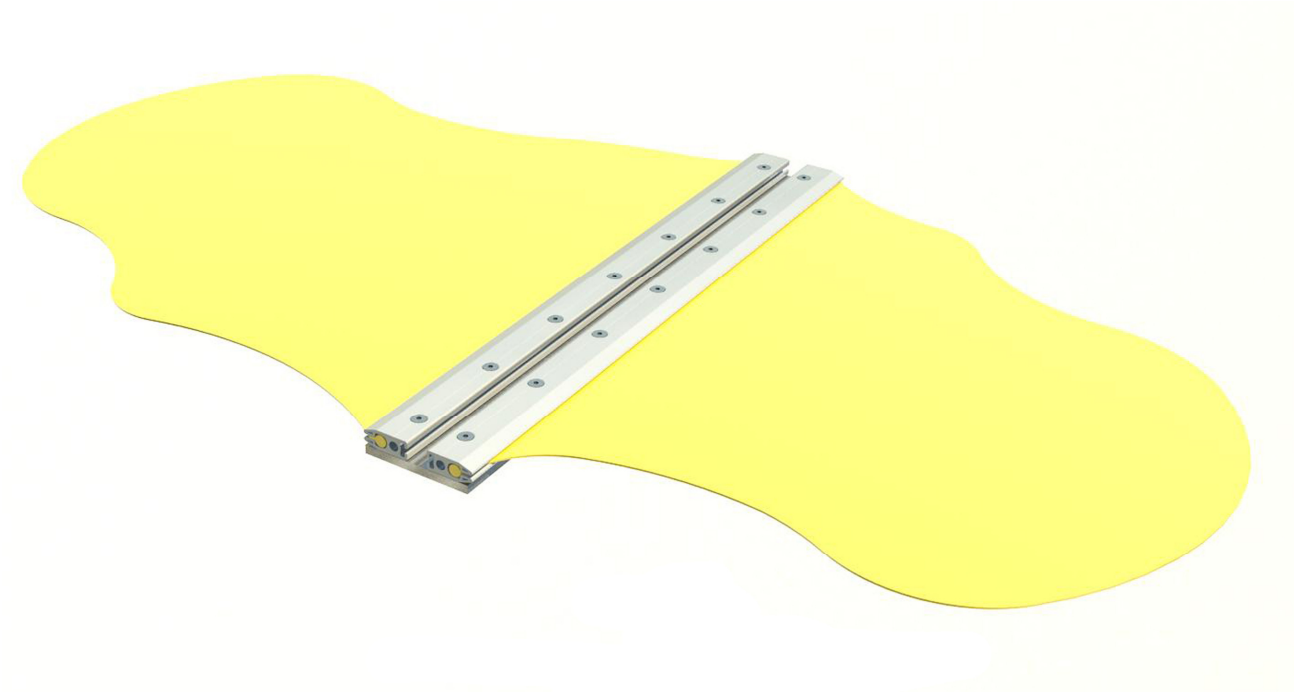
TENNECT

Manual: linear fixation



date: 10.09.2010

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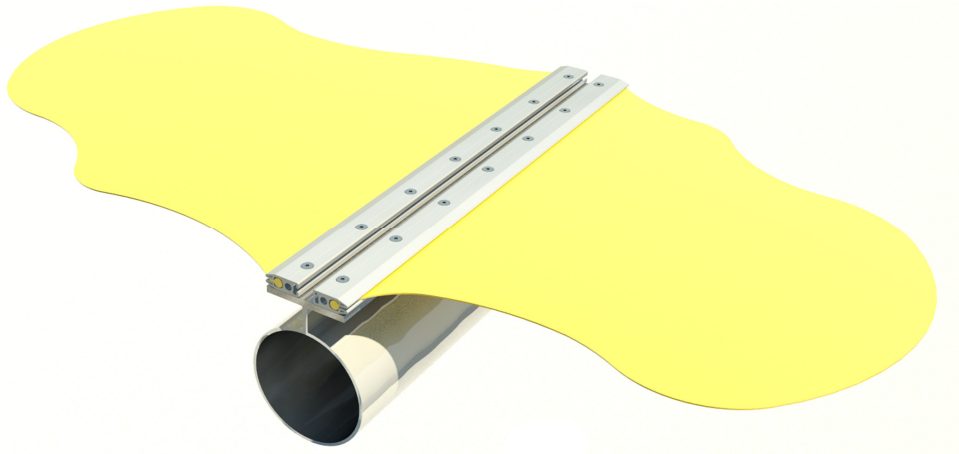
1 Overview

