

PCB e-Learning Platform


PCB SAMPLING AND SCREENING

REFERENCES AND GUIDANCE DOCUMENTS









Please refer to the guidance documents on the environmentally sound management of PCBs **on the development of PCB inventories and analysis**, provided by the BR secretariat.

CLICK HERE TO BE REDIRECTED TO THE STOCKHOLM CONVENTION'S GUIDANCE DOCUMENTS

Guidance

 The following guidance documents provide information on all aspects related to the environmentally sound management of polychlorinated biphenyls (PCBs), including identification and inventorying of PCBs, regulatory frameworks, handling, transport, storage and disposal, development of national strategies and phaseout plans as well as advice on potential funding mechanisms for PCBs elimination.

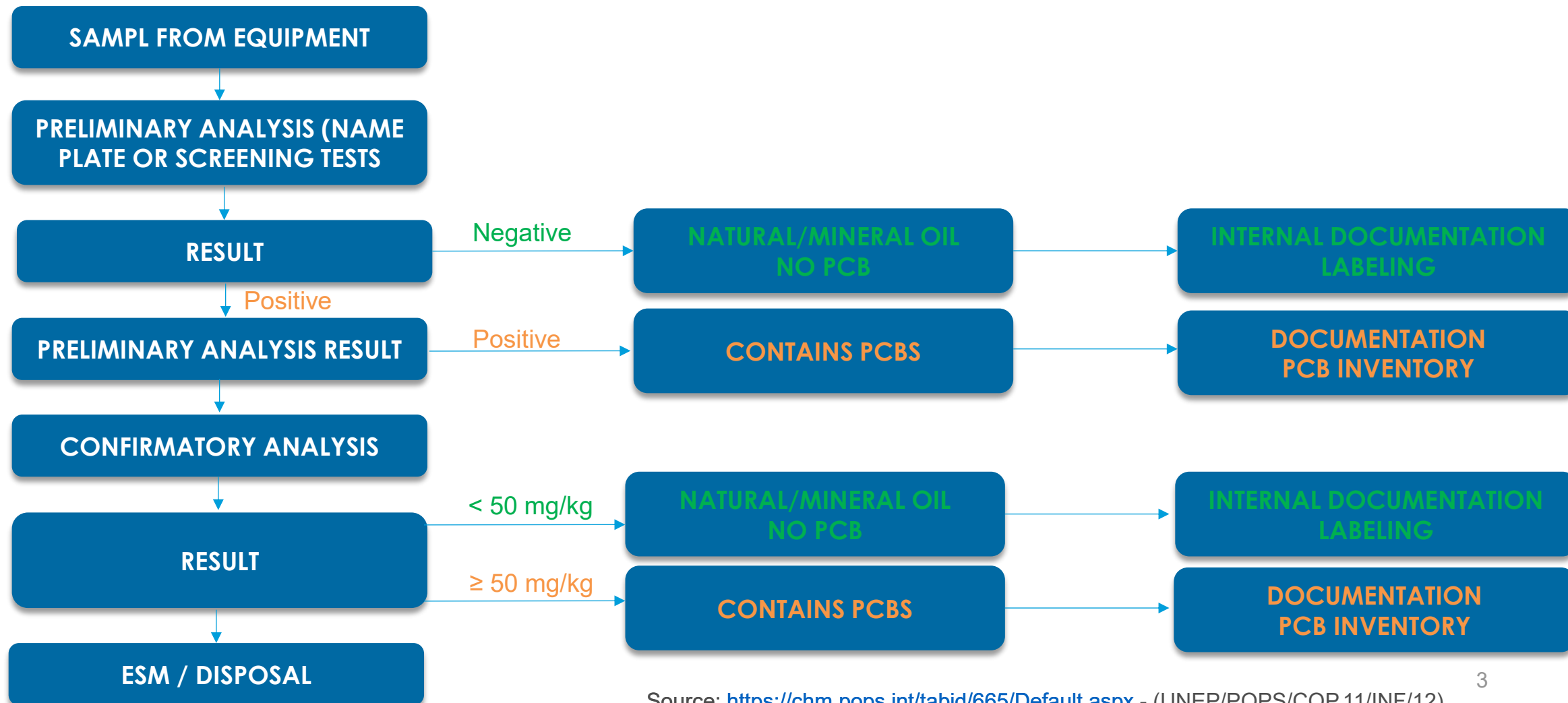
1. PCB identification and inventory 2. PCB disposal 3. Open applications
4. National strategies and phase out plans

Document	English
Guidance for development of PCB inventories and analysis of PCB (UNEP/POPS/COP.11/INF/12)	 
Updated PCB inventory form (2024)	
Guidelines for the identification of PCBs and materials containing PCBs (UNEP, 1999)	 
PCB inventory guidance (PCB Elimination Network, 2016)	 
PCB inventory and analysis form (2023)	

