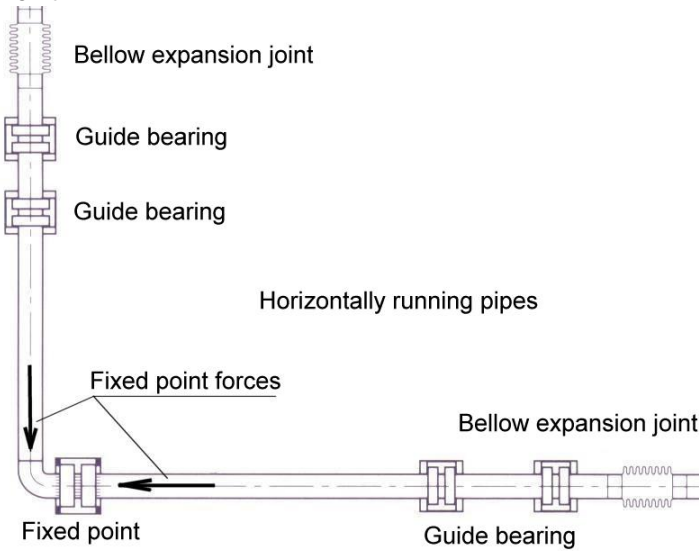

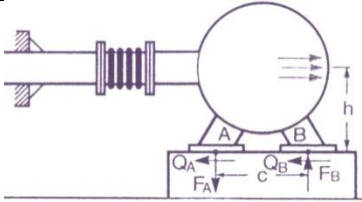

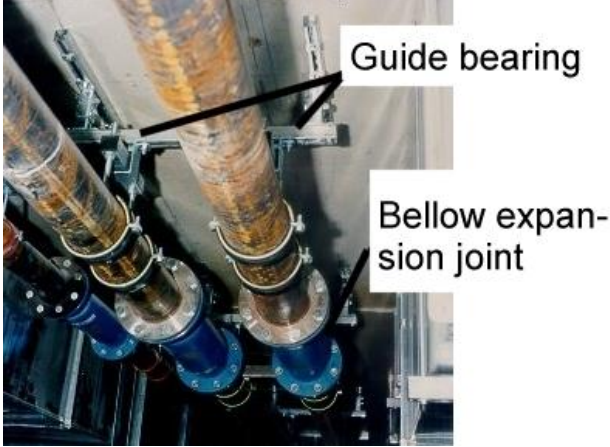


## FAQ Frequently Asked Questions

No.	Description
1	<p>Which modules does the Anchor Point Calculation programme provide?</p> <p>From version 14.0, the following modules are available:</p> <ul style="list-style-type: none"> <li>- Anchor Point force determination in case of utilisation of non pre-compressed axial expansion joints in horizontal pipelines.</li> <li>- Anchor Point force determination in case of utilisation of U-bends in horizontal pipelines.</li> <li>- Anchor Point force determination in case of utilisation of L-bends in horizontal pipelines.</li> <li>- Anchor Point force determination in case of utilisation of Z-bends in horizontal pipelines.</li> <li>- Anchor Point force determination in case of a pipe held on two sides in horizontal pipelines.</li> </ul>
2	<p>Is it possible to calculate pipelines that do not run horizontally?</p> <p>Use the Anchor Point calculation programme to determine the Anchor Point forces and then – in a second step – add the Anchor Point forces from the own weight of pipe and the own weight of the medium inside the pipe.</p>
3	<p>I have got a pipe system of two pipes sections joining at an angle. There is one axial expansion joint in both pipes each. In the point of intersection between the two pipe sections, there is an Anchor Point.</p>  <p>Do an Anchor Point calculation for each of the two pipe sections. Then, form the resultant for the Anchor Point in the intersection. In case the left-hand pipe section should run vertically, refer to FAQ no. 2.</p>
4	<p>In which languages is the Anchor Point calculation programme available?</p> <p>German, english, french, nederlands and spanish. You may use any of the languages for your calculation and any of the languages for the print-out. For example: Calculation in German and print-out of results in English. Any combination is possible.</p>
5	<p>Why does the Anchor Point force in case of a pipeline held on two sides not depend on the length of the pipe?</p> <p>According to strength of materials an expansion or compression is defined as:</p> <p>(1) <math>\varepsilon = \Delta L / L</math></p> <p>According to Hooke's law the tension results in:</p> <p>(2) <math>\sigma = E \cdot \varepsilon</math></p>

