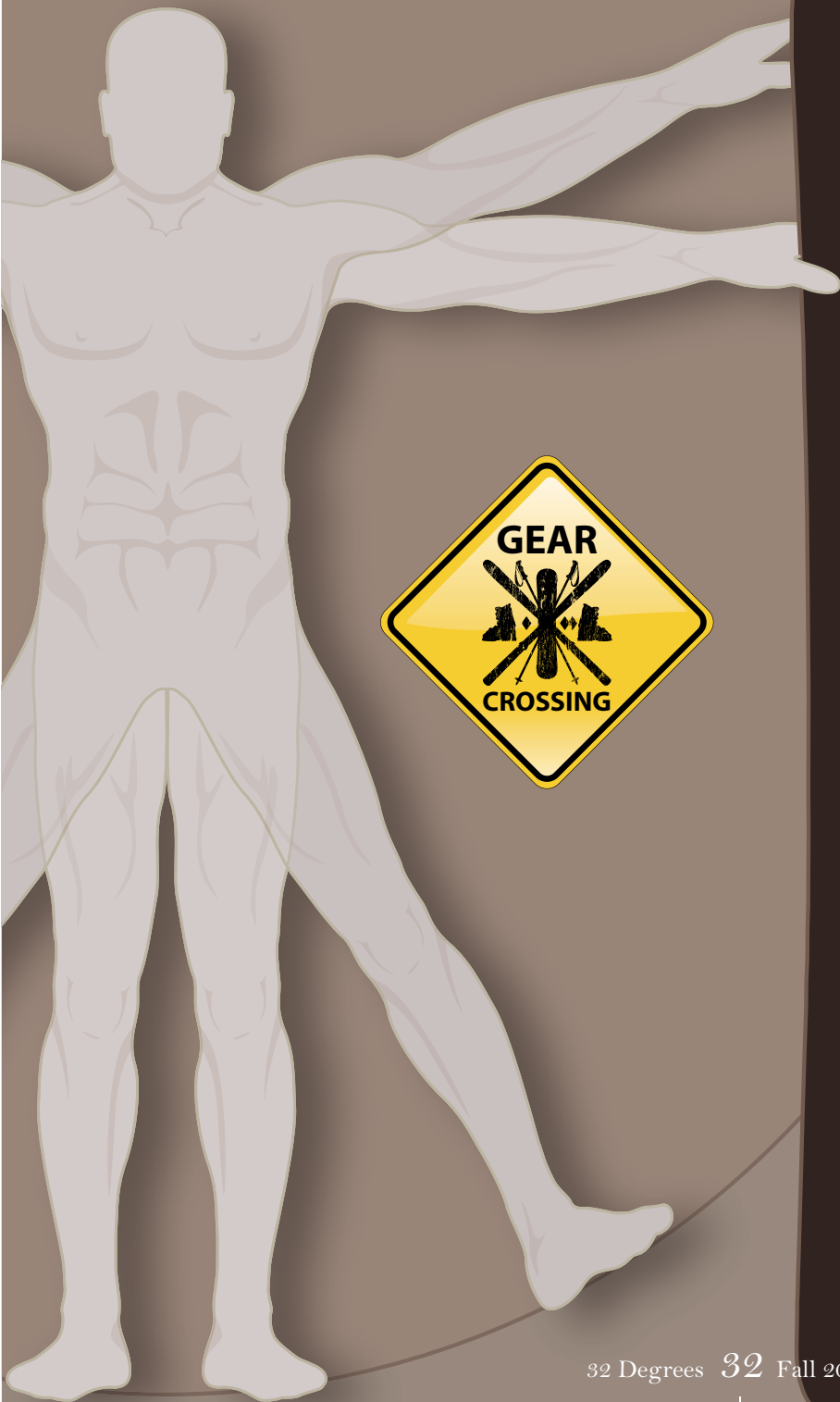


Choices, Choices: A Guide to Today's Ski Designs

by MIKE PORTER



If you're surveying the landscape of new skis with an eye to buy this year, you'll find lots to like. To help sort through the options, it's good to know how you ski, where you ski, and what you want your skis to do.

