



This document will provide fleet management guidance to coaches, parents and wax technicians. Ski construction, ski specificity, weather conditions, wax are interrelated.

In the sport of cross country skiing, we encounter a wide variety of weather and snow conditions. The snow on the track is constantly evolving with the common variables interacting to create a fluid evolution of snow such as track hardness (whether it is soft, medium or hard track) snow types, and the direction in which it is changing. One slight change in one of these variables is enough to influence how one ski performs over another. Hence why there are “good” and “bad” ski selection from day to day, or even hour to hour. Just as cyclists and race car drivers will change tires with different tire compound (rubber), treads, and tire pressure depending on track conditions, we must choose the correct ski for the race to optimize our hard work we have put in training for the best performance outcome.

**WEATHER/SNOW CONDITIONS:**

**Influencers**

<b>Weather/snow conditions</b>	<b>Local conditions (geography/meteorology)</b>
Air temperature	Elevation
Air Humidity	Sunlight
Snow Temperature	Ground temperature
Snow Humidity	Snow humidity
Age of snow	Wind

**Ski construction:** A ski has 3 key parts that work together to give you a good glide. The **Bridge** (camber), **Pressure points**, **tip** and **tale splay**. It is very important to make it clear that these three variables, are measurable and act in direct relation to each other to define how the ski behaves. This means that one of these parts is not enough to ensure the ski works in one specific condition.

- The defining characteristics of the **bridge**, are its length, height, and how much it changes when loaded with your half and full body weight (stiffness). In skating this directly influences the stability of your ski. In classic this defines your grip zone, and how easily you can ski with grip wax. Too hard, and the grip wax does not contact the snow, too soft and you will be gliding on the grip wax (slow). The Bridge is part of what defines how the ski will behave on a soft or hard track.
- The second aspect, **tip** and **tale splay**, is defined by how much the shovel (tip) or tale of the ski rock up, or away from the snow when the ski is loaded/pressed with force. This is the other defining factor in how a ski will behave in different track conditions. Low tip splay, means a ski will behave better in harder tracks, high splay, will work best in soft snow.
- The third part, the **Pressure points** define the temperature range ideal for the ski, this is also the connection point between the bridge, and the tip and tale. Universal skis should have medium length pressure points (6-8cm), a cold ski should have long pressure points (8-12cm), a wet/warm ski should have short pressure points (3-6cm). This is regardless of classic or skate.

When you are building your ski fleet it is important to look at these key points. The simplest way is to put a pair of skis together (base to base) and give them a squeeze with your hands just below the marked balance point. This, without knowing the exact pressure, will give you an immediate indication of what the ski profile looks like. Is it hard to push the camber together? Do the tips start to spread apart?

Skate Ski descriptions/course descriptions				
Ski Types	Temperature/Humidity/Snow	Track	Camber characteristics	Additional notes
Universal	+5° -8° 60% - 90%Rh	Hardness varies	This is the perfect “not too much, not too little” when looking at camber characteristics	
Universal Cold	-8°C 60% - 90% Rh	Variable	Similar to the Universal, often on a slightly softer side, and slightly longer pressure points of things.	Generally these are similar to universal skis, but will have a finer stone grind

<b>Coarse/Dirty (often clear base skis)</b>	Wider temperature range More specific to snow type Manmade, or old snow Snow crystals are coarse and relatively round, generally higher humidity >80% rh (snow in warmer temperatures)	Soft or hard track	This is typically a stiffer ski, with a fair amount of splay, which makes it good in both wet soft and wet hard	Often symbiotic with wet and soft
<b>Hard Track cold</b>	Wide temperature range Much like coarse/dirty snow ski but specifically works when surfaces are hard because of higher moisture levels in the snow (manmade below 0°C, or transformed snow below 0°C)	Hard	Much stiffer and longer bridge, usually with a higher camber, minimal tip and tail splay	

For Classic, we often incorporate the type of wax used with the description of snow to name ski types, for example “it is perfect hard wax skiing out there”, or “Try your Klister cover skis today”.

