
Subject: Fact and fiction about the VF14 tube
Posted by [Klaus Heyne](#) on Wed, 19 May 2004 19:07:57 GMT
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...As to the original reason why Neumann used a VF14 in the U47, rather than the other available 6.3 V. and 12.6 V.-heated siblings EF and UF: There are many stories floating around, and, rather than giving any of them further credence, I'd like to get an expert to fill in some facts here.

Kind regards

Subject: Re: Underheating of a microphone tube (VF14 etc.)
Posted by [Oliver Archut](#) on Thu, 20 May 2004 04:51:01 GMT
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Hello Klaus,

...VF14? there are about 100 different stories out there, here are my findings, based on historic internal Telefunken documents, talks with former developing engineers of Telefunken's tube factories, RFT engineers and the IRT employees.

It is not true that the VF14 is a WWII surplus tube, a VF14 was not made before 1944. The first time it shows up in Telefunken data as well as price sheets in 1946 catalog (issued around November 1945). There is a reference in the manufacturing report of the VF14 to a LVIII made for the German Air Force in 1944, but this tube never showed up in any reference data and I only could find one specimen in over 20 years of searching.

It is not true that a UF14 is the 100mA version of the VF or EF 14. The UF14 is a 2 Watt universal pentode made only for a short time 1947 to 1954. It shares the same cathode dimension and pin layout but that's all. 1st, 2nd and 3rd grid are different as well as the smaller plate construction

It is not true that only Telefunken made the VF14 alone, RFT Erfurt made approx. 15k VF14 in an glass version with a Zink coating (like the pre war tubes). Only found two specimen.

Here are some facts,

Approx. 27k VF14 were made in three production runs in the Telefunken factory in Berlin, they stopped the entire steel tube production in March 1954 due to the high production cost.

Only 1/3 meet the desired M specs, the rest was unusable and used for a Telefunken made AC/DC radio receiver (only short time made in 1948) with one VCH11 for the radio part and the VF14 as and 2 Watt output driver.

The VF14 was in 1945, when the test phase of the U47 started, a special request tube, custom designed for the Neumann/Telefunken U47. The first time that "Isolation cut outs" and specialty resistance coating was used to prevent grid leak currents from plate to grid. Compared to the pre war condenser tubes a milestone in tube design.

The cathode material, an American passive nickel alloy, can take underheating better than the standard "German C" used in the rest of the steeltubes, like EF12 and EF14.

The VF14 was marked in the Telefunken tube catalog as special request, with a higher price than any other tube.

Even the VF14 shares 90% of the same parts of the EF14, a tube first introduced in 1938 and the back bone of the Nazi electronic war machinery, the minor changes of cathode and 1st grid material makes all the difference. You can find about 1 out of ten EF14 that is suitable for microphone use, but that is all.

The 1.1V of the cathode in a U47 is just above the magic "Temperature Tension Voltage "of Barium Oxide of 1V with a cathode temperature of 680 degree, so electrons make it just out.... Even a U47 circuit looks quite simple, the develop engineers at Telefunken did everything they could to to make this design as best as possible. Unfortanally a VF14 is very hard to replace....

Hope that helps out, even a bit long it is still not enough to cover everything....

Best regards,

Oliver

File Attachments

1) [VF14 preis.jpg](#), downloaded 653 times

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Mark Lemaire](#) on Thu, 20 May 2004 22:44:57 GMT
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Oliver-

Now THAT'S information! I have never seen so much hard VF14 historical/ technical information in one post. Thank you!

Any other knowledgable folks care to add to this lovely thread?
sincerely

Mark Lemaire

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Marik](#) on Thu, 20 May 2004 23:35:35 GMT
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Oliver,

Thank you so much!

I have a few more questions.

- 1) The data you provide, shows VF14 as a 55V filament tube. I will attach file which shows it as a 60V type. Where is this 5V difference coming from?
- 2) I would appreciate if you or other folks could give some background (both, technical and historical) Nuvistor substitute for VF14 in U47, and why (apart of Nuvistor's high microphonics) it did not have much success, as used in microphones.
- 3) Although it might be a topic for another thread, I would be very interested to know if there were any commercial attempts (or at least experiments) using planar tubes (such as 7077, 6299, etc.) as a capsule impedance converter.

