South Lake County Regional CERT

Cold Weather Preparation and Equipment

Randy James

Randy.James@TheConsultantsSource.com

312-835-4742

Revised January 20, 2021

Winter Pre-Callout Preparation

Winter call-outs and activities offer different challenges than milder seasons. You must be prepared for more severe weather and shorter daylight hours by having extra gear and additional skills.

Before the season starts

- Check all of your gear and its condition
- Update your go bags with winter equipment.
- Collect and layout your call-out clothing and equipment in advance – maybe at the end of your closet, etc.
- Carry winter clothing and your go bag in the car so that you can respond without driving home.

For each callout

- Let others know where you'll be, what vehicle you are driving, how to contact you
- Have a cell phone – keep it charged and have a car charger

After each callout or activity

- Assess the need to restock, replace, add, or upgrade any of your clothing, equipment, or supplies.
- Immediately re-supply and be ready for the next event.

Monitor the Weather

- Stay abreast of the weather forecast – anticipate the next callout and be prepared.
- When a callout occurs, check the current weather conditions and the forecast for the next 24 hours.
- Keep your driveway clear of snow in advance of a call-out.
- Download a weather app like Weatherbug for your smartphone.
- The NOAA-NWS Web site and Weather Radio’s offer details of current conditions and forecasts, and also broadcast alerts.

Winter Pre-Callout Preparation - continued

Know the area

- Obtain and study maps and research key locations in our service areas.
- Check the local road conditions. Have a primary route and a backup route to navigate to the staging point.
- How long will it take to get to common staging areas?
    - What are the safest routes to use?
    - What is the fastest route?
    - What are good alternate routes?
- If something goes wrong, where is the nearest medical assistance and how can you contact them?

Do What is Right For You

- Your winter preparation needs will likely be different from your peers due to many factors.
- Be aware that fabrics, clothing, equipment, and medical advice have changed significantly in the past 10 years.
- Try new types of clothing, materials, and equipment – see what works for you **– BEFORE A CALLOUT!**

Share your experiences with others

- Did you find a pair of warm gloves that are great?
- What items have performed poorly?
- Do you have a favorite store or brand of equipment?
- Have you tried a new product recently?
- What foods/snacks do you consume to give you a quick calorie boost?

Winter Safety: Wind Chill

The NWS Windchill index provides an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. The index:

- Is based on a human face model
- Incorporates heat loss from the body to its surroundings, during cold and breezy/windy days
- Assumes no impact from the sun (i.e., clear night sky) – but direct sunlight can add 10-18 degrees F to the perceived temperature.

NWS Windchill Chart

Wind (mph) \ Temperature (°F)	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5		36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10		34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15		32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20		30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25		29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30		28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35		28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40		27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45		26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50		26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55		25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60		25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes; 10 minutes; 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph)

Effective 11/01/01

Winter Safety: Frostbite

Frostbite is a freezing of the tissues usually on the fingers, toes, nose or face. It is a result of heat being lost faster than the blood can circulate. In severe cases, appendages may have to be amputated.

YOUR PERSONAL SAFETY COMES FIRST! Understand the current conditions (temperatures and wind speeds), and know the maximum safe exposure times. Work with your team leaders/members to rotate them into a heated area (building, vehicle, heated tent, etc.) to avoid danger.

Symptoms:

1. Numbness to an area.
2. Loss of sensitivity to touch.
3. Tingling that feels like burning.
4. Shivering.
5. Skin appears red and then white-to-purple.

Monitor Your Teammates for Symptoms!

Prevention:

1. Don't put yourself in that position. Your health and well-being are the most important.
2. Be aware of your body signals.
3. Stay warm and dry - Use chemical heat packs to help stay warmer.

Remedies:

1. Place the cold/frostbitten appendages against warm skin, such as your feet against a companion's stomach or armpits, or your fingers in your own armpits.
2. Use warm water on the afflicted area.
3. Do not use fire to thaw area—speedy relief can increase the injury.
4. Do not rub because the abrasive action could damage tissue more.
5. Evacuate to a medical facility.

Winter Safety: Hypothermia

This is the body's temperature decreasing due to exposure to the cold conditions. A hypothermic person doesn't have enough heat to warm themselves. A person can become hypothermic without even noticing it. It can be life threatening.

Symptoms:

1. Shivering.
2. Slurred speech.
3. Non-communication.
4. Lethargy.

Monitor Your Teammates for Symptoms!

Prevention:

1. Stay warm.
2. Stay dry.
3. Stay hydrated.
4. Eat well.

Remedies:

1. Get to a warm place (vehicle, building, heated tent, etc.).
2. Put on dry clothing.
3. Eat and drink warm (not hot!) foods and fluids.
4. Put warm water in bottles and place them in the blankets with the person.
5. Use another person to warm the hypothermic person.
6. In severe cases, careful evacuation to a medical facility is required.

Tip: Carry a small Thermos bottle with a hot drink or soup—it'll warm you up when you're getting cold.

Winter Safety: Dehydration

Even when the temperature is low, you are still perspiring and losing fluids and become dehydrated. Dehydration effects your kidneys, heart or brain. So drink plenty of water—even if you're not thirsty. **Drink before you become thirsty. Most of us are dehydrated!**

Tip: Keep the fluids flowing in freezing weather with an insulated reservoir. In extreme cold, leave the reservoir at home and use a (hot) water bottle cover for your bottle. Turn the bottle upside down. (Water freezes from the top down, so by turning it right-side up you'll be able to unscrew the cap and drink.)

A good way to determine if you're drinking enough is to check the color of your urine. If it's dark, you are dehydrated. If it's pale in color, you're doing a good job hydrating!

Other symptoms of dehydration in extreme temperatures:

Monitor Your Teammates for Symptoms!

1. Increased heart rate.
2. Dry mouth.
3. Dizziness.
4. Muscle cramps.
5. **Confusion – even slight dehydration effects mental capacity – in all age groups!**
6. Weakness.

Warmth Starts From Within – Nutrition Tips

If the callout requires a lot of physical activity, you will be using a lot of energy. If you are not active, your body still needs “fuel” to generate body heat to stay warm.

