

Saxophone Mouthpiece Materials - Part 1

by Theo Wanne

The most sought after and famous vintage saxophone mouthpieces were manufactured in the 1950s and 1960s. These mouthpieces were played on by such musicians as John Coltrane, Sonny Rollins, Dexter Gordon, Charlie Parker, Cannonball Adderley, Lester Young and the other “Giants of Jazz”. Today’s equipment is all compared to this vintage equipment as it holds a strong benchmark for quality, sound and design. Modern saxophones are compared to the vintage Selmer Super Balanced Action and Mark VI saxophones as well as Conn 10Ms, Martin Committee, and Buescher Aristocrats. Modern mouthpieces are compared to New York and Florida Otto Link, Long Table Berg Larson, Selmer Short Shank, Great Neck Brilhart and Meyer Bros. New York mouthpieces.

In the last decade or so, many new materials suitable for the manufacture of mouthpieces have been developed and used. Before we talk about those, let’s look at what the great vintage mouthpieces of yesteryear were made of.

BRASS MOUTHPIECES

In the early 1930s, the most popular mouthpieces were the New York **MASTER LINK** brass mouthpieces



Otto Link’s first production mouthpiece was the ‘New York’ Master Link mouthpiece cast from brass.

by Otto Link. There are currently many brass alloys; however most vintage brass mouthpieces were made of Brass composed of approximately 70% copper and 30% Zinc. This is similar to cartridge brass which, you guessed it, is used for bullet cartridges. Later the term *Bell Metal* brass was used. This, however, has always been a bit of an enigma to me as few bells are actually made of brass.

Most bells, such as the Liberty Bell in Philadelphia, Pennsylvania are made from bronze. Bronze is composed of 92%-80% copper and 8%-20% tin and has a hardness that ranges from 125-225HV. Bronze is usually used to make bells because it is loud, sharp sounding and projects tone well. For this same reason, most drum cymbals are also made of bronze. As saxophonists, we don’t always want our saxophones sounding like a bell or cymbal though.

Brass has a much warmer (though less loud and piercing) tone. The zinc and copper combination gives the material good strength and acoustical properties. Its hardness ranges from 100-175HV and is generally softer than bronze. Brass is also a wonderful material to machine and reface for this reason.

A valid concern for many musicians is that lead has been, and still is, used in most forms of brass. Lead free brass is available today, which must have less than .07% lead content to be termed *lead-free*. Many vintage mouthpieces contain much higher levels of lead though. It has only been in the last 10 years that lead poisoning has been taken seriously. Before any of you playing an old brass mouthpiece with all the plating worn off gets alarmed, it is important to note that the quantity of lead potentially leached from a leaded-brass mouthpiece is extremely minimal. In fact, it is measured in micrograms, or millionths of a gram. If people drank all of their water from leaded brass pipes, lab experiments have shown they would take in approximately ½ a microgram of lead a day, which is considered safe according to California's state regulations. Further, leaded brass pipes and fittings have been common in the USA for over a century and it is hard to find a single documented case of lead poisoning due to a household water supply. The quantity of lead musicians encounter from their mouthpieces is significantly smaller than drinking all of one's water from leaded pipes; it is just too small to be considered dangerous.

The overwhelming opinion of doctors and knowledgeable people in the metallurgy industry that I have consulted on this topic is that a musician's normal exposure to vintage leaded brass mouthpiece materials would not be damaging. It is important to note, however, that some people are allergic to brass. This is a different and real concern, but should not be confused with toxicity.

HARD RUBBER MOUTHPIECES



Otto Link 'New York' Slant Signature Tenor Mouthpiece

An OTTO LINK Mouth-
piece — A *FACING*
that suits you—
And you're in
company with
the outstand-
ing per-
formers.

Ask your dealer or write
direct to us.
Send for Free descriptive
Booklet.

OTTO LINK & CO. INC.
264 West 47th Street
New York City

Early ad showing both the brass and hard rubber mouthpieces produced by Otto Link while located in New York City.

In the late 1930s Otto Link came out with their mouthpiece designs in hard rubber. The reason for the release of these hard rubber mouthpieces was primarily economical. Hard rubber was significantly cheaper than brass. The cost of brass at the time was a large component in the cost of Otto

Link's metal mouthpieces. The use of hard rubber allowed Otto Link to produce a budget line of mouthpieces. In fact, the hard rubber mouthpieces sold for less than one half the price of their metal counterparts. Of course, we don't think of a good hard rubber mouthpiece as being a 'cheap' version of a metal mouthpiece anymore and in fact good quality hard rubber costs more than brass now. Today, many musicians simply prefer the sound and feel of a hard rubber mouthpiece. In fact, most alto saxophonists use hard rubber mouthpieces. I believe this is because the richness of tone produced by hard rubber melds well with the sharper tone produced by the alto. Good hard rubber tends to blend a warm, rich tone with a resonance many find appealing.

