

## Hertel and Company Inc®— **WAXFAX© E-BOOK**

*In 1974 I left a lucrative computer marketing position to start Hertelwax. I first invented the first original Hot-Waxer®. I then realized wax was the major issue. I purchased every ski wax I could and forwarded them to Skinner and Sherman labs to be analyzed. We found all of them to be identical. This continues to be the issue today. Understanding the elements we are dealing with I set out to design my All temperatures ski and snowboard wax® Today it is still the leader and we have five waxes they don't.*

Hertel and Company Inc®, (HCI, <http://www.hertelwax.com>) is located in the heart of Silicon Valley in Santa Clara, California. Our company has successfully encapsulated Surfactants and liquid c6 Fluorocarbons into paraffin, which until recently was said to be impossible! HCI has been able to accomplish this with the ski and snowboard waxes of White Gold® Wax, Racing FC739® Wax, Super HotSauce® Wax and Spring Solution® Wax. Terry Hertel is not a chemist but a formulator, and he enlisted chemist Dr. Timothy C. Donnelly. That enabled him to figure out how to produce the Hertel waxes. HCI also created a new extremely slick wax vehicle called "158 Flex"® used in our Racing FC739® Wax. This, along with Fluorosurfactants, make our new waxes extremely flexible while enhancing durability. This wax system actually semi-bonds to the PE base of skis and snowboards. Fluorosurfactant is Hertel's term and invention. Hertel never used the powdered fluorocarbon (PTFE, a registered trademark of Dupont) that many did. Considering the size of the ski wax market, before you judge, please google. Hertel wax is still the only company dealing with the elements, and they are water or melting snow, freezing snow, cold air, pollens, and the base material. Some people state a round sphere/ball bearing is the best results for ski wax, but this is wrong. I have proven that you ski on water. We have to disburse this water to allow water/air circulation. White Gold® assisted in winning Gold for the USA in the 1994 Olympics in Lillehammer, both the Men's and the Women's team, as well as many World Cup successes. Super Hotsauce® assisted in Gold at the 1988 games. Hertel waxes have been a part of every Olympics since 1974, according to a well-known tech writer whose job it was to report tech. Hertel products are emulated by many but duplicated by none! There is no other ski wax like it in the world today... read on to see why!



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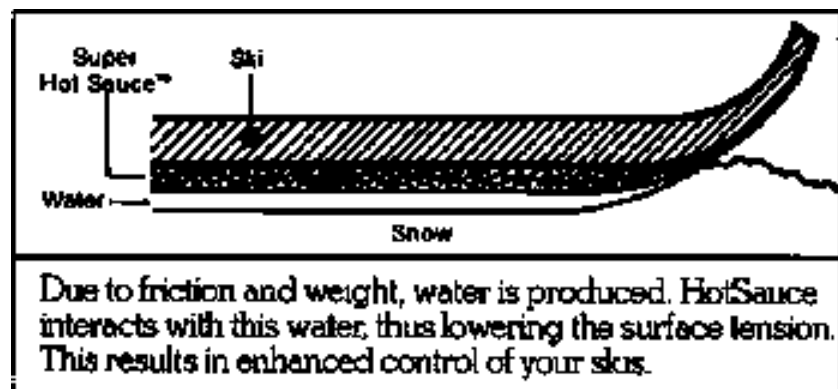


### 1.) THE MYTH OF SPEED and HOW THE MYTH BEGAN

Waxing your skis / snowboards is a way to improve your performance. For many years an old myth has been that wax makes skis/snowboards go fast. However, your skis/snowboard will go fast if you turn them downhill and let them go, with or without wax. This old myth came about when traditional ski waxes were designed and popularized after WWII. It seems that people simply waxed their skis and started to go down the hill. When they attempted to turn and got resistance, they continued to go straight. When a turn became necessary, they were going too



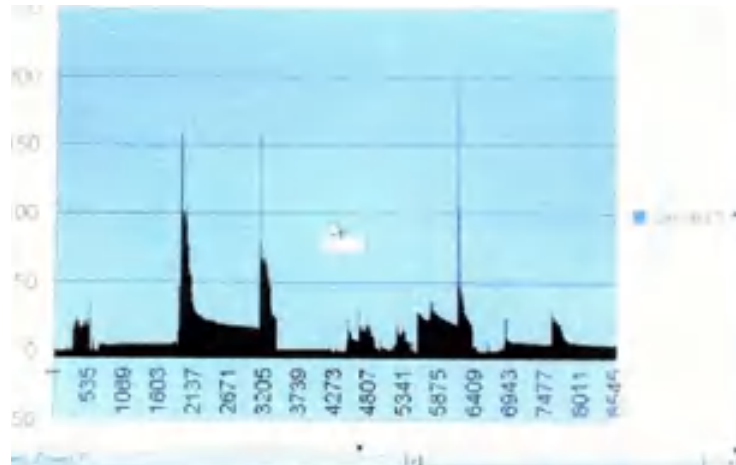
fast and the turn would be made in panic. The results were error, loss of control, or in many cases injury or just a crash. No matter who you are it is scary. But the fact is, with or without these traditional ski/snowboard waxes still sold today, your turning ability was pretty much the same. This validates the need for a superior wax, namely the HotSauce® All Temperature Ski and Snowboard Wax®.



This product with its scientifically proven formula is all white: One wax, All-Temperature, All-Mountain = Totally UNIVERSAL! Put it on and go have more fun.

2.) WHAT'S HAPPENING UNDER YOUR SKI/SNOWBOARD? *Pg 8 photo* When skiing/snowboarding, the moment you begin to move across the snow you are applying pressure and exerting friction, melting the snow and creating a fine layer of water between your ski or board and the snow. Traditionally wax was designed to be hard or soft based on the outside temperature and the snow temperature. The harder waxes were colored differently so you could distinguish

which wax to use depending on the snow and air temperature. Since the early days of waxing and continuing today, there have been many theories of what makes a wax the best. With modern technologies, many of the theories have become outdated and left behind. As previously stated, water is created and this is what we are gliding on as we ski. The structure of this water is where we arrive at our control and speed in skiing. The structure of water can be altered to improve our ski glide. If the water is long and tightly chained together, we create suction, as no air is mixed with the water to create a bearing-type surface. HotSauce® Wax Systems have been designed with today's skier/snowboarder in mind, with the safe chemical properties of the wax breaking up this suction. With new ski/snowboard bases used today, we need a wax that will wet its way into the open pores deeply. As the wax seals and protects the ski/snowboard, we



are creating a special surface that is textured to create snow and water air dynamics. The Hertel Wax Systems have been designed as an encapsulation-type process so as to allow the special water or oil soluble ingredients to activate upon contact with either. The surface tension is lowered, resulting in better control with even speed of your skis/snowboard. Hertel uses wax as a vehicle to get the water soluble ingredients to the base.

