

# Expansion in Perimeter Heating $\beta$ Perimeter Enclosure Systems

Movement from thermal expansion should be taken into account and is the product of:

1. The length of pipework between fixed points (anchors)
2. The maximum range in temperature of the pipe.
3. The coefficient of linear expansion.

Copper pipe -0000167--0000189 per unit length per °C.  
Carbon steel pipe -0000117--0000133 per unit length per °C.  
Calculated from the formulae:

Exp. mm = Original length x Coeff. Exp x temperature rise.

Item 1 and 3 are both factual but item 2 has to be estimated by the engineer. Whilst the maximum flow temperature of the service has been attained the lowest ambient temperature is often wrongly assumed at 10°C being approximately the most common ambient installation temperature on U.K. sites. The low ambient temperature should always be taken as 0°C. This allows for an empty building with a drained system for maintenance or during construction initially.

## EXPANSION JOINTS

The expansion joints are specifically designed for aluminium finned perimeter heating element with the end fittings in copper to B.S. 2871. The tube ends are exactly as the element tube so that a common jointing media can be used throughout without the costly addition in labour and materials of copper to iron adaptors. The sizes available are 22mm, 28mm and 35mm.

The joints are capable of a total nominal movement of 25mm with a maximum working pressure of 6.9 bar (100 p.s.i) and are therefore suitable for both L.T.H.W. open vent or sealed system and M.T.H.W. systems incorporating a pressurization unit. On the few and far between occasions when a building of large breadth and width exceeds 15 storeys and the combined working/static head may exceed 6.9 bar (100 p.s.i) Special joints can be supplied.

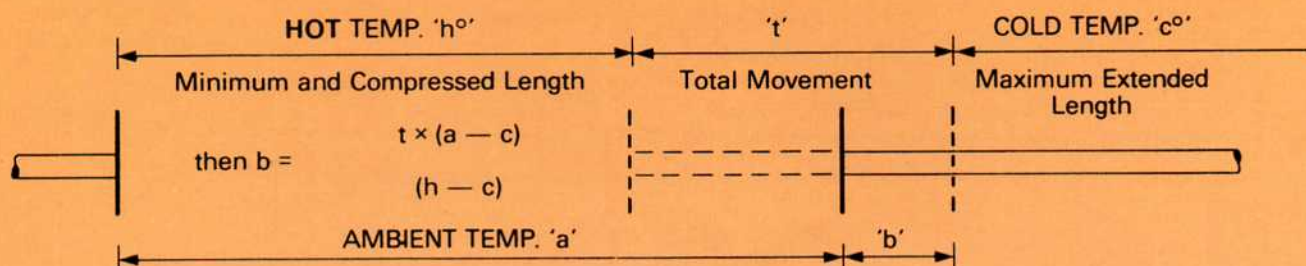
## INSTALLATION GUIDING AND ANCHORS

The bellows are supplied at a maximum installed length (pre cold drawn) and on the majority of U.K. sites slight over extension beyond this is normally permissible if, for example, installation takes place during summer when the ambient temperature exceeds 10°C. However when high ambient installation temperatures arise with a large fall to low ambient a correction factor should be used as seen below to eliminate the contraction over extending the bellow.

A particularly notable climatic region for this item is the Middle East.

A guide as seen on the adjacent page must be positioned each side of the expansion bellow and at working pressures exceeding 2 bar (30 p.s.i) an intermediate guide is recommended when the maximum anchor pitch is used (18 metres copper element or 25 metres steel element) pressure exceeding 4 bar (60 p.s.i) two intermediate guides are recommended each side of bellow excluding the main guide. The guide assembly is used as an anchor by adding the packing. A fitting should be placed against the anchor or the pipe brazed or welded to the anchor, as the frictional resistance of clamping the pipe will be insufficient. This will become apparent on the lower floors of buildings with a large number of storeys where the anchor load becomes higher due to static head on open vent systems. Anchor fittings should be approved by the architect or engineer to ensure the part of the building to which they are fixed is capable of withstanding the forces involved. Anchors should always be fixed before installing the bellows. Likewise guides should be fixed in position at the time of installation of the bellows. It is considered incorrect to pressure test without the bellows installed as this does not test the anchors and guide. *Do not* pressure test without the guide and anchors installed.

## CORRECTED INSTALLED LENGTH AT HIGH AMBIENT INSTALLATION



Amount of compression from max extended length = b  
Total movement = t

Min. cold temp. = c°  
Max. hot temp. = h°  
Ambient installation temp. = a°