

Could using stainless steel save SA millions in water losses?

With South Africa experiencing stage two and three water restrictions following its worst drought in decades, the spotlight falls on how to reduce leakages and maintenance costs and preserve our already strained water resources into the long-term future.



300mmØ bulk water connection installation for Pearl Valley, Paarl

The importance of tightening up South Africa's water supply infrastructure comes into sharp focus when one considers statistics cited in a [Timeslive.co.za report](https://www.timeslive.co.za/report/20150701-johannesburg-water-losses), which stated that up to 40% of Johannesburg's water goes unaccounted for annually, costing the city R1.16bn in the year (ending June 30, 2015). Of that about R851m of water was lost to leaks.

Inferior or inappropriate water infrastructure

These high losses have been identified as due in part to the use of inferior or inappropriate (system) metals in pipe joints and other fittings being used by municipalities including flanges, tee-pieces, reducers, and bolts and nuts all bearing short lifespans further compounded by high pressure systems and high corrosion levels in South African soils and resultant challenges in leak detection.

Southern Africa Stainless Steel Development Association (SASSDA) executive director John Tarboton says, "There is high value potential of using stainless steel material for service piping and all fittings predominately manufactured using grade 316 stainless steel in the service delivery of municipal water that can potentially save millions of rands currently lost in leakage and filtration costs, as well as see a reduction in the usage of water per capita.

"With the use of corrugated stainless steel piping, the need for joints in the system is reduced, allowing the corrugated stainless steel pipes to maintain their strength, improve workability and extend the piping systems service life. There is a clear case of cost savings both on the treatment of water that is lost through leakage as well as water that municipalities are unable to charge service fees for its distribution and use. Stainless steel is an optimal material in water system applications and while it comes at a price, it is an investment in the country's infrastructure, the benefits and cost-savings which will still be seen 100 years from now."

A model municipality

The Newcastle area in KwaZulu-Natal represents some of the worst cases of water waste, where three municipalities see as much as 65% of treated water leaking away or being used illegally. On the other end of the scale, the Drakenstein Municipality in the Western Cape is just one of a handful of municipalities which has the wisdom to ensure its water wise future.

When asked why his municipality is a frontrunner in the use of stainless steel applications, Drakenstein Municipality senior engineer: water services Andre Kowaleski, who has 33 years' experience as a technical official in the municipality, comments, "Since 2002, we have applied grade 316 stainless steel in all the metal we use in our underground network or grade 304 in above-ground applications. We also use stainless steel in all our refurbishments, including the recent refurbishment of the Meulwater Reservoir, Paarl Mountain and Van Blerk Reservoir in Wellington.

“This stems from the fact that when it comes to replacement maintenance, it would be unwise to put a pipe in the ground that has an operating life of between 50 and 100 years and then have to replace fittings, such as T-pieces and connection saddles that corrode and rust away after just a few years - there’s no logic in that. You must use material with a lifespan of 50-100 years.

“So even though the initial cost of stainless steel installations is considerably higher than other available materials, we are reaping the rewards of our long-term approach and currently have a 13.4% water loss figure, as compared to other municipalities’ average water loss of 39% and our figure will only improve as we continue replacing inferior fittings over the years.”



Leliefontein Booster pump station

While Japan, for example, uses stainless steel in its entire service piping network installations, South Africa faces both cost and criminal obstacles. As Kowaleski explains, “We use stainless steel for piping lengths only if it is inside a locked chamber with high security and pepper spray mechanisms. If we lay a stainless steel pipe in the ground, criminals will dig it up, even if it is full of sewage. We use high density polyethylene (HDPE) pipes in those cases, which do not corrode and have the same lifespan as stainless steel.”

Long-term savings

International Water Association water loss specialist group chairman Dr Ronnie McKenzie says he wishes more municipalities operated in the manner of Drakenstein Municipality. “What we are seeing currently is that most municipal tenders are just looking at price. Long term sustainability is not in the equation. The company offering the cheapest solution is usually awarded the tender and in some cases, they will not use quality valves and fittings but cheap lookalikes with a very limited lifespan. Unfortunately, once it is buried, no one knows if it is a high-quality fitting that will last for more than 50 years or a cheap fitting that may only last for a few years. Water pressures in South Africa tend to be very high in many areas and it is false economy to use poor quality fittings.”

He adds that stainless steel fittings and specials are more expensive initially but can often be highly cost effective in the long run when the life of the installation is considered, especially in humid coastal areas and areas with highly aggressive soil conditions.

“When you apply stainless steel, the maintenance costs are reduced which will often outweigh the higher initial capital costs. It is always a balance between affordability and sustainability and in certain cases it makes sound financial sense to utilise stainless steel for specific sections of the water reticulation infrastructure.

“Relatively few municipalities have the foresight of Drakenstein, which places significant emphasis on quality and the life-span of any new infrastructure. This approach has served the municipality well over the past 20 years which has seen its

leakage levels drop from over 30% to around 13.4%, which is one of the lowest levels of leakage in South Africa,” says McKenzie.

A coup for the manufacturing industry

Tarboton comments, “Unfortunately, current short-sighted, cost-cutting practices do not serve for our future. The implementation costs of stainless steel should instead be viewed as a cost-saving opportunity where initial outlay would be recouped through the savings gained in reduced energy costs and streamlined monitoring and billing systems. If finance companies could see fit to finance the implementation of stainless steel systems based on the savings gained from wasted and unauthorised water usage costs, a return on investment and total project costs could be built into the financing structure and provide a compelling initiative for South Africa’s water distribution services.

“We also have the ability and the technology available here in South Africa to manufacture the specified stainless steel pipes, something which could be a coup for the manufacturing industry in South Africa both at an incubator level and as a commercial enterprise. If our municipalities are already investing so heavily in leakage repairs and replacement piping, it makes sense to replace outdated pipe systems with stainless steel.”



Refurbishment of pipe work at Van Blerk Reservoir, Wellington

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