HOLMENKOL®

WAXY WORLD

WELCOME TO THE WAXY WORLD OF HOLMENKOL

the wax myth

The ardent ski jumper, Max Fischer, was once again unsatisfied. As he jumped for the umpteenth time from his favourite hill, the „HOLMENKOLLEN" near Oslo in Norway, he was convinced that it had to be possible to jump even further. Driven by his boundless ambition, Max Fischer (a doctor of chemistry) withdrew to his laboratory and tested for more than three years until he found the right formula. Skiwax was born. Fischer named it after his favourite hill: HOLMENKOL.

In 1922, he founded the „Vereinigte Wachswarenfabriken AG" in Ditzingen, Germany. The product range at that time included skiwaxes, shoe creams, leather fats, household candles, floor strippers and floor cleansers. The first skiwax product, „HOLMENKOL-MIX", was manufactured in the same year. LHC (LOBA-HOLMENKOL-CHEMIE) is thus today the oldest existing skiwax manufacturer in the world.

The main demand made on a skiwax at that time was to provide a suitable protective coating for the wooden surfaces of the skis, to make them more durable and impermeable. For optimum ski preparation, a „ski sole" was therefore applied which generally lasted for one season. Other, less abrasion-resistant methods, included the painting of the wooden surfaces or the application of wood tar compounds (HOLMENKOL Express-Teer). A ski prepared in this way could already be waxed as the snow type and weather conditions demanded.

In 1948/1949, HOLMENKOL then achieved a pioneering feat: A wax system based on synthetic raw materials was developed in which the colours (silver/red/blue) of the skiwaxes characterised the respective fields of application. The rapid further development of the ski bases, particularly since the seventies, has naturally also had an effect on the skiwax technology. New waxes have been developed in close cooperation with the ski and raw materials industries which are regularly tested and assessed by experienced international ski racers and by the wax teams of various ski manufacturers and national teams. The highest demands made on skiwaxes needed for racing, set the standard for the product policy at HOLMENKOL.

At the end of the eighties, HOLMENKOL made it possible for the first time to create an individual composition of the skiwax mixtures for damp and wet snow conditions with the high-fluor additive GW 25. The glide raw material, fluorocarbon, from HOLMENKOL proved to be the ideal material for these demands and very successfully triggered off the development of the CHAMPION waxes and TOPSPEED products at the beginning of the nineties. CHAMPION waxes are ready-to-use wax mixtures with very high fluorocarbon contents. TOPSPEED products even consist completely of fluorocarbon mixtures. Both product series simplify the choice of the „right" wax mixture, particularly in racing applications, and have helped the world's leading skiers to innumerable victories.

Although the HOLMENKOL wax products already enjoyed an outstanding reputation worldwide, the unique abrasion characteristics of the new wax collection and the simultaneous unrivalled glide properties have now given them legendary importance.

With the same painstaking efforts as once Max Fischer, the service technicians and chemists from HOLMENKOL today still conduct research to find even better raw material combinations for optimum glide properties. But a real HOLMENKOL expert is only satisfied with the best. In 1999, HOLMENKOL introduced the pioneering new HYBRID technology to the wax sector.

By **HYBRID technology** we mean a special laboratory process which allows concentrated active ingredients to be filtered out from a wide range of raw materials and to be blended in new formulae to produce a unique combination of active substances. The outstanding feature of this technology is that all glide raw materials coming onto the market in the future can also be quickly and easily integrated into the formulations at any time. This gives the user the assurance of being able to rely on the latest in modern wax technologies with the **HOLMENKOL hybrid waxes**.

Independently of chemical raw material trends. Because experience pays and creates the basis for innovation. The successes create assurance and faith. Just concentrate on your skiing, the chemistry behind it is our business. That is why HOLMENKOL is always good for a sensation: Yesterday, today and tomorrow! HYBRID - the skiwax of the future, naturally from HOLMENKOL.

Thanks to Max Fischer.

HYBRID TECHNOLOGY

HOLMENKOL

CONTENTS

nordic

Proper preparation first demands an understanding of snow!

