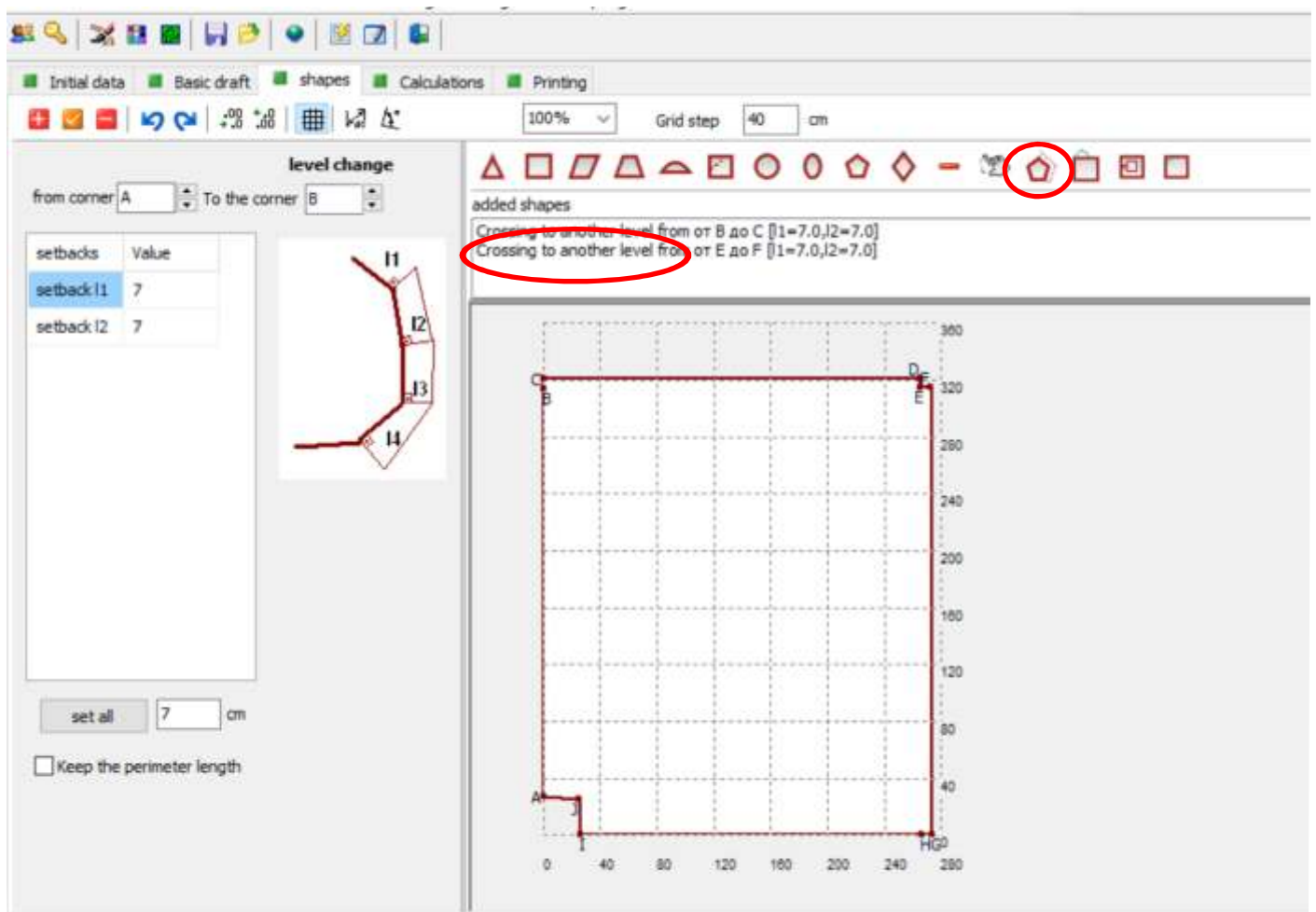


Fig. 38

In case of a slightest dimensional or shape change, or a slightest displacement compared to the intended installation position etc., it is required to re-measure both stretch ceiling levels.

Upper and lower level membrane installation shall be done following the standard procedure requiring hanging and thorough pre-heating over the entire surface.

Once both upper and lower level stretch ceiling membranes have been installed, cover the gap using the №15 oval cover strip (Fig. 39) (except for the cases where so called gapless structures are used).



Fig. 39

## STRETCH CEILINGS WITH LED LIGHTING

Ceilings with LED lighting are a popular interior design feature. LED lighting changes visual perception of the room and ceiling height.



SAROS DESIGN offers both ready-to-install structures for LED-lit stretch ceilings and components that can be used to construct LED-lit ceiling structures on site.

Below you can find types of LED lighting and key aspects you need to keep in mind when working with such structures.

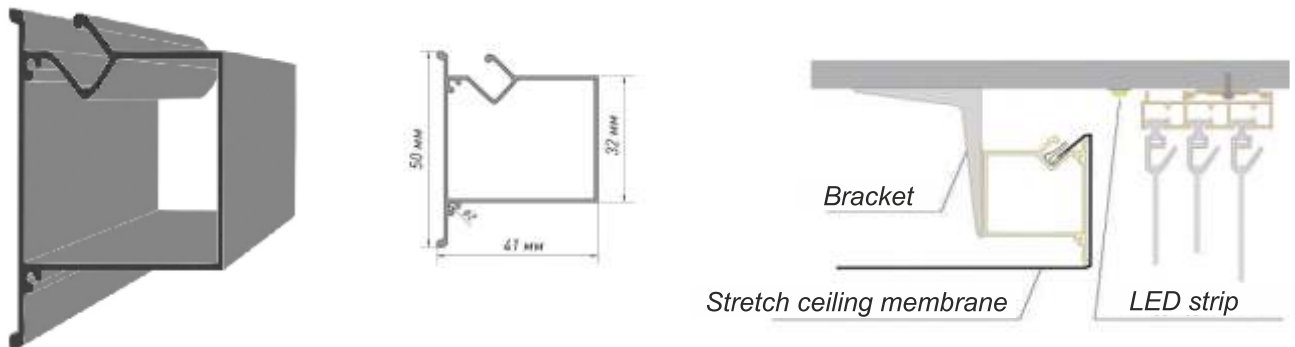
## Curtains LED lighting



Curtains accent lighting from a concealed niche intended for curtain rods installation is one of the most simple types of LED ceiling lighting as basically this is a one-level ceiling with a cornice and a light source installed at a distance from the window itself.

There are several ways to install this kind of accent lighting:

1. Using a B aluminium track (Fig. 40).



This track is used for installation of concealed cornices and niches acting both as a load-carrying structure and a structure for stretch ceiling attachment requiring no additional materials.