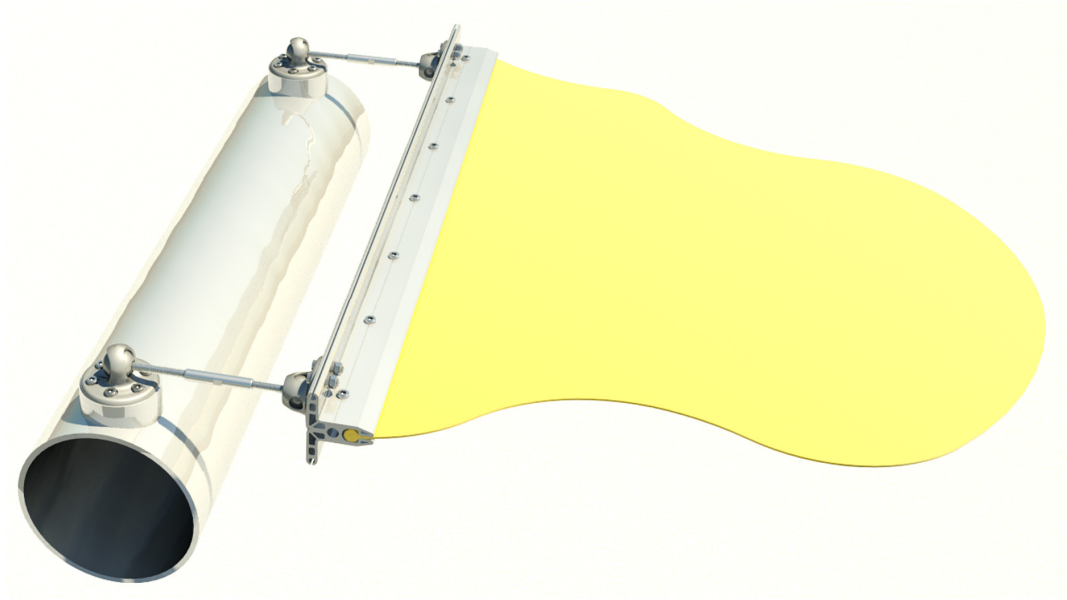
1.1 General

The TENNECT system includes two types of aluminium profiles for linear fixation of membrane borders.

