NanoFil™
Microsyringe for nanoliter injection

Serial No.____________________
CONTENTS

ABOUT THIS MANUAL .................................................................................................................... 1

INTRODUCTION .............................................................................................................................. 1
  Unpacking .................................................................................................................................... 2

INSTRUMENT DESCRIPTION ......................................................................................................... 3
  Choosing the Right Tip–Beveled or Blunt? ................................................................................... 3
  Tip size ........................................................................................................................................ 3

OPERATING INSTRUCTIONS ........................................................................................................... 5
  Installing or Changing the Needle .................................................................................................. 5
  Filling the NanoFil Syringe ............................................................................................................. 6
  Using the Syringe With RPE and IO Injection Kit ....................................................................... 7
    Application ................................................................................................................................ 9
  Cleaning the System ....................................................................................................................... 9
  Cleaning NanoFil Needles (304 stainless steel) ......................................................................... 10

TROUBLESHOOTING ...................................................................................................................... 11

ACCESSORIES ................................................................................................................................. 12
  Recommended Accessories ......................................................................................................... 12
  Replacement Parts ....................................................................................................................... 12

WARRANTY ....................................................................................................................................... 15
  Claims and Returns ..................................................................................................................... 15
  Repairs ......................................................................................................................................... 15
ABOUT THIS MANUAL

The following symbols are used in this guide:

⚠️ This symbol indicates a CAUTION. Cautions warn against actions that can cause damage to equipment. Please read these carefully.

⚠️ This symbol indicates a WARNING. Warnings alert you to actions that can cause personal injury or pose a physical threat. Please read these carefully.

NOTES and TIPS contain helpful information.

**Fig. 1**–The NanoFil syringe is available in two sizes, 10 µL and 100 µL.

INTRODUCTION

NanoFil™ is a unique 10 or 100 mL syringe developed in response to customer requests for improved microinjection in mice and other small animals. It makes quantitative nanoliter injection much easier and more accurate than any other method currently in use.

**NANOFIL-100** is a 100 mL NanoFil syringe. All the tip attachments for the original 10 µL NanoFil can also be used with this syringe. The large volume of the syringe is useful for applications that require multiple injections. The speed of the flow at the tip can also be 10 times faster than the 10 mL NanoFil when used with UMP3 UltraMicroPump. The limitation of the 100 mL syringe is that the injection volume resolution is lower than that of the 10 mL syringe.

The design reduces the tip size and dead volume of the system. The smallest metal needle offered for NanoFil is our 36 gauge OD (110 mm long) stainless steel needle. This needle is so small it can be inserted into the tip opening of a 33 gauge needle, previously the smallest gauge available from any micro syringe manufacturer. Offered in both blunt and beveled styles, the tip will cause less damage to the tissue than other micro syringes on the market. In applications where a 36 gauge needle may be too small, slightly larger gauges are also available. The full range includes 33, 34 and 35 gauge needles in both blunt and beveled styles.

In traditional nanoliter injection, the dead volume of the syringe and needle is backfilled with oil as a transfer medium. This makes the process messy and risks contamination of the injected sample. NanoFil’s low-volume, flexible tubing eliminates the need for oil. Injection is now simpler and less messy, and there is no possibility of oil contamination in critical applications such as ophthalmology research. See the Retinal Pigment Epithelial (RPE) and Intra Ocular (IO) injection kits listed below.

Based on application requirements, NanoFil can be used in several different configurations:
- Installed on WPI's UMP3 UltraMicroPump: This combination allows nanoliter resolution and reproducibility. For neural system injection, mount the UMP3 on a stereotaxic frame.

- SilFlex tubing and holder: The needle is mounted on a small plastic holder that is connected to the NanoFil by a 35 cm length of flexible tubing. The NanoFil is mounted on the UMP3 pump. This configuration allows you to hold the animal in one hand and insert the needle with the other. When the needle reaches the desired location, activate the pump using the foot switch and the pre-programmed injection volume will be injected. This configuration gives a nanoliter level of accuracy and reproducibility. It is best suited for applications such as the RPE and IO injection.

- Direct injection by hand: This is the simplest and most economical way to inject. Any of the tips can be inserted directly into the NanoFil syringe. The limitation of this method is the difficulty in achieving sub-microliter resolution.