Because hard rubber is more prone to chipping and cracking than metal it is usually made thicker and larger in girth than its metal counterparts. If metal mouthpieces were made to the same thickness (girth) as hard rubber mouthpieces, they would be far too heavy and cumbersome. One of the few exceptions to this is Aluminum, which is quite lightweight. Aluminum is an easy and inexpensive material to manufacture with, however, is not often used though as it does not have very good acoustic properties.



Gale Hollywood 'triple dot' alto mouthpieces included a metal band around the shank to increase the strength of the hard rubber.

Hard rubber mouthpieces often have a metal band around the shank so that it doesn't crack when being put on the neck cork. This band strengthens the shank while the mouthpiece is repeatedly put on, and taken off, the saxophone neck. Such a metal reinforced shank can be seen on the Gale Hollywood 'triple dot' alto mouthpiece as well as vintage Gregory mouthpieces and new Theo Wanne™ mouthpieces.

Hard rubber (vulcanized rubber) was discovered by Charles Goodyear in 1844. His invention included mixing sulfur with natural latex rubber to make it more stable, then cooking (vulcanizing or curing) it in an oven to make it less elastic and harder. He found that less sulfur and more latex would make the

rubber compound more elastic, while adding more sulfur and less rubber would make it more viscous and harder. Natural rubber melts in high temperatures and gets hard in low temperatures, so is not very stable. This is why Charles Goodyear's invention was so important; it stabilized the rubber.



Natural Latex Being Collected
from a Rubber Tree

The natural latex rubber that Charles Goodyear used comes from the sap of certain plants, most notably the rubber tree originating in Brazil. Natural latex oozes out of these plants as a sticky white sap when these plants are cut. This white sap turns into a rubbery mass within 12 hours after being exposed to the air. Today, more than 80% of the world's natural rubber is grown in Thailand, Indonesia, and Malaysia. Rubber is an elastic polymer called polyisoprene which can

also be produced synthetically. Both natural and synthetic rubbers are commonly used today.



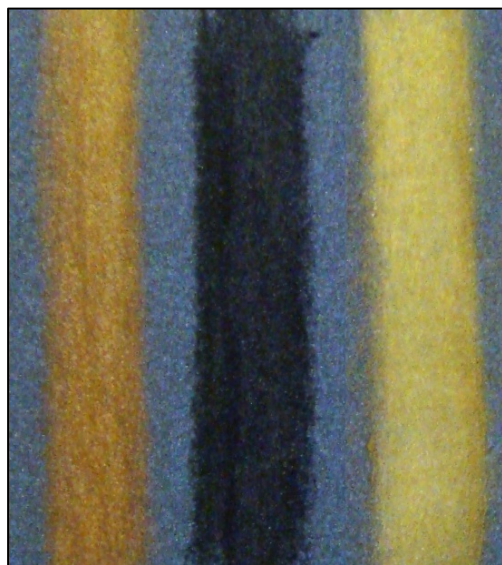
Oxidized Hard Rubber Brilhart Personaline Mouthpiece.

Hard rubber does oxidize in UV rays and oxygen, so never leave your hard rubber mouthpieces in direct sunlight too long. Also never wash them in hot water, always use cold water. These things will turn your mouthpieces green. Oxidation can also spread from one mouthpiece to another because it leaches. So be careful storing your oxidized hard rubber mouthpieces

together with your new hard rubber mouthpieces. On another note, have you ever noticed that your oxidized hard rubber mouthpieces also taste bad? That nasty taste is the sulfuric acid leaching from the mouthpiece.

Hard rubber can have many other additives, too. For example, the oven curing time for hard rubber can be very long, as long as several days, so hard rubber often has accelerators in it to reduce this oven curing time. This makes it cheaper to produce but reduces its acoustical properties. Carbon black is a chemical often used to strengthen rubber and is partly responsible for giving some hard rubber its charcoal black color. Carbon black is carcinogenic, but once it is cured in the oven it does not leach out and is safe. While carbon black may help the strength of rubber, it is known to degrade the acoustical nature of the rubber, making a mouthpiece less rich-sounding. Rubber dust is used as an additive to make hard rubber less expensive, such as repurposed old tires. Since rubber deforms so much during the several day curing process, all mouthpieces made in this fashion must be machined or refaced after the vulcanizing (curing) process has taken place.

