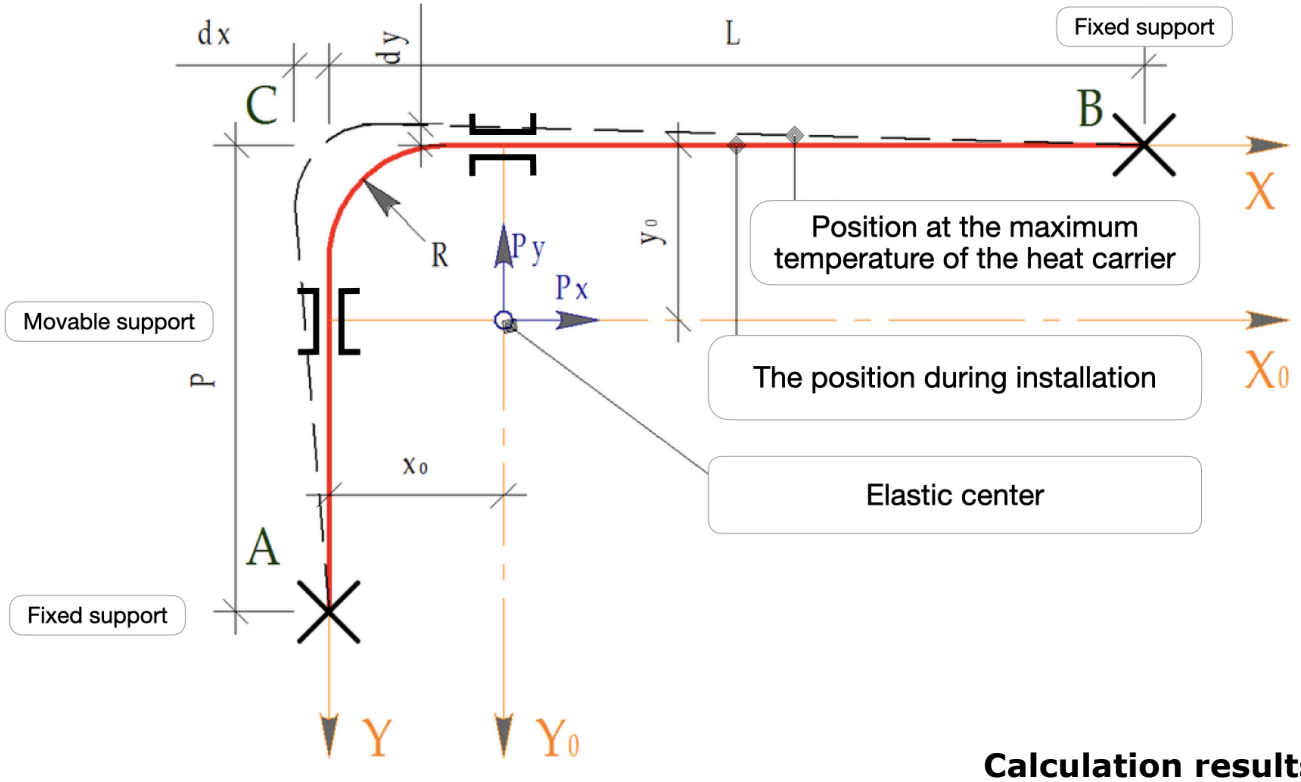
Calculation of the L-shaped pipe compensator

Initial data

D = 89 mm	pipeline outer diameter	**t = 3.5 mm**	pipe wall thickness
L = 10 m	longer arm length	**R = 120 mm**	elbow axis radius
P = 2,5 m	short arm length	**E = 200000 MPa**	modulus of elasticity of steel
S = 80 MPa	permissible bending compensation stress		



Calculation results

dx = 16 mm - thermal elongation along the X axis
dy = -4 mm - thermal expansion along the Y axis
h = 1,00 - geometric characteristic of pipe flexibility
k = 1,00 - elbow flexibility factor
Lax = 12 m - reduced length of the compensator axis
Xo = 31 m - distance from the axis of the pipeline to the elastic center along the X axis
Yo = 181 m - distance from the axis of the pipeline to the elastic center along the Y axis
Ix = 5 m3 - central moment of inertia about the X-axis
Iy = 133 m3 - central moment of inertia about the Y-axis
Ixy = -13 m3 - central centrifugal moment of inertia about the X and Y axes
Px = 820 N - elastic deformation force directed along the X axis
Py = -85 N - elastic deformation force directed along the Y axis
Ma = 1536 N - maximum bending moment at point A
Mв = -298 N - maximum bending moment at point B
Mc = -522 N - maximum bending moment at point C

79 MPa*	bending compensation stress at point A
-15 MPa*	bending compensation stress at point B
-27 MPa*	bending compensation stress at point C

*bending stress within the permissible value of +/-80MPa