M-Vac Processing

1. Purpose

To describe the procedure for evidence collection using the M-Vac collection system

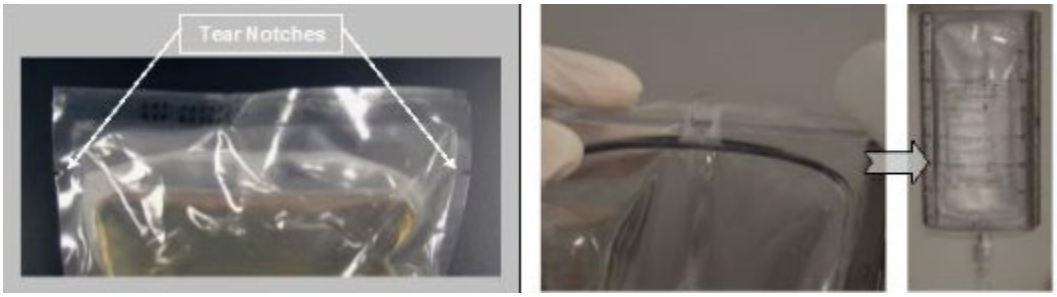
2. Summary

The M-Vac collection system uses a liquid solution to extract potential cells from various substrates and a wet vacuum for collection. The extraction solution is then filtered. The filter can then be processed for DNA.

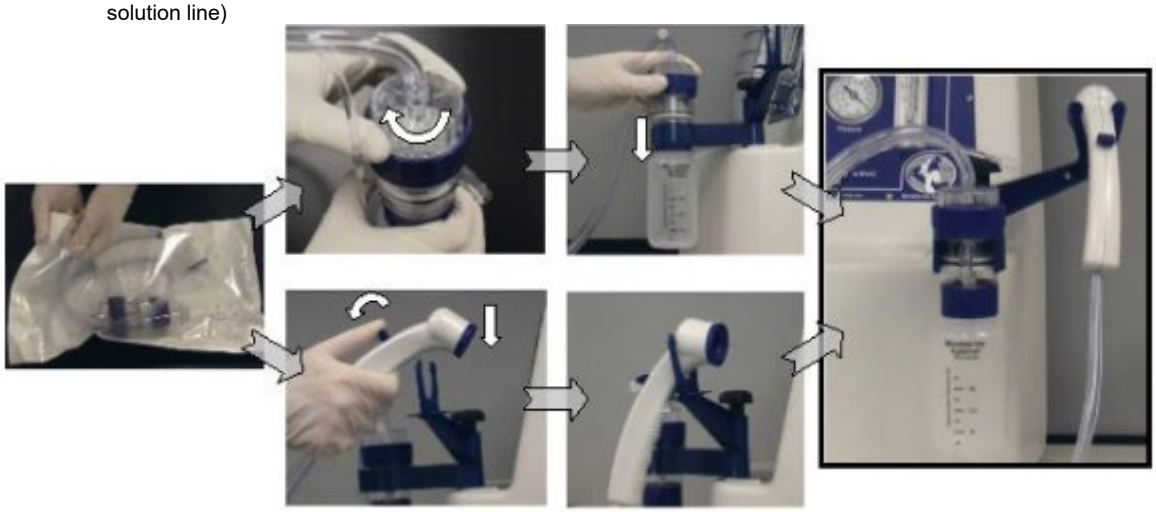
3. Procedure

M-Vac Setup:

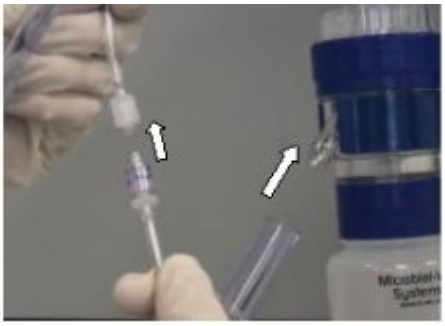
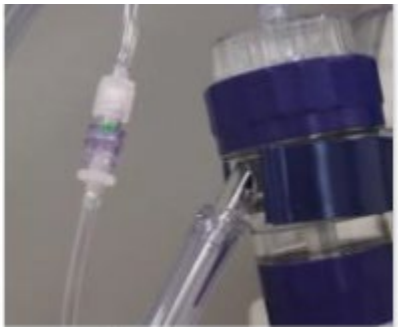
1. Turn ON the SEC power switch
2. Remove over wrap from Surface Rinse Solution bag by tearing straight across at the notches on the side of the over wrap & hang bag on solution door (see figure)



3. Preparing the M-Vac for use (one approach)
   a. Remove M-Vac & tighten lid (tighten-release-tighten)
   b. Turn OFF switch on sampling head by pulling back with thumb or finger
   c. Place separation unit and sampling head in holder or on the sterile field (Do not contaminate the male fitting on solution line)



