Calculation of the U-shaped pipe compensator

Initial data

H = 7 m   margin of compensator

L = 7 m   compensator width

D = 89 mm   outside diameter of the pipeline

t = 3.5 mm   pipe wall thickness

R = 120mm   elbow axis radius

S = 110 MPa   bending stress

E = 200000 MPa   modulus of elasticity of steel
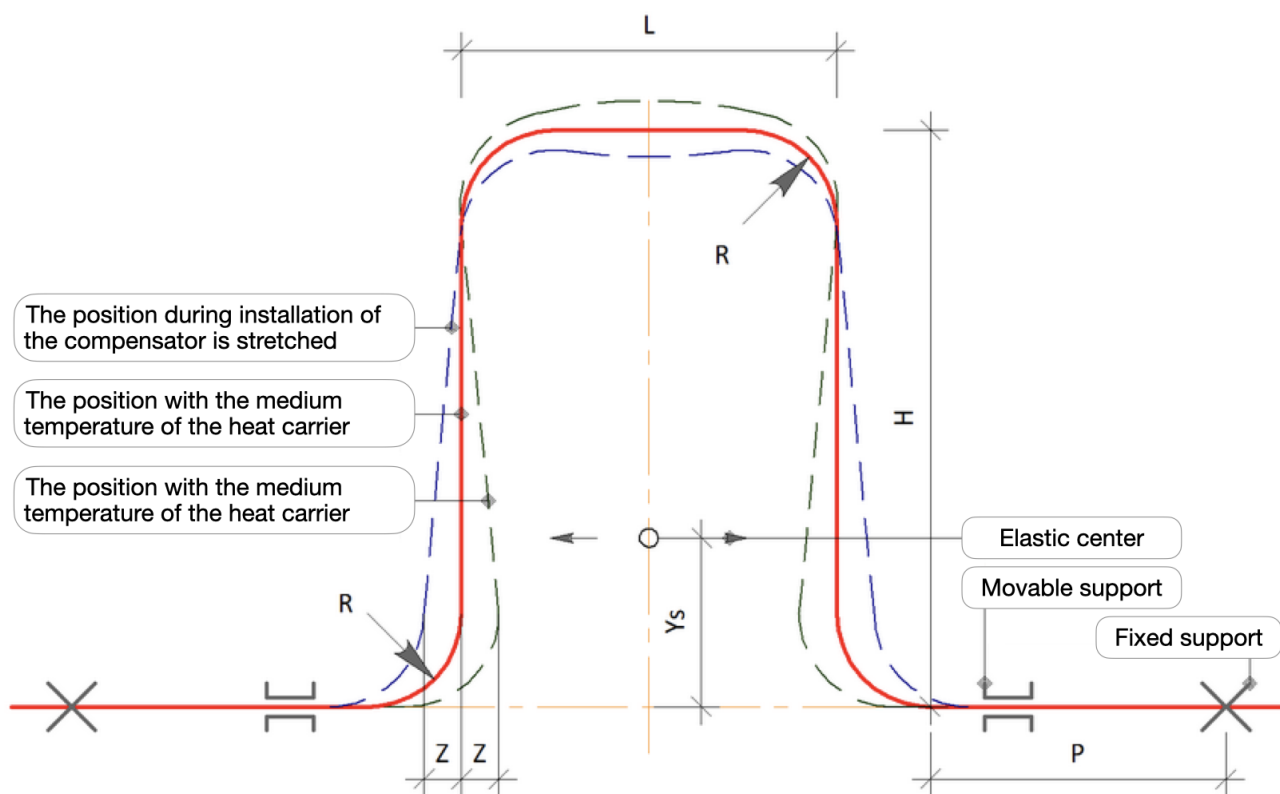
Calculation results

h = 1.00 geometric characteristics of pipe flexibility

k = 1.00 elbow flexibility factor

Lпр = 27 m the length of the axis of the compensator is indicated

Ys = 3,58 m distance from the axis of the pipeline to the elastic center

Ixs = 221 m³ the moment of inertia of the elastic line of the compensator axis relative to the axis X

Px = 621 N elastic resistance force of the compensator

M = 2126 N maximum bending moment in the back of the compensator

Z = 399,0 mm bias of the compensator

During installation, the compensator must be stretched by 798 mm.

798 mm   compensating capacity without pre-stretching during installation
1596 mm   compensatory capacity with stretching