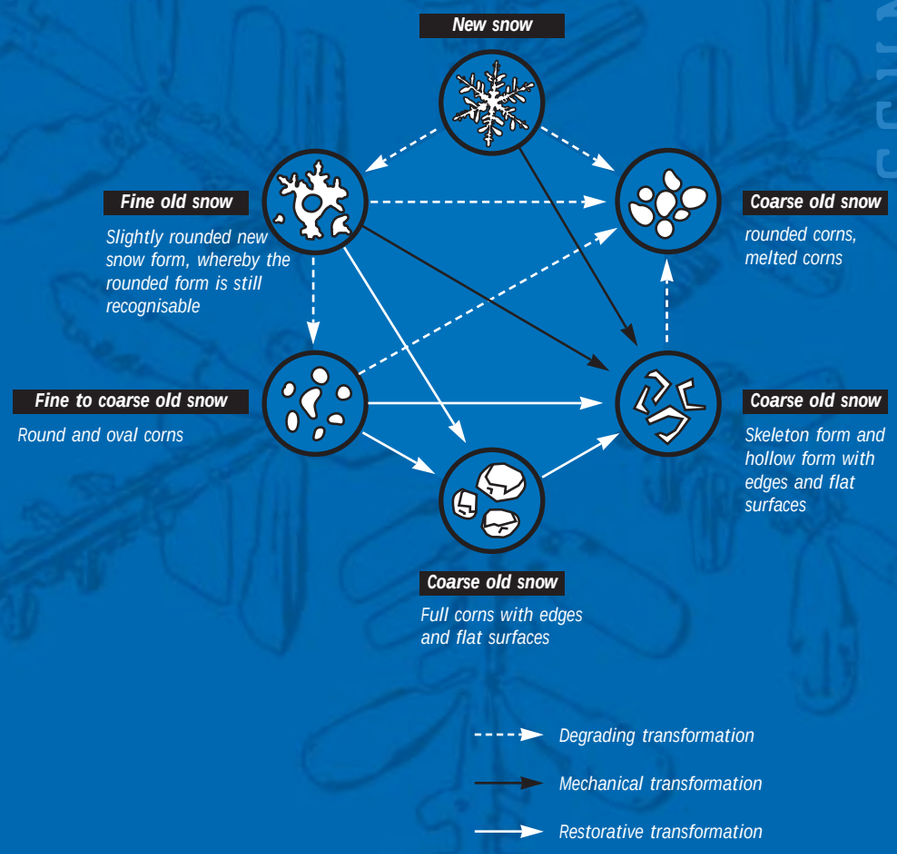
There are good reasons why in former times proper waxing of the skis was regarded as „black magic“, comparable with the occult sciences of the alchemists in the Middle Ages:
In its different forms, snow is just as diverse as nature itself. Its character depends on a large number of factors such as temperature, humidity, age and crystalline structure. Modern skiwax makes it easy today even for beginners to make the right choice - as long as he can form a clear picture of the condition of the snow and its possible changes during the course of a day. Here - in very simple terms - are the four basic types of snow:

New snow is a crystalline, unadulterated form of the snowflake with delicate crystals which - depending on the temperature - are harder at low temperatures and softer at higher temperature. These delicate crystals can be easily compacted during gliding and cause a friction/ suction effect which can be prevented with an appropriate wax mixture and corresponding base texture.

Fine-corn snow (old snow) has already undergone one or more transformation processes as a result of temperature changes which have caused the outer tips of the crystals to melt or break off and have led to a corn structure. Compared with new snow, the suction effect is less pronounced and the friction effect increases. Depending on the temperature the snow can be damp and heavily infiltrated with water or can be dried out by the cold and wind.

Coarse-corn snow (old snow) has completely lost its original form due to repeated melting and freezing processes and been transformed into a snow corn, in other words has become metamorphosed. We speak of old snow or coarse corn snow. Depending on the corn size, a distinction is made between coarse-corn and fine-corn old snow (corn size between 1 and 3 mm). The most common forms of coarse corn snow are firn snow and crusted snow.

Artificial snow or „machine snow“ confronts waxers with considerable problems, particularly due to its aggressiveness. Because of its high density and inhomogeneous form, this snow is very dull and demands a particularly high abrasion resistance of the wax. The snow surface changes after a few transformation processes into more crystalline forms, the glide properties improve and less hard waxes can be used again. Despite its unfavourable characteristics, this is the most frequently encountered snow type at alpine events.



