Brazilian wheat consumption is about 10.5 million tons per year. Wheat end use is generally classified as: bread making (52%), homemade products (21%), pasta (16%), and biscuits (11%). Wheat quality can be differentiated by means of rheological and physicochemical tests, such as grain hardness and specially flour color. These are important quality attributes for marketing of wheat and wheat flour. International literature indicates that there is a high correlation between flour color, represented by value "L*" (brightness) and "b*" (blue-yellow chromaticity coordinate) and grain hardness. It is also suggested to use only one of these attributes (color or hardness), for categorizing raw material. The objective of this study was to correlate the color parameters of flour and grain hardness index of wheat samples collected from different growing conditions in Brazil. A total of 5,019 samples representing different wheat genotypes produced in several locations and years were analyzed for flour color (Minolta colorimeter) and grain hardness index - ID (Single Kernel Characterization System). The quality tests results were subjected to multiple correlation matrix analysis. Although all the correlation coefficients were statistically significant, the r-values were not very high: (L * X ID: r = -0.59), (b * X ID: r = 0.55), showing that it is necessary to perform both tests for a correct evaluation of wheat quality.