# A Guide to Proper Care and Handling of Ophthalmic Surgical Instruments

## TABLE OF CONTENTS

- Inspecting New Instruments ................................................................. 2
- Preparing an Instrument for Its First Use .................................................. 2
- Preparing an Instrument for Its Next Use ................................................ 2
- Manual Cleaning ...................................................................................... 3
- Ultrasonic Cleaning .................................................................................. 4
- Inspection and Lubrication ......................................................................... 5
- Storage ....................................................................................................... 6
- Handling ...................................................................................................... 7
- Sterilizing .................................................................................................... 8
- Repairs ....................................................................................................... 8

## Appendices

- A. Understanding Stainless Steel .......................................................... 9
- B. Understanding Stains on Stainless Steel .............................................. 9
- C. Understanding Titanium ................................................................. 10
- D. TASS Resources ................................................................................. 10
  - Case Studies ......................................................................................... 10
  - Description ........................................................................................... 11
  - Prevention .............................................................................................. 11
- E. Instruments Requiring Special Attention ............................................ 12
  - Adjustable Speculums ......................................................................... 12
  - Diamond Knives .................................................................................. 12
  - Luntz-Dodick Trabeculectomy Punch .................................................. 12 - 13
  - Spring Handle Scissors, Forceps and Needle Holders .......................... 13
  - Vitreo-Retinal Forceps and Scissors ..................................................... 14
  - Katena IOL Cutter ............................................................................... 14 - 15
  - Stolte IOL Cutter ............................................................................... 15 - 16
  - Aspirating Cannulas, Speculums, and Bimanual Instruments .......... 16
- F. Cannula Flushing and Drying Guidelines ............................................ 16
- G. Contacting Us ..................................................................................... 17
A Guide to Proper Care and Handling of Ophthalmic Surgical Instruments

Inspecting New Instruments

Although Katena makes every effort to ensure that the instruments you receive are perfect, we suggest that you inspect each new instrument before using it.

1. Carefully remove the instrument from its packaging.
2. Examine the instrument under magnification – preferably a microscope – to ensure that it is in perfect condition.

Notify us immediately if you discover any problem (see Contacting Us, page 17).

Preparing an Instrument for Its First Use

If your inspection of a new instrument confirms that it is in perfect condition, you can proceed to clean and sterilize it as described in this document.

Even new instruments must be cleaned and sterilized before they are used for the first time.

Preparing an Instrument for Its Next Use

As soon as possible after an instrument has been used in surgery, the reprocessing – or preparation for the instrument’s next use – should begin. This urgency comes from the need to prevent debris and undesirable fluids from drying on the instrument. It is much more difficult to remove debris or a coating of fluids from an instrument after it has dried.

Therefore, instruments should be wiped and/or rinsed during use (or immediately after) to minimize the accumulated debris and fluids. Instruments should be kept moist until they can be cleaned. Proper cleaning and decontamination is essential for effective sterilization. A sterilization process will not be effective if debris is dried on or trapped in crevices.

Basically, the reprocessing of surgical instruments consists of the following:

- manual cleaning
- ultrasonic cleaning
- inspection and lubrication
- packaging
- sterilization
- storage until next use

Silicone mats securely hold instruments.
Manual Cleaning

Cleaning is the prerequisite for sterilizing surgical instruments.

Cleaning is defined as the removal of visible and invisible soil (blood, proteins, etc.) from all surfaces, crevices, lumens and joints of surgical instruments. This starts in the operating room.

Immediately after surgery:

1. Remove excess soil from instruments with a moistened, sterile Katena Instrument Wipe (K20-5040). These non-shedding sponge wipes are designed specifically for cleaning delicate instruments.
2. Rinse all instruments in the surgical tray with demineralized water, including those that were not used.
3. Keep used instruments submerged in a basin filled with demineralized water until further cleaning is possible.

