



## Windsaver Valves - Part 2

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In the last issue we looked at windsaver valves—what they are, why they exist, and how to install and service them. In this issue, we'll investigate how windsaver valves and note bending interact, and how you can customize both chromatics and diatonics with valves to change their bending capabilities.

### Bending without Valves – the Dual Reed Bend

When you sound a reed normally, your breath moves the reed down into its slot and through the other side, before it springs back for one complete vibration. It's like a door closing into its doorframe (a swinging door, not the kind you can slam). This type of reed motion is called **closing reed** motion and the reed is referred to as a closing reed.

In standard chromatic and diatonic harmonicas, each hole presents a blow reed and a draw reed. In an unvalved harmonica (as in most diatonics), both reeds are affected by your breath in the following ways:

- When you inhale, your breath pulls the draw reed into closing and it plays a note, but the blow reed also vibrates slightly.
- And when you exhale, the blow reed is pushed into closing and plays a note, but the draw reed also vibrates slightly.

Normally you don't hear the reed you're not playing—it vibrates slightly but inaudibly. But when you bend a note, everything changes. The non-playing reed moves away from the reedplate—instead of being like a door closing into its frame, it's like a door opening away from its frame. This is known as **opening reed** motion.

An opening reed does something very interesting—it vibrates at a higher pitch than when it plays as a closing reed. For instance, a blow reed that normally sounds the note C will instead sound a note close to C# when it opens.

Let's apply this to a diatonic harmonica in C. Hole 4 Blow will be the note C, and Draw 4 will be D. If you bend the draw note down, you get C#. What you're actually hearing is the D reed bending down as a closing reed, and *at the same time*, the C reed opening and also sounding the C#. This is known as a **dual-reed bend** because it's produced by two reeds, one blow and one draw, one opening and one closing, cooperating to create a bent note.

If your bending technique is good, the note will sound rich and tonally complex, and you'll feel like the bend is stable—you can easily sustain the bent note. But you'll also notice that you can't bend it down any further than a slightly flat C#—the bend is limited to the opening pitch of the blow reed.

Another thing you may notice is that if you try to bend the blow reed down, it will only bend a tiny bit. If you keep pressing into the bend, you may get the sound of rushing air, a cacophonous noise that sounds like the reeds are having a catfight, then you may get a pure note—the sound of E-flat, being produced by the D draw reed opening a semitone above its closing pitch, sounding an overblow in response to the blow breath.

### **Bending with Valves – the Isolated Reed Bend**

If you try the same draw bend on a fully valved chromatic, the inside valve seals off the blow reed, directing all air to the draw reed. You can still bend the D draw reed down, but you'll notice a few differences:

- The tone isn't as rich.
- The bend is harder to sustain—it fights back more.
- If you're careful you can bend the note down much farther than the C# limit on the unvalved harp. Depending on your skill and the adjustment of the reeds, you might be able to get it down to C, B, maybe even Bb.

This is known as an isolated reed bend.

To hear the difference between dual-reed and isolated reed bends, click here (visit [harmonicasessions.com](http://harmonicasessions.com) for audio samples): [29-01.mp3](#)

If you try to bend the C blow reed down on a valved harp, you'll get the same response as with the draw reed—the note will bend down (but will fight back) and will bend down to B, B-flat and maybe even A. Again, the draw reed is out of the picture due to the inside valve closing of the draw reed slot and directing all the air to the blow reed, which then allows an isolated closing reed bend on the blow reed.

To hear the difference between the valve and unvalved harp when you apply a bend to the blow note, click here: [29-02.mp3](#)

### **Splitting the Difference with Half-Valving**

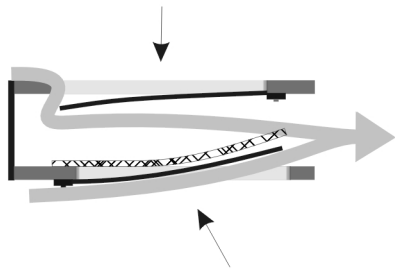
What if you removed the outside valve—the one over the blow reed slot? If you inhale, air will still come through the blow reed, so it should be able to open and participate in the draw bend, making the draw bends dual reed bends, right?

Right. Figure 1 shows the action of the breath on reed and valve in a hole where the outside valve has been removed.

Figure 1:

### Half-valved draw bend

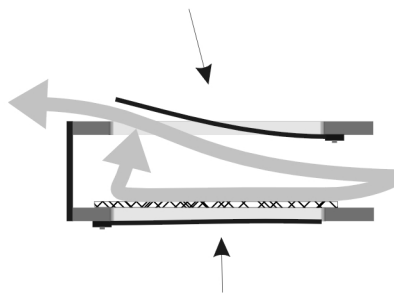
Inhaled bend pulls the blow reed into opening reed motion a semitone above its closing pitch.



Inhaled bend pulls the draw reed down a semitone in normal closing mode and opens the inside valve.

### Half-valved isolated blow bend

Exhaled bend pushes blow reed into its slot.



