

CHOOSING a *Lawson* MOUTHPIECE

GENERAL INFORMATION

The mouthpiece is turned on a lathe from any material that is machinable to dimensions of very close tolerances. Precision is important as a musician can feel changes in the acoustics of his instrument as a result of mouthpiece variances of a thousandth of an inch (.001"). Brass or plastics are the materials of choice. Brass mouthpieces are generally plated silver or gold. Some players prefer to use a bare metal rim because it oxidizes to a rough finish which gives a feeling of security. This is not recommended because of the danger of allergic reaction or even, in severe cases, metal poisoning.

Players may be classified in two categories, those that use a dry embouchure or those that prefer a wet embouchure. The rim surface can greatly influence performance. A rough surface, such as a rim which has been silver plated is best for dry embouchure players who need extra friction for a good grip. Gold plate provides the slippery surface desired by wet embouchure players.

People with allergies to metal or have a high acidic content in their saliva are recommended to use plastic rims. These materials vary, so careful selection of the right plastic is important. Some plastics, such as acrylics, are very brittle and are easily cracked or broken. Others irritate sensitive lips or are very slippery. Once the right plastic formula is found, the concerned player would do well to obtain a sample length so that future rims could be made without an aggravating search for the same material. Lawson rims are made of lexan plastic, which is tough and hypoallergenic.

The most commonly plated surfaces are silver or gold. These two elements are relatively soft and wear in a gradual manner so that there is never a sharp edge where the brass metal is exposed. Once the plating has worn through, the mouthpiece should be refinished or replaced because the base metal will etch. Pits or scars will result if left unplated too long. Hard plates such as nickel or chromium are cheap but tend to chip leaving razor sharp edges that can seriously injure a lip.

RIM DIMENSIONS

In order to insure even wear of the rim and shank, the mouthpiece should be inserted into the horn's mouthpipe differently every time. The size and shape of the rim are extremely important to each player because of the direct physical contact.

The player would do well to use empirical methods in the selection of a rim contour. It is recommended that the player start with a rim similar in contour and inside diameter to the one presently in use and then progress to making changes once comfortable with the new cup.

The dimensions of the rim are:

1. **Outside diameter** - may vary from .920" - 1.00" plus.
2. **Curve depth** - outside and inside the cup - this measurement with the grip, peak, and outside diameters, determines the rim contour.
3. **Rim contour** –
Outside contour - To those that use an ansetz (set on) embouchure the outside shape of the rim is relatively unimportant but an einsetz (set in) embouchure is very sensitive to the outside contour. Some player's lips shift from ansetz to einsetz as they pass through different registers.

This is especially noticeable in a player that moves the lower jaw down and/or out for low notes and rolls the lower lip around the rim edge. In this case a **rounded** outer contour of the rim will produce smoother slurs, particularly between lower open harmonics. There may be some loss of endurance due to the narrower front face of the rim, but the ability of the player to compensate with a build up of strength soon returns endurance to normal and the trade-off in having better flexibility is often worthwhile.

Face contour - There are four popular rim face contours - oval, wide cushion, reverse peak and round. Selection of the proper shape depends on a person's teeth, oral cavity, shape and thickness of the lips and how the rim feels and performs.

- a. A **round contour** offers good flexibility and average endurance.
- b. A **cushion contour** enhances endurance because the rim is wide, but limits flexibility.
- c. A **reverse peak contour** is a narrow rim that feels wide across the grip and conforms well to certain types of tooth structure. It enhances sound but cuts endurance.
- d. An **oval contour** is a general purpose type which offers average endurance, flexibility and clarity of attack.

Statistics show that about 75% of experienced players use an oval rim, followed by about 20% reverse peak. Players who use round or cushion contours make up a small minority.

4. **Peak diameter** - the measurement which is obtained if a rim is placed face down on a glass plate smeared with some sort of colored material so that a mark will appear on the face of the rim. This is the outermost part of the rim contour that contacts the lips and it has a very narrow measurement range averaging from .800" to .835". The rest of the contour is built around this diameter.

5. **Grip diameter** - a vague yet extremely important dimension that must be determined primarily relying on experience. The grip controls slurring (flexibility) and clarity of attack. A rounded grip allows the lips to vary tight to loose easily, a sharp grip restricts the lips but allows a more clear, crisp attack. Grip diameters generally vary in a narrow measurement range from .690" to .705" but there are many exceptions. Lawson rims are now available in .005" increments up to .735". The grip diameter is a very difficult measurement to make. Some players use dimes, a bus token or other methods to record their grip diameter. This is accomplished simply by noting how deep the coin drops into the cup vertically. If a person finds a mouthpiece that feels good, then that grip can be used as a reference for comparison with further measurements or other mouthpieces.

