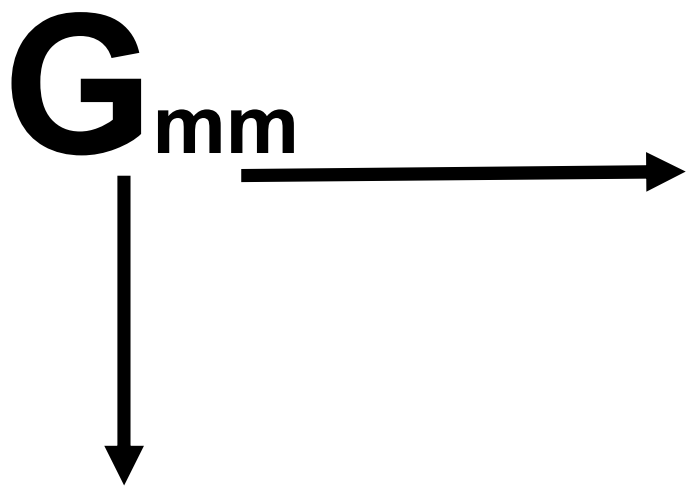
Volumetrics

Section 6 – Voidless Unit Weight
AASHTO T 209: (WYDOT 419.0)

AASHTO T209, Voidless Unit Weight

- **Specific Gravity:**



SCOPE

- **This procedure describes the verification and adjustment of the production mix Voidless Unit Weight (VUW). The VUW is sometimes referred to as maximum density, theoretical maximum weight, maximum specific gravity (Gmm), or Rice specific gravity.**

Use

- **VUW for construction mix is conducted under controlled condition.**
- **VUW for construction and production mix may vary from the JMF, thus need to be warranted.**
- **Contractors test results may be verified by the WYDOT Materials Program.**

Theoretical Maximum Specific Gravity and Density of Asphalt Mixtures

AASHTO T 209
WYDOT MTM 419.0

- WyDOT Voidless Unit Weight (VUW / Gmm)
- Make sure that you have enough materials to run the test (3000-3600 grams)
- Make sure balance is level and readable to four figures.
- Make sure the suspension wire or chain is hanging freely from the bottom of the scale.
- Make sure that there is sufficient water to fully immerse the specimen and that the temperature of the water is (77° ± 1.8°F)

AASHTO T209: G_{mm} and Density

- Apparatus
  - Vacuum container with capacity 2000 to 10000 mL.
  - Bowl for Mass Determination in Water Only.
  - Balance with accuracy 0.1 gram and with setup to determine weight in water.
  - Vacuum pump with capacity to keep residual pressure of 4kPa (30 mmHg).
  - Thermometer, oven and water bath.

Procedure (Method A)

- No conditioning required for QC/QA materials
- Remove air trapped in the sample by applying gradually increased vacuum until the residual pressure manometer reads 4.0 ± 0.6 kPa. Maintain this residual pressure for 15 ± 1 min.
- Agitate the container and contents using the mechanical device during the vacuum period. Glass vessels should be shaken on a resilient surface such as a rubber or plastic mat, and not on a hard surface, so as to avoid excessive impact while under vacuum.
- At the end of the vacuum period, release the vacuum by increasing the pressure at a rate not to exceed 8 kPa (60 mmHg) per second.