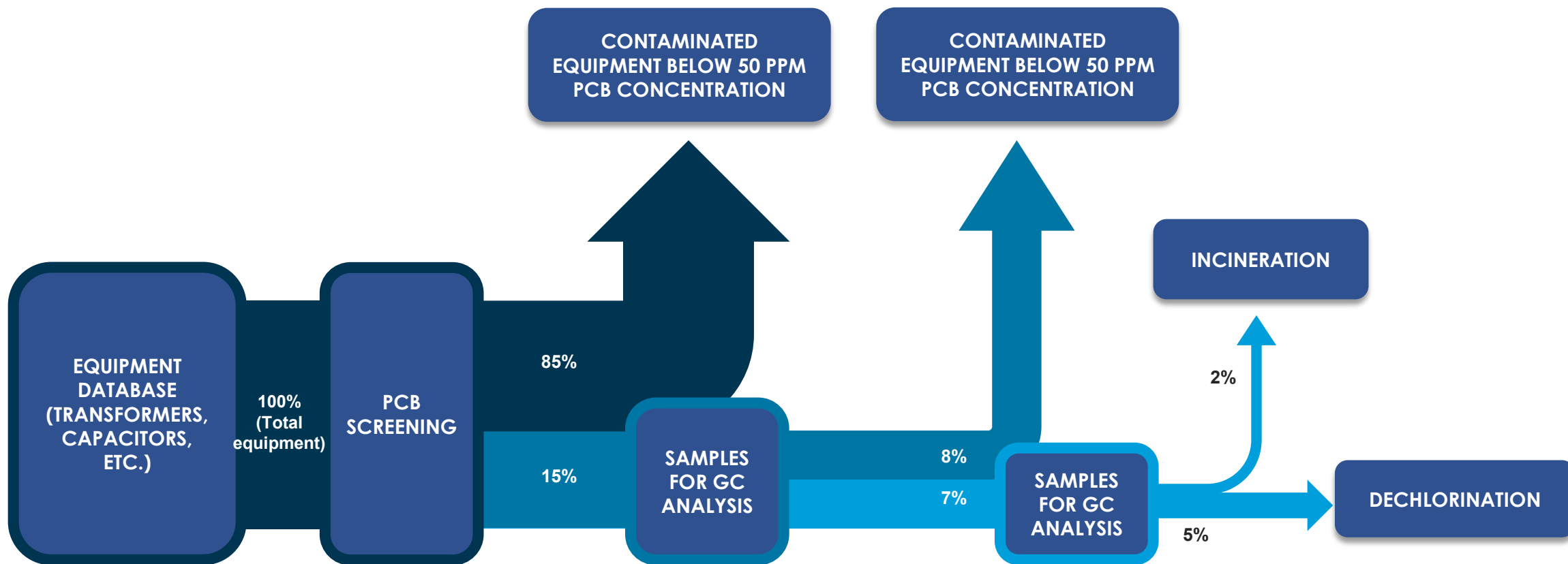
Items: 5

Source <https://chm.pops.int/Implementation/IndustrialPOPs/PCB/Guidance/tabid/665/Default.aspx>

FLOW CHART ON DECISION-MAKING AND IDENTIFICATION



EXAMPLE OF THE QUANTITATIVE FLOW OF THE INVENTORY PROCESS



SAMPLING TASKS

PREPARATION OF
MATERIALS AND
TOOLS

IDENTIFICATION AND
USE OF PERSONAL
PROTECTIVE
EQUIPMENT (PPE)

