



PIPELINE COMPANY IMPROVES SMALL VOLUME PROVER PERFORMANCE

BY: *e9 Treatments, Inc.*

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Common in all small volume prover designs are the use of seals. The seals maintain the fluid in each chamber. Inherently, hydrocarbon fluids carry trash and contaminants that often stick to the metal surfaces of the prover. This trash can be paraffin, iron sulfide, scale, any combination of these or actual plastics and metals lost anywhere along a pipeline. This trash can be hard or sharp, abrasive and nearly impossible to remove.

Replacement seal costs are expensive. Complete kits can run from \$5,000 to \$30,000 to outfit a single prover. Even more expensive is the time needed to change out the seals and to re-certify the prover via a water draw or master meter method.

This pipeline company significantly reduced their costs and increased prover efficiency by treating their prover shafts and barrel with e9 Treatments. Seals that were failing monthly have now lasted over 8 months, requiring no maintenance.

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SMALL VOLUME PROVERS

Small volume provers are compact, cost-effective devices used to verify the accuracy of flow meters used to measure product and process materials. Small volume provers entered the market in the late 1980's. Over the years, the technical progress in small volume provers has been extraordinary.

In the 1960's, the original small volume prover was developed to calibrate meters used to measure rocket fuel. Eventually this technology was developed into the first small volume prover used in the oil and gas industry, commonly known as the "Brooks prover." In the 1980's, the second generation of small volume provers were developed and are known as the Calibron Syncrotrak prover. The original Calibron prover had belts and a worm gear piston retraction system. It also had fiber optic cable isolators on the processor board. This type of prover design changed tremendously over time. However, in the mid 2000's, the FMD prover was developed and ironically, went back to a belt-based retraction system which works well in the current design. In the last few years, the Meter Engineer's Magna Prove was developed. This prover uses a magnet based system to retract the piston.

A COMMON PROBLEM WITH PROVERS



Common in all small volume prover designs are the use of seals. The seals maintain the fluid in each chamber. Inherently, hydrocarbon fluids carry trash or contaminants that often stick to the metal surfaces of the prover. This trash can be paraffin, iron sulfide, scale, or any combination of all of the above. It may also contain everything from plastics to metals lost anywhere along a pipeline. This trash can be hard or sharp, abrasive and nearly impossible to remove from a surface. Trash scratches or scars the seals, causing leaks internally and externally to the prover. Internal leaks cause false meter factors and errors in measurement. External leaks can cause equipment and site contamination, fires, or even explosions. Trash often permanently damages the shafts and the internal metal sealing surfaces, which results in down time and replacement costs.

Replacement seal costs are expensive. Complete kits can run between \$5,000 and \$30,000 to outfit a single prover. The more expensive part is the time needed to change out the seals and the need to re-certify the prover via a water draw or master meter method. This service can add another \$10,000 or more per session. Add in the cost of inaccurate measurement and the problem of trash on the prover rails and you can see how these costs can multiply.

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THE SOLUTION

e9 Treatments, Inc. offers a nanotechnology based metal surface treatment that, when applied to the prover's metal surfaces, prevents trash/contaminants from sticking or adhering to metal surfaces—primarily the prover shafts and barrel interior. The treatment is proven to slow fouling on sensors, valves, meters, and vessels throughout the oil and gas industry, as well as other industries, saving operators thousands of dollars. *e9* treated equipment and flow meters are currently providing precise measurement accuracy and operating efficiency throughout North America and Europe.

APPLICATION TO SMALL VOLUME PROVERS

In August of 2023, *e9* had the opportunity to apply *e9 Pro Premium Metal Treatment* to a small volume prover. Treatment was applied on the prover shafts, seals and barrel interior. Material was sprayed on the surface and then wiped in to ensure full coverage. No curing nor drying was needed. The total prover took one man less than 60 minutes to treat.

Prior to being treated with *e9*, this prover had endless seal problems from trash and contaminates building on the shafts and interior of the prover barrel. Every month there were issues.



"It's pretty simple. e9 works. We were having trouble with the prover at least once a month. Since we treated the first prover with e9, we haven't had any problems. We can focus on other things and know the provers are accurate and in good shape. For us, treatment with e9 is now a standard for all new provers and any needing repair or maintenance." – Sean McDonald, Measurement Manager, OneOK

Build up on the shafts, in particular, was scratching the seals. Seals were developing leaks and leaking internally, impacting the measurement accuracy.

Over the eight months since treating the prover with *e9 Pro Premium Metal Treatment*, there have been no issues, no failures, and no leaks. The end user reports savings resulting from no prover downtime, reduced maintenance costs, and no site contamination. Based on these results, the end user has standardized on treating all their small volume provers with *e9 Treatments*.