

Measurement devices for deformation and strain

Measurand	Measurement device	Measuring range	typ. measurement uncertainty
Length / Displacement / Shape	Laser interferometer	< 2 m (max 50 m)	$0.2 \mu\text{m} + 1.5 \times 10^{-6} L$
	Potentiometric transducer	150 mm to 1800 mm	0.5 % f.s.
	LVDT	$\pm 1\text{mm}$ to $\pm 200\text{ mm}$	0.5 % f.s.
	Laser triangulation sensors	$\pm 10\text{ mm}$ / $0 \dots 20\text{ mm}$ / $\pm 50\text{ mm}$ / $0 \dots 200\text{ mm}$	0.5 % f.s.
	Interferometric film thickness transducer	0.3 mm	$0.5 \mu\text{m} + 0.005 d$
	Geometric moiré	Object size D: $0.05\text{ m} < D < 2\text{ m}$	$10^{-3} D$
	Projection moiré Fringe projection	Object size D: $0.02\text{ m} < D < 0.6\text{ m}$ Measuring range: $0.1 D$	$10^{-3} D$
Strain	Differential strain sensor	$\pm 17'000 \mu\text{m}/\text{m}$	$10 \mu\text{m}/\text{m}$
	Resistive strain gauges (RSG) 1D / x-y / Rosettes	$\pm 100'000 \mu\text{m}/\text{m}$	$2 \mu\text{m}/\text{m} + 0.01\varepsilon$

D Object diameter
 ε Strain value
 f.s. full scale
 L Displacement value