TORNIER

AEQUALIS ASCEND™ FLEX

Convertible Shoulder System

SURGICAL TECHNIQUE

WRIGHT
FOCUSED EXCELLENCE

Tornier Upper Extremities

Contents

Contents

Intended Use

chapter 1

Description

The AEQUALIS ASCEND™ Flex Shoulder System is intended for use as:

» A replacement of shoulder joints in primary anatomic or primary reverse arthroplasty.

» A replacement of other shoulder joint devices in case of revisions, if sufficient bone stock remains.

The AEQUALIS ASCEND™ Flex Shoulder System also allows for conversions from anatomic to reverse shoulder prosthesis in case of revision.

The AEQUALIS™ Pyrocarbon Humeral Head associated with the AEQUALIS ASCEND™ Flex stem is intended to be used to partially replace the shoulder joint in primary treatment or during revision.

Indications for Use

IN ANATOMIC

The stem and head may be used by themselves, as a hemiarthroplasty, if the natural glenoid provides a sufficient bearing surface, or in conjunction with the glenoid, as a total joint replacement.

The AEQUALIS ASCEND™ Flex Shoulder System is to be used only in patients with an intact or reconstructable rotator cuff, where it is intended to provide increased mobility and stability and to relieve pain.
The AEQUALIS ASCEND™ Flex Shoulder System is indicated for use as a replacement of shoulder joints disabled by:

» Rheumatoid arthritis with pain.

» Non-inflammatory degenerative joint disease (i.e. osteoarthritis and avascular necrosis).

» Correction of functional deformity.

» Fractures of the humeral head.

» Traumatic arthritis.

» Revision of other devices if sufficient bone stock remains.

WITH PYROCARBON HEAD

The AEQUALIS™ Pyrocarbon Humeral Head shoulder prosthesis combined with the AEQUALIS ASCEND™ Flex stem are to be used only in patients with an intact or reconstructable rotator cuffs and if the native glenoid surface is intact or sufficient, where they are intended to increase mobility, stability, and relieve pain.

The AEQUALIS™ Pyrocarbon Humeral Head associated with the AEQUALIS ASCEND™ Flex stem is indicated for use as a replacement of deficient humeral head joints disabled by:

» Rheumatoid arthritis with pain,

» Non-inflammatory degenerative joint diseases (osteoarthritis, avascular necrosis)

» Correction of functional deformity

» Fractures of the humeral head,

» Post-traumatic osteoarthritis,

» Revision of other implants if bone stock is sufficient.

IN REVERSED

The reversed adapter is indicated for use as components of the AEQUALIS ASCEND™ Flex Shoulder System total shoulder replacement and for transformation of the AEQUALIS ASCEND™ Flex Shoulder System into reverse shoulder prosthesis without the removal of the humeral stem during revision surgery for patients with a functional deltoid muscle.
The components are permitted to be used in the transformation from anatomic to reverse if the humeral stem is well fixed, the patient has a functional deltoid muscle; the arthropathy is associated with a massive and non-repairable rotator cuff-tear.

The AEQUALIS ASCEND™ Flex Shoulder System is indicated for use as a replacement of shoulder joints for patients with a functional deltoid muscle and with massive and non-repairable rotator cuff-tear with pain disabled by:

» Rheumatoid arthritis.

» Non-inflammatory degenerative joint disease (i.e. osteoarthritis and avascular necrosis).

» Correction of functional deformity.

» Fractures of the humeral head.

» Traumatic arthritis.

» Revision of the devices if sufficient bone stock remains.

Notes: *All components are single use. The coated humeral stem is intended for cemented or cementless use. The non-coated humeral stem is intended for cemented use only. The all-poly glenoid components are intended for cemented use only. The glenoid sphere implant is anchored to the bone with screws and is intended for non-cemented fixation. Titanium humeral heads are intended for patients with suspected cobalt alloy material sensitivity. The wear properties of Titanium and Titanium alloys are inferior to that of cobalt alloy. A Titanium humeral head is not recommended for patients who lack a suspected material sensitivity to cobalt alloy.*

Contraindications for Use

IN ANATOMIC

Absolute contraindications for shoulder arthroplasty:

» Active local or systemic infection, sepsis and osteomyelitis.

» Inadequate bone stock in the proximal humerus or glenoid fossa for supporting the components.

» Poor bone quality, where there could be considerable migration of the prosthesis and/or a chance of fracture of the humerus or glenoid.

Relative contraindications for shoulder arthroplasty:

» Uncooperative patient or patient with neurologic disorders who are not capable of following directions.

» Osteoporosis.

» Metabolic disorders which may impair bone formation.

» Osteomalacia.

» Distant foci or infections which may spread to the implant site.

» Rapid joint destruction, marked bone loss or bone resorption apparent on roentgenogram.

WITH PYROCARBON HEAD

Absolute contraindications with shoulder arthroplasty:

» Active local or systemic infection, sepsis, or osteomyelitis.

» Insufficient bone stock to support implants in the humeral epiphysis.

» Insufficient bone stock or excessive deformation of the native glenoid to allow normal functioning of the glenohumeral joint.

» Poor bone quality leading to the risk of considerable migration of the prosthesis and/or to the risk of the fracture of the humerus or glenoid.

Relative contraindications related to shoulder arthroplasty:

» Patient not cooperative or patient suffering from neurological disorders and unable to follow the recommendations of the healthcare professional.

» Metabolism disorders that could compromise bone formation.

» Osteomalacia.

» Distant foci of infections that could spread to the site of the implant.

» Rapid destruction of the joint, marked bone loss, or bone resorption apparent on the X-ray.

» Known allergy or suspected allergy to the materials.

» Pregnant women.

IN REVERSED

Absolute contraindications for shoulder arthroplasty:

» Poor quality and insufficient quantity of glenoid bone stock.

» Pre or per-operative glenoid fracture.

» Acromion fracture.

» Non-functional deltoid or external rotator muscles.

» Active local or systemic infection, sepsis and osteomyelitis.

» Elevation of sedimentation rate unexplained by other disease, elevation of WBC count, or marked shift in WBC differential count.

» Use of this implant is contraindicated in the presence of significant injury to the upper brachial plexus.

» Paralysis of the axillary nerve.

» Neuromuscular disease (e.g. joint neuropathy).

Relative contraindications for shoulder arthroplasty:

» Uncooperative patient or patient with neurologic disorders who are not capable of following directions.

» Osteoporosis.

» Metabolic disorders which may impair bone formation.

» Osteomalacia.

» Distant foci of infections which may spread to the implant site.

» Rapid joint destruction, marked bone loss or bone resorption apparent on roentgenogram.

Relative contraindications for reverse adapter during transformation from Anatomic to Reversed shoulder prosthesis:

Stability of the reversed adapter relies on secure fixation to a stable diaphysis. If this is compromised by poor diaphyseal fixation to the humerus, insufficient access or cleanliness to fully seat the reverse adapter on the humeral taper, or damage to the humeral taper, the entire stem must be removed and replaced with a new, externally assembled, AEQUALIS ASCEND™ Flex shoulder prosthesis in reversed configuration.

Surgical Technique

chapter 2

Pre-Operative Planning

Pre-operative planning is performed utilizing x-ray templates on the frontal and sagittal views.

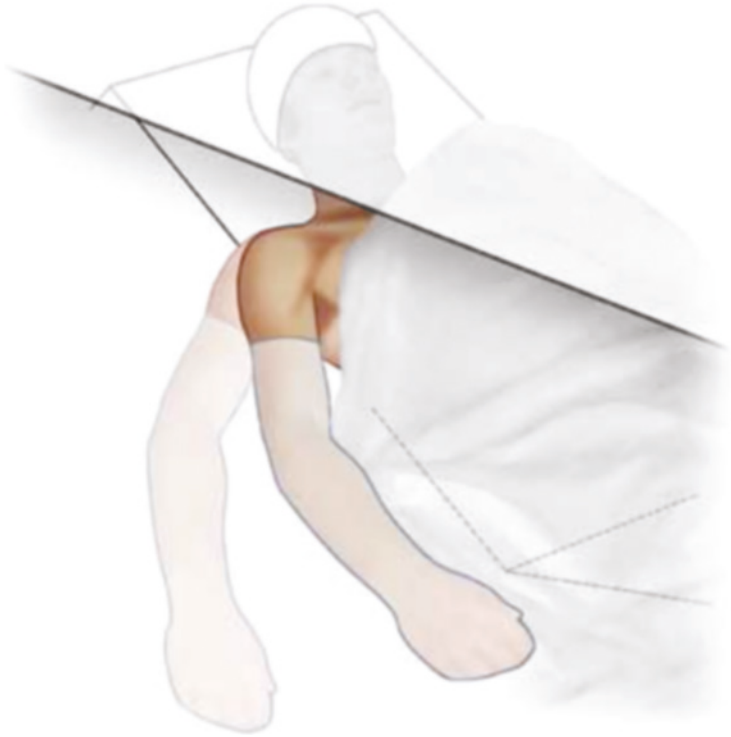
Appropriate implant size and positioning is determined.

The use of a CT scan or MRI is recommended to better determine the orientation of the glenoid, the quality of glenoid bone stock and to confirm the integrity of the rotator cuff.

X-rays are also used to determine the length of the humeral stem.

Patient Positioning

Position the patient in a beach chair position with the operative arm draped free. For optimal access, the patient should be positioned near the edge of the operating table such that the shoulder can be fully extended. A bump can be placed under the operative shoulder to stabilize the scapula.



Anatomic Humeral Exposure

Humeral Exposure – Delto-Pectoral Approach

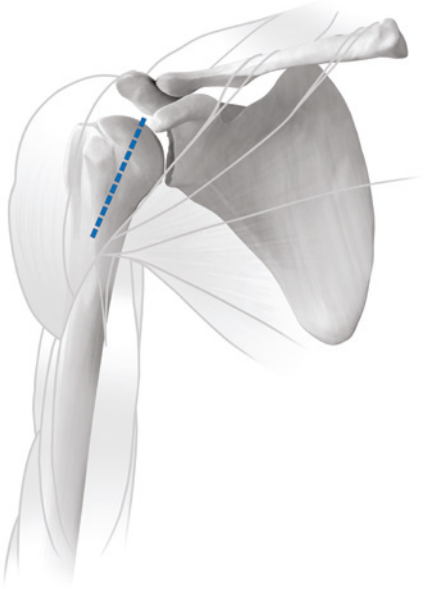
An incision is made from the tip of the coracoid along the delto-pectoral groove, slightly lateral to the axillary fold.

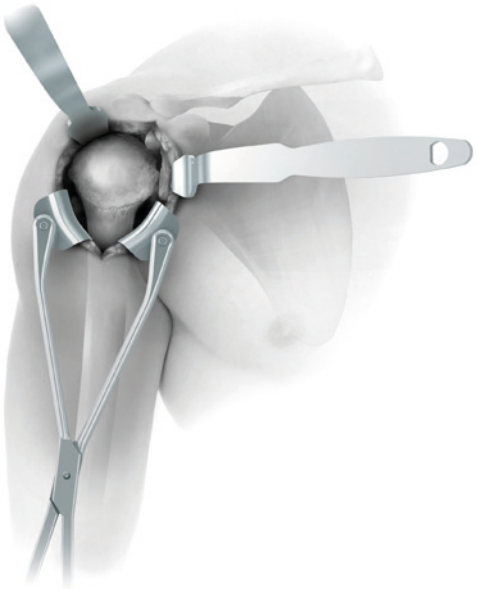
The pectoralis major is identified. The deltoid and cephalic veins are retracted laterally to open the deltopectoral groove. The coracoid process is identified. A Hohmann retractor is positioned behind the coracoid. Care should be taken to preserve the origin and insertion of the deltoid.

The clavi-pectoral fascia is incised at the external border of the coraco-brachialis. The axillary nerve is then identified before opening the subscapularis. As the arm is externally rotated, the anterior and inferior capsule is released from the humerus to the glenoid.

With adequate releases, the humeral head is then dislocated into the delto-pectoral interval by abduction of the arm and progressive external rotation and extension.

In cases of severe restriction of external rotation (0° or less), it is recommended to release more of the upper pectoralis insertion.





Reversed Humeral Exposure

Delto-Pectoral Approach

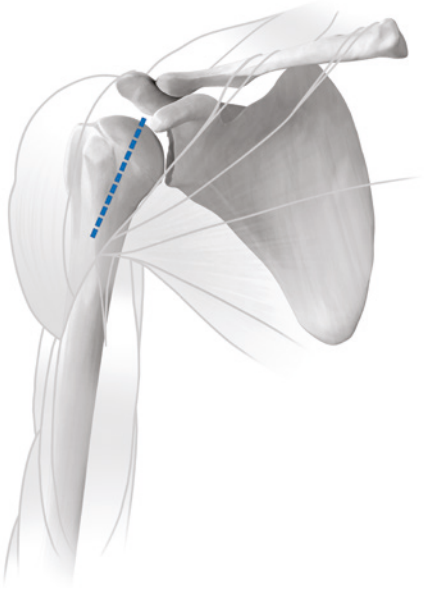
An incision is made from the tip of the coracoid along the delto-pectoral roove, slightly lateral to the axillary fold.