Every year ski manufacturers offer new sidecuts, changes in ski design, and variations in ski construction to entice consumers to upgrade their ski quiver. Up until the early 1980s the advanced skier basically had only three ski designs to choose from; a slalom sidecut, giant sidecut, or a combined ski. Then in the mid '80s a major revolution began, marked by the development of wide powder skis; parabolic, or shaped-ski designs; and the introduction of all-mountain skis.

Today, you can select from waist widths of 63 mm to more than 130 mm, and a full range of sidecuts—from those with a 12-meter turning radius to skis with reverse sidecut. Some skis feature tips that get wider beyond the forward contact point, while others bend into reverse camber (rocker) at both tip and tail. And some have tip-only rocker.

Given this vast array of options, you (and/or your students) are likely teeming with questions and uncertainty when it comes to choosing skis—whether the goal is to have one pair of go-to, do-anything skis or several from which to choose, depending on conditions and terrain. To help you narrow your choices and match the ski relative to your style and desired outcomes, this article examines five design parameters—waist width, sidecut radius, ski taper, rocker, and tail shape—and how they influence ski performance in three condition/terrain categories: groomed, all-mountain,

and soft powder/crud. And the material on tactics can enhance your own skiing and help shape the strategies you share with students in lessons.

Getting the Goods on the Goods

To solidify your selection, use these insights in combination with information you can get from company websites, ski magazine reviews, and personnel at your local ski shop. Company websites address the desired performance characteristics for each of their models and what the ski was designed for, while the magazine tests give good insight into a skis' personality and how it likes to be skied. For example, last season's reviews featured such descriptors as "burly and aggressive," "playful and forgiving," "easy to engage and a pleasure to cruise," "not hard-charging but reliable and predictable," and "#1 in edge grip but slow from edge to edge."

Shop employees are also a good source of information, since many of them have tested the new models at dealer shows and ski company product introductions. It's important to ask how

the ski skied, as likes and dislikes are very individual and not really reflective of a good or bad ski. Ultimately what you want to do is find the category of ski(s) you need, then test and/or research the group to determine the model that best reflects the traits you desire.

As you ponder your ski selection, reflect on what you want out of a ski. The more specific you can be, the more likely you are to find a ski that meets your expectations.

Design Parameters

Waist width is the width of the ski under the foot, which determines how quickly or slowly a ski goes from edge to edge and how well the ski will float in soft snow. Narrower waists offer better quickness at initiation and edge-hold on firm snow. A trade-off with quickness is that the ski can become more finicky, rewarding good turns but generally being less forgiving and consistent when skied all day. The wider the waist the better the ski's flotation in soft snow or crud.

The closer the numbers are, the more closely the tails will follow the tips through the arc (think of a car with all-wheel-drive, with the front tires [tips] pulling and the back tires [tails] pushing).

Sidecut radius is the turn radius a ski would make if you placed it on its side—flexed into an arc—and then continued to extend this arc into a full circle (fig. 1, page 34). The radius of this circle is defined in meters as the turn radius of the ski.

Waist width is closely aligned with sidecut radius, but it's the latter that determines turn radius. The smaller the sidecut radius the shorter the ski's turn radius, regardless of waist width. Conversely, the larger the sidecut radius the longer the turn radius of the ski.

If you combine a narrow waist with a small sidecut radius you have a quick ski that predominately makes short turns. A wider-waisted ski with a small sidecut will make short turns but not be as quick in initiation as a narrow-waisted model. Continuing this train of thought, a narrow waist with a larger sidecut makes for quick initiation of medium- to large-radius turns, while a wide-waisted ski with a large sidecut makes a slower-to-initiate, long-radius turn. Got that?

Again, the smaller the radius number, the tighter the turn shape will be, with 12 meters the shortest generally available. Some skis have what's called progressive sidecut, in which the forebody of the ski has a different turn radius than the aft section of the ski. For example, a ski may have more of a slalom ski sidecut in the forebody, but taper down to more of a GS sidecut in the aft section. Generally, the forebody has more sidecut than the tail. The idea here is to provide more variations in turn shape, since increasing tip pressure and edge angle will tighten the turn radius, and reducing tip pressure or edge angle will lengthen the turn radius. While all skis have tip/waist/tail dimensions—which determine the sidecut—I find it easier to look at the turn radius in meters to determine the skis' characteristics.

