KETTERING Health Network

CytoFuge 2 Cytocentrifuge

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I. PRINCIPLE
Cytocentrifugation is a method utilized in the clinical microbiology lab that aids in the concentration and detection of bacteria present in small numbers in critical specimens. Cytocentrifuged gram stains improve the early detection of bacteria in normally sterile sites, such as body fluids, allowing the physician to begin treatment and lead to better patient outcomes.

The CytoFuge 2 is a microprocessor -controlled cell preparation system that uses centrifugal force to deposit cells onto microscope slides. Samples are centrifuged in disposable gasket-sealed chambers (Cell Concentrators), or in disposable chambers (Filter Concentrators) that include a filter material to absorb and capture suspension fluid during cytocentrifugation. The system is designed to be operated on a laboratory bench or, if potentially biohazardous material is processed, in a biological safety cabinet. A cover interlock system prevents operation until the centrifuge cover is securely latched and prevents access to spinning parts until the rotor has come to a complete stop. Speeds from 600 rpm to 4400 rpm and cycle times from 2 minutes to 30 minutes can be selected. Automatic acceleration rate control and dynamic braking are included to protect delicate samples.

II. SPECIMEN COLLECTION, TRANSPORT, AND HANDLING
A. **Specimens**
1. Clinical specimens that are acceptable for use in the cytocentrifuge, and require a cytocentrifuge smear, are all body fluids: cerebrospinal fluid, peritoneal, pleural, synovial, and pericardial fluids. All other specimens should be prepared following the Gram Stain Preparation and Staining procedure.

B. **Specimen Collection**
1. Refer to Specimen Collection Manual for specimen collection by anatomic site.

C. **Rejection Criteria**
1. Any specimen other than a body fluid is unacceptable for use in the cytocentrifuge. Additionally, the body fluid must be submitted in a sterile container.

III. MATERIALS
A. **Supplies**
1. Precleaned glass cytospin slides
2. Filter Concentrators
3. Cytospin filters
4. Sterile Pasteur pipettes
5. Stainless Steel Clips
6. Safety Shield

B. **Equipment**
1. Electric slide warmer 45-60°C
2. StatSpin Cytofuge

IV. QUALITY CONTROL
A. For Quality Control for gram stains, please see the Gram Stain Preparation and Staining Procedure.

V. PROCEDURE
A. Specimen Preparation
B. Slide Preparation

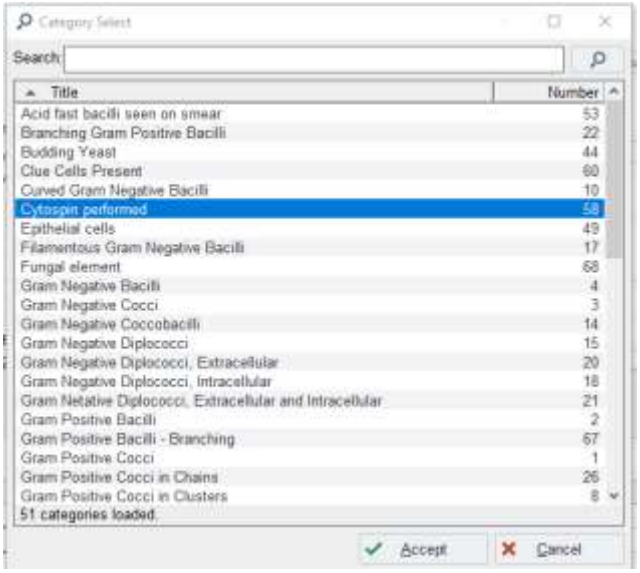
1. General considerations
   a. Label the frosted ends with a Beaker label.
   b. If manually staining the slide. Label the frosted ends with the following information:
      1) Accession Number
      2) Last name of patient
      3) Source of specimen
      4) Date
         a) **Clinical specimens should be processed and handled in a biosafety cabinet, including the preparation of Gram stain slides. When working in a BSL2 cabinet, PPE should be used, including gowns and gloves.**
         b) **Specimens should be processed and handled behind a safety shield at locations where there is not a biosafety cabinet**
   c. Specimen Preparation:
      1) Please refer to the Specimen Processing Procedure for Specimen Preparation.
      2) Note if the specimen is too viscous, bloody, or cloudy, a direct gram stain should be made in place of a cytocentrifuge slide.
   d. **Assembly of the Filter Concentrator:**
      1) Lay the filter concentrator flat and open it. Take one filter card and align it with the concentrator hole, ensuring that the absorbent side is facing the funnel.
      2) Place the microscope slide behind the filter. Make sure that the circle on the cytocentrifuge slide is lined up with the filter hole.
      3) Gently compress the assembly and slide the Steel Clip over the bottom of the concentrator to close it.
      4) Place the fully assembled filter concentrator into the rotor**.** If processing only one specimen, a balance tube is needed. If processing two specimens, make sure they are opposite each other in the rotor.
      5) The filter concentrator should tilt towards the center of the rotor. It is important to load the patient sample after installing the Filter Concentrator to minimize the premature settling of cells.
      6) Using a sterile pipette, add two drops of the specimen to the funnel.
      7) Place the lid on the rotor and secure it by turning the screw clockwise. Close the centrifuge top gently.
      8) Select Time (8 minutes) and speed (2200 rpms)
      9) Press the green start button. When the timed cycle is complete, the rotor stops; three beeps sound; and the interlock mechanism releases. The cover latch can then be squeezed to open.
   e. **Disassembly of the Filter Concentrator**:
      1) Unscrew and remove the rotor lid. Carefully remove the concentrator from the rotor (tilt the funnel downward).
      2) Holding the concentrator flat with the funnel facing up, gently remove the steel clip by pushing the clip away from you with both thumbs.
      3) Gently open the filter concentrator. Remove the absorbent filter and dispose of it in a biohazard bin**.**
      4) Gently remove the cytospin slide and allow it to air dry in a biosafety cabinet or covered on a slide warmer at 60°C.
      5) Gram Stain the smear following the Gram Stain Preparation and Staining procedure.