Be sure to eat and hydrate before, during and after the callout to keep your energy up and help your body recover.

Proteins, fats and carbohydrates all provide energy.

- Proteins (meats, dairy and eggs) help build muscles and body tissue.
- Fats (nuts and meats) are used primarily for energy.
- Carbohydrates (cereals, legumes, vegetables, fruits, breads and candy) also provide energy.

Consider food that does not take much preparation or clean up.

Avoid alcohol and caffeine. Alcohol increases blood flow and cools your core temperature; caffeine restricts blood flow and cools your extremities. **Alcohol also effects your ability to sleep deeply…**

Tip: To stay warmer, take short breaks to snack on food and hydrate, or simply nibble/sip while you're moving/active.

DO NOT STORE FOOD/SNACKS/CANDY in your coat pockets or vehciles unless they are WELL SEALED to reduce the risk of mice and other “critters” from finding them…

The simple rules of winter callouts are to stay safe, dry, warm, and visible.

Choose clothing **layers** that wick moisture, dry quickly, insulate and are waterproof and breathable. By adjusting these layers, you can regulate the amount of warmth you need based upon differing levels of activity (sitting or standing around vs. lifting or walking, etc.)

The 3 basic layers for clothing are:

The **base layer** is basically your underwear—the layer next to your skin. Synthetic and merino wool fabrics work best (**avoid cotton**). They wick perspiration away from your skin to outer layers so it can evaporate. They dry quickly so you spend minimal time in wet clothing. In winter, it's common to wear 2 base layers: a lightweight or midweight layer, then a thicker heavyweight layer.

The **middle layer** is your insulating layer. It is primarily designed to help you retain body heat. Consider expedition-weight fleece or micro-fleece shirts, pants and jacket and/or a goose down jacket.

The **outer layer**, or shell, is your waterproof/windproof/breathable layer. Laminates such as Gore-Tex Active, Outdry Extreme, eVent or REI Elements claim to offer premium protection. Less expensive alternatives use polyurethane coated fabrics that are equally waterproof but somewhat less breathable. **High levels of activity will create perspiration…even the latest technologies will often require core and/or underarm vents or being opened from time to time to release built-up moisture and heat. Look for products that claim to dry quickly if they become wet.**

Be sure the outer layer is high visibility – wear a reflective vest over the outer layer – or choose outer layers that include lime green and have ANSI 2 amounts of reflective material.

Tip: If you take a break, put on a layer so you don't cool off too much. Your body will have to work harder to warm up again.

Fabrics - Synthetics

This refers principally to polyester and polyester blends. Some underwear blends use high percentages of nylon (as a means of increasing abrasion resistance), or they add small amounts of spandex or elastin (to enhance stretch). Polyester, though, is the dominant synthetic fiber used in wicking first layers. Some are treated with anti-fungal products to reduce odors; some are available with bug-repellent treatments.

Pros:
- Feels soft against skin.
- Lightest in this group.
- Moisture-wicking.
- Abrasion- and wrinkle-resistant.
- Easy care.

Cons:
- Odors may build if worn repeatedly on multiday outings.
- Potentially vulnerable to staining.
- Petroleum-based fiber.

Synthetic Sock liners – example are Polypro X-Static Sock Liners available thru L.L. Bean

ExOfficio Bugsaway Hiker Crew Socks – include bug-repellant materials – available thru L.L. Bean.

Fabrics – Synthetics – Polypro®

Due to its low thermal conductivity, Polypro possesses a high insulating power. Polypro enables the air to become trapped in its tiny apertures, creating **the most efficient thermal insulation of any fabric in the marketplace today.**

The thermal protection is due to its light and voluminous structures. Coupled with this, moisture vapor permeability has proven that movements of heat and moisture through our most fabric is a major factor in determining its comfort. The moisture regain of Polypro is virtually nil. Polypro is the most effective fabric for energetic activists an well as those enthusiastic observers.

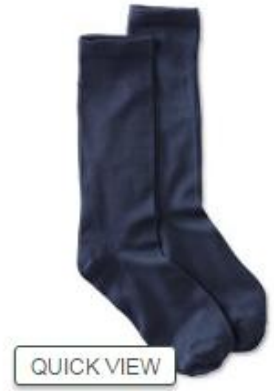
This fiber can not and will not absorb water. If water vapor cannot escape sufficiently and quickly through clothing, the relative humidity at skin level increases and condensation can occur - causing chills, discomfort, and possible harmful effects. With Polypro this cannot happen. A comfortable balance of heat and relative humidity is maintained, and the fabric directly in contact with the skin is kept dry at all times.

A most important quality of Polypro is its high resistance to abrasion which is similar to that of nylon and far higher than that of wool or acrylic. When wet, it maintains its low abrasion level. The wearer has a comfortable and easy care fabric that remains soft regardless of the fabric's activity.

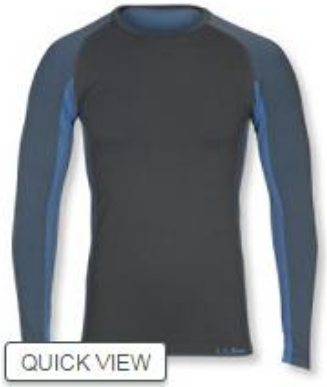
Key attributes of PolyPro include:

· Lightweight In Both Polypro And Polythick · Moisture Insensitivity · Water Repellency · Dimensional Stability · Resistance To Chemical Agents · Resistance To Mildew And Spot Formation · Resistance To Abrasion · Thermal Conductivity Lowest Of All Natural And Man Made Fibers · Soft As Cotton, Warmer Than Wool