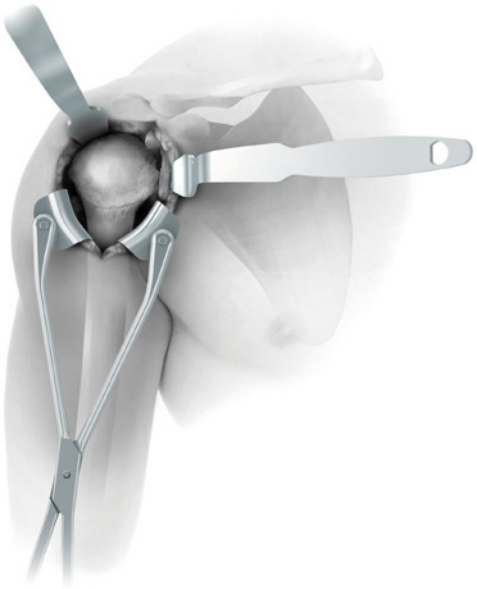
The pectoralis major is identified. The deltoid and cephalic veins are retracted laterally to open the deltopectoral groove. The coracoid process is identified. A Hohmann retractor is positioned behind the coracoid. Care should be taken to preserve the origin and insertion of the deltoid.

The clavi-pectoral fascia is incised at the external border of the coraco-brachialis. The axillary nerve is then identified before opening the subscapularis, if still present. As the arm is externally rotated, the anterior and inferior capsule is released from the humerus to the glenoid.

With adequate releases, the humeral head is then dislocated into the delto-pectoral interval by abduction of the arm and progressive external rotation and extension.

In cases of severe restriction of external rotation (0° or less), it is recommended to release more of the upper pectoralis insertion.





Supero-Lateral Approach

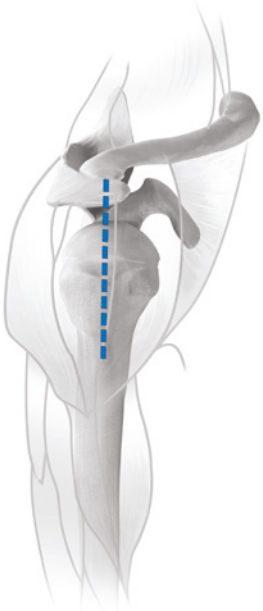
The incision is made from the acromioclavicular joint along the anterior border of the acromion and downward approximately 4 cm.

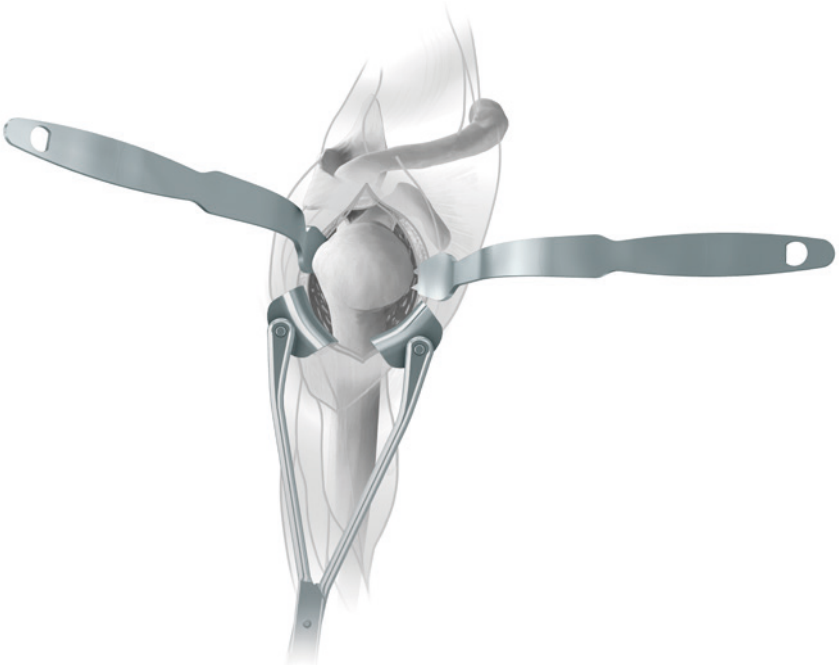
The deltoid is split in line with its fibers. Extra care should be taken to avoid any damage to the axillary nerve, which is located approximately 4 cm distal to the acromion.

The anterior part of the deltoid and the coracoacromial ligament are then carefully detached from their acromial insertion up to the acromioclavicular joint.

The humeral head will then become visible at the anterior border of the acromion. Next, the subscapularis bursa is released and the humeral head dislocated by placing the arm in flexion and external rotation.

To optimize the exposure, the anterior border and the remaining superior cuff can be resected. In some cases, the remaining subscapularis tendon may be resected.





Humeral Head Preparation

With the humeral head dislocated, remove all osteophytes. This is done with Rongeur or a curved osteotome, using a superiorly directed motion, to identify the exact capsular insertion at the anatomic neck.

Humeral Head Resection

The humeral head resection for a reversed prosthesis is made at a fixed inclination of 132.5° degrees, while the resection for an anatomic prosthesis is made at the level of the anatomic neck.

Two cutting guides are available to assist in the humeral head resection:

» One for the Anatomic resection

» One for the Reversed resection

Anatomic Resection

The anatomic head resection may be made free hand or with the assistance of a cutting guide.

Free Hand Resection

To facilitate the resection, the cutting plane can be defined by:

» Marking the superior/lateral point (12 o'clock position), inferior/medial point (6 o'clock position) and the most anterior point (3 o'clock for a left shoulder and 9 o'clock for a right shoulder).

» Connecting these three points with a surgical pen or bovie will help identify the anatomic humeral neck prior to resection.

Guided Resection

To utilize the guided resection, begin by placing the appropriately sized Cut Ring over the humerus. It is important that the Cut Ring be able to pass over the humerus without impingement. The top flat portion of the Cut Ring can then be aligned with the anatomic neck of the humerus.

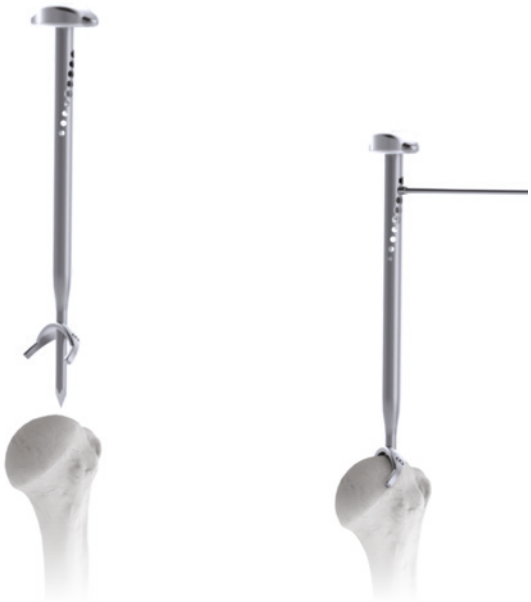
With the Cut Ring appropriately positioned, place the two 3 x 75 mm Guide Pins through the Cut Ring and into the humerus to secure the construct. It is recommended to place the lateral Pin first as it will act as a hinge and can facilitate more precise medial alignment of the Cut Ring.

With the Cut Ring aligned at the anatomic neck, place the Oscillating Saw along the top flat portion of the Cut Ring and complete the head resection.

Reversed Resection

The tip of the Reversed Cutting Guide is inserted inline with the humeral shaft at the hinge point of the humeral head and should be centered in the anterior/posterior plane. Advance the Guide until the ring sits flush on the humerus.

To define the version of the resection, a Version Rod can be positioned into the desired version hole along the axis of the Cut Guide. The Guide is then rotated until the Version Rod is aligned with the patient's forearm. With the Guide aligned, the head is then resected at a 132.5 (B) degree inclination with an Oscillating Saw below the ring of the Cut Guide. The resection should be made at or slightly below the level of the anatomic neck. Consider a deeper resection in the case of static superior subluxation.



Pilot Hole

Using the Starter Awl, create a pilot hole in-line with the humeral canal at the hinge point of the resection.

The Starter Awl should be advanced until the large fluted diameter is just below the level of the resection, thus, providing a pilot hole for the first Sounder.

Distal Preparation

Sizing the Medullary Canal

Next, the Sounders (Size: 1-2, 3-4, 5-6, 7-8) are utilized to determine the upper size limit of the distal humerus. The Sounders have been designed to compact bone which creates a dense bony bed for the final implant.

Each Sounder is color coded to correspond with instrumentation to be utilized in subsequent steps. Version holes have been incorporated into the proximal shaft of each Sounder and can be used to ensure the Sounders are utilized at the version established during the resection.

To begin sounding, insert the Sounders through the pilot hole starting with the Size 1-2 and progressively increasing until contact is made with the cortical wall of the canal. It is important to orient the Sounders so the oblong flats of the Sounder align with the plane of the resection. These flats align the flutes of the sounders to the anatomic distal implant geometry, serve as a depth stop indicator and identify the threshold for sizing.

When the Sounder reaches the cortical wall and fits securely, stop and read the number closest to the resection. This number will indicate the largest size stem that can safely be implanted.

In certain anatomy, humeral mismatch may exist between the metaphysis and diaphysis. As such, the final implant size should be determined by the Compacting step and subsequent proximal press-fit with the Sounder setting the upper limit on the size Stem that should be used. In other words, the final Stem size need not match the size of the last Sounder used and should never be larger than the last Sounder used.

If the Sounder seats in between sizes, select the lower of the two numbers. It is important to leave the Sounder in place at this time.

As an alternative to utilizing the proximal version guides, two holes have been provided on the side of each Sounder at the level of the depth stops. The smooth end of the Version Rod can be placed through either of the two holes to act as a depth stop. The rod can also be useful in providing a visual reference to ensure that the Sounders are placed in the same version as the resection.

CAUTION: The Sounders are not intended to cut cortical bone. As a result, a reaming motion should not be used when cortical contact is made.

CAUTION: Do not impact the Sounder.

Proximal Preparation

Metaphyseal Punch

Two options are available to guide the Punches which have been designed to score the proximal metaphyseal cancellous bone.

Option 1: Guided Punching (Delto-Pectoral)

With the final Sounder in place, select the corresponding Punch Template. As verification, check to ensure the color of the Punch Template matches that of the Sounder.

Attach the Punch Template to the Sounder via the axial slots and slide it down the Sounder until the Template rests flat on the resection. Place the corresponding Punch into the Template and impact the Punch until it bottoms out on the Template.

The scored bone must be removed by pulling the Sounder, Punch and Punch Template vertically out of the proximal humerus.

Option 2: Axially Punching (Supero-Lateral Approach)

With the final Sounder in place, select the corresponding Punch. As verification, check to ensure the color of the Punch matches that of the Sounder.

Attach the Punch to the Sounder via the axial slots and slide it down the Sounder until the tip of the Punch rests on the resection. Impact the Punch to score the metaphysis taking care not to violate the medial cortex. Stop when the etch line on the top of the Punch that corresponds with the size determined by the Sounder aligns with the top surface of the Sounder Handle.

Once the cancellous bone has been scored, remove the Sounder and Punch. Remove the scored bone with an Osteotome or Rongeur.

Metaphyseal Compaction

Compactor Overview

The AEQUALIS ASCEND™ Flex Shoulder System offers both short and long Stems and therefore offers both short and long Compactors.

Short Stems are offered in three anatomic angles (A-127.5º, B-132.5º, C-137.5º) and are intended to be utilized as both an anatomic and reversed implant. When utilized in the reversed configuration, select the "B" or 132.5º angle. Additional instruction on converting an anatomic implant to a reversed implant will be provided later in this surgical technique.

Long Stems are offered only in "B" or 132.5º angle and are intended to be utilized as a reversed or revision implant.

Short and long Compactors have been designed with a proximal body that pivots about the mid-point allowing a single Compactor to adjust to all three Stem angles, streamlining the preparation process. The proximal body is locked into position via a set screw at the bottom of the taper that is manipulated with the 2.5 mm Locking Inclination Driver.

Assembling the Compactor

Anatomic Implant

When preparing for an anatomic implant, it is recommended to loosen the proximal body of the Compactor so that it pivots freely prior to impaction. This is a necessary step in determining the angle of the final implant.

Reversed Implant

When preparing for a reversed implant, it is recommended to lock the proximal body of the Compactor at the "B" or 132.5 degree angle prior to impaction. This angle can be read off the back of the Compactor.

To begin the compacting process, select the Inserter Handle and slide the Depth Stop onto the handle via the vertical slots located near the bottom of the handle. The Depth Stop has a positive locking feature that will automatically "click" and lock into the handle as it rides down the slots.

The Inserter Handle has optional version holes designed to accept the Version Rod to assist in orienting the Compactors to the previously determined version. If utilized, be sure the Version Rod is placed on the side of the Inserter Handle that corresponds with the operative side of the patient (Left or Right). It is recommended to remove the Version Rod prior to extraction.

When possible, select the Compactor three sizes below the final Sounder reading and compact sequentially until satisfactory fixation is achieved.

Note: *That in certain anatomy satisfactory fixation may be achieved prior to reaching the size indicated by the Sounder. Satisfactory fixation can be assessed by a slight torque motion of the Inserter Handle. The Compactor should not move within the humerus during this test.*

To assemble the Compactor to the Inserter Handle, ensure the handle of the Inserter Handle is in the fully unlocked position and place the clamp feet of the Inserter Handle into the medial and lateral slots on the Compactor. Next, squeeze and lock the handle to secure the assembly.

Compacting

Place the tip of the Compactor into the pilot hole created by the Sounders and orient the assembly so the bottom of the Depth Stop is parallel to the resection plane. This will ensure the version created with the resection is maintained during the compacting step. Alternatively, the optional Version Rod described above could be utilized in reference to the forearm to orient the Compactor to the desired version.

Advance the Compactor until the Depth Stop rests flush on the resected surface of the humerus. Continue with progressive compaction until the satisfactory fit described above is achieved.

Note: *Metaphyseal Compaction for Cemented Stems When implanting a cemented stem, please note that the Stems are undersized as compared to the Compactors resulting in a 0.7 mm average cement mantle.*

Locking the Compactor Inclination

If preparing for a reversed implant, loosen the handle of the Inserter Handle and leave the Compactor inside the humerus as the trial implant. It may be advisable to re-tighten the set screw prior to removing the handle.