For details of the application, please refer to the Waxcharts on the front fold-out page

Base science

Modern ski or board bases must satisfy the following demands: They should be elastic and at the same time withstand the highest possible loads. For this reason, sintered bases are predominantly employed in racing sports today. **Sintered bases** can be produced with a wide range of different additives, each base form offers special qualities for particular conditions.

Transparent sintered bases

This base type is characterised by greater toughness, but nevertheless without any reduced wax absorption ability.

Graphite bases

Graphite protects the base against impurities thanks to its anti-static properties. With their good thermal conductivity, graphite bases provide good glide properties particularly in wet snow.

Multi-sinter bases
(different molecular weights of the individual components)

Multi-sinter bases have outstanding all-round properties and are equally suitable for cross-country and downhill skis as well as for snowboards since they exhibit good glide properties in all temperature ranges.

TIP:

Best application is attributed when sand paper (100-180 Surface) is used prior. The sand paper may be wrapped around a block. Sand the ski from the tip of the ski to the end. This process can be repeated numerously. To remove any strands from sanding, use the Metal scraper. Smooth out afterwards by passing over the ski with the ski pad.

Base Structures

The structure of the base (the contact surface between the ski and snow) influences the gliding character of the ski. Friction while gliding stems from snow crystals rubbing the dense water in the snow. A good structure hinders this friction, even eliminates it.

Base structures can be made manually and professionally with the TRI-MAXX or STRUKTUR-MAXX

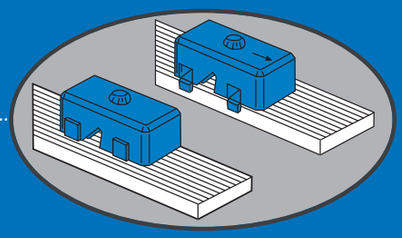
Generally valid:

Fine, coarse Snow/ New Snow
Middle , fine Structure
i.e. TRI-MAXX 0,5-0,9 mm

Coarse/ Moist- wet Snow
Middle, coarse Structure
i.e. TRI-MAXX 0,9-1,25 mm

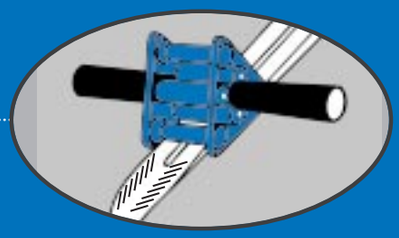
Fine/ dry, coarse Snow
Middle/coarse Structure
i.e. TRI-MAXX 0,9 mm

In order to make a straight thin or wide structure in the base of the ski, a special Structure is required ..... (i.e. STRUKTUR-MAXX) . Structures should be made into the ski after every wax tuning.

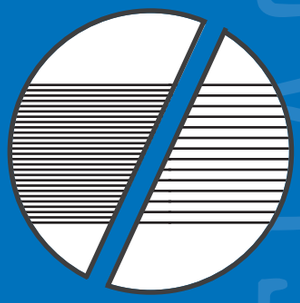


STRUKTUR-MAXX

A double V Structure... ..... with three different structure intact (0,5;0,9;1,25)



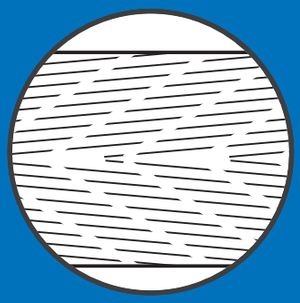
TRI-MAXX



STRUKTUR-MAXX

TRI-MAXX 1,25 mm

TRI-MAXX 0,9 mm



TRI-MAXX 0,5 mm

TRI-MAXX

Three different interrupting structures

- 0,5 mm for dry snow
- 0,9 mm for old – moist powder snow
- 1,25 mm for wet to very wet snow

Application:

1. Place ski into a vice

2. Thoroughly scrape the ski with a metal scraper (Nirosta) and wipe clean

3. Roughen the surface of the ski with a green Ski Pad or Sand paper

4. Wax as usual, Scrape Excess Wax with a Plastic Scraper and Brush

5. Take the Structuring Tool in your hands- observing the accurate direction of the structure tool, place it on the ski, so that a structure roll and a roll guide are set on the ski.

