

Tuning matters

Players are often concerned as to whether they are playing "in tune", by which they usually mean: are they in tune with another instrument? The advice below may help deal with tuning problems (another information sheet about tuning, with particular relevance to simple system Flutes, which includes a section on equal and unequal temperament, can be found with the Flute information sheets).

Firstly – is your instrument in tune with itself?

This is referred to as "intonation" and is measured using "cents"- there are a hundred cents in each semitone and an instrument's intonation can be tested against a tuning meter: if the instrument plays A and the meter reads zero then the note is perfectly in tune; if the meter reads 20 then the A is 20 cents sharp; if the meter reads 50 then the instrument is either playing the note A natural 50 cents sharp, or the note A# 50 cents flat! All notes on the instrument can be tested this way.

When you do such a test on a woodwind instrument (trying not to bring the instrument in tune with your embouchure) you will *always* find that most notes are several cents sharp or flat. This is normal and is a result of a compromise, when the instrument was made, between tone, response, volume, and intonation, (this compromise is what gives each model of instrument its' own "sound"). If the notes within the normal compass of the instrument are each within 20 cents of zero this is acceptable. The player has to use his/her ear and embouchure to bring the instrument exactly in tune. (Note that if the pads are leaking this will affect the intonation.)

The normal compass of the instrument is from all six fingers down without the speaker key(s) or the little finger keys - up to all fingers off but with the speaker key(s) on. Notes below and above this range may deviate more than 20 cents, but it is expected that the player will bring them into tune by means of their embouchure.

Secondly – is your instrument in pitch?

Your instrument may be in tune with itself - i.e. it has reasonable intonation, but the whole instrument (the pitch centre) might be flat or sharp compared to another instrument. Tuning meters are calibrated to A = 440 Hz; this is the internationally agreed frequency for the note A. When a modern orchestral woodwind instrument is designed, the positions of the tone holes are determined by a mathematical formula that multiplies or divides the figure 440.

However, some instruments are not tuned to A 440 Hz, this is particularly the case for instruments made before the year 1945. For example some are tuned to A = 435 Hz, the positions of the tone holes are determined using the same mathematical formula but this time based on the figure 435; the instrument is in tune with itself but each note would be flat in comparison with an instrument tuned to A 440 Hz.

An instrument with a lot of leaks will have a lower pitch centre - that is the whole instrument will sound flatter than it should.

Tuning to another player

If you have problems tuning to another player then test your instrument against a tuning meter. Make sure the instrument is well warmed up and test throughout the normal compass. If your instrument is in pitch and has good intonation then it could be that the other player's instrument is out of tune. If your instrument appears to be out of pitch or have bad intonation the first thing to do is have it serviced because leaks on an instrument affect the pitch centre and the intonation.

Further tuning issues

Calibration: when a woodwind player tunes to a note what she/he is calibrating is her/his embouchure. Conventionally players tune to the note sounding A (instruments in Bb will call this note B, instruments in Eb will call this note F#) - if your instrument naturally plays an A that is exactly in tune this is fine, but if your instrument plays an A that is, say, 10 cents sharp then you will be manipulating your embouchure to bring this in tune. If you maintain this underlying bias for all the other notes then they will all be 10 cents sharper - if some of these notes are already 15 cents sharp then they will now be 25 cents sharp! It would be better to tune to another note on your instrument that you know is exactly in tune.

Warming up the instrument: make sure the instrument is thoroughly warmed up before tuning to another player - *do not blow into it* - this will cause instant condensation at the top of the instrument and affect the tuning. Wooden instruments can be warmed up by holding the instrument in your hands for a few minutes; Saxophones and metal flutes can be held over a radiator briefly. If there is no time to warm up the instrument then it is best to swab out the instrument at the first opportunity. Instruments are tuned at 20 degrees Celsius, so when playing in a room that is several degrees below 20, the woodwind instruments need to be kept warm when not being played (hold them rather than put them on a stand).

