

Sampling methods for Counterfeit Refrigerant

- Requirements
- Risks
- Unit Screening
- Final safety checks for screened units
- What to do with contaminated units
- Tolerated contamination levels

Presentation by:
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Requirements

- **Safety**
- **Rapid screening**
- **Inexpensive and simple**
- **Procedure required for contaminated units**

Sampling Risks and Difficulties

- **An explosion**
 - **disturbing the system**
 - **letting in air**
- **Flammable gas**
- **Possibility of TMA in sample**
- **No gas in system**
- **System even under vacuum**

Sampling Methods

- **Quick screening method to check reefer machine for chlorine contamination**
- **Method for taking a sample from a reefer machine for laboratory analysis (bottle)**
- **Method for taking a sample from a reefer machine for laboratory analysis (pipe or small container)**

Tell Tale Signs

- **No cooling**
- **Unusual noise from compressor**
- **Blackened oil**

Quick Screening

- Use service manifold to take sample
- Take sample test station
- Carry out Halide test
- If positive VOC test
- Lab test



Quick Screening Method

- **Gauges need to be flushed with N₂ and then vacuumed out**
- **Need to follow procedure**
- **Advantage of being quick and safe**

Gauge Sampling



Bottle Sample

- Take sample using recovery bottle
- Send to lab for analysis



Bottle Sampling Method

- **Gauges need to be flushed with N₂**
- **Bottle flushed with nitrogen and triple evacuated**
- **Time consuming**

Bottle Sampling



Pipe Sample

- Use refrigerant line and gauge for sample



Pipe Sampling Method

- Flushed with N2
- Refrigerant trapped between valves
- Pipes taken to sample station or sent off for analysis
- Advantage of being less time consuming

Sampling Points

- **Recommended sampling points need to be developed**
- **Probably safer to use the king valve or if not possible the discharge valve**

Procedure for Contaminated Units

- **Units likely to be damaged beyond repair**
- **Any TMA needs to be neutralised before scrapping**
- **Procedure needs to be developed and tested**

Neutralisation of TMA

- **Incineration**
- **Small quantities of trialkyl aluminum reagents can be destroyed in the laboratory by addition of t-butanol to a solution of the reagent in an inert solvent such as toluene or hexane under an inert atmosphere**
- **Considerable fire and health risks**

Neutralisation of TMA

- **Reaction with Silicone Oil (polydimethyl siloxane) a possibility**
- **Forms**
Ethyldimethylsiloxydiethylaluminium
- **Incineration**
- **Reaction may not work**

Tolerated Contamination Levels

- **Up to 2% ?**
- **New bottles found with traces of methyl chloride**
- **Degradation of oil**
- **Erosion of aluminium parts**
- **Damage to seals**

Degradation of Oil

- **Reaction of methyl chloride with oil**
- **Degrades oil back to acids and alcohols**
- **Compressor likely to be u/s**

Repaired Unit

Repaired Unit



Repaired Unit



CRT

The logo consists of the letters 'CRT' in a bold, dark blue, sans-serif font. Below the letters is a stylized, dark blue wavy line that resembles a signal or a ribbon. The entire logo is centered on a white rectangular background.