I have been fortunate to work with a lot of great quality vintage hard rubber mouthpieces. I have found that the quality of rubber can usually be seen in the color



Sanding Lines Created by Three Different Mouthpieces.

of its shavings when filed and its sanding lines when sanded, such as during mouthpiece refacing. For reference, the picture here shows the hard rubber sanding line created when different mouthpieces are sanded on 150 grit sandpaper. The far left is the best quality hard rubber currently available today, reformulated vintage rubber made by Bradford Behn and myself aside. The middle sanding line is common rubber used in the industry today. The sanding line to the right is from a 1950's Meyer Bros. New York alto mouthpiece. It is easy to see that the Meyer Bros. mouthpiece has a much lighter colored sanding line. In fact, I have found most good quality vintage hard rubber mouthpieces have a light tan sanding line like the picture shown here of the sanding line made

by a late 1950s hard rubber Otto Link Florida slant signature tenor mouthpiece and a New York Meyer Bros. alto mouthpiece. The purer the rubber the more tan the sanding line; the less pure the hard rubber the darker the sanding line. It is the additives that darken the sanding line color.

People often ask me how to tell a vintage hard rubber Brillhart mouthpiece from their plastic mouthpieces. While there are physical indicators (such as none of the hard rubber models had a bite plate insert like the plastic ones), we can also tell them apart by the color of their sanding lines. A vintage Brillhart mouthpiece will sand the beautiful tan color while plastic will have a black colored sanding line. Plastic can sometimes also leave a bluish hue.

Besides sanding a tan color, most good hard rubber has an almost sweet smell to it when sanded. The vintage Brillhart hard rubber mouthpieces, in particular, have an incredibly sweet smell and is my all time favorite hard rubber.

While brass and hard rubber are the two most common mouthpiece materials, many other materials have been used throughout history. In future articles I will discuss these other materials as well as new space age materials available today and how they all sound.



Sanding Lines Created by a Vintage Florida Otto Link & Meyer Bros. Mouthpiece.

OTHER VINTAGE MOUTHPIECE MATERIALS

While the vast majority of vintage mouthpieces were made of brass and hard rubber, other materials have been used. Some of those include:

COPPER - Commercially pure copper must contain less than 0.7% total impurities, meaning it is at least 99.3% pure copper. Copper is much softer and ductile than brass or bronze. Its softness does not make it ideal for mouthpieces as it is prone to bending and gives off a duller tone. It's dullness of tone is also why it is not used to make bells or symbols, and why brass is a favorite in the manufacturing of saxophone mouthpieces. Copper is becoming more popular as a saxophone body and neck material to create a very dark and warm, though less resonant, tone.



Rare Meyer Bros. Solid Silver Tenor Saxophone Mouthpiece.

SILVER - Silver, like copper, is quite soft and ductile. It is more prone to bending out of shape than brass, and tends to have a mellow, more generic, tone. It has not been a common mouthpiece material; however, it has been put to good use

by Brendan Tibbs and Ted Klum. A very rare version of a vintage Meyer Bros. solid silver tenor mouthpiece is shown here. Silver does tarnish to form a patina, which is just oxidation. It is this patina that makes silver darken over time.

SILVERITE - Silverite, a form of pewter which is approximately 98% tin and 2% copper, does not actually contain any silver, though its density and color resemble silver. Silverite has been used since the 1970s in

Bobby Dukoff mouthpieces. This material is quite soft and must be handled carefully. Prior to Dukoff's use of Silverite, their mouthpieces were made from brass and hard rubber.



Dukoff mouthpiece
made of Silverite



Vintage Berg Larsen
Mouthpieces made from
Stainless Steel

STAINLESS STEEL - Berg Larsen

mouthpieces have used stainless steel

since the 1940s. In general stainless steel has a brighter, more sterile tone than brass. In the 1960s and 1970s, Berg Larsen made some brass and bronze mouthpieces too. Their brass mouthpieces had a lot more color and warmth in their tone than their stainless steel counterparts. The bronze ones were somewhat in-between the brass and stainless in tone. Shown on the far left is the first model stainless steel mouthpiece made by Berg Larsen, affectionately called a Long-Table Berg Larsen due to its reeeeeeeally long table. Next to it are two different vintage 'Duck Bill' models.

PLASTIC - Though often associated with student mouthpieces, Brillhart and Runyon both made professional quality mouthpieces from plastic. These mouthpieces often contained some percentage of synthetic rubber dust (up to 30%) in the mixture as well. The most notable musicians who played plastic mouthpieces were Gene Ammons, who played a tenor Brillhart Ebolin mouthpiece, and Charlie Parker who has been reported to play a Brillhart Tonalin, white Runyon Model 22, and white Selmer England alto plastic mouthpiece.



Gene Ammons with his
Brillhart Ebolin tenor
saxophone mouthpiece

MODERN MOUTHPIECE MATERIALS

Now that we have taken a look at vintage mouthpiece materials, it is time to look at what is available today. So what are the new materials available for mouthpiece manufacturing? How do they compare to the materials of the golden age of mouthpiece manufacturing? To answer these questions, we took as many new materials as we could put our hot little hands on and machined, to exacting standards, the identical mouthpiece out of all of them....a couple times! We then play tested them all.....and the results are..... Sorry, you'll have to wait for part two of this article. Yeah, I know I'm a tease! - *Blessings,*
Theo Wanne