

POWER TOOL FACTS & TERMINOLOGY

DOUBLE INSULATED/GROUNDED TOOLS: A double insulated tool is one that has all the electrical parts of the motor insulated from each other and all gripping surfaces made of non-conductive materials. In essence there are two layers of insulation between the operator and the tool's electrical systems. Tools that are double insulated are not intended to be grounded and therefore are equipped with a two pronged plug. Three-pronged plugs are found on grounded tools and are electrically safe as long as the receptacle is properly grounded.

GROUND FAULT INTERRUPTER: A device which protects both the worker and the tool against line ground faults (short circuits). It does this by detecting any imbalance in the current flow to and from the tool. If a ground fault should occur, the current imbalance will trip the G. F. I. before the operator is shocked.

POWER: In general, the higher the amperage rating of a tool the more powerful the motor. This assumes that tools being compared have motors operating at the same efficiency. Efficiency is defined as a percentage which is obtained when comparing usable output amps (power) to the amps being drawn by the motor. Different motors and/or different manufacturers will not have the same efficiency. One tool manufacturer says 5 amps, another says 750 watts and still another says 1 horsepower all for the same tool.....How does one make a logical comparison?

$$\text{*WATTS} = \text{AMPS} \times \text{VOLTS} \times 62\%$$

(AC apparent power)

$$\text{AMPS} = \frac{\text{WATTS}}{\text{VOLTS}}$$

$$1 \text{ HORSEPOWER} = 746 \text{ WATTS}$$

*This is the power consumed by the tool and not its power output. Output Watts is the true measure of a tool's power.

HAMMER DRILL: Hammering action is obtained by the rotation of one cam ring against a stationary cam ring. For light duty in solid and some hollow masonry up to 1". Make sure all jaws have been tightened on Jacobs type chucks. Though this tool hammers its real emphasis is on drilling.

ELECTRO/PNEUMATIC HAMMER: Hammering action is obtained by a piston driven air cylinder which delivers a hammer like blow to the top of the drill bit. For heavy duty drilling up to 1-1/2" with solid bits in solid masonry. As the emphasis of this tool is hammering, it should not be used on hollow or thin masonry.

GEARS & BEARINGS: Gears are used on almost all power tools. Single, double or even triple reduction may be found depending on the tool and power requirements. In general, the greater the gear reduction the slower the speed and the higher the torque. Bearings support the rotating parts of the tool, reduce friction and help the tool operate smoothly and efficiently. There are three main types of bearings:

- **Ball Bearings:** are generally used on parts which are heavily loaded on a continuous basis and are used on professional and contractor quality tools.
- **Needle Bearings:** are used on parts of the tool with lesser loads.
- **Sleeve Bearings:** are used on lightly loaded parts of the tool and are generally found on consumer grade tools.

MOTORS: The most common type of motor used in hand held construction power tools is the universal motor or commutator series-wound motor. This motor can be operated on AC or DC. Induction motors are brushless and have no commutator. Many induction motors use capacitors to start and in some cases to run the motor which reduces starting power and helps the motor run more efficiently. These types of motors are used on pumps, compressors and refrigeration equipment.

TORQUE: A turning or twisting force. Torque is another way of determining a tool's output power and is measured in foot pounds. In general the higher the speed the lower the torque.

POWER CORD RATINGS

AMP RATING	.1-2	2-3.4	3.5-5	5.1-12	7.1-12	12.1-20
CABLE LENGTH	WIRE SIZE (GAUGE)					
25 Ft.	18	18	18	18	14	12
50 Ft.	18	18	16	16	14	12
100 Ft.	18	16	14	14	14	10
150 Ft.	16	16	14	14	12	
200 Ft.	16	14	14	12	10	
300 Ft.	14	14	10	10		

The above values are based on a maximum current drop of 3% in 100 feet at 120 Volts. The resistance used is 14 Gauge = .26 Ohms, 12 Gauge = .16 Ohms and 10 Gauge = .1 Ohms.