

Assess if a Refrigerating and Air-Conditioning Plant Is Sustainable



Checklists and Guidance Sheets produced by ASHRAE and UNEP OzonAction enable technicians, plant managers, policy makers, and suppliers to assess if a plant is operating sustainably.

The tools can be downloaded for free from the ASHRAE-UNEP portal at ashrae.org/unep-RACchecklists.

RAC plants must meet key parameters in eight dimensions of practice to achieve energy-efficient, safe, and environmentally sustainable performance:

- Safe Storage and Proper Handling of Refrigerants
- Periodic Leak Checking and Proper Documentation
- Preventive Maintenance of Equipment
- Preventive Maintenance of Automatic Controls
- Energy-Efficient Operation
- Proper Commissioning and Recommissioning Practices
- Proper Disposal of Equipment and Refrigerant
- Competencies of Operating and Service Personnel

To assess performance and implement recommended practices in a RAC plant's day-to-day operations, ASHRAE and UNEP OzonAction have developed Operations and Maintenance Best Practices Checklists and Guidance Sheets for each dimension of practice to **Assess RAC Plant Sustainability.**



Checklists

The Checklists are practical tools to assess and implement recommended practices. In addition to best practices, each checklist:

- States why it is needed
- Describes a sustainability-centric mindset
- Lists required actions to achieve sustainability and efficient and safe operation
- Provides measures of success that identify targets to know if operations and maintenance changes are leading to improvement, including emphasis on preventive maintenance through regular inspections and upkeep of RAC equipment

The checklists have been formatted as fillable, savable PDFs that are also printable for retention in notebooks or display as posters in equipment rooms.

The checklists are supplemented by an annex covering Requirements for Tools and Servicing, sample work orders for preventative maintenance of equipment, and sample checklists for maintenance practices for energy-efficient operation.

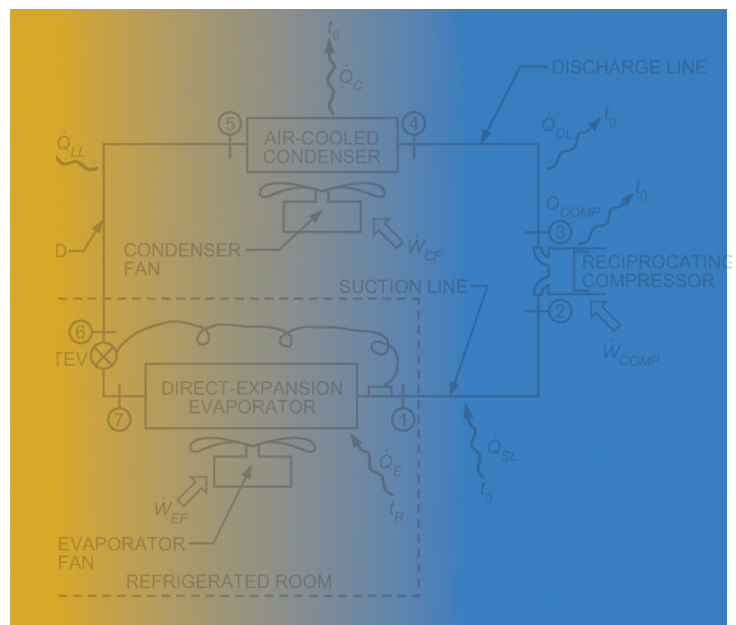
Assessing RAC Plant Sustainability

will become a critical resource for plant operators as low-GWP alternatives are increasingly used. Many of these solutions have flammability concerns, and compliance with safe-handling practices is necessary to eliminate risks to humans and property. Regulations also mandate increased tracking and reporting of refrigerant inventory and system leakage.

While the primary target group for the checklists and guidance to **Assess RAC Plant Sustainability** is service technicians and plant operations managers, the checklists and guidance sheets are also useful for plant owners to learn

- How to reduce refrigerant emissions
- Document refrigerant compliance
- Reduce operating costs
- Improve uptime
- Lower service/maintenance expenses

Governments can use checklists to establish requirements and compliance paths to reduce refrigerant emissions and energy consumption. The guidance sheets can provide the basis for safety and sustainability regulations.



Since better-performing equipment rooms are characterized by more efficient equipment, RAC equipment suppliers can use the materials to train customers on preventive maintenance.

Visit ashrae.org/unep-RACchecklists to download the free checklists, review the guidance sheets, and begin assessing if RAC plants are operating sustainably.

While there is no cost to access the checklists and guidance, registration is required to enable UNEP and ASHRAE to provide updates.

2. Periodic Leak Checking and Proper Documentation

Mindset: No leak is acceptable. The goal should be zero.

Why: RAC systems are designed to operate with a fixed charge of refrigerant. Building designers, installers, and service and maintenance technicians should be aware of potential hazards and always check to see if any are occurring or leading to leakage. If a system has insufficient refrigerant, it must be checked for leaks, then repaired and recharged.

OBJECTIVE

Identify target leak rates for various types of RAC equipment.

DIRECT SYSTEMS

The following actions are required to be performed.

- | | |
|--------------------------|---|
| | Perform regular leak checks as follows: |
| ☐ | • Self-contained: yearly |
| ☐ | • Field erected < 20 HP: Semiannually |
| ☐ | • Field erected > 20 HP: Quarterly |
| ☐ | • All systems: Leak alarm actuated |
| ☐ | Properly document any leaks found during leak checks in the daily maintenance log, including the date, specific location, repair method, and amount of refrigerant added. |
| ☐ | Leaks were properly repaired, and the refrigerant used documented. |
| ☐ | Report leaks as required by regulations. |
| ☐ | Ensure all leak detection sensors are installed in appropriate locations. |
| ☐ | Follow protocols for leak detection of all refrigerants with special attention paid to flammable and/or toxic refrigerants. |

MEASURE OF SUCCESS

Systems are well maintained by proactively checking for, repairing, and documenting leaks while driving toward zero-leak systems.

INDIRECT SYSTEMS

Covering centralized systems typically use air-cooled or water-cooled chillers, heat recovery chillers, heat pumps, absorption chillers, or other types of equipment. Each of the following checks is to be recorded in the daily log.

- | | |
|--------------------------|---|
| ☐ | Meet all requirements for direct systems as defined by the OEM. |
|--------------------------|---|

Monthly

- | | |
|--------------------------|------------------------------------|
| ☐ | Check anti-corrosion additive. |
| ☐ | Check sacrificial anodes for wear. |

Every Three Months

- | | |
|--------------------------|---|
| ☐ | Analyze lithium bromide (LiBr) solution for steel or copper deposits. |
| ☐ | Check heat recovery heat exchanger for corrosion. |

Every Five Years

- | | |
|--------------------------|--|
| ☐ | Check heat exchanger tubes for leaks using an eddy current test. |
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For additional guidance and resources, visit www.ashrae.org/unep-RACchecklists.

