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Properties of Elastomeric Impression Materials

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In spite of the recent advent of digital chair-side scanners to facilitate restorative dentistry, using impression materials to capture dental anatomy is still an accurate, relatively inexpensive and, therefore, popular technique. Following are the important qualities the clinician should expect to find in their elastomeric impression material:

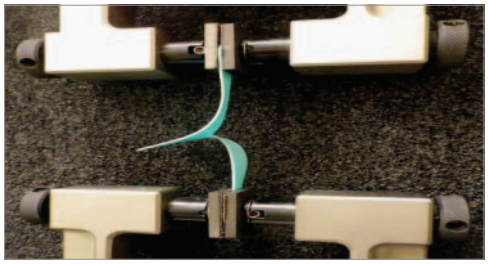
Working/Setting Time: Impression materials should have minimal setting with a predictable working time but then they should set reliably and quickly when placed in the mouth. Setting triggered by exposure to body temperature shortly after placement is a time-saving characteristic found in one of the more recently introduced impression materials *(**Imprint 4**, 3M ESPE)*.

Wettability: Impression materials should be able to displace moisture and form intimate contact with the tooth and soft tissue. No bubbles or voids should be present. The contact angle is a measure of wettability. The lower the contact angle, the greater is the wettability.

Flexibility (Strain-in-compression, %): Impressions should be flexible enough to allow easy removal from the mouth when set. ADA and ISO standards recommend 0.8 – 20 % for heavy body and 2 – 20 % for light-bodied materials. The greater the strain-in-compression, the more flexible is the material.

Elastic Recovery (%): An impression should return to its original dimensions after removal from undercut areas in the mouth. The ADA recommends elastic recovery greater than 96.5%. Many impression materials have an elastic recovery of more than 99%.

Tear Energy (J/m^2): Impressions must resist tearing upon removal from the mouth and when separating the model from the impression. Tear energy should be between 390 and 1800 J/m^2. The higher this value, the more tear resistant is the material. The figure shows a tear specimen being tested.



Detail Reproduction: Impression materials must reproduce the finest details of the oral tissues and be able to transfer them accurately to gypsum dies or digital scanners.

The table provides data on three of the most important mechanical properties for four elastomeric impression materials.

Elastomeric Impression Material Mechanical Properties

Product	Company	Viscosity	Elastic Recovery, %	Strain-in-compression, %	Tear Energy, J/m^2
Splash! MAX Half-time Set	Den-Mat Holdings, LLC	Light Heavy	99.0 (0.3) 99.2 (0.1)	6.7 (0.1) 3.3 (0.1)	1298 (42) 1140 (104)
Honigum Quad Fast	DMG America	Light Heavy	99.6 (0.0) 99.6 (0.0)	4.3 (0.2) 2.0 (0.1)	395 (34) 834 (48)
Identium Fast	Kettenbach LP	Light Heavy	99.5 (0.1) 99.4 (0.1)	3.3 (0.0) 2.7 (0.1)	1019 (17) 1032 (48)
Panasil Fast	Kettenbach LP	X-light Light Heavy	99.5 (0.1) 99.3 (0.1) 99.7 (0.1)	4.1 (0.1) 4.1 (0.1) 2.4 (0.1)	838 (87) 798 (69) 946 (36