If preparing for an anatomic implant, ensure the Depth Stop is flush on the resected humerus and the Inserter Handle ceases to toggle. Then pass the 2.5 mm Locking Inclination Driver through the hole in the distal end of the Inserter Handle and lock the inclination angle via the set screw in the bottom of the Compactor taper. The angle will be read off the back of the proximal body in a subsequent step after the Compactor is removed.
Once the angle is locked into place, loosen the handle of the Inserter Handle and leave the Compactor inside the humerus as the trial implant.

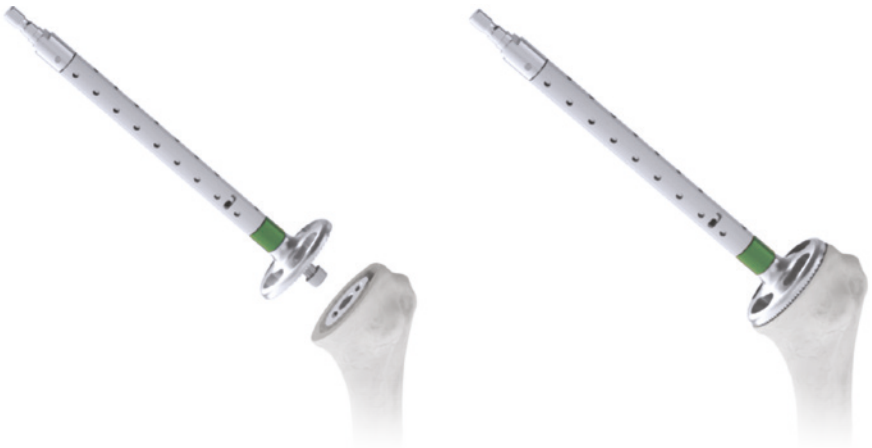
Note: *It is important not to use a Compactor larger than the size measured by the Sounder to avoid risk of humeral fracture.*

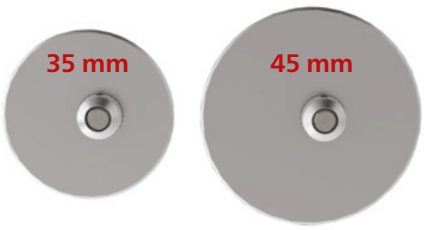
Planning the Resection

If the position, fixation and taper of the Stem are acceptable, select the Surface Planer and place the plastic tip of the Surface Planer into the taper of the Stem.

To plane, engage the power prior to advancing the cutting teeth to the resection. Take care to ensure the Surface Planer is aligned with the taper of the Stem and not pushed off axis. Slowly advance the Surface Planer axially into the taper until it reaches the built-in stop, taking care not to rock or wobble the Surface Planer.

Utilizing the Surface Planer will ensure adequate clearance for the Reversed Tray that will be placed onto the Stem in subsequent steps.





Protecting the Resection

Cut Protectors are provided to protect the resection from retractors while preparing the glenoid and are offered in two diameters (35 and 45 mm). The Cut Protectors have been designed to include a retention feature and an eccentric taper to allow for optimal coverage.

To place the Cut Protector, select a diameter slightly undersized to the resection. Next, push the tip of the 3.5 mm Retaining Driver into the screw located on the top of the Cut Protector. An audible "click" can be heard when the retention feature snaps into place.

The male taper of the Cut Protector can then be placed into the female taper of the Compactor. To dial the Cut Protector for optimal coverage, rotate the handle of the Driver without applying downward force onto the screw (pushing down on the screw will prevent the Driver from rotating the Cut Protector). Once the best coverage has been achieved, push the screw down into the taper and tighten to secure it in place.

To remove the Cut Protector, loosen the screw with the 3.5 mm Retaining Driver and lift the Cut Protector off the Compactor.

Anatomic Preparation

chapter 3

Overview of Subsequent Steps

To this point in the technique the surgical steps have been common for the anatomic and reversed preparation. However, the next section, which begins with trialing and concludes with final implantation and rehabilitation, are unique for the anatomic and reversed implants. The first section will cover the anatomic implant and the second section will cover the reversed implant.

Anatomic Preparation

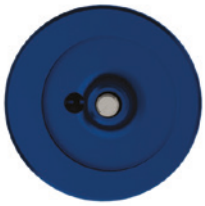
Trialing Humeral Head Components

The initial size of the Humeral Head Trial can be determined by placing the resected head onto the Humeral Head Sizer or by mimicking the resected head (except in the case of severe deformity). This is accomplished by placing the resected head against a Trial Head and determining which diameter and thickness most closely represents the resected head.

Note: *In the case of severe deformity of the native humeral head, pre-operative radiographic templating may be utilized to determine the optimally sized humeral implant.*

The AEQUALIS ASCEND™ Flex Shoulder System offers both Low and High Offset Humeral Head Trials. To determine which offset to begin with, evaluate the position of the Compactor relative to the center of the resection.

Low Offset



High Offset

A Compactor located centrally within the resection will most likely require a Low Offset Humeral Head Trial where as a Compactor further from the center will most likely require a High Offset Humeral Head Trial.

Select the Humeral Head Trial of the determined resection diameter, height and offset. Then, insert the tips of the Trial Clamp into the holes located on the sides of the Trial.

Place the male taper of the Humeral Head Trial into the female taper of the Compactor. Utilizing the Trial Clamp, rotate the Trial until the best coverage is achieved or until it is determined that a different size or offset is necessary.

Once the size, offset and rotation are established, insert the 3.5 mm Retaining Driver into the screw of the Humeral Head Trial and advance the screw to lock the Trial securely into position.

Trial Reduction

Reduce the Humeral Head Trial into the glenoid.

After the shoulder joint is reduced, posterior force on the Humeral Head should allow for subluxation of 50% of the width of the joint.

If less than 50% subluxation is possible, remove the Humeral Head Trial and replace it with the next smaller Humeral Head Trial. If direct posterior force dislocates the Humeral Head Trial, remove the Trial and replace it with the next largest Humeral Head Trial.

Mobility Testing

The arm is abducted to 90 degrees and internally rotated. 60 degrees of internal rotation should be obtained.

If less than 60 degrees of internal rotation is demonstrated, further capsular release off the inferior humeral neck and glenoid may be necessary for optimal function.

Removing the Trial Construct

Once the Humeral Head size, offset and rotation have been confirmed, dislocate the shoulder and remove the Trial construct. It is important to leave the Trial construct assembled and remove it as one piece as this will provide information necessary for assembling the final implant.

To remove the Trial construct, thread the tip of the Trial Slaphammer (with handle all the way at the bottom to stabilize the tip) into the threads located on the top of the Humeral Head Trial. It is important to not over-tighten the threads.

Next, slide the handle of the Trial Slaphammer away from the Humeral Head Trial. This will free the pivoting joint allowing the handle to move in any direction. Orient the handle in a superior position and with incremental backslaps, remove the Trial construct.

After removing the Trial construct, unthread the Trial Slaphammer and note the angle indicator (A, B, C angle) located on the proximal, lateral aspect of the Compactor. This will determine which angle should be selected for the final stem.

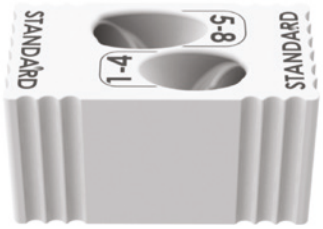
To determine the rotation of the Humeral Head, orient the Trial construct so the bottom of the Humeral Head Trial is visible. A clock-like face with numbers ranging from 1-12 is marked on the bottom of the Humeral Head Trial. Take note of the number that falls closest to the lateral most edge of the Compactor. This number will determine the position of the final Humeral Head as it relates to the notch on the lateral edge of the final Stem.

Final Implantation — CrCo OR Ti6A14V Head

Note: *The surgeon should inspect the implant tapers and articular surfaces for debris or blemishes before assembly. The tapers should be clean and dry for assembly. The humeral head should be assembled to the definitive stem with clean gloves.*

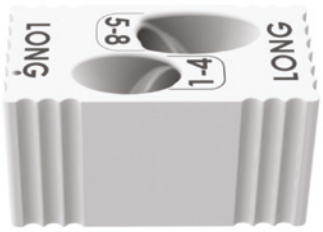
The final implant can be assembled on the back table or in-vivo.

Back Table Assembly



Place the chosen definitive Humeral Stem (respecting the size and angle measured on the Compactor) into the appropriate slot of the Impaction Stand.

The Standard Stem slots are located on one side of the Impaction Block and the Long Stem slots are located directly opposite the Standard Stem slots. Each side of the Impaction Block is then divided into two sections depending on size (1-4, 5-8).



With the definitive Stem in hand, orient the selected size Humeral Head to the previously determined rotation and apply pressure to temporarily hold the Humeral Head in this position. Next, place the Implant Assembly into the appropriate slot of the Impaction Block. Using the Impactor Handle with the Head/Tray Impactor Tip, seat the taper.

AEQUALIS ASCEND™ Flex PTC Stem

To implant an AEQUALIS ASCEND™ Flex PTC Stem, insert the Assembly into the prepared humerus while maintaining the established retroversion. Impact the Implant until the Humeral Head is flush with the cut and check implant instability.

AEQUALIS ASCEND™ Flex Cemented Stem

To implant an AEQUALIS ASCEND™ Flex Cemented Stem, irrigate and dry the humeral canal then insert a Cement Restrictor. Inject cement into the medullary canal using a standard cementing technique and insert the Implant Assembly until the Humeral Head is flush with the cut.

In-Vivo Assembly

Note: *It is not advisable to use the in-vivo technique in patients with poor bone quality.*

Attach the definitive Humeral Stem (respecting the size and angle measured on the Trial) to the Inserter Handle with the Depth Stop in place.

The Inserter Handle has optional version holes designed to accept the Version Rod to assist in orienting the definitive Stem to the previously determined version. If utilized, be sure the Version Rod is placed on the side of the Inserter Handle that corresponds with the operative side of the patient (Left or Right).

AEQUALIS ASCEND™ Flex PTC Stem

To implant a PTC Press-fit Stem, insert the Stem into the prepared humerus taking care to maintain the version of the resection. Impact the Stem until the Depth Stop is a few millimeters above the resection.

Remove the Inserter Handle and orient the selected size Humeral Head to obtain the best coverage. Seat the taper using the Impactor Handle with the Head/Tray Impactor Tip and continue to impact until the Humeral Head is flush with the cut and check implant stability.

AEQUALIS ASCEND™ Flex Cemented Stem

To implant an AEQUALIS ASCEND™ Flex Cemented Stem, irrigate and dry the humeral canal then insert a Cement Restrictor. Inject cement into the medullary canal using a standard cementing technique and insert the Stem into the humeral canal. Advance the stem until the Depth Stop is flush against the resection taking care not to countersink the implant.

Remove the Inserter Handle and any excess cement and wait for the cement to harden. Clean and dry the Stem taper. Orient the selected size Humeral Head to obtain the best coverage. Seat the taper using the Impactor Handle with the Head/Tray Impactor Tip and check implant stability.

Note:*The final PTC Stem, including the coating, is diametrically 2 mm larger than the Compactor. In most cases this provides for a firm press-fit without the need for cement. The final Cemented Stem is on average diametrically 1.4 mm smaller than the Compactor. The decision to use cement or a press-fit technique is based upon individual surgeon preference.*

Final Implantation — Pyrocarbon Head

Note: *To avoid repeated impactions onto the AEQUALIS™ Pyrocarbon Humeral Head, the definitive uncemented stem is impacted first into the humerus. In a second phase, the AEQUALIS™ Pyrocarbon Humeral Head will be impacted onto the stem.*

CAUTION: The handling of the AEQUALIS™ Pyrocarbon Humeral Head implant with metal forceps is not recommended.

The chosen definitive Humeral Stem Implant (respecting the diameter and angle measured on the trial) is fixed onto the trial Inserter.

Insert the stem into the prepared humerus while maintaining the established retroversion. Then impact the stem until it is flush with the humerus cut.

Once the final stem is in place, the Manual Planer can be used to ensure the stem is perfectly flush to the bone.

Assemble the T-Handle from the AEQUALIS ASCEND™ Flex instrumentation with the correct AEQUALIS™ Pyrocarbon Humeral Head Manual Planer Reamer. Place the Reamer Tip (blue part) into the taper of the Stem.

The Manual Planer is asymmetric. In order to protect the trans-osseous sutures for subscapularis reinsertion, the Manual Planer is used backwards and forwards.

Note: *The surgeon should inspect the implant tapers and articular surfaces for debris or blemishes before assembly. The tapers should be clean and dry for assembly. The humeral head should be assembled to the definitive stem with clean gloves.*

Orient the selected size AEQUALIS™ Pyrocarbon Humeral Head onto the stem with the previously determined rotation. Adjust the Head rotation until the best coverage is achieved. Apply pressure to temporarily hold the Humeral Head in this position.

Note: *Never impact the AEQUALIS™ Pyrocarbon Humeral head using the AEQUALIS ASCEND™ Flex Impactor.*

Humeral Stem Size	Manual Planer
12/3	Small
4/5/6	Medium
7/8/9	Large

Use the specific Pyrocarbon Head Impactor in order to impact the Pyrocarbon Head onto the stem.

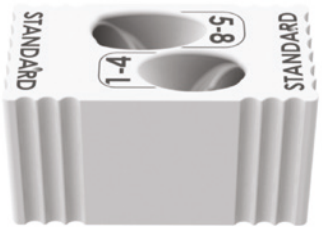
Choose the correct silicon tip that corresponds to the Pyrocarbon Head size.

Choose the Impactor Tip Support that corresponds to the chosen silicon tip.

Take the Spring Impactor. Screw the Impactor Tip Support on its extremity and place the silicon tip inside.