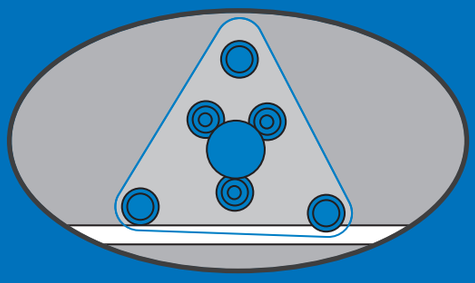
6. Apply pressure on the tool, slowly and without wobbling, move it along from the ski tip to the end.

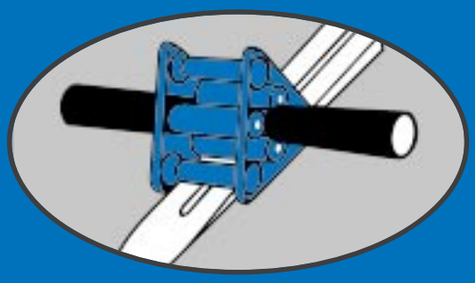
7. Avoid going back and forth with the structuring tool as this ruins the structure more than helps.

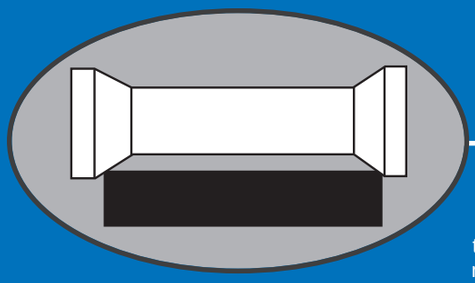
8. Finally, brush through with a horsehair brush.

Highlights

- **Double V Structure with optimal water drainage**
- **3 Structures in one tool**
- **ergonomic roll guides for precise structures**
- **Flexible roll guides allow structures on any Nordic Ski (even carving) to be made**

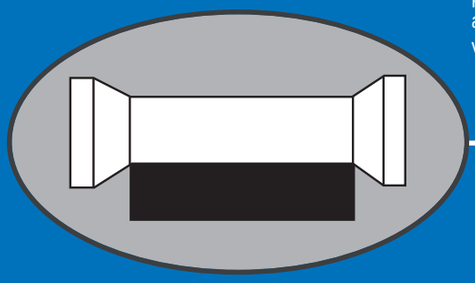






max. 50 mm Ski width

the concave roll guides allow flexible positioning for all nordic carving skis



40 mm Ski width

Technique

Classic:

Classic is the traditional form of cross country skiing in Nordic. In contrast to the skate ski, the classical cross country ski does not have a gliding zone throughout the length of it. There is a kick zone in the middle of the ski base. Grip waxes are used in this area (Kick or Klister) (see Wax Table).

Hot waxes are used in the gliding zones (before and after the grip zones) as in Skating Skis (see Skate Tuning)

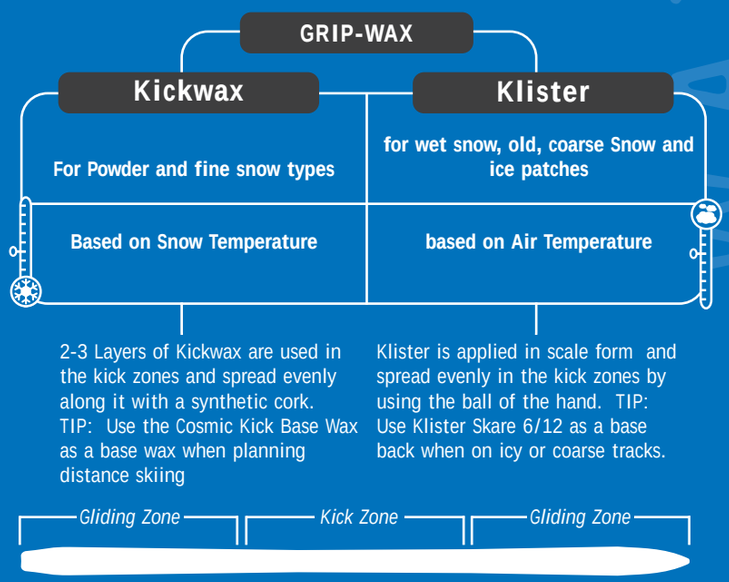
Skating:

Skating is the faster method in cross country skiing. Therefore more attention is placed on appropriate hot waxes. In order to optimize gliding characteristics, the ski base should have a good foundation of base wax on it.
A good structure is equally important. (TRI-MAXX).

