The conventional method to simulate the wear occurring in deep drawing processes is using the Archard model with a constant wear coefficient, which depends on the tribological properties of the system. This implies that the wear development is constant over time. However, it is a known fact that the wear is nonlinearly related to loading duration. On the other hand, another opinion is that the wear can be explained by dissipation energy. Using these facts, the authors present a modified Archard's model, in which the wear coefficient is modeled to be variable. In this new approach, the coefficient is a function of the accumulated wear work, which is directly proportional to dissipated energy. In order to determine these wear coefficient values as well as their gradients along the life cycle, deep drawing experiments with a cylindrical cup geometry were carried out. The prediction of tool wear is accomplished by REDSY, a wear simulation software developed at the Institute of Metal Forming and Casting, TU München. The wear predictions made by this software are based on the results of a finite element deep drawing simulation. The results obtained using the proposed model are in a good agreement with the experiments.