

Harmonic Series for Clarinets

by Allen Cole

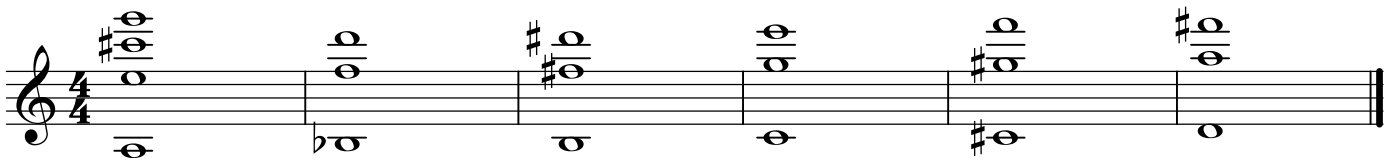
The primary notes of the clarinet go from low E to throat B \flat . Each of these pitches has a particular number of vibrations per second, or *frequency*. By applying pressure to the reed, we can make it vibrate a various multiples of that frequency. These other, higher frequencies are called *harmonics*. When the fundamental frequency is doubled, the pitch rises one octave to its *second harmonic*. This is what happens when you press the octave key on a saxophone, oboe or bassoon. The clarinet's physical structure causes it not to sound octaves or other even-numbered harmonics, so its pitch rises in much longer, less even leaps.

Because the clarinet does not overblow octaves and other even-numbered harmonics, its high note fingerings can seem confusing at first. Below are the fundamental notes from which the altissimo fingerings are derived. Practice moving between the different registers to help develop your embouchure & fingers.

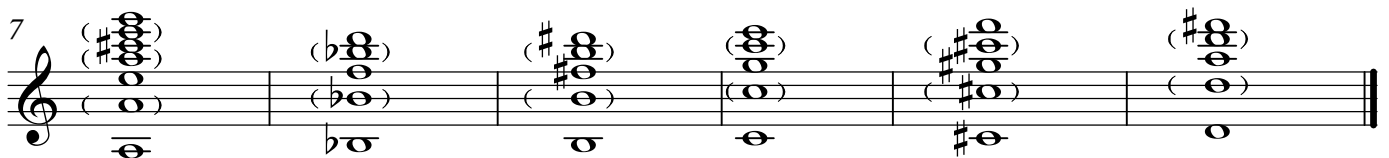
Chalemeau register - This is the bottom register, where the instrument's natural sound is heard. This pitch is called the fundamental. This register is named for the folk instrument that later became the clarinet.

Clarion register - Press your left thumb on the register key and go up a 12th to the notes with the clear, trumpet-like sound that gave the clarinet its name. This is the third harmonic, or three times the frequency of the fundamental pitch.

Altissimo register - Vent the "E" tone hole by sliding or removing your left index finger. For pitches "D" and above, put your right pinkie on the pinkie E \flat key. This is the fifth harmonic or five times the fundamental frequency. To move up from C# to G, remove your left ring finger from the "C" tone hole. This is the seventh harmonic, or seven times the fundamental frequency.



Illustrated below is the full harmonic series for each note. Pitches in parentheses are the even-numbered harmonics which are suppressed by the clarinet's closed-cylinder acoustics.



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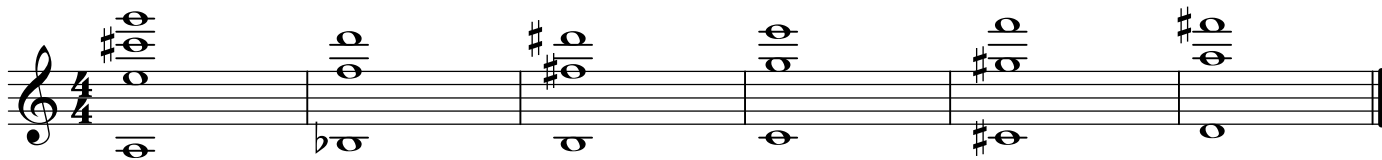
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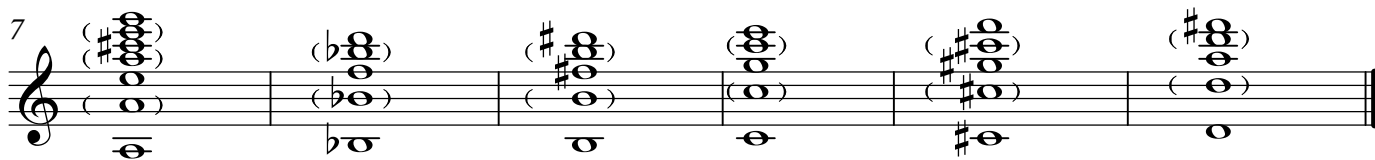
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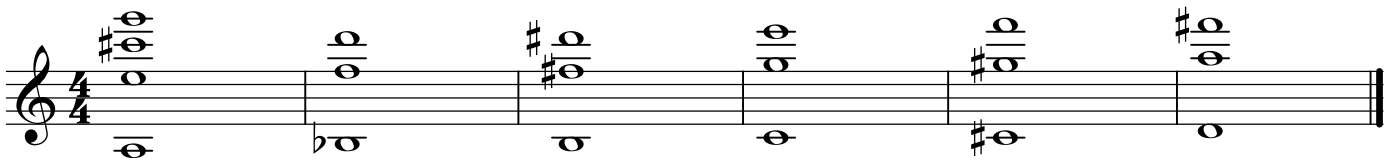
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