**Unpacking**

Upon receipt of this instrument, make a thorough inspection of the contents and check for possible damage. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed damage should be reported at once to the carrier and an inspection requested. Please read the section entitled “Claims and Returns” on page 15 of this manual. Please contact WPI Customer Service if any parts are missing at 941.371.1003 or customerservice@wpiinc.com.

**Returns:** Do not return any goods to WPI without obtaining prior approval (RMA # required) and instructions from WPI’s Returns Department. Goods returned (unauthorized) by collect freight may be refused. If a return shipment is necessary, use the original container, if possible. If the original container is not available, use a suitable substitute that is rigid and of adequate size. Wrap the instrument in paper or plastic surrounded with at least 100 mm (4") of shock absorbing material. For further details, please read the section entitled “Claims and Returns” on page 15 of this manual.
**INSTRUMENT DESCRIPTION**

**Choosing the Right Tip—Beveled or Blunt?**

The replaceable needles used with the **NanoFil** are available with either blunt or beveled tips. The blunt tip is used for injection into soft tissue and when a uniform solution distribution is needed. The beveled style is used for applications that involve the penetration of tough tissue.

One of the main factors that limit the resolution and accuracy of conventional micro syringes is diffusion from the large ID tip. When the tip ID is equal or larger than 100 mm, the error caused by tip diffusion is in the nanoliter range level ($[100 \text{ mm}]^3 = 1 \text{ nL}$). With a 36 gauge needle installed on the **NanoFil**, the error caused by diffusion is reduced to the sub-nanoliter level, making accurate injection of a nanoliter possible.

All of WPI's beveled tips have a unique 25° tri-surface bevel that is optimized for microinjection. A 10° single-surface beveled tip penetrates better than one with a 25° angle, however the distance between the upper opening to the tip (see dimension F in Figure 1) is longer. As a result, it requires a deeper penetration of the tip to achieve the same level of liquid delivery. Deeper penetration means more tissue damage. WPI's unique 25° tri-surface bevel tip solves this problem with two extra beveled surfaces. The tip of a single surface beveled tip is actually a blade instead of a point. It dulls very quickly. In contrast, the tri-surfaced tip has a real point. It not only penetrates much better but is also much more durable. Tests show that WPI's 33 gauge, 25° beveled tip penetrates easier and lasts longer than other manufacturers' 33 gauge, 10° single-beveled tips. With a 35 gauge tri-surface beveled tip, the resistance to the penetration becomes even less. Each WPI tip undergoes a penetration test before leaving the factory to guarantee the best results.

**Tip size**

**36 gauge:** This is the smallest tip available — so small that it can be inserted into the lumen of a 33 gauge needle tip. There are some limitations to consider before using it. The small diameter makes it necessary to limit length to 2.5–3.0 mm in order to maintain a usable strength. Since the tip ID is in the 25 to 50 µm range, it is easily clogged. Therefore, only well-filtered solutions can be used. Depending on the viscosity of the sample, you might also need to pre-load the syringe with a regular tip before switching to this tip for injection. We recommend using the 35 gauge tip instead of the 36 gauge unless experimental design requires the finer tip.

**35 gauge:** With its balanced combination of strength, length, durability and clog resistance, this was the most popular and preferred tip of most scientists during NanoFil's field trial. It is much smaller than the 33 gauge tip and only slightly larger than the 36 gauge tip, and is much stronger and less likely to clog. Samples can be directly loaded with this tip. Its 5 mm length is sufficient for almost all injection applications in mice.

**34 gauge:** This is a transitional size between the 33 gauge and 35 gauge. If the 35 gauge is too weak and the 33 gauge is too large, 34 gauge is a good alternative.

**33 gauge:** This tip is similar to Hamilton's 7762 and 7803 series removable needles in both tip length and outside diameter. However, WPI's beveled tip version is shorter, more durable, and penetrates better due to the special tri-surface grinding technique.
In the past, 33 gauge tips were the smallest size sold and were frequently cited in literature. However, our new 35 gauge tip is much better for injections involving small animals, especially mice. Compared with Hamilton’s 33 gauge, 10° beveled tip, WPI's 35 gauge 25° beveled tip can reduce the depth of penetration by almost 80%. The distance between the tip and the upper rim of the opening (dimension F on Figure 1) is 1024 mm for the 33 gauge tip. On the 35 gauge tip, the distance is only 230 mm. In addition, the smaller tip size significantly reduces the required penetration force. In nearly all applications, a 33 gauge tip can be replaced with WPI's 35 gauge tip and produce better results.

