

MOUNTAINEERING KNOWLEDGE & SKILLS

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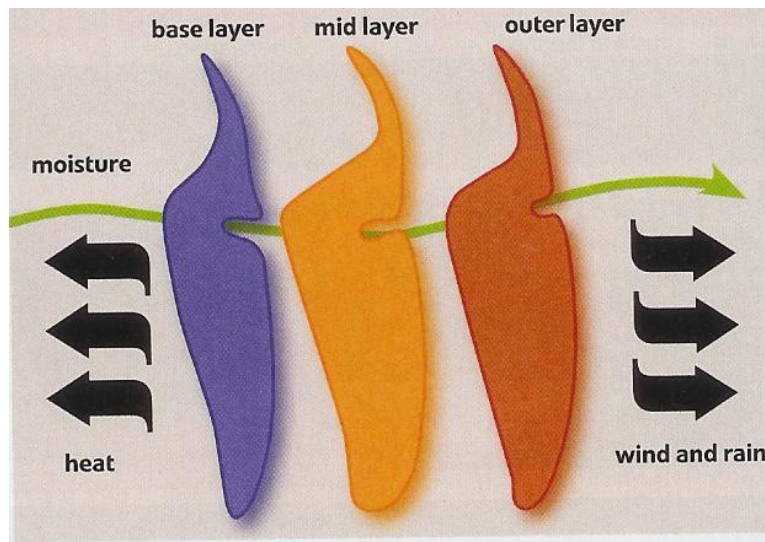
Outdoor Clothing: The Layering System

When you're out in the mountains and you get cold, hot or wet it is sometimes difficult to enjoy the adventure and it may even become dangerous with risks such as hypothermia, frostbite or even heat exhaustion becoming a frightening reality!

The best way to protect yourself from the elements is to wear your clothing in a system of layers where each layer has a specific task and purpose. This way you can add or subtract layers as conditions dictate without much interruption of the activity and so maintaining optimum safety and protection.

Modern outdoor clothing is designed to function optimally in such a layering system and is often labelled to indicate where in the system the specific garment fits in. We distinguish between 3 layers in the layering system:

- 1) **Base Layer**
- 2) **Mid Layer**
- 3) **Shell Layer**



All the layers work together to let moisture escape, keep warmth in and protect against rain and wind.

Base Layer

Base layer clothing is designed to keep you warm and dry by “wicking” the sweat away from your skin to the outside fabric of the garment where it can easily evaporate. By keeping your body dry of sweat it prevents the icy chills you get from even a light breeze blowing across your soaked skin. At the same time it aids evaporation of that sweat which in turn cools you down; keeping you from overheating.

Base layer clothing should have a snug, next-to-skin fit but should not restrict comfortable movement. There are a wide range of fabrics and different weights/thicknesses available on the market from which base layer clothing is made and your choice will depend on your intended activity. Lighter weight base layers are more appropriate to high aerobic activity (trail running, mountain biking, hiking) in warmer conditions whereas the heavier base layers are suitable for expeditions and mountaineering in cold conditions or for doubling as a light weight mid layer. It is best to avoid cotton thermal underwear as they do not adequate wicking characteristics and, once wet, do not dry out fast. Modern fabrics are designed to be light, fast drying, smell resistant and of small packed size.



Wicking Briefs



Expedition weight Long Johns



Thermal Top

Base layer clothing would include such items as underpants and panties, bra's, Long Johns or tights, thermal tops and T-shirts.

Mid Layer

The function of the Mid Layer is to provide insulation while continuing transportation of moisture to the outside. Insulation is achieved by the clothing trapping the heat generated by your body in-between it's fibres. Many options exist for mid layer clothing; from light weight fleece fabric garments to heavily insulated down and synthetic filled jackets and pants. Your choice would depend on you intended activity and the amount of insulation required to keep you safe.

Mid layer clothing can, in certain conditions, function as the outer or Shell Layer.



Down Jacket



Fleece Pants



Fleece Jacket

Typical Mid Layer garments would include fleece jackets and pants of various weights/thicknesses; down or synthetic filled jackets and pants; fleece or insulated waist coats. Features such as waist and hem draw cords, pit zips and full front zips are useful for adjusting insulation levels.

Modern innovations include "Soft Shell" clothing where manufacturers have tried to combine the Mid and Shell Layers into one garment that insulates and offers wind and rain protection. It is important to note that most of these garments are not waterproof; mostly with un-sealed seams; and that they usually offer less warmth than traditional Mid Layer garments. Soft Shells are very suited to certain sports such as snow boarding and ultra lightweight backpacking.

