newsTRAC

NEWSLETTER FOR TECHNICIANS IN REFRIGERATION AND AIRCONDITIONING (RAC) SECTOR

SAFE HANDS: FOUNDATIONS OF GOOD SERVICING & REFRIGERANT BASICS

ISSUE I

September 2026

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Ministry of Environment, Forest and Climate Change
Government of India

UN environment

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FOUNDATION FOR ISHRAE
RESEARCH SCIENCE & TECHNOLOGY

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Joint Secretary

सत्यमेव जयते

LiFE Lifestyle for Environment

भारत सरकार
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT FOREST AND CLIMATE CHANGE

MESSAGE

India's refrigeration and air-conditioning (RAC) sector is undergoing rapid transformation, driven by rising cooling demand, technological advancements and the transition towards low-global-warming-potential (GWP) refrigerants. Refrigerants are integral to cooling systems and have significant implications for ozone layer protection and climate action. From the phase-out of ozone-depleting substances under the Montreal Protocol to the transition towards low-GWP alternatives under the Kigali Amendment, India has remained committed to advancing global environmental goals. The upcoming phase-down of HFCs underscores the need to strengthen the RAC servicing sector and equip technicians with the skills required to manage evolving refrigerants and technologies.

The RAC servicing sector is central to this transition. Technicians play a critical role in installation, maintenance, refrigerant management and efficient system operation, with their skills and practices directly influencing refrigerant emissions, energy efficiency and equipment performance. Strengthening technical capacities, promoting good servicing practices and improving access to knowledge and appropriate technologies are therefore essential to achieving sustainable and efficient cooling.

In this context, the Ozone Cell, Ministry of Environment, Forest and Climate Change, is bringing out newsTRAC, a quarterly newsletter for the RAC sector, to facilitate knowledge-sharing and awareness on emerging technologies, good servicing practices, training and certification, and other sectoral developments for RAC service technicians. Launched on World Ozone Day 2026, as the global community marks a decade of the Kigali Amendment, newsTRAC is envisaged as a valuable platform to reach RAC technicians across the sector, including those associated with industry and associations, as well as independent and freelance technicians.

(Rajat Agarwal)

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Identify before you connect...

Refrigerant identification is the first safety control. Confirm the refrigerant, its safety class and the system's pressure rating before connecting any hose, gauge or recovery equipment.

1. **READ**
   Read the equipment name plate and all labels.
2. **CHECK**
   Check pressure ratings using calibrated gauges.
3. **CLASSIFY**
   Classify the refrigerant (A1, A2L, A2, A3).
4. **MATCH**
   Match the system to compatible pressure rated tools.
5. **VERIFY**
   Isolate the system if labels, pressure readings, or service history do not agree.

Do Not Rely on Cylinder Colour

Cylinder colours and repainted cylinders can be misleading. The permanent label, refrigerant designation, UN marking and safety data are the primary identifiers. Use a refrigerant analyser when the contents are unknown or contamination is suspected.

Properties & Flammability of Refrigerant

HCFC R-22

SAFETY CLASS: A1
Lower Toxicity,
Non-Flammable

SERVICE CAUTION:
Ozone-depleting; keep it separate from other refrigerants during recovery and servicing.

FLAMMABLE CLASS
1
No flame

HFC Blend R-410A

SAFETY CLASS: A1
Lower Toxicity,
V Non-Flammable

SERVICE CAUTION:
High operating pressure; use dedicated, properly rated tools.

FLAMMABLE CLASS
1
No flame

HFC R-32

SAFETY CLASS: A2L
Lower Toxicity,
Lower Flammability.

SERVICE CAUTION:
Mildly flammable; control ignition sources and ensure adequate ventilation.

FLAMMABLE CLASS
2L
Lower burning velocity

HC R-290

SAFETY CLASS: A3
Lower Toxicity,
Higher Flammability

SERVICE CAUTION:
Highly flammable; use only in equipment specifically designed for R-290.

