

Poisson's Ratio

R&D Center

1. Definition of Poisson's Ratio

A ratio of a transverse direction axis to a longitudinal direction axis when the material is stretched by tensile force.

2. Measurement

Tensile test is done by ISO 527-1.

To measure Poisson's ratio, we use one of the devices as follows. It operates at longitudinal and transverse direction at once.

- (1) A bi-axial extensometer
- (2) An axial extensometer in combination with a transverse extensometer
- (3) Video extensometer

Poisson's ratio is determined from the following equation.

$$\mu = -\frac{\Delta \varepsilon_n}{\Delta \varepsilon_l} = -\frac{\Delta n / n_0}{\Delta L_0 / L_0}$$

μ : Poisson's ratio; it is dimensionless.

$\Delta \varepsilon_n$: the strain decrease in the selected transverse direction, while the longitudinal strain increases by $\Delta \varepsilon_l$, expressed as a dimensionless ratio or percentage.

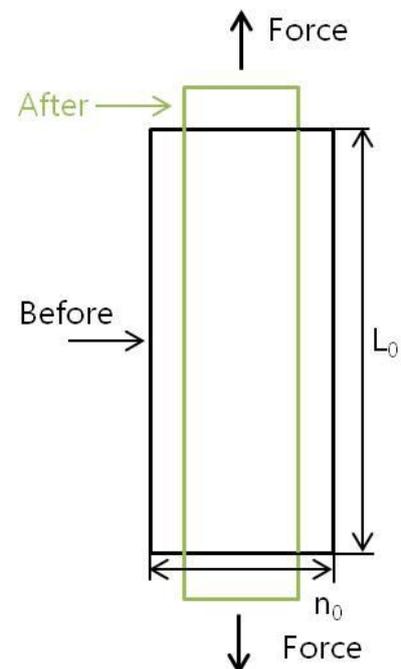
$\Delta \varepsilon_l$: the strain increase in the longitudinal direction, a dimensionless ratio or percentage.

L_0, n_0 : the initial gauge lengths in the longitudinal and transverse directions, respectively, expressed in millimetres (mm).

Δn : the decrease of the specimen gauge length in the transverse direction: $n = b$ (width) or $n = h$ (thickness), expressed in millimetres (mm);

ΔL_0 : the corresponding increase of the gauge length in the longitudinal direction, expressed in millimetres (mm).

Poisson's ratio is indicated as μ_b (width direction) or μ_h (thickness direction) according to the relevant axis.



3. Poisson's Ratio of KEP material

(1) Test condition

- 1) Tester : Korea Polymer Testing & Research Institute
- 2) Test method : Poission's ratio is calculated using strain gauge.
- 3) Test machine : UTM(Universal Testing Machine)
- 4) Test speed : 1 mm/min
- 5) Gripping distance : 115 mm
- 6) Load cell : 30.000 N
- 7) Test temperature and humidity : (23 ± 2)°C, (45 ± 5) % R.H.

(2) Test results

1) KEPITAL(POM)

Grade	Poission's Ratio(-)
F20-03	0.37
FG2025	0.34
TE-24	0.44
FA-20	0.39

2) KEPAMID(PA6, PA66, PPA)

Grade	Poission's Ratio(-)
1330GF NT	0.38
2300MR BK	0.35
2300SF BK	0.38
2315GF NT	0.33
2330GF NT	0.34
6130GFH BK	0.32

3) KEPEX(PBT, PET)

Grade	Poission's Ratio(-)
3330GF NT	0.37
3730GF BK	0.35

4) MAXIMID(MXD6)

Grade	Poission's Ratio(-)
7550GF BK	0.31

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