For condition description to match skis needed in a fleet, here are the descriptions.

<b>Classic Ski Descriptions</b>			
<b>Ski type</b>	<b>Camber Height</b>	<b>Type of Wax</b>	<b>Temperature range/snow conditions</b>
<b>Hardwax (HW)</b>	Lower camber height Usually ranging from 0.6-1.1mm in height	Hard wax Applied in thin layers (see explanation below)	≤0°C, new to old snow
<b>Klister</b>	More defined and higher camber height Usually ranging from 1.0-1.7mm in height).	Klister	Soft snow or coarse/icy snow
<b>Universal HW or Universal HW/Klister (Classic Universal)</b>	Medium height camber – low enough to be able to be skied with Hardwax but high enough to tolerate klister or a klister cover	Klister Klister/Klister cover Hardwax	
<b>Universal Cold HW</b>	Low	Hard wax	-8°C or colder
<b>Zero/Rubber</b>	Specialty skis	Grip waxing is impossible	+5°C -2°C Most often with new snow or glazing tracks

- **A Hardwax ski (HW) and a Klister ski** are defined by camber height. HW as it (the wax itself) applies a lot thinner has a much lower camber height (usually ranging from 0.6-1 mm in height) whereas Klister will have a much more defined and higher camber height as it applies a lot thicker (usually ranging from 1.0-1.7mm in height). The Temperature range of ski classification explained earlier with skate skis still stands, hence why we describe a classic ski as Universal HW, or Wet Klister.
- **Universal HW or Universal HW/Klister** refers to a ski which has a medium height camber, is low enough to be able to be skied with Hardwax (this might need 1 or more additional layers of hardwax), but high enough to tolerate klister or a klister cover. This is one ski for all conditions - **Classic Universal**.
- **Universal Cold HW** is a ski which is uniquely for hardwax conditions, and works best below -5°C.
- **Klister** as It is known is defined by the height of the camber and is often tuned to work best in soft wet snow, or coarse/icy snow.
- **Zero/Rubber** skis are specialty skis that work most often best with new snow, or glazing tracks, when grip waxing is impossible.

Below is an explanation of the minimum ski fleet requirements for high performance racing, from a competition level perspective. Skis are ranked by their importance in their respective techniques. Note that early on the importance of having a more diverse classic fleet is key, as the types of waxes used in classic skiing also dictate which skis are used, not just snow type. Up until L2T the focus must be on both (1) skate and (1) classic ski that must “work” for the growing athlete. This means that they are in the correct flex range and length. Any local ski shop will be able to cater to these needs for the athlete.

### Fleet Requirements

LTAD STAGE	DESCRIPTION	# of pairs skis	CLASSIC Fleet	SKATE Fleet
L2T	<ul style="list-style-type: none"> <li>- Longer ski season</li> <li>- Performance focus</li> <li>- Specific waxes</li> </ul>	3	1- Universal HW Classic 2- Universal Klister Classic	1- Universal
T2T	<ul style="list-style-type: none"> <li>- Travelling longer distances to competition</li> <li>- Manufacturer’s ‘race’ quality skis</li> </ul>	4	1. Universal Hard Wax 2. Klister, Klister-cover 3. Zero/Rubber	1. Universal 2. Universal cold
L2C	<ul style="list-style-type: none"> <li>- Demands for good equipment grow</li> <li>- Use of manufacturer’s top tier of skis</li> <li>- Still possible to find good 2<sup>nd</sup> tier skis, but</li> </ul>	7	1. Universal HW 2. Klister/Klister cover 3. Cold HW, hard track 4. Zero/Rubber	1. Universal 2. Universal cold skate-hard track 3. Coarse dirty snow

