Tech Manual Alpine 2013/14

Racing-Service

Introduction

When Jakob Tobler founded Toko in 1916, he had no way of imagining what a rapid development lay ahead in ski sport. The tricks and secrets of waxing – together with expert knowledge – over a period of many years of research and development permitted the creation of a wide range of Toko products. For decades, the users of the Toko line could depend on the latest experiences from professional racing continuously being applied in the development of Toko products. What happens in the fringe between snow and ski today is a research subject for entire scientific institutions. The conversation of this knowledge to speed, gliding comfort, and the care for ski bases is Toko's very special expertise.

Waxing at the World Cup level is a very specific and exact science. It is also very secretive. National Teams have enjoyed enormous success with Toko, but naturally expect us to be close-lipped about it so as not to lose their advantage. This doesn't just mean regarding what brand is being used, but more importantly, what waxes they are using where and when. For this reason, we don't talk much about who is using what.

Toko has quietly pioneered virtually all of the wax technology breakthroughs that have occurred in recent history. Some examples of this include the following: Toko was the first company to develop and offer a fluorocarbon in block form (Streamline). This product line is carried on by the JetStream products. Toko Dibloc was the first fluorinated wax to be used on the World Cup. This tradition continues with the Tribloc HF and LF product lines. Toko was the first company to develop an iron specifically for the purpose of waxing skis. This concept has been greatly built on with the Toko T14 Digital and T8 Wax Irons. The Toko Scraper Sharpener was the first hand tool developed to sharpen scrapers. It has since then been anatomically shaped and been made more affordable. Irox and Irox Fluoro make skiing far more fun for the working (time challenged) skier who likes to ski on fast skis, but doesn't want to take the time to wax them before every ski. Irox is also a great product for junior and youth program coaches who wax dozens of skis before a race. It is affordable easy and quick to put on, and performs extremely well.

Toko's continuous commitment to research and development guarantees consumers the latest wax technology. Each year, the Toko team tests hundreds of new formulations of glide waxes. These formulations get narrowed down to just a few which get introduced into the market. Race Service is Toko's last step in evaluating new products. If they are readily accepted by National Team technicians and used in big events, then they finally get the green light to become mass produced and be sold in the retail stores. Toko does not have "race stock wax". The products used on the World Cup are identical to those sold in the shops, except for the occasional test product that, if really good will hit the shops the following year. This has always been Toko's procedure.

Despite being on the forefront of wax technology, the Toko system remains simple, easy to understand, and requires a minimal investment. Three color choices in the NF, LF, and HF lines (with the addition of DLC Black) and three colors in the HelX and JetStream fluorocarbon products, means a Toko waxer has fewer waxes to buy and will be far more familiar with each product. With a better understanding of the product, the waxer will be more confident in determining the proper wax.

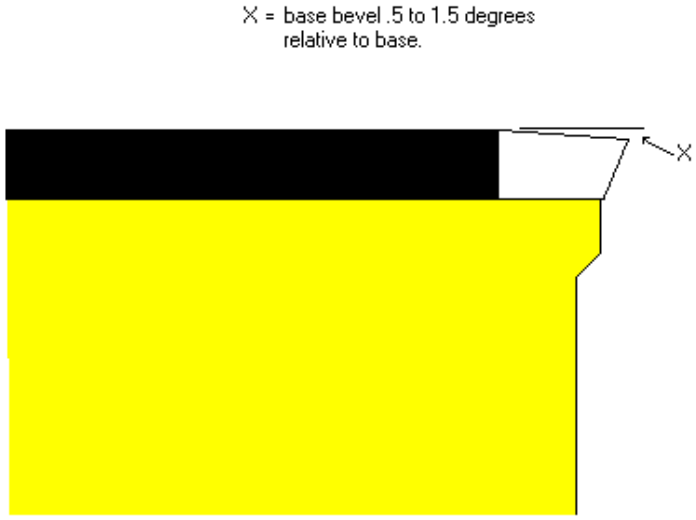
Skiing has gone through a dramatic evolution in the last ten years. New shaped skis in shorter lengths, wider skis, new constructions, lifted bindings and radically short slalom skis have changed the way we ski and tune skis. Never has tuning been as important as it is with the modern shaped skis, The latest techniques allow skiers to carve both skis simultaneously , but with skis lengths as low as 150cm for racing skis, proper bevels and wax are crucial for maximum performance.

