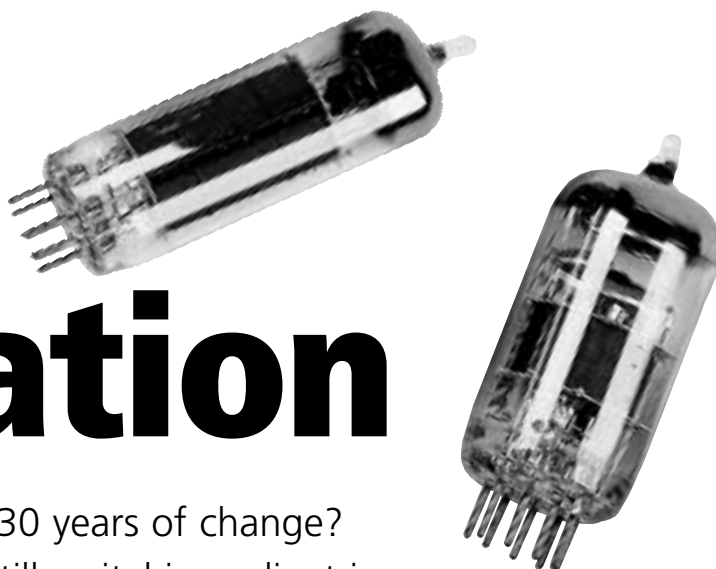


Biased information



How have valve amps survived over 30 years of change? Derek Rocco explains why they are still a vital ingredient in music making, and talks you through the mysteries of biasing

IN THE LAST DECADE WE HAVE seen huge advances in technology which have profoundly changed the way we work. Despite the rise in solid-state and digital modelling technology, virtually every high-profile guitarist and even recording studios still rely on good ol' fashioned valves.

What is a valve?

Hopefully, a brief explanation will give you a full understanding of what is happening inside your amp and the enigma that engulfs the term known as biasing. A valve is made up of a minimum of four component parts: the heater, cathode, grid and plate. They are all housed in a sealed, airless vacuum and this is why the Americans call them vacuum tubes.

The heater warms the cathode, which when heated allows the electrons to flow from the cathode (negatively charged) to the plate (which is positively charged). The grid is situated between the cathode and the plate.

By applying

a signal to the grid it causes a current to flow from the cathode to the plate. The grid is also known as the control grid, as by varying the voltage on the grid you can control how much current is passed from the cathode to the plate. This is known as the grid bias of your amp – the correct bias level is vital to the operation and tone of the amplifier.

By varying the negative grid bias the technician can correctly set up your amp for maximum performance, thus ensuring that the valve is operating correctly. The valve therefore operates literally as a 'valve' regulating the current flow from the cathode to the plate – that's why in England we call it a valve.

What is bias?

The amplifier bias, and the problems associated with it, confuses many musicians if you think of a kitchen tap as a valve and the

water as an electrical current, you will never be confused again. When your tap is turned off you get no water flowing through. With your amp if you have too much negative voltage on the grid you will stop the electrical current from flowing. This is known as 'over-biased' and the amp will produce an unbearable distortion at all volume levels.

If you turn your tap full on you get a huge rush of water. If your amplifier does not have enough negative voltage at the grid then you will find you have an under-biased amplifier. This allows too much current to pass through the valve and will cause it to burn out quickly and you will lose punch and clarity in your sound.

alter the negative grid voltage by replacing the resistor to gain the current draw required. Cathode bias amplifiers have become very sought after. They have a sweet organic sound that has a rich harmonic sustain and they produce a powerful soundstage. Examples of these are most of the original 1950's

Fender tweed amps such as the Deluxe and, of course, the legendary Vox AC30.

In a 'fixed bias' amplifier the cathode is grounded and a separate negative voltage is applied to the grid of the output valve. Some amplifier manufacturers, such as Marshall, fit

a little trim-pot on the negative power supply. This allows for easy resetting of bias when the output valves are changed.

In Mesa/Boogie amps no such trim-pots are fitted but, contrary to popular belief, by changing a few resistors, bias on these amps can be adjusted. I would always fit a trim pot where possible on these amplifiers as it will give you more valve choice in the longer term and also make it easier for a tech to set the bias. These amps generally have high outputs and more headroom than cathode bias amplifiers; examples being Marshall and 'Boogie.

Matching and dual matching

Now we need to understand the terms 'matched' and 'dual

Types of bias

You can now see that the bias of the amplifier affects its tone. More interestingly, the type of bias arrangement that the amplifier manufacturer chooses also affects the sound. Generally there are two types of bias arrangement used in guitar amplifiers. A 'cathode bias' amplifier has a resistor going from the cathode to ground. This resistor is set to provide the correct current draw of the valve by setting the negative voltage. This enables the tech to





Preamp valves (front) power output valves (rear) next to a rectifier valve

matched' (which are significantly different) when replacing output valves. Output valves will normally last around two years, but higher quality British and American valves can last at least twice as long, due to better components and build quality.

We are often bombarded with science and weird and wonderful methods of how to match valves. Simply, the term 'matched' means that when a fixed amount of negative voltage is applied to the grid, the valve will allow a certain amount of current to flow through it. The amount of current allowed by each individual valve can vary significantly, and therefore by matching, or grouping those with the same current draw readings we can ensure that the amplifier is drawing evenly with a similar current draw from each valve.

So, having the valves matched (all drawing the same current), gives the amp technician the opportunity to correctly set the negative grid voltage so the amplifier functions correctly. If the valves were not matched, as the technician sets the negative grid voltage, they would all draw different amounts of current therefore making it impossible for the amplifier to be set-up correctly.

It is very important to understand, however, that this method of matching, based on the current draw, is only half the task. Because valves also have different output levels, when you fire up your guitar through the amplifier, valves with different outputs will lead to the amplifier sounding unbalanced with uneven distortion.

This is why at Watford Valves, for example, we drive the output valves

under working conditions and load to measure the output of the valve. This is measured in milliamps per volt and ensures that the valves also have the same output. This procedure enables us to identify and supply valves with very different characteristics. For example, valves with a higher output will generally distort sooner, and valves with a lower output will take longer to distort. Valves matched on current draw and output levels are termed as dual matched. They will give you a richer harmonic sound, as they all working evenly, and they'll prevent premature component wear.

When do I need to re-bias?

Having the bias checked should always happen when you change your output valves. Valves that are made today are not as consistent as those produced in the early days of valve production. We quite commonly see great variance between valves from the same batch. So to simply buy a matched pair of EL34s, for example, even by the same maker, is no guarantee that they will work correctly as they may draw more or less current and differ from the way in which the amp has been set-up.

The cost of using an amp technician varies; some offer a full-service, others will just check the bias setting. The thing to remember is that these guys see amps day-in and day-out and they can prevent trouble happening – vital for all gigging musicians.

Valve choice

Another often used term in relation to valves is New Old Stock (NOS).

This simply means that the stock is new but is not of current production. These valves are generally made by British, German and American factories such as Mullard, Philips, GE and RCA. These factories, sadly, no longer produce valves. But these valves are the highest quality available as they were made with very strict production control and high quality components. They are well worth seeking out. They have a longer life, better tone and superb reliability.

In recent years we've seen the Americans take over the control and distribution of a number of Russian factories, giving rise to the names Svetlana and Sovtek. The Tesla factory has also reformed as JJ. Their valves are very good. The Chinese-made ones, which plagued musicians for many years, now seem in decline.

Why are valve amps so popular?

A valve amp's sound is tremendously flexible and can be tailored to the individual's taste. Many valves like the EL34, 6L6GC, 5881, KT66, KT77, KT88 and 6550A all share the same base configuration, yet they all have different sounds and can be used in

the same amplifiers with only slight modifications or simple bias alterations. The classic Marshall JTM 45 with KT66s, and Malcolm Young's Marshalls fitted with 6550A are just a couple of examples.

I believe the main reason so many players still chose valve-driven product is down to tone. A valve has a clipping point that provides that rich distortion and sound which can't be replicated by a transistor. Undoubtedly some manufacturers are now very close to replicating the tone of a valve amp with alternate technology but with minimum impact on the valve market.

The great manufactures of yesteryear, like Mullard, Philips, GE and RCA all used different materials and techniques to produce valves. In the same way that a great guitar shapes the tone and characteristics of your amplifier, so does a valve, so a lot of thought must be put into buying valves and the characteristics desired.

Musicians have kept valves alive over the last 30 years and with the current Russian and Eastern Block valves continuing to improve, the future looks good. Maybe in these days of samples and MP3 files we

Useful numbers

Here are some useful numbers for technicians who undertake amplifier biasing

Bristol
Soundburn Audio
Jessey James, 0117 955 5766
Beds Bucks & Herts
S D Electronics
Steve Dove, 01442 257269

Eire
P Keenahan amp repairs
Peter Keenahan,
00353 1 671 8886

London
T A Services
Theo, 0208 881 1623

Manchester
The Amp Clinic
Roland Lumby, 0161 787 8082



Inside Watford Valves

Derek Rocco runs Watford Valves in the UK.
Ben Bartlett pays him a visit...

WHEN YOU BUY A matched set of output valves for your amp you naturally expect them to be tested. In most cases output valves are subjected to tests to ascertain the current draw and heater continuity. These tests give a quick idea of whether a valve will 'work' in a guitar amp or not, but they are a long way from ideal.

The kind of punishment a valve gets put through in a real guitar amp being played loudly is a lot like the gruelling training undergone by the world's toughest troops. Using this analogy, the majority of valve testers put their output valves through a day's gentle march in the

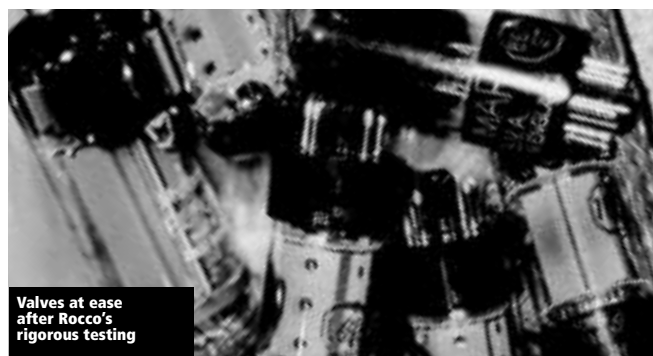
army cadets. Watford Valves, however, with the aid of its custom-built test rigs, puts the valves under 'real working' conditions which is the equivalent of a hellish week with the US Navy Seals.

Custom-built rigs

"These custom-built test rigs set Watford Valves apart from other dealers," says Rocco. "They allow custom selection to guarantee that the valves are less likely to fail when the going gets tough." Two of the most common machines that are used for testing valves were made by AVO (which stands for amps, volts and ohms). The most

common tester, which was used by most valve suppliers in the sixties, was the AVO Mark IV. This machine can perform many functions on a single valve. It was designed for

service stations to check whether a valve had the correct conformity to the manufacturer's specification. This enabled valve distributors to 'match' valves on the current that it



Valves at ease after Rocco's rigorous testing



Regular supply

The second test-rig takes the range of the first rig a stage further with the inclusion of digital meters and a signal generator. Here I see why it is so important to regulate the mains supply – these digital meters are so accurate that a change in the supply can change a valve's reading drastically. The principle here is simple: there is no point learning to fire a pistol and then being expected to use a semi-automatic. So, each valve has to be tested under real working conditions to measure not only the current drawn but also the output of the valves.

"This is vital," explains Rocco. "Valves with the same current draw will have different outputs; if the valves have different outputs then they can sound odd and dramatically affect the sound and balance of the amp, therefore all output valves are matched on current draw and output/gain." These rigs have bias setting which are the same as 'Boogie, Fender and Marshall,

was drawing on the tester and so was born the phrase 'matching'. In the seventies, AVO launched the VCM-163 which was the first machine to allow the output of a valve to be measured accurately, along with the current draw.

It's clear that although these testers can prepare our troupes for battle, they will not prepare them for the conditions that the road will throw at them: SAS style-training will be needed. Watford Valves identified this problem at the beginning of the nineties.

The company was originally set-up to provide local groups with a reliable source of valves, but it became clear that specialist equipment was needed which was not available commercially. Watford Valves then embarked, with military precision, on a research and development programme which, by listening to some of the most-respected technicians in the industry, has resulted in what they believe is the most advanced test-centre for valve evaluation.

On with the tests...

The first rig Rocco shows to me is the 'high plate volt rig' which was designed around Marshall and Fender amplifiers. This rig is a working amplifier which resembles a serious assault course and one which all Harma valves, Watford's own brand, have to pass. This unit tests all output valves from 6V6GT to KT88 and applies to an EL34, for example, 500V plate and screen.

Watford Valves was set up to help local groups. It soon found there was a high demand for its specialist equipment

This procedure sorts the chaff from the wheat – any weakness or short circuits will cause the valve to fail.

The valves are also tested here for cathode heater insulation. The heater inside is a bit like a miniature electric-bar fire which gets the cathode or negative plate up to operating temperatures. If the insulation of this component is poor the valve will hum – unfortunately, it'll be humming a different tune from the one you want to play! This tester also has a microphonic test for output valves which was designed around a

Fender Twin, as this is one of the many tests that the AVO simply cannot do.

Although our American chums call valves vacuum tubes, the vacuum isn't always as perfect as it could be. If the valve is 'gassy' – it has too much air inside – the life and the gain of the valve are significantly reduced, thus resulting in poor sound. Watford Valves prefers not to use Chinese-made valves, believing that a lot of them suffer from a gas problem and that they have a high failure-rate.

thus insuring more meaningful readings, unlike the AVO testers.

Brian May

Rocco now informs us that the prototype rigs have been developed into two modular blocks which handle 30 valves-per-block, each valve individually tested for all the above parameters. In any army, some troops need to be sent for special application training and in this case it does not get any tougher than the way in which Brian May, for example, drives his valves in his AC-30. So



what hellish device has Watford Valves come up with to drag those screaming EL84s and make them come of age?

"Conventional testing was simply not enough, we had to replicate what was actually happening in Brian's amp" explains Rocco. "He simply runs his valves so hard that they are at the point of destruction – this contributes to his famous trademark sound. The test rig had to be designed to replicate sustained notes, single runs and power chords. This was a mammoth task and we needed the best, so in came Dave Petersen the country's leading Vox expert."

Enter the 'full drive burst tester', the Hammer house of horror to all little EL84s. The tester is a 10 valve AC 30 with a signal generator providing the most destructive May-type signal. A timer is included which alters the signal from shorts bursts to long sustaining notes. This is the only tester of its type in the world and was designed and built in good old Blighty. Only the strongest survive and while Watford Valve's goal of supplying the most reliable valves for Vox amps has been achieved, the failure rate is high – as the EL84 'graveyard' proves.

Mission time

Finally, we come to a totally unique tester. This drive testing rig puts the small ECC83/12AX7 through a real-life mission. The ECC83/12AX7 is the most commonly used preamp valve and unfortunately is the most variable. The tester runs the valves under the same conditions they would meet in your amp. The valves are firstly tested for hum and



Well done my pretties, you've passed the test

electrode noise – any faults here and the valve is given it's marching orders.

They are then tested for microphony. Now, microphony is not just reserved for guitar pickups, your valves can start howling too so the valves are

Once the chosen few have come this far then the final test comes into play, the drive test. This test measures the actual amplification of the valve with the guitar signal driven into it. Each half of the valve is given a three digit

The unique drive testing rig puts the kit through a real-life mission

linked to an amplifier and speaker and are checked to see whether they would be good in a guitar amp. The valves are then tested for the balance between the triodes. Most preamp valves are made up of two separate halves which function best when they have the same value in terms of gain and output.

code. The valves at the higher end of the scale will break into distortion a lot faster and provide you with more gain; lower values mean that the valves will stay cleaner as they are harder to distort.

Next time you need to re-valve your amp, think on. Are those new shiny bottles up to your demands? **G**



(Left) A Variac regulates the mains supply; (right) quality valves of yesteryear

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AMP TECH

VALVES U-Like

THE HUMBLE VALVE IS WIDELY ACCEPTED as the most influential single component of a good guitar amp, but how do these little glass bottles work and why are they so important. Dave Hunter visits ace British distributor Watford Valves for a look at all things tubular, including the 'Brian May' testing rig...

