Equipment Maintenance Guideline

Good equipment maintenance will help to ensure that the quality of the output is maintained and will also extend the lifetime of the equipment. Also, in some cases it may be that poor maintenance or the lack thereof could cause problems when warranty claims are submitted.

In this document we describe and discuss the basic maintenance of equipment used in the vision centre.

1. PROCEDURES

Equipment maintenance is important to ensure equipment is working correctly and accurately. Equipment ranges from the computer in the reception area to the lens edger in the optical workshop.

A folder or file labeled "Equipment Inventory" should be created to store:

- list of all equipment
- instruction booklets
- serial numbers
- warranties
- supplier's details.

A folder or file labeled "Equipment Maintenance" should be created to store

- servicing records/logs
- service/repair invoices
- service schedule recommendation
- contact details of servicing company
- repair request forms (see below).

A folder or file labeled "Current Equipment Repairs" should be created to store

- processing jobs documentation
- completed repair request forms.

All folders will be used to track all equipment, servicing and monitoring requirements.

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3. EQUIPMENT REPAIR

- A repair request form needs to be completed by the vision centre manager within 2 days from when the need for a repair has been identified by the ST/EE.
- The vision centre manager will contact the appropriate service provider to make the requested repairs. Once the equipment has been repaired, the invoice will be placed in the "Equipment Maintenance" file.

4. EQUIPMENT SERVICING

- Servicing of equipment should occur routinely as recommended by the servicing company, manufacturer, or the supplier.
- A list of general recommendations is located further in this document.
- The vision centre manager should make sure the servicing company completes a service log for each equipment serviced.

5. EQUIPMENT MONITORING

- All equipment in a Vision Centre should be checked regularly. Equipment used regularly by clinical and technical staff should be monitored by them and reported to the vision centre manager if any servicing or repairing is needed.
- Administrative equipment such as a computer should be regularly monitored by the vision centre manager.

6. EYE EXAMINATION EQUIPMENT MAINTENANCE

Equipment	Service Recommendation
Retinoscope	3 Years
Ophthalmoscope	3 Years
Slit-Lamp	2 Years
Tonometer	2 Years

This service recommendation period should be used unless stated otherwise by the manufacturer.

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Other equipment such as charts (direct at 3m), trial frames, trial lens sets, Jackson cross cylinders, occluders, flippers, prism bars, low vision devices and pen torches should be kept clean and stored away when not in use.

Retinoscope / Ophthalmoscope	**Frequency**
Over time, dust and haze will build up on the mirror and lenses inside the instrument which will reduce the brightness of the light. This can be cleaned out when requesting a service. When not in use, the instrument should be kept in a clean, dust free storage.	As required Daily
Always keep a spare bulb. It is important to know which type of bulb is required for the instrument. The old bulb can easily be removed depending on the model and the instructions can be found in the manual. It is important to follow the manual, as bulbs can easily be damaged if not inserted or removed properly. Make sure the power is switched off when replacing the bulb.	As required
The instrument should be turned off immediately after use to prevent the bulb from overheating.	After every use
The instrument is sensitive to high voltages and bulbs can blow if the voltage is too high. Always check the voltage setting of the outlet corresponds to the instrument.	When charging through a new power outlet
Slit-Lamp	**Frequency**
Cover the instrument when not in use. Over time, dust and haze will build up on the mirror and lenses inside the instrument which will reduce the brightness of the light. The mirror, lens and eye pieces should be cleaned from dust, fingerprints and other particles with a soft cloth.	Daily
Chin rest paper should be changed between patients and replenished when it has finished. The papers are held in place by pins or screws, which can easily be removed to allow replacement. If it is difficult to source the papers, a tissue can be used instead. The chin and forehead rest should be wiped down with alcohol or mild detergent and water solution. Note some models that have rubber parts may be damaged if alcohol is used. Please carefully read the instruction manual.	Between patients Ideally between patients or at least every day.
Always keep spare bulbs. It is important to know which types of bulbs are required for the instrument. The old bulb can easily be removed depending on the model and the instructions can be found in the manual. It is important to follow the manual, as bulbs can easily be damaged if not inserted or removed properly. Two important things when replacing the bulb • make sure the main power is switched off • use a soft cloth or tissue when handling the new bulb; to prevent fingerprints on the bulb which can reduce illumination.	As required

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The fuse can also wear out over time. Use the instruction manual for instructions on how to replace the fuse.	As required
It is possible to adjust certain features of some slit-lamp models e.g. slit width control. Please refer to the instruction manual before attempting any adjustments.	As required
The instrument should be turned off immediately after use to prevent the bulb from overheating.	After every use
The instrument is sensitive to high voltages and bulbs can blow if the voltage is too high. Always check the voltage setting of the outlet corresponds to the instrument.	When connecting to a new power outlet
The stage should be locked after every examination, to prevent the slit-lamp from rolling around and getting damaged. If the stage is difficult to move around, the glide plate, friction plate or the ball bearing underneath should be cleaned with a cloth. Please refer to the instruction manual for detailed instructions.	After every use As required

Maintenance of tonometers

Calibration of tonometers varies depending on the type (contact or non-contact) and model. Refer to the manufacturer's instruction manual for full details of calibration procedures. This tool kit only covers the Perkins hand-held and Goldmann Applanation Tonometer.