COLLECTION OF
EQUIPMENT
INFORMATION

SAMPLE EXTRACTION

LABELLING AND
PACKAGING

CLEANING

PERSONAL PROTECTIVE EQUIPMENT (PPE) FOR SAMPLING



PROTECTIVE SUIT



VINYL GLOVES



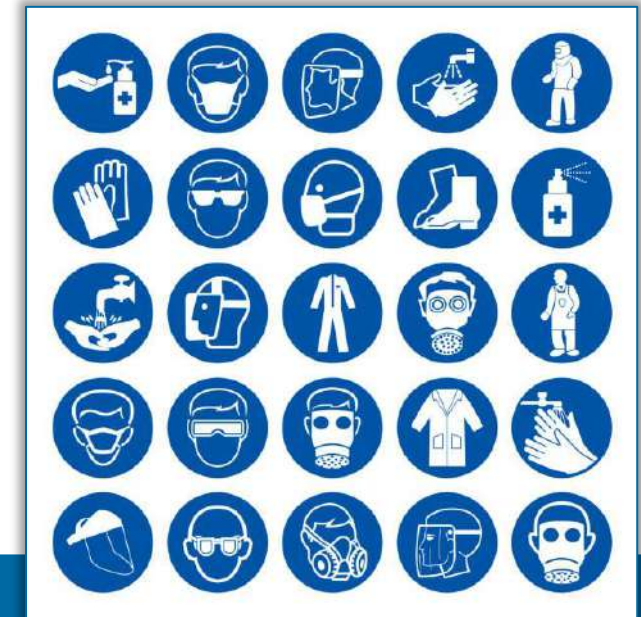
GOOGLES



**SAFETY HELMET,
MECHANICAL
GLOVES, BOOTS**



RESPIRATORS



PPE SIGNALIZATION

MATERIALS AND TOOLS FOR SAMPLING



(STEEL) PIPE NIPPLE



CONTAINERS



SPUDS AND FITTINGS



WRENCH



STEEL TRAY



SPILL KIT



THREE-WAY VALVE



GARBAGE BAGS



SOLVENT



SAFE CONTAINER

COLLECTION OF EQUIPMENT INFORMATION

The equipment's information must be obtained from the manufacturer's plate.

If the unit in question does not have one, or it is damaged and unreadable, the staff must personally assign it with a unique identification number that is sufficient for tracking the unit during the PCB management process.

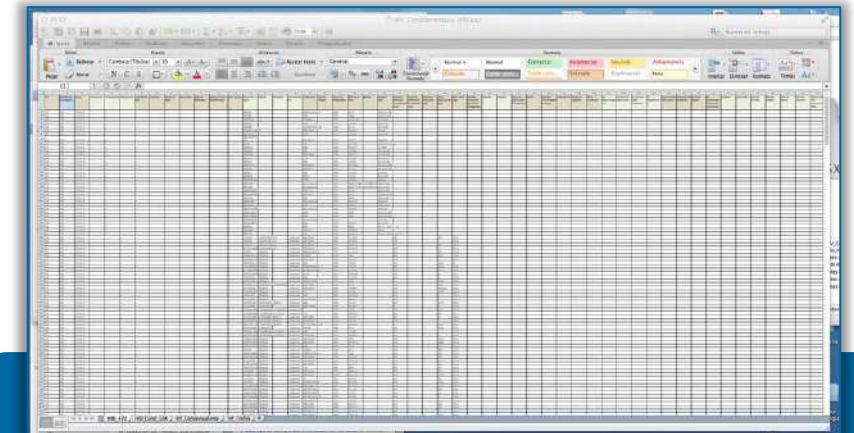


Image source: api.cabinet.smart-market.uz; patricioconcha.ubb.cl

SAMPLE EXTRACTION

The method of sampling a transformer with a valve at the bottom requires the floor to be protected against any leakage of oil.

As mentioned by many documents, it is recommended that the sampling is undertaken only by professional staff or fully trained operators equipped with adequate personal protection equipment (UNEP, 2016b). A strict quality assurance (QA)/quality control (QC) procedure should be followed to get representative and non-contaminated samples.

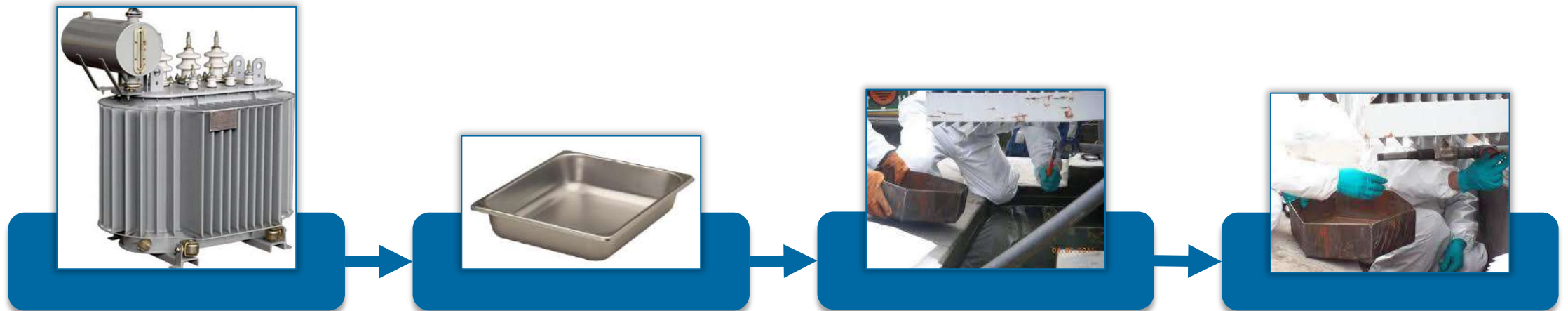


Image source: api.cabinet.smart-market.uz; laboratorysales.com; bcr-argentina.net.ar

LABELLING AND PACKAGING OF SAMPLES

LABELLING

Label 50 mL glass vial with transformers' main information and unique ID.



