



RIPPLE

Ripple is the AC component that rides on the DC output of rectifier.

Most DC power supplies (rectifiers) used in the metal finishing industry are AC to DC converters. After the AC is converted to DC, there is always an amount of AC that is not converted, and is passed to the output of the rectifier.

The only device that puts out pure DC is a battery!

Some DC power applications do not react favorably to high amounts of ripple. The amount of ripple that could be present on the output of rectifier will vary depending on the type of rectifier circuit, and what level of output you are operating at (rectifiers that have variable outputs).

Most rectifiers are 3-phase (6 pulse) systems. These may have a fixed output voltage rating, or they may have a variable output, or they may be variable and provide voltage or current regulation. All of these systems will deliver about 4.2 to 5% ripple only when operating at full rated voltage and current levels.

The variable and regulated rectifiers are most typically controlled by SCR's (Silicon Controlled Rectifiers). When these SCR devices are used to lower the output voltage or current levels of the rectifier (phase controlling), the AC ripple content increases. In some applications, this is detrimental to the application process, and results in poor metal finishing results. Most metal finishing applications work well with only 5% ripple filtering.

An inductor and capacitor circuit can be used to lower the ripple content to 5% or less when operating through a typical operating range of 0 to 100% of the DC rating. Additional filtering can be provided to allow 1% or less throughout a operating range also.

L/C ripple filters can be provided for existing rectifier systems. It is a simple matter of inserting the filter between the output of the rectifier and the load. These usually come in free-standing enclosures, and take up little floor space.

Specialty applications usually require some form of low ripple, and needs to be addressed.

Other means of obtaining low inherent ripple are 12-pulse circuits.

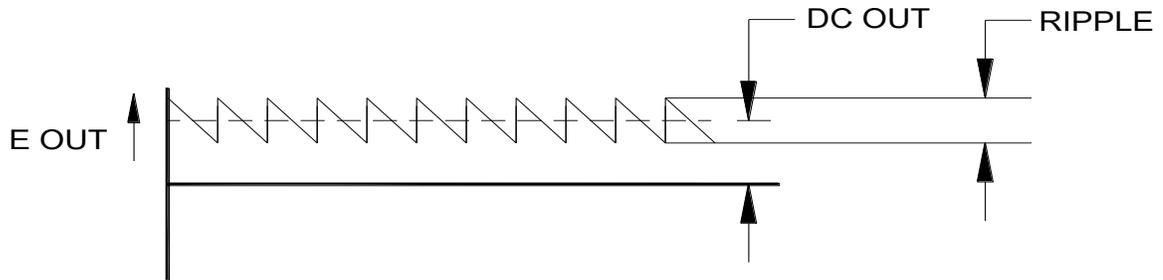


Ripple.

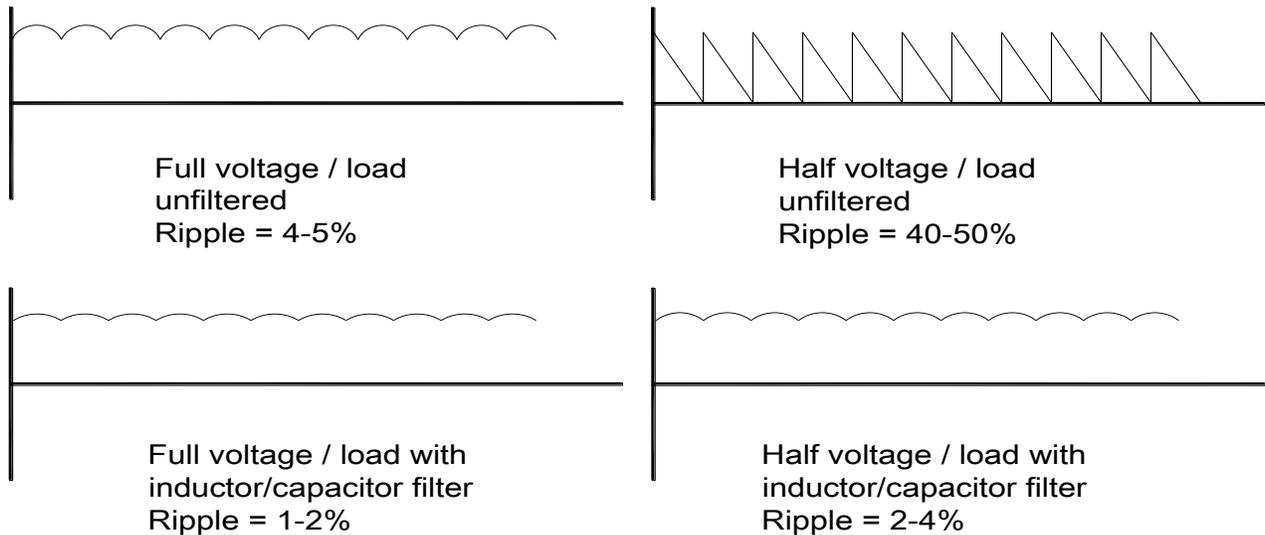
The residual ac component which is superimposed on the dc output.

The following formula is used to calculate ripple percentage.

$$\% \text{ Ripple} = \frac{\text{AC rms volts}}{\text{DC volts}} \times 100$$



Typical rectifier output waveforms for 3 phase 60 Hz input.(6 pulse units)
Ripple frequency = 360Hz



Typical rectifier output waveforms for 3 phase input.(12 pulse units)
Ripple frequency = 720Hz

