HPC Application on Surfuric Acid Tank and Valves in Korea

Courtesy of Mirae International Trade Company

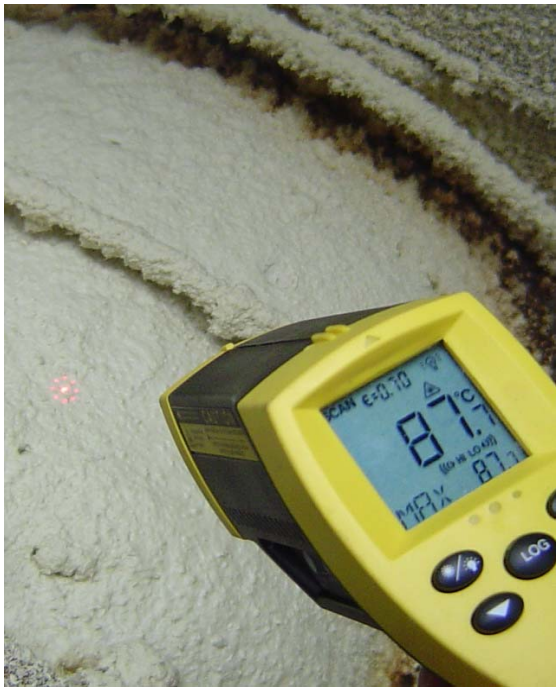
The picture below was taken in Koryo Zinc company in Korea. Currently they are using Rockwool (15 -25 cm thick) with Metal Jacket (0.6 mm thcik) to insulate Sulfuric Acid pipe line, Valves, and Storage Tank. The temperatures in these areas without insulation are: Sulfuric Acid pipe line = 470 C, Valves = 380 C, and Storage Tank a= 320 C. The tank is at 520 C in operation and at 320 C in an idle condition. With the current Rockwool & Metal Jacket, the temperatures stay in the range 60-80 C. After applying HPC, they are hoping to bring down the temperature to 60 C.

Application of HPC on Sulfuric Acid Tank

Surfuric Acid Tank

Surface temperature before HPC application: 474 C

HPC application at 25 mm thickness:



Temp. right after application: 87 C

Temp. after 2 hours: 120 C

Temp. after 5 days: 145 C

Application are for Sulfuric Acid Tank

Surface temperature before HPC application: 320 C

HPC application to 25 mm thickness

Temp. right after HPC application: 66 C

Temp after 5 days: 88 C

We compared these data with VTEC HPC temperature drop vs, thickness result as well as with the data fro Chevron Oil.

Unit : ℃, mm

No.	Application Area	Temp. before Application	Coating thickness	Temp. after application	Temp. difference before and after application
1	Valve	474 (885F)	25 (WFT)	145 (293F)	-329
2	Tank	320	25 (WFT)	88	-232
3	VTEC 1	315.5	25 (1000mils)	27.2	-288.3
4	VTEC 2	482.2	25 (1000mils)	61.1	-421.1
5	Chevron	315	19 (DFT)	57	-258

Question

In the test data above, No. 1 (Valve) and No. 4 (VTEC 2) have similar surface temperature and coating thickness. But the temperature difference between the two cases is as much as 110 C. This needs to be explained.

Answer

The HPC test conducted by VTEC has the hot side temperature maintained at a fixed level. In actual field where HPC is applied on a tank or pipe, the hot side metal

temperature goes up. Therefore the hot side temperature is different before and after the application. Therefore the hot side temperatures for No.1 & 2 case above (valve & tank) can not be compared with VTEC test case.

HPC Coverage Test

We have conducted an actual test to find out how much area we can cover with one gallon of HPC. For HPC thickness of 25 mm, we were able to cover HPC 38cm X 38cm = 0.1444 ㎡를. This means, with 7 gallon, we can cover about 1 m^2.

Response

You can use the following formula to find coverage area for HPC.

Coverage Area = (1604 x HPC Volume%) / Coating Thickness

(Example)

HPC Volume % = 85.1%

Coating Thickness = 1000 mil (= 25mm)

Coverage Area = (1604 x 0.851) / 1000=1.365 (ft^2) (= 0.127 m^2)

With 7 gal, the coverage area is 0.127 x 7=0.89 m^2