Back in the mid-'60s when transistors appeared to be the amplification technology of the future, the guitar amp industry started trying to sell the public on lines like 'durability-low maintenance-no tubes to burn out and replace'. Devoted music engineers and insiders knew, of course, that much of it was just marketing speak: wrapping up a cheaper-to-produce product as 'progress' and 'technological advancement' ('90s computer boom and planned obsolescence, anyone'). Long-time Leo Fender cohort and legendary engineer Forrest White resigned from Fender in December 1966 when CBS execs tried to force his hand on solid state production. Fender went ahead without him, and guitarists - in an era when Hendrix, Townshend, Clapton, Beck and others were reaching new heights of lusciously distorted valve amp tone - fled from tranny amps in their droves. These new amps were different in a lot of ways, but the single most significant omission? *Valves*.

In order to lift the lid on these mysterious glass bottles, TGM visited Derek Rocco of Watford Valves in St. Albans. As one of the UK's premier valve retailers and the most thorough valve tester in Europe, he was keen to help us discover what's behind Watford's raison d'être, and to unveil the complexity and variety of the valve market

as we approach the Millennium.

HARMONIC DISTORTION

'I think in a nutshell what's important is how the valve distorts,' says Rocco. 'When you push a transistor into distortion, when it clips, it just shuts down - it doesn't see anything at the peaks and troughs of the sine wave (figure 1). With a valve you get that harmonic distortion happening as the valve slowly goes into distortion. The more it distorts the more it clips, giving that compression and distortion that everybody loves.'

Even with valve amp settings we'd consider 'clean', a certain amount of smooth, rounded distortion adds texture and harmonic richness to the sound, along with some valve-induced compression which makes the tone feel more tactile and playable, and warmer to the ear. 'That's why valves have survived,' adds Derek, 'and, I think, solely because of the guitar world. We've got a huge valve hi-fi market now, but it was guitarists who recognised how great valves could sound when everything else had gone over to solid state.'

TUBES? VALVES?

Inside your amp the guitar signal is handled as a flow of electronic current; inside the

valves themselves this takes the form of electrons flowing from the 'cathode' to the 'plate' (see figure 2 for the constituent parts) - all of which means little to us out of context.

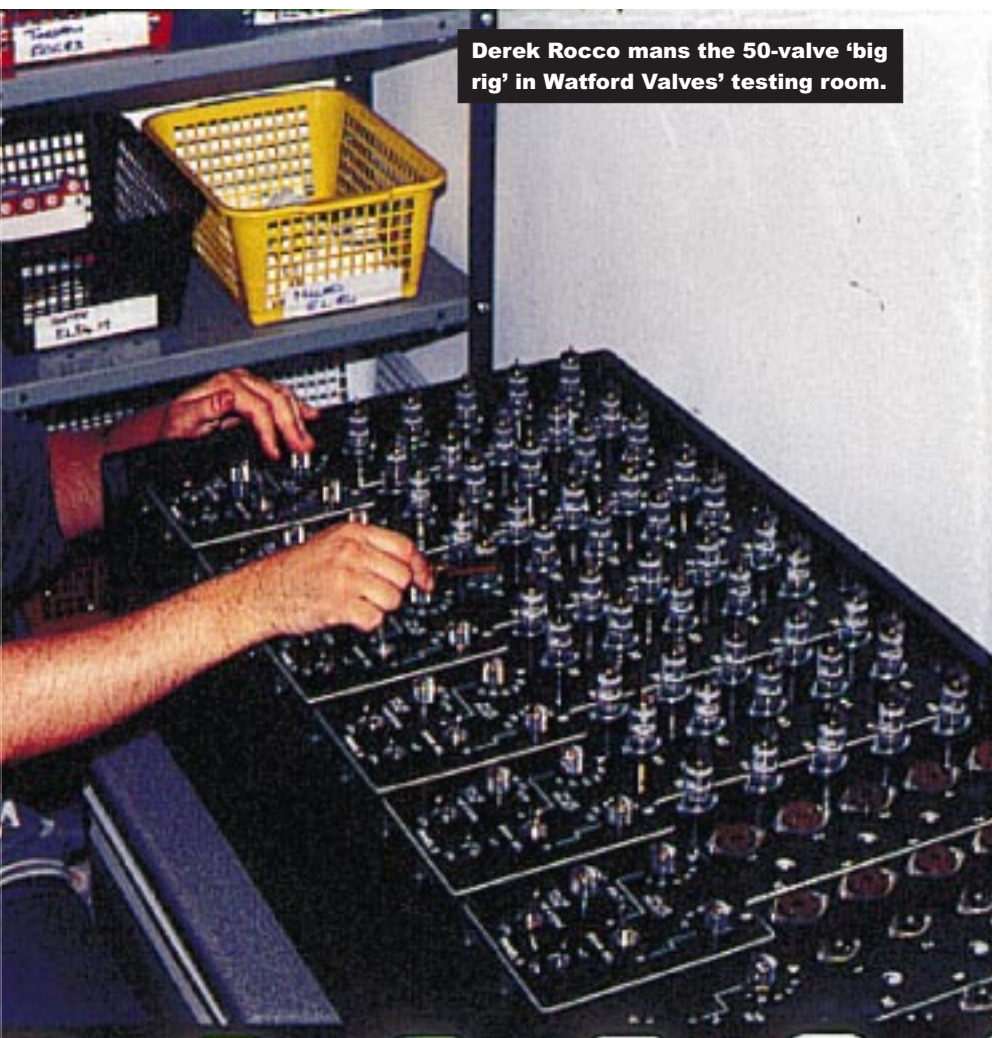
'Basically, a valve amplifies the signal,' explains Rocco. 'One way to look at it is to examine why we call it a -valve-. The Americans call it a -vacuum tube- because there's a vacuum in that bottle, but what it basically does is - and it's probably a more logical way of describing it - is it's an electronic valve. Just as your central heating's water valve can limit the amount of water flowing through the system, electronic valves can limit or increase the current flowing through them.'

As the major handlers of current flow within the amplifier, the valves play a big part in shaping the resultant tone. Valves with different characteristics shape the sound differently; the ultimate conclusion of this thinking is the fact that, while you can put any functioning valve of the right type in your amp and it will 'work', in order to get it performing at its peak and sounding just the way you want it, it pays to put a little extra thought into your valve buying.

TESTING, TESTING

Even though the best valve manufacturers (mainly European and American) shut down in the '70s, '80s and early '90s as western industry - and, significantly, the military - turned more and more to solid state components, a great number of generally excellent NOS (New Old Stock) valves





Derek Rocco mans the 50-valve 'big rig' in Watford Valves' testing room.

remain available from makers like GE, RCA, Mullard, Brimar, Philips and others. All newly made valves currently come from factories in Eastern Europe or China. Not only do different makes have somewhat different characteristics, but wide tolerances within the industry often mean that even valves of one type from the same factory can sound and perform very differently. In either case, as with any product turned out en masse, there are also a certain number of duff valves in any batch to come off the assembly line; sadly, plenty of these seem to slip past the factory and/or wholesalers' (sometimes, admittedly, limited) quality control and into the marketplace.

The only way to weed out the clunkers is to test them individually; and while

undertaking such quality tests, some retailers - Watford Valves and Groove Tubes among the very few in the world - also test their valves along further parameters which help to quantify their tonal characteristics.

'What's driving me is the goal of producing the best-tested valves in the world,' says Rocco. 'We've had the opportunity of working with people like Brian May, Manic Street Preachers, Kula Shaker, Thunder, Lighthouse Family and others - touring musicians, who need to rely on the quality of the valves in their amps.'

While tube testers have existed for as long as tubes have been manufactured, Rocco's drive to further quantify their quality and characteristics led him to obtain - and in some cases, to have custom-built - valve

Connections

Watford Valves

WWW.WATFORDVALVES.COM

Digitally matched and graded valves for the music industry

testers that go well beyond good valve/bad valve.

'We had our preamp valve tester designed and built especially for us,' explains Rocco. The resultant rig holds 50 preamp valves of types such as ECC83 (called 12AX7 in the USA), 12BH7, 12DW7 and others, and runs them through more checks than any other testing facility in the world, even that used by famous California retailer Groove Tubes. 'This is an actual, working amplifier with the same loadings you'd find inside your guitar or bass amp, and we drive an actual signal into each valve. We put them through a range of tests that are relevant to musicians.' These include:

- drive - the power/gain factor
- distortion - the point at which they cross over into distortion
- hum
- balance - valves like ECC83s are called 'dual triodes' because they contain two small valves within one bottle; for optimum

Fig. 1 Valve vs. Solid State Distortion

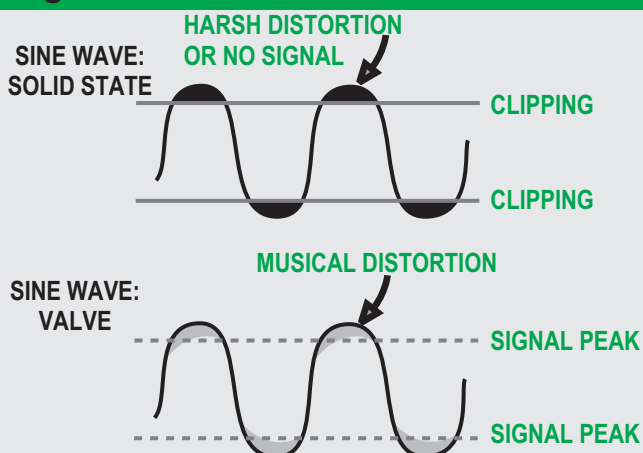
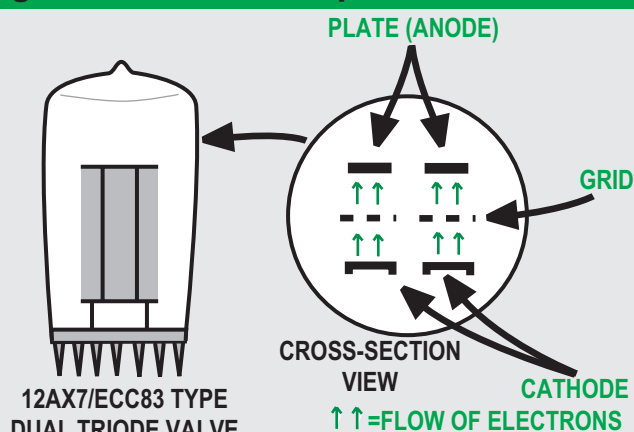


Fig. 2 Inside a Preamp Valve





performance in the amplifier circuit the two halves should be balanced

- microphony - susceptibility to vibration disturbance and feedback
- noise

'The main thing we're looking at, beyond the basic function and whether the valve is noisy or not, is drive. The drive scale runs from 0 to 300. For good, basic valves we're looking for 170-180. For an excellent first driver valve for a Marshall, say, you might want each half of the triode to be 250 - but you'll find out of a whole batch of good valves, not many will read that high. We selected a batch of preamp valves for Kula Shaker recently, and they were all 270 and 280!'

Output (power amp) valves of the 6L6 type (which includes 6550s, 5881s and others) are run on another specialised rig which tests for gain, distortion, hum and microphony. These are driven at a whopping 500+ volts, close to or above the levels running within actual amps, to determine current-draw levels for accurate matching (for the importance of output valve matching, see Biasing sidebar).

MAY DAY

When it comes to pinpointing premium examples of the sweet-sounding, small-bottled EL84 output valves, however, Watford Valves are driven by a higher calling. 'We were supplying valves for Brian May's Vox AC30s, and we found they were failing at an alarming rate,' says Rocco. 'Brian runs his AC30s flat-out, with a treble booster going into the front end, and anything but the sturdiest EL84s just can't take it.'

To isolate valves that are up to the job, Watford built yet another custom rig, this time with the help of TGM contributor and premier Vox technician David Petersen.

'David is brilliant,' enthuses Rocco. 'He worked out all the parameters for this tester according to what's actually going on inside Brian May's amps. We power up 12 at a time, and while we're burning them in under load a timer puts signal surges through them every few seconds for an extended period of time. Any weak ones will blow, and we'll weed them out.'

'Batches of EL84s tested in this way have been sent to May for months now, to the great satisfaction of the man himself - and the even greater relief of his amps.'

To capitalise on their valve-testing experience, Watford have recently launched their own high-end range, branded as Harma 'Diamond Range' valves. 'Our goal,' Rocco admits, 'is to one day be rated alongside Groove Tubes, but to still be able to sell valves cheaper than they do' - although many Harma valves are already tested to more stringent parameters. 'What

we want to achieve is an affordable way to test all our valves for quality, then the Harma range will be a select valve that will combine confidence in how it's been tested with the knowledge that it's different from anything else on the market.'

'The downside is, the more rigorous testing we do the more valves we come across that fail our standards; so we've approached it from the perspective of - what's the best sounding - rather than just - what's the cheapest or most readily available wholesale valve-.'

'What a full range of testing allows us to do, however, is to offer quality guarantees on all valves but, for a little more money, also offer valves that have been tested and graded more rigorously - for more headroom or more distortion, use in Fenders or Marshalls, and so forth. That allows us to tailor valves to a variety of specialist applications and sounds.'

For more information on Watford Valves and the Harma 'Diamond Range', contact: Watford Valves ☎ 01923-893270, or visit their Web site: www.watfordvalves.com

Amp Helpline: Biasing

What is this thing called 'biasing' that we're meant to have done whenever we change power valves, and what's it all about?

Think of your amp as the engine on an older model car,' explains Derek Rocco. 'Changing the valves is like putting in new spark plugs, points and condenser, but in order for things to run smoothly you still have to set the timing and idle control. Biasing simply sets the operational level of your amplifier's output valves.' Preamp valves, note, are self-biasing - and therefore excuse themselves from the discussion from here on in.

All valves of the same type may be made to the same general specs, but they come off the assembly line with slight variations meaning that, plugged straight in, they won't necessarily draw the same current as the valves you're replacing. The 'negative grid bias' setting affects the current flowing from the plates of the power valves: increasing the negative grid bias means less current flows through the valve, while decreasing it means more current will flow. Why is this important?

'If you have too much current flowing through your valves you will run them and your amp hot. This will result in burning the valves out prematurely and can even risk amplifier and/or transformer damage,' says Rocco. 'If your amp is running with not enough current flow then the valves will not

have enough time to correctly amplify the signal, resulting in weak tone and a horrible un-musical distortion which is hard on the ear.'

The importance of correctly biasing your amp also brings us to the subject of 'matched' power valves. Most amps provide a single facility for bias adjustment, even though they may carry a pair or a quartet of power valves. Because the amp must be set a single negative grid bias level that both valves are happy with, it's important to install matched sets with similar current draw levels. Slightly mismatched power valves may 'work', but the push-pull circuitry in the amp will operate inefficiently, possibly resulting in impaired tone.

Some amps are built with fixed-bias circuits - notably many by Vox and Matchless (the classic old and new Class A designs), some older Fenders, and even earlier Mesa/Boogies - so they can't be adjusted anyway, though matching output valves remains vital to keep the push-pull circuit at its peak.

NOTE: Biasing - which involves working with potentially lethal voltages - is a professional job only. Don't attempt it yourself without proper training, the correct tools and equipment, and full safety precautions. An amp tech should charge between £10-£30 pounds to correctly bias new power valves (and may include it as part of a general service and re-valving job)

TUBE Tasting

A Players Guide: Pt1 Preamp Valves

JUST AS DIFFERENT STRINGS OR PICKUPS WILL DRASTICALLY alter the sound of your guitar, different makes of even the same type of valve can radically change your amp's tone and affect its reliability. British dealer and premier tube tester Derek Rocco of Watford Valves shares his taste tests with us...

Tubes are tubes, right? Sadly, no. Guitar amps may 'function' in the literal sense with an appropriate type from any manufacturer (though not for long in some cases), but because preamp and output valves really are at the centre of an amp's tone, the sound produced can alter beyond recognition from make to make.

In simple terms, valves available to buy today come from two distinct camps: current production examples, and 'New Old Stock' (NOS). The first are manufactured in factories that are still up and running, while the second batch consists of remaining stocks of valves which are still 'new' in the sense that they've never been used, but were manufactured long ago – sometimes as far back as the '50s.

Valve production in Western Europe and the USA ceased in the 1980s, by which time the technologies that primarily supported it – mainly military and communications uses – had changed over from vacuum tube to solid state circuitry. Although valves were and still are used in better instrument amplifiers and some high-end audio, these markets just weren't enough to keep the high-cost factories running. From that point onward,

new valves were only manufactured in Eastern Europe and China. With China recently having ceased production, current manufacture comes only from the Sovtek and Svetlana factories in Russia, JJ Tesla in the Slovak Republic, and EI in Yugoslavia (though availability and quality of EI are being hampered by wartime embargoes, so we won't consider them here).