Edge tuning

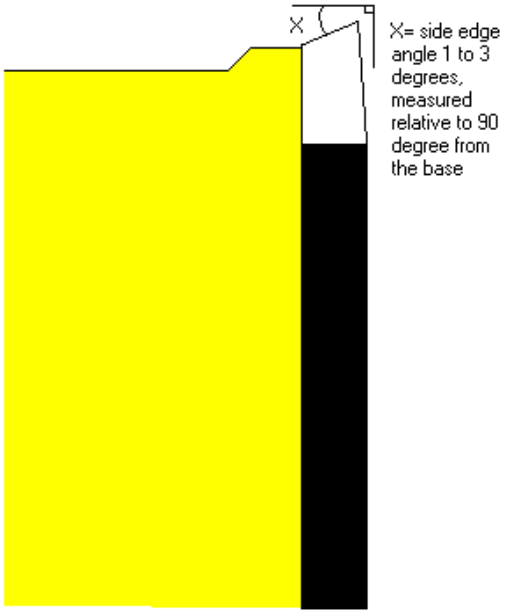
Edge preparation will determine how the skis feel on snow. The edge geometry chosen should match the skiers' ability and equipment. By preparing and maintaining your own skis a dependable level of

consistency can be achieved. Instead of tuning skis once at the beginning of the ski season, only to let them get progressively worse until they are tuned again, maintaining the base and edges means that your skis will always perform well. Predictable performance is not only safer, but can also become the foundation for improvement.

When you hear about edge bevels there are two angles that are being described, base edge angle, or base bevel, and side edge angle or side bevel. It is very important to understand the difference between base and side bevels, as they have different effects on the ski. Base bevel is the amount that the edge is tipped up off the snow relative to a flat base.



Base bevels range from 0 degrees to 1.5 degrees. Less base bevel makes a ski quick and grip hard. Slalom skis often have only a half degree of base bevel. More bevel on the base lets the ski transition from edge to edge more easily, making the ski more forgiving, especially at speed. For this reason downhill skis often have base bevels up to 1.5 degrees. Side edge bevel refers to how much the edge is "pointed" and is measured relative to 90 degrees of the base. To confuse you further there are three methods to describe this angle. Some people describe the angle as an increase from 90 degrees, therefore two degrees is 92, conversely this angle can be described as a decrease from 90 degrees making two degrees 88. Most simply this angle can be described by its difference from 90 (ie 2 degrees).



Side bevel determines how the edge will hold, mild bevels of 0-1 degree provide some bite, but remain forgiving for less advanced skiers. For someone seeking a higher level of performance, side bevels of 2-3 degrees will allow the ski to hold better, especially on hard snow. Extreme side bevel of 4+ degrees hold even better, but can become too demanding for most people. Because of the increase in hold, the ski will be harder to break loose once it has been set on edge making a line correction very difficult.

The first step in edge tuning actually starts with the base. Using a true bar (Prisma straight edge) start at the tip and check the base for flatness, check the entire length of the ski as flatness can change dramatically in only a few cm.

