

How to test a chromatic harmonica

By Cheng Jang Ming

In this issue, I would like to discuss about the methods to test a chromatic harmonica. When testing a harmonica, most people would simply play some tunes on it, and assess its performance by their feeling of how the tune sounds. The result will be subjective and sometimes misleading, because the full performance of the harmonica is not tested thoroughly.

For the test methods described below, we will be concentrating mainly on the tests that affect the performance of the harmonica, and not the design or construction of the harmonica, even though they are closely related. With these tests, you will be able to measure the performance of a harmonica better, and know where it can be further improved. In order to have a comparison, you should compare the tests on the new harmonica to your usual harmonica that you know best.

1. Evenness test

This is a very simple and natural test, play all the notes slowly and with the same amount of effort, and check for their evenness. Try to listen to the air leakage while playing each note. If you have ever played a very air-tight harmonica (such as the Suzuki SCX48) and get used to its air-tightness, you will be able to notice when a note sounds slightly leaky (on another harmonica). Next, play all the notes again but very softly, are they still very even? The basic requirement is that the mid octave should at least give a uniform feel of air-tightness. A good harmonica, of course, will have all notes sounding very even in volume. Of course, this is not always the case, and most of the 'uneven' notes (i.e. either too soft or too loud) can be corrected by adjusting the reed gapping or the valves.

2. Softest to loudest test

Play a note in the mid octave (e.g. E or G), from very weak breath, slowly increase until the note can be heard, this is the softest volume of this note. Next, increase your breath to the maximum and listen to the volume. If you have a sound pressure meter, you can take the two readings (in dBspl). The arithmetic difference between the readings gives you the dynamic range. Compare the test on your usual harmonica. Naturally, the one with the wider dynamic range is the better harmonica.

3. Chord test

Play Tommy Reilly's composition for solo harmonica, **Serenade**. Or, you can also play the slightly more difficult piece, Yusuo Watani's composition for solo harmonica, **Fantasy Dream**. Play it softer, do all the double stops

come out nicely and willingly at your command? A cross-tuned harmonica will do better in this test.

4. Compression test

Pick a blow note in the mid octave (e.g. E), blow (use tongue blocked embrochure) as hard as you can into the hole to get the loudest volume. Try to keep your embrochure constant. Does the note sound a little flatter (i.e. lower in pitch) at your maximum strength? For plastic combs, the note will usually go a little flat when the sound pressure is beyond a certain level. This is the compression point of the note. For metallic comb, the note will usually stay at the same pitch.

5. Valve test

Play the scale of C in mid octave, ascending then descending, and repeat. Increase the speed to as fast as you can (try to reach tempo of 150 or faster) while keeping the same power from your mouth. Do the notes still react to your breath and sound the same level? Or do they become softer when you play faster and faster? If the notes become softer when you accelerate to a certain speed, this shows that the valves can't react fast enough to the breath. Harmonica manufacturers use different materials for their valves, some valves can withstand high temperature but may not be sensitive enough at high speed. Some valves are sensitive and fast, but will curl up badly if they are exposed to high temperature (about 60-70°C, e.g. temperature inside the car on a sunny day). Teflon valve is both tolerant to high temperature and very sensitive, you should give it a try if you can get them.

6. Tongue trill test

Pick a hole in mid octave and play the tongue trill (e.g. G-A trill, blow and draw rapidly using air inside the mouth, without letting the air go down to the lungs). Play at a fast speed and from loud to very soft, find out how soft can the trill still work smoothly. The harmonica that allows the trill to continue to work at weaker volume is the better one. Repeat the test on hole 3 for G-A trill, if the harmonica allows you to play tongue trill on this note, then it must be a terribly good one! Generally, a more air-tight harmonica will perform better in this test. If you can do circular breathing (which uses the same mechanism as the tongue trill), you can use this test to find the best harmonica that suits you.

7. Last 2 holes draw test

Now, this is the most detrimental test for any chromatic harmonicas. Play the A-B trill (holes 11 and 12 draw) from slow to fast and from soft to loud. Do the notes sound even and also follow your breath? For most

harmonicas, the last two draw notes are very difficult to play evenly, and they also tend to sound leaky and soft. A harmonica that lets you play this A-B trill (holes 11-12) smoothly just as the A-B trill on holes 7-8 will be a superbly good one! If these two notes don't sound good, there isn't much that you can do to the harmonica to improve it!

8. First 2 holes draw test

The first 2 draw notes, D and F, are also not easy to play loudly. However, you can adjust the gapping to improve these two notes. But the best solution is to train yourself to play them loudly. The training is really very simple, just play the two notes for as long as you can, gradually increase the volume, and alternate between them. Practice it for 5 to 10 minutes everyday. After a few weeks, you will discover that they sound much louder! This is because your body (with help from your ears) has discovered by itself the natural way to play the notes louder. Hint, don't breathe through your notes while practicing these notes because you will all the air you can get for the loud volume.

9. Staccato test

Play staccato on mid octave scale on the new harmonica, using tongue-blocked embrochure, at 4 repetitions per note, and play at your top speed (between 110 to 130). Now compare it with you old harmonica, is it easier to play on the new one? If yes, then the new harmonica has a better comb construction that helps in the start-up of the notes. Such a harmonica will be invaluable in playing staccato in classical music. More importantly, it will also allow you to play smoother legato.

10. Bending test

Pick any note in the mid-octave and try to bend the note. A more air-tight harmonica will bend easier. But be careful here, if the instrument is both air-tight and easily bendable, then the reeds will not last too long. A harmonica that is air-tight but only allows moderate amount of bending will be a better instrument for classical playing, with a much longer life for the reeds.

11. Slide

Press the slide rapidly, it should be very smooth and quiet, and it should also feel quite light to the finger. However for most new harmonicas made from mass production, the slides are usually noisy and somewhat sluggish. This is generally due to the sharp edges of all the holes on the slide assembly. If you debur them carefully, you should be able to reduce the noise substantially. A cross-tuned harmonica generally has a smoother slide as there is less surface area in the slide for friction.

12. Mouthpiece, octave test

Play octave on the new harmonica, do you feel any tension in your face and lips? If the mouthpiece is too big, it will not be comfortable to play octaves. Always pick a mouthpiece that suits your own mouth.

13. Centre of gravity (CG) test

Hold the new harmonica at its left edge (near hole 1) and lift it up. It will slant to the right side because its CG is to the right. Remember how much the slant is. Now hold the harmonica at the right edge and lift it up. Does it slant to the left with the same amount as before? If yes, then the CG is about at the centre. But for most harmonicas, including all the custom made harmonicas that I have tested, none of them have their CG at the centre. This creates a problem when playing a heavy harmonica (more than 400 grams) for extended period of time (more than 1 hour of continuous playing), because the uneven distribution of weight causes a prolonged stress at your left wrist and elbow. If you are not careful, this can create a big health problem, watch out!