

Warming, Assembling, and Caring for the Piccolo (Jan 2023)

Each woodwind instrument has particular maintenance problems; Piccolos are the woodwind instruments that are most affected by water build-up due to condensation from the players breath; the Piccolo player must take particular care to avoid problems caused by the condensation.

Why condensation occurs

The air that a player blows into a woodwind instrument contains a great deal of water vapour. The temperature of this air is approximately 37 degrees Celsius. The temperature of the instrument (even when warmed up to room temperature) is approximately 20 degrees Celsius. The water vapour in the player's breath condensates on the inner surface of the instrument, which is cool compared to the temperature of the air.

Where condensation occurs

The air leaving the player is hot and humid and the water vapour immediately condensates onto the surface area at the top of the bore. The air continues down the bore becoming drier and cooler as the water vapour condensates out. The air finally passes out of the first free open tone-hole. The bore of a Piccolo is so short (in comparison to most other wind instruments) that condensation can occur through out the entire bore so water problems can occur on any pad.

What happens to the condensation

The condensation in the bore forms equally over the inner surface of the bore. Gravity forces the microscopic droplets of condensation to run down the sides of the bore to meet at the bottom of the bore where a rivulet of condensation forms. This rivulet runs down the length of the bore and drips out the end of the instrument. Gradually, during playing, the whole instrument warms up to an optimum operating temperature and an equilibrium is reached where the internal surface of the bore is warm enough so only a minimum of condensation occurs. The Piccolo is small enough to reach an equal temperature more or less throughout its' length (but virtually all other instruments have will have a temperature gradient with the temperature of the body of the instrument being lower the further away from the top of the bore).

Why condensation is a greater problem for Piccolo players

All woodwind players have to cope with water caused by condensation but it is a particularly serious problem for Piccolo players for three reasons.

Firstly, the distance between where the player's breath enters the instrument, and the first free open-tone hole, is very short on a Piccolo. On a clarinet most the water vapour condensates in the mouthpiece and barrel and the top section of the top joint, and the now drier air proceeds down the bore; likewise on a flute and saxophone there is a reasonable length of bore where condensation can occur drying out the air before it reaches the pads. On a Piccolo the length of bore is much shorter – and the surface area of the bore is far less – so the air is not dried out before reaching the tone-holes and in fact nearly the whole body of the Piccolo is affected by hot and humid air.

Secondly, with less surface area available the condensation quickly builds up to form droplets. Because the whole body of the Piccolo is affected by hot humid air these droplets are forming throughout the bore and adjacent to the tone holes. Water forms the same size droplets regardless of the size of the instrument. If a droplet runs into the pad of a saxophone it will get absorbed into the surface leather of the pad and might make no noticeable swelling of the pad. On a Piccolo, where the pads are considerably smaller, a droplet of water can dramatically affect the pad making it swell and so not cover its tone-hole.

Thirdly, the rivulet caused by the condensation is roughly the same for each woodwind instrument; however, the size of the Piccolo bore is much smaller than for other woodwinds and therefore the tone-holes are much closer to the bottom of the bore, so there is a much greater chance of water running into the tone holes.

What the player can do to minimize these problems

1. Make sure the instrument is thoroughly warmed before playing – *not by blowing into it*, but by holding it gently in closed hands for a few minutes.
2. Carefully swab out the instrument after it has been played for a few minutes - use a piece of good quality paper towel threaded in the slit at the end of the tuning rod because this absorbs the excess moisture rather than pushes it down the bore (and possibly into tone holes).
3. During a performance, if the instrument is not being played it should be held carefully (to keep it warm) and in such a way that the head-joint is slightly higher than the body so that water can run down the bottom of the bore without running into the tone-holes. If the instrument cannot be held then place it in its open case with the head joint slightly higher than the body.
4. If water does get on to the pads the instrument should be swabbed out immediately (with a piece of good quality paper towel kept handily in the case) and also any other water still visible (check tone-holes and pads) should be removed by careful use of good quality paper towel. The Piccolo should be held for a few minutes with all fingers closing the keys.

A safe method of assembly

It is often during assembly that the instrument gets damaged so it's worth checking that your method of assembly does not put undue strain on the mechanism. Outlined below is a safe method of assembly.

1. Make sure the tenon cork is adequately greased.
2. Grip the head joint in your left hand.
3. Grip the body, between the trills and the tenon, with the thumb and forefinger of your right hand.
4. Gently twist the body of the Piccolo onto the head-joint.

Servicing and repair

The instrument should be serviced regularly to ensure it is operating correctly. The pads, corks, and felts on the instrument (and also the adhesives which keeps these items in place) deteriorate over time. On older or poorer quality instruments the mechanism itself starts to wear and keys can become loose or jammed. Usually such deterioration is gradual and the player subconsciously compensates by blowing harder and pressing harder on the keys. Without servicing the deterioration continues - the quality of tone diminishes, the instrument becomes less responsive, and the tuning becomes unreliable; the deterioration continues until something major goes wrong and the instrument becomes unplayable and in need of considerable repair.

As a general guide to the frequency of servicing - if you have one main woodwind instrument and you are under grade 5 (or have been playing less than 5 years) you should have the instrument serviced approximately every two years, if you are above grade 5 (or have been playing more than 5 years) then you should have the instrument serviced approximately once a year. If you have more than one main woodwind instrument then each instrument probably gets used less often so you can go longer between services. If you are doing exams on the instrument it is best to at least have the instrument checked a few weeks before the exams so that you know it is working reliably when you go into the exam; players often blame themselves for the poor sound they produce when actually the instrument is at fault. Test your Piccolo with the following exercises, in all cases you should be able to play the notes without squeezing the keys hard or blowing hard: C to Bb using thumb key; B to A; A to G; G to F#; G to F; E to D.

Adjusting to your instrument if it has just been serviced:

When an instrument is overdue a service the player has to compensate for the instrument's various problems. You have probably developed habits of pressing harder on the keys, and blowing harder, and manipulating your embouchure as necessary to help tune the notes. You may not even have been aware that you were doing these things. You now need to stop compensating for the problems you were having with the instrument – therefore you need to break the habits you have developed. The easiest way to do this is to spend the first 10 minutes of your next two or three practices working on simple scales or arpeggios only; use a light finger pressure and a light breath pressure and try to play quietly. If you do not practice scales and arpeggios then choose some easy exercises or pieces of music to play so you can concentrate on your fingers and breath pressure rather than the notes.

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