Survival Tips for Tube Amps

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Nov. 30, 2008 - *PRLog* -- Survival Tips for Tube Amps

by R. Aspen Pittman(Reprinted from The Tube Amp Book)

TIP #1 Speaker Impedance
The proper matching of the impedance between your tube amp and speaker is extremely important. Improper matching will cause severe tube wear and is a common cause of early tube failure. Some amplifiers are more sensitive to this than others . Pay attention that the Marshall's impedance selector is on 16 ohms when your running a common 16 ohm Marshall cabinet, and reduce it to 8 ohms when adding a second identical cabinet. Always check your cabinets by measuring with a volt meter on the ohms scale (these meters read low, i.e.: an 8 ohm cabinet might read 6 ohms while a 4 ohm cabinet could read 3 ohms). Another way to determine the impedance of your cabinet is to read the individual speaker impedance and note how they are wired. If there are two 8 ohm speakers wired in parallel (+ to both +'s and - to both -'s) then the cabinet will be a 4 ohm load. If the two speakers are wired in series (+ to spk #1 +, #1 - to #2 +, #2 - to -) then the cabinet will have a 16 ohm load. In other words, parallel wiring halves the impedance of the speakers while series wiring will double it.

Beware the dangers of using a power attenuator with your Marshall as most power attenuators do not match impedance closely enough for these amps. Using a power attenuator might let your Marshall distort at lower levels, but at the expense of much more rapid output tube wear -- premature failure of the output tubes is common in Marshalls used with power attenuators. Fender amps are not as sensitive to power attenuators as Marshalls, because of differences in design in the output section. However, since the tubes are putting out full power into the attenuator, they will wear out quicker than if they were just coasting at a moderate output level. If you like the sound you get with the attenuator, be prepared to spend a little more on power tubes.

TIP #2 Power Tube Replacement
The regular replacement of power tubes is normal in amps with regular use. Just when to change them can vary with the type of use the amp gets and how often it's used. Most players should change their tubes once a year if they play moderately loud and fairly often. As the output tubes wear out, both the bass and treble responses of the amp will begin to suffer. This power loss from worn out tubes isn't always noticeable because it occurs gradually over time, and because power level differences aren't easily noticed. It takes twice the power for the ear to hear just 3 dB more, and that's just barely audible! Worn tubes will usually have poor, mushy bass response. Regular power tube replacement will guarantee consistent and reliable performance. It's cheaper in the long run.

TIP #3 Drive Tube Replacement
The driver tube operates in conjunction with the power tubes to form the power-amplifier section of the amp. The best power tubes will sound bad with a weak driver tube, as this is the tube that controls the output tubes -- if it can not control the output tubes, the amp can't sound its best. This will show up particularly at higher power playing, or when playing the amp distorted. REPLACE THE DRIVE TUBE WHENEVER REPLACING THE OUTPUT TUBES! In most amps, the driver is the smaller tube (12AT7, 12AX7, 7025, 12AU7 or similar), which is adjacent to the output tubes.

TIP #4 Re-Tensioning Tube Sockets
NOTE: Because the tube sockets are connected to the very highest voltages in the amplifier, we suggest that the following work be done only be those having the proper knowledge of electrical safety.

When tubes are changed again and again over time, the sockets female parts begin to stretch and not make good tight contact with the tube pins. This can lead to arcing and intermittent connections between the tube and the amp. This condition can be aggravated by the vibration from your speakers and so may occur on certain notes on your guitar or keyboard. You can correct this by replacing the socket (last resort) or by re-tensioning the socket with a large safety pin, jeweler's screwdriver, or small ice pick. Use a tool with an insulated handle if at all possible.

First: disconnect the amp from the AC outlet and allow the amp to drain off any voltage by leaving your speakers hooked up to the amp with the standby "ON". This takes just a few minutes and could save an awful experience later. Now remove the tubes and notice the contacts located inside each pin hole of the socket. These contacts spread the pin hole -- do not push the contacts in so far that the tube will not re-insert. After you've re-tensioned all the contacts, replace the tubes and notice how much tighter the tubes are held.

You may also find corrosion on the contacts. Try spraying a little contact cleaner or WD-40 on a tube and inserting it into the socket a few times. This will improve the connection to the tube and prevent future corrosion.

TIP #5 Capacitors and Resistors
The most common problem we see in tube amps (other than tubes) is worn out capacitors and bad resistors. What follows are some common symptoms of bad resistors and capacitors, why they can go bad, and how to locate and fix the problem.

NOTE: We do not recommend that you open your amp, or try to perform any repair operations unless you are properly trained in electronic servicing.
A common result of cheap tubes failing is that they will take out a screen grid resistor with them (usually located across the inside of the tube socket, or near by). These take the heat when the tube shorts and can fall out of specification easily. This will cause improper function of any power tube you place in the faulty socket -- if the resistor is open, the tube may as well not be in the socket! In any case, the amp will not be reliable until the screen grid resistor(s) have been replaced. Fender amps usually have a 1 watt 470 ohm screen grid resistor, while Marshalls generally use a 5 watt 1000 ohm resistor for this purpose. The screen grid resistors can be checked using an ohm-meter to measure their resistance. The measurement should be within 10% of it's marked value.

Another common source of poor sound quality would be worn-out filter capacitors in the output or supply stage of the amp. This is especially common in amps over ten years old. These are fairly large components and are often mistaken for "metal tubes" at first glance. The filter caps "filter out" the 60 cycle hum from the power source and through the years they dry out and filter less and less. As the 60 cycle hum is now present in your audio output, it will create an odd harmonic that will seem to follow your notes up and down the scale. It's almost like having somebody singing off-key all the time. In addition, since the amp is now producing sub-harmonic notes, the power is sapped and the overall response of the amp will become weak and sound mushy.

Inspection of filter caps can usually determine if they are bad. These large metal cylinders are easy to spot. Fender amps have them on the under side of the chassis, between the transformers, covered by a 4" X 6" metal pan. It is therefore not usually necessary to remove the amp chassis from the wood cabinet. Remove

the pan and "drain" the capacitor by touching a screwdriver from the hot side of the caps to ground. Now inspect the top site (or positive) of the part, looking for a broken or swollen seal. This can look like a little bubble about to pop, or it could have already burst and have powder coming out. Capacitors have this relief seal to expose when they go faulty. Be sure to replace them with the same value (or greater value) and make sure they are placed with the proper polarity.

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State/Province	Guangdong
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Industry	Music
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