Note: *Make sure the specific AEQUALIS™ Pyrocarbon Humeral Head Impactor is perfectly centered and fully in contact with the Pyrocarbon Head before impaction.*

The Spring Impactor is made of a spring that is activated thanks to the handle. It provides a precise amount of energy thus helps controlling the amount of energy that is delivered for impaction. It is necessary to activate and release the Spring Impactor 3 times to achieve the perfect AEQUALIS™ Pyrocarbon Humeral Head impaction onto the stem.



Cemented Stem

Final implants can be assembled on the back table using the specific Impactor mounted with the silicon tip that corresponds to the AEQUALIS™ Pyrocarbon Humeral Head size.

Note: *Do not impact the AEQUALIS™ Pyrocarbon Humeral head onto the stem with the AEQUALIS ASCEND™ Flex Impactor. Make sure the Pyrocarbon Head Impactor is perfectly centered and fully in contact with the Pyrocarbon Head before impaction.*

The full implant is introduced manually into the humeral diaphysis with no impaction.

Refer to AEQUALIS ASCEND™ Flex Surgical Technique "Back Table Assembly" on page 27 for more details.

Testing & Closure

Test the Pyrocarbon Head assembly onto the stem by pulling the head back.

If the Pyrocarbon Head is not correctly impacted, clean head & stem tapers and repeat impaction steps.

After the joint has been washed and the prosthesis reduced, the stability and mobility of the shoulder are tested.

The joint is closed by reinsertion of the subscapularis to the coraco-humeral ligament, and to the subscapular remnant, allowing slight slipping of the subscapularis upwards.
The wound is closed in planes over an aspiration drain.

Post-operatively the arm is immobilized in a simple sling.

Rehabilitation

Rehabilitation is essential and is responsible for at least 50% of the final result. Rehabilitation begins on the evening of surgery by removing the sling and actively moving fingers, wrist and elbow. If the patient desires, his/her arm may be left along the length of his/her body, putting no tension on the suture line.

The following day, the patient begins active exercises of the fingers, wrist and elbow, assisted by a physiotherapist, 5 to 6 times daily, each for a few minutes duration. The patient is allowed to get out of bed with his/her arm in a sling. Once the drain is removed after 48 hours, the patient is encouraged to carry out brief pendular exercises throughout the day.

The fundamental principle which guides rehabilitation, either in the operative center or as an outpatient, is maximal recovery of passive joint movement prior to any active motion.

Passive elevation is begun by simple pendular movements followed rapidly by selfmobilization with the patient in the dorsal decubitus position, with elbow extended. This is helped by exhaling through the mouth, which adds a few degrees movement with each inspiration. It is preferable to perform a single smooth motion rather than repeated jerking movements. External rotation is performed using a stick, with the elbow against the body. Internal rotation is performed with the arm behind the back, helped by the other hand wherever possible.

Rehabilitation sessions should not be more than 5 minutes long and should be performed ideally hourly throughout the day. The time required for purely passive rehabilitation varies depending on preoperative passive mobility.

In the rare case that pre-operative mobility is present; the amplitude of movement generally recovers after 45 days and active movement may be possible. In this case a few minutes of active movement should be performed mornings and evenings exercising the joint in a swimming pool using arm movements for 10 to 15 minutes daily for 3 months.

If a patient was highly restricted preoperatively (forward elevation less than 90°), it should be understood that the total shoulder prosthesis is not a mobilizing procedure. It is unlikely the patient will recover passive elevation beyond 130° degrees. The patient should be asked to perform multiple daily passive stretching exercises and breast-stroke movement of his/her arms in a swimming pool throughout the first postoperative year, in order to obtain and maintain maximum mobility.

Note: *Desired rehabilitation protocols vary by surgeon. The surgeon, physical therapist and patient should play an active role in determining the appropriate recovery process.*

Reversed Preparation

chapter 4

Reversed Preparation

Trialing Reversed Components

Trialing the reversed component is critically important to ensure a successful clinical outcome.

The AEQUALIS ASCEND™ Flex Shoulder System Reversed Components are comprised of Reversed Trays that are placed onto the Humeral Stem and Reversed Inserts that "snap" into and line the Reversed Tray.

When assembled, these two components are collectively referred to as the Reversed Adapter.

Reversed Tray Overview

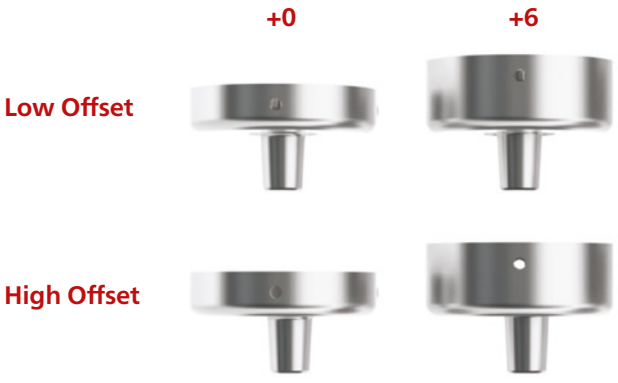
The Reversed Trays are offered in Low and High Offsets which creates meaningful flexibility in the operative setting including the following:

The Flexibility to limit medial overhang. Medial overhang has been demonstrated to reduce overall range of motion and increase the probability of both scapular and acromial impingement. (Internal data on file.)

The Flexibility to adjust the humeral center of rotation to be more lateral like the traditional Grammont design.

The Flexibility to facilitate reduction by decreasing tension when reducing the shoulder.

Each style of the Reversed Trays is offered in a +0, +6 thickness.



Reversed Insert Overview

Reversed Inserts are offered in A, B, and C angles to allow conversion from any stem angle to a 145°construct (A and C angles are special order only). The Reversed Inserts are offered in articular surfaces of 33mm, 36mm, 39mm and 42mm diameters and in +6 and +9 thicknesses.

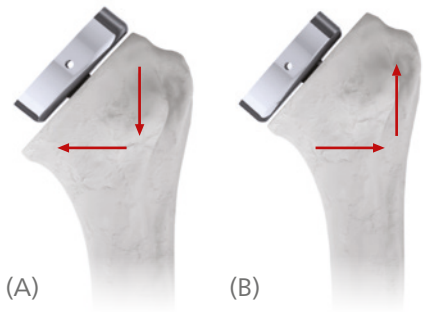
Anatomic to Reversed Conversion Chart

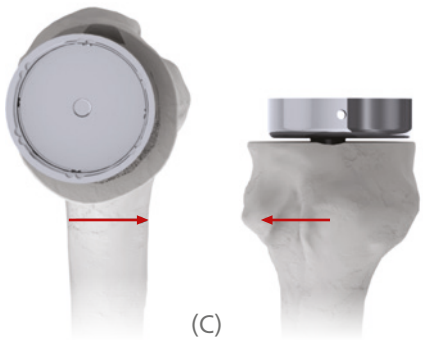
Anatomic Stem		Reversed Insert		Reversed Construct	
Angle	Inclination	Angle	Inclination	Angle	Inclination
A	127,5°	A	17,5°	A	145°
B	132,5°	B	12,5°	B	145°
C	137,5°	C	7,5°	C	145°

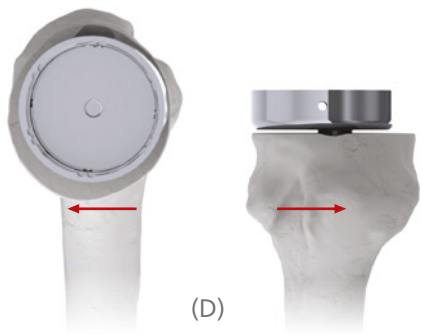
Note: *Additional "Special Request" Inserts are available for cases of instability or post-operative conversion from an anatomic construct into a reversed construct. These options and their use are described in detail later in this surgical technique.*

Understanding Humeral Movement with Offset Trays

		Reverse Tray Position	
		Medial	Lateral
Humerus Movement	Medial		X
	Lateral	X	
	Inferior		X
	Superior	X	







To determine which Reversed Tray will be utilized, it is necessary to first understand how the position of the Offset Trays influences the position of the humerus relative to the scapula.

The key point in understanding this relationship is to recognize that the Reversed Tray spins about the axis of the taper which is perpendicular to the resection. Therefore, in the A/P view, as the Tray is rotated the humerus will move in both the Superior/ Inferior and Medial/Lateral planes at the same time. In the Axillary view, the humerus will move in the Anterior/ Posterior plane.

As an example consider the following:

» Positioning an offset Reversed Tray directly Lateral on the resection will move the humerus Medial and Inferior (down and in) relative to the scapula. (A)

» Positioning an offset Reversed Tray directly Medial on the resection will move the humerus Lateral and Superior (up and out) relative to the scapula. (B)

» Positioning an offset Reversed Tray directly Posterior on the resection will move the humerus Anterior relative to the scapula. (C)

» Positioning an offset Reversed Tray directly Anterior on the resection will move the humerus Posterior relative to the scapula. (D)

As a simple rule of thumb, the humerus will move directly opposite the position of the offset Reversed Tray, as it relates to the scapula.

Selecting the Reversed Tray Offset

The selection of the Reversed Tray offset is highly dependent upon individual surgeon's preference, as each option has unique advantages. However, below are guidelines, based upon simulated use studies, laboratory experiences and review of the x-ray of the early clinical cohort which are worth consideration when selecting a Reversed Tray.

- Medial overhang of the Tray should be avoided as it reduces overall range of motion and increases the likelihood of both scapular and acromial impingement.
- Lateral overhang of the Tray should be avoided as it increases the likelihood of excessive humeral lengthening and therefore tension of the conjoined tendon.
- Excessive Posterior placement of the Tray should be avoided as it will move the humerus Anterior and may limit internal rotation due to conflict between the Lesser Tuberosity and the Conjoined Tendon.
- Central placement of the Tray within the resection reduces the least chance of impingement and may be beneficial to both internal and external rotation.
- It is important to place the stem such that the upper portion of its resection plan set below the greater tuberosity to avoid excessive humeral lengthening.

Once a Reverse Tray offset has been chosen, select the +0 Trial of that particular offset. Insert the tips of the Trial Clamp into the holes located on the sides of the Trial. The Trial can then be placed onto the Compactor and rotated to the desired location.

With the Trial angle B (12, 5°) placed in the desired location, insert the 3.5 mm Retaining Driver into the screw of the Reversed Tray Trial and advance the screw to lock the Trial into position.

Next, select the +6 Reversed Insert Trial angle B (12,5°) that corresponds to the Stem angle B (or 137, 5°) and matches with the diameter of the Glenoid Sphere. Orient the Insert Trial so the laser mark is positioned at the most Lateral position of the Humerus. As a check, the thinnest portion of the Insert Trial should be Lateral (Superior) and the thickest portion of the Insert Trial should be Medial (Inferior).

Trial Reduction

The Humeral Trial is then reduced into the joint to check deltoid tension, stability, range of motion and impingement. If needed the thickness of the Trial Implant can be adjusted to provide the optimal deltoid tension. The following table provides guidance on the possible Reversed Adapter combinations and their impact on thickness.

Reversed Adapter Thickness Combinations

Reversed Tray	Reversed Insert	Combined Thickness
+0	+6	+6
	+9	+9
+6	+6	+12
	+9	+15

Mobility Testing

Pull the arm away from the body after reduction to ensure that there is no pistoning effect. A complete separation of the Reversed Insert from the Glenoid Sphere indicates inadequate tensioning of the deltoid.

Abduction of the arm is performed to check that there is no impingement and that anterior elevation and abduction has been restored.

External rotation with the elbow at the side checks for mobility and risk of subluxation.

Internal rotation with the elbow at the side and in abduction (the forearm has to be parallel to the thorax) is performed.

Adduct the arm to check that there is no impingement between the pillar of the scapula and the Humeral Implant.

After reduction, the Conjoined Tendon should show sufficient muscular tension (similar to the deltoid).

Trial Adjustments

In case of impingement, remove the Insert Trial and adjust the position of the Reversed Tray to prevent impingement. This can be accomplished by simply changing the position of an Offset Tray or by switching from a Centered tray to an Offset Tray.

If the initial reduction is too loose, remove the +6 Reversed Insert Trial and replace it with a +9 Reversed Insert Trial. If additional thickness is required, remove the +9 Insert and +0 Tray and replace them with the +6 Tray and +6 Insert. Continue incrementally until the desired tension is obtained.

If muscles are over-tensioned, first try adjusting the position of the Tray. If this does not adequately reduce the tension, additional resection of the etaphysis may be required.

The dimensions of the final implants (Reversed Tray and Inserts) are determined based upon the combination that provides the best stability and range of motion.

Removing the Trial Construct

Once the Reversed Trial Components have been confirmed, dislocate the shoulder and remove the Trial construct.

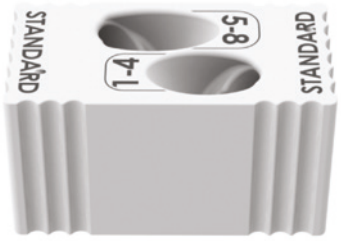
(It is important to leave the Trial construct assembled and remove it as one piece as this will provide information necessary for assembling the final implant).

To remove the Trial construct, thread the tip of the Trial Slaphammer (with handle all the way at the bottom to stabilize the tip) into the threads located in the screw head of the Reversed Tray Trial. It is important to not over tighten the threads.

Next, slide the handle of the Trial Slaphammer away from the Trial. This will free the pivoting joint allowing the handle to move in any direction. Orient the handle in a superior position and with incremental backslaps remove the Trial construct.

After removing the Trial construct, unthread the Trial Slaphammer. If an Offset Tray was utilized, determine the rotation by orienting the Trial construct so the bottom of the Reversed Tray Trial is visible.

