

INTONATION TENDENCIES OF WIND INSTRUMENTS

by

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Intonation Tendencies of Wind Instruments

- All wind instruments are affected the same regarding temperature (cold=flat, hot=sharp).
- All have the same tendency regarding embouchure (tight=sharp, loose=flat).
- All wind instruments have the same tendency regarding air intensity (weak air=flat).
- All wind instruments are pulled out to flatten and pushed in to sharpen (see concern in this area under oboe and bassoon).
- All wind instruments can lip down (flatten) pitch to a greater degree than they can lip up (sharpen).
- Venting (opening closed keys or holes) and damping (closing open keys or holes) are available on all woodwinds. The possibilities are almost infinite, though some "pet" fingerings seem to be widely known and used.

Flute Intonation

- Head joint pulled out=flatter, pushed in=sharper
- Temperature: cold=flat, hot=sharp
- Extreme range: GENERALLY high=sharp, low=flat
- Dynamic level: loud=sharp, soft=flat (big danger on releases)
- More than any other factor, air direction affects intonation. A raised air stream will raise pitch, and a lowered air stream will lower pitch. Jaw movement (embouchure manipulation) should be used to control pitch, but it can be done by raising or lowering the head. NEVER TEACH “ROLL IN/ROLL OUT.” The contact point of the flute to the lip should not be disturbed, nor should the hands be encumbered with unnecessary movement. Be sure students are looking at their music when they tune, since this is the direction their air will travel when they perform.
- The crown assembly in the head joint of the flute must be set at the proper place for good intonation. Cleaning/tuning rods have a mark on them which should appear in the center of the blow hole when the rod is inserted into the head joint. Students should be warned against moving the crown of the flute.

Piccolo Intonation

Piccolo is affected by all the same factors as flute. However, it is important to note these points:

- The bore of the piccolo is not the same as a flute! The flute’s body is cylindrical, but the piccolo body is a reverse conical taper. This causes different notes to be “problem notes” on piccolo, and some special fingerings can be used to alter piccolo pitch on certain notes.
- Don’t tune piccolo to the strobe! If you do, it will sound flat in the ensemble. In equal temperament, the top octave of the piano is stretched upward. In other words, you really need for the piccolo to be just a little sharp in the upper register. It is best to tune piccolo by ear—start with the head joint pulled just enough to get your thumbnail in, then adjust from there by ear.

Oboe Intonation

THE REED IS EXTREMELY INFLUENTIAL ON OBOE INTONATION.

- Reed pulled out=flatter, pushed in=sharper
Good oboists make their own reeds to play at A=440 with the reed pushed all the way in. It harms response to pull the reed out because of the “bubble” created in the receiving tube.
- Temperature: cold=flat, hot=sharp
- Reed strength: hard reed=sharp, soft reed= flat
- Embouchure: (sometimes directly related to reed strength) loose embouchure=flat, pinched embouchure=sharp
- Range: Generally lower register tends toward flatness, but the upper register can go either way depending on the reed and player. An experienced player tends toward sharpness in the upper register.
- Dynamic level: Loud=flat, soft=sharp BUT NOT AS PREDICTABLE IN THIS FACTOR AS CLARINET/SAX. IT DEPENDS SO MUCH ON THE REED.

Bassoon Intonation

- Bocals come in three common lengths, with 2 being standard, 1 being shorter (sharper) and 3 being longer (flatter). There are also the rarer sizes of the longer 4 and the shorter 0 and 00. It harms response to pull the bocal out because of the “bubble” created in the receiving tube.
- Temperature: cold=flat, hot=sharp
- Reed strength: hard reed=sharp, soft reed=flat
- Embouchure: (usually directly related to reed strength) loose embouchure=flat, pinched embouchure=sharp
- Range: lower notes are sharp on many bassoons, but the bass joint can be pulled a little from the boot, because there is not bridge key between those two joints. High range depends on too many factors too generalize.
- Dynamic range: Hard to answer this one! Experienced players flatten in extremely loud dynamics. Softer dynamics are harder to generalize. Young players usually do not have a wide dynamic range, and the problem of flattening in a diminuendo is really caused by reed, air and embouchure.

