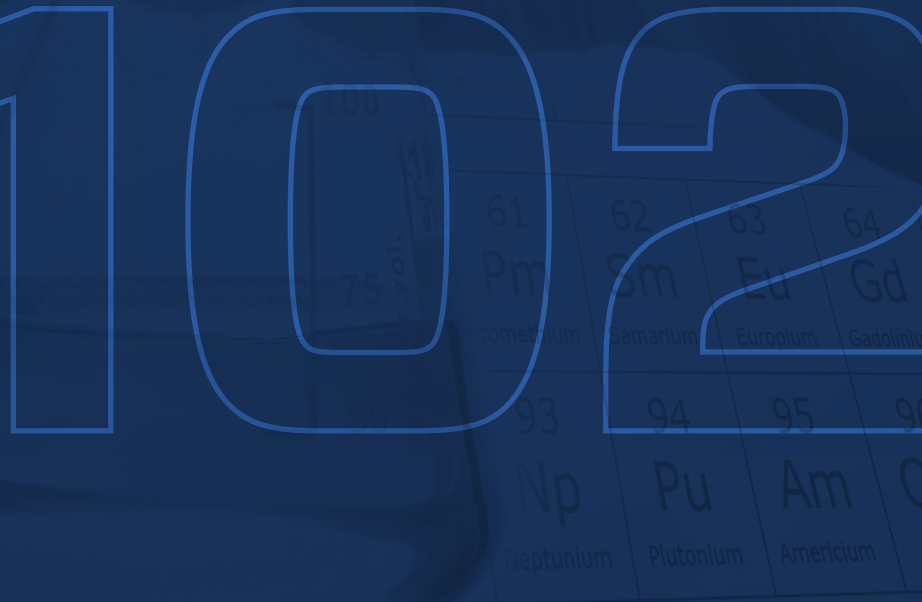


# HOLDTIGHT



# LAB TEST REPORT



## HoldTight®102 Lab Test Report

Woodson Engineering LLC directed Benchmark Lab to test panels prepared by Andrew Swan (as directed by Woodson) to determine if any residue remained after white metal abrasive blasted steel panels were pressure washed with three commercially available flash rust inhibitors. The test panel preparation procedure is shown on page 3.

Benchmark Lab is a recognized expert for determining if organic chemicals leave a residual on steel substrates. See page 3.

Three sets of panels were solvent cleaned with xylene, abrasive blasted to white metal with virgin garnet, then pressure washed at 1,000 psi with properly diluted HoldTight®102, Competitor A and Competitor B as recommended by the chemical manufacturers.

Holdtight 102 and Competitor A were diluted at 50:1 (DI water to chemical) and Competitor B was diluted at 100:1 (DI water to chemical). Liquid samples of each chemical taken from the manufacturer's new containers were furnished to Benchmark to establish a baseline for detecting residual left on the surface.

An analysis to determine if any residual chemical was present on the pressure washed panels was conducted with Agilent Gas Chromatography (GC) equipment.

### Summary of results

- The GC indicates each chemical contains similar ingredients. The higher, sharper peak of the HoldTight sample indicates it is a higher purity than the other two chemicals. It does not necessarily indicate that it is a stronger or weaker concentration. This could affect the amount of residue remaining on the test panels after pressure washing and evaporation. See Figure 1.
- Impurities or a higher concentration of chemicals can cause a precipitate to form in the water in wet abrasive blast equipment. This can impact the effectiveness of the equipment by causing clumping of the abrasive in the pot in systems that use water in the blast pot. This may cause erratic flow of water and abrasive to the nozzle. The potential for reaction with chemicals in various water sources or abrasives increases the importance of cleaning out the blast pot before placing it in storage.
- Analysis of the panels prepared with HoldTight 102 determined that no residue was found. This confirms there is no residual HoldTight 102 left behind after the water and 102 evaporate, leaving nothing on the surface to impact the performance of coating systems. See Figure 2.
- Analysis of the Competitor A panels found that there was a residual volatile organic chemical contamination left behind after evaporation. It appears to be a small amount and the exact chemical makeup of the residual has yet to be determined. See Figure 3.
- Analysis of the Competitor B panels found that it had the most organic chemical contaminants left behind and specifically that there were two different contaminants. The exact chemical makeup has not yet been determined. See Figure 4.
- In summary, the Agilent Gas Chromatography testing performed by Benchmark Labs demonstrates that of the three salt removing/flash rust preventing additives tested, HoldTight 102 is the only additive that does not leave residual contamination after application and evaporation.