Regards, Mark Fuksman

File Attachments

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- 1) [VF14.pdf](#), downloaded 602 times
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Subject: Re: Fact and fiction about the VF14 tube
Posted by [Oliver Archut](#) on Fri, 21 May 2004 04:12:50 GMT
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Hello Mark,

sorry I could not open your pdf file, but the European tube key states V for 55mA, U for 100 P for 300 and only E stands for 6.3V.

There are several different data books about tubes and mostly they have printing errors, etc. Most ITT/SEL/Lorenz issued data books have the 60V error, but than again Lorenz never made a VF14. I can e-mail you the entire RFT data, with graphs, etc. in case you need it...

The Nu Vistor was a emergency solution introduced on the Berlin radio show 1960 because several big german customer refused to buy new mics if Neumann would not take care of their old mics. Other than the pre war models that could be converted to other tubes like AC701 and EF804 the U47 did not have a filament supply. Aside some major mis matching and frequency problems the Nu Vistor was and is just a fast solution in case your VF14 craps out, just pop it in change the supply a bit and loose your tone...

Disk triodes work wonders in the UHF range but are not suitable for audio use and than again they are out of production for about 30 years, if you find some good ones you need about \$100 a piece, also flip about an other Benjamin for the socket...

Best regards,

Oliver

File Attachments

1) [Lorenz.JPG](#), downloaded 307 times

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Klaus Heyne](#) on Fri, 21 May 2004 04:19:32 GMT
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Mark,

I am sure that Oliver will take good care of your technical and historical needs.

I can confidently address only one of your questions: The (un)suitability of the 13CW4 Nuvistor in the U47.

Three reasons, plain and simple:

- Impedance mismatch between tube and transformer primary (resulting in a horrible low-end phase shift which expresses itself in a cut-off, honky low end with repercussions reaching all the way into the all important mid band region of the U47)
- Propensity for RF-interference (hence the need for another butcher knife into the heart of the U47- a rather large choke coil between capsule and tube grid)
- The afore mentioned microphonics of most of even the selected Nuvistors. Longevity or low noise also were not strong points of these monsters.

Kind regards,

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Meriphew](#) on Fri, 21 May 2004 20:52:00 GMT
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I've been tossing around the idea of buying one of the Telefunken USA U47's (the version with the VF14). I know the VF14's are a bit on the rare side, but how likely is it that they will become extinct in the near future?

- Kelly

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Marik](#) on Fri, 21 May 2004 22:01:47 GMT
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Thank you Klaus and Oliver!

Oliver, I would be very interested in seeing its data. I will PM you with my email.

Regards, Mark Fuksman

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Klaus Heyne](#) on Sat, 22 May 2004 19:33:58 GMT
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Meriphew wrote on Fri, 21 May 2004 13:52I've been tossing around the idea of buying one of the Telefunken USA U47's (the version with the VF14). I know the VF14's are a bit on the rare side, but how likely is it that they will become extinct in the near future?

- Kelly

That's up to the collective wisdom of investors and aficionados. The price of the U47 Vntage Tone copy is awfully close to the price of a real (average condition) Neumann U47.

Therefore it would be prudent of any potential customer of any copy microphone to rigorously verify any claims that are made by these manufacturers pertaining to original performance.

I am very sceptical by nature, and even more so after comparing some of the copy-capsule products (clone is too generous in this context) to the originals, where in every instance, bar none, the copies sounded unlike the original, and rarely sounded appealing enough in their own right.

Kind regards,
Klaus Heyne

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Meriphew](#) on Sat, 22 May 2004 20:12:49 GMT
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Klaus Heyne wrote on Sat, 22 May 2004 12:33

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products (clone is too generous in this context) to the originals, where in every instance, bar none, the copies sounded unlike the original, and rarely sounded appealing enough in their own right.

Kind regards,
Klaus Heyne

Thx for the info Klaus. I was planning on doing a three way shootout between the Tele USA U47, Soundelux E47, and an original U47 in good condition, and purchasing the one that sounded best to me.

- Kelly

Subject: Re: Fact and fiction about the VF14 tube
Posted by [wildplum](#) on Tue, 12 Oct 2004 23:20:44 GMT
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Meriphew did you ever do that shoot out? If so, what were your conclusions?

