

Best Practice on the Differential Pressure for Nck2 5G

- Installation best practices
- Differential pressure calibration with digital manometer
- Pecllet manometer best practices
- Regular maintenance vacuum line



Keywords: Noack volatility, ASTM D 5800B, CEC L-40-93, Vacuum calibration.

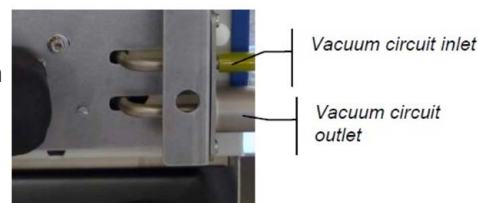
INTRODUCTION

The Noack test is simple, but lot of operations are still manual and must be done properly to obtain precise and repeatable results. A wrong differential pressure measurement can have a significant impact on the volatility result.

This document guides the user through several steps that are critical for the measurement of differential pressure.

1. Pay attention to the analyzer installation

Volatility testing with the NCK2 5G automatic analyzer must be carried out at constant ambient pressure. Do not place the apparatus under an air vent or under a functioning fume cupboard during a test. Connect the outlet of the vacuum circuit to an extractor hood to extract VOC.



One way to achieve a draft-free environment is to install a draft protection shield to isolate the heating block, thus greatly reducing the air flow immediately around the sample while allowing sufficient thermal exchange. A draft protection kit is available as option. This protection shield is installed very simply on the heating block.



Part number V240105: Draught protection kit NCK2 5G

2. Differential pressure calibration

We recommend using a digital manometer with a minimum precision of 0.2 mmH₂O for differential pressure calibration. The use of a digital manometer allows better calibration precision and easier metrological traceability compared to an inclined liquid manometer.

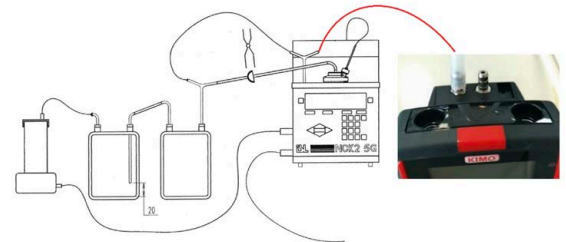
Part number 3902-200-000: Digital pressure calibration manometer.

Part number 3902-200-003: Digital pressure calibration manometer - certified calibration



To perform the calibration at 20.0 mmH₂O in the best conditions:

- Power on the NCK2 5G analyzer and wait approximately 30 minutes to let electronics heat up
- NCK2 5G analyzer, heating block, crucible, and cover must be at room temperature
- Crucible and cover must be clean and dry
- Disconnect the exhaust line to avoid any 0-line drift
- If the analyzer is close to an extractor hood, it must be switched off
- Connect the digital manometer
- Use the average function of the digital manometer to have a stable reading (functions > averages > automatic)
- Put in place crucible, cover, and sample probe
- Follow instructions on the NCK2 5G screen

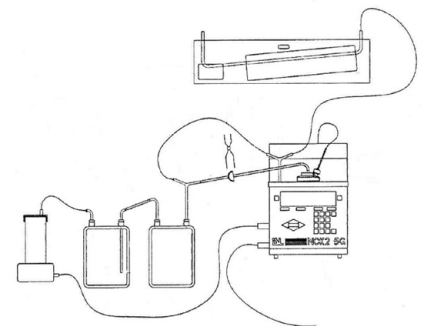


3. Differential pressure monitoring during the test

The digital manometer provided by PAC is not suitable to monitor the test. (This manometer is only suitable for pressure calibration.) To monitor differential pressure during the test, the CEC L40-93 method specifies the use of an inclined liquid column manometer.

Part number V240101: Pecllet-Type Manometer

Part number K02121: Flask Liquid Density 0.88 at 15 °C

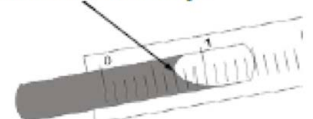


Best practices to use a Pecllet-type manometer:

- Do not place the Pecllet manometer under an air vent or under a functioning fume cupboard
- Set the horizontality of the manometer with the setting screw. Use a precise level to get a better precision. An error of 0.1° angle on horizontality create a reading error up to 0.4mmH₂O
- Pour the manometer fluid up to the zero point of the graduation
- Connect the left connector of Pecllet manometer to the instrument
- Before each test, adjust the zero point by moving the ruler to the right or left. The meniscus must be placed on the zero
- Reminder of the reading principle on an inclined liquid column manometer: for all measurements, it is imperative to read in the meniscus deep
- For a good reading, it is important to stand up to and face the manometer
- It's recommended to change the liquid in manometer once or twice a year, or when the aspect (color) of the liquid changes



Correct reading : 0.7 mmH₂O



4. Regular maintenance on vacuum line

A good practice is to have regular maintenance on the Nck2 5G.

Depending on number of tests performed daily, a weekly to a monthly frequency maintenance program is necessary to maintain the Nck2 5G in the best condition.

Weekly to monthly maintenance:

Description	Operation	Inspection	Comments
Bottle 1 & 2	Pour the residue and clean up the bottle	Verify that the glassware is not notched	Discard any bottle damaged at the level of cork screw
Filter	Pour the residue and clean up the glassware	Verify number of tests performed by the filter	Change the filter if worn (see counter)
Glass tubes	Clean up	Integrity of silicon tube	
Stoppers		Integrity of O-rings	
Cover ball bearing test	Run the ball bearing in the extraction tube	Free run of ball bearing	
Cover reamer nozzle check	Check the 3 nozzles with the reamer	Free run of the reamer	

At last, a yearly extensive maintenance (or every six months if high frequency tests) must be performed on the analyzer. This includes the calibration checks. At a minimum, perform the regular maintenance operation and in addition:

Description	Operation	Comments
Filter cartridge	Change the cartridge	If counter not used
Bottle O-rings	To be changed	
Glass tubes	Change the glass tubes	Or at minimum remove any deposit
Extraction tube	Remove any deposit	Use appropriate solvent or detergent
Temperature calibration	Check sample temperature with appropriate simulator	Calibrate if necessary
Pressure calibration	Check differential pressure calibration	Calibrate if necessary In case of calibration disconnect the exhaust line to avoid any O-line drift. Preferably use a digital manometer

Maintenance Kits

Part Number	Name	Contents
V240111	Nck2 - Standard kit	1 - filter cartridge 4 - bottle O-rings (flat ring + ferrule + stopper)
V240112	Nck2 - Complete kit	1 - Standard kit 1 - filter cartridge (a second one) 1 - set of glass tubes
V240110	Nck2 - plastic tubes kit*	1 - Complete set of plastic tubes (excluding exhaust)

(*) The original silicon tubes are permeable to the silicon added in formulated oils. After several years of working, the silicon tubes must be changed. The new kit has a better resistance to silicones.