



TLC™

TIRE & RIM PROTECTION

A **CARLISLE** BRAND

A Comparison of Rim Protection and the Impact of Corrosion & Color Visibility

Reducing corrosion and enhancing color visibility impacts overall performance and safety in off-the-road (OTR) tire applications. This paper explores the differences in wheel conditioner products in their ability to reduce corrosion and retain color. The test simulated approximately one year of field use in the extreme operating conditions of a mining OTR tire.



Putting TLC to the Test: Corrosion

Corrosion is one of the biggest detriments to mining equipment's wheels and tires. The damage caused by corrosion adversely impacts performance and makes equipment unreliable and unsafe. Due to its non-toxic, non-flammable, and non-hazardous formula, the TLC Tire and Rim Protection liquid helps to prevent corrosion for longer tire life, easier tire changes, reduced downtime and costs, and overall safer operations.

About the Test

To prove the strength of TLC products, Applied Technical Services, Inc. (ATS) conducted a series of rigorous corrosion tests and compared them to other industry leading products. Since 1967, ATS has served as a top tier consulting engineering firm and independent lab with extensive testing and inspection capabilities.

For the corrosion test, ATS constructed specialized chambers to simulate approximately one year of field use in a mining OTR tire that operates at up to 176° F (80° C) on a two-shift basis. To achieve this, corrosion testing was conducted at extreme temperatures of 212° F (100° C) and 100 PSI (6.89476 Bar, 689.5 KPa).

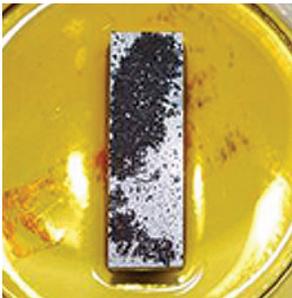


Proof of Performance

The best measurement of corrosion is weight loss, as the process of corrosion is actually the reduction or deterioration of a metal by oxidation.

Corrosion Test Results: Weight Loss % After 1 Week Under 100 PSI and 100° C (212° F)

| Product | Steel Weight Loss % (smaller number means less corrosion) | Relative Performance Index |
|--------------------|--|----------------------------|
| TLC (All Formulas) | 0.0123% | 1.00 |
| Competition 1 | 0.0145% | 1.18 |
| Competition 2 | 0.0136% | 1.11 |



Competitor 1 Product after just 2 weeks in the test chamber



TLC PRO after a full 7 weeks in the test chamber

Summary

TLC provides the best protection against corrosion compared to Competitor 1 (17.9% increased weight loss) and Competitor 2 (10.6% increased weight loss). The differences in corrosion protection will be most noticeable in high heat situations (long runs, 24/7 operations with heavy loads on the haul trucks). Over time, the competition's accelerated rate of corrosion could lead to premature equipment failures, safety issues, and increased downtime.



Putting TLC to the Test: Color Retention

Tires are susceptible to slow leaks and cracks. Residue from a wheel conditioner product builds up where any air escapes, making it easier to identify slow leaks and cracks. This greater visibility of problems during pre and post-shift inspections helps prevent catastrophic failures.

About the Test

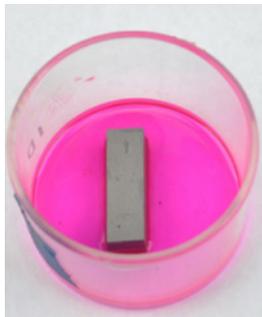
For the color retention test, ATS constructed specialized chambers to simulate approximately one year of field use in a mining OTR tire that operates at up to 176° F (80° C) on a two-shift basis. To achieve this, color retention testing was conducted at extreme temperatures of 212° F (100° C) and 100 PSI (6.89476 Bar, 689.5 KPa).

Proof of Performance

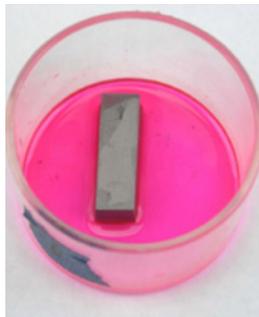
TLC HT



Day 1 – PM



Day 2 – AM

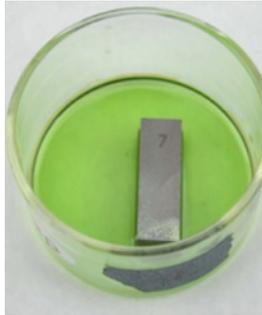


Day 5 – AM

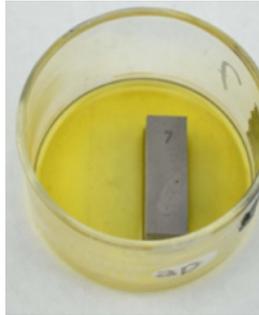
Competition 1



Day 1 – PM

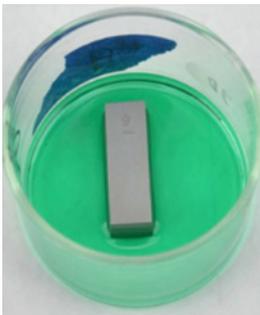


Day 2 – AM

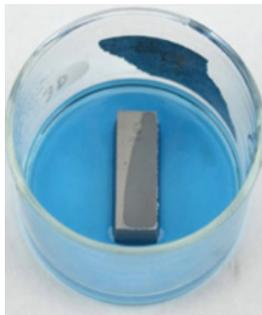


Day 5 – AM

Competition 2



Day 1 – PM



Day 2 – AM



Day 5 – AM

Summary

TLC Neon Red will keep its bright color longer than both competitive products in the field. The bold Neon Red color makes it easier to identify slow leaks and cracks on the tire. This greater visibility of problems during pre- and post-shift inspections helps prevent catastrophic failures.

Note: the test performed is considered an extreme test and is often more severe than the real-world conditions these fluids experience. Just because the competitor products faded in this test, does not mean it will definitely fade in the field, as field conditions are often not as extreme in heat (which is the greatest enemy here). However, it is clear that TLC Tire & Rim Protection will last longer than the competitive products under the same conditions.



We keep the world rolling.
No flats, smoother ride, more protection.

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