Clarinet Intonation

- Pulling barrel (then middle joint)=flatter, pushing in=sharper
- Barrel length: Shorter and longer barrels are available 66mm standard for Bb
- Range: Throat tones are sharp on almost every instrument, especially the A and B-flat. Altissimo register=sharp in more experienced players, though young players will often be a little flat when learning these notes.
- Embouchure: biting or pinching=sharp, loose=flat
- Temperature: cold=flat, hot=sharp
- Dynamic level: loud=flat, soft=sharp
- Reed strength: soft reed=flat, hard reed=sharp
- Angle of entry: held too far out=flat, held too close=sharp
- Lay of the mouthpiece: closed=sharp, open=flat

Low Clarinets

- Pulled out between neck and upper joint=flat, pushed in= sharp
- All other factors are the same as the clarinet (except barrel length)

Saxophone Intonation (all saxes)

- Mouthpiece pulled out from neck=flat, pushed in= sharp
- Temperature: cold=flat, hot=sharp
- Dynamic level: loud=flat, soft=sharp (unless air is weak)
- Reed strength: soft reed=flat, hard reed=sharp
- Embouchure: biting or pinching=sharp, loose=flat
- Angle of entry: held too far out=flat, held too close=sharp
- Lay of the mouthpiece: closed=sharp, open=flat
- Range: Low range is usually flat, high register is usually sharp, unless air or embouchure is weak.

Intonation Issues Specific to Woodwind Instruments

	Flute	Oboe	Bassoon	Clarinet	Saxophone
Temperature	Hot # Cold b	Hot # Cold b	Hot # Cold b	Hot # Cold b	Hot # Cold b
Extreme Range	Low b High #	Low b High ?	Low * High ?	Low: * High: %	Low b High #
Dynamic Level	<i>ff</i> & < #	<i>ff</i> & < b	<i>ff</i> & < b	<i>ff</i> & < b	<i>ff</i> & < b
	<i>pp</i> & > b	<i>pp</i> & > #	<i>pp</i> & > #	<i>pp</i> & > #	<i>pp</i> & > #
Air Direction	Down b	X	X	X	X
	Up #				
Crown Assembly	Aligned!	X	X	X	X
Reed Strength	X	Hard #	Hard #	Hard #	Hard #
		Soft b	Soft b	Soft b	Soft b
Bocal length	X	X	3 longer 2 standard 1 shorter	X	X
Barrel length	X	X	X	66 mm standard; (other lengths available)	X
Angle of Entry	X	X	X	Close #	Close #
				Out b	Out b
Lay of mouthpiece	X	X	X	Closed #	Closed #
				Open b	Open b

* depends on the individual note

% depends on the player's embouchure

? too many factors to predict

Important piccolo warning: if you tune a piccolo to a tuner, it will sound flat in performance. Our ears do not perceive the pitches in upper octave of the piano as "in tune" unless they are stretched upward slightly. A piccolo must be a couple of cents sharp to a tuner as a starting place—then match to a good flutist rather than a tuner.

Brass Instruments

- Slides pulled out=flatter, pushed in=sharper
- Temperature: cold=flat, hot=sharp
- Extreme range: high register=sharp, low can go either way depending on player's experience level.
- Dynamic level: loud=sharp, soft=flat
- Mutes: straight and harmon=sharp, cup=flat
- Embouchure and voicing: pinching=sharp, loose=flat. The voicing inside the oral cavity (tongue position) can also move the pitch up or down.
- Mouthpiece design: shallow cup=sharp, deep cup=flat
- Valve combination series:
 - open in tune
 - 2nd in tune
 - 1st in tune
 - 1st, 2nd little sharp (3rd valve as substitute=little flat)
 - 2nd, 3rd little flat
 - 1st, 3rd sharp (trumpets MUST "kick" 3rd valve slide)
 - 1st, 2nd, 3rd very sharp (trumpets must kick 3rd valve slide)
- Overtone series (tendencies of the harmonics compared to equal temperament)
 - 1 in tune (1 not available on trumpet)
 - 2 in tune
 - 3 slightly sharp (2 vibrations per second)
 - 4 in tune
 - 5 slightly flat (some can be lipped, many players use alternate fingerings)
 - 6 sharp
 - 7 very flat
 - 8 in tune

Percussion

- Mallet instruments play sharp in cold weather--beware of this at those cold football games!