VI. INTERPRETATION

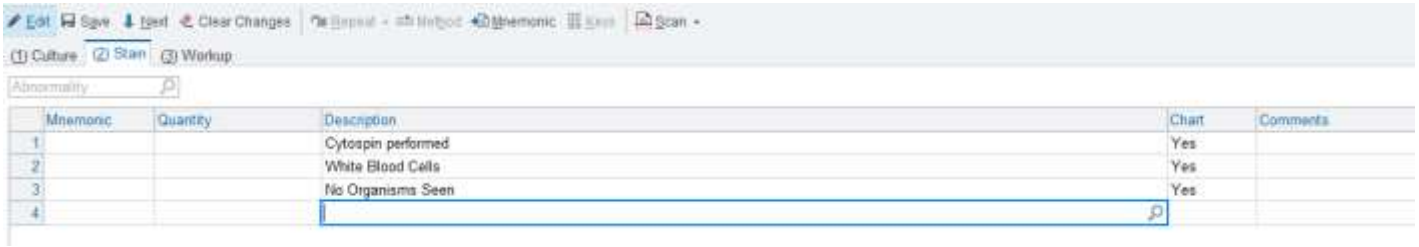
A. Refer to the Gram Stain Preparation and Staining Procedure for enumeration and interpretation of gram stain smears.
B. If after examination of the gram stain the specimen is too thick to read, perform a direct smear instead.

VII. REPORTING RESULTS

A. **Resulting in Epic Beaker**
   1. Refer to the Gram Stain Preparation and Staining Procedure for entering results into Epic Beaker.
      a. **Note:** Document the presence of cells and bacteria on the smear in the description box. **Do not quantitate cytospin gram stains**.
   2. Report that a Cytospin slide was performed on the specimen by adding the "Cytospin performed" in the **first** description box.
      a. Type in the number **"58"** to auto populate the appropriate comment or select the magnifying glass and then select the "Cytospin performed" comment.
      b.



      c. The comment will display under the description tab.



VIII. MAINTENANCE

A. All maintenance tasks must be performed at the frequency required, and the task documented on the StatSpin Cytofuge Maintenance form.

B. **Daily Maintenance**
   1. Cleaning the Filter Concentrators
      a. The concentrator should be disinfected in between each patient use. To clean, place the concentrator into a 10% bleach solution jar for 10 minutes, then thoroughly rinse them with DI water. Allow the concentrators to dry before use.

C. **Intermittent Maintenance**
   1. Disinfect the funnel clips
      a. The steel filter clips should be disinfected as needed with a disinfectant wipe if they become soiled.

D. **Weekly Maintenance**
   1. Replace the Concentrators
      a. The concentrators are replaced weekly and discarded in the biohazard trash.
   2. Rinse the funnel clips
      a. The steel filter clips should be rinsed weekly with DI water and allowed to air dry before use.
   3. Cleaning the interior and exterior of the instrument
      a. Clean the exterior and interior surfaces of the Cytofuge with an absorbent tissue dampened with 70% alcohol or a 10% bleach solution.
         1) Note: Do not spray cleaning solutions directly onto the centrifuge bowl or housing. Overspray can reach the motor bearing or internal circuitry, causing harm to the electronics.

E. **Monthly Maintenance**
   1. Check electrical connections at rear panel of system to ensure they are plugged in and in good condition.

IX. CRITICAL DETERMINANTS

A. For a complete list of critical determinants refer to the Laboratory Collection Manual and Gram Stain Preparation and Staining Procedure.

X. REFERENCES

A. Beckman Coulter StatSpin Cytofuge 2 Operator's Manual
B. Filter Concentrators, Cytofuge Manufacturer Insert

XI. FORMS ASSOCIATED WITH PROCEDURE

A. StatSpin Cytofuge Maintenance Form