In addition to the base condition, you must also determine the base bevel. Base bevel can only be increased, so if the ski has more bevel then you desire it must be stone ground to take down the base. It is not uncommon to find that your skis have too much base bevel, or a base that is not flat. Even most new skis are not flat, because manufacturers have to keep up production, skis don't get a chance to fully cure in the mold. This means that even after the ski has been tuned at the factory it may continue to cure, causing the base to warp. Although skis today come finished better than ever, they can be improved. So chances are whether your skis are new or old a stone grind is needed. Stone grinding is the only way to create a perfectly flat base. Most shops can grind skis, but ask around in your area if there is a shop that specializes in grinding. A good grind is the base of a good tune, but a bad grind can ruin a ski. An added benefit of stone grinding is the ability of the stone to impart a structure in the base. Structure is the pattern left in the base as the stone cuts away the base. This pattern can help the ski break up the suction created by water

under the base, letting the ski glide faster. There are an infinite number of structures that can be created by a modern stone grinding machine; these include linear, cross, left and right biased crosses, chevrons, waves, crescents, and compound grind which combine elements of different grinds on the same ski. Despite all the options the two main things to accomplish are a flat ski and a base that has been cut cleanly, this means no hairs and the base was not burned. A burnt base is when the base material becomes sealed because excessive heat was produced during the grinding process. A base that is burned will not absorb wax and surely be slow. This is an overly simplified explanation of stone grinding for the purposes of this manual. So be sure to work with a qualified shop in your area. This will ensure that you get a grind that is clean and flat, with a structure that works well in the conditions you ski in.

Once the skis are ground flat the base edge will have to be beveled. A ski vise is needed to securely hold the ski with the base up (World Cup ski vise is best). Clamp the ski in the vise, and use a true bar to once again check the flatness and base bevel. It is important to check the ski often; this will let you know how much work has been done. Even the most experienced tuners constantly check their work, because variables such as the sharpness of your tools, the hardness of the edge material, existing and desired bevel can greatly influence how much work must be done and how easy or hard it will be. With the ski base up, start on the edge that is away from you. Which end of the ski you start from will depend on whether you are left or right handed, and if you prefer to push or pull the file. Each method has its advantages, and proponents. What is most important is that you develop consistency in your style. Place the bevel tool on the ski with a sharp file. Start with light strokes of 10 to 20 cm moving down the length of the ski. Then clean the base and tools from filings and check your work.

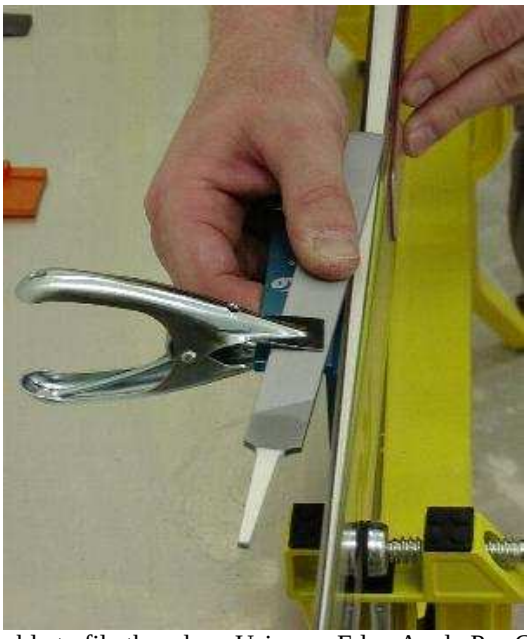
Continue with progressively longer strokes, still with light pressure, checking the bevel and cleaning the base often. The Precision Base File Control will continue to remove material the more it is used, so use it minimally and then check your work. To bevel the other edge switch the ski so the opposite edge is on the far side, and repeat the process. Working the edges either from tip to tail or tail to tip is fine so long as technique is kept consistent. Because the base bevel determines to a large degree how the ski feels on snow, some experimentation may be needed to find the appropriate base bevel for a given ski and skier. Starting with about a half degree, ski the skis to determine if more bevel is needed. Differences in bevel may be hard to see, but on snow the change from a half degree to one degree can be enormous. Bevel can be added the entire length of the ski or only at the tip and tail to customize the tune. Remember different skis will respond differently to the same bevel. Because only an increase in bevel is possible (a decrease would require regrinding), proceed slowly.