	performance advantages of top tier become important			
T2C	<ul style="list-style-type: none"> <li>- focussing on target “pathway” events, specifically ordering skis for location of target events</li> <li>- Ideal fleets have multiple skis that can be designated in the same condition but might have different performances based on certain variables changing. Therefore testing them prior to racing is important to determine which of these similar skis is best for the day</li> </ul>	<p>Minimum 7</p> <p>Growing fleet to 12-15</p>	<ol style="list-style-type: none"> <li>1. Universal</li> <li>2. Universal HW</li> <li>3. Klister wet</li> <li>4. Klister/klister cover</li> <li>5. Cold HW</li> <li>6. Zero/rubber</li> </ol>	<ol style="list-style-type: none"> <li>1. Universal</li> <li>2. Universal cold</li> <li>3. Cold hard track</li> <li>4. Wet soft</li> <li>5. Coarse dirty</li> <li>6. Universal soft snow</li> </ol>

Once athletes are at the L2C level of racing, although it is still possible to find good secondary tier skis, it becomes much harder for them to meet the performance demands of elite level racing, and the performance advantages of the top level are obvious. More quality control, higher quality base material, lighter construction, more precise measurement methods, better stone grinds, and lastly more specific flexes for different conditions.

**Post season fleet review**

The last step to managing ski fleet is to do a post season review, or gap analysis. This will allow athletes to reflect on their skis, which ones got used, and which ones lost their magic. It happens quite often that new skis end up getting a lot more attention year after year. This is normal, it is important when this happens that the skis that did not cut it, get put aside into a training designation, or for sale at the local ski swap. By doing this athlete will limit the number of skis they travel with, and focus their energy on effective testing and immensely reduce stress and potential for poor decisions.

**The four major manufacturers and importer of skis in Canada and their ski designation:**  
**Here is a list of Skate skis available in Canada.**

<b>SKATE SKIS available in Canada</b>			
<b>Brand</b>	<b>Tier</b>	<b>Ski type</b>	<b>Target snow condition</b>
Fischer	Top: Speedmax 2 <sup>nd</sup> : Carbonlite	Plus	Universal snow conditions
		Cold	Universal cold conditions
		C-Special	Coarse dirty snow (Manmade, wet or icy) conditions
Rossignol	Top: Premium 2 <sup>nd</sup> : Xium	S2	Universal snow conditions
		S1	Cold hard track conditions
		S3	Coarse dirty snow (Manmade, wet or icy) conditions
Salomon	Top: Carbon 2 <sup>nd</sup> : S-Lab	Yellow	Universal snow conditions
		Blue	Universal cold snow conditions -5°C
		Red	Wet Soft conditions
Madshus	Top: Redline 2 <sup>nd</sup> : Nanosonic	Plus	Universal, wet conditions
		Cold	Universal to cold snow conditions

**Here is a list of Classic skis available in Canada:**

<b>CLASSIC SKIS available in Canada</b>			
<b>Brand</b>	<b>Tier</b>	<b>Ski type</b>	<b>Target snow condition</b>
Fischer	Top: Speedmax 2 <sup>nd</sup> : Carbonlite	Plus	Universal HW/Klister snow conditions
		Cold	Universal cold HW conditions
		C-Special	Klister conditions Coarse dirty snow (Manmade, wet or icy)
		Zero	0°C snow conditions
Rossignol	Top: Premium 2 <sup>nd</sup> : Xium	C2	Universal HW snow conditions
		C1	Cold HW hard track conditions
		C3 white base	Wet Soft, Klister conditions
		C2 Rubber	0°C snow conditions
Salomon	Top: Carbon 2 <sup>nd</sup> : S-Lab	Yellow	Universal HW/Klister snow conditions
		Blue	Universal cold HW snow conditions -5°C
		Red	Wet Klister Soft conditions
		Zero	0°C snow conditions
Madshus	Top: Redline 2 <sup>nd</sup> : Nanosonic	Plus	Universal Klister wet conditions
		Cold	Universal to cold HW snow conditions
		Zero	0°C snow conditions