

Hall Series 3 Drill/Saws

HALL® SERIES 3 DRILL/REAMER*

Combination drill and reamer for large bone surgery. Sets bone screws.

Material: Stainless steel and aluminum

Standard Operating Speeds (FWD and REV):

Drill Position: 750 RPM

Screw Position: 250 RPM

Ream Position: 250 RPM

Average Output Torque (FWD and REV):

Drill Position: 40 in. lbs.

Screw Position: 18-22 in. lbs. (automatic torque limiter)

Ream Position: 100 in. lbs.

Operating Pressure: 100 PSI

Cat. No.	Description
5044-001	Hall Series 3 Drill/Reamer
Includes: 5044-005 5052-010	Trinkle adaptor Universal hose
5044-001	Hall Series 3 Drill/Reamer w/o Universal Hose (5052-010)

*U.S. Patent No. 4,510,816

HALL SERIES 3 OSCILLATING SAW

Designed for precise cuts in transverse or longitudinal large bone osteotomies and total hip and knee procedures.

Material: Stainless steel and aluminum

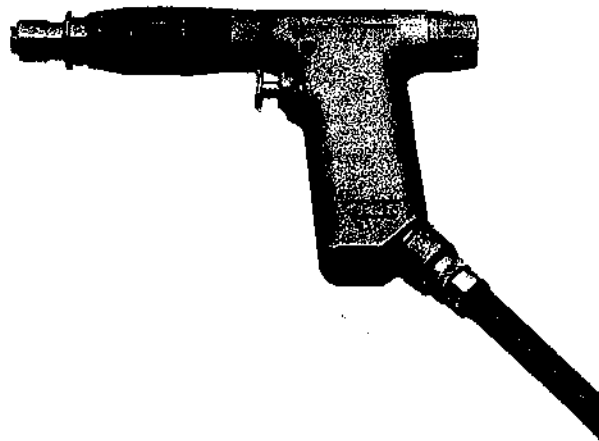
Standard Operating Speed: 18,000 cycles per minute

(36,000 strokes per minute)

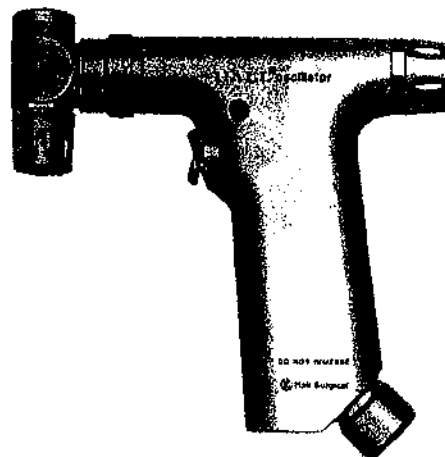
Operating Pressure: 100 PSI

Packaging: 1 each

Cat. No.	Description
5044-002	Hall Series 3 Oscillating Saw
5044-002	Hall Series 3 Oscillating Saw w/o Universal Hose (5052-010)



5044-001



5044-002





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INHOSPITAL PROCEDURES FOR CLEANING, PACKAGING, AND STERILIZING POWERED SURGICAL INSTRUMENTS

INTRODUCTION

Powered surgical instruments represent a major financial investment, and are expensive to replace; however, with proper care and maintenance, their lifetime will be greatly extended. This material discusses the steps for the proper processing of these devices, based on the principles and guidelines suggested by the manufacturers of such product. These recommendations apply to a broad range of devices; therefore the specific manufacturers' recommendations for your instruments should be consulted.

PRELIMINARY CLEANING PERFORMED IN THE OPERATING ROOM

To minimize the bioburden, powered surgical instruments must be wiped clean of all gross debris immediately after use:

1. Remove all attachments and accessories from the handpiece immediately after the last surgical use.
2. Immediately wipe gross blood and soil from the handpiece, attachments, and hose/cord/battery container. Use a moist cloth.
3. Transport the fully disassembled powered surgical instruments and accessories to the cleaning area.

