HTS APPLIED FLUID TECHNOLOGY
HTFLUIDFIX DRYING
TECHNICAL ISSUE 2

# Is the water in your Sub Zero Heat Transfer Fluid System costing you Money?

Water causes extensive plant reliability problems and is a major cause of plant failure and production loss. Synthetic fluids are used as a heat transfer medium at temperatures down to –100°C and up to 400°C and water causes problems through the whole range. Sub zero systems are particularly susceptible to problems.

In order to reduce system water content, we have designed a range of mobile and fixed drying units based on 'nitrogen stripping' and 'distillation' principles.

The units can dry fluid down to below 10 parts per million while in continuous production at Sub Zero temperature or in stand alone batch processing.

Mobile drying unit

**The range of heat transfer fluid dryers are ideally suited for the following situations:**

## At Commissioning:

To dry the system following system installation or modification.

## During plant operation:

To trim water levels without stopping production.

## In emergency:

Following accidental water ingress or heat exchanger failure.

## Stock fluids:

Stand alone batch drying of 'wet' fluids.

## Permanent Installation:

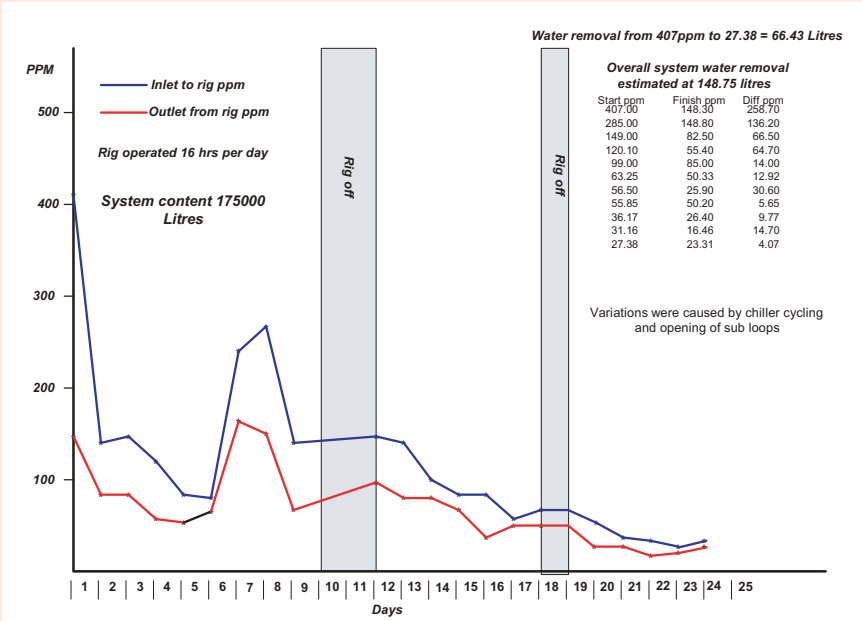
Dedicated to one or more process plants.

## Mobile Units:

For operation on several plants as well as standby for emergencies.

## Recent example

System Content: 175 000 litres of Dowtherm J
Drying cycle: 24 days (16hours per day)
Water removed: 148.75 Litres
Water content: 407 ppm dried to 27.38 ppm.



# The Problem

The water saturation point of heat transfer fluids varies with the fluid type and the operational temperature.

Free water, above the saturation point, will circulate as ice particles which will deposit themselves on heat exchanger surfaces, in chiller heat exchangers and in expansion tanks.

It should be noted that the surface temperature on heat exchangers will be far lower than the circulating fluid and that the refrigerant temperature should be taken into consideration. Allow at least 10°C lower than the fluid requirement.

As systems are closed loop, eliminating water is not easy. Cycling chillers and allowing individual reactors jackets to warm to release water still leaves the problem of removal or the water will simply deposit itself elsewhere in the system.

