

## IMPORTANT NOTES BEFORE FIRST USE OF NEW TUBES:

- 1) **NEVER** tap on a working tube for microphonics testing. This causes filament coating to chip-off, resulting in short circuit, shorter lifetime, and other kind of unexpected damage.
- 2) If for any reason the new tubes should give much more plate current, or much less current than the previous tubes, there is something wrong. In this case, do **NOT** operate them longer than just one minute, and clarify this situation with your dealer. Otherwise this will void the guarantee.

### FAQ about tube burn-in and first use of new tubes.

Dear customer,

New tubes are burned-in initially in the factory, to allow selection and testing. They need 50...100 hours extended burn-in under normal home use. A good burn-in will assure maximum lifetime and develop the final sound. Some occasional blue glow effects will disappear during burn-in. Use different loudness levels from the beginning, and increase the maximum loudness gradually. Let the tubes cool down after each use. During burn-in, do not use the stand-by mode. You need to use the tubes the normal way, every day a few hours, and let them cool down until the next day.

#### Q: What happens during burn-in?

A: Several things happen. The main are : **First**, a tube is a mechanical product, and all piece parts need some time to set, and loose the mechanical tension. After this, the plates and grids will be not too tight in the mica, giving the kind of lower resonance which makes a tube sound good, and natural. Specially triodes benefit from this. **Second**, the cathode active surface will format itself best under normal use conditions. When the tube is new, it adapts to the particular way it is used. **Third**, any residual contaminations that are always there, will be absorbed by the getter. During that time the filament will develop a good quality, and this makes the tube last long.

#### Q: Why are tubes not sold already burned in?

A: The cathode active surface not a smooth layer, but is formed out of many active points. These points can grow or shrink. They will grow during burn-in, and they will shrink during the cold rest period of the tube. (so called diffusion). During cold condition, the burn-in process reverses partially. As long as the tube is new, this reversal process can take place in a few months. The effect of the factory burn-in will disappear partially, when not used, so we can never sell them fully burned-in. New tubes have a memory effect. The more often the tube is used, the more the tube starts to „remember“ this use condition, and stay like this for a long time. So, the condition gets stabile after several weeks of normal use, specially when it includes many rest times. In fact just NORMAL use will do this! In the factory, there is simply no possibility for that. Note, a very long rest time, like 10 years or more, will remove any burn in effect. Such tubes must be burned in again at first use.

#### Q: How can I make sure, the tube will last long?

A: Three things. **First**. Take just the filament voltage as on the datasheet. This will help very much. A 15% too low filament voltage can do damage in just three minutes! A 15% too high voltage will do damage after hours. **5% is the maximum deviation in either direction** When you know that the mains voltage will already vary a few percent, you have only a small margin left for yourself. **Second**: Don't stress the tube with heat. This will really accelerate the wear-out very much. Don't heat the tube more than you need. 10% less heat will increase the lifetime with a factor 2 (all tubes, all brands). Stay away safely from any MAXIMUM specification if lifetime is an issue for you. (For math lovers: the relation is to the power 7). If your car engine can rev. up to 6300rpm (by the book) it means you can do it sometimes, but not all of the time. Any mechanical product that is stressed will have similar behaviour. **Third**: Don't overdrive the tube, also not very short to try what it „sounds like“!

#### Q: Must I use the stand-by mode?

A: No! You can use it after burn-in, but there is no benefit for the tube. If the stand-by period is going to be longer than 4 hours, it is better to switch the amp off anyway.