a : ISK-PF 3000 welt section AW6060 T6



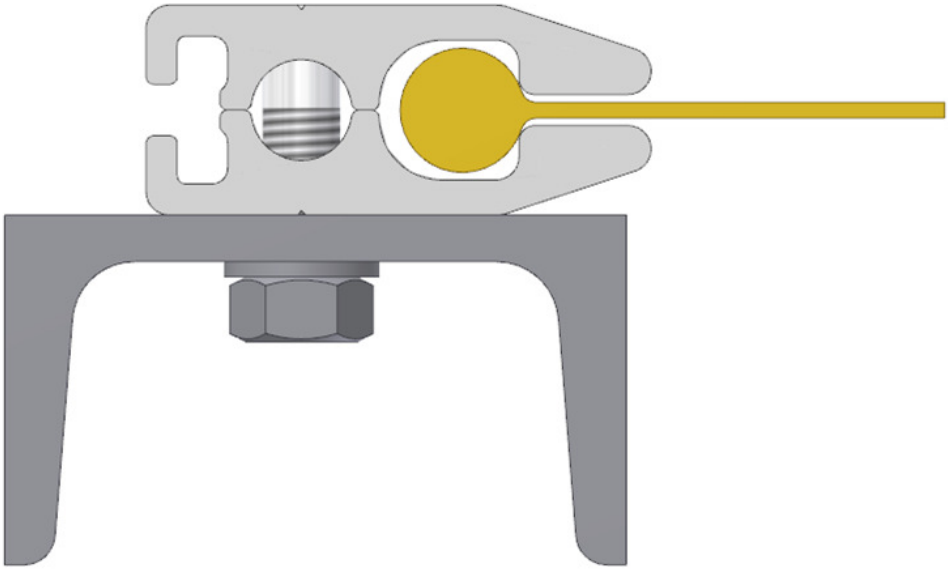
b : ISK-PL 3000 welt section AW6060 T6



The different welt sections can be combined can be combined.

Up to now either the membrane border is perforated at regular intervals and clamped or the keder (also known as a „bolt-rope“) is pulled into a single aluminium profile. Both proceedings include serial disadvantages. The perforation of the membrane border is expensive, complex and error-prone. The looming of the membrane border is mostly difficult to realize and complex.

The TENNECT system consists of an aluminium profile that can be screwed with a mirrored one. In that manner the looming of the membrane border will be much easier.



The welt section ISK-PF 3000 is particularly suitable for linear fixation on a beam or a wall. The aluminium profile has got in different to the welt section PL a lower moment of inertia in transverse direction and must be fixated in regular distances.

The welt section ISK-PL 3000 can be used, because of the higher moment of inertia in transverse direction, if a continuous fixation on a beam or wall is not feasible, or if the system should be tensible.

In case of a tensible system the TENNECT part W25 can be used which size is adjusted to the sizes of the welt section PL.

1.2 Sample applications

Additional to the sample applications of chapter 1.1 further examples should point up the application possibilities of the welt sections.

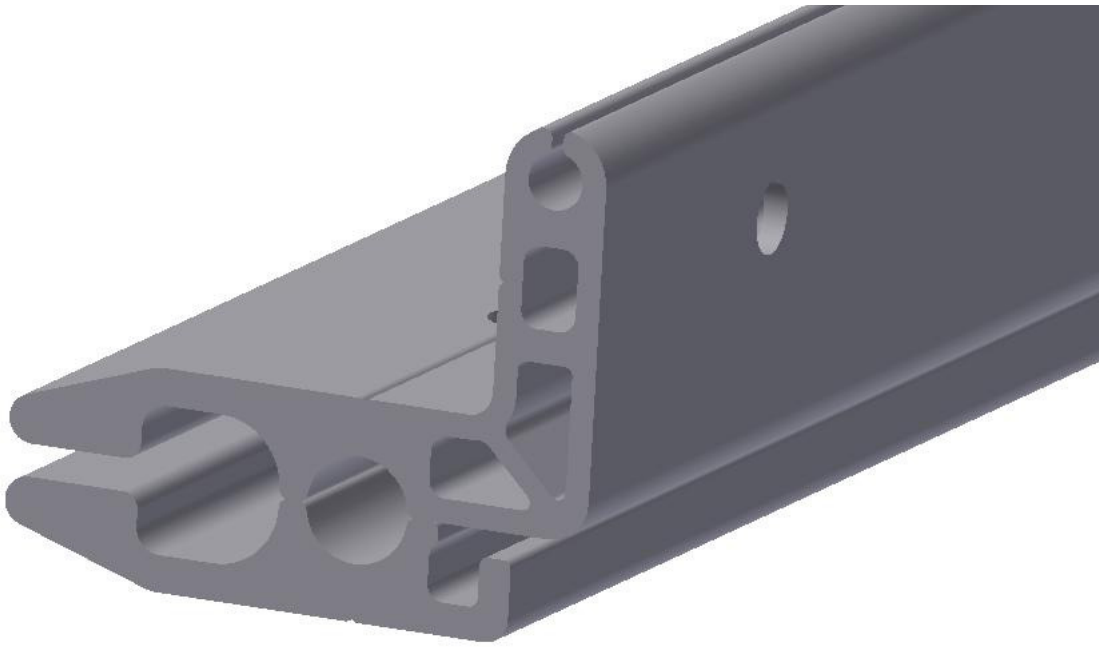
The welt section ISK-PF 3000 contains a slot which can be used to pull the system during assembly or to fixate the system in case of low horizontal forces The slot is designed for a cup square neck bolt DIN 603 M6. The maximum bearing load of the bolt is F = 3,0 kN.