Perkins Hand-Held Applanation Tonometer - Maintenance	Frequency
Do not attempt to repair the tonometer. Return it to the supplier to servicing centre for repairs.	As required
The applanation head/probe should be cleaned and sterilised between patients: Step 1: Place the tip (2-3mm) of the probe (that touches the eye) in a small dish with sterilising solution (either 3% hydrogen peroxide or one part household to ten part water) for a minimum of 5 minutes and maximum of 10 minutes. Step 2: After sterilising; the probe should be dried thoroughly for a minimum of 20 minutes before use. If you do not let it dry properly, some residual sterilising solution on the probe can cause serious damage to a person's eye when used next. Step 3: After the probe has dried; you can rinse it thoroughly with saline if available. Two applanation probes can be used in one exam room so that one disinfected head is always ready for use. If the probe is not cleaned and sterilised between patients, it can spread infectious diseases.	Between patients
Batteries should not be kept in the instrument if it will not be used for a long period of time. The batteries can leak and damage the instrument over time.	As required

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The instrument should be stored away in its case when not in use. The pressure sensitive arm and internal prism should be protected at all times. You must remove the probe from the holder before you store the instrument away.	When not in use
Perkins Hand-Held Applanation Tonometer – Calibration	**Frequency**
<u>To calibrate</u> Step 1: Batteries must first be removed. Step 2: Insert the probe/head/doubling prism into the holder. <u>Check for Zero Position</u> Step 3: Adjust the thumb wheel so that the scale reading is below zero by the full thickness of one scale (e.g. 58mmHg). It doesn't matter which way you are holding the instrument, but the probe should tend towards its backwards position at this reading. Step 4: Adjust the thumb wheel so that the scale reading is above zero by the full thickness of one scale (e.g. 2mmHg). It doesn't matter which way you are holding the instrument, but the probe should tend towards its forwards position at this reading. <u>Check at the 2g Position</u> Step 5: The tonometer should then be placed on a flat surface horizontally, with the probe facing up. Place the setting block (usually round black piece that comes with the instrument) underneath the top of the instrument. Step 6: Turn the thumb wheel so that it reads 18mmHG. Step 7: A 2 gram weight that comes with the instrument, should be placed centrally on the probe. (Indented part should be placed facing downward). Check and see if it moves the probe moves down to the lowest position. Step 8: Take the 2 gram weight off and turn the thumb wheel so that it reads 22 mmHg. Step 9: Place the 2 gram weight again centrally on the probe. This time, check and see that the probe remains in its highest position. <u>Check at the 5g Position</u> Step 10: Repeat Steps 5 to 9, with a 5 gram weight and work around the 50mmHg scale mark (Step 6 – 48mmHg, Step 8 - 52mmHg). If the tonometer is inaccurate at any of these dial positions, it should be returned to the manufacturer/supplier/service centre for recalibration (tolerance levels are specified in the instruction manual). When the tonometer does not work properly, it will give false pressure readings. Calibration is fairly standardised. For more details, please refer to the instruction manual.	Monthly

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Goldmann Applanation Tonometer - Maintenance	Frequency
Do not attempt to repair the tonometer. Return it to the supplier to servicing centre for repairs.	As required
Sterilisation of the head/probe is the same procedure as that of the Perkins Tonometer. Please look above.	In between patients
The instrument should be stored away in its case when not in use. The pressure sensitive arm and internal prism should be protected at all times.	When not in use
Goldmann Applanation Tonometer - Calibration	**Frequency**
Calibration is done at dial positions 0, 2, and 6 (equivalent to 0, 20, and 60 mmHg). <u>Check for Zero Position</u> Step 1: Insert the probe/head/doubling prism in the holder and place the tonometer on the slit-lamp . Step 2: At dial position 0, the feeler arm should be in free movement. Step 3: Adjust the thumb wheel is so that the scale reading is slightly below zero. The arm should fall towards the examiner. Step 4: Adjust the thumb wheel is so that the scale reading is slightly above zero. The arm should fall towards the patient. <u>Check for 2 and 6 Position</u> Step 5: The check weight used (this is normally found in the case with the tonometer prisms or in the drawer of the slit-lamp). There are five markings engraved on the bar. These represent 0 centrally, then 2 on either side, and 6 towards the edges. Line up the adjustable holder with index mark 2 on the weight. With the longer end of the bar facing you, put it into the slot on the side of the tonometer and push it all the way in. Step 6: Turn the thumb wheel so that it reads 18mmHG. Check and see that the arm falls towards the examiner. Step 7: Turn the thumb wheel so that it reads 22mmHG. Check and see that the arm falls towards the patient. Step 8: To check dial position 6, move the weight bar to the end position. Repeat the steps 5 to 7(Step 6 – 58mmHg, Step 7 - 62mmHg). If the tonometer is inaccurate at any of these dial positions, it should be returned to the manufacturer/supplier/service centre for recalibration (tolerance levels are specified in the instruction manual). When the tonometer does not work properly, it will give false pressure readings. Calibration is fairly standardised. For more details, please refer to the instruction manual.	Every 3 months

