

SCS Corrosion Resistance - Humidity

OBJECTIVES

- Determine comparative corrosion resistance of samples of SCS, P&O produced through continuous in-line pickling, and P&O produced through a batch pickling process, when exposed to a persistent high humidity environment.

APPLICABLE STANDARDS

ASTM D 2247-02

Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity

ASTM D 1193-99E

Standard Specification for Reagent Water

TESTING LAB

St. Louis Testing Laboratories, Inc.

Lab No. 07C-0024

Report dated January 25, 2007

TEST PROCEDURE

Three sets of three flat panels each were placed in a high humidity cabinet - constant temperature 100°F and 98% relative humidity. Samples were removed at regular intervals and visually inspected for evidence of corrosion (rust). Corrosion levels were characterized and panels returned to the cabinet for further exposure. The sets of panels were marked as follows:

SCS - SCS-processed hot rolled with no coating.

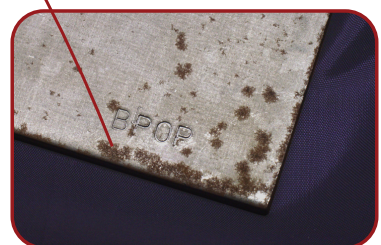
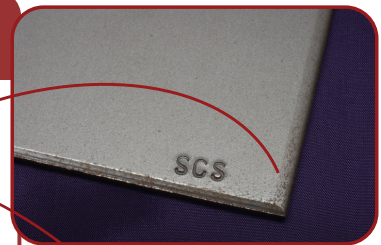
P&O - hot rolled which underwent a continuous in-line pickling and had oil applied to prevent oxidation. The oil coating remained on throughout the humidity exposure testing.

BP&O - hot rolled which underwent an immersion (batch) pickling and had oil applied to prevent oxidation. The oil coating remained on throughout the humidity exposure testing.

TEST RESULTS

Sample Group	Observation of corrosion at increasing exposure					
	48 hrs	96 hrs	144 hrs	312 hrs	384 hrs ¹	504 hrs ¹
"SCS" (3 panels)	none	none	none	none	none	red corrosion
"P&O" (3 panels)	none	none	none	slight red corrosion	red corrosion	--
"BP&O" (3 panels)	none	none	none	slight red corrosion	red corrosion	--

¹ Sample testing concluded when distinct corrosion observed



CONCLUSIONS

The test provides a relative indication of "shelf life" of the three different steel sample sets, inasmuch as it simulates storage in a high humidity environment. Even though the two P&O samples were placed in the test chamber with their protective oil coatings intact, moisture penetration eventually caused surface oxidation by 300 hours exposure. The SCS samples did not show corrosion until 504 hours exposure, and then only edges where the sample had been sheared. It is suspected that the shearing pressure dislodged protective SCS brushed scale layer enough to allow moisture penetration in only these areas.