

1. Objective

Piping suspension represents an important feature from the point of view of the operational reliability of pipe systems directly affecting function of the assembly and its life time. In case of incorrect function of the pipe hangers an unacceptable loading of e.g. flanges can occur, causing leakage of the connected rotating equipment resulting in increased vibrations as well as leakage in parts of piping resulting in possible cracks, especially with pipes in the area of material creep point. Another important feature of the pipe supports is providing of protection against dynamic impacts in the piping.

To assess the pipe support function we recommend introduction of a system of periodic inspections with subsequent evaluations. The periodic inspections are planned for those pipe systems where the operating conditions and the danger of failure are assessed as critical for the operation reliability of the power assembly - HP pipe work, steam piping in the area of material creep point.

2. Description and range of inspections

The inspections are made in the selected branches, for the following characteristics:

- a/ Position in the cold pipe condition
- b/ Position in the operating (hot) pipe condition
- c/ Setting of the pre-stressing force of springs
- d/ Purity of sliding parts
- e/ Damage to the piping supports components, compactness
- f/ Visible deformation of piping support components
- g/ Possibility of movement
- h/ Reserves in the lift of spring components
- i/ Vertical movement in hot condition

These characteristics are tested, if possible, for all branches of the piping systems.

The piping position in the cold condition is checked after cooling of piping under 50°C. The position in hot condition is checked at the operating nominal mode. An integral part of the inspection report should be the record on the temperature course during inspection.

Selection of pipe works for the position inspection is made by the planner or the engineer responsible for the piping static, with regard to the visibility, accessibility and reading reliability, in particular for the junctions that are important and provide a representative image of the piping behaviour as a whole.

Under deformation of suspension components, visible plastic deformations of rigid components are understood, e.g. clamps, clips, eyes, parts of supporting steel structures and brackets etc.

The possibility of movements - inspection whether the movement of piping is prevented neither in horizontal nor in vertical direction.

Purity of sliding parts - visual inspection in line with criteria given in chapter 4.

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3. Inspection periods

The following inspection periods are determined for the main systems:

1. Regular inspection after five year operation
2. Another regular inspections in the five year period
3. Extended inspection after twenty years operation

Visual inspection of compactness (intactness) and deformations of the piping support components is made on random basis at each planned shutdown.

4. Inspection ranges:

a/ Regular inspection

Inspection, measurement and evaluation are made for all items given in para. 2. The high-pressure systems are inspected to 100% range for all piping support components. For other piping systems the inspection is made on random basis.

b/ Extended inspection

Inspection, measurement and evaluation are made for all items under para. 2, in addition inspection of clamps and clips of piping is made after removal of insulation.

On the high-pressure systems it is made to 100% range, for all piping support components. For other piping systems the inspection is made on random basis.

5. Evaluation description

The evaluation is performed by a specialist planner or engineer responsible for piping static. For individual checked characteristics the evaluation is made in line with the following criteria:

a/ Position in the cold piping condition

Comparison of the actual position with the assembly position / calculation position or position measured during preceding inspection. Change in the piping position between individual inspection periods is evaluated. The causes of the position change can be in the relaxing of springs, plastic deformations of piping and parts of piping supports, deformations of supporting structures etc.

b/ Position in the operating piping condition

Comparison of actual position with calculation position or position measured at the preceding inspection. Change in the piping position between individual inspection periods is evaluated as well as possibility of the shifts of piping supports. The causes of deviations between individual inspection periods can be in increased friction in spring cages, spring relaxing etc.

c/ Setting of the spring initial stress

Should a change be required, during the shutdown the change in the initial stress of springs setting of supports of a constant strength will be made.

d/ Purity of the sliding support parts

For the spring hangers / supports the pureness and wear of the sliding parts of spring cages are evaluated. With sliding supports especially corrosion of sliding parts is evaluated. Evaluation of the condition is made according to the following scale:

1. Surfaces without material wear, without contamination, corrosion
2. Surfaces without material wear, slight contamination, flat corrosion when oxidized parts cannot be slipped off.
3. Surface with slight wear without marks of seizing, contaminated, flat corrosion.
4. Unacceptable – visible wear - scratches, pitting corrosion

- e/ Damage to the piping supports components, compactness (intactness)
All piping support components should be intact and undamaged without breaks and cracks (neither local).
- f/ Visible deformations of the piping support components
All rigid piping suspension components, esp. sleeves, bend parts, should be without visible plastic deformations.
- g/ Possibility of shifting
Spring cages of hangers should not be to the stop in the lower or upper position. Draw rods of hangers should be capable of a necessary deflection. Supports should not be locked in the move by a foreign body or corrosion.
- h/ Reserves in spring components lift
For the spring suspensions and supports the lift reserve should be 10% of the calculation shift from both end position, however at least 5 mm.
For suspensions and supports of a constant force the lift reserve should be 10% of the calculation shifts from the both end positions, however at least 10 mm.
- i/ Horizontal shift in hot condition
Measured horizontal shifts in hot condition are compared with calculation shifts for the purpose of piping behaviour evaluation.

6. Maintenance

All parts of piping supports are in regular operation maintenance free. In case of occasional damage or Irregular function, please contact the manufacturer.