TENACIOUS
ergodyne
WORK GEAR
est. 1983

THE OFFICIAL ERGODYNE

GUIDE TO COLD STRESS

TENACIOUS WORK GEAR

BUILT TO ENDURE

TABLE OF CONTENTS

// COLD STRESS OVERVIEW

WHAT IS COLD STRESS?

The data doesn't lie: Seasons are becoming more extreme. And the ever-increasing unpredictability of Mother Nature is making it harder than ever for workers exposed to her wild weather swings to prepare.

Take the record-setting winter of 2017-2018, for example. Long stretches of extreme cold matched with powerful blizzards put much of North America in a deep freeze many have not seen in their lifetime. Even areas like Louisiana, Texas and Florida were impacted by sizable snowfall and temps that plummeted well below average. In many parts of the U.S., winter didn't release its grip until well into April.

With these cold-weather extremes as a backdrop, it's more important than ever to be able to properly identify the most common cold-related illnesses, knowing what treatments to seek and how to prevent them in the first place.

Know the Risk

When the body temperature drops below 98.6° F (or 37° C), blood begins to flow away from the extremities to heat the body's core. This immediately cools exposed skin and extremities, and increases the risk of cold stress, specifically frostbite and hypothermia. According to the Centers for Disease Control and Prevention (CDC), early signs and symptoms of cold stress include shivering, fatigue and confusion or disorientation. They can evolve to include blue skin, a slow pulse, and even loss of consciousness.

Cold Related Illnesses

Hypothermia, frostbite and trench foot are the most common cold-related illnesses.

Trench Foot

- **How it happens:** Occurs in damp or wet environments that are just above freezing
- **Symptoms:** Numbness, swelling, blisters open sores. Feet may turn red or blue as a result of poor blood supply. If left untreated, trench foot can turn gangrenous
- **How to treat it:** Remove wet socks and footwear. Clean feet with warm water and dry thoroughly. Seek medical treatment immediately and do not wear socks when sleeping or resting

Frostbite

- **How it happens:** Blood leaves the extremities to protect vital organs in the body's core
- **Symptoms:** White, grayish, or bluish skin. Cold, hard, or waxy feel. May itch, burn, or feel numb. Blistering and hardening of skin are signs of extreme frostbite
- **How to treat it:** Get out of the cold, and gradually warm the affected skin. Place frostbitten areas in warm – not hot – water. Wrap affected areas in a warm blanket and seek emergency medical help immediately

Hypothermia

- **How it happens:** Body heat is lost faster than it's produced. Core body temp drops below 95°F (35°C)
- **Symptoms:** Shivering, poor coordination, confusion, slurred and slow speech, hallucinations or changes in personality
- **How to treat it:** Treat the worker very gently and do not apply external heat to re-warm. In mild cases, move to warm area and stay active. Cover head and body with dry clothes or blankets. Drink a warm (not hot) drink. Contact emergency medical personnel in more moderate cases. In severe cases, hospital treatment is required

Prevention + Solutions

Working safely in bitter cold conditions requires planning, regular breaks to get warm, and layering up in the right PPE.

Layering

There is no single magic garment able to adapt to the ever-changing environmental variables of winter the way a proper layering system can.

» **Smart solutions:** A breathable, wind/water-resistant outer layer, an insulating middle layer and a breathable, moisture-wicking base layer provide the protective barriers needed to combat cold. Protect extremities with thermal headwear and work gloves. Supplement with warming packs for feet, hands and liners

Traction

Ice and snow make for treacherous terrain that leads to nasty slips and falls.

» **Smart solutions:** Ice cleats that fit over workboots provide a simple solution for stable footing

Hydration

Dehydration in cold environments is a major risk especially since lower temperatures suppress thirst (the body is focused on regulating core temp more than fluid balance).

» **Smart solutions:** Hydration packs encourage more fluid intake than bottles

Plan Ahead

Cold related illnesses and fatalities are 100% preventable when you know the risks, symptoms and solutions. With expert training, support and endless innovation, Ergodyne is here to help you lead the way in making the Workplace a Betterplace™.


2
3
1

// LAYERING

Because there is no single magic garment able to adapt to all the ever-changing environmental variables of winter the way a proper layering system can, experts recommend wearing at least three layers of loose-fitting clothing.