Figure 1

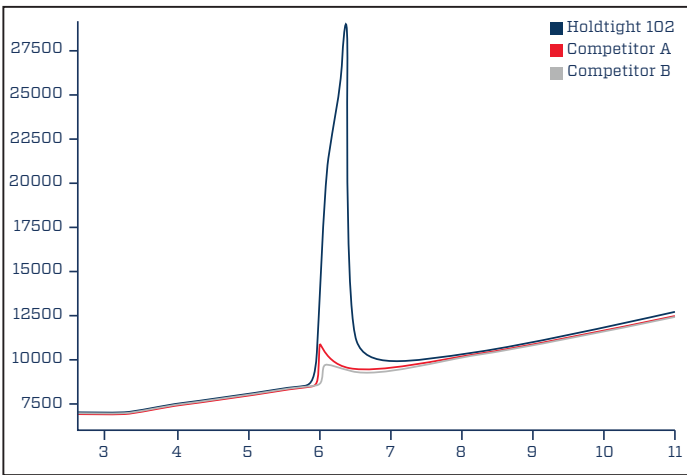


Figure 2

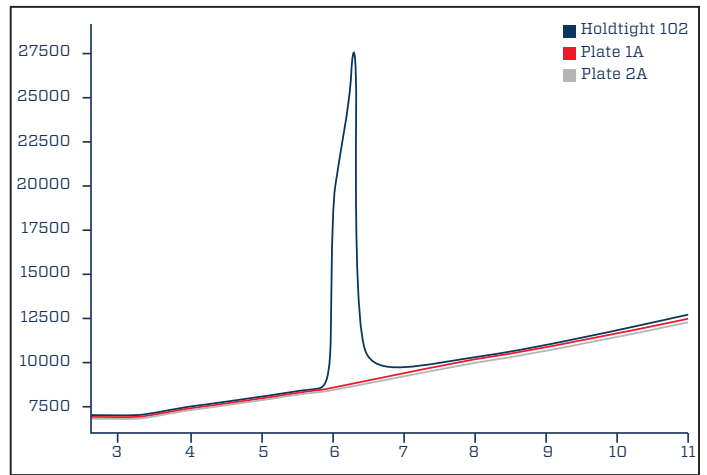


Figure 3

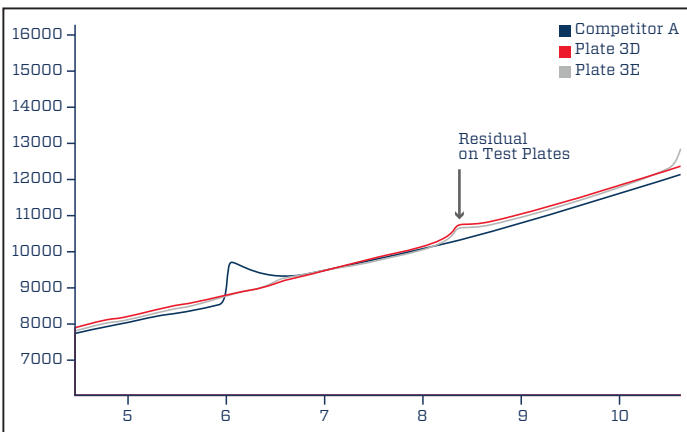
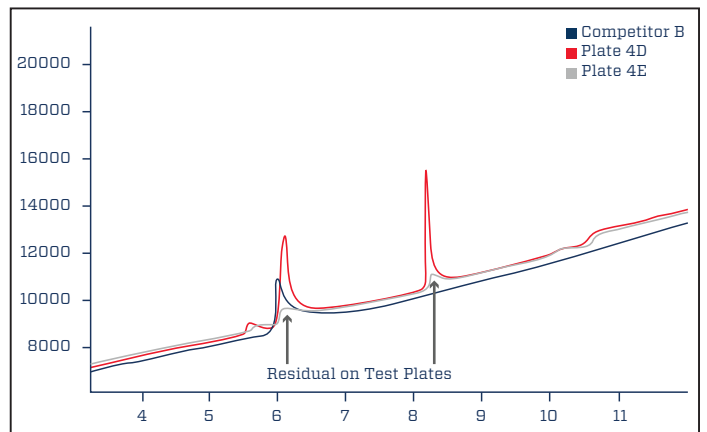


Figure 4



## Flash Rust Testing of Competitive Rust Preventers / Passivators / Inhibitors

Panel ID	Surface Preparation	Secondary Preparation	Chemical ID	Chemical Name
Plate #1A Plate #2A	Dry Blast Dry Blast	Power Wash Power Wash	A A	HoldTight 102 Rust Preventer HoldTight 102 Rust Preventer
Plate #3D Plate #3E	Dry Blast Dry Blast	Power Wash Power Wash	B B	Competitor A Competitor A
Plate #4D Plate #4E	Dry Blast Dry Blast	Power Wash Power Wash	C C	Competitor B Competitor B

## Procedure

**Test Panel Material:** New AISI 1018 Mild Carbon Steel

**Test Panel Size and Number:** Total Six (6) each 5" by 5" by 1/8" for Analytical Testing for Residual

**Initial Surface Preparation:** Wash with xylene and abrasive blast with virgin garnet to SSPC SP5/NACE No. 1 White Metal with a 2 to 3 mil anchor profile.

**Obtain:** Demineralized water - 25 gallons in 5 gallon containers. Denatured alcohol - 5 gallons.

Obtain 2 gallon Simpson Pump Up Sprayer. Connect the output of the Simpson tank to the inlet of the pressure washer.

Wash equipment with one gallon denatured alcohol and one gallon demineralized water before starting, between power washing with each chemical, and at the end.

Put demineralized water in 2 gallon Simpson Pump Up Sprayer, add chemical additive and mix, pressurize to feed the power washer inlet with mixed water and chemical.

**Mixing Ratio:** 2 gallons = 256 fluid ounces = 7.6 liters = 7,600 ml  
50 to 1 Ratio: 256 X 2% = 5 fluid ounces per two gallons or 152 ml per 7,600 ml.  
100 to 1 Ratio: 256 X 1% = 2.5 fluid ounces per two gallons or 76 ml per 7,600 ml.

Power wash the abrasive blasted white metal test panels at a minimum 1,000 psi.

Place the 5" by 5" by 1/8" panels in Ziplock bags and take them to Benchmark Laboratory in Houston, Texas for testing to determine if there is any residual left on the surface using Agilent Gas Chromatography (commonly called GC).