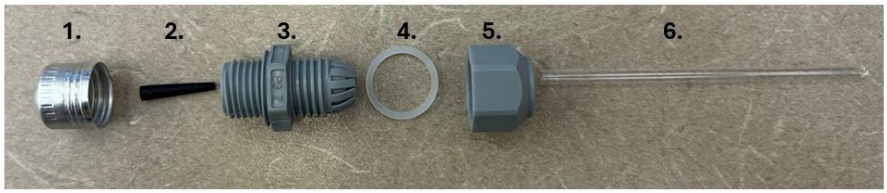
Loading a NOMAD 3 mm Capillary for Mail-In Proposal

Purpose: This guide informs users on how to properly load 3 mm capillaries for mail-in proposals on the NOMAD instrument. Failure to follow the procedure listed below may result in (1) samples being misaligned in the neutron beam leading to poor data quality or (2) loss of sample integrity.

NOMAD Capillary Components:



1.	Aluminum lid
2.	Rubber plug
3.	Gland body
4.	Spacer
5.	Gland nut
6.	3 mm quartz tube

Figure 1. NOMAD Capillary Components

Assembled NOMAD Capillary:

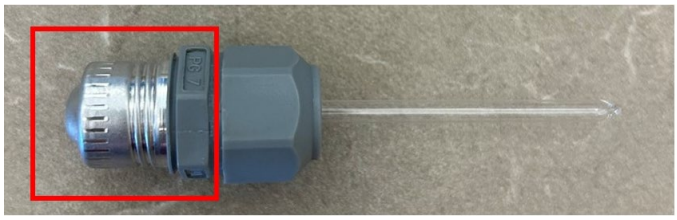
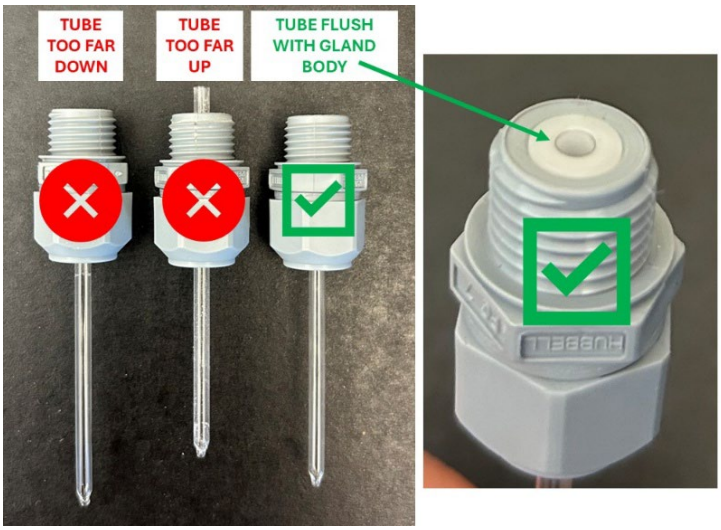


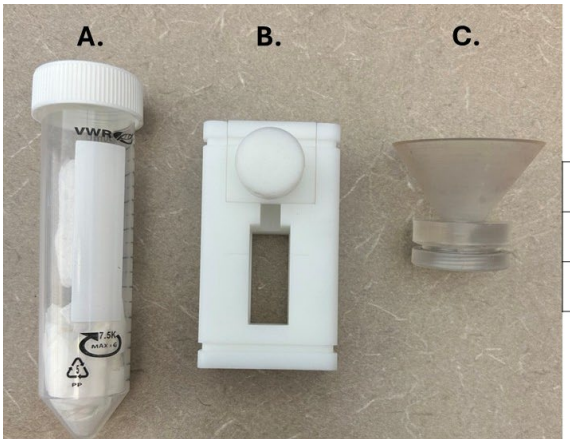
Figure 2. Assembled NOMAD Capillary. *****NOTE: Only handle the capillary assembly by the gland body or secured lid.***