Subject: Re: Fact and fiction about the VF14 tube
Posted by [neve1073](#) on Fri, 25 Feb 2005 23:54:05 GMT
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Meriphew wrote on Sat, 22 May 2004 21:12 Klaus Heyne wrote on Sat, 22 May 2004 12:33
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Kind regards,
Klaus Heyne

Thx for the info Klaus. I was planning on doing a three way shootout between the Tele USA U47, Soundelux E47, and an original U47 in good condition, and purchasing the one that sounded best to me.

- Kelly

I am demoing an E47 and, though it really is a fine mic, it does not sound like a nice U47 at all to my ears. I am quite disappointed (though I suppose I shouldn't have expected it to sound like a 47 despite its name and appearance). It lacks the amazing midrange saturation that I was hoping for.

Meriphew, I'd be curious to hear the results of your shoot out.

Does anyone have a wagner 47? I'd love to hear opinions on this or any other reproductions. You can PM me if you don't want it public.

Thanks

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Barry Hufker](#) on Sat, 26 Feb 2005 02:13:07 GMT
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Mr. Wagner, who has been quite friendly and helpful to me in our correspondence, emailed me an MP3 demo of his 47. It was "nice" sounding but not outstanding. The claim again is that it uses an M7 capsule. While the physical dimensions, etc. may be identical to the M7. The capsule does not use PVC, but Mylar.

Barry

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Bob Olhsson](#) on Sat, 26 Feb 2005 18:19:36 GMT
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I've been told that the VF-14 was much more reliable than most tubes and in many cases the original could be expected to still be good. I'm curious if this is true.

Unfortunately here in the US it was considered "good engineering practice" to replace every tube

in a professional studio once a year, needed or not, as a preventative measure. This resulted in most original VF-14s in the US being discarded until none were available and in many cases the NuVistor was then substituted and replaced yearly.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [David Satz](#) on Sat, 26 Feb 2005 22:46:52 GMT
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Replacing each tube annually, regardless of its actual condition--even the tubes in microphones, which aren't operated in a way that should lead to frequent burnout? Wouldn't you consider that to be rather appallingly ignorant? Changing those little fellers isn't exactly a plug-and-play procedure, either. It's a shame that the techies didn't revolt against the outrageous waste of time, effort and materials.

I have a pair of 40-year-old Schoeps M 221 B microphones which, to the best of my knowledge, still have their original AC 701k tubes and still perform to spec. No one who deals often with professional tube equipment seems to find this especially remarkable from what I can tell, but I'm certainly impressed.

Wikipedia refers to the Guinness Book regarding two light bulbs--one from 1901 and one from 1908--which reportedly are still working every day. One is said to be running at 4 Watts, which seems relevant especially if it was designed for something more; the other is apparently a 40-Watt bulb but whether it's being used at full voltage nowadays or not is not stated. The article says that as a rule of thumb, a 5% reduction in filament voltage approximately doubles the life of a filament while causing a 20% decrease in its output of visible light.

--best regards

Subject: Re: Fact and fiction about the VF14 tube
Posted by [maxdimario](#) on Sun, 27 Feb 2005 11:29:38 GMT
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David Satz wrote on Sat, 26 February 2005 23:46 Replacing each tube annually, regardless of its actual condition--even the tubes in microphones, which aren't operated in a way that should lead to frequent burnout? Wouldn't you consider that to be rather appallingly ignorant? Changing those

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--best regards

interesting info. but could be misinterpreted.

it's not the filament that wears out in tubes, but the cathode emission etc.

I wonder if raising the vf14's heater voltage could compensate for reduced emission.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [tuchel](#) on Mon, 28 Feb 2005 13:46:08 GMT
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Gee this is probably a stupid question, but...

Since the tube is getting rare (\$), and so necessary to the sound of the microphone, why isn't someone making them?

Terry

Subject: Re: Fact and fiction about the VF14 tube

Posted by [Klaus Heyne](#) on Mon, 28 Feb 2005 16:04:13 GMT
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That question has been answered a few times in this and other forums:
Even at, let's say, \$1000.- a piece, a VF14 would need to be produced in such high quantities to justify the start up costs, that, so far, there has been no taker for this proposition.

And we have not even begun to address the issue of construction authenticity...

Subject: Re: Fact and fiction about the VF14 tube
Posted by [volki](#) on Tue, 01 Mar 2005 21:19:20 GMT
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maxdimario wrote on Sun, 27 February 2005 12:29
it's not the filament that wears out in tubes, but the cathode emission etc.

