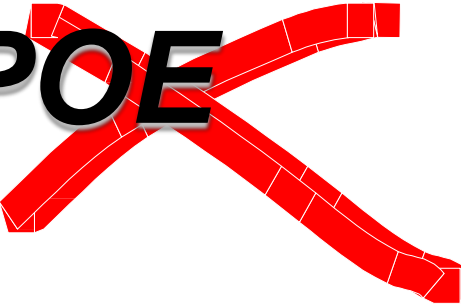


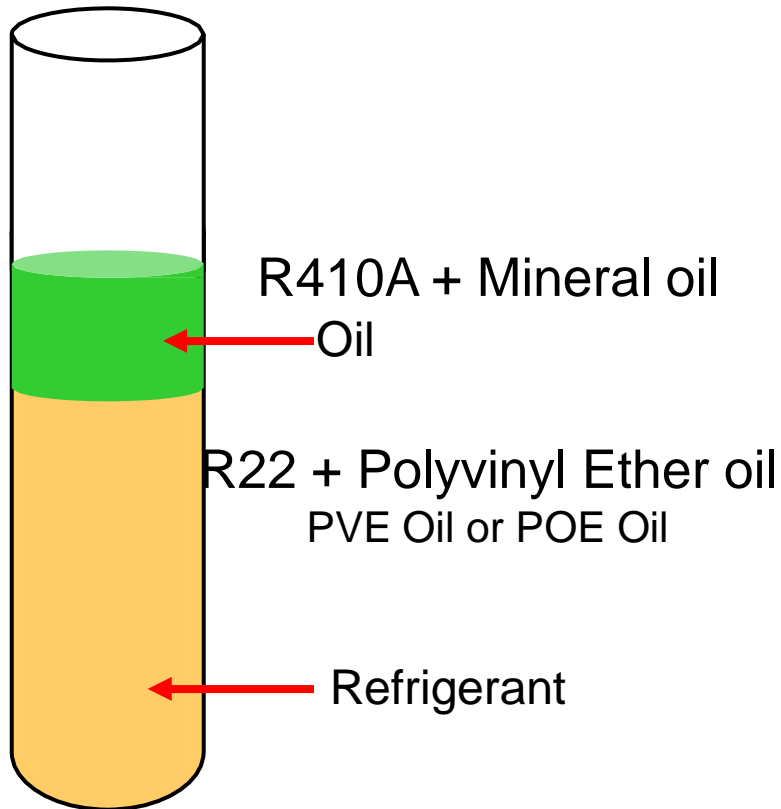
Working with PVE Oil

POE

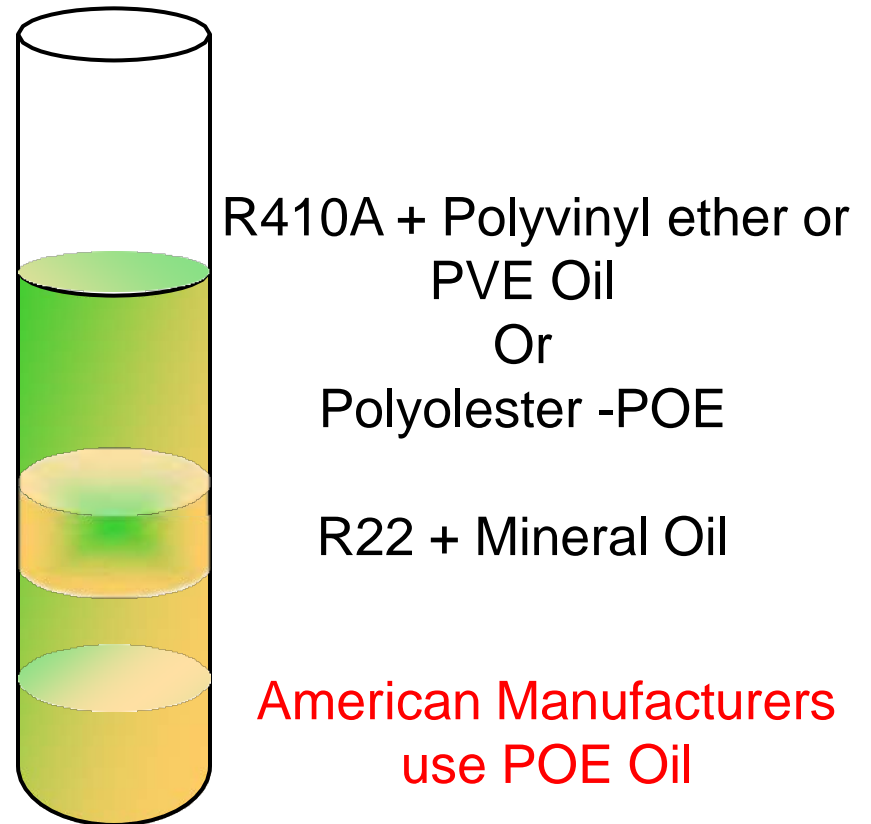


Oil leaves the compressor along with the refrigerant, It must be miscible with the refrigerant to allow correct oil return from the evaporator.

Immiscible



Miscible



Polyolester Oil

When an alcohol and an organic acid react, an organic ester and water are produced.

This is called esterification. **This reaction is reversible**

The reverse reaction of the ester and water to produce alcohol and the organic (fatty) acid is called **HYDROLYSIS**

- ❖ Keep POE containers closed. **POE oil is extremely hygroscopic**, wants the water molecule back.
- ❖ **Moisture will rapidly cause POE oil to sludge**