Tip: Use a softer wax when the snow is warmer and coarse. With fine and Cold Snow a harder one. (see Wax Table)

Gripwax

Kick waxes (Hard wax) and Klister differentiate from one another in character and in use



(If the kick zone is not obvious on the ski, measure from the end of the shoe about 2-2 1/2 shoe sizes forward ca. 40-60 cm)

TIP:

Problems on the cat walk

The ski slides back, bad climbing characteristics: Wax too thin	Lengthen Kick Zone, Apply additional Wax Layers (eventual use of soft waxes)
Ski glides badly: Wax was applied too thick. Kick zone is too long! Wax is too soft	Shorten Kick Zone, apply less wax (eventual use of hard waxes)
Iced Ski: Wax layer is too thick. Kick Zone is too long! Wax is too soft	Remove iced areas and wax again by polishing

Influences on the choice of wax

Temperature

As the world's first wax company, Holmenkol has taken not only the air temperature but also and more importantly the snow temperature and snow type, snow texture as well as snow moisture content and relative humidity into consideration during the development of its waxes. For this reason, Holmenkol indicates the corresponding snow temperatures as the application temperatures for its racing waxes. Due to its greater density, snow changes its temperature far more slowly than the air; this means that the snow temperature remains more constant even under extreme weather conditions (such as High Dry Winds) than the air temperature. As a result, significant differences in temperature between air and snow can occur.

HYBRID TECHNOLOGY

Snow texture and snow moisture content

The snow texture gives the most important indication as to the choice of the optimum wax. The corn size of the snow influences the abrasion resistance (friction effects) and the snow moisture content the glide properties (suction effects). Holmenkol differentiates between new snow and fine corn/coarse corn old snow. These snow types can also occur as dry, damp or wet snow. Each of these combinations influences the choice of the ideal wax. Under certain conditions the snow can be very damp, while at the same time consisting of sharp, hard crystals. In this case a very abrasion-resistant wax is needed which also offers excellent water-repellent properties. Holmenkol has taken the importance of the snow texture as an important factor in the wax development with the introduction of the Hybrid Technology. This technology permits an unrivalled combination of abrasion-resistant materials which nevertheless exhibit the best possible water-repellent properties. For this reason the otherwise problematical artificial snow no longer presents any difficulties for the choice of wax.

Furthermore, the snow texture is significantly affected by the wind. New snow or damp old snow is quickly dried out by the wind. The snow becomes more aggressive and harder wax mixtures are needed although the snow temperature remains the same. In addition, strong wind breaks down the fine crystalline structures of new snow and the snow surface. This leads to a compaction of the snow and higher friction effects between snow and ski/board base.

Hotwaxes and their application

WAXE

Hydrocarbon waxes
(CosmicPack)

Hydrocarbon waxes from Holmenkol are an independent wax system for the highest demands in the training and race sector. Holmenkol additives allow these hydrocarbon waxes to be adapted to certain conditions (SI33 with high moisture content) or even to be upgraded to race waxes with the Fluor Additiv GW25.
Predominantly, however, hydrocarbon waxes as base waxes form the basis for the wax buildup with fluorocarbon waxes and TopSpeed products. Base waxes produce a stronger (more abrasion-resistant) bond between ski base and the fluorocarbon waxes.

Base waxes can also be used as cleaning waxes (iron on and scrape off in hardened, warm condition).

Application temperature: 110°C to 140°C. Mixing ratios: see Waxcharts.

Fluorocarbon waxes
(CosmicGlide)

Fluorocarbon waxes are special ready-to-use race wax mixtures with high fluorine contents. These waxes are developed and manufactured by Holmenkol with the new Hybrid Technology. This technology combines the best properties of the world's highest quality adhesive and gliding active ingredients. These waxes are therefore characterised by optimum glide characteristics with maximum abrasion resistance in an unrivalled, broad spectrum of applications. Fluorocarbon waxes are outstandingly suitable for damp and wet snow types and for high humidity. These products can be further optimised for extremely damp conditions (humidity > 75%) with the Fluor Additiv GW25.

Application temperature: 110°C to 145°C.
Mixing ratios: see Waxcharts.