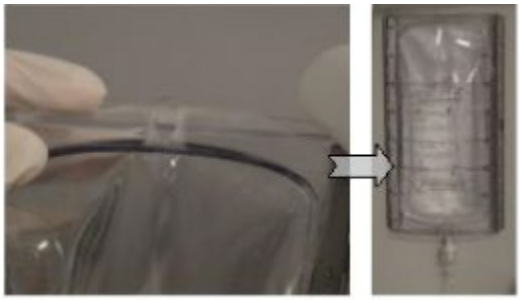
4. Open extension tubing by tearing at the notches on the side of the pouch. Attach solution line fitting to the M-Vac fitting on the M-Vac. Lightly attach vacuum tubing

5. Aseptically break tip off SRS bag from step 2. Connect spiked fitting of the tubing to the bag port. To connect, push and twist the fittings together until fully seated

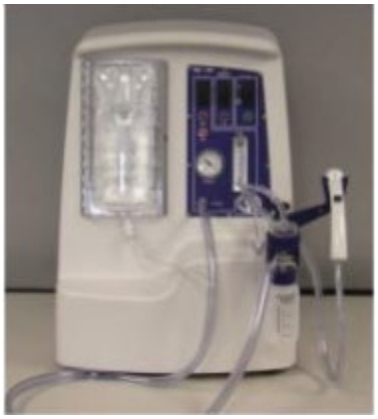
Do not contaminate the rubber septum under tip of SRS Bag by touching it

6. Close the door until it is locked shut by hinged latch. Turn Solution Pressurization switch to “ON.” It is pressurized when the low pressurization indicator light turns “OFF”



7. Connect vacuum side of tubing to SEC by slipping the quick-connect fitting into the vacuum port on SEC labeled “to M-VAC”

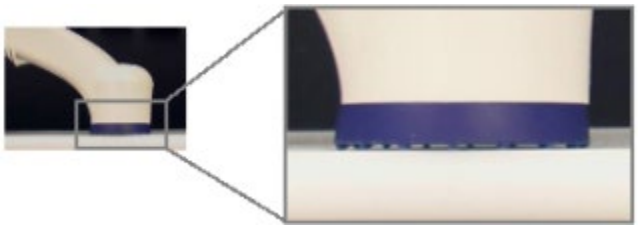




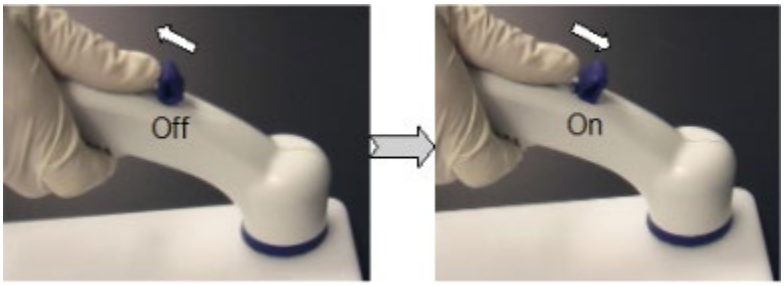
Collecting Samples:

This section gives general guidelines for sampling surfaces with the M-Vac. Customers will need to determine the best method for sampling their specific surface of interest.

8. Turn the Vacuum switch of the SEC to ON
9. With the vacuum pump ON, retighten the lid on the Separation Unit
10. Place the sampling head against that surface to be sampled as shown below. Try to keep all the flexible feet in light contact with the surface or equally in contact with the surface while sampling



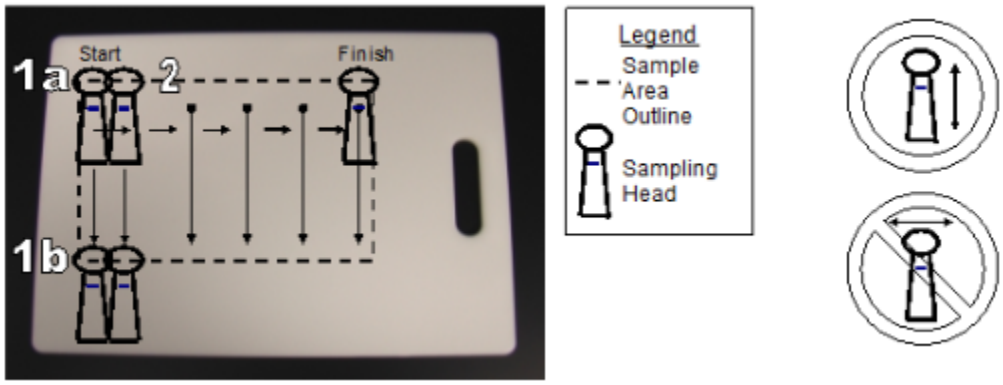
11. Turn the surface rinse solution (SRS) ON and OFF as shown below with thumb or finger



   a. For Practice – A Petri dish makes an excellent surface
      i. Looking through the bottom of the dish shows how the system works
      ii. Lifting the flexible feet from the surface of the Petri dish shows why they should all be kept in light contact with the sample surface

iii. It can be used to practice sampling while watching for solution loss. Solution loss is when droplets of solution are coming out from under the sampling head. As sampling proficiency improves, little solution will be left behind on the surface during the process
iv. The surface being left wet is normal, but solution squirting out from under the sides of the sampling head is not. If there is solution squirting out from under the sides of the sampling head, the head is not being kept in even contact with the sample surface
v. It can be used to practice the different orientations, horizontal, vertical, etc.