Fabrics – Synthetics – Polypro®

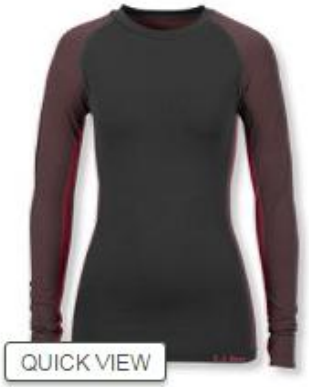


Men's Polypro X-Static Sock Liners
$16.95
Add to Compare



Men's Polypro Base Layer, Long-Sleeve Crew
$49.95
Add to Compare

Women's Polypro Base Layer, Pants
$49.95
Add to Compare



Women's Polypro Base Layer, Long-Sleeve Crew
$49.95
Add to Compare

Men's Polypro Base Layer, Pants
$49.95
Add to Compare

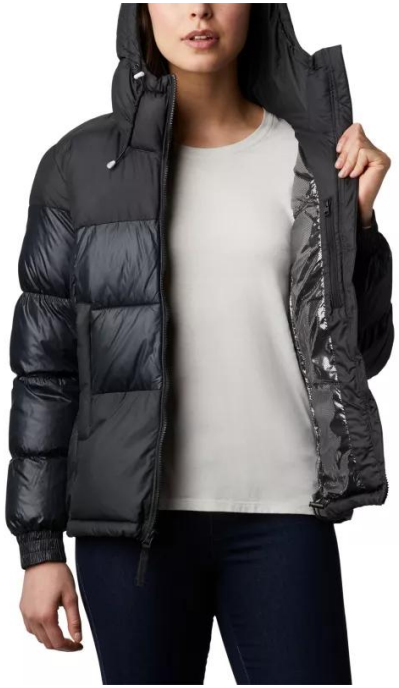
Sock Liners, Socks, and Base Layer garments are all available in Polypro®.

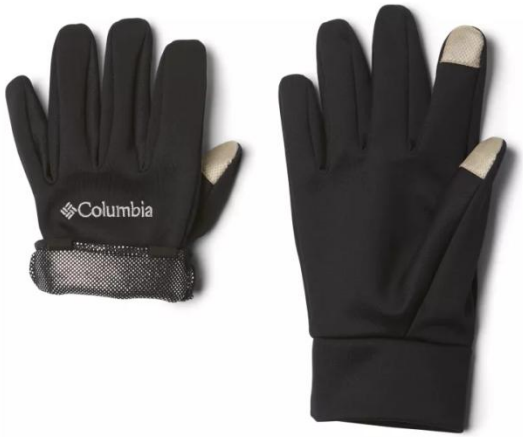
Fabrics – Synthetics – Columbia Omni-Heat®

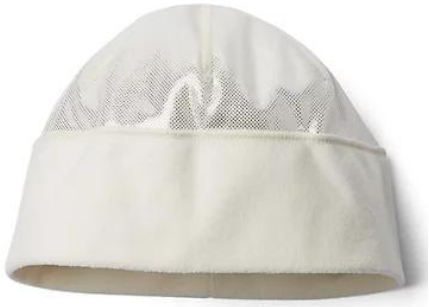
Columbia Omni-Heat is a silver reflective lining that is designed to reflect your body heat back to you. Remember that clothes don't "warm you up" – they are only insulating you to reduce/minimize heat loss. So reflecting your body heat back to you is very effective.

Nearly any type of hat and liner (shown inside out below), neck liners, gloves, coats, vests, and underwear can be purchased with Omni-Heat. All poly material to stay dry.

Great deals can often be found at Columbia Factory Outlets – 50% off.







Combine an Omni-Heat hat liner with a visible wool hat to stay toasty!

Fabrics - Merino Wool

Merino wool has virtually replaced traditional wool thanks to its soft "ultrafine" fibers. Many people are surprised to learn that lightweight merino wool creates a terrific all-season base layer.

Pros:
- Lightweight, soft on skin and not itchy.
- Usually machine washable.
- Stain- and wrinkle-resistant.
- Natural fiber.

Cons:
- Not as fast drying as synthetics.
- Potentially vulnerable to shrinkage.

Fabrics - Silk (Treated Silk)

Silk underwear is largely a specialty fabric, intended primarily for cool and cold-weather usage.

"Treated" indicates the silk has been chemically modified to enhance wicking (a fabric's capacity for moving perspiration off skin to speed its evaporation).

Fans of silk are attracted to its smooth texture.

Pros:
- Soft, luxurious texture.
- Thin; adds no bulk and layers well.
- Natural fiber.

Cons:
- Some styles require hand washing; machine washing can cause shrinkage.
- Not very durable – subject to abrasion and sunlight.
- Expensive

Fabric Weights

Every weight in this category is appropriate for use as a stand-alone garment – it depends on the activity, temperature, body metabolism, and layering.

When selecting tops and bottoms for use as base layers (actual underwear), anticipate the conditions you'll face when choosing the heft of the fabric. Here are general guidelines:

- **Micro-weight:** For mild to cool conditions.
- L**ightweight**: Cool to moderately cold conditions.
- **Mid-weight:** Moderately cold to cold conditions.
- **Heavyweight:** Cold, frigid or blustery conditions.
- If you get cold easily, choose a heavier fabric. Just know that if conditions become unexpectedly mild, a mid-weight or heavyweight first layer could feel too warm during vigorous activity.

Fit

The warmer the conditions, the looser you want your base layer to be. Snug-fitting base layers keep body-generated warmth close to your skin, boosting comfort in cool conditions.

When temperatures heat up, it's best to let your next-to-skin layers hang loose to accommodate lots of air circulation.

If a garment's advertising promotes an "athletic fit," assume its fit will be on the snug side.

Winter Clothing and Accessories – Base Layer

Base Layer = Moisture Management

This is your next-to-skin layer. It helps regulate your body temperature by moving perspiration away from your skin. Keeping dry helps you maintain a cool body temperature in the summer and avoid hypothermia in the winter.

If you've ever worn a cotton T-shirt under your raincoat while you were active, you probably remember feeling wet and clammy, even though you weren't getting wet from the rain itself. ***Cotton is a fabric that retains perspiration and can leave you chilled…or worse. Don't even use cotton underwear!***

For outdoor comfort, your base layer should be made of merino wool (popularized by brands such as SmartWool, Ibex and Icebreaker), synthetic fabrics (polyesters such as Polartec Power Dry or Patagonia Capilene), **Columbia Omni-Heat**, or, for less-active uses, silk.

Rather than absorbing moisture, these fabrics transport (or "wick") perspiration away from your skin, dispersing it on the outer surface where it can evaporate. The result: You stay drier even when you sweat, and your shirt dries faster afterwards.

