



COPA Implementation Models Working Group
2026 Webinar Series

Refrigerant Identification and characterization

The importance of conducting testing and the implications of mis-identified cylinders for the downstream handling.

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INTRODUCTION

- How are refrigerants identified, quantified, consolidated?
- How to ensure chain of custody (COC) during movements: minimize risks
- Practical implementation and recommendations from recent experience

A-Thermal operates a thermal treatment facility for hazardous and general wastes in Olifantsfontein since 2004



OBJECTIVES

Information required

- Refrigerant identification: what exactly is in the cylinder
- Refrigerant quantity mass: how much is there
- Cylinder type and condition: pressure and process connections
- Cylinder storage condition: what equipment is needed to move cylinder
- Generator / owner of the cylinder
- Local jurisdiction

Rationale

- Select correct management method: recovery / destruction
- Transportation requirements
- Stakeholders for permits / documentation

Practically, this can be very difficult to determine, or it is missed

FIELD SITUATION

- Cylinder and valve condition – **be careful**



*No handle
No end cap*

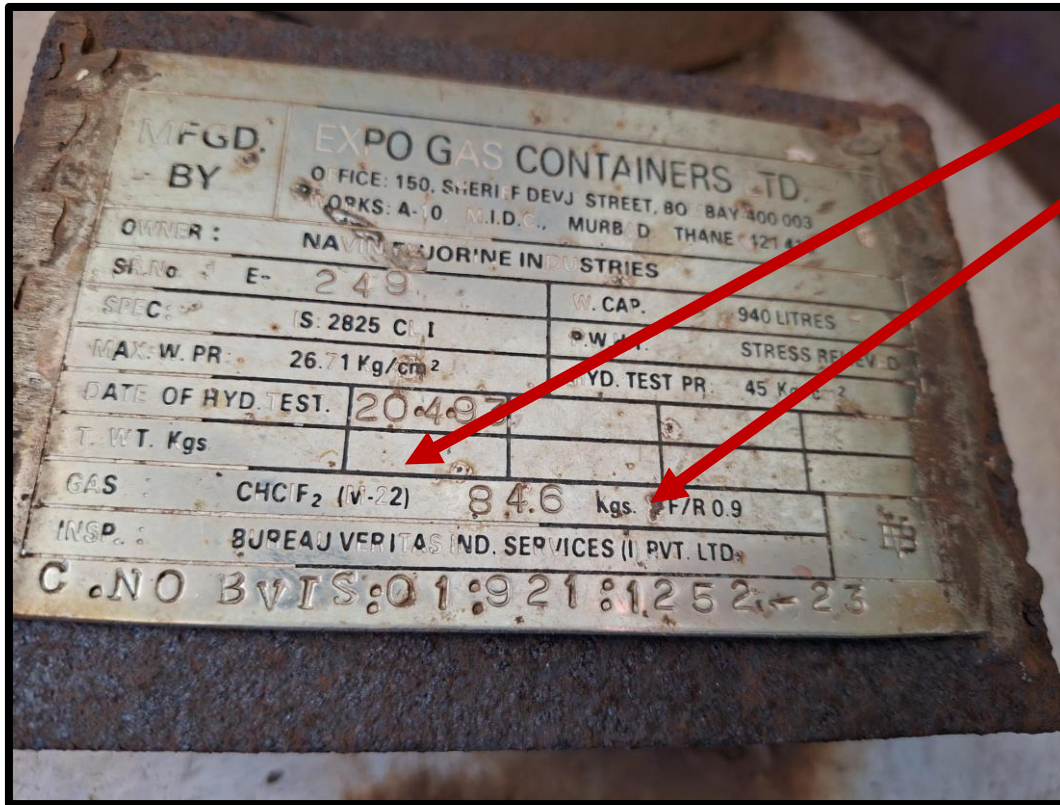
*No valve
guard*

Reality



FIELD SITUATION

- Cylinder nameplate information – **do not trust**



R-22. Actual?

Maximum mass. Actual?

Two phase liquid and vapour?

Reality

PRACTICAL STEPS

Site work to be performed before upliftment. All steps should be performed by trained personnel. Applicable to recovery or treatment.