2. Using a No 4 general-purpose track and a 25x25 aluminium square bar. Shelf brackets are used to level the track horizontally (Fig. 41).

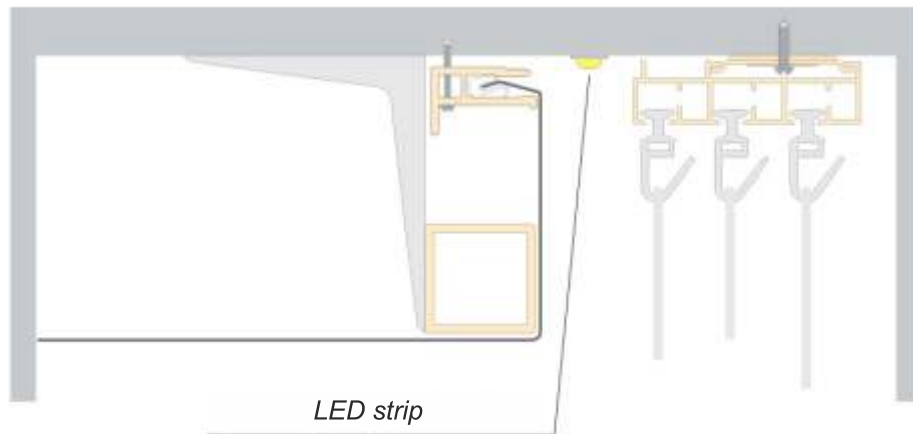


Fig. 42

### **Floating stretch ceilings. Ceilings with contour lighting**

Floating stretch ceilings and ceilings with contour lighting use the installation procedure for one-level stretch ceilings with LED lighting around the perimeter requiring no installation of any additional structures.

There are special tracks for such ceilings that both serve for stretch ceiling attachment and have a ledge for LED strips installation.

### **Floating stretch ceilings**



For floating ceilings, SAROS DESIGN offers a special LED track (Fig. 42) The LED track has a specifically designed vertical ledge for LED strips installation. When installed, light from LED strips is directed towards the walls creating an illusion of floating around the entire ceiling perimeter.



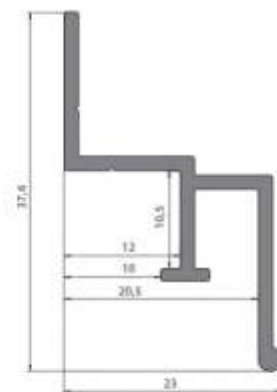


Fig. 42

The LED track is wide enough to put an LED strip up to 10 mm wide on it. The ceiling height loss is not more than 38 mm. The distance between the ceiling and the wall is only 10 mm ensuring a neatly looking ceiling with lights off. The installation sequence for the LED track is similar to the use used with the wall №5 track.

### Stretch ceilings with contour lighting

For a stretch ceiling with hidden contour lighting, use a track where the LED strip installation position is completely behind the stretch ceiling. Thus, when the lights are off, the ceiling looks like a regular one-level stretch ceiling, whereas when the lights are on, the light spreads evenly around the contour (Fig. 44, 45).



Fig. 44,45

SAROS DESIGN offers installation of stretch ceilings with hidden contour lights using a combination a Z-shape track and Track 5 (5G) (Fig. 46). The ledge of the Z-shape track is wide enough to put an LED strip up to 20 mm wide on it. Below are sketches showing Z-shape track installation for countour-lit ceilings (Fig. 46):

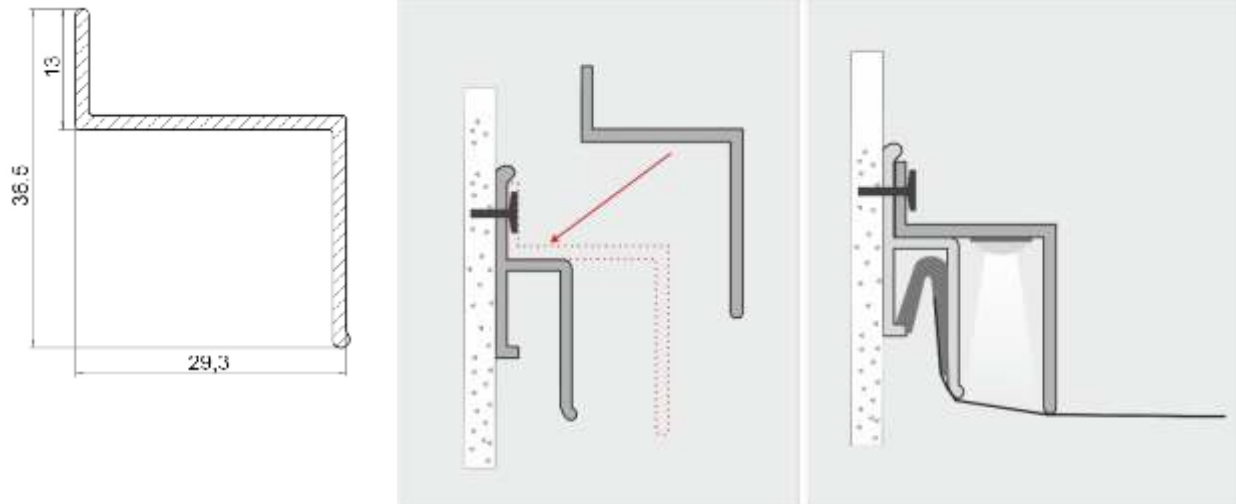


Fig. 46

## Cornice lighting



A distinguishing feature of such ceiling lighting is a special apron (cornice) where the LED strip is installed.

Similar to the multi-level ceilings installation procedure, installation of cornice-lit ceilings can be split into two key stages:

1. Installation of metal structures
2. Stretch ceiling membrane installation

Cornice-lit stretch ceiling structures can be seen as a kind of structure with changing height levels. The structure itself shapes a niche for LED strip installation.

## **AB tracks-based metal structures with changing height levels and additional LED lighting**

AB tracks-based metal structures (A – the upper part, Fig. 49) and (B – the lower part, Fig. 48) provide the possibility to have height level changes 65-70 mm high in stretch ceilings with decorative LED lighting along the height level change line (Fig. 50).

