

The background features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. The shapes are primarily triangles and polygons, creating a dynamic, layered effect. The overall composition is clean and modern, with the text centered in the white space.

LUBRICANTS FOR AIR CONDITIONING
AND REFRIGERATION
BY C.V.RATNAYAKE

MINERAL OIL

- ▶ Miscible with old refrigerants
- ▶ Used with old type refrigerants such as R-12, R-22, R-502

Synthetic lubricants

- ▶ MISCIBLE WITH NEW REFRIGERANTS
- ▶ PAG
- ▶ - MOBILE AIR CONDITIONING with R-134a, R-1234yf, Co2

- ▶ PAG
- ▶ PVE
- ▶ PAO
- ▶ For other AC & REF applications

NORMANCLATURE

- ▶ Generic name- chemical name
- ▶ PAG-32
- ▶ Polyalkylene Glycol(PAG)- Viscosity 32
- ▶ POE-68
- ▶ Polyol Ester(POE) - Viscosity - 68
- ▶ Trade name - Oil code
- ▶ Suniso -3GS , ND-8, ND-9, BSE-32, BSE-55

VISCOSITY

- ▶ ISO VISCOSITY - CENTISTOKES cst @ 40C
- ▶ ISO-32(SUS-32)
- ▶ ISO-68
- ▶ ISO-100

EXAMPLES

GENERIC NAME/CHEMICAL NAME	TRADE NAME/OILCODE
PAG-46	ND 8
PAG-100	ND 9
POE-32	160SZ/160SZ
POE-68	BSE-55

OIL CODES

- ▶ TOYOTA- ND-08 - PAG-46
- ▶ TOYOTA - ND -09 - PAG-100
- ▶ NISSAN - KLHOOPAGSO- PAG-46
- ▶ NISSAN- KLHOOPAGRO - PAG-100
- ▶ NISSAN PLANETELF-488- PAG-150

LOSSES 1

- ▶ High Fuel consumption
- ▶ High Electricity cost(high COP)
- ▶ Environmental pollution goes up due to high emission
- ▶ Extraordinary vibrations on the car create additional problems
- ▶ Engine efficiency comes down
- ▶ High Engine ware and tare
- ▶ Engine and car life time comes down
- ▶ Frequent compressor failures

CORRECT OIL QUANTITY

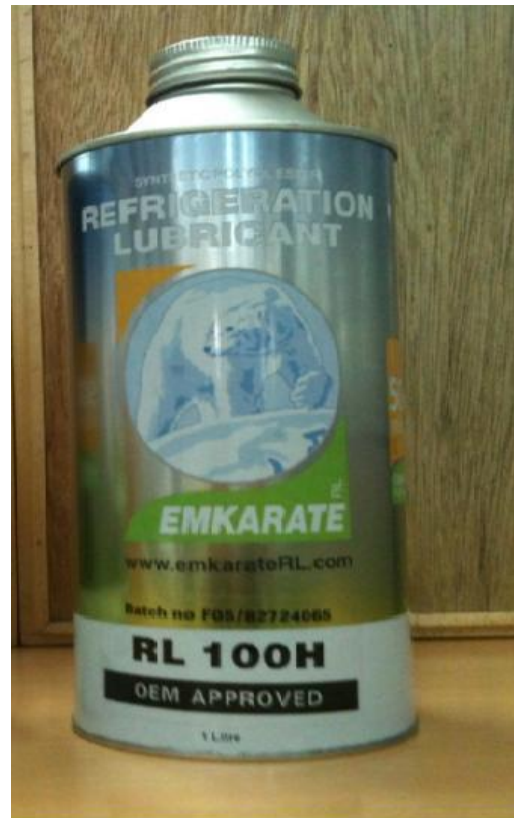
- ▶ Equipment manufacturers recommendation
- ▶ In large compressors tag near the sight glass indicates
- ▶ In mobile air conditioning tag near the engine indicates
- ▶ E.g. ND 8 150ml, R-134a - 400g
- ▶ Refer to service manuals

GENUINE POE CAN

- ▶ EMKARATE
- ▶ GENUINE
- ▶ OIL
- ▶ CONTAINS
- ▶ POE



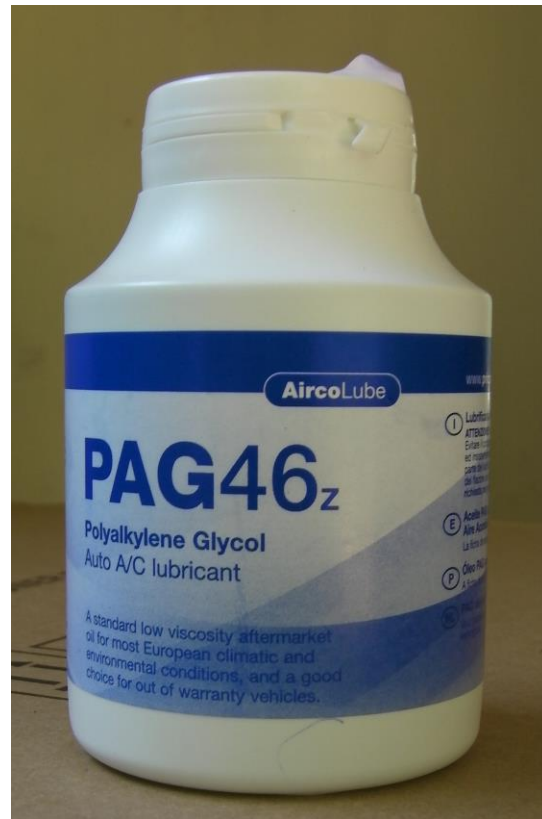
EMKARATE COPY/FAKE OIL (CONTAINS MINERAL OIL)