Bracing with a cup square neck bolt

The welt section ISK-PL 3000 can be fixed variously. Secondary to the solution of chapter 1.1 where the system is connected with TENNECT parts, also U-bolt pipe hanger can be used. This kind of fixation is cheap and very flexible and offers the possibility to retension the membrane.

Bracing with U-bolt pipe hanger

The combination of welt section is possible and could make sense in case of high vertical loads which would overload the welt section PF.



Combination of welt sections

2 Welt section PF 3000

2.1 Characteristics of welt section

Distance center of gravity: x_s = 8,3 mm

y_s = 30,1 mm

x_1 = 5,2 mm

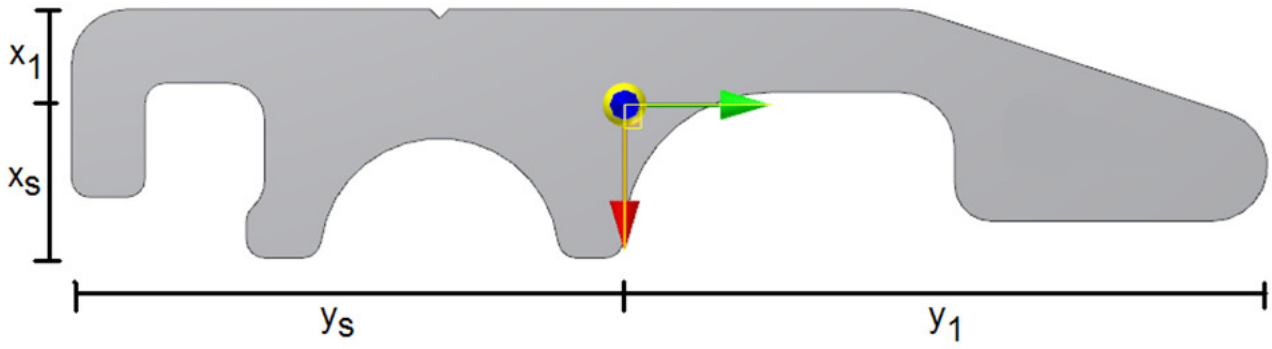
y_1 = 34,9 mm

Moment of inertia: I_{xx} = 15,7 cm^4

I_{yy} = 0,5 cm^4

I_{xy} = -0,6 cm^4

Area: A = 474 mm^2



2.2 Choice of crew distance

The value of crew distance depends on the magnitude of force and the direction of the resulting force. The following graphic illustrate a feasible crew distance depending on the forces. The loading F_h (kN/m) is a characteristic value without any safety- or combination factors according to DIN 1055-100, EC1 or equal standard.

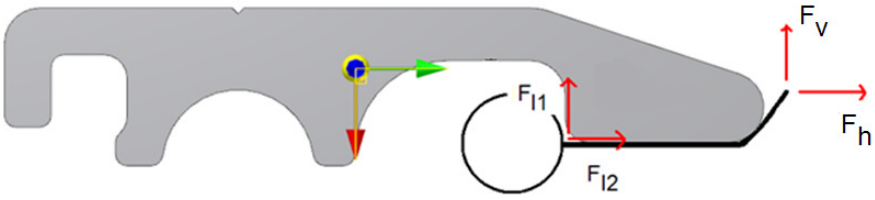
The values given in the spreadsheet assuming that the keder is large and rigid enough that a ripping out of the keder is impossible. Basic of the calculation is a continuous fixation of the welt section on a beam etc.