Examples: A base layer can be anything from briefs and sports bras to long underwear sets (tops and bottoms) to tights and T-shirts. It can be designed to fit snugly or loosely. **For cool conditions, thermal underwear is available in light-, mid- and expedition-weights.** Choose the weight that best matches your activity, metabolism, and the temperature/weather.

Winter Clothing and Accessories – Choosing a Base Layer

	Synthetics	Wool	Silk (Treated)
Leading Brands	Capilene; Ex Officio; Marmot; Mountain Hardwear; REI Polartec Power Dry; The North Face; Under Armour; **Columbia Omni-Heat**	Ibex; Icebreaker; Patagonia, SmartWool. REI.	REI.
Moisture wicking	**Excellent** Nonabsorbent fibers transport moisture away from skin, spreading it over the garment's outer surface to speed evaporation.	**Excellent** Wool fibers absorb moisture (as much as 36% of its weight), then gradually release it through evaporation.	**Good** Transports moisture away from skin more slowly than synthetics.
Drying Time	**Excellent** Dries faster than any other fabric on this List.	**Good** Slower to dry than synthetics, but often feels dry on skin.	**Fair to good** Silk absorbs some moisture and is thus fairly slow to dry.
Temperature Regulation	**Fair to good** If breezes arise before it dries, a wearer could get chilled. In hot, humid conditions, faster-drying synthetic layers are usually best.	**Very good** Surprisingly comfortable on warm days; excellent for cool days. Offers more warmth than a synthetic garment of the same thickness.	**Very good (in low temperatures)** As nice as silk feels, people typically find it too warm for vigorous warm weather activity. Good insulator when it's cool or cold out.

Winter Clothing and Accessories – Base Layer Continued

	Synthetics	Wool	Silk (Treated)
Odor resistance	**Poor to fair** When worn for extended periods, synthetic fabrics readily collect bacteria that cause odors. Best if laundered after every use.	**Excellent** Wool is naturally antibacterial, usually for the life of the garment. Can be worn on consecutive days with minimal odor buildup.	**Fair** Best if laundered after every use.
Stretch	**Very good** Above-average elasticity. Retains shape after being stressed.	**Very good** Above-average elasticity. Retains shape after being stressed.	**Good** Moderate elasticity. Usually retains shape after being stressed.
Price	**Good** Moderately priced.	**Expensive** Natural fibers tend to be costly.	**Fair** Borderline expensive.
Suggested Uses	• All activities, all conditions. • Best in this group for rainy conditions and for heat and high humidity. • Snug fit best for cold weather, loose fit for mild days.	• Most activities, most conditions. In rainy/wet conditions, faster drying synthetics are a better option. • Best in this group for cool conditions.	• Moderate cool weather activities and snow sports. • When stationary or post-activity lounging indoors.

Winter Clothing and Accessories – Insulating Layer

Middle Layer = Insulation

The insulating layer helps you retain heat by trapping air close to your body. Natural fibers such as wool and goose down are excellent insulators. Merino wool sweaters and shirts offer soft, reliable warmth and keep on insulating even when wet.

For very cold and dry conditions, goose down is best. It offers an unbeatable warmth-to-weight ratio and is highly compressible. Down's main drawback is that it must be kept dry to maintain its insulating ability. A new innovation—water-resistant down—promises to change this.

Classic fleece such as Polartec 100, 200 or Thermal Pro polyester and other synthetics such as Thinsulate provide warmth for a variety of conditions. They're lightweight, breathable and insulate even when wet. They also dry faster and have a higher warmth-to-weight ratio than even wool.

Classic fleece's main drawbacks are wind permeability and bulk (it's less compressible than other fabrics). Like thermal underwear, fleece tops are available in 3 weights:

- Lightweight for aerobic activity or mild climates.
- Mid-weight for moderate activity or climates.
- Expedition-weight for low activity or cold climates.

Examples: For high-energy activities such as cross-country skiing, cycling or running, choose lightweight fleece (Polartec 100 or Power Dry) to avoid overheating. For cold conditions, try thicker fleece such as Polartec 200 or 300. Wind fleece such as Polartec WindPro polyester or Gore WindStopper adds a high level of wind resistance to fleece. How? It uses a hidden membrane that does not affect breathability.

Types of Insulation

Down: Nature's best insulator—the most warmth for the least weight and bulk. Just don't get it wet.

Water-repellent down: (Introduced in 2012) Down treated with a molecular-level polymer that can withstand mist or light moisture. That's a big plus, but you still shouldn't let it get soaked.

Synthetic materials: Water-repellent, quick-drying fibers engineered to mimic down's loft, low weight and compressibility. Down edges synthetics in all those areas, but synthetics are getting better with each new generation of products. PolyPro is a recent innovation.

Fleece: Best for chilly conditions, but not serious cold. Fleece jackets, vests and pullovers are more commonly worn as a middle layer (the insulating layer) in a 3-part layering system used to regulate heat and perspiration during vigorous activity. Fleece can be synthetic or wool.

Types of Insulation - continued

	Pros	Cons	Best for
Down	• Lightest • Most compressible • Most warmth per weight	• Won't insulate if wet • Slow to dry • More expensive	• Dry condition • Mild activity
Water-repellent down	• Same weight, warmth and compressibility as untreated down • Insulates even if exposed to light rain • Dries a little faster	• Vulnerable to heavy rain or getting submerged • More expensive	• Dry or damp conditions • Mild activity
Synthetic fibers	• Water repellent • Relatively quick to dry • Less expensive	• Slightly bulkier, heavier and less breathable • Less durable	• All conditions • Mild activity
Fleece	• Soft and breathable • Dries quickly • Less expensive	• Modest warmth • Most bulky option	• Cool conditions • High activity

Winter Clothing and Accessories – Shell Layer

Shell Layer = Weather Protection

The shell or outer layer protects you from wind, rain or snow. An outer shell is an important piece in bad weather, because if wind and water are allowed to penetrate to your inner layers, you begin to feel cold.

