



POLYURETHANE RESILIENCE

When a material is deformed, a certain amount of energy is required to achieve deformation. Recovery from deformation also takes a certain amount of energy. The ratio of energy returned during recovery to the energy required to cause the deformation is called resilience. A material that is perfectly elastic will return all the energy during recovery. A more viscous material will return less energy upon recovery because some of the input energy was lost in the form of heat. The energy loss is due to internal friction within the elastomer and is called Hysteresis; it's equal to the percent energy loss per cycle. A material with high resilience will be very lively, think bouncy ball, because all the energy that is input during deflection is returned on the rebound. A material with low resilience will feel very dead because the input energy is lost in the form of heat during deflection.

Resilience is typically measured in a variety of ways with the most common probably being the Bashore rebound test. Resilience is measured on a scale of 0 to 100%. A 100% resilient material would return all of the input energy upon recovery.

Shown below are tables containing the resilience for a variety of Gallagher Corporation polyurethane compounds. Resilience is a property that can vary widely among the compounds independent of the hardness. Resilience will also vary widely based on the temperature of the material. When a polyurethane part is heated, it's able to flow more easily, thus reducing the internal friction and increasing the resilience.

Feel free to [contact us](#) for more information on this and other topics or to discuss your specific application.

Resilience Summary Tables

Bashore Resilience					
Compound	485-3	855	960	970	980
Hardness (Shore A)	85	55	60	70	80
Rebound	25%	33%	30%	35%	30%
Compound	990	995	1260	1265	1270
Hardness (Shore A)	90	95	60	65	70
Rebound	30%	28%	60%	60%	60%
Compound	1275	1280	1285	1290	1295
Hardness (Shore A)	75	80	85	90	94
Rebound	60%	60%	60%	63%	60%
Compound	1080	1085	1090	1095	
Hardness (Shore A)	80	85	90	95	
Rebound	60%	50%	45%	40%	
Compound	1550	1555	1560	1565	1575
Hardness (Shore D)	50	55	60	65	75
Rebound	40%	41%	42%	46%	50%