PACKAGING

Transport the samples in an adequate and safe container



CLEANING AND WASTE DISPOSAL AFTER SAMPLING

CLEANING

After sampling, leave the place cleaned and in good condition.



WASTE DISPOSAL

All waste must be collected and be adequately disposed of.



HANDLING OF SAMPLES

**GOOD CODING AND
LABELLING**

SAFE TRANSPORTATION

CHAIN OF CUSTODY

**CAN BE STORED FOR
A LONG PERIOD OF
TIME**

**PHYSICAL
PROTECTION**

HERMETIC CLOSURE

**NO REFRIGERATION
REQUIRED**

SAMPLING FROM ELEVATED TRANSFORMERS

THE SAMPLING PROCESS IN AN ELEVATED TRANSFORMER TYPICALLY INVOLVES THREE TECHNICIANS WITH EACH ASSIGNED THEIR SPECIFIC ROLE.

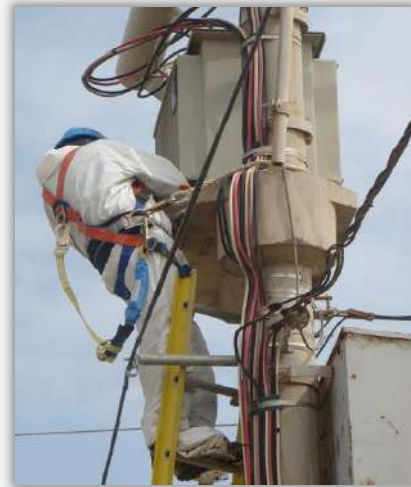


Image source: Pictures from the PCB Project in Peru. Mario Mendoza

It is recommended that the sampling is undertaken only by professional staff or fully trained operators equipped with adequate personal protection equipment (UNEP, 2016b). A strict quality assurance (QA)/quality control (QC) procedure should be followed to get representative and non-contaminated samples.

SAMPLING FROM THE BOTTOM OF A TRANSFORMER



Image source: Pictures from the PCB Project in Peru. Mario Mendoza

THE SAMPLING PROCESS IN A TRANSFORMER WITH A VALVE AT THE BOTTOM OF THE UNIT.

SAMPLING FROM THE TOP OF A TRANSFORMER



Image source: Pictures from the PCB Project in Peru. Mario Mendoza

**THE SAMPLING PROCESS IN OLDER TRANSFORMER OFTEN REQUIRES OPENING THEIR TOP COVER.
SAMPLES ARE EXTRACTED USING A DISPOSABLE SYRINGE AND PLASTIC TUBING.**

METHODS FOR PCB DETECTION (SCREENING)

COMPARISON AGAINST CONFIRMATORY ANALYSIS METHODS



- Low cost
- Portable
- Immediate results
- Does not require special infrastructure
- Versatility in sample selection
- Low waste generation
- Only positives require gas chromatography
- Does not require specialized training



- Less accurate
- Less reliable
- False negatives
- False positives

EXAMPLES



PCB COLORIMETRIC TEST KITS



PCB POTENCIOMETRIC TEST (L2000DX ANALYZER)

METHODS FOR PCB DETECTION (CONFIRMATORY ANALYSIS)

COMPARISON AGAINST SCREENING METHODS

- More accurate
- More reliable



- Expensive
- Not portable
- Long analyses times
- Requires special infrastructure



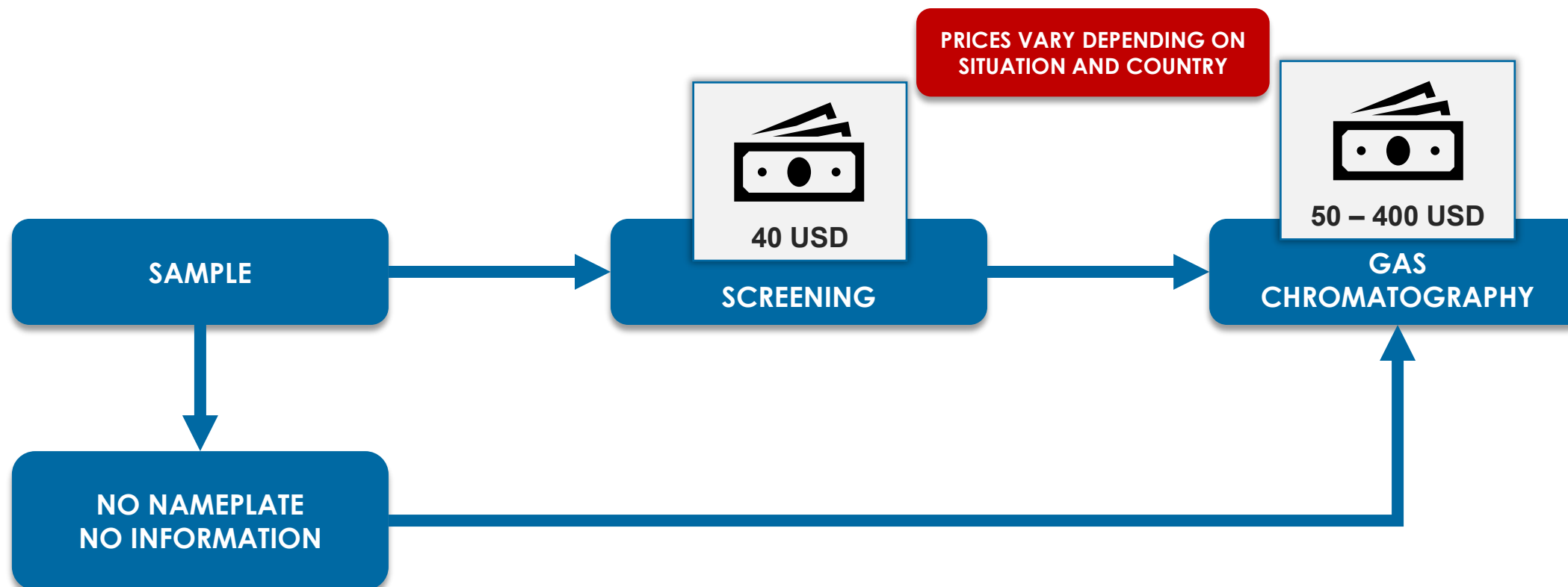
Detailed information on confirmatory methods (GC)
in Module **PCB Laboratory Analysis**



