HEMAPREP ®

AUTOMATED BLOOD SMEARING INSTRUMENT

OPERATOR MANUAL

We are delighted that you have chosen HEMAPREP® for your laboratory. Hemaprep® is manufactured by J.P. Gilbert Co, an FDA registered medical device manufacturer. We sincerely hope that you will find - as we have - that it produces smears of highly consistent quality, and that it is easy to use and trouble-free.

For best technique, we recommend that you follow the simple directions described in this manual.

SECTION	TABLE OF CONTENTS	PAGE

1. USE & FUNCTION

The HEMAPREP® is a mechanical device designed to emulate the standard method of preparing peripheral blood films by the wedge technique. Also see Special Smears, Section 13.

2. INSTALLATION INSTRUCTIONS

This instrument has been designed both for stationary and portable use. As a stationary instrument it is valuable for preparations both in the lab and at satellite locations; its portability makes it extremely valuable for the preparation of specimens at the patient's bedside. Because it is lever operated, it does not require an external power source or battery.

HEMAPREP® instruments are shipped with glass blades assembled. When the unit is used as a portable instrument, it should be operated in a horizontal position or placed on a level surface.

3. PRINCIPLES OF OPERATION

During the cycle of operation, glass spreader blades are brought mechanically into contact with the drop of blood; the instrument pauses to allow the blood to wet the spreaders, and then the spreaders pull the blood gently along the slide at a predetermined angle and preselected speed. The speed control, which is achieved by an air-operated piston, dispenses the blood in the standard wedge configuration.

4. PERFORMANCE CHARACTERISTICS

Because the smearing action is automatically controlled, it is able to achieve reproducible smears with ample "working area," good distribution and minimization of trauma; in addition, it produces borders along the edges of the slide which facilitate inspection of these-areas when used in accordance with these instructions. The length and thickness of the smear are related to the hematocrit, the quantity of blood used and the speed of the spreader blade. (See Calibration, Section 6). However, a valuable characteristic of the smears is that the monolayer of long and short smears is generally similar. This is because it dispenses at a constant rate.

5. OPERATING INSTRUCTIONS:

The slides should be placed in the slots provided, making sure they are properly seated. Either frosted end or clear slides may be used; if frosted slides are used, the frosted end should be placed at the front of the tray. If a single smear is desired, a “dummy” slide should be left in the second tray.

You will obtain best performance by using quality slides which have been pre-cleaned. Occasionally, slides may be cut either too long or too short, or with ends that are not square, or with the frosted area too large; these poorly made slides should be discarded.

6. CALIBRATION

The SMEAR CONTROL KNOB is located on the top of the unit. To adjust this knob, move the SPREADER ARM slightly forward and hold. The smear control adjusts the rate of air escapement from the piston, thus controlling the return rate of the spreader holder arm. By turning the knob clockwise, the spreader return is slowed and a longer, thinner smear is produced. The opposite effect is achieved when the smear control knob is adjusted counterclockwise.

Your Hemaprep® has been factory set to provide a medium-long smear. Should you wish to change this setting, adjustments should be made in 1/8 turn increments, until you have reached the desired length of smear. It is possible to tighten this knob too much. If the rate of return is too slow, turn the knob counterclockwise in 1/8 turn increments until the desired rate of return is achieved. Adjustments may be needed when presented with blood samples with extremely high or low hematocrit levels.

7. PAUSE CONTROL

The PAUSE CONTROL determines the amount of time that the spreader blades stay in contact with the blood drop. The PAUSE CONTROL screw is located on the underside of the instrument and is factory set. ***With normal use, it should not need to be adjusted by the operator.***

a. To check the duration of the PAUSE CONTROL setting, completely depress the front lever and immediately release it. The lever will remain depressed for one second and then begin to rise. Measure only the amount of time that the lever remains fully depressed.

b. To increase the duration of the pause, turn the screw clockwise in 1/8 increments.

c. To decrease the duration of the pause, turn the screw counterclockwise in 1/8 increments

d. Check duration of pause after every adjustment. ***Never tighten this screw completely. Never force the lever.*** If it will not easily depress, loosen the adjustment screw.

8. PRECAUTIONS

When operating the front lever, use gentle force.

When using frosted slides, make sure frosted portion is facing front; otherwise, spreaders will become nicked if they come into contact with frosting.

