14.11.1 Application Factor

The application factor $K_a$ considers the probability that load variations, vibrations, shock, speed changes, and other application-specific conditions may result in peak loads greater than $W$, being applied to the gear teeth during operation. Table 14.8 will be used, where the application factor is a function of both the driving power source and the driven machine. An application factor of 1.00 would be applied for a perfectly smooth-operating electric motor driving a perfectly smooth-operating generator through a gear speed reducer. Rougher conditions produce a value of $K_a$ greater than 1.00. Power source classifications with typical examples are

1. **Uniform**: electric motor with constant-speed turbine
2. **Light shock**: water turbine with variable-speed drive
3. **Moderate shock**: multicylinder engine

Classification of driven machine roughness and examples are

1. **Uniform**: continuous-duty generator
2. **Light shock**: fans and low-speed centrifugal pumps, liquid agitators, variable-duty generators, uniformly loaded conveyors, rotary positive-displacement pumps
3. **Moderate shock**: high-speed centrifugal pumps, reciprocating pumps and compressors, heavy-duty conveyors, machine tool drives, concrete mixers, textile machinery, meat grinders, saws
4. **Heavy shock**: rock crushers, punch press drives, pulverizers, processing mills, tumbling barrels, wood chippers, vibrating screens, railroad car dumpers