



© 2017 Kryo Cooling

## Why We Need Body Cooling

Our bodies generate heat, even when we are sleeping. The more work we do, the more heat we produce. A person at rest generates about 100 watts of heat. A person bicycling at 9 mph generates over 400 watts of heat.

If we are not able to cool ourselves, especially because of high temperatures, humidity, or protective clothing, our core body temperature will rise. As our body temperature rises, we make more mistakes, become dehydrated, and can suffer heat exhaustion. We become less productive and may have to limit our working time because of heat stress. Prolonged high body core temperatures can lead to heat exhaustion or heat stroke.

Body cooling systems can help us control our body core temperature, reduce mistakes and dehydration, and help us be more productive. The U.S. Army uses body cooling systems in its helicopters and in many combat vehicles.

## Kryo Ice-based Systems

Kryo ice-based cooling systems provide low-cost, effective, portable cooling for persons working in hot or humid conditions or who wear protective clothing.

They are especially useful in aviation, vehicles and racing, industrial and rehabilitation, nuclear power, firefighting, and medical applications.

## Cooling System Components

Kryo ice-based systems provide simple, effective, inexpensive body core cooling.

They consist of four main components

1. An ice chiller that pumps ice-cold water through a cooling garment worn by the user
2. A cooling garment that circulates cold water across the body core, removing body heat.
3. An insulated water hose that transports cold water to the user and returns warm water back to the chiller
4. A power source and optional accessories such as extension cables or an on-off switch

## Kryo Ice Chillers

Kryo chillers hold ice and water. They pump cold water through an insulated water hose to the cooling garment and return the warm water to the chiller where it is re-chilled by the ice.

Ice absorbs a substantial amount of heat when it changes phase from ice to water. Ice chillers use body heat to melt the ice and heat the ice water.

Melting a pound of ice requires 42 watts of heat. Raising the temperature of a pound of water from 32 to 70 degrees requires an additional 11 watts of heat.

A good rule of thumb is that an ice chiller will provide 50 watts of cooling per pound of ice. Users typically require 125 to 175 watts of cooling per hour, depending on work load.

The type of ice affects the amount of cooling the chiller delivers. Block ice contains the least air and provides the greatest amount of cooling, with ice cubes providing less and crushed ice providing the least.

Ice chillers are available in 13, 19, and 30-quart sizes. They can be secured in a mounting tray or can be carried. The most common size chiller is the 19-quart, representing approximately 85% of chillers in use. When space is limited or cooling times are short, the 13-quart chiller is a good choice. Industrial and rehabilitation users, such as industrial painters or fire fighters, often select 30-quart chillers because of their long cooling time.



Size	Dimensions L x W x H	Weight Full Ice & Water	Cooling Time One user	Cooling Time Two Users
13 Quart	15 X 10 X 11	20 LBS	2 - 3 hours	1 1/2 - 2 hours
19 Quart	17 X 11 X 13	32 LBS	5 - 6 hours	3 - 5 hours
30 Quart	20 X 13 X 15	50 LBS	7 - 9 hours	5 - 6 hours

\* Cooling time was determined in a heat chamber test with chiller full of ice, an ASTM sweating mannequin at 95° F, and the heat chamber at 95 °F. Cooling time will vary with temperature, number of users, type of ice, temperature, work load, and other conditions.

Kryo water hoses carry cold water from the ice chiller to the user and return warm water from the user to the ice chiller.

They are insulated with heavy-duty, closed-cell, EDM foam that protects the water lines and keeps the water cold.

All fittings are dry-release. The water flow stops when disconnected. They are also emergency release. Give them a sharp pull and they will disconnect.

Hoses are available in 8, 12, 20, 30, and 40 foot lengths.

A one-person hose allows one person to connect to the chiller. A two-person hose allows two persons to connect to the chiller without purchasing any additional hose.



Kryo one-person water hose



Kryo two-person water hose

## Economical Portable Cooling

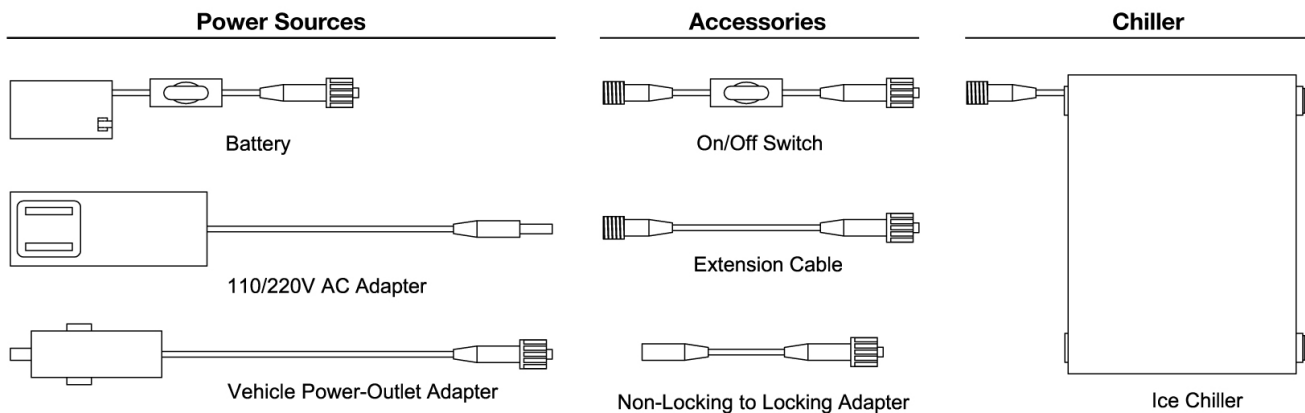
Battery-powered Kryo cooling systems provide low-cost portable cooling. The 13 and 19-Quart systems are light weight and are easily carried by the user.

