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Installation rules and length calculation

The right installation form and an accurate minimum length calculation ensure full effect and a long service life of the hose.

Besides conveying media where rigid steel pipes cannot be used, corrugated hoses are applied for:

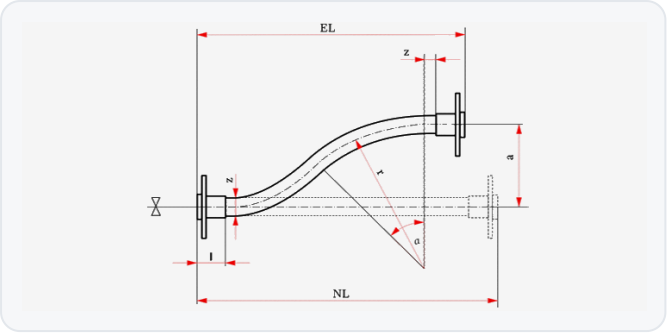
- eliminating the effects of inaccuracies in rigid pipelines,
- compensating parallel offset of pipelines,
- absorbing angular movement,
- absorbing multi-directional, small-amplitude, high-frequency vibrations from machines and equipment,
- absorbing vertical and horizontal movement of one or both pipe legs,
- absorbing thermal expansion of rigid pipelines.

For a long service life the installation form must avoid multi-directional vibration: forces must act perpendicular to the hose axis and the system must lie in one plane to exclude dangerous torsional stress.

NL – nominal length; EL – installed length; r – bending radius ($r \geq R_{min}$); α – bending angle; l – fitting length; z ≅ D – rigid allowance; a – offset or leg length; S – movement; h1 / h2 – maximum / minimum loop width (all in mm).

A flexible hose must never be twisted (torsion) or bent below the minimum radius R_{min} given in the technical data.

Installation form A



To eliminate the effects of inaccuracies in rigid pipelines and to compensate for parallel offset. The bending angle must not exceed 45° for braided and 60° for unbraided hoses.

$$NL = r \cdot \pi \cdot \alpha / 90 + 2 \cdot (l + z)$$

$$EL = 2 \cdot r \cdot \sin \alpha + 2 \cdot (l + z)$$

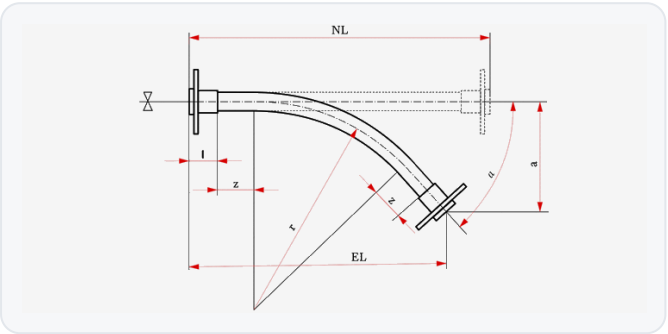
$$a = 2 \cdot r \cdot (1 - \cos \alpha)$$

$$\cos \alpha = (2r - a) / 2r$$

$$45° < \alpha \leq 60°: NL = 2.68 \cdot a + 2 \cdot (l + z);$$
$$EL = 2.414 \cdot a + 2 \cdot (l + z)$$

DN	≤ 12	16 - 25	32 - 40	50 - 65	80 - 100	125 - 150
z (mm)	25	50	75	100	150	200

Installation form B



To compensate for inaccuracies of rigid pipelines and for angular movement. Bending angle up to 45° for braided and up to 60° for unbraided hoses.

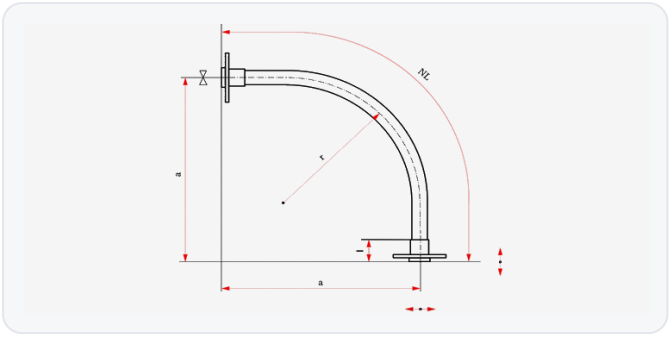
$$NL = r \cdot \pi \cdot \alpha / 180 + 2 \cdot (l + z)$$

