DURATHERM
COMPETITORS REPORT

There are numerous heat transfer fluids on the market today and selecting one that is right for your application is a challenging task. While specifying a fluid that will efficiently transfer heat for your application is very important this study is more about how clean the fluid (and your system) stays while it's in use.

Most major oil refineries in their offerings of fuels, lubes and greases have a heat transfer fluid. Commonly, however, these fluids tend to be multipurpose and lack additive packages specific to heat transfer applications. **Then there are a handful of companies, like ours who specialize in manufacturing heat transfer fluids.**

Heat transfer fluids can also be comprised of many different base fluids:

CHEMICAL AROMATICS offer high temperature stability but come with a high price both economically and environmentally.

GLYCOLS have been used for years and can be effective if formulated properly but also carry a moderate price tag.

PETROLEUM base stocks can be an economical start to a good heat transfer fluid. However proper selection of the base fluid and additive package is crucial to making a high performance, long lasting fluid. Petroleum heat transfer fluids commonly have a mineral oil, white oil or synthetic base fluids.

DURATHERM fluids are mainly comprised of Petroleum (highly refined pure paraffinic base) and Glycols as well as with some use of synthetic blends and silicones. However all contain our proprietary additive system to ensure high performance throughout their long life cycle.

While laboratory studies can show comparatively how one fluid stacks up against another there is no better test than the real world. Many will say that lab studies can be conducted in ways that skew the results in one favor or another. While we have done our utmost to select and conduct our test methods (IP 48) we also stand behind our products by offering a **risk free trial.**

While cost is always a motivating factor, fluid longevity should be closely scrutinized before committing to a heat transfer fluid.

Ever wonder why some fluids have two recommended upper limits, one for open and one for closed system?

read on...

THE TEST

We selected a group of heat transfer fluids that we felt represented the most commonly used fluids in applications under 600F that are open to the atmosphere and susceptible to oxidation.

These applications tend to be in smaller, electrically heated equipment used in plastic processing, molding, die casting etc. However, for any heat transfer system that is not sealed from air contact the effects of oxidation should also be considered.

FLUID DEGRADATION

There are two basic ways that a fluid can degrade.

1. Thermal cracking or overheating beyond the recommended temperature.
2. Oxidation, which will be the focus of our study.

Oxidation occurs in a heat transfer fluid usually at temperatures above 200F where the fluid comes in contact with air.

Some fluids have two recommended upper limits, one for open and one for closed system because they are not engineered to offer the high level of protection needed when used in open to atmosphere conditions. As the operating temperature increases the effects of oxidation multiply exponentially, this is why some fluids recommend lower maximum operating temperatures for open systems.

We have selected 6 competing fluids to test head to head with two of our more commonly used fluids, **Duratherm 600** and **Duratherm G**. All fluids, including ours were from production batches and not laboratory samples or custom blends.

