This research aims to enhance the tensile strength and flame retardancy properties of wool and wool/polyester blended fabrics by using boric acid. Two different cross-linkers were also used to enhance the adsorption of boric acid on the fabric surface. The wool and wool/polyester fabrics were chosen because of a steady increase in the demand for wool and polyester technical textile apparel. Tensile tests, flame retardancy, air permeability and colour value measurements were used to investigate the effects of the treatment. The fabric surfaces were also observed by Scanning Electron Microscopy (SEM) and Fourier Transform Infrared Spectroscopy (FTIR-ATR). According to the all test results, it can be concluded that boric acid is an excellent agent for improving the tensile strength and flame retardancy properties of fabrics.