3.) WHAT IS A "SURFACTANT" THAT HERTEL USES? The term "surfactant" is a contraction of "surface active agent." This refers to any material capable of reducing the surface energy of a liquid at relatively low concentrations. Generally, such a compound having an insoluble moiety (which is inherently insoluble in the liquid in which it is useful) is combined with a stabilizing group. Such surfactants can be divided into four major chemical classes: 1.) Hydrocarbons 2.) Sodium Dodecyl Sulfate (SDS) 3.) Silicones 4.) Fluorochemicals. These classification describe the "tail portion of the surfactant molecule." In regard to their relative ability to reduce surface tension in water-based systems, the general trend is that fluorochemicals and SDSs are more effective than silicones, which in turn are more effective than hydrocarbons. Each class has its own utility. Ultimately the decision as to which one to use is determined by the level of performance needed. If more than one material proves effective, cost-effectiveness parameters are used as the selection basis. To the layman, it simply changes the structure of the water under your ski from a sharp bead of water to a flat layer of water, NOT a high angled bead like many competitors display. Think about it: if you have many sizes of water beads with sharp angles, your ski or snowboard is crashing into them. If you have a water

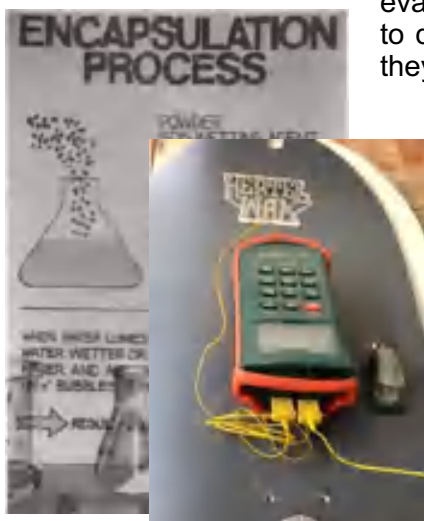
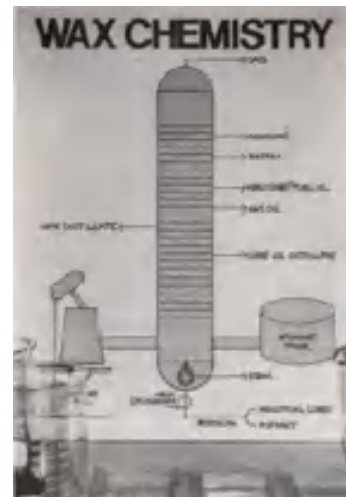


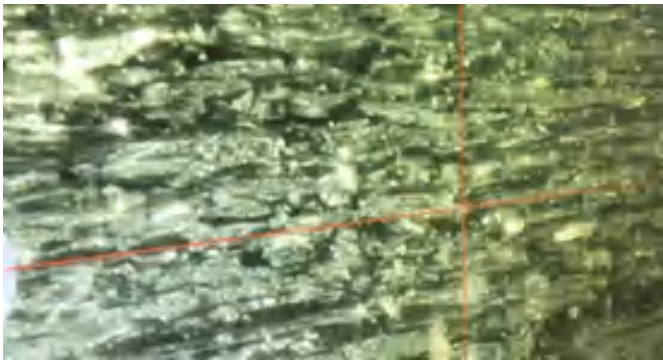
soluble surfactant, the bead is collapsed to allow the board or ski to smoothly glide over it giving the user 50% more lateral and forward control per our test.



4.) **LOW SURFACE TENSIONS, LOW CONCENTRATIONS, DYNES AND STABILITY.** Fluorochemical Surfactants differ greatly from conventional hydrocarbon and silicone surfactants. In most systems the Fluorochemical Surfactants are far more efficient in reducing surface tension to levels that are unreachable with other types. Surface tensions as low as 15 to 16 dynes/cm can be attained. Dynes is a means of measuring a unit of force, measuring the surface tension in Dynes per square centimeter. You want low dynes to reduce this force. Pure water at 25° C has a surface tension of about 72 dynes/cm squared. With our water-soluble surfactant agent and liquid per-fluorocarbons (using less than 2%), and using our form of micro encapsulation in which tiny bits of powder are formulated into the wax and react upon sensing the water, we reduce the surface tension down to 20 to 30 dynes per square cm. By using our formula Racing FC739®, which is a double micro encapsulation process, we reduce the surface down to 14 to 16 dynes per square cm. With our latest formula, when temperatures are very low it rejects snow, eliminating friction, thus creating the ultimate control. At the other end of the curve, we activated water-soluble agents to decrease friction as the water content increases. In the springtime, nature deposits pollens onto the snow, as well as diesel fuels and oil from a season of the cat machines. Because we have a special ingredient in our Spring Solution® wax to reject foreign objects, we make it slicker, and you achieve control never attainable before. Equally important is the fact that certain of these fluorochemical surfaceactive agents are stable and effective in many hostile environments. These include strongly acidic, strongly alkaline and even strongly oxidized systems.

