

Lamons High Temperature Gasket used in coker unit to solve oxidation issue.

CASE STUDY

INDUSTRY DESCRIPTION

A major refinery in Joliet refines crude oil into gasoline, diesel, jet fuel, and other petroleum products, operating under extreme temperatures in critical processing units.

BUSINESS SITUATION

The refinery was experiencing a graphite oxidation attack of spiral wound gaskets in their coker unit where temperatures measured between 900°F and 1000°F. Gaskets were not only failing, but in some cases, the gaskets came out with 100% of the graphite completely oxidized, leaving the gasket with just the metal wire, inner, and outer rings.

THE LAMONS DIFFERENCE

Lamons representatives discussed the gasket issue they were experiencing with the engineering team to be able to recommend a gasket upgrade for this high temperature application.

LAMONS PRODUCTS AND SERVICES

Lamons WRI-HTG gaskets were initially installed in the coke wedge plugs of the Joliet refinery coker unit in 2005. This application was of major concern and experienced the worst issues with leaks in the coker unit.



In 2005, a refinery in Joliet, one of the largest oil companies in the world, experienced a fire in its coker unit due to gasket failure. Investigations revealed that the graphite filler in their spiral wound gasket had oxidized, and the metal winding had disintegrated, leaving only the inner and outer rings. Given that the coker unit operates between 900–1000°F—exceeding the 850°F rating of standard graphite—the refinery's coker engineer explored alternative solutions. This led to the installation of Lamons High Temperature Gasket (WRI-HTG) used in coker unit to solve oxidation issue in the coke wedge plugs, a primary source of leaks and fire risk. Pictures revealed petroleum coke buildup at the bottom of the gasket. As the graphite oxidized, the coke would fill in the voids causing the gasket to leak, acknowledging the need for a more reliable sealing solution.



THE PROBLEM

Many refineries struggle with leak issues on their coke wedge plugs in the coker unit. This is due to a combination of high temperatures and the tendency of petroleum coke building up at the inner ring area of a spiral wound gasket. Because the inner ring does not function as a gasket sealing element, there are gaps between the inner ring and flange surface where petroleum coke gets trapped and builds up. With high temperature operation, the hydrocarbon media accelerates the graphite oxidation process, quickly deteriorating the graphite sealing element and causing the gasket to leak.

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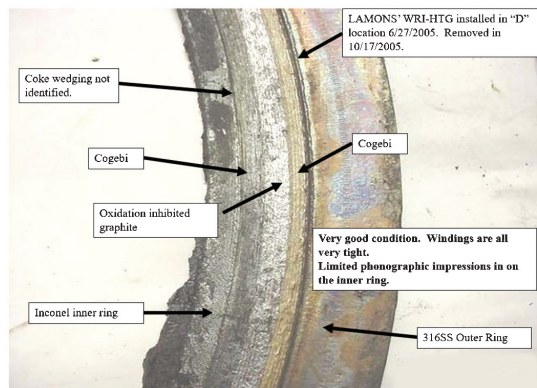
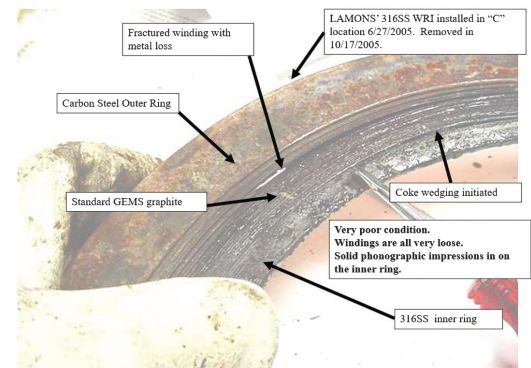
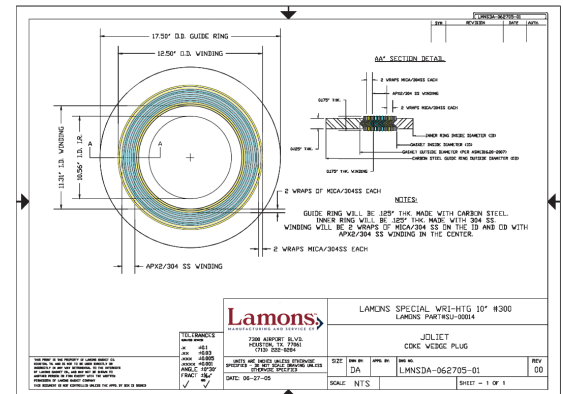
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THE SOLUTION

The collaboration between Lamons Joliet branch and the refinery's coker engineers in 2005 was a key moment in refining the technology used in coke wedge plug flanges. By installing the Lamons WRI-HTG with Inconel metal wire, they addressed issues related to the durability and performance of gaskets under extreme conditions, especially in environments prone to petroleum coke buildup. Inconel, a high-performance nickel-chromium alloy, is known for its ability to withstand high temperatures and corrosion, a critical factor in preventing gasket failures in aggressive environments. The WRI-HTG design further enhances sealing performance at extreme temperatures, particularly in areas susceptible to coke buildup, preventing damage to seals that would normally lead to failures or downtime.

THE RESULTS

The WRI-HTG design worked well to prevent petroleum coke build up on the gaskets. The illustration below shows coke wedging not identified at the ID of winding. The windings are very tight and in good condition. Cogebi mica filler on inner 1/3 of windings provided an oxygen barrier from middle APX2 super oxidation inhibited graphite.



LASTING BUSINESS BENEFITS

Because Lamons solution of placing HTG gaskets in the coke wedge plugs were such a success, the refinery standardized the use of WRI-HTG with Inconel wire on all standard pipe flanges for half of their coker unit where temperatures exceed 900°F. Almost 20 years later, they continue to stock these gaskets in their coker maintenance building where they can monitor and maintain adequate stocking quantities.

Learn more today by contacting your Lamons representative or by visiting Lamons.com.

To discuss a challenge you are experiencing in your facility, contact Info@Lamons.com.

For technical assistance, contact Engineering@Lamons.com.

To contact a Lamons office near you, visit our website.