Shells range from pricey mountaineering jackets to simple windproof jackets. Most claim to allow at least some perspiration to escape; virtually all are treated with a durable water repellent (DWR) finish to make water bead up and roll off the fabric. **DWR wears off over time, so retreatment is usually necessary on a regular basis.**

At least as important as the type of fabric is the DESIGN of the shell. Better shells include multiple vents to allow for proper ventilation of perspiration. If perspiration can't evaporate, it will condense on the inside of your shell and begin to soak your other layers. Many experts agree that even the best "breathable" fabrics may not be able to export all of the perspiration that a body can generate…so vents are still a necessity.

Fit is another consideration. Your shell layer should be roomy enough to fit easily over other layers and not restrict your movement.

Shells are categorized as either rainwear, which emphasizes low weight and packability, or mountaineering wear, which is more abrasion-resistant and has additional features.

Winter Clothing and Accessories – Shell Layer Continued

Waterproof/breathable shells: The most functional (and expensive) choices, these are best for wet, cool conditions and alpine activities. Shells using laminated membranes such as Gore-Tex Active, Outdry Extreme and eVent offer top performance; those using fabric coatings are a more economical alternative.

Water-resistant/breathable shells: These are best for light precipitation and high activity levels. Less expensive than waterproof/breathable shells, they're usually made of tightly woven fabrics (such as mini-ripstop nylon) to block wind and light rain.

Soft shells: These emphasize breathability. Most feature stretch fabric or fabric panels for added comfort during aerobic activities. Many offer both shell and insulative properties, so they in effect combine 2 layers into 1. Soft shells include cold- and mild-weather options.

Waterproof/non-breathable shells: These economical shells are ideal for rainy days with light activity. They are typically made of a sturdy, polyurethane-coated nylon which is water- and windproof.

Insulated shells: Some outer shells have a layer of insulation built in—such as fleece—making them convenient for cold, wet conditions, but not as versatile for layering in fluctuating temperatures.

Winter Clothing and Accessories - Socks

Wear a thin, snug layer next to your skin and a second layer over it, both made of merino wool or a synthetic fabric. The thickness of your second sock is determined by your boot fit. **An extra-thick sock will not keep your feet warm if it makes your boots too tight.** Take extras. If they get wet, change them and put them in the vehicle to dry.

Athletic/multisport socks: This broad category ranges from traditional white gym socks (updated with moisture-wicking fabrics) to technical socks intended for cross-training and running. Most provide some sole cushioning but have minimal bulk overall.

Running socks: These range from thin liner socks with very little padding to those with dense cushioning in the heel and ball of the foot. Some runners prefer less padding for a better fit in their shoes; others like more padding for added cushioning and reduced foot fatigue.

Walking socks: These offer cushioning and moisture-wicking properties for fitness walkers.

Casual socks: Though distinguished by their casual styling (colors, stripes, etc.), these lightweight socks are usually made from performance fabrics such as **merino wool**.

Lightweight hiking socks: These relatively thin socks provide a good fit for those with **high-volume feet** (i.e., feet that are wide or have a high instep). They wick away moisture and offer modest cushioning in the heel and ball of the foot. They are thinner, especially on the top, than mid-weight socks and can be worn with or without liner socks.

Mid-weight backpacking socks: Their additional thickness gives a good fit to those with **low-volume feet** (i.e., feet that are narrow or have a low instep). They offer more padding in the heel and ball of the foot than do lightweight hiking socks, plus cushioning on the top of the foot and leg for comfort on long trails. They can be worn with or without liner socks.

Mountaineering socks: These heavyweight socks are your **thickest option, with extra bulk and padding to withstand rugged conditions.**

Winter Clothing and Accessories – Socks Continued

Ski and snowboard socks: These are padded in the shin area and usually underfoot as well. They are thin and not intended to provide significant warmth; rather they are meant to protect your feet from pressure points and rubbing inside the boots. Their design also serves to not interfere with the energy needed to make quick turns.

Liner socks: These are worn next to your skin, under a pair of regular hiking socks (or slightly thinner than usual depending on the shoe fit). Typically made of synthetics such as CoolMax polyester, they pull moisture away from the feet to the outer sock where it can evaporate. Liner socks are popular because they can be washed and dried easily on long trips. They're usually used with hiking boots rather than walking or running shoes, since boots often have extra volume to accommodate them.

Waterproof socks: You have 2 choices. Waterproof/breathable oversocks are great for rainy weather, when keeping your regular socks dry is a real necessity. Or, choose waterproof/breathable socks worn in place of regular socks. These feature a thick exterior, a moisture barrier and a fleece interior.

Toe socks: Like gloves for your feet, seamless "toe socks" help prevent between-toe blisters. (Note: Between-toe blisters can also be the result of too tight shoes.) Typically made of synthetic fibers, toe socks are intended for running or hiking.

Fleece socks: These are a cozy choice with shoes or sandals, or by themselves as house slippers. The fabric wicks moisture but does not conform to the foot as much as a hiking sock.

Heated socks: These use low-amperage battery power to provide fast, shockproof heat. Popular for sedentary pursuits (e.g., standing, sitting) in cold weather, or for those with low metabolism.

Winter Clothing – Balaclava and Face Masks

Keeping your core warm during winter outdoor sports should be a priority, but just as important is making sure your head and face are protected from cold temperatures and harsh wind that can lead to anything from mild discomfort to frostbite. Recent data suggests **you can lose up to 7-10% of your body heat through your head.**

Leaving your face exposed to the elements can lead to sunburn, windburn, frostbite, or other irritations, and when these forces join together, it could lead to serious skin irritation. On a cold, windy day, your face will quickly chap, making it even easier for sun and wind to cause more damage.

Balaclavas, face masks, neck gaiters, and ski goggles can be used individually or together to create the optimum level of comfort and protection you'll need.

Balaclavas
These cold-weather-clothing items are ideal for covering your head, neck, and ears, shielding them from biting wind that could certainly spoil your good time. Made of lightweight fleece or sometimes neoprene, balaclavas are pulled over your head and fit snugly across your chin and forehead; they also fit nicely under ski helmets.