Once the skis ski well it is very important to maintain the base bevel. A common mistake is to file the base edge to sharpen the ski. The edge may become sharper to the touch, but as the base edge becomes beveled up off the snow it becomes impossible for the skier to engage the edge. So to maintain the base bevel only fine grit diamond or ceramic stones should be used to deburr. Sharpening will actually be done from the side edge.

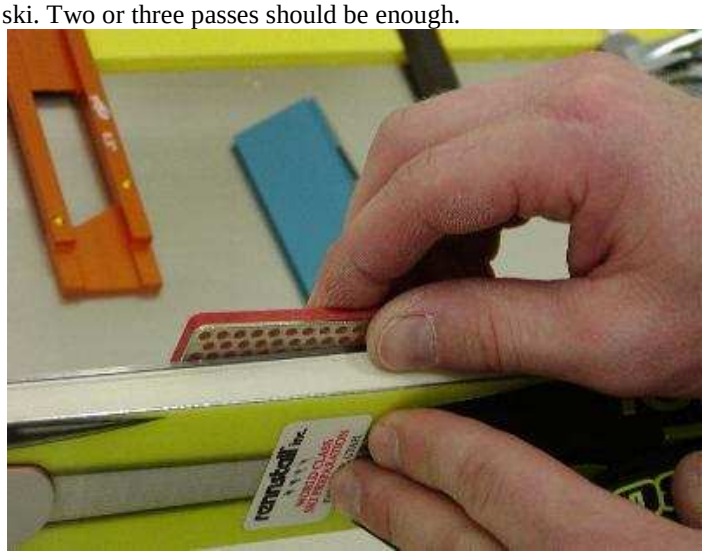
After the base bevel has been established, the side edges must be beveled and sharpened. The ski should be held in the vise, on its side with the base facing away. Once again start by checking the existing bevel. This is done using both a true bar and an Edge Angle Pro side edge guide. Place the side edge guide against

the base then use the true bar across the top of the side edge guide, if the true bar lies flat on both the edge and the side edge guide, your bevel is that of the side edge tool. If the true bar is not flat on the edge the bevel is off.

When using the true bar to check the side edge, take note of the sidewall. The sidewall is the side of the ski just above the edge. Sidewalls are generally plastic, but may contain a layer of metal or fiberglass, just above the edge. The sidewall material can prevent the file from filing the edge. If it interferes with the file some of the sidewall must be removed. The Sidewall Planer Pro should be adjusted so the blade removes the material just above the edge. Set the depth guides to prevent the blade from cutting too deep, this will also keep the tool from chattering. Remove only the material that interferes with the file. The sidewall supports the edge, so don't remove too much.



Now you should be able to file the edge. Using an Edge Angle Pro Clamp secure the file to the side edge guide, as with the base edge, you should start, using short, light strokes. Again, check the bevel and clean the tools, and ski base frequently. Metal edge filings can scratch the base if dragged along by the side edge guide. Just because you are using a file guide, and removing material, does not guarantee the bevel is correct. It is very easy for the side edge guide to wobble, causing the bevel to be off. As the bevel is set use gradually longer and lighter strokes, this will leave a smoother finish. Only remove enough material to set the bevel and sharpen the edge, removing more only shortens the life of the ski. Be sure to remove an equal amount of material over the whole length of the ski. Even though the tip and tail of the ski may be sharp and the area under foot may still need sharpening, still continue to file the entire length of the ski, this will keep the wear over the edge even. Under extreme circumstances filing only under foot can change the shape of the ski. Once the bevels are established the ski should feel very sharp. Check the sharpness by lightly pulling your finger or finger nail across the edge. The freshly filed edge will have a burr hanging off the side edge. You can feel this burr catch your finger nail, at the point of the edge. A burred edge will also feel rough if you run your hand along the length of the edge (be very careful a burred edge will cut you easier than a clean edge). The burred edge must be cleaned up. A clean edge will ski easier, and stay sharper longer. To remove the burr use a coarse or fine (blue or red) DMT diamond stone. Start with the ski still mounted on its side with the base facing away; hold the diamond stone flat against the base then tip it up very lightly to match the base bevel. Run the diamond stone along the edge back and forth the entire length of the ski. Two or three passes should be enough.



