ARAMID IN-MOLD HELMETS
An in-mold helmet construction is very lightweight, but lacks penetration resistance due to the thin shell. By molding a sheet of aramid to the core, the low weight is maintained and the protection is radically improved. This is called Aramid Penetration Barrier.

ARAMID BRIDGES
By molding aramid bridges to the core of the helmet, the impact forces are spread over a larger surface, and at the same time the helmet gains structural stability through the bonding of the unbreakable aramid weave and the EPS liner. It allows for a very lightweight and very well ventilated helmet.

DOUBLE SHELL
POC’s patented VDSAP system (for Ventilated Double Shell Anti-Penetration) is made out of two ventilated shells that are placed offset for maximum protection against penetration from sharp objects, while maintaining good air flow and ventilation. The safety performance of this construction is amazing and represents a unique take on helmet design.

MIPS
Short for Multi-directional Impact Protection System, the MIPS system protects the brain from rotational forces that often occur in oblique impacts. A normal helmet is created to absorb shocks by compression very efficiently, but is not as good at the rotational forces. The MIPS system absorbs those forces by allowing a small rotation of the outer shell around the inner helmet in case of an impact.

SUPER VENTILATED HELMET
By studying the airflow inside the helmets, POC has been able to create super ventilated helmets with adjustable air flows to adapt to the conditions. The combination of goggle vents, chimney vents, VDSAP and adjustable vents makes the helmets very ventilated, with a maintained low weight and protection.

CARBON FIBER HELMETS
POC’s carbon fiber shell defies the problems of excessive stiffness and thickness that the industrial carbon fiber poses, by using a ductile matrix as a carrier for the fiber. The resulting super-thin and super-light shell is a premium feature of the Super Skull Comp.

MULTI IMPACT HELMETS
Most helmets today have liners made of EPS (Expanded Polystyrene), a great shock absorbing material, but that will be permanently compressed when absorbing a shock, even a minor one. Using multi-impact EPP (Expanded Polypropylene) as core material creates a helmet that will protect your head over and over again. (All Skull helmets, Cortex, Receptor +, Receptor Backcountry)

MULTI-IMPACT DEFLECTOR PANEL
By studying top ski racers, we learned that race helmets are exposed to repeated violence from hitting gates, as the skiers deflect the gates with the helmets in search of the fastest path. This violence is more severe than expected and led us to the development of the Multi-impact deflector panels, that decrease the transmitted forces of these impacts and increase the shock absorbing capacity of the helmet.

POC Body Armor Concepts
VPD - VISCO ELASTIC POLYMER DOUGH®
POC has developed a body armor technology, VPD - Visco Elastic Polymer Dough®. The material is a Visco-Elastic foam, which is highly damping. When VPD gets exposed to impact the material softens and has an extreme absorption of energy. One of the great functions of VPD is that the damping functions progressively and adapts itself to the force of the impact. The material is soft and comfortable and adapts to create an individual fit for every user. VPD offers a high degree of flexibility and is very tear resistant.
Different helmet concepts for several different needs

When POC first started up, there were two types of helmets on the market. The traditional helmet with a hard shell and a liner of softer expanded polyethylene (EPP) which has good penetration resistance and energy distribution properties.

The disadvantage is that upon impact, the hard structure causes a sudden stop. The brain may continue to move in the direction of travel and the impact is not absorbed very well. The hard shell is also quite heavy which may cause the helmet to bounce off the ground on impact. These properties can lead to brain damage and whiplash injuries.

The second type of helmet is the “in-mold” type, which originated in the bike business. These molded helmets have a thinner shell of hard plastic that covers the ears and the back of the neck. Normally, both the traditional hard shell and in-mold helmets rely on expanded Polyethylene (EPP) for the shock absorption. EPP absorbs energy by plastic deformation, meaning it is deformed permanently upon impact. Therefore, a helmet liner made of EPP will not be good at absorbing repetitive shocks. Another aspect that is not taken into account in traditional helmets are the effects of rotational violence, which is a major risk in oblique impacts.

For the shock absorbing capacity of the helmet, to transmitted forces of these impacts, and increase the unbreakable aramid weave with the foam liner creates a new structural stability. The concept was first launched in our trail mountainbike helmet Trabec, and for this season, we also use it in our light free skiing helmet Fornix.