CUP DIMENSIONS

1. **Cup threads** - should match the rim threads.

2. **Joint diameter of the rim** - determine the width of the cup at the joint. This measurement varies in a very small range of .660" - .680". Variations influence the ease of playing or efficiency of the horn in different registers.

3. **Cup volume** - the most important acoustic variable of a mouthpiece which can now be optimized electronically for any given length of horn.

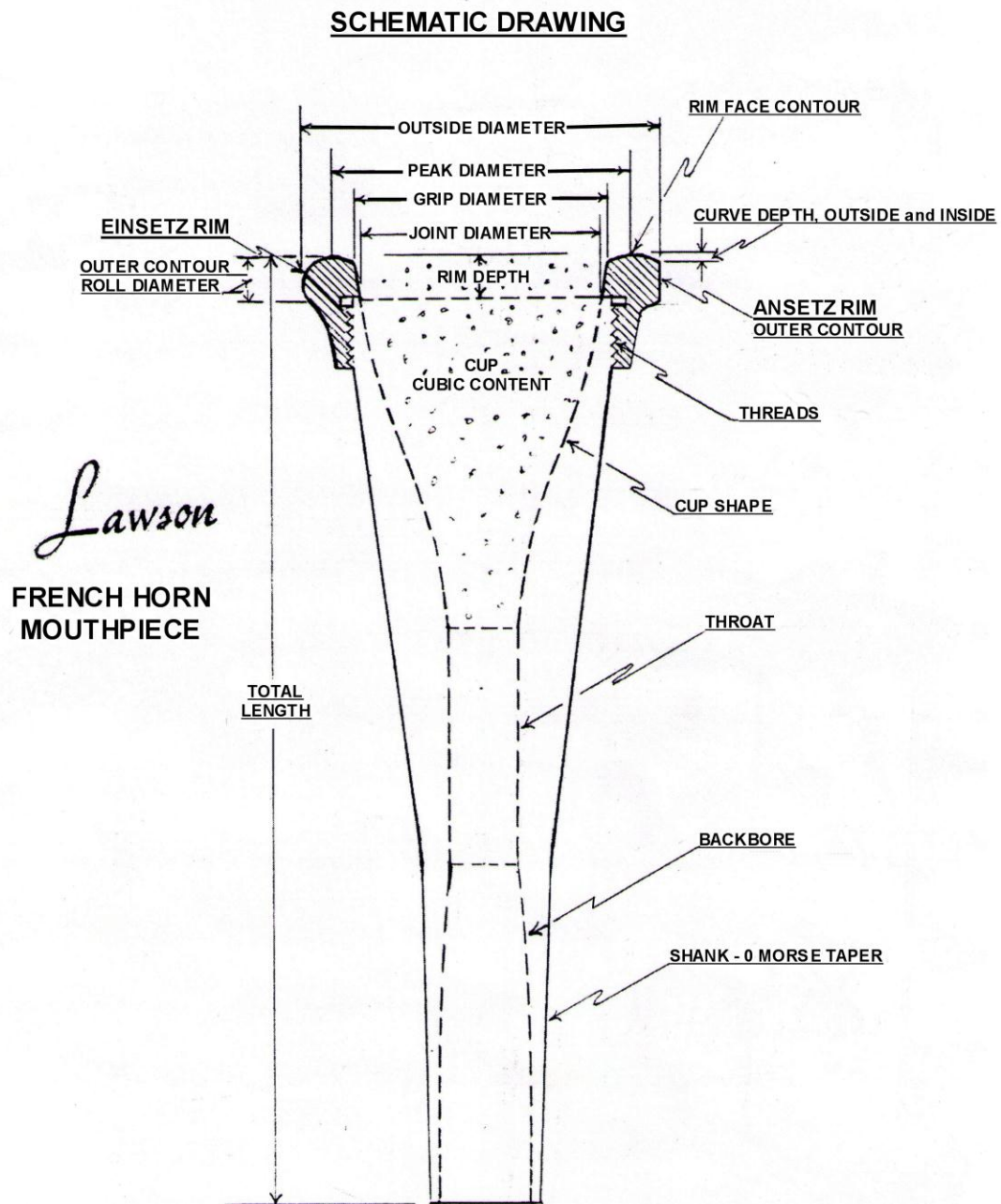
4. **Cup shape** - a major factor in determining the acoustics of the mouthpiece. Of the three styles of cup: convex, straight, and concave tapers, the latter has proven to be most efficient and best suited to today's requirements. The curve of the side of the cup can be altered to create different effects.

