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hotter than ambient. Watering the field had a short-term effect.” (http://www.miloneandmacbroom.com/downloads/MMI%20Syn%20Turf%20Study_Bristol_McDermott.pdf)

“Right now there is no effective and economically feasible way to lower the surface temperature of infilled synthetic turf,” says Dr. McNitt. “Many are working on lots of ideas but I don’t think anyone has solved it yet.” [Editor’s note: Dr. McNitt maintains a research plot of various manufacturers’ infill synthetic surfaces; see <http://cropsoil.psu.edu/mcnitt/Infill.cfm> for details of his research to date.]

“This is one issue that the industry is working hard to address,” says Rick Doyle, president of the Synthetic Turf Council (STC). “Great strides have already been made through the introduction of new fibers and infills that produce significant reductions in heat absorption. I think you will see further improvements in this area in the coming year.”

Darren Gill, director of marketing for FieldTurf, says, “While an artificial turf surface is warmer at the base, it isn’t any warmer at the key levels which could lead to heat stroke. This conclusion can be supported by the data that has been collected at the NCAA and high school levels, as we have seen a reduction of heat stress injuries on artificial turf. For clients who have a concern over the field temperature, we do recommend misting the field with some water.”

Toxicity

Despite a growing body of scientific evidence to the contrary, some parents, environmental groups, and a few in the medical community continue to loudly voice concerns about synthetic turf’s safety. Do these fields contain lead or other carcinogens that can be ingested by kids or other users? they ask. Has enough research been done?

There have been several local threats on banning installations until more research is in; meanwhile, the synthetic turf community continues to point to answers from science that show there are no health issues for anyone playing on their fields. Or playgrounds, since the First Family’s White House playset sits on recycled tires.

Current research has shown turf fibers (on new generation of fields rather than original AstroTurf products) are lead-free, do not leach, and that crumb rubber infill is neither ingestible nor inhalable. Both the states of New Jersey and New York cycled through the concerns and questions and arrived at “Let them play” decisions. Other states, including California and Connecticut, are currently testing.

Synthetic system manufacturers also point across the Atlantic, where Europeans have been playing on artificial turf longer than we have here; studies there have found no health risks. As Darren Gill, director of marketing for FieldTurf, wrote in a recent newspaper column, “Simply put, since the industry’s early installs 15 years ago, no illness has ever been shown to be related to play on artificial turf.”

The latest scientific report we found is from the New York Department of Environmental Conservation and Department of Health, released May 29, 2009. This study concluded that crumb

rubber material used in synthetic turf fields poses no significant environmental threat to air or water quality and poses no significant health concerns (<http://www.dec.ny.gov/chemical/8792.html>). Major conclusions included:

- There is no significant threat from chemicals leaching into surface water and groundwater. While some chemicals can be released from crumb rubber over time, they are in small concentrations and are reduced by absorption, degradation and dilution, resulting in no significant impact on groundwater or surface water.

- Lead concentrations in crumb rubber are well below federal hazard standards for lead in soil and do not represent a significant source of lead exposure.

- Levels of chemicals in the air at synthetic turf fields do not raise a significant health concern.

New York state scientists conducted lab tests on crumb rubber samples obtained from manufacturers and conducted tests at synthetic fields. They tested for leaching, exposure to acid rain and acid digestion, exposed samples to a range of temperatures to observe impacts, assessed chemical particle sizes for their potential to move through soil and air, collected soil samples at wells down-gradient from existing synthetic turf fields and measured air samples upwind and downwind of such fields.

Environment and Human Health, Inc. (EHHI) is an example of an organization that is concerned with these issues. This nonprofit is “dedicated to protecting human health from environmental harms through research, education and the promotion of sound public policy.” Its members include doctors, public health professionals and policy experts.

EHHI teamed with the Connecticut Agricultural Experiment Station (CAES) to determine the chemicals released into the air and water under ambient conditions. One set of experiments tested the leaching potential of the metals from samples of tire crumbs and one sample from commercial rubber mulch. A second set of experiments tested the chemicals released from crumb rubber and commercial rubber mulch. CAES said the study conclusively demonstrated that the tire crumbs and tire mulch release chemical compounds into the air and ground water, constituting a chemical exposure for humans and the environment. They also concluded that “There are still data gaps that need to be filled in and additional studies are warranted.”