Then using your side edge guide and the diamond stone, you should hone the side edge. This process should be repeated until the burr is gone. By using this process with finer and finer diamond and ceramic stones, the edge will become sharper and free of burrs. The finished edge should feel glassy smooth as you run your finger along the edge, but razor sharp when you drag you hand across it. Once the edges are sharp an Edge grinding rubber (gummi stone) can be used to de-tune the tips and tails. Skis today require very little de-tuning, to take advantage of modern shaped skis; they are skied shorter but left sharper towards the tip and tail. If you are unsure how much to de-tune, start with the shovel and tail of the ski where it does not contact the snow, and lightly dull these areas first. Never de-tune so much that the edge can not be re sharpened. Carry a stone with you so you can de-tune further as needed.

Skiing your newly tuned skis will give you the feed back on whether more de-tuning is needed or possibly even a change in the bevels. Skiing on your skis will also create the need for maintenance. Repeating the steps for deburring is the easiest way to maintain a clean, sharp edge. If rock damage or significant dulling has occurred you will have to file the edges to resharpen them. Remember sharpen from the side edge only, as filing the base edge will change the base bevel.

Hitting rocks or even skidding on hard snow can cause the metal of the edges to harden. This hardening can create spots on the edge that have hardness greater than that of a file. A file will only skip off these spots, and become dulled. An extra coarse diamond stone (black DMT) must be used to break through this hardened spot. Once the hardened spot is removed with the diamond stone the edge can be filed as usual. Some damage to the edge can clean up easily, but occasionally enough of the metal has been gouged out that filing will not remove the spot. Don't worry about these nicks, it is more important that any burrs hanging off are stoned smooth and the bevels remain accurate. Working these major gouges out of the edge usually means removing too much material and compromising the bevel, they are better left alone. When the ski has accumulated a significant amount of gouges to the edge it can be reground. Then the process of tuning the ski must be repeated. Edge tuning requires some practice to develop a comfort level with the tools. Many people are intimidated, and fear that they will ruin their skis. An easy way to get started is to get your skis fully prepared by a reputable ski shop, then begin by maintaining this tune. This will get you used to using a true bar, file guides and various stones. You will also develop an 'eye' for checking for flatness and checking bevels.

WAXING

Skis need wax for many reasons. We wax not only to make them fast but waxing also improves the skis ability to turn and increases the durability of the base. Wax can be used in various forms such as liquid, paste, rub on, and iron in hot wax. For the purpose of this manual we will be primarily concerned with hot waxing, although all wax can be beneficial to the ski.

To understand why hot waxing is the most effective and beneficial to the ski you will need to understand a little bit about base material. Ski bases are made of polyethylene. The quality of the base will depend on how the polyethylene is processed and what additives are used. The best bases are made using a process called sintering. Sintered bases start out as a powder of raw polyethylene and additives such as graphite. The powder is pressed together under extreme pressure and heat. The sintering process bonds the grains of polyethylene together, but leaves tiny spaces between them. It is these spaces that give the base the ability to absorb wax. With proper care you can maximize the bases ability to hold wax. Neglect or improper care can leave the base dry, leading to oxidation, or seal the "pores" of the base preventing the penetration of wax. Ski bases are subject to tremendous friction; this friction is what can damage the base material. To protect the base from the start the bases must be properly prepared.

