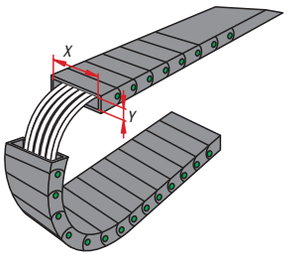
Technical note on energy supply chains

Determining the chain size and interior layout

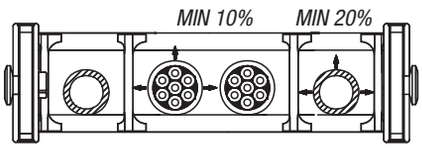


All lines must be able to move freely in the energy supply chain.

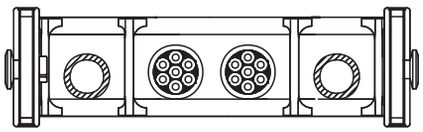
X = Inside width of the chain. This is determined by adding all the outside diameters of the lines + safety factor + any separators.

Y = Inside height of the chain. This is determined by the largest outside diameter of the lines + free space.

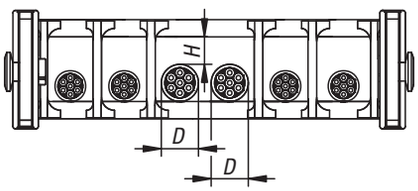
To avoid damaging the lines, pay attention to the following criteria.



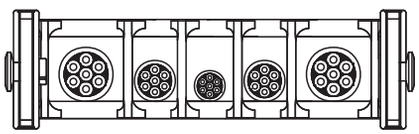
For electrical lines, a space of 10% of the line's outside diameter must be provided. For hydraulic hoses, the space provided must be 20% of the hose's outside diameter.



Separators must be used to prevent any contact between e.g. hydraulic hoses and electric cables.

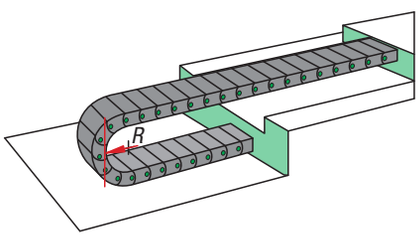


For applications with more lines, it is advisable to lay the lines individually with the separators provided, in order to prevent the lines from becoming crossed. If this is not possible, make sure that the inside space does not allow the lines to overlap (H<D).



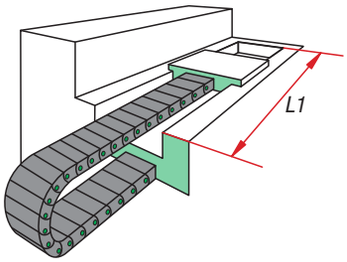
Lines are laid symmetrically according to their weight and size; those with greater diameter and weight on the outside, and the smaller and lighter ones on the inside.

Determining radius R



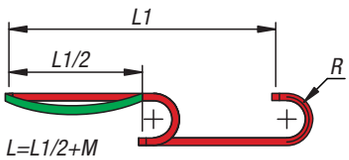
The required bend radius of the chain must be equal to or greater than the largest minimum bend radius of the lines being laid. Please refer to the specifications of the manufacturer of the lines and hoses.

Calculating the chain length



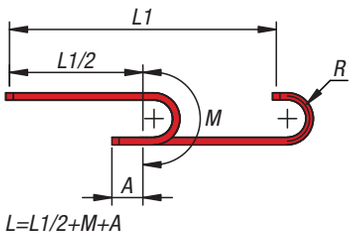
The shortest chain length is when the fixed point lies at the centre of the travel path. If the fixed point of the chain lies beyond the centre of the travel path, then this distance has to be added.

Fixed point at the centre of the travel path



Chain length (L) is calculated as half the travel path L1/2 plus dimension (M) corresponding to the bend radius (see table of the related energy supply chain). The value calculated for plastic chains is rounded up to the next full chain link.

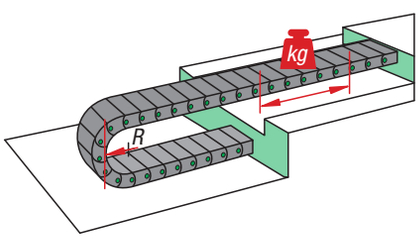
Fixed point beyond the centre of the travel path



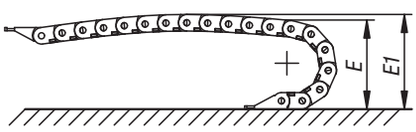
Chain length (L) is calculated from half the travel path L1/2 plus dimension (M) corresponding to the bend radius (see table of the related energy supply chain), and dimension A from the fixed point to the centre of the travel path. The value calculated for plastic chains is rounded up to the next full chain link.

L = Chain length
L1/2 = Half the travel path
M = Chain length in the radius
A = Distance between fixed point and centre of the travel path

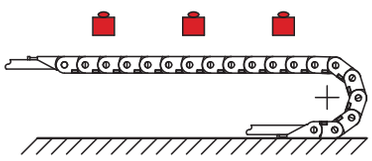
Checking the self-supported length



As standard, the energy chains are preloaded in order to obtain the maximum self-supported length. The preload produces a camber in the upper run of the self-supported length.



Because of the preload, value E is increased. Therefore, sufficient free space must be provided during construction.



Preload is a property which allows the energy supply chain to bear its own weight as well as the weight of the lines in it, and makes it parallel or with a slight upward bend relative to the support surface.

The permitted load on the self-supported energy chain is calculated from the total weight of the lines inside the chain. If lines are filled with fluids, the weight of these must also be taken into account in the calculation.

There is a load diagram specific to each chain height. The following illustration gives an example of a load diagram for determining the chain load. The upper value „kg max.“ gives the maximum loading on the energy chain. This value should not be exceeded.