



BRASSELER

USA[®] DENTAL INSTRUMENTATION

High Speed Air Turbine Handpiece

NL4500

Rx only

Please read this Operation Manual carefully before use and file for future reference.

Symbol

 This product is Autoclavable up to Max. 135°C.

 This Product can be washed via Thermo Disinfector.

Rx Only Caution: U.S. Federal law restricts this device to sale by or on the order of a licensed physician



1. User and Indications for Use

User: Licensed Physician (Dentist)

Indications for Use: The NL4500 is an air-powered dental handpiece with intended use of being a surgical tool for impacted third molar removal and periodontal procedures for which a conventional handpiece would be used.

2. Directions for handling and operation

- Please read these precautions carefully and use only as intended or instructed.
- Safety instructions are intended to avoid potential hazards that could result in personal injury or damage to the device. Safety instructions are classified as follows in accordance with the seriousness of the risk.

Class	Degree of Risk
 WARNING	Hazard that could result in serious injury or damage to the device if the safety instructions are not correctly followed.
 CAUTION	Hazard that could result in light or moderate injury or damage to the device if the safety instructions are not correctly followed.
NOTICE	General product specification information highlighted to avoid product malfunction and performance reduction.

Brasseler U.S.A. Dental, LLC hereinafter will be referred to as "Brasseler USA."

Warning

- Depressing the Push Button while the handpiece is in rotation may lead to overheating, causing burn injuries or product failure. Avoid contacting oral tissue with the push button.
- Read this Operation Manual before use to fully understand the product functions.
- When operating the handpiece always consider the safety of the patient.
- Users are responsible for the operational control, maintenance and continual inspection of this product.
- Do not attempt to disassemble the handpiece or tamper with the mechanism except as recommend by Brasseler USA in this Operation Manual.
- Do not drop, strike or permit any impact to the handpiece.
- Proper protective equipment (i.e. eyewear and masks) must be worn when operating this handpiece.
- Should the handpiece function abnormally, cease operation immediately and contact Brasseler USA.
- Do not use high acid water or sterilizing solutions to wipe, immerse or clean the handpiece.
- The products are delivered in a non-sterile condition and must be autoclaved prior to use.
- Perform regular function and maintenance checks.
- If the product is not used for a long period check it is functioning correctly before using on a patient.
- To avoid clinical downtime it is recommended that a spare be kept on hand in case of a breakdown during use.
- U.S. Federal law restricts this device to sale by or on the order of a licensed physician.



Cautions

- Under normal operating conditions air exhausts from the back of the head of the handpiece. Directing air into an open wound or beneath the mucosa or dermis may result in injury from air emphysema or embolism.
- When using this handpiece do not direct the back of the head towards a tissue flap.

3. Setting of Air & Water Supply Pressure

Measure the supply pressure at the handpiece / hose connection point and set the pressure to the value specified on the specification table. (Fig. 1)
For Multi Gauge information refer to Option Parts List.

Warning

- Do not exceed the optimum pressure specified on the specification table.

Caution

- Do not use air contaminated by dust, moisture and oil.

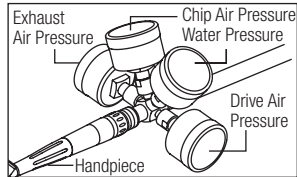


Fig. 1

Refer to Operation Manuals of coupling and hose before connecting the handpiece.

4. Connection & Disconnection of the Handpiece (NL4500)

(1) Connection

- 1) Insert the handpiece into the coupling.(Fig. 2)
- 2) Make sure the handpiece is firmly connected to the coupling.

(2) Disconnection

Pull back the Retention Lock Ring and remove the handpiece from the coupling.(Fig. 2)

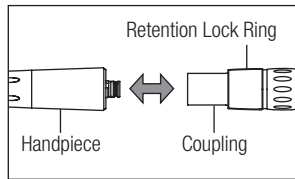


Fig. 2

Caution

- Do not operate the Retention Lock Ring while under drive air pressure. The high pressure may cause sudden release of the handpiece from the coupling.

5. Insertion and Removal of the Bur

5-1 To Insert the Bur

- 1) Insert the bur until it is correctly seated in place. (Fig. 3)
- 2) Depress the Push Button and insert the bur into the chuck until it is secure then release the button.
- 3) Ensure that the bur is secure by gently pulling and pushing the bur **WITHOUT** depressing the Push Button.

5-2 To Remove the Bur

Depress the Push Button firmly and remove the bur.

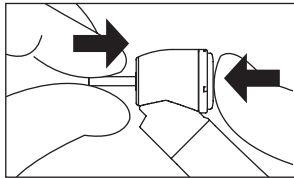


Fig. 3



Notice

- Do not use a sharp tool to clean the Cellular Glass Optic Rod. It could damage the glass and reduce the light transmission.



Caution

- Ensure the bur is fully seated in the chuck before use.
- Do not attempt to remove the bur until it has come to a complete stop.
- Do not use dirty, worn or used single use burs.
- Debris from the bur shank that is introduced into the chuck could cause the bur to slip and prevent the handpiece from fully gripping the bur.
- Do not exceed the bur speed recommended by the bur manufacturer.
- Do not exceed maximum bur length recommended by Brasseler USA.
- Do not apply excess pressure to the bur as it may break or bend or become difficult to remove.
- Damaged burs may break at high rotation speeds or slip from the chuck. Always inspect the bur before use and do not use any bur with damage that includes but not limited to:
 - Bent, deformed, worn, rusted, broken bur.
 - Cracked.
 - Non-ISO standard or tampered bur

Caution

- When using a bur with a 25mm length, the working diameter must be within the value specified in the table below. Using a bur with an excessive diameter could cause bur run-out and bend or break the bur.

$\varnothing a$	Diamond Bur: $\varnothing 2\text{mm}$ or less
	Carbide Bur: $\varnothing 1\text{mm}$ or less



6. Pre Check

Check that the Head Cap is firmly tightened. Also check for handpiece vibration, noise and overheating. If any abnormalities are found do not use the handpiece and contact Brasseler USA.

7. Maintenance

After each patient maintain the product as follows. Lack of maintenance could cause premature failure or overheating of the handpiece.

7-1 To Insert the Bur

After the treatment of each patient, clean the Clean Head.

- 1) Remove dirt and debris from the Clean Head Holes with the cleaning wire and brush (supplied as an accessory for the handpiece). (Fig. 4)
- 2) Half fill a cup with clean water.

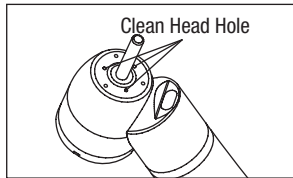



Fig. 4

7. Maintenance cont.

7-1 To Insert the Bur

- 3) Rotate the handpiece and immerse half of the handpiece head in the cup of water. (Fig. 5)
- 4) Rotate then stop intermittently the handpiece 3 times for 2 to 3 seconds each time.
- 5) Wipe the handpiece dry.

7-2 Cleaning (Handpiece)

- 1) Remove dirt and debris from the handpiece. Do not use a wire brush.
 - 2) Wipe clean with alcohol-immersed cotton swab or cloth.
-  This icon denotes that the handpiece can be washed via Thermo-Disinfector. Refer to the Thermo-Disinfector manual.

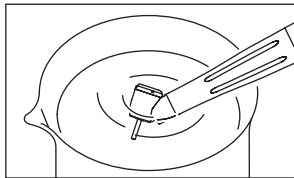


Fig. 5

Caution

- After washing with Thermo-Disinfector and prior to lubrication, dry the handpiece until all internal moisture is thoroughly removed. Thermo-Disinfector moisture remaining inside the handpiece could reduce the effect of lubrication and could cause corrosion.
- Never use and solvent such as benzine or thinner to clean the handpiece.

7-3 Cleaning (Optic)

Wipe clean the Glass Rod tip with an alcohol-immersed cotton swab.
Remove all debris and oil. (Fig. 6)

Caution

- Do not use a sharp tool to clean the Glass Rod. It could damage the glass and reduce the light transmission.