Not a lot to choose from, you'll agree. Fortunately considerable – if ever-dwindling – supplies of generally superior NOS valves do remain, but if you've studied your economics you'll already have guessed that the laws of supply and demand dictate that these desirable Western European and US manufactured components will gradually command higher and higher prices as they sell out into extinction.

That's the reason you really need to know what you're paying for and why. In the tests below, we'll look at the most common and readily available current production preamp valves and a basket of still relatively easily found NOS examples, along with a couple fetching astronomical prices but worth considering as 'standards' of the type – the legendary Mullard, for example.

TESTING: 12AX7/ECC83

In order to test the full range of applications, the amplifiers used were a '70s Fender Twin Reverb fitted with JBLs, a '70s Fender Twin Reverb fitted with original Fender 'blue back' speakers, a Mesa/Boogie Mark IV combo, a Marshall 100 Super Lead into a 4x12" cab, an '80s Fender Princeton Reverb II and a vintage Vox AC10 with Elac speakers. Guitars used included a 1973 Fender Stratocaster, 1980 Yamaha SA 2000S semi-acoustic and a 1980 Gibson Les Paul Standard. Valves were selected for low microphony and low noise and rated for gain.

All of the valves below are of the 12AX7/ECC83 'double triode' type (12AX7 being the US designation, ECC83 the European). While you will find other valve types in some parts of guitar preamps, these are the most common 'first gain stage' choice and therefore have the most effect on your amp's drive and tone. Origin and Current or NOS manufacture are indicated; GP stands for Guide Price and gives an approximate range of prices commanded by each valve type on today's market. For specific prices and availability, check with retailers in our *Connections* sidebar. Any letters or numbers following the manufacturer name (such as 'WA' or 'LPS') indicate sub-codes in the valve type – ie '12AX7LPS'. Mullard ECC83, Mullard M8137 Box anode, RCA 7025 and Telefunken ECC83 were used as the reference.

SYLVANIA

(USA, NOS. GP: £9 – £16)

Classic American valve which was fitted by all the great '60s amplifier companies such as Ampeg, Fender & Gibson. This valve produces a rich, warm sound with excellent balance; when distorted it produces a fat sound with plenty of drive without loss in top end clarity. In the Fender amps the valve produces a clean, bright response which is great for fingerpicking. Single coils sound full with no harshness and plenty of detail.

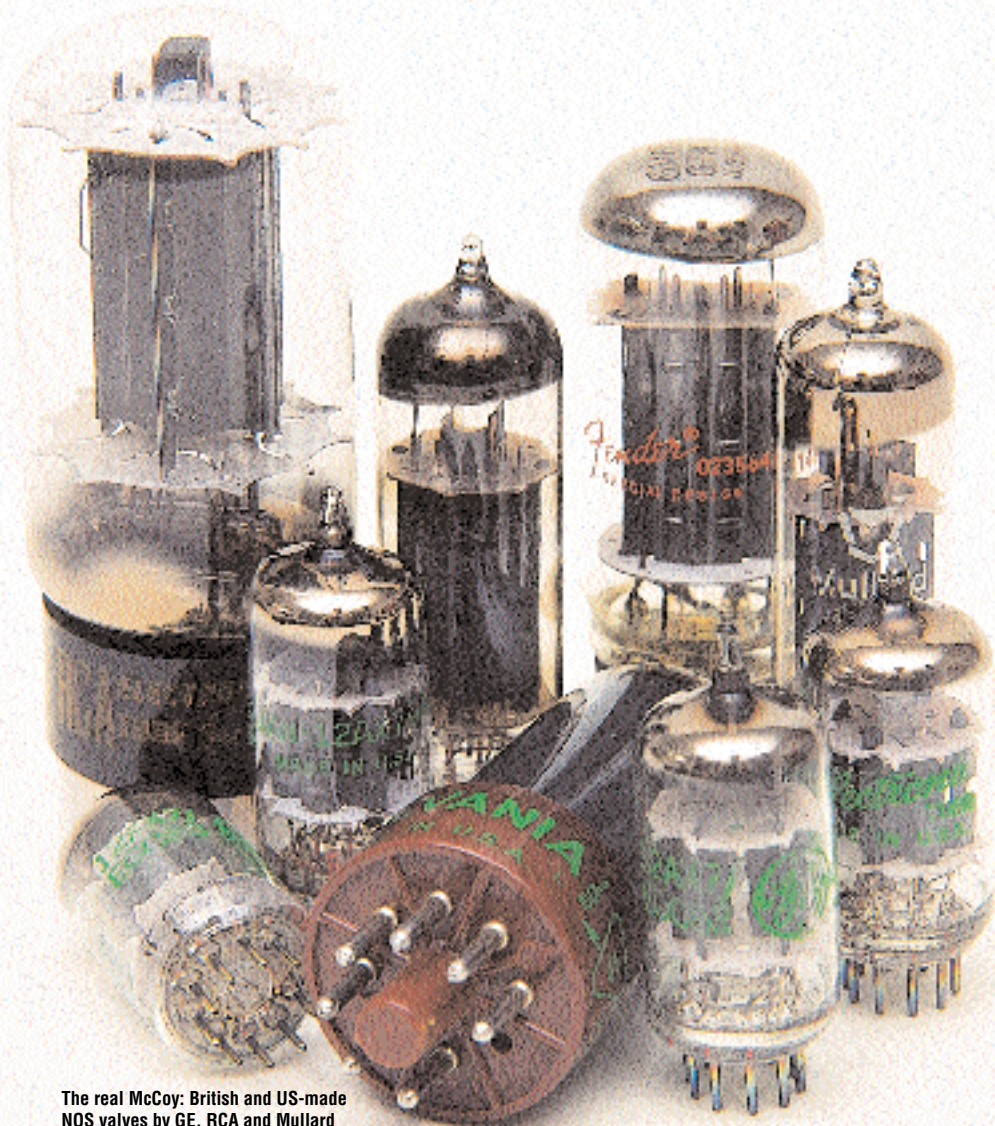
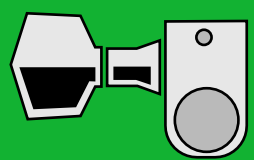
In the Boogie a sweet, crisp clean sound is easily attained, plus a classic rock sound with a little mid-forwardness (which we like). Because of the high-gain nature of the Boogie, however, it's important to select valves for low microphony. Early 1960s production; an ideal choice for all vintage Fenders.

GE-JAN

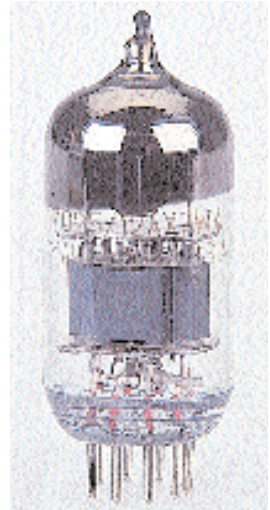
('Joint Army Navy') 'WA'

(USA, NOS. GP: £8 – £25)

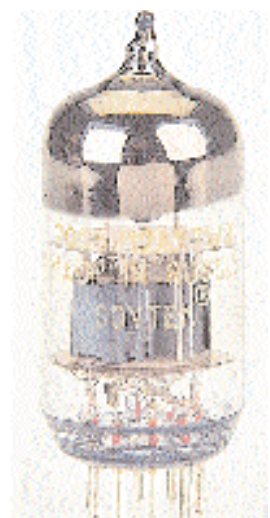
This rugged American military spec valve is of immense quality – it's the same valve fitted as standard in '70s Fenders. The GE valve is famous for its big, crisp



The real McCoy: British and US-made NOS valves by GE, RCA and Mullard are the stuff of ampaholics' dreams



Sovtek's lower-gain 'WA'



A more desirable Sovtek 'WB'

sound stage and bright top end response, something which really breathes life into Fenders. This valve supplies that authentic Fender twang; it's brighter than the other American valves and also works really well in the Vox by giving it a clearer top end response. When the valve distorts it has a rich harmonic feel and chime. Even under heavy Boogie distortion the bass and midrange detail are superb. Thoroughly recommended.

SOVTEK 'WA'

(Russia, current. GP: £3.50 – £6)

Low to medium gain with the same sound quality and less gain than the WB. When distorted, the WA doesn't have the detail or balance of NOS stuff – this valve seems to be pushing everything through the mid band. When pushed hard the sound compresses very early, too. But it's good for general repairs.

SOVTEK 'WB'

(Russia, current. GP: £5 – £8)

Low to medium gain with low microphonics. Clear, bright sound,

although it lacks the clarity and definition of NOS valves, and it distorts earlier than the WA. The sound is the same as the WA, but far better than the Chinese 12AX7 – no 'snap, crackle and pop'.

SOVTEK 'LPS'

(Russia, current. GP: £8 – £10)

The new Sovtek 12AX7LPS is now in production in Russia. This valve is of medium to high gain and has a special spiral filament which greatly reduces hum when operating in amplifiers with AC heaters. This is certainly the best 12AX7 that Sovtek have come up with.

In guitar amps we noticed that the level of microphonics are higher than the WB, but this would also be consistent with the higher gain of the tube. It gives a bright and clean sound, but not as sharp as the GE (below). When distorted, it retains its control and sounds sweet. Overall this is a very good sounding valve – a decent choice for audio or guitar.

PHILIPS-JAN 'WA'

(USA, NOS. GP: £7 – £14)

Low-noise American military made

in the famous Sylvania plant in Emporium, Pennsylvania. It retains the classic warm, solid sound of the early Sylvania but has less drive. This proves useful in the Boogie as the lower gain of the valve gives less microphonics. Midrange is very musical with all the clarity of the Sylvania.

The bottom end is superb: in comparison to the Sylvania it sounds a little tighter and better defined, which is welcomed in the Marshall amps. The bass is not as deep as the Mullard but the Philips does have that instant British-style tone. In the Fender amps all the tone that you would expect is there. This is a superb valve and an instant upgrade for all modern amps.

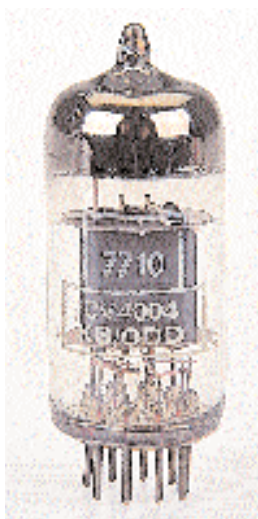
MULLARD

(GB, NOS. GP: £35 – £60)

This legendary British valve is the most sought-after ECC83/12AX7 type of all time. The key is the way the valve distorts. The Mullard reproduces exactly what is driven into it with great musicality, combining smooth drive with balanced low microphonics and reproduces every subtle detail with a rich



Mullard: king of preamp tubes



A military grade Brimar CV4004

sound stage. When overdriven the valve has a 3-D effect which makes it really sing – and it sounds amazing in a Boogie. The noise level even at full saturation is very low, while the bass response has great kick without loss of definition. We came to the conclusion that this was going to be a hard act to follow.

BRIMAR CV4004

(GB, NOS. GP: £11 – £24)

British military spec valve with half-flange anode giving instant British rock. Exceptional balance and sound staging with great drive. It hasn't got the rich harmonic distortion or the unique 3D effect of the Mullard and under full distortion doesn't have the same bite, but the presentation is relaxed and musical, which none of the new ECC83 types can match. This valve does every-

thing it should do excellently.

CHINESE

(Sold under various brands, recently discontinued. GP: £4 – £7)

Chinese 12AX7s tended to be fitted by all the major amp manufacturers while they were in production. On the plus side they have good gain and low microphonics, which suits the Boogie and the Marshall amps. The drawback? A complete lack of tone, giving the trademark 'wasp in a jam jar' cheap overdrive sound. The treble is fizzy and the bass response gives a hazy distortion. Also, after only

short periods of gigging these valves tend to sound harsh and brittle. Sadly, we can't recommend these valves.

JJ TESLA

(Slovak Rep, current. GP: £5 – £8)

Watford Valves have recently re-evaluated this valve (some early production items produced excessive hum which rendered them useless). The valve's gain characteristics place it in the medium to high gain range. The bottom end response is clean and clear; it has a solid structure which makes it free from adverse microphonics. Tonally, they're great. The midrange has a slight blurring which seems to increase the harder you push it, while the top end is sweet and clear and has nice sustain. Great for rock sounds, but not ideal for clean.

GE 5751

(USA, NOS. GP: £6 – £12)

This is a low-gain valve which produces all the classic GE sound stage and performance as described with the 12AX7WA version. The valve is very low in distortion and very difficult to clip. This is an excellent valve for use in Fenders or any clean stage application, sounding bright and vibrant with plenty of detail. It's very well balanced – indeed it's very easy to get identically matched examples (where each of the twin triodes have identical characteristics). This valve is far better than any currently produced valve for clean, pure Fender style twang.

RFT

(former East Germany, NOS.

GP: £8 – £14)

This German valve – used for a long period by Marshall – is sometimes branded Brimar, Siemens or Telefunken. It has a rich bass response, great drive, a clear and detailed midrange and is very low in microphonics due to a thick glass envelope. This valve distorts earlier than the USA types, but it shows less treble response – a characteristic which lends it to rock-style set ups. The rich harmonic distortion, full of rich sustain with plenty of bass crunch, makes this a great valve in Marshall, Boogie and Vox amps. Definitely one for rockers and blues players.

TESLA E83CC/ECC803S

(former Czechoslovakia, NOS.

GP: £18 – £24)

The Czech replica of the famous

Telefunken ECC803S, this valve has the large 'A' frame getter and thick grade glass which eliminate microphony. It also retains the gold pins and plate structure of the Telefunken (and is *not* the same as the new JJ Tesla E83CC).

The first thing that strikes you is that it is very quiet and displays no microphonics whatsoever. It's beautiful on female vocals in pro-audio applications as it has a super midband, very fast and dynamic. We checked these against a private stash of real Telefunken ECC803S and now reckon that these are identical in every way, including the sound (all it really lacks is the diamond mark). It has a rich bottom end, silky smooth treble and nice balance.

In guitar amps the sound stage is big, with no rings and no pops – just your guitar. This valve seems very neutral, not colouring the sound in any way, and when pushed into distortion it sounds really rich with super-late compression. This is fabulous – it just does what it is supposed to do: nothing more, nothing less.

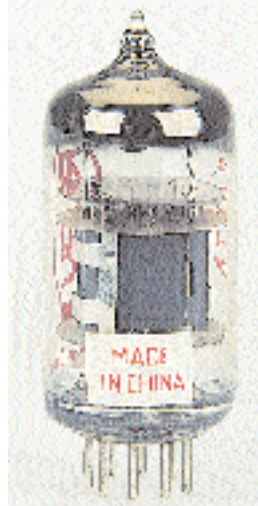
SUPER TUBES: RESULTS

The first thing is that under these tests the unanimous conclusion is that the NOS valves offer better sound quality than the current production types, but this has to be balanced against cost and what your own budget will allow. Tonality is in the ears of the listener and you might find that a current production item has exactly what you are looking for. So try as many valves as you can until you find the sound that suits you.

The **Mullard** ECC83 is the clear winner, as its own superb character shines through. Detail, sustain and perfect balance are second to none, but



GE's robust, low-gain 5751



Chinese 12AX7: not a favourite

what really wins the day is its superb three-dimensional distortion character and bass bite.

Otherwise, it's a very close race for runner-up. The **RFT** has a great rock tone and Mullard-style gain: it can be made to distort very easily and is most at home in Marshall and Boogie amps. With bass crunch in abundance, this is an ideal valve for rock players. The **GE** is the most 'American' sounding due to its bright nature. We love the sound stage and crisp distortion of this valve, and it's certainly a great all-rounder with low microphony.

The **Sylvania** and **Philips** valves all show a similar sound quality. The Sylvania have higher gain and higher drive: this could lead to feedback in critical early gain stages if the valves are unselected for microphony. The Philips seems to be tighter in the bass area but retains the classic mid-band warmth – and it sounds really good in Fender amps.

The **Brimar** CV4004 is a classic British-sounding valve. Refined and balanced, it does everything it should,

and very well. Mind, it's not as aggressive as the Mullard, the GE or the RFT.

