Suppose \( \pi : Y = \text{Spec}(S) \to X = \text{Spec}(R) \) is a generically separable finite morphism of \( F \)-finite normal varieties in characteristic \( p > 0 \). By analyzing lifting properties of \( p^{-e} \)-linear maps using the trace map on function fields, we are able to relate (generalized) test ideals \( \tau(X, \Delta_X) \) and \( \tau(Y, \Delta_Y) \) corresponding to certain divisors \( \Delta_X \) and \( \Delta_Y \) on \( X \) and \( Y \), respectively. This generalizes previously known results on the behavior of test ideals under finite morphisms which are étale in codimension one. (Received September 21, 2009)