Taper refers to the difference between the tip width and tail width (fig. 1). This number tells you how a ski will exit the turn and how it will track in a

Tester's Choice

I have found that testing different skis has helped me learn a lot about how I ski and provides insight on how I can improve—or, in many cases, how new technology can improve me. I have a tendency to primarily ski one pair of skis. As a result, I know its turn radius, how it reacts, and how it responds to my movements. In fact, I often ski like I'm on auto pilot. When I test a ski I'm not sure what its personality is, so I'm on full alert. I make sure my initiations are precise, my timing is spot-on, and I'm tuned in to feel the ski react. I an-

ticipate how it's going to exit a turn, allowing me to select my line and create a good rhythm.

If I'm on slalom skis, I'm constantly amazed at the quickness, positive edge grip, and powerful arc they enable. They also make me realize that if my timing is off—or if I hesitate one second in the turn—the skis leave me behind. The end result is that when I go back to my regular skis I find that I'm more centered, my timing is better, and I can get more performance out of my turns. — Mike Porter

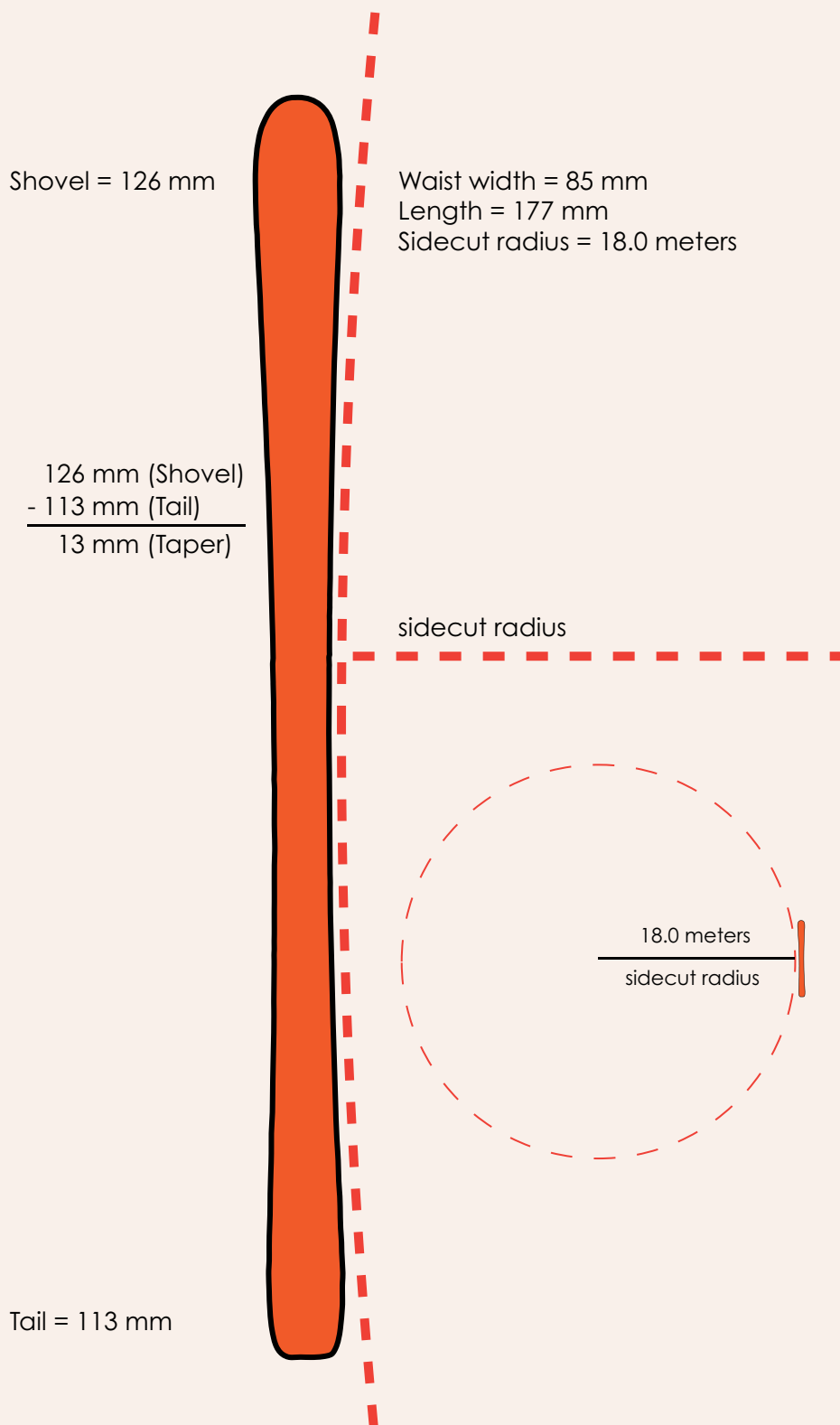


Figure 1. Sidecut radius and taper

straight line. A ski with a 10 mm to 15 mm difference will exit the turn easily. The closer the numbers are, the more closely the tails will follow the tips through the arc (think of a car with all-wheel-drive, with the front tires [tips] pulling and the back tires [tails] pushing). As the taper increases, the aft section of the skis has less impact on turn completion. The taper is usually widest at the tip and most narrow at the tail.

Rocker has to do with a ski's camber. If you place skis with traditional camber together, base to base, the tips and tails touch but there's a small (.5 cm to 2 cm) space between the center of the skis. In other words, each ski arches a bit underfoot. This helps distribute a skier's weight along the whole ski surface when he or she is standing on the ski. Without camber a skier's weight would be predominantly on the center of the skis, with the tips and tails bearing almost no weight.

This traditional camber concept is being challenged in many of today's skis, with rocker—a design in which the ski swoops up toward the tip (or toward the tip and the tail)—being one of the most prevalent of the new trends. Rocker allows the skis to float higher on the surface of the snow and was originally designed for powder skis. This opened up a whole new way to ski in the deep stuff, making it possible to "surf" in powder, land big airs more easily, ski powder switch (i.e., backwards), and jump—and land—switch, etc. Basically, this design keeps the skis from diving or becoming submarines in deep snow.