**Flexible Quartz Tubing:** The flexible quartz tubing tip is made of 160 mm OD polyimide coated quartz tubing with a special adapter sleeve mounted at the end. It is designed for filling glass capillary electrodes or pipettes, just like WPI's traditional MF34G MicroFil. However, unlike the traditional MicroFil which has about 50 mL of dead volume in its luer hub, the dead volume of this tip is less than 0.4 µL. It is useful for loading electrodes with solutions that have a limited volume or are too expensive to waste. The detailed dimension of each tip can be seen in Fig. 2.

**Fig. 2—Tip dimensions**

<table>
<thead>
<tr>
<th>Tip Order Number</th>
<th>Gauge</th>
<th>Tip O.D.</th>
<th>Tip I.D.</th>
<th>Tip Length</th>
<th>Total Length</th>
<th>Shank O.D.</th>
<th>Bevel Length</th>
<th>Total Dead Volume</th>
<th>Tip Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>NF33BV-2</td>
<td>33</td>
<td>210 µm</td>
<td>115 µm</td>
<td>10 mm</td>
<td>40 mm</td>
<td>460 µm</td>
<td>≈348 µm</td>
<td>0.416 µL</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>NF34BV-2</td>
<td>34</td>
<td>185 µm</td>
<td>85 µm</td>
<td>5 mm</td>
<td>35 mm</td>
<td>460 µm</td>
<td>≈290 µm</td>
<td>0.199 µL</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>NF35BV-2</td>
<td>35</td>
<td>135 µm</td>
<td>55 µm</td>
<td>5 mm</td>
<td>35 mm</td>
<td>460 µm</td>
<td>≈204 µm</td>
<td>0.435 µL</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>NF36BV-2</td>
<td>36</td>
<td>110 µm</td>
<td>35 µm</td>
<td>3 mm</td>
<td>33 mm</td>
<td>460 µm</td>
<td>≈156 µm</td>
<td>0.339 µL</td>
<td>Stainless Steel</td>
</tr>
<tr>
<td>NFQ34-5</td>
<td>34</td>
<td>160 µm</td>
<td>100 µm</td>
<td>55 mm</td>
<td>75 mm</td>
<td>460 µm</td>
<td>n/a</td>
<td>0.589 µL</td>
<td>Quartz</td>
</tr>
<tr>
<td>Silflex Tubing</td>
<td></td>
<td>100 µm</td>
<td></td>
<td>35 cm</td>
<td></td>
<td></td>
<td></td>
<td>2.749 µL</td>
<td></td>
</tr>
<tr>
<td>NF26BV-2</td>
<td>26</td>
<td>460 µm</td>
<td>140 µm</td>
<td>3 mm</td>
<td>40 mm</td>
<td>460 µm</td>
<td></td>
<td>0.616 µL</td>
<td></td>
</tr>
</tbody>
</table>

Above dimensions apply to blunt tips also.
OPERATING INSTRUCTIONS

CAUTION: Please note that the syringe should only be operated when the barrel is wet. Otherwise, friction can damage the Teflon® tip of the plunger. Do not pull the plunger repeatedly when the barrel is dry.

WARNING: WHEN THE TIP IS CLOGGED, THE PLUNGER CAN GENERATE A VERY HIGH PRESSURE EXCEEDING 10,000 PSI DUE TO THE SMALL CROSS SECTIONAL AREA OF THE PISTON. THE GASKET IN THE SYRINGE WILL NOT BE ABLE TO HOLD THE TIP IN POSITION UNDER SUCH A HIGH PRESSURE, SO IT MAY MOVE OR SHOOT OUT LIKE A BULLET. THEREFORE, NEVER POINT THE SYRINGE TIP AT A PERSON, AND ALWAYS USE PROTECTIVE GLASSES WHEN USING THE VERY SMALL TIP.

Installing or Changing the Needle

The NanoFil syringe system utilizes a seal system that is based on a 0.46 mm shank diameter. Any needle or tubing with an outside diameter of 0.46 mm should fit the NanoFil’s seal system.

To prevent damage to the gasket and to have the straightest needles, use this method to assemble your needle and syringe.

1. To change or install a needle, loosen the screw cap by turning it counterclockwise to release the compression of the seal. If there is a needle in place it should be easy to pull it out.

2. Remove the screw cap and the gasket from the syringe.

3. Install the replacement needle by pushing the shank of the needle (4) into the open hole in the screw cap (3).

   **TIP:** The thick part of the needle shank that goes into the gasket should be cleaned with alcohol to remove any oils left behind by handling and prevent the needle from slipping or moving, residual lubricants left behind can allow the needle to slip or move from the zero set position. The use of surgical gloves is recommended.

4. Place the gasket (2) on the needle.

5. Push the gasket up into the screw cap.
6. Place the needle into the syringe body and align it to the zero mark.

**TIP:** Push the needle in far enough to observe the shank through the glass syringe body. In general, the needle should be pushed in until the end of the shank is positioned at the zero mark on the scale. Going beyond this position will not damage the syringe or the needle, but it will prevent the plunger from being able to travel down to the zero mark.

7. Once the shank is in the desired position, tighten the screw cap by hand finger tight. Then test the security of the seal by pulling on the needle. It should not come out easily.

**Filling the NanoFil Syringe**

There are two different methods for filling the NanoFil syringe with fluid.

**The vacuum method** is the standard method used. It involves front filling the syringe via the needle tip using vacuum created by withdrawing the plunger. With this method, the tip of the needle is submerged into a reservoir of fluid while the plunger is withdrawn. This method does not work well for the 36 gauge needle, because the ID of the needle is so small that very little liquid can be taken up. Additionally, this method inherently introduces an air gap at the plunger end of the barrel due to the dead volume of air that exists in the needle prior to pulling fluid into the syringe. This air gap is practically impossible to remove, and the compressibility of air may have an undesirable effect on injection dynamics for certain applications. However, this method has the advantage of being an expedient way to fill the syringe, while exposure and handling of the fluid is kept to a minimum.

![Vacuum filling of the syringe leaves an air gap.](image)

**The pre-load method** is useful when working with higher viscosity fluids. A second, larger-volume syringe equipped with WPI’s MicroFil tubing is used to fill the smaller lumen of the NanoFil. The NanoFil is loaded from the front with the screw cap, gasket and needle removed. Withdraw the NanoFil plunger to the desired volume. Insert the MicroFil tubing into the lumen of the NanoFil syringe until it is in contact with the plunger. Inject fluid slowly from the loading syringe into the NanoFil lumen, and gradually withdraw it as filling occurs. This filling method does not leave an air gap at the NanoFil plunger.
Using the Syringe With RPE and IO Injection Kit

These kits are specially designed for “hands-free” and oil-free submicroliter injection. Originally developed for retinal pigment epithelium and intraocular injection, they can also be used for other applications. The injection volume is controlled by UMP3’s program and is activated by a foot switch. The “free hands” can be used to hold the animal and place the needle into the injection site. These kits need to be used with a NanoFil syringe and UMP3 to achieve accurate, repetitive and oil-free injection in the submicroliter range. Each kit includes two pieces of SilFlex tubing (one for a spare), a tip holder, spare gaskets, and an assortment of four tips — blunt for the RPE kit and tri-surface beveled tips for the IO Kit. Each kit comes with one each of 33, 34, 35 and 36 gauge tips so that first time users can find the best size for their application.

- **SilFlex** (flexible and low dead volume tubing). This tubing is made of 100 μm ID quartz tubing with a Teflon jacket making it a total 460 μm OD. It is 350 mm long and the dead volume of the tubing section is about 3 μL. The low dead volume,
consistent inside diameter and flexibility are essential for the system. Special attention is needed when handling this tubing.

**CAUTION:** Sharp bending can crack the glass and damage the tubing permanently. Do not bend it with a radius less than 30 mm or against a sharp corner.

The tubing needs to be flushed with distilled water after use. Due to its small inside diameter, the tubing can become clogged with particles or proteins in solution. If clogged, flushing it from the opposite end of the tubing with a syringe might dislodge the particle. Load cleaning solution into the NanoFil syringe with the 26 gauge needle provided. Remove the 26 gauge needle and insert the SilFlex tubing with the opposite end coupled to the chosen tip. Force the cleaning solution out. An ultrasonic bath might also help to loosen particles in the tubing.

