



TENSILE TESTING OF PLASTICS



Student:

Year:

Date:

Teacher:

Program:

- Characterization of tested polymers – chemical formulas, examples of application.
- Typical stress-strain diagrams.
- Differences between tensile testing of plastics and steels.
- Tensile test and evaluation of measured data.

Symbols:

B	[]	Specimen thickness
W	[]	Specimen width
L	[]	Initial distance between grips L = 115 mm
ΔL_{tb}	[]	Increase of the distance between the grips
F_y	[]	Yield force
F_m	[]	Maximum force
F_b	[]	Force at break point
A	[]	Initial cross-section area of testing specimen
σ_y	[]	Yield strength
σ_m	[]	Ultimate strength
σ_b	[]	Tensile strength at break
ε_{tb}	[]	Nominal tensile strain at break

Used formulas:

$$A = B \cdot W \qquad \sigma_y = \frac{F_y}{A} \qquad \sigma_b = \frac{F_b}{A} \qquad \sigma_m = \frac{F_m}{A} \qquad \varepsilon_{tb} = \frac{\Delta L_{tb}}{L}$$

Task:

Measure dimensions of testing specimens, inspect the setting of distance between the grips, proceed the tensile test of given specimens, fill the table and evaluate the measured data.

TABLE 1: *Measured and calculated values*

Specimen		Measured values						Calculated values					Tensile test diagram
Type	Chemical structure	B	W	F _y	F _b	F _m	ΔL _{tb}	A	σ _y	σ _m	σ _b	ε _{tb}	
		[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]	[]

Conclusion: