

Note To Readers: The following is the raw, unedited text and all associated illustrations for the “Heated Gear Comparison” article in the April 2010 Motorcycle Consumer News. It is shown here for additional clarity and reference as the lab data was omitted from the published article.

Raw Text for MCN Article: Heated Riding Gear Comparison

For many motorcyclists who don’t live in desert climates, Thanksgiving marks the end of the riding season, and the beginning of a notoriously depressing winter condition known as PMS – Parked Motorcycle Syndrome. However, those in the know have long understood that with the addition of heated garments, a riding season can be dramatically extended through the coldest conditions. Heated gear envelops the rider in a cozy warmth despite below-freezing ambient temperatures, without the movement-constricting effects of heavy multi-layered clothing. As a satisfied user of heated gear purchased a decade ago, it was time to see what technological advancements have been made in the interim, and whether replacement of my perfectly good 10 year old Gerbing’s jacket liner and gloves is advisable.

For the purposes of this test, we rounded up some of the top contenders in heated vests, jacket liners, gloves, and controllers. We then subjected all of the gear to months of rigorous testing in winter commuting applications, as well as lab testing for objective data collection. For sizing reference, the author is 5’8” and 160 pounds, and the test rig used throughout is a 2004 BMW R1150RT. The following is a compilation of our findings at first glance, in the lab, and on the road.

At a Glance: Aerostich Kanetsu Airvantage Jacket Liner (MSRP \$297.00)



Figure 1: Aerostich Kanetsu Airvantage Liner’s inflation tube shown in left hand

The American-made 75W Kanetsu adds a twist to the traditional heated jacket liner, by employing an internal air bladder which the rider can inflate or deflate so as to adjust the garment's insulation properties. More air equals a tighter fit and greater insulation properties, while less reduces insulation and results in a looser fit. The exterior of the Aerostich is Gore-Tex Windstopper fabric, but there are no external pockets. However, the nylon interior side has 3 large YKK-zippered pockets with pulls, 3 supplemental non-zippered storage areas, and storage for the air inflation tube. There are no provisions for integrating heated gloves with the liner's input power wiring, as included on the FirstGear and Gerbing's liners. A detachable coil cord with lighted on/off switch is included, and connects to the Kanetsu's integrated SAE connector, sewn into the left front inner zippered pocket as per [Figure 2](#).



Figure 2: Aerostich SAE Connection Point

As expected from an Aerostich garment at this price point, overall build quality is superb.

At First Glance: FirstGear Warm & Safe Gloves (MSRP \$129.95) & 90W Jacket Liner (MSRP \$199.99)



Figure 3: FGWNS Gloves

FG's Warm & Safe (FGWNS) Pakistani-made gloves demonstrated solid construction, with tight seams and no loose threads on our test examples. This model features a Porvair Porelle windproof/waterproof membrane between its outer leather surface and the inner lining, supplemented with 3M Thinsulate insulation. The size XL test pair weighs a relatively light 0.58 pounds. The left glove has a rubber face shield wiper, and each glove is secured via elastic wrist and two hook and loop type adjustable straps on the gauntlet. The fingers are pre-curved as well, for a comfortable, broken-in feel the moment you put

them on. Oddly, FirstGear advertises the gloves to have reflective piping, though there was none on the test set. These gloves are rated at 15W each.



Figure 4: FGWNS 90W Jacket Liner

FGWNS's Thailand-made jacket liner has a nylon shell and heated fleece collar, as well as 2 YKK zippered storage pockets. Lycra panels on the sides and sleeve backs ensure a snug fit. It also features an "access zipper" that allows easy admission to the internal alloy-based resistance wiring, should any repairs need to be made. A pouch is included for storage of the liner when not in use. Main power entry is via coax connector stored in the left front pocket. The liner is wired such that the gloves and liner can be powered through one input coax, or independently through two coax connectors. The glove coax connector is hidden in its own pocket when not in use, as shown in [Exhibit 5](#). Power connection wire length for the gloves is generous 12" from its wire pouch to the coax tip. The integrated glove power wires exit the jacket through sewn buttonholes, and can be stored in zippered pockets on the sleeves when not in use. An additional accessory plug for pants or another item is also provided. Overall construction is very good, and the size L tester weighed in at 1.9 pounds.



Figure 5: FGWNS coax connectors. A is for additional garments, B is for separate glove control, and C is main liner power input. All store in dedicated pockets within the liner.

At a Glance: Gerbing's G3 Microwire Gloves (MSRP \$139.95) & Microwire Jacket Liner (MSRP \$199.95)

Gerbing's new "Microwire" line of heated clothing replaces the 0.075" copper resistance wire used for many years prior with bundles of hundreds of microscopic stainless steel strands, each about 12 microns thick, twisted and wrapped in a thin Teflon-derived coating. Both the gloves and liner tested here feature this new technology, which was developed for the Department of Defense. The gloves and liner tested were made in China.



Figure 6: Gerbing's G3 Gloves

Our G3 tester gloves exuded robust quality, with even stitching and no loose threads. The gloves feature an "Aqua-Tex" windproof/waterproof membrane between its outer leather surface and the inner lining. 3M Thinsulate insulation is also included, and this size M pair weighs 0.68 pounds, 0.04 heavier than my original 1999 model Gerbing's gloves. Each glove is secured via elastic wrist and one hook and loop type adjustable strap on the gauntlet, and the palms have gel padding. These gloves are advertised at 135F surface temperature and rated at 13.5W each.



Figure 7: Gerbing's Microwire Jacket liner

The 77W Microwire jacket liner has a teflon-coated nylon shell and heated micro denier collar, 2 non-zippered external pockets, and 2 internal pockets (1 is YKK zippered). Power entry is via a Power Distribution Unit, which is basically 3 coax connectors in a rubberized housing sewn into the lower left front section of the liner, as shown in [Figure 8](#). Power connection wire length for the gloves is a rather short 6" from its wire pouch to the coax tip. The integrated glove power wires exit the jacket through metal grommets, and can be stored in zippered pockets on the sleeves when not in use. Overall construction is excellent. The cuffed sleeves and elastic band at the bottom, as well as the Gerbing's logo and company color swatch on the collar, make for a classy appearance. The size 42/32 tester weighed in at 1.5 pounds, or 0.22 pounds lighter than my original 1999 model Gerbing's liner, and is advertised at 135F surface temperature.



Figure 8: Gerbing's PDU has three connections: White-tip plug closest to the zipper is main input, middle plug is for separate glove control (if desired,) and outside plug can be used for additional garments.

At a Glance: EXO² Stormshield Gloves (MSRP \$229.99) & Stormrider Bodywarmer Vest (MSRP \$239.99)

EXO²'s line relies on a new polymer-based heating element made of FabRoc, a rubbery black material less than 1mm thick which is laid throughout the garments. The company claims as one of the main

benefits of this material that it can continue to operate even if it is slit or torn, with no possibility of short circuiting, unlike wire-based systems.