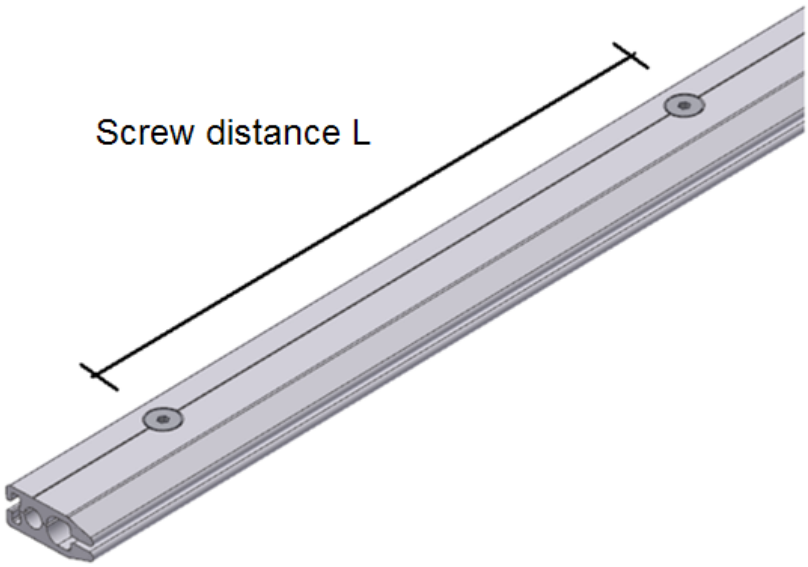
The values given in the caption relate to the quotient of the forces F_v/F_h. For example the curve 0,4 illustrate the loading $F_v = 0{,}4 * F_h$.

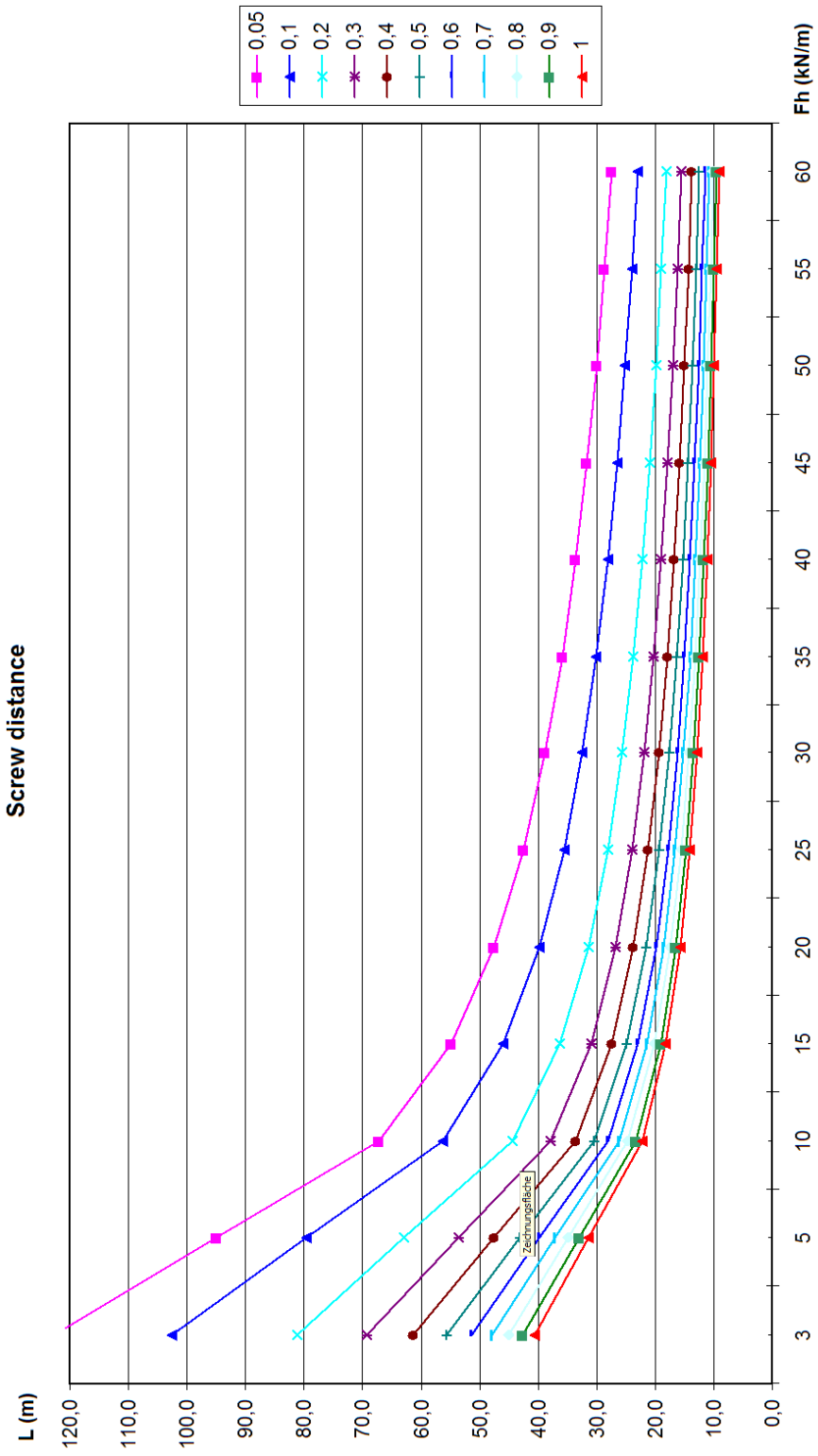
Example:

The forces are $F_v = 2$ kN and $F_h = 10$ kN

In this case the screw distance can be read from the loading value in x-direction $F_h = 10$ KN/m and the curve 0,2. The screw distance from table is 44 cm.



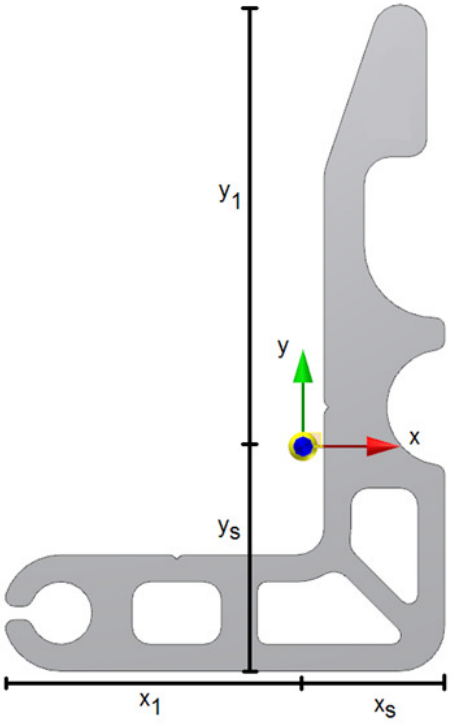




The graphic based on the safety value and material properties of DIN 4113.