As soon as possible after surgery:

1. Disassemble those items that can be disassembled for cleaning, keeping all parts together and protected from being misplaced or intermixed with parts from other similar devices.
2. Clean all instruments, gently scrubbing stubborn stains with a soft brush and paying particular attention to less accessible areas such as hollow tubes, slots, stops, ends, joints, box locks, and serrations. If debris collects in these areas, it could cause corrosion to develop.
3. Use a syringe with demineralized water to flush items with a lumen, dispersing the fluid in a different bowl so as not to contaminate the soaking water for other instruments. See helpful guidelines in Appendix F on page 16. Thoroughly rinse all instruments with demineralized water.
4. If ultrasonic cleaning is not possible, thoroughly dry instruments using a lint-free cloth or hot-air blower, making sure the inside channels and less accessible areas are thoroughly dried. Otherwise, keep the instruments moist until they can be given an ultrasonic cleaning.

Note: Brushes and other cleaning implements should be cleaned and decontaminated after each use. However, it is best to use single-use brushes and other cleaning implements that can be discarded after use.

What to avoid

- Do not allow medicines, viscoelastic, irrigating solutions (saline), or protein residue to dry on instruments.
- Do not use corrosive cleaning agents such as bleach. Cleaning solutions and rinses at or near neutral pH (7) are best. Aggressive cleaning agents with a high pH (8 to 11) will damage an instrument’s metal surface.
- Do not use metal brushes, steel wool, or abrasive powders. These will seriously damage the surface finish of the instruments, making them much more susceptible to corrosion.
The best method for thoroughly cleaning delicate micro-instruments is to use an ultrasonic cleaner. This equipment uses high-frequency sound waves to separate particulate matter from device surfaces. It is superb for dislodging debris that has settled into inaccessible areas (such as box locks, joints, and serrations, as well as obstructions in cannulas and needles). All visible debris should be removed from the instrument before ultrasonic cleaning.

Ultrasonic cleaners vary, so follow the instructions supplied by the manufacturer of your ultrasonic cleaner. However, the following guidelines should prove helpful:

1. **We strongly recommend** that you dedicate an ultrasonic cleaner to be used only for eye surgery instruments. Mixing other surgical instruments (and their debris) with eye instruments could promote TASS (see Prevention of TASS, page 11).

2. **We strongly recommend** that the water for ultrasonic cleaning be heated to maximize its cleaning effect. Water temperature of about 150° F (65° C) is adequate for this purpose.

3. Ensure that the ultrasonic bath is not contaminated before use. Visually inspect the water in the bath for debris, dirt, or discoloration of the water. If you see any contamination, replace the water in the bath with new demineralized water.

4. If you choose to use a cleaning solution, be sure to use one that is recommended for surgical instruments. Never use common household detergents because they produce excessive foam and may leave an undesirable coating on the instruments.

5. Check each instrument to be cleaned for areas of corrosion. Manually clean any instrument with corrosion prior to ultrasonic cleaning.

6. Sort instruments by similar metal so that contact between dissimilar metals will not occur. In general, instruments should not touch each other. This provides the best cleaning results and avoids damage to delicate instrument tips.

7. Place the instruments in a wire or perforated plastic basket and suspend it in the cleaning solution, ensuring that all instruments are totally submerged during ultrasonic cleaning. Position instruments that have hinges and joints in their open state.

8. If a basket is not used, do not place the instruments directly on the surface of the ultrasonic cleaner’s metal basin – use a silicone mat.

9. If you use ultrasonic cleaning regularly, a cleaning cycle of about 5 minutes should be adequate; however, stubborn stains may require additional time.

10. After cleaning the instruments, thoroughly rinse them under running water. Then give them a final rinse using a clean bath of demineralized water. Thoroughly rinse and flush instruments with lumens using demineralized water (see Appendix F, page 16). Rinsing should provide a flow through and/or over instruments. Agitation in a basin should not be used for the final rinse.

