

TPUs for adhesives

PARAMETER	WHAT DOES IT MEASURE?	METHOD	UNITS
VISCOSITY	Measurement of the flow properties of a liquid. Corresponds to the relation between the shear stress and the shear rate, when two layers of a fluid are moved.	MQSA n° 40-A	mPa·s
CRYSTALLIZATION SPEED	This is the measurement of the time needed by a film of a PU adhesive, for reaching its maximum values the cooling period that follows its heat activation.	MQSA n° 12-A	min
ACTIVATION TEMPERATURE	This is the temperature range which allows a good bonding, with interpenetration of both parts to which an adhesive layer has been applied. The right temperature within the range depends on the degree of porosity of the substrate, as well as the quantity of adhesive which has been applied. This characteristic combines the thermoplastic and hot-tack properties of the adhesive.	“European test methods for shoe materials and footwear adhesives”	°C
THERMOPLASTICITY	This is the property of softening or melting under the effect of temperature. It is measured in terms of modulus of deformation (MPa), in relation to temperature.	MQSA n° 68-A	MPa
OPEN-TIME	Time during which a bond on a substrate can be obtained in good conditions, after the heat-activation process. This is the maximum time-span during which both adhesive coats can interpenetrate adequately.	“European test methods for shoe materials and footwear adhesives”	min

Elastomeric TPUs

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MELT FLOW INDEX	This measures the melt mass-flow rate of thermoplastic materials under specified conditions of temperature and load.	DIN 53735	g/10min
GLASS TRANSITION TEMPERATURE (Tg)	This is the temperature where the amorphous portions of a thermoplastic material soften, losing their glassy state. It is measured by Differential Scanning Calorimeter under specified conditions of scanning temperature speed (usually at 10°C/min).	DIN 51007	°C
MELTING RANGE (MFI=10)	This measures the range of temperature where a TPU has a MFI = 10 g/10min under a load of 21.6Kg. At this range, the elastomers have the same viscosity under the same shear stress. It gives a comparative idea of the processing temperature.	MQSA n° 111	°C
SHORE HARDNESS	This measures the resistance against the penetration of a body of specified shape applied under a specified spring loading. The shore hardness scale covers a range of 0 to 100 hardness units, 0 representing the lowest and 100 the highest hardness value. Type A Shore durometers are designed for softer specimens. For harder than 90 Shore A specimens, the use of type Shore D durometers is recommended.	DIN 53505	°shA/°shD
ABRASION RESISTANCE	This measures the volume loss under the specified conditions of test of a defined test piece traversed through a defined abrasion distance under a specified contact pressure across an abrasive cloth of a specified abrasive grade	DIN 53516	mm ³

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TENSILE STRENGTH AT BREAK	This measures the ratio of the force at break to the initial cross-sectional area of the test piece.	DIN 53504	MPa
ELONGATION AT BREAK	This measures the ratio of the change in length at break to the initial gauge length of the test piece.	DIN 53504	%
MODULUS 100% / MODULUS 300%	This measures the ratio of the force at an elongation of 100% or 300% respectively to the initial cross-sectional area of the test piece.	DIN 53504	MPa
TEAR RESISTANCE	This measures the maximum force required to cause the rupture by tearing action of the right angle test specimen divided by the thickness of the specimen.	DIN 53515	KN/m
COMPRESSION SET	This measures the extent to which elastomers retain their elastic properties after prolonged compression at constant strain and at a given temperature.	DIN 53517	%
DENSITY	This is the mass of a material divided by its volume. Usually the density is measured at a reference temperature of 20°C.	DIN 53479	g/cm ³