

# Selecting and installing PVC pipe

By Luke Frank

Irrigation piping is like underwear—as long as it's hidden and not leaking, you're not likely to give it much thought. But like skivvies, an irrigation piping system must match the demands of the system and the environment in which it performs, and when it fails to perform, it's pretty obvious.

For the sake of simplicity, we'll address sports turf irrigation piping systems comprised of PVC piping and fittings, the most common material used in turf applications. Two primary types of PVC are used, and differ only in the pressure rating system used to designate their respective capacities.

### PIPING PRESSURE RATING SYSTEMS

The PVC industry has developed two pressure-rating systems: the Standard Dimension Ratio (SDR) and the Schedule system. The SDR is a ratio of the minimum wall thickness to the outside diameter of the pipe for an established pressure level. This type of PVC pipe is commonly referred to as Class pipe. Therefore a system comprised of Class 200 PVC pipe has a pressure rating of 200 psi.

In the Schedule system, Schedule 40 and Schedule 80 PVC pipe have specific pressure ratings for each pipe size. These ratings can range from 850 psi for half-inch Schedule 80 pipe, down to about 180 psi for 6-inch Schedule 40 pipe.

The use of Class pipe in turf irrigation systems ensures a consistent pressure rating throughout the entire system. The Schedule system would have the same rating as the largest-diameter pipe, since the pressure rating decreases as the diameter increases.

### A fitting proposition

There are several choices of fittings used to connect PVC pipe and route the system main and laterals. We'll zero in on the four primary options: PVC fittings that are solvent welded to join pipe; PVC fittings that use ring-tight gasket connections; epoxy-coated steel fit-

tings that are joined to pipe with gasket joints; and ductile-iron, gasket-joint fittings.

Naturally, there are a near endless variety of specialty fittings that target the individual needs of sports turf managers and sites. And, there are numerous products that can make irrigation piping system repairs simpler.

Compression couplings using gaskets to effect a seal, and solvent-welded slip-fix type expanding couplings can transform a difficult repair into a relative cakewalk. But far and away the most popular type of fitting used in landscape irrigation systems is the solvent-welded PVC fitting. It's inexpensive and easy to install, and when properly used should provide years of trouble-free operation.



### When the pressure's on

Large turf irrigation systems consist of pressurized mainlines that feed water to a series of automatic control valves. The control valves are opened and closed either electrically or hydraulically and in turn feed water to the lateral lines and ultimately the sprinkler heads.

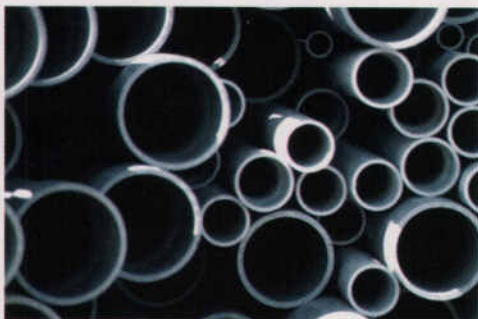
The opening and closing of valves can cause pressure surges in the system, known as water hammer, that if repeated often enough can damage fittings and cause a destructive and at times expensive piping system failure.

The power behind water hammer can be reduced by maintaining acceptable system velocities through proper system design and scheduling. So, if a system is properly designed, why do we still have fitting failures? The issue may lie with how the fittings are/were installed.

Perhaps the most common problem associated with sports turf irrigation piping system failures is the welding of solvent-cement joints. As straightforward as the process seems, a certain degree of attention and procedure is required to construct a leak-free, durable joint.

Before you ever get out into the field, it's critical that you select the proper solvent cements and primers. Don't confuse primers with plastic pipe cleaners, and most cement labels offer a range of pipe sizes for which the product will be most effective.





Solvent cement consists mostly of volatiles that evaporate during curing. When a solvent-cement is not evenly and appropriately applied and the parts aren't quickly joined, the volatiles "flash off," leaving insufficient solvent to create a bond between the pipe and fitting. This results in a dry joint.