Use a glass container (Flask) for testing

Add water into the container

Fill up the flask with water

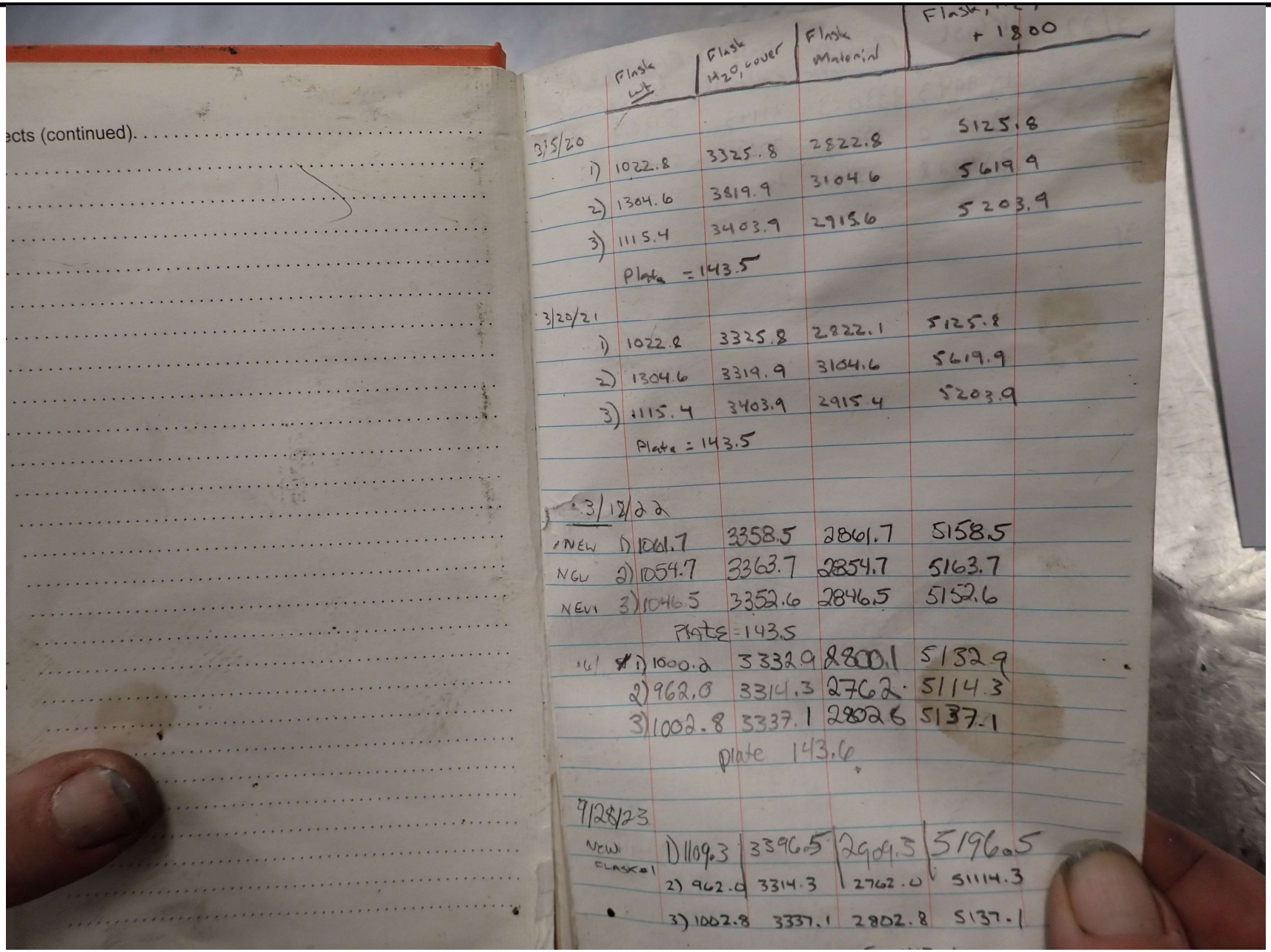
The flask is full

Dry the flask

Dry the bottom of the flask

Get the weight of the filled flask

Record the weights



	Flask wt	Flask + H2O, cover	Flask Material	Flask + 1800
3/5/20				
1)	1022.8	3325.8	2822.8	5125.8
2)	1304.6	3819.9	3104.6	5619.9
3)	1115.4	3403.9	2915.6	5203.9
	Plate = 143.5			
3/20/21				
1)	1022.8	3325.8	2822.1	5125.8
2)	1304.6	3319.9	3104.6	5619.9
3)	1115.4	3403.9	2915.4	5203.9
	Plate = 143.5			
3/12/22				
NEW 1)	1061.7	3358.5	2861.7	5158.5
NEW 2)	1054.7	3363.7	2854.7	5163.7
NEW 3)	1046.5	3352.6	2846.5	5152.6
	Plate = 143.5			
1)	1000.2	3332.9	2800.1	5132.9
2)	962.0	3314.3	2762.0	5114.3
3)	1002.8	3337.1	2802.6	5137.1
	plate 143.6			
9/28/23				
NEW FLASK 1)	1109.3	3396.5	2904.3	5196.5
2)	962.0	3314.3	2762.0	5114.3
3)	1002.8	3337.1	2802.8	5137.1

