

PHASE OUT: ARE YOU READY?

Finding the right answer starts with asking the right questions. So before you finalize your phase out plan, use the chart below to help gauge some important system factors and determine which strategy is the best fit for your facility.

1. RATE YOUR SYSTEM

For each criteria, select the most appropriate description and find the point value.

A. SYSTEM TYPE	POINTS	B. SYSTEM AGE	POINTS
Rooftop make-up air unit	1	1-5 years old	1
Split Evap/Condenser system	2	5-10 years	2
Centrifugal Chiller	3	10-15 years	3
Centralized Plant with dedicated machinery room	4	15-20 years	4
		20+	5

C. PLANT CONDITION	POINTS
Excellent – regular maintenance program and audits, no unexpected failures or refrigerant leaks in the last 10 years	1
Good – regular maintenance program and audits, no unexpected failures or refrigerant leaks in the last 5 years	2
Fair – regular maintenance program and audits, some unexpected failures or refrigerant leaks in the last year	3
Poor – no regular maintenance or audits, unexpected failures or refrigerant leaks occur often	4

D. OPERATIONAL IMPORTANCE	POINTS
Breakdowns can be tolerated for a week or more until repairs are made.	1
Breakdowns can be tolerated for less than a week. Temporary chilling units available to rent, parts available same day.	2
Breakdowns can be tolerated for less than a day. Temporary rental solutions are difficult to source, parts available in days, prolonged breakdowns lead to cancellation of ice rentals/production and loss of revenue.	3
Breakdowns can be tolerated for less than a few hours. No temporary rental solutions available, parts available in days/weeks, prolonged breakdowns leads to loss of product and revenue.	4
Breakdowns cannot be tolerated. No temporary rental solutions available, parts available in weeks, any breakdown leads to loss of revenue and a risk to health and safety.	5

2. CALCULATE YOUR SCORE

Add up your total points score.

$$A + B + C + D = \text{TOTAL}$$

0-11: Retain

If your total is 11 or less, consider
Option 1: Retain and manage existing system

12-16: Retrofit

If your total is between 12 and 16, consider
Option 2: Retrofit with a drop in refrigerant

17+: Replace

If your total is 17 or higher, consider
Option 3: Replace or upgrade to a new system

FOR DETAILS ON EACH OPTION, SEE OTHER SIDE ►

OPTION 1

Retain and manage existing system

Based on your score, it is reasonable that you would implement an enhanced maintenance and leak detection program. This approach is most effective when the existing program is reviewed with a maintenance and leak prevention focus on high risk components where leaks might occur.

- Install multipoint leak detector to measure refrigerant release from floats, seals, oil cooler, compressors and relief lines.
- Leak detector calibrations semi annually
- Ensure that all relief valves have a rupture disc to prevent weeping
- Daily/weekly/monthly plant inspection with hand held leak detector to find leaks
- Vibration analysis at manufacturer's recommended intervals
- Change any relief valves, shaft seals that have age and may be outdated
- Maintain a 25% surplus of refrigerant
- Regular inspections by certified refrigeration mechanics

OPTION 2

Retrofit with a drop in refrigerant

Based on your score, you may want to consider modifying your system with a drop in refrigerant. The drop in option needs to be carefully considered and it is recommended to do a full engineering study. An engineering study will help determine the complexity, risk, and cost. The following should be considered:

- Determine system type and plant conditions
- Review system capacity and load requirements
- Review material compatibility and cooling capacity
- Review refrigerant glide limitations
- Determine future oil and filter dryer requirements
- Provide recommended refrigerant conversion requirements
- Review and determine the TX valve position adjustment and/or replacement to verify valve size and recommend adjustments
- Identify worn or damaged components
- Determine new refrigeration capacity, expected runtimes, and energy usage
- Assess whether new refrigerant might be a target of current future phase-outs (high GWP)

OPTION 3

Replace or upgrade to a new system

Replacing a refrigeration system can be complicated and several factors need to be considered as part of the planning process. When evaluating a new system, here are the things you should consider to avoid surprises:

- Projected operating cost
- Projected maintenance costs
- Environmental impact
- Local and national regulations
- Disruption of current usage and production
- Required refrigeration performance
- Operating season
- Future expansion plans
- Incentives available to offset capital expenditure
- Automation and building integration