- **Tip holder nuts**. The holder connects the SilFlex tubing with the injection tip. It has the same coupling mechanism used on the NanoFil syringe. The inside diameter of the barrel and gaskets are identical to the one on the syringe. Both tip and tubing should be installed by loosening the screw, inserting the tubing and tightening the nut finger-tight. The SilFlex is inserted through the red nut on the back of the holder. Insert your tip of choice through the front cap. The length of the tip can be adjusted by sliding the tip up into the holder. *The tip and SilFlex should be very close to each other inside the holder barrel, but not touching.* Because the tubing will move forward as the screw is tightened, a gap between the tip and the tubing is essential to avoid crushing the tubing. The gap can be as large as 1 mm while only increasing dead volume by 0.17μL. Because the SilFlex tubing is very soft, it might be difficult to “fish” it through the gasket during the installation. To solve this problem, unscrew the red nut and use forceps to take out the silicone gasket. Thread the nut and the gasket onto the SilFlex tubing. Then, with the red nut and gasket on, fit the SilFlex into the back hole of the holder. Using one hand to hold the SilFlex in the holder, slide the gasket and red nut into the holder and tighten it.

- **Gasket**. The gasket is yellow, and it has both a narrow and a wide opening to make the needle insertion easier.

*Fig. 5–The NFINHLD holder has a gasket at each end with a narrow opening. As shown in the cutaway view, the wide opening of the gasket faces the end nuts, and the narrow opening of the gasket points toward the holder.*
• **Injection tip.** Any tip that can be used directly on the NanoFil syringe can also be used with the pipette holder and is installed in exactly the same way.

### Application

Assemble the SilFlex, tubing, tip holder and tip first without mounting the SilFlex into the NanoFil syringe. When the SilFlex is dry, the air trapped in the tubing will prevent it from being filled like a regular needle. The dead volume of the SilFlex is about 1.8 µL. Therefore, the syringe needs to be pre-filed with a regular needle with more than 2 µL of fluid before installing the SilFlex on to the NanoFil. (After the first injection is finished, the syringe can be filled directly from its tip, because the tubing will be filled with solution at that time.)

After filling the system, install the SilFlex and tip holder assembly and mount it on the UMP3 UltraMicroPump. Advance the plunger until a small amount of liquid comes out of the tip. The system is now ready for injection. Program UMP3’s controller for the volume to be injected. Use one hand to hold the animal and the other hand to place the needle into the injection site. Then use the foot switch to activate the pump for injecting a controlled amount of solution.

The NanoFil syringe is 60 mm x 10 µL (or 100 µL) and has an inside diameter of 0.46 mm (or 1.46 mm). When using a MICRO2T SMARTouch™ controller, select the NL syring type. If you are using a Micro4 controller with your pump, the syringe type you choose will depend on the firmware version of your Micro4 controller.

<table>
<thead>
<tr>
<th>Micro4 Revision</th>
<th>60 mm x 10 mL Syringe Type</th>
<th>60 mm x 100 mL Syringe Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>M</td>
<td>G</td>
</tr>
<tr>
<td>J</td>
<td>L</td>
<td>G</td>
</tr>
<tr>
<td>K.3</td>
<td>L</td>
<td>G</td>
</tr>
</tbody>
</table>

**TIP:** Micro4 units display the version on power up. To identify the version of older Micro4 controllers, first look for a firmware label. If a label is not found, program the Micro4 for syringe Type L and enter a value of 170 nL /sec. If the number displayed automatically switches to 169 then your unit is Rev. H. (Use syringe Type M and the setting of 0.5293 for the entry.) If the number remains 170, the controller is Rev. J. (Use syringe Type L.)

### Cleaning the System

When dried, protein or other high molecular weight reagents inside the syringe can clog the system. Saline solutions in the stainless needle can cause corrosion of the needle if not rinsed out, so it is important to rinse and dry the syringe and needle after each use. (A drying cabinet is recommended.) The entire system is made of materials that are resistant to most organic solutions. It can be cleaned using any organic solvent or chemical sterilization.