FLAMMABLE CLASS
2
Flammable

HC R-600a

SAFETY CLASS: A3
Lower Toxicity,
Higher Flammability

SERVICE CAUTION:
Highly flammable; requires gram level charge accuracy

FLAMMABLE CLASS
3
Highly flammable

STOP

STOP-WORK TRIGGER

If the equipment label, cylinder label, service history do not agree, isolate the system and verify the refrigerant before recovery or charging.

Make the Work Area Safe Before Opening the Circuit

For R-32, R-290, and R-600a based refrigeration and air conditioning equipment, start with a safe work area. Remove ignition sources, ensure good ventilation, and be ready for managing an accidental leak.

Establish a Temporary Flammable Zone:

Mark the area with visible signs. Keep smoking materials, flames, and electrical devices that may create sparks away from the work area. Maintain 2m distance in all directions.

Important Safety tips for Work Area

Keep the windows open or use exhaust fan. If using an exhaust fan, keep its ON/OFF switch outside the work area.

Use a refrigerant rated leak detector throughout the service.

Wear safety goggles, gloves, covered clothing, and safety footwear.

Keep a dry-powder or CO_2 extinguisher nearby.

Mandatory Personal Protective Equipment

Basic Inspection & Hose Connection
Goggles, gloves, covered skin and safety shoes.

Recovery & Cylinder Work
Gloves and eye protection; face shield if required.

Brazing
Heat-resistant gloves and face/eye protection ; only after recovery and OFDN flushing.

Cylinder Handling And Transport
Gloves, safety shoes, upright restraint and valve cap.

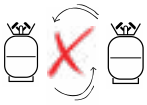
PRE-SERVICE SAFE-WORK CHECKLIST

- Read the service history and confirm the refrigerant safety class.
- Isolate electrical power and control re-energisation.
- Establish the temporary flammable zone and visible "work in progress" signage.
- Provide natural ventilation or a suitable ventilation fan with the switch outside the work zone.
- Remove flames, smoking materials, hot surfaces, spark producing tools and non rated electrical devices.
- Keep a dry powder or CO2 extinguisher within quick reach.
- Continuously monitor the area with a leak detector rated for the refrigerant.
- Do not work alone on flammable refrigerant service activities.

Cylinder safety

Use a dedicated, labelled recovery cylinder.

Perform recovery in appropriate pressure rated cylinders as per refrigerant



Avoid mixing of refrigerants in the same recovery cylinder

Do not exceed 80% of the cylinder water capacity by weight.

Keep cylinders upright, capped and away from heat/direct sun.

IF FLAMMABLE REFRIGERANT LEAK OCCUR

Stop work. Do not operate switches or create sparks. Evacuate the immediate area, increase ventilation from a safe location, isolate the source only when it can be done safely, and follow the site emergency procedure.

The Essential Service Toolkit

Manifold Gauge Sets

Use for safe diagnostic, pressure rated testing and accurate adjustments to both sides—high and low for precise prevent contamination.

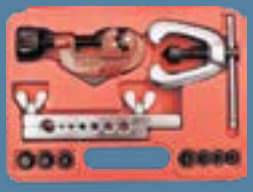
Vacuum & Micron Gauges

Systems require a thorough vacuum purge and seal to stabilize micron gauge suitable for the specific work area.

Oxygen-Free Dry Nitrogen (OFDN) Kit

Includes dry nitrogen cylinder, a regulator assembly, and hoses for safe pressure testing.

Joint & Flaring Tools



High-precision wok requires a full cutter, deburr, flaring tools, and a torque wench set to OEM needs.

Recovery Machine & Components

A recovery set consists of a compatible recovery machine, an electronic scale for accuracy, and a dedicated recovery cylinder.

Leak Detection Tools

Use a rated electronic detector and soap solution; never use a flame for leak detection.

