**Identifying Compressor Failure Modes**

Indicators, Symptoms, and Corrections

**Refrigerant Floodback**

The oil is diluted with refrigerant to the point it cannot properly lubricate the load bearing surfaces. This is the result of liquid refrigerant returning to the compressor during the running cycle.

- **Open Drive Compressors**
  - Worn piston rings and cylinders
  - Progressive wear crankshaft
  - Rods broken from seizure

- **Refrigerant Cooled Compressors**
  - Center & bearing worn/welded

**HIGH DISCHARGE TEMPERATURE**

- **Discarded valve plate**
- Burned piston and crankshaft
- Worn pistons, rings, and cylinders

**LIQUID SLUGGING**

- **No evidence of overheating**
- **Progressively worn crankshaft**
- Little or no oil in crankcase

**LOSS OF OIL**

- **All oil is burned or seized**
- **Unburned crankshaft uniformly scored**
- Little oil in or on crankcase

**SINGLE PHASE BURN**

- **Worn piston rings**
- **Possibly worn piston rings**
- **Positively worn piston rings**

**LOSS IN OIL**

- **Both contactors, one will be defective**
- **Check sequence timer for one second or less total time**

**ELECTRICAL FAILURES**

Motors are generally damaged as a result of mechanical failures but some are true electrical failures.

**GENERAL or UNIFORM BURN**

- Check high or low voltage
- Check for unbalanced voltage
- Check for rapid compressor cycling

**SLOW CIRCUIT**

- Maintain proper evaporator and compressor superheat
- Correct abnormally low load conditions

**PRIMARY SINGLE PHASE BURN**

- 1. Check oil failure control operation if applicable
- 2. Check system refrigerant charge

**SELECTIVE BURN**

- Any phase of a single phase motor is burned or unbalanced
- 1. Check for improper line sizing and improper traps
- 2. Check for inadequate defrosts

**HALF WINDING SINGLE PHASE BURN**

- This occurs when one half of a PART WINDING START motor has a single phasing condition.

**CORRECTION**

- 1. Maintain proper evaporator and compressor superheat
- 2. Correct abnormally low load conditions
- 3. Install suction accumulator to stop uncontrolled liquid return

**FLOODED STARTS**

- This is the result of liquid refrigerant melting in the crankcase oil during the OFF CYCLE. When the compressor starts, the diluted oil cannot properly lubricate the crankcase bearing surfaces. The liquid will wash the oil off the cylinders and piston walls during the suction stroke causing them to wear during the compression stroke.

**CORRECTION**

- 1. Locate the compressor in a warm ambient or install continuous pumpdown
- 2. Check crankcase heater operation (Should be energized during off cycle)
- 3. Operate with minimum refrigerant charge
<table>
<thead>
<tr>
<th>Refrigerant Conversions</th>
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<th>Discharge Pressure</th>
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**Key:**
- **Gray shaded cells** indicate vacuum pressures lower than 3 psi.
- **Orange shaded cells** indicate saturated liquid pressures.
- **Blue shaded cells** indicate saturated vapor pressures.
- **Denotes pressures above critical point of the refrigerant.**

**CONSULT CARLYLE FOR DETAILED RETROFIT RECOMMENDATIONS**

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