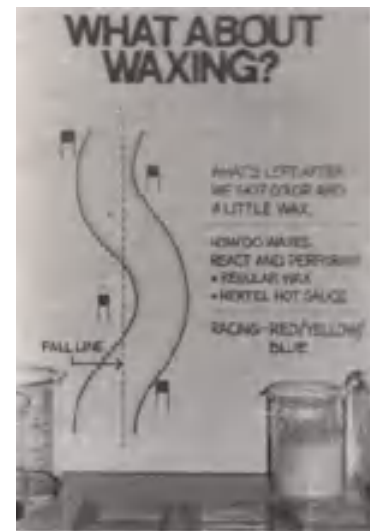
5.) **ARE PER-FLUOROCARBONS ADDITIVES LINKED TO OZONE DESTRUCTION?** No, they are not. Recent reports by the news media have again raised the public's concern about damage to the earth's ozone layer caused by chlorofluorocarbons (CFC's). Misconceptions and erroneous information also has developed along with this increased publicity. Contrary to the misconception, these fluorocarbon additives are not CFC's and do not contribute to damage to the ozone layer. It is important to stress the differences because some skiers/snowboarders have expressed concern about the additives, apparently confusing them with CFC's. Even some scientists, government regulators, and editors of trade journals are confused as evidenced by their public statements on the subject. Chlorofluorocarbons and halons (bromofluorocarbons), which can evaporate into the atmosphere, are linked to destruction of the ozone layer because they release chlorine and bromine. Chlorine and bromine catalyze the breakdown of ozone, permitting more UV radiation to reach the earth's surface. Hertel uses a base of fluorocarbons, and then introduces per-fluorocarbons that have a different structure or chain and that are used





in liquid form at 2% per formula or less. Hertel then put the per-fluorocarbons and surfactants together to invent fluorosurfactants. These additives are

much more stable than CFC's and halon and do not degrade when exposed to UV light in the atmosphere.



*This is the results of many test using a Thermocoupler Datalogger with three thermos leads embedded into the base of a snowboard or ski. As we move forward, you can log temperatures on the base of the board as it hits a mogall or in a turn that requires the energy to do so. At the same time we measure the outside temperature that goes down significantly.*

*Picture 2 is what a base looks like under a high powered microscope. This is additional proof why we need a good coat of wax applied every third day.*

6.) IMPROVE YOUR PERFORMANCE, SPEED, AND ENJOYMENT. Some people look for speed, some people look for performance, while some just are looking for fun. With Super HotSauce® ski wax systems, we supply it all. Super HotSauce® skiing wax has been designed to give the consumer ultimate control and safety. Super HotSauce® uses the highest quality waxes on today's market as a vehicle to carry special ingredients that actually interacts with the water created on the base of your ski/snowboard. The water is created through friction and weight. HotSauce® ski wax changes the water (snow) and makes it work for you. The net result is easier running surface, more control, additional safety and more fun! Now when you command your skis/snowboards to turn they will slide with ease. One wax covers All-Temperatures, All-Mountains, Totally-UNIVERSAL. This means no more looking up at the sky for the weather, or testing the snow in order to choose the best ski wax. Before Super HotSauce®, most consumers did not wax due to making a mistake applying the wrong wax color the night before. Once they went to the top of the hill, disappointment set in as they got off the chair and stuck. This is where the danger set in, with possible loss of a lift ticket as many took off the skis and walked down to have the wax removed. This causes the majority of skiers to not wax. This is why less than 2 % of skiers wax today. Ladies think that wax will make them go too fast and men are macho so they power through with no wax. In reality, wax gives confidence and control.

7.) WHAT EXACTLY IS SKI/SNOWBOARD WAX? Starting at the beginning, wax is a process of crude oil production. All oil manufacturers produce wax and wax systems to deal with it. Depending on their processes and areas of the country, the wax will vary, resulting in a Western crude versus an Eastern crude. At HCI we use Western crude, which is the best for making our

product. Once the crude begins the refinement process, as the above picture shows, oil is run through a heat exchanger. As the oil rises in the refractory tower, byproducts are released at different levels for further processing (*above diagram - note the wax is in the middle*). Once products are separated, they are held for continued processing or for a wax distillate.

8.) WAX PROCESSING – After crude oil processing, the wax is in storage awaiting further processing. The next process distills the wax and separates it into different grades for yet further processing. The distilling process can be thought of as a straining process similar to straining foods or making whiskey. Grades of wax are denoted by their melting points. Thus the oil company collects and filters this distillate, and the end result is a refined product that we use for making ski and snowboard wax. The next step is putting in additives. Wax Hardener allows us to change the hardness of the wax used on our skis/snowboards. Traditionally, this is the way we adjusted the wax to work in varied temperature ranges and why we needed colors to distinguish the waxes. We continue to use hardeners, but at HCl we use a higher quality product called TH2, an additive with a high melting point produced from a distillation process from manufacturers such as Chevron, 76, and other oil companies. This distillation process results in the various plastic products including ski/snowboard wax. There are other products that come from the earth that are similar to the TH2, but TH2 performs better. HCl exclusively uses TH2, enabling us to exceed our high specifications and have the highest quality available.

We have upgraded our wax to meet the standards of the 21st century onward. HCl produces wax ensuring you are getting a wax designed for the snow sports industry. We have researched a hardener that is a one of a kind and performs beyond all expectations. We look at snow ski/snowboard waxing from a practical point, and have decided that wax is a vehicle for getting the proper ingredients to the base of your skis/snowboards. Once the ski/snowboard is in motion, you create a fine layer of water that Super HotSauce® Wax reacts to. There is a special ingredient added to the wax that allows it to perform on demand as you ski, IN ANY CONDITION.

9.) SNOW & WATER. At warmer temperatures, snow takes on the shape of roundness, as we have all witnessed when snow or ice melts. Colder temperatures display much harder crystals with a sharp edge-like structure that has the ability to stick together, thus allowing the packing of the crystal. Snow crystals are formed in the upper atmosphere when the temperature is at or



below 32° Fahrenheit. If a water droplet freezes or crystallizes, it will form the nucleus of a snow crystal. As soon as a crystal structure exceeds a certain weight, it starts to fall, resulting in what we know as snow. When you see the snow sparkling in the sun, it is melting as it is falling.

*PICTURES The transformation of a snow crystal: Note the gradual rounding off of the point as the crystal ages.*

10.) WHY WAX SKIS & SNOWBOARDS? Skis and snowboards are made of several different products such as wood, foam, glass, fiberglass, plastic polyethylene, steel, aluminum and glue hot melts, which in many cases bond the skis together. With all these materials, we now see one of the many needs for continued waxing of skis/snowboards. 1.) It is important to seal your base inside and out. This keeps the contaminants out, such as water and air, and protects your ski/snowboard from future damage. We call it preventative medicine. 2.) Many manufacturers pre-wax the skis/snowboards at the factory just for that reason. They want you to start with a ski/snowboard that is ready for use with the necessary pre-treatments made. This, in many cases, eliminates future problems of non-waxing. Hertel recommends removing the manufacturers pre-wax and applying a good coat of Hertel Racing FC739® ski wax. 3.) Waxing your skis or snowboard is protecting your investment. It is a proven fact that waxing your skis properly every 20 to 25 runs will extend the life of your skis one year or more. 4.) If you slide across a rock with waxed skis, the ski wax will be between the rock and the ski acting as a lubricant in many cases. The fact is that less or no damage occurs. 4.) Waxing your skis and snowboards gives you control and allows the skis and boards to glide smoothly, increasing the fun factor!