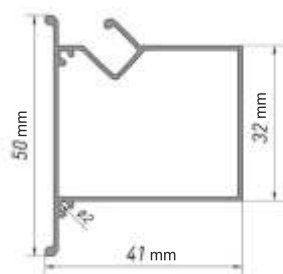


Fig. 48

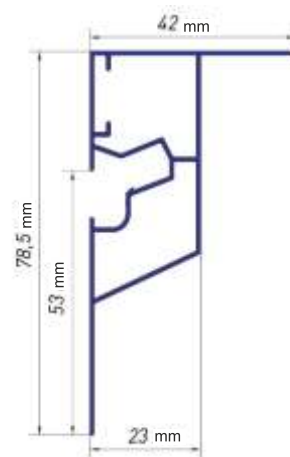


Fig. 49

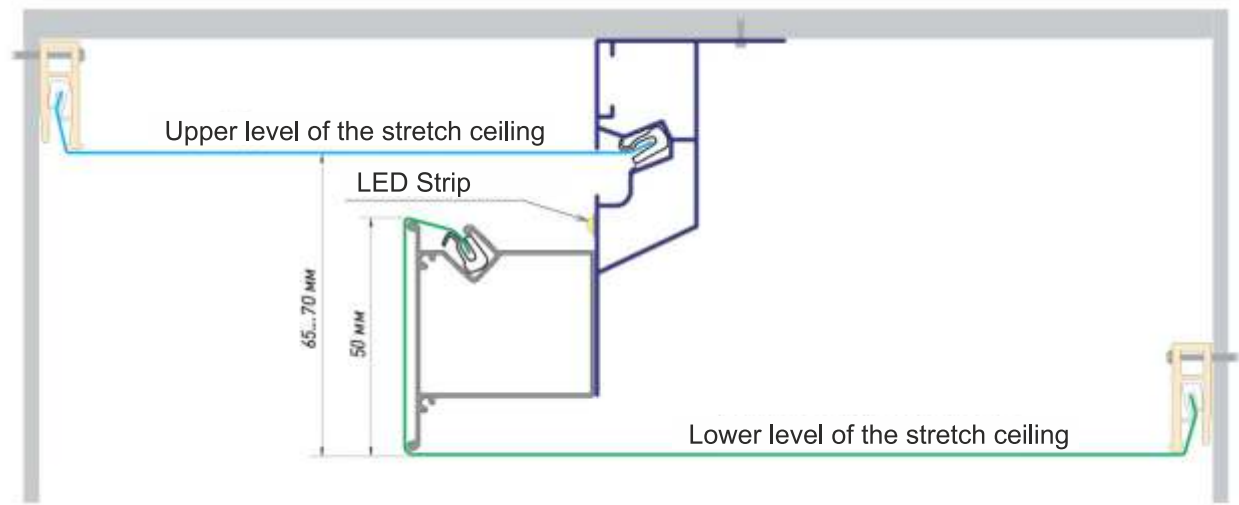


Fig. 50

You can either assemble AB tracks-based structures for cornice-lit ceilings on site by yourself or order ready-to-install structures.

## General operational sequence with AB tracks

A tracks are joined together with a connection piece (an aluminium strip 15x2 mm) (Fig. 51). The recommended strip length is 40 mm. Once the tracks are joined, the strip is secured with pressure-pad self-tapping screws for metal. In order to be able to join B tracks more precisely, use pins 2 mm in diameter and 20-30 mm long (Fig. 52).

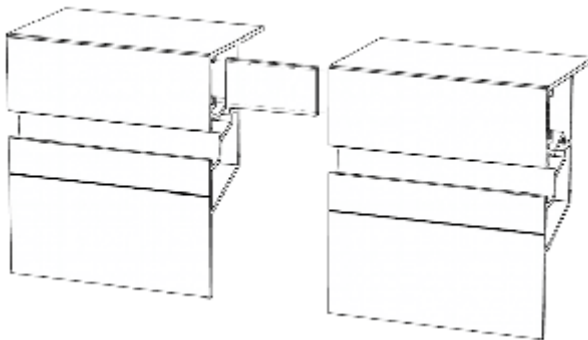


Fig. 51

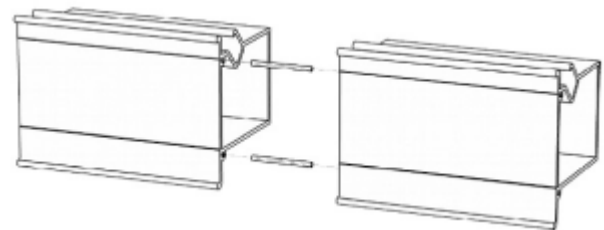


Fig. 52

Two track sections are joined together with pressure-pad self-tapping screws for metal with a distance 15-30 cm between each other. The structure is attached to the original ceiling using either the horizontal track ledge or shelf brackets (seat angles). Pieces of the horizontal track ledge need to be removed in shelf brackets installation positions (Fig. 53).



Fig. 53

## Curved AB track-based structures for cornice lighting

Notched AB tracks are used to make curved structures. Notches are made at a distance from 7 to 20 mm from each other so that front sides of the AB tracks remain intact (Fig. 54).

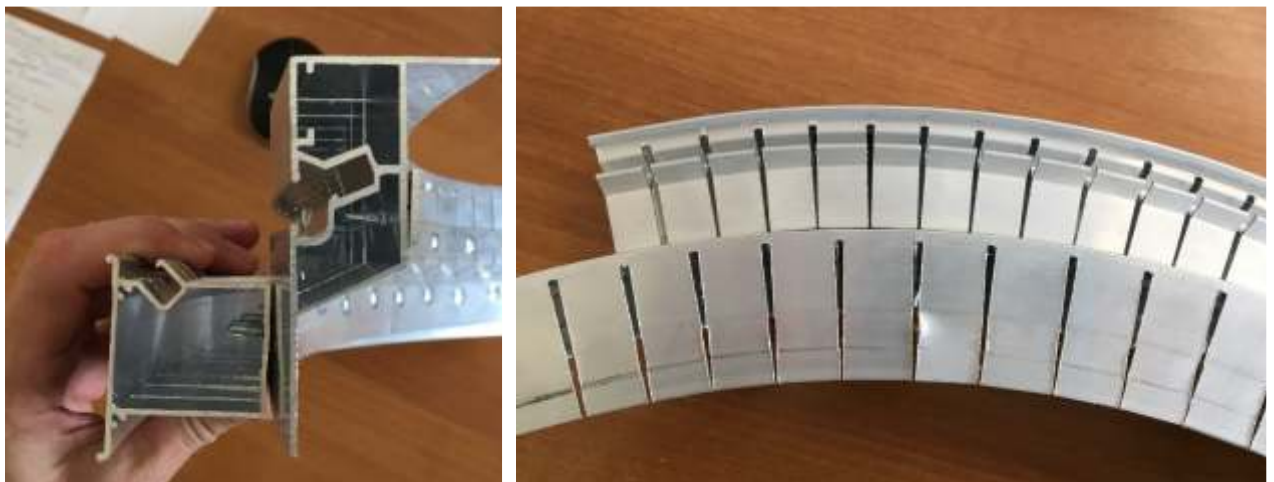


Fig. 54

A structure with curved sections is assembled following the sequence below: first, an A track is bent to the radius required, and then the A track bend is secured with an aluminium



strip (15x2 mm). After that, a B track is bent as required (to fit the A track shape). Then, the two sections are joined together (Fig. 55). The B track does not require any additional securing. The recommended minimal curve radius of a finished structure is 150 mm.