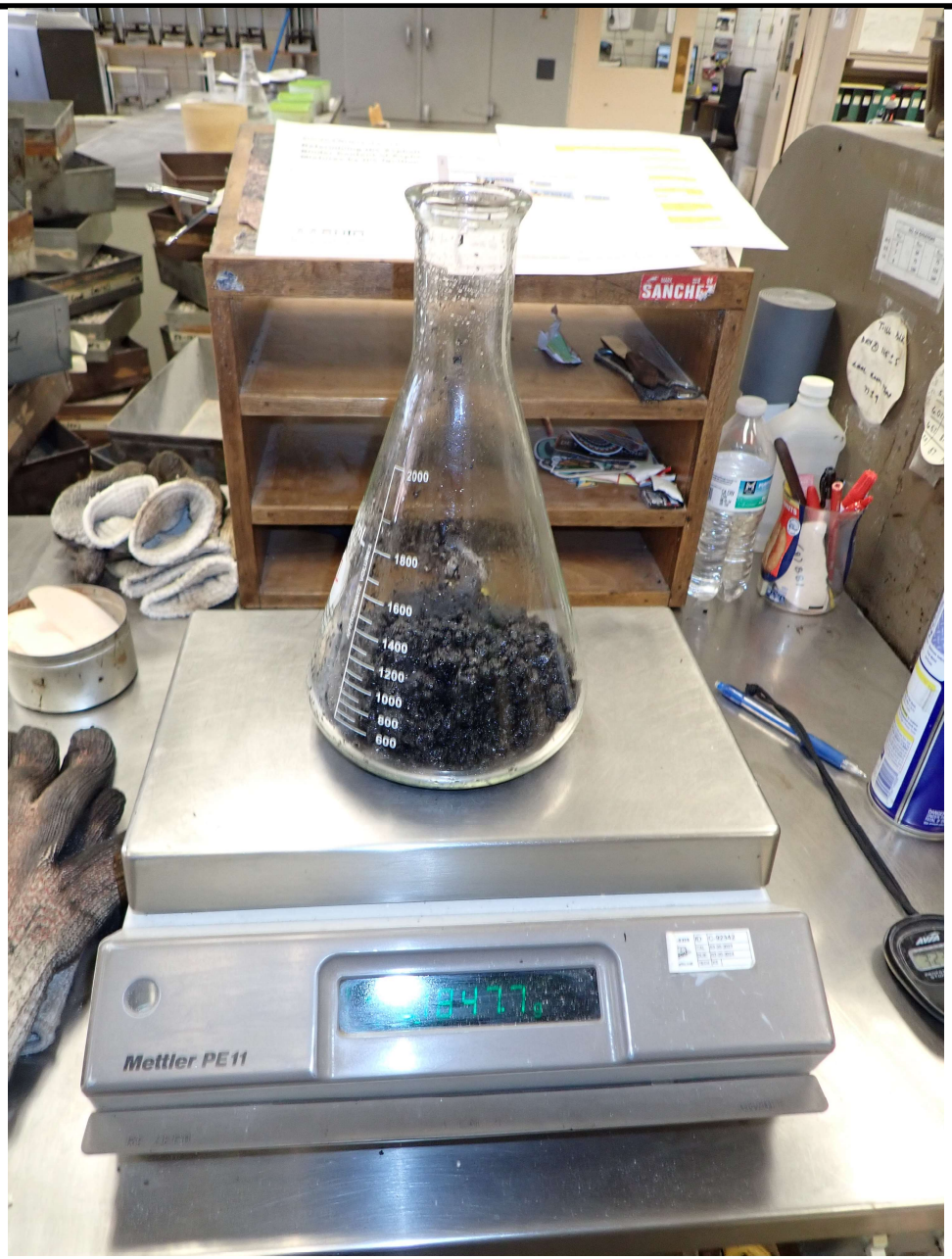
Empty the flask

Get the mix ready for testing (No bigger than ¼ in

Put the mix in the flask

It is allowed to use a funnel

Record weight of mix and flask



Add water to the flask (Covered with 1 in water)

Prepare the flask for vacuuming


Vibro-Deaitator