Of the current production items, in terms of pure sound quality the **JJ Tesla** is the best. The current JJ Tesla valves (used heavily by Groove Tubes) are higher gain than ones from the early production years. They generally have a good sound with a forward presentation, though when pushed really hard they can sound a little rough around the edges. The audio boys may not like this but it does sound good in guitar amps.

The **Sovtek** valves are certainly low on microphonics – and that's why they're used by more amp manufacturers than any other valve. The WB and LPS are the best for

guitar. The LPS seems to be cleaner and sharper than the other Sovteks, and what you lose in microphonics you get back double in terms of gain. This provides more crunch, more drive and more musical tone than any Sovteks before. Basically, the Sovteks do tend to suffer from a little midrange fuzz when pushed and lack the midrange detail of NOS valves, but they offer top value for money and are available in quantity.

The simple rule to remember is that all the valves do sound different and it may be the least expensive valve that meets your needs. Once you have found your preference always get some spares because in life these three things are certain: death, taxes – and the fact that stocks of original vintage valves will dry up!

Next issue: current production and NOS output valves go under the tone microscope.

Further results and other tube types can be seen on the **Watford Valves** web site: www.watfordvalves.com

CONNECTIONS

Valves are available from a number of established UK dealers, although prices vary according to supply, degree of testing and matching provided, and so forth. You can generally expect to pay a quid or two more for guaranteed tested preamp valves than from job-lot wholesale style sellers; you'll have to decide for yourself what the savings vs the risk is worth to you. As these tests indicate, many current Eastern European valves in particular have occasionally high failure rates, and even US and UK-built valves of near-mythical status can sometimes fail right out of the box.

Although many big valve dealers will re-brand units with their own logos (as

done by Groove Tubes, Ruby Tubes, and Watford Valves' own Harma label) you should always have access to accurate information on the original model number and country of origin. As discussed in our feature, all current production valves will come from well-known lines built in a few established factories, while remaining supplies of NOS valves are also generally only from familiar and traceable production runs of years past – whatever new branding is given them. Many good guitar shops carry stocks of valves, but for specialist UK suppliers try:

Watford Valves ☎ 01923-893270 or www.watfordvalves.com



TUBE Tasting

A Players Guide: Pt2 Output Valves

WITHOUT FUNCTIONING, GOOD QUALITY OUTPUT VALVES your £5000 hand-built, point-to-point Scream-O-Tone combo is just so much crackling plywood. This issue, Derek Rocco of Watford Valves shares with us his taste tests of the larger variety EL34 and 6L6GC power tube varieties...

Having sorted you out for preamp valves last issue, this installment of *Tube Tasting* turns the microscope on the two major styles of large octal (that is, eight-pin) output valves.

Mainly an American valve in its original form – though examples were built elsewhere, and of course current production comes from Eastern Europe only – the 6L6GC and its relative the 5881 are most closely associated with the big Fender amps rated at 40W or more, though they also feature in newer designs from Mesa/Boogie, Soldano and others. Its British cousin the EL34A (a somewhat similar valve but with slightly different voltage requirements and tonal characteristics) is the longest-running valve of choice for Marshall, Hiwatt and others, and typifies the classic 'British sound'. The two most popular smaller varieties of output valves – the EL84 and the 6V6GT – will be examined next time in the third and final part of this series.

As in our last issue, our tests will compare both current production and NOS (New Old Stock) samples (turn back to Part 1 for a fuller explanation of terminologies and the history of Western versus Eastern European and Chinese valve production). 'GP' stands for 'guide price' and indicates the approximate price range you can expect to pay for a single valve on the UK market (remember: most amps will require

either two or four output valves).

TESTING: EL34

By evaluating current production EL34 against NOS items, we hope you'll be able to select the most suitable and reliable valve for your style of music. We've placed the emphasis on current production items which should be easy to get hold of – and the good news is the quality of current production EL34s has greatly improved since the start of the decade. We've picked valves with low microphony, low noise and similar gain characteristics, using the Mullard EL34 as a reference valve. The same applies now as did years ago: if you want the ultimate tone, simply buy the Mullard... if you can find (and afford) them.

The amplifier we used was a Marshall 100 Super Lead into a 4x12" cab loaded with Celestion Vintage 30s. The guitars were a '73 Fender Strat, a 1980 Yamaha SA2000S semi-acoustic and a 1980 Les Paul Standard.

MULLARD 'SINGLE GETTER'

(GB, NOS. Guide Price: £60 – £90)

The Mullard provides crisp ringing sustain and huge, tight bottom end with clarity which was unrivalled in this test. The Mullard has it all: the valves sound huge with wide imaging and detail. When

the valve is pushed hard it sounds ferocious with cutting bite. Power chords rock the very foundations, and the valve never loses control when saturated. In history, not many valves can claim the mantle of best audio valve and best guitar valve: the Mullard still reigns supreme at both.

SOVTEK 'WXT'

(RUSSIA, current. GP: £6 – £12)

The WXT is an upgraded Russian valve which replaces the EL34G & EL34G plus. The manufacturers claim a unique grid block design which improves electron flow and gives higher output – apparently 6 per cent higher than the competition.

With a rating of 25 watts plate dissipation, this valve is a vast improvement on its predecessors. It has a higher anode current draw and higher gain and is very stable. In reliability terms, the valve has stood the test on the road in countless Marshall amps – and in our high plate volt test, all 24 pieces come through with no problems.

The valve has good bottom end response which is nice and tight. It doesn't have a big sound stage like the Mullard, instead offering a one-dimensional focus which is great for lead work as it pushes the sound right out. When saturated, the distortion has a fuzzy element... great for grunge. The top end response can go a little grainy and get hard on the ear but generally there's a nice top end chime. We'd recommend this valve for use in all applications.

SVETLANA

(Russia, current. GP: £8 – £14)

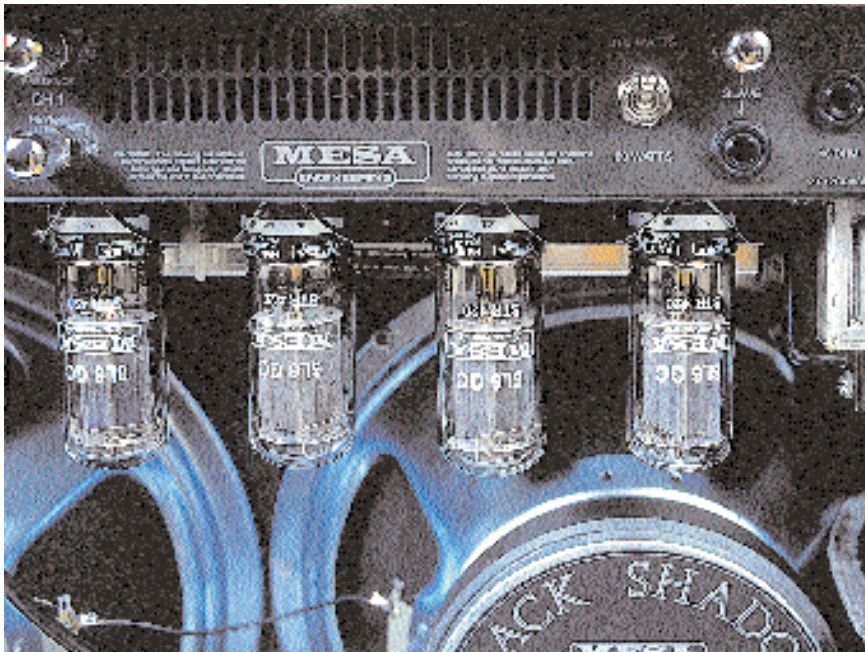
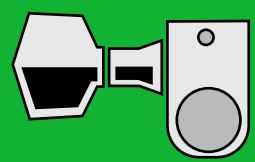
The Svetlana – claimed by its makers to give the best performance under overload conditions thanks to a special plate material – is used by many OEM manufacturers including Marshall. Reliability is not a problem: this valve has stood the test of time. In our endurance test all the Svetlanas came through with flying colours. The thing that really impressed us was that the readings didn't change. Svetlana definitely have the ageing process sorted out.

The valve has a more linear performance than cheaper options like the Sovtek, and the bass response is better defined. The sound stage is also bigger than the Sovtek, and gives the Marshall more of the trad British rock sound. This unit is very well balanced with the midrange in correct focus, the top end smooth and crisp. A great valve and, again, thoroughly recommended.

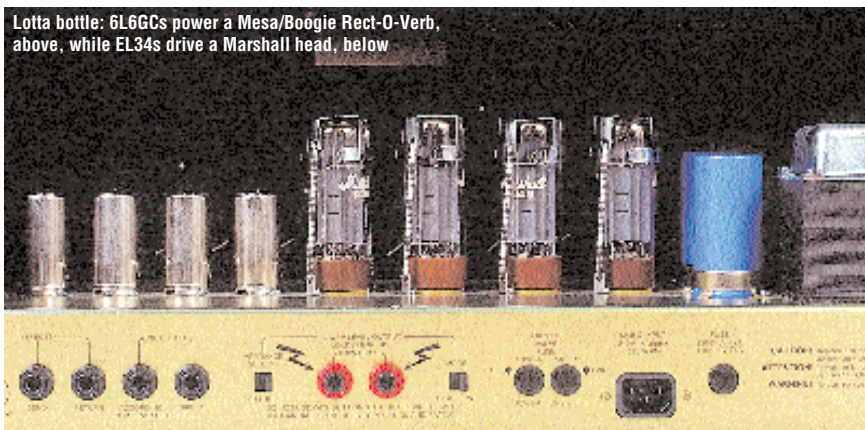
EI & EI '6CA7'

(Yugoslavia, current. GP: £8 – £14)

Both of these Yugo valves failed the endurance test at an alarming rate – even the 6CA7 versions which are supposed to be 'specially tested' by the



Lotta bottle: 6L6GCs power a Mesa/Boogie Rect-O-Verb, above, while EL34s drive a Marshall head, below



manufacturer. The valves that did come through (about 7 out of 12) were drawing up to 10ma less current than when we started the tests. These would need a serious burn-in process before matching.

Those which survived burn-in lacked the bottom-end response of the Mullard, Sovtek, Svetlana and Harma and sounded lighter and woollier. There's a nice top end response which is not harsh and easy on the ear, but the midrange response is recessed and very fuzzy when pushed.

Overall, these are not as good as the Sovtek or Svetlana if you want the classic rock sound and, basically, this valve just isn't in the same league as the others, with poor reliability and electrical construction. Best avoided.

JJ/TESLA ('HARMA' Version)

(Slovak Rep, current.
GP: £8 - £15)

The Harma is a specially tested/selected valve of European manufacture. It has the widest frequency response and the highest plate dissipation (30 watts) of the

valves tested. It has a number of features such as gold wound grids and heavy grade glass – all making this a rugged valve for road use.

The bass response is big and bold and very well balanced. The tone is bright and slightly forward-sounding, with a sound stage that's big and quite Mullard-sounding and a mid response that's clear and sweet. When driven hard the valve never loses control, with rich distortion blasting through. We really love the top end response – it makes a Marshall really sing, and it's easy on the ear. Reliability-wise, these are rock-solid: the best current production EL34, bar none.

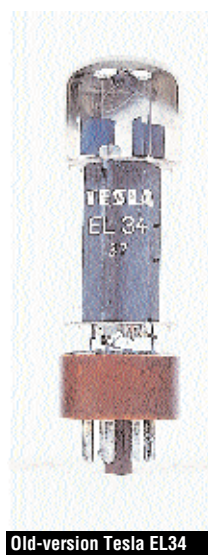
CHINESE

(Sold under various brand names, current.

GP: £5 - £10)

Chinese valves have a bad name for reliability, being electrically inconsistent and of poor build quality. Some dealers are saying that they've improved, so we thought we'd try them again.

The results: as bad as ever. These are the only valves to have ever blown more than



Old-version Tesla EL34

one fuse on our test rig. Even when you find some that actually work they have absolutely no top end, sounding dull and unrefined. Frankly, the box and the printing is worth more than the valve itself. Our advice? Don't bother.

EL34s: CONCLUSION

The general standard of EL34s has certainly increased since the start of the decade. The battle ground comes down to three valves, all of which have their own virtues: the Sovtek, Svetlana and the JJ/Tesla. The other valve manufacturers can't currently compete.

The best-sounding current production valve is the **JJ/Tesla** (sold by Watford Valves as the **Harma STR** version). This we found the closest to the Mullard in sound quality and overall 'size'. The **Svetlana** also has a great Mullard-style bottom end but is not as involving or as forceful as the Tesla. The **Sovtek** is a great blues valve which overdrives nicely and pushes out fierce, hot solos. They can sound grainy at the top end, but I don't mind that: after all, it's rock'n'roll.

The **Mullard** is still king of the pile, followed by the **Siemens**. The gap is definitely getting closer, but it's doubtful that the Mullard will ever be bettered. Mullard prices continue to rise, so if you require the ultimate then it would genuinely pay to buy now. If financially challenged then then the JJ Tesla/Harma, Sovteks and Svetlana are all good choices which you can try until you find your favourite.

TESTING: 6L6GC

6L6 types are one of the biggest-selling valves in American history, and are still the favoured choice of many manufacturers. We wanted to see if the current production types could compete with some of the finest valves ever made.

The amplifiers used were a '70s Fender Twin Reverb fitted with JBL speakers, a '70s Twin Reverb fitted with original Fender blue back speakers, and a Mesa/Boogie Mark IV combo. Guitars used were the same as for the EL34 tests.

We chose the famed RCA 6L6GC was used as a reference. The JBL-fitted Twin – with its piercing high end and overall volume – was used to establish if the valves were microphonic.

RCA 'BLACK PLATE'

(USA, NOS. GP: £50 - £80)

The RCAs handle every situation with great authority. From hard rock in the Boogie to steely Fender twang, these justify their legendary reputation and provided an accurate reference standard. The bass is big with perfect balance and definition between top, middle and bottom. Sonic presentation is full and when the valve goes into distortion it

remains sweet and musical. All the amps sound huge with RCAs and displayed not a hint of harshness, even when saturated. These valves simply make you want to play.

CHINESE

(Sold under various brands, current. GP: £5 – £10)

This valve is offered by many amplifier manufacturers and many designer valve companies. All we can say is: why? After finding a choice foursome to fit the Twin (after 10 valves failed a simple burn-in test) the sound quality was still abysmal: harsh and brittle, with compression way too early. The bass is loose and fizzy and in the Fender with JBLs I found myself thinking that a transistor amp would sound better... then the amp went down. On examination we found the cathode/heater insulation was poor and the valves were gassy, whichever brand name was placed on them. They also were pretty microphonic. It makes no commercial sense for any dealer to stock this valve as they simply cannot operate at normal guitar amp plate voltages. If your amp has these valves installed, discard them at the earliest opportunity.

SOVTEK 5881/5881 'WXT'

(Russia, current. GP: £5 – £10)

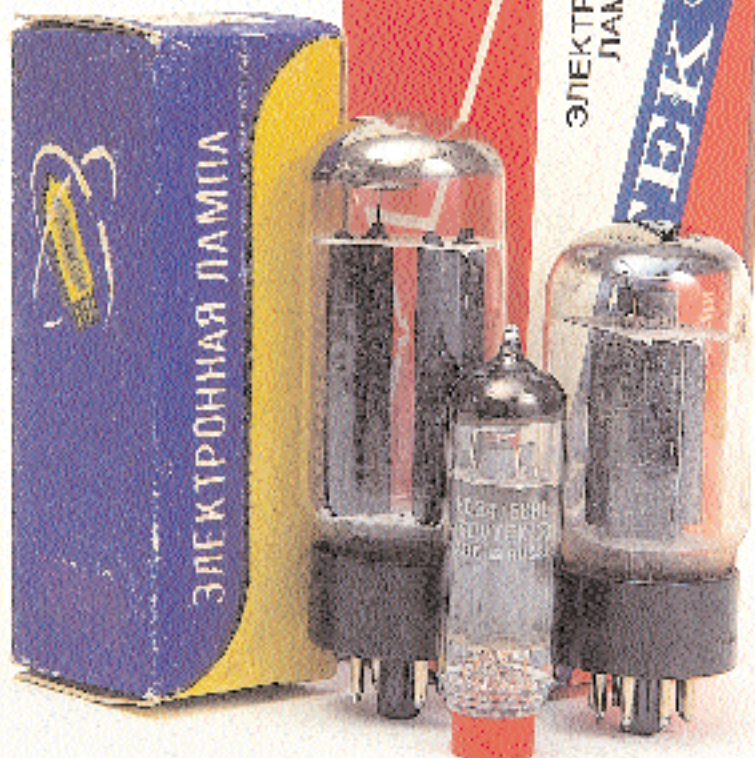
This is the industry standard, fitted by Fender, Marshall and Boogie. They have a warm tone but lacks the scale and harmonic detail of the RCA. When pushed hard the Sovteks tend to lose control and can sound muddy. The fine detail is blurrier than the other valves, especially with the JBL-loaded Twin. The Sovteks performed very well on the microphony test, and only a few units failed the burn-in test.

