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Diesel Blending with Illuminating Paraffin

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Introduction

Engine damage due to fuel contamination and incorrect formulation of fuel in South Africa, is fast becoming a distressing concern for consumers.

Manufacturers do not guarantee fuel systems under warranties, due to the fact that damage caused by contaminated fuel is considered an external factor they have no control over and therefore can't be held liable for.

The South African Committee of Mineral & Petroleum Resources highlighted the issue of poor fuel quality in March 2024, warning fuel stations of impending crackdowns on rogue fuel suppliers selling dirty fuel.

The contamination of fuel is so alarming that manufacturers have seized imports of certain motors due to the fact that they simply won't be able to withstand the onslaught and damage caused by contaminated fuel.

In South Africa, the blending of Illuminated Paraffin with Diesel is illegal and controlled by The Department of Mineral Resources and Energy as well as South African Revenue Service inspectors.

Together with scientists at AuthentiX a multi-level marker was developed and has to, by law, be added to all Illuminated Paraffin imported into and produced in South Africa. AuthentiX has also developed an easy to use field test kit - this kit however, tests for the Authentix Markers, not IP.

A major concern is that the practice of blending IP with Diesel is not illegal in all African countries and therefore can't be tested using the aforementioned test kit as it isn't required for their IP to contain the AuthentiX A1 multi-level marker.

The following articles will extensively explain the risks involved in using IP blended Diesel in your vehicles or equipment.



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News Article 1

www.businessstech.co.za

Title: 'Alarm bells for anyone who fills up with diesel in South Africa'

Published by: www.businessstech.co.za

Date: (19 June 2025)

Journalist: Malcolm Libera

"South Africa has a major contaminated diesel problem, part of a wider illicit fuel industry that costs the fiscus around R3.6 billion annually.

At the centre of this crisis is the illegal mixing and smuggling of fuel, particularly diesel adulterated with paraffin, which damages engines, machinery, and SARS' bottom line.

According to the South African Revenue Service (SARS), the country is losing an estimated R3.6 billion annually due to illicit fuel.

Over the past decade, countries along the **Maputo Corridor - South Africa, Swaziland, and Mozambique** - have become key targets of organised fuel crime.

SARS uncovered that many storage and distribution depots nationwide are engaged in fuel adulteration, illegally mixing diesel with illuminating paraffin.

This tampering is especially appealing to criminals because paraffin is not taxed and is significantly cheaper than diesel, by around R6 to R7 per litre. Blending the two allows syndicates to sell diesel at lower prices whilst pocketing the difference.

Speaking to [Newzroom Afrika](#), **Avhaphani Tshifularo**, the Executive Director of the South African Petroleum Association, echoed this concern, warning that the scale of the problem is enormous.

He explained that the blending of tax-free paraffin with diesel has become one of the most common practices in the illicit trade.

Paraffin is intended for household use and is supposed to be marked with a tracer dye to prevent abuse. However, Tshifularo said criminals have found a way around this safeguard. "They set up massive operations to launder out the marker," he said.

Once the marker is removed, the paraffin is blended with diesel and sold at prices that seem like a bargain but come at a significant cost.

Tshifularo noted a sharp rise in paraffin sales as evidence of this misuse.

"If you look at what was sold five years back, it was roughly about 600 million litres per annum. But as of December 2024, it's easily 1.2 billion litres."

This surge, he believes, reflects the scale of paraffin being diverted into the diesel supply chain.

The impact is being felt across all sectors. "You'll find that there are operators who will sell diesel that contains paraffin to commercial customers, agricultural customers, transport companies, without them knowing, thinking it's a good bargain," he said.

A government investigation around 18 months ago confirmed the extent of the issue, finding that "about 70 service stations were selling diesel that contained paraffin across the country."



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The damage to consumers can be severe. "It causes damage to vehicle engines and many other types of equipment that use diesel as a fuel," Tshifularo warned.

The adulterated fuel may be cheaper upfront but can lead to costly repairs and equipment failures over time.

Tshifularo urged consumers, particularly diesel vehicle owners, to remain vigilant. "We would like to encourage all diesel car drivers to always be suspicious," he said.

He also advised motorists to be cautious of unusually cheap diesel.