A clock-like face with numbers ranging from 1-12 is marked on the bottom of the Tray. Take note of the number that falls closest to the lateral most edge of the Compactor. This number will determine the position of the final Reversed Tray as it relates to the notch on the lateral edge of the final Stem.



Final Implantation

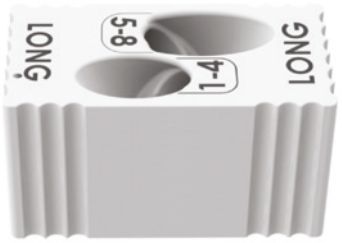
Note: *The surgeon should inspect the implant tapers and mating surfaces for debris or blemishes before assembly.*

The tapers should be clean and dry for assembly.

The Implants should be assembled with clean gloves.

The final implant can be assembled on the back table or in-vivo.

Back Table Assembly



Place the chosen definitive Humeral Stem (respecting the size and angle of the Trial) into the appropriate slot of the Impaction Stand.

The Standard Stem slots are located on one side of the Impaction Block and the Long Stem slots are located directly opposite the Standard Stem slots. Each side of the Impaction Block is then divided into two sections depending on size (1-4, 5-8).

With the definitive Stem in hand, orient the selected Reversed tray to the previously determined position (please note that this does not apply to the Centered Reversed Tray) and apply pressure to lock the Tray in this position. Next, place the Implant Assembly into the appropriate slot of the Impaction Block and using the Impactor Handle with the Head/Tray Impactor Tip seat the taper.

With the Reversed Tray and Stem assembled, place the Reversed Tray Inserter on top of the Reversed Tray taking care to align the notch on the Inserter with the lateral notch of the Stem. This will allow for version assessment in subsequent steps.

AEQUALIS ASCEND™ Flex PTC Stem

To implant the AEQUALIS ASCEND™ Flex PTC Stem/Tray Assembly, insert the tip of the Stem into the prepared humerus while ensuring the Tray is parallel to the resection. Next, place the previously selected Reversed Insert Trial into the tray taking care to align the Insert Trial so that the laser mark is aligned with the Lateral aspect of the Humeral Stem. This will help ensure the appropriate impaction angle is achieved to seat the Stem. With the Insert Trial in place, use the Impactor Handle with Insert Impactor Tip to seat the Stem/Tray Assembly ensuring the bottom of the Reversed Tray is flush with the resection. Once this has been accomplished, remove the Insert Trial.

AEQUALIS ASCEND™ Flex Cemented Stem

To implant the AEQUALIS ASCEND™ Flex Cemented Stem and Tray Assembly, irrigate and dry the humeral canal then insert a Cement Restrictor. Inject cement into the medullarycanal using a standard cementing technique and insert the Stem/Tray Assembly.

Once the Stem/Tray Assembly has been implanted into the humerus, select the Reversed Insert of the size and thickness determined during the trialing step. Orient the Insert so that the laser mark is aligned with the Lateral aspect of the Humeral Stem (12 o'clock position of the Humerus). As a check, the thinnest portion of the Insert should be Lateral (Superior) and the thickest portion of the Insert should be Medial (Inferior). The Reversed Tray and Insert should be clean and dry prior to assembly.

Using two thumbs, place even pressure on the Insert to initially seat the Insert into the Tray and then use the Impactor Handle with the Insert Impactor Tip to finish seating the Insert into the Tray.

Note: *The groove marking on the Insert Impactor Tip must be aligned with the laser mark of the insert (12 o´clock position of the Humerus).*

In-Vivo Assembly

Note: *It is not advisable to use the in-vivo technique in patients with poor bone quality.*

Attach the chosen definitive Humeral Stem (respecting the size and angle of the Trial) to the Inserter Handle with the Depth Stop in place.

The Inserter Handle has optional version holes designed to accept the Version Rod to assist in orienting the definitive Stem to the previously determined version. If utilized, be sure the Version Rod is placed on the side of the Inserter Handle that corresponds with the operative side of the patient (Left or Right).

AEQUALIS ASCEND™ Flex PTC Stem

To implant an AEQUALIS ASCEND™ Flex Stem, insert the Stem into the prepared humerus taking care to maintain the version of the resection. Impact the Stem until the Depth Stop is a few millimeters above the resection.

Remove the Inserter Handle and orient the selected Reversed Tray to the desired location. Seat the taper using the Impactor Handle with the Head/Tray Impactor Tip and continue to impact until the bottom of the Reversed Tray is flush with the cut and check implant stability.

AEQUALIS ASCEND™ Flex Cemented Stem

To implant an AEQUALIS ASCEND™ Flex Cemented Stem, irrigate and dry the humeral canal then insert a Cement Restrictor. Inject cement into the medullary canal using a standard cementing technique and insert the Stem into the humeral canal. Advance the stem until the Depth Stop is flush against the resection taking care not to countersink the implant.

Remove the Inserter Handle and any excess cement. Clean and dry the Stem taper. Orient the selected size Reversed Tray to the desired location. Seat the taper using the Impactor Handle with the Head/Tray Impactor Tip.

To place the Reversed Insert select the size and thickness determined during the trialing step. Orient the Insert so that the laser mark is aligned with the Lateral aspect of the Humeral Stem (12 o'clock position of the Humerus). As a check, the thinnest portion of the Insert should be Lateral (Superior) and the thickest portion of the Insert should be Medial (Inferior). The Reversed Tray and Insert should be clean and dry prior to assembly.

Using two thumbs, place even pressure on the Insert to initially seat the Insert into the Tray and then use the Impactor Handle with the Insert Impactor Tip to finish seating the Insert into the Tray.

Note: *When implanting a PTC stem, please note that the proximal stems are larger than the compactors. When using sets YKAD251S, the resulting press-fit is 1 mm, insuring a 0.7 mm average cement mantle. The decision to use cement or a press-fit technique is based on individual surgeon preference.*

Testing & Closure

After the joint has been washed and the prosthesis reduced, the stability and mobility of the shoulder are tested.

In the supero-lateral approach, the deltoid is reattached to the acromion with a trans osseous suture. In the delto-pectoral approach, a full or partial re-insertion of the subscapularis is performed, if possible.

Complications

Post-Operative Stiffness

In case of significant preoperative stiffness, it may be difficult to regain postoperative mobility. A surgical arthrolysis in conjunction with a capsulotomy may be required with the removal of soft tissue adhesions and removal of the tuberosities. Postoperatively, the arm is usually immobilized in a shoulder abduction splint for 3 to 6 weeks (in 60 degrees abduction). Passive elevation above the splint in the scapular plane is started immediately.

Prosthesis Instability

Possible causes:

» Improper humeral cut

» Massive humeral bone deficiency

Such cases are the consequence of insufficient deltoid tension.

In case of early postoperative dislocation, a closed reduction under local anesthesia is performed. If the prosthesis is in good position, then immobilization for 6 weeks normally restores stability.

With recurrent instability, a revision is needed to check the humeral version and increase (if necessary) the thickness of the construct. If possible, switching to a 39mm or 42mm Glenoid Sphere will likely provide greater stability. Special request Retentive Inserts are also available and may be useful in addressing recurrent instability.

Rehabilitation

Post-Operative Rehabilitation

The arm is placed in a brace with the elbow close to the body in neutral or internal rotation.

An abduction cushion can be used especially in cases of deltoid detachment or if the supero-lateral approach was performed. Rehabilitation is performed with passive pendular motion exercises five times per day at 5 minutes per session. Aquatic therapy can begin as soon as healing has occurred.

Arm Motion to be Avoided

Abduction/external rotation or abduction/internal rotation.

Note: *Active motion in the arm is restricted in daily activity as only elbow, wrist and finger motion is allowed.*

6 Weeks Post-Op

Strengthening of the deltoid muscle and external rotators at 6 weeks post-op can be initiated with isometric exercise against resistance. Strengthening of the external rotators with the elbow at the level of the arm can be initiated by isometric exercise against resistance. Provided that deltoid attachment has not been disrupted, normal active elevation is generally rapidly recovered.

Note: *Desired rehabilitation protocols vary by surgeon. The surgeon, physical therapist and patient should play an active role in determining the appropriate recovery process.*

Revision Preparation

chapter 5

Consideration for Revision Surgery

ADDRESSING RECURRENT INSTABILITY

With recurrent instability, a revision may be necessary to check the humeral version and increase (if necessary) the humeral lateralization utilizing a thicker Insert and/or thicker Tray.

Special request Retentive Inserts are available and may be useful in addressing recurrent instability.

To facilitate the removal of an existing Insert an Insert Revision Clamp is available.

The Insert Revision Clamp utilizes three of the four holes in the Reversed Tray to loosen the metal clip on the Reversed Insert.

To use, first locate the fixed arm of the Clamp (the side with the larger thumb screw). Place the tip of the fixed outer arm into either the Anterior or Superior holes in the Reversed Tray ensuring the that larger thumb screw is pointed up, above the Reversed Tray.

Ensure that the central post is completely unthreaded and then align the central tip of the Clamp with the hole in the Tray. Advance the smaller thumb screw until there is slight resistance. Take care not to over tighten the Clamp as it may prevent removal of the Insert. Next, align the final tip and draw it into the tray with the larger thumb screw.

Finally, place the Distractor over the Clamp and between the Insert and the Tray and lift the Insert out. It is critical that the Distractor be placed on the same side as the Clamp.

If the Insert cannot be removed, adjust the tension of the thumb screws and re-attempt removal with the Distractor.

Once the Insert has been removed, inspect the Reversed Tray for damage. If damaged, remove the Tray and replace it with a new Tray. If the Tray is not damaged, proceed with trailing until stability is obtained, then ensure the Reversed Tray and Insert are clean and dry and implant the selected Insert.

ADDRESSING CONVERSION (Anatomic to a Reversed Construct)

Overview

Although rare, revision from an anatomic construct to a reversed construct may become necessary as a result of a secondary massive irreparable cuff tear. The AEQUALIS ASCEND™ Flex Shoulder System has been designed to facilitate this type of conversion without the need to remove a well-placed and well-fixed Stem.

Reversed Inserts have been designed and are available upon special request to allow conversion from any of the anatomic inclinations to a 145 degree reversed construct. It is as simple as A, B, C.

Anatomic to Reversed Conversion Chart

Anatomic Stem		Reversed Insert		Reversed Construct	
Angle	Inclination	Angle	Inclination	Angle	Inclination
A	127,5°	A	17,5°	A	145°
B	132,5°	B	12,5°	B	145°
C	137,5°	C	7,5°	C	145°

Removing the Humeral Head

To begin, remove the Humeral Head by placing the tips of the Distractor between the resection and bottom of the Humeral Head and impact to free the Morse taper. Once the Humeral Head has been removed, assess the position, fixation and taper of the Stem.

Implant Assembly

__Note:__ The surgeon should inspect the implant tapers and mating surfaces for debris or blemishes before assembly. The tapers should be clean and dry for assembly. The Implants should be assembled to the definitive stem with clean gloves.

Orient the selected Reversed Tray Implant to the desired position. Seat the taper using the Impactor Handle with the Head/Tray Impactor Tip.

To place the Reversed Insert select the size and thickness determined during the trialing step. Orient the Insert so that the laser mark is aligned with the Lateral aspect of the Humeral Stem (12 o'clock position of the Humerus). As a check, the thinnest portion of the Insert should be Lateral (Superior) and he thickest portion of the Insert should be Medial (Inferior). The Reversed Tray and Insert should be clean and dry prior to assembly.

Using two thumbs, place even pressure on the Insert to initially seat the Insert into the Tray and then use the Impactor Handle with the Insert Impactor Tip to finish seating the Insert into the Tray.

Tips for Removing a Humeral Stem

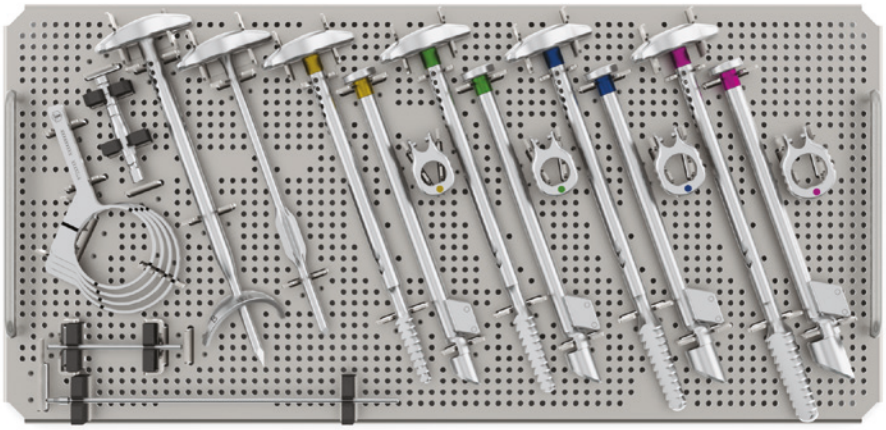
The design of Inserter Handle includes a special feature that may make it easier to remove a well-fixed Humeral Stem.

With the Humeral Head or Reversed Tray removed, it is recommended to run a Flexible Osteotome down the sides of the stem to separate bone from the stem. Attach the Inserter Handle to the Stem and place the 3.5 mm Retaining Driver through the hole in shaft of Inserter Handle until the Driver Handle contacts the Inserter Handle.

Utilizing the handle of the Driver, apply gentle rotational force while simultaneously impacting the underside of the head of the Insert Handle.

The combination of rotational and axial force helps to expedite the removal process.