However, the Connecticut Department of Public Health (CDPH) responded to this study by stating their review “does not find any reason to stop installation of these fields. Currently there are no federal or state limits on the installation of crumb rubber-based turf fields. Therefore, it is up to towns to make a case-by-case decision on whether artificial turf is the right choice for a particular setting. While we see no health evidence to stop installations, DPH acknowledges that much of the information is very recent and this area is rapidly evolving. Additionally, the potential exposures and risks have not been fully characterized. DPH recommends that towns consider these uncertainties as part of the array of issues evaluated when deciding whether to install artificial turf fields (e.g., cost, maintenance, public acceptability).”

Concerns about the exposure of children to excessive levels of lead in synthetic turf were raised after the metal was detected on some playing fields in New Jersey several years ago. In April 2008, the US Consumer Product Safety Commission (CPSC) agreed to investigate artificial turf fields to evaluate the risk. They evaluated many school and government-owned athletic fields, and although some older fields were found to contain lead, the commission concluded that young children are not at risk of lead poisoning as a result of synthetic turf (<http://www.cpsc.gov/cpscpub/prerel/prhtml08/08348.html>).

STC's Doyle says, "We are pleased to see that recent studies conducted by independent environmental firms on behalf of state agencies validate the safety of synthetic turf and crumb rubber. We've always relied on science to support our statements of safety."

MRSA

Outbreaks of skin infections associated with sports teams caused by *Staphylococcus aureus* bacteria that are resistant to many antibiotics have been increasing, according to public health officials. These resistant strains of "staph" are known as MRSA.

Studies have been conducted on whether staph can live in the synthetic turf environment. In published reports (Kazakova et al.

2005) and (Begier et al. 2004) said two possible risk factors for contracting a MRSA infection from synthetic turf fields were a) an increased risk for skin abrasions and other injuries leading to open wounds and b) whether the fields themselves harbor the bacteria. These two studies were conducted with football teams to determine the relationship between synthetic turf and MRSA infections and both concluded that skin abrasions and turf burns caused by synthetic turf provide a means of access for the MRSA infection. However, in both cases it was found that physical contact (due to position played), body shaving, equipment sharing, and poor sanitary practices in the locker rooms and training facilities facilitate the transmission of the disease.

Penn State's Dr. McNitt said in a 2007 report that no MRSA was found on any bulk samples he took from synthetic turf fields throughout Pennsylvania. He did find staph on blocking pads, weight equipment, stretching tables, and used towels, in addition to the hands of five randomly tested individuals.

The McNitt study concluded that "These infilled systems are not a hospitable environment for microbial activity. They tend to be dry and exposed to outdoor temperatures, which fluctuate rapidly. Plus, the infill media itself contains zinc and sulfur, both of which are known to inhibit microbial growth."

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Paint and Equipment for Synthetic Fields



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Audubon International recognizes STMA member

WITH MY BACKGROUND IN MANICURING GOLF COURSES, I am used to the environment being a consideration. Protecting it is expected of you and your maintenance program. Once I accepted the position for superintendent of grounds at St. Mary's College of Maryland, with responsibility for overseeing the college's roadways, grounds, beds and seven sports fields, I thought it would be an easy transition. I quickly realized, however, that there is a difference between golf course maintenance and maintaining sports fields—a very big difference. I not only have the turf to worry about, but also the soil chemistry and moisture for the baseball field skin area, field conditions for playability, learning about titanium oxide and calcium carbonate from sports field paints, and, most important, the safeness of the fields for athletic play.

The St. Mary's College of Maryland grounds crew and I have met these challenges. We were recently rewarded for our environmentally sound grounds plan by Audubon International with certification in Environmental Planning from the Audubon Cooperative Sanctuary Program (ACSP). The college is the first in Maryland to receive this certification. The international program is designed to help preserve and enhance the environmental quality of properties.