Some people think waxing a ski or board is difficult. They pay \$35.00 to \$40.00 or even more for a wax application, when it isn't difficult to do yourself. The base material of a ski or board is only 1.36mm or 0.054 inches thick and some think the board or ski gets filled with wax, but that is not the case. Unless overheated, the wax does not penetrate the base. Most people can equate with the fact that most of the wax is gone minutes after they take their first run. This is due in part that many waxes do not bond to the base. Most waxes are brittle and they pop off the minute the base flexes. Also the hard crystals of morning will rip most waxes off. Hertel has a racing high performance wax that actually hooks on to the base allowing it to last up to seven days. Hertel waxes have ingredients that are nano in size thus are allowed to get into the pores like no other wax. This has been proven and these images support these findings. *images*

Another factor is the ski or board that is purchased. Some of the Big Box Stores have low quality equipment. They know that the board will be used only for a weekend, so after ten runs the ski or board further loses quality and effectiveness in making turns.

11.) KINDS OF WAX. There are number of different types of wax. Their choice of use depends on conditions, time factors, location, and durability requirements.

PRE-WAXES: One of the best ways to remove old ski wax is to apply a very hot coat onto the ski, scraping immediately to remove old ski waxes, dirt and grime. This will set your ski or board up well for the rest of the preparations.

IRON-ON WITH SOLID WAXES: Traditionally, iron-on ski wax are made of a much harder product. Ski Wax temperature ranges are denoted by hardness. Whatever the temperature, if you are using traditional colors, you have a Soft for Warm, Medium for Cold, and Hard for Colder. However, colored ski waxes should not be used as is explained under # 32 REVEALING THE MYTH OF COLORED SKI WAXES. Solid white ski waxes are best for hot waxing in Hertel Hot-waxer® equipment or using an iron. Most companies have cut the color dyes to a minimum so as not to stain the base. Dyes actually slow the ski down. Ironing the wax heats the base, opening the pores and the wax, which has taken on a liquid state, becomes thinner. The ski wax flows into the ski/snowboard base. As it cools, it has a holding effect (bonding), typically lasting



the better part of the day. Durability and longevity is dependent on the quality of the ski wax, the type of base, the method of application, the outside and snow temperatures, and the number of runs made. With the sintered (formed into a mass by heat and pressure) bases started in the 1980's, waxing is mandatory due to the honeycomb pore structure. Without ski wax, performance may be greatly reduced. With a sintered base, due to its deep pores, ski wax if properly designed, has the ability to reach up to the matting of the ski base. This is a keen feature paralleled by no one except our Racing FC739® Ski & Snowboard Wax.

**RUB-ON WAXES:** Traditionally, rub on waxes are softer. The bar fits in the grip of the hand so you can smear the product on the base. Due to its softness, longevity is in the neighborhood of ½ to 1 run. With Hertel's new multi-use rub on wax, we have designed the ski/snowboard wax to be harder. When you rub the product on, tiny micro-parts of wetting agents and wax work their way into the ski or snowboard. Corking or Scotch Brite-ing (buffing) after will smooth the surface. Longevity will be increased to one day or more. The more applications, day to day, you will notice the ski wax lasting longer due to the activation of additional wetting agents not used and lodged into the pores of the ski / snowboard. I have proved that holding a bar of wax at 30 ° and rub EDGE to EDGE. See how it transfers the wax to the ski.

**LIQUID SKI WAXES:** A good liquid ski wax is made of a powerful polyethylene solution plus special ingredients to work with the water under the ski/snowboard. Due to the fact that these products are applied cold, the application will last for a few runs, but with additional applications, better performance ratios will be realized. Do not apply Hertel liquid ski wax to any other-brand ski wax already existing on skis/snowboards. Only apply if Hertel Super HotSauce® ski wax is already on your skis/snowboard. The products are incompatible (this goes for most liquids tested by our staff). Our liquid ski wax is compatible with all of our products. HotSauce® Liquid Ski Wax will last longer if sprayed on the night before you use the equipment. Simply set the equipment with the bottom up, spray it on, and you're done! The next morning your equipment is ready for skiing or snowboarding. Quite a simple process! There are several liquid or tube-type waxes on today's market. In the 1970's, I saw everything from silicones and antifreeze to shoe polish, trying to be the one that replaces the hard waxes used in Hot Waxing. Silicones are an oil-based product and we all know getting rid of oils and tars is a problem. Teflon is similar to silicone and does not reduce the suction and therefore does not work. Liquid HotSauce® is an evolution designed to be compatible with the ski base. It is a powdered polyethylene emulsion. We add a special water activation product that is encapsulated to do the same process that Super HotSauce® does. As you apply it, it actually wets itself into the ski. Like gasoline spilled onto the ground, as it hits it spreads fast; that is a wetting process. It gets into every crack and crevice until dry. Surface-active agents cause the water to form thin films. Our ski/ snowboards now have reduced surface tension and lateral control never offered by any waxes of today's market. It reacts to the coldest of snows and ice to totally reject it, and in the spring season it rejects nature's own pollens as well as that tar-like black substance that is a very small amount of diesel fuel and lift grease. As the groomers do their job, they are actually plowing pollens all through the snow. This is spring- time enemy #1. I do know how to stop that, but they would have to pay me big bucks for the solution.



ALL-TEMPERATURE WAXES: We generally ski/snowboard at normal temperature ranges of 06° to 55° Fahrenheit. (When we designed an All-Temperature product, we designed these temperature boundaries). The ski wax, if applied differently and mixed with other ingredients, may easily be used at the two temperature extremes. Therefore, the general consumer need only buy All Temperature Super HotSauce® Ski wax to enjoy and have fun.

