This table is based on A. Forster, T. Neudeck and S. Blatcher (PA Consulting Group), "Approaches to the Physico-Chemical and Mechanical Characterisation of Functional Coatings, Part II", Medical Device Technology, November/December 2008 pp. 42-47. Modified with permission.

	Technique	Description	Pros	Cons
Destructive	Focal Depth Indexing	▪ Coating partially removed down to substrate ▪ Microscope imaging ▪ Focal plane subtraction (Coating Edge - Substrate Surface)	▪ Low cost ▪ Simple operation	▪ Destructive test ▪ Operator dependent ▪ Sample preparation and coating alteration ▪ Limited accuracy/resolution ▪ Only works for single layer coating ▪ Provides no information about coating properties.
	Indentation	▪ Indentation with controlled force normal to substrate/coating surface ▪ Hardness variation on air/coating and coating/substrate interface ▪ Thickness of coating layer from recorded force/displacement graph	▪ Provides some additional information about coating hardness and adhesion.	▪ Expensive hardware to measure soft coatings ▪ Only single layer coating ▪ Destructive test ▪ Sample preparation and coating alteration
	Stylus Profilometer	▪ Coating partially removed down to substrate ▪ Recording of tip deflection during surface scanning	▪ Simple operation	▪ Only works for single layer coating ▪ Sample preparation and coating alteration ▪ Destructive test ▪ Slow scan speed ▪ Provides no information about coating properties.
Non-destructive	Confocal Raman Microscopy	▪ Distinct Raman spectra depending on coating composition in focal plane ▪ Shifting focal plane in the z-axis ▪ Depth profiling by measuring specific compound as function of depth ▪ Quantity actually measured is 'thickness divided by refractive index'	▪ No sample preparation ▪ Non - destructive ▪ Can measure multiple coating layers	▪ Depth resolution (>±0.5µm) ▪ Relatively expensive instrumentation ▪ Requires skilled operator ▪ Requires refractive index of coating layers; this must be assumed, or measured using a separate test piece on a separate instrument e.g. prism coupler ▪ Very slow (no potential to be used in production)
	Optical Profilometry/ Interferometry	▪ White light interferometer ▪ Good contrast fringes only where surface is in focus ▪ 3D surface map ▪ Quantity actually measured is 'thickness divided by refractive index'	▪ No sample preparation ▪ Non-destructive ▪ Nanometre accuracy (strictly speaking, nanometre *reproducibility* - results may be highly inaccurate if wrong refractive index used) ▪ Simple operation	▪ Only translucent coatings ▪ Relatively expensive instrumentation ▪ Requires refractive index of coating layers; this must be assumed, or measured using a separate test piece on a separate instrument e.g. prism coupler ▪ Thickness obtained is a function of refractive index selected; this is a large source of thickness uncertainty ▪ Provides no information about coating properties. ▪ Little sensitivity to films <2µm thick ▪ Very slow (no potential to be used in production)
	Spectral Reflectometry	▪ White light source focused on coating surface ▪ Destructive/constructive interference modulation as function of wavelength ▪ Analysis of spectral composition of reflected signal ▪ Quantity actually measured is 'thickness multiplied by refractive index'	▪ Relatively low cost instrumentation ▪ No sample preparation ▪ Simple operation ▪ Non-destructive ▪ Multiple layers simultaneously ▪ Nanometre accuracy (strictly speaking, nanometre *reproducibility* - results may be highly inaccurate if wrong refractive index used) ▪ Provides limited film-composition information (via changes in film absorption at different wavelengths).	▪ Only translucent coatings ▪ Requires refractive index of coating layers; this must be assumed, or measured using a separate test piece on a separate instrument e.g. prism coupler ▪ Thickness obtained is a function of refractive index selected; this is a large source of thickness uncertainty
	Beam Profile Reflectometry (BPR) NIGHTINGALE eos EFFICIENT OPTICAL SOLUTIONS	▪ Low-power laser beam focused on coating surface ▪ Destructive/constructive interference modulation as function of laser incident angle, which is equivalent to spatial position within beam ▪ Analysis of spatial composition of reflected signal ▪ Thickness and refractive index are obtained independently and simultaneously.	▪ Relatively low cost instrumentation ▪ No sample preparation ▪ Simple operation ▪ Non-destructive ▪ Multiple layers simultaneously ▪ High throughput (potential production-line technique) ▪ Provides refractive index directly - no need to assume or measure separately ▪ Largest source of thickness uncertainty removed, hence true Ångstrom-to-Nanometre accuracy. ▪ Provides measurement of film birefringence (related to film stress) ▪ Trivial to combine on same platform with spectral reflectometry ▪ When combined with spectral reflectometry, provides greatly improved film-composition information (because thickness uncertainty is removed).	▪ Only translucent coatings