

# REAMER/IRRIGATOR/ ASPIRATOR (RIA)

For Intramedullary Reaming and Bone Harvesting



Instruments and implants approved by the AO Foundation. This publication is not intended for distribution in the USA.



Image intensifier control

#### Warning

This description alone does not provide sufficient background for direct use of DePuy Synthes products. Instruction by a surgeon experienced in handling these products is highly recommended.

#### Processing, Reprocessing, Care and Maintenance

For general guidelines, function control and dismantling of multi-part instruments, as well as processing guidelines for implants, please contact your local sales representative or refer to:

http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance For general information about reprocessing, care and maintenance of Synthes reusable devices, instrument trays and cases, as well as processing of Synthes nonsterile implants, please consult the Important Information leaflet (SE\_023827) or refer to:

http://emea.depuysynthes.com/hcp/reprocessing-care-maintenance

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#### REAMING WITH LOWERED RISK OF SYSTEMIC COMPLICATION

#### Designed for:

- Lower intramedullary pressure<sup>1, 4, 5</sup>
- Lower fat embolisation<sup>2, 3, 14</sup>
- Lower heat generated<sup>11</sup>
- Removal of infected tissue<sup>6, 7, 8, 13, 14</sup>

#### FAST, EFFICIENT REAMING

- Time saving one-step procedure<sup>10</sup>
- Sharp reamer heads for facilitated cutting



Flow of irrigating fluid



### AUTOGRAFT HARVESTING

- Low morbidity<sup>7, 18</sup>
- Possible range: 30 to 80 cc per procedure
- Well-known technique
- Osteoinductive and osteogenic<sup>12, 16, 17</sup>







## INDICATIONS

#### Intended use

- To clear the medullary canal of bone marrow and reaming debris
- To clear the medullary canal of infected bone tissue
- To effectively size the medullary canal for the acceptance of an intramedullary implant or prosthesis
- To harvest finely morselized autogenous bone and bone marrow for any surgical procedures that require bone graft in order to facilitate fusion and/or fill bone defects. These procedures include spinal fusion, joint arthrodesis, total joint replacement, fracture repair, nonunion, maxillofacial reconstruction, and tumor removal

**Note:** When deciding on bone harvesting, the patient's history, bone quality, physiological condition and compliance must be taken into account.

## PREPARATION

#### **1** Select appropriate length of tube assembly

Instruments	
314.7455	RIA Tube Assembly, for RIA Drive Shaft mini- mum length 360 mm, for No. 314.742, sterile
314.7465	RIA Tube Assembly, for RIA Drive Shaft mini- mum length 520 mm, for No. 314.743, sterile

Contraction of the second

Select the appropriate length of the RIA tube assembly based on the length of the canal.

Length of the canal	Tube assembly
Less than 350 mm	360 mm
Greater than 350 mm	520 mm

#### 2 Confirm reaming diameter

Instrument	
351.717	Depth Gauge for Medullary Nails

- To estimate the canal diameter, position image intensifier for an AP view of the limb at the level of the isthmus. Hold the radiographic depth gauge perpendicular to the limb and overlay the diameter tabs over the isthmus. Read the diameter on the tab that fills the canal. Repeat with a LM view.
  - **a** For reaming only, choose the implant diameter. Select a reamer head 1.0 mm to 1.5 mm larger than the chosen implant diameter.
  - b For bone harvesting only, select a reamer head 1.0 mm to1.5 mm larger than the canal diameter at the isthmus.

#### Notes:

• Measure both in AP and LM view.

#### **Precaution:**

The distance of the depth gauge from the bone and the position of the receiver affect the diameter measurement.

Always place the depth gauge on the side of the limb closest to the receiver. Estimate the real width as follows:

Distance between depth gauge and bone

- 25 mm = 1 mm larger reading
- 50 mm = 2 mm larger reading
- 100 mm = 3 mm larger reading



#### **3** Access canal and place reaming rod

Instruments	
393.100	Universal Chuck with T-Handle
352.032	SynReam Reaming Rod $\varnothing$ 2.5 mm, short, length 950 mm

Gain access to the intramedullary canal using standard opening procedures and instrumentation for the chosen implant or entry point. Reduce the fracture, if present.

Attach the universal chuck with T-handle to the reaming rod. Insert the reaming rod into the canal to the physeal scar.Verify its position with the image intensifier.