Playing in tune: having tested your instrument you will know some notes play a bit sharp or flat but you should be able to bring them in tune by means of your embouchure. You subconsciously alter your embouchure to compensate for tuning anomalies when you play. When you are playing along side other players you won't notice a few cents deviation between instruments, but with greater deviations you might consciously sharpen or flatten notes to try to blend with the other players. Obviously the better the intonation and the closer the pitch centres of the individual instruments in an ensemble the easier it is for the whole to play in tune. The more an instrument is in tune the less hard the player's embouchure has to work (either consciously or subconsciously) to bring the instrument in tune, and so the more the player can concentrate on other musical aspects.

Notes for particular instruments

Flutes: Boehm flutes are usually designed so that the head-joint should be pulled out 2 mm to bring the instrument into correct pitch. The harmonic fingerings in the 3rd register can produce notes that are unstable or a bit out of tune.

Bb/A Clarinets: intonation suffers particularly at the low bell notes and in the third register. If left hand notes seem sharper or flatter than right hand notes investigate the barrel. Harder reeds play sharper.

Saxophones: a great deal is dependent on the design of the mouthpiece; and an instrument has to be matched with a suitable mouthpiece. Also each mouthpiece that you use on the instrument will have its own optimum position on the crook in terms of pitch and intonation, so do NOT move a mouthpiece further on or off the crook to tune to another player (the one exception to this could be when playing outside). Most Saxophones, that are in good condition and fitted with a suitable mouthpiece, play with good intonation and a good response throughout the normal compass, but it is common to alter your embouchure to bring Bell notes and Palm key notes into tune. Few players play the harmonic fingerings required for the 3rd register but if they do then the relationship between the G and A keys on the instrument can be critical. Harder reeds play sharper.

Alto and Bass Clarinets, and Baritone Saxophones: lower quality instruments are usually reasonably in tune in the lowest register because that is what the instruments are mostly required for, but the middle register and above has poor intonation and tone.

Oboes and Bassoons: a great deal depends on the reed. With Bassoons, often pitch and intonation can be made more reliable by reducing leaks and ensuring a suitable crook (bocal) is used.

Playing outdoors

Playing outdoors is particularly problematic for Woodwind instruments. Aside from the issues of possible damage caused by strong sunlight or rain, there is the problem of the temperature affecting the tuning; unless it is a very warm and windless day the instruments will not warm up properly - they will play flat and what is more the flattening effect will be greater on the right hand notes of each register than on the left hand notes. Because the instruments will not warm up properly they are also likely to have more water collecting in the bore due to the water in the player's breath continually condensating on the cold bore (which effectively narrows the bore at the top of the instrument compounding the tuning problems).

To reduce the condensation in the bore the player must hold the top section of their instrument in their hands when they are not playing it i.e. Flute players keep their hands on the head-joint; Sax players keep their hands on the crook; Clarinet players keep their hands on the barrel and upper part of the top-joint.

Different woodwind instruments use different methods to help compensate to some degree for the flattening effect of playing outside:

Flutes: Flute players can push the head-joint fully into the body of the flute and twist the head-joint slightly away from them - they will lose some tone and control but the instrument will be easier to keep in tune, also the sharpening effect of twisting the head-joint is the same throughout the compass of the instrument.

Clarinets: Clarinet players sometimes have a second shorter barrel for these occasions (although this will sharpen left hand notes more than right hand notes). Players can also try a slightly harder reed which may make it easier to keep the instrument in tune or perhaps have a second mouthpiece with a wider tip-opening which again might help keep the instrument in tune.

Saxophones: Saxophone players sometimes have other mouthpieces (perhaps with a wider tip opening) that normally play a bit sharp and will help compensate for the flatness; also they can try a slightly harder reed. In extreme circumstances the player can move the mouthpiece further onto the crook cork (only if the bore of the mouthpiece is parallel) although this will sharpen the left hand notes more than the right hand notes as well as adversely affecting the response of the Bell notes and Palm key notes).

Mixed ensemble: If the woodwind instruments are playing as part of a mixed ensemble (such as in a Jazz band) it might be best for the stringed instruments to tune slightly flat to match the woodwinds and brasses lowered pitch centres.