

# Technical Bulletin 53

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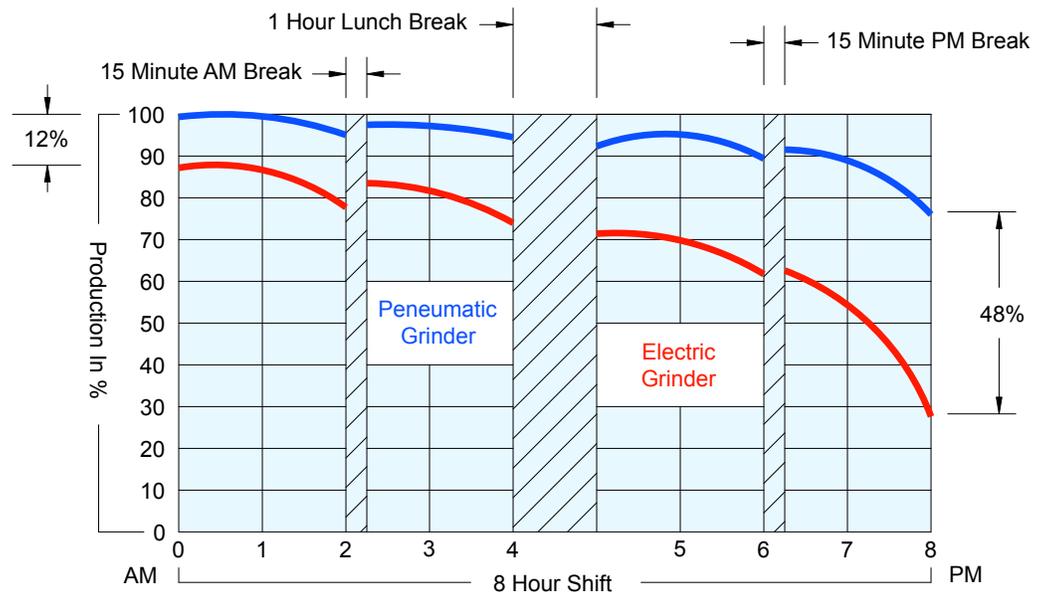
## Production Variations Between Electric & Pneumatic Tools

by Brian S. Elliott

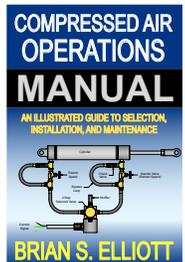
When comparing the power produced from compressed air components with electric components, it becomes clear that compressed air is not the most efficient method to transmit energy. In general, a pneumatic component is only 10 to 15% as efficient as its electric counterpart. (This is the reason that very few fixed air motors are encountered in industry.) However pneumatic components can compensate for their low efficiency with other attributes, principally their power-to-weight ratio. As an example, if an electric grinder has 1.4 horsepower and weighs 15.5 pounds, an equivalent pneumatic grinder is 2.5 horsepower and weighs 8 pounds. The electric grinder has a power-to-weight ratio of .09 horsepower per pound while the pneumatic grinder is .31 horsepower per pound. A considerable difference.

The overall weight of a pneumatic tool can have a profound effect on the fatigue level that workers experience. As an employee's fatigue increases, his production decreases. The table below shows the difference in production between an employee using a pneumatic grinder versus an employee using an electric unit. Notice that in the morning, the production level of the electric unit is 12% lower than the pneumatic unit simply because it has less power. As the work day progresses, the weight and lower power takes its toll on the worker. By the end of the day, the worker's productivity is 48% less than the worker using the pneumatic unit. This clearly illustrates that, on paper, the electric unit may seem more efficient, however, in the real world it is not.

In addition to high power-to-weight ratios, pneumatic tools have a number of other significant benefits over their electric counterparts. One of the most noteworthy is that they are inherently safe. Pneumatic tools have no danger of electrical shock, they do not represent a significant fire hazard, can be safely used in wet environments and become cooler during operation, not hotter.



Comprehensive information on compressed air systems is provided in the book "Compressed Air Operations Manual" by Brian S. Elliott, ISBN: 0-07-147526-5 Published by the McGraw-Hill Book Co.



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