12.) REVEALING THE MYTH OF COLORED WAXES AND ARE THEY NECESSARY? I can prove to you the answer is absolutely NO. Let us understand why the competition attempts to continue to sell colored waxes. The answer is twofold: 1.) Much of it is on-going marketing 2.) Most of it is lack of technology. In 1974, the president of certain company (which I will leave nameless) came by my booth at the annual SIA show in Las Vegas and stated that our white All-Temperature Super HotSauce® Ski Wax was causing havoc in the ski wax industry. He mentioned that he sold several different colored waxes to dealers every year. Red wax for this type of skiing conditions, Blue wax for that type of skiing, Yellow wax for whatever type of skiing; you get the idea! Thus, he revealed that selling dealers just one wax color (Hertel's White wax covering All Temperatures) was ruining his colored wax sales bottom line. Colored ski waxes do not work on all temperatures. Their claim is to work on only one specific skiing/snowboarding condition/temperature. I feel that color is only added to make one believe it is doing a specific function. Hertel All Temperature Ski & Snowboard Wax covers temperatures ranging from 6° Fahrenheit to 55° Fahrenheit. I proved we ski on a fine layer of water, and NOT on the previously held belief that we ski on an angle of a snow crystal. That was and continues to be old school, mistaken and erroneous information. Next, I proved that changing the structure of the water was the real achievement. Hertel waxes all change the structure of the water through its micro-encapsulation process. I also proved that the brown stuff all over the snow in the spring was not the traction grease and exhaust, or the lift grease. It was in fact spring-season pollens blown onto the snow by nature. By understanding both wax chemistry technology and nature's elements first, I was able to develop three cutting-edge ski & snowboard waxes: Super HotSauce Racing FC739® Wax, White Gold® Wax and Spring Solution® Wax. I also listened to the consumer and was able to achieve ski & snowboard waxes that last up to seven days without a re-application. In 1988 I forwarded a press release announcing my new Super HotSauce Racing FC 739® ski wax to a ski tech magazine. Interestingly, in the same magazine a European competitor stated they had invented Fluorocarbon wax and would deliver the fluorinated product that autumn (they actually had no product). By the time autumn had set in, they found a product called PTFE that is still widely used today. PTFE is a trademark of Dupont Corporation and is also known as Teflon. PTFE was added in all their colored ski waxes; however, this was a poor choice as there are several types of fluorocarbons. All-Temperature or All-Mountain wax was NOT part of their product line. Certain FC's work as ours, and some are inactive. This is why our European competitors still continue to market mass amounts of wax colors to the world. Hertel has chosen the accurate FC and our competitors are certainly aware of it. In the 49+ years I have been involved in ski wax chemistry, I have openly shared my ski wax technology with students doing research programs. The result was I soon found them as my new competitors in the ski and snowboard world of wax! Hertel is also aware of one competitor who has attempted a direct copy of our snowboard waxes. I must say they came somewhat close in their chemistry, yet not close enough. We have tested several of our competitors colored ski waxes and noticed parts of our formulas slowly sneaking into the market. Yes, imitation is the sincerest form of flattery, however imitation is also infringement on our claims. HCI Ski & Snowboard Wax has been successful in being a part of the Olympic dream. Usually, whichever skier or boarder won an Olympic medal, the manufacturer's representatives wanted to have that product to sell. When we won the Lillehammer, Norway Olympics with Hertel White Gold® Ski Wax in 1994, our two European competitors decided to flood the market with free product. I want you to understand exactly why we lost some of our dealers around the country. Our two gigantic Euro-competitors could not compete with our advanced technology, so they attempted to flood the market with

their product. The dealers were contracted not to sell Hertel Wax or they would lose their Norway Line.

13.) WHAT SKI/SNOWBOARD WAXING DOES FOR LATERAL PERFORMANCE - With Super HotSauce® Ski & Snowboard Wax, the lateral performance is greatly improved due to the reduction in surface tension of the base. This is the most important feature of ski and snowboard waxing - it is essential for greater maneuverability and control. As we stated earlier: 1.) New skis/snowboards should always be hot waxed to protect your investment. This will seal your bases from the inside out. 2.) Your skis/snowboard should be hot waxed every three days for your safety, others safety, and for overall control. 3.) If you use traditional wax systems, you have to choose the color of the day and apply wax either cold or hot. This is not recommended. Super HotSauce® Ski Wax Systems is designed for the everyday fun customer. It is guaranteed for All Temperatures but works best in temperatures from 06° to 55° Fahrenheit. Super HotSauce® is the only All Temperature wax system available on today's market. Traditionally skis were made of wood. Then came plastic or polyethylene extruded bases, as we know today. A new base was introduced which gave the manufacturer and skier/snowboarder new advantages in production, skier performance and durability. This base, being very hard, has a honeycomb like structure with tiny little holes throughout the ski/snowboard base not visible to the eye. If you put a raw ski base against the snow you will notice a drag and not the best performance characteristics. Once the ski wax has penetrated clear up to the matting, the ski/snowboard is ready. With HotSauce® ski wax products we have designed ski waxes for deep penetration through liquid reconstruction when the ski wax is hot, wetting the ski wax deep into the pores.

*Hot water, iron rub on pictures ↓*

14.) HOW TO APPLY SKI/SNOWBOARD WAX. There are six ways to apply ski and snowboard wax. 1.) Cold or rub-on wax, rubbing from edge to edge 2.) Applying a thick coat of wax with a Hotwaxer® 3.) Apply a coat of wax with a hot iron 4.) High-speed friction hot waxing 5.) Liquid Wax (spray-on) wax 6.) Cream wax. Make sure your ski/board bases are clean with no serious gauges. A product called Chevron 350B solvent is the best product to remove old ski wax from your ski/snowboard base. Make sure your edges are as sharp as you desire. Make sure there is no rust on the edges. Make sure it is in the comfort zone for all waxing 62° plus Fahrenheit. Hertel Ski Waxes are produced at around 170° Fahrenheit, so your ski/snowboard base does not need to be cooking at high temperatures. Other ski waxes out of Europe require the iron or ski waxer to be operating at extremely high temperatures that may cause serious harm to your base. These waxes are old technological designs from the 1950s and are usually colored. I do not recommend ski waxes with powdered Fluro due to the fact that is ground up Teflon. Smoking Teflon is extremely harmful to one's health. An overlay was developed because the manufacturer was unable to successfully produce a product like the HotSauce® ski wax line. Hertel Ski Waxes are All-Temperature. All other ski waxes on today's market are not! This can be proven by the fact that all European ski waxes are set up to be used in specified temperature ranges (i.e. red colored wax for so & so temperature, blue colored wax for this & that temperature, etc.). Note the red at one company is not the same as the red for another company. Consequently, there is no such thing as a standard for each specific ski wax color. Confusing, wouldn't you say?! Much of the European color confusion is caused by the lack of scientific laboratory developments, the zest to market for profits only, as well as resistance to change.