Figure 9: EXO² Stormshield Gloves (inlay Figure 9A below, which shows the bare FabRoc)



The Pakistani-made Stormshield gloves have rugged yet handsome styling details, with the main Cordura fabric accented with cowhide leather and white stitching. There are also faux carbon-fiber knuckle protectors (actually molded PVC) and a matching weave “Carbo-Leather” on the pinky-side outer material, as well as the gauntlets themselves. Build quality is excellent overall. A Porvair Porelle windproof/waterproof membrane and 3M Thinsulate insulation are also included. Overall weight is 0.66 pounds for this size L test pair. Each glove is secured via elastic wrist and two hook and loop type adjustable straps on the gauntlet. The palm area features an especially grippy Amara synthetic leather material, as well as reinforcement on the outer palm area. Visor wipes are included in both left and right thumbs. These gloves are advertised at 124F and rated at only 7 watts each.



Figure 10: EXO² Bodywarmer Vest

The Sri-Lankan made Bodywarmer vest has a windproof, waterproof AirXtreme shell and 100% polyester lining. The jackets feels very plush, flexible, and crushable. 4 FabRoc panels supply the advertised warmth of 122F at a total draw of 34 watts. Two external zippered pockets with large pulls are included.

At a Glance: Tourmaster Synergy Gloves (MSRP \$169.99) & Vest (MSRP \$134.99)

To its credit, Tourmaster is the only manufacturer here to include a variable temperature controller with the gear. Each waterproof controller can vary the temperature in 3 steps (low, medium, and high settings). The wiring used is especially stout, and Synergy gear can be interconnected accordingly. The Chinese-made Synergy line relies on carbon fiber elements to provide the requisite heat.



Figure 11: Tourmaster Synergy Gloves. Arrow denotes integrated controller

The size L Synergy gloves tested feature a goatskin leather exterior with Rainguard waterproof membrane. The thumb and first two fingers have a palm-side Clarino panel for added grip. 3M Thinsulate is included, as are two generous swatches of Phoslite reflective material on the outer wrist area of the gauntlet. The left thumb has an integrated rubber visor wipe. On the highest setting, these gloves are advertised at 161.6F surface temperature and rated at 12W each. The pair weighed 1.18 pounds, including 0.24 pounds for the integrated controller.



Figure 12: Tourmaster Synergy Vest. Integrated controller can be clipped onto included velcro strap on left thigh.

The size M Synergy vest has a nylon exterior and polyester lining, with 100g Polyfill insulation and elastic side panels. Like the gloves, it has its own integrated controller, which has an included belt clip, as well as a Velcro strap the rider can wrap around his left thigh to clip the controller to. Advertised warmth at the highest setting is 167F, at a total draw of 52 watts. Two external zippered pockets are included. The vest weighed 1.32 pounds, including 0.14 pounds for the integrated controller.

At A Glance: Controllers With the notable exception of the Tourmaster Synergy line, all of the other gear manufacturers tested do not include temperature controllers with the clothing. As such, the potential customer is faced with three basic choices:

- 1) Use the gear as-is, and plug direct into the motorcycle's battery. Downside to this is the gear is always on, set to full power, unless physically unplugged. For obvious reasons, this is not the preferred method of operation.
- 2) Buy a simple on/off switch as shown in [Figure 13](#), which allows the gear to be turned on (to full power only) and off without disconnecting it from the power source. (Note: such a switch is included with the Aerostich Kanetsu liner). This is only marginally more practical than the first choice, akin to having a faucet that is either on full blast or totally off. Switches like this are usually around \$15.00.
- 3) Buy a temperature controller, which essentially functions like a dimmer switch, allowing the rider to vary the amount of heat emitted from the gear from barely any to full power. Here, there are many choices, from single output temperature controllers to models which allow two separate pieces of gear to be adjusted independently of each other. Operationally, all controllers tested work as advertised – but ergonomically, some designs distinguished themselves as much more motorcycle-friendly than others.



Figure 13

FGWNS Dual Portable Heat-Troller – MSRP \$99.95: The Heat-Troller is a familiar face to winter riders, a proven design that has seemingly been around forever. In this latest guise, the FGWNS Heat-Troller allows two pieces of gear to be controlled independently, via two separate knobs. Each knob is about 0.65" in diameter, and is marked so its position can be seen, but has no tactile detents to allow the rider to “feel” the knob turning, other than the initial on/off position. Two LEDs (one for each knob) indicate when power is applied on each respective output, and its power cord is fused for 15A maximum.



Figure 14 Caption: FG-WNS Dual Heat-Troller measures approx. 1”H x 3”L x 2”D (not including the knobs).

Gerbing’s Portable Dual-Temp Controller – MSRP \$99.95:

Like the FGWNS Heat-Troller, the Gerbing’s design also allows two pieces of gear to be controlled independently via two separate knobs and corresponding LEDs. The Gerbing’s knobs are tapered from their 0.58” tips to 0.68” bases, and are not marked, so the rider cannot tell at a glance where the knobs are set. Also like the Heat-Troller, the Gerbing’s knobs have no tactile detents besides the initial on/off, and its power cord is fused for 15A maximum.



Figure 15 Caption: Gerbing’s Dual Temp Controller measures approx. 1”H x 2.9”L x 2.5”D (not including the knobs).

EXO² Stormrider Controller – MSRP \$53.99: Unlike either the FGWNS or the Gerbing’s controllers tested, the Stormrider has only one output. The controller itself is a small waterproof box with a 0.5” digital readout, and two flush membrane-type buttons to control on/off and temperature level. Temp control varies from 0 (off) to 9 (full power), and tapping the “H/L” button moves the temp readout in increments of 1. A substantial aluminum mounting bracket is included, and its power cord is fused at 10A maximum.