**PROCEDURES PERFORMED
IN THE CLEANING AREA**

Powered surgical instruments must be hand cleaned; do not immerse, process in a washer sterilizer or an ultrasonic cleaner. The tools needed for cleaning include:

- surgical scrub brush or other soft-bristled brush and mild detergent for working on open surfaces
- tooth brush
- small diameter, round, stiff bristle brush
- fine point, rigid dental-type pick
- pipe cleaners
- dental floss
- metal bur brush
- clean, lint free towels for drying

1. Separate equipment according to the cleaning procedure to be followed:

- Equipment without internal parts i.e., burs, saw blades, wrenches, holding handles, and other simple attachments. These may be allowed to soak, then brushed clean, rinsed, and dried. Inspect all burs and blades; dull burs and blades should be discarded.
- Equipment with internal parts i.e., handpieces, chucks, bur guards, adapters, etc... These are non-immersible; if soaking an attachment is questionable, do not immerse. Use a soft damp brush and mild detergent to scrub external areas, and picks and other cleaning implements to remove debris from recesses and cannulations. All movable parts should be checked for smooth operation.

2. To prevent the entry of moisture into pneumatic instruments, attach a hose to each handpiece prior to cleaning.

3. Use a soft bristle brush and mild detergent to scrub the handpiece. Rinse under flowing water, positioning the working end of the handpiece down and away from the water.
4. Clean the handpiece trigger or lever with a toothbrush or other small, stiff brush; pay special attention to switches or rotating knobs and surface crevices. Rinse under flowing water.
5. Pull a pipe cleaner, long-handled brush, or large-diameter K-wire through cannulated areas. Rinse under flowing water.
6. Use a fine-point pick for working in areas where bone or bone chips can become trapped. Pay special attention to crevices, and slide the collars back for the chuck or blade holder. For saws, open the blade holding mechanism as far back as possible. Rinse and re-examine.
7. Rinse, inspect, and repeat cleaning as necessary; be sure to rotate rings and all movable parts to ensure cleanliness and smooth functioning. Areas requiring special attention include: collets, chucks, grippers and their activation rings, trigger mechanisms and throttle levers, control knobs and mode selectors, exposed threads, and open cannulations.
8. Dry the handpiece and the attachments with a lint free towel.
9. Wipe the hose with a detergent solution, and then a cloth moistened with water. Check the end of the hose to make sure it is clear of debris, and check for the presence of the o-ring.
10. Wipe the electric cord or battery container with a detergent solution, and then a water moistened cloth.
11. To prevent spotting, dry hose/cord/battery with a lint free towel. Activate pneumatic devices to blow out any internal condensation. Detach the hose from the unit.

12. Lubricate, **but only if required**. Due to different manufacturing designs, some powered instruments may require lubrication. **If a device or attachment does not require lubrication, do not lubricate since this may harm the unit.** For those powered instruments and attachments that do require lubrication, follow the instructions of the manufacturer. Prior to each sterilization, apply the prescribed type and amount of lubricant to the locations indicated.

PROCEDURES PERFORMED AFTER CLEANING AND LUBRICATING

At this stage, all items must be completely clean, devoid of any detergent, grease, soil, blood, bone/tissue, and other materials.

1. Separate the instruments, attachments, and accessories into appropriate groupings.
2. For pneumatic devices, coil the hose loosely and place in the sterilization container or instrument tray. Do not use sterilization cases that require forceful packing. Only mesh instrument trays or large, fully perforated sterilization containers should be used.
3. Pack accessories and attachments in the sterilization container as per the manufacturer's recommendation. Leave large spaces between items.
4. Be sure that non-sterilizable items (i.e. lubricants, plastic caps, certain types of foot controls, nitrogen tank regulators, etc.) are not included in the sterilization container.

PACKAGING FOR STERILIZATION

For wrapped containers:

1. Place a chemical indicator in the center of the tray to be wrapped.
2. Double wrap the container with a suitable material, woven or non-woven.
3. Place a chemical indicator on the exterior of the wrapped instrument pack.