Autoclaving the NanoFil syringe is not recommended, since the adhesives and the Teflon seal will eventually breakdown or swell from the heat and pressures involved. The most practical method of sterilizing is either ethylene oxide (EtO) gas or Rapidcide OPA/28 (WPI # 504611) liquid chemical sterilization.
**CAUTION:** Chemicals that should be avoided include:
- Hydrofluoric acid (HF) damages the glass and quartz.
- Strong acid damages the stainless needle and plunger.

**TIP:** If you are using multiple syringes, take care to avoid mixing plungers and bodies when disassembling for cleaning. *Plungers and syringe bodies are not interchangeable.* Each plunger has been individually selected to fit the tight tolerances of each syringe body. Because of this, replacement plungers are not available; if a plunger tip breaks, the entire syringe must be replaced.

**Cleaning NanoFil Needles (304 stainless steel)**

**Enzymatic Cleaners**—Immediately after using the NanoFil needles, flush them out with soap or enzymatic cleaner (like Enzol or Tergazyme) and rinse with distilled water. Follow this with 95% alcohol, and then dry it with compressed dry air (or nitrogen).

**Ultrasonic Cleaners**—If desired, you may use an ultrasonic cleaner with hot detergents. Avoid using strong acids, chlorinated compounds or strong corrosives that are detrimental to stainless steel 304.

**Autoclave**—NanoFil needles may be autoclaved (wet, 121°C) a number of times. Be sure to Dry them inside and out after sterilization.

Store NanoFil needles dry. The best storage is in a desiccant cabinet with a drying agent like calcium chloride. Do not store these needles in water or leave them soaking in an aqueous solution.
<table>
<thead>
<tr>
<th>Issue</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>After the syringe has been stored for a period of time, the syringe</td>
<td>This is most likely due to leakage in the gasket. After a long period of storage,</td>
<td>Tighten the nut to compress the gasket.</td>
</tr>
<tr>
<td>will not pick up the solution even with the 26 gauge needle.</td>
<td>the gasket could become compressed and lose its sealing ability.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When using the RPE or IO kit, the solution keeps flowing out of the</td>
<td>The most likely cause is a trapped air bubble in the syringe. Because the RPE</td>
<td>Air bubbles MUST be removed before injection. It is especially important for the NANOFLIL-100.</td>
</tr>
<tr>
<td>needle tip after UMP3 pump has stopped pumping.</td>
<td>and IO kits require a high pressure to inject, an air bubble trapped in the system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>will be compressed during injection. It will expand back to original size after</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the injection is finished, causing the solution to ooze out of the tip slowly.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The tip is blocked.</td>
<td>Particles getting trapped in the tip. Concentrated salt solutions such as those</td>
<td>Because of the small inner diameter, most blocked tips are very difficult to recover. However, here</td>
</tr>
<tr>
<td></td>
<td>used in microinjection of this type can form crystals inside the needle or the</td>
<td>are some methods to unblock the tip that might work. Try using an Ultrasonic cleaner to clean the</td>
</tr>
<tr>
<td></td>
<td>syringe. This can corrode the tip.</td>
<td>tip for 5 to 10 minutes. This might shake the particles inside the tip loose.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Syringe leaks at the Teflon tip.</td>
<td>The Teflon coating on the plunger tip has shrunk.</td>
<td>Remove the plunger and heat it (80°C max.) with a hot air gun to soften the Teflon coating. When</td>
</tr>
<tr>
<td></td>
<td></td>
<td>When hot, place the tip on a flat surface and press down gently for a few seconds. Allow plunger</td>
</tr>
<tr>
<td></td>
<td></td>
<td>to cool before wet reassembly.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The needle slips out of the zero position in the syringe or the</td>
<td>The gasket is damaged or the needle shank has been contaminated with oils.</td>
<td>Wash the exterior of the needle and gasket interior with alcohol or replace the gasket (NFGSK-5).</td>
</tr>
<tr>
<td>NFINHLH needle holder.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** If you have a problem/issue with that falls outside the definitions of this troubleshooting section, contact the WPI Technical Support team at 941-371-1003 or technicalsupport@wpiinc.com.
ACCESSORIES
NANOFIL   NanoFil Syringe, 10 microliter
NANOFIL-100   NanoFil Syringe, 100 microliter

NanoFil syringe does not contain any injection needles. Needles must be purchased separately. It does include a 26 gauge beveled needle for backfilling.