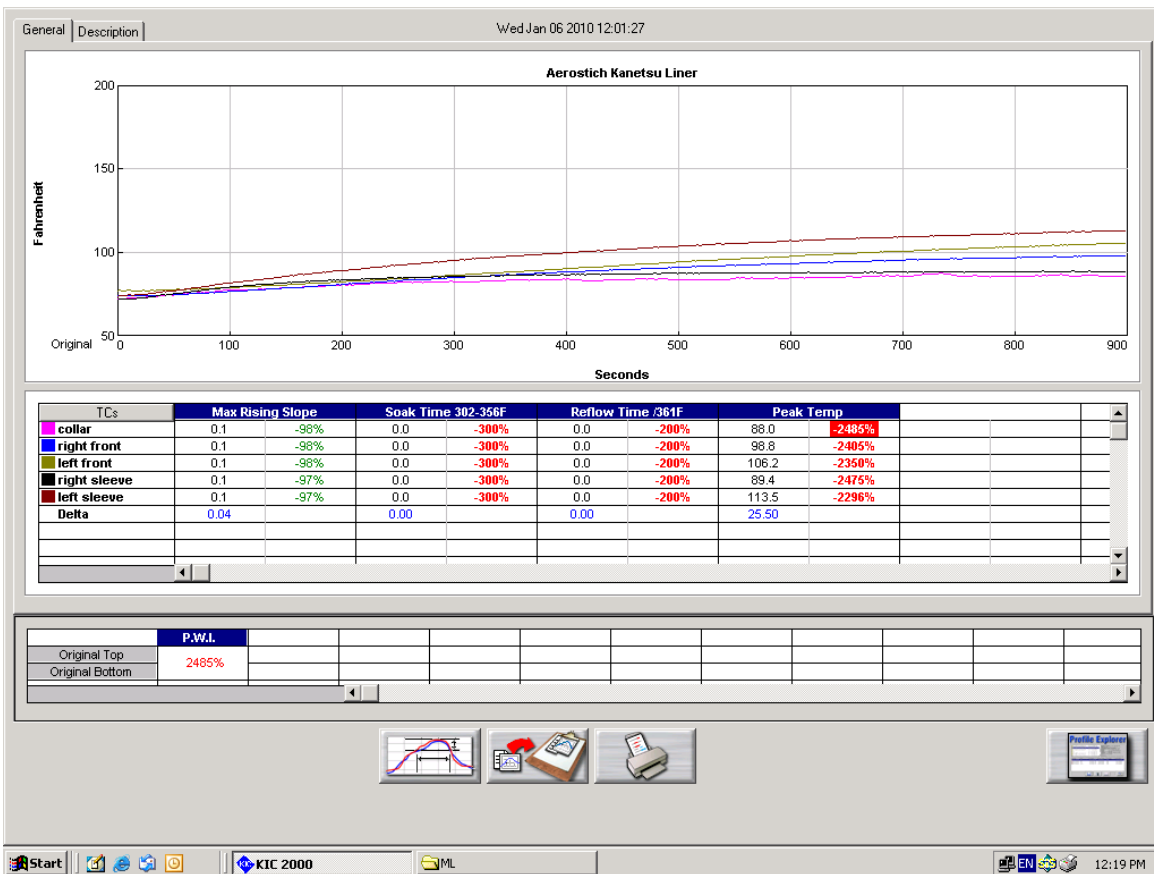


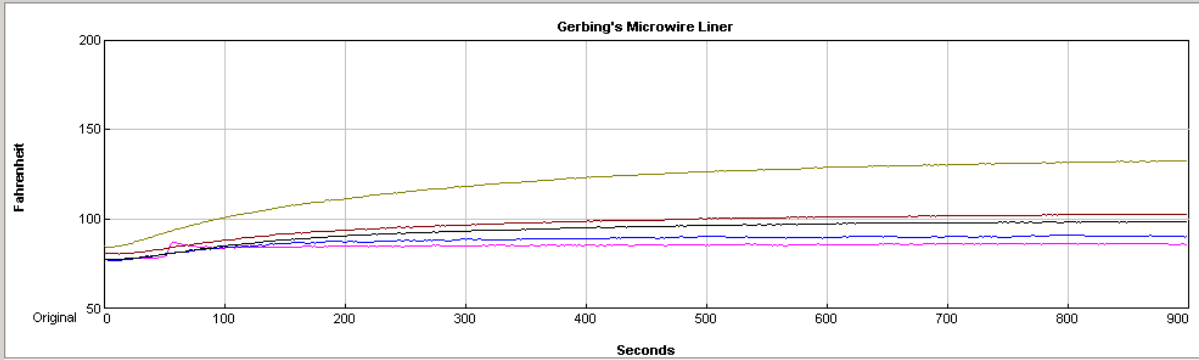
Figure 16 Caption: Stormrider Controller measures approx. 1”H x 2.3”L x 1.8”D (not including the bracket).

In The Lab

This being MCN, objective data was harvested in a controlled laboratory environment to allow readers the opportunity of direct comparison. In a temperature controlled test chamber, the gear was powered at 13VDC by a freshly calibrated Sorensen DCS60-18E power supply, and its heating profile recorded using a SlimKic 2000 Temperature Profiler. Readers should note that such lab data does not always translate perfectly into corresponding on-road experiences. For example, Brand X gear that heats up slowly in the lab may also boast superior insulation properties, such that in real-world conditions, it actually feels warmer overall than gear which heated up quickly in the lab from Brand Y. As usual, the right purchasing decision should be based on an amalgam of both objective and subjective data.

In The Lab: Liner Performance Analysis – For this test, temperature probes were attached to the lower front sides, the back, the collar, and each sleeve of the liners. The liners were then worn in a seated position (as one would sit on a standard motorcycle,) and a winter riding jacket (a first generation Firstgear Kilimanjaro model) was worn over the liner while the measurements were recorded. The following charts represent the temperature rise of each liner over a 15 minute period. As can be seen, the Aerostich, FGWNS, and Gerbing’s all provided similar recorded levels of heat, though the Gerbing’s reached the highest overall peak temperatures in the least amount of time. My original 1999 Gerbing’s liner is also shown for reference. See below for reports.



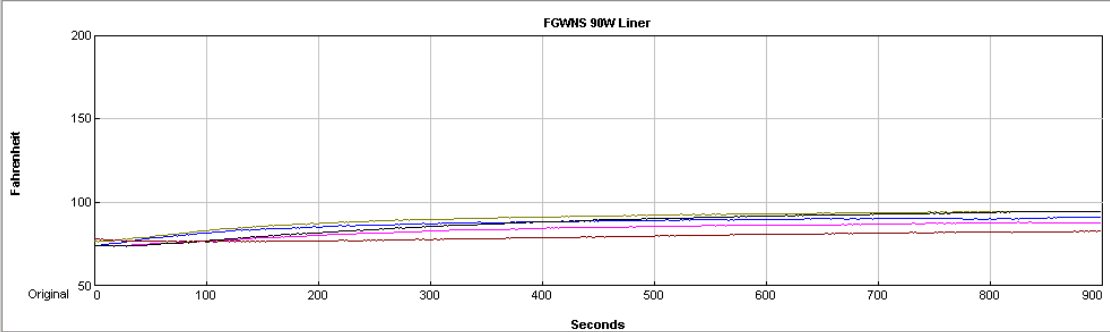


TCs	Max Rising Slope	Soak Time 302-356F	Reflow Time /361F	Peak Temp
collar	0.4 -88%	0.0 -300%	0.0 -200%	88.0 -2485%
right front	0.1 -97%	0.0 -300%	0.0 -200%	92.1 -2455%
left front	0.2 -94%	0.0 -300%	0.0 -200%	133.2 -2150%
right sleeve	0.1 -97%	0.0 -300%	0.0 -200%	99.5 -2400%
left sleeve	0.1 -96%	0.0 -300%	0.0 -200%	103.7 -2369%
Delta	0.32	0.00	0.00	45.24

