Refrigerant Leak Repair Flow Chart

1. **Start**
2. **Is the normal charge of the refrigeration system > 50 lbs?**
   - Yes: **System is outside the scope of this rule. No action required. [82.156(i)(1), 82.156(i)(2), 82.156(i)(5)].**
   - No: **Leak Discovered**
3. **Is the system classified as either industrial process or commercial?**
   - Yes: Trigger leak rate is 35% annually. [82.156(i)(1) & 82.156(i)(2)]
   - No: **Calculate annual leak rate.**
4. **Is the leak rate greater than the trigger rate?**
   - Yes: **Commercial, Comfort A/C, & Other** or **Industrial Process Refrigeration**
   - No: **No action required.**
5. **Leak Repair Option**
   - Repair leaks sufficient to lower leak rate below 15% annually (35% for commercial) within 30 days of discovery.* [82.156(i)(1), 82.156(i)(5) & 82.156(i)(9)]
   - **End**
6. **Retrofit/Retire Option**
   - Develop, within 30 days of leak discovery*, a one-year retrofit or retirement plan for the leaking system. Keep plan (or a legible copy) at the site of the equipment. [82.156(i)(6)]
   - Complete plan within one year of plan date.* [82.156(i)(6)]
   - **End**
7. **Leak Repair Option**
   - Follow leak repair process.*
   - **End**
8. **Retrofit/Retire Option**
   - Develop, within 30 days of leak discovery*, a one-year retrofit or retirement plan for the leaking system. Keep plan (or a legible copy) at the site of the equipment. [82.156(i)(6)]
   - **End**

*Note: All time-related requirements for repairing, retrofitting, or retiring a leaking system are temporarily suspended if the system is mothballed. [82.156(i)(10), 82.152]
Determine the total time allowed for retrofit/retirement of leaking refrigeration equipment by following each of the three pathways below which is applicable.*

Custom Built/Critical Component Path (Path 1)

Is a custom-built system required?
[82.156(i)(7)(ii)(A)]

No

Is quoted delivery for any critical component > 30 weeks from when order is placed?
[82.156(i)(7)(ii)(B)]

No

Maximum time of one year from the plan's date allowed for retrofit/replacement unless additional time allowed from a different pathway.

Yes

If you have not already done so, follow the other applicable pathways to determine the total amount of time allowed for retrofit/retirement activities.

Notify EPA within 6 months after the end of the 30-day period after >35% leak discovery per 82.166(o).
[82.156(i)(7)(ii)(C)]

Maintain records adequate to determine unit is custom built and quoted delivery for critical components >30 weeks.
[82.156(i)(7)(ii)(D)]

Additional one-year period beyond initial one-year period allowed for retrofit/retirement.
[82.156(i)(7)]

Complete the retrofit or retirement work within the total time allowed.
[82.156(i)(6) & 82.156(i)(7)]

End

*Note: All time-related requirements for repairing, retrofitting, or retiring a leaking system are temporarily suspended if the system is mothballed. [82.156(i)(10), 82.152]
Retrofit/Retire from pg. 2

Other Regs or Unsuitable Replacement Refrigerant Path (Path 2)

Do other regulations require delays and/or is a suitable replacement refrigerant with lower ODP unavailable?

- Yes
  - Notify EPA of the need for additional time along with the records necessary to allow EPA to determine that delays occasioned by other regulations and/or due to the unavailability of a suitable refrigerant apply per 82.166(o). Notification and records must be submitted within 6 months after the 30-day period following the >35% leak discovery. [82.156(i)(7)(i)]
  - Additional time, to the extent reasonably necessary, is allowed unless EPA objects. EPA will notify of its determination within 60 days of submittal. [82.156(i)(7)(i)]
  - Extra time allowed?
    - Yes
      - Go to pg. 2
    - No

- No
  - Maximum time of one year from the plan's date allowed unless additional time allowed from a different pathway.
  - Maximum time of two years from the plan's date allowed unless additional time allowed from a different pathway.
  - More than Two Years Needed for Retrofit/Retirement Path (Path 3)

More than Two Years Needed for Retrofit/Retirement Path (Path 3)

Was an additional year received via Path 1 and still more time is needed?

- Yes
  - Before completing the end of the 9th month of the first additional year, submit a request to EPA per 82.166(o) to further extend the deadline for completing retrofit/retirement activities. [82.156(i)(7)(iii)]
  - Extension is automatically granted unless EPA objects within 30 days of receipt. [82.156(i)(7)(iii)]

- No
  - Did EPA object?
    - Yes
      - Go to pg. 2
    - No
30-day repair period allowed. [82.156(i)(9)]

Is an industrial process shutdown needed to repair leaks? [82.156(i)(2)(ii)]

Yes

120-day repair period allowed. [82.156(i)(2)(ii)]

120-day repair period allowed. [82.156(i)(2)(ii)]

Is necessary leak repair parts unavailable or do other regulations make a repair within 30/120 days impossible? [82.156(i)(2)(i)]

No

Conduct leak repairs within 30/120 days of discovery. An unlimited number of repair attempts is permitted within the allowed time.