1. Base Layers

Moisture is your enemy. Sweat and/or water on the surface of the skin will draw heat away from the body, cooling it rapidly. When the goal is to stay warm, productive and agile, a moisture-wicking, quick-drying layer is key. Venting under arms and a slightly loose, non-compression fit garment also creates a breathable layer of air insulation.

2. Mid Layers

The human body loses 65 percent of its heat through radiation once the air temperature drops below 68°F (20°C). And this second layer – often your work gear or uniform – not only provides an added layer of insulation from the cold to trap body heat, but allows the wearer to react to changing temps and adjust their warmth by removing or adding layers as needed.

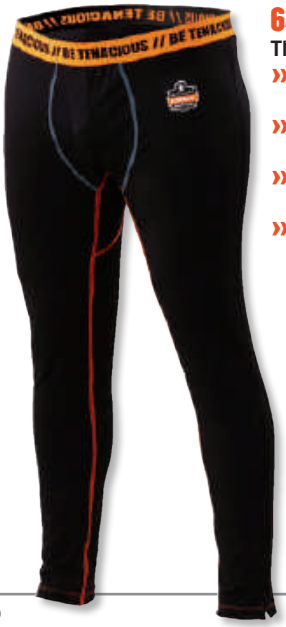
3. Outer Layers

Wind and precipitation pull heat away from the body (AKA, convection). To guard against this, the third layer features durable materials designed to stand up to abrasion, wind, rain and snow, as well as the cold. Additionally, insulated shells should also allow for air and moisture to pass through to the outside, with venting adding another level of temperature control.

6435

Thermal Base Layer - Long Sleeve Shirt

- Stretch fabric, brushed interior for warmth and comfort
- Anti-odor treatment helps you remain unscented
- Moisture-wicking treatments keep you dry
- Raglan sleeves, flat seams, thumb loops, and long tail cut



6480

Thermal Base Layer - Bottoms

- Stretch fabric, brushed interior for warmth and comfort
- Anti-odor treatment helps you remain unscented
- Moisture-wicking treatments keep you dry
- Flat seams and tagless waistband

INTERIOR POCKET WITH HEADPHONE CORD PORT

6466

Thermal Jacket

- Rugged 500D Nylon shell with water-repellent-treatment
- 1600D Nylon reinforcement zones
- Removable hood with adjustable draw cords
- YKK® zippers

6471

Thermal Bibs

- Rugged 500D Nylon shell with water-repellent-treatment
- 1600D Nylon reinforcement zones
- Full-length YKK® zippers on each leg for easy on/off
- Reflective accents keep you safe and seen

REMOVABLE PE FOAM KNEE PADS

// THERMAL GLOVES

Many so-called winter work gloves are actually retro-fitted all-season gloves crammed with cheap insulation and made using materials that actually absorb water and let cold air in. Here's how to spot winter hand protection that works.

Outer Shell

Ripstop nylon with a DWR (Durable Water Repellent) finish not only fends off the wind and the wet stuff, it will stay pliable in plummeting temps.

Insulation

To maintain warmth and dexterity, look for gloves with dual-zone insulation that use a heavier insulation on the back of the hand, and lower-weight insulation on the palm.

Waterproofing

Serious winter work gloves are built with a waterproof membrane to shout out moisture from the outside while allowing sweat to escape.

Tech-Friendly

The ability to perform basic mobile device tasks without exposing hands to the elements can be the difference between staying on track or stopping to warm up.

8190D // 819WP

Extreme Thermal Waterproof

- Dual-zone 3M™ Thinsulate™ Insulation
- Weather-resistant ripstop outer shell + DWR finish
- Touchscreen-capable thumb and index finger
- **8190D:** OutDry® waterproof/windproof bonded membrane
- **819WP:** Waterproof/windproof breathable membrane insert

818WP

Performance Thermal Waterproof

- Dual-zone 3M™ Thinsulate™ Insulation
- Waterproof/windproof breathable membrane insert
- Weather-resistant ripstop outer shell + DWR finish
- Touchscreen-capable thumb and index finger
- **Also available in HV Orange**