5. **Throat size** - can be controlled by varying the drill size of the hole and the total length of the cup This is the one mouthpiece dimension easily altered but can only be enlarged. If the throat is to be opened, it should be drilled one number size at a time. The average throat size of a French horn mouthpiece is a No. 11 (.191"). The most accurate way to size a throat is to use a reamer after drilling the hole undersize. This ensures a uniform, consistent bore. For a given diameter of hole, a long throat will give

more resistance than a short throat and will play with a stronger response in the mid-range of the instrument at the expense of the high-range. Obviously, a careful balance must be determined for the intended player.

6. **Backbore** - this inside taper is made with a reamer or CNC controlled cutter and its size and shape can influence the ease of playing in the different registers and how much the horn 'locks up' to a particular range of harmonics.

7. **Outside shank taper** - determines the depth of the mouthpiece penetration and fit into the lead-pipe. American mouthpieces have a Morse 0 taper (approx. 3 degrees). The dimensions of this taper should be carefully maintained because poor mouthpiece fit can drastically alter an instrument's performance. Some European horns have a larger lead-pipe receiver which may cause an American mouthpiece to wobble. We offer a "Euroshank" which usually corrects this problem.



DESIGN

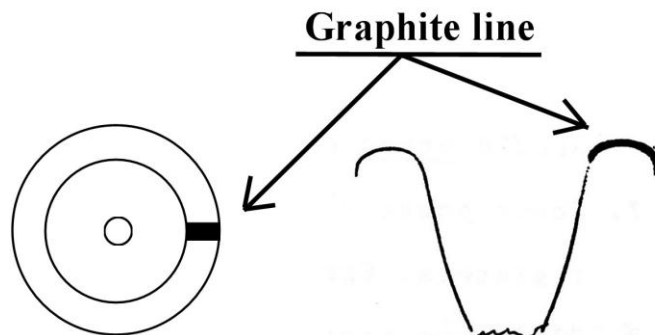
The design of a French Horn mouthpiece influences at least seven playing characteristics of an instrument:

1. Ease of playing in a specific register.
2. Intonation (correct frequency of individual harmonics).
3. Tone color.
4. Band width of the harmonics (width of the slot of each harmonic, also related to how fluid the horn feels as the player moves between harmonics).
5. Ease of playing or fluidity when slurring between harmonics.
6. Clarity of attack on individual harmonics.
7. Power (efficiency of response of the instrument).

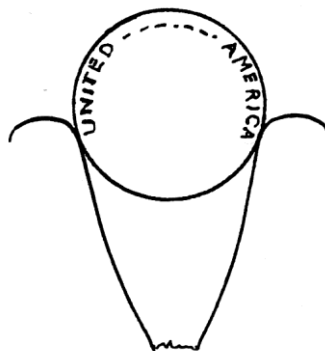
All of the above factors can be accurately measured electronically. By comparing dimensions of different mouthpiece designs, changes can be made in the interior shape in order to favor the areas that need improvement.

SELECTING A MOUTHPIECE

The proper rim is most important because contact with the player needs to be not only comfortable but efficient in allowing the lips to buzz the full range, to provide good support for endurance and to move freely between the high and low frequencies. The first place to start is to feel other mouthpieces and find a close match for rim face shape and inside diameter at the grip. The rim face contour can be determined by drawing a line across the rim with a soft pencil. When viewed across the edge of the rim, the contour is shown by the line of graphite.



The grip (inside) diameter can be determined if one uses a dime on edge to compare inside dimensions between mouthpieces.



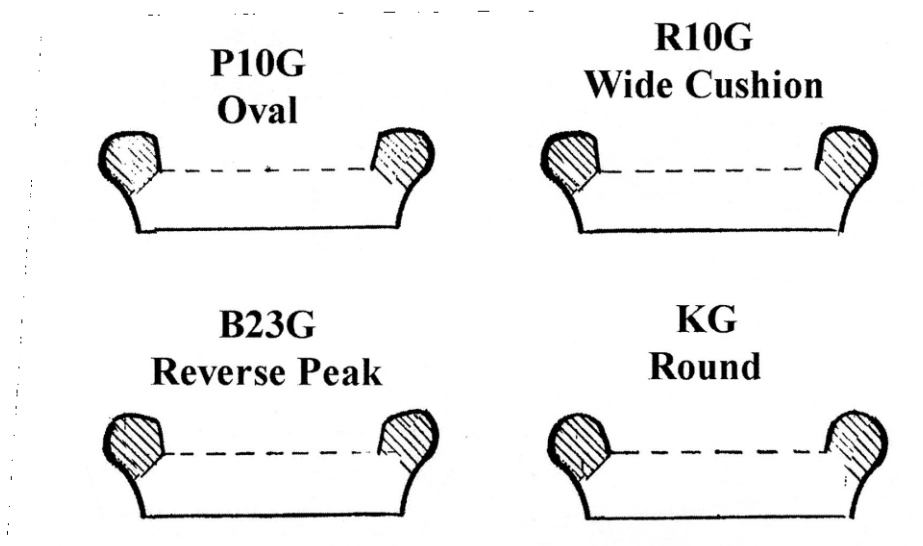
When sighting along the edge of the rim, the position of the U and A in the phrase “United States of America” can be compared between mouthpieces. The bottom edges of U and A just show in a .695” inside diameter rim. After a suitable rim is chosen, a playing test of the complete mouthpiece should be undertaken in order to choose the proper rim and cup. Refer to the seven factors as stated above in the section **DESIGN**.

