Combined movement calculation

The potential axial, lateral and angular movements are specified for the respective expansion joint systems. In the event of combined axial extension and lateral displacement, the values drop as follows:

Permitted lateral displacement for a given axial extension

$$l_{per} = l_{max} * \left(1 - \frac{ae_{eff}}{ae_{max}} \right)$$

Permitted lateral displacement for a given axial compression

$$l_{per} = \frac{l_{max}}{2} * \left(2 - \frac{A}{ac_{max} * 0,75} \right)$$

with $A = ae_{eff} - ac_{max} * 0,25$ in case of $A < 0 \rightarrow$ insert 0

Permitted axial extension for a given lateral displacement

$$ae_{per} = ae_{max} * \left(1 - \frac{l_{eff}}{l_{max}} \right)$$

Permitted axial compression for a given lateral displacement

$$ac_{per} = \frac{ac_{max}}{4} * \left(4 - \frac{3 * B}{l_{max} * 0,5} \right)$$

with $B = l_{eff} - l_{max} * 0,5$ in case of $B < 0 \rightarrow$ insert 0

ac_{eff}	[mm]	given axial compression
ae_{eff}	[mm]	given axial extension
l_{eff}	[mm]	given lateral displacement
ac_{max}	[mm]	maximum axial compression
ae_{max}	[mm]	maximum axial extension
l_{max}	[mm]	maximum lateral displacement
ac_{per}	[mm]	permitted axial compression
ae_{per}	[mm]	permitted axial extension
l_{per}	[mm]	permitted lateral displacement

Example

For an expansion joint with a given axial compression of ac_{eff} = 25 mm, the permitted lateral displacement l_{per} is searched. The maximum values for the movements of the expansion joint are:

ac_{max}	[mm]	40
ae_{max}	[mm]	15
l_{max}	[mm]	30

$$A = ae_{eff} - ac_{max} * 0{,}25 \quad = \quad 25\,mm - 40\,mm * 0{,}25 = 15\,mm$$

$$l_{per} = \frac{l_{max}}{2} * \left(2 - \frac{A}{ac_{max} * 0{,}75}\right) \quad = \quad \frac{30\,mm}{2} * \left(2 - \frac{15\,mm}{40\,mm * 0{,}75}\right) = 22{,}5\,mm$$