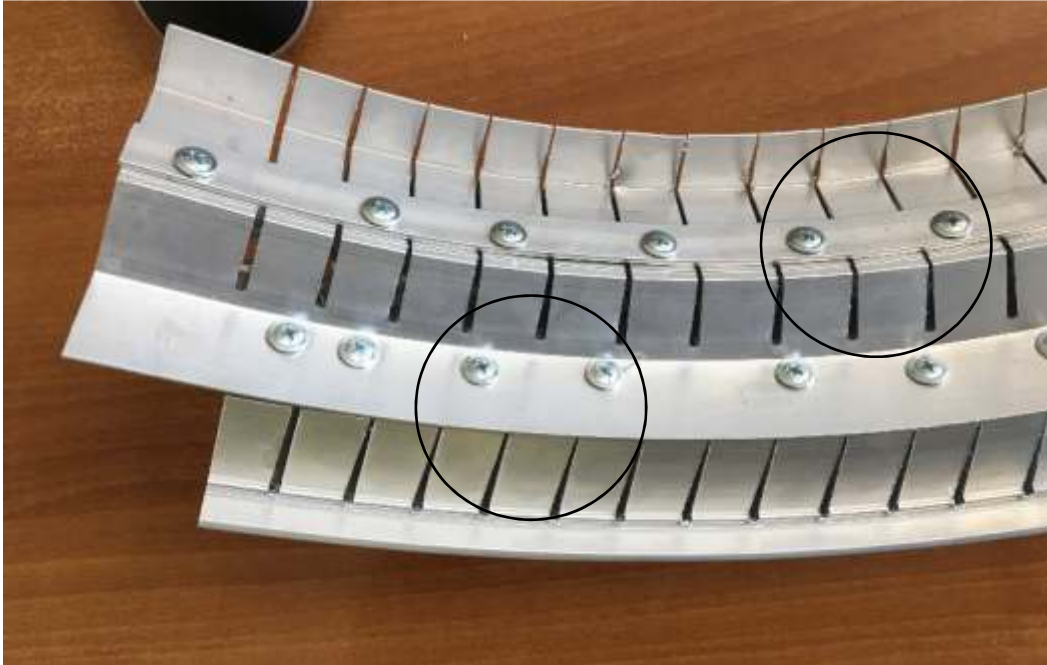


Fig. 55



Use aluminium foil tape over all the notches in the Ab tracks and all the joints between the tracks to avoid flare (Fig. 56).



Fig. 56

## STARRY SKY-EFFECT STRETCH CEILING



Starry Sky is one of the most eye-catching ceiling finishes that imitates a night sky with star systems and constellations. The effect is made more dramatic with a twinkle effect mode.

A Starry Sky set consists of a light source (projector) and a bundle of optical fibres transmitting light (Fig. 61).



Fig. 61

## Starry sky-effect stretch ceilings installation procedure

### Projector installation

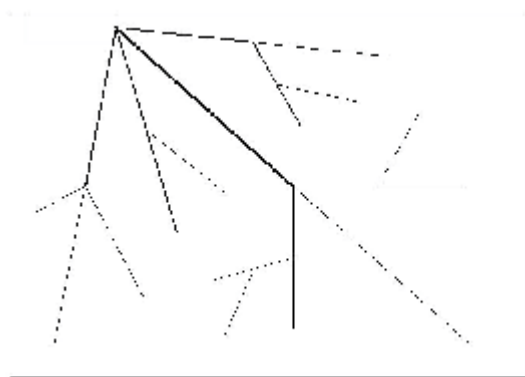


It is not possible to take an entire Starry Sky-effect stretch ceiling down and re-install it afterwards. Only partial dismantling of the membrane around the room perimeter is possible.

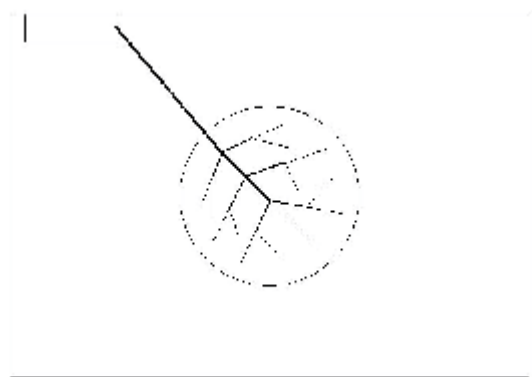
Therefore, it is recommended that you install your projector as close to the stretch ceiling perimeter as possible so that you have access to it in case of necessity. The projector is attached to the original ceiling or to a wall using a perforated tape.

### Installation of optical fibres and strand distribution over the original ceiling

Once you have attached the entire bundle input to the projector, you need to arrange the fibres over the original ceiling. You need to distribute all the optical fibre strands uniformly in accordance with stars layout. Optical fibre distribution patterns are shown in Fig. 62.



*Optical fibre distribution in case of Starry Sky installation over the entire stretch ceiling area*



*Optical fibre distribution in case of Starry Sky installation over a part of the stretch ceiling*

Each fibre that extends from the bundle needs to be attached to the original ceiling. To do that, screw a self-tapping screw into the ceiling and then use a plastic tie or electrical tape to tie your fibre to the screw (Fig. 63).



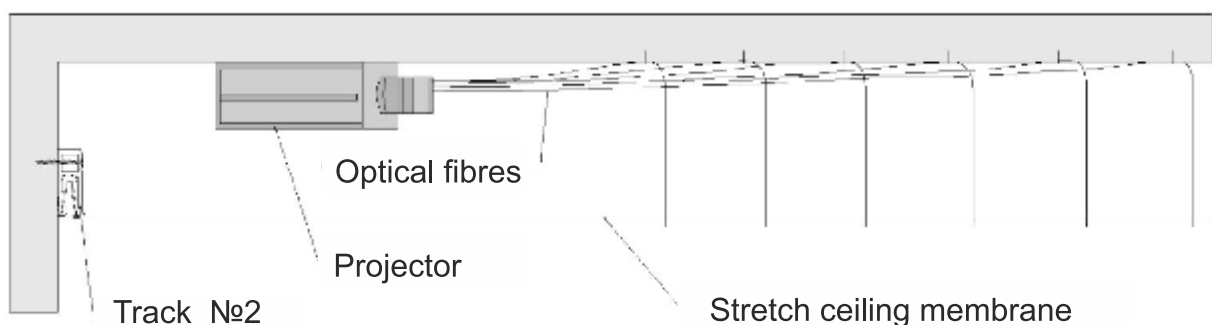
Fig. 63

Arrange and secure optical fibres so that fibres dangle at least 15 cm below the level of the stretch ceiling to be installed. This length is required for subsequent 'star' installation.