11. Dry instruments with a hot air blower or a lint-free cloth.

12. Empty, clean, rinse, dry, perform preventive maintenance, and validate functioning of the ultrasonic cleaner according to the manufacturer’s recommendations. Change the cleaning solution from the ultrasonic cleaner after each use or at least once daily, as directed by the manufacturer’s recommendations.
Inspection and Lubrication

Before you package and sterilize the instruments, you should verify that the instruments are clean and functioning properly. We recommend that you lubricate those instruments that require it at this point.

**Inspection**

- Visibly inspect each instrument for debris and damage, preferably under magnification. *(see photo A)*
- Perform additional cleaning and rinsing steps as needed on any instruments that have remaining debris on them. *(see photos B & C)*
- Remove damaged instruments (bent tips, misaligned jaws, etc.) from the set – they must be repaired or replaced. Never try to repair an instrument yourself. Only a qualified technician should repair an ophthalmic instrument. *(see Repairs, page 8)*

**Lubrication**

- For instruments requiring lubrication, only apply a lubricant that is approved for use with surgical instruments to all moving parts, box locks, joints, and catches.
- Because the next step in reprocessing the instruments is to sterilize them, you should use a lubricant that can withstand the high temperature of steam autoclaving, such as silicone or Teflon sprays.
- Never use ordinary lubricant oils because they can become gummy when exposed to the high temperatures of steam autoclaving.
- Delicate micro-surgical instruments should not require lubricating baths. However, if lubricating baths or dips are used, the instruments must be totally free of stains and corrosion. Covering the corrosion on the instruments with a lubricating film, especially in the joints and box locks, seals in the corrosion and allows it to aggressively attack the steel during autoclaving, ultimately resulting in frozen or even cracked joints and box locks.
Storage

The best way to store, protect, and sterilize delicate surgical instruments is in a sterilizing case specifically designed for that purpose. Katena offers a variety of cases, made of aluminum, plastic, or stainless steel, to accommodate one instrument or a complete set.

- Plastic cases are best suited for single or small groups of instruments. They are inexpensive and have a limited lifespan.
- Stainless steel and aluminum cases are more costly, but last for many years of active use and provide maximum protection.

All cases offered by Katena include autoclavable silicone mats with a series of flexible “fingers” to hold each instrument in place. The mats and fingers can be cut with scissors to accommodate instruments of unusual shape for best protection.

All cases and mats are perforated to facilitate circulation of steam and drainage. Some larger stainless steel and aluminum cases also feature racks to hold and protect such delicate instruments as IOL manipulators, phaco spatulas, and various cannulas.

<table>
<thead>
<tr>
<th>Katena Sterilizing Trays</th>
</tr>
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<tbody>
<tr>
<td><strong>Catalog #</strong></td>
</tr>
<tr>
<td>Plastic</td>
</tr>
<tr>
<td>K9-2018</td>
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<tr>
<td>K9-2300</td>
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<tr>
<td><strong>K9-2040</strong></td>
</tr>
<tr>
<td><strong>Double-Level</strong></td>
</tr>
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<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
All micro-surgical instruments must be handled with the greatest care when being transported, cleaned, treated, sterilized, and stored. This is especially true for blades, fine tips, and other sensitive areas. Here are some guidelines for handling and storing micro-surgical instruments:

- We recommend storing instruments in the same container in which they will be sterilized. This will reduce the unnecessary handling of instruments. Such a sterilizing case must be large enough to accommodate a set of instruments. *(see Storage, page 6)*

- Place instruments in the tray so that they do not touch each other.

- Firmly seat each instrument in the tray to prevent movement and possible damage during handling. Because instruments vary a great deal in size and shape, sterilizing trays that feature soft silicone mats with fingers are ideally suited for this purpose.

- Placement of delicate knives, hooks, and spatulas in an optional stainless steel rack *(K9-2355)* will provide maximum protection.

- Always store and sterilize diamond knives in a separate container. *(K2-6555 for one knife, K2-6556 for two knives)*

- Store instruments in a dry area at ambient temperature.