Face Masks
Using a face mask will keep your nose and mouth from taking a beating from the cold and wind. These masks are often made of wind- and water-resistant neoprene shells and typically feature breathing holes to allow air to pass through easily where your mouth is. Choose a face mask that’s lined with fleece to give you the utmost comfort and warmth against your skin.

Winter Clothing – Balaclava and Face Masks - continued

Keep in mind that face masks, unlike balaclavas, don't cover your neck or forehead. When the wind is blowing snow sideways and temperatures are extremely low, you might want to consider the best of both worlds: the balaclava and face mask combo.

Balaclava and Face Mask Combo
Some products feature both balaclava and face mask combined, giving you complete protection from cold and wind. If you prefer, you can use a separate face mask with a balaclava, allowing you to position each for maximum comfort.

Neck Gaiters
Just as you'd wear a scarf to keep heat from escaping from where your jacket meets your neck, a neck gaiter can help you retain heat. Neck gaiters are often made of polyester fleece, which makes them quick drying and warm.

Be sure to look for a gaiter that has a longer front than back, because this will provide the most coverage and still fit better around your neck and inside your jacket. Some models also offer a cinch cord to make the gaiter especially tight around the neck, keeping heat in. If you expect to be out in windy conditions, consider a neck gaiter made with wind-resistant fleece.

Ski Goggles
Ski goggles, which can fit over a balaclava and are usually designed to fit well with face masks, will keep you from tearing up in the cold even in the windiest conditions.

Winter Clothing – Gloves, Mittens, and Liners

Choosing the right pair of gloves or mittens can make all the difference when it comes to keeping your hands toasty and dry all winter.

While mittens naturally offer more warmth than gloves by grouping your fingers together (think lots of people in a small, crowded room), the different forms of insulation used also have a major impact on warmth. If you're looking for a lightweight glove with outstanding resistance to extreme cold, take a look at goose down gloves. But if you suspect moisture could be a part of your outdoor experience, gloves or mittens with PrimaLoft insulation may be better suited.

You'll also find several forms of fleece gloves, which, being made of polyester, dry quickly and can come in a variety of different levels of wind- and waterproofness. Generally, any synthetic snow gloves, including fleece and PrimaLoft, will keep your hands warmer in wet conditions than down.

Dexterity
When deciding on the type of insulation, keep in mind how important it will be to have complete control over your hand movements. If you choose a heavily insulated mitten, you may be shielded well from the elements, but it could also restrict movement—a bad situation when you‘re working with tools outside. If it's dexterity you need, first focus on the stretch of the fabric, then decide how well it will suit you in the cold. Gloves trade off warmth for dexterity.

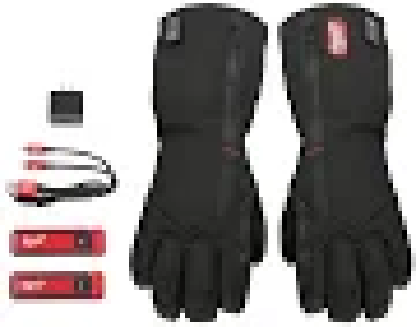
Coverage
You may notice that winter gloves come in a wide range of shapes and sizes. A smaller glove or mitten may end at the wrist, which can be handy when you're actively working with your hands in the cold. But if you're using your gloves for activities, you may want to check out gloves with coverage that goes well beyond the wrist to keep out snow and cold.

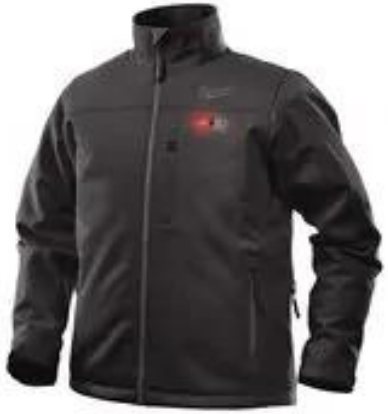
Winter Clothing – Gloves, Mittens, and Liners - continued

Unique Gloves

There are several forms of gloves that offer unique benefits, such as the ability to work touch screen devices. Liner gloves that can be worn under heavier (**and even heated**) gloves or mittens for added warmth; and fingerless gloves, which provide the most possible dexterity. But remember, with more dexterity comes greater exposure to cold, so be sure to balance which you'll need most.

Milwaukee Tools – the same company that sells premium power tools, offers very nice (yet expensive) heated gloves, sweatshirts, coats that use rechargeable batteries.





Outdoor Research (OR) is also a great brand of very warm gloves and mittens.

Columbia offers Omni Heat glove liners.

Winter Clothing – Gloves, Mittens, and Liners - continued

Gloves or Mittens? What is best to keep <u>you</u> warm?

At the end of the day, it will be most important for you to know which gloves to use for the activities you'll be doing. For callouts that need extreme cold-weather gear, look for gloves and liners with a good balance of warmth and dexterity, and waterproofing. A pair of warm mittens , combined with liners will also keep you warm between vigorous activities that require gloves.

Tips:

- Buy very good quality gloves/mittens – read the reviews on web sites for guidance
- Use wool or synthetic liners to wick away moisture.
- Waterproof and windproof shells are important to stay warm and dry.
- Bring extras in case they get wet.
- Use chemical hand/feet warmers as needed.
- Avoid “metal mesh” glove liners – they will result in cold hands if exposed to the air.

Insulated Footwear

Snow boots enable you to withstand a range of winter conditions. They are designed to keep the cold out while at the same time keeping the moisture away from your foot. This keeps your feet happy through a range of activities. Warm feet? Yes. Sweaty feet? No.

If you are prone to cold feet and are going to be outside for a lengthy time, make sure you have a warm enough boot. If you are going to be active, take that into account too! The first consideration when you choose a winter boot is the temperature range you'll experience when you wear the boots.

Manufacturers use temperature ratings based on scientific testing that results in cold weather extremes not relevant to the average snow boot shopper's life. Experts find that most boots rated at -40 F are actually the perfect snow boot for cold, snowy northern U.S. winters even though the typical temperature is closer to 10 or 20 F. It's best to buy for a lower temperature range than the actual outside temperatures you'll encounter.