No.	Description
	<p>standing for the tension [N/mm<sup>2</sup>], E standing for the modulus of elasticity [N/mm<sup>2</sup>] and <math>\varepsilon</math> (epsilon) standing for the expansion [/]</p> <p>In case of a temperature change by <math>\Delta T</math>, the pipeline will extend by:</p> <p>(3) <math>\Delta L = L \cdot \Delta T \cdot \alpha</math>  <math>\alpha</math> (alpha) standing for the coefficient of expansion [1/K] and  <math>\Delta T</math> standing for the temperature difference [K].</p> <p>Inserting equation (3) into equation (1) will result in:</p> <p>(4) <math>\varepsilon = L \cdot \Delta T \cdot \alpha / L</math></p> <p>Equation (4) may be reduced by the length L:</p> <p>(5) <math>\varepsilon = \Delta T \cdot \alpha</math></p> <p>Inserting equation (5) into equation (2) will result in:</p> <p>(6) <math>\sigma = E \cdot \Delta T \cdot \alpha</math>  i.e. the tension depends on the modulus of elasticity (contingent on material), from the temperature change, and from the coefficient of expansion (contingent on material), but not from the length of the pipeline.</p> <p>Note: In case of high temperatures, the tension will decrease since the modulus of elasticity decreases. This is neglected in Calculations by the Anchor Point Calculation Programme. If you want to take this into account, you may modify the modulus of elasticity specified.</p> <p>The Anchor Point force is determined on the basis of the following formula:</p> <p>(7) <math>F = \sigma \cdot A</math>  A stands for the pipe cross section [mm<sup>2</sup>].</p> <p>Note: The Anchor Point force F [N] acts upon both Anchor Points.</p>
6	<p>What does pre-compression mean?</p> <p>There are pre-compressed models of expansion joints in the market. These may only be utilised if the lowest operating temperature is not essentially lower than the installation temperature.</p> <p>In the case of a non-compressed expansion joint the joint has to be compressed on site according to requirements. In this case a gap corresponding to the pre-compression length has to be left between the expansion joint and the pipe. Then the expansion joint will be extended and welded or screwed to the pipe. Prior to this the Anchor Points will have to be firmly fixed.</p>  <p>A U-bend will be widened prior to connection with the pipe sections.  For refrigeration lines, pre-compression will effected in the opposite direction, the expansion joint will be mounted compressed and the U bend will be pressed.</p>
7	<p>What do I have to consider when attaching the expansion joint?</p> <p>In the case of a pre-compressed model expansion joint the butt straps must not be loosened before the Anchor Points have been firmly fixed.</p> <p>There are no swivelling suspensions admissible near the bellow expansion joint.</p> <p>Prior to loading the pipeline with test pressure the Anchor Points will have to be fixed firmly and any butt straps will have to be removed from the bellow expansion joint.</p> <p>To prevent buckling or lateral yielding, the pipeline will have to be run in guide bearings up to the Anchor Point.</p> <p>In order to prevent the Anchor Point force from effecting any machine or pump an Anchor Point or a pre-compressed expansion joint will have to be installed ahead of machine or pump.</p>

No.	Description
	 <p>When using a non pre-compressed expansion joint, the Anchor Point force will act on the device and will have to be transmitted via the foundation.</p>
8	<p>Which are the most notorious errors made when installing an axial expansion joint?</p> <ol style="list-style-type: none"> <li>The hydraulic pressure test of the pipeline has been effected at a higher pressure than assumed in the calculation.</li> <li>The Anchor Points are not firmly fixed at the time of effecting hydraulic pressure test and consequently move.</li> <li>The pipe sections are not guided but suspended with Swivels. The pipeline buckles or is deformed between the expansion joint and the Anchor Point.</li> <li>The expansion joint manufacturer's recommendation of the the distance between the expansion joint and the first attachment has not been followed.</li> <li>The picture below shows a wrong installation of bearing ahead of expansion joint:</li> </ol>  <p>Either a Anchor Point or a guide bearing should have been used, as the following picture shows:</p>  <ol style="list-style-type: none"> <li>The function of the expansion joint is adversely affected by dirt (paint, dust, etc.).</li> </ol>
9	<p>What does 'load alternation' mean in connection with the utilisation of a expansion joint?</p> <p>The maximum admissible expansion is indicated for each expansion joint. It refers to 1000 load alternations. In case the number of temperature changes is higher, the admissible expansion will have to be reduced by the load alternation factor specified by the manufacturer.</p>

10	<p>What does the term, welding efficiency rating' refer to in connection with the calculation of U and L bends?</p> <p>The welding efficiency rating <math>v_N</math> is defined by DIN 2413, part 1 (Calculation of the wall thickness of steel pipes against internal pressure), specifying the utilisation of the admissible calculated tension of the pipe material used in case of longitudinal or spiral welding seams.</p>
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