The 11-Steps Good Servicing Procedure

1. **Identify & assess** — Confirm refrigerant, safety class, history & work-zone controls.
2. **Recover safely** — Use a compatible recovery machine and dedicated cylinder.
3. **Remove residual charge** — Inertise and remove remaining refrigerant before opening.
4. **Clean & flush** — Use OFDN/dry nitrogen; never oxygen, air or prohibited solvents.
5. **Repair correctly** — Use OEM parts; use safe connection methods for A3 systems.
6. **Choke test** — Confirm free passage with OFDN through the circuit.
7. **Pressure test** — Use regulated dry nitrogen at OEM specified test pressure.
8. **Leak detect** — Use soap solution and a rated electronic detector.
9. **Evacuate & hold** — Pull to 500 microns or lower and verify the vacuum holds.
10. **Charge & operate** — Charge slowly by weight; check current, temperatures and pull-down.
11. **Final check & label** — Leak-check, seal, label refrigerant/ date/technician and record quantity.

Important Tips

PRESSURE TEST

Use regulated dry nitrogen (OFN) only, never use oxygen, compressed air, or refrigerant for this stage.

VACUUM HOLD

Evacuate to 500 microns or lower. After isolation, reading should not rise sharply and should remain within the handbook limit.

CHARGE & LABEL

Charge slowly by weight to the OEM quantity, final leak-check, then record refrigerant, date and technician.

FAQ & BEST PRACTICES

Ten Questions Every Technician Should Answer

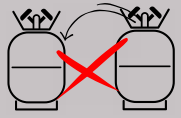
1. What refrigerant is in this system and what is its safety class? Check the nameplate or service records. The safety class (A1, A2L, A3) determines PPE, ventilation and tool requirements.	**6. Am I charging by weight to the OEM-specified quantity?** Use a calibrated electronic scale. Charge slowly, monitor current draw, temperatures and pull-down rate.
2. Have I recovered all refrigerant before opening the circuit? Use a compatible recovery machine and dedicated cylinder. Confirm gauge reads zero or slight vacuum before cutting.	**7. Are all replacement parts OEM-specified or equivalent-rated?** Non-OEM parts risk leaks, pressure failure or warranty void. Confirm compatibility before fitting.
3. Am I using oxygen-free dry nitrogen (OFDN) for purging and pressure testing? Never use oxygen, compressed air or refrigerant. Use regulated OFDN at the OEM-specified test pressure only.	**8. Have I labelled the system with refrigerant type, charge quantity, date and my name?** Labelling is a legal and professional requirement. It protects the next technician and the end user.
4. Is my vacuum pump pulling to 500 microns or below? Evacuate and isolate. The micron gauge reading should hold steady and not rise sharply— confirming no leaks or moisture.	**9. Is my workspace ventilated and do I have the correct PPE for this refrigerant?** A2L and A3 refrigerants require additional controls: no ignition sources, gas detectors, and adequate ventilation.
5. Have I leak-tested every joint with an approved method? Use soap solution plus a rated electronic detector. Never use a flame. Re-test after pressure holds.	**10. Have I recorded the service in the job sheet and logbook?** Document refrigerant recovered, charged, system pressures, and any parts replaced. This supports compliance and traceability.

FIELD BEST-PRACTICE RULE
Do not replace diagnosis with "gas filling". Good service means identifying the fault, containing the refrigerant, restoring leak-tightness, evacuating moisture and confirming performance.

Remember this...

🚫 NO OPEN-FLAME LEAK TEST
Use an approved leak-detection method.

🚫 NO OXYGEN / COMPRESSED AIR
Use dry nitrogen for pressure testing where permitted.



🚫 NO MIXED RECOVERY CYLINDERS
Keep one refrigerant type per cylinder.

🚫 NO UNREPAIRED TOP-UP
Find and repair the leak before adding refrigerant.

🚫 NO UNAUTHORISED RETROFIT
Follow the manufacturer's approved retrofit procedure.

FAQ & BEST PRACTICES

Troubleshooting Without Guesswork

A symptom is not a diagnosis. Confirm instrument accuracy, compare readings with the correct manufacturer data, and follow a logical sequence before opening or charging the system.