We recommend that spreaders be cleaned when an excess quantity of blood has been applied to the slide and the spreader blades have a visible amount of blood on them. This is necessary to prevent carry-over. (See Cleaning Instructions, Section 14)

How frequently the spreaders are cleaned is a choice for the individual laboratory. In our experience, only a small number of cells will remain on the spreaders; experiments run by the original manufacturer have determined that approximately five to ten leukocytes have been carried over from one smear to the next, where they typically are mixed with approximately 20,000 leukocytes.

It is good practice to clean spreaders whenever the unit is not operated for several hours. This is to remove dust and other foreign particles.

9. HAZARDS

As with any procedure involving fresh biological specimens, care should be taken to observe sanitary practices.

When handling slides or when replacing spreaders, care should be taken to handle glass carefully, avoiding cuts.

10. SERVICE & MAINTENANCE

HEMAPREP® is made of rugged materials and should provide trouble-free operation. It does not require periodic adjustments or lubrication. If you should have trouble, let us know immediately and we will offer suggestions and direct assistance. Our warranty covers all parts and labor for one year from date of purchase. The user may be required to return-ship the unit to a designated service depot.

If it should be necessary to return the unit, we would prefer that you use the original carton with original packing material to prevent damage in transit. If the unit is shipped without the factory container, it must be well-padded on all four sides; failure to do this could cause damage during shipment, which will result in loss of warranty. Please do not use “peanuts” or loose Styrofoam as packing material. Contact J.P. Gilbert Co for return instructions.

Shipping address: J.P. Gilbert Co., Inc.
548 Mountain Road
Boyertown, PA 19512
610-367-7457

11. SPECIMEN COLLECTION

The unit accepts both fresh and anti-coagulated blood; e.g., EDTA. We recommend that smears be made as soon as possible after collection. Typically, the EDTA will cause morphological damage after four hours.

If capillaries are used, we recommend plain micro hematocrit tubes of approximately 1.0 mm -internal diameter. If these tubes are filled at least halfway, they will release a drop easily.

If sticks are used, it is somewhat more difficult to control the quantity of blood. The best technique is to touch only one of the sticks to the slide; this generally releases the desired quantity of blood. If both sticks are touched at the same time, too much blood may be released.

12. PROCEDURE

Place a drop of blood at target locations indicated by marks on the trays which can be seen through the slides. The drop should be placed directly above these marks and approximately the same diameter as the marks.

By depressing the lever in front of the instrument, the spreaders are brought forward to make contact with the blood. ***The lever should be depressed firmly but gently. Do not use force.***

Release the lever as soon as it is fully depressed. The speed at which the lever returns to original position is determined by the air piston adjustment screw. The most desirable speed is one second. Once the lever is 'home', the spreaders will return to their original position, spreading the sample and producing the desired smear. The rate of travel of the spreaders is determined by the smear control setting. (See Calibration, Section 6).

A. SUMMARY OF PROCEDURE

Step 1- Place blood drop on slides at target locations.
Step 2- Depress front lever with a firm, smooth stroke. Release when fully depressed.
Step 3- After an automatic pause allowing the blood to spread laterally, the spreaders pull the blood gently along the slide.
Step 4- Remove slides.

13. SPECIAL SMEARS

Finger sticks

We do not recommend that blood be applied directly from the finger to the slide because of the difficulty in controlling the amount of blood and in placing it properly on the slide. Instead, we recommend using a 1 .0 mm. capillary tube to transfer the blood. Make sure that the tube is filled at least halfway so that the blood will run out easily.

Reticulocyte Smears

Leave the SMEAR CONTROL at its usual setting and use drop of blood approximately half the normal amount. The instrument will produce a slide with a monolayer over the major area. The spreaders may require cleaning after each specimen.

Lupus Erythematosus Preps

Place a small quantity of the prepared Buffy-Coat material on the target. Set the SMEAR CONTROL at the slowest setting (clockwise) and activate the unit. Be sure to clean the spreaders after smearing.

14. CLEANING INSTRUCTIONS

To clean spreaders rotate backward to rest position and wipe with tissue dampened with alcohol or water. Ensure spreaders are dry before using.