Temperature Rating Category	Manufacturer Rating	Ideal Low Temperature (don't get cold)	Ideal High Temperature (don't get hot)
Extreme Cold	-148 F /-100 C	- 50 F / - 45 C	20 F / - 6 C
Advanced Cold	- 94 F / -70 C	- 20 F / - 28 C	30 F / - 1 C
All Around Cold	-40 F / -40 C	0 F / - 18 C	40 F / 4 C
Every Day Cold	10 F / -12 C	20 F / - 6 C	50 F / 10 C

The ideal low and high temperatures represent the spectrum that most people prefer. They are recommendations but not hard and fast performance guarantees. Read the on-line reviews to assist in a purchase decision. Consider using chemical warmers if needed.

Insulated Footwear - continued

Start with the numbers on the thermometer and then consider **your unique needs**. Take these four factors into account when deciding which pair of winter boots to purchase:

What is the temperature outside?
Remember that you are buying for a temperature range which includes winter's fickle highs and lows. The typical northern winter has temperatures between 0 and 30 degrees F. For most customers, the ideal walking/shoveling/sledding/strolling boot will be found in the Everyday Cold or All Around Cold collection. EMA members may need a warmer boot for extended activities.

What is my personal tolerance for cold?
Some of us find ourselves with frosty feet well before the rest of the crowd while others could happily wear our Converse high tops year round. You need to decide where you fall on the spectrum. If you always have cold feet, you may need to consider the All Around Cold or Advanced Cold boots for your everyday wear even if the temperature ratings seem lower than you expect to find.

How long will I be outside?
Nothing freezes up the feet faster than standing around on cold snow. Think ski lift attendant or traffic control. You'd be surprised to learn that most lift attendants wear the warmest snow boot they can find from December right through March, just because of the length of time they stand still on the cold snow.

If you love to be outside for the duration, consider the Advanced Cold or Extreme Cold collections. These boots will be a bit heavier than other models, but on those long, cold days, you'll feel the warmth, not the weight!

How active will I be?
Winter snow boots are your armor from the cold. The longer you stay outside, the warmer the boot you need. The more you stand still, the warmer the boot you need.

Activities like walking will heat your body up faster and will not require the warmest boots.

Footwear - continued

Boot Gaiters:
A must for deep snow, they help keep snow and water out of your boots. They even add a bit of warmth. Be sure to use a waterproof/breathable model designed for winter use.

Hand and Foot Warmers:
There are 2 common types - chemical and electric. Chemical foot warmers are disposable; they use a controlled chemical reaction to generate heat for several hours. Electric foot warmers use batteries and electric heating elements to provide warmth…usually with a "in-sole" like insert design.

- **TIP: check the expiration dates of the chemical warmers – they DO expire – so use them before then – or they will be cold when you REALLY need them! DISPOSE OF EXPIRED PACKAGES.**
- **We have noticed a BIG difference in the amount of heat and reliable operation of hand warmers – we recommend sticking with GRABBER brand. They are frequently on sale, especially the 10 packs.**

Very Good Winter Boots to consider as a starting point (from 2021 NY Times)

- Best all-around snow boot for men: Kamik Nation Plus
- Also great: Sorel Caribou Boot, Men's and Women's
- A boot that fits like a shoe: Ugg Adirondack III & Ugg Butte
- A lighter boot for easy walking in snow: Columbia Heavenly Omni-Heat (Women's)
- A durable slip-on: Muck Boot Arctic Ice Mid
- Also consider: Bogs Arcata Knit Boot
- Best for walking on ice: Danner Arctic 600 Side-Zip
- Best snow slipper: Ugg Classic Short Boot

Member recommendations - Base Layer Pants and Shirts

From Cosco: 32 Degrees brand Heat Performance Mesh base layer pants and shirts in both men's and women's sizes. The composition is 47% polyester, 26% rayon, 24% acrylic and 3% spandex (no cotton), so it retains body heat and wicks moisture away from the skin. The price was quite reasonable. They bought a set for winter biking with the dog.

From Columbia – Omni-Heat based clothing and underwear is fantastic!

Cabelas also has a great selection of underwear.

Winter Clothing and Accessories

Helmets, Goggles and Sunglasses

- Protect your eyes from sun, wind, and cold.
- There are different lens tints for various weather conditions.
- Clean your glasses and goggles with anti-fog products.
- Bring cases to protect glasses/goggles when not in use.

Member Recommendation: Bolle' snow sport helmet and goggles.

The helmets come in several sizes. Although these are not the Bolle' high end helmets, the quality seems quite suitable for CERT and SAR searches. They are warm, have ear vents, and protect the head from impacts from branches and minor falls. The price is more reasonable than the technical rescue helmets and they provide better protection to the side and back of the head. The helmet would be too warm for temperatures above 70 degrees, but could be used anytime the temperature is 60 degrees or below. In the spring and fall, temperatures often are cool enough at night for the helmet to be useful.

The goggles come with two interchangeable lenses (yellow and pink). The yellow lenses make vision much sharper, a good thing on searches. The pink might work better in some lighting conditions. The goggles protect your eyes from bright sun, cold, wind and impact from twigs and briars. I could even wear the goggles over my prescription glasses. Since they are not well ventilated, they would not work well in warmer temperatures.

Winter Preparation - Communications

VHF two-way radios allow you to stay connected to members and leadership. Always carry a spare battery. Keep your batteries fully charged.

Remember that hand held VHF radios are relatively low power (usually 4-7 watts), and are limited to line-of-sight coverage to the receiving radio antenna. If you have trouble communicating, try to raise the height of the radio antenna, connect to an external antenna (like a magnetic mount), or move to higher ground if possible.

Carry your cell phone with you at all times. Add the cell phone numbers of CERT leaders and team members into your phone's contact list. Carry a list of CERT members and their home and cell phones in your backpack and car.

IF not in use, turn off wi-fi and Bluetooth options to conserve battery life. If you are staged in a metal structure for a long period of time, consider turning your phone to "airplane mode" to avoid battery drain from the phone trying to constantly "ping" and locate a far away cell tower.

For smartphones, close any applications that will not be needed. This will also extend battery life.

Carry a PLASTIC whistle with you – avoid the metal variety as they can freeze to your skin.