	P.W.L.								
Original Top									
Original Bottom	2485%								



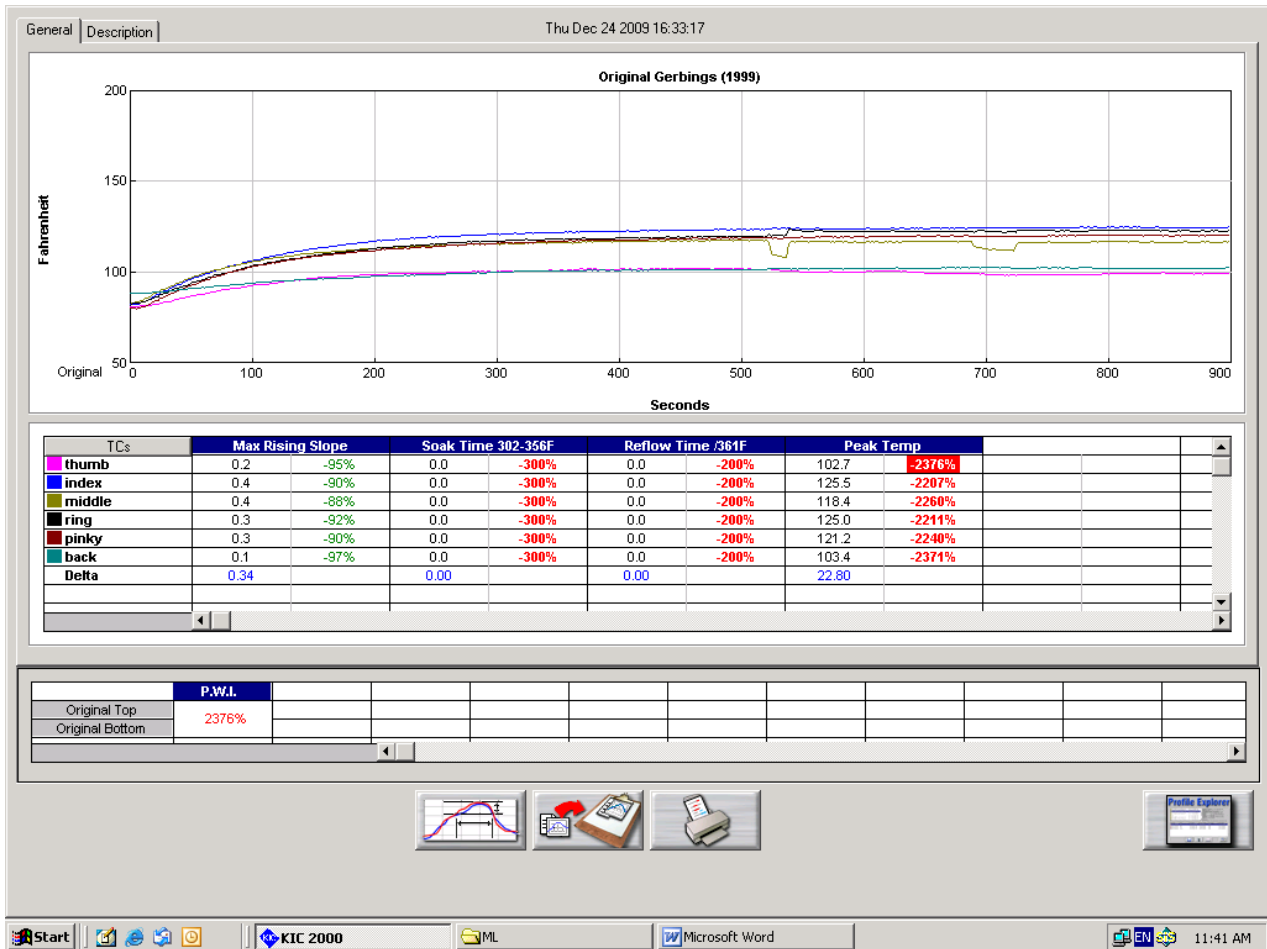


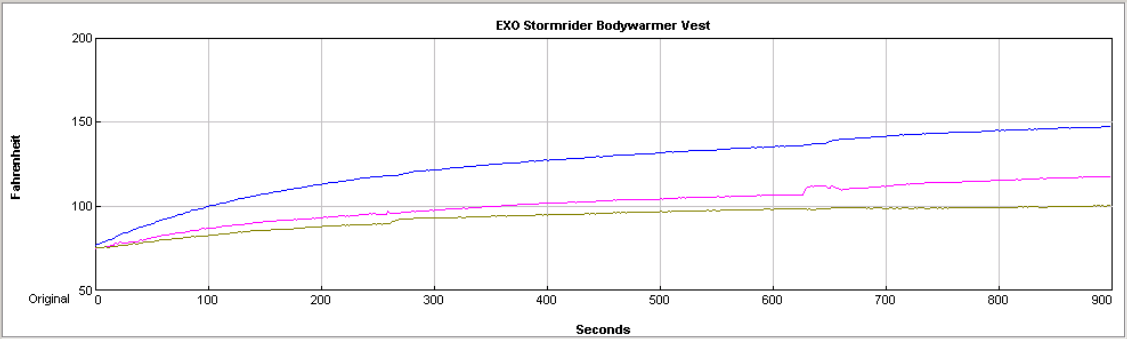
TCs	Max Rising Slope	Soak Time 302-356F	Reflow Time /361F	Peak Temp
collar	0.1 -98%	0.0 -300%	0.0 -200%	88.7 -2480%
right front	0.1 -97%	0.0 -300%	0.0 -200%	91.6 -2458%
left front	0.1 -97%	0.0 -300%	0.0 -200%	95.4 -2430%
right sleeve	0.1 -98%	0.0 -300%	0.0 -200%	95.4 -2430%
left sleeve	0.0 -99%	0.0 -300%	0.0 -200%	83.6 -2518%
Delta	0.08	0.00	0.00	11.83

	P.W.L.
Original Top	
Original Bottom	2518%