Rocker comes in two varieties (so far), full rocker and tip rocker. Full rocker skis are designed with reverse camber (the ski, when viewed from the side, looks like the runner on a rocking chair). In a ski with tip rocker, only the forebody of the ski is in reverse camber.

Between the tip- and tail-rocker section, some skis are flat (i.e., there's no camber underfoot) and pretty straight. Some are flat or slightly cambered with sidecut, and some feature reverse camber with reverse sidecut—all of which is meant to help the rockered ski handle groomed terrain and let the skier traverse to find a favorite line.

Okay, so what does this all mean? Tip

rocker allows the ski tips to float on top of powder or crud snow, allowing for easier turn initiation and less likelihood of the skis diving. Full rocker has the same floating ability as tip rocker, but it also allows you to pivot/smear the skis in powder, making it easier to ski in trees or narrow chutes. Outside of the powder/big-mountain arena that almost all these skis are designed for, some ski companies are creating skis with shallow tip and tail rocker for beginner and intermediate skiers as a way to advocate easier turn initiation and turn exit.

Tail shape is another design parameter with several varieties. For the most part there are three different categories: ski tails are flat (i.e., have minimal upturn), slightly upturned and rounded, or similar to the tip (i.e., twin tip). All affect how the ski finishes the turn. The slightly upturned tail and the twin tip allow the ski to release easily out of the turn by curving up and flexing, which reduces the pressure on the tail as you finish a turn (i.e., the skis are more forgiving). While this can be a plus for all-mountain skiing and skiing in challenging conditions, it has its downside if you love to arc the last bit of the turn off the tail or develop rebound and acceleration out of the tail at the completion of the turn.

The flat tail is most common on high-performance skis designed for groomed or race situations. Lately, some models of the wider powder skis come with flat tails for the same reason, to provide a bit of pop or energy at turn completion (a flat tail can work as a brake or to help the skier accelerate out of the turn). These are also useful in backcountry situations where skis are used as anchor points. (Until recently, many hardcore backcountry/heli skiers cut the tails off of their twin-tipped fatties.) The rounded-tail skis promote softer and more consistent turn completion.

