I. Scope and Application

This guide describes the procedure used to clean the digestion blocks and their associated fume hoods for the Total Kjeldahl Nitrogen (TKN) digestion procedures (DEP SOP NU-091). Clean digestion equipment is essential for the accurate determination of TKN.

II. Frequency and Log Keeping

On the fume hood sash, each digestion block should be labelled with the block's name, date last cleaned, and the number of uses since last cleaned. When a block has been used 5 times, it's time for the block and the hood to be cleaned. Once cleaned, record the cleaning in the associated digestion block's logbook and record the date on the sash.

III. Equipment and Supplies

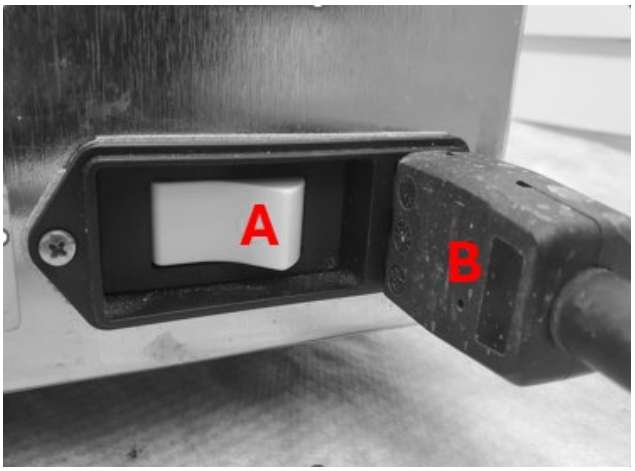
a. Equipment:
   i. Seal Digestion Block
b. Supplies:
   i. DI squeeze bottle
   ii. Technicloths
   iii. Bench paper
   iv. Tape
   v. Swiffer
   vi. Sample cart
   vii. Brush and dustpan

IV. Procedure

a. Turn off the digestion block:
   i. Put the white switch (A) on the upper-right side of the block in the "off" position.
   ii. Carefully unplug the three-pronged cord (B) next to the white on/off switch and place outside of the hood.
   iii. Carefully unscrew the housing of cord (C), disconnect the eight-pronged face, and place the cord outside of the hood.
b. Remove the block:

NOTE: If unable to lift yourself, please seek assistance from another employee.

   i. Carefully lift the digestion block out of the hood and place onto a sample cart.

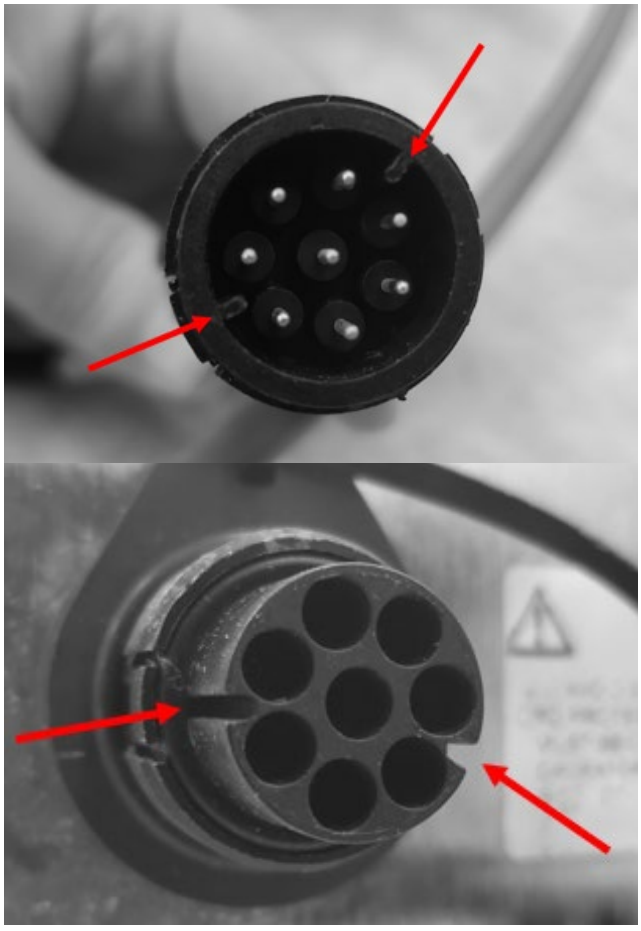




c. Dust the fume hood:
    i. Locate the extendable Swiffer duster from the "block cleaning" drawer and dust the inside of the hood.
    ii. Be sure to get the sides, sash, and upper areas of the hood.
d. Replace the bench sheet paper:
    i. Remove and dispose of the old bench sheet paper lining the inside of the hood.
    ii. Wipe down the area of the hood. If necessary, use a brush and dustpan to remove any sand/debris.
    iii. Cut new, bench sheet paper to cover the area of the hood bench and tape down.
e. Clean the block:
    i. With the block still on the sample cart, use a DI squeeze bottle to wet some technicloths (found in the block cleaning drawer) and wipe down the digestion block.

NOTE: Do NOT spray water directly onto the block or into the block holes.

    ii. Wipe the block until the acid built-up is no longer coming off on the technicloths. Stubborn discoloration on the blocks is typical through consistent use and time.
f. Clean the tray-holder:
    i. Each block has a tray-holder situated on top of it to make placing and removing the trays easier. These also experience acid build-up over time due to samples boiling over and need to be cleaned regularly.
    ii. Similar to the block, use a DI squeeze bottle to wet some techicloths and wipe until acid build-up is removed.
g. Return the block:
    i. Once the block and tray-holder are cleaned, carefully place the block back into the hood and replace the connections removed in "step a".
    ii. Be aware of the orientation of the cords and their associated prongs.



NOTE: Notice the notches in the photos above. These MUST be lined up before attempting to plug in these connections. Failure to do so can lead to significant damage to the block and costly repairs.

h. Finishing steps:
    i. Return the switch from "step a" to the "on" position.
    ii. Record the date, your initials, and what maintenance was performed in the appropriate digestion block instrument logbook.

V. **Nonregulated Cleaning**

While uncommon, sample tubes may break during the digestion process due to age and overuse. In the event of a data logger tube breaking, due to the high temperatures, sand may fuse the glass to the block and make it difficult to remove.

NOTE: The following steps involve the use of hand tools and exposure to broken glass. Please reach out to a supervisor or fellow analyst in the event that you feel unsafe or unsure of the procedure. Be sure to wear all necessary PPE including lab coats, safety glasses and gloves to reduce the risk of harm.

a. Supplies:
    i. Hammer
    ii. Screwdriver
    iii. Brush and dustpan
    iv. Bench paper
b. Procedure:
    i. Remove the tray from the block, leaving the broken tubes in their block positions.
    ii. Wait at least 2 hours for the block to cool to room temperature. Monitor the cooling process using the temperature display on the block's controller.
    iii. If sand spilled in the block holes, carefully unplug the block and gently invert the block on a cart lined with bench paper to remove excess sand and broken glass. Once completed, **return the block to the hood**.
    iv. Obtain the hammer and flathead screwdriver from the "TKN Block Cleaning" drawer and, **with the hood sash as low as possible** to protect from glass debris, begin to chisel out the remaining broken glass from the hole. Alternate between chiseling and inverting the block to ensure as much glass is removed as possible.
    v. Once the hole is clear of debris, wrap up the bench paper containing the broken glass and place it in the glass disposal box.
    vi. Clean the block and hood as normal, ensuring any bench paper or waste from the dustpan that contains glass is disposed of in the glass disposal box.
    vii. Record the position of the broken tube(s) and the data logger probe, if necessary, in the digestion block logbook.