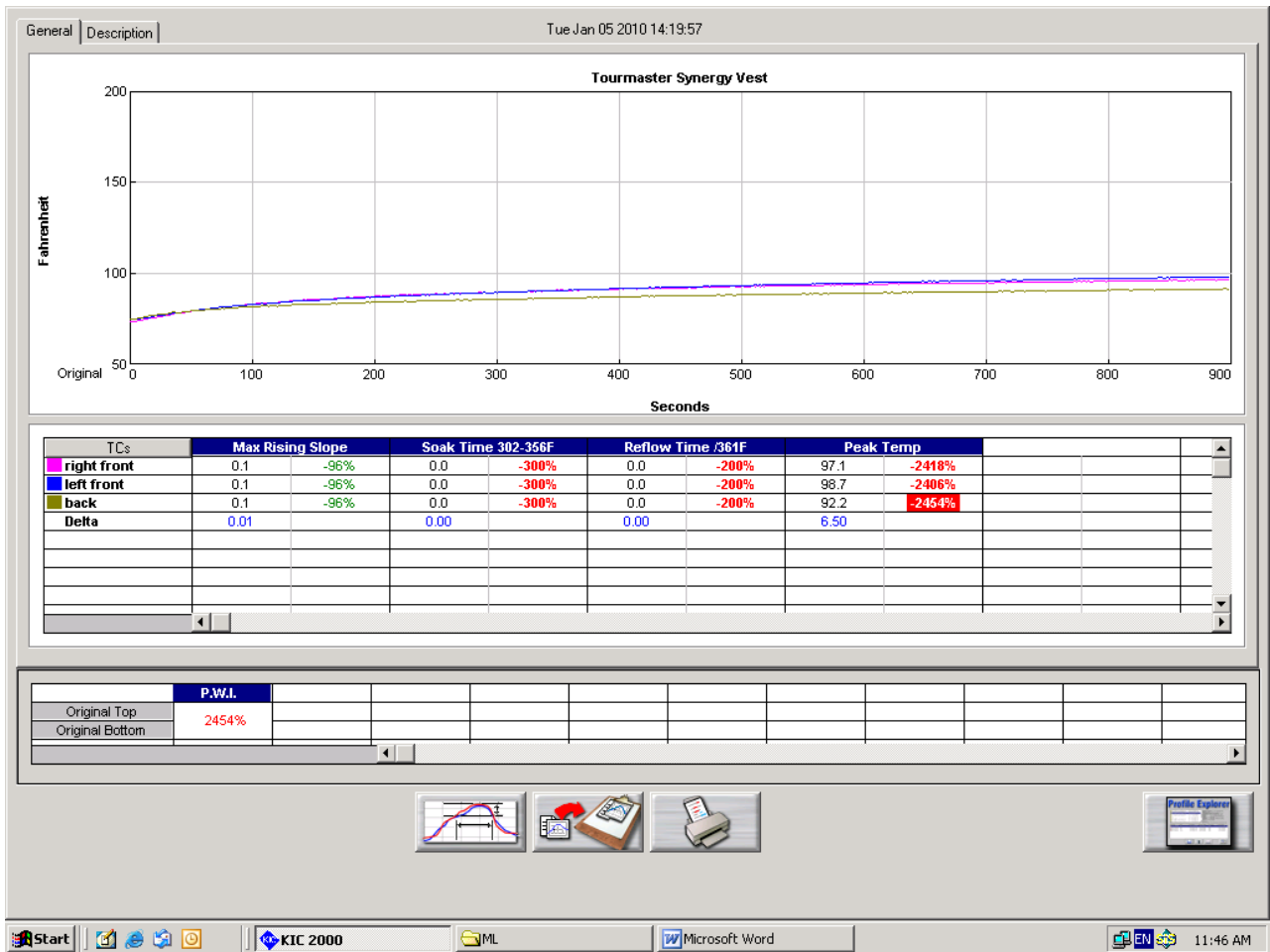
In The Lab: Vests – To test the vests, temperature probes were attached to the lower front sides and the back of each. Like the liners, they were then worn in a seated position with the Kilimanjaro jacket over them. The following charts represent the temperature rise of each liner over a 15 minute period. Here, the Bodywarmer clearly has the advantage, cresting much higher temperature peaks in very little time compared to the Tourmaster, which stabilized at around 100 degrees towards the end of the 15 minute window. See below for reports.