For rigid containers with internal filters:

1. Select a container design for the type of sterilizer to be used.
2. Place a chemical indicator in the center of the container.
3. Insert the proper filters, using new ones for each use.
4. Do not wrap the outside of the container.
5. Apply the appropriate chemical indicator to the exterior of the container.

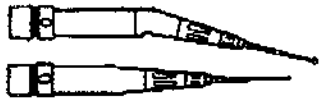
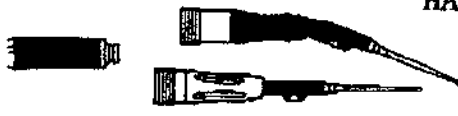

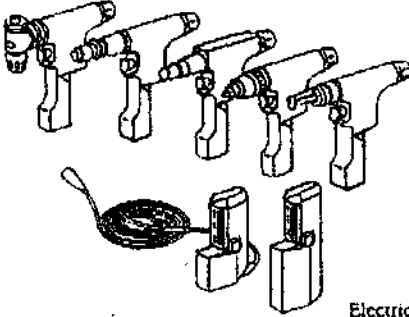
STERILIZATION

Prevacuum sterilization is preferred because it allows rapid steam penetration to the internal mechanisms of the powered surgical instrument, thus permitting shorter cycle times. **The times below apply equally to wrapped or unwrapped containers.**

1. If the prevacuum sterilizer has fixed cycles, always select the "Hard Goods" cycle; this ensures total evacuation of the air from the chamber before exposure to steam for 4 minutes at 270 - 272F (132 - 133C) followed by 8 minutes or more of vacuum drying. If the prevacuum sterilizer is the selectable type, in which the program can be chosen, select 4 minutes of exposure time at 272F and a minimum of 8 minutes of vacuum drying time.
2. For gravity displacement sterilizers, longer sterilization times are needed since these sterilizers rely on gravity for removal of air and steam penetration. At 272F, the times for various types of powered surgical instruments range from 15 minutes to 55 minutes; at 250 - 254F (121 - 123C), an additional 25 minutes is added, on average to the above times. Again, a minimum of 8 minutes of drying time is needed.
3. Do not "Flash" sterilize powered surgical instruments since this will not result in internal sterilization of the instrument or proper drying. Internal sterilization is required between cases at all times. Flash sterilization and inadequate drying of powered surgical equipment will damage the internal components and mechanisms of the instrument.

4. Do not process powered surgical instruments or their accessories in a washer/sterilizer (a gravity displacement sterilizer). The washer cycle will harm the internal components and mechanisms. The sterilization cycle, even if used alone, is inappropriate since the 10 minute cycle is insufficient for internal sterilization and there is no drying cycle to ensure adequate drying of the internal mechanisms of the device.

5. Ethylene oxide sterilization is not recommended for the majority of powered surgical instruments. This process should only be used when specified by the manufacturer since it requires lengthy exposure times due to the slow diffusion of the sterilant through the seals, lubricants, and internal mechanisms. Lengthy aeration times may also be required to ensure that no ethylene oxide or its reaction products are retained in internal mechanisms, lubricants, or on the surface of the instrument. Very little information exists in the literature about adequate aeration times. Reliable aeration studies can be quite expensive and require repeated analyses for ethylene oxide residuals. Few hospitals would be equipped to do this.