Twin tips present some differences in their skiing traits, with some designed to go switch at speed, others set up with stronger tails to support all-mountain applications and provide good pop for tricks, and others designed to be soft for buttering. With regard to tail shape, it's best to read the manufacturer's promo-

tional material prior to selecting your skis. (For more on these versatile skis, see "Twin Tips: They're Not Identical," on page 86.)

Now that you have a grasp of all the ski traits, the next step is to combine ski design with ski conditions to help you refine your selection.

Groomed Terrain

Waist width: 63 to 76 millimeters

Skis with a waist width of 70 mm and less support very high performance, especially when matched with a 12 to 15 meter turn radius. The narrow width supports quick initiation when combined with a small sidecut and pulls the ski quickly into the turn. This "encourages" you to be 100-percent focused and committed to your line—because not only are the turns quick, they are powerful and have a good bit of rebound as you link the turn in the fall line. They're great fun but require both physical and mental energy to get the most out of them. As you go wider, you sacrifice a bit of response time for greater ease and consistency of turn initiation. That said, skis at the wider range of this category are still quite acceptable in turn-initiation quickness.

I should note that almost all the skis in this category require the use of binding lifters, which provide more leverage to facilitate stronger edge engagement. These skis range from race slaloms to detuned slalom race skis (groomer-suited carvers) to all-mountain carvers with good ease of initiation and a consistently playful nature. The last favor groomers and an edgier skill blend, but are meant to be skied off the groomed.

Sidecut radius: 12 to 18 meters

Skis in the 12- to 15-meter range are very quick and generally require physical and mental commitment, since they always want to be turning. There is little to no room for relaxation, particularly when this sidecut measurement is combined with a narrow waist. The upside is quick, responsive, dynamic turns.

A 15- to 18-meter turn radius still offers a good short turn with excellent variety of "medium-ish" turn shapes.



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Considerations for Women

Over the past few years there's been tremendous progress in skis designed for women. Gone are the days when a woman's ski was just a softer production ski with the binding mounting point moved slightly forward. Today's skis are engineered specifically for women. Within the women's range, ski manufacturers have developed a wide variety of models—from soft and easy to full-on powerhouses.

One reference point to look at concerns sidecut radius. Some manufacturers give a radius for one length ski (not each individual size), usually in their most popular length. If the reference is an 18-meter radius on a 174 cm ski, then skis shorter than 174 cm will have a tighter turn radius, while skis longer than 174 cm will have a longer radius.

If you're a woman, realize that there is an array of models in all waist widths to match your individual preferences; just make sure you test a variety to see what features you really like. The ski design characteristics discussed in the accompanying article are equally valid for either sex, so they should be used as a guideline.

— Mike Porter

If you like short-radius turns, look for small numbers; if you prefer long-radius turns, go for the bigger numbers. If your priority is overall versatility rather than specific turn-radius performance, skis with progressive sidecut can be a good alternative.

Taper: 10 to 18 millimeters

The majority of skis have a 14 to 18 mm range of taper. The smaller the number, the more the tail will stay in the turn. The larger the number, the easier the tail releases out of the turn.

Ski Tactics

The narrower skis with deeper sidecut (i.e., tighter radius) want to be skied aggressively, working primarily from edge to edge. You can do some shaping, but if not on edge the ski tends to be very "nervous." These skis don't track well in a straight line, and it's usually easier to go from edge to edge (e.g., in mini railroad track turns) while on cat tracks or roads.

To get the most out of the ski, you need to be centered and ski deliberately and aggressively. Narrow skis with deep sidecut can be extremely rewarding, but they demand precision. These skis are generally skied in a shorter ski length to maximize the ski characteristics.

If you like to cruise and carve, the wider waist width of the category with a 15- to 18-meter radius would likely be a better choice. This allows you to shape the whole turn with stability, because the ski isn't too nervous and fussy, yet you can tip it up on a higher edge and still carve. The difference is that the turn radius will be longer and the turns not quite as quick and snappy. The skis' ability to blend between steering, edging, and skidding permits a wide performance range. If you like to ski bumps, choose skis with less sidecut; straighter skis offer the ability to slide, shape, and skid the ski in a variety of bump lines.