Winter Preparation - Lighting and Batteries

Winter nights are long, so make sure your headlamp and flashlight batteries are new or fully charged before a callout, and **always bring extra devices and batteries**.

A best practice is to immediately recharge/replace used batteries after a callout.

ALWAYS USE HIGH QUALITY BATTERIES like Duracell, EverReady, and Kirkland.
Batteries included with most newly purchased flashlights/battery power appliances are often of very poor quality. IMMEDIATELY replace them with high quality batteries to reduce the possibility of leakage and DAMAGE.

Lithium batteries perform very well in cold weather, but they can overpower some devices like headlamps. Some lithium-ion rechargable batteries also perform well in cold. Check your product's manual for compatibility.

Alkaline batteries are inexpensive and should work in any device, but they perform at 25% of capacity when cold, and drain at a faster rate. **Use Eveready or Duracell brands. AVOID CHEAP BATTERIES (Ray-O-Vac, off brand names) AS THEY ARE PRONE TO LEAKAGE THAT WILL DESTROY THE DEVICE.**

Tip: Cold temperatures decrease alkaine battery life. Store your batteries and battery-operated devices inside your insulating layer (fleece or down coat) and close to your body heat to keep them warm. ALWAYS have a spare set of batteries for each device!

Consider the use of a headlamp during cold weather. Metal flashlights held in your hand will "drain away" heat from your body. Using a headlamp avoids the heat loss from your flashlight, and also allows you to place your hands in pockets for added warmth.

TIP: If you have a flashlight that does not work after being in storage or unused for a period of time, check the condition of the batteries (look for old batteries, leakage, corrosion) and for corrosion on the terminals INSIDE the flashlight case and holder. Try using a Q-Tip swab and distilled white vinegar to clean the terminals and holders. – it's ok to soak some of the parts, just be sure to dry them off before replacing the batteries. In many cases, this will solve the problem and extend the useful life of your flashlights!

Winter Preparation - Vehicles

Take good care of your vehicle – *unless you can get to the call out, any other preparations will not matter.*

- Keep the fuel tank filled.
- When refueling, clean all windows and lights of snow and ice to maintain visibility. **Note that many vehicles with LED lights ARE PRONE TO ICING - which will GREATLY REDUCE VISIBILITY - since they operate much cooler than traditional incandescent lamps – so stop, check, and CLEAN them FREQUENTLY – especially if it is snowing, or there is slush on the roads.**
- For diesel engines, use anti-gelling additives all season long.
- For diesel engines, drain the fuel/water separator on a regular basis to avoid fuel line freezeup.
- Proactively service and replace maintenance items before they fail or become dangerous.
- Check that all headlights, taillights, turn signals, flashers, and emergency lights are working.
- Replace non HID headlights on a regular basis BEFORE they burn out…they can dim 50% with age.
- Consider having amber color warning lights on/in the vehicle
- Check the condition of your tires – consider using snow tires and separate steel rims for the winter season.
- Check tire pressure – often they will need extra air in cold weather.
- Carry a can of "fix-a-flat"
- Clean the interior windows each month. **Use Stoner Invisible Glass (regular yellow cap aerosol can ONLY – NOT the version with the "grip handle")** and Scott towels for streak free cleaning.
- Consider using RainX to help keep exterior windows and headlight and taillight lens' clean and minimize snow and ice buildup.
- Use new winter wiper blades each season; pull the blades away from the windshield to prevent getting stuck to windshield when snow is in the forecast.
- Use de-icer washer fluid rated to at least -25F and keep your washer reservoir full. Carry extra washer fluid.

Winter Preparation – Vehicles continued

Take good care of your vehicle – *unless you can get to the call out, any other preparations will not matter.*

- Use synthetic motor oils – it will reduce the load on your starter and battery.
- Consider replacing your car battery after 3 years, carry jumper cables and know how to use them.
- Keep you car battery fully charged – **DISABLE ECO mode if this results in your car engine stopping while parked for more than a few seconds, or stopping the engine when you are at a traffic signal, etc. The constant starting of your engine (especially) in cold weather, and the car not running long enough to charge the battery will result the battery voltage dropping enough to prevent the car from starting!**
- **Consider purchasing a lithium battery powered portable jump starter.**
- Use lithium batteries in your car flashlights; have an extra set of batteries in the car.
- Carry extra clothing, food, liquids, and blankets.
- Carry a strong shovel.
- Apply lock de-icer and lock lubricants to doors.
- Have a first aid kit.
- Have some cash for emergencies.
- Have a 12V charger for your cell phone.
- Have a roll of paper towels, and box of Kleenex
- Carry some basic tools.
- Have a means to navigate if electronic devices fail – paper maps and a compass

Sources for Quality Gear and Info

- http://andrewskurka.com
- http://andrewskurka.com/product/ultimate-hikers-gear-guide
- https://gearjunkie.com
- http://www.wearitforsafety.com
- http://www.thegearcaster.com
- Recreational Equipment, Inc. (REI) – Northbrook; REI.com
- Berlands House of Tools, Rand Road, Palatine
- Dicks Sporting Goods – Deer Park Mall area
- MooseJaw.com - web
- SummitHut.com - web
- Pro-pac.com – web
- Galls.com - web
- LLBean.com – web and South Barrington area
- Melon Ink – Lake Zurich – lettering and embroidery for clothing and jackets
- Cabelas – South Barrington area
- Cutler Workwear/Hardware – Route 83 north of Route 22 – great selection of steel toe boots and outer wear
- Eastern Mountain Sports – EMS.com – web
- WinterFootWear.com – web
- Costco – **Kirkland batteries**
- Farm and Fleet (Rt 14 Woodstock) for hi-viz wear; clothing – **Carhart and other brands**
- Duluth Trading – **their FireHose brand pants are also available with flannel lining for extra warmth!**
- **LL Bean – also sells lined pants for extra warmth**
- **Columbia.com – Omni Heat items**
- **MilwaukeeTool.com – heated wear**
- Rental Max in Lake Zurich – safety clothing
- Sierra Trading Post – Rt 12 Deer Park

Please provide feedback and suggestions to improve this document to:
Randy.James@TheConsultantsSource.com

THANK YOU!