- Always keep delicate tips protected with a tip guard when the instrument is not in use. Soft silicone tubing with adequate wall thickness and inside diameter will provide good protection for instrument tips. Katena provides a line of color-coded protective tip guards in various sizes with vents for sterilization.

- Great care should be taken when putting on and removing tip guards. Delicate instruments can easily become damaged during this critical step.

- Frequently replace protective tip guards. Immediately replace any tip guard that is discolored or cracked.

Above shown at actual size. Packaged 100 per catalog number.
Sterilizing

We recommend that you sterilize your Katena surgical instruments using the steam autoclaving procedure that is regularly used in hospitals and surgery centers. The following table provides the suggested cycles based on AAMI and AORN recommended practices.

<table>
<thead>
<tr>
<th>Steam Sterilization Cycle</th>
<th>Preparation</th>
<th>Exposure Time (Minimum Time)</th>
<th>Temperature</th>
<th>Drying Time (Minimum Time)</th>
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<td>Gravity Displacement</td>
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<td>132 °C / 270 °F</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Pre-Vacuum</td>
<td>Wrapped</td>
<td>4 minutes</td>
<td>132 °C / 270 °F</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Pre-Vacuum</td>
<td>Wrapped</td>
<td>3 minutes</td>
<td>134 °C / 273 °F</td>
<td>20 minutes</td>
</tr>
<tr>
<td>Flash/Immediate Use</td>
<td>Unwrapped</td>
<td>3 minutes</td>
<td>132 °C / 270 °F</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*The above parameters and cycles have been validated through an independent FDA-approved third-party laboratory.

Note: Consult the manufacturer of your steam autoclave to confirm appropriate temperatures and sterilization times. Other methods, times, and temperatures may also be used, but you must validate any alternate methods.

Here are some additional guidelines for sterilization:

- Sterilize only instruments that have been cleaned and inspected as described in the previous sections of this document.
- Do not use flash sterilization to save time or as a substitute for standard instrument reprocessing. Flash sterilization cycling is designed to manage unanticipated, urgent needs for instruments.
- Verify that the sterilizer is functioning properly on a regular basis: at least weekly, but more often is preferable.
- Ensure that preventive maintenance, cleaning and inspection of sterilizers is performed on a scheduled basis, according to the manufacturer’s instructions.

Repairs

Never attempt to make repairs yourself. Service and repairs should be referred to trained, qualified persons only. You should be aware that not every individual or company claiming to be capable of repairing surgical instruments is capable of repairing the types of delicate, precision micro-instruments used for eye surgery.

Katena’s surgical instruments are handmade by highly trained and skilled Master Craftsmen who prepare for this exacting, technical trade by completing an apprenticeship program that involves rigorous training and evaluation before they can be certified as Master Craftsmen. Placing such painstakingly crafted instruments in the hands of a person without such extensive training could result in damage to the instruments.

Therefore, Katena advises caution when selecting an individual or company to repair your surgical instruments. For your convenience and for assurance of quality instrument care, Katena has a surgical instrument repair program. Please contact us for details.
APPENDIX A  Understanding Stainless Steel

Most surgical instruments are made of stainless steel. Stainless steel is an alloy consisting of various elements that make it more resistant to staining and corrosion. Remember, however, that the phrase, “stainless steel” really means that these steels “stain less.” They are not “stain-free” or “stain-proof.”

Of the many different types of stainless steel, those types used for surgical instruments usually fall into two basic categories:

- **300 series steel** (austenitic) contains a small percentage of carbon and is considered the most stain-resistant of all steels. It is commonly used in hospitals for sinks, basins, and sterilizing containers. In ophthalmology, it is typically used for making eye speculums and handles for instruments, such as hooks, retractors, and knives.

- **400 series steel** (martensitic) contains a higher percentage of carbon and thus can be heat-treated to attain the desired degree of hardness. The percentage of carbon content determines its hardness; the more carbon, the higher the attainable hardness.
  - Steels with a lower percentage of carbon are typically used for making forceps, needle holders, and hemostats.
  - Steels with a higher percentage of carbon are used for scissors and cutting instruments. That explains why forceps and needle holders tend to be more resistant to staining than scissors.

