

## Poisson's ratio

Poisson's ratio  $\nu$  is a measure of the lateral contraction of a material if it is subjected to a tensile stress in the longitudinal direction. It is defined as follows.

$$\varepsilon_l = -\nu \cdot \varepsilon$$

where

$\varepsilon_l$  = strain in lateral direction,  
 $\varepsilon$  = strain in longitudinal direction.

Note that the strain in the lateral direction  $\varepsilon_l$  is negative, as contraction occurs.

Poisson's ratios lie between 0.3 and 0.5 for most polymers. Incompressible polymers, like rubbers, have a Poisson's ratio 0.5. Other polymers have lower values.

The Poisson's ratio of polymers depends on:

- the temperature,
- the moisture content in case of polyamides and
- the fiber content and the fiber orientation in case of filled polymers.

The values in the table below can be used for mechanical calculations.

<b>Poisson's ratio at 23°C</b>			
<b>DSM Products</b>	<b>Polymer description</b>	<b>Dry</b>	<b>Conditioned</b>
Akulon	PA6 & PA66	0.38	0.45
Stanyl	PA46	0.38	0.45
Arnite	PBT	0.44	
	PET	0.43	
Arnitel	TPE	0.45 – 0.49	
Xantar	PC	0.38 – 0.42	
Xantar C	PC + ABS	0.36 – 0.42	
Stapron E	PC + PET	0.36 – 0.42	