

For winter sports, technology is cooler than ever

Application Note

The winter brings a special edge to competitive sport. When they step into the cold, athletes have not only their rivals to defeat. They have to beat the weather itself.

Many winter sports look much as they did when Olympians first slipped into Chamonix, France in the winter of 1924. But don't be fooled by surface appearances. Competition relentlessly drives athletes toward peak achievement. Wherever technology can help, you'll find it at winter sports competitions and, you'll find Fluke there, too.

Some advanced technology stands out, like the new two-man bobsleds designed for Team USA at the Los Angeles studios of BMW. Replacing the 20-year-old predecessor with this high-tech carbon fiber racer could slide the USA into the winners' circle.

Other technology is equally important, but harder to spot. Fluke test tools are used extensively in winter sports to measure and control the snow and ice that winter delivers. They monitor sports equipment and help maintain winter sports facilities. And, when Old Man Winter can't deliver the slippery stuff, Fluke tools help get that fixed, too.

Ice is a fluid

At the Prudential Center in Newark, N.J., Chief Engineer Tim Dougherty uses the Fluke 66 Hand-held Infrared Thermometer to spot check the surface temperature of ice at the National Hockey League's Jersey Devils' home court.

For a material that's literally frozen, ice is still a fluid that changes physically as temperatures rise and fall. Its quality as a playing surface is influenced by its temperature as well as the air temperature and humidity above.

"If you don't have the right combination you'll start to see the chipping, you'll see a lot of snow, you'll see bouncing of the puck—that immediately tells me that we don't have good ice," Dougherty said. "We make sure we keep those compressors running and we have a slab temperature of 17 degrees to keep that ice temperature between 21 and 24."



And it's not just the ice that Dougherty has to manage. "The surface temperature alone is one thing, but it really goes with the humidity and temperature," Dougherty said. "There are three factors here: the surface temperature being 21 to 24, the air temperature being 60 to 64 degrees and humidity, there's got to be a really tight rein on it, between 30 and 40 percent."

Humidity that's too low—18 to 20 percent—will remove moisture and dry out the ice. Excess humidity will wet the ice. To check air temperature and humidity above the skating surface, the crew uses the Fluke 971 Temperature Humidity Meter.





It's all downhill from here

Facility and equipment conditions are just as crucial where athletes train for winter sports. At Park City's Utah Olympic Park, site of the 2002 Winter Olympics, the maintenance team is dedicated to maintaining ideal conditions.

No detail is too small. Warm runners are faster, so the rules are written to keep temperatures among competing sleds essentially equal. Waiting for the start, sleds are stored upside down in the open, their runners exposed to the weather. Officials check the temperature of the runners before the race and compare it to a reference runner.

Whether they're checking air temperature, ice temperature, or the sled runners, the Park City team relies on Fluke 50 II and 52 II Dual Input Digital Thermometers, equipped with Fluke 80PK-26 SureGrip™ Tapered Temperature Probes. Before each race they match readings from two thermometers. The extra instrument is available for teams that don't have their own.

But chances are those teams have their own Fluke tools—the Canadian Bobsleigh Team sure does. According to Matt Hindle, Bobsleigh Program Manager in Calgary, Alberta, "The temperature of our equipment, and in particular the runner blades, is very tightly regulated. Any variants can mean the difference between qualifying or elimination." They use Fluke 52-II thermometers for this important job.



Keeping "Peak 2 Peak" in tip-top shape

At British Columbia's Whistler-Blackcomb ski resort, site of the 2010 Winter Olympics, the 20-member electrical maintenance team uses the Fluke Ti25 Infrared Camera and Fluke ScopeMeter to test and maintain a total of thirty-eight lifts plus the unique Peak 2 Peak gondola. The first of its kind in North America, it's longer and higher than any similar lift in the world.

The smaller lifts have variable-speed ac drives, ranging up to 40 hp. The larger lifts use dc drives rated for 100 horsepower, 250 horsepower, and 400 horsepower, while the large detachable lifts are rated up to 900 horsepower. Along with the lifts, the resort also has 200 buildings to maintain and 15,000 horsepower of snowmaking capability. Power comes from fifty-five 25 kV substations.

When the team commissioned the Peak to Peak system they used their Fluke ScopeMeter® test tool to record motor currents, all of the start-up parameters, how long it took the brake to lift, and the acceleration and deceleration ramps. Those baselines are now saved on the scope, for comparison at annual inspections. They use their Fluke Thermal Imagers to check switches and circuits for hot spots, and examine concrete lift towers for water leaks.

Come on winter, SNOOW!

When nature cools it so much that there is no snow, Fluke tools help resort operators near Silverthorn, Colorado create the blizzards that Old Man Winter won't. Situation: powerful pumps designed to supply water to the snow-making equipment failed to provide enough volume. Technicians used a Fluke 41B Power Quality/Harmonics Analyzer to test the power supply, discovering that harmonic distortion was sapping power to the pump motor. By installing a harmonic filter they remedied the power problem, returned flow to the snow machines—and helped restore skiers to the slopes.



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Fluke Corporation
PO Box 9090,
Everett, WA 98206 U.S.A.

Fluke Europe B.V.
PO Box 1186, 5602 BD
Eindhoven, The Netherlands

For more information call:

In the U.S.A. (800) 443-5853 or Fax (425) 446-5116
In Europe/M-East/Africa +31 (0) 40 2675 200 or Fax +31 (0) 40 2675 222
In Canada (800)-36-FLUKE or Fax (905) 890-6866
From other countries +1 (425) 446-5500 or Fax +1 (425) 446-5116
Web access: <http://www.fluke.com>

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