1. Play from the lowest to the highest register.
2. Check intonation of open harmonics with an electronic tuner.
3. Record or have another musician listen for sound and tone color.
4. Evaluate how well notes lock into pitch or if intonation varies too easily.
5. Play open harmonic series, particularly in the low register.
6. Play hard and fast staccato scales or passages. The notes should start clearly and fast.
7. Check power – play very softly and very loudly in all registers. Crescendo and diminuendo long tones..
8. Play some etudes, pieces or excerpts.

By using the above criteria, different mouthpieces can be compared resulting in the selection of the one most suited to the player and instrument.

Lawson RIMS

Lawson rims are offered in four contours and ten inside diameters: .690” (17.5mm), .695”, .700” (17.75mm), .705”, .710” (18mm), .715”, .720” (18.25mm), .725”, .730” (18.5mm), and .735”.



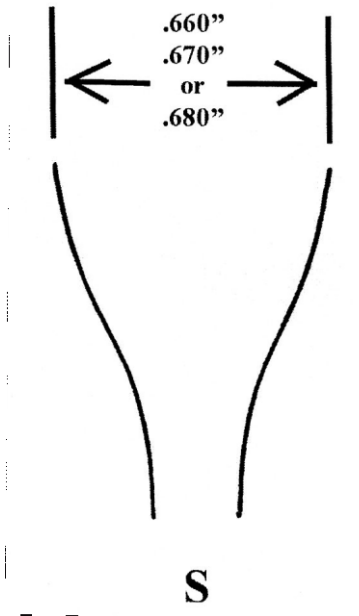
Lawson rims are numbered and lettered according to the contours and inside grip diameter. EX: R10G 695 means that the face contour is a wide cushion with a rounded outer contour of .166” dia. and an inside grip diameter of .695”.

690 and 695 rims fit on .660 cups. 700 and 705 rims fit on 670 cups. 710 and wider rims fit on 680 cups. (See below).

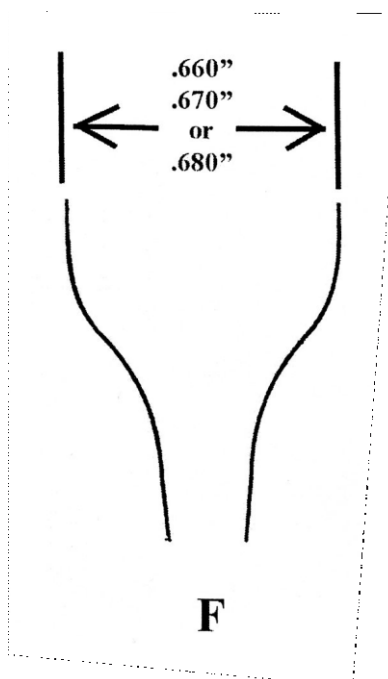
Lawson Cups

Lawson French Horn mouthpieces are offered in two cup shapes and three widths at the joint.

The S cup is gently concave and is designed to produce an efficiently balanced amount of power throughout the instrument's range, have overall good intonation as well as smooth slurs between the harmonics without compromising response time and staccato.



The F cup is slightly more concave with the basic S curve toward the rim. This cup produces more power and ease of playing in the upper register, good intonation and quick staccato response without sacrificing smooth slurs.



The cubic contents of all cups are nearly the same and are matched electronically to operate most efficiently on modern French horns.

The standard bore on both cups is drill no. 11. We also offer our cups with 9, 15 and 17 bores. The 9 bore has more “give” in the response but there is some sacrifice to the tone quality and efficiency. The 15 and 17 bores are more responsive, but with more center and brightness in the sound, and are primarily used on descant horns for baroque and other repertoire written with high tessitura.