A freshly ground ski has no wax in the base. Because the base can only absorb wax in the first few molecular layers, even a light stone grind will remove any wax in the base. New skis from the factory are waxed quickly, not enough to saturate the base. Before the ski is subject to base damaging friction, wax will need to be built up in the base. Base preparation begins with cleaning the base, then saturating the base by repeated waxing. The best method for cleaning the base is hot scraping. Using a soft wax, such as NF yellow or, even better Hot Box and Cleaning Wax, the ski should be waxed. By carefully scraping the

ski with a plexi scraper before the wax fully cools, the wax will be pulled out of the base and with it pull out dirt that was in the base. Brushing with a copper brush will clean the base further. Because the base is very vulnerable to damage when warm, make sure your plexi scraper is clean and moderately sharp. You should check the sharpness of your scraper before every ski. If it is dull or nicked up, sharpen it using a Scraper Sharpener. One or two hot scrapes should clean most of the impurities out; further wax cycles will continue to clean the base. Next the base needs to be saturated with wax. The amount of wax a base can absorb depends somewhat on the base material, but also on how the base is conditioned. By waxing you can open the pores of the base increasing the ability of the base to hold wax. This is why multiple wax cycles are so beneficial to the base. When waxing, be sure to use enough wax to protect the base from the iron. After dripping on enough wax, use one pass to spread the wax over the entire base. Once the base is totally covered go back and use two or three slower passes to iron in the wax. Work tip to tail, and pay attention to areas that are hotter or colder. Move the iron quicker over hot spots and slower over cooler spots, to heat the base evenly. Apply more wax if the iron begins to feel like it is dragging. In addition, the scraping and brushing between waxing will remove micro-hairs on the base leaving it smoother and faster. A base that is well conditioned will be much more resilient. It will resist gouging and abrasion much better. This is important because of the abuse the base will have to endure at high speeds and when carving turns on hard snow. Also a base that is well saturated will be fast even if the wax is not exactly right. In events where two runs are taken, a ski needs enough wax built up in the base to get through both runs.

Preparing a new ski starts with cleaning the base. After a couple hot scrapes, about five waxings with Hot Box and Cleaning Wax (or NF yellow) should be done (scraping and brushing between each application). The soft wax gets into the base most easily; this will open the “pores” of the base. Once the “pores” have been opened, the base can absorb harder waxes much better. Then start alternating hard (NF blue) and soft (NF yellow) waxes. This will work the hard wax into the base. Building up harder waxes in the base hardens the base and increases the durability.

Much research has been done to develop waxes that penetrate the base well and have good adhesion properties so they are durable. But the two factors that effect wax penetration most are heat and time. Heat refers to the temperature of the wax, and the base material. Time refers to the duration of time that the heat is applied. Increasing the heat or the time will increase the penetration of wax into the base. Increasing the heat will help wax penetration up to a point; once the melting point of the base material is reached (around 150 C) the base can be severely damaged. For this reason a wax specific iron is critical to maintaining a safe working temperature. The duration of time the wax is left on the base increases wax penetration also. A ski should be left to cool for about an hour before scraping. Because wax adhesion can increase over time, leaving the wax on as long as possible is important. It is for this reason that storage waxing is so important, not only over the summer but between skiing. These two factors can also work simultaneously when the ski is cooling, the slower the ski cools the better the end result. For this reason it is unwise to put hot skis outside to cool. If you are in a hurry let the skis cool inside as long as possible before placing them out in the cold. The research done by Toko R&D in this area has lead to the development of the Thermo Bag. The Thermo Bag technology allows the skis to remain at an elevated temperature for any length of time; it also can let the skis cool extremely slowly. The Thermo Bag can provide a significant increase in wax absorption in a relatively short time, so it is a fantastic tool for preparing new or newly ground skis.

