

E-Beam Services, Inc.
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Test Methods to Determine Crosslinking of Polyethylene

Method	Equipment Needed	General Method	Pass/Fail	Additional Comments
Oven	Oven	Sample is placed in an oven above the melting point of the polymer for 15 minutes. If it doesn't melt, it is crosslinked.	Pass: Doesn't melt Fail: Melts	Very simple go/no-go test that is used by a number of customers to verify the product was crosslinked.
Hot Modulus	Universal Testing Machine (i.e. Instron) with an environmental chamber.	At a temperature above the melting point of the polymer, the modulus of a dogbone sample is measured.	Pass: Measureable modulus Fail: Melts or low modulus	Reasonable test which may be able to be correlated to the crosslinking percentage. Often used for heat-shrink products.
Gel Fraction	Wet lab equipment - often this test is outsourced due to the technique sensitivity and equipment needed.	Shaved and weighed sample is boiled in xylene for 24 hours and the remaining weight is the "gel" portion.	Pass: Measureable gel Fail: Low or no gel	The "standard" for percent crosslinking is the gel test. It is rather expensive if outsourced and is sensitive to technique.