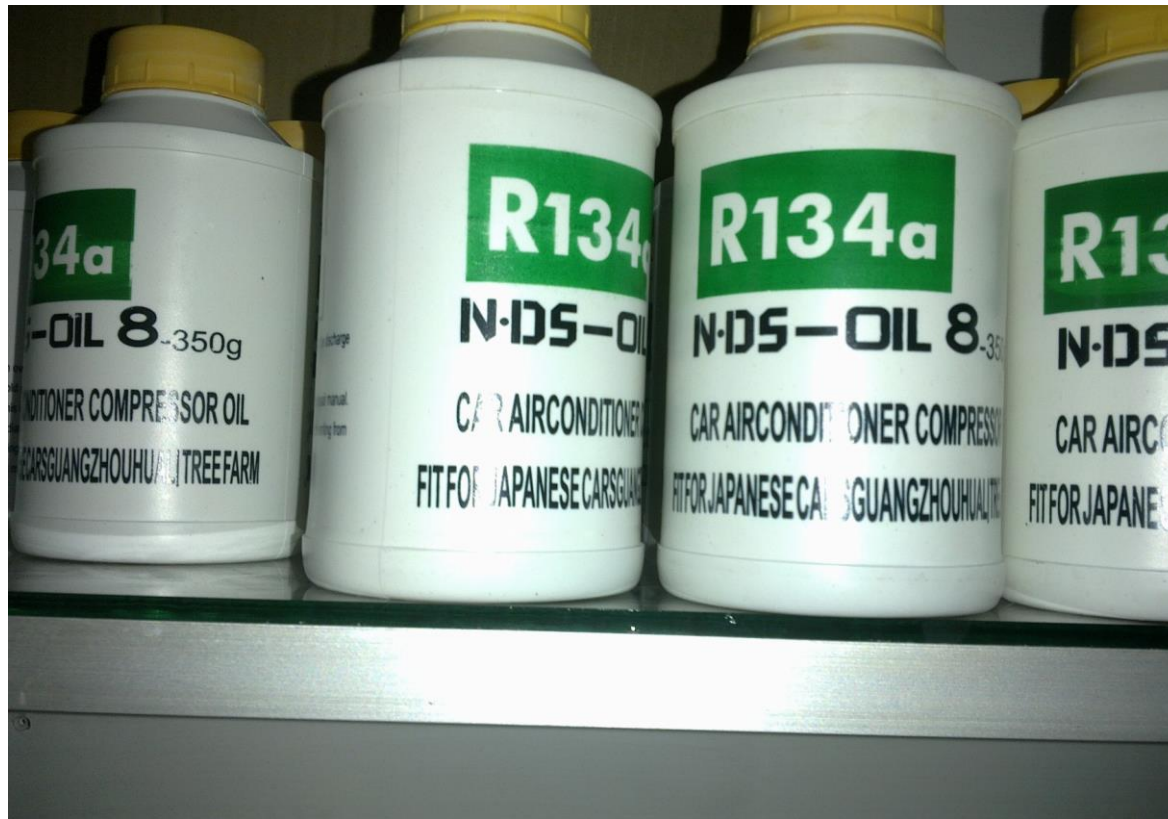
GENUINE CAN VS COPY CAN

- ▶ Genuine can address- CPI ENG SERVICES - Contains PAG
- ▶ COPY/FAKE address - uniquema/ ICI - Containes MO
- ▶ SAME WEB ADDRESS APPEAR ON THEM

GENUINE PAG OIL



FAKE PAG OILS- No address, No chemical names



ND 8 COPY OIL



DAMAGED DUE TO USE OF FAKE LUBRICANTS

- ▶ Compressor failures
- ▶ Due to not return the oil
- ▶ Increased friction
- ▶ Acid formation
- ▶ Rust formation
- ▶ Acid formation
- ▶ Formation of sludge
- ▶ Reduction in life time
- ▶ Frequent failures
- ▶ Loss of foreign exchange(equipment, vehicles)

HOW TO IDENTIFY GOOD LUBRICANT

- ▶ Website on the can(wrong web on Em fake)
- ▶ Searching of manufacturers website
- ▶ Checking of PDS AND MSDS
- ▶ Checking of test reports
- ▶ Comparisons of molecular distribution.

WHY FAILURES DUE TO FAKE OIL ARE DIFFICULT TO IDENTIFY

- ▶ Due to slow chemical reactions
- ▶ Over charging(Return during the off cycle)

CHANGE OF COLOUR

MAJORITY OF AIR-COND FAILURE DUE TO OIL NOT CHANGED

- 1 NEW**
- 2 11/2 YEAR**
- 3 BAD**
- 4 WORSE**
- 5 WORST**
- 6 TERRIBLE**



HOW TO CONTROL THE FAKE OILS

- ▶ Best way is to educate the end user
- ▶ Government control :
 - ▶ 1. At the entry point
 - ▶ 2. During sales