GAS CHROMATOGRAPHY (GC)

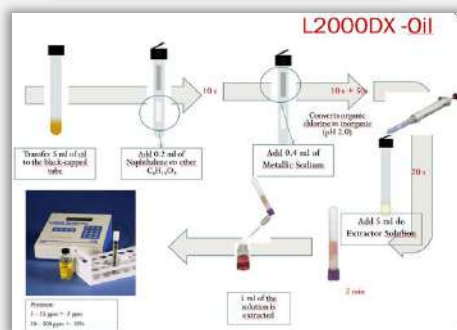
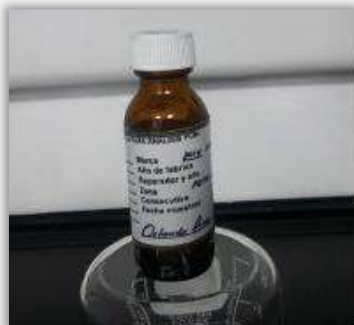
Image source: Thermo Scientific TRACE™ 1600 Series Gas Chromatograph. Thermofisher

WHAT IS THE COST?



SCREENING PROCEDURE

SAMPLE PREPARATION

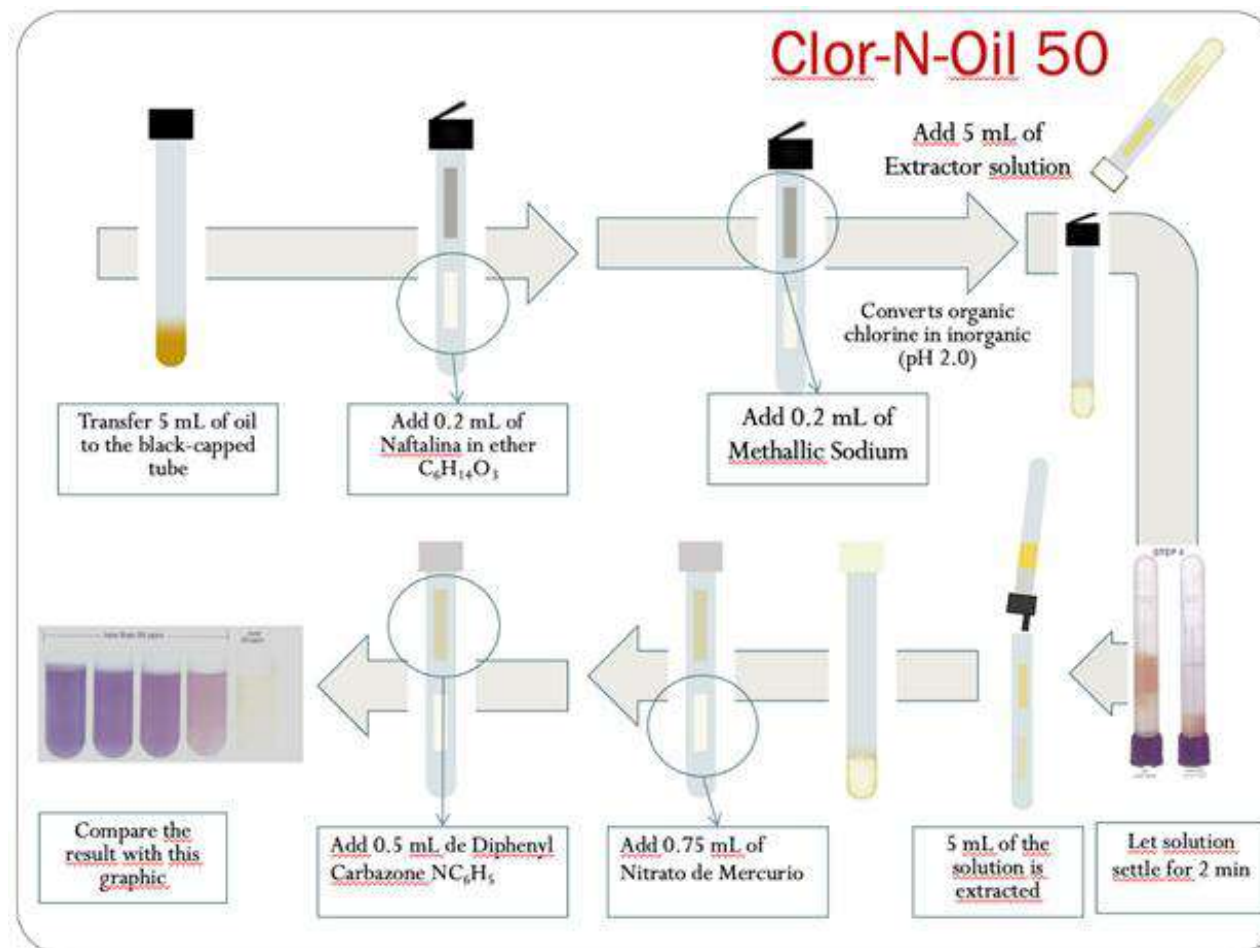


READING OUT THE SAMPLE

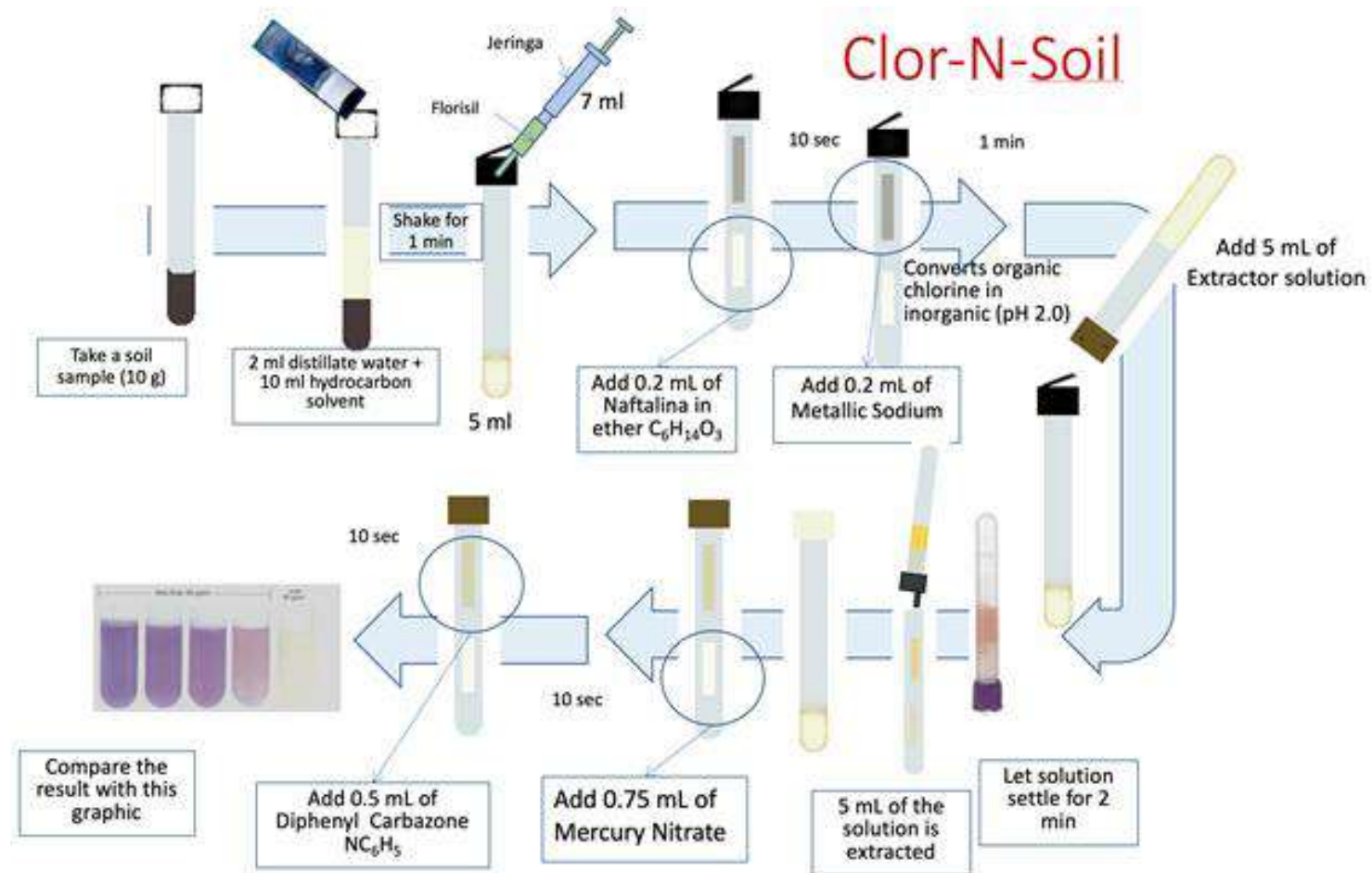