During the manufacturing process, the steel is milled, filed, ground, polished, and brushed, all of which disrupt the steel surface. After final finishing, Katena instruments are exposed to an electropolishing process to seal the surface. This process greatly enhances the ability of the instrument surface to resist corrosion.

APPENDIX B  Understanding Stains on Stainless Steel

Rust will leave permanent damage, but a stain can be removed. Most stains do not indicate rust, but may indicate other issues with instrument processing and handling.

Here are some guidelines:

- **brown/orange stains** – these stains could indicate rust, but there may be another cause. A simple way to find out is to rub a pencil eraser vigorously on the stain. If this reveals a pit mark, it is rust. However, if the metal underneath is smooth, the stain may have been caused by baked-on blood, saline solution, cold sterilization solution, or inappropriate detergents.

- **dark brown/black stains** – could be caused by exposure to dried blood, inappropriate detergents, or acids.

- **black stains** – could be caused by exposure to acids, ammonia, or bleach.

- **blue-black stains** – could be caused by different types of metal being processed together in the ultrasonic cleaner or steam autoclave sterilizer.

- **light and dark spots** – could be caused by mineral deposits from water spots if instruments are allowed to air dry and demineralized water is not used.
APPENDIX C Understanding Titanium

Titanium is a lustrous, white metal that has high tensile strength and good corrosion resistance, making it a preferred choice for many industrial, manufacturing, and medical applications. Since titanium is always bonded to another element in nature, considerable time and effort is required to extract it from the ground and prepare it properly. This makes titanium more costly than other metals, such as stainless steel.

Titanium has become increasingly popular for surgical instruments, with some manufacturers using it extensively or even exclusively. For certain types of instruments, titanium does offer a functional advantage when compared to stainless steel. For example, suturing with a needle holder that has picked up a magnetic charge becomes frustrating to the surgeon as the needle becomes difficult to release. Since titanium cannot become magnetized, needle holders made of titanium will never have this problem. For applications where the advantages of titanium can be realized, Katena makes available instruments in either stainless steel or titanium. These include needle holders, forceps, tying forceps, and choppers.

Although titanium has high tensile strength, its main disadvantage is that it cannot be hardened. Hardening is particularly important for instruments that need to hold an edge, such as scissors or other instruments used for cutting. A scissors made from titanium will need frequent re-sharpening because it will become dull quickly. A hardened stainless steel instrument is harder than a titanium instrument.

Another disadvantage of titanium is its cost. Good quality titanium generally costs 15 to 20 percent more to produce and machine than good quality stainless steel. Sadly, many surgical instruments are touted as superior simply because they are titanium, when, in fact, they are produced from poor quality titanium.

APPENDIX D TASS Resources

The risk of contamination and infection during surgery is a real concern for all healthcare facilities, which is why so much time and effort is invested in cleaning and sterilizing surgical instruments. A specific concern for cataract surgery is toxic anterior segment syndrome (TASS), which is an acute inflammation of the anterior chamber (or segment) of the eye following cataract surgery, resulting in toxic damage to intraocular tissues.

Much has been written about this rare, but serious condition. This section lists a few helpful sources for understanding TASS.

