Hernani, a 24 de Julio de 2017

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EXE0008 THERMAL SHOCK RESISTANCE

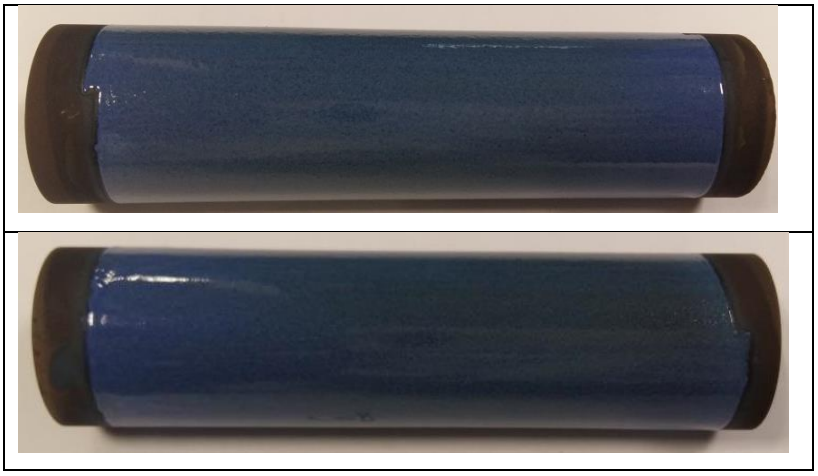
1 – SAMPLING

We had prepared some Extruded Carbon Steel Tubes coated with a high temperature resistance ceramic coating:

EXE0008

Thickness – 100 to 150 µm

Note: Sharp edges have been corrected to avoid defects



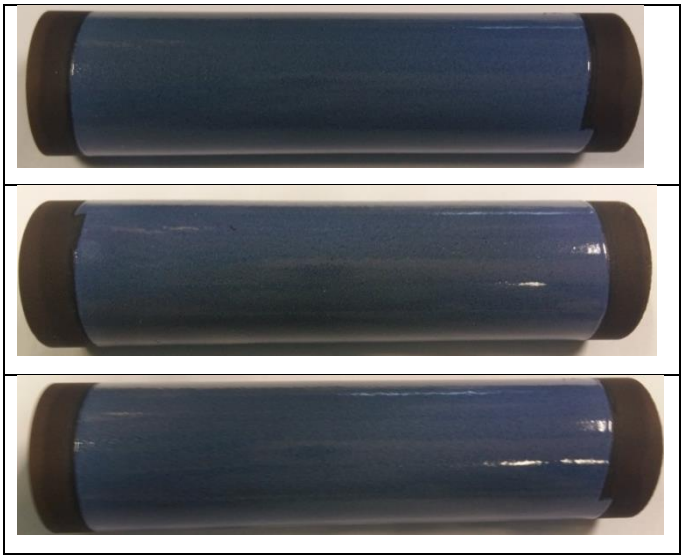
2 – PROCEDURE

For each cycle the following steps have been performed:

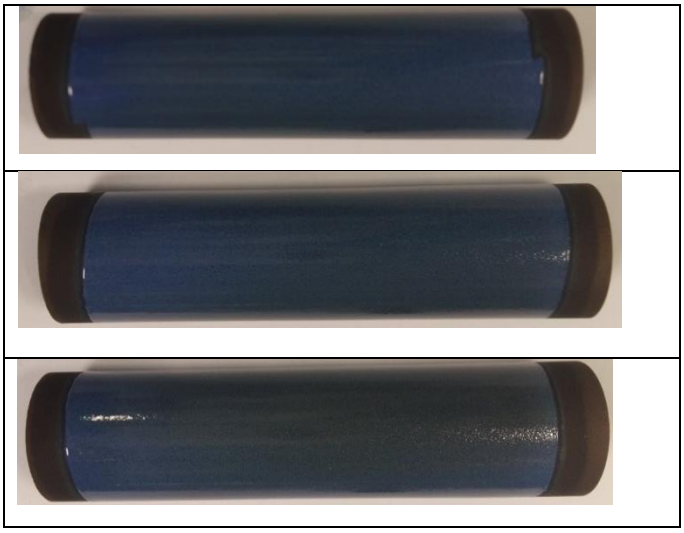
- ✓ Samples are introduced in a furnace at 600ºC (1112ºF) 30'
- ✓ After 30 min at temperature samples taken from the furnace and directly introduced in a container with cold water 20ºC (68ºF).
- ✓ Drying after 5'
- ✓ Visual Inspection after 30'
- ✓ If the coating shows no damage, goes to the next cycle same time but increasing temperature +50ºC (+90ºF).

