Hose Installation Guidelines

INTERMITTENT AND STATIC FLEXING LOOPS

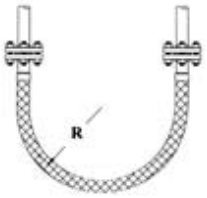

Figure 1

Case 1 - Hose loops must be installed with the proper live *length* and bend radius (Figure 1). The live length distance is based on the distance between two pipes and the proper *bend* radius.

Figure 3

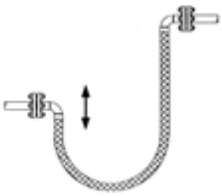

Figure 5

Case 4 - The vertical movement of a hose loop *(Figure 8)* must be directed in the same plane as the loop *(Figure 9)*.Movement out-of-the-plane or with the loop offset *(Figure10)* will result in unnecessary torsion on the hose. The torsional stress will result in a hose failure

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Figure 6

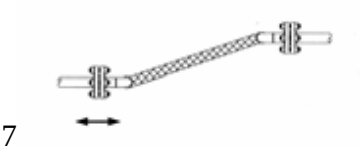

Figure 7

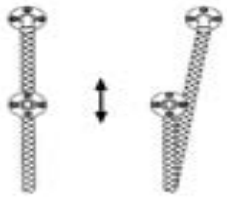

Figure 9

Figure 10

Figure 2

Case 2 - Avoid bending the hose at the end Connections (*Figure* 4). Install 90˚ pipe Elbows in horizontal pipe runs with hose Loops (*Figure* 3). The proper *live length* and *bend radius* must be taken into account as in *Case 1* (*Figure* 1).

Figure 4

Case 3 - The horizontal movement of a hose loop *(Figure 5)* must be directed in the same plane as the loop *(Figure 6)*.Movement out-of-the plane or with the loop offset *(Figure 7)* will result in unnecessary torsion on the hose. The torsional stress will result in hose failure

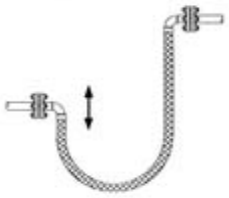

Figure 8

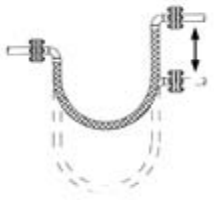

Figure 11

Figure 12

Case 5 - A hose loop with elbows *(Figure 11)* is more Suited for vertical movement than a straight hose *(Figure 12)*. The vertical movement will cause bending stresses at the hose ends, resulting in a hose failure**.**

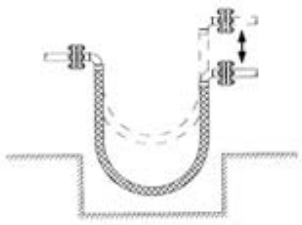

Figure 13

Case 6 - A hose loop *(Figure 13)* should be installed to ensure that the hose at full offset is free from interference and all obstacles *(Figure 14)*.

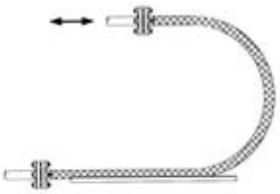

Figure 15

VIBRATION

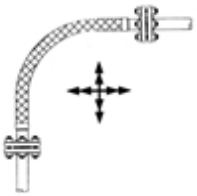

Figure 17

Case 8 - For vibration the hose should be installed so the movement will be in the plane of the bend *(Figure 17)*. If the hose bend is installed for vibrations so that the movement is out the plane of the hose bend *(Figure 18)*, a torque will be imposed upon the hose, resulting in a hose failure.

Figure 19

Figure 22

Case 10 - For vibration in one plane a straight hose should be used and installed perpendicular to the source of the vibration *(Figure 22)*. Installing the hose parallel to the source of vibration *(Figure 23)* will cause the hose to be placed in a compression/extension which is not allowed and may cause a hose failure.

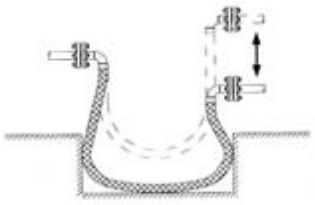

Figure 14

Figure 16

Case 7 - A horizontally traveling hose loop *(Figure 15)* should have the same type of support to keep the hose from sagging *(Figure 16)*.

Figure 18

Figure 20 Figure 21

Case 9 - For vibration the proper hose *livelength* for intermittent flexing should be determined *(Figure 19)*. If the hose live length is too long *(Figure 20)* or too short *(Figure 21)*, a hose failure could occur. Also,unnecessary flow restriction could result from an awkward bend .

Figure 23

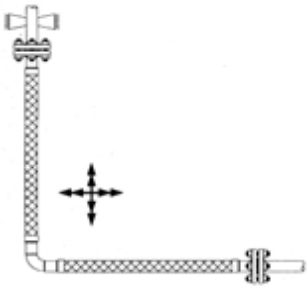

Figure 24

ANGULAR BENDING

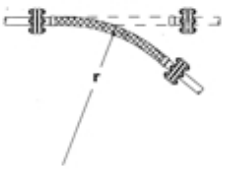

Figure 26

Case 12 - The hose must have the proper live length to withstand angular bending *(Figure 26)*. Installing a hose that does not have the proper *live length* for that angular rotation can cause the hose to be permanently bent in the direction of the angular rotation *(Figure 27)* or can cause hose failure if the bend is severe enough.

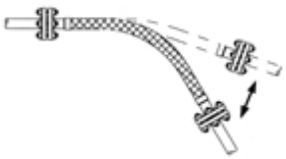

Figure 28

THERMAL EXPANSION

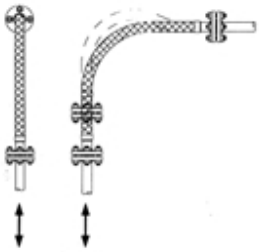

Figure 30

Figure 31

Case 14 - Thermal expansion of a pipeline should be absorbed by a 90˚ hose bend *(Figure 30 and 31)*. The movement should be in the directions of the bend plane. A single hose should not be installed in a multi-plane system and then be subjected to thermal expansion *(Figure 32)*. This type of installation will cause a torsion on the hose which could result in hose failure

Figure 34

Figure 25

Case 11 - For multi-plane vibration a double hose assembly should be installed *(Figure 24)*. Installing a single hose for multi-plane vibration *(Figure 25)* will cause the hose to be placed in compression or extension in the axial direction. Compression and/or extension is not allowed and may cause a hose failure

Figure 27

Case 13 - The direction of the angular rotation must be in the bending plane *(Figure 28)*. Angular movement on a hose that is perpendicular to the bending plane *(Figure 29)* will cause torsional stress on the hose or hose failure If the hose bend is severe enough

Figure 29

Figure 32

Figure 33

Case 15 - Lateral movement or intermittent offset is permissible as long as the proper *live length* of the hose is used *(Figure 33)*. The movement should be 90˚ to the hose. The hose should not be installed in the same direction as the expansion *(Figure 34)*. This type of installation will place the hose in compression and/or extension