Always adhere to the proper sequence of applying primer and cement recommended by the manufacturer. Generally, the recommended procedure is to prime both the pipe and fitting socket to be joined. Then, immediately apply a light coat of cement to the adjoining tapered socket pipe end and a more liberal coat of cement to the outside of the pipe. Push the parts together, rotating one-eighth to one-quarter turn and hold the joint for about 15 seconds.

The second coat of cement on the pipe is the key to success because it puts the most adhesive where it will be most beneficial. As you insert the pipe into the fitting, any excess cement on the pipe will be pushed out along the pipe, filling the gap between the pipe and the fitting at the socket opening. Excess cement will not be trapped inside the joints.

Finally, wipe off the connection, as excess cement and primer can cause softening and blistering of the plastic compounds. And rest easier with the knowledge that properly designed and installed irrigation piping and fittings should last upwards of 50 years.

Paying a little more attention to the less visible parts of your irrigation system will increase your comfort in how well and how long products perform. ■

Luke Frank is a veteran writer who specializes in irrigation topics. He can be reached at [lukefrank@earthlink.net](mailto:lukefrank@earthlink.net).

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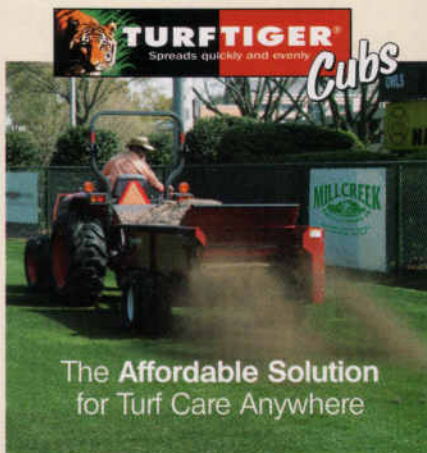
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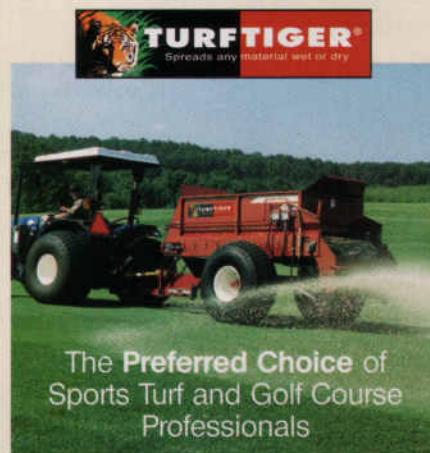
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# Tales from the Gulf

## One turf manager's Hurricane Katrina experience

By Ken Edwards, CSFM

**E**ditor's note: Ken Edwards has worked for the City of Gulfport's Department of Leisure Services in Mississippi for the past 6 years. He is the sports turf manager/superintendent for both the Goldin and Gulfport sport complexes, responsible for day to day maintenance operations and supervision of nine crewmembers. He previously served in the US Army where his responsibilities included recreation program management, sports field and golf course maintenance and management, and human resources management.

The last hurricane I recall to pass through Gulfport and cause damage to any of the complexes was Hurricane George a couple of years ago. There was very minor damage to the Gulfport SportsPlex. One set of ten high bleachers blew over, a couple of bleacher tarps ripped off but that was it. No turf or major structure damage. Goldin Sports Complex was not completed yet.

Being a native of New Orleans I have experienced some bad hurricanes, including Betsy and Camille. My family and I relocated to Gulfport in October 1995 after my military retirement. As I recall, the day our household goods were to be delivered a storm was in the Gulf of Mexico approaching us. We stayed in Gulfport through that but promised never to stay again. For the past 10 years we boarded up the windows and doors on the house and left town whenever there was a hurricane approaching. We always prepare for hurricane season, we just never stay for the storm itself.

On Thursday, August 25, all indications were that Katrina was headed our way. We watched the news faithfully and every model showed that Katrina was huge and would hit the entire Gulf Coast area. A department staff briefing was called and all scheduled weekend tournaments were cancelled.

