From the data that Art gave (note this is for a much higher temperature):

Which Implies:

Yielding:

Giving:

When ;

Each engine cycle has two such loadings, which implies that the number of engine cycles to failure =

An average formula one race lasts around 2.5 hours. If the driver were able to maintain the max torque setting, this is cycles of the engine. This implies that our engine will last the required single race, and many more.