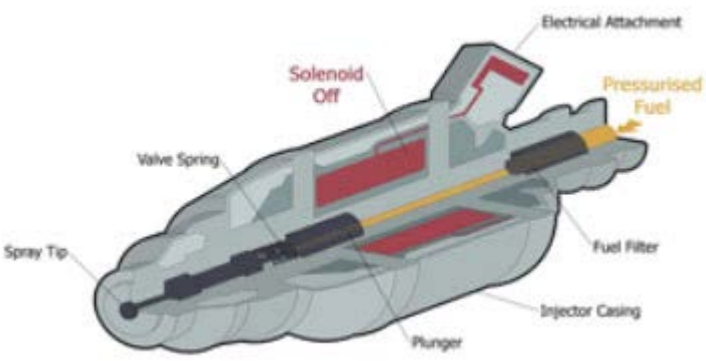
Lack of sustainable filtration and its direct negative impact on revenue.

Filtration is all about the reduction of wear in Fuel systems and the optimisation of their economical lifecycles. Sustainable filtration in fuels and oils at correct cleanliness levels, easily extends the economical lifecycles of machinery by 20% and lowers their direct operational costs.

Combustion efficiency and lowering component wear is the prime objectives .We don't understand or realize the material impact contamination has on our equipment, as the focus or budget has historically been lacking. The advancement in equipment technology requires improved cleanliness levels. Actual case studies have proven that sustainable cleanliness levels are becoming a necessity and that filtration pays with multiple returns in various direct and indirect benefits .The lack thereof impacts on various budgeted costs or has dire consequences.

To demonstrate this, consider the negative impact of current inadequate filtration systems on the fuel systems and economical lifecycles of your equipment.

Direct impact in fuel system on all of the following crucial elements: Note:

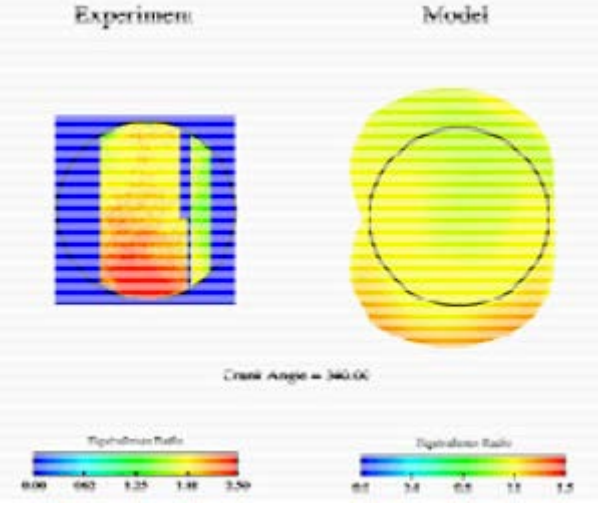


Contamination wear affects the entire fuel system and all internal combustion parts directly. Replacing the injectors doesn't reverse the impact of contamination damage. The sleeves, piston, piston rings, bearings are all affected directly by contamination abrasion, heat disbursement and increased soot, as the contamination passes through to the exhaust system.

Injector life > There is a direct correlation in wear and the sustainable cleanliness levels of fuels. Injectors are vital for optimal performance,as they are directly responsible for the continuous optimal diesel spray pattens and the maximum possible oxidation of the fuel. Both are directly negatively impacted on by wear on the injectors.

Spray pattens > injectors today have up to 12 spray holes in one nozzle and inject up to 6 to 9 times per single piston burn cycle-CAT. i.a.w very advanced. If this is directly adversely affected this leads to poor fuel oxidisation.

Fuel oxidisation> It is vital to optimise and maintain fuel oxidisation as it impacts on all of the following:



- Temperature disbursement Delayed or heat build up due to droplets, or worse, streams of diesel, leads to combustion chamber failure. The combustion heat does not timely disburse, resulting in the piston and sleave deforming, due to excessive heat.
- Fuel consumption The wear of injectors and the internal combustion chamber directly impacts on fuel efficiency. In actual case studies this were conservatively 5 -12% over a timeline. This cost alone justifies attention and an active focus on filtration. Fuel saving alone pays for filtration costs, if not budgeted. Unburnt fuel simply increases heat, dilutes oil and exits thought the exhaust system.
- Soot formation Soot is a highly abrasive substance and naturally occurs

during diesel combustion, however improperly burnt fuel drastically increases soot. Soot also affects the spray pattens directly, as it deposits on the spray nozzle and increases internal abrasion wear, everywhere.

- Oil dilutions Fuel and soot dilution, through poor combustion, negatively affects the functional service intervals and effectiveness of oils. This increases internal wear and leads to premature failures.
- Toxic emissions Direct result of bad combustion. The excessive soot exiting and depositing on the exhaust is a clear indication of poor combustion.
- Engine Lifecycles are directly economically extendable by a minimum of 20%, if fuels and oil are sustainably filtered to the required cleanliness levels. Fuels should be a minimum of 10-8 mg/kg at bulk tank levels, this is the current European specification.
- Engine failures have a direct correlation to both particle and water contamination. Contamination failures are totally preventable by the implementation of a contamination blueprint. Even small improvements assist with filter capacity constraints.
- Running costs are materially affected but are mostly budgeted for. We are used to treating the symptoms, not the cause, due to lack of sustainable cleanliness levels. Running, maintenance, fuel, down-time and financial replacement costs are all directly materially impacted.

What is normal wear and how do we bench mark it? Firstly benchmarking is complicated due to a multiple of variances. However through case studies and multiple fuel sampling it is clear that contamination levels are simply above adequate. Most mining sites run between 50 -75 mg/kg. This is simply not sustainable in the future.

Minimum 20% increase in economical lifecycle on all equipment is achievable, especially on the current contamination blueprint low base levels, which are totally achievable.

Test on filtration:

1. What are your current cleanliness levels on fuel and oils?
2. Were correct test procedures followed for representative sample extraction?
3. What does the OEM suggest in terms of cleanliness levels?
4. Who actively monitors the cleanliness levels?
5. Whose responsibility is it to maintain tank farms?
6. Who is monitoring the changing of filtration filters and air breathers?
7. Were these filters in bypass or filtration medium compromised?
8. What is your contamination blueprint?

Currently most bulk filtration is totally inadequate or non-existent, placing severe capacity constraints on downstream filters. The filters simply can't handle the sheer volume of particles, particle size and water contamination it has to contain. Downstream filters have capacity and filtration efficiency

constraints. When compromised on capacity, they simply go to bypass mode or medium compromise occurs. iCerMax™ ceramic filter medium is 100% sustainable, as the medium offers depth filtration without channel formation or medium compromise – it can't even flex. That is why dirt restrained by ceramics, stay in ceramic filters. Vast dirt holding capacity, flow rates, service intervals, surges and sustainable cleanliness levels are all benefits of iCerMax™.

The sole intent of this is to bring awareness to contamination and the impact on equipment. We've read about contamination for years, in various publications, but seldom take correcting action .This is one of the easiest projects to implement – a contamination blueprint, with a high return, as the current market base is substandard or neglected. It is the market's view that it is the responsibility of third parties to combat contamination. The bad news is they won't, if they are not reimbursed for implementing and maintaining these cleanliness levels.