First order of business for me was to brief my crew and update their contact information. Our goal was to have the two complexes prepared by noon on Friday, then everyone would go home to prepare their personal property or plan to evacuate.



Ken Edwards, CSFM, Gulfport, MS, snapped these shots in the immediate aftermath of Hurricane Katrina.

### The order of business for preparing the sportsplexes:

- Fuel; top off every vehicle, all equipment and every available fuel container
- Remove all advertisement banners from fences
- Remove tarps from bleachers and flip over the three highs
- Tie dugout benches to dugout fence
- Pull all bases and portable mounds, place them in the shop
- Remove soccer goal nets, flip goals over and strap to light poles
- Flip over all picnic tables
- Empty all trashcans and place in the restrooms
- Put all equipment, trailers, and vehicles in shop
- Unplug all appliances
- Empty contents from shop refrigerator
- Turn off power to irrigation pump
- Shut off main valve to potable water
- Shut off power to the maintenance building and lock the gates.



# IRRIGATION & DRAINAGE

Program coordinators and recreation aids are responsible for securing the control towers and concession facilities. Concession contractors are notified and responsible for securing their equipment and supplies.

At about 11:20 am Friday, I phoned my director and informed him that Goldin and Gulfport SportsPlexes were secure and that I was releasing my team to take care of their personal needs and property.

By Saturday, August 27, Katrina was strengthening and definitely heading our way. I now started my personal preparations:

- Fill up cars and fuel cans
- Service and test generator
- Inventory can goods and water (Usually bought at the start of hurricane season in June)
- Check flashlights
- Clear yard of anything that moves
- Place candles about the house
- Board up windows and doors
- Pack personnel memoirs and valuables
- Pack small suitcase and personal hygiene items
- Load car
- Fill tubs and sinks with water
- Decide on final destination
- Call family, friends and employer

Our plan has always been to depart when a hurricane is no less than 8 hours away. We tracked the news most of the night Saturday and since Katrina was projected to hit on Monday morning we decid-

ed that we would leave Sunday around noon. We were heading east on I-10 to Tallahassee, FL. By 10 AM Sunday I-10 was backed up to New Orleans and estimates were that it would take 8 hours to get to Mobile, AL—usually a 50-minute drive. We had a decision to make, be stuck in traffic or stay home. We chose to stay.

Katrina's full effect started around 5 AM Monday morning. First went the power, so we turned on the battery powered TV. Then went the TV station. We turned on the radio. Then went the radio stations. For the next 12 hours my family and I listened to Katrina batter the house. At about 6 PM the worst was over. My son Keair and I went outside to see the unbelievable destruction. My entire neighborhood was severely damaged. My home sustained minor damage as compared to others. One pecan tree on the house, roof damage, ceiling damage, a little water damage inside, and the fence around my property completely down. We were blessed.

On Tuesday morning, August 30, the order of business for me was to get out the chain saw and remove the tree from the roof, get the damaged areas covered, contact the boss and my crew. I was able to take care of my roof. We had no form of communications in the entire city, cell phones didn't even work. I decided to venture out to check on the SportsPlexes. Trees and power line poles were down everywhere and blocked most of the roads. My son and I rode bicycles to Goldin Sports Complex about 1/4 of a mile away, where my company truck is parked.

Goldin is a 25-acre site consisting of a "4-plex" baseball/softball complex, a two-field football/softball complex, outdoor pavilion, playground, basketball/tennis courts, and a maintenance shop. The fields

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Will Schnell  
Rose Bowl Turf  
Superintendent



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are built to USGA spec with a 6-inch, sand-based rootzones, certified Tifway 419 Bermudagrass, and laser leveled with a 1.5% slope. The complex is almost 3 years old and plays host primarily to local league activity but it often used as an overflow complex for large tournaments usually hosted by the Gulfport SportsPlex.

To my amazement the physical structures suffered minor damage, mostly roofing. Sixty percent of the fencing was destroyed and there was minor damage to the playground. All 22 field lighting poles were leaning with a few light fixtures missing. All four scoreboards and eight foul line poles were destroyed. Every parking light pole also leaned, all 56 of them.