Cold Powder

For extremely aggressive and cold conditions:
Cold Powder is an independent wax. This powder is ironed on either as a base before the hot waxing or together with a hot wax in order to protect the ski and to increase the abrasion resistance of the applied waxes in very cold, icy and hard conditions.

Pure fluorinated products
(TopSpeed PF Series)

TOPSPEED products are the final finish to the waxing process. TOPSPEED products enable extreme acceleration values and highest speeds to be achieved even over long distances. The 100% high-tech fluorinated products are additionally upgraded by the Hybrid Technology as a wax finish to give you the decisive lead. As a stick, paste or powder for warm and cold temperatures, TOPSPEED offers an optimum and variable solution for all applications.

TOPSPEED Powder PF 41/PF 51 can be worked into the base (primarily for downhill sports) with a finishing cork. Ironing in of TopSpeed Power PF 41/PF 51 for cross-country sports is also possible.

TOPSPEED STICK 0/2 and 8/15 are rubbed on and then worked into the base with a finishing cork.

TOPSPEED Paste 0/6 is applied to the base sparingly with a sponge and after airing can be worked into the base with a finishing cork.

„High end“ for all TOPSPEED products: In fine snow, brush out the base with a horsehair brush. In coarser snow, brush out with a nylon brush and polish with a soft cloth.

HYBRID
TECHNOLOGY

PREPARATION

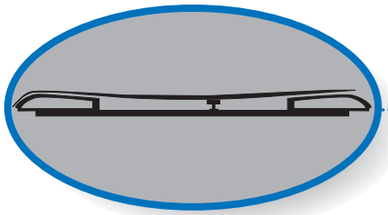
Safety precautions during waxing

Instructions for the application temperature are given on the packaging of all Holmenkol hot and race waxes. Nevertheless, certain precautions have to be taken and certain rules observed during the work in any workshop when preparing skis or boards:

- **Ensure good ventilation of the working area at all times!**
- **Do not expose waxes to open flames!**
- **Use only special waxing irons!**
- **The specified wax temperatures should not be exceeded! (Avoid causing smoke!)**
- **Highly fluorinated products (CosmicGlide/ SnowChamp Systems) should be ironed in at 110°C to max. 145°C and degrees. TOPSPEED products at 90°C to 95°C. Higher temperatures are not necessary. (Avoid causing smoke!)**
- **When brushing out the base with the SpeedBrush (rotating brush), microscopically fine wax particles are swirled around. We recommend the use of a face mask and goggles to protect the airways and eyes.**
- **If base cleaners are used, ensure good ventilation of the working area at all times and on no account breathe in the fumes directly!**

Kickwax Preparation

The products described in the following pages can be found from 37–38.



1. Place the ski firmly on the vice.

2. Sand paper the kick zone thoroughly (Coarse 120)

3. Apply the Kick Wax evenly

Tip: Kick Waxes can be layered on top of each other.

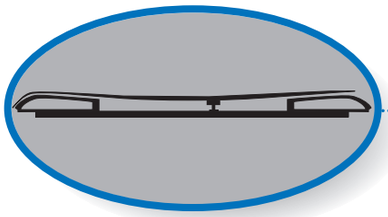
4. Spread the Kick Wax evenly with the synthetic cork.

Example:

Old Powder Snow, Snow Temperature –5°c, Air temperature +3°c, Ski distance about 20-30 km. Apply the base wax thinly and cork in (when an iron is used, allow the wax to dry first before applying other layers) Cosmic Kick 3/8 and 0/4 apply in thin layers and spread with the cork. Repeat this about 3-4 times. Under the same conditions, but rather at high humidity, use Cosmic Kick Fluor 3/8 and 0/4.

Klister Tuning

The products described in the following pages can be found from 37–38.

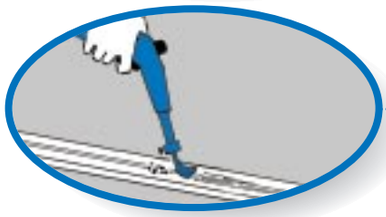


1. Place the ski firmly on the vice.

2. Sand paper the kick zone thoroughly (Coarse 120)

3. Apply the klister in scale form and rub into the base using the ball of the hand.

Tip: Fish scales with differing klister waxes can also be combined.