The ski length you select will also play a role in how the ski reacts, as shorter lengths allow for quicker turns and easier fall line lanes. A longer ski provides more stability in variable terrain and at higher speeds.

All-Mountain

Waist width: 74 to 88 millimeters

As skis get wider, they usually become slower to initiate and sometimes heavier underfoot. This can be good or bad, depending on the conditions you ski and your preferred turn style and shape. The wider the skis, the better they will float. The heavier the ski becomes, the more stable and less easily deflected it is.

If you ski at faster speeds and in challenging terrain and/or snow conditions, the extra width, slower initiation, and additional weight are to your advantage. If you ski different conditions—from bumps to powder—a mid-range waist may be a better choice as it would provide a blend between weight, quickness, and stability.

Notice I said that as skis get wider they usually get heavier. Ski weight varies considerably between manufacturers, and some are actually lighter than their groomer-g geared counterparts—especially with touring bindings becoming a "standard" option for system skis in this category. If you opt for a lighter all-mountain setup, you can expect the skis to initiate more easily, but they'll also tend to get bounced around at higher speeds, in chunkier snow conditions, and in frozen ruts.

Sidecut radius: 15 to 21 meters

If you gravitate toward shorter turns, go to the smaller radius but keep in mind that all-mountain versatility is best with a radius of 16 to 18 meters. If you ski a fair amount of powder or crud, too much turn radius can be a negative as the tips will want to over-turn.

Turn radius is less of a concern if you ski powder and crud rather slowly, and it actually can be an asset, since having the tips pull into the turn can help you. Skis with progressive sidecut can provide a good option, as they will produce a variety of turn radii.

Taper: 12 to 17 millimeters

The characteristics here are the same as those detailed in the "Groomed" category. One exception, however, is if you will use your all-mountain ski fairly often for powder skiing. Most

think a broad waist width is the main criterion for a powder ski, but taper is also important. The narrower the tail in relationship to the tip, the more the tail will sink into the snow, allowing the tip to float higher on the snow. This will permit a mid-fat ski to perform like a wider ski in powder, without sacrificing all-mountain versatility.

Ski Tactics

These skis are very stable and, while not being very quick edge to edge, they still provide a good short turn. They can be skied edge to edge if you are making longer-radius or high-speed turns. In general, they provide a nice blend between performance and all-day skiing pleasure.

All-mountain skis typically have a large sweet spot, and are easy to initiate and forgiving. This allows for greater consistency when linking turns and handling variable snow and terrain. The more you steer and shape the turns, the less energy is needed.

Creating higher edge angles will capitalize on the ski's design, with the trade-off being the need for more muscle involvement. If you prefer to ski terrain that's less groomed, look for skis with a wider waist and a larger sidecut radius, as the ability to shape the turns and steer the skis is more important than the carving aspect.

Ski length also plays an important role in personalizing your selection. If you favor quicker turns, like to ski more in the fall line, or ski a variety of terrain, such as moguls and narrow lines with a shorter turn shape, select a shorter ski length. If you like making longer turns—or favor higher speeds—you might want to go longer.

This category represents the greatest volume of ski sales in this country. The skis are extremely versatile, handle all conditions well, and provide a good blend between strong performance and all-day skiing ease. They provide good hard-snow performance while still proving more than capable in soft or crud snow conditions. If in doubt about your selection, I don't think you can go wrong with a model in this category.

Powder, Freeride

Waist width: 90 to 110 millimeters

At this waist width the skis can't be considered quick. Medium- and long-radius turns are the norm unless you're skiing fresh powder.

Sidecut radius: 18 to 28 meters

With the width and weight of these skis, the turn radius typically ranges from medium- to long-radius. If you favor long turns, higher speeds, or the ability to smear your turns, go for the larger sidecut radius. If you like medium-radius and linking figure-eight track turns, opt for the smaller sidecut radius.

Generally speaking, a larger turn radius is better in powder. Since snow texture and depth aren't always consistent, too much sidecut can be a negative as it can cause the tip to hook up and over-turn. A straighter forebody is less likely to be deflected, enabling a more consistent arc. These skis also are usually stiffer to allow the ski to push through the inconsistencies. The ski

width—rather than the ski flex—floats the ski.

