## COMPRESSOR FAILURE ANALYSIS

### RECIPROCATING TYPE

<table>
<thead>
<tr>
<th>Type</th>
<th>Displacement</th>
<th>Variable</th>
<th>ND oil 8 (equivalent to PAG 46*)</th>
<th>ND oil 8 (equivalent to PAG 46*)</th>
<th>ND oil 9 (equivalent to PAG 100*)</th>
<th>ND oil 11 (equivalent to POE oil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R134a</td>
<td>Fixed</td>
<td>Fixed</td>
<td>ND oil 8 (equivalent to PAG 46*)</td>
<td>ND oil 8 (equivalent to PAG 46*)</td>
<td>ND oil 9 (equivalent to PAG 100*)</td>
<td>ND oil 11 (equivalent to POE oil)</td>
</tr>
<tr>
<td>R1234yf</td>
<td>ND oil 12</td>
<td>Discontinued</td>
<td>ND oil 12 (equivalent to PAG 46* + additives)</td>
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<td>ND oil 12 (equivalent to PAG 46* + additives)</td>
<td>ND oil 11 (equivalent to POE oil)</td>
</tr>
</tbody>
</table>

### ROTARY TYPE

<table>
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<th>Displacement</th>
<th>Variable</th>
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<tr>
<td>SC</td>
<td>Fixed</td>
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<td>ES</td>
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</tr>
</tbody>
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### Problem Descriptions

- **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:** PAG oil added to the refrigerant cycle. PAG oil and POA oil do not mix and will cause creation of paraffin-like substances.
  - **Resulting in:** Clogging of control valve and/or refrigerant cycles.

- **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. POE oil and POA oil do not mix properly.
  - **Resulting in:** A high percentage of POE will reduce lubrication performance.

- **Suction port is clean and dry**
  - **Problem description:** Compressor seizure.
  - **Cause of failure:** Insufficient lubrication caused by:
    1. System blockage.
    2. No oil return and no lubrication of compressor inner parts.
  - **Resulting in:** No variable displacement and/or system leakage.

- **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:** Chemical reaction of the leak stop or conditioner caused blockage of the compressor control valve and / or expansion valve.

- **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 or a reaction with conditioners, sealers or flushing agents.
  - **Resulting in:** Rubber material travels through the refrigerant cycle resulting in blockage and compressor failure.

- **Rubber seals are swollen and do not fit in the original position**
  - **Problem description:** No variable displacement and/or system leakage.
  - **Cause of failure:** The system was charged with the wrong type of refrigerant.
  - **Resulting in:** Rubber seals are swollen and do not fit in the original position.

- **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 traveled through the system and re-entered the compressor resulting in bad lubrication or clogged control valve.

- **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.

- **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:** Excessive drive belt movement results in negative force to the compressor pulley.

- **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 CL-pulley before or after installation.
  - **Resulting in:** Excessive force was applied to the pulley resulting in cracks or shattering of the pulley.