I wonder if raising the vf14's heater voltage could compensate for reduced emission.
On a German forum (www.frihu.de) with quite some old tube guys around (if often hi-fi oriented, rather), someone posted the "secret hint" that faded VF14's could be given (a specific) treatment (quote):....

(omitted- this is a treatment too hazardous to post here- K.H.)

...the idea behind it is obviously to apply an =AC= filament voltage of 57+ volts, resulting out of the voltage divider formed by the series connection. Although severely overheated in the U47, the actually specified voltage is 55 H+.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Henrik Vogel](#) on Wed, 03 Aug 2005 05:48:04 GMT
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Bumping this old thread...

Oliver Archut states above that only 1/3 of the VF14s reaches the "M" specs and that the rest is unuseable for microphones. How strongly should one interpret the "unuseable" judgment? I talked to Håkan Lindberg, Microtech Gefell's representative in Sweden and a wealth of knowledge regarding vintage microphones. He said a non-"M" VF14 may be slightly noisier than an VF14M, but fully useable in lieu of a VF14M. I suppose "noisier" could mean "unuseable" to some people :d , just trying to understand the level here.

Best,
Henrik

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Oliver Archut](#) on Wed, 03 Aug 2005 08:48:37 GMT
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Hello Henrik,

the none M VF14 mostly did not made the M specs due to positive or negative grid currents, aside the given noise and microphonic figures. Either grid current that will offset the bias in an high impedance environment. Even the M specs does not insure a flawless condenser mic operation.

Just to give you an idea about useable tubes, the tube used in an UM900 is selected to very similar criteria than the VF14, the rejection rate is 23 out of 30, in average so here again roughly 70% rejects. Those rejects will work in an UM900 but not to the fullest possibility; same applies for a VF14...

Best regards,

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Klaus Heyne](#) on Wed, 03 Aug 2005 14:46:41 GMT
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The practical answer is this:

There is no theoretical approach to tube selection. If you want to obtain a fully functional, quiet VF14 for your U47/48, you will need to audition the specific tube. It's been too long since the tube was made, to guess which ones today are still fully operable in a mic.

I run across plenty of (used, of course) VF14 non-M which are acceptable, even for critical recording.

But on average acceptable quality VF14M tubes (again, used) are more frequently found these days than acceptable VF14 non-M.

And, as stated in an earlier posts, and to be repeated ad nauseam:
DO NOT assume acceptable performance from this tube ever, regardless whether new or used.
Test each and every one before committing to purchase.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Dale Ulan](#) on Thu, 04 Aug 2005 02:03:13 GMT
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I don't have a lot of experience with VF14's but I do know that the 6AU6 and 6AH6 tubes I use in some of my microphones need burn-in and grading. The noise seems to drop about 10 dB after operating the filament at 7.4 volts for several hours, under fairly high cathode currents. After burn-in, I find about one in five RCA tubes work with acceptable noise, grid leakage currents, and give a reasonably good sound.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Henrik Vogel](#) on Thu, 04 Aug 2005 13:44:02 GMT
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Thanks Oliver and Klaus for your replies!

Best,
Henrik

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Bob Olhsson](#) on Mon, 15 Aug 2005 05:17:19 GMT
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David Satz wrote on Sat, 26 February 2005 16:46 Replacing each tube annually, regardless of its actual condition--even the tubes in microphones, which aren't operated in a way that should lead to frequent burnout? Wouldn't you consider that to be rather appallingly ignorant? Not when every active stage in your facility is tube and every single recording session involves 8-100 musicians that are being paid union scale and your studio is financially responsible for any lost time. While I agree it doesn't make sense within the context of today's less professional approach to recording, it made no sense at all in the late '50s to try and save money on tube replacement when a noisy tube could easily cost a studio more than the price of a brand new U-47.

Subject: Re: Fact and fiction about the VF14 tube
Posted by [Gary Flanigan](#) on Tue, 16 Aug 2005 15:28:20 GMT
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Several years ago, I was speaking with Aspen Pittman of Groove Tubes about this tube. He indicated that, at some point in the future, he might undertake a process of rebuilding a batch of expired ones. Not being too knowledgeable in this area, I can't say what that would involve, or whether it would even be feasible.