There are two ways to install a Starry Sky stretch ceiling:

- with punctures in the stretch ceiling membrane and
- without punctures in the stretch ceiling membrane

## **Starry Sky installation with punctures in the membrane**



Follow the standard installation procedure to install a stretch ceiling membrane. The only difference is that you need to leave small uninserted sections on each side of the membrane. The larger the starry sky ceiling area is, the more uninserted sections you need to leave to ease further installation. The ceiling installed needs to cool down to room temperature.



After cooling, the stretch ceiling needs to be partially unhooked, i.e. the uninserted sections have to be made larger. Unhook those parts of the membrane that provide best access to the farthestmost parts of the starry sky.

Begin 'star' installation starting with the farthestmost ones.

First, make punctures in the stretch ceiling membrane (use a needle or a thin awl). Continue putting optical fibre strands through the punctures. Only one strand shall be put through one puncture (Fig. 64).



Fig. 64

Make sure the strands do not rest on the back of the membrane but dangle, as, otherwise, the optical fibres will be visible on a finished stretch ceiling (especially, in case of thinner materials).

Follow the procedure to evenly distribute 'stars' over the entire stretch ceiling surface (Fig. 65).



Fig. 65



Once all the 'stars' and the stretch ceiling have been installed, the strands need to be securely fixed to the membrane. Apply a drop of superglue onto a strand just below the membrane and then pull the strand up until the drop touches a respective puncture in the film. As soon as the glue has dried, cut the strand with a pair of side cutters at a distance approximately 1 mm from the membrane (Fig. 66).

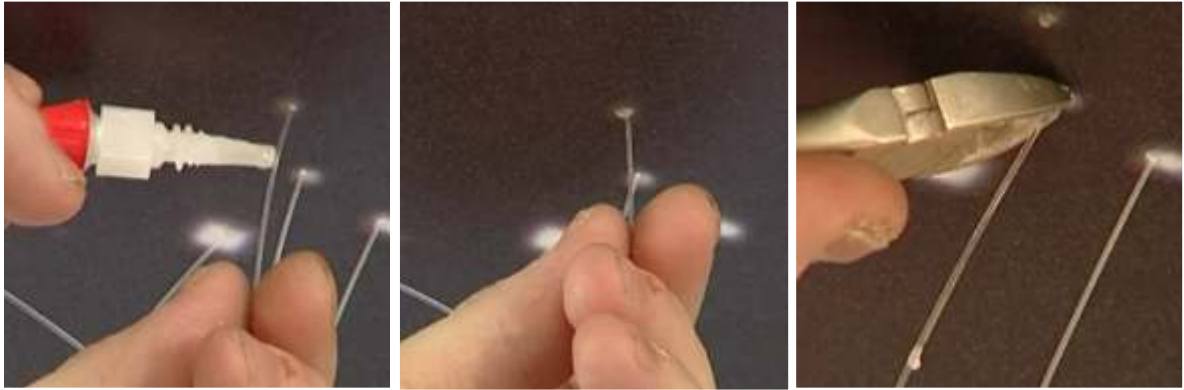


Fig. 66

In case of a punctured starry sky installed in Lacquer finishes, cut and glued strands might become visible on the ceiling surface in a well-lit room (Fig. 67). However, this will not happen if you choose a Suede finish since its pile can hide traces of glue.



Fig. 67

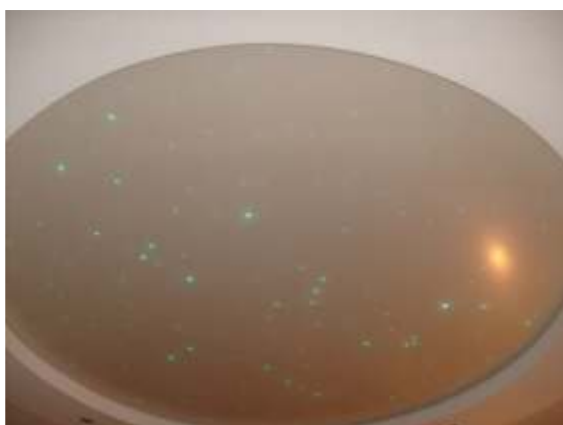
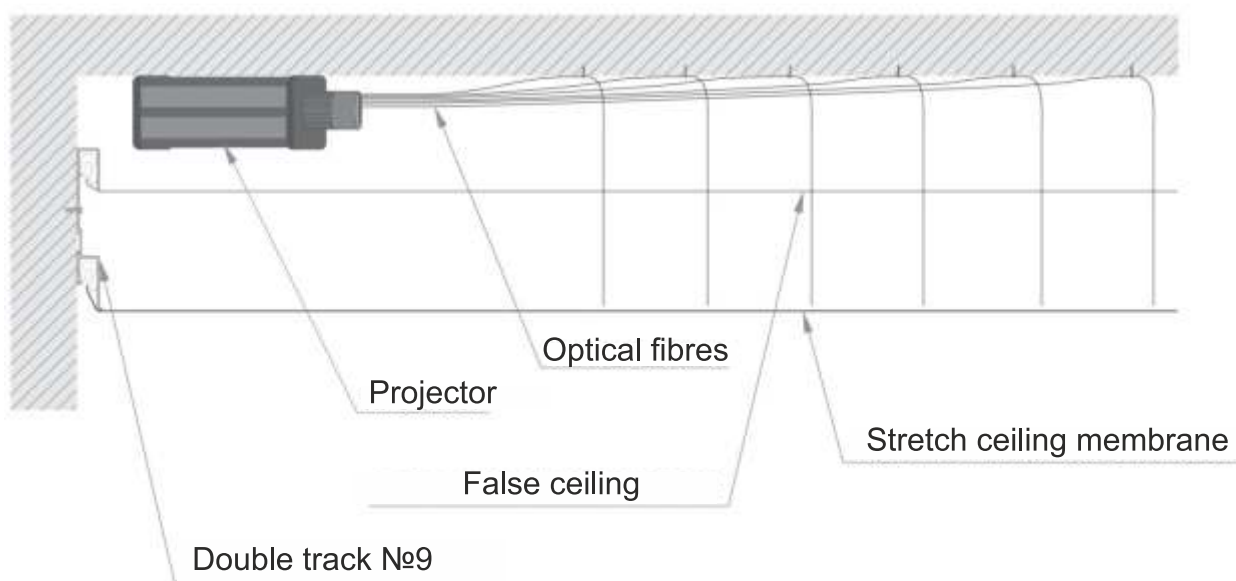
Crystals or lenses can be installed onto optical fibres (Fig. 68). They are installed in the same way as recessed light fixtures, i.e. they will require a background support installed behind the stretch ceiling membrane. Respective supports and reinforcement rings can be ordered from our workshops.