Exhaled breath closes the inside valve, isolating the blow reed.

Figure 1 assumes that the draw reed is tuned to a higher note than the blow reed. In an actual chromatic, the blow reed is tuned higher than the draw reed in one hole per octave. In the other three holes the draw note is higher than the blow note but by varying amounts.

Figures 2 and 3 shows the note layouts for a C chromatic, first with the slide out and then with the slide in. If you study these layouts, you'll see the bending potential for draw notes with half-valving. In any given hole:

- The higher pitched note will bend down to about a semitone above the lower pitched note.
- The distance in semitones between the high note and the low note is the distance the higher note will bend down.

Figure 2:

Slide out:	1	2	3	4	5	6	7	8	9	10	11	12
Blow	C	E	G	C	C	E	G	C	C	E	G	C
Draw	D	F	A	B	D	F	A	B	D	F	A	B

Figure 3:

Slide in:	1	2	3	4	5	6	7	8	9	10	11	12
Blow	C#	F	G#	C#	C#	F	G#	C#	C#	F	G#	C#
Draw	D#	F#	A#	C	D#	F#	A#	C	D#	F#	A#	D

You'll find that half-valving offers these bending behaviors:

- Draw notes D and A (and, with the slide in, D# and C#) bend down a semitone because the blow notes in those holes are two semitones lower.
- Draw notes F and F# bend down less than a semitone (because they're only a semitone above their corresponding blow notes), but still produce dual reed bends.
- Draw note B (and Draw C with the slide in) don't bend because the blow notes in those holes are higher in pitch than the draw notes, not lower.
- All the blow notes bend down as isolated reed bends.

- Dual reed blow bends of less than a semitone are available for the Blow C and C# in Holes 4 and 8 by removing **inside valves** to enable the draw reeds to bend. (What about Hole 12? It's already unvalved on most chromatics.)

To hear the difference between a fully valved chromatic and one that's been half-valved, listen to the following recordings. All recordings were made with a Hohner CX-12 Jazz.

Fully valved: C Major scale, middle octave, bending each note [29-03.mp3](#)

Half valved: C Major scale, middle octave, bending each note [29-04.mp3](#)

Fully valved: Third position blues, middle octave, bending each note [29-05.mp3](#)

Half valved: Third position blues, middle octave, bending each note [29-06.mp3](#)

## Problems with Removing Valves

When you remove valves you can run into some problems:

- The instrument may leak more air than before.
- The pitch of the reeds may go sharp.
- The blow notes and draw notes sound less alike than before.

Valves exist to make the harp less leaky, so it only stands to reason that it will leak more air if you remove valves. Some players have tried half-valving and found the harp unbearably leaky as a result. Others have no problem.

It helps to have an airtight harp, such as a Hohner CX-12 or a Suzuki G-48, to begin with. Even then, you may want to do additional work to make the harp more airtight—reducing clearance in the slide housing, making sure reedplates screws are snug, flattening the comb and embossing reed slots.

Reeds go sharp because a reed that is not isolated gets less air pressure and the pitch therefore does not get pulled down as much as with an isolated reed. Consequently the notes that now produce dual reed bends may be sharper than they were before and you may need to tune those reeds down slightly if the sharpness is unpleasant.

The change in tonal color is because one reed will be isolated and the other isn't. One leaks a little (making the tone less concentrated) and has cooperation from the other reed (making the tone more complex). The other reed has less leakage, a more concentrated sound, and also a less complex sound.

Unequal tonal color may be a problem if you're playing classical music or other music where you seldom bend notes and want tonal consistency. If tonal consistency is less important and you'll be bending a lot, then the changes in tonal color brought on by half-valving may be less important.

## Half-Valving Diatonics

Diatonics can be half-valved so that the notes that don't usually bend down (Blow 1–6 and Draw 7–10) will bend down as isolated reeds.

If you valve the inside slots on Holes 1 through 6:

- The blow notes will be isolated, allowing isolated reed blow bends.
- The valves will be pulled away from the draw slots when you inhale, allowing for normal draw bends.
- No overblows will be possible, because the inside valves prevent any blow breath from reaching the draw reeds.

If you valve the outside slots on Holes 7 through 10:

- The draw notes will be isolated, allowing isolated reed draw bends.
- The valves will be pushed away from the blow slots when you inhale, allowing for normal blow bends.
- No overdraws will be possible, because the outside valves prevent any draw breath from reaching the blow reeds.

The Suzuki MR-360 valved ProMaster diatonic comes half-valved, but you can add valves to any diatonic.

To listen to two master half-valve players together, get the album *Back to Back*, featuring PT Gazell on half-valved diatonic and Brendan Power on both diatonic and chromatic half-valved instruments.

## Recommended Book—Basic Blues Chromatic

<http://harmonicamasterclass.com/bc.htm>

## Notation Key

Please visit <http://www.harmonicassessions.com/feb05/ChromaticTab.pdf> for a notation key.