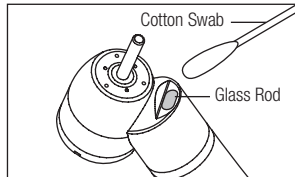


Fig. 6

7-4 Cleaning (Spray Point)

When spray ports are clogged, or spray does not exit evenly from the ports, clean the ports. (Fig. 7)

Caution

- Do not forcibly insert the wire into the port. Resultant port damage could cause the spray to be directed away from the bur, and the cooling efficiency reduces.
- Do not blow the air into the Clean Head Hole.

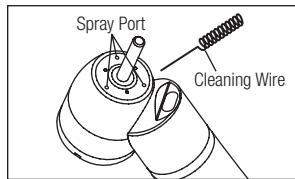


Fig. 7

7-5 Lubrication NL4500

■ NSK PANA SPRAY Plus or other approved lubricant.

Apply NSK PANA SPRAY Plus every time after each use and/or before autoclaving.

- 1) Remove the bur from the handpiece.
- 2) Insert the Spray Nozzle into the Spray Port nozzle on the can.
- 3) Insert the Spray Nozzle in rear of the handpiece. Hold the handpiece and spray for approximately 2-3 seconds. Apply lubricant until it expels from the handpiece head for at least 2 seconds. (Fig. 8)

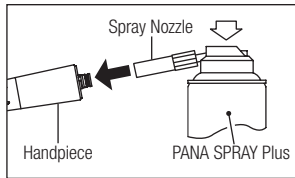


Fig. 8

Caution

- When applying spray be sure to hold the handpiece firmly to prevent the handpiece from slipping out of the hand due to the spray pressure.
- Hold the spray can upright.

■ Chuck cleaning

Clean Push Button chuck once a week.

- 1) Mount the arrow-head spray nozzle tip into the spray can port.
- 2) Lubricate the chuck for 1 to 2 seconds directly through the bur insertion hole. (Fig. 9)
- 3) Lubricate handpiece by using NSK PANA SPRAY Plus (or other approved handpiece lubricant) (Fig. 8) or an automatic handpiece cleaning and lubrication system.

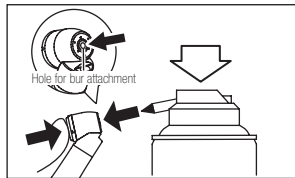


Fig. 9

! Caution

- If the chuck is not regularly cleaned the chuck grip may be weakened and the bur may be accidentally released while in operation.

■ An automatic handpiece cleaning and lubrication system

When using an automatic handpiece cleaning and lubrication system, refer to the system instructions.

7-6 Sterilization

Sterilize the product by autoclave sterilization. Remove the bur after each patient and sterilize as noted below.

1) Insert into an autoclave pouch. Seal the pouch.

2) Autoclavable under the conditions below.

Autoclave for more than 20 min. at 121°C, or 15 min. at 132°C, or 3 min. at 134°C.

3) The handpiece should remain in the autoclave pouch until required for use.

Caution

- Do not autoclave the handpiece with other instruments even when it is in a pouch. This is to prevent possible discoloration and damage to the handpiece from chemical residue on other instruments.
- Keep the handpiece in suitable atmospheric pressure, temperature, humidity, ventilation, and sunlight. The air should be free from dust, salt and sulphur.
- Immediately after use, the handpiece should be cleaned, lubricated and sterilized. If blood remains on the external or internal surfaces it can become clotted and cause rust.
- Do not heat or cool the handpiece too quickly. Rapid change in temperature could cause damage to the handpiece.

 **Caution**

- To avoid product failure, do not use a sterilizer that exceeds a cycle temperature of 138°C, including the dry cycle. In some sterilizers, the chamber temperature may exceed 138°C. Contact the sterilizer manufacturer for detailed information about cycle temperatures.
- Autoclave sterilization is recommended for the product. The validity of other sterilization methods is not confirmed.
- Do not touch the handpiece immediately after autoclaving as it will be very hot and must remain in a sterile condition.

 **Notice**

- Brasseler USA recommends Class B sterilizers as stated in EN13060.

8. Replacing the O-rings

Replace the O-rings if water is present in the exhaust air line. This is an indication of possible water leakage within the coupling. ALWAYS change the complete set of O-rings.