**PCB CONCENTRATION
EXPRESSED IN
PARTS PER MILLION
(PPM)**

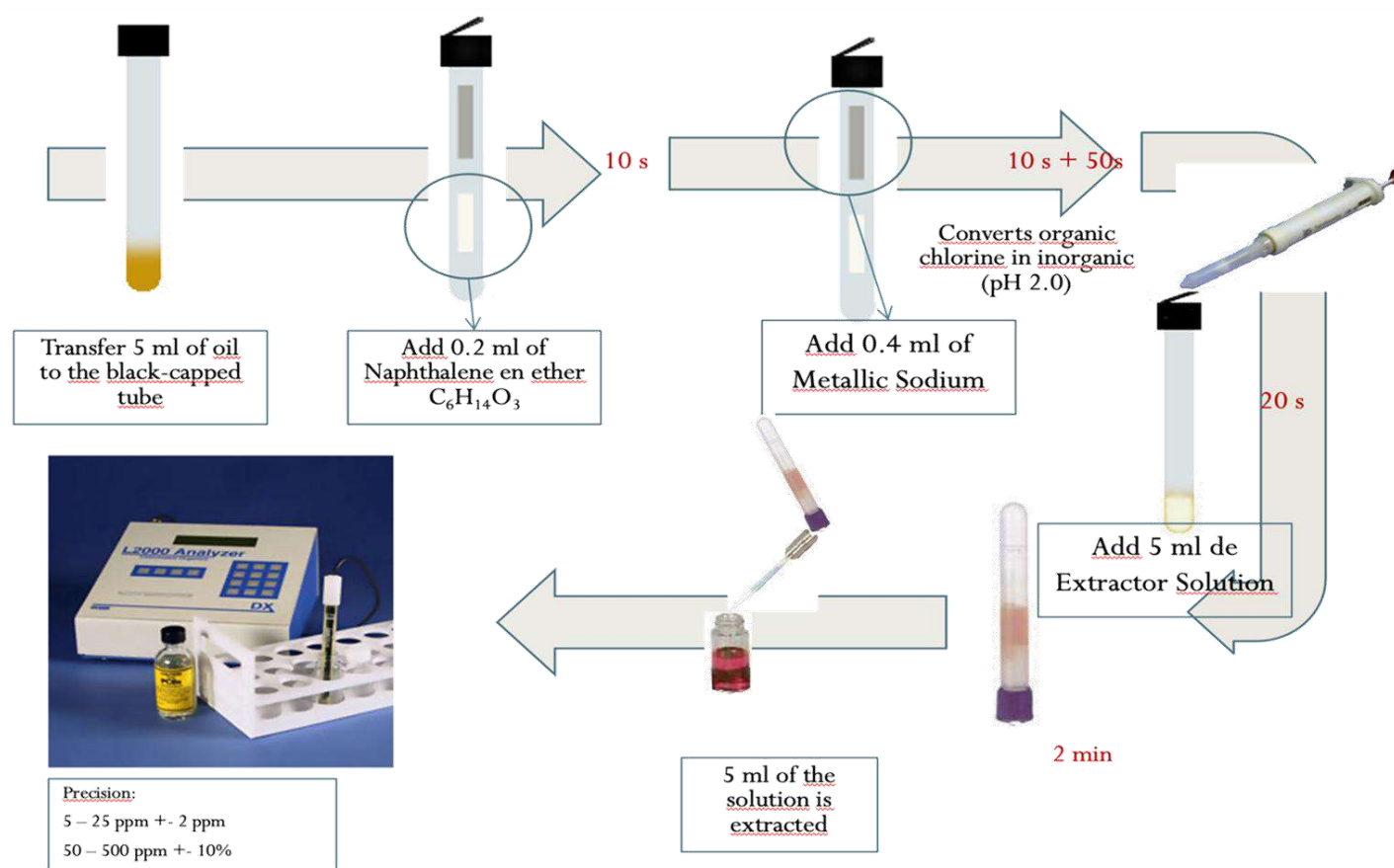
SCREENING PROCEDURE FOR OIL SAMPLES (CLOR-N-OIL TEST KIT)