TCs	Max Rising Slope	Soak Time 302-356F	Reflow Time /361F	Peak Temp
right front	0.3 -93%	0.0 -300%	0.0 -200%	118.5 -2259%
left front	0.3 -91%	0.0 -300%	0.0 -200%	148.0 -2041%
back	0.2 -96%	0.0 -300%	0.0 -200%	101.2 -2388%
Delta	0.16	0.00	0.00	46.82

	P.W.L.
Original Top	
Original Bottom	2388%

Navigation icons: Graph, Print, Save, and Profile Explorer.

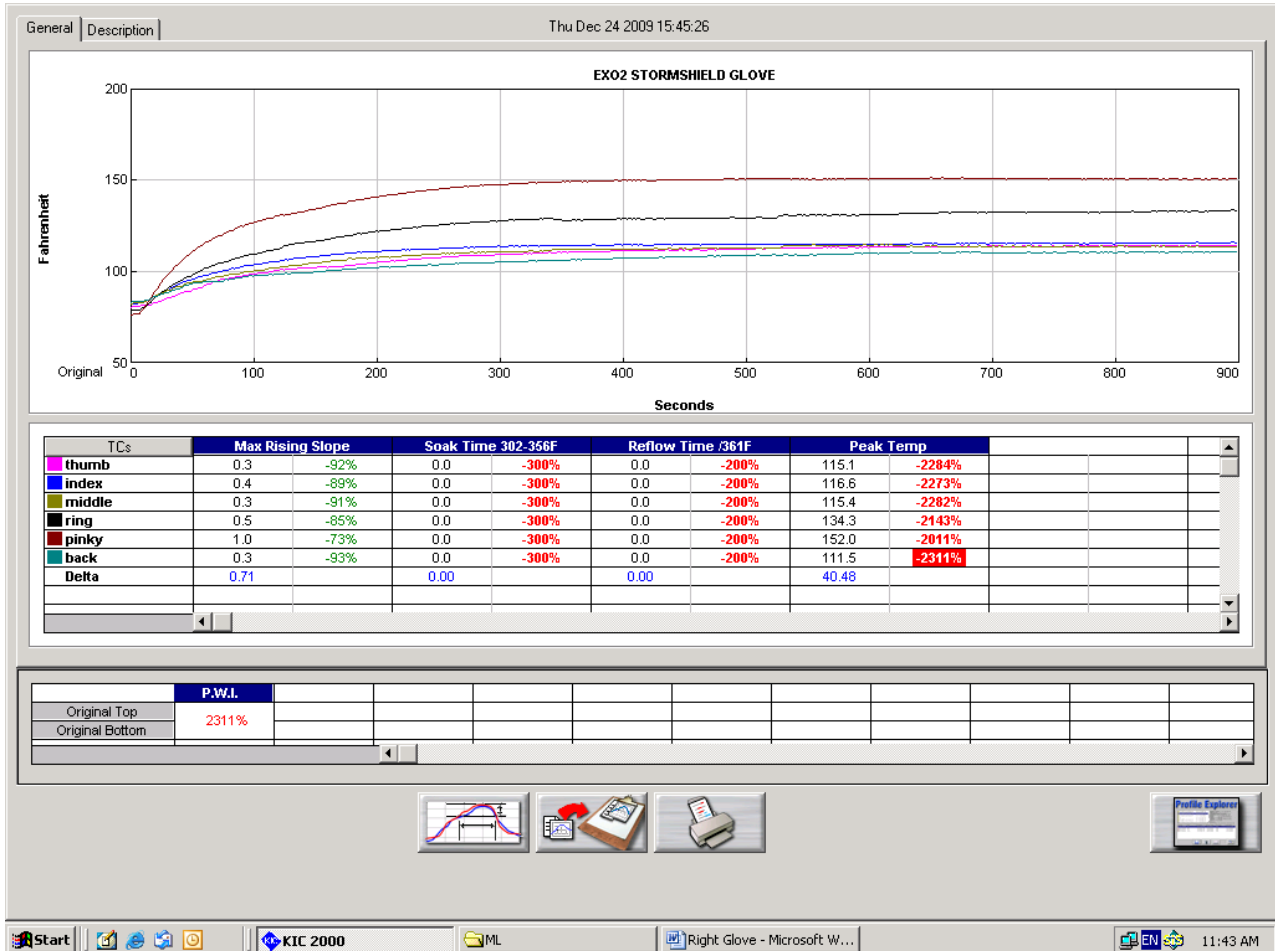


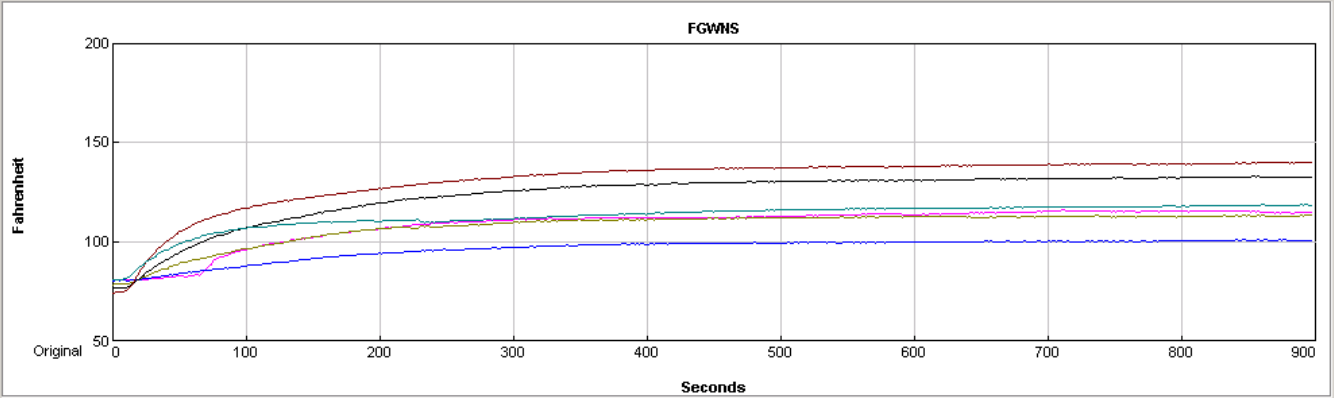
In The Lab: Glove Performance Analysis - For the glove test, we used the right hand glove for each subject pair tested, by wiring each finger and the back of the palm with its own individual temperature probe, as shown in [Figure 17](#). Once inserted into the glove, the hand was closed around a motorcycle grip to simulate its typical position while riding. The following charts represent the temperature rise of each glove over a 15 minute period, with the original 10-year-old Gerbing's gloves used as a baseline comparison.



Figure 17 – Right hand wired up for glove insertion.

As a fundamental analysis, the FGWNS, Gerbing's, and EXO² gloves all essentially reached similar recorded levels of heat, with the EXO² Stormshields holding a slight lead in achieving peak temps in the shortest amount of time – quite impressive, considering they draw only half the wattage of the other gloves. The Tourmaster gloves lagged behind in peak heat generation. See below for reports.

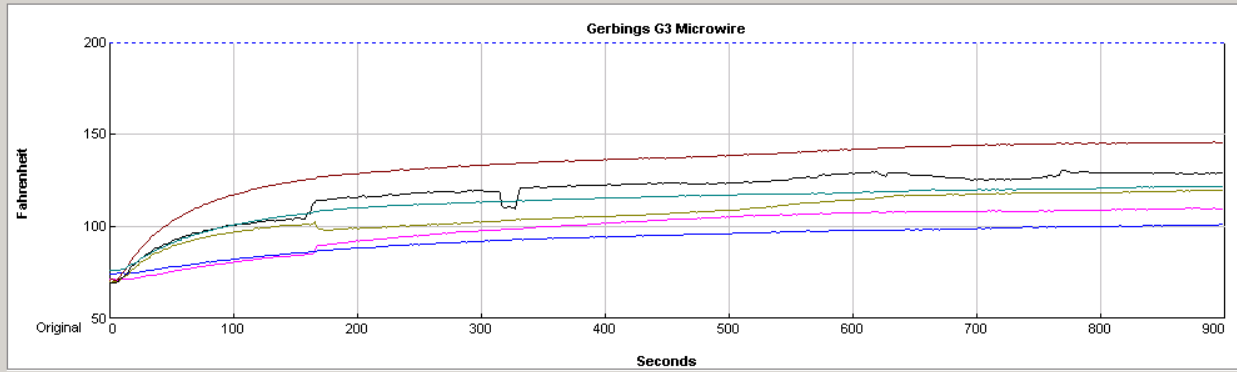




TCs	Max Rising Slope	Soak Time 302-356F	Reflow Time /361F	Peak Temp				
thumb	0.5	-85%	0.0	-300%	0.0	-200%	116.6	-2273%
index	0.1	-97%	0.0	-300%	0.0	-200%	101.7	-2384%
middle	0.3	-92%	0.0	-300%	0.0	-200%	114.1	-2292%
ring	0.5	-86%	0.0	-300%	0.0	-200%	133.6	-2147%
pinky	0.9	-74%	0.0	-300%	0.0	-200%	140.8	-2094%
back	0.5	-85%	0.0	-300%	0.0	-200%	119.5	-2252%
Delta	0.81		0.00		0.00		39.05	