 <p>HALL® OSTEON</p>	<p>100 PSI</p>	<ol style="list-style-type: none"> Set temperature and corresponding exposure time 270°-272°F (132°-133°C) 35 Minutes 250°-254°F (121°-123°C) 60 Minutes Set drying time for eight minutes minimum.
 <p>HALL® OTOTOME High-Speed End Low-Speed End</p>	<p>160 PSI</p>	<ol style="list-style-type: none"> Set temperature and corresponding exposure time 270°-272°F (132°-133°C) 35 Minutes 250°-254°F (121°-123°C) 60 Minutes Set drying time for eight minutes minimum.
 <p>NEURAIRTOME®</p>	<p>160 PSI</p>	<ol style="list-style-type: none"> Set temperature and corresponding exposure time 270°-272°F (132°-133°C) 55 Minutes 250°-254°F (121°-123°C) 100 Minute Set drying time for eight minutes minimum.
 <p>VERSIPOWER® Drill Oscillator Reciprocator Reamer Sternum Saw Electric Module Battery Module</p> <p>Electric Module may be wrapped and sterilized in a manner consistent with the VERSIPOWER handpieces.</p>	<p>N/A</p>	<ol style="list-style-type: none"> Set temperature and corresponding exposure time 270°-272°F (132°-133°C) 13 Minutes Set drying time for eight minutes minimum. <p>FOR BATTERIES ONLY:</p> <ol style="list-style-type: none"> Set temperature and corresponding exposure time 270°-272°F (132°-133°C) 3 Minutes Set drying time for four minutes. Battery Modules, when processed in a gravity displacement autoclave, should be placed unwrapped in the 5048-012 Battery Sterilization Rack and placed in the sterilizer. Battery Modules, when processed in a prevacuum sterilizer, may be wrapped or unwrapped, with or without utilization of the 5048-012 Battery Sterilization Rack

NOT sterilize power consoles.

NOTE 1: Prevacuum Sterilization
Our prevacuum steam sterilizer has a prefixed cycle, use the Hard cycle. If it does not have a prefxed cycle, set exposure time at 270°-272°F (132°-133°C) for four minutes. Set the drying time for eight minutes or more for all instruments (except for Batteries).

NOTE 2: Lubrication
Most HALL handpieces do not require lubrication. Exceptions are the NEURAIRTOME Handpiece, which must be lubricated after cleaning before sterilization, and the Angular Attachments for the HALL MICRO 100 and MICRO E Drills.

NOTE 3: Times apply equally to wrapped or unwrapped powered surgical instruments. Wrapped times do not include batteries.

NOTE 4: Use only instrument trays or fully perforated sterilization boxes.

NOTE 5: For sterilization containers with filters, add five minutes to dry cycle.

General Information

Steam sterilization is safe and effective, and there are no contraindications to sterilizing HALL-powered surgical instruments and accessories in an autoclave.

ETO/ASHE sterilization should not be used for powered surgical instruments as internal sterilization of the equipments is required between cycles.

NO process powered surgical instruments or their accessories in a liquid chemical sterilizer.

Gas plasma sterilization is not recommended for powered surgical instruments. HALL-powered surgical instruments are capable of withstanding the recommended exposure times and temperatures used in steam sterilization.

DO NOT IMMERSSE in liquid chemical sterilants.



Zimmer, Inc. 1991
USA HALL SURGICAL 1991

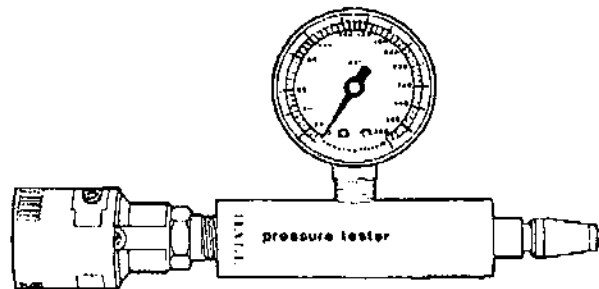
GROUPS	MAXIMUM ACCEPTABLE PRESSURE LOSS
Group I—160 PSI	30 PSI
Group I—100 PSI	20 PSI
Group II—160 PSI	15 PSI
Group II—100 PSI	10 PSI
GROUP I	GROUP II
A. Series (100 PSI)	A. MICRO 100 Series (100 PSI)
• Drill/Reamer	• Micro Drill
• Oscillator	• Reciprocator
• Reciprocator	• Oscillator
	• Sagittal Saw
	• Oscillator XL
B. ORTHAIR (160 PSI)	B. MICRO (160 PSI)
• ORTHAIRTOME II	• Reciprocating Saw
• ORTHAIR® Oscillator	• MICRO Oscillating Saw
• ORTHAIR® Reciprocator	• MICRO Sagittal Saw
• ORTHAIR® Reamer Driver	• MICRO Drill
C. NEURAIRTOME (160 PSI)	C. SURGAIRTOME TWO (100 PSI)
D. HALL® Air Driver (160 PSI)	D. HALL® Arterial Oscillator (100 PSI)
E. MICRO Wiredriver (160 PSI)	E. HALL® II (100 PSI)
F. CEBOTOME (100 PSI)	F. OSTEON (100 PSI)
G. HALL Sternum Saw (100 PSI)	G. WIRE DRIVER 100 (100 PSI)
H. OTOTOME (160 PSI)	

the 2075-17 gauge. The pressure loss is a normal occurrence.

