



Case story #3

INDUSTRY	FINE CHEMICAL
MEDIA – COND	HYDROFLUORIC ACID 60% - 90 to160°C
MATERIALS	GT FLON
EQUIPMENT	SHELL & BLOCKS BOILER THERMOSIPHON
YEAR	2015

A Chinese company JV between a state's own company and a global European chemical company is mainly engaged in the production of fluorine chemical. Major products cover hydrogen fluoride, anhydrous hydrofluoric acid 20000t/y, electronic grade hydrofluoric acid 5000t/y. The production of electronic grade hydrofluoric acid is the first line in China.

They use, since years, blocks heat exchanger of a famous graphite company made of PTFE graphite impregnated. The high purity of final product (99.9999%) does not allow contamination from metal and graphite with PTFE impregnation is a perfect candidate for such application. The boiler use steam at 160-180°C for heating a mixture with high concentration fluorhydric acid send to a tower for further condensation (boiling point around 90°C).

Customer faced several failures of graphite which required replacement of graphite parts. Customer has a backup equipment which was sent to GT's workshop for investigation after a new leakage was detected.

The equipment was first depolluted from corrosive media by GT. Customer witnessed in GT's workshop dismantle of the equipment which showed 2 blocks broken and the inner surface of the carbon steel shell severely corroded.

The original manufacturer of the blocks was not able to replace the components with reasonable planning. Previously, repairs were done with material non compatible with chemical process without any other solution. Moreover, there was no efficient support to analyze cause and advise customer about possible solutions to avoid recurrent failures.

GT's expertized the original graphite material and conclude that the failure was not due to graphite weakness but more likely from steam hammering. This problem often happen with installation with wrong design of condensate line (see our guide "PREVENTION OF WATER AND STEAM HAMMER - PROTECTION OF GRAPHITE CHEMICAL EQUIPMENT" for more information).

Customer requested GT to replace the carbon steel shell with a stainless steel shell to reduce risk of corrosion in case of future leakage of graphite blocks. GT's analyzed the differential thermal expansion of the graphite and stainless steel shell and identified a potential risk of fatigue of the graphite. Stainless steel has higher coefficient of thermal expansion than carbon steel shell. Springs system from original supplier could not compensate the dilatation within a safe range for integrity of gaskets and graphite. GT proposed to customer to adopt GT-STABLE LOAD spring system which reduces by 90% to 98% the fatigue due to thermal expansion. By this way, gaskets and graphite have extended lifetime.



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GT's provided blocks in replacement of original blocks within a much shorter delivery time and compatible design with existing parts. GT provided new shell in stainless steel and set of gaskets, tested and cleaned other graphite parts, assembled and tested the equipment. The new equipment matched exactly the existing piping connections.

Equipment is now operating without any trouble.

Customer adopted GT design and graphite to replace the last old equipment to benefit of all the improve features from GT.

Final equipment with stainless steel shell



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Contact us ; info@graphite-technology.com