3 – RESULTS

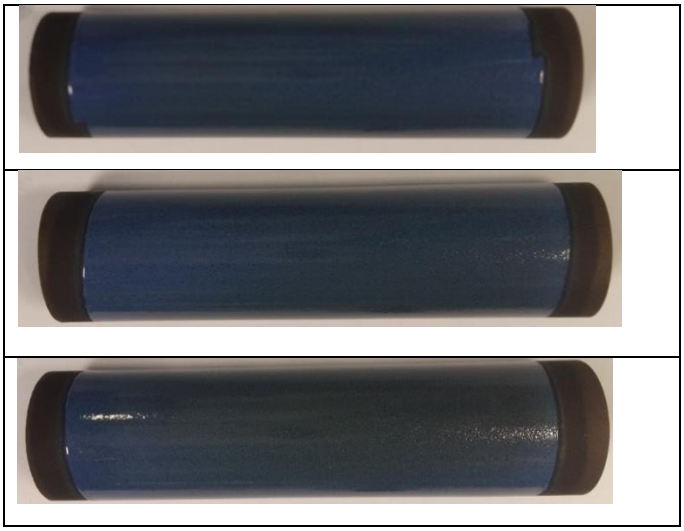
1st Cycle: 600ºC (1112ºF) – NO DAMAGE



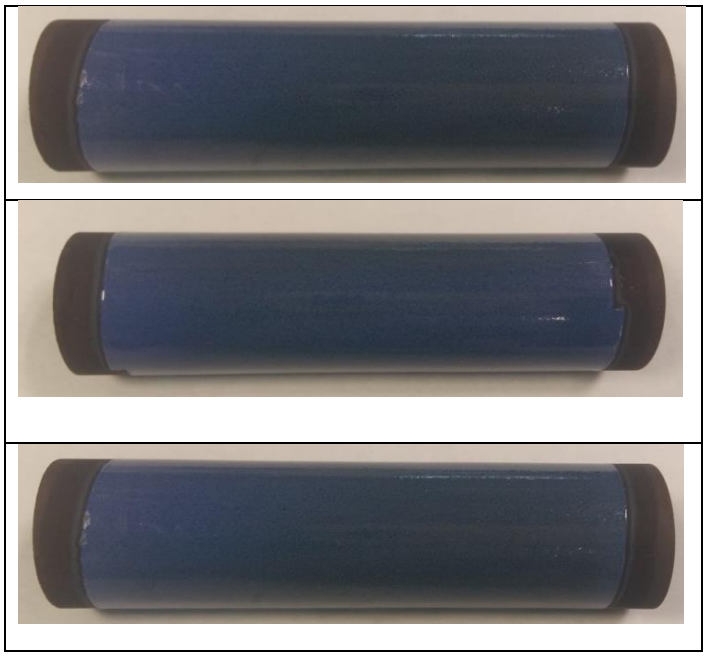
2nd Cycle: 650ºC (1202ºF)– NO DAMAGE



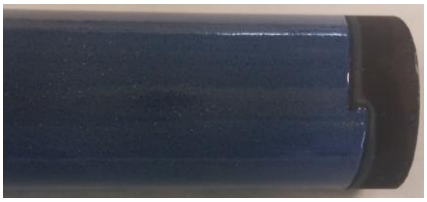
3rd Cycle: 700ºC (1292ºF) – NO DAMAGE



4th Cycle: 750ºC(1382ºF) – NO DAMAGE

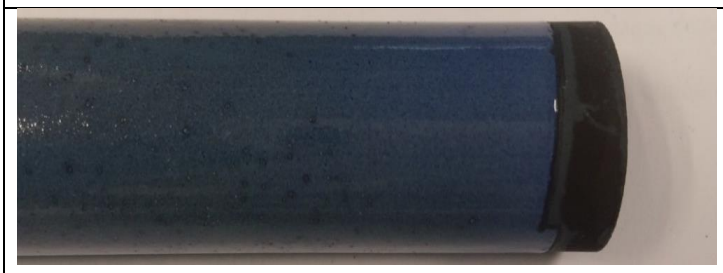


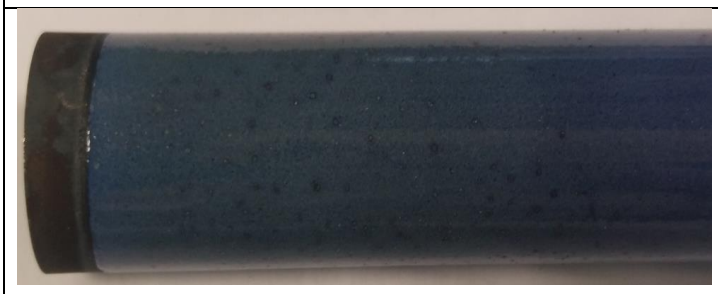
5th Cycle: 800ºC (1472ºF)- NO DAMAGE



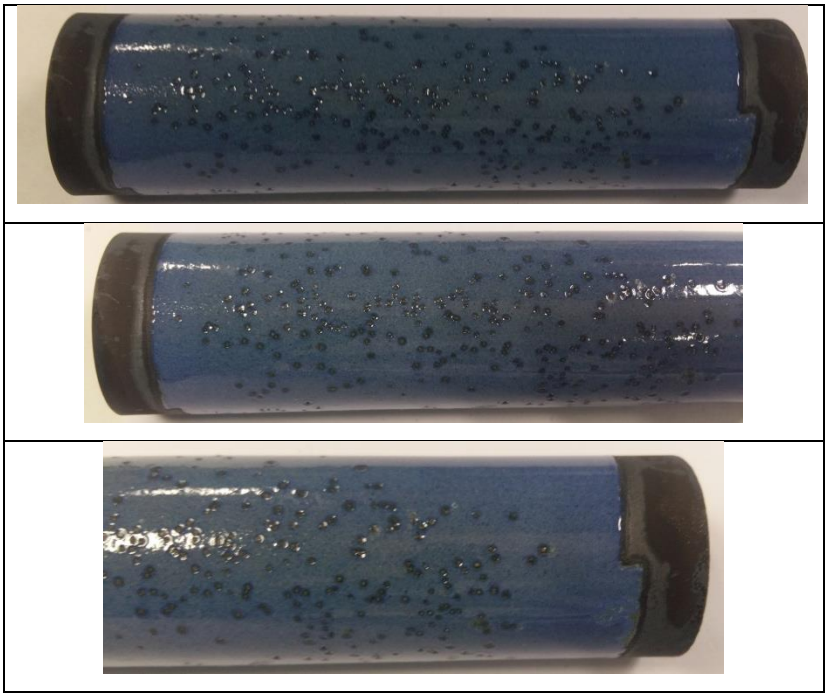
6th Cycle: 850ºC (1762ºF) – NO DAMAGE

Some black spots appear due to softening of the ceramic, temperature limit, but the coating surface remains unaffected , no dammage from thermal shock





7th Cycle: 900ºC (1652ºF) – DAMAGE ON THE CERAMIC COATING APEARS due to the start of the ceramic's melting process…. But even at this point , the THERMAL SHOCK DOES NOT MAKE ADDITIONAL DAMMAGE



4 - CONCLUSION

EXE0008 THERMAL RESISTANCE IS **850ºC with NO thermal shock effect**