- ❖ Driers will remove moisture from mineral oil or PVE oil.
- ❖ **Driers will not remove moisture from POE oil.**
- ❖ Minimize the time systems are open—install caps in lines until they are sealed.

HYDROLYSIS ?

A big inconvenience for the ester oils is that they are very
HYGROSCOPIC.

According to HOECHST Chemicals:

“It has been found from experience that once the moisture level reaches about 800 ppm there is a likelihood of incipient ester hydrolysis”

Further:

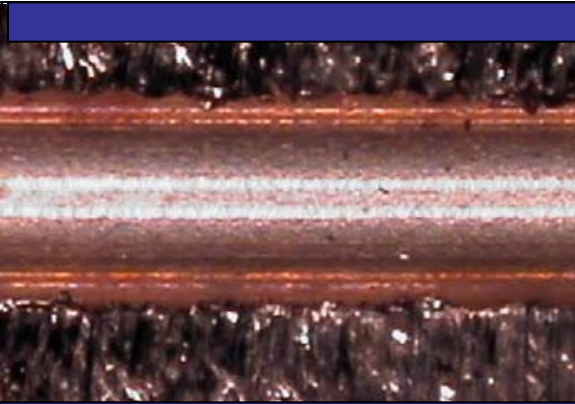

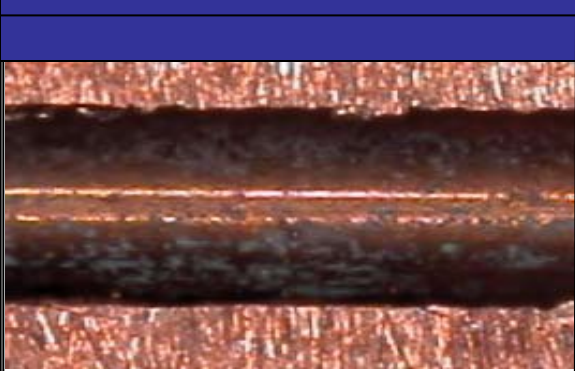

“The carboxylic acid components manifest themselves by an increase in the acid value and may lead to copper plating reactions in the system”

Thus:

Because of humidity, fatty acids will clog the capillary tube and attack the motor windings... after a while...