SOVTEK 'WXT Plus'

(Russia, current. GP: £7 – £12)

This valve differs from the 5881 by having larger plate dimensions and improved

A Russian-made 5AR4 rectifier and EL84 (left & centre) flank an NOS small-bottle USA-made GE 6L6GC (right), one of the clear favourites of the tone tests



grids to allow higher power handling, and it performed very well in the microphonic tests. The WXT Plus has more top end clarity than the 5881: the midrange is still muffled when pushed, while the bass response is much the same as the 5881, being soft and sweet. In all three amps we noticed a little more detail and clarity than with the 5881, yet the WXT Plus valves were not as good as the majority of others in this test in the clarity department.

SYLVANIA

(USA, NOS. GP: £20 – £30)

These Sylvania valves – late-'60s and early-'70s production – sound full and rich, and they're solid as a rock: no problems on the high plate volt tests and no problems with microphony. The bass is nice and tight with that classic warm sound associated with Sylvania. In the Fender amps they sound a lot brighter than in the Boogie but in no way are they harsh. The midrange is not as detailed as the RCA, but the valves are very punchy and forward sounding.

Imaging and presentation are far better than the Sovteks, too. These are a great choice for all applications if you want that real Fender twang.

GE (Early Type)

(USA, NOS. GP: £22 – £32)

The 'early type' GE 6L6 has a more rounded appearance and is slightly

smaller than later production items. The sound stage and imaging are huge, making the notes fly out of the amp. Bass is deep, rich and plentiful and equally as extended as the RCA; the famous Strat voice is not lost even under driven conditions. The top end has a rich, bell-like clarity which begs you to sustain a note. In the Boogie – which came with poor-quality Chinese 6L6 valves – fitting the GE gave an instantly richer, fatter, almost stack-like tone which I thought sounded better even than with the RCAs, while the JBL-fitted Twin shone with clarity and midrange sparkle. These GEs are one of the greatest 6L6s of all time and come with our strongest recommendation.

TUNG-SOL 5881

(USA, NOS. GP: £35 – £45)

This is the valve that gave the tweed Fender Bassman its true voice. The bass is very tight, well defined and in your face: the valve is well balanced and has the classic midrange twang. They give less power than the Sylvania, GE or RCA but have superb drive and great early distortion and actually make the amp sound bigger than it really is. A great-sounding valve that deserves its classic status.

PHILIPS 'WGB' (& HARMA SB)

(USA, NOS. GP: £10 – £20)

This American-made military



Valve heaven: an original RCA 'black plate' 6L6GC

specification valve has all the tight bass and midrange clarity and twang of the Tung-Sol – and it's something of a bargain. The break up is very musical and the dominant midrange response is uniquely 'classic Fender' with no harshness. True, it's a little less defined and aggressive than the Tung-Sol, but it's warmer with a touch less bass.

This valve is superb in Fenders if you fancy midrange honk and early distortion at club volume levels. These valves are an ideal choice in reissue Bassmans, Boogies and Soldanos. The Harma SB-6L6 is a specially selected version of the Philips.

HARMA 'STR'

(E. Europe, current. GP: £14 – £17)

This is the best current production 6L6. The glass envelope is made from high quality heavy grade glass, making the valve the most unmicrophonic of any we tested. The gold-plated grids and special plate alloy give it improved plate dissipation and greater stability at high voltages.

When it comes to scale of sound, the Harma STR is second only to the GE. The treble response is full, smooth and creamy, the sustain long and pleasing with punch and definition. This valve is a real goodie: highly recommended.

SVETLANA

(Russia, current. GP: £10 – £16)

The Svetlana has a growing list of professional users. The specs claim a design based on the famous Philips/Sylvania STR 387, and sure enough the extra thick mica spacer does make this valve less prone to microphony.

In all test amps the balance was perfect – just like the RCA bass is crisp and clear but not as deep as the Harma. Distortion is sweet with good punch, and when pushed this valve avoids the muddiness of the Sovteks. We reckon it's the best current production item available... behind the excellent Harma STR reviewed above.

PHILIPS/SYLVANIA 'STR 387'

(USA, NOS. GP: £22 – £32)

These 387 valves are famed for their rugged construction and high voltage tolerances. In sound terms we could detect no difference between the 387 and the Sylvania 6L6GC: indeed, this tube actually sounded brighter than its earlier brother, which I felt was over-bright in the Twin fitted with JBLs. Overall, it has the same characteristics as the Sylvania and would be a very decent choice.

EAST EUROPEAN/HARMA STR KT66

(Russia, current. GP: £28 – £35)

This is a completely different valve from those built by Sovtek and Chinese

factories in recent years and (somewhat misguidedly) labelled 'KT66'. This new run – commissioned from Russia's Reflector factory by 'a leading US tube retailer' but now also available under the Harma brand – is accurately based on the specs of the legendary British GEC KT66, that essential ingredient in so many early Marshall amps, including a rugged structure and gold-wound grids.

Tested somewhat separately from the other 6L6s in a vintage '59 Fender Bassman, a reissue Marshall Bluesbreaker and a reissue Fender Vibrolux, this valve proves stunning in all applications. Bass response is big, and the sound is warm and very responsive throughout the range. In the reissue Bluesbreaker it was actually hard to hear any difference between these and an NOS pair of GEC KT66s (costing from £65 – £95 each on today's market, when you can find 'em). Highly recommended.

6L6GC: CONCLUSION

With 6L6 valves the first step is to decide how you want the amp to sound in relation to your style of music. Some types distort sooner, others stay tight and crisp – and both can be considered excellent tubes in their own right. It all depends on what you're looking for.

The **Russian 6P3S** and the **Chinese 6L6s** are not worth fitting in guitar amps. Most of them don't work: the ones that do sound poor.

The Russian-built **Sovtek** valves are more reliable and make good economic choices for general repairs or replacements, but they don't have character or tonal definition to compare with NOS units.

The top two current production 6L6GCs are the **Harma STR** and the **Svetlana**. The Harma have a bigger GE-style presentation and are more vibrant,

easily ranking alongside many USA valves.

Of a slightly different breed but an electronic virtual equivalent of the 6L6 types, the new-model **Russian KT66** is a welcome addition to the current-production market, and puts to shame many valves marketed as KT66s in recent years. If you want the sound of an original GEC KT66 but can't pay that kind of money, this is the only real alternative.

The real stars of the NOS examples are the early production **GE** and, not surprisingly, the **RCA black plate**. The GE's bass is not as deep as the RCAs, but would you really notice this with your Boogie or Fender cranked up to eight your favourite club? I think not. The great thing about the GE is that the more you turn it up, the bigger it gets. The RCA is better balanced, but I would gladly trade that for the more forward, slightly brighter sound of the GE. This tube is pure rock'n'roll.

The **Sylvania 6L6GC** proved itself another great valve: warm, rich, full-bodied and an excellent choice for a Fender Twin. With a Strat in the 'out of phase' position, this was just heaven.

But the real revelation was the US-made military spec **Philips WGB/Harma SB-6L6**. It has less power than the other USA items, but an excellently detailed midrange presentation and the advantage of early break-up, giving big, fat distortion in a Twin Reverb without taking your head off and, in the Boogie, a nice crunch with any amount of pre-amp distortion. This valve is just the job for a club player.

Next issue: small bottle EL84 and 6V6 output valves. Further results and other tube types on the Watford Valves web site: www.watfordvalves.com



Chinese 6L6GC: 'discard them'



TUBE Tasting

A Players Guide: Pt3 EL84 & 6V6GT

TAKE A LOOK BEHIND THE WORLD'S FAVOURITE recording amps like Fender Champs and Deluxes, Vox AC15s and AC30s and the more diminutive Matchless models and you'll find these sweet but hot sounding small bottle tubes. This issue, Derek Rocco of Watford Valves shares his tests of EL84 and 6V6GT varieties – with a little help from some Brit-rock royalty...

Many guitarists are turning on to the fact that heavenly sonics are more easily achieved for recording and small gigs by cranking up a great 15 or 20 watt amp than by piling mattresses against the doors, swaddling the walls in carpet liner, and trying to coax that 100W Marshall Plexi or Fender Twin Reverb into its tone zone while homicidal neighbours and the noise police launch tear-gas into your studio flat. Because they mimic the tonalities of their respective older brothers but do so at significantly lower output levels, these smaller valves are responsible for some of the finest tones available without risking shattering your eardrums and your tenant's agreement in the swipe of a single power chord.

Related in constructional and sonic characteristics to the larger 6L6 types, the 6V6GT is the classic small-bottle American tube. Putting out from around 6 to 15 watts each (depending on the circuit and transformers) compared to its bigger brother's 15 to 30 watt output, it endows Fender classics like the Champ, Princeton and Deluxe with an easy, smooth distortion and raw, rich texture – but make no mistake: while a 6V6 will fit a 6L6 socket, *do not* substitute them in an amp not designed to do so. The consequences could be very expensive.

Sonically aligned to the larger EL34 though different in construction – most

notably housed in a slim, baseless, 9-pin bottle – the EL84 is a true British classic. Originally found most famously in vintage Vox amps and taken up by everyone from Mesa/Boogie to Matchless to Orange to Laney in recent years, it's a sweet and sparkling output valve with easy compression and crystalline highs.

As with Pts 1 & 2, our tests will compare both current production and NOS (New Old Stock) samples; turn back to *TGM* vol 11 no 3 for a fuller explanation of terminologies and the history of Western verses Eastern European and Chinese valve production. 'GP' stands for 'guide price' and indicates the approximate price range you can expect to pay for a single valve on the UK market (remember: most amps will require either two or four output valves).

TESTING: EL84

To evaluate a range of EL84s, myself, Queen guitarist Brian May and Brian's personal tech Greg Fryer loaded the valves into a variety of Vox amps for two separate rounds of testing, under both normal playing conditions and the hardest of professional working situations. All valves were pre-selected to have the same plate current and transconductance. GE and Mullard EL84s were used as a reference.

Test 1: The amplifiers used were an original Vox AC10 Twin fitted with Elac

speakers and an original Vox AC4: for test guitars used we chose a 1973 Fender Stratocaster and a 1980 Yamaha SA2000S semi-acoustic.

Test 2: The second tests were carried out by Greg Fryer and Brian May at Brian's home in the summer of 1998 and in rehearsals in preparation for his 1998 world tour. The Vox AC30s were fitted with Celestion Greenback, Vintage 30 and Alnico Blue speakers – and Brian's famed treble boost was employed, too). This work led to the development of our Full Drive test rig, with assistance from *TGM* amp expert and Vox guru David Petersen.

MULLARD

(GB, NOS. Guide Price: £20 – £40)

The Mullard excelled in the initial test and in the tests with Greg and Brian. They provided crisp, ringing sustain and huge tight bottom end with clarity which sounded larger than life, giving the impression of space and immense detail. It never seemed to lose control even when Brian's treble boost was added; indeed, it seemed to get more punchy and dynamic. Bass, middle and treble were all in proportion. We all agreed this is a great valve – and impressive in standing up to the massive punishment it receives inside Brian's flat-out AC30s.

EUROPEAN 'STR'

(European, NOS. GP: £10 – £15)

This valve has always, in my opinion, got as close to the Mullard as you could go without buying a Mullard. It's got rich, creamy mids with a GE-style sound stage, and the bottom end is tighter and deeper than the Sovteks. Under normal saturated conditions this valve always sounds in control, with sweet, clear treble. Greg and Brian liked these valves for the aggressive edge and musical tone under treble-boosted conditions.

SOVTEK

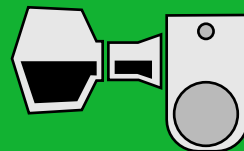
(Russia, current. GP: £4 – £8)

This current production valve is used by many leading OEM including Laney and Peavey. Generally we find it has around half the anode current of a Mullard, and the gain is also a lot lower, but soundwise it's better and more reliable than the Chinese valves – though it doesn't have a great deal of bass, and when pushed hard it tends to go muddy. In a regularly gigged amp we suggest you buy two or three sets, as they'll wear out. Great for repairers and hobbyists, though.

SOVTEK EL84M

(Russia, current. GP: £5 – £10)

The EL84M is a Russian military surplus which is of more robust construction than the standard item, with current draw typical of what we would expect for a military valve. In the amps this valve sounded fine with good balance, and the midrange was more detailed than its



cheaper relation. With normal drive units the valve sounded aggressive with deep bass; with Brian's treble boost the midrange sound became very heavily compressed. To my ear this sounded awful with the Greenbacks, got better with the Vintage 30s and sounded very aggressive with the Blue speakers.

Not the refinement of the Mullard or Philips, then, but it does push the solo right out which recessed the bass and top under heavy distortion, and it has a unique mid-range honk that Greg and Brian both love. Recommended.

GE 6BQ5

(USA, NOS. GP: £18 – £24)

Many American-made units will carry a '6BQ5' designation, the US code number for EL84 valves – but they're exactly the same thing. The GE valves have always been a favourite of mine and in the Vox amps they showed all the virtues: gain, balance and huge sound.

With the treble boost in place the middle thickened up – it sounded heavy and crisp without losing definition. With Brian playing the famous Queen runs the valve was extremely touch-sensitive. This is a great valve and sounded superb in the Vox AC30.

PHILIPS ECG

(USA, NOS. GP: £15 – £24)

In my own tests this was my favourite EL84. The valve has plenty of bottom end, sweet clean midrange, and a top end that's brighter than the Mullard. When pushed with a Real Tube Driver, Ibanez Tube Screamer or standard distortion unit the valve has quality and refinement, providing cutting solos just on the edge of mayhem.

The treble response is sweet and clear with plenty of definition, but when Greg introduced Brian's treble boost the valve did appear to go over the edge somewhat (the change happened in the midrange response, which seemed to go wild: remember, though, that the treble boost adds huge gain at line level and is selected for certain frequencies, and this shouldn't prove a problem for other musicians in any set up). Here we are dealing with the classic trademark sound of a genuine guitar hero, and for his applications the Mullard, which excelled in this area, got the vote (and Brian can afford 'em). This is a great valve in all applications.

JJ/TESLA

(Slovak Rep., current. GP: £6 – £12)

This valve was not part of the test with Greg and Brian, but its sound quality is great: a cross between the bright sweet sound of the Philips with the balls of the Mullard. It's not as high gain as the STR

and therefore gives a little more headroom, plus a nice rich overdrive sound with clear top end response. The balanced presentation makes this an ideal choice.

EL84 TEST RESULTS

Cue the familiar conclusion: all three of us agreed that the **Mullard** is the best overall valve, although the **GE** also scores very well due to its big sonic spectrum. These two valves can both be considered a true reference of the type. On the other hand, they are very pricey and you might find it hard to justify the expense... without your record company or someone else picking up the tab! Greg and Brian both liked the European STR which in the test we called **NOS European** (though branded by Watford Valves as the Harna STR) as we aren't 100 per cent sure of its origin. This is the closest in terms of tone to the Mullard and also the closest in terms of specification. .

The **Philips EL84** is the best sounding in the Vox as its rich, bright sound gives the amp a cleaner edge. When the treble boost is applied the valve goes into mega distortion – which I love – but the valve does not have the control of the Mullard. Of the current production items the **JJ/Tesla** sounds brighter and cleaner in normal operation than the **Sovteks**. Both of these valves show good bass and treble response under normal distorted situations, but in treble boost mode the Sovtek EL84M seems to handle the punishment a little better. They do sound muddy in comparison to the Mullards but they never lose control, and they seem better balanced than the JJ, which seems to go very middly.

Overall, there are many good sounding, reliable EL84s on the market which can suit all budgets and playing situations.