Once I got my sports turf management program in place, I thought about how I could make a difference by using more environmentally friendly maintenance practices on the athletic fields and campus grounds. At first this was a bit tough since I had no program to guide me. I wanted to come up with a plan that would be good for the environment and our athletic field program as well.

I first talked to my direct supervisor, Derek Thornton, who is assistant vice president of campus operations. He was 100 percent behind my efforts. I then talked to the assistant athletic director and head soccer coach, Herb Gainey, who helped me by setting up a plan and setting an example for the other coaches to follow by rotating his goal area to all four sides of the fields when teams were practicing on them. He also had every team member do warm-up exercises off the playing

surface. He had his team walk the stadium field and practice fields after games to repair damaged areas and pick up any litter. This was the start of my program.

Environmentally sound sport fields are often rare. We have several sports fields located near or on a historic site that is part of the campus. To put an environmental plan into action with these considerations was challenging but rewarding. My first step was to take a hard look at the natural landscape within our sports field complexes. Our baseball field was designed by Paul Zwaska, formerly with the Baltimore Orioles and now the general manager at Beacon Athletics. The Hawk's Nest, which opened in 2001, has the nostalgic feel of a ball park in the early 1900s. The dugout is built of timber, and native plantings surround most of the backdrop and sides of the park. We have transplanted 17 Crape Myrtle trees and 67 Abelias from areas under construction to the ball field to add color and shade for fans watching games. We are in the final phase this year of planting a buffer zone of native Black Eyed Susan's for a distinctive look behind the outfield fence in a grassy meadow that captures nutrients from the water that drains from the ball field and parking lots.

We have in place a good integrated pest management program for the sports fields as well as water management programs that we check daily. We also topdress some of the sports fields and events lawns with compost from organic material waste that we collect from the campus and sports fields. We apply it about an inch deep. This helps nourish nutrients and soil moisture. We use wetting agents to keep irrigation efficient. Regular checks are made for broken heads, leaks, and to ensure that irrigation heads are running efficiently and watering only the turf and not the skin area or warning track of baseball or running track of the stadium fields. We also use turf growth regulators to help cover areas with lateral turf growth movement and reduce mowing, which in turn helps reduce our carbon footprint.

The baseball field is planted primarily in bluegrass and ryegrass,

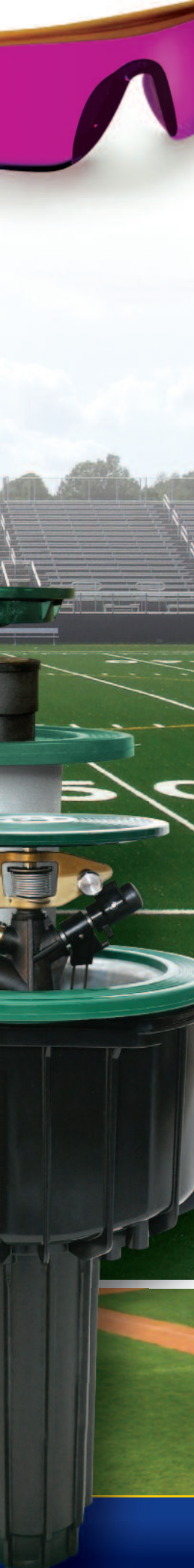
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Left: Part of St. Mary's wildlife habitat, part of the buffer management program for the storm water pond. **Middle:** From left: George Lancaster, James Dyson, Steve Gregory, Kevin Duffy, Eric Reed, Cheryl Krumke, Chris McKay, Rick Thompson and Superintendent of Grounds Kevin Mercer. **Right:** Campus green space called Admissions Field features recycled sports field turf and is used for Frisbee golf, recreation, and intramurals.