3 Welt section PL 3000

3.1 Characteristics of welt section



Distance center of gravity: x_s = 15,9 mm

y_s = 25,1 mm

x_1 = 33,3 mm

y_1 = 49,3 mm

Moment of inertia: I_{xx} = 39,5 cm^4

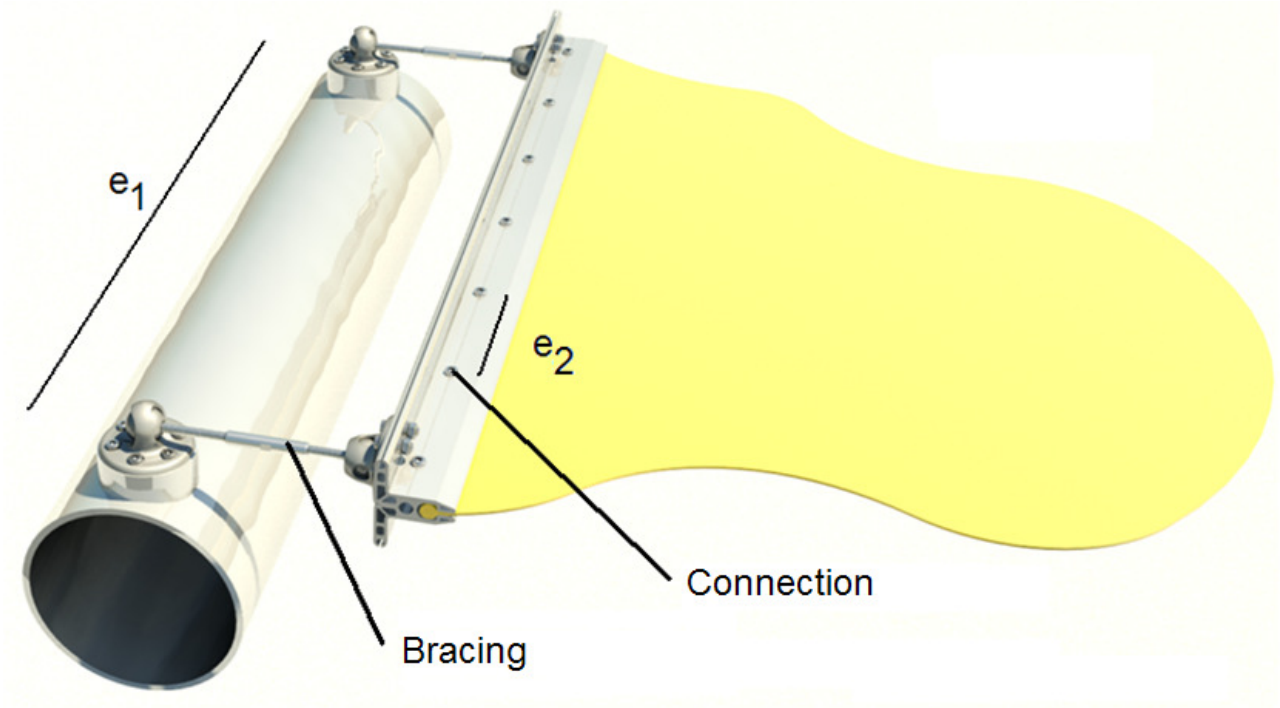
I_{yy} = 14,3 cm^4

I_{xy} = -12,4 cm^4

Area: A = 835 mm^2

3.2 Choice of crew distance

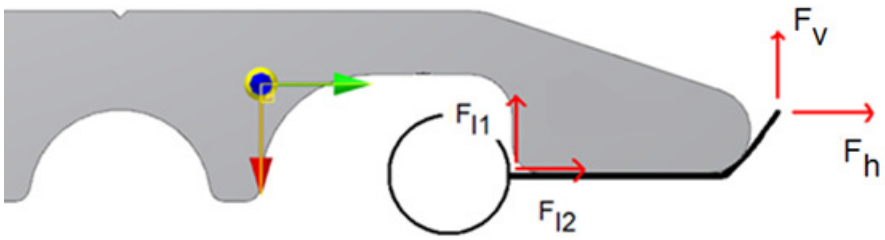
For the fixation of the welt section the distance e_1 of the bracing is as well to estimate as the distance e_2 which mark the distance of two screws which connect the two profiles together. The distance e_2 can be taken from the table of chapter 2.2, whereas the distance should be at maximum e_2 = 0,4 m.



The value of crew distance depends on the magnitude of force and the direction of the resulting force. The following graphic illustrate a feasible crew distance depending on the forces. The loading F_h (kN/m) is a characteristic value without any safety- or combination factors according to DIN 1055-100, EC1 or equal standard.

The values given in the spreadsheet assuming that the keder is large and rigid enough that a ripping out of the keder is impossible. Basic of the calculation is a continuous fixation of the welt section on a beam etc.