12. The following is an example of unidirectional sampling
    a. Starting at point 1a, turn solution ON and pull the sampling head toward you while applying light pressure to the sample surface (~2.4 - 4.8 in/sec)
    b. At point 1b, turn OFF the solution and return to point 1a. Sample over the same area with the solution OFF once or twice.
    c. Move to position 2 and repeat the sampling process (Overlap the prior sampling path about 30 percent)
    d. Repeat until the desired sampling area has been sampled (This technique will vary depending on the surface being sampled)
    e. Depending on the surface being sampled or the substance being collected, repeat the entire process from the beginning point to the end point with another set of wet and dry cycles (dried blood will likely require two wet cycles with a damp period between the cycles to release)



    f. Do not apply excessive force to the sampling head. It is not meant to be used as a scrubbing device
    g. Unidirectional sampling is shown above, bidirectional sampling is another approach. It is sampling with the solution ON in both directions or in other words, instead of turning it OFF and moving back to the starting point, the sampling head is pushed back to the starting point with the solution ON
13. If the sampling area is large and additional bottles are needed to complete the sample, turn the Vacuum switch on the SEC to OFF. Remove the sample collection bottle as outlined on page 10. Replace the full bottle with a sterile bottle and continue sampling
14. When sampling a small area:
    a. Ensure that the sample is taken while moving the sampling head across the spot (at least the length and width of the sample area)
    b. Sample the area until a minimum of 30 mL has been collected

Filtering a Sample

15. If your collection is full of debris, you may want to consider pre-filtering your sample before doing the final concentration with a PF 040 – a Sterile, 40 Micron Pre-Filter

16. On a “sterile” field, open the vacuum filter unit, Attach the M-Vac vacuum tubing to the vacuum filter

17. With the SEC as the vacuum source, remove the vacuum tubing from the M-Vac and attach it to the vacuum port of the vacuum filter

18. Support the vacuum filter in an upright position during processing

19. Turn ON the vacuum on the SEC (Remove the lid on filter funnel)

20. Swirl the sample in the bottle and then slowly pour into the vacuum filter funnel

21. Continue vacuum pressure until all the solution has passed through the filter
    a. If the solution is passing slowly through the filter (It is taking longer than 5 minutes), the following procedure is recommended
        i. Turn OFF the vacuum switch (leave the power to the SEC unit ON since this maintains the power to the cooling fan)
        ii. The system is sealed, so the vacuum pressure will be maintained for a period and the solution will continue to slowly pass through the filter.
        · If the pressure is not maintaining for an extended period, the fitting between the vacuum tubing and the filter may not be sufficiently tight enough to maintain vacuum. Simply leave the vacuum on until it is filtered
        iii. When the vacuum has dropped below 16 inHg or the sample has completely filtered, release the vacuum by disconnecting the vacuum hose and then reconnect the hose. Note – It is critical to release the vacuum pressure before turning the vacuum pump ON. Not releasing the pressure would be like trying to start your car while it is in gear
        iv. Turn the vacuum back ON and repeat until the filtration is complete
    b. When completed and if the filtration time was long, proceed to step 9
    c. When completed and if the filtration was about 15 minutes, proceed to step 8, but only use a small portion of liquid for the rinse
    d. When completed and if the filtration was short, proceed to step 8

22. It is recommended to complete the following rinsing procedure at least once to rinse the collection bottle – turn OFF the vacuum, release the vacuum pressure and either remove the filtrate collection bottle from the bottom of the concentration filter and pour it back into the sample bottle or spray collection solution into the collection bottle if the sampling head used in the collection is still attached to the SEC. Replace the filtrate collection bottle and repeat steps 3-6
    a. If desired, the vacuum filter funnel walls can be rinsed with DI water at the end of filtering

23. Discard the filtrate (filtered solution)

24. Handle the filter/filter funnel apparatus with standard evidence handling practices
    a. Filter can be stored and dried while in the housing

25. For extraction, using a sterile scalpel remove and process the entire filter. The filter can be cut into strips or confetti for placement in an extraction tube (or tubes as shown). A variety of extraction methods have been used successfully to process the filter. Please contact M-Vac Systems for the latest list

4. References

SEC Series 100 and 150 User Guide

5. Definitions

Clarify any terms used within the document