Kryo cooling systems can be operated full-time on the battery. They can also be connected to a fixed power source in a building, vehicle, or aircraft and operated on the battery when away from the fixed power source.

## Kryo Power Sources and Accessories

Kryo ice chillers operate on 12-volt DC power. The power can be supplied by a battery, an AC adapter, a vehicle power outlet adapter, or a direct connection to a 12-volt vehicle electrical system.

All Kryo electrical components have standard 2.1 mm X 5.5 mm plugs and jacks that plug into each other and lock together so they don't accidentally disconnect. No electrical knowledge or ability is needed except to connect the direct connection cable to a vehicle electrical system.



## Kryo Cooling T-Shirt

Kryo's Cooling T-shirt is the perfect low-cost cooling garment.

We start with a Hanes Beefy-T made with 6.1 ounce, 100% cotton fabric.

Then we carefully stitch 80 feet of cooling tubing to it.

The result delivers superior cooling, can be worn under other clothing, and is machine washable.

### Comfort Features

- Soft, comfortable 100% cotton fabric
- Natural moisture-wicking

Colors: White, Black

Size: X-Small, Small, Medium, Large, X-Large, 2X-Large, 3X-Large



© 2017 Kryo Cooling

## Kryo Fire-Resistant Cooling Vest

Kryo's Fire-Resistant Cooling Vest, with its smooth front zipper, is easy to put on and take off.

The vest is made from an incredibly comfortable hi-tech fire-resistant blend of 70 Modacrylic, 23% Tencel, and 7% Lycra knit. The fabric is breathable, moisture-wicking, and anti-microbial.

Wear it with the smooth comfortable fabric next to your skin or over a T-shirt with the tubing on the outside. The vest's four-direction knit gently hugs the tubing close to your body to keep you cool.

### Fire-Resistant Features

- Fire-resistant Modacrylic fabric
- Fire-resistant, self-extinguishing tubing

### Comfort Features

- Soft, smooth, comfortable stretch knit fabric
- Superior moisture-wicking
- Anti-microbial protection kills microorganisms such as bacteria, viruses, mold, and mildew.

Colors: Natural, Black

Size: X-Small, Small, Medium, Large, X-Large, 2X-Large, 3X-Large



© 2017 Kryo Cooling

## Kryo SFI Certified Cooling Shirt

The SFI Foundation has tested and certified that Kryo's SFI Certified Cooling Shirt meets SFI specification 3.3 for fire resistance.

The shirt is made from an incredibly comfortable hi-tech fire-resistant Modacrylic knit fabric that is breathable, moisture-wicking, and anti-microbial.

Wear it with the smooth comfortable fabric next to your skin and the tubing on the outside. The shirt's four-direction knit gently hugs the tubing close to your body to keep you cool.

### Fire-Resistant Features

- Fire-resistant Modacrylic fabric
- Fire-resistant, self-extinguishing tubing

### Comfort Features

- Soft, smooth, comfortable stretch knit fabric
- Superior moisture-wicking
- Anti-microbial protection kills microorganisms such as bacteria, viruses, mold, and mildew.

Colors: Natural, Black

Size: X-Small, Small, Medium, Large, X-Large, 2X-Large, 3X-Large



© 2017 Kryo Cooling

## Chiller Electrical

The chiller operates on 12 V DC power and draws approximately 1.5 amps. It has a 6" electrical power cable ending in a locking female jack to accept a power source.



## Power Sources

All power sources end in a male plug that can be plugged into the chiller, an on-off switch, or into an extension cable.

### Battery

Kryo's battery turns Kryo into a portable cooling system that can be easily carried.

The 8.3 amp-hour battery will run the chiller for approximately 7 hours.

It includes a 110-volt AC charger and 2X4-inch adhesive Velcro hook-and-loop to attach the battery to the chiller cover or another flat surface.



### AC Power Adapter

The AC power adapter plugs into a standard 110-volt U.S. electrical outlet. It can use 110-240 volt, 50 or 60 Hz AC input power.



### Power Outlet Adapter

The vehicle power outlet adapter plugs into a standard 12-volt DC automotive power outlet or cigarette lighter outlet.



## Accessories

### On-Off Switch

When you plug the power source directly into the chiller, the chiller will begin to pump water at the maximum flow rate.

An on-off switch turns the chiller pump on and off. You can also use it to turn off the chiller if you feel too cold.



### Extension Cables

Power extension cables allow you to place the chiller in a convenient location and run the power cable to a battery or power source some distance from the chiller.