Several optical fibre strands are put inside a crystal or a lens depending on their diameter and requirements specification.



Fig. 68

**Starry Sky installation without punctures in the membrane**



To install a starry sky without punctures, you will need a false ceiling fitted between the original ceiling and the main stretch ceiling membrane. The false ceiling will be used to arrange optical fibres and to secure them in the positions required. You can also put specific constellation images or star charts onto such a false ceiling to use as a basis for further puncturing.

It is recommended that you use a double №9 track to install two stretch ceiling membranes (Fig. 68).

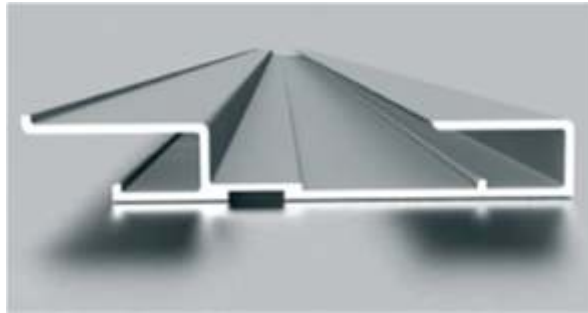


Fig. 68

The installation procedure is similar to the one used to install a punctured starry sky. Evenly (or according to a specific image or chart) distribute optical fibres throughout a false ceiling until all the 'stars' have been installed. However, unlike with the other method, you can enhance the brightness and size of some 'stars', which becomes possible when several optical fibre strands are pulled through a puncture.

Once all the false ceiling 'stars' and the stretch ceiling have been installed, you need to cut dangling optical fibres at a distance 45 mm from the film (the distance between the original and the false ceiling installed using a №9 track). In case of several fibres pulled through one puncture to enhance the brightness, secure these fibres together with electrical tape (Fig. 69).



Fig. 69

Then install the main stretch ceiling (Fig. 70). The thickness of the material used for the main ceiling should not exceed 0.17 mm (many Lacquer and Satin finishes will do, and some of the Style finishes).



Fig. 70

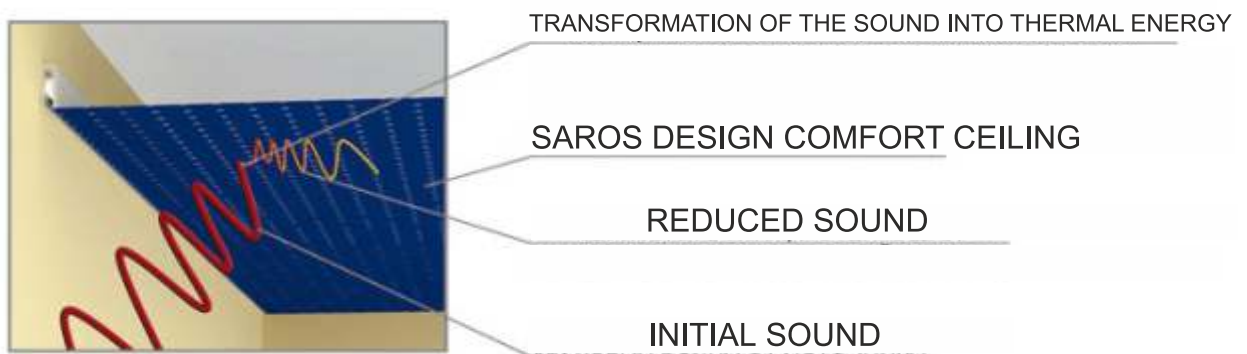


Use identical materials with the same shrinkage factor for both ceilings to ensure an equal distance between the films.

## SAROS DESIGN COMFORT ACOUSTIC STRETCH CEILINGS

SAROS DESIGN COMFORT stretch ceilings is an easy and simple solution to manufacture and create acoustic comfort in a room while keeping the great-looking appearance specific to stretch ceilings.

Sound waves that emanate from a sound source located in a room are partially absorbed by micro-perforated holes in the SAROS DESIGN COMFORT stretch ceiling. The air in the micro-perforations causes the obstruction of the initial sound, partially converting the sound waves into thermal energy and reducing their intensity. In addition, there is obstruction from the air between the micro-perforated panels and the back wall. As reflected sound waves continue to reverberate around the room, acoustic absorption continues and the reverberation time in the space is reduced.



### Installation recommendations for acoustic stretch ceilings

Normally, a SAROS DESIGN COMFORT acoustic stretch ceiling (without any additional sound-absorbing panels) is enough to ensure satisfactory sound absorption in a room. The advisable distance between the membrane and the original ceiling is at least 100 cm (Fig. 71).

In case the purpose of the room requires higher sound absorption, for instance, in case of home theatre rooms, it is recommended that you use additional sound-absorbing materials. A combination of sound-absorbing panels and acoustic stretch ceilings improves sound absorption to class B (maximum absorption).

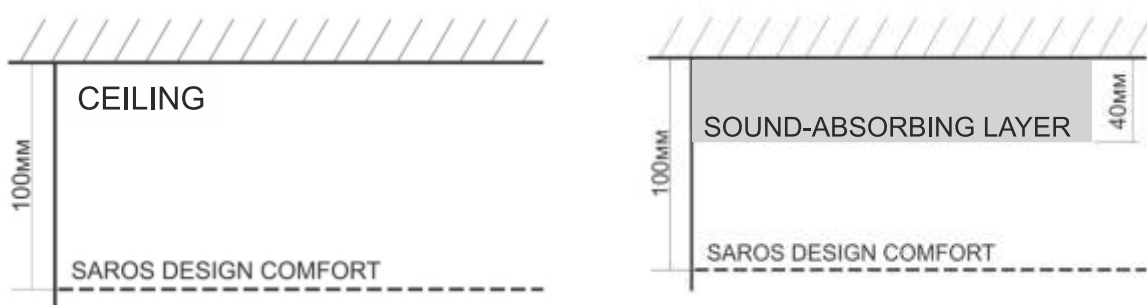


Fig. 71



## 3D STRETCH CEILINGS: WAVES, ARCS, DOMES ETC

Complex three-dimensional configuration stretch ceilings that are discussed in this chapter are installed similar to regular stretch ceilings. However, every kind of a 3D stretch ceiling has its own special installation aspects that need to be taken into account.