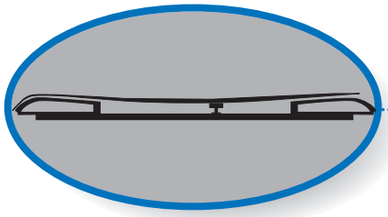
4. Used out in the open the Power Jet (Gas Burner) is used to slightly heat and spread the skare/base wax

Example:

Old wet snow (coarse), Snow temperatures –1°c,
Air temperature +3°C, ski distance about 20-30 km
Apply Cosmic Klister 0/3 with cosmic Klister special black in proportion and spread.

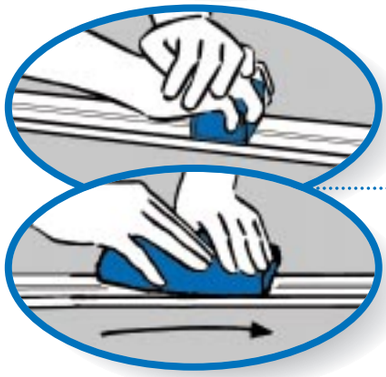
Use a layer of the Skare 6/12 as a base when applying Klister Fluor Speed 0/3 as well as Fluor 6/6

Basic Tuning of Glide and Kick Zones



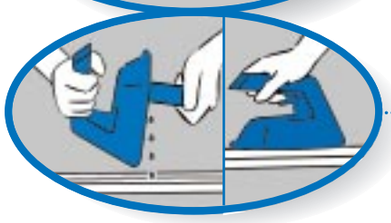
1. Secure skis with supports on a Vice.

2. Scrape evenly with a Nirosta scrapper (Metal Scraper)



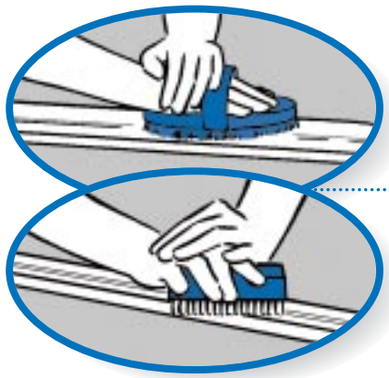
3. Roughen the Kick and Gliding zones with a ski pad or sand paper

4. Remove scraping with a metal scraper

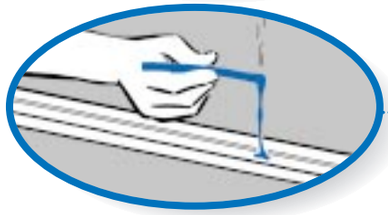


5. Apply a base wax only on the gliding zones. CAUTION: Tape over the kick zones for protection.

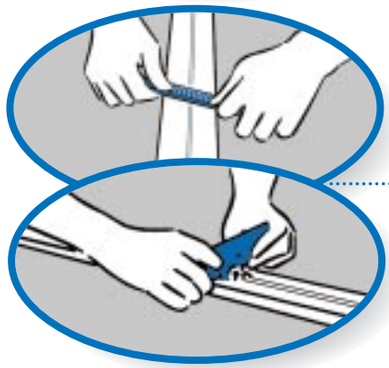
Tuning the Glide Zone



1. Brush the base with a bronze brush and remove old wax



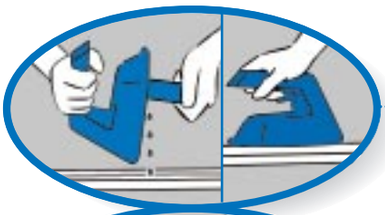
2. Drip folit strips into any damaged areas



3. File off excess folit strips forming a flat surface again...

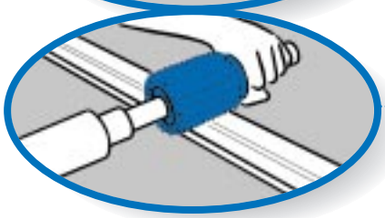
... or scrape off with a metal scraper

4. Smooth out with the use of a ski pad or sand paper



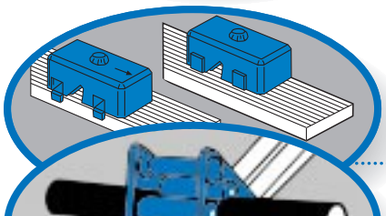
5. Clean off the surface by using a care wax, cool, scrape off , and brush out. This can be repeated often. It improves the hold of the wax