THE FLUIDS

Calflo AF- *044945*

Duratherm G - *058448*
Duratherm 600 - *058689*

Mobiltherm 603 - *M19K9A3*

Momar - ISO 46 SYN

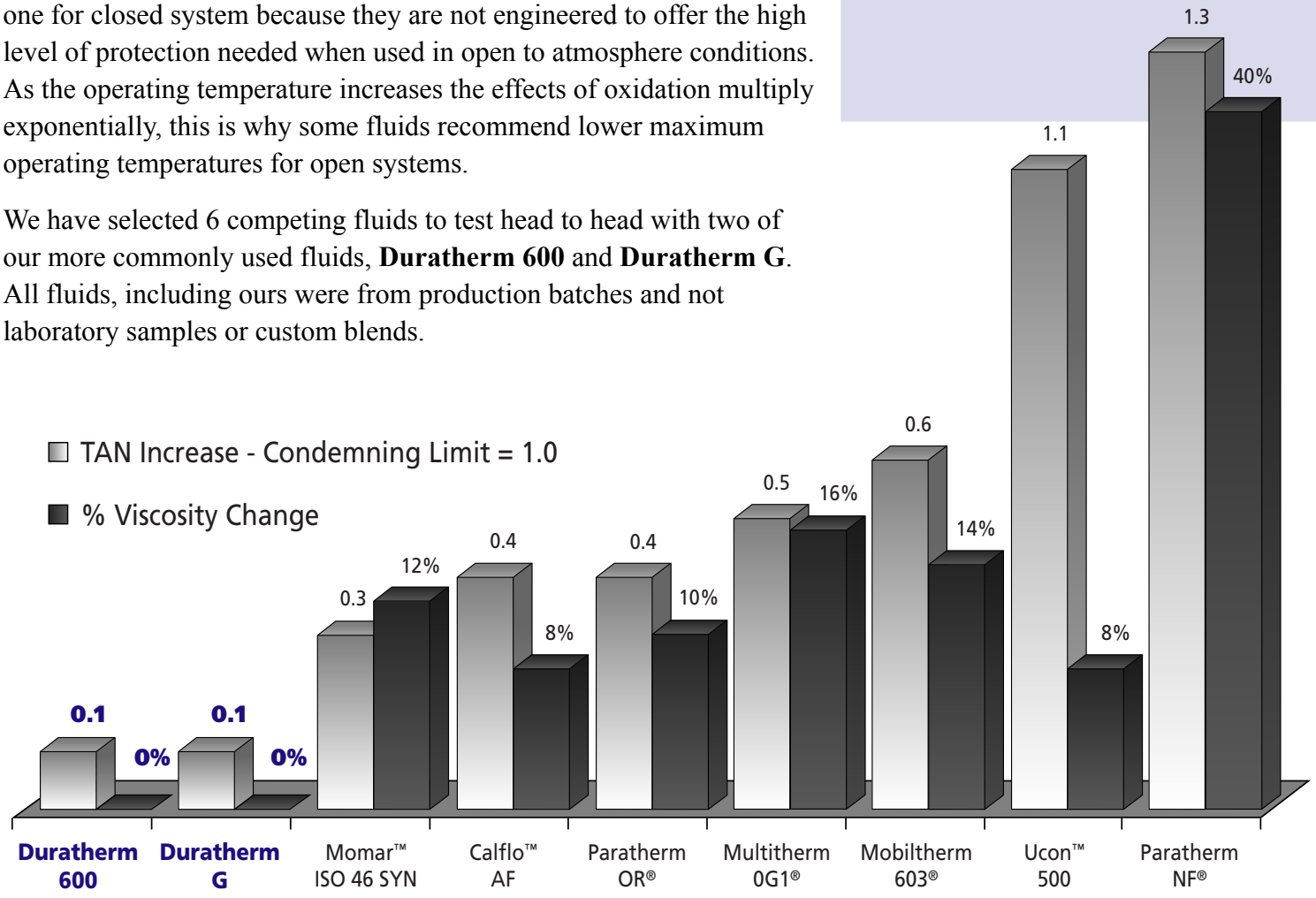
Multitherm OG1 - *64742-54-7*

Paratherm OR - *CN4060031-L12*
Paratherm NF - *CN4000042-B02*

Ucon 500 = *335073*

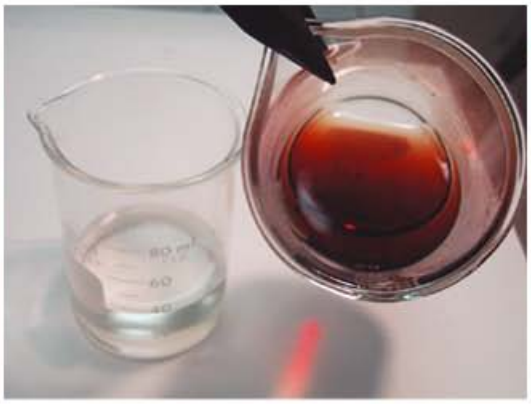
THE TEST METHOD

IP48 is a Petroleum Institute test standard in which 40ml of fluid is exposed to 400F with 15 L/h of air blown through the samples for 24 hours.



Products under review were purchased directly from the manufacturer, authorized distributor or their customer prior to 2005. All tests were conducted with the available street formulations of that time, as we cannot anticipate a manufacturers possible revisions or improvements and as such all tests are accurate as per current pre - 2005 product formulations. If you are a manufacturer and wish to submit or resubmit a product for testing or would like to talk to us about how you can utilize our additive techniques and packages in your products please contact us.

Duratherm 600



Duratherm G

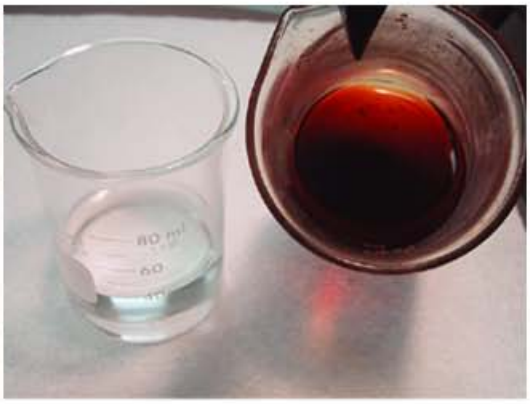
Calflo® AF

	BEFORE		AFTER		OBSERVATIONS
	TAN	Viscosity Cst	TAN	Viscosity Cst	
Duratherm 600	0.0	34	0.1	34	Clear, no deposits, slight color change but viscosity and TAN remain unchanged
Duratherm G	0.0	34	0.1	34	Clear, no deposits, slight color change but viscosity and TAN remain unchanged
Calflo AF	0.0	34	0.4	37	Clear, minor deposits, slight color change and TAN increase over time deposits could cause system problems
Mobiltherm 603	0.0	24	0.6	28	Dark, moderate deposits, heavy black color. TAN increase is quick and would cause short fluid life or risk heavy deposits in system.
Multitherm OG2	0.0	36	0.5	42	Dark, deposits on upper glassware and moderate color change. Mid point for fluid life, moderate Tan increase.
Paratherm NF	0.0	24	1.3	40	Dark, moderate deposits suspension, extemely high TAN and viscosity increase.
Paratherm OR	0.0	45	0.4	50	Clear, deposits found on glassware and bottom of beaker. Potential for heavy deposit fallout in system
Ucon 500	0.0	48	1.1	52	Dark, light deposits, high TAN past condemning limit of 1.0
Momar ISO 46 SYN	0.0	40	0.3	12	Dark, light deposits, slight rise in TAN, significant rise in viscosity

A TAN of 1.0 is considered the condemning limit

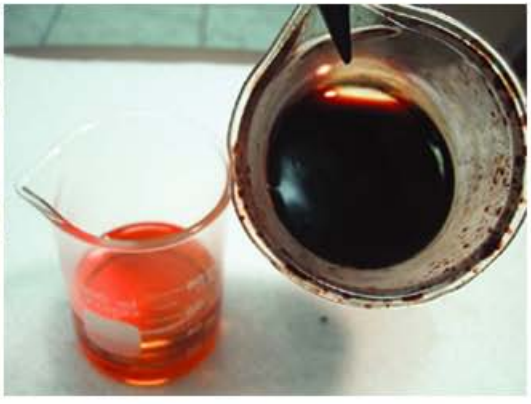
Mobiltherm 603®

Multitherm OG2®



Paratherm NF®

Paratherm OR®



Ucon® 500

Momar® ISO 46 SYN