Quick Troubleshooting Checklist

Check	What it tells you	Next step
Instrument accuracy	Faulty gauges give false readings that lead to wrong conclusions	Calibrate or replace before diagnosing
Manufacturer data	Confirms correct pressures, temperatures and charge for the model	Obtain OEM service manual or data sheet
Service history	Reveals recurring faults, previous repairs and refrigerant type	Check logbook and system label
Logical sequence	Prevents skipping steps that mask the real fault	Follow: inspect → measure → diagnose → act
Do not open system prematurely	Opening without diagnosis introduces moisture and contaminants	Complete external checks and readings first
Do not charge without diagnosis	Top-up without repair wastes refrigerant and hides leaks	Find and fix the leak, then evacuate and charge

Ask The Expert | Quarterly Field Scenario

An R-32 split AC in a small occupied bedroom has a visible oil mark at the flare joint. The customer asks for a quick top-up because the room is not cooling.

Expert Guidance

1. Do not top up. Explain that the leak must be repaired first.
2. Move occupants away, isolate power, ventilate and establish the temporary flammable zone.
3. Confirm the nameplate and use R-32-compatible recovery, detection and pressure rated tools.
4. Recover the refrigerant, repair the flare with the correct tool and OEM (Original Equipment Manufacturer) torque, then pressure-test with OFDN (Oxygen-Free Dry Nitrogen).
5. Evacuate and hold the vacuum, charge the nameplate quantity by weight, perform a final leak check and operating test.
6. Label and document the work, including recovered and charged quantities.

BEFORE LEAVING THE SITE

Cap service valves and ports; remove temporary connections; confirm no leak; verify temperature, current and controls; restore the work area; explain safe operation and the service record to the customer.

Lifecycle Refrigerant Management & Sustainability

Good refrigerant management continues throughout the life of the system. Prevent leaks, recover refrigerant before opening the system, keep different refrigerants separate, and record all refrigerant handled.

Prevent
Leak- tight installation and correct charging

Recover
Remove refrigerant before opening the circuit

Segregate
Used dedicated cylinders, never mix gases

Recyle / Reclaim
Clean to the required quality standard

Reuse/ Manage
Return to suitable use or approved end-of - life route

Record
Track type, weight, owner, date and technician

The best refrigerant is the refrigerant that stays safe/ contained, is recovered at service, and returns to productive use

Responsibilities of the Concerned Stakeholders

Technician
Repair leaks; recover before opening; use dedicated labelled cylinders; weigh and record refrigerant; prevent contamination.

Workshop owner
Maintain a cylinder register and tool log; provide recovery equipment; segregate refrigerants; arrange authorised recycling/reclamation routes.

Customer / facility manager
Demand documented service; approve leak repair rather than repeated top-up; retain records; plan replacement of ageing HCFC equipment.

Information to be recorded by the technician	
RECORD THIS ON EVERY JOB	**WHY IT MATTERS**
• Equipment ID and location • Refrigerant type and safety class • Quantity recovered and cylinder ID • Leak location and repair method • Quantity charged and source cylinder • Date, technician and workshop contact	• Lower demand for virgin refrigerant • Reduced ozone and climate impact • Better energy efficiency • Lower lifetime cost for customers • Improved worker and public safety

RAC Technician Training & Certification

Two-day training program with NSQF-aligned certification

Good service practices for room air conditioners

Covers HFC-32, HCFC-22 and flammable refrigerants | October 2026 to March 2027

Organised by GIZ Proklima in collaboration with the Ozone Cell, Ministry of Environment, Forest and Climate Change under HPMP Stage-III

1 TRAINING

Two consecutive days. Classroom theory and practical work. Weekdays or weekends, including Sundays.

2 WHO CAN JOIN

Indian RAC technicians, age 18+, Class 8 or higher, usually with about 2 years or more field experience in the informal sector.

3 BATCH SIZE

Usually 25 technicians. A batch may have 18 to 27 people. The local training provider enrols candidates.

4 CERTIFICATION

Assessment and certification are undertaken through ESSCI under the NCVET-approved framework of MSDE, with registration on the Skill India Digital Hub Portal.

How to join the training?

Choose the regional training provider for your state. Ask for the next date, training-centre address and admission details.

FIND PROVIDER
Use the state list below to find a provider serving your area.

CALL OR EMAIL
Ask about dates, centre location, documents and admission.

GET ENROLLED
The provider and ESSCI register you for training and assessment.

ATTEND AND GET CERTIFIED
Complete both days, practical work and the final assessment.