"SEMI-HARD SHELL" 2.0 HELMETS

When first developed and launched season 2005/2006, the aim of the “semi hard shell” helmets was to combine the advantages of in-mold and hard shell helmets. The excellent energy absorption properties from the in-mold helmets was achieved by using a thin and light outer shell and the ability to withstand sharp object penetration was solved by adding a barrier of ballistic aramid. POC has been refining the concept into the second generation of these helmets; the “semi hard shell 2.0” collection. By studying today’s top ski racers, it was evident that a helmet used for ski racing is likely to be exposed to repeated violence from hitting gates at high speed. The updated helmets are therefore equipped with a liner of Expanded Polyethylene (EPP) instead of EPS. The difference between the materials is that EPP, unlike EPS, does not deform permanently on impact and is therefore suitable to absorb repetitive shocks. The outer shell is also updated for increased durability and optimized for the new liner material (all Skull helmets).

ARAMID IN-MOLD HELMETS

With the amazing properties of our Skull Comp helmet, we have taken the technology further by incorporating the Aramid ballistic penetration barrier APB, into a series of in-mold helmets – Synapsis. This has enabled us to overcome the traditional problems of in-mold helmets breaking easily and not being able to withstand penetration. The Synapsis helmets are designed to offer extreme lightweight, ventilation and comfort without compromising safety.

DOUBLE SHELL HELMETS

Improving properties such as better shock absorption, lower weight and penetration resistance are some of the major advantages made possible by using POC’s patent pending Aramid ballistic penetration barrier APB. Transferring these qualities and lessons learned into a fully ventilated system has led to the new revolutionary, patent pending; Ventilated Double Shell Anti Penetration - VDSAP.

The concept was initially developed for the Receptor+ all season helmet. A helmet developed and certified in Europe and the US for skiing, snowboarding, skateboarding, biking and water sports. VDSAP is built with double shells, placed offset, for maximum penetration resistance and has channels in between to evacuate heat, moisture or water. The inner shell is an extremely thin in-mold shell, while the outer shell is a hard shell of ABS and PC. The properties are amazing and used in all Receptor helmets and the Cortex DH.

OPTIMIZED VENT HELMETS

Some markets asked us to come up with a super ventilated helmet, adjustable for cold days. With the experience gained from previous models, innovations and patents, we came up with a cocktail of different ventilation concepts, all included in one helmet. When using an adjustable system, there is also the challenge of keeping weight down. The solution combines three different ventilation systems.

At the front, there was the POC patent VDSAP, a double shell solution where air is transported between two layers of shell, to avoid direct wind and to withstand penetration from sharp objects. At the back, there are vents slots for the helmet to function as a chimney, where air is pulled from the front to the rear.

On top, the helmet has generous ventilation with six vents, that may be closed or semi-closed with a turning-device. This combination makes the helmet very airy and very light (all Frontal helmets).

CARBON FIBER HELMETS

So far, carbon fiber helmets haven’t made too much sense. The methods of industrially laying carbon fiber have been counterproductive to the goal of thin, light shells that deform or destruct at certain stress points. The shells have been too stiff and too thick for use in ski helmets.

However, thanks to a new method, we can make a super thin and super light carbon fiber shell, which is highly flexible and makes sense to use in a ski helmet. Unfortunately the technique is still very expensive but it’s so good that we were chosen to introduce it in the high end line of Skull helmets; Super Skull Comp.

MULTI DIRECTIONAL IMPACT PROTECTION SYSTEM HELMETS

Traditional helmet testing methods only test vertical falls. However, the real situation is that if coaching at speed, the impact will be oblique. This means that the helmet and head will rotate when hitting the ground, resulting in rotational forces to the brain. The brain is highly sensitive to this kind of violence. By applying the MIPS technology in POC helmets, the different layers in the helmets are allowed to move in relation to each other. Thanks to that, rotational violence can be controlled. All MIPS helmets; Receptor Backscatter, Cortex DH.

ARAMID BRIDGE SHELL HELMETS

When looking for low weight in combination with a tough and durable structure, we added aramid in strategic locations just under the outer shell, molded together with the foam liner material. The unbreakable aramid weave bonds with the foam liner, adding a totally new structural stability. Combining the unbreakable aramid weave with the foam liner creates a new structural stability. The concept was first launched in our trail mountainbike helmet Trabec, and for this season, we also use it in our light free skiing helmet Fornix.

MULTI IMPACT DEFLECTOR PANEL

After having studied today’s top ski racers, we realized that the racing helmets are exposed to countless hits by gates at the front. This violence is way more severe than we had ever imagined, and the discovery led us to developing the Multi Impact Deflector Panels, featured in this new line of Skull Orbic helmets. The deflector panels decrease the transmitted forces of those impacts, and increase the shock absorbing capacity of the helmet, to ensure that the helmet performance remains at the highest level for the time when it’s really needed; in a real crash.

In the deflector panels of the Skull Orbic Comp, we integrated our premium shock absorbing material VPD 2.0 with outstanding energy absorbing properties, previously only used in our body armor. The Skull Orbic X has deflector panels with multi-impact EPP.