**Note:** Ensure the reaming rod is centered in the canal in **()** both AP and LM view.





#### **4** Confirm nail length (for reaming only)

Instruments	
351.717	Depth Gauge for Medullary Nails
351.719	Elongation Tube for Reaming Rods, for Depth Gauge for Medullary Nails, for Nos. 351.717 and 03.019.001

Assemble the extension tube to the depth gauge.



Place the depth gauge assembly over the reaming rod.

**Notes:** The tip of the depth gauge assembly should be located at the entry site.

#### **Precaution:**

Use the depth gauge only with the 950 mm reaming rod.



Determine the length of the canal. Choose the length of the implant accordingly.

**Note:** Consider dynamization when choosing the length of the implant.



## ASSEMBLY

#### **1** Attach reamer head

Instruments	
352.250S- 352.259S	RIA Medullary Reamer Heads 12.0 mm–16.5 mm, sterile
352.261S – 352.265S	RIA Medullary Reamer Heads 17.0 mm–19.0 mm, sterile
314.7455	RIA Tube Assembly, for RIA Drive Shaft minimum length 360 mm, for No. 314.742, sterile
314.7465	RIA Tube Assembly, for RIA Drive Shaft minimum length 520 mm, for No. 314.743, sterile

Select the appropriate reamer head. Insert it into the tube assembly.

Note: The reamer head is attached correctly when it can spin freely and is retained by the tube assembly.

**Precaution:** Reamer heads are sharp. Use care when attaching the reamer head to the tube assembly.





## **2** Attach drive shaft to tube assembly and reamer head

Instruments	
314.742	RIA Drive Shaft, length 360 mm
314.743	RIA Drive Shaft, length 520 mm

Select the respective length of the drive shaft. Guide the tip of the drive shaft through the RIA tube assembly.



Mate the hexagonal end of the RIA drive shaft with the hexagonal recess in the reamer head.

**Note:** Visually check mating through the aspiration holes.

**Precaution:** Improper assembly can result in product breakage, which may lead to surgical delay, bone damage, and/or adverse tissue damage.



**Note:** The drive shaft is properly attached when the hex flats are not visible. The helix is also visible when properly attached.

**Precaution:** Improper assembly can result in product breakage, which may lead to surgical delay, bone damage, and/or adverse tissue damage.

Note: The drive shaft hex is properly engaged in the

reamer head when the retaining groove is hidden.

**Precaution:** Improper assembly can result in product breakage, which may lead to surgical delay, bone damage, and/or adverse tissue damage.





Push the outer sleeve of the RIA drive shaft forward to engage the body of the RIA tube assembly.

**Precaution:** Improper assembly can result in product breakage, which may lead to surgical delay, bone damage, and/or adverse tissue damage.



**Note:** The drive shaft is properly attached when the tan/gray plastic coupling shaft is no longer visible.

**Precaution:** Improper assembly can result in product breakage, which may lead to surgical delay, bone damage, and/or adverse tissue damage.



#### **3** Attach locking clip

Instrument	
352.2605	Locking Clip for RIA, sterile

Slide the locking clip onto the assembled RIA drive shaft and tube assembly.

Note: The small ridge on the inner surface of the locking clip matches the groove between the drive shaft and the tube assembly.

Rotate the locking clip until the circular notches on the locking clip align with the corresponding buttons on the tube assembly.





## **4** Attach drive shaft seal

Instrument	
351.718.025	Seal for RIA Drive Shaft, sterile,
	pack of 2 units

Attach the drive shaft seal to the proximal end of the drive shaft.

**Note:** The drive shaft seal is important to retain irrigation within the cannulation of the drive shaft.



### **5** Attach drive unit with large quick coupling

Instruments	
530.605	Battery Reamer/Drill
530.760	Quick Coupling for DHS/DCS Triple Reamers, for Battery Power Line

Select a cannulated drive unit that will deliver 3.5 to 4.5 Nm of torque and 700 to 900 rpm (standard drill speed). Use the cannulated quick coupling to attach the drive shaft to the drive unit.

**Note:** Do not use a reduction drive. Drills with a torque greater than 6 Nm must not be used. Power equipment designed for reaming must not be used.