1. **Valve inspection:** check the valve condition: Optional: valve handle removed to prevent chance of tampering.
2. **Screening analysis:** use of a portable screening analyzer to confirm contents of the cylinder / label. Assists processing facility to plan correct operation and cylinder handling.
3. **Pressure test:** in the absence of an analyzer / weight, pressure test helps understand cylinder condition. Pressure is not formal identification method, it is a consistency check.
4. **Weight of cylinder: prior to final packaging and shipment:** to determine the quantity in the cylinder to facility and confirm if loss on transport. Part of Chain of Custody/
5. **Weight of cylinder: immediately on receipt destination:** to ensure no loss on transport.

PRACTICAL STEPS



Transport



Received at facility

Documentation to show: date, time, person for

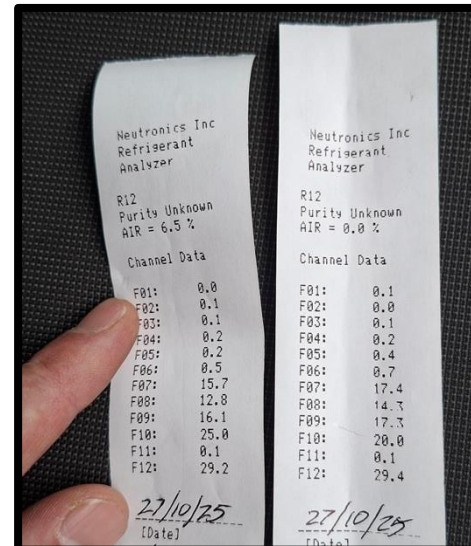
- Relinquishing of goods from the originator
- Receipt of materials at destination

PRACTICAL STEPS



Pressure testing

Screening analysis



PRACTICAL STEPS

Bulking of materials

- Larger containers can make handling and processing easier.
- Bulking is *irreversible* from a Chain of Custody and quality perspective.
- Earlier example:
 - If the “M-22 labelled cylinder” was bulked with clean R-22, it would contaminate the receiving vessel.
 - Result: loss of reclaim value, increased destruction cost, possible transport misclassification, and chain-of-custody dispute.

Analyzers

- Availability and operators for testing cylinders

PRACTICAL STEPS

Finding	Likely classification	Downstream implication
Successful analysis	Candidate for recovery/reclaim	Keep segregated, avoid contamination
Analyzer mismatch	Misidentified cylinder	Do not bulk; laboratory confirmation
Multiple refrigerants detected	Mixed/contaminated gas	Usually destruction route or special handling (challenge)
High pressure inconsistent with ambient PT chart	Possible wrong gas / overfilled / non-condensable contamination	Quarantine and investigate
Unknown gas / analyzer cannot identify	Unknown hazardous compressed gas	Treat conservatively; specialist sampling (challenge)
Cylinder damaged / valve compromised	Packaging/containment risk	Overpack, transfer, or controlled ventless recovery (challenge)

PRACTICAL STEPS

Chain of custody: Failure points

- Cylinder collected without unique identifier or verified serial number;
- Label/nameplate accepted as contents without screening confirmation;
- Weight recorded without tare uncertainty or dispatch/receipt reconciliation;
- Pressure recorded without ambient temperature or refrigerant consistency check;
- Analyzer result recorded without instrument, calibration or operator details;
- Cylinders bulked before final classification;
- Final reclaim/destruction outcome not linked back to the original cylinder.

PRACTICAL STEPS

Chain of custody: Control points

- Assign a unique cylinder ID before handling / use of nameplate serial number.
- Photograph cylinder, valve, label, nameplate and defects.
- Record pressure, temperature and gross weight before upliftment.
- Conduct field screening before transport where practicable.
- Do not bulk unknown or mismatched cylinders.
- Re-weigh and reclassify at receipt.
- Use laboratory testing for final reclaim/destruction decisions.
- Link final treatment certificate back to the original cylinder ID.

The system must be set up before cylinders are handled.

Time is of the essence to prevent gradual leaks and loss of custody.

CONCLUSIONS

- Planning, documentation are critical
- Site measurements at point of origin and destination
- System for Chain of Custody and final use of material
- Classify. Then bulk.



*Maloti-Drakensberg Park
UNESCO World Heritage Site*

THANK YOU

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