TRAINING CALENDAR

GIZ-Proklima will provide the training calender which will be available at ozonecell.nic.in as well as with the regional training providers. Training may be on weekdays or weekends, including Sundays.

Regional Training Providers

CARE Foundation (with Keypath India Pvt. Ltd.)	J. S. Refrigeration (with Anant Enterprises)
STATES / UTs: Andhra Pradesh, Telangana, Delhi, Haryana, Uttar Pradesh, Tamil Nadu, Puducherry, West Bengal **Contact**: V. V. A. Rao **Mobile**: 9873001382 **Email**: caretechnician@gmail.com, rao@keypath.in	**STATES / UTs**: Punjab, Himachal Pradesh **Contact**: Jagjit Singh Mann / Raj Kumar Wadhwa **Mobile**: 9812302544 **Email**: ultrakoolchd@gmail.com, ozone.chandigarh@gmail.com
Funfirst Global Skillers Pvt. Ltd.	**CRISP**
STATES / UTs: Assam & North East, Gujarat, Karnataka, Madhya Pradesh, Chhattisgarh, Maharashtra, Goa, Odisha, Tamil Nadu, Puducherry, West Bengal **Contact**: Ulka Patel (9833981768), Siddharth Kacker (8451801583) **Email**: upatel@funfirst.in, siddharth@funfirst.in	**STATES / UTs**: Gujarat, Maharashtra, Goa, Rajasthan, New Delhi **Contact**: Rajesh Maheshwari (9425302725), Vijay Saxena (9425029865) **Email**: rmaheshwari@crispindia.com, vijay@crispindia.com
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Able Technomart (with Divyansh Enterprises)	**Carrier World**
STATES / UTs: Madhya Pradesh, Chhattisgarh **Contact**: Arvind Kumar Sharma / Arun Mishra **Mobile**: 9826620890 **Email**: dishcare.indore@gmail.com	**STATES / UTs**: Bihar, Jharkhand **Contact**: Anil Kumar **Mobile**: 943139078 **Email**: carrierworld09@gmail.com

Benefits of the training

SAFER WORK
Learn safer handling, PPE, correct tools and good service practices

STRONGER SKILLS
Practise copper-tube work, brazing, recovery, installation and troubleshooting

RECOGNISED CERTIFICATE
Complete the assessment to obtain certification.

BETTER OPPORTUNITIES
Improved skills can support bette work, customer trust and selfer ployment

NOTE

Enroll in the training batches by contacting the training provider in your region using the details provided below.

Exemplary Technician Showcase

Name: Sonu Kumar
City / State: Delhi
Experience: 8 years
Refrigerants handled: R22, R410A, HFC32

SAFE SERVICE IN PRACTICE

Verify gas type, prep a safe work area, and explain to the customer why fixing leaks and recovering gas is essential instead of just topping up.

ONE JOB THAT SHOWS THE DIFFERENCE

- Problem & Diagnosis: AC was icing up and not cooling; detected a micro-leak using Nitrogen and an electronic detector.
- Fix & Process: Repaired the joint, safely recovered old gas, deep-vacuumed the pipes, and charged the exact gas weight using digital scales.
- Result: Restored factory level cooling, lowered power bills, and prevented future breakdowns.

WORKSHOP DISCIPLINE

Maintain tools (recovery unit, vacuum pump, digital scale), calibrate monthly, store cylinders in color-coded racks, and record vacuum/gas weights on job sheets.

MESSAGE TO YOUNG TECHNICIANS

Always work safely, improve your skills every day, and complete every job with responsibility and honesty.

Showcase Practice Scoreboard

- Identifies before connecting
- Creates a controlled work zone
- Uses rated, maintained tools
- Recovers and segregates refrigerant
- Labels, records and explains

Air Conditioner Cleaning Tips

CLEAN – KEEP FILTERS AND COILS CLEAN.

CHECK – CHECK THE SYSTEM AND ITS PARTS.

DIAGNOSE – FIND THE CAUSE OF THE PROBLEM.

RECORD – NOTE THE READINGS AND WORK DONE.

Want to learn and explore more about good servicing practices, scan here:

Ask The Expert Column

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