Taper: 10 to 18 millimeters

In this category you start seeing the taper decrease as a way to get the whole ski to float on top of the snow. If the whole ski is "above the fray," so to speak, it can make eight inches of powder ski like two feet, since you can't feel or ski on the irregularities underneath.

If the entire ski is on top of the snow, you also have more turn options. You can make traditional turns, smear berms and other terrain features (both natural and artificial), or butter the ski sideways.

The more you're floating on the snow, the less the irregularities in terrain, snow conditions, and cut-up terrain will impact you. The options are almost limitless.

Rocker: Full and tip

As mentioned, rocker lets the skis float higher on the surface of the snow. Tip rocker helps turn initiation by keeping the tip above the snow, allowing it to

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enter the new turn more easily. It also helps keep the ski from over-turning at initiation. Riding higher on the surface, the tip is less likely to be deflected by snow variations and inconsistencies, enabling a smoother ride. Adding tail rocker permits easy turn exit and enhances the ability to pivot or smear the skis for narrow lines in the trees or on tight lines.

Rocker definitely gives the skis a surfy feel. It also has advantages when landing your favorite cliff drop. Among today's skis, you can find all sorts and degrees of rocker. The less rocker the more the ski acts like a traditional ski on groomed runs. Slight tip rocker can still make for a very good all-mountain ski, while some full-rocker skis are great in soft snow but a challenge on groomed. Although rocker initially made its debut in powder ski designs, this technology is evolving very quickly and could potentially make its way into all categories and ability levels. It's definitely an interesting and exciting new dimension.

Ski Tactics

Powder skis are meant to be skied flatter on the snow. The width does you no good if the skis are tipped up on edge. You want the ski to float on top of the snow as much as possible.

As you tip the ski up on edge, the area in contact with the snow surface decreases, allowing the ski to sink down into the snow. To get the most out of the equipment, use more steering and less angulation when skiing powder.

Today's trend of making longer turns in powder is partially a result of keeping the skis flatter on the snow. The classic powder turns of yesteryear had the skis rising and sinking into the snow with each turn.

If you like to make more traditional powder turns (with the skis in the snow and then rising up to start the new turn), look for skis with relatively narrow waist widths and more sidecut. If, however, you like flatter, longer-radius turns and staying on top of the snow, use the wider skis with less sidecut. It's all a matter of what you like and how you ski.

Skis in this category are generally skied in longer lengths to give more

stability and better float but, once again, if you ski slower speeds and narrower lines, or like shorter turns, you can use your normal ski length. If you enjoy wide-open, high-speed turns and rolling through variable terrain, a longer ski length will provide more stability.

Conclusion

Okay, so I hope you now have a more solid grounding in all the nuances that go into selecting skis that will help you master the mountain—given the conditions of the day or the way you like to ski. The best plan of attack is to narrow your choices by using these insights in combination with the gear-test information in commercial ski magazines (which generally covers ski-specific waist width, taper, and sidecut data as well as some performance features). Tester descriptions of how the skis skied can be very insightful, but I also recommend that you test as many of the skis as possible.

I often seek out instructors/individuals who ski similar terrain, lines, speed, and turn shapes as I do to see what they ski on. And, of course, some of the best inside information comes from ski reps and shop employees, so don't be shy about pumping them for information on what they think is best for you. Be sure to tell them how you ski and what kind of terrain you favor.

Good luck, and happy hunting. And enjoy the process. Don't feel as if you must embark on an overwhelming quest to find the right ski. Just explore your options until you find a comfortable design that emphasizes your strengths in the terrain and conditions you like to ski. These days the quality and performance of the major-brand skis is extremely good. They all ski very well and it's more a matter of finding one in which the "feel" and traits match your needs and desires. **32**

Mike Porter served on K2's product development team for 29 years, and from 1988 to 2002 served first as the training director and then the director of Colorado's Vail and Beaver Creek Ski Schools. He was a member of the PSIA Alpine Team from 1974 to 1996, serving as head coach of the team for 16 years.