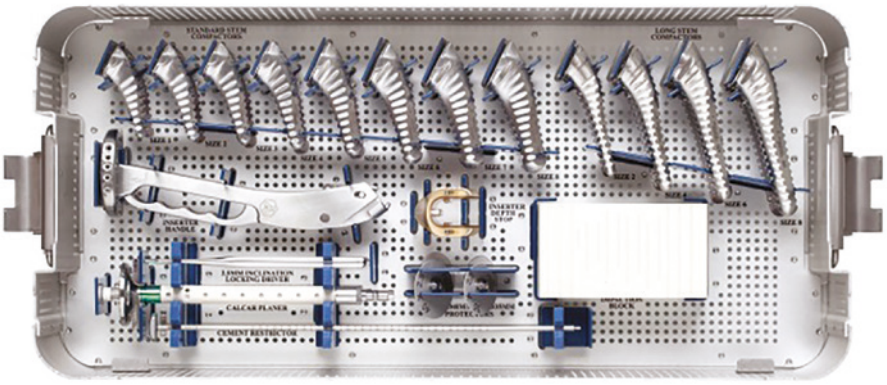
Components



AEQUALIS ASCEND™ Flex Humeral Instruments* (YKAD251S: TOP TRAY)

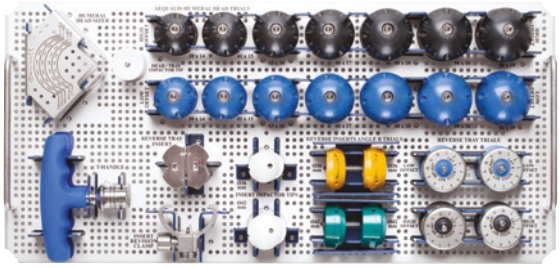
Reference	Description
MWF2885	Pin Driver
MWF2926	Small Cut Ring
MWF2927	Medium Cut Ring
MWF2928	Large Cut Ring
MWF2929	X-Large Cut Ring
MWD250	3mm dimater guide pin
MWF113	Retroversion Rod
MWF011	Reverse Cut Guide
MWF101	Starter Awl
MWF021	Sounder Size 1-2
MWF023	Sounder Size 3-4
MWF025	Sounder Size 5-6
MWF027	Sounder Size 7-8
MWF031	Punch Size 1-2
MWF033	Punch Size 3-4
MWF035	Punch Size 5-6
MWF037	Punch Size 7-8
MWF041	Punch Template Size 1-2
MWF043	Punch Template Size 3-4
MWF045	Punch Template Size 5-6
MWF047	Punch Template Size 7-8

* Depending on the geography, there will be either a YKAD251S or YKAD251



AEQUALIS ASCEND™ Flex
Humeral Instruments* (YKAD251S: BOTTOM TRAY)

Reference	Description
MWF601S	Standard Stem+ Compactor Size 1
MWF602S	Standard Stem+ Compactor Size 2
MWF603S	Standard Stem+ Compactor Size 3
MWF604S	Standard Stem+ Compactor Size 4
MWF605S	Standard Stem+ Compactor Size 5
MWF606S	Standard Stem+ Compactor Size 6
MWF607S	Standard Stem+ Compactor Size 7
MWF608S	Standard Stem+ Compactor Size 8
MWF612S	Long Stem+ Compactor Size 2
MWF614S	Long Stem+ Compactor Size 4
MWF616S	Long Stem+ Compactor Size 6
MWF618S	Long Stem+ Compactor Size 8
MWF102	2.5 mm Inclination Locking Driver
MWF103	Inserter Handle
MWF106	Inserter Depth Stop
MWF051	Cut Protector Ø35 mm
MWF053	Cut Protector Ø40 mm
MWF107	Impaction Block
MBO101	Cement Restrictor
MWF063	Calcor Planer Size 3-4



AEQUALIS ASCEND™ Flex Reversed Trial (YKAD252) TOP TRAY

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF361B	Reversed Insert Trial	36 mm	(+) 6	12.5 Std
MWF362B	Reversed Insert Trial	36 mm	(+) 9	12.5 Std
MWF421B	Reversed Insert Trial	42 mm	(+) 6	12.5 Std
MWF422B	Reversed Insert Trial	42 mm	(+) 9	12.5 Std

REVERSED TRAY TRIALS							
Reference	Description	Thickness	Ecc	Reference	Description	Thickness	Ecc
MWF510S	Reversed Tray Trial ****	(+) 0	1.5	MWF520S ****	Reversed Tray Trial	(+) 0	3.5
MWF511S	Reversed Tray Trial ****	(+) 6	1.5	MWF521S ****	Reversed Tray Trial	(+) 6	3.5

REVERSED TRAY TRIALS	
Reference	Description
MWF621	Insert Revision Clamp (Including MWF624 compression screw and MWF625 left clamp)
MWF722	Reversed Insert Impactor Tip, Ø36 mm
MWF222	Head or Tray Impactor Tip
MWB290 or MWB337	SZH T-Handle or SZH T-Handle V2
MWF200	Humeral Head Sizer
MWF630	Reversed Stem Inserter
MWF723	Reversed Insert Impactor Tip, Ø42 mm

AEQUALIS™ HUMERAL HEAD TRIALS				
Reference	Description	Diameter	Thickness	Ecc
MWF239S	AEQUALIS™ Humeral Head Trial **	39 mm	14 mm	1.5 mm
MWF241S	AEQUALIS™ Humeral Head Trial **	41 mm	15 mm	1.5 mm
MWF243S	AEQUALIS™ Humeral Head Trial **	43 mm	16 mm	1.5 mm
MWF246S	AEQUALIS™ Humeral Head Trial **	46 mm	17 mm	1.5 mm
MWF248S	AEQUALIS™ Humeral Head Trial **	48 mm	18 mm	1.5 mm
MWF250S	AEQUALIS™ Humeral Head Trial **	50 mm	16 mm	1.5 mm
MWF251S	AEQUALIS™ Humeral Head Trial ***	50 mm	19 mm	1.5 mm
MWF339S	AEQUALIS™ Humeral Head Trial **	39 mm	14 mm	3.5 mm
MWF341S	AEQUALIS™ Humeral Head Trial **	41 mm	15 mm	3.5 mm
MWF343S	AEQUALIS™ Humeral Head Trial **	43 mm	16 mm	3.5 mm
MWF346S	AEQUALIS™ Humeral Head Trial **	46 mm	17 mm	4 mm
MWF348S	AEQUALIS™ Humeral Head Trial **	48 mm	18 mm	4 mm
MWF350S	AEQUALIS™ Humeral Head Trial **	50 mm	16 mm	4 mm
MWF351S	AEQUALIS™ Humeral Head Trial ***	50 mm	19 mm	4 mm

[1] Only available in specific countries

*Available upon request ** Including Humeral Head Trial screw MWE001 ***Including Humeral Head Trial screw MWE002 ****Including Tray Trial screw MWE003

AEQUALIS ASCEND™ Flex Reversed Trial (YKAD252S) TOP TRAY

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF356B	Reversed Insert Trial*	33 mm	(+) 6	12.5°/B
MWF357B	Reversed Insert Trial*	33 mm	(+) 9	12.5°/B
MWF361B	Reversed Insert Trial	36 mm	(+) 6	12.5°/B
MWF362B	Reversed Insert Trial	36 mm	(+) 9	12.5°/B
MWF391B	Reversed Insert Trial	39 mm	(+) 6	12.5°/B
MWF392B	Reversed Insert Trial	39 mm	(+) 9	12.5°/B
MWF421B	Reversed Insert Trial	42 mm	(+) 6	12.5°/B
MWF422B	Reversed Insert Trial	42 mm	(+) 9	12.5°/B

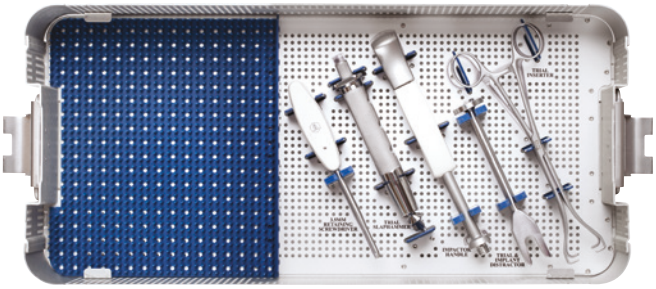
REVERSED TRAY TRIALS							
Reference	Description	Thickness	Ecc	Reference	Description	Thickness	Ecc
MWF510S	Reversed Tray Trial ****	(+) 0	1.5	MWF520S ****	Reversed Tray Trial	(+) 0	3.5
MWF511S	Reversed Tray Trial ****	(+) 6	1.5	MWF521S ****	Reversed Tray Trial	(+) 6	3.5

REVERSED TRAY TRIALS			
Reference	Description	Reference	Description
MWF621	Insert Revision Clamp (Including MWF624 compression screw and MWF625 left clamp)	MWF758	Reversed Insert Impactor Tip, Ø39 mm
		MWF222	Head or Tray Impactor Tip
MWF722	Reversed Insert Impactor Tip, Ø36 mm	MWB290 or MWB337	SZH T-Handle or SZH T-Handle V2
MWF723	Reversed Insert Impactor Tip, Ø42 mm	MWF200	Humeral Head Sizer
MWF757	Reversed Insert Impactor Tip, Ø33 mm	MWF630	Reversed Stem Inserter

AEQUALIS™ HUMERAL HEAD TRIALS				
Reference	Description	Diameter	Thickness	Ecc
MWF239S	AEQUALIS™ Humeral Head Trial **	39 mm	14 mm	1.5 mm
MWF241S	AEQUALIS™ Humeral Head Trial **	41 mm	15 mm	1.5 mm
MWF243S	AEQUALIS™ Humeral Head Trial **	43 mm	16 mm	1.5 mm
MWF246S	AEQUALIS™ Humeral Head Trial **	46 mm	17 mm	1.5 mm
MWF248S	AEQUALIS™ Humeral Head Trial **	48 mm	18 mm	1.5 mm
MWF250S	AEQUALIS™ Humeral Head Trial **	50 mm	16 mm	1.5 mm
MWF251S	AEQUALIS™ Humeral Head Trial ***	50 mm	19 mm	1.5 mm
MWF339S	AEQUALIS™ Humeral Head Trial **	39 mm	14 mm	3.5 mm
MWF341S	AEQUALIS™ Humeral Head Trial **	41 mm	15 mm	3.5 mm
MWF343S	AEQUALIS™ Humeral Head Trial **	43 mm	16 mm	3.5 mm
MWF346S	AEQUALIS™ Humeral Head Trial **	46 mm	17 mm	4 mm
MWF348S	AEQUALIS™ Humeral Head Trial **	48 mm	18 mm	4 mm
MWF350S	AEQUALIS™ Humeral Head Trial **	50 mm	16 mm	4 mm
MWF351S	AEQUALIS™ Humeral Head Trial ***	50 mm	19 mm	4 mm

[1] Only available in specific countries

*Available upon request ** Including Humeral Head Trial screw MWE001 ***Including Humeral Head Trial screw MWE002 ****Including Tray Trial screw MWE003



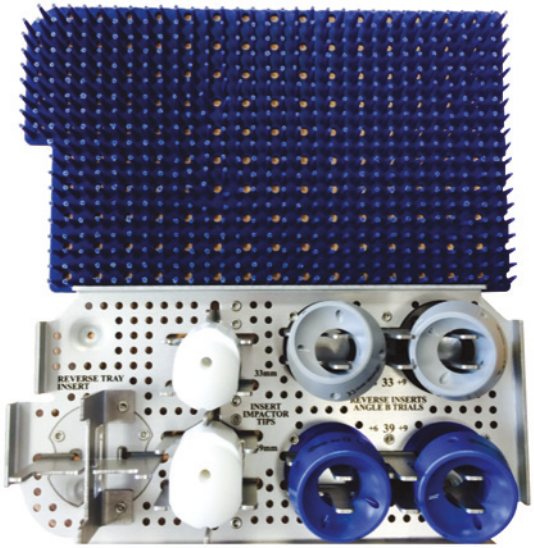
AEQUALIS ASCEND™ Flex Humeral Instruments (YKAD252 or YKAD252S BOTTOM TRAY)

Reference	Description
MWF108	Head Distractor
MWF109	3.5 mm Retaining Driver
MWF110	Humeral Trial Slaphammer
MWF221	Impaction Handle
MWF124	Trial Clamp
MWF630*	Reversed Stem Inserter

AEQUALIS™ HUMERAL HEAD TRIALS				
Reference	Description	Diameter	Thickness	Ecc
MWF237S	AEQUALIS™ Humeral Head Trial*, **	37 mm	13.5 mm	1.5 mm
MWF337S	AEQUALIS™ Humeral Head Trial*, **	37 mm	13.5 mm	3.5 mm
MWF252S	AEQUALIS™ Humeral Head Trial*, ***	52 mm	19 mm	1.5 mm
MWF253S	AEQUALIS™ Humeral Head Trial*, ***	52 mm	23 mm	1.5 mm
MWF254S	AEQUALIS™ Humeral Head Trial*, ***	54 mm	23 mm	1.5 mm
MWF255S	AEQUALIS™ Humeral Head Trial*, ***	54 mm	27 mm	1.5 mm
MWF352S	AEQUALIS™ Humeral Head Trial*, ***	52 mm	19 mm	4 mm
MWF353S	AEQUALIS™ Humeral Head Trial*, ***	52 mm	23 mm	4 mm
MWF354S	AEQUALIS™ Humeral Head Trial*, ***	54 mm	23 mm	4 mm
MWF355S	AEQUALIS™ Humeral Head Trial*, ***	54 mm	27 mm	4 mm

REVERSED TRAY TRIALS			
Reference	Description	Thickness	Ecc
MWF500S	REVERSED TRAY TRIAL*, ****	0	0
MWF501S	REVERSED TRAY TRIAL*, ****	(+) 6	0
MWF502S	REVERSED TRAY TRIAL*, ****	(+)12	0
MWF512S	REVERSED TRAY TRIAL*, ****	(+)12	1.5
MWF522S	REVERSED TRAY TRIAL*, ****	(+)12	3.5