$$EL = r \cdot \sin \alpha + (l + z) \cdot (1 + \cos \alpha)$$

$$a = r \cdot (1 - \cos \alpha) + (l + z) \cdot \sin \alpha$$

DN	≤ 12	16 - 25	32 - 40	50 - 65	80 - 100	125 - 150
z (mm)	25	50	75	100	150	200

Installation form C

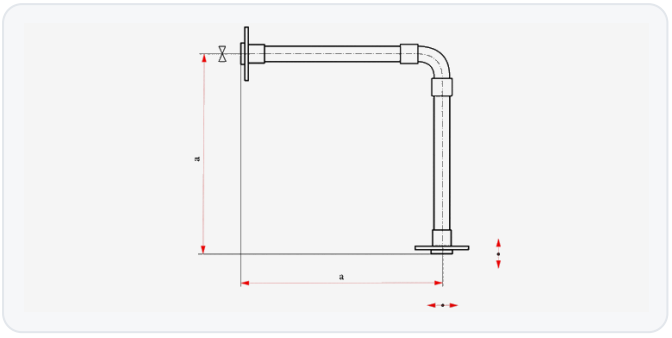


To absorb multi-directional vibrations of small amplitude and high frequency from compressors, pumps and engines. Forces act radially to the hose axis; direction of movement and hose bend lie in one plane, avoiding dangerous torsion.

$$NL = 2.3 \cdot r + 2 \cdot l$$

$$a = 1.365 \cdot r + l$$

Installation form D

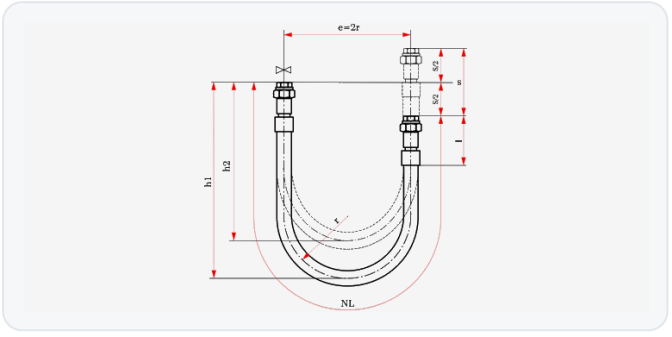


To absorb vibrations on large sizes (DN 125 and DN 150): two hose legs connected by a rigid elbow.

$$a = 700 \text{ mm (DN 125)}$$

$$a = 800 \text{ mm (DN 150)}$$

Installation form E



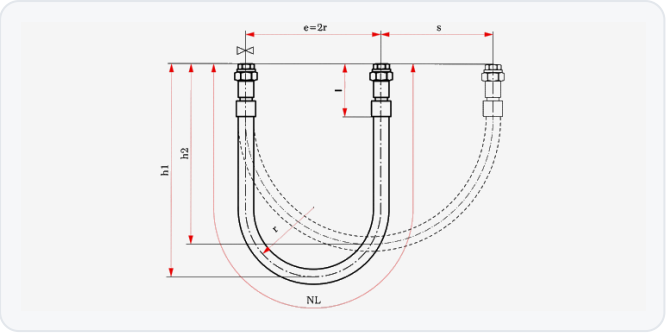
For vibrations of large amplitude and low frequency. The legs are connected at 180° with one moving leg in vertical direction. Both legs and the movement must lie in one plane.

$$NL = 4 \cdot r + S/2 + 2 \cdot l$$

$$h1 = 1.43 \cdot r + S/2 + l$$

$$h2 = 1.43 \cdot r + l$$

Installation form F



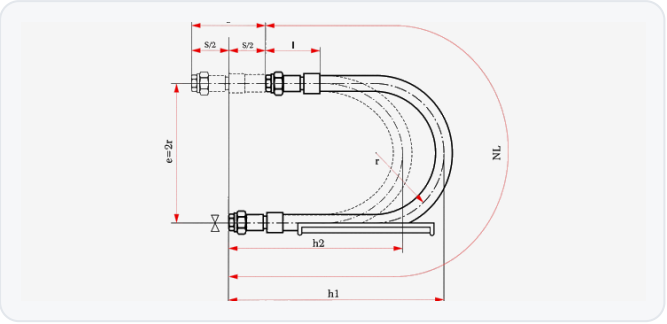
For vibrations of large amplitude and low frequency with the moving leg in horizontal direction (lateral movement). Legs and movement lie in one plane.

$$NL = 4 \cdot r + 1.57 \cdot S + 2 \cdot l$$

$$h1 = 1.43 \cdot r + 0.785 \cdot S + l$$

$$h2 = 1.43 \cdot r + S/2 + l$$

Installation form G



For vibrations of large amplitude and low frequency with the moving leg along its own axis (horizontal loop). Legs and movement lie in one plane.

$$NL = 4 \cdot r + S/2 + 2 \cdot l$$

$$h1 = 1.43 \cdot r + S/2 + l$$

$$h2 = 1.43 \cdot r + l$$