Premium PAG

Description

PREMIUM PAGs are high performance Polyalkylene glycol for air conditioning systems with R134a and R1234yf. PREMIUM PAG lubricants have optimal miscibility with R1234yf refrigerant gas.and they are also compatible with R134a, over a wide range of concentrations and temperatures. This results in excellent lubricating properties and increased efficiency of the refrigeration system. PREMIUM PAG has a reduced hygroscopicity compared to normal PAG used with other refrigerants, it also has a high chemical and thermal stability and resistance to hydrolysis. **Compatible with electric compressors with PAG oil.**

The pursued aims in the development of new Errecom lubricants are:
- Excellent Lubricant ability;
- Hydrolytic stability;
- High Compatibility with the materials of all kind of systems, both new and old ones (with a constant attention to their evolution over the time);
- Excellent properties at low temperature;
- Low toxicity and high biodegradability level, always following our green philosophy precepts;
- Reduced hygroscopicity and additive anti humidity;
- High thermal stability to oxidation;
- High solubility performances with R1234yf refrigerants;
- Optimal miscibility with R1234yf refrigerants

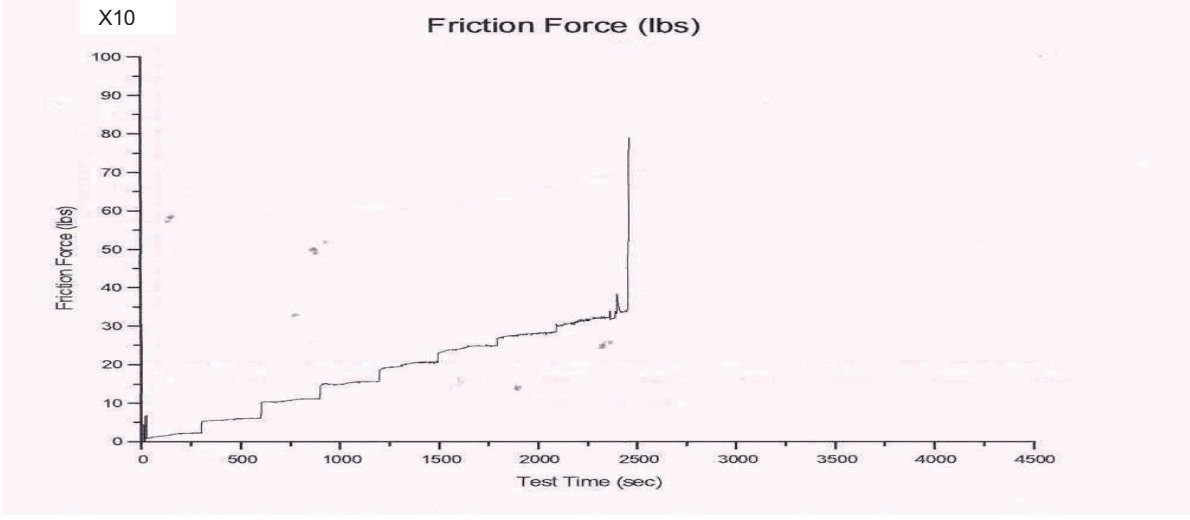
Method and Reference Unit	Value	Reference method
ISO VG	68	-
Kinematic Viscosity @ 40°C (cSt)	68	ASTM-D445
Kinematic Viscosity @ 100°C (cSt)	16,6	ASTM-D445
Kinematic index	190	ASTM-D2270
Pour Point (°C)	-42	ASTM-D 97
Flash Point (°C)	225	ASTM-D 92
Density @ 15°C (g/cm³)	0,999	ASTM-D4052
Humidity Content (ppm)	100	ASTM-E1064
Total Acidity (mg KOH/g)	0,03	ASTM-D 974
Color (APHA)	60	ASTM-D1209
Capping efficiency (%)	95	IM

The data shown in the table refers to PAG 68 and has to be considered as an example.
For technical data relating to the other viscosities of the Premium PAG range, please, refer to the specific TDS.

Lubricating Properties

The development of more performing systems requires special lubricants due to the high pressure and consequently higher load on the bearings. The extreme pressure and anti-wear properties of PAG are superior to those of POE and other synthetic materials, these lubricating properties are maintained under high pressure conditions.
Load pressure (lbs) and estimated wear (mm) have been recorded for PAG (and with the addition of EP / AW Additives) - PREMIUM PAG:

50 lbs increments:



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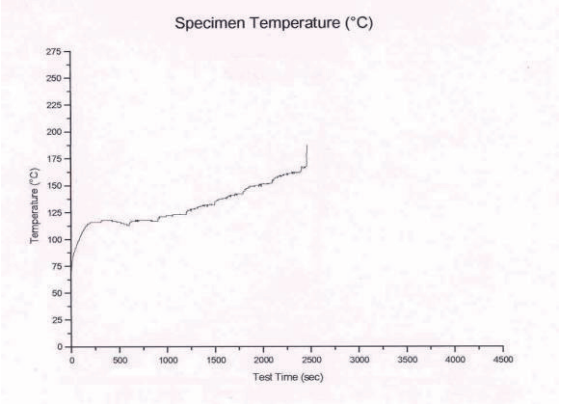
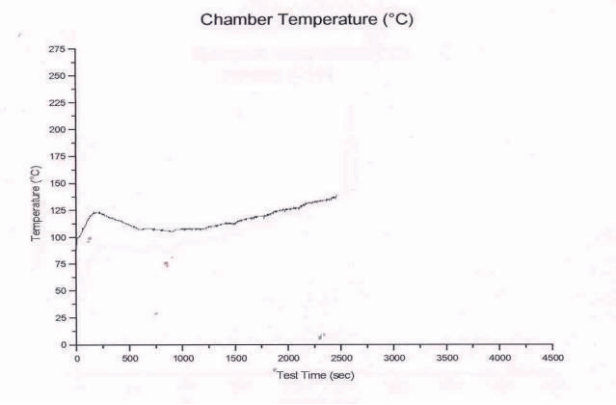
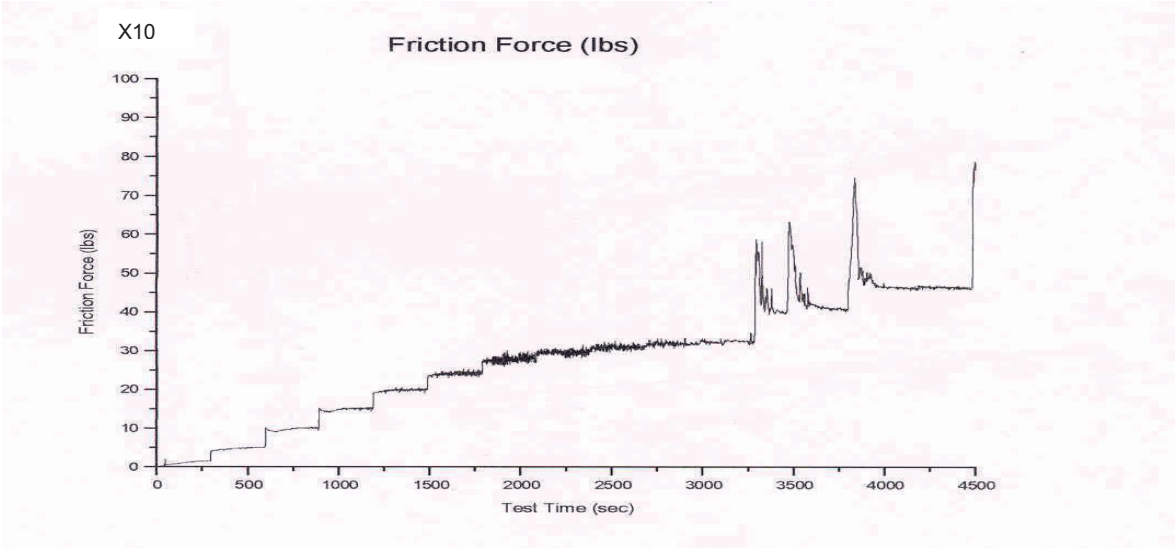
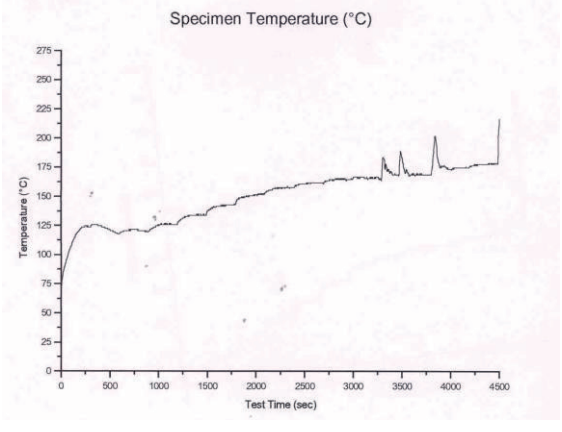
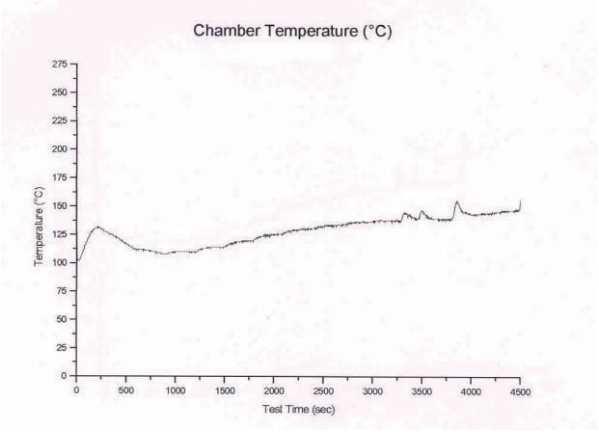
AIR CONDITIONING & REFRIGERATION CHEMICAL SOLUTIONS





