

Ergonomic Comparison of Pulse Tools and Impact Tools

When comparing pulse tools and impact tools, you see two primary issues - vibration and sound levels. Based on our current data and research, there is a tremendous difference in the ergonomic considerations comparing impact wrenches to pulse tools, regardless of brand.

Impact Tools:

First, as you are aware, the impact wrench mechanism is based upon metal-to-metal contact of a rotating anvil against a housing. The impact of the anvil to the housing on each revolution produces the torque required to run down the fastener. However, this same impact is what caused the high noise and vibration levels. There are primary factors in inducing Raynaud's syndrome, white finger disorders, and other common cumulative trauma disorders.

Pulse Tools:

A pulse tool uses a chamber filled with hydraulic fluid. This chamber rotates and generates torque on each revolution when the anvil reaches an internal seal point. Since the fluid generates the torque, instead of metal-to-metal contact, pulse tools operate much more quietly and with less vibration.

Sound:

The average sound level of an impact wrench is about 98 dB(A) (averaged over four tool sizes from 3/8" to 1" drive sizes). The average pulse tool operates at only 80 dB(A). This difference is accentuated by the fact that sound level values are logarithmic. Every increase in only 3 dB(A) is actually doubling the sound level. This means that an impact wrench is 64 times as loud as a pulse tool. Likewise, one impact wrench sounds as loud as 64 pulse tools operating simultaneously.

Vibration:

Vibration can be measured with an accelerometer in meters per second squared (m/s^2). The vibration levels of the same set of impact wrenches ranged from 5.6 to 35 m/s^2 , with an average of 16.2 m/s^2 . The equivalent of earth's gravity is only 9.8 m/s^2 . Holding this type of tool is equivalent to almost 2 "g's" in force constantly. Another analogy is that a high tech racing sports car going through a slalom course would have a hard time generating even 1 "g" in force. This impact wrench used on a daily basis generates a constant load of almost 2 "g's".

In comparison, the typical pulse tool generated from 0.7 to 3.2 m/s^2 , with an average of 2.1 m/s^2 . This is only 13% of the vibration level as the impact wrench.