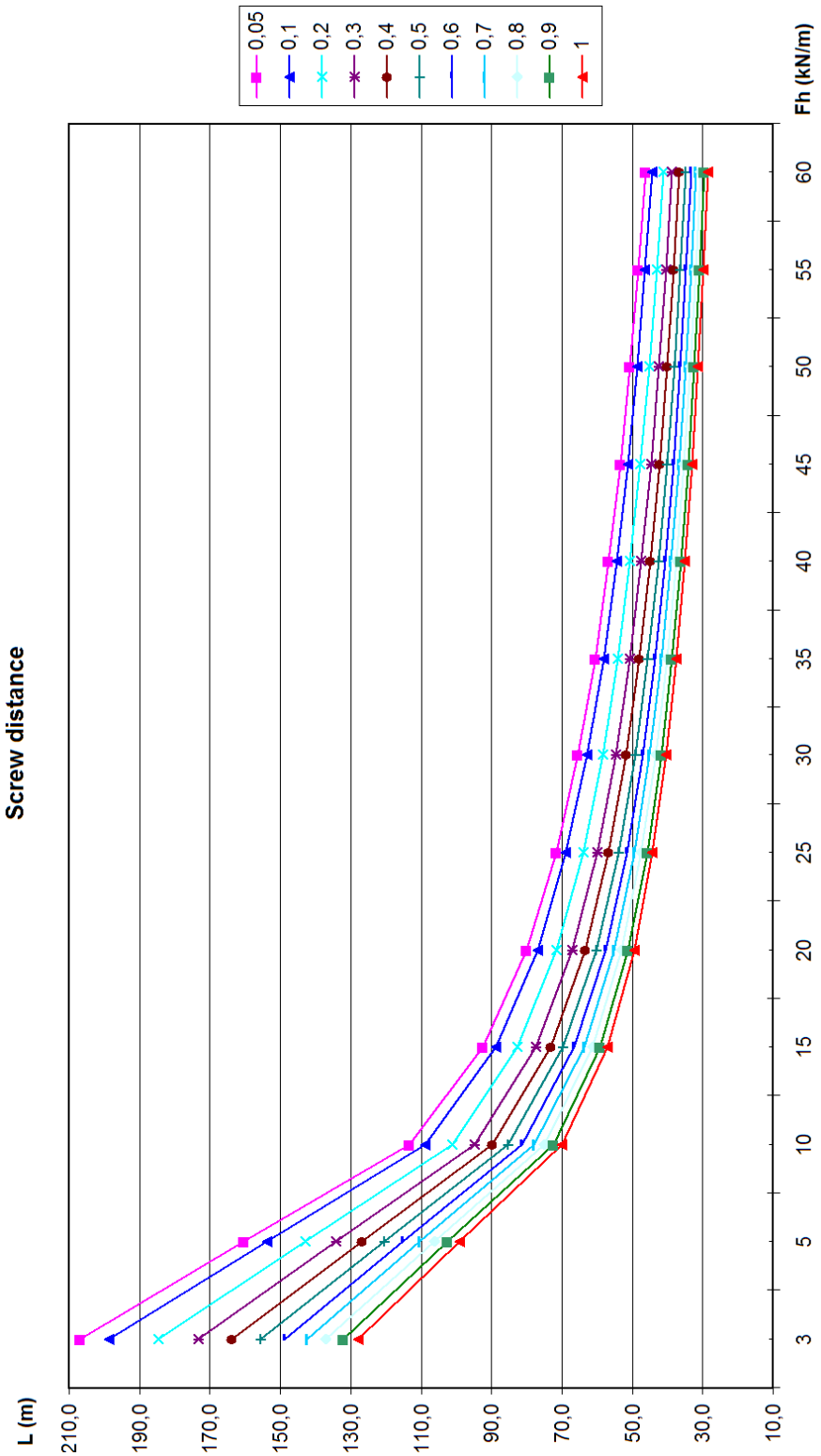
The values given in the caption relate to the quotient of the forces F_v/F_h. For example the curve 0,4 illustrate the loading $F_v = 0{,}4 * F_h$.



Example:

The forces are F_v = 2 kN and F_h = 10 kN

In this case the screw distance can be read from the loading value in x-direction F_h = 10 KN/m and the curve 0,2. The screw distance from table is 100 cm.



The graphic based on the safety value and material properties of DIN 4113.

4 Ripping out of the keder

The ripping out of the keder depends on several factors. Magisterial is the size of the keder and the distance of screwing. Advisable is a keder with a thickness of 10-12 mm. The total thickness of the keder and surrounding membrane should not bigger than 18 mm, otherwise the keder will be sqeezed.