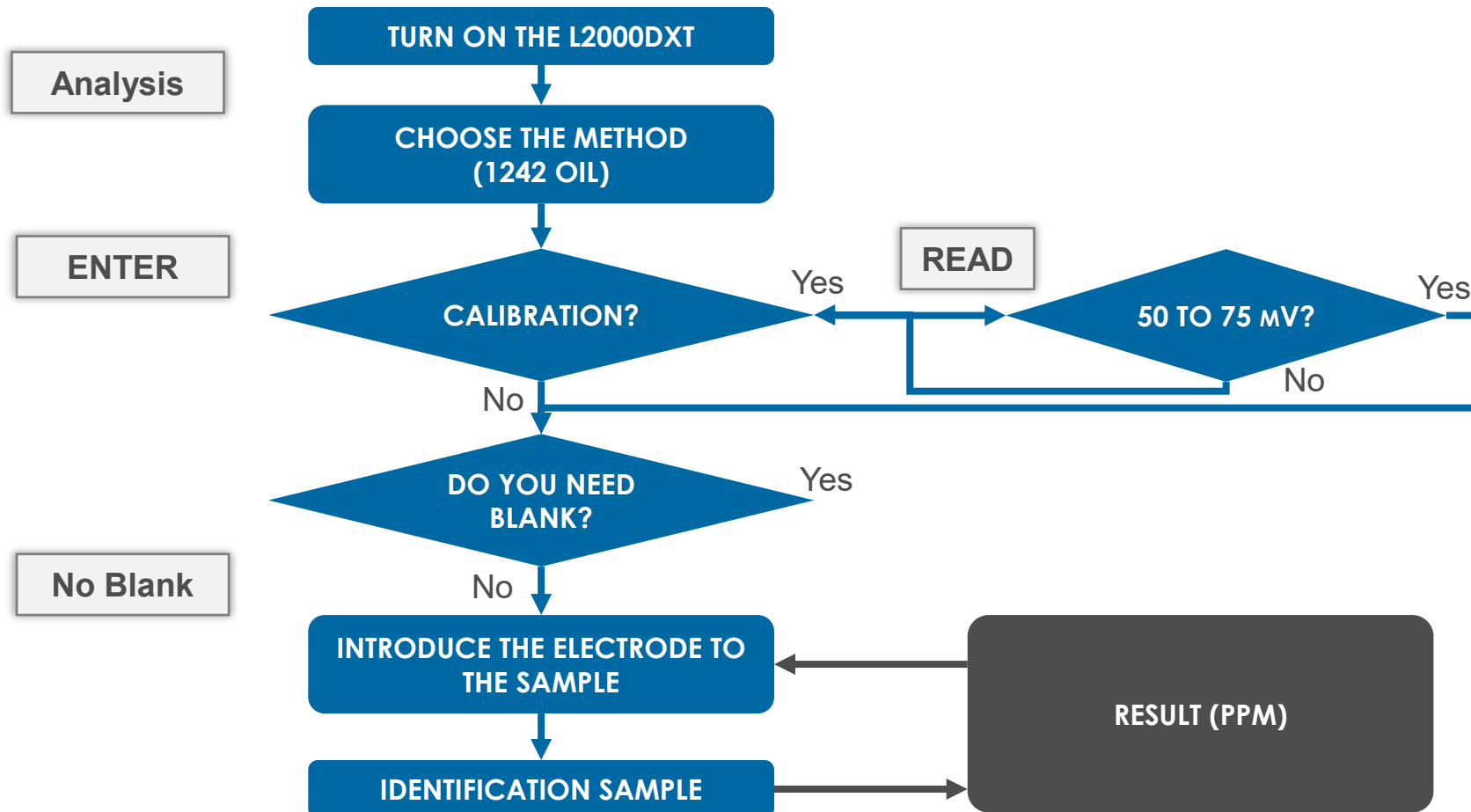
SCREENING PROCEDURE FOR SOIL SAMPLES (CLOR-N-SOIL TEST KIT)

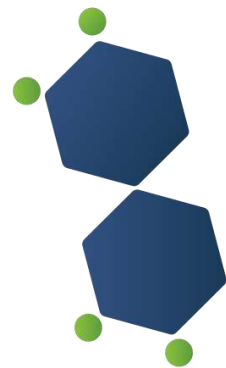


SCREENING PROCEDURE FOR OIL SAMPLES (L2000DXT ANALYZER)



SCREENING PROCEDURE (L2000DXT ANALYZER)





PCB e-Learning Platform

END OF PCB SAMPLING AND SCREENING

Detailed information on confirmatory methods (GC) in Module **PCB Laboratory Analysis**

<https://pcb.unitar.org/>