Hot waxes can be divided into two basic groups, hydrocarbons and fluorinated waxes. Hydrocarbon waxes, often referred to as training waxes, are inexpensive paraffin based waxes. These waxes (NF) are important for initial ski preparation, base cleaning, storage waxing, and training. Race waxes (Tribloc) are basically hydrocarbon waxes that contain fluorine. The fluorine is not just an additive; it is actually part of the wax molecule. Adding fluorine to a wax is not easy, therefore expensive. Fluorinated waxes are more hydrophobic, which means they repel water better. They also have very high resistance to dirt. For these reasons fluorinated waxes are faster in almost all conditions. Fluorinated waxes are also a must when using a fluorocarbon such as JetStream or HelX, because the fluorocarbons will not bond well with a hydrocarbon wax; it needs fluorine in the basewax to properly adhere to the base. In addition to the fluorinated race waxes Toko offers DLC (black) waxes. Diamond Like Carbon is a solid lubricant, with excellent antistatic and dirt resistant properties. In the past graphite and molybdenum were used, but because the DLC has better overall properties for ski wax we have progressed from graphite to molybdenum to DLC.

Choosing the correct wax can seem confusing at first given all the parameters. The key is to start simple and build on your knowledge and experience. Because of the simplicity of the Toko system, learning is quick and easy. For everyday skiing it is most important to wax religiously, as this will ensure that your bases stay clean and well conditioned. NF hydrocarbon waxes are perfect for this. Choosing a wax and mixing colors for training will be the first step to understanding wax selection. A better selection can be made by understanding some of the other factors that influence performance. Course profile and event will influence selection. Harder waxes offer better acceleration, waxing slightly harder then recommended for a slalom event is key. Harder waxes will build speed quickly, but have a lower top speed. Top speed isn't a factor in a slalom event but getting up to speed is, especially if you lose momentum after a bad turn. A harder wax will also harden the base, thereby helping it resist damage on aggressive man made snow conditions. A softer wax offers higher top speed and better glide, but slower acceleration, speed events and courses where gliding is critical may require using a slightly softer wax. Corrections of this type account for only a slight shift on the wax chart for a given temperature range and snow type, so experiment, and log your results. Snow humidity can also influence the wax chart; drier snow can be more aggressive, requiring a slight shift towards a harder wax. X-Cold powder added to your normal wax selection, can increase the hardness and durability to compensate for drier snow also. The DLC Black waxes are a must in man made and old snow conditions. Because of the resistance to dirt and static they excel in these conditions. Almost all ski racing takes place on man made or old snow so LF Black (DLC) and HF Black (Dlc) should be mixed in both the basewax and racewax of the day, making it a necessity in every racer's wax box.

To prepare a ski for a race, start by deburring or sharpening the edges as needed. You never want to begin waxing before the edges are cleaned up. Burred edges will damage your scraper and your iron, a scratch on your iron can make mess of your base. Next you should clean the base. A copper brush should be used with firm pressure to brush out the structure of dirt and wax. After brushing take a sharp scraper and scrape the ski. You will be able to scrape a fair amount of dirt off that was brought out of the base from brushing. It is a good idea to pre-scrape like this before all waxing as you don't want to iron dirt into the base. If you think there is still dirt in the base, hot scrape using NF yellow or red. A base layer of wax should then be ironed in. Your base layer of wax should be a slight bit harder than what you have selected as your race wax. This will help keep the race wax on top of the base, and add durability. This base layer should contain some if not all DLC Black when waxing for man made or old snow. The base layer must cool for about one hour, before it is scraped. A white nylon brush followed by a horsehair brush should be used to remove excess wax and clean out the structure. The goal when brushing is to remove the wax that is on the surface of the ski without disrupting the wax in the base. Depending on the structure in the base you may use more than one brush. Your top layer of race wax will always be fluorinated. Fluorinated waxes are extremely hydrophobic making them increasingly important as the temperature warms and the moisture content of the snow increases. The only exception to this rule is in extreme cold and dry snow; in these conditions fluorinated waxes offer little advantage. Let's say we have old snow conditions in the spring, snow temps around 30 degrees F. sunny skies, and a relative humidity around 35%. After brushing out a base layer of LF Black a combination of HF Yellow and HF Black is dripped on in a 1:1 ratio, and ironed in well. Don't make the mistake of skimping on the race wax. People often try to use a minimum of the more expensive waxes, but if you do not have enough wax to protect the base from the hot iron, you will burn the base. Ideally the race wax should cool over night, longer if you can make your wax selection earlier. Most people prefer to have their equipment ready the night before, especially if they have a long early morning drive. A good compromise is to lightly scrape the skis about an hour after waxing, and clean up any wax on the side wall or bindings.