817WP // 817

Reinforced Thermal Utility

- Dual-zone 3M™ Thinsulate™ Insulation
- Weather-resistant ripstop outer shell + DWR finish
- Rugged AX Suede™ palm and fingertip reinforcements
- Touchscreen-capable thumb and index finger
- **817WP:** Waterproof/windproof breathable membrane insert

814

Thermal Utility

- Insulated fill for cool to cold temps
- Weather-resistant outer shell
- Durable synthetic leather palm
- Touchscreen-capable thumb and index finger

814CR6

Thermal Utility + Cut Resistance

- Nex-gen Armortex® for extreme cut protection
- Insulated fill for cool to cold temps
- Weather-resistant outer shell
- Contrasting color fingertips for hand signaling

816

Thermal Flip-Top

- Fleece-lined mittens convert to half-finger gloves
- Mitten pocket and thumb stow easily when not in use
- Weather-resistant outer shell
- Durable synthetic leather palm
- Contoured gathered elastic cuff w/ ID space

925WP

Performance DIR + Thermal WP

- Dual-zone 3M™ Thinsulate™ Insulation
- Waterproof/windproof breathable membrane insert
- Full TPR armor + technical foam for max protection

// THERMAL HEADWEAR

While the long-held belief that about 50% of body heat escapes through the head has been debunked, the face, head and chest are more sensitive to changes in temperature than the rest of the body. And any part of the body left exposed in cold temps leaves workers at risk for cold related illness.

Thermal Hats

We've come a long way from the winter hats your mom made you wear as a kid. High-tech materials, insulation and thoughtful design deliver enhanced warmth matched with dry, breathable comfort that won't overheat.

Thermal Liners

Much like balaclavas, thermal liners provide a boost of warmth underneath head protection. Though not as versatile (or fun to say) as a balaclava, options like pockets for warming packs and optional facemasks allow workers to customize comfort and protection in changing conditions.

Balaclavas

Like a scarf, facemask and hat all in one. Balaclavas have become popular on worksites for their versatility, breathable/moisture-wicking comfort and ability to fit under head protection.

6802

Classic Trapper™ Hat

- Faux fur detail and quilted satin crown lining
- Durable wind- and water-resistant shell
- 60 grams of 3M™ Thinsulate™ Insulation

6802ZI

Zipper Trapper Hat with Universal Bump Cap Insert

- Compartment holds 8945 bump cap insert
- 40 grams of 3M™ Thinsulate™ Insulation
- Available as hat only (6802Z)

6819BT

Be Tenacious™ Beanie

- 100% acrylic shell
- CoolMax™ lining
- 100% tenacious look

6818

Dry Acrylic/Fleece Beanie

- 100% acrylic shell
- 40g of 3M™ Thinsulate™ flex insulation
- Soft fleece liner
- One size

6816

Reversible Knit Beanie

- 100% poly/fleece reversible hat
- Lime microfleece laminated to gray polyester
- Stylish and comfortable

6816RT

Reversible Knit Beanie - Realtree®

- 100% poly/fleece reversible hat
- Stretchable Realtree Xtra® camo polyester with soft brown fleece on reverse side
- Stylish and comfortable

6812

Ribbed Knit Beanie

- 100% acrylic, stretchable ribbed-knit fabric
- One size

6810 // 6815

Stretch Cap - Half/Full Face

- 100% polyester knit
- One size
- **6810:** Half cap style
- **6815:** Full face style

6877

3-Layer Liner w/ FR Modacrylic Shell

- Shell: 60% modacrylic/ 40% cotton blend EBT 6.4 cal/cm^2
- Mid-Layer: 100% polyurethane foam
- Lining: 100% polyester fleece
- Warming pack pockets/ Hook & loop straps

6863 // 6867

3-Layer Liner w/ Poly Shell

- Shell: 100% polyester
- Mid-Layer: 100% polyurethane foam
- Lining: 100% polyester fleece
- Warming pack pockets/ Hook & loop straps

6950 // 6952

3-Layer Liner w/ Sherpa

- Shell: 100% polyester
- Mid-Layer: 100% polyurethane foam
- Lining: 100% polyester sherpa
- Warming pack pockets/ Hook & loop straps

6860 // 6862

2-Layer Liner w/ FR Modacrylic Shell

- Shell: 60% modacrylic/ 40% cotton twill blend EBT 6.4 cal/cm^2
- Lining: 100% polyester fleece
- Warming pack pockets/ Hook & loop straps