Cross Country Ski Waxing: Cross Country skiing waxing is much the same as Alpine ski waxing. The Cross Country skis are waxed the same as Alpine but are only



waxed on the tips and tails. The center of the ski is where different techniques are used. One is a klister or sticky type ski wax so the skier can get a better grip when applying energy to thrust forward. Often a fish scale type surface is used instead of the sticky stuff. At this time HCl is not in the XC wax business.

15.) HOW TO IRON-ON WAXES: 1.) If you are using an iron, NEVER allow the iron to be in one place for more than a few seconds! If you do, you will be purchasing a new ski/snowboard 2.) Touch the bottom of the iron with the wax allowing it to drip onto the base. With the iron, spread the wax evenly. 3.) Set the iron down making sure it is off or out of the way to prevent burning yourself or other things. Think safety! 4.) Have good ventilation at all times. 5.) Do not smoke the wax. When the wax is smoking the lower melting point wax is dissipating into the atmosphere, thus the wax specifications will not apply. 6.) Once you have applied the wax with the iron, use a plastic scraper to scrape the base. 7.) Put the scraper in both hands using the bottom side of the scraper pulling it toward you. It is actually a mash/scrape process. 8.) After scraping, use a cork or Scotchbrite pad to buff the ski wax smooth. You are ready to go and have some fun now!! Teachings: The competition has people believing the base has to be scraped, waxed, scraped, and waxed again several times. There is more wax on the floor than on the ski. This is nonsense. I would like to quote Hons Tobler, the past president of Toko wax. "Mr. Hertel, you are going to ruin the wax business. We sell them four or five colors for different temperatures. Mr. Hertel, you are selling one wax to cover all the temperatures thus if we go your way we will lose three fourths of our business. When it comes to just applying one coat, again you are costing us business. We have them believing applying several coats is necessary therefore we sell more wax."

16.) FAKE NEWS - STOP BUYING GOODS FROM ADVERTISING Advertisers do everything they can to get you to buy their product, including drama and false claims. Hertel does not sell wax for speed, but for control. When you have a smooth sliding ski or board you have control, which gives you confidence. When you have confidence, you ski better and are less likely to have an injury. Many spend a lot of money on equipment but go the cheap route when it comes to waxing. You must read and understand about the waxes and why you must wax. The cost of not waxing could be an injury, which is very expensive. Not waxing is like buying a tire and not putting air in it. Just like a tire, you need to maintain by re-waxing when needed.

17.) GENERAL SKI MAINTENANCE Today most manufacturers attempt to produce a ski/board that is ready to go right out of the factory. This cannot be true in all cases. If skis, I suggest to match the pair up first making sure they are a matched set (pair). Look for abnormal bends or poor workmanship. Have your ski/snowboard bindings mounted by a certified and insured shop. It is mandatory that you get the proper DIN setting for your ability and size. After your bindings are mounted, you should perform a quick & easy Touch Up-Tune Up. Check the bases, making sure it is flat and the edges are tuned and sharpened to your ability. Next, make sure they have been waxed (it's called pre-waxing). This is done by making sure the wax is of a hotter nature, so the flow of contaminants (i.e. water, oil, road grime), does not penetrate the ski / snowboard inner core and start premature deterioration. After prep, you should be ready for a very enjoyable skiing experience. Please remember to wax every three days, unless you use our Racing FC739® Formula ski wax, which lasts up to seven days. After skiing/snowboarding a certain amount of time, you will notice the normal wear and tear on your base -- scratches, gouges, etc. When you purchase your equipment it is a lot like buying a new car or a new dress. You have to check it out first, make sure it's gassed up, tire pressure is okay, and ensure other checks and balances have been made. A new piece of clothing may have to be hemmed, threads cut off or you might want to check stitching and material for quality and workmanship. Check skis/snowboards for trueness, make sure they are as close to flat as possible, there are no gouges in the base, and that the edges are sharpened properly. Lastly, make sure your bindings are set to your physical specifications. Never take chances. The better your ski/snowboard is tuned, the



higher performance you will get out of the ski/snowboard. The better your equipment is tuned, the safer you will be and skiing and snowboarding will become a much more enjoyable sport. If you are fortunate enough to work in the snow sports industry, please make sure your dealer is using Hertel Super HotSauce® ski waxes. If not, ask them why! Most dealers go for cheap, bottom line cost, or sadly have become accustomed to using a poor quality wax products. You know your skis and boots thoroughly; it is your right to know your wax just as well! I soundly believe Hertel ski waxes are the key to major injury reductions on the mountains slopes.

18.) TUNING YOUR SKIS / SNOWBOARD & BASIC REPAIR. The following process should provide guidelines for preparing and maintaining skis/snowboards. Both skis and snowboards should be thought of as a tool that must be properly kept finely tuned. Working on skis/snowboards for a few minutes after each day on the slopes will keep them tuned to provide optimum performance.

TUNING KIT BASIC TOOLS: 1.) Steel scraper for scraping base material 2.) Plastic scraper for scraping wax 3.) Mill Bastard files, 8 and 10, for scraping edges 4.) File Card for cleaning files 5.) Roll Bar for checking trueness of base 6.) Stone for cleaning edges after sharpening 7.) Base material candles/repair material to 7:11 gauges 8.) Waxer, or an old household iron works 9.) Clamps / Vice to hold skis & snowboards 10.) 180 Grit Wet/Dry Sandpaper (not the type normally used to sand wood) 11.) Scotchbrite for buffing wax 12.) Base Cleaner for removing old ski wax

BASE PREPARATION: Generally, skis/snowboards arrive from the factory concave, or edge high. This must be corrected by flat filing. It may take a considerable amount work to get the bases flat, but will greatly improve performance. 1.) Check the base with a roll bar to determine if it is concave, convex or flat. 2.) If the base is concave, the steel edges must be brought down with a file until the ski / snowboard is flat. As you file the edges, remove the excess base material with a steel scraper to make the filing job easier. 3.) If the base is convex, use a sharp steel scraper to remove the excess base material. It is very important to constantly check your work with a roll bar.