This will let the remaining wax continue to cool and adhere to the base. Then use tape or ski straps to protect your skis during travel. When you arrive at your event you will only need to aggressively brush out the remaining wax and polish the base with a Thermo Pad.

For final preparation in all conditions HelX or JetStream should be applied to a well brushed out and polished base.

HelX is Toko's liquid fluorocarbon. It comes in blue, red, and yellow formulations. It should be sprayed on the ski and simply let dry. This application works well in a warm room and not so well outside as the wax doesn't bond so well with the ski base if it is cold or wet. It is possible to apply HelX outside more effectively by spraying it on and then polishing it with a rotocork (high speed and almost no pressure at all). Then brush out with a Nylon Polishing Brush. Use HelX Blue when waxing with a blue glide wax. Use HelX Red when using HF Red and Yellow when waxing with HF Yellow.

The JetStream waxes come in block and powder form. These are Toko's most popular race waxes. Like HelX, JetStream comes in blue, red, and yellow formulations (in both block and powder). Once again, a general guideline is to use blue when waxing with a blue glide wax, red with red, and yellow with yellow. The block is generally easier to use because it can be rubbed on. This makes applying JetStream on the hill easy. Once the base has been completely brushed out and polished, rub on a thin layer of JetStream. More is not better; a single thin layer is all that is needed. Too much JetStream can build up resulting in a slower ski. A single block of JetStream should last for around twenty applications. Use a

cork to work the JetStream in. Without a fluorinated wax as the foundation, the JetStream will not adhere well to the base. In order to generate enough heat to create a good bond, use good pressure cork moving back and forth vigorously. Don't be surprised if you break a sweat. After corking the base should be brushed with a fine nylon polishing brush. Then the JetStream should be polished with a Thermo Pad. In events where two runs are taken, hot waxing between runs is usually impossible. Not to mention that that rushing to hot wax and scrape skis that are still warm, almost guarantees that the skis will be slower. So just relax, and brush the bases with a horse hair brush. Reapply JetStream, rub in and polish. Another option for a final layer is HF Rub-on. In drier conditions, HF Rub-on as a final layer is best. Starting in dry snow conditions is one of the hardest conditions to wax for, because friction is high and not enough speed is present, to generate water to lubricate the base. HF Rub-on will act as an accelerant breaking the friction, because it is so effective it is relied on heavily in racing service in cold snow.

After racing on fluorocarbons it is important to brush the skis out well with a Copper brush (or Steel) and wax with hydrocarbon waxes. This will clean the base of dirt and fluoros, bringing the base back to its normal condition, and providing a consistent starting point for future race waxes. If the skis won't be skied or are traveling, a storage wax of NF red should be ironed in. This wax is hard enough to protect the skis, and has an average temperature range so it can be scraped and skied in nearly any condition.

Although all the information here has been related to skis, all the same rules apply to snowboards. Snowboarders are quickly learning how important it is to have a well tuned board. This not only makes riding a lot more fun, sliding is always better than pushing, but to be competitive in any event tuning is critical. Not only do waxing and tuning benefit alpine snowboarders, but freestyle riders probably have the most to gain from tuning. Half pipe and big air events need speed to get high in the air, and good edges to carry that speed, carving on the transitions. Boarder cross events can be won or lost out of the gate; position into the first turn can mean the difference between riding away, and having to fight through traffic. So good maintenance on your board means bigger airs, deeper carves, and faster runs. For more information, please see the Board Tech Manual.

Visit www.TokoVideos.com for demonstrations on waxing and tuning

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