	P.W.I.
Original Top	
Original Bottom	2384%

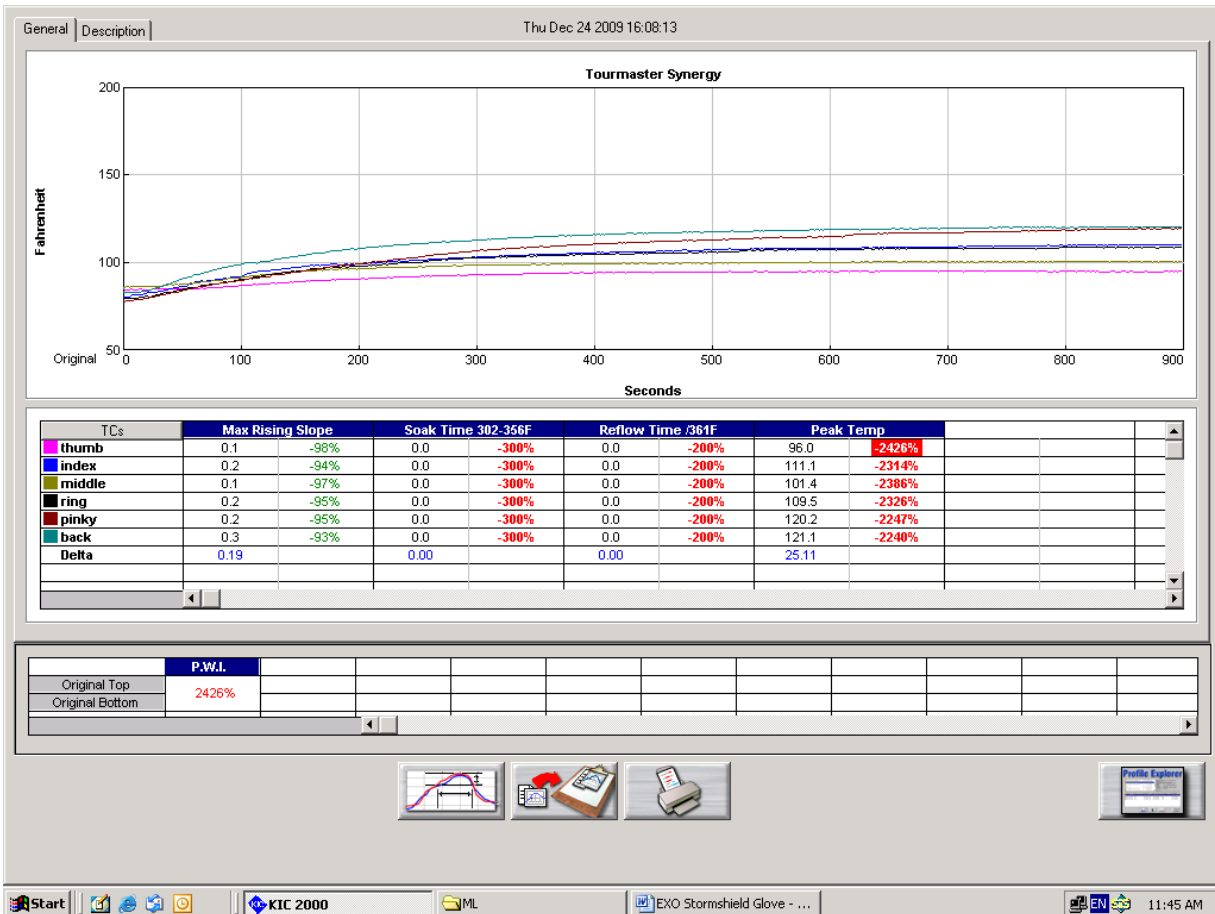




TCs	Max Rising Slope	Soak Time 200-250F	Reflow Time /250F	Peak Temp				
thumb	0.3	-92%	0.0	-300%	0.0	-200%	110.6	-456%
index	0.1	-97%	0.0	-300%	0.0	-200%	101.6	-494%
middle	0.6	-84%	0.0	-300%	0.0	-200%	120.5	-418%
ring	0.7	-81%	0.0	-300%	0.0	-200%	131.6	-374%
pinky	0.9	-75%	0.0	-300%	0.0	-200%	146.4	-314%
back	0.4	-88%	0.0	-300%	0.0	-200%	122.7	-409%
Delta	0.78		0.00		0.00		44.60	

	P.W.I.						
Original Top							
Original Bottom	494%						





On The Road

On-road liner testing was conducted in the NJ/NY/PA area, in temperatures ranging from +15 to +45F degrees, though mostly below freezing. In these types of conditions, any weaknesses in design or construction became quickly apparent. The same Kilimanjaro jacket used in the lab was worn over the liners while on the road. Here are the pros and cons of each different garment tested:

Jacket Liners

Aerostich: 3rd Place

The Kanetsu lives up to the Aerostich reputation for quality construction, the best of all liners tested. Also, compared to the other two jacket liners, the Kanetsu liner did an admirable job of blocking out wind chill. Its Windstopper exterior and air-adjustable insulation allowed for a lower setting on the controllers to achieve the same equivalent feeling of toasty warmth as the other two liners on higher settings. Heat was evenly distributed, with no dramatic cold or hot spots detected. However, its enigmatic lack of integrated glove wiring kept it from being considered as a practical alternative to the other two liners. Using the liner with heated gloves – the most common configuration of heated gear use in the test riding area – in this case meant running an unwieldy separate set of glove power wires through the sleeves of the liner or outer jacket, as well as mandatory use of a dual-type controller, two separate single output controllers (one for liner, and one for gloves,) or purchasing a separate splitting

cable. Users of the FGWNS and Gerbing's liners are spared from this inconvenience. Likewise, the Kanetsu's lack of any exterior pockets didn't compare well with the other liners, which had useful hand warming storage pockets as standard issue.

Gerbing's: 2nd Place

Compared to my 10 year old original Gerbing's liner, the new Microwire liner certainly is an improvement in many ways. Its build quality is excellent, and it fits as though custom tailored. The heating element wiring is not easily felt, as on the FGWNS. Functionally, the Gerbing's delivered as well, with the quickest warm-up (especially welcome on the soft collar.) Indeed, the Gerbing's liner would have stolen this competition by a good margin, were its PDU connection point not such an exercise in pure frustration. Advertised as a cure for dangling wires, the PDU instead subjects the rider to making the coax connections for all gear and the controller on the inside of the jacket liner itself. Unlike the Aerostich's similarly positioned SAE input connector, the Gerbing's coax is far more likely to come loose, and in fact did so on some longer, more aggressive test rides. To deal with this, the rider has to stop, take off the gloves, unzip the outer jacket and any inner layers, unzip the liner, repair the connections, and layer up again. Although this PDU connection issue is a matter of personal preference, for this motorcyclist, anything that forces the rider to get undressed or fumble around with connections in bitter cold is bothersome, to say the least. Another more minor issue was the very short length of the glove power wires, which in some cases (depending on which gloves were used) meant the connections took place under the glove gauntlets, lifting them from their seal against the jacket cuff, and letting in cold air. Gerbing's can solve this by providing another 2 inches or so of glove power wire per sleeve.

FGWNS: 1st Place

The FGWNS liner trails the other two liners in overall build quality, styling, and fit. Yet, it held such an advantage in convenience that it was able to obtain top honors in the jacket liner comparison. Convenience in this case is exemplified by the main power and accessory coax connections which are all hardwired into the jacket liner, with generously long cable leads, and dedicated, zipped storage pouches for all. In a practical sense, this means no dangling wires when off the bike, but no need to ever undress to access connections while on the road – the best of both worlds in one liner! Indeed, when in use, the lead lengths for the line are long enough to leave on the outside of the jacket within plain sight of a full-face helmeted rider. Same with the glove power wires, which are long enough to connect *outside* of the gauntlets. In this way, both liner and glove connections are unstressed, but if anything ever disconnects, it can be reattached in seconds without any disrobing required. In fact, there is such adequate input cable length provided that getting off the bike to refuel could be accomplished without disconnecting anything – a very big plus, and impossible with either the Aerostich or Gerbing's, unless separate input cable extensions are purchased separately for them. Overall functional performance of the liner was very good, with quick warm up, even coverage (including the collar,) effective insulation, and no cold or hot spots.

Vests

EXO² Stormrider Bodywarmer: 1st Place

Tourmaster Synergy: 2nd Place

Both vests were comfortable down to about +30F, at which point the jacket liners become preferable because of their heated sleeves, collars, and (in the case of FGWNS and Gerbing's) integrated glove wiring. The EXO² Stormrider Bodywarmer is a much more luxurious vest, softer to the touch and of an overall higher build quality. Its price (with a controller factored in) is more than twice what the Tourmaster Synergy vest (with its included controller) costs, but in fairness, it feels twice as expensive when worn. Despite the lab performances, the Synergy actually felt just as warm as the EXO² under all tested conditions, making the price differential very difficult to justify on the basis of primary function alone. The equation of overall value is thus up to the rider to determine. Overall, it should be noted that the vests are not as versatile as their liner counterparts, which can be used in far lower temperatures due to their greater area of coverage (notably the neck and sleeves). (Note: Tourmaster offer heated jacket liners based on the vests tested herein.) Nevertheless, for those who need some extra warmth for their riding seasons between freezing and about +50F, a vest is just the ticket.

Gloves

Tourmaster Synergy Gloves: 4th Place

The Synergy's last place finish comes down to warmth, or in this case, lack of it. As shown in the lab, tested on the highest setting, these gloves were not in league with the others. Tourmaster deserves credit for innovative ideas like the integrated controller, and features such as the reflective piping sadly missing on all the other gloves. Yet, the primary functional requirement of a heated glove is to keep hands warm in freezing temperatures, and here the Synergy gloves need improvement to compete.

FGWNS Gloves: 3rd Place

The FGWNS gloves have a classic style and are very comfortable, second only to the Gerbing's in that regard. They were warm, though when temps dipped below +25F, the fingertips of the gloves were noticeably cooler than the rest of the hand. With some more heating material or better insulation at the fingertip region, this glove's showing would have improved.