"Diesel is not regulated at the forecourt," he explained. "So, you'll find many competing brands along the same street. But if the discount being offered is way out of sync with anything else on that street, that must give you a hint that something might not be right."

He encouraged South Africans to purchase fuel from reputable outlets, especially those affiliated with major oil companies, to reduce the risk of buying contaminated diesel.



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News Article 2

www.news24.com

Title: 'SA's dodgy diesel is mixed with paraffin and it's getting harder to detect'

Published by: www.news24.com

Date: (24 September 2023)

Journalist: Lisa Steyn

"On the outskirts of Johannesburg, a farmer was confounded to find all six of his tractors were suddenly failing to start. After much investigation, he concluded his fuel supply was to blame and is now stuck with thousands of litres of contaminated diesel and a supplier unwilling to be held accountable.

On the West Coast, a fuel supplier was also left with tens of thousands of litres of unsaleable goods after fishing industry customers found themselves stuck offshore, unable to start their boats' engines.

And in Limpopo, a transporter first noticed the viscosity of the engine oil in his trucks was strange, and subsequently traced it back to the diesel supply which, in fact, contained almost 40% paraffin.

Fuel contamination has long been a cause for concern in South Africa, but the blending of diesel with paraffin, and even other liquids like used transformer oil, is feared to be surging – helped by increasingly sophisticated criminal methods – and outpacing woefully inadequate law enforcement.

Testing of fuel is on the rise as equipment failure is increasingly being linked to dodgy fuel supply, and it seems to be happening all over the country.

The motive for contaminating diesel is monetary gain. Taxes and levies account for 30% of the current fuel price. The most significant levies that apply to diesel and petrol are the government's fuel levy (18% of the retail price) and the road accident fund levy (about 10%). There are no such duties on paraffin, which is not intended to be used in vehicles on South Africa's roads.

Unlike petrol, the diesel price at the pump is not regulated, which allows competitors to undercut each other. The decision not to regulate it is based on a historical understanding that diesel is mainly used in the commercial space and that discounts on the wholesale price would benefit the economy.

As such, adulterating diesel with paraffin is a tempting endeavour for the criminally minded, especially if you don't think it is likely you will get caught.

'Pregnancy' tests

The Department of Mineral Resources and Energy, as well as the South African Revenue Services, are tasked with ensuring fuel in South Africa complies with national fuel specification standards.

Typically officers will test fuel randomly or in response to tip-offs.

Testing for paraffin is relatively simple thanks to a marker that is legally required to be added to all illuminating paraffin produced in, or imported into, South Africa.

Known as the Authentix A1, this multi-layered security package is to mark paraffin, as required in terms of the Customs and Excise Act.



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The presence of the marker is tested with a simple test kit resembling an at-home pregnancy or Covid-19 test. Two lines suggest you are in the clear, while one line points to the presence of the Authentix marker – which in turn points to the presence of paraffin.

If such a fuel test reveals the presence of the marker, more in-depth, more costly, tests can be run to ensure the fuel complies with the South African National Standards (SANS) for fuels.

The only court-defensible test is the test for the third layer of unique individual proprietary markers which can only be detected with specific proprietary analyser technology platforms performed by only two licensed and accredited laboratories in South Africa – SGS and Intertek.

While testing might be considered the purview of enforcement agencies, large fuel consumers are increasingly testing their fuel to ensure compliance, with laboratories confirming to News24 that they have seen an uptick in testing.

One major lab – WearCheck – has seen a 25% surge in fuel testing since January.

Pierre le Roux, WearCheck's transformer laboratories manager, says: "Towards the second half of last year, we were hovering around 900 to 980 samples a month, of which only about 20 or 25 samples were not for diesel. Now that has risen to between 1 200 and 1 250 samples a month."

A competitor, Oilwatch Laboratories, says it's experienced a similar increase while another fuel tester – Mobilab – said their annual figures showed a year-on-year increase of 10% or so.

These service providers are however only able to do the "home-kit" style test in-house but can send samples on behalf of customers to those labs accredited for more in-depth testing.

'Big money'

By law, mixing unmarked goods with marked goods is illegal, as are any attempts to remove or neutralise the marker.

Criminal syndicates are, however, said to be hard at work finding ways to do just that.

Industry sources say it's often as simple as blending fuel with paraffin in neighbouring Zimbabwe or Mozambique where the Authentix marker is not required to be added.

