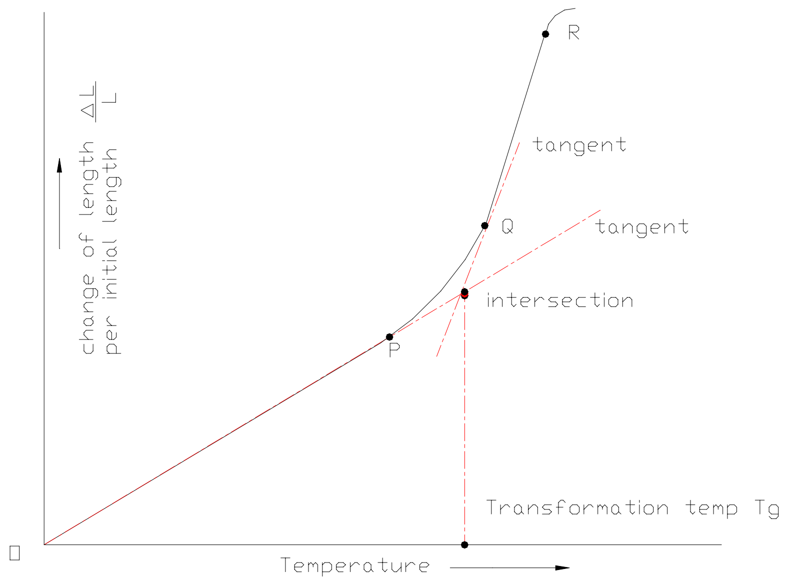

Fig 13.

On the curve as shown in fig 13 we can distinguish 3 different ranges. Starting from a "liquid" and cooling down we see the following:

1) **Range R - Q**

The viscosity of the glass is still so low that the tetrahedrons can move easily to find their place in the structure. The building of the tetrahedrons can follow the cooling rate and glass behaves as a viscous, plastic material.
The expansion coefficient is higher then at lower temperatures. As in this range free deformation of the glass is possible any expansion difference of two sealed glasses will be compensated as a result of the viscous flow and no stresses will develop. This ends at the Philips Softening Point as from this point onwards internal stresses can be generated.

2) **Range Q - P**

The viscosity is higher and hinders the movement of the elements more and more. Although the glass is in principle still viscous the time it takes for the tetrahedrons to move through the structure gets longer and longer up to a point (setting point) where the glass for practical purposes is "solid". In the range up to this point glass behaves not as a completely viscous material but neither as a solid, elastic material. In other words it has a mixed behaviour between plastic and solid. This is called the "transitional" range.
The expansion coefficient decreases but is not yet linearly proportional to the temperature. A seal of two different glasses will not develop stress as long as one the two glasses can "follow" the possible contraction difference. This is up to the setting point (= strain point + 5°C).

3) **Range P - O**

The viscosity is now so high that it is impossible for the tetrahedrons to move through the structure within a reasonable time and the glass behaves as an elastic, solid material.