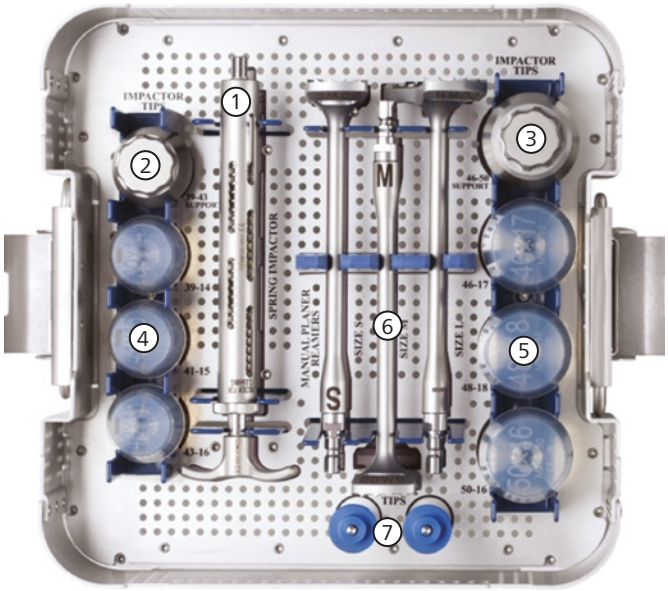
* Available upon request. These trials are included in the blue part of the bottom tray ** Including Humeral Head Trial screw MWE001
*** Including Humeral Head Trial screw MWE002 **** Including Tray Trial screw MWE003



Instrumentation
YKAD252M (upon request only)

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF356B	Reversed Insert Trial	33 mm	(+) 6	12.5°/B
MWF357B	Reversed Insert Trial	33 mm	(+) 9	12.5°/B
MWF391B	Reversed Insert Trial	39 mm	(+) 6	12.5°/B
MWF392B	Reversed Insert Trial	39 mm	(+) 9	12.5°/B

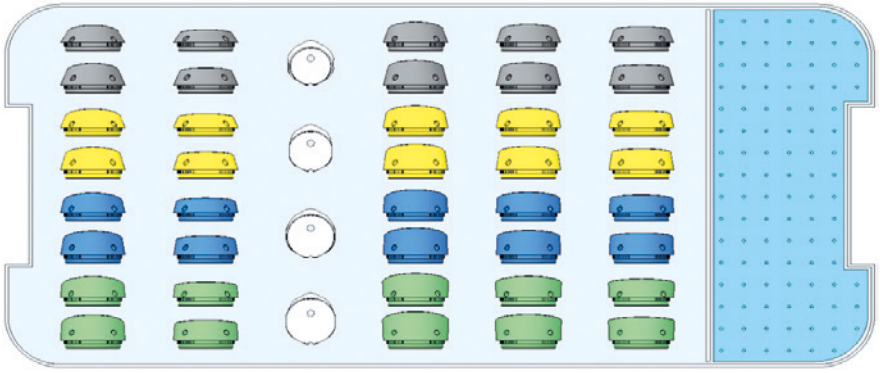
REVERSED INSERT TRIALS		
Reference	Description	Quantity
MWF757	Standard reversed insert impactor tip diameter 33 mm	1
MWF758	Standard reversed insert impactor tip diameter 39 mm	1



The AEQUALIS™ Pyrocarbon Humeral Head is assembled onto the AEQUALIS ASCEND™ Flex stem. The AEQUALIS ASCEND™ Flex instrumentation is necessary for the implantation of the AEQUALIS™ Pyrocarbon Humeral Head.

AEQUALIS™ Pyrocarbon Humeral Head Instrumentation (YKAD238)

#	Catalog #	Description
1	MWF724	Spring Impactor
2	MWF720	39-43 Impactor Tip Support
3	MWF721	46-50 Impactor Tip Support
4	MWF739	Pyrocarbon Head Impactor Tip Dia 39 H 14
	MWF741	Pyrocarbon Head Impactor Tip Dia 41 H 15
	MWF743	Pyrocarbon Head Impactor Tip Dia 43 H 16
5	MWF746	Pyrocarbon Head Impactor Tip Dia 46 H 17
	MWF748	Pyrocarbon Head Impactor Tip Dia 48 H 18
	MWF750	Pyrocarbon Head Impactor Tip Dia 50 H 16
6	MWF725	Manual Planer Reamer Size S
	MWF726	Manual Planer Reamer Size M
	MWF727	Manual Planer Reamer Size L
7	MWF728	Reamer Tip



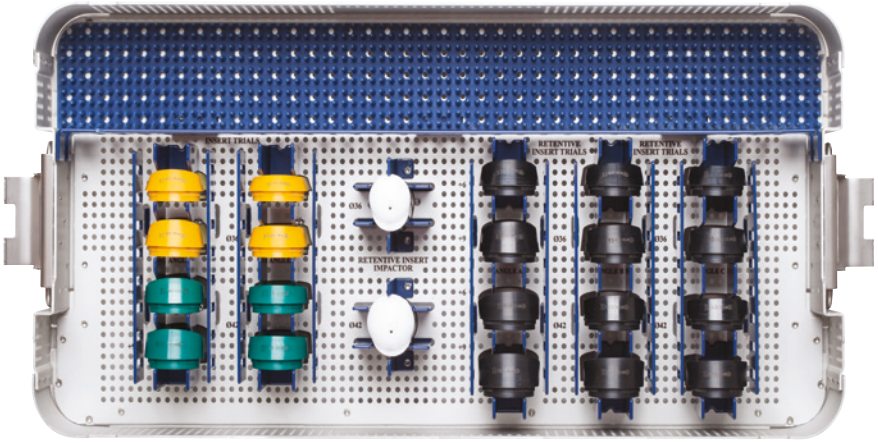
AEQUALIS ASCEND™ Flex Reversed Revision Trials (YKAD235S)

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF356A	Reversed insert trial	33mm	(+) 6	17.5°
MWF357A	Reversed insert trial	33mm	(+) 9	17.5°
MWF361A	Reversed insert trial	36mm	(+) 6	17.5°
MWF362A	Reversed insert trial	36mm	(+) 9	17.5°
MWF391A	Reversed insert trial	39mm	(+) 6	17.5°
MWF392A	Reversed insert trial	39mm	(+) 9	17.5°
MWF421A	Reversed insert trial	42mm	(+) 6	17.5°
MWF422A	Reversed insert trial	42mm	(+) 9	17.5°
MWF356C	Reversed insert trial	33mm	(+) 6	7.5°
MWF357C	Reversed insert trial	33mm	(+) 9	7.5°
MWF361C	Reversed insert trial	36mm	(+) 6	7.5°
MWF362C	Reversed insert trial	36mm	(+) 9	7.5°
MWF391C	Reversed insert trial	39mm	(+) 6	7.5°
MWF392C	Reversed insert trial	39mm	(+) 9	7.5°
MWF421C	Reversed insert trial	42mm	(+) 6	7.5°
MWF422C	Reversed insert trial	42mm	(+) 9	7.5°
MWF358A	Retentive Reversed insert trial	33mm	(+) 6	17.5°
MWF359A	Retentive Reversed insert trial	33mm	(+) 9	17.5°
MWF364A	Retentive Reversed insert trial	36mm	(+) 6	17.5°
MWF365A	Retentive Reversed insert trial	36mm	(+) 9	17.5°
MWF394A	Retentive Reversed insert trial	39mm	(+) 6	17.5°
MWF395A	Retentive Reversed insert trial	39mm	(+) 9	17.5°
MWF424A	Retentive Reversed insert trial	42mm	(+) 6	17.5°
MWF425A	Retentive Reversed insert trial	42mm	(+) 9	17.5°

AEQUALIS ASCEND™ Flex Reversed Revision Trials (YKAD235S) - Suite

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF358B	Retentive Reversed insert trial	33mm	(+) 6	12.5°
MWF359B	Retentive Reversed insert trial	33mm	(+) 9	12.5°
MWF364B	Retentive Reversed insert trial	36mm	(+) 6	12.5°
MWF365B	Retentive Reversed insert trial	36mm	(+) 9	12.5°
MWF394B	Retentive Reversed insert trial	39mm	(+) 6	12.5°
MWF395B	Retentive Reversed insert trial	39mm	(+) 9	12.5°
MWF424B	Retentive Reversed insert trial	42mm	(+) 6	12.5°
MWF425B	Retentive Reversed insert trial	42mm	(+) 9	12.5°
MWF358C	Retentive Reversed insert trial	33mm	(+) 6	7.5°
MWF359C	Retentive Reversed insert trial	33mm	(+) 9	7.5°
MWF364C	Retentive Reversed insert trial	36mm	(+) 6	7.5°
MWF365C	Retentive Reversed insert trial	36mm	(+) 9	7.5°
MWF394C	Retentive Reversed insert trial	39mm	(+) 6	7.5°
MWF395C	Retentive Reversed insert trial	39mm	(+) 9	7.5°
MWF424C	Retentive Reversed insert trial	42mm	(+) 6	7.5°
MWF425C	Retentive Reversed insert trial	42mm	(+) 9	7.5°

RETENTATIVE REVERSED INSERT IMPACTOR TIPS		
Reference	Description	Diameter
MWF213	Retentive Reversed Insert Impactor Tip	33mm
MWF211	Retentive Reversed Insert Impactor Tip	36mm
MWF214	Retentive Reversed Insert Impactor Tip	39mm
MWF212	Retentive Reversed Insert Impactor Tip	42mm

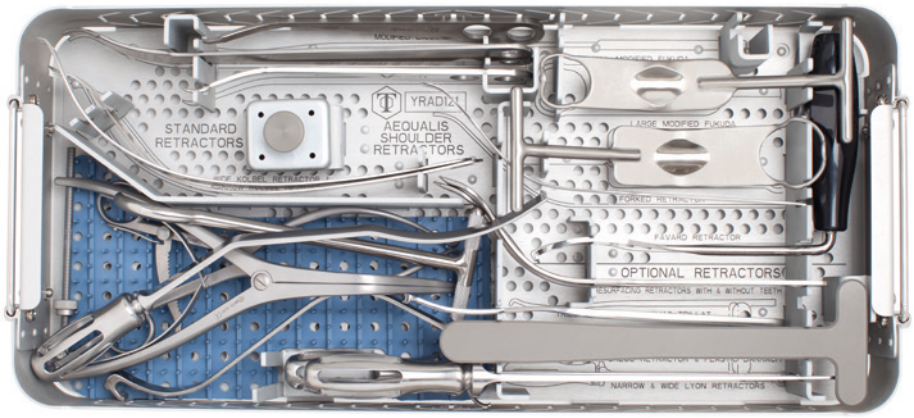


AEQUALIS ASCEND™ Flex Reversed Revision Trials (YKAD235)*

REVERSED INSERT TRIALS				
Reference	Description	Diameter	Thickness	Angle
MWF361A	Reversed Insert Trial	36 mm	(+) 6	17.5°
MWF362A	Reversed Insert Trial	36 mm	(+) 9	17.5°
MWF421A	Reversed Insert Trial	42 mm	(+) 6	17.5°
MWF422A	Reversed Insert Trial	42 mm	(+) 9	17.5°
MWF361C	Reversed Insert Trial	36 mm	(+) 6	7.5°
MWF362C	Reversed Insert Trial	36 mm	(+) 9	7.5°
MWF421C	Reversed Insert Trial	42 mm	(+) 6	7.5°
MWF422C	Reversed Insert Trial	42 mm	(+) 9	7.5°
MWF364A	Retentive Reversed Insert Trial	36 mm	(+) 6	17.5°
MWF365A	Retentive Reversed Insert Trial	36 mm	(+) 9	17.5°
MWF424A	Retentive Reversed Insert Trial	42 mm	(+) 6	17.5°
MWF425A	Retentive Reversed Insert Trial	42 mm	(+) 9	17.5°
MWF364B	Retentive Reversed Insert Trial	36 mm	(+) 6	12.5°
MWF365B	Retentive Reversed Insert Trial	36 mm	(+) 9	12.5°
MWF424B	Retentive Reversed Insert Trial	42 mm	(+) 6	12.5°
MWF425B	Retentive Reversed Insert Trial	42 mm	(+) 9	12.5°
MWF364C	Retentive Reversed Insert Trial	36 mm	(+) 6	7.5°
MWF365C	Retentive Reversed Insert Trial	36 mm	(+) 9	7.5°
MWF424C	Retentive Reversed Insert Trial	42 mm	(+) 6	7.5°
MWF425C	Retentive Reversed Insert Trial	42 mm	(+) 9	7.5°

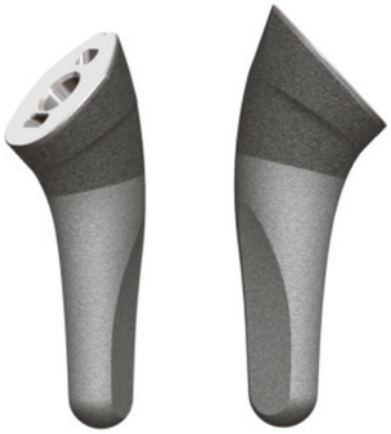
RETENTIVE REVERSED INSERT IMPACTOR TIPS		
Reference	Description	Diameter
MWF211	Retentive Reversed Insert Impactor Tip	36 mm
MWF212	Retentive Reversed Insert Impactor Tip	42 mm

* Available upon request. These trials are included in the blue part of the bottom tray.