- 1) Loosen and Remove the taper ring at the rear of the handpiece. (Fig. 10)
- 2) Gently remove each O-ring by hand. (Fig. 11)
- 3) Insert the complete set of new O-rings in the correct grooves.
- 4) Replace and firmly tighten the taper ring.

*Refer to Spare Parts List to identify the correct parts.

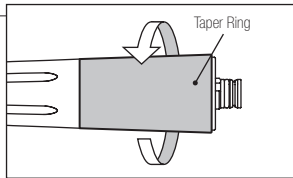


Fig. 10

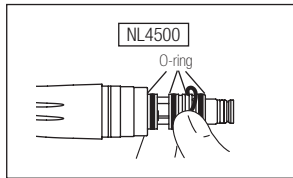


Fig. 11



Caution

- Do not force the new replacement O-ring with excessive pressure.
- When inserting new O-rings, make sure they are inserted in the correct grooves.
- Make certain that the taper ring is firmly tightened. If the taper ring is loose water and air leakage could occur.

9. Replacing the Non-Retraction Valve

A water Non-Retraction Valve is integrated in the coupling joint (the product below), which shuts off the water retraction directly at the handpiece head to prevent fluids infiltrating the water line. If water is beginning to leak from the handpiece, replace the Non-Retraction Valve.

Brasseler / NSK Coupling

- 1) Remove the coupling joint from the hose.
 - 2) Remove the back-end gasket.
 - 3) Pull and remove the water tube, and replace the Non-Retraction Valve.
 - 4) Insert the new Non-Retraction Valve securely and remount the back-end gasket.
- *Refer to Spare Parts List to identify the correct parts.

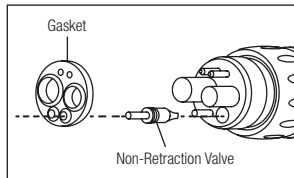


Fig. 12

10. Routine Maintenance Checks

Perform periodical maintenance checks every three months, referring to the check sheet below. If any abnormalities are found, contact Brasseler USA.

Points to Check	Details
Head cap is loose	Check that the Head Cap is firmly tightened.
Rotation	Rotate the handpiece and check for abnormalities such as abnormal rotation, vibration, noise, and overheating.

11. Specifications

Model	NL4500
Hose Connection Type	—
Max. Rotation Speed	380,000-450,000 min ⁻¹
Bur Type	ISO 1797-1 ø1.59-1.60mm Surgical Long Shank Bur (25mm)
Chucking Length	10.7mm
Max. Bur Length	25mm
Max. Working Part Diameter	ø2mm
Drive Air Pressure	0.25-0.3MPa (2.5-3.0kgf/cm ²) (36.2- 43.5psi)
Max. Air Consumption	45±5NL/min (1.41±0.18cfm) (0.25MPa)
Water Pressure	0.1-0.2MPa (1.0-2.0kgf/cm ²) (14.5-29.0psi)

11. Specifications

Optic	Glass Rod
Use Environment	Temperature: 10-40°C Humidity: 30-75% Atmospheric Pressure: 700-1,060hPa
Transportation and Store Environment	Temperature: -10-50°C Humidity: 10-85% Atmospheric Pressure: 500-1,060hPa

*This handpiece is a water jet type. The coolant water is not sprayed.

12. Warranty

Brasseler USA products are warranted against manufacturing errors and defects in materials. Brasseler USA reserves the right to analyze and determine the cause of any problem. Warranty is voided should the handpiece not be used correctly or for the intended purpose or has been tampered with by unqualified personnel or has had non Brasseler USA parts installed. Replacement parts are available for seven years beyond discontinuation of the model.

13. Option Parts List

Model	Order Code
MG-4H Multi Gauge	Z109400

14. Spare Parts List

Model	Order Code	Compatible Product
PTL O-ring Set	Y900580	NL4500
Non-Retraction Valve	P401054	Brasseler/NSK Coupling

14. Disposing Product

In order to avoid the health risks of operators handling the disposal of medical equipment, as well as the risks of environmental contamination caused thereof, a surgeon or a dentist is required to confirm the equipment is sterile. Ask specialist firms who are licensed to dispose of specially controlled industrial wastes, to dispose the product for you.



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