



Compressor Failure Analysis

	Reciprocating Type			Rotary type		
Type	10PA / 10S	SBU / SE / SL	SC	TV	SV	ES
Displacement	Fixed	Variable	Fixed	Fixed	Fixed	Variable
R134a	ND-oil 8* (ISO 46)	ND-oil 8* (ISO 46)	ND-oil 8* (ISO 46)	ND-oil 9 (ISO 100)	ND-oil 8* (ISO 46)	ND-oil 11 (POE oil)
R1234yf	ND-oil 12* (ISO46 + additives)	ND-oil 12* (ISO46 + additives)	ND-oil 12* (ISO46 + additives)	Not applicable	Not applicable	ND-oil 11 (POE oil)

*double end capped oil

ISO 46 / 100 = Viscosity Grade



Clear separation of two different oil substances; one transparent and the other not

Problem description: No variable displacement, system blockage or compressor seizure.

Cause of failure: PAO oil added to the refrigerant cycle. ND-oils and PAO oil do not mix and will cause creation of paraffin like substance.

Resulting in: Clogging of control valve and/or refrigerant cycle.



Rubber seals are swollen and do not fit in the original position

Problem description: No variable displacement and/or system leakage.

Cause of failure: 1) The system was charged with the wrong type of refrigerant.
2) Additives (conditioners) or wrong type flushing agents were used.

Resulting in: The refrigerant, oil, additive or flushing agent resulted in swelling of the rubber seals.



Clear separation of two different oil liquids; one is forming droplets on the other

Problem description: Excessive noise and/or compressor seizure.

Cause of failure: POE oil added to the refrigerant cycle. ND-oil 8 & ND-oil 12 do not mix properly with ND-oil 11.

Resulting in: A high percentage of POE will reduce lubrication performance.



The suction port is dirty and black

Problem description: No variable displacement or compressor seizure.

Cause of failure: Insufficient cleaning of refrigerant cycle and/or not all required parts replaced.

Resulting in: Dirt particles travel through the system and re-enter the compressor resulting in bad lubrication or clogged control valve.



Suction port is clean and dry

Problem description: Compressor seizure.

Cause of failure: Insufficient lubrication caused by system blockage or no run in procedure.

Resulting in: 1) No oil return and no lubrication of inner parts.
2) Excessive engine rpm at first time of operation provides insufficient time for oil and refrigerant to mix before returning to the compressor.

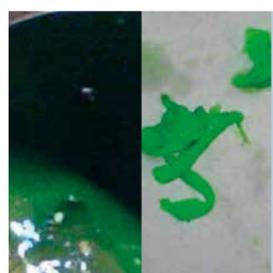


Discharge port is black and discolored

Problem description: No variable displacement or compressor seizure.

Cause of failure: Low refrigerant amount or partially blocked refrigerant cycle.

Resulting in: Insufficient oil return resulting in bad lubrication and overheating of the compressor.



A hardened or a gel like substance inside the oil or suction port

Problem description: No variable displacement, system blockage or compressor seizure.

Cause of failure: Leak stop additive or conditioner added to the refrigerant cycle.

Resulting in: 1) No oil return and no lubrication of inner parts.
2) Excessive engine rpm at first time of operation provides insufficient time for oil and refrigerant to mix before returning to the compressor.



Broken hub limiter of the DL-Pulley

Problem description: No compressor operation

Cause of failure: 1) Too high internal friction or complete seizure.
2) Liquid lock.
3) Alternator free run pulley seized, broken belt tensioner, crankshaft damper or dual mass flywheel.

Resulting in: 1+2) For safety reasons the limiter of the pulley hub will break instead of drive belt.
3) Excessive drive belt movement results in negative force to the compressor pulley.



Rubber particles at suction and discharge port

Problem description: No variable displacement or compressor seizure.

Cause of failure: Deterioration of rubber hose due to ageing of or a reaction with conditioners, sealers or flushing agents.

Resulting in: Rubber material travels through the refrigerant cycle resulting in blockage and compressor failure.



Cracked or shattered plastic pulley

Problem description: Drive belt noise or drive belt disengaged.

Cause of failure: 1) Incorrect removal or installation of the drive belt.
2) Hitting of the DL-pulley before or after installation.

Resulting in: Excessive force was applied to the pulley resulting in cracks or shattering of the pulley.