Case Studies – TASS Outbreaks

The challenge in preventing TASS lies in the fact that it can have a multitude of possible causes. In places where outbreaks have occurred, a multi-faceted approach to preventing a subsequent outbreak is usually implemented, but this makes it difficult to isolate the specific cause. One such case of this is described in the following article:
However, some studies are able to suggest a cause for a TASS outbreak. For example, this study concluded that improper maintenance of a steam autoclave system was the cause:


Description of TASS

Many publications provide useful information about the symptoms, diagnosis, treatment, and prevention of TASS. Here is a sample of information available online:


Prevention of TASS

An article from the journal of the Association of periOperative Registered Nurses (AORN) provides an excellent discussion of the many causes of TASS as well as preventive strategies. Author Janet Johnston, RN, observes:

“Finding a causative factor in TASS can be a challenge. Often the cause is unknown, even after thorough investigation. Clinical literature reveals case studies in which a multiplicity of potential causes of TASS have been identified. Many factors before, during, and after cataract surgery, such as bacterial endotoxin residues, viscoelastic residues, and exotoxins, can be a potential source of TASS. Many risk reduction strategies can be associated with the multiplicity of potential causes of this condition. The most obvious are awareness of the problem, communication, and using good surgical techniques.”

Glaucoma Today, published by Bryn Mawr Communications LLC, provided the following article on TASS prevention:


An example of specific TASS prevention training can be found in the following publication written by Cynthia Hubbard, RN:


The sources cited above are only a sampling of available information about TASS, and not intended as a comprehensive reference. There are many potential causes of TASS, and not all of them are directly tied to the cleaning and sterilizing of surgical instruments. However, following the guidelines in this booklet for cleaning, sterilizing, storing, and handling Katena’s ophthalmic surgical instruments should be a key part of your strategy for preventing TASS.
Adjustable Speculums

All areas with threads need to be completely cleaned and dried. Pay attention to areas which might be inside the base assembly. Turn knurled thumb mechanism several turns to expose hidden threads to complete cleaning and drying.

Diamond Knives

*Never allow the diamond blade to touch anything harder than tissue.*

- Cleaning: Immediately after using a diamond knife, the blade must be rinsed with demineralized water, preventing cell particles or viscoelastic materials from sticking to the blade. Ultrasonically clean the diamond by holding the knife and suspending only the blade into the fluid. Be sure that the blade does not touch any other instruments or the sides of the cleaner. Never completely submerge a diamond knife in an ultrasonic cleaner. During sterilization cycles keep the blade retracted.

Luntz-Dodick Trabeculectomy Punch (K2-9505)

Disassembly

- Hold the handle (2) securely between the thumb and fingers of one hand, and with the thumb and forefinger of your opposite hand, gently unscrew the serrated outer sleeve (3) counter-clockwise and carefully remove it.

Squeeze the handle (2) to release pressure on the plunger (1). Grasp the serrated end of the plunger and carefully extract the plunger cutting head through the notched side of the handle assembly.

Assembly

- Squeeze the handle (2) with your thumb and fingers and hold the handle in this position throughout assembly.
Hold the serrated end of the plunger (1) with your opposite hand and insert the plunger (cutting head first) through the opening in the notched side of the handle (2). Rotate the plunger (1) until the cutting head is in the desired cutting position and the plunger hub easily slips into the notch in the handle (2). DO NOT FORCE THE HUB INTO THE NOTCH.

Carefully slide the serrated outer sleeve (3) over the cutting head and turn clockwise until the threaded end is fully seated in the handle. The outer sleeve should screw into the handle very easily. DO NOT FORCE.

- This instrument is designed so the surgeon can choose one of four cutting head positions: up, down, right or left.

**Spring Handle Scissors, Forceps and Needle Holders**

Spring handle instruments are specially designed for cleaning. A simple disassembly of the box lock gives easier access to difficult-to-clean areas.

1. Grasp instrument by springs.
2. Turn spring with tab 45°, aligning with corners of box.
3. Gently pull tab end through box.
4. Carefully spread handle open up to 45°.
5. Remove all debris around pin or screw area.
Vitreo-Retinal Forceps and Scissors

Cleaning Instructions:

- Clean instrument immediately after each use by rinsing in demineralized water to remove surgical residue (i.e., blood, saline, tissue). If it is not possible to clean the instrument immediately, keep it moist to prevent residue from drying on the instrument.

- Under magnification carefully remove all residue from the instrument tips with a soft, moistened instrument wipe or soft bristled brush. Wipe instrument tips in one direction only, from the instrument handle toward the tips. Do not scrub or apply force.