### How does water get in?

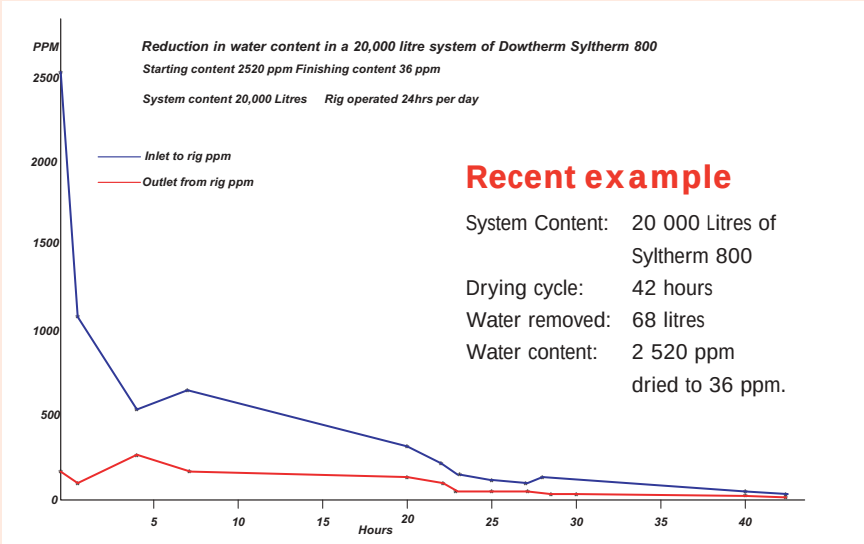
New Systems:
New systems, extensions and alterations not being sufficiently dried at commissioning.

New Fluid:
Fluid suppliers do not necessarily guarantee a low moisture content on barrelled fluid. We have tested new fluids at 60—80ppm:- not much help if you are running at –30°C!!

Poor Housekeeping:
External filling points unprotected from the weather. Barrels stood upright and not properly dried before use. Barrels that are partially full being stored upright wit loose caps. The use of non dedicated filling pumps and hoses.

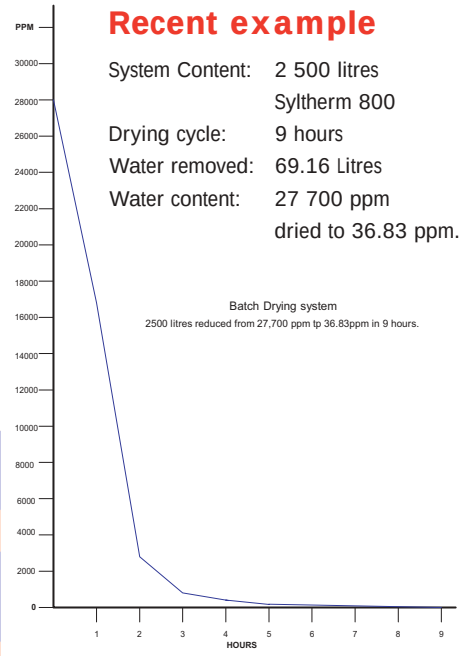
Plant Failure:
Water heat exchangers, reactor jackets failing:- the nightmare scenario.

Services:
Saturated nitrogen used for blanketing. We have experienced systems where 30% water was found after a heat exchanger failure, with a complete plant closure. Similarly we have seen systems where around 20ppm is causing maintenance headaches, particularly where Plate Heat Exchangers are used.




## Recent example

System Content: 20 000 Litres of Syltherm 800
Drying cycle: 42 hours
Water removed: 68 litres
Water content: 2 520 ppm dried to 36 ppm.




## Recent example

System Content: 2 500 litres Syltherm 800
Drying cycle: 9 hours
Water removed: 69.16 Litres
Water content: 27 700 ppm dried to 36.83 ppm.

# What can be done?

Our units, available for hire or purchase, are connected to the system as a side stream, taking a proportion of the flow through a heat exchanger to a temperature below the boiling point of the HTfluid and above 100°C.

The fluid is passed through a 'flash chamber', over a series of micromeshes, cooled and returned to the system. Nitrogen is passed through the 'flash chamber' to pick up the released vapours and passed through a condenser.

The condensate can be collected for safe disposal or further reconditioning.

Mobile drying unit on its way to a customer. This is ATEX Zone 1 compliant.

**Heat Transfer Systems Limited**
Ridge Hall, Chapel-en-le-Frith, High Peak
Derbyshire SK23 9UD
telephone **01298 815862**
fax **01298 815863**
e-mail **office@heattransfersystems.co.uk**
website **www.heattransfersystems.co.uk**