According to one scientifically-inclined industry source, a method to remove the marker is the use of a strong oxidising agent – like chlorine – although this is a crude tactic which quickly causes severe engine trouble.

Richard Friend, programme operations manager at Marker Solutions (Authentix), said they had seen an increase in demand from the industry for being able to detect illegal, unmarked paraffin entering the country.

Regarding deliberate attempts to remove or neutralise the markers in the Authentix A1 blend, he said "a few incidences" in South Africa have been successfully combatted thanks to the Authentix marker's multi-layered approach.

Friend said such attempts were detected "due to the Authentix A1 marker blend being layered with several unique individual proprietary markers which can only be detected with specific proprietary analyser technology platforms".

It's important to note however that South Africa's fuel standards don't strictly prohibit paraffin.

In fact, Le Roux notes that up to 5% paraffin is permitted in diesel, because the higher burning point helps to prevent diesel from seizing. However, anything higher than 5% will be detected by the marker test.

"We don't test for paraffin, we test for the Authentix marker," Le Roux points out. In fact, he notes, the SANS342 fuel standards don't talk to paraffin content at all – rather, they seek to ensure fuel does not exceed specified sulphur, density, viscosity and temperature flashpoint limits.



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Normally, adulterating your diesel with paraffin would affect these metrics. But that is not necessarily the case anymore.

As one test provided to News24 by an industry source shows, a diesel sample was found to be 40% paraffin and yet was considered to be compliant with the SANS342 standard for low sulphur automotive diesel fuel.

That so much paraffin can be blended into diesel without breaching the various limits suggests that some sophisticated chemical engineering is involved.

“The wholesalers are testing a lot,” said Oilwatch's David Moir, adding: “But the guys are getting clever, they get to a dilution where it just passes the physical test”. Said one industry source, who asked not to be identified: “Whoever is behind this is not a fool. They put in a lot of paraffin and then they disguise it with other hydrocarbon streams, so you don't see it as obviously as it used to be done in the past. It meets the requirements, but it's got a tremendous amount of paraffin in it. There's obviously big money in it and clearly someone at a very high level is involved who is able to put together fuel formulations that fool the normal testing.”

It's also worth noting that fuel consumers are not necessarily testing the fuel for paraffin in every case – and so will not automatically be supplied with such a result. They often simply want to ensure the fuel meets spec, something which can be thrown out if the fuel was not handled or stored properly.

Surging imports

Avhaphani Tshifularo, CEO of the South African Petroleum Industry Association (Sapia), said the organisation's members and many other players in the market are very concerned about contamination.

“We can clearly see out in the market that level of discounts that are offered in certain parts of the country really cannot be justified if you are selling a pure diesel. So clearly there are people who are continuing to mix some paraffin with diesel.”

Tshifularo, who in the past headed a specialised unit at SARS to tackle fuel adulteration issues, notes South Africa's paraffin consumption has been on the rise in recent years.

In 2014 South Africa consumed 558 million litres of paraffin. This doubled to over 1 billion by 2021 and continues to rise.

Tshifularo says these numbers do not make sense:

“The only explanation is that there's a lot of paraffin that's finding its way into diesel.”

While it is Sapia's very own members that import large quantities of paraffin into South Africa, Tshifularo says these volumes are dispatched to customers, usually big distributors, in bulk.

“[Major oil companies] will have sold paraffin with a tracer dye, but they will never know where it's going or where it ends up,” he says.

Two years back the DMRE (Department of Mineral Resources and Energy) set up a fuel compliance forum. “There have been several proposals, even from Sapia, in terms of how to go about combatting this issue [of fuel adulteration], but we have just not been getting traction.

“It's an issue that is worrying us quite a lot as Sapia,” Tshifularo said.

He said all legitimate players lose out to such nefarious practices, especially where bargain-seeking customers will be enticed to buy cut-price diesel.

The motorist is, however, at risk. “If you put that diesel in and your engine packs up, the first thing that the OEM [original equipment manufacturer] does is check the fuel that you're using. If they found that you used diesel with paraffin, you will lose your warranty benefits,” Tshifularo said.

Oilwatch's Moir notes machinery also appeared more sensitive these days, with high performance engines not responding well to contaminated or adulterated fuel.



