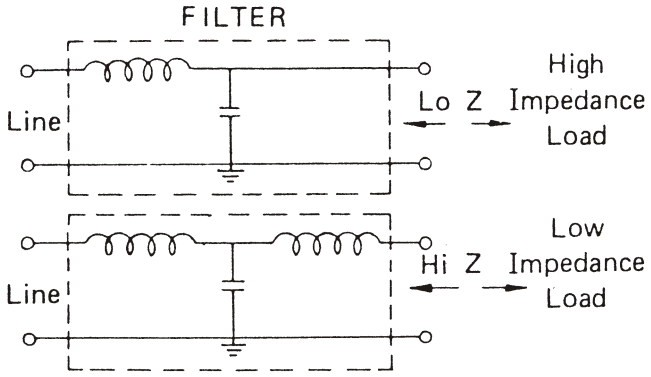
The effectiveness of noise attentuation is undoubtedly the primary concern for selecting an EMI filter. The capability in this aspec usually refers to the reading of insertion loss which is derived from the following formula:

$$\text{Insertion loss (dB)} = 20 \log \frac{V1}{V2}$$

Where V1=EMI voltage without filter
V2=EMI voltage with filter

Published insertion loss data assumes that power line and load have the same impedance and all such data are in practice generated from a 50 OHM-50 OHM circuit. However, the said condition seldom exists in actual application. Therefore, insertion loss readings are not supposed to represent actual performance of noise suppression but a reference for comparison among different units or evaluation of product conformity in incoming inspection. To verify actual effectiveness in noise suppression, a filter has to be mounted in the equipment and be subjected to a conduct emission test in a shielding room.

The effectiveness of noise attenuation depends heavily on the source and load impedence. EMI filters function as "mismatching network" between source and load impedence at higher frequencies. The greater the mismatch, the more effective the filter will be in attenuating the interference. In most cases, the power line presents low impedance. The filter line side should then present high impedance. Equipment, on the other hand, can be either high or low impedance. High impedance equipment such as linear power supplies should use a filter with low impedance or a shunt capacitor at the load side to create a mismatch. Low impedance equipment such as switching power supplies, sychronous motors or shunt regulators should use a filter with high impedance at the load side and should have a series inductor. The schematics below provide an easy way for choosing the appropriate filter.



The following factors should also be taken into consideration in your selection process:

a. Current voltage rating
b. Environment requirement such as temperature, shock, vibration and humidity
c. Physical dimension and terminal configuration
d. Availability
e. Cost effectiveness
f. Safety approval

Qualtek Electronics Corporation
7675 Jenther Drive * Mentor, Ohio 44060
Phone: 1-440-951-3300 * Fax: 1-440-951-7252
E-Mail: mailbox@qualtekusa.com