6850 // 6852

2-Layer Liner w/ Cotton Shell

- Shell: 100% cotton twill
- Lining: 100% polyester fleece
- Warming pack pockets/ Hook & loop straps

6840 // 6842

2-Layer Fleece Liner - Economy

- Shell: 100% polyester with PU coating
- Lining: 100% polyester fleece
- Hook & loop straps

6870

2-Layer Mouth Piece

- Shell: 100% cotton twill
- Lining: 100% polyester fleece
- Hook & loop closure
- Attach to winter liner for face coverage

6842HV

2-Layer Fleece Liner - Hi-Vis Lime

- Shell: 100% oxford polyester
- Lining: 100% polyester fleece
- Warming pack pockets/ Hook & loop straps

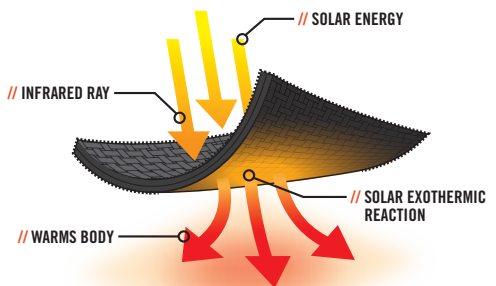
MULTIPLE WAYS TO WEAR

6838

Solar Activated Balaclava

- Utilizes Heaterex® Technology
- Dual-Layer face mask w/ hinged design
- Multi-functional/multi-climate

HEATEREX®



6970

Fleece Balaclava w/ Hot Rox™

- 2-piece fleece, patented design
- Built-in heat exchanger for warm air inhalation
- Form-fitting design prevents eyewear from fogging

6827

2-Piece Fleece/Neoprene Balaclava

- Polyester fleece w/ neoprene mask
- Reflective accents for high visibility
- Hook & loop to attach to hard hat suspensions

6826

2-Piece Fleece Balaclava

- 2-pc polyester fleece attached by hook & loops
- Unique hard hat hook and loop suspensions
- Reflective accent for higher visibility

6832

Spandex Balaclava

- Polyester/spandex blend
- Lightweight and stretchable for all-day comfort
- Easily fits under hard hat or other head protection
- Long length for added protection
- Reflective accents for visibility

6824

Wool Blend Balaclava

- Moisture wicking polyester/ wool blend
- Easily fits under hard hats
- Lightweight and stretchable
- Reflective accent for visibility

6822

Balaclava with Spandex Top

- Polyester fleece for warmth
- Lightweight, stretchable spandex top
- Reflective accent for visibility

6821

Fleece Balaclava

- Polyester fleece for warmth
- Reflective accents for visibility

6823

Wind-Proof Hinged Fleece Balaclava

- Fleece with wind-protectant fabric
- Unique hinged design
- 3-panel construction for comfort
- Reflective accent for visibility

Ergodyne N-Ferno 6823 Thermal Fleece Wind-Resistant Hinged Balaclava, Black

★★★★★

arctic roughnecking

By Amazon Customer on Dec 10, 2017

"This is my second year working in North Dakota on workover rigs. This is by far the best mask I've worn working derricks. High wind and below-zero temps, this mask was awesome. I keep a spare in my bag at all times."

// FLAME RESISTANCE

Each year, hundreds of burn injuries and deaths are recorded from workers exposed to open flame, high heat, flash fire or arc flash without proper personal protective equipment (PPE).

Avoid "Single Wash" Solutions

Winter liners that are made of polyester with topical FR treatments are often inaccurately believed or reported to be FR-compliant. The topical treatment does help the liner self-extinguish, but only after the flame source is removed. As long as the flame is present, polyester will do what polyester does: melt, drip, and burn.

This treatment is often described as a "single wash," meaning it will be ineffective after one laundering. **Treated polyester products do not meet any FR garment standard appropriate for ARC flash or flash fire hazards such as ASTM F1506 or NFPA 2112.** If the job calls for workers to wear clothing compliant to any of the FR garment standards, it is critical that they do not wear PPE with a topical FR treatment.

Instead, make sure PPE is made with trusted, compliant materials like Nomex® or modacrylic blends and sewn with flame resistant Nomex® or meta-aramid threads per the appropriate FR performance requirements.

