Permittivity and Permeability

Permeability is the measure of a soil's ability to permit water to flow through its pores or voids. Evaluation is done in terms of the soil's Darcy coefficient of permeability which expresses the *velocity* of water that can flow through a soil. Permeability values are appropriate for soil comparisons. This measurement is very important for evaluating the rate of settlement of a saturated soil under a load or designing an earth dam. Since geotextiles and geomembranes used for liquid containment are not soils, permeability should not be used to compare them.

Permittivity measures the quantity of water that can pass through a geomembrane perpendicular to its surface. According to ASTM D4491, "it is more significant to evaluate the quantity of water that would pass through a geomembrane under a given head pressure over a particular cross-sectional area. This is expressed as Permittivity". Permittivity is the correct test method that should be used for geomembrane comparison.

Converting Permittivity to Permeability According to ASTM D4491:
"If the permeability of an individual geotextile is of importance, a nominal coefficient of permeability, as related to geotechnical engineering, may be computed.
By multiplying permittivity times the nominal thickness of the geotextile/geomembrane, as determined by Test Method D5199, the nominal coefficient of permeability is obtained."

Permittivity x Material thickness = Coefficient of Permeability

For more information, here is a link to a manufacturer of geotextiles website where they discuss Permittivity and Permeability.

http://www.thraceling.com/tech_notes.php?num=06