## Identifying Compressor Failures

Most compressors fail due to system malfunctions which must be corrected to prevent repeat failures. After a compressor fails, field examination of the failed compressor often will reveal symptoms of system problems.

| | | |
|---|---|---|
| **Liquid Slugging**<br>Broken reeds, rods or crankshaft<br>Loose or broken discharge bolts<br>Blown gaskets. | Slugging is a result of trying to compress liquid in the cylinders.Liquid may be either refrigerant or oil or more likely a combination of both.<br>Slugging is primarily the result of off cycle refrigerant migration on refrigerant cooled compressors and floodback on air cooled compressors. | **Correction:**<br>**1. Maintain proper compressor and evaporator superheat.**<br>**2. Prevent uncontrolled liquid return (particularly oil) with accumulators.**<br>**3. Locate compressors in warm ambient or install pump down cycle.**<br>**4. Correct abnormal low load conditions.** |
| **Liquid Washout**<br>Worn rods and bearings.<br>Worn pistons and cylinders on lower end.<br>Worn crankshaft and oil pump.<br>Scored cover bearing and crankshaft. | This is a result of refrigerant washing oil off wearing surfaces.Off cycle migration of saturated refrigerant into crankcase.<br>Compressor starts up resulting in a mass of foam which when pumped washes bearing surfaces clear of oil film necessary for proper lubrication.<br>Severe migration results in slugging. | **Correction:**<br>**1. Locate compressor in warm ambient or install pump down cycle.**<br>**2. Check crankcase heater operation.** |
| **Liquid Dilution**<br>Rotor drag/shorted stator<br>Worn bearings.<br>Scored and/or broken rods<br>Scored crankshaft.<br>Worn oil pump. | This is a result of liquid refrigerant returning to compressor during running cycle. Oil becomes diluted and lubrication for oil pump and end bearing may be adequate, but as it progresses down the crankshaft insufficient oil to lubricate the rods and main bearings will occur.This may allow the rotor to drag on the stator and short out the stator. | **Correction:**<br>**1. Maintain proper compressor and evaporator superheat.**<br>**2. Prevent uncontrolled liquid return with accumulator if necessary.**<br>**3. Correct abnormal low load conditions.**<br>**4. Check of defrost cycle.**<br>**5. Check for oversized TXV.** |
| **High Discharge Temperature**<br>Discoloured valve plate (Cannot rub off).<br>Overheated or burned valve reeds<br>Worn rings and pistons.<br>Worn cylinders.<br>Scored rods, bearing and crankshaft.<br>Spot burn in stator. | This is a result of temperatures in the compressor head and cylinders becoming so hot that the oil loses its ability to lubricate. | **Correction:**<br>**1. High compression ratio:check for low suction and high discharge pressures. Low load and evaporator problems.**<br>**2. Check low pressure control setting.**<br>**3. Check for dirty condensor,inoperative condenser fan and ambient temperature.**<br>**4. Check air flow across compressor.** |

## Identifying Compressor Failures

**Corrections will help eliminate future**

Identifying Compressor Failures

| | | |
|---|---|---|
| **Lack of Oil**<br>Scored bearings.<br>Broken rods.<br>Scored crankshaft.<br>Low oil in crankcase | This is a result of lack of enough oil in crankcase to properly lubricate the running gear. | **Correction:**<br>**1. Check oil failure switch operation.**<br>**2. Check pipe sizing and also for oil traps.**<br>**3. Check for inadequate defrost.**<br>**4. Correct abnormal low load conditions.**<br>**5. Eliminate short cycling.** |
| **Electrical** | Many motors fail as a result of a mechanical or lubrication failure. Many fail due to malfunctioning external electrical components. | |
| **General or Uniform Burn** | Entire winding is uniformly overheated or burned. | **Correction:**<br>**1. Low voltage.**<br>**2. Rapid cycling of compressor.**<br>**3. Inadequate motor cooling.**<br>**4. Unbalanced voltage.** |
| **Single Phase Burn**<br>Two Phases of a three phase motor are overheated or burned. | A result of not having current through the unburned phase and overloading the other | **Correction:**<br>**1. Replace contactor.**<br>**2. Check terminal connections on compressor.**<br>**3. Check for balanced voltage.**<br>**4. Check for blown fuses.** |
| **Half Winding Single Phase Burn** | This shows as when one half of the motor has a single phasing condition on a PART WIND MOTOR with a two contactor system. | **Correction:**<br>**1. Check both contactors as one may be defective.**<br>**2. Check timer for proper time delay.** |
| **Start Winding Burn** | Only the start winding is burned in a single phase motor due to excessive current flowing through the start winding. | **Correction:**<br>**1. Check C,S and R wiring.**<br>**2. Check starting capacitor and/or start delay.**<br>**3. Check for compressor overloading.** |
| **Run Winding Burn** | Only the run winding is burned in a single phase motor. | **Correction:**<br>**1. Check relay.**<br>**2. Check run capacitors.** |
| **Primary Single Phase Burn** | This will show as only one phase burned. Other two will be OK.A result of losing one phase in the primary of a Δ to Y or Y to Δ transformer. | **Correction:**<br>**1. Check transformer for proper voltage incoming and outgoing.** |