



BAND INSTRUMENT REPAIR PROGRAM

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LUBRICATING PISTON VALVES

*A guide for band directors, students, and
performers*



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Lubricating Piston Valves

All moving parts on wind instruments need to be lubricated. On that, there is little disagreement. Confusion lies in how often to lubricate and how much lubrication to use. This article is written for band directors, students, and working professional brass players in an effort to dispel myths and concerns that people may have about proper instrument care.

Valve Material

Valves are either nickel-plated or made of Monel. Some brasswinds from Europe use stainless steel as piston material.

Monel, a very hard metal composed primarily of nickel, is common on professional trumpets, cornets, flugelhorns, and some euphoniums. Some manufacturers are now using Monel on student-line instruments as a selling point. A Monel piston is identified by its brass ports (the tubes that route air through the piston body). Since Monel is not electro-plated, it does not exhibit wear. Monel is a durable material and is relatively non-staining.

A nickel-plated piston is also very durable and stain resistant, and actually has a faster feel than a Monel piston. It will be plated over its entire valve surface, including the ports. Nickel-plated pistons are now commonly found on student trumpets because they generally cost less to produce than Monel pistons. By no means an inferior way making valves – some manufacturers, like the Getzen Co., still use nickel-plated pistons on all their trumpets and cornets - their valve being just as good and durable as anyone else's. Nickel-plated pistons are also common on large brass instruments where the use of Monel is not cost effective.

Stainless steel pistons are now found on instruments coming from Europe. Like Monel, the stainless steel pistons are not plated.

Originally used almost exclusively for professional instruments, Monel is now used as a selling point for both student and professional model brasswinds. While most manufacturers trumpet the superiority of Monel over plating, there is no inherent advantage of one material over another for playability and valve action. Some also say that Monel is non-corroding, though, given the right conditions (lack of oiling, unstable metal pH, etc.), Monel can stain and stick excessively.

Which is better? There is not one material, Monel, nickel-plating or stainless steel which has proven to be superior over the others. Above all, what matters is the fit of the valve. A loose valve, no matter the material it is made of, means the performance and overall life of the instrument will suffer. When selecting a brasswind for purchase, new or used, the piston material should be considered behind how the instrument plays and how well the valves are fit. Have a technician inspect, and measure if necessary, to insure the tolerances are proper. For student brasswinds, this means tolerances no greater than

.002” (two thousandths of an inch when measuring diameters) and on professional instruments, no greater than .001” (one thousandth of an inch).

Valve Oil

Valve oil does the following:

- ❖ *Lubricates*
- ❖ *Cleans*
- ❖ *Fills the space between the piston and casing where leaks occur*
- ❖ *Prevents Corrosion*

Valve oil doesn't just lubricate. Valve oil, when properly applied, flushes the debris and saliva that has gathered on the valve face down toward the bottom valve caps. Valve oil also serves to seal the space between the piston and casing, actually improving instrument performance on those with looser valves. Finally, saliva can have a devastating corrosive effect on both Monel and nickel plating. Valve oil serves as a barrier to such agents.

Frequency of Oiling

With all valve oils, it is best to oil piston valves before playing the instrument, every day that it is played.

The decision on how often to oil doesn't lie in how easily the valves move but by how much oil remains present over a given length of time.

Most petroleum valve oils can dissipate and evaporate significantly within forty-eight hours, leaving behind condensation, corrosive saliva and dried scale. This remaining debris causes premature wear, no matter the perceived smoothness of the valve action. Most professionals oil their pistons every day because constant use also contributes to dissipation. The biggest clue when looking for lack of oiling is the brownish-green staining of the piston material, particularly on Monel valves.

Do not wait to oil until the valve is not running smoothly or when it is making grit noise. Oil them every day the instrument is played.

Over-Oiling?

There are some who feel that valves can be over-oiled. While true to the extent that valve oil can be wasted, there has been no evidence of brasswinds being harmed by oiling. If the valves slow down after applying oil, it is an indication of possible excessive debris in the casing that is being loosened by the oil, or improper grain on the valve and casing surfaces. If the valves slow after oiling, and the casing and piston are clean, take the instrument to a technician to have the valves lapped to a vertical grain on the piston body.

Which Oil to Use

Because piston valves are fit to varying tolerances, choose the oil that works best for the instrument.

Valve oils come in petroleum-based (both kerosene and paraffinic solvent) and synthetic forms, both offering satisfactory lubrication. The only problem with synthetic oils is the expense for young students and the inability of some to mix with petroleum products-- a particular problem when students share everything during band. There is also a common brand of synthetic that has proven to be a corrosive to both the pistons and casings.

The expensive synthetic and pro-line oils may offer slicker action, but are best left for the tighter valves found on professional level instruments where the true difference can be appreciated.