### Wave-shaped ceiling



A wave-shaped stretch ceiling between two walls shall be installed as follows:

- First, put respective marks on opposite walls in order to be able to install tracks to form waves as specified in a requirements specification. It is preferable that you use a pre-manufactured curve to do that.
- Pre-cut a wall track from the top (cut to the middle of the track height) and attach it along the marked line (Fig. 72).

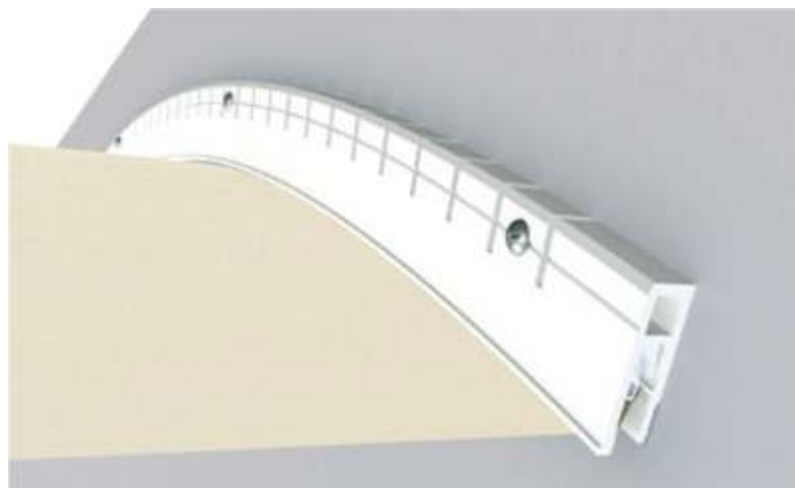


Fig. 72

- Then follow the standard installation procedure; clamp a stretch ceiling membrane in the corners to hang it, uniformly heat the entire membrane up, and insert it into the tracks starting with harpoon sections in the middle.

Please keep in mind that in case the wave width is more than 1.5 m, the film will tend to flatten in the middle during installation. Therefore, you will need to allow for the right membrane shrinkage as follows: shrinkage along the length – 0%, and shrinkage along the width – considerably larger than the standard one. Remember to make a special remark notifying of the wave shape of the stretch ceiling when placing a respective order so that our specialists could select the most favourable length and width shrinkage ratio.

### Floating wave



A floating wave-shaped stretch ceiling is installed using metal structures. Such a ceiling can either side with one of the walls or be installed as an independent suspended interior design element.

A floating wave metal structure is constructed using 25\*25 square bars (Fig. 73).



Fig. 73

Such stretch ceiling installation and shrinkage adjustment shall be done the same as in case of a simple wave-shaped ceiling.

## Arcs and vaults



The main difficulty in case of an arch- and vault-shaped stretch ceiling installation is keeping the membrane straight in the middle. Remember to make a special remark notifying of the arched or vaulted shape of the ceiling you are going to install so that our specialists could select the most favourable length and width shrinkage ratio. As opposed to wave-shaped ceilings, in case of arch- or vault-shaped ceilings the length shrinkage should be considerably larger than the standard one whereas the width shrinkage should be reduced to 0%.

In addition to the above, the sides of the membrane are pre-cut in the workshop arc-like (Fig. 74), which helps keeping the required arched or vaulted shape during installation.

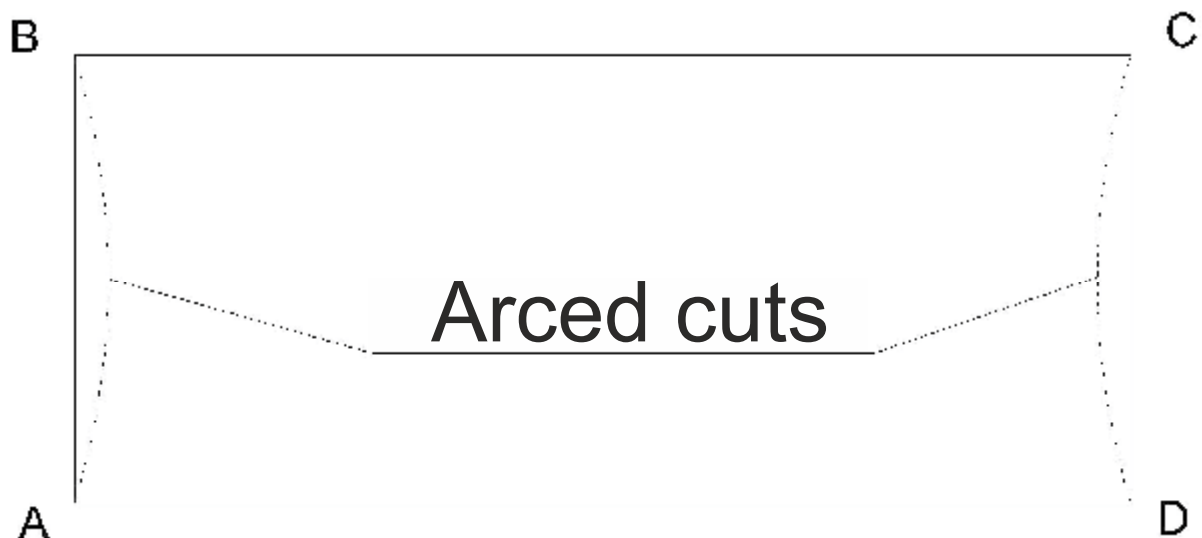


Fig. 74

## Domes



A dome can be shaped by means of raising or lowering the membrane level. However, tracks shall be secured around the perimeter at the same level. Normally, light fixtures attached to rigid suspensions used to ensure the required dome height shall be installed in the vortex of inverted or outward domes (Fig. 75).