In case blood is inadvertently spilled into the mechanism, a swab should be used to immediately clean the parts. A mild soap solution is recommended. ***Do not immerse the HEMAPREP®.***

15. SPREADER REPLACEMENT

The precision spreaders used in your instrument are manufactured of high- strength glass and are designed for long-term operation. Our experience indicates that in normal use they will last for several months.

The spreaders may become nicked from hitting chips of glass or other obstructions on the slide; a nick on the edge of the spreader may cause a streak in the smear.
The spreader should be replaced if nicked or cracked.

Replacing a spreader is quite easy as it is held in place by double-sided tape. To replace he spreader, simply hold the spreader assembly and pry off the spreader blade with thumb and forefinger. A new spreader is applied after first removing the protective paper. The spreader is then positioned squarely in the slot provided in the spreader holder and pressed firmly in place.

If additional spreaders are required, they are available from J.P. Gilbert Company, Part# 756301. (Spreader replacement package contains one pair of spreaders).

16. TROUBLESHOOTING

PROBLEM AREA 1:	Erratic smears with a rough edge. Streaks in smears. Appearance of a dip in the center of the feathered edge.

CAUSE	SOLUTION
a. Blood trapped in the front of the spreader blade.	Do not hold the lever down too long. Release it as soon as it reaches its bottom position. Avoid depressing the lever too rapidly. Avoid jerking the lever when removing your finger from it. Avoid placing the blood drop off the black target area. The PAUSE CONTROL may require readjusting. See PAUSE CONTROL, Section 7.

b. Dirty spreader blades c. Nicked spreader blade d. Bubbles in the blood drop	Clean the blades. Replace the nicked blade. Avoid dispersing the blood drop in such a way that bubbles will be produced. If they are produced, attempt to “pop” them with the edge of the pipette or wooden stick.

Problem Area 1 (continued)

e. Dirty Slides	Do not use slides that appear to be particularly dirty or greasy.
f. Dried blood drop	Depress the lever immediately after the blood drop has been applied to the slide.

PROBLEM AREA 2: Run off or excessively long smears.

CAUSE	SOLUTION
a. Blood drop too large	Apply a smaller blood drop.
b. SMEAR CONTROL set too thin or blood has very low hematocrit	Turn the SMEAR CONTROL knob counterclockwise in one-eighth-of-a-turn increments until a satisfactory setting is obtained.

PROBLEM AREA 3: Excessively short smears.

CAUSE	SOLUTION
a. Blood drop too small	Use a larger blood drop.
b. SMEAR CONTROL knob on a setting which is too thick or blood has a high hematrocrit.	Turn the SMEAR CONTROL knob clockwise in one- eighth-of-a-turn increments until a satisfactory setting is obtained.

PROBLEM AREA 4: Smear is too short and/or feather edge is bullet-shaped.

CAUSE	SOLUTION
a. Blood drop is too small	Use a slightly larger blood drop
b. Blood is too thick	Use two drops of blood. Place a drop on either side of the target area.

PROBLEM AREA 5: Entire smear is in the shape of a bullet.

CAUSE	SOLUTION
a. Spreader blades are not pausing in the blood drop long enough.	The PAUSE CONTROL is set too short. Adjust the pause. (See Pause Control , Section 7.) Fully depress lever to its bottom position.

PROBLEM AREA 6: Lopsided smears.

CAUSE	SOLUTION
a. Blood drop not placed in center area contacted by spreader blade	Place blood drop on target of area.
b. Spreader blade not positioned squarely in its slot.	Make sure that the spreader blade is centered in its slot. Reposition spreader blade.

PROBLEM AREA 7: Incomplete pickup of blood drop.

CAUSE	SOLUTION
a. Spreader blade not making contact with blood drop; drop being placed behind target area	Be certain to place the drop directly on the target. If insufficient blood is still picked up, place the blood drop slightly forward of the target area (toward the spreader).

PROBEM AREA 8: "Stand-up" blood drop (a drop which, when dispensed, doesn't spread out and "wet" the slide).

CAUSE	SOLUTION
a. Dirty slide	Discard slide.
b. Blood dispenser is being held at an angle which is too vertical	Hold dispenser at about a 45° angle when the blood drop is dispensed. The amount of blood which is delivered can be controlled by the angle at which the dispenser is held.

Please do not hesitate to contact us with any questions or problems.

Our goal is a satisfied HEMAPREP® user!

J.P. GILBERT COMPANY

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