TURF WATERING PRODUCTS
2009 CATALOG



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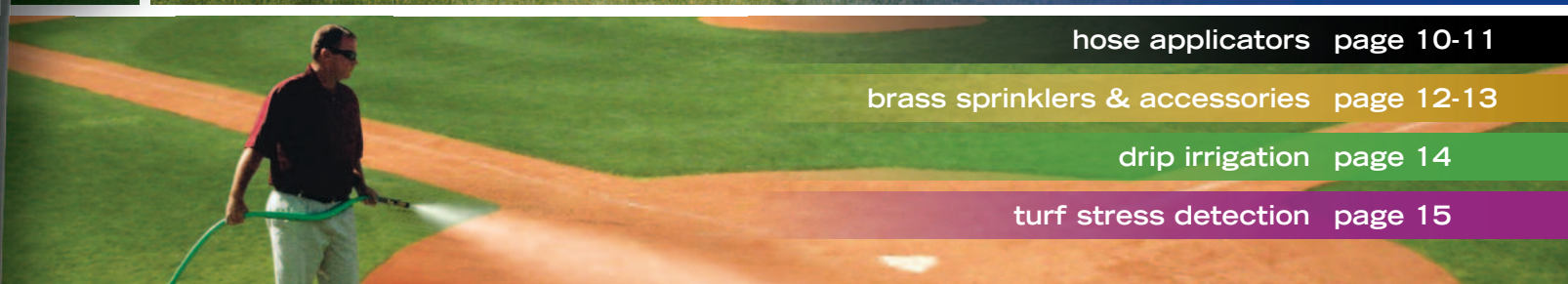
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Products that work...smart.™



An industry leader in innovative watering products for golf, sports field and other large turf areas, Underhill brings 30 years of know-how in developing our inventory of “Products that work...smart.”™

sports turf sprinklers

Mirage™

HUGE THROW, HIGH-PERFORMANCE SPORTS TURF SPRINKLERS

Underhill Mirage pop-up turf sprinklers, featuring precision engineering and huge throw radius, can be installed completely outside the playing area of sports fields. Employing precision German engineering in design and manufacture, Underhill offers the finest large turf sprinklers in the world.

M-160: With its powerful **164 ft. throw radius**, the Mirage™ M-160 is a worldwide favorite for cooling and cleaning synthetic sports fields, dust control and irrigation. Featuring ultra-precise rotation speed adjustment, these piston-drive cannons get the job done quickly and efficiently.

M-125: A very impressive long-throw sprinkler in its own right with a **125 ft. radius**, the M-125 is perfect for installation in artificial turf fields, or in the out-of-play areas of natural turf fields.

M-115: For areas where irrigation must be installed within the playing area, the M-115's large 4" (101 mm) deep sod cup cover, which holds a 9" (220 mm) diameter section of natural grass, “disappears” when not in use, staying out of the way of athletes and mowers.

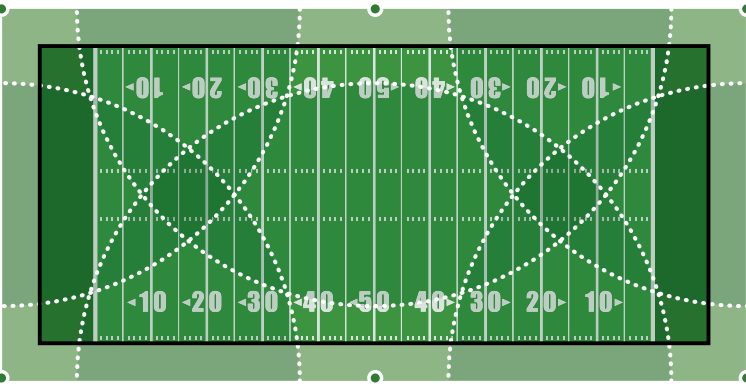


This little module converts irrigation controllers to 2-wire. You'll save a ton in wiring costs, installation and maintenance.

See Page 4

Mirage M-160 pictured at right with artificial turf lid covering to blend in with surroundings when not in use.