*****The most crucial part of loading the NOMAD capillaries is that the quartz tube does not move inside of the gland body. The tube height and position are what determine alignment when the sample is in the neutron beam. Ensure at every step of the procedure that the opening of the quartz tube is flush with the gland body***:**



FOR BENCHTOP LOADING (NON-AIR-SENSITIVE SAMPLES):

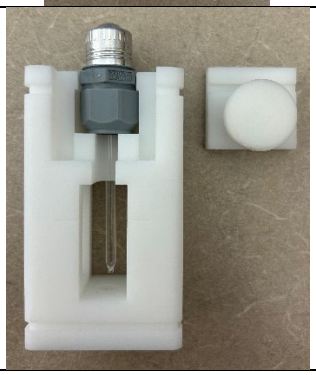
Ancillary items:

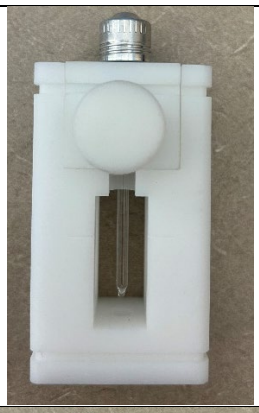
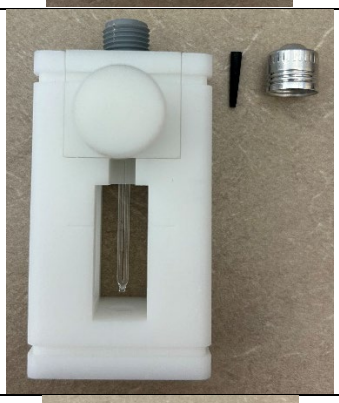
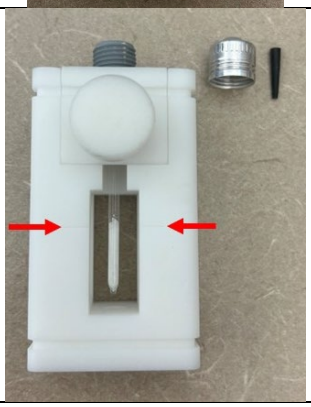


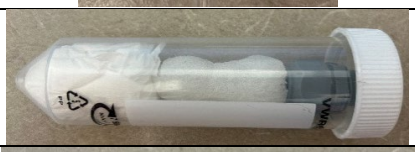
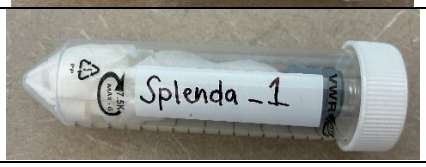
A.	Shipping tube
B.	Loading fixture
C.	Funnel

Sample loading sheet:
https://sns.gov/sites/default/files/loading%20spreadsheet%2020180110.pdf

PROCEDURE:

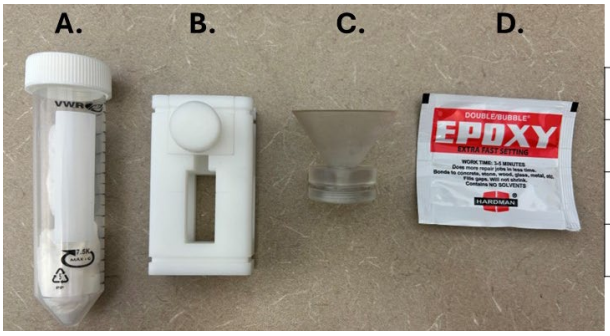
1.	Carefully remove the capillary from the shipping tube. **DO NOT DISCARD THE PACKING TUBE OR PACKING PEANUT.**	
2.	Slide the capillary into the loading fixture.	

3.	Replace loading fixture handle.	
4.	Unscrew capillary lid and remove rubber plug.	
5.	Screw on the funnel.	
6.	Load powder into funnel/tube. Ensure that the packed powder is at least 2 cm high inside the tube. This is denoted by the lines on the loading fixture.	