Recommended Accessories
RPE-KIT     Retinal Pigment Epithelium (RPE) Injection Kit: SilFlex tubing, gasket (2), holder, and blunt tipmix (33, 34, 35 and 36 gauge)
IO-KIT      Intraocular (IO) Injection Kit: SilFlex tubing, holder, gasket, and beveled tipmix (33, 34, 35 and 36 gauge)
NF33BL-2    33 gauge blunt NanoFil needle (pkg of 2)
NF34BL-2    34 gauge blunt NanoFil needle (pkg of 2)
NF35BL-2    35 gauge blunt NanoFil needle (pkg of 2)
NF36BL-2    36 gauge blunt NanoFil needle (pkg of 2)
NF33BV-2    33 gauge beveled NanoFil needle (pkg of 2)
NF34BV-2    34 gauge beveled NanoFil needle (pkg of 2)
NF35BV-2    35 gauge beveled NanoFil needle (pkg of 2)
NF36BV-2    36 gauge beveled NanoFil needle (pkg of 2)
NF33-36BL   Assortment of 4 blunt NanoFil needles
NF33-36BV   Assortment of 4 beveled NanoFil needles
NFQ34-5     34 gauge Flexible Quartz Tubing for filling (pkg 5)

Replacement Parts
NFINHLD     NanoFil Injection Holder
SILFLEX-2   SilFlex tubing (pkg of 2)
NFGSK-5     Spare Gasket for NanoFil and Holder (pkg of 5)
**WARRANTY**

WPI (World Precision Instruments) warrants to the original purchaser that this equipment, including its components and parts, shall be free from defects in material and workmanship for a period of 90 days* from the date of receipt. WPI's obligation under this warranty shall be limited to repair or replacement, at WPI's option, of the equipment or defective components or parts upon receipt thereof f.o.b. WPI, Sarasota, Florida U.S.A. Return of a repaired instrument shall be f.o.b. Sarasota.

The above warranty is contingent upon normal usage and does not cover products which have been modified without WPI's approval or which have been subjected to unusual physical or electrical stress or on which the original identification marks have been removed or altered. The above warranty will not apply if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electric power, air conditioning, humidity control, or causes other than normal and ordinary usage.

To the extent that any of its equipment is furnished by a manufacturer other than WPI, the foregoing warranty shall be applicable only to the extent of the warranty furnished by such other manufacturer. This warranty will not apply to appearance terms, such as knobs, handles, dials or the like.

WPI makes no warranty of any kind, express or implied or statutory, including without limitation any warranties of merchantability and/or fitness for a particular purpose. WPI shall not be liable for any damages, whether direct, indirect, special or consequential arising from a failure of this product to operate in the manner desired by the user. WPI shall not be liable for any damage to data or property that may be caused directly or indirectly by use of this product.

**Claims and Returns**

Inspect all shipments upon receipt. Missing cartons or obvious damage to cartons should be noted on the delivery receipt before signing. Concealed loss or damage should be reported at once to the carrier and an inspection requested. All claims for shortage or damage must be made within ten (10) days after receipt of shipment. Claims for lost shipments must be made within thirty (30) days of receipt of invoice or other notification of shipment. Please save damaged or pilfered cartons until claim is settled. In some instances, photographic documentation may be required. Some items are time-sensitive; WPI assumes no extended warranty or any liability for use beyond the date specified on the container.

Do not return any goods to us without obtaining prior approval and instructions from our Returns Department. Goods returned (unauthorized) by collect freight may be refused. Goods accepted for restocking will be exchanged or credited to your WPI account. Goods returned which were ordered by customers in error are subject to a 25% restocking charge. Equipment which was built as a special order cannot be returned.

**Repairs**

Contact our Customer Service Department for assistance in the repair of apparatus. Do not return goods until instructions have been received. Returned items must be securely packed to prevent further damage in transit. The Customer is responsible for paying shipping expenses, including adequate insurance on all items returned for repairs. Identification of the item(s) by model number, name, as well as complete description of the difficulties experienced should be written on the repair purchase order and on a tag attached to the item.

* Electrodes, batteries and other consumable parts are warranted for 30 days only from the date on which the customer receives these items.
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