Incredible but true... with its huge 164 ft. radius throw, the M-160 can shower a regulation size football field with only 6 heads!



model selection guide

	M-115	M-125	M-160
Max Radius	115 ft. (35 m)	125 ft. (38 m)	164 ft. (50 m)
Valve Type	In Head or Block	In Head or Block	3" Sleeve Valve
Lid Cover	Sod Cup - Natural Grass 4" (101mm) Depth 9.5" (242 mm) Diameter	7" (180 mm) Diameter	15.6" (395 mm) Diameter
Typical Applications	Natural Turf: Play Areas	Artificial Turf: Sideline Areas Natural Turf: Sidelines	Positioned at Sidelines: Artificial Turf Cooling Natural Turf Irrigation
Field Usage Examples	All Sports	All Sports	Football, Soccer, Race Tracks
Nozzle #s (mm)	7, 8, 9, 10, 11, 12 13, 14, 15	7, 8, 9, 10, 11, 12 13, 14, 15, 16, 17.5	16, 18, 20, 22, 24, 26
Pop-Up Height	8.1" (206 mm)	4" (99 mm)	2 3/4" (70 mm)
Arc	30 - 360 degrees	30 - 360 degrees	30 - 360 degrees
Trajectory	22 degrees	22 degrees	23 degrees
Rotation Speed	60 seconds	60 seconds	Precision Adjustable 100-240 seconds
Inlet (Specify)	1 1/2"	1 1/2"	2 1/2" side inlet
Height	26.7" 678 mm	17.7" 450 mm	24.5" 622 mm



The superior characteristics of Mirage sprinklers is proven daily around the world: from the futuristic Allianz Arena in Munich, to the Olympic stadiums in Athens 2004 and Beijing 2008, to large collegiate sports complexes in the United States.

ordering

- Part # M160-FP Mirage™ 160 full/part circle
- Part # M160-EP Mirage™ 160 full/part circle, with 3" electric valve
- Part # M125-EF Mirage™ 125 full circle, valve-in-head
- Part # M125-EP Mirage™ 125 full/part circle, valve-in-head
- Part # M125-BF Mirage™ 125 full circle, block
- Part # M125-BP Mirage™ 125 full/part circle, block
- Part # M115-EF Mirage™ 115 full circle, valve-in-head
- Part # M115-EP Mirage™ 115 full/part circle, valve-in-head
- Part # M115-BF Mirage™ 115 full circle, block
- Part # M115-BP Mirage™ 115 full/part circle, block



2Wire

JUST TWO WIRES AND ONE MODULE FOR CONTROL OF UP TO 48 STATIONS

With over 150,000 field successes, Underhill™ 2WIRE irrigation control systems are a proven leader in converting controllers like the Hunter® ICC to the simplicity and low cost of two-wire technology. Installation is a breeze and after your system is in, you'll enjoy reduced maintenance costs and unbelievably easy system expansion (just splice into the 2-wire path and add a decoder). Add the Hunter® IRC remote control and you've created the ultimate (and most affordable) way to syringe anywhere on your field at the press of a button.

