

THERMAL EXPANSIONS

It's important to check the dimensional changes due to temperature variations in order to avoid that the expansional contraction effects may cause heavy damages to the plant; for that reason it's necessary to sustain and bracket the plant in order to let the pipeline free slide between two fixed points or otherwise to insert a compensator between two fixed points if they are positioned at a distance which may cause sensible contractions/expansions.

For the system F-Line.PRO with aluminum tube this coefficient "d" is equal to 0,023 mm/m/°C.

Aluminum thermal expansion factor: 0,023 mm/m/°C

CONTRACTION - EXPANSION OF ALUMINUM TUBE

L (m)	T MIN	T MAX	ΔT	ΔL
10	5°C	45°C	40	9,2 mm
20	5°C	45°C	40	18,4 mm
30	5°C	45°C	40	27,6 mm
50	5°C	45°C	40	46 mm
100	5°C	45°C	40	92 mm

Table of contraction - expansion depending on the length **L** of a straight stretch and the temperature difference **ΔT**.

The design and the construction of any plant will consider this phenomenon which is calculated with the following formula:

$$\Delta L = d \times L \times \Delta T$$

LEGEND:

d= coefficient of lateral expansion

L= length of piping

ΔT= difference of temperature in centigrade

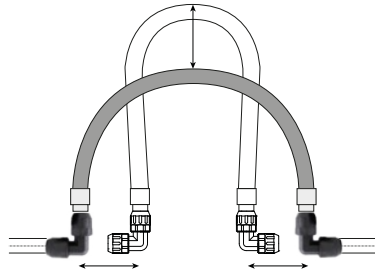
ΔL= difference of length (expansion or contraction)

example: temperature is +10°C; length of piping 20m; working temperature 35°C

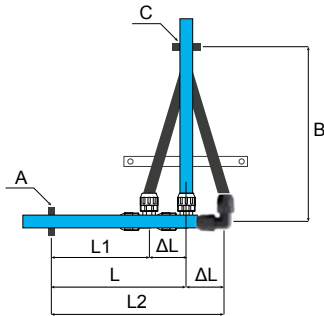
$$\Delta T = 35 - 10 = 25^\circ \text{C}$$

$$\Delta L = 0,023 \times 20 \times 25 = 11,5 \text{ mm}$$

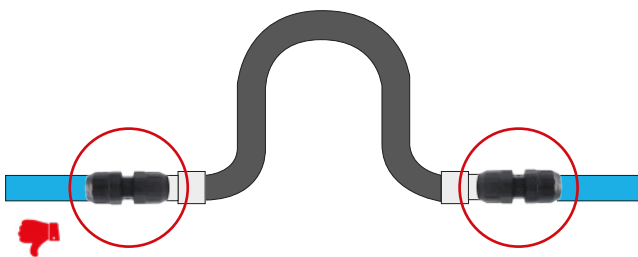




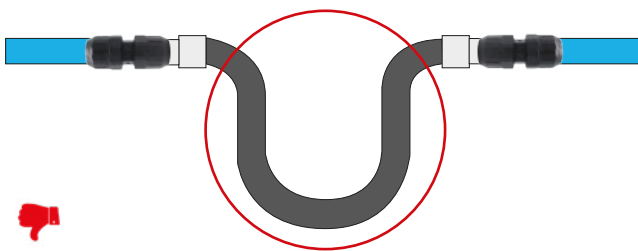
DN	FLEXIBLE TUBE LENGHT
25	1 m / 2 m
40	1,5 m / 3 m



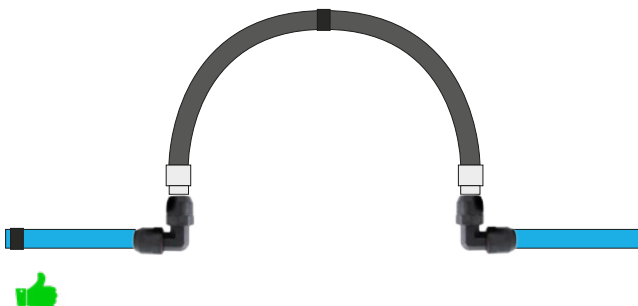
- L:** pipeline length at the installation
- L1:** length with minimum temperature
- L2:** length with maximum temperature
- ΔL:** length difference due to ΔT
- B:** length of the arms of the Lira or of the direction change
- A:** Sliding bracketing
- C:** Fixed bracketing



Avoid anchoring the expansion joint to two connections aligned to the same plan.



Always install the expansion joint facing upwards and not downwards in order to avoid a deposit of the condensation.



This is the correct application of the installation of expansion joint. It should be facing up and with two elbows aligned. You need also to insert two clips on the pipe aluminum fasteners close to the installation of an expansion joint.