- Attach a syringe filled with demineralized water to the cleaning tube luer lock connector supplied with the instrument. Do not use tap water or saline.

- Carefully place the silicone cleaning tube over the end of the instrument and attach it to the front of the handle (Figure 1). Gently depress the syringe plunger to flush the instrument with the demineralized water. Repeat several times.

- Carefully remove the syringe from the cleaning tube connector and attach another syringe containing isopropyl alcohol. Gently depress the syringe plunger to flush the instrument with isopropyl alcohol and remove any remaining water.

- Remove the syringe from the cleaning tube connector and attach an empty syringe. Gently depress the syringe plunger to flush the instrument with air to dry and remove any residual isopropyl alcohol. Repeat until the instrument is thoroughly dried.

- Place the clean, dry instrument securely in a tray suitable for sterilization.

Katena IOL Cutter (K4-5571)

- This instrument features a fixed lower blade for insertion under the IOL and movable upper blade so blade movement can be visualized by the surgeon.
Cleaning and Sterilization

- **Immediately after each use,** attach a syringe to the luer fitting on the instrument and flush the hollow shaft with 30ml of a mild soap solution to remove residual balanced salt solution (BSS) or viscoelastic from the instrument. **Never flush with tap water or saline solutions.**

- **Use 30ml of demineralized water** in a syringe and rinse the hollow shaft thoroughly. Use a dry syringe to force a minimum of 30ml of air through the shaft to remove moisture. Compressed air, if available, may be substituted for a syringe. Be sure the instrument is clean and dry before storing it.

- **Sterilize and store** the IOL cutter in a peel pack until needed. Continuous autoclaving with infrequent use can be harmful to the instrument.

**Stolte IOL Cutter (K4-5565)**

**Cleaning Instructions:**

- Attach a 30ml syringe filled with demineralized water to the cleaning tube luer lock connector supplied with the instrument. **Never flush with tap water or saline solutions.**

- Carefully place the silicone cleaning tube over the end of the instrument and attach to the front of the handle *(Figure 1).* **Depress the syringe plunger to flush the instrument with the demineralized water.**

- Carefully remove the syringe from the cleaning tube connector and attach another 30ml syringe containing isopropyl alcohol. Depress the syringe plunger to flush the instrument with isopropyl alcohol and remove any remaining water.
- Remove the syringe from the cleaning tube connector and attach an empty 30ml syringe. Depress the syringe plunger to flush the instrument with air to dry and remove any residual isopropyl alcohol. Compressed air, if available, may be substituted for a syringe.

- Place the clean, dry instrument securely in a tray suitable for sterilization.

**Aspirating Cannulas, Aspirating Speculums and Bimanual Instruments**

Always clean in the direction from smallest to largest openings.

- The best way to clean and maintain instruments that aspirate is to properly remove any debris remaining inside. This can be accomplished by submerging its small port(s) in distilled water and aspirate into a syringe. Flushing in this direction prevents debris from occluding the small ports. Any instrument which becomes clogged should be sent to Katena for repair.

### APPENDIX F Cannula Flushing and Drying Guidelines

<table>
<thead>
<tr>
<th>Cannula Gauge</th>
<th>Minimum Flush Volume*</th>
<th>Minimum Drying Volume**</th>
</tr>
</thead>
<tbody>
<tr>
<td>25-30</td>
<td>5ml</td>
<td>10ml</td>
</tr>
<tr>
<td>19-24</td>
<td>10ml</td>
<td>10ml</td>
</tr>
</tbody>
</table>

* Minimum amount of demineralized water to forcefully flush through the lumen during cleaning. If the cannula was used with heavy fluids (i.e. viscoelastics), continue flushing until demineralized water flows freely through the lumen.

** Minimum amount of air to be forced through the lumen with a dry syringe following the flushing step. Compressed air, if available, may be substituted for a syringe.