BASE REPAIR 1.) Skis/snowboards should be at room temperature and free of ski wax before attempting to repair a base. 2.) Light the (polyethylene) candle until the material is clear and burning with a blue flame. Hold candle low and close to metal scraper. Be very careful, as you do not want to get hot material on your hand! 3.) The most effective technique in filling gouges is to drip the burning candle, holding it close to the damaged area. Use the scraper as a palette. 4.) After the gouge is filled in and the area completely cooled, use the scraper to take off excess material.





Corking or buffing.

Base magnified to see what it looks like to prove why we need a good wax

SKI SHARPENING 1.) Make sure bottoms are flat as discussed in Base Preparation above. 2.) For Side Filing, hold the file in one hand and use long strokes with constant pressure. Be sure to hold the file at a 90° angle to the base using fingers and your second hand as a stabilizer. Use a file card to keep the file clean. Remove filings from the base frequently with a cloth. 3.) Polishing with a stone. Normally, use a stone on bottom edge only to remove burrs. Stoning the side edge for extra sharpness is only necessary under extreme conditions. After sharpening, run fingers along the edge to check for burrs 4.) De-tune the tip and tail with sandpaper. Dull the tip 3-5 inches from base of shovel and the last 2-3 inches of the tail. 5.) The sharpest portion of the ski should be the middle section, with the sharpness decreasing gradually toward the tip and tail. Learning to perform this maintenance can save you time and money, although all of the above can be accomplished at your dealers with high-tech machines that, if properly maintained, will perform a wonderful job.

19.) SKI AND SNOWBOARD WAXING: The best way to clean the ski/snowboard is to ski wax and scrape immediately. The wax will draw impurities from the base without drying it out 1.) In pre-wax preparation, roughing up the base structure will make the base more receptive to wax. This is accomplished by first using sandpaper, followed by Scotchbrite. Wrapping Scotchbrite around a file will make it easy to control. With a snowboard, release the binding screws on the bottom of the board to prevent indentation. 2) Ironing -you can use a Hot Waxer® or household iron. Touch ski wax to base of iron and al-





low the ski wax to drip to the base. Ski Wax should not smoke during application. If it does, lower the temperature of the iron. Smooth out the ski wax, using the iron and make sure the iron is continually moving. 3.) Scraping-Use a plastic scraper to remove all excess wax. The base should be scraped very clean for all snow conditions. When

buffing, draw an imaginary line down the center and buff from the center outward in the shape of a banana. This allows the water to flow out the sides of the ski or board, instead of traveling down the whole ski or board.

Wax should be kept on skis/snowboards at all times when traveling. If you transport your skis

outside of the vehicle and you don't have a ski bag to protect them, at least make an effort to

cover the bindings with a secured plastic bag. Otherwise the bindings get soaked with road grime, salt and more. If not protected, you put them onto the snow and step into the binding, never once considering the friction they have incurred if a release is necessary. Other people are skiing next to those who do not take caution, those who do not wax, or have the wrong wax, and they are careless. This is a liability to we who have taken care of our equipment.

20.) SKI & SNOWBOARD STORAGE In the summer months do not store your skis/snowboard on a concrete floor. I suggest storage is at eye-level in your garage, preferably on their sides. Do not allow your ski/snowboard to be in the direct sun for any length of time.

21.) ACL NOTE FROM WINTERSPORT BUSINESS INC. SKI TECH Ski Binding, ACL Link Question: Breuil-Cervinia, Italy "There may be no link between serious knee injuries and ski bindings despite binding manufacturers' claims of knee-friendly bindings and a host of research into the relationship." That's the claim of a trio of US researchers who called on the industry to

look elsewhere if it wants to solve the ACL injury epidemic. There is no significant relationship between the quality or choice of the release system (bindings) and the quantity of ACL injuries, said Dr. Robert Johnson of the University of Vermont's Orthopedics department. Johnson and researchers Jasper Shealy and Carl Ettlinger have headed a 27-year study of ski and snowboard injuries at the Sugarbush resort in Vermont and have studied more than 2,000 ACL injuries. No one product has been identified that can sense and respond appropriately to potentially injurious loads, Johnson told the 13th International Congress on Ski Trauma & Skiing Safety. Ettlinger said afterwards that no single brand or type of ski binding has been shown to affect ACL injuries. Johnson instead urged researchers to turn their attention to other possible factors, such as the interactions between ski boots and skis. Clearly, the ACL injury is the most troublesome problem in our industry, he said. ACL injuries, or anterior cruciate ligament injuries, are the most serious injury in alpine skiing today, although their frequency has leveled off in the last 6 years. In the Sugarbush study, ACL injuries account for about 20% of all ski injuries. Knee injuries of all kinds make up a third of all ski injuries. Johnson said recent studies confirm well-known trends in ACL patterns: 1.) Women are more than twice as likely as men to suffer an ACL injury. 2.) Less serious knee injuries have declined in frequency while the most serious types primarily

Above is a picture of the Hertel wax production system. We produce all our waxes in house.

ACL injuries have increased. 3.) Oddly, the left knee is more likely to be injured than the right. Johnson had no explanation, but said the research found no relationship to whether a skier was right or left-handed. Other researchers disagree with Johnson and say binding design could hold a key to reducing ACL injuries. Richard Greenwald, a biomechanical engineer with TUV Product Service in Providence, RI, said forward twisting falls, which could be reduced through binding design are a significant contributor to ACL injuries and should not be discounted. "We shouldn't be putting all our eggs in one basket", Greenwald said. Some said the newer style of higher, stiffer boots contributes to the problem because the boot does not give in a backwards fall. One German researcher said his is working on a boot with a rear spoiler that will release in dangerous positions."

**CAN PROPER WAXING HELP SOLVE THE ACL PROBLEM?** Writing to a magazine, a letter from Terry Hertel to the Editor: I continue to read about ACL injuries. Now we are reading that it is not the bindings fault. Poorly tuned equipment could be a major factor in injury. A study should be done on the amount of resistance created by equipment with no wax, equipment using any old wax, and equipment using inferior wax systems. If everyone has good equipment that is adjusted and maintained properly, our mountains would be much safer. We know that 95% of snowboarders and skiers have never addressed waxing. It's no wonder that, when a person has not one drop of good wax on their equipment and they meet with resistance, the added energy applied often results in an accident. If I am right, it could mean profits for all wax companies, safer mountains, reduced medical bills and possibly reduced insurance rates. Most importantly, it could mean more fun for all. Many people think wax makes you go faster. This is true if you point your skis or your snowboard downhill. The speed gained by a properly waxed ski is insignificant compared to the gain in lateral control. Most novices don't point their equipment downhill. It's only done when the skier or rider is unable to make the desired turn. Then they are faced with speeds that cause them to panic. Because they are afraid to turn or doing anything, the obvious occurs. This needs to be addressed for slower speeds also. With Hertel Wax, you can turn on a dime while going fast or slow. Try to spin a poorly waxed board or ski in a 360-de-



gree motion at a slow speed. Our products reduce resistance and give the user added control, allowing their equipment to perform on demand. There is nothing else like the HotSauce® line. \*\*Via from Terry Hertel HCI, Mount Vista, Ca. September 1999.