- G. The gauge on the pressure tester should be checked for calibration on a routine schedule. This should reduce the incidence of pressure regulators being returned for service because of a bad test gauge. (FIGURE 5M-22)

When pneumatic instrument is in surgical use:

- A. To eliminate hose weight from the surgeon's hand and to minimize back pressure in the hose it may be convenient to loop the hose in the surgical field some two feet away from the surgical site.



**Pressure Tester
(FIGURE 5M-22)**

- B. Make a circle with the hose, about 12 inches in diameter. Pick up drape from the center of the circle and carry over top of the hose loop and form a sling.
- C. Instruments should be cleaned after each surgical involvement, if at all possible. This lessens the buildup of dried protein, which could resist postsurgical cleaning.
- D. To maintain functional efficiency of these units and ease post-surgical cleaning problems use a bristic brush to keep bur flutes and blade teeth clean after each surgical involvement.

Cleaning/Oiling

The next area to consider is the cleaning and, if necessary, the oiling of Hall powered products. There are several critical points you must know.

Of course, the products must be cleaned after surgical use. However, as noted earlier, powered equipment must NEVER be placed in a solution. IMMERSION CAN BE EXTREMELY HARMFUL TO THESE INSTRUMENTS.

Here is a list of the correct procedures in the OR prior to sending to the cleaning area:

- Remove bur or burs from instruments and/or angular attachments immediately after last surgical use
- Remove all attachments and accessories from basic instruments immediately after last surgical use
- Wipe off the hose with a moist cloth before placing in instrument tray
- Transport powered instruments fully disassembled and with surfaces wiped clean in sterilization containers to cleaning area

To Clean Hall Surgical Instruments

After having been brought from the OR completely separated:

- Turn on tap water to medium warm, in an open unstoppered sink
- Attach hose to each unit to be cleaned
- Use soft bristle brush and mild soap or detergent
- Place unit under running water with opening to motor completely and tightly covered if hose has not been applied
- Use a small, round, stiff brush for tight or recessed areas
- Use a fine-point pick device for working in areas where bone or bone chips can become trapped, such as the end of the Duraguard, with the exception of bur guards and angle drill attachments
- Use long-handled brushes for pulling through cannulated areas
- Rinse under flowing tap water taking care not to have flowing water enter opening to motor area
- Dry with lint-free cloth to remove water spots

To Oil Hall Surgical Instruments

Some major points must be made regarding oiling. There are large numbers of Hall Surgical units now in use which require lubrication.

However, there are also many more in use which *do not* require lubrication and which, indeed, can be harmed by it. Here are the general rules for oiling which your customers should follow.

- Use only the lubricant furnished by the manufacturer of the equipment. Do not mix, because they may not match
- Oil as instructed, prior to each sterilization if unit requires oiling
- When inserting oil into "handpieces" with detachable hoses, always put 3 to 5 (see chart provided by Hall Surgical on Lubrication) drops into the pressure inlet with the throttle depressed. This is vitally important
- When inserting oil into the "end of an attached hose," place 4 to 10 (see Lubrication chart, page M-28) drops, and run instrument for 5 seconds
- When inserting oil into "lube cup," always put 3 to 5 (see Lubrication chart) drops into the cup and run instrument for 5 seconds
- When oiling attachment for the MICRO E or MICRO 100 Drill, always remove the 70° and 90° angled handpieces from the instrument and place a drop of oil in the head, on the gear, in the sleeve bearing hole just below the gear and in the bottom
- When oiling the 20° angle attachment for the previously listed drills and XL 20°, always place a drop in the nose bushing of the attachment, locking slot and a drop in the bottom

- Burguards must be oiled (one drop) in the tip each time prior to sterilization
- **DO NOT OIL INSTRUMENTS THAT DO NOT REQUIRE LUBRICATION.** This can be harmful
- Place a drop of oil in Trinkle and ZIMMER Chucks to maintain smoothness and cleanliness

Sterilization

Here is another checklist with which you should become familiar. It's an important area in which you should provide your customer with helpful information. After cleaning and oiling powered instruments the following procedure should be exercised in sterilizing them.