6885

2-Way 2-Layer FR Liner

- Top: FR modacrylic twill with FR modacrylic fleece
- Lower: Double layer FR modacrylic rib knit
- Nomex® metal zipper
- **NFPA 70E CAT2 // ATPV 17 CAL/CM²**

6880 // 6882

2-Layer FR Modacrylic Liner

- Shell: 60% modacrylic/ 40% cotton twill blend
- Lining: 60% modacrylic/ 40% cotton fleece blend
- **NFPA 70E CAT2 // ATPV 20 CAL/CM²**

6892

3-Layer FR Modacrylic Liner

- Shell: 60% modacrylic/ 40% cotton twill blend
- Mid-Layer: 3M™ FR Thinsulate™
- Lining: 60% modacrylic/ 40% cotton fleece blend
- **NFPA 70E CAT3 // ATPV 27 CAL/CM²**

6872

2-Layer FR Modacrylic Mouthpiece

- Shell: 60% modacrylic/ 40% cotton twill blend
- Lining: 60% modacrylic/ 40% cotton fleece blend
- **NFPA 70E CAT2 // ATPV 20 CAL/CM²**

6825

FR Nomex Balaclava

- FR Nomex® fleece
- Arc-rated; ATPV of 9.7 cal/cm²
- Reflective accent for visibility
- Stretchable and comfortable
- **NFPA 70E CAT2 // ATPV 9.7 CAL/CM²**

6828

FR Modacrylic Balaclava

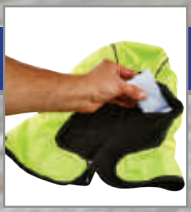
- FR modacrylic blend fleece
- Arc-rated; ATPV of 10.6 cal/cm²
- Reflective accent for visibility
- EN 1149 (Anti-Static)
- **NFPA 70E CAT2 // ATPV 10.6 CAL/CM²**

6820

FR Modacrylic Knit Cap

- Shell: 60% modacrylic/ 40% cotton blend
- Lining: 60% modacrylic/ 40% cotton fleece blend
- Reflective accent for visibility
- **NFPA 70E CAT4 // ATPV 49.5 CAL/CM²**

// WARMING PACKS



// WARMING PACKS

Whether in liners, boots or gloves, warming packs come in handy whenever you need to keep fingers and toes from freezing. You can even get crazy and toss the 6990 in a pocket! The 6992 and 6995 Warming Packs adhere to the insole of a shoe or boot to keep feet and toes comfortable – so frostbite can fuggedaboutit.

6990

Hand Warming Packs

- Natural contents heat up on contact with oxygen
- Seal in zip-top bag to reuse
- Heats up to 12 hours

6992

Toe Warming Packs

- Natural contents heat up on contact with oxygen
- Seal in zip-top bag to reuse
- Heats up to 5 hours

6995

Foot Warming Packs

- Natural contents heat up on contact with oxygen
- Seal in zip-top bag to reuse
- Heats up to 7 hours

// ICE TRACTION

Slips, trips and falls are the second most common cause of accidental death in the U.S. every year. And even deeply lugged soles – which work great in mud, snow, gravel, etc. – may be inadequate for ice. Wearing some type of personal ice traction device may be a better option. While versions of anti-slip devices have been available for generations, designs and materials have improved.

Carbon Steel Cleats

Ice traction devices with carbon steel studs can provide solid traction on ice and snow-covered surfaces. Heat treating the carbon steel hardens the compound, making it even more durable on rough terrain.

Tungsten Carbide Cleats

Made from a durable, exceptionally hard compound, tungsten carbide studs wear up to 100 times longer than steel and can be made thinner than heat-treated carbon steel, allowing for better penetration and sharper grip on ice and snow.

Heel-Only Cleats

Great for workers that regularly climb ladders, or operate pedals in vehicles or equipment where studs or spikes across the middle of the foot could interfere or cause discomfort.

Easy On/Off

Look for cleats with a one-piece design that stretch right over existing footwear. Modern thermoplastic elastomers (TPE) are both durable and tested for cold weather use.