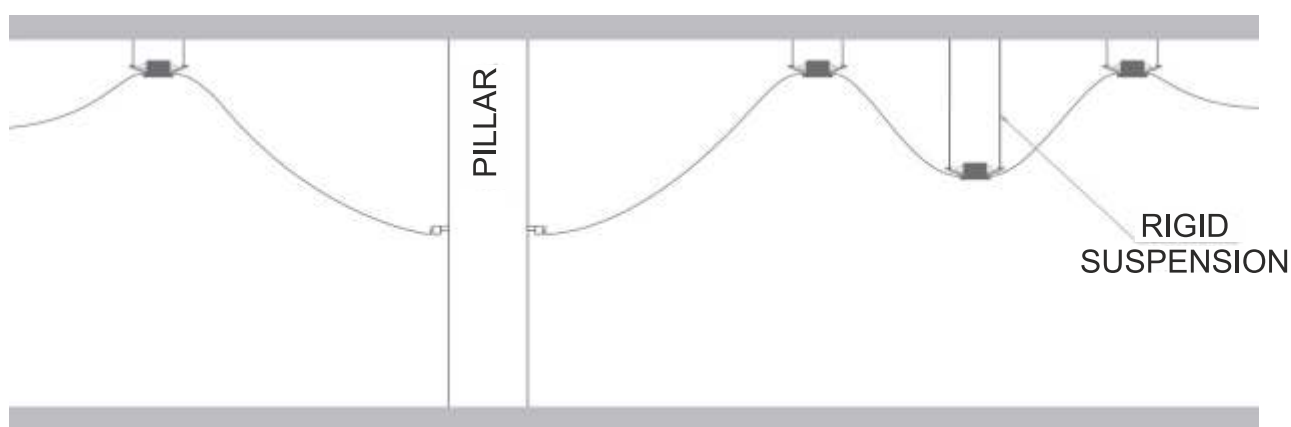


Fig. 75

The shrinkage factor applied to dome-shaped ceilings is smaller than the standard one, therefore, you need to put a special remark notifying of the ceiling shape when placing a respective order.

To shape an outward dome, install your light fixture following the standard procedure, i.e. using a background support and a protective reinforcement ring. The only difference is that your background support shall be secured to rigid suspensions preventing the fixture from displacement and the membrane – from being drawn in.

In case of an inverted dome, keep in mind the fact that the larger the height level difference is, the higher the probability that your light fixture will not be able to hold the over-stretched stretch ceiling membrane. You need to take specific design features of the fixtures installed into account to be sure that fixtures' lugs will be able to withstand membrane stretching.

If a light fixture structure is not strong enough and the fixture is likely to drop from the installation hole, install a rail around the perimeter of the respective background support and weld harpoon to the edges of the respective hole directly on site. The harpoon inserted into the rail around the light fixture installation hole perimeter will make the entire arrangement secure.

## Other stretch ceiling shapes



A stretch ceiling can be modelled into any shape due to its elasticity. Regardless of the shape, the process will always involve preparation of a structural frame that will be covered with film afterwards.

While constructing the structure, remember that the film will sit tightly over the structure parts located close to it and such parts will be visible through the membrane. Therefore, the structural frame should be constructed so that there are as few points of contact between the structure and the stretch ceiling membrane as possible (Fig. 76).





Fig.76

## Examples of 3D stretch ceilings:



## INSTALLATION OF STRETCH CEILINGS WITH SOLDERED SHEETS

### Special aspects of installation of a stretch ceiling with a straight-line soldered joint



When installing a stretch ceiling with a straight-line soldered joint, first, you must corner-clamp it and thoroughly heat its entire surface. Keep heating while inserting the harpoon into the tracks because otherwise the soldered joint may become uneven.

In case you do have an uneven soldered joint after installation, it is recommended that you follow the joints straightening procedure described in Part 1 of the Training Manual.

### Special aspects of installation of a stretch ceiling with a curved soldered joint



Normally, curved joints are welded in the workshop in 7-15 mm sections. Therefore, sometimes you may see some knees on an installed ceiling that will need to be straightened.

Use electrical tape to do that. First, attach half-way a piece of the tape near the section you need to straighten (see the figure below). Then use a blow dryer to heat the membrane on the other side of the joint. You shall be able to straighten the joint, pulling the tape as shown in Fig. 77.



Reinforcement rings should only be glued to a stretch ceiling membrane after you have completed installation and made sure all the lines run smoothly.

## MANSARD CEILINGS



There are no differences compared to installation of a regular stretch ceiling. Installation of such ceilings requires №6 separators (Fig. 78).

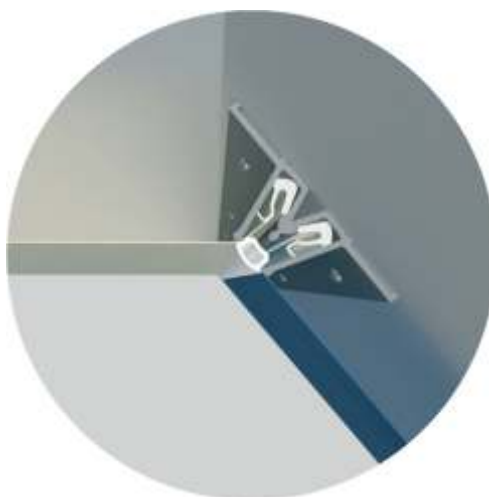


Fig. 78

It is recommended that you install such stretch ceilings above human scale or in hard-to-reach places as the film might be damaged with piercing and/or cutting articles, or by domestic animals or children.



## INSTALLATION PROCEDURE FOR LARGE LIGHT FIXTURES AND NON-STANDARD ACCESSORIES

Quite frequently there is a need to install large light fixtures (requiring an installation hole perimeter of 50 cm and more) and non-standard recessed accessories (acoustic speakers, air conditioners etc.).

It is not possible to install such recessed accessories following the standard procedure using reinforcement rings as any large ring will deform as a result of ceiling stretching. Therefore, it is recommended that you install such accessories using harpoons.

First, prepare a background support that will ensure secure light fixture attachment to the original ceiling and needs to be rigidly fixed onto suspensions.

You can use a No 4 or 4G general purpose aluminium track to make a background support in case of recessed accessories with a maximum side length less than 25 cm (Fig. 79).



Fig. 79

In case of larger accessories, you will need a reinforced background support made using a bar or №16 aluminium track. A track for harpoon installation shall be fixed inside the support (Fig. 80).



Fig. 80

Once you have completed stretch ceiling membrane installation, you can map out the outline of the installation hole you are going to cut. Then use superglue to secure a harpoon along that outline (Fig. 81).



Fig. 81



You can only cut an installation hole after you have glued the harpoon around the entire perimeter. Otherwise, your membrane may be torn.

Next, insert the harpoon into the track starting with corners and middle sections on each side (Fig. 82).



Fig. 82

Once you have inserted the entire harpoon, you can connect and install accessories (Fig. 83).



Fig. 83

Any round or non-rectilinear accessories shall be installed following the procedure above. The only difference is that a background support shall be made using a curved square bar or is cut from plywood that is at least 15 mm thick.