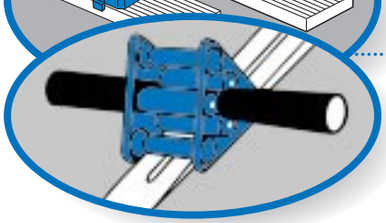
6. Apply the racing wax (CosmicKlister) and allow to cool



7. Remove wax from the groove and side walls and brush out.

Tip: This can be repeated – smoother surface base

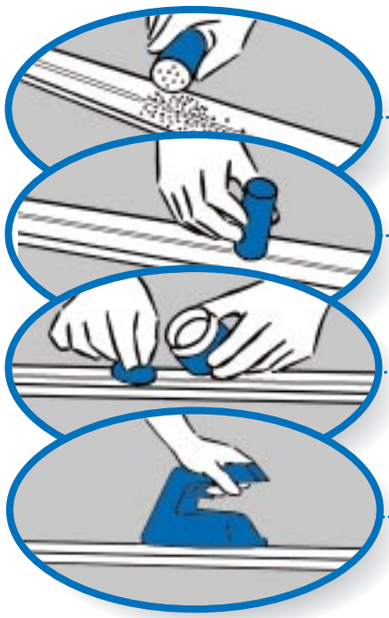




8. Add a new structure with a structure tool(Struktur-MAXX or Tri-Maxx)

9. Work in with a nylon brush

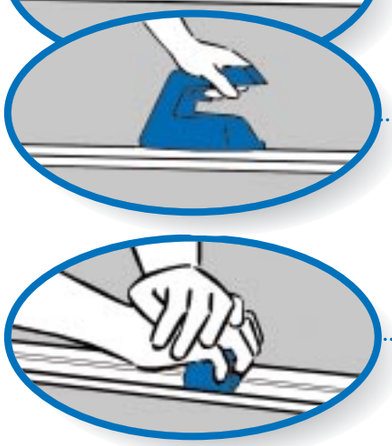
Use only one of the following TOPSPEED Fluorinated Products (depending on the snow conditions).



10/A TOPSPEED PF 41 or PF 51: spread powder evenly
or

10/B TOPSPEED-Stick 0/2 or 8/15: apply generously
or

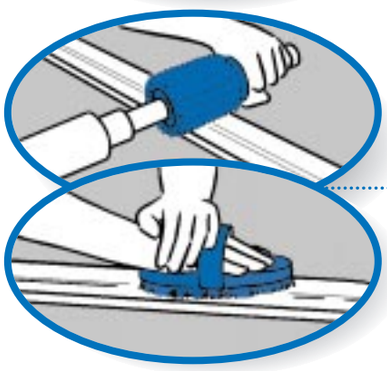
10/C TOPSPEED-Paste 0/6: apply thin and evenly, allow to air out



11. TOPSPEED-Products may be carefully ironed into the base (max. 80°C – 90°C)

TIP: Work in with a hair dryer

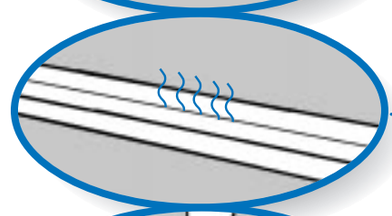
12. All TOPSPEED-Products will be rubbed into the base with cork or felt



13. Brush the base with a speedbrush or base brush always from the tip of the ski to the end. Brush the base with 10/A – 10/C by using a nylon brush (for warm and wet snow) or a horsehair brush (colder/finer/dry snow). Brush again at the end using a soft nylon brush.

After the race...

Classic-Ski – spray the kick zone with a cleaner or Wax-AB.



After using the ski (Race/Training) brush out the base and apply a base or care wax again. Do not scrape off the wax.

NOTES

NOTES

Event					
Date					
Location					
Air temperature					
Humidity					
Snow temperature					
Snow moisture content					
Snow type					
Weather					
Discipline					
Wax mixture used					

Event					
Date					
Location					
Air temperature					
Humidity					
Snow temperature					
Snow moisture content					
Snow type					
Weather					
Discipline					
Wax mixture used					

NOTES