

Good Vibrations - The Physics of Cymbal Care and Maintenance

Since their creation for intimidating sonic displays used in Asian warfare some 5,000 years ago, cymbals have come a long way. Today cymbals are offered in a stunning variety of configurations, compositions, sizes, thicknesses, and shapes, offering an ever expanding palette of sounds to modern drummers and percussionists. Though cymbals have evolved, the way these instruments create their sound is the same as it ever was—through the generation of sound waves. With this in mind, today we'll examine the physics of cymbal sound, and how different cleaning and maintenance products and procedures effect cymbals. A full study of cymbal physics could fill this issue, so for now we will keep the focus on various cymbal cleaning strategies and how they effect cymbal vibration.

Metal in Motion - Most modern cymbals are a mix of copper and tin, customized for maximum sound vibration. Striking the cymbal sets in motion a vibration through the cymbal's body. The cymbal moves very fluidly as the sound wave rolls through and out of the instrument, an effect documented dramatically in slow motion videos. Different types of strokes produce different vibrations, as does playing different parts of the cymbal. Anything that interferes with this wave motion, like dirt, oxidation, or corrosion on the cymbal surface, will muffle or distort the sound.

One way to clean and remove contaminants is with polishes and cleaners, which vary considerably. Some use chemical cleaners or stripping agents, others use gentle non-chemical actions that penetrate under and "lift off" oxides, dirt and debris. Dual-action products clean and condition metal surfaces with one application rather than a separate two-step cleaning and conditioning process.

Cymbals today often come with a protective lacquer coating. Coated or uncoated has little effect on sound and is up to player preference, but both benefit from a certain level of maintenance. Protective coatings do fend off excess wear and tear for a time, but will eventually wear off. Conditioning both uncoated and coated surfaces will serve to extend cymbal life and playability.

Different Drummers -The subject of cymbal cleaning is one that will elicit as many different opinions as there are drummers. Some reject any cleaners or conditioners at all, maintaining that the build-up of oxides, smoke, sweat, and funk creates a mellow, warmer tone than shiny clean cymbals. This largely a matter of personal taste and what your particular pair of ears likes. Some players keep a vintage cymbal set-up that are never polished or deep cleaned for jazz gigs, and a set of sparkling bright polished cymbals for rock and pop. Cleaning your cymbals with just warm water and a mild detergent on a regular basis will keep them sounding livelier and more responsive. To prevent more serious problems with oxidation and corrosion, though, issues especially common with older vintage cymbals, there are a number of polishes and conditioners especially for cymbals—but there are a few considerations you will want to make before using any of these products.

Deep Conditioning - Surface treatment products known as conditioners may also contain certain waxes, silicones, Teflon®, anti-oxidants, or specialized micro-barrier films to condition and protect metal surfaces. Conditioning formulas vary considerably and have different features, such as: resistance to oxidation, corrosion, humidity and moisture; migration vs. surface stability; and particle size vs. penetration capability. These formulas possess other mechanical attributes such as the ability to reduce chaotic vibration and promote smoother wave

propagation by reducing metal surface tension; and the reduction of other stressors like kinetic friction and impact. Conditioned cymbals are able to flex and warp organically and unrestrictedly by removing surface debris, allowing the cymbal's integrity and rich sonic textures to come through.

Patina Ahead—Proceed with Caution - Most abrasive polishes and cleaners will strip the valuable patina (subtle surface features built up over time) from an aged cymbal, possibly losing certain warm or smoky acoustic characteristics. It's advisable to try the product on a very small patch of the cymbal underside, or on an older "test" cymbal. Preserving the patina requires a non-abrasive cleaner that does not contain harsh chemicals. Avoid high-speed buffing and polishing, which can damage lathing grooves and hammering marks, effecting the cymbal's sound and vibration. Buffing also generates heat that can warp or bend the cymbal.

You may decide patina is not an issue for your non-coated cymbal and prefer to strip it down to bare metal. This is where conditioners play a critical role. The instant bare metal is exposed to atmosphere the process of oxidation begins and unless you apply a conditioner/protectant to your cymbal surfaces they will begin to oxidize and deteriorate. Also bear in mind polishing often removes the ink logo marking on the cymbal.

Follow the manufacturer's application instructions, and use a soft microfiber cloth while applying in a circular motion in the direction of the grooves to best maintain finish integrity. Do not rub vigorously if you are concerned with preserving the patina.

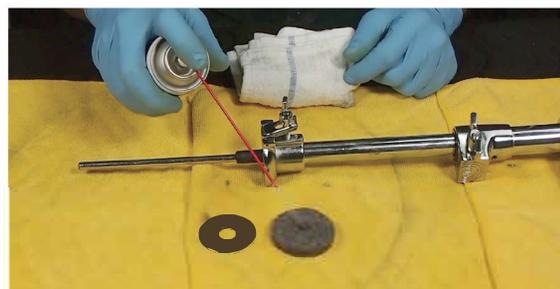
Conclusion -The physics of drums and cymbals are all about maximizing good vibrations, and the right maintenance products and practices can help keep your kit well-tuned and ready for pumping out deep grooves and great vibes. Understanding how cymbals make sound helps determine which approach to maintenance is right for you. Don't hesitate to ask your local drum store technician—they can be a valuable resource for cymbal care and maintenance tips and tricks.

CYMBAL CLEANER & CONDITIONER COMPARISON CHARTS

Metal Cleaners	Abrasive abrasive particles, removes patina	Non-abrasive type1 harsh chemical action, removes patina	Non-abrasive type2 mild chemical action, can partially remove patina
Metal Conditioners type 1 provides protection against oxidation & corrosion	Polishes contain waxes, silicones, Teflon® or anti-oxidants	Barrier Films broad-spectrum protection	
Metal Conditioners type2 reduces metal surface tension & chaotic vibration; promotes smoother wave propagation	Traditional polishes and cleaners do not possess these mechanical properties	Barrier Films mechanical interaction between film and metal surface produces these characteristics	
Metal Conditioners type3 reduces kinetic friction and are formulated for mounting hardware	Common Lubricants usually attract dirt, unstable, and tend to migrate with low impact resistance	Barrier Films do not attract dirt; are stable and tend not to migrate - possess high impact resistance	



One-step application of barrier film to cymbal surface to clean, condition and protect against oxidation and corrosion



One-step application of barrier film to clean and lubricate the moving parts of a hi-hat assembly