Remember the saying: Fleece is not windproof and Windproof Fleece is not that warm. So, choose wisely and consider your planned activity.

Shell Layer

The Shell Layer protects the other layers from outside elements such as rain, snow, ice and wind. For mountaineering it is important that this layer is completely waterproof and windproof and preferably constructed from a breathable material such as Gore-Tex®.

Full featured mountaineering jackets will have a good hood with stiffened brim; ventilating pit zips; a baffle over the full front zip; large chest pockets and/or hand warmer pockets; a large inside pocket; waist and hem draw cords and a longer “snow tail” at the back to keep your bum dry.

Shell pants should have full or half leg length zips for easy on and off over heavy footwear; a built-in gaiter on the legs and either proper hand pockets or access to the pockets of your Mid Layer pants.



Light weight Shell Jacket



Shell Pants



Full-featured Shell Jacket

Shell layer garments are available in various designs and fabric weights offering different levels of protection. Currently the market is flooded with ultra light weight shell garments of which many perform as well, or even better, than the older style heavy weight shell systems. Usually the expected life span of a heavier weight garment is significantly longer than the light weight one's and they often offer a higher level of protection. Once again you will have to make your choice depending on your activities and use.

Hands & Feet

Just like your body your hands require a layering system of gloves to keep them warm and well. For a Base Layer wear a thin, tight fitting fleece glove made from a material such as Polartec Powerstretch®. This will protect your hands while still giving you some dexterity for tasks such as replacing batteries or films or doing knots.

Shell Layer for your hands can be a glove or mitten made from a waterproof, breathable material and padded with an insulating fabric.



Powerstretch Liner Gloves



Insulated Shell Gloves



Insulated Shell Mitts

Modern trekking and hiking boots generally don't require a double sock system for preventing blisters when fitted correctly. Heavy mountain boots, however, may be more comfortable worn with a thin, wicking liner sock and heavier insulating outer sock. For very cold conditions it may be advisable to wear a double pair in thick insulating socks. Always remember to fit your boots with the socks you intend to wear and the expected conditions in mind.

Wearing a thin, wicking liner sock may also help to prevent blisters by keeping the feet dry from sweat and absorbing some of the friction generated between the boot and your skin.

Putting all the layers together

Once you have chosen the components of your layering system you can mix-and-match them to build a system for each and every adventure or expedition you embark on. When designing your system keep the following in mind:

- Season and Time of Year
- Duration of the adventure (1 day or maybe a multi-day expedition)
- Will expected conditions remain the same throughout the adventure or will my needs be different at various stages of the trip. (Think trekking with a high altitude summit somewhere in the middle!)

Example: Mt Kilimanjaro Expedition

Below follows an example of a layering system for a typical Mt Kilimanjaro expedition. For the first two to three days on Kilimanjaro, while trekking up the lower slopes of the mountain, you can expect warm, humid (but possibly wet) conditions during the day with cooler to cold temperatures at night. Once past 4000m you can expect temperatures to start steadily dropping and while making your summit bid on day 4 or 5, with a typical midnight alpine start, you can expect to face very cold conditions with the possibility on severe snow and wind conditions. As you descend the mountain conditions once again change to warm and humid and your layers will need to be changed to remain comfortable.

Here's what works for Kilimanjaro:

Day 1 – 3: Lower slopes and Forests to sub-alpine belt.

- 1) Wicking T-Shirt or Nylon Trekking Shirt or both to layer up if it gets colder.
- 2) Nylon Trekking Shorts or the very versatile Convertible Trekking Pants that can change from pants to shorts by unzipping the legs.
- 3) Keep your shell gear in your day pack for in case it starts raining.
- 4) At night you should be comfortable sleeping in a fresh set of thermals.



Layering with wicking T-Shirts and Nylon Trekking Shirts & Pants on the lower slopes of Kilimanjaro

Day 4 & 5: Alpine Zone & Summit

- 1) Thermal underwear: Long Johns & Long Sleeve Top
- 2) Wicking T-Shirt or Trekking Shirt – optional
- 3) Heavy Weight Fleece Jacket & Pants
- 4) Light weight down or synthetic filled insulating jacket
- 5) Glove system & cold weather socks
- 6) Fleece cap or Balaclava
- 7) Gaiters
- 8) Shell Jacket & Pants



Well layered up against the cold on the Roof of Africa

Day 6: Descending to the Park Gates

As for days 1 – 3. Conditions again getting warmer and possibly humid and even wet.

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