6300

One-Piece Ice Traction

- 8 rugged, heat-treated carbon steel studs
- Stretchable rubber for fit and easy on/off
- U.S.: M (5-8), L (8-11), XL (11-15), 2XL (15-18)

6300TC

Tungsten Carbide Ice Traction

- 8 rugged, durable tungsten carbide steel studs
- Stretchable rubber for fit and easy on/off
- U.S.: M (5-8), L (8-11), XL (11-15), 2XL (15-18)

6304

Performance One-Piece Ice Traction

- 12 rugged, heat-treated carbon steel studs
- Stretchable rubber with “step-in” design
- U.S.: S (5-7), M (7-9), L (9-11), XL (11-14)

6310

Adjustable One-Piece Ice Traction

- 10 rugged, heat-treated carbon steel studs
- Adjustable cord for a secure fit
- Stretchable rubber for fit and easy on/off
- U.S.: M (5-8), L (8-11), XL (11-14)

6315

Strap-On Heel Ice Traction

- Corrosion-resistant steel heel plate
- Heel-only design leaves mid-foot free
- Rugged webbing, hook & loop strap

6301

Replacement Studs

- 8 heat-treated carbon steel replacement studs
- Fits Trex™ 6300, 6304, and 6310

6301TC

Replacement Studs

- 8 tungsten carbide replacement studs
- Fits Trex™ 6300TC

THE 6300TC FEATURES TUNGSTEN CARBIDE STUDS:

// ARE A STRONGER ELEMENT THAN HEAT-TREATED CARBON STEEL.
// 40% THINNER PROFILE FOR BETTER PENETRATION AND STRONGER GRIP.

TUNGSTEN CARBIDE STUD

HEAT-TREATED CARBON STEEL STUD

// HYDRATION

Because hydration is at the core of your body's regulatory functions, it's key to health and performance in cold environments. But that's where it gets tricky. The risk of dehydration may increase when working in cold conditions because lower temperatures suppress thirst even when the body requires fluids, and thirst is not a great indicator of hydration levels to begin with (urine color is, however – aim for a clear stream!).

In short, people tend to drink less in cold weather, which puts them at greater risk for cold related injury and illness. Proper hydration has a host of health benefits, and the more workers can remember to do it, the better they'll be able to function.

Here are a few handy hydration tips:

- Keep water handy and drink from it throughout the day. Continuous sipping of fluids is better than infrequent chugging!
- Enhance water intake with an electrolyte solution, sports drink, or salty snack.
- Drink water before, during, and after a shift.
- To make drinking water a habit, start and end each day with a glass.

The use of hydration packs is a good way to encourage more intake of fluids. Because they make their next drink so readily available and hands-free simple, workers can hydrate without missing a step or having to go searching for their water bottle or tumbler.

5157

3L Premium Cargo Hydration Pack

- 600D rip-stop polyester
- 8mm foam padded straps
- 4 zippered compartments
- Breakaway straps for safety
- 100% anti-microbial valve

5156

3L Premium Low-Profile Hydration Pack

- 600D rip-stop polyester
- 8mm foam padded straps
- 1 zippered compartment
- Breakaway straps for safety
- 100% anti-microbial valve

5155 // 5155HV

2L Low-Profile Hydration Pack

- 600D rip-stop polyester
- Breakaway straps for safety
- 100% anti-microbial valve

5158

Hydration Pack Pressure Pump

- FDA-approved food grade silicone
- Valve cover keeps debris off tip
- Fits all Chill-Its® Hydration Packs

5159

Hydration Pack Bladder Cleaning Kit

- Compatible with any Chill-Its® bladder
- Includes:
  - Drying rack
  - Bladder cleaning brush
  - Delivery system cleaning brush
  - Bite valve cleaning brush

5151

Plastic Wide Mouth Water Bottle

- Impact-resistant tritan copolyester plastic
- Wide mouth to easily fit ice cubes
- BPA-free, dishwasher safe
- Available in black, lime and orange

TENACIOUS SINCE 1983.

INTERGALACTIC HEADQUARTERS:
44° 58' 18.31" N 93° 09' 12.88" W ALT. 934 FT.
1021 BANDANA BOULEVARD EAST SUITE 220 SAINT PAUL, MN, USA 55108
PHONE 651 642 9889 // 800 225 8238 WWW.ERGODYNE.COM

MEMBER ASSOCIATIONS:

PART # 99889A