EXPAND EXISTING MULTI-WIRE SYSTEMS

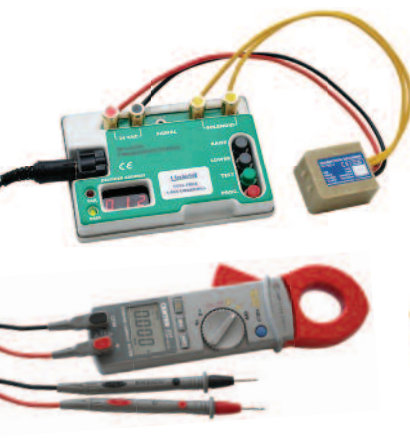
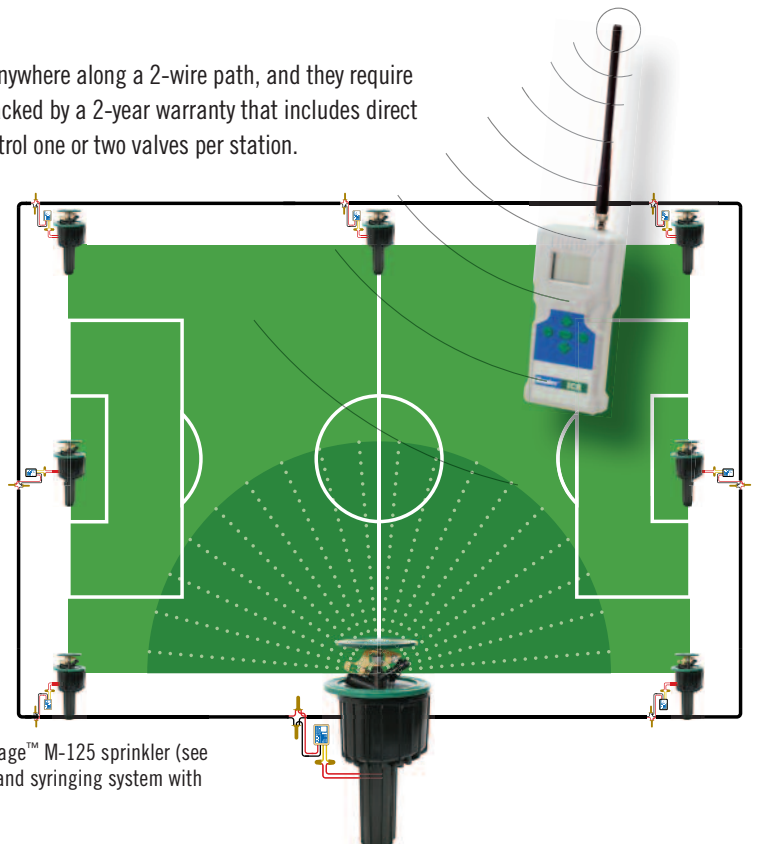
To run a 2WIRE system in tandem with your existing system, simply install the decoder module into the controller, run a 2-wire path to the new valves, and operate your ICC as normal for all stations (up to 48 total). To add stations in hard to reach areas (across a road, path, parking lot, etc.), you can even "piggyback" onto the existing system out in the field and avoid trenching back to the controller!

NO GROUNDING NECESSARY

Underhill™ decoders quickly install anywhere along a 2-wire path, and they require no grounding. So reliable, they are backed by a 2-year warranty that includes direct lightning hits! Each decoder can control one or two valves per station.



An irrigation installation featuring the powerful Mirage™ M-125 sprinkler (see page 2-3) and 2Wire decoders becomes an on-demand syringing system with the Hunter® IRC remote control.



Setting up stations is a breeze with our portable decoder programmer. And for troubleshooting wiring in the field, the digital clamp meter measures AC volts, current and resistance, and the faultfinding transformer adds the proper voltage to the two-wire path.

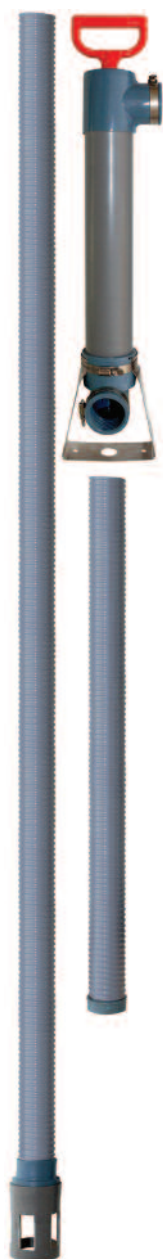
ordering

Part # TW-ICC-48	ICC Decoder Module
Part # TW-TK-DEC-1	2WIRE Decoder (includes 4 DBY connectors)
Part # DEC-PROG-115	Portable decoder programmer, 115V
Part # DEC-PROG-240	Portable decoder programmer, 240V
Part # TW-DCM	Digital Clamp Meter
Part # Transfrmr-115	Faultfinding Transformer 30V, 5A
Part # TW-2C-14-1000	2-conductor, 14 AWG wire reel, 1000 ft.
Part # TW-2C-14-2500	2-conductor, 14 AWG wire reel, 2500 ft.

Gulp™ Series Pumps

WATER REMOVAL SUCTION PUMPS

Whether you need to remove water from sprinklers and valve boxes or displace gallons of standing water in the field, the Underhill Gulp™ series of water removal hand pumps has the right tool for the job. Constructed from heavy-duty, corrosion-proof materials, these pumps are self-priming and easy to clean. The Gulp Syringe™ and Gulp™ are ideal for carrying on maintenance carts for small, routine needs. For larger water removal jobs, BigGulp™ pumps a gallon of water in only four strokes and SuperGulp™ can move 16 gallons of water in one minute.