EXO² Stormshield Gloves: 2nd Place

Based purely on heating element performance, the Stormshields are the gloves to beat by a thin margin. The Stormshields warmed up quickest and were by far the most efficient, with a draw of around half of all the other gloves tested. The interior of the glove is somewhat less "cushy" than the others, perhaps a function of break in, but not as instantly comfortable as the FGWNS or Gerbing's. Insulation is excellent, and the FabRock heating elements are less detectable than all the other gloves tested. Construction is first rate and these gloves certainly feel as though they would offer far more protection than the others in the event of a fall, what with all the extra knuckle protection and palm padding. Some riders may feel this protection is worth a premium, but the price is a whopping 1.6 times more expensive than the Gerbing's G3. If that is not a factor in your purchasing decision, the Stormshields are surely just as good a choice as the Gerbing's.

Gerbing's G3 Microwire Gloves: 1st Place

Of all the gloves tested, none delivered the winning combination of quality, performance, fit, comfort, and value as well as the Gerbing's. The G3 gloves were incredibly comfortable under all conditions, from

the moment they were donned. They are very well put together, properly insulated with seemingly no wind permeation, and have a timeless styling that is universally appealing. They also competently performed their primary function of keeping the hands warm for extended periods of time in the lowest temperatures tested, without any negatives to report on.

On The Road: Controllers

Gerbing's Portable Dual-Temp Controller: 3rd Place

FGWNS Dual Portable Heat-Troller: 2nd Place

EXO² Stormrider Controller: 1st Place

After spending months in below-freezing cold with all three of these designs, it's safe to say there really is no comparison. For motorcycle use, the mounting, ergonomics, appearance, and value of the EXO² Stormrider controller render the other two designs near obsolete, as follows:

Mounting: The Stormrider's included aluminum mounting bracket is extremely well designed, and solidly constructed. Combined with the controller's small size, it allows for very easy mounting on virtually any motorcycle, using the existing hardware in the switch housings or handlebar clamps as the most obvious location. Once mounted, it looks almost OEM, as shown in [Figure 18](#). By contrast, both the FGWNS and Gerbing's designs must somehow be mounted with velcro, zip ties, double-sided tape, or some other creative means (none of which are included) to a flat surface on the motorcycle, tank bag, pant leg, or elsewhere. Ultimately, most attempts look relatively slapdash, and are not nearly as stable or secure from theft as the EXO's sturdy integrated metal bracket.

Unlike most other "permanent" controllers (not tested here, but similar in appearance and function to the FGWNS and Gerbing's models,) the EXO² requires no drilling or otherwise permanent modifications to the motorcycle to mount it. On the RT test mule and most other bikes, the existing handlebar hardware is all that is required, and the Stormrider controller can be removed for the season or swapped between multiple bikes in just a few minutes.



Figure 18 - EXO² Stormrider controller mounts perfectly on BMW RT test mule using existing handlebar hardware.

Ergonomics: Likewise, there is no ergonomic comparison between the Stormrider controller and the other two. The EXO² boasts a huge numerical LED temperature setting readout which the rider can easily see at a glance, and the membrane button to adjust the temperature is very easy to actuate with a gloved finger. By contrast, the other two designs relay their operational status with tiny LEDs which

are difficult or impossible to see from the saddle (depending on mounting orientation,) and both also utilize small knobs which have no tactile feel when adjusted. At least the FGWNS knobs are marked – with the Gerbing’s unmarked knobs, the rider has no means whatsoever to discern what the settings are by looking at the controller. Worse, the Gerbing’s tapered knobs are miniscule and placed close together, making them difficult to manipulate with a gloved hand, as shown in [Figure 19](#).



Figure 19 – Small knobs and gloved hands do not mix well

Both FGWNS and Gerbing’s offer belt-mounted pouches at additional cost in the \$12 range. These allow the controllers to be mounted on pocket lips, clipped to tank bags, and more commonly to the waist-belt of $\frac{3}{4}$ length winter jackets. Ergonomically, this is also subpar, usually putting the controller completely out of sight of the rider while seated on the bike, and requiring “feeling around” for the tiny, detentless knobs to adjust.

Appearance: The high-tech digital appearance of the Stormrider controller is unquestionably far more aesthetically pleasing than the FGWNS or Gerbing’s controllers, neither of which has changed in years. When mounted, the Stormrider simply looks more at home on a modern motorcycle.

Value: When considering a Stormrider controller’s value, one must know it is only available with one output, and that output is limited to 10A. However, for those who demand dual output, they can simply buy two Stormriders for just a few dollars more than either the tested FGWNS or Gerbing’s dual controllers currently cost. As an added bonus, they will gain 5 more amps of capacity (for 20A total) to boot by doing so, since the other dual-controllers are limited to 15A maximum. Clearly, the Stormrider is an outstanding value.

Some riders who cling to habit may find our criticisms of the FGWNS and Gerbing’s controllers harsh, but after using them ourselves for many years now, we feel justified in our praise of the Stormrider controller as a genuine game changer. In short, unlike the other two, it feels as though it was designed from the outset with a serious motorcyclist’s convenience in mind. We found plugging the gloves into the jacket liners (or using a splitter on the EXO² vest and Kanetsu) for single-output control was perfectly comfortable under our test conditions, though some riders who demand dual-control will in this case require two Stormriders. Either way, this controller was far and away the single biggest revelation of this test, and undoubtedly a worthy upgrade for any winter rider.

Conclusions: But for lack of space, we did not delve into the myriad of wiring options and connector choices, but suffice it to say that a read through the owner’s manual of your heated gear prior to first use is a good idea. Pay special attention to instructions about *not* layering underneath any heated gear, so as to keep the warm elements close to the body. Some manufacturers frown on “mixing and matching” various brands of gear and controllers, but we did not have any issues doing so during testing

- our favorite setup wound up being the FGWNS liner, Gerbing's G3 gloves, and EXO² controller, which all worked together flawlessly. Don't forget to check the owner's manual of your particular motorcycle to determine its alternator's capacity, to ensure the gear you pick doesn't overload the system.

Once these issues are tackled, you will discover that there are indeed changes afoot in the world of heated gear. The wiring so easily felt in the old gear has been replaced by more advanced heating elements which warm up faster, are more resilient, and are infinitely more comfortable. Likewise, the dreaded cold and hot spots are thankfully absent from the newer designs. Integrated controllers like Tourmaster's are an example of an ergonomic breakthrough. EXO²'s FabRoc material proved that heat can be generated much more efficiently than before, allowing riders of smaller or classic motorcycles without much excess alternator capacity to consider heated gear anew. New battery technologies are changing the face of the industry as well – EXO², FGWNS, and Gerbing's all offer hybrid Lithium powered garments, extending the potential uses of heated gear off the bike as well.

Ultimately, all of these significant improvements mean motorcyclists with old gear should indeed consider replacement, if only to take advantage of some of these benefits. Indeed, all of the gear tested here seriously outclassed my decade-old garments in any functional category that matters. Finally, always remember winter riding carries with it a higher set of risks, from the salt which slowly eats away at engine cases to the black ice that can bring even the most skilled rider down in an unexpected instant. Please use extra caution, but at least do yourself the favor of staying warm while doing it!