7.	Unscrew funnel. Place rubber plug into the capillary tube. **DO NOT FORCE THE RUBBER PLUG DOWN INTO THE TUBE—THIS WILL BREAK THE QUARTZ.** The rubber stopper should sit ~3 mm above the top of the gland body when inserted.	
8.	Screw lid back onto the capillary and gently slide capillary out of loading fixture. Slide packing peanut over the quartz tube and place capillary into the shipping tube.	
9.	Label the shipping tube with the **EXACT, UNIQUE** name for the sample. **ENSURE THAT THE LABEL ON THE SHIPPING TUBE MATCHES THE NAME ON THE SAMPLE LOADING SHEET.**	
10.	Place shipping tubes, sample loading sheet, funnel, and loading fixture into a box and use shipping guide (https://sns.gov/users/shipping-guide) to mail samples to SNS. **ENSURE SHIPPING TUBES ARE PROTECTED INSIDE SHIPPING BOX. QUARTZ CAPILLARIES CAN BREAK DURING SHIPPING IF THE BOX IS NOT PACKED PROPERLY.**	

FOR GLOVEBOX LOADING (AIR-SENSITIVE SAMPLES):

Ancillary items:



A.	Shipping tube
B.	Loading fixture
C.	Funnel
D.	Fast-curing epoxy

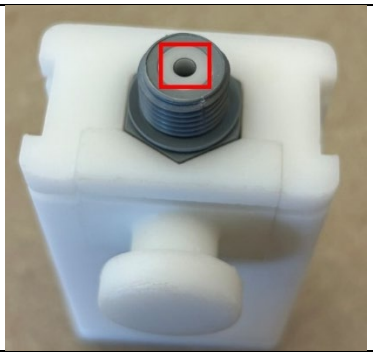
Optional items that help further protect integrity of samples during shipping:

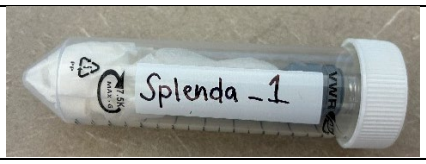
- Mylar heat-sealable bags, (https://www.amazon.com/Mylar-Vacuum-Seal-Bags/s?k=Mylar+Vacuum+Seal+Bags)
- Parafilm

Sample loading sheet:
https://sns.gov/sites/default/files/loading%20spreadsheet%2020180110.pdf

PROCEDURE:

STEPS 1-6 same as above but performed inside glovebox.

7.	Unscrew funnel. You may discard the rubber plug. Cut epoxy packet open and squeeze contents into a disposable tray (e.g., weigh boat). Coat the tube hole with epoxy. **ENSURE THAT NO EPOXY IS PLACED ON GLAND BODY THREADS.**	
8.	After epoxy has cured, screw lid back onto capillary. Gently slide capillary out of loading fixture. **DO NOT PUT PARAFILM ANYWHERE ON THE CAPILLARY—THIS WILL NEGATIVELY AFFECT HOW THE CAPILLARY IS MOUNTED AT NOMAD.** Slide the packing peanut over the quartz tube and place the capillary into the shipping tube. **PARAFILM MAY BE USED ON THE SHIPPING TUBE LID.**	

9.	Label shipping tube with the **EXACT, UNIQUE** name for the sample. **ENSURE THAT THE LABEL ON THE SHIPPING TUBE MATCHES THE NAME ON THE SAMPLE LOADING SHEET.**	
10.	Place the shipping tubes into a sealable mylar bag. Either evacuate bag or heat seal under inert atmosphere.	
11.	Place sealed mylar bags, sample loading sheet, funnel, and loading fixture into a box and use shipping guide (https://sns.gov/users/shipping-guide) to mail samples to SNS. **ENSURE SHIPPING TUBES ARE PROTECTED. QUARTZ CAPILLARIES CAN BREAK DURING SHIPPING IF THE BOX IS NOT PACKED PROPERLY.**	