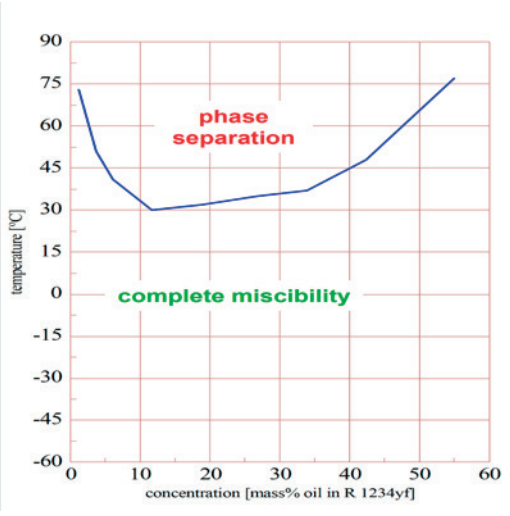






PAG presents a higher natural protection of the System components from oxidation and corrosion, less propensity for the formation of humidity and acidity and this guarantees a longer life to the refrigeration System

Solubility R1234yf



Good general solubility, Insoluble already above 30°C
The solubility offered by ERRECOM PREMIUM PAG is among the best compared to most of the synthetic alternatives on the market.

Hydrolytic stability:
The unprotected polyalkylene glycols at the hydroxyl are very hygroscopic and can absorb several thousand ppm of water when exposed to damp conditions. Despite this, PAG oils do not hydrolyze under normal operating conditions: thanks to this characteristic they do not generate problems that alternative synthetic lubricants (such as polyol esters) normally find with water absorption (corrosion or ice formation in the expansion valve or in the capillaries).
Due to the substitution of the terminal hydroxyl group with an alkyl species in PAG 68 for AC/R Systems the hygroscopicity is lower than that of a free PAG.

Levels of Moisture Absorption of PREMIUM PAG:
The water absorbed by PAG is not free (but linked to PAG) and therefore does not cause problems that can be associated with free humidity: the reduced hygroscopicity exhibited by PAG can be obtained through a careful selection of the final hydroxyl protections. A maximum water content of 0.07% is defined for PAG lubricants.

Stability of PREMIUM PAGs according to ANSI/ASHRAE standard 97-2007 tests
We performed an accelerated stability test according to the ASHRAE 97-2007 standard by bringing three PREMIUM PAG standard solutions mixed wt/wt with R1234yf Refrigerant at a temperature of 174 ° C for 14 days with elements of Copper, Steel and Aluminum into them.

For each viscosity:
A sample with no added moisture (20 ppm initial moisture only)
A sample with added moisture up to 100 ppm
A sample with added moisture up to 500 ppm

Initial acidity value (mg KOH / g) 0.01 for all solutions

The solutions are clear, with no presence of suspension. The titles of Copper, Iron and Aluminum are zero.
At the end of the 14 days:
There was no change in viscosity.
The metal elements were not affected.
The acidity value rose respectively to:

0.01 mg / KOH for 20-ppm-humidity solutions

0.02 mg / KOH for 100-ppm-humidity solutions

0.05 mg / KOH for 500-ppm-humidity solutions

All the solutions are clear.
All the solutions are without precipitate.
Solutions at 20 ppm and 100 ppm of humidity do not show variations in metal content
Solutions at 500 ppm of humidity have 0.3 ppm of Copper, no variation on Aluminum and 0.2 ppm of Steel

Thermal stability PREMIUM PAG		
Test: 174°C, 14 days Refrigerant lubricant 1:1		
Appearance		Clear
Deposits		None
Water		500ppm
Acidity	Initial	0,016
	Final	0,067
Metals	Copper	0,3 ppm
	Steel	0,2 ppm
	Aluminum	No change

Conclusions:

Thanks to their additive set, Errecom PREMIUM PAG lubricants for refrigeration show a high stability to thermal stress in presence of gas and metals and therefore are absolutely stable in the system. They reduce the normal formation of acidity due to moisture presence by compensating and blocking most of the free humidity. These characteristics are fundamental to stabilize a Reactive refrigerant such as R1234yf, in which presence of humidity and air speed up the decay and aggression of the system.
The oxidation generated by the hydrofluoric acid produced slows down and consequently the risk of compressor breakdown. Reactions of aggression to exchangers, condensers and evaporators also arrest.
PREMIUM PAG is guaranteed as a product SUITABLE for use with R1234yf