Inside of Capillary Tubes

1500 hour failure test- blockage & moisture

	PVE	POE
Dryer		
Non-Dryer		

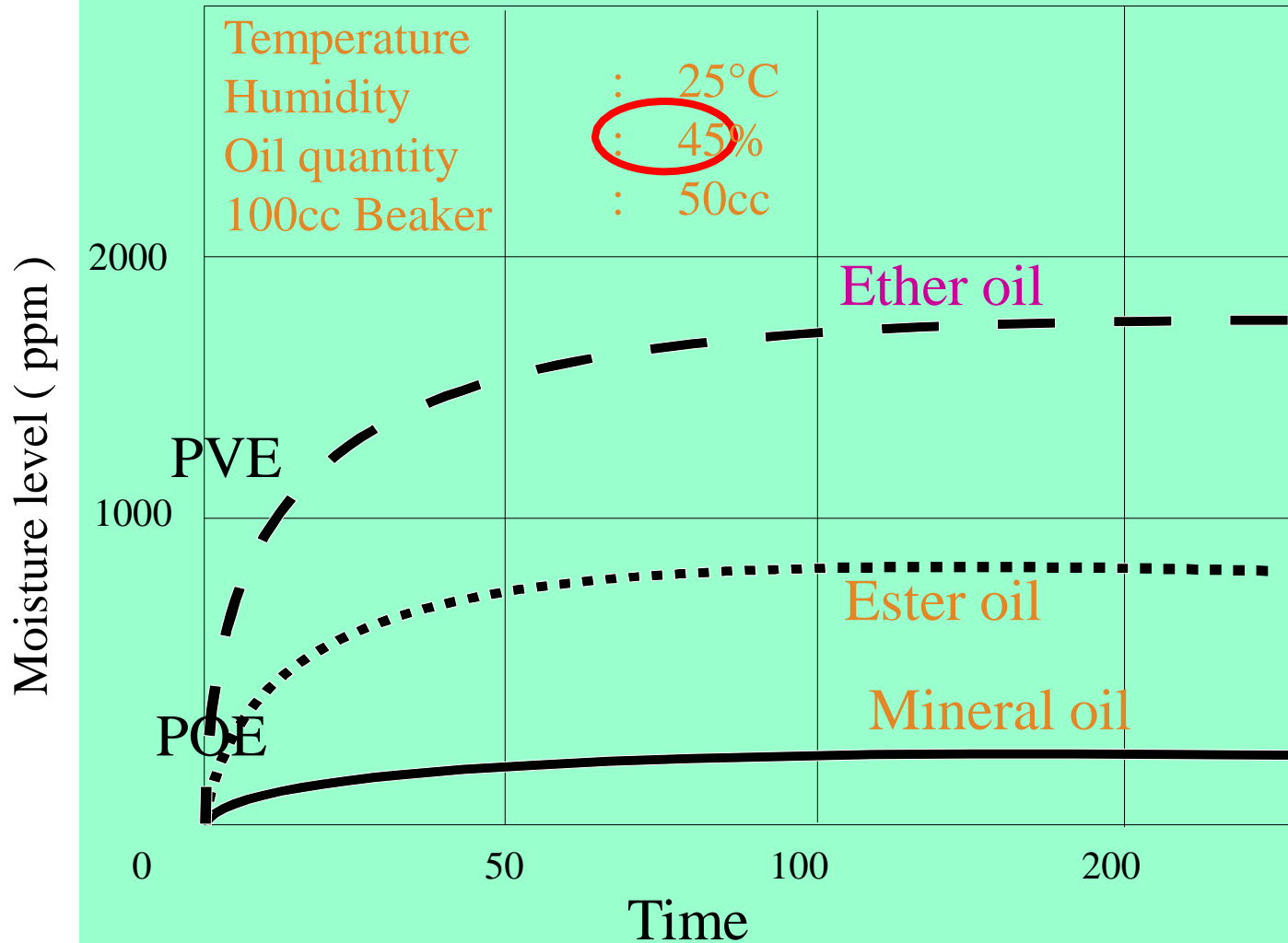
DAIKIN chose to use :

Polyvinyl Ether Oil

Manufactured by IDEMITSU

- (1) Compatible with all HFC refrigerants (R134a, R404A, R407C, R410A)
- (2) **No Hydrolysis** unlike POE (Polyolester) Lubricants.
- (3) Better solubility with **process fluids**.
- (4) Superior resistance to **Capillary Tube Blockage**.
- (5) Unsurpassed **Lubricity** for greater wear protection.
- (6) Optimum for **Non-dryer System**.

Moisture Absorption



The advantages over ETHER oil?

Ether oil is even more hygroscopic BUT

NO reaction with moisture !!!

When oil would deteriorate because of very high temperatures we will get:

Metalled ethers
Polymerized oils

Do pay attention to possible contamination !

Moisture is a non-condensable and will cause high internal temperatures!!!