## So far so good

Every square foot of soccer/football fields was covered with debris from nearby homes and apartments that were completely destroyed. The baseball/softball fields were slightly littered with debris but the skinned infields were completely stripped of its conditioner (approximately 1/4 inch of crimson stone). Infields are 13,000 square feet each. My overall assessment of Goldin was good as compared to the surrounding community. To my amazement the maintenance building suffered very minor damage.

I got into my truck and snaked my way across town to the Gulfport SportsPlex. That's when I realized that my entire city was devastated. I saw it first hand.

The Gulfport SportsPlex is a 250-acre site containing a five-field softball complex, four-field baseball complex, and a four-field soccer complex. The fields are also built to USGA spec with a 6-inch, sand-

based rootzones, and certified Tifway 419 Bermudagrass. All fields are laser leveled to 1.5% slope.

Both complexes are irrigated by Rainbird MaxiCom systems and both have Hubble lighting systems. Future additions to this facility include increasing the softball complex to six fields, a tennis complex, two additional soccer fields, and a four-plex replica stadiums (Fenway, Wrigley, Yankee and Gulfport Stadiums, respectively). To date the total cost of the SportsPlex is \$12 million. According to the Harrison County Tourism Commission, this year's 54 scheduled tournaments should pump \$13 million into the local economy through the weekly influx of players, coaches, and team supporters. We lost 12 events due to Katrina which easily means a loss of about \$1.5 million.

Upon entering the Gulfport SportsPlex, I saw that all 11 scoreboards were destroyed, all 70 field lighting poles were leaning, and 34 parking lot light poles were damaged. Fences were down and bleachers were flipped over, some as far as the right field fence, 300 feet away. The control towers and concession buildings also received major roof and interior damage. Then came the shocker—half of the maintenance building was destroyed, totally collapsed with equipment and supplies under it. All three pull up doors completely gone. My office in this building was intact but water-soaked.

On Wednesday my foreman, John August, reported for work and we started our assessment of what to do next. John's first mission was to find our team and assess their needs. I finally made contact with my director, we crossed paths on the road leading to the sportsplex. Still no communications were available. A department meeting was set up for Thursday. All



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# IRRIGATION & DRAINAGE

city employees were placed on hurricane leave through Friday, September 2. By Monday, my team was accounted for and reported to work.

By that Wednesday we had all the debris off of the fields and most of the downed fencing cut and rolled up at the Gulfport SportsPlex. We removed everything that we could from the maintenance shop and took it over to the shop at Goldin. We spent the next few days cleaning up the debris at Goldin. On Friday we returned to the Gulfport complex only to find it occupied by disaster security forces. They locked us out and we didn't gain reentry for another week. We took the weekend off only to return to Goldin on Monday and find it occupied by a debris removal contractor. It seemed like all of our hard work was in vain. Tents were all over the fields, heavy equipment, mobile campers, and large trucks all over the parking lots. There were hundreds of people and no portable facilities. And 2 weeks later there were still no phones, no water, no power, and by the way, no rain.

## Rain needed

I finally got control of Goldin and had the contractor moved to another site. My concern now was that the fields needed water. Our plan was to get a generator to run the pump at the Gulfport SportsPlex but Goldin is on the city's water main. Finally we got power after about 16 days and immediately started watering. We also gained reentry to Gulfport SportsPlex to perform maintenance and salvage what we could from the shop.

Our preliminary damage assessment was as follows:

Structures: 100% damaged, estimated loss \$502,000

Equipment: 10% damaged, 1% destroyed, estimated loss \$25,700

Fields: 80% damaged, 20% destroyed, estimated loss \$23,000

Other collateral: 10% damaged, 80% destroyed, estimated loss \$30,276

Clean up/debris removal: \$40,000

Emergency equipment: \$6,100

Potential revenue lost: \$48,000

As of September 23, we gained full control of both complexes and were back on track with our maintenance programs. We have not made any major repairs yet (late October) but the facilities were safe and have adequate lighting. On October 11 we started Little League tackle football at Goldin and the city's soccer and pee-wee flag football leagues started play at the Gulfport Sportsplex. All other tournaments were cancelled until further notice.