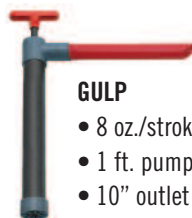
SUPER GULP

- 16 GPM pumping capability
- 4" dia. x 2 ft. pump chamber
- 3" dia. x 3 ft. outlet hose
- 3" dia. x 7 ft. outlet hose



BIG GULP

- 35 oz./stroke
- 3 ft. pump chamber
- 36" or 72" outlet hose



GULP

- 8 oz./stroke
- 1 ft. pump chamber
- 10" outlet pipe



GULP SYRINGE

- 8 oz./stroke
- 1 ft. pump chamber
- 11" outlet tube



Use the BigGulp™ Riser Attachment to help prevent mud and rocks from entering the pump chamber.

ordering

Part # A-G12	Gulp™
Part # A-G12S	Gulp™ Syringe
Part # A-G3636K	BigGulp™ with 36" outlet hose
Part # A-G3672K	BigGulp™ with 72" outlet hose
Part # A-G2484	SuperGulp™ with 84" outlet hose
Part # A-G01	BigGulp™ Riser Attachment



SuperGulp™



BigGulp™



Gulp™



Gulp™ Syringe

Magnum™

SOLID METAL HOSE NOZZLE

Underhill™ Magnum™ contains no plastic internal parts to break, stick or wear out. Our unique ratchet mechanism easily adjusts from gentle fan to powerful jet stream and prevents over-tightening damage. Precision-machined, incredibly smooth operation and outstanding distribution patterns make it ideal for high-demand areas like sports fields. Magnum™ is also an excellent equipment wash-down nozzle.

features

- Built for 1" and 3/4" flow rates
- Fire hose quality nozzle feels great in your hands
- Ultra-durable construction withstands any abuse
- Solid metal internal body - no plastic parts to break or wear out
- Beautiful, consistent spray patterns for life
- Ratchet mechanism prevents over-tightening damage
- Multi-pattern sprays - effortless control with hydraulic assist on/off

specifications

Materials: stainless steel, aluminum, TPR rubber

Flow: 37 GPM at 80 psi

Inlet: 3/4" hose thread (1" brass adapter available, see Page 7)



Magnum™ nozzle pictured with 1" brass adapter (sold separately on Page 7)



solid metal internal

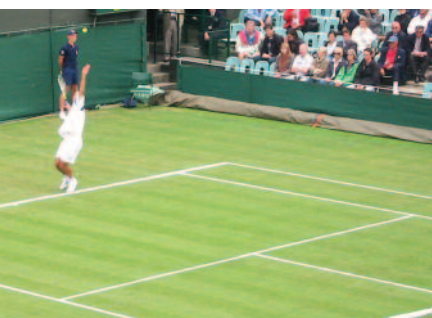
Won't stick...won't break



fan

jet

soak



CoolPro™

Cool Without Over Watering - No Root Damage

A hot summer day can be murder on high quality turf areas (like baseball infields and golf greens). Use too much water and you risk damage to the roots. CoolPro™ is the first nozzle specifically designed for the single purpose of lightly misting the turf canopy to cool without over watering. And its 25 foot fogging pattern gets the job done quickly.

features

- 3/4" inlet (1" brass adapter available, see Page 7)
- Ergonomic handle/valve provides easy grip and variable on/off control.
- Solid metal design for durability: zinc, aircraft aluminum and stainless steel.
- Patented Precision™ nozzle fogs at 70 psi to deliver a 25 ft. pattern with only 4-6 GPM

Perfect for tournament play, CoolPro™ puts down only enough water to cool the turf canopy. It prevents wilting while maintaining good ball speed. CoolPro is a great tool for protecting grass on hot days without damaging roots.

ordering

Part # NG450

Part # HNC075

MAGNUM Hose Nozzle

CoolPro™ Hose Nozzle