#### **6** Connect irrigation

Instrument

Irrigation Tube

Other material

1–2 liter container of saline solution (eg, isotonic 0.9 % NaCl)

Suspend a 1 or 2 liter container of saline solution or irrigating fluid approximately one meter above the level of the RIA assembly.

Attach the end with spike on the irrigation tube to the irrigation container.

**Note:** The clamp on the irrigation set should be closed until reaming begins.



Connect the opposite end of the irrigation tube to the irrigation port on the tube assembly.

**Note:** The irrigation port is the smaller of the two ports and is indicated by an "I".



#### 7 Connect aspiration

Instrument

Aspiration Tube

Other material

2-5 liter suction canister

Vacuum source

Connect the aspiration tube (non-flared end) to the aspiration port on the tube assembly.

**Note:** The aspiration port is the larger of the two ports and is indicated by an "A".



#### Alternative for bone harvesting

Instrument

352.2295 Graft Filter for RIA, sterile

Connect the graft filter to the aspiration port on the tube assembly.

Connect the distal end of the graft filter to the aspiration tube.

Connect the other end of the aspiration tube (flared end) to the suction canister. Connect the suction canister directly to the vacuum source.

**Note:** Connect the irrigation/aspiration tube directly to the suction canister to avoid a reduction in suction. Never connect several suction canisters.

Start vacuum source, if necessary.

Note: Set adjustment to maximum vacuum.



## REAMING

#### 1 Introduce RIA assembly into medullary canal

Guide the reamer head over the reaming rod. The system should only be used with SynReam reaming rod (352.032), as described on p. 7.

Open the irrigation clamp to start flow. Turn on the vacuum source.

**Note:** Prior to insertion into patient's limb, visually verify flow of irrigation fluid at the tip of the reamer head.

Advance the RIA assembly over the reaming rod until the aspiration holes are fully immersed into the bone. Check position on the image intensifier. A flow of blood and bone marrow becomes visible in the aspiration tube.

**Notes:** Flow of aspiration begins when aspiration holes are fully immersed in the bone.

The irrigation/aspiration cools the reamer heads and removes bone marrow and morselized bone from the medullary cavity. It is crucial for the properties of the system.

#### **Precautions:**

- Never ream when there is no irrigation/aspiration.
- While not reaming, always turn off irrigation flow and vacuum (aspiration).





### 2

#### Ream

Commence reaming using a gradual advancing/retracting technique. Slowly advance 20–30 mm and then retract 50–80 mm allowing the irrigation to flow in front of reamer head. Then advance until resistance is felt and repeat.

**Notes:** An insufficient irrigation volume may lead to clogging. Never advance too fast to avoid clogging.

#### **Precaution:**

Periodically check that the reaming aspirate is flowing back via the aspiration port and tube into the suction canister. Stop reaming if there is no flow.

After the reamer head reaches the desired depth, withdraw the RIA assembly while maintaining rotation with the drill.

Note: Reverse the drill if advancement of the reamer becomes difficult.



## BONE HARVESTING

#### 1 Turn off irrigation and aspiration

Instrument	
352.2295	Graft Filter for RIA, sterile

Stop irrigation after withdrawing the RIA assembly from the patient. Turn off the suction or clamp the suction tubing. Disconnect the filter canister from the lid and move it to the back table.



### 2

#### Prepare graft

Hold graft filter vertically. Compress the bone graft by gently pushing down on the plunger. Estimate the volume of bone graft with the scale on the outer canister.



#### **3** Remove graft from filter

Invert filter vertically with the plunger in a downward position. Remove the inner filter from the canister.

**Precaution:** When handling, do not hold the opening downwards as there is a risk of dropping the graft.



Hold the inner filter over an appropriate container.





Invert the inner filter vertically. Push the bone graft out of the filter with the plunger.

## DISASSEMBLY

#### 1 Remove drive shaft

Remove and dispose of the irrigation/aspiration tube and locking clip. Push the outer sleeve of the drive shaft toward the body of the RIA tube assembly.



Keep the outer sleeve in a forward position while withdrawing the drive shaft from the body of the tube assembly.

Remove the drive shaft from the RIA tube assembly.