TESTING: 6V6GT

The 6V6GT is one of my favourite valves, but so many modern amps that use it do not have the tone of those classic tweed Fender Deluxes – one of the greatest

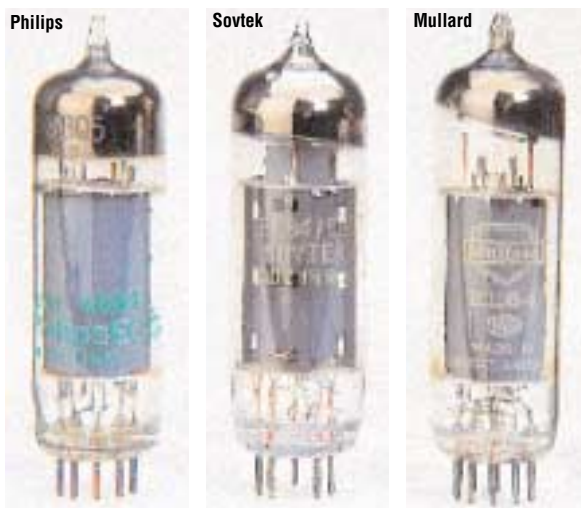
rock'n'roll amps of all time. We set out to find out why.

The amplifier used was a Fender Princeton Reverb II Paul Rivera model – a good amp to evaluate 6V6, being capable of supplying some very crunchy modern sounds as well as vintage. To the 1973 Fender Stratocaster and Yamaha SA2000S we added a 1980 Gibson Les Paul Standard.

RCA 6V6GT/A

(USA, NOS. GP: £18 – £25)

These were used as the reference and seem at home with single coils or humbuckers. They produce a fat, controlled bass with a strong mid character. The valve has great balance and individual notes can



be easily distinguished even under heavy distortion – every slight variation of tone is accurately reproduced. When pushed hard the midrange character distorts beautifully, with clarity and refinement. Valves from the '50s and '60s which are the most sought after. This is a hard valve to beat.

MAZDA

(France, NOS. GP: £10 – £14)

These are a 1950's French military valve that we decided to test at 500V DC plate and screen on our test rig (well above their rated maximums). Five hours later they were rock-solid where others had died – a serious indication of the unit's solidity.

Fitted into the Princeton the Mazda rocks, the sonic spectrum big, the distortion fat and punchy. The bass response is not as deep as the RCA, mind, and it does sound slightly edgy. When overdriven the valve has a raw, organic sound which I fell in love with; it seems better suited to the grungy side of rock. With a Les Paul the sustain is full and rich with no harsh edges – you feel you're playing a wall of amps, not just a little Princeton. These babies are great little blues valves and work well with the semi-acoustic Yamaha in both single and humbucking mode. The valve doesn't lose punch or go muddy even when effects are introduced. We loved them.

SOVTEK

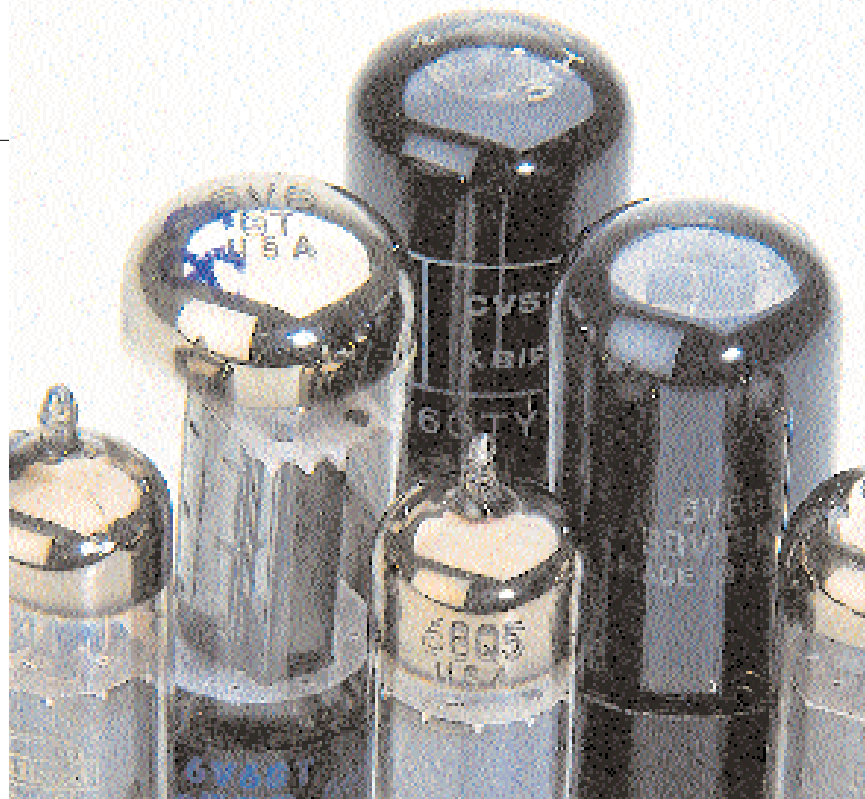
(Russia, current. GP: £5 – £10)

Sovtek have some good valves in their line up, but sadly this is not one of them. It has trouble in old Fender Deluxes as it cannot handle plate voltages of much above 345V DC (indeed in tests many died at 325V DC, so be warned). The valve is very harsh-sounding with an inferior bass response, and when overdriven it is very muddy. A good measure of a valve is, 'do your ears hurt after prolonged use?' Boy, with this valve I was hurting.

STANDARD 6V6GT

(USA, NOS. GP: £16 – £24)

With its brown base and semi-smoked glass this looks identical to the RCA units (and was possibly made by them). The top end of this valve really sings; the more you throw at it, the more it wants. Killer Kossoff-like sustain is achievable with the amp really pushed, with no harshness. The bass is bigger than the Mazda and keeps full definition even on fast runs. Balance is superb – clear and precise – and the valve is at home with country or jazz. Thoroughly recommended.



PHILIPS

(USA, NOS. GP: £10 – £18)

This is identical to the valves used by Fender in the '70s and would have been the standard valve fitted to the Princeton when new. It's a lot brighter than the Mazda or Standard and works very well with the Fender Strat. The amp sounds thinner, however, due to the sonic presentation being not as large, and the sustain isn't as fat or as long-lasting as the Mazda or Standard. The bass is not as well-defined, either, but the tone is still rich and warm. A great rock'n'roll valve.

GE (LARGE & 'NUDE' BASE)

(USA, NOS. GP: £12 – £18)

Watford Valves currently stock two types of GE: one with the pins straight out the bottom like the Sovtek 5881 and one with a full base. Both valves have the large grey box plate, and we found the sound quality to be identical when both are placed together.

These have the characteristic GE sonic presentation: big, fat and proud. The top end response is noticeably less than the

Philips, with midrange twang more pronounced than any other. It's a forward, in-your-face tube with great punch. Ideally suited to country or steel guitar.

ELECTRO-HARMONIX 6V6EH

(Russia, current. GP: £5 – £10)

A newer offering, this is a Russian unit commissioned by Electro-Harmonix to duplicate the design of the RCA (also sold as the Hama 6V6GT 'STR') – and it holds its own surprisingly well against the classic RCA. Compared to the bright, well-balanced Philips the 6V6EH also performs well, with a nice top end sparkle which is not quite as bright but still great for that out-of-phase Strat sound. When pushed hard it maintains control, sounding loud and clear. When fully saturated the EH is not as crisp and round in the midrange, but starts to blur – actually a great sound.

The EH doesn't have quite the huge sonic presentation of the Mazda nor its refinement – and it breaks up somewhat earlier – but this gives it a unique voice which will undoubtedly appeal to a lot of

people. The sustain is lovely and singing sustain, the breakup rich with plenty of bottom end slam, balancing performance with fine detail; what's more our tests so far prove it's sturdy and well built. A great addition to the market.

WESTINGHOUSE 6V6GTA

(USA, NOS. GP: £12 – £20)

These valves are marked 'USA' and come in the original box. These are for the Neil Young fans with fantastic bass response due to the bass-forwardness of the valve's sonic presentation. When distorted the bottom notes on the guitar are in full focus –



Brimar 6V6GT/CV511



Sovtek 6V6GT



Philips 6V6GT

MUST YOU SPEND A FORTUNE?

great for riffing or heavy Zep-style music. The top end is not as detailed, but sustain is good and clear; the midrange seems a little recessed but Strat twang can still be produced. This is definitely for hard rockers.

SYLVANIA 6V6GT/A

(USA, NOS. GP: £10 – £16)

This is a very warm-sounding valve that's a little bass-light when compared to the Standard or Mazda. The midrange response is this valve's real voice, and the clarity and Fender twang shine through. Sustain is warm and rich, if again not as forward as the Mazda. When pushed hard the bass seems to become less defined but the valve still retains a very musical sound.

BRIMAR 6V6GT/CV511

(GB, NOS. GP: £7 – £16)

We have recently seen a lot of dealers trying to make a market in these by saying that they are a super hi-fi valve and great guitar valve, with high prices to match. If you want a hi-fi valve, the Mazda stamps all over this.

In guitar amps the Brimar is a traditionally British-sounding unit. The bass response is lighter than the RCA, Mazda or Westinghouse and it has a very smooth, laid-back sound with no harshness. It doesn't have the 'get up and go' of most of the other valves tested, which is a shame, though the clear midrange never gets flustered, even with heavy rock. Rock solid stability and a good all round valve – ideally suited, maybe, to jazzers.

VISSEAUX

(France, NOS. GP: £10 – £16)

This is another French military valve with a lot of the same characteristics of the Mazda. It has rich sustain with good bass – not as deep as the RCA, Standard or Westinghouse, but about the same as the Mazda. Like the Brimar, the mids are very smooth and controlled without the Mazda's raw edge. The top end response seems recessed compared to the Philips or Mazda, but there's still plenty of traditional Fender twang on tap and sustain superb, rich and clear. This valve is very well balanced and would be a good choice for all applications.

6V6GT TEST RESULTS

The first rule when fitting 6V6GTs is to avoid the Russian 6p3s valve which an American designer valve company re-brands as there own 6V6HD. In our experience this version is a poor unit which is also very hard to bias. This valve is also sold by many UK dealers under the guise of 6L6GC, 6L6GT and 6L6GB. We do not recommend fitting any of these. The more commonly seen **Sovtek 6V6GT** reviewed above is poor in the sound quality department, so the best alternative

These tests were conducted with the specific aim of determining the fine points of valve characteristics and performance with the central goal of telling you which will be the best-sounding and longest-lasting components for a variety of tastes and applications. Over the course of these three articles it might have looked liked our reviews have been splitting hairs over certain matters – comparing ultra fine-tuned sonic nuances which might be virtually undetectable to many players – but as with everything we do at TGM, if a product is worth testing, it's worth testing thoroughly.

The difficulty that 'open field' reviews presents us, however, is that very often the more expensive items prove the superior. That's been no different through the course of these *Tube Tasting* features, where nine times out of ten (though by no means always) we found you get what you pay for. That leaves us in the awkward position of appearing to suggest that in order to achieve any half-decent tone you need to re-mortgage the house to invest in a quartet of Mullards or RCAs. Not so. If your budget is limited, it won't always be advisable to spend large sums on valves which, by nature, will eventually burn out – however good they are. (Think of them like fine wine: as soon as you start enjoying them, they're on a countdown to extinction. Then again, what's the fun of

leaving them racked up in the cellar? What a dilemma...)

Other more affordable types might be perfectly suitable to your needs, so don't feel you must have the most expensive options to be happy with your amp. Comprehensive testing available today can weed duff budget units from good, and many affordable current production valves from Sovtek, JJ Tesla and Electro-Harmonix among others can sound extremely good indeed. If you're gigging your Vox AC30 three or four times per week plus rehearsals with no big record deal to foot the bills, it's probably not worth risking burning up £160-worth of Mullard EL84s or £80-worth of Philips ECGs on a pub full of sweaty punters who won't notice the difference five pints into the set; but £40-worth of JJ/Teslas might sound righteously rocking, and end up lasting you two years anyway (and if you want to treat yourself to the Mullards, maybe tuck them away for recording and special occasions). In short, these things will blow up eventually, however good they are, so don't spend beyond your means just for the sake of it.

Finally, thanks again to Derek Rocco and the others from Watford Valves and beyond who contributed to *Tube Tasting*, without whom these features would not have been possible.

Dave Hunter

by far for current production 6V6s is the Russian-made **Electro-Harmonix 6V6EH**, a laudable copy of the classic RCA. The 6V6EH is one of the best valves of its type to be produced since the 1960's: it provides balanced performance with fine detail and offers credible performance both in clean and distorted modes. This valve is important as it provides a current-manufacture 6V6GT that can be fully recommended, and gives the OEMs the chance to produce a great-sounding rock and blues amp that could put tone back at your fingertips – so let's see them do it!

Taking in the entire field, however, the **RCA** is still the valve to beat, but two others come very close: the **Mazda 6V6GT** and the **Standard 6V6GT**, and the former is not badly priced by any means either. The Mazda really rocks from Zep to Muddy Waters. It has a raw, wild

feel and makes you want to play the guitar and feel good – and it makes it easy to get a great sound quickly. The Standard 6V6GT does everything that the Mazda but with more control; push it harder and harder and it simply shouts back, 'Give me more!' Its huge bottom end response is clear as a bell. These are 1958 production and are identical to the RCA that we used as a reference. Under heavy distortion the valve just seems to get bigger, with a sustain that is simply remarkable.

The new Electro-Harmonix valve aside, this market remains dominated by NOS units, but fortunately these out-of-production examples are generally less costly than NOS 6L6s or EL34s, with the Mazda, Brimar, Philips and even GE within reach of most players. Try a few sets before they are all gone.



GROOVE TUBES

Le spécialiste américain des lampes depuis 1979

Les guitaristes d'hier et d'aujourd'hui ont un point commun : l'utilisation des amplis à lampes. Malgré les avancées technologiques dans le domaine des amplis à transistors, les guitaristes continuent à leur préférer les amplis à lampes. Qu'est-ce qui différencie la technologie à lampes de la technologie à transistors ? Les lampes offrent un son et une sensation de jeu différente tout simplement parce qu'elles fonctionnent différemment.

Qu'est-ce qu'une lampe ? Une lampe est un composant électronique constitué d'un minimum de quatre éléments actifs : un filament, une cathode, une grille et une plaque. Tous ces éléments sont scellés sous vide dans une enceinte en verre, afin d'éviter leur combustion. Lorsqu'elle est chauffée, la cathode (chargée négativement) émet des électrons vers la plaque (chargée positivement). Le rôle de la grille est de contrôler ce flux d'électrons.

Comment fonctionnent les lampes ? Le micro de la guitare produit un signal de faible niveau (résultant de la vibration des cordes dans le champ magnétique du micro), qui est appliqué à la grille. Ceci entraîne un fort débit en courant entre la cathode et la plaque. Cela signifie donc qu'une tension importante apparaît au niveau de la plaque. Le réglage du courant de repos de la grille (équilibrage) (une partie des circuits électroniques de l'amplificateur), permet de régler correctement la tension de polarisation de la grille. Lorsque le courant de repos de la grille est correctement réglé, la lampe est adaptée aux circuits et délivre un signal à la fois clair et puissant. La plaque est connectée à un transformateur de sortie qui permet d'adapter l'impédance à celle de l'enceinte ou du haut-parleur.

Ampli Soul-O GT

Comment les lampes produisent-elles de la distorsion ? Lorsque le signal émis par la plaque approche de son niveau maximal, la lampe réagit progressivement et de plus en plus faiblement au signal d'entrée initial. Cela produit une sorte de compression du signal : le signal subit un écrêtage doux. La distorsion des lampes est douce et progressive : la qualité et la chaleur du signal initial s'en trouvent améliorées. Cela permet aussi de passer aisément d'un son clair à distordu, et inversement.

Pourquoi les sons des amplis à lampes sont-ils différents ?

1. La qualité et le type des lampes varient.
2. Le gain produit par une lampe varie en fonction des circuits de chaque amplificateur. Dans des conditions similaires, certaines lampes amplifient plus le signal que d'autres.

Remplacement des lampes :

1. Mettez l'amplificateur hors tension et débranchez-le du secteur. Laissez refroidir les lampes.
2. Repérez les lampes à l'aide du schéma d'implantation ou en ouvrant les boîtiers.
3. Lampes de puissance : retirez la fixation à ressorts située à la base des lampes. Retirez ensuite la lampe en la tenant par le haut.
4. Lampes préamplificatrices : Même procédure que pour les lampes de puissance. Assurez-vous que les plots s'encastrant bien.

LES 4 ÉTAGES À LAMPES :

Étage de préamplification : Amplifie le signal d'entrée guitare ou micro pour l'adapter à l'étage suivant.