After cleansing and oiling:

- A. All items must be completely clean. They must be devoid of any soil, soap, or other materials.
- B. Separate the instruments, attachments, and accessories into proper groupings. Make sure, for example, that the safety cover is on the Duraguard, hoses are detached from the instruments, etc.
- C. Use an adequate sterilization container. Standard instrument trays are suggested for the heavy units and attachments, such as the Air Driver, NEURAIRTOME, ORTHAIR, and Series 3 Instruments, and possibly a half instrument tray or fully perforated sterilization case for the lighter and smaller units, such as the SURGAIRTOME Two, HALL II, MICRO and MICRO 100 Series, OTOTOME, and Osteon.
- D. Place the items into the instrument tray, or the sterilization container with adequate space between each instrument. Do not overload.
- E. Do not use sterilization cases which would require forceful packing of the units. Do not use sterilization cases which are only partially perforated or those for which a tray is required. Possibly when fully packed, the tray could compress the contents in the restricted space underneath.
- F. When feasible, wrap instrument hoses separately to eliminate any possibility of damage from sterilization in tightly packed containers. Always coil loosely, never "kink" when placing in a sterilization container.
- G. To eliminate constant repetitive sterilization prior to actual use, additional burs can be packaged separately. They can then be stored until needed. Repetitive sterilization may tend to

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Lubrication Chart

PRODUCTS	DATE OF MANUFACTURE	OIL NEEDED	HOW MUCH	WHERE	REMARKS
SURGAIRTOME	1963-1970	Yes	3 drops	End of hose	Operate for 5 seconds
ORTHAIRTOME	1965-1972	Yes	3 drops	Lube Cup	Operate for 5 seconds
NEURAIRTOME	A. 1965-1972	Yes	5 drops	Lube Cup	Operate for 5 seconds
	B. 1972-1975	Yes	10 drops	End of hose	Operate for 5 seconds
	C. 1975-	Yes	5 drops	Pressure Inlet	Don't forget to depress throttle
MICRO Drill	1967-1970	Yes	3 drops	Lube Cup	Operate for 5 seconds
HALL II	1970-1979	Yes	3 drops	Pressure Inlet	Don't forget to depress throttle
ORTHAIR Series	1975-1983	No			
MICRO Series	1975-1983	No			
MICRO 100 Series	1983-	No			
OTOTOME	1974-1983	No			
Osteon 1984	1984-	No			
Drill Attachments 20°		Yes	1 drop in 3 sites	End, Slot, Bottom	Each time . . . prior to sterilization
20° XL		Yes	1 drop in 3 sites	End, Slot, Bottom	Each time . . . prior to sterilization
70°		Yes	1 drop in 4 sites	Head, Gear, Sleeve, Bottom	Whether used . . . or not
90°		Yes	1 drop in 4 sites	Head, Gear, Sleeve, Bottom	Whether used . . . or not
Burguards		Yes	1 drop in 4 sites	Head, Gear, Sleeve, Bottom	Whether used . . . or not
Other Attachments		No			
Series 3	1983	No			
TRAUMA DRILL	1984	No			
Cebotome	1980	No			
ARTHROTOME Low Speed	1984	No			
MICRO Oscillator XL	1984	No			
ARTHROTOME High Speed	1985	No			
Battery Sternum Saw	1986	No			
MICRO E Drill	1987	No			
MICRO E Reciprocating Saw	1987	No			
MICRO E Sagittal Saw	1987	No			
MICRO E Wiredriver	1987	No			
MICRO E Oscillating Saw	1987	No			

dull cutting edges before burs are actually required in surgery.

