

CORROSION AND FOULING RESISTANCE IN HIGH TEMPERATURE ENVIRONMENTS
TEMPERATURE > 450°C (850°F)

Application fields:

- Power generation boilers (Coal, Biomass, Urban garbage): water walls ,steam re-heaters, super heaters and heat recovery bundles
- Tubular systems of Molten salt solar power plants
- Ash corrosion and fouling in the Oil and Gas Industry (Visbreaker, Coke Unit, Coke Calciner, Heat Recovery Units...)
- Overhead Sulphur Condensers
- Metal dusting avoidance (Syngas, Supercritical CO2, ETC...)
- Nitric Acid Condensers

CERAMIC COATING AGAINST IRON SULPHATE AND WITH THERMAL RESISTANCE

Following a customer query we had make some test with different:




1. Steels
Carbon Steel AND AISI316L
2. Ceramics Coating.
2015038/1, 2015038/2 and 2015038/3

The purpose of this test was the characterization of a Ceramic Coating with Iron Sulphate and Thermal resistance proprieties.





As we do not have any Norm for test this kind of resistance, we have tested the Ceramic Coatings and steels in different kind of Iron Sulphate environments:




IRON SULPHATE - COLD TEST - COATED SAMPLES

- ✓ With iron sulphate powder.
Iron Sulphate Powder 1 Hour





| | | |
|---|---|--|
|  |  |  |
| 2015038/1 - 3 | 2015038/1 | 2015038/3 |
| Iron Sulphate Cold | Fe ₂ (SO ₄) ₃ . H ₂ O, at RT (1 h) | |
| NO ATTACK | | |




- ✓ With an Iron Sulphate water solution
Iron Sulphate water solution 10% at Room Temperature

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|---|---|--|---|
|  |  |  |  |
| 2015038/1-2-3 in a water solution of $\text{Fe}_2(\text{SO}_4)_3$. H_2O - 10 %. | 2015038/1 | 2015038/2 | 2015038/3 |
| Samples after 3h. – NO ATTACK | | | |

| | | |
|---|---|--|
|  |  |  |
| 2015038/1 | 2015038/2 | 2015038/3 |
| Samples after 24h - NO ATTACK | | |



Iron Sulphate water solution 20% At Room Temperature

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|---|--|---|--|
|  |  |  |  |
| | 2015038/1 | 2015038/2 | 2015038/3 |
| Samples after 2h – NO ATTACK | | | |

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|---|---|--|
|  |  |  |
| 2015038/3 | 2015038/1 | 2015038/2 |
| Samples after 24h - NO ATTACK | | |

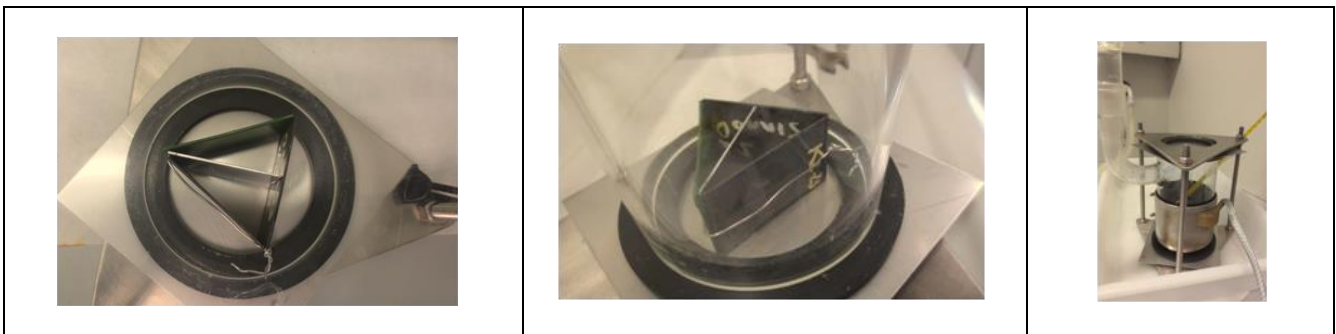
IRON SULPHATE - COLD TEST - NOT COATED SAMPLES

Iron Sulphate water solution 20% At Room Temperature




| | |
|---|--|
|  |  |
| After 15 min. - Visible attack | After 24h - Visible attack |

IRON SULPHATE - HOT TESTS – COATED SAMPLES

We had tested the Steels and Ceramic Coatings (below apparatus test) in hot environment.



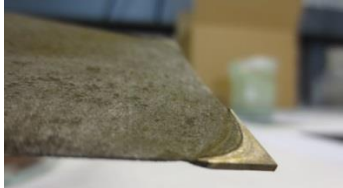


Iron Sulphate water solution 20% at 168°F

| | | |
|---|---|--|
|  |  |  |
| 2015038/1 | 2015038/2 | 2015038/3 |
| Samples after 24h - NO ATTACK | | |

IRON SULPHATE - HOT TEST - NOT COATED SAMPLES

Iron Sulphate water solution 20% at 168°F

| | | |
|---|---|---|
|  |  |  |
| After 24h - | Important Attack | Lost of 50% of their weight |

TEMPERATURE RESISTENCE.

After 24h at 932 °F in an electrical furnace, ***THERE IS NOT ANY DAMAGE IN THE COATED SAMPLES:***

