

Akiet Chemical Resistance Guide

Akiet's High Strength Composite Tubular (HSCT) systems meet high standards of performance with respect to temperature and chemical resistance. In most downhole applications involving corrosive service, composite tubular systems are the optimal choice. They are durable and resistant to an exceptionally wide range of corrosive chemicals and environments.

The information provided in this section will guide you through the chemical resistance tables of high strength composite tubular systems.

The data of this guide are based on more than 30 years of field experience in which field and laboratory testing has indicated good expected service life. However, it should be noted that combinations of chemicals, heat, flow rate, the presence of solids, and other considerations can influence a material's corrosion resistance capacity. Therefore, this corrosion resistance guide is to be considered as a recommended guideline and not a guarantee.

Service life and corrosion resistance in an aggressive chemical environment depends on the total wall thickness, the chemical type and concentration, the service temperature, the duration of use.

For chemicals, mixtures of chemicals, or actual operating conditions not mentioned in the following tables, or circumstances wherein only "trace" quantities of NR listed chemicals are present. Please consult Akiet before deciding on the suitability of HSCT systems for an application.

Chemical Resistance Guide

CHEMICAL	MAX OPERATING TEMPERATURE [°C]
Acetone	50
Benzene	65
Carbon Dioxide	105
Aqua solution (chlorinated)	105
Gas Condensate	105
Gas Natural	105
Hydrogen Sulfide	90
Methane	105
Propane	40
Heavy Oil (277g/mol)	105
Crude Oil (Sour/Sweet)	105
Sodium Chloride	90
Toluene	65
Water Fresh pH 2 - 13	105
Water Brine	105



Modelling

A specialist Abaqus-Chemical FEM software package is used to model long-term properties of Akiet HSCT and connections in the downhole environment. The outcome of this modelling will be used to de-rate the “as new” performance and provide properties that are representative up to the end of well life.

In many real-life circumstances, chemical exposure triggers several chemical-mechanical effects that influence material service life to a significant extent. The modelling enables Akiet to virtually test these effects on the composite in any configuration and application to obtain quantitative insight in lifetime and eventual failure modes. With a chemical risk (bow-tie) analysis can several scenarios be identified which will be modelled.

Following example scenarios can be modelled:

- Cement environment: quantitatively evaluate effects of mix water pH and composition, temperature, loads on the composite and on the adhesive.
- Mud environment: quantitatively evaluate the effects of mud chemicals, temperature, loads on the composite and adhesive.
- Injection environment: quantitatively evaluate effects of exposure to produced water and expected thermal changes on the composite and adhesive.
- Quantitatively evaluate effects of during periods of water injection/rest over the life of the well.

Learn more about HSCT

For questions or further installation details please contact:

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