Yes

Notify EPA within 30 days of this determination per 82.166(n) [82.156(i)(2)]

Conduct all necessary repairs, if any, that do not require time beyond 30/120 days. Once parts received or regulations complied with, conduct remaining repairs within remaining time of original 30/120-day repair period. [82.156(i)(2)]

Additional time is allowed (only what is necessary) to receive parts or comply with regulations. Document all repair efforts. [82.156(i)(2) & 82.156(i)(2)(i)]

Conduct initial verification testing at the conclusion of the repair effort (and prior to replacement of the refrigerant, if evacuated). If off line, system may not be brought back on line until test(s) are successful. [82.152, 82.156(i)(3), & 82.156(i)(3)(i)]

Re-verify success of leak repairs by conducting follow-up verification test(s) at normal operating conditions** within 30 days of completing repairs or bringing the system back on line. [82.152 & 82.156(i)(3)]

Does testing indicate leak(s) were successfully repaired? [82.156(i)(3)(i)]

No

If off line, system may be brought back on line, but retrofit or retirement is required. System automatically fails follow-up verification test. [82.156(i)(3)(ii)]

Yes

Does testing indicate leak(s) were successfully repaired?

Yes

End

No

** The follow-up verification test may be conducted prior to achieving normal operating conditions in some circumstances. See pg. E-3 of the guidance document for details.
Leak(s) not successfully repaired during first repair effort. (from pg. 4)

Within 30 days of failed follow-up verification test:
1) Notify EPA that verification test was failed per 82.166(n); and,
2) Develop a one-year retrofit/retirement plan. Keep plan (or a legible copy) at the site of the equipment.
Choose one or more of the options below. Two options, if successfully taken, may relieve the obligation to retrofit or retire.***
[82.156(i)(3)(ii), 82.156(i)(3)(iii) & 82.156(i)(6)]

Relief from Retrofit/Retirement:
2nd Repair Efforts Option

Repair same leaks subject to first repair efforts within 30 days of the failed follow-up verification test (120 days if industrial process shutdown is required). An unlimited number of repair attempts is permitted within the allowed time.
[82.156(i)(3)(iv)]

Conduct initial verification testing at the conclusion of the repair effort (and prior to replacement of the refrigerant, if evacuated.) If off line, system may not be brought back on line until test(s) are successful.
[82.152, 82.156(i)(3), & 82.156(i)(3)(i)]

Does testing indicate leak(s) were successfully repaired?
[82.156(i)(3)(i)]

Yes

No

If off line, system may be brought back on line. Retrofit or retirement is still required.
[82.156(i)(3)(i)]

Re-verify success of leak repairs by conducting follow-up verification test(s) at normal operating conditions** within 30 days of completing repairs or bringing the system back on-line.
[82.152 & 82.156(i)(3)]

Does testing indicate leak(s) were successfully repaired?

Yes

No

Notify EPA within 30 days of successful verification per 82.166(n). Obligation to retrofit/retire is relieved.
[82.156(i)(3)(iv)]

End

Retrofit or retirement is still required.
[82.166(i)(3)(ii)]

Go to pg. 6

** The follow-up verification test may be conducted prior to achieving normal operating conditions in some circumstances. See pg. E-3 of the guidance document for details.

*** IMPORTANT NOTE: The deadline for completing a retrofit or retirement and the deadline for requesting an extension if more than one year is needed to retrofit or retire are both based on the date of the failed verification test from the initial repair efforts. You should be aware of these deadlines and make appropriate provisions if you intend to attempt one or both of the options to be relieved of the obligation to retrofit or retire and are ultimately unsuccessful.
From pg. 5

Relief from Retrofit/Retirement: 180-day Verification Option

In notification of failed verification test from initial repair efforts, notify EPA of parameters to be used for establishing leak rate is less than 35%. Parameters are acceptable unless EPA objects within 30 days of receipt of notice. [82.156(i)(4)]

Determine leak rate of system using acceptable parameters within 180 days of failed follow-up verification test from first repair efforts. [82.156(i)(3)(v)]

Leak rate <35%?

Yes

Notify EPA of determination within 30 days per 82.166(n). Obligation to retrofit/replace is relieved. [82.156(i)(3)(v)]

End

No

Retrofit or retire the leaking equipment within one year of the plan's date. Proceed through the remainder of the flow chart to determine if time beyond one year is permitted.

180-Day Verification

Verification test indicates leak(s) not successfully repaired. (from pg. 5)

Proceed with retrofit/retirement or 180-day verification.

Retrofit/Retirement