Étage de traitement du signal : Les effets sont appliqués à cet étage (réverbération, réglages de tonalité, etc.).

Étage de l'ampli de puissance : L'étage fondamental de votre ampli. Au-delà de 10 Watts, la plupart des amplis utilisent un étage de puissance de type Push/Pull : une lampe est activée lorsque que l'autre est désactivée. Votre amplificateur peut être équipé de deux, quatre, six ou même huit lampes de puissance.

Étage de redressement : Permet de convertir la tension secteur alternative en tension continue dans votre ampli. La plupart des amplis modernes ont des étages de redressement à diodes.

POURQUOI REMPLACER VOS LAMPES ?

Composées de multiples petits éléments en verre, en métal, etc., les lampes sont susceptibles de connaître des problèmes mécaniques. Elles ne sont pas conçues pour durer éternellement. Et plus vous utilisez vos lampes, plus elles s'usent rapidement. Il est donc parfois nécessaire de les remplacer. **Voici quelques raisons de remplacer vos lampes :**

1. Lorsqu'une lampe commence à décliner, elle entraîne les autres dans son sillage, diminuant ainsi l'efficacité globale de l'amplificateur. Le son se détériore et le sustain est réduit.
2. Plus la qualité de la lampe est bonne, plus le son est excellent. En bref, voici la meilleur raison de remplacer vos lampes par des Groove Tubes : le son de votre ampli s'en trouve largement amélioré, ainsi que votre jeu.
3. Lorsqu'une lampe est brûlée, l'ampli ne fonctionne plus correctement. C'est aussi simple que cela.

Signes de détérioration des lampes :

1. Perte des aigus ou des graves.
2. Accords manquant de précision dans les aigus.
3. Différence de niveau de sortie selon la note jouée.
4. Manque de Punch.
5. Production de bruits bizarres.
6. Le son de l'amplificateur s'affaiblit.
7. La puissance varie sans cesse.
8. Absence de sustain ou déclin rapide en fin de note.

Conclusion. Restez attentif à l'efficacité de votre amplificateur. Lorsque vous constatez que le son commence à se détériorer, cela signifie qu'il est temps de changer vos lampes. Cela permet d'allonger la durée de vie de votre amplificateur. Votre son sera toujours au meilleur niveau. Pensez-y. Vous n'attendez pas le point de rupture des cordes pour les changer ? Il en va de même pour les lampes.

LE PROCÉDÉ GROOVE TUBES

Amplificateurs à lampes – au-delà de la puissance pure.

Groove Tubes a été créé et est toujours dirigé par un groupe de passionnés du son et des amplis guitare. Au départ, nous avons constaté que chaque lampe de puissance présente des propensions spécifiques à la distorsion (constatation que les techniques traditionnelles n'avait tout simplement pas pu relever). Les lampes de puissance sont associées dans la création du son de votre ampli, c'est pourquoi deux amplis de puissances identiques offrent un son différent. Nous savons que les lampes de puissance ont été utilisées non seulement pour leur capacité à amplifier le son, mais elles jouent également un rôle déterminant dans le son final et notamment dans le Rock'n Roll. C'est alors que Groove Tubes a créé le procédé Groove Tubes, un procédé qui, dans le respect total du son, a produit les meilleures lampes de ces 19 dernières années !

LE PROCÉDÉ GROOVE TUBES EN DÉTAIL

Analyse et sélection des lampes. Nous passons littéralement en revue des milliers de lampes et nous refusons plus de lampes que nous n'en acceptons. Nous faisons subir des tests rigoureux à chaque lampe (une à une) dans de *véritables* circuits d'amplification. Les lampes préamplificatrices sont refusées pour microphonie, niveau de sortie faible ou bruit de fond important. Les lampes de puissance subissent des tests encore plus draconiens :

1. **Fuite de grille.** La lampe se consume rapidement et la fuite entraîne de nombreuses défaillances (courts-circuits, etc.). Nous ne gardons pas de telles lampes.
2. **Pression de vide trop faible.** La lampe fonctionne de manière tout à fait normale, puis tombe en panne d'un seul coup. Ces lampes sont également écartées.
3. **Rapport gain/distorsion.** *Le cœur de la magie Groove Tubes !* Cette mesure détermine la saturation de la lampe en fonction du gain. Comme la distorsion des lampes est riche en harmoniques, le son de chaque lampe varie en fonction de ce rapport. Seules les lampes Groove Tubes sont contrôlées et appairées afin d'offrir un sustain plus long, une bande passante plus large et un amplificateur plus musical !

Calibrage et appairage des lampes. Nous traduisons ce rapport gain/distorsion par une échelle de performance allant jusqu'à 100 points, puis nous sélectionnons les lampes à un point d'écart les unes des autres. Enfin, nous réduisons l'échelle à 1-10 avant que les lampes ne quittent notre usine. Toutes les lampes sont exactement appairées pour fonctionner par deux, quatre, six, voire huit.

Un son dépassant l'excellence. Le procédé Groove Tubes offre de nombreuses améliorations :

1. **Un sustain considérablement amélioré** par élimination des déphasages (qui annulent certaines fréquences lorsque des sons non identiques provenant de lampes non appairées se combinent).
2. **Un meilleur équilibre harmonique** – Toutes les notes que vous jouez ont la même amplitude (fini les points morts et les notes ternes !).
3. **Une durée de vie plus longue** – 1 : Grâce à l'élimination des lampes défaillantes.
2 : L'appairage de nos lampes réduit les problèmes de compensation des lampes les plus fortes pour les lampes faibles. 3 : Nos lampes alimentent le transformateur de sortie de manière homogène et ce dernier chauffe moins.
4. **Une homogénéité inégalée** – Lorsque vous avez équilibré votre ampli selon vos besoins, il n'est pas nécessaire de recommencer la procédure d'équilibrage lorsque vous remplacez les lampes (si vous

utilisez des lampes identiques). Le système de calibrage Groove Tubes est si fiable et homogène que vous pouvez sans problème changer vous-mêmes vos lampes.

Grooves Tubes. L'essentiel du son. Aller dans un magasin pour acheter des lampes est une entreprise hasardeuse lorsque vous n'achetez pas des lampes Groove Tubes. Sans le procédé Groove Tubes, il est impossible de prédire le son d'une lampe. Lorsque les autres fabricants prétendent avoir équilibré leurs jeux de lampes, ils se réfèrent uniquement à la puissance de la lampe, ce qui n'est pas satisfaisant. Comme nous l'avons mentionné, il est inutile de mesurer la puissance car vous ne pouvez pas entendre les variations de puissance (alors que vous pouvez entendre les variations de distorsion harmonique). Même si vous le pouviez, la puissance varie constamment à mesure que la lampe se dégrade (cette mesure ne peut pas rester « équilibrée » — contrairement à notre mesure). L'achat de lampes Groove Tubes est une source d'économie qui vous évite toutes sortes de problèmes annexes, tout en tirant le meilleur son possible de votre ampli ! Les lampes Groove Tubes sont plus chères que la plupart des autres lampes. Vous savez maintenant pourquoi.

Le système de calibrage Groove Tubes :

Les jeux de lampes Groove Tubes appairées porte un numéro entre 1 et 10, qui indique le rapport gain/distorsion.

1-3 : Distorsion rapide (une plage de distorsion plus large)

4-7 : Distorsion normale

8-10 : Distorsion tardive (puissance/réserve dynamique plus importante et un son plus clair même à fort niveau)

Lorsque vous avez équilibré votre ampli pour un type de lampes idéal, il n'est pas nécessaire de recommencer l'équilibrage de votre ampli lorsque vous remplacez les lampes (si vous utilisez des lampes d'un même calibre). Le système de calibrage Groove Tubes est fiable et homogène : vous pouvez sans problème changer vous-mêmes vos lampes.

Le phénomène Tube-Tone. La prochaine fois que vous essayez votre son et avant de dépenser votre argent en nouveaux effets, gadgets, guitares ou autres amplis... vérifiez d'abord la tête de votre amplificateur et essayez un nouveau jeu de lampes Groove Tubes.

Satisfaction garantie. Les lampes sont des composants fragiles. Elles peuvent facilement être endommagées ou « désappairées » durant le transport. Nous garantissons donc nos lampes pendant 90 à 180 jours, afin que les défauts éventuels aient le temps de se manifester. De plus, si vous achetez un jeu de nos lampes et que leur son ne vous convient pas, vous disposez d'une semaine pour les échanger contre un type ou un calibre différent !

LAMPES DE PUISSANCE

Si vous êtes prêts à entrer dans le monde Groove Tubes, quelle est la prochaine étape ? Pensez d'abord au son que vous désirez obtenir. Puis, utilisez les informations de ces deux pages, du tableau de comparaison des lampes de puissance situé au dos de ce catalogue et de la classification par calibre (1-10) pour faire votre choix. Il suffit ensuite de demander à votre magasin de musique votre premier ensemble de lampes Groove Tubes. Si votre magasin habituel ne dispose pas des lampes que vous souhaitez, appelez le numéro : 01 60 79 23 64 et l'on vous dirigera vers le revendeur le plus proche.

Note sur l'équilibrage. Faites toujours équilibrer votre ampli lorsque vous changez de type ou de calibre de lampe (les lampes préamplificatrices s'équilibrent automatiquement). Le coût de l'opération est compris entre environ 150 et 600 francs.

LA FAMILLE DES 6550/KT88

(Puissance de 35 à 50 Watts)

Pentode de puissance maximale pour les amplis Marshall, Hiwatt, Ampeg SVT, GT et quelques autres amplis extrêmement puissants. Convient également aux amplis Hi-Fi.

GT 6550C

Un peu moins de puissance mais une construction de qualité et une distorsion rapide que de nombreux guitaristes apprécient sur les Marshall. Plus chaude que la version 'A' mais avec une durée de vie moins grande (comme l'atteste le prix moins élevé).

GT-6550R

Dernier modèle combinant qualité, puissance et fiabilité. Excellente réponse tout en étant plus facile saturer que la version 'A'. Son un peu plus dur que la version 'C'.

GT-6550A

Édition limitée USA

Lampe de très forte puissance utilisée avec les amplis Ampeg SVT, Sunn (Hendrix), Marshalls (années 70 et début des années 80), Leslies et tous les séries studios GT D75. La lampe la plus puissante que nous ayons jamais créé. Une réserve dynamique exceptionnelle. Convient à la fois aux guitaristes de Country et de Metal.

GT-KT88

Copie du type américain et britannique original. Moins de puissance ou de réponse que l'original. Mais elle offre tout de même un bon compromis pour les amplis à base de 6550/EL34 (comme les Marshall). Un gros son dense, mais une distorsion douce.

GT-KT88s & KT88sv (6550a) (également en verre rouge et bleu). Nouvelle conception exclusive GT avec des « ailettes de refroidissement » spéciales fixées à la plaque pour une puissance accrue, une durée de vie plus longue et un meilleur son. Basses puissantes. Très dynamique. La plus puissante de sa catégorie. Convient idéalement aux amplis Ampeg SVT et Hi-Fi. Utilisée par de nombreux fabricants comme Matchless, McIntosh et Cary Audio.

Le **KT88 's'** est la première version avec une sortie de 15 % supérieure, qui peut s'avérer trop chaude pour certaines applications.

Le **KT88 'sv'** est la dernière version, identique aux Gold Lion des années 60.

LA FAMILLE 6L6

(Plage de puissance de 20 à 25 Watts)

La solution pour la plupart des amplis Fender de puissance moyenne. Cette pentode spécialement conçue avec une électrode formant un rayon fut inventée par RCA et existe en de nombreuses versions. Sa réponse est plus ronde, avec des médiums prononcés. Type très vieux Rock'n Roll.

GT-6L6C

Nouveau modèle. Lampe de type Sylvania STR de la fin des années 70 (forme de bouteille droite). Forte puissance, son ciselé avec des basses denses. Idéale pour le Rock ou la Country. Une valeur sûre, à la fois plus puissante et moins chère que la 6L6B (5881) de type russe.

GT-6L6CB

Lampe en forme de bouteille avec étranglement. Forte puissance. Idéal pour un son Vintage rond. Construction légère, durée de vie plus courte (le prix étant divisé par 3 en conséquence). Très appréciée des musiciens de Blues en raison de sa douceur et de sa propension à la distorsion.

GT-6L6B

(KT66, 5881) Sans doute la plus fiable des types de lampes actuellement fabriqués, avec un peu moins de puissance et un peu plus d'agressivité lorsqu'elle est poussée à la distorsion. Utilisée pour les amplis à lampes GT Fender.

GT-6L6S

(KT66, 5881) Nouvelle conception GT avec plus de puissance et des composants haute fidélité. Forte puissance avec plus de graves et d'aigus que les autres lampes de type 6L6.

GT-KT66

(6L6, 5881) Nouvelle conception exclusive GT. Une copie conforme de la légendaire Gold Lion « Valve » du combo Marshall « Blues Breaker » d'Eric Clapton. Considérée par beaucoup (dont nous !) comme la meilleure lampe pour ampli guitare qui soit. Des basses profondes et puissantes, des aigus ciselés, une réponse très chaude et dynamique. Chaudement recommandée pour les amplis Fender.

GT-5881

(édition limitée)

(6L6, KT66) Référence encore en stock mais plus fabriquée (fabriquée aux Etats-Unis).

LA FAMILLE 6V6

(Plage de puissance de 12 à 18 Watts)

La solution pour la plupart des amplis Fender de faible puissance et autres amplis similaires de faible puissance (environ 15 Watts par lampe). Un son chaud, rond et facilement saturé. Convient parfaitement pour l'enregistrement et les répétitions.

GT-6V6C

(7408) Conçu de manière classique avec une saturation chaude et une distorsion douce. Un coût inférieur traduit une durée de vie inférieure.

GT-6V6HD

(7408) Mise à jour européenne de l'ancien type US. Lampe la plus utilisée pour les amplis US inférieurs à 30 Watts comme les amplis Fender Princeton & Deluxe, Gibson, Magnatone, Silvertone, Supro et Harmony. Un son doux pour un jeu tranquille. Convient bien à l'enregistrement.

GT-6V6NOS

(édition limitée)

(7408) RCA originale fabriquée aux USA. Une lampe idéale pour un son exceptionnel. Une réponse exempte de microphonie et une longue durée de vie.

LA FAMILLE EL34

(Plage de puissance de 25 à 38 Watts)

(Également disponible en verre rouge ou bleu)

La lampe de puissance de type pentode classique utilisée sur les amplis Marshall, Hiwatt, Laney et les amplificateurs européens du même type. Ces lampes offrent des basses prononcées et des aigus ciselés qui deviennent « Crunchy » en augmentant le gain. La réponse présente un creux dans les médiums. Le choix des rockeurs modernes – type Rock britannique et Heavy Metal.

GT-E34Ls

(EL34, KT77) Nouvelle conception exclusive GT avec des ailettes de refroidissement spéciales fixées à la plaque pour une puissance accrue, une durée de vie plus longue et un meilleur son. Très dynamique et avec des basses prononcées, il s'agit de la lampe la plus puissante de sa catégorie. Choisie par Matchless et par de nombreux musiciens comme Billy Gibson, Joe Perry et Joe Walsh.

GT-EL34R

(EL34, KT77) Nouvelle conception exclusive GT, copie fidèle de la lampe classique de type Mullard avec une puissance respectable et une réponse plate. Un son unique, légèrement mordant lorsque les lampes sont poussées. La lampe la plus fiable de cette famille.

EL34C

Un bon rapport qualité/prix. Une puissance légèrement inférieure et un creux dans les aigus. Sa conception légère signifie qu'elle est plus souple et facilement saturée. Une durée de vie plus courte explique le prix inférieur.

LA FAMILLE EL84

(Plage de puissance de 5 à 8 Watts)

La pentode faible puissance la plus répandue, popularisée par les premiers amplis Vox AC30. Redécouverte par les amplis Matchless et actuellement utilisée par pratiquement tous les fabricants d'amplis à lampe. Distorsion douce et rapide. Convient très bien pour les enregistrements, mais le volume est généralement trop faible pour les concerts.

GT-EL84

(6BQ5) Bonne qualité, longue durée de vie avec une attaque légèrement agressive en saturation.

GT-EL84S

(6BQ5) Nouvelle version européenne avec plus de réponse, une puissance accrue et un son plus chaud.

