COMPRESSOR FAILURES

Why has the compressor failed?

- Electrical Failure
  - External electrical problem
    - Single phasing of three phase system
      - Can cause internal problem of Grounded or open windings
    - Capacitor problem
      - Can cause internal problem of Grounded or open windings
    - Potential relay problem
      - Can cause internal problem of Grounded or open windings
    - Wiring problems
      - Loose, brunt or undersized wires and/or connections
        - Can cause internal problem of Grounded or open windings

  - Internal electrical problem
    - Grounded windings
      - Caused by winding failure only?
        - Very rare usually occurs soon after installation
      - Caused by system problem?
        - Can be caused by:
          - Foreign material in system-physical damage to windings or acid damage
          - High system superheat-windings overheat
          - Excessive amp draw-compressor overloaded
          - External electrical problem causing winding failure
    - Open windings
      - Windings broken
        - See above (grounded windings)
      - Internal protector open
        - Can be caused by:
          - High system superheat-repeated openings will cause failure of protector
          - Compressor overloaded

- Mechanical Failure
  - Locked up or noisy compressor
    - Internal damage, bearings pistons etc
      - Caused by normal wear?
        - Extremely rare
      - Caused by system problems?
        - Can be caused by:
          a. Low system superheat-liquid flood back
          b. Refrigerant mixed with oil on startup-crankcase heater needed/not working
          c. Loss of oil
             c1. Leakage- has system been losing refrigerant?

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c2 Oil 'trapped' in system
- i Low load causing low refrigerant flow
- ii Bad piping design
- iii Short cycling of compressor

- Hydraulic lock
  - Liquid flood back
  - Refrigerant migration
  - Oil slug (See c2 above)

- Valve failure
  - Damaged valves and/or valve plate
    - Liquid flood back-low/no superheat
    - Oil slug (see c2 above)
    - Excessive discharge temperature-usually also high discharge temp.
  - Internal relief open
    - Check discharge pressure if high check system before replacement of compressor
    - Repeated openings of valve may cause failure
- Leakage

IMPORTANT NOTES ON COMPRESSOR REPLACEMENT

- **Remember that over 90% of compressor failures are result of some other problem; allow time in the replacement to fully check the system after the replacement.**
- **Always replace all electrical components controlling the compressor, contactor, overloads, capacitor, potential relay etc. (Some compressor manufacturer's are rejecting replacement compressor warranty claims if evidence of contactor change is not available).**
- **A fixed orifice system will have a low superheat if the evaporator coil is even slightly dirty; many compressor failures are the result of dirty coils. Make sure that they are clean before starting the replacement compressor.**
- **When you find a bad compressor don't just walk away and report that a new compressor is needed. Try and investigate the REAL cause of the problem. Remember that when you fully check that system after replacing the compressor, the customer is not happy to be told that more work needs to be completed in order for the system to operate satisfactory. Failure to diagnose and correct the real cause will result in a repeat failure and possible warranty claims.**
- **Make recommendations on options that may prevent future failures, i.e. phase monitors, high and low pressure switches, freeze stats, interlocks.**

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