H. Be sure nonsterilizable items are not included in the sterilization container. These items include bottles of lubricant, plastic caps, certain kinds of foot controls, etc.

Wrapping containers for sterilization:

A. Use double thickness 36 inches × 36 inches

muslin, 140 thread count. Double wrap the container. This creates four (4) layers of muslin which permits dependable post-sterilization storage if required.

B. Apply appropriate chemical indicator to the exterior of the wrapped instrument pack. This indicates to the surgical team that the equipment has been through a sterilization cycle.

Sterilization

- A. The preferred method of sterilizing Hall airpowered instruments is in a pre-vacuum sterilizer. If this pre-vacuum type has fixed cycles, always select the "Hard Goods" cycle. This will ensure total evacuation of air from the sterilizer chamber before exposure to steam for four minutes at 272°F followed by eight minutes of vacuum dry. This is the fixed cycle labeled "Hard Goods."
- B. If the pre-vacuum sterilizer is a selectable-type, in which the program can be chosen, then set 272°F, at an exposure time of four minutes with eight minutes vacuum dry.
- C. In a downward-displacement sterilizer, equipment such as the ORTHAIR Series, NEURAIRTOME, and the Air Driver, must be exposed to 272°F for a period of 55 minutes. The dry cycle should be eight minutes. If the sterilizer can only achieve 254°F maximum, add 25 minutes to the above time.
- D. For equipment such as the Series 3, Trauma Drill, MICRO 100 Series, MICRO Series, SURGAIRTOME II Instrument, HALL II, CEBOTOME, Arterial Oscillator, Ototome and Osteon, as well as the Sternum Saw—the exposure time is 35 minutes at 272°F, with an eight-minute dry cycle. Again, should the sterilizer be capable of achieving only 254°F, then 25 minutes must be added to the above exposure time.
- E. Times apply equally to wrapped or unwrapped containers.
- F. Only instrument trays or fully perforated sterilization boxes should be used.
- G. Gas sterilization is not recommended.
- H. Do not process air-powered equipment in a washer sterilizer.

"Flash" sterilization does not apply to surgical air-powered instruments. Internal sterilization of these instruments is required.

"Flash" sterilization is used only as an emergency cycle for the sterilization of the forgotten or dropped instrument in a downward displacement sterilizer. Instrument(s) must be opened fully and placed in an unwrapped tray and exposed to 272°F for three minutes. This is sufficient for the external sterilization of simple noninvolved instrumentation. If a cannula or a tubing is involved, the "flash" cycle is ten minutes. No other interpretation of "flash" is acceptable.

CHECKPOINT QUIZ NO. M-3

1. A particular danger to air powered units is immersion in saline. If this happens, the unit should be:
 - a. Sterilized immediately
 - b. Rinsed and agitated in demineralized water
 - c. Lubricated
 - d. Packaged and returned to *Zimmer*
 - e. Both a and b
 - f. Both b and c.
2. A good reason for using nitrogen to power the equipment is:
 - a. It's almost free of bacterial contaminants
 - b. It's active chemical properties
 - c. It sustains oil droplets
 - d. All of the above
 - e. a and b only
3. After sterilization and before use, if instruments are very hot they should be immersed to cool.
 - True
 - False
4. If at all possible, instruments should be cleansed after each surgical involvement.
 - True
 - False
5. Today, all Hall products require oiling.
 - True
 - False
6. The preferred method of sterilizing these products is _____ sterilization:
 - a. Flash
 - b. Gas
 - c. Downward displacement
 - d. Pre-vacuum

SUMMARY

The outstanding line of powered surgery products, produced by Hall Surgical, a Division of Zimmer, is another way of providing you with a total system approach of selling to your clients.

Zimmer has pioneered in this specialized surgical equipment area and offers state-of-the-art products to a growing and lucrative market.

An important aspect of successfully selling these products will be your ability to provide good inservice information as well as being familiar with the features and benefits of your products.