## Help

Financial assistance is coming from a lot of different sources. Insurance claims take precedent then the state and federal government will assist with funding rebuilding efforts. Many cities and associations such as the National Recreation and Parks Association and they all are providing some form of assistance to us. We want to give a special thanks to Jerry Pate Turf and the Toro Company for coming to the rescue during our time of great need. ■

*Ken Edwards, CSFM, is the sports turf manager/superintendent for the City of Gulfport, MS.*

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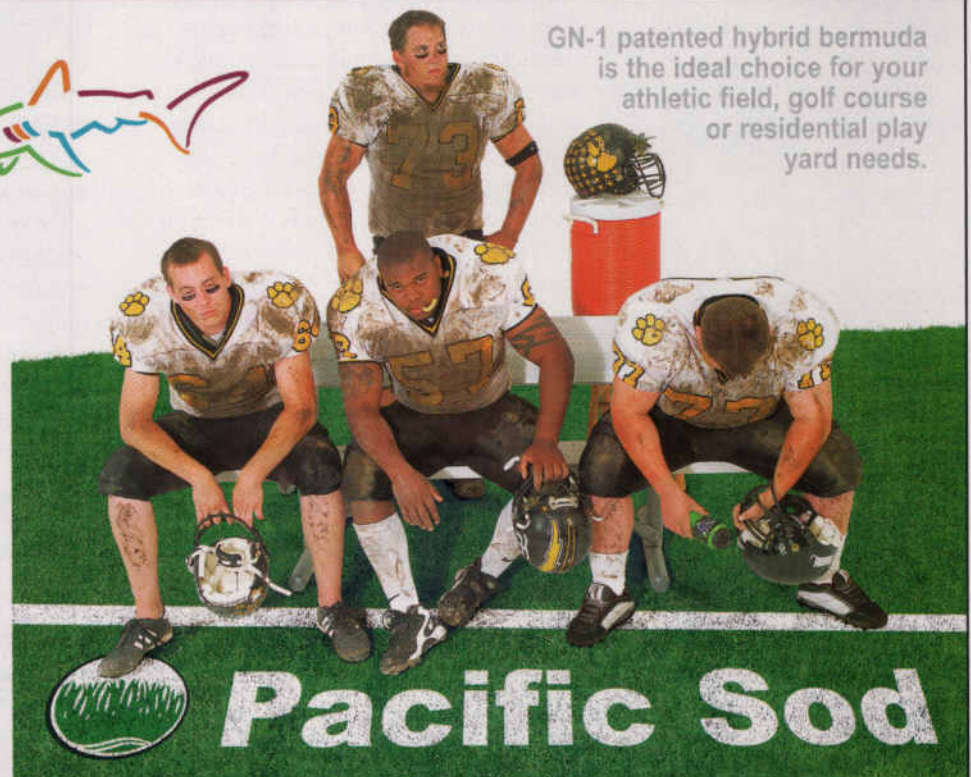


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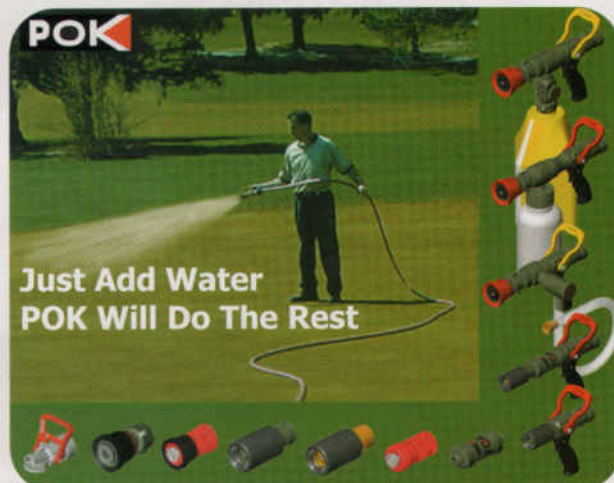


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