LAMPES PRÉAMPLIFICATRICES

LA FAMILLE DES LAMPES PRÉAMPLIFICATRICES

Ces lampes sont utilisées dans les premiers étages à faible niveau des amplis à lampes. Il existe de nombreux modèles interchangeables et chacun offre son propre son, son propre gain et sa propre réponse. Le meilleur exemple est la gamme 12AX7, qui comprend plus de 6 options (ECC83, 7025 & 5751). Elles sont interchangeables (sans modification du circuit), offrant une aisance d'utilisation incomparable. Essayez-les !

GT-12AX7

(ECC83, 7025) Idéale pour les amplis Marshall et Fender. Des médiums chauds qui se combinent très bien au son des amplificateurs européens.

GT-7025

(12AX7, ECC83) Excellent son, fabriqué en Europe, plaque de grande taille avec un gain légèrement plus élevé et une large bande passante. Aujourd'hui disponible après 5 ans d'embargo des Nations Unies.

GT-12AX7R

Nouvelle lampe d'origine. Légèrement plus brillante, avec un gain inférieur et une compression plus rapide que la GT-12AX7. Convient très bien à la plupart des amplis Fender, sauf aux amplis de type Fender à gain élevé (comme les Boogie).

GT-ECC83

(12AX7, 7025) Type européen classique avec un gain moyen à élevé et une bande passante linéaire. Son très clair et homogène avec des basses bien définies.

GT-12AU7

(EC82, 6189) Similaire à la 12AY7, niveau de sortie moins puissant. Utilisée comme inverseur de phase sur les amplis puissants pour obtenir un son plus clair. Convient très bien aux amplis haut de gamme – amplis McIntosh, Ampeg & Leslie.

GT-6201M

(12AT7) Type 12AT7 fabriqué aux Etats-Unis spécialement sélectionné pour son faible bruit de fond. Pour les micros à lampes et les appareils d'enregistrement.

GT-6072M

(12AY7) Type 12AY7 fabriqué aux Etats-Unis spécialement sélectionné pour son faible bruit de fond. Pour les micros à lampes et les appareils d'enregistrement.

GT-12AT7

(ECC81, 6201) Inverseur de phase ou Driver en attaque de l'étage de puissance. Idéale pour tous les amplis fabriqués aux Etats-Unis, en particulier les amplis Fender. Convient très bien en Driver des amplis Marshall pour un son plus clair et plus brillant (devrait être changée à chaque remplacement des lampes de puissance pour une meilleure performance !).

GT-12AT7A

(6201) Lampe militaire de la plus haute qualité. Fabriquée aux Etats-Unis, avec une longue durée de vie.

GT-12AY7

(6072) Double triode à gain plus faible utilisée sur les premiers amplis Fender. Peut être utilisée pour les lampes de type 12AX7. Diminue le gain et produit un son plus chaud. Fabriquée aux USA.

GT-5751

(12AX7, 7025) Lampe militaire de la plus haute qualité. Gain plus faible, son chaud, longue durée de vie.

(non représentée)

GT-12DW7

Édition limitée (7247)

Utilisées sur certains amplis Ampeg Vintage (lorsque Magnavox possédait la société). Lampe rare dont la production a été arrêtée depuis longtemps. Vous avez la possibilité de convertir les circuits Ampeg pour les adapter aux lampes 12AX7.

Pour comprendre l'histoire des lampes, il est nécessaire de remonter un peu dans le temps. Lorsque nous nous sommes lancés dans l'aventure Groove Tubes, la plupart de nos lampes venaient des usines occidentales. Nous partons alors d'un très bon produit pour essayer de l'améliorer. Mais ces usines ferment peu à peu et les nouveaux arrivages proviennent des usines de lampes d'Europe de l'Est, de Russie et de Chine. Ces lampes sont des copies des originaux, mais elles sont de mauvaise qualité. C'est pourquoi le procédé Groove Tubes prend alors toute son importance. Aujourd'hui, il existe une multitude de variétés de lampes – et autant sont encore à venir. Enfin, ces dernières années, nous avons créé nos propres conceptions de lampes, à la fois novatrices et améliorées. Nous les fabriquons aux Etats-Unis et également à l'étranger. Ces nouvelles lampes offrent une puissance de sortie accrue, un son de meilleure qualité et une durée de vie plus longue.

SUBSTITUTIONS

Pour ceux d'entre vous qui utilisent des amplis de type Fender, votre ampli fabriqué aux États-Unis est certainement destiné à utiliser une lampe de type 6L6. Groove Tubes propose 7 différentes lampes de type 6L6. La plupart des amplificateurs de type britannique sont conçus pour utiliser des EL34, mais aussi des 6550 ou des KT88 avec peu ou pas de modifications. Cela permet aux propriétaires d'amplis Marshall de choisir parmi 8 types de lampes de puissance !

MODIFICATIONS ET AUTRES AGRÈMENTS

Il est possible de dépasser les limites de votre ampli afin d'obtenir des résultats surprenants. Cependant, cela implique des conversions et des modifications. Avant de vous lancer dans *votre* propre aventure, nous vous recommandons de vous procurer un exemplaire du Tube Amp Book d'Aspen Pittman afin de vous familiariser avec les techniques de Customisation des amplis à lampes. Demandez-le à votre magasin de musique habituel ou contactez-nous directement.

L'HISTOIRE DE GROOVE TUBES

(Ou un homme à la recherche de la quintessence des lampes)

La société Groove Tubes fut créée à la fin des années 70 lorsqu'Aspen Pittman, fondateur visionnaire, commença à explorer le son si particulier des lampes. Guidés par la curiosité et le désir de créer une nouvelle entreprise, Aspen et ses ingénieurs découvrirent les caractéristiques de fonctionnement des lampes et réussirent à les mesurer. Cette découverte devint le principe fondateur de Groove Tubes.

Dans les 20 dernières années, Groove Tubes a connu un développement exceptionnel, passant d'un modeste atelier situé dans un garage à une entreprise d'envergure internationale. Dirigée par des passionnés du son des amplis guitare, l'entreprise a depuis longtemps quitté son garage d'origine mais son esprit imaginatif et sa motivation première ne l'ont pas quitté. La liste de ceux qui croient aujourd'hui en Groove Tubes serait beaucoup trop longue à établir : ne suffit-il pas de constater que la majorité des guitaristes professionnels utilisent les lampes Groove Tubes ? Les lampes Groove Tubes sont également le choix privilégié des plus grands fabricants d'amplificateurs comme Fender, Ampeg, Matchless et Soldano. Il existe même une gamme de lampes Groove Tubes spécialement conçues pour et distribuées par Fender.

En tant que spécialiste des lampes, Aspen devait naturellement étendre ses activités en produisant différents circuits électriques à lampes. Sa première invention novatrice, le Speaker Emulator (Brevet US 4,937,874), permettait de relier directement la sortie d'un ampli guitare à lampes à une console d'enregistrement ou à une console de sonorisation. Sur la base de ce brevet de 1984, Aspen fonda GT Electronics, qui fabrique ses conceptions uniques et novatrices de circuits électroniques guitare à lampes, de micros à condensateur et de processeurs de signal. La société GT Electronics est récemment

devenue une filiale d'Alesis Corporation et a lancé une série de nouveaux micros GT. Aspen continue aujourd'hui à développer pour GT Electronics des circuits électroniques novateurs pour la scène et le studio.

AUTRES PRODUITS GROOVE TUBES

LE LIVRE

La renommée d'Aspen Pittman est aussi largement due à la publication de son livre, The Tube Amp Book – la bible des lampes. Cet ouvrage en est à sa cinquième réédition et s'est vendu à plus de 75 000 exemplaires. Toute une génération de guitaristes modernes a été abreuvée à cette source de découverte des lampes. Les produits créés par Aspen et son livre ont largement contribué à l'engouement pour les lampes qui touche aujourd'hui tous les guitaristes !

FATFINGER (Brevet US 4,840,102)

Aspen a fait breveter cet appareil étonnant qui permet d'améliorer le sustain et le son naturels des guitares et des basses, et qui se fixe sur la tête de l'instrument. Le principe est simple : la masse ajoutée à la tête permet aux cordes de résonner plus fort, plus longtemps et élimine les notes mortes !

HUMDINGERS

Il remplace le cache en plastique de votre micro simple bobinage par un cache en cuivre plaqué nickel et une plaque inférieure en acier. Ce produit, à la fois simple et efficace, réduit le ronflement et les interférences tout en créant un son plus puissant et plus dense à partir d'un micro simple bobinage. Il transforme un micro chevalet trop faible en un micro chevalet puissant et améliore l'équilibre des autres micros. Ne nécessite aucune soudure !

REPRODUCTION D'ENCEINTES CLASSIQUES

Conçues d'après nos enceintes Vintage favorites, elles sont fabriquées spécialement pour Groove Tubes par des usines américaines et européennes. Elles sont disponibles en 10" et en 12".

TRANSFORMATEURS GT CUSTOM

Spécialement conçus à l'ancienne et fabriqués à la main pour nous par AXIOM, afin de produire le son le plus doux qui soit pour votre ampli moderne ou Vintage. Nous vous proposons une ligne style moderne et une ligne style Vintage afin d'améliorer le son et la puissance de n'importe quel ampli à lampes.

NOTRE KIT ET MODE D'EMPLOI D'ÉQUILIBRAGE

Groove Tubes a développé un kit d'équilibrage simple qui comprend un contrôleur en ligne, un voltmètre numérique (optionnel) et un mode d'emploi qui vous apprend à régler tous les points d'équilibrage importants de vos amplis à lampes.

TABLEAU DE COMPARAISON DES LAMPES DE PUISSANCE

(Étude de cas)

Lorsque vous choisissez la lampe qui vous permettra d'obtenir le son de vos rêves, vous devez vous poser deux questions essentielles : 1. Quel serait le résultat de l'association d'un type de lampe particulier avec votre ampli ? 2. Quel est le calibre de cette lampe ? Pour décrire plus en détail les caractéristiques sonores des lampes, nous avons réalisé une « étude de cas » sur le fonctionnement des lampes avec notre ampli Dual 75 GT Electronics (qui a été spécialement conçu pour pouvoir utiliser tous les types de lampes). Le tableau de comparaison des lampes de puissance GT reprend les résultats de cette étude. Vous devez rechercher le type de lampe – Nous mettons ces lampes (chacune avec un calibre de distorsion moyen de 5) dans l'ampli, puis nous équilibrons l'amplificateur pour cette lampe particulière. En utilisant deux lampes appairées Groove Tubes, nous avons testé chaque lampe sur 3 plages de fréquences (graves, médiums, aigus). Nous avons noté la puissance maximum en son clair (en Watts eff. dans le tableau). Puis nous avons ajouté quelques commentaires sur le son et la performance des lampes. Morale de l'histoire : *sur le même ampli, chaque lampe présente une performance et un son différents !*

Étude du calibre.

À quel réglage sur votre ampli la lampe commence-t-elle à saturer ? Cela est un paramètre à connaître pour déterminer les lampes que vous souhaitez acheter. Deux facteurs entrent en jeu : **1. Dans quel contexte jouez-vous ?** – Si vous avez besoin que votre ampli sature facilement, il est préférable de choisir une lampe qui écrête rapidement. Si vous souhaitez obtenir un jeu plutôt propre et dynamique, il est préférable d'utiliser une lampe qui sature de manière tardive. **2. Comment souhaitez-vous utiliser votre ampli ?** La plupart des guitaristes souhaitent que leur ampli se comporte en accord avec sa configuration, c'est pourquoi ils utilisent généralement le calibrage moyen (4-7). Mais pour les guitaristes qui souhaitent plus ou moins de saturation des lampes, nous offrons également des calibres supérieurs ou inférieurs. Un calibrage rapide (1-3) vous offre une plage de distorsion plus large. Si vous souhaitez plus de dynamique, choisissez la distorsion tardive (8-10).

Tous les amplisaturent différemment et à différents niveaux. Grâce à Groove Tubes, vous pouvez personnaliser votre son en sélectionnant le type de lampe et le calibrage à utiliser afin d'obtenir le son de vos rêves. De plus, nous appairons les lampes exactement et toujours de la même manière : vous pouvez donc reproduire à loisir le son de vos rêves – et sans recommencer l'équilibrage de votre ampli ! C'est pourquoi les groupes qui partent en tournée équipent toujours leurs amplis de lampes Groove Tubes. Où qu'ils soient, lorsqu'ils remplacent leur lampes par un jeu de lampes identiques, ils sont sûrs de retrouver le même son !

En regardant le tableau de comparaison, vous constaterez qu'il n'y a pas grande différence entre la puissance maximum des 6L6 n°1 et n° 10 que nous avons comparé. Les lampes au calibre le plus faible ne sont pas des lampes faibles : elles produisent seulement un son différent... tout comme les cordes de guitare ou les baguettes de batterie. Quel que soit votre style, quel que soit votre son... il existe une lampe Groove Tubes et un calibre qui répondent à votre attente !

La garantie Groove Tubes

Lampes préamplificatrices

Garanties contre les surchauffes fatales, le bruit excessif ou la microphonie pendant une période de 180 jours à compter de la date d'achat.

Lampes de puissance

Garanties contre les surchauffes fatales pendant une période de 90 jours à compter de la date d'achat. Si une lampe est défectueuse, tout le jeu de lampes doit être remplacé afin d'assurer un appairage correct.

GT-Solid Rectifiers & Substi-tubes

Garanties pendant 3 ans à compter de la date d'achat.

TABLEAU DE COMPARAISON DES LAMPES DE PUISSANCE					
Type de lampe (calibre n° 5)	Équilibrage	400 Hz (graves)	1 500 Hz (médium)	4 000 Hz (aigus)	Remarques sur le son
GT-6550 A	-67,8 V	96,6	108,1	98,1	Lampe la plus puissante, la plus dense et la plus claire.
GT-6550 C	-68,2 V	81,9	83,2	83,2	Puissance honorable, distorsion douce, son rond et chaud.
GT-6550 R	-66 V	82,5	82,6	77,5	Nouvelle copie de la 6550 A avec moins de puissance et de durée de vie.
GT-KT88	-64,4 V	87,1	87,1	86,5	Gros son rond et chaud mais facile à compresser.
GT-KT88 SV	-62,8 V	84,3	86,8	87,5	Comme la S, mais avec moins de puissance pour adaptation au Genelex « Vintage ».
GT-KT90	-52,5 V	77,5	83,8	81,9	Similaire au son d'une grosse EL34, agréable et Crunchy
GT-KT66	-61,9 V	62,2	63,4	64,7	Forte puissance, son chaud et dynamique avec un bon rendu des aigus.
GT-5881 (6L6)	-61,1 V	61,2	62,5	63,1	Son rond et chaud avec un bon équilibre et une puissance élevée.
GT-6L6 B	-56,0 V	60,5	63,5	62,1	Légèrement agressif, attaque forte, mais son chaud tout de même.
GT-6L6 C	-54,3 V	54,6	57,2	55,6	Son dense et ciselé pour le Rock ou la Country.
GT-6L6 OS	-59 V	57,8	59,9	59,9	Son chaud et rond avec un bon équilibre entre clarté et distorsion.
GT-6L6 S	-49,7 V	63,3	64,9	64,8	6L6 à très forte puissance avec un bon rendu des basses et des aigus.
GT-E34Ls	-50,5 V	85,2	86,5	86,5	EL34 européenne classique, basses prononcées et aigus Crunchy.
GT-EL34 C	-47,3 V	71,4	75,6	78,8	Son Crunchy et souple avec un peu moins de basses.
GT-EL34 R	-49,9 V	76,3	76,3	76,3	Réponse linéaire et homogène avec une attaque plus mordante.
ÉTUDE COMPARATIVE DES CALIBRAGES GROOVE TUBES					
GT6L6 OS n° 1	-54 V	57,2	60,5	56,7	Son souple et rond avec une large plage de compression douce.
GT6L6 OS n° 10	-63 V	70,2	70,2	68,4	Son dense et clair avec plus de réserve dynamique avant compression.
Max 6L6 OS n° 1	-54 V	113,3	107,3	102,9	Note : les différences entre les n° 1 et 10 au maximum ne sont que d'environ 10 %, alors que les différences de puissance avant écrêtage vont jusqu'à 20 %.
Max 6L6 OS n° 10	-63 V	118,6	118,6	115,5	

Tensions d'équilibrage indiquées uniquement pour la comparaison. Toutes les lampes ont été calibrées dans un ampli Dual 75 de GT Electronics avec une tension de plaque constante de 500 V (continu), spécialement conçu pour pouvoir utiliser tous les types de lampes de puissance.

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