For example, you can place the chiller behind your seat and run an extension cable to the front seat where it will connect to a power source such as a battery



### Kryo Mounting Trays

Kryo trays allow secure location of a Kryo cooler in a vehicle. It is pre-punched with holes to allow it to be bolted to a vehicle.



## Why Kryo Garments Cool Better

**Engineering** – Kryo cooling garments are engineered to provide the best combination of effective cooling and comfort. They have been extensively tested in our heat test chamber using a heated sweating mannequin that simulates the human body under heat stress.

**Tubing Pattern** – Kryo’s tubing pattern concentrates the tubing on the front and back of your body core to maximize your cooling. The tubing is spaced so that the cooling effect is distributed evenly over your entire body core.

**More Tubing** - Kryo averages 80 feet of water tubing, double the amount used by some manufacturers. More tubing means more cooling.

**More Circuits** - Kryo uses eight water circuits, twice as many as some manufacturers. Eight circuits distribute the cooling water more evenly and send it back to the chiller as soon as it has absorbed your body heat.

**Hi-tech Manifolds** - Kryo gathers the tubing into a high-performance flexible manifold that has a lower water pressure drop and 10% more water flow than other designs. It is so innovative that it is protected by Patent No. 9,399,149 “Flexible Fitting for Heat Exchanging Garments.”

**Innovative Tubing** – Kryo’s proprietary matte-finish tubing is fire-retardant and self-extinguishing. The tubing is 0.096” ID and 0.156” OD, the exact dimensions identified by researchers as the best combination of cooling effect and comfort.

**Dry Release** – Water hose couplings are dry release. The flow of water stops when they are disconnected.

**Quick Release** – Hose couplings are emergency release. They should automatically release when you pull on them one-by-one. They may not automatically release if you pull on two couplings at the same time.

## **WARNING**

It is the user's responsibility to determine whether kryo products are appropriate for the intended use. Improper use of kryo products may result in injury or death. Improper use includes but is not limited to improper selection, use without adequate training, disregard of warnings and instructions supplied with the product, and failure to inspect and properly maintain the product according to the manufacturer's specifications.

### **KRYO COOLING SYSTEM COMPONENTS**

Kryo ice-based products are intended for use with ice and ice-cold water only. Use of any other coolant, including dry ice, refrigerants, or any other cold liquids or gases will damage the system chiller and tubing, voiding the manufacturer's warranty, and may result in death or serious injury to person or property.

### **CAUTION: IMPORTANT - PLEASE READ**

Avoid extended use of Kryo products. Failure to follow instructions or warnings could result in serious injury. Discontinue use immediately if skin feels too cold or becomes red, or if you begin to shiver, become drowsy, confused or feel uncomfortable. Extreme cold can cause hypothermia, frostbite or burns. Never use while sleeping. No warranty or representation is made as to the product's ability to protect the user from any injury or death in any manner of use. The user assumes that risk. Gibson & Barnes, its owners, dealers, distributors, or representatives are not responsible for any loss or injury arising from misuse of this product, including failure to observe the above precautions.

## **WARNING**

### **FIRE-RETARDANT AND FIRE-RESISTANT COOLING GARMENTS**

Kryo garments designated as "fire retardant" or "fire resistant" are designed for reducing the chance of combustion in the presence of ignition source. They are not fireproof.

## **WARNING**

### **STANDARD COOLING GARMENTS**

Kryo garments not designated as fire retardant or fire resistant are made from natural and synthetic materials. They are not fire retardant or fire resistant.

### **KRYO COOLING GARMENTS**

Kryo cooling garments may not be modified or altered in any manner other than by the manufacturer and must be used strictly in accordance with its intended purpose. Any such modification or alteration of the product will void the manufacturer's warranty relating thereto. Modifications and alterations of garments include, but are not limited to, cutting, piercing, tearing, removal of stitching, sewing, gluing, pinning or other means of attaching decorations (patches, buttons) or accessories. All users of the product are advised that modifications and alterations of the product may reduce the product's safety and reliability and may result in death or serious injury to person or property. Any party that modifies or alters these products may be subject to liability for injuries and damages suffered by others as a result of such modification or alteration.

## **LIMITED WARRANTY**

Kryo products are warranted by Gibson & Barnes to be free of defects in material and workmanship for a period of one (1) year from the date of purchase by the retail customer, in accordance with and subject to the manufacturer's standard limited warranty terms and conditions specified in the Owner's Manual and other literature provided with the product or subsequently supplied by the manufacturer. This warranty is void if the system is operated with improper fluid levels, or if improper fluid mixtures result in build-up of mineral deposits or algae within the system. This warranty does not cover physical abuse to the unit or damage caused by improper power connections.

## **DISCLAIMER**

Gibson & Barnes expressly disclaims any and all other representations, express or implied, including, without limitation, implied warranties of merchantability and fitness for a particular purpose. No warranty is made or implied regarding any product sold or manufactured by gibson & barnes to protect the user from injury or death. The user assumes all risks. In no event, shall gibson & barnes' liability to the buyer arising out of or relating to this product exceed the purchase price.