# SLOSS INDUSTRIES
# TESTING DOCUMENTATION
# FOR PERIMETER INDUSTRIES
# SUPERIOR PRODUCTS

## Introduction

The purpose of the tests was to target specific problem areas that Sloss maintenance personnel have to deal with on a daily basis. The areas targeted were the coke ovens, the coke pusher cab, and a stand (uptake to collector main) pipe. The following tests show the methods used to test as well as the cost and results stemming from these tests. Included in this documentation is a summary of the findings for each test as well as recommendations for proceeding with a larger implementation of the products tested.

**TEST**: Coke Pusher Cabs

**Purpose of Test**: To bring down the inside temperature of the cabs to (1) save the air conditioning units from constant maintenance, and (2) allow the cab's operator to work in an environment that would not be detrimental to their health stemming from over-heating.

**Date**: July 14, 1998

**Testing Procedures**: Take measurements of the inside surface temperature of the cab during normal operations, before any testing was implemented. Clean cab of any residue that might impede the coating's ability to bond to the surface. Coat the cab with a layer of Super Therm. Put the cab back in operation and measure the inside surface temperature of the metal.

Test the inside surface temperature of the following surfaces:

Left cab wall (inside) 105 degrees F.
Front cab wall (inside) 110 degrees F.
Right cab wall (inside) 110 degrees F.

Cleaned the cab of any existing residue by washing down cab with steam cleaner. Left cab out of service while drying. Coated cab with Super Therm by spraying 3 gallons of coating on cab. Waited 2 hours to cure. Put cab back into operation. The cab was out of operation (1/2) days during this process.

Measured the inside surface temperature of the cab after Super Therm was applied.

Left cab wall (inside) 85 degrees F.
Front cab wall (inside) 85 degrees F.
Right cab wall (inside) 87 degrees F.

**Results of Test**: The Super Therm coating effectively reduced the inside temperature of the cab from 110 degrees Fahrenheit to 85 degrees Fahrenheit. The AC units are now for the first time able to cool the cab and cycle (shut on and off) so that they are not running wide-open all the time. The cab operators are no longer constantly complaining about the excessive heat in the cab.

**Cost**: Labor (prepping and coating cab) $ Depends on the contractor
Material: 3 gallons Super Therm $267.00

**Potential Savings**: The savings to our facility cannot be measured in monetary value alone. In the past few years it has been a never-ending battle to keep the air conditioning functional on the oven equipment. The air conditioners alone are extremely expensive and the possibility of a violation of OSHA stndards are even more likely. Since the cabs on the pusher and later the 78 Larry cab were coated, the normal air conditioning problems have dropped unbelievably. Although it was recommended by the manufacturer of this coating that there should be a minimum of 7 to 12 mil of coating applied to the cab surfaces, there was not enough money available for this, so a lesser amount was applied and still there was a substantial temperature change. In my opinion, if the suggested thickness were to be applied, the changes would probably be unbelievable. After the findings of our first tests we used the coating in other places on the oven battery with the same or even better results. These tests are on-going and as the data become available, there will be another memo on this topic alone.

**TEST: Stand Pipe**

**Purpose of Test**: To effectively seal the gooseneck of the stand pipe in the bucket of the collector main, to stop coke battery emissions from release.

**Date**: July 30, 1998

**Testing Procedure**: 2 to 3 coats of Super Therm on inside surface of collector main bucket. 2 to 3 coats on opposing surface of the stand pipe gooseneck. After installation of gooseneck apply a tight packing of ceramic wool and top coat the wool liberally with Super Therm. This is sealed with foundry packing. (If the gooseneck is deep into the bucket, the ceramic wool may have to be applied more than once.)

**Results of Test**: Effectively sealed gooseneck to bucket area and its insulating properties has made it possible to reduce the number of times the neck must be repacked. Because of its heat resistance qualities, during several over-heats on the battery which normally cause a repacking of the necks, the packing material did not harden or become brittle and very little maintenance was necessary to stop the smoke.

**Cost**: 1 gallon Super Therm per gooseneck $89.00

**Potential Savings**: Reduction of escaped emissions can potentially save the company from any EPA fines due to excessive leakage violations. Due to the low maintenance requirements after the application of the product the company can potentially save money by reducing the man hours necessary to maintain low emissions.

**TEST: Steam Pipe**

**Purpose of Test**: To see how much the outside temperature of a 3/4 steam tracer line could be reduced by Super Therm.

**Date**: July 12, 1998

**Testing Procedure**: Using a paint brush, apply 2 coats of Super Therm to a 5-foot section of a live steam line.

**Results of Test**: Effectively reduced the surface temperature of the coated portion of the tracer line from 310 degrees F. to 155 degrees F--a 50% reduction.

**Cost**: 1/4 pint Super Therm (approximately $4.50)

**Potemtial Savings**: Reduced Workman's Comp claims due to steam burns, and reduced steam condensation. Also could effectively be used in place of fiberglass insulated pipe with stainless steel jacket, which is costly, hard to apply and has been known to collect moisture and cause pipe deterioration.

**TEST: Oven Door Plug**

**Purpose of Test**: To try and increase coke temperature at the face of the oven and reduce dead-coke and emissions.

**Date**: August 19, 1998

**Testing Procedures**: Sandblasted a door plug and applied 5 gallons of SP2001F. Allowed to dry in the door warmer for 24 hours.

**Results of Test**: Effectively blocked 1900 BTUs per hour of heat loss through the door and raised the face temperature. The increase in temperature had a two-fold effect: (1) it assisted the coking process and (2) reduced dead-coke on the face of the push, lowering emissions (smoke). Also found that the tar and carbon no longer sticks to the plug. This eliminates the need to chisel the hardened substance from the plug, which results in reduced maintenance for the door plug.

**Cost**: Labor (prepping and coating plug) $ Depends on contractor cost.
Material: 5 gallons SP2001F $705.00

**Potential Savings**: Reductions of emissions, longer plug life, less man hours in plug maintenance, and more complete coking on the face of the oven.

**TEST: Leveling Door Castings**

**Purpose of Test**: To reduce the heat damage to the cast iron leveling door openings and doors. Also to try and reduce the amount of carbon buildup in the opening.

**Date**: January 22, 1999

**Testing Procedure**: Cleaned and painted inside and outside of the leveling door casting and door with SP2001F using a brush on 4 castings.

**Results of Test**: Test still in progress. Expecting sealant to reduce the fissions and fractures caused by the heating and cooling of the casting when leveling doors are opened and closed in the charging process.

**Cost**: Approximately 1/2 gallon of SP2001F $71.00 per casting and door

**Potential Savings**: To save the continuous replacement of these castings due to damage and leakage.

## Summary and Recommendations

These tests are still ongoing, but have shown very positive results. There is a need for a larger scale testing base of several of the coatings. There are numerous areas that the use of the coatings might be beneficial and cost effective. If we can acquire additional material for testing we can more effectively evaluate and document the cost and benefits of the coatings.

To date, the use of Super Therm on the goosenecks has become standard practice, due to its ease of application, effectiveness and longevity on the uptakes. We have also enjoyed less maintenance time spent on the cabs that we have coated with this product. We feel that these coatings have made a difference in the way that they reduce heat and allow the air conditioning equipment to perform its job.

With further testing we believe that coating the door plugs could effectively lower the emissions and reduce the risk of emission violations in the future. We need the ability to coat a number of doors on each battery to evaluate it at different temperatures and at different coking times.