TI 037

# GPX Graphite Corrosion Resistance to Bromine and Bromine Compounds

Technical Information

Annular groove heat exchangers can be used successfully in bromination reactions under some specific conditions. In order to evaluate the success of this type of use, well-based, detailed information on the specific reaction (compounds, temperatures, process) is crucial.

The use of graphite for bromine processes is generally critical (see also our Corrosion Resistance List W-2). Graphite is either unresistant or conditionally resistant to elementary bromine (Br2) and to bromine water ($Br_2 + H_2O$).

**However, our annular groove heat exchangers are resistant to:**

- **Hydrobromic acid (HBr)** up to a wide concentration and temperature range (for further details please contact us or find it in our Corrosion Resistance List W-2).
- **Elementary Bromine ($Br_2$)** in low concentrations in an acidic environment (e.g. combined with HBr or HCl)
- **Bromine compounds (Br ions and some organic bromine compounds)**

Some of our customers successfully use our annular groove heat exchangers as condensers as bromination reactors to distill off solvents. None of these applications have ever caused corrosion of the heat exchangers. This is probably the result of the following details:

- Due to its high density, very little $Br_2$ reaches the condenser, and the reaction is generally performed in an acidic environment.
- Due to the very intensive and constant cooling performance of the annular groove design, the condensation process starts immediately and therefore the graphite wall has little to no contact with $Br_2$.
- Due to the very intensive and constant cooling performance of the annular groove design, the wall temperature is comparatively low, thereby lowering the potential for chemical wear.

**Conclusion**

**Before deciding on the materials to be used we would be glad to support your decision making with a detailed technical discussion. Furthermore, we can provide a supply of graphite samples for corrosion testing in order to prove resistance.**

GAB Neumann GmbH | Alemannenstrasse 29 | D-79689 Maulburg
T +49 (7622) 6751 0 | F +49 (7622) 6751 20 | info@gab-neumann.de

Graphite and SiC Heat Exchangers and Process Equipment