What not to use: Stay away from oils and greases with silicone added. They are great for trombone handslides but cause moisture build-up and promote excessive corrosion on pistons, casings and tuning slides. The way to tell if a valve oil contains silicone is if the bottle reads, "shake well before using". Home concocted lubricants are also not advised. These include olive oil, mineral oil, pure kerosene, WD-40, and spray silicone lubricants. These are bad news for brass instruments.

While there is a difference in oils available, the oils provided by manufacturers will, by and large, work very well on student line piston valves. When the student reaches the point where a difference is discernible, the synthetic and more expensive oils can be experimented with.

Synthetics

Synthetic oils are not all equals. It is important that educators and students gain as much information as possible on them. The advantage of the quality synthetic oils is their longevity. For instruments that are played sporadically or need to be stored over the summer, synthetic oils, such as Hetman®, Pro-Oil® and Space Filler® are good choices to help prevent pistons and rotors from seizing, staining and glazing. The lubrication properties of these synthetics are also excellent. Bear in mind though, that it is still recommended to oil piston valves every day the instrument is played, six to eight drops per piston.

Which is the best way to oil piston valves?

Placing the oil directly on the piston valve surface is really the only way to go.

Recommended:



Preferred by many repair technicians and professional players. Oiling the pistons from the top to bottom offers a sheeting action which carries dirt and debris down the valve caps and offers a clean coating of oil over the entire piston surface. This properly lubricates and offers the pistons prolonged life. Note: Use 6 – 8 drops of oil per piston. Also, spinning the piston is **not** necessary to distribute the valve oil – it only serves to scratch and score the piston face.

Not Recommended



Oiling through the bottom caps is not a good idea. This is a widespread practice but is not good for two reasons: 1. The oil will generally fall inside the hollow valve, not really lubricating as it should. 2. The bottom caps will release all the dirt and grime they are designed to collect, only serving to gum up the valves. This debris serves as an abrasive and can loosen the valves over time.

Not Recommended

Through the slide tubing. Oiling through the slide tubing will, too often, thin the slide grease and contaminate the valve oil as the two mix together on the way into the valve casing. There is also a good chance of picking up debris along the way. Not recommended.



Not Recommended

Through the mouthpipe. Also common, oiling through the mouthpipe is popular because it is said that oil on the inside tubing of the instrument can protect against scale build-up. Oiling the mouthpipe to protect it is okay, but to do it as a means of lubricating the valves is not recommended.

The first problem is that the oil reaches the #3 piston primarily and is unable to get to the 1st piston. Secondly, as an instrument is played over time, grime, salts, and calcium deposits are inevitable and are forced into the valve section. This grit will eventually slow and wear the pistons. Lastly, there is the danger of petroleum distillates irritating the player as the oil runs back through the mouthpiece. Not recommended.



Should students stretch their valve springs if the pistons are running slow?

No. Students should not tamper with the instrument. If the valves are too slow or sticking, there is something wrong with the pistons or casings.

The real cure for slow piston valves is usually a good chemical cleaning or a simple wiping. It is recommended to wipe the casings and pistons once a month to remove excess grime and buildup.

Stretching the valve springs will only ruin a set of springs and make the player work much too hard in moving the valves.

Slow Pistons

Slow pistons can be caused by a number of problems that are best solved by a professional repair technician. Be certain that no abrasives are taken to either the pistons or casings. These include cleansers, toothpaste, sandpaper of any grit, grinding wheels, steel wool, plastic scouring pads or any other abrasive. Too often, a well-intentioned parent or teacher can create an unnecessarily costly repair by using such products on their valves.

Storing Your Brasswinds

It's always best to wipe both the casings and pistons with 100% cotton cheese-cloth or T-shirt material to remove debris. For regular playing, this simple procedure is recommended once a month. When storing brasswinds, wipe the casings and pistons as shown, then oil the pistons liberally with either a heavy petroleum-based valve oil or a synthetic that will mix with petroleum oils such as the Hetman® products. This will help keep valve seizing to a minimum.



Summary

Regular lubrication is a must for properly performing brasswinds. Be certain to use six to eight drops of oil, lubricating the valves every playing day, placing the oil on the piston face as shown above. There is no need to spin the valves – the grain on the pistons will take care of that. Try to take all brasswinds to a repair shop once a year for regular cleaning, necessary dent work, soldering, and any other maintenance items. The oil you use is not as important as how often you apply it – every day the instrument is played. Synthetic oils are great for preserving valve action over the summer, though be certain to choose a synthetic that does not corrode. Wipe your casings and pistons once a month to remove debris and build-up. Finally, if you have questions, ask your local repair technician – most will be very willing to offer their advice to you.

The Band Instrument Repair Program at Red Wing

The Band Instrument Repair Program at Minnesota State College-Southeast Technical is a nine-month comprehensive study of the repair of woodwinds and brasswinds. Training approximately thirty students yearly, the Program is recognized as leading provider of qualified repair technicians across the United States and around the world.

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