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"Engines are more sensitive [nowadays] because they're lighter, and more fuel efficient, so the combustion pressures are higher. So if you're mixing with something like paraffin that runs a bit hotter, your engine's going to run hotter," said Moir. "Depending on how much paraffin is in there, the worse it will be. You maybe won't have a failure straightaway, but you will have an uptick of breakdowns over time."

Worse than bad

"It's getting worse than bad," said Peter Morgan, CEO of the Liquid Fuels Wholesalers Association of South Africa, referring to the prevalence of fuel adulteration. Morgan believes the proliferation of diesel wholesale licenses to be another driving factor.

"There's probably more than 5 000 licences out there at the moment," he said. Eager new entrants pay attorneys exorbitant fees for "copy and paste" business plans which are readily passed by the DMRE. But even once the licence is obtained, these participants find they've paid a lot of money to get the licence but because of the intense competition, they struggle to get a foothold in the industry and often succumb to nefarious behaviour.

"They start putting up little diesel depots in the middle of nowhere... and when the inspector from the department goes there to investigate, they just shut up shop and move somewhere else. That's the way this industry is operating," Morgan said.

*There is also some concern over the new regulations for transformer oil, which is used as an electrical insulator.

Transformer oil is by no means cheap, but scrap transformer oil is – and new regulations around Polychlorinated biphenyls (PCB) content might just see it flooding into the market soon.

"If you're not allowed to have 100 000 litres of transformer oil because the PCB content is high and you're not allowed to have it, what are we going to do with it? Incinerating it will cost you money. The easiest route is to send to somebody who has a truck company or fuel depot," says Le Roux who notes WearCheck has also seen a massive rise in testing for PCB in recent months.

Like paraffin, transformer oil is similar to diesel in that the difference can't be easily detected by the naked eye.

*For more info on Used Transformer Oil Blending, refer to Benvero article titled: '**Types of Fuel Contamination**'

Urgent, coordinated, and concerted response

Among the biggest losers is the fiscus, which is losing out on the taxes and levies that would have been applied to pure diesel.

The simplest way to quell fuel adulteration might be to apply taxes to paraffin. But doing so to this currently zero-rated good – an essential for cooking, lighting, and heating in many of South Africa's lowest-income households – will place an added burden on the poor.

Given the sensitive nature of this issue, SARS did not wish to divulge too much to News24 about its efforts to clamp down on adulterated fuel, save to say that it was aware of the challenge of contamination of diesel.

"The problem is receiving an urgent, coordinated and concerted government response," said spokesperson Siphithi Sibeko.

The DMRE failed to provide News24 with information regarding its efforts to combat fuel adulteration.

One official who formerly served on the department's fuel compliance forum, said the aim was not to look for adulterated fuel per se, but rather to ensure that technical standards for fuel are adhered to.

Samples happen randomly or upon receipt of complaints. If fuel is found to be non-compliant, a notice is issued.

"Our law is corrective in nature. We will ask to correct," the official said. The department is further limited to test no more than 540 samples with SGS laboratory, as is contracted".



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Summary: Diesel blending with Illuminated Paraffin

Illuminating Paraffin Blending:

As extensively discussed in the former section, the adding of Illuminating Paraffin is fast becoming a major concern and regular occurrence in multiple African Countries.

Problems Caused by Illuminating Paraffin in Diesel:

- **Reduced Flash Point:** IP lowers the flash point of diesel, making it more flammable and increases the risk of fire, especially around storage facilities.
- **Compromised Lubrication:** IP reduces the viscosity of diesel, which can lead to insufficient lubrication of fuel pumps and injectors.
- **Injector Issues:** Reduced lubrication can cause injectors to malfunction, leading to incorrect fuel delivery, increased fuel consumption, noisy operation, and black smoke.
- **Engine Damage:** In extreme cases, injector failure can cause engine damage, including piston crown failure.
- **Lower Cetane Levels:** IP reduces the cetane number of diesel, which can result in slower starting and rougher engine operation.
- **Increased Sulfur Content:** IP may increase the sulfur content, potentially leading to black smoke production.

For companies & individuals left with no choice but using Diesel blended with IP - especially in countries where the practice is legal, our range of fuel enhancement products will mitigate the engine damage caused by Illuminated Paraffin Damage.





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