22.) STANFORD UNIVERSITY GRADUATE STUDY In 1988, a group of Stanford University graduate students in the Masters of Business Administration Division conducted a three-year study on HCI Ski Wax. The purpose of this study was to: 1.) Research the background and inner workings of Hertel Ski Wax business. 2.) Understand how Hertel Ski Wax fit into the larger snow sports industry. 3.) Provide recommendations for streamlining the business. 4.) Provide recommendations for marketing Hertel Ski Wax, thereby increasing sales. At the time, Hertel was not only selling ski wax, but also skiing accessories such as Ski Tooling Kits, Hot Waxers, Waxing Irons, etc. The results of the Stanford study were as follows: Since Hertel Ski Wax is high quality ski wax, the study recommended focusing solely on volume sales and marketing of the ski wax. The accessories were considered secondary, and not an area of focus for volume sales. I indeed took the study's advice and slowly phased out the accessories. From there, I focused my efforts on creating new sales and marketing strategies, as well as inventing new ski wax formulas. The invention area was interesting, as the creative process is always exciting! With assistance from Chemist Dr. Timothy C. Donnelly, Hertel was able to achieve maximum ski wax chemistry in creating Hertel's HotSauce® ski wax (my first marketed ski wax). From there, I worked on my own to invent three more ski wax products in addition to HotSauce®. The three newer ski waxes are: 1.) Hertel Racing FC739® ski wax(for experienced skiers who desire a long lasting, durable product. Also great for fast skiing with maximum control). 2.) Hertel White Gold® ski wax (For experts only -- This is THE FASTEST ski wax on the market, used in the Olympics and other competitions) 3.) Hertel Spring Solution® skiing wax (for skiing in the spring-season, when pollens have blown onto the snow). Lastly, with the introduction of snowboarding in the late-1980's, I invented the above waxes for snowboards as well. The thickness of your base. How far can you push wax into the base?

23.)

ELEMENTS -Hertel is the only company that addresses this. In chatting with several snowboarders, I heard the complaint of being tired. Moving the board from side to side causes a lot of friction. When it comes to the flats, pumping on one foot to get through the flats takes a lot of energy. With Hertel this is not the case as you cruise through, passing everybody. How do we know our wax has been used in every Olympics since 1974? As the winners finish, each manufacture representatives came to me wanting to rep our line. We were also told by and insider that every tech uses Super or Racing asa mix 50/50. When ask why? "Because it works".

Test: Snow in Region 1 (East and Central US), Region 2 (Colorado), Region 3 (California)  
Our research: I took nine snowboards waxed with the competition wax and Hertel wax. I drilled a hole in the tip and hooked a cable to it that had a digital scale attached to a computer with software that measured resistance and ran into an IBM computer. I also used a thermo coupler

that had three wires, one going to the tip, one for under the binding, and one for the tail. This information gave the temperature under the ski/snowboard. *Chart here* I also had one on top of the board measuring air temperature. This proved to me that our wax was the best in all the regions with the different pollens.

24.) CONCLUSION Since 1972, I have committed my focus to creating and perfecting Hertel Ski & Snowboard Waxes. My original background in college was Computer Science, which gave rise to constant laboratory experiments. However, it was my tremendous love of skiing that sparked interest to invent a high quality, durable ski wax product. During those early years working in the laboratory, I became further motivated to achieve the highest quality All-Temperature ski & snowboard wax on the market. I believe the ski waxes succeeded in this perfecting process. Hertel's line of All-Temperature, All-Mountain, and Totally Universal Ski & Snowboard Waxes are the BEST!! I just know that if you compare Hertel to any ski wax competitor, you will immediately experience the high-quality difference in speed, durability, and maximum control. Waxing is an extremely important part of tuning. We believe proper application of Hertel All-Temperature Ski & Snowboard Waxes will make the positive difference to your skiing/snowboard performance. SKI & SNOWBOARD SAFELY AND HAVE FUN TOO! HCl is the registered owner of Trademarks Hertel, HotSauce® and Hot Waxer®. Hertel is the registered owner of 18 claims for the design of the Hot Waxer® and its method of use.

Additional reading: In the last quarter of the 20th century, researchers addressed the twin problems of water and impurities adhering to skis during spring conditions. Terry Hertel addressed both problems, first with the novel use of a [surfactant](#) that interacted with the wax matrix in such a way as to repel water effectively, a product introduced in 1974 by [Hertel Wax](#). Hertel also developed the first [fluorocarbon](#) product and the first spring-time wax that repels and makes the running surface slick for spring time alpine ski and snowboard. This technology was introduced to the market in 1986 by Hertel Wax.<sup>[5]</sup> In 1990, Hertel filed for a U.S. patent on a "ski wax for use with sintered-base snow skis", containing paraffin, a hardener wax, roughly 1% per-fluoroether diol, and 2% SDS surfactant.<sup>[6]</sup> Trademarks for Hertel waxes are Super HotSauce, Racing FC739, SpringSolution and White Gold.<sup>[5]</sup> In the 1990s,

Masia, Seth (April 1989). *Alpine Ski Maintenance and Repair* (Revised ed.). Contemporary Books. [ISBN 978-0809247189](#).

Wikipedia search ski wax.

The Chemistry and technology of waxes, ED 2, Pt 1 and 2. Worthy, A

Candle crafting from art to science. William Nusske

Commercial waxes - natural and Synthetic.

Fundamentals of Analytical chemistry; Douglas Sroog, Donald M. west.

Input by Dr. Tim Donnelly PHD.

Helpful hints: Wax weekly with an all temperature wax.

Make sure your base and edges are tuned to prevent accidents.

Make sure your DEN setting is set for your age and weight and ability.

Understand your wax and its performance.

Poorly waxed skis and boards make you a liability to other around you.