**Note:** Dispose of the tube assembly and reamer head. Remove and dispose of the drive shaft seal.



## PRODUCT INFORMATION SINGLE-PATIENT-USE INSTRUMENTS

#### Reamer Heads

- Conical tip helps centralize reamer
- Deep flutes prevent clogging
- Sharp cutting edges for every case
- Diameters: 12 mm-19 mm in 0.5 mm increments
- Stainless steel
- Sterile packed
- Attaches to RIA Tube Assemblies

Article No.	Diameter (mm)	Article No.	Diameter (mm)
352.2505	12.0	352.2585	16.0
352.2515	12.5	352.2595	16.5
352.2525	13.0	352.2615	17.0
352.2535	13.5	352.2625	17.5
352.2545	14.0	352.2635	18.0
352.2555	14.5	352.2645	18.5
352.2565	15.0	352.2655	19.0
352.2575	15.5		



Tube Assemblies

- Two lengths available (attach to corresponding drive shafts)
- Sterile packed

Article No.	Diameter (mm)
314.7455	360
314.7465	520



#### 351.718.025 Seal for RIA Drive Shaft, sterile, pack of 2 units

- Elastomeric seal
- Prevents flow of irrigation fluid into drive unit
- Sterile packed



352.2295

• Collects finely morselized bone chips and marrow

Graft Filter for RIA, sterile

- Capacity: 100 cc
- Graduations for estimating volume
- Plunger for removal of graft
- Sterile packed



352.260S Locking Clip for RIA, sterile

- Secures attachment between drive shaft and tube assembly
- Sterile packed



Irrigation/Aspiration Tubes

- Spike on irrigation tube to connect with irrigation source
- Clamp on irrigation tube to control flow of irrigation fluid
- Aspiration tube to connect to suction canister







Irrigation Fluid Bag

- 1–2 Liters for reaming
- 3 Liters minimum for harvesting



#### Suction Canister

- 2 Liters minimum for reaming
- 3 Liters minimum for harvesting



Vacuum Source





# Product Information GENERAL INSTRUMENTS

Article No.	Length (mm)	
314.742	RIA Drive Shaft, length 360 mm	 
314.743	RIA Drive Shaft, length 520 mm	 Q

- Made of superelastic Nitinol, an alloy of nickel and titanium
- Two lengths available
- Attaches to RIA tube assemblies

351.050	Tissue Protector	
351.717	Depth Gauge for Medullary Nails	001 001 001 001 001 001 001 001 001 001
351.719	Elongation Tube for Reaming Rods,	

for Depth Gauge for Medullary Nails, for Nos. 351.717 and 03.019.001

393.100 Universal Chuck with T-Handle



352.032\* SynReam Reaming Rod  $\varnothing$  2.5 mm, short, length 950 mm

\*Available non-sterile or sterile packed. Add "S" to the catalogue number to order sterile products.

# Product Information OPTIONAL INSTRUMENTS

Opening Inst	ruments	
351.020	Reverse Awl, small	
03.010.040	Awl Ø 12.0 mm, cannulated	
03.010.115	Guide Wire Ø 3.2 mm, 290 mm	
03.010.036	Drill Bit Ø 12.0 mm, cannulated, length 190 mm, 3-flute, for Quick Coupling for DHS/DCS	
351.240	Cutter for UTN/CTN and Universal Medullary Nail, $\varnothing$ 11.0 mm, length 350 mm	

#### **Other Accessory Instruments**

351.782

Holding Forceps for SynReam Reaming Rod  $\varnothing$  2.5 mm



03.010.093

Rod Pusher for Reaming Rod with Hexagonal Screwdriver  $\varnothing$  8.0 mm







# Product Information CLEANING INSTRUMENTS

Cleaning In	struments	
352.041	Cleaning Brush $\varnothing$ 3.6 mm, length 600 mm, for flexible shafts	
351.800	Air Jet, for Cleaning the Instruments with Compressed Air	
351.810	Air Tube $\varnothing$ 2.0 mm, for No. 351.800	

## RIA-INSTRUMENTS SET (105.309)

Instruments	
314.742	RIA Drive Shaft, length 360 mm
314.743	RIA Drive Shaft, length 520 mm
351.050	Tissue Protector
351.717	Depth Gauge for Medullary Nails
351.719	Elongation Tube for Reaming Rods, for Depth Gauge for Medullary Nails, for Nos. 351.717 and 03.019.001
393.100	Universal Chuck with T-Handle



690.308	Graphic Case for RIA Instrument Set,
	without Contents

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