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Trial Frame	**Frequency**
Should be kept clean and nose pad should be wiped with alcohol in between patients. The frame can be wiped with a soft cloth when cleaning.	As required
Trial Lens Set	**Frequency**
Should be kept in a drawer or covered to keep the lenses clean and dust free. The lenses can be cleaned with a glass cleaner and a soft cloth.	Daily
Lenses can be easily misplaced/ lost. Each lens should be put back in it its correct place after each time it is used to avoid any loss. Lost lenses should be noted and reported.	After every use
Jackson Cross Cylinder	**Frequency**
Can be washed and cleaned with a damp cloth. Make sure harsh detergents are not used as they can remove the markings. The lenses should also not be rubbed rigorously as they can become loose and rotate around the rim.	Daily
If the lens rotates: slowly unscrew the handle from the lens rim so that is it has only partially come undone. The lens will become loose and then can be rotated back in place so that the 2 of the markings (+/- 0.25/0.50/1.00) are 45 degrees to the handle.	As required
Eye charts	**Frequency**
Can be washed and cleaned with a damp cloth. Make sure harsh detergents are not used as they can remove the markings.	weekly

1.7 Dispensing Workshop Equipment Maintenance

Equipment	Service Recommendation
Automatic edgers	3 Years
Hand edger	3 Years
Pattern maker	3 Years
Blocker	3 Years
Focimeter	As required

This service recommendation period should be used unless stated otherwise by the manufacturer.

Other equipment such as pliers, calipers and heaters should be kept clean and stored when not in use. Jobbing boxes should be cleaned out before being re-used.

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The following are generic instructions for calibration and maintenance of equipment. In some cases, such as with patternless edgers and some template cutters, a specific brand-related procedure should be followed. The equipment maintenance folder should be referred to before calibration is carried out.

Automatic edger calibration	**Frequency**
Setting the wheel differential - Follow the instruction instructions	On original set-up or installation of a new stone
<u>Calibration</u> Check the sizing of the lenses Step 1: Set the sizing dial to zero (0). Step 2: Clamp a lens on the edger and edge to a round template (this is normally provided with the edger). Step 3: Use the vernier calipers to compare the size of the finished lens to the size of the template – the sizes should be the same. Step 4: If the sizes vary, re-set the size wheel following the instruction instructions.	Once a week
<u>Calibrating axis</u> Step 1: Select a rectangular shaped template. Step 2: Dot a pair of lenses to be edged – draw a straight line through the dots using a permanent pen (the blocker must be calibrated first – see below). Step 3: Flat edge the lenses on the automatic edger. Step 4: Compare the lenses back to back to determine whether the lines are co-linear. Step 5: Check each lens against the template. Step 6: Adjust the axis as required by following the instructions.	Once every six months
Automatic edger maintenance	**Frequency**
Clean away any residual lens material and wipe down the machine.	Daily
Check the water levels in the tank.	Daily
Remove excess froth from the top of the tank.	Daily
Empty, clean and re-fill the tank. Use fabric softener or 'Pinoclean' to reduce frothing.	Weekly or as required for heavy workload
Flush the machine by running hot water (not boiling) through the machine.	Weekly or as required for heavy workload (when cleaning tank)
Dress the wheel with the appropriate dressing stick.	Monthly

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Lubrication Step 1: Wipe off excess grease and oil from exposed parts Step 2: Re-grease where required Step 3: Apply grease to all grease nipples Step 4: Apply a light coating of Vaseline or light grease to the template shoe Step 5: Oil any other moving parts	Follow manufacturer's recommendation or once every six months
Hand edger maintenance	**Frequency**
Clean away any residual lens material and wipe down the machine.	Daily
Remove and wash sponges.	Daily
Check the water levels in the inlet tank.	Daily or as required with heavy workload)
Check and empty the waste tray (usually under the edger).	Daily or as required with heavy workload)
Dress the wheel with the appropriate dressing stick.	Monthly
Template cutter calibration	**Frequency**
<u>Calibration</u> Check the sizing of the template Step 1: Set the sizing dial to zero (0). Step 2: Clamp a template blank on the template cutter and cut a template for a selected frame. Step 3: Use the vernier calipers to compare the size of the template to the size of the dummy lens (the lens insert) – the sizes should be the same. Step 4: If the sizes vary, re-set the size wheel following the manufacturer's instructions.	Once a month
<u>Calibrating axis and centration</u> Step 1: Select a rectangular shaped frame. Step 2: Draw a horizontal centre line and a vertical box line using the boxing system. This should be done by clamping the frame in a parallel rule and drawing the lines on the back of the dummy lenses with a fine permanent pen. Step 3: Cut the template. Step 4: Compare the template to the dummy lenses to determine whether the lines are co-linear and the centres line up. Step 5: Adjust the axis as required by following the manufacturer's instructions.	Once every 6 months

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Template cutter maintenance	**Frequency**
Remove off-cuts and waste from the waste tray and clean around the top of the cutter.	Daily
Replace blunt cutter blade - Follow the manufacturer's instructions	As required
Blocker calibration	**Frequency**
<u>Calibrating axis and centration</u> Step 1: Select a pair of lenses. Step 2: Dot a pair of lenses to be blocked – draw a straight line through the dots using a permanent pen. Step 3: Compare the horizontal line on the lenses to the block to determine whether the lines and the block are co-linear. Step 4: Adjust the axis as required by following the manufacturer's instructions.	Once a month
Blocker maintenance	**Frequency**
Wipe down the blocker and ensure the light is switched off.	Daily
Wipe the inking blades where applicable.	Daily
Focimeter calibration	**Frequency**
<u>Focus the eyepiece</u> Step 1: Place a piece of white paper in between the telescopic unit (the viewing system) and the bottom of the focimeter (the focusing system). Step 2: Look into the focimeter with your open eye and keeping both eyes open. Step 3: Turn the eyepiece anti-clockwise until it stops. Step 4: Slowly turn the eyepiece clockwise until the black lines of the graticule become sharp. Step 5: Remove the paper, turn the focimeter on and focus the green target. It should read 0.00 D on the power scale. If not repeat steps 1 to 4.	Each new user or daily
<u>Calibration - Checking the power</u> Step 1: Find a lens of –10.00 D sphere and a +10.00 D or sphere of known accurate power. Step 2: Measure both lenses to ensure that the focimeter continues to give the correct reading. If it does not give the correct reading, follow manufacturer's instructions.	Every 6 months

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<u>Calibration - Checking the axis</u> Step 1: Choose and retain a pair of mounted spectacles with a significant cylindrical power and known axis. Step 2: Measure both lenses to ensure that the focimeter continues to give the correct axis reading.	Every 6 months
<u>Calibration - Checking for unwanted prismatic effect</u> Step 1: Centre and dot a lens Step 2: Turn the lens around by 180 degrees and re-dot The dots should correspond exactly If not the focimeter may be inducing prism	Every 6 months
Ensure that the target is centred in the graticule.	Daily
Move your eye side to side to ensure that the target doesn't move relative to the graticule.	Daily
Focimeter maintenance	**Frequency**
Clean the lenses using a soft cloth or camel hair brush.	Weekly
Turn the power off and cover the focimeter.	At the end of each day's use
Check that there is no slack in the frame table.	
Check that there is no slack in the power wheel or axis wheel.	Monthly
Clean the ink pad.	Monthly or as required
Lens measure calibration	**Frequency**
Step 1: Place a box against a mirror. The box must have vertical sides. Step 2: Place the lens measure against the side of the box and slide it down on to the mirror The box ensures that the lens measure is perpendicular to the mirror. Step 3: The needle on the face of the lens measure should point to 0.00 D (the mirror is a flat or plano surface). Step 4: If the needle does not point to 0 carefully rotate the centre pin with a pair of points (pliers) until it reads 0. Some lens measures have a small flat area on the centre pin to make turning the pin easier.	Once a month
Tint bath set up	**Frequency**
Make sure that the tank has sufficient heat transfer fluid. Water may be used, however there is a risk of rusting the unit over time.	Daily
Ensure that the pots are clean.	Daily
Turn on the unit and set the thermostat to 94º C.	Daily
Add the concentrated dye to water and stir.	Pots should be

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Allow tint pot to stand at required temperature for one hour before tinting. Stir one more before tinting.	changed once per week
Tint bath maintenance	**Frequency**
Empty and clean tint pots.	Once per week
Replace heat transfer fluid.	6 monthly unless it is water in which case it is topped up daily
Clean the top of the tank.	Daily

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