AEQUALIS™ Retractor Shoulder System (YKAD121)*

Reference	Description
MWE120	Large Hohmann Retractor (L11863)
MWA683	Small Hohmann Retractor (L11863)
MWA681	Wide Kolbel Retractor
MWD046	Narrow Kolbel Retractor
MWB353	Wide Lyon Retractor
9000379	Small modified Fukuda
9000380	Large modified Fukuda
MWD001	Favard Retractor (Trillat Modified)
MWD160	Forked Retractor (2820)
MWE122	Smooth tip*
MWE123	Groove tip*
MWE124	Tapered tip*
MWE125	Resurfacing tip*
MWE121	Lamina Spreader*
MWE126	Acromial Retractor*
MWE128	Gelpi (L11871)*
9000384	Crego Retractor*
MWB352	Narrow Lyon Retractor*
MWB070	Resurfacing Retractor Without Teeth*
MWB071	Resurfacing Retractor With Teeth*
MWE127	Trillat Retractor / Texas Trillat*
9000381	Plastic Darrach*
MWE103	Wide BW Retractor
MWE104	Narrow BW Retractor



AEQUALIS ASCEND™ Flex
Standard PTC Humeral Stems

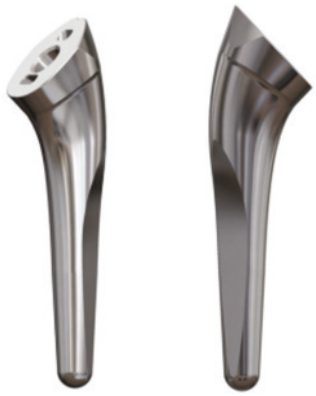
Reference	Description	Size	Angle	Length (mm)
DWF601A	Standard PTC Humeral Stem	1A	127.5°	66
DWF601B	Standard PTC Humeral Stem	1B	132.5°	66
DWF601C	Standard PTC Humeral Stem	1C	137.5°	66
DWF602A	Standard PTC Humeral Stem	2A	127.5°	70
DWF602B	Standard PTC Humeral Stem	2B	132.5°	70
DWF602C	Standard PTC Humeral Stem	2C	137.5°	70
DWF603A	Standard PTC Humeral Stem	3A	127.5°	74
DWF603B	Standard PTC Humeral Stem	3B	132.5°	74
DWF603C	Standard PTC Humeral Stem	3C	137.5°	74
DWF604A	Standard PTC Humeral Stem	4A	127.5°	78
DWF604B	Standard PTC Humeral Stem	4B	132.5°	78
DWF604C	Standard PTC Humeral Stem	4C	137.5°	78
DWF605A	Standard PTC Humeral Stem	5A	127.5°	82
DWF605B	Standard PTC Humeral Stem	5B	132.5°	82
DWF605C	Standard PTC Humeral Stem	5C	137.5°	82
DWF606A	Standard PTC Humeral Stem	6A	127.5°	86
DWF606B	Standard PTC Humeral Stem	6B	132.5°	86
DWF606C	Standard PTC Humeral Stem	6C	137.5°	86
DWF607A	Standard PTC Humeral Stem	7A	127.5°	90
DWF607B	Standard PTC Humeral Stem	7B	132.5°	90
DWF607C	Standard PTC Humeral Stem	7C	137.5°	90
DWF608A	Standard PTC Humeral Stem	8A	127.5°	94
DWF608B	Standard PTC Humeral Stem	8B	132.5°	94
DWF608C	Standard PTC Humeral Stem	8C	137.5°	94
DWF609A	Standard PTC Humeral Stem	9A	127.5°	98
DWF609B	Standard PTC Humeral Stem	9B	132.5°	98
DWF609C	Standard PTC Humeral Stem	9C	137.5°	98

AEQUALIS ASCEND™ Flex Long PTC Humeral Stems

Reference	Description	Size	Angle	Length (mm)
DWF611A	Long PTC Humeral Stem	1A	127.5°	88
DWF611B	Long PTC Humeral Stem	1B	132.5°	88
DWF611C	Long PTC Humeral Stem	1C	137.5°	88
DWF612A	Long PTC Humeral Stem	2A	127.5°	93
DWF612B	Long PTC Humeral Stem	2B	132.5°	93
DWF612C	Long PTC Humeral Stem	2C	137.5°	93
DWF613A	Long PTC Humeral Stem	3A	127.5°	98
DWF613B	Long PTC Humeral Stem	3B	132.5°	98
DWF613C	Long PTC Humeral Stem	3C	137.5°	98
DWF614A	Long PTC Humeral Stem	4A	127.5°	104
DWF614B	Long PTC Humeral Stem	4B	132.5°	104
DWF614C	Long PTC Humeral Stem	4C	137.5°	104
DWF615A	Long PTC Humeral Stem	5A	127.5°	109
DWF615B	Long PTC Humeral Stem	5B	132.5°	109
DWF615C	Long PTC Humeral Stem	5C	137.5°	109
DWF616A	Long PTC Humeral Stem	6A	127.5°	115
DWF616B	Long PTC Humeral Stem	6B	132.5°	115
DWF616C	Long PTC Humeral Stem	6C	137.5°	115
DWF617A	Long PTC Humeral Stem	7A	127.5°	120
DWF617B	Long PTC Humeral Stem	7B	132.5°	120
DWF617C	Long PTC Humeral Stem	7C	137.5°	120
DWF618A	Long PTC Humeral Stem	8A	127.5°	125
DWF618B	Long PTC Humeral Stem	8B	132.5°	125
DWF618C	Long PTC Humeral Stem	8C	137.5°	125
DWF619A	Long PTC Humeral Stem	9A	127.5°	130
DWF619B	Long PTC Humeral Stem	9B	132.5°	130
DWF619C	Long PTC Humeral Stem	9C	137.5°	130

AEQUALIS ASCEND™ Flex
Standard Cemented Humeral Stems

Reference	Description	Size	Angle	Length (mm)
DWF702A	Standard Cemented Humeral Stem	2A	127.5°	66
DWF702B	Standard Cemented Humeral Stem	2B	132.5°	66
DWF702C	Standard Cemented Humeral Stem	2C	137.5°	66
DWF703A	Standard Cemented Humeral Stem	3A	127.5°	70
DWF703B	Standard Cemented Humeral Stem	3B	132.5°	70
DWF703C	Standard Cemented Humeral Stem	3C	137.5°	70
DWF704A	Standard Cemented Humeral Stem	4A	127.5°	74
DWF704B	Standard Cemented Humeral Stem	4B	132.5°	74
DWF704C	Standard Cemented Humeral Stem	4C	137.5°	74
DWF705A	Standard Cemented Humeral Stem	5A	127.5°	78
DWF705B	Standard Cemented Humeral Stem	5B	132.5°	78
DWF705C	Standard Cemented Humeral Stem	5C	137.5°	78
DWF706A	Standard Cemented Humeral Stem	6A	127.5°	82
DWF706B	Standard Cemented Humeral Stem	6B	132.5°	82
DWF706C	Standard Cemented Humeral Stem	6C	137.5°	82
DWF707A	Standard Cemented Humeral Stem	7A	127.5°	86
DWF707B	Standard Cemented Humeral Stem	7B	132.5°	86
DWF707C	Standard Cemented Humeral Stem	7C	137.5°	86
DWF708A	Standard Cemented Humeral Stem	8A	127.5°	90
DWF708B	Standard Cemented Humeral Stem	8B	132.5°	90
DWF708C	Standard Cemented Humeral Stem	8C	137.5°	90
DWF709A	Standard Cemented Humeral Stem	9A	127.5°	94
DWF709B	Standard Cemented Humeral Stem	9B	132.5°	94
DWF709C	Standard Cemented Humeral Stem	9C	137.5°	94



AEQUALIS ASCEND™ Flex
Long Cemented Humeral Stems

Reference	Description	Size	Angle	Length (mm)
DWF712A	Long Cemented Humeral Stem	2A	127.5°	88
DWF712B	Long Cemented Humeral Stem	2B	132.5°	88
DWF712C	Long Cemented Humeral Stem	2C	137.5°	88
DWF713A	Long Cemented Humeral Stem	3A	127.5°	93
DWF713B	Long Cemented Humeral Stem	3B	132.5°	93
DWF713C	Long Cemented Humeral Stem	3C	137.5°	93
DWF714A	Long Cemented Humeral Stem	4A	127.5°	98
DWF714B	Long Cemented Humeral Stem	4B	132.5°	98
DWF714C	Long Cemented Humeral Stem	4C	137.5°	98
DWF715A	Long Cemented Humeral Stem	5A	127.5°	104
DWF715B	Long Cemented Humeral Stem	5B	132.5°	104
DWF715C	Long Cemented Humeral Stem	5C	137.5°	104
DWF716A	Long Cemented Humeral Stem	6A	127.5°	109
DWF716B	Long Cemented Humeral Stem	6B	132.5°	109
DWF716C	Long Cemented Humeral Stem	6C	137.5°	109
DWF717A	Long Cemented Humeral Stem	7A	127.5°	115
DWF717B	Long Cemented Humeral Stem	7B	132.5°	115
DWF717C	Long Cemented Humeral Stem	7C	137.5°	115
DWF718A	Long Cemented Humeral Stem	8A	127.5°	120
DWF718B	Long Cemented Humeral Stem	8B	132.5°	120
DWF718C	Long Cemented Humeral Stem	8C	137.5°	120
DWF719A	Long Cemented Humeral Stem	9A	127.5°	125
DWF719B	Long Cemented Humeral Stem	9B	132.5°	125
DWF719C	Long Cemented Humeral Stem	9C	137.5°	125

AEQUALIS ASCEND™ Flex Humeral Heads (Cobalt Chrome)

Reference	Description	Diameter	Height	Ecc	
*DWF037R	Humeral Head	37 mm	13.5 mm	1.5 mm	
DWF039R	Humeral Head	39 mm	14 mm	1.5 mm	
DWF041R	Humeral Head	41 mm	15 mm	1.5 mm	
DWF043R	Humeral Head	43 mm	16 mm	1.5 mm	
DWF046R	Humeral Head	46 mm	17 mm	1.5 mm	
DWF048R	Humeral Head	48 mm	18 mm	1.5 mm	
DWF050R	Humeral Head	50 mm	16 mm	1.5 mm	Low
DWF051R	Humeral Head	50 mm	19 mm	1.5 mm	
*DWF052R	Humeral Head	52 mm	19 mm	1.5 mm	
*DWF053R	Humeral Head	52 mm	23 mm	1.5 mm	
*DWF054R	Humeral Head	54 mm	23 mm	1.5 mm	
*DWF055R	Humeral Head	54 mm	27 mm	1.5 mm	
*DWF137R	Humeral Head	37 mm	13.5 mm	3.5 mm	
DWF139R	Humeral Head	39 mm	14 mm	3.5 mm	
DWF141R	Humeral Head	41 mm	15 mm	3.5 mm	
DWF143R	Humeral Head	43 mm	16 mm	3.5 mm	
DWF146R	Humeral Head	46 mm	17 mm	4 mm	
DWF148R	Humeral Head	48 mm	18 mm	4 mm	
DWF150R	Humeral Head	50 mm	16 mm	4 mm	High
DWF151R	Humeral Head	50 mm	19 mm	4 mm	
*DWF152R	Humeral Head	52 mm	19 mm	4 mm	
*DWF153R	Humeral Head	52 mm	23 mm	4 mm	
*DWF154R	Humeral Head	54 mm	23 mm	4 mm	
*DWF155R	Humeral Head	54 mm	27 mm	4 mm	

* Available upon request.

AEQUALIS ASCEND™ Flex Humeral Heads (Titanium)**

Reference	Description	Diameter	Height	Offset	
DWF237	Humeral Head*	37 mm	13.5 mm	1.5 mm	Low
DWF239	Humeral Head	39 mm	14 mm	1.5 mm	
DWF241	Humeral Head	41 mm	15 mm	1.5 mm	
DWF243	Humeral Head	43 mm	16 mm	1.5 mm	
DWF246	Humeral Head	46 mm	17 mm	1.5 mm	
DWF248	Humeral Head	48 mm	18 mm	1.5 mm	
DWF250	Humeral Head	50 mm	16 mm	1.5 mm	
DWF251	Humeral Head	51 mm	19 mm	1.5 mm	
DWF252	Humeral Head*	52 mm	19 mm	1.5 mm	
DWF253	Humeral Head*	53 mm	23 mm	1.5 mm	
DWF254	Humeral Head*	54 mm	23 mm	1.5 mm	
DWF255	Humeral Head*	54 mm	27 mm	1.5 mm	
DWF337	Humeral Head*	37 mm	13.5 mm	3.5 mm	High
DWF339	Humeral Head	39 mm	14 mm	3.5 mm	
DWF341	Humeral Head	41 mm	15 mm	3.5 mm	
DWF343	Humeral Head	43 mm	16 mm	3.5 mm	
DWF346	Humeral Head	46 mm	17 mm	4 mm	
DWF348	Humeral Head	48 mm	18 mm	4 mm	
DWF350	Humeral Head	50 mm	16 mm	4 mm	
DWF351	Humeral Head	51 mm	19 mm	4 mm	
DWF352	Humeral Head*	52 mm	19 mm	4 mm	
DWF353	Humeral Head*	53 mm	23 mm	4 mm	
DWF354	Humeral Head*	54 mm	23 mm	4 mm	
DWF355	Humeral Head*	54 mm	27 mm	4 mm	

AEQUALIS ASCEND™ Flex Humeral Heads (Pyrocarbon)**

Reference	Description	Diameter	Height	Offset	
DWH039	AEQUALIS™ Pyrocarbon Humeral Head	39 mm	14 mm	1.5 mm	Low
DWH041	AEQUALIS™ Pyrocarbon Humeral Head	41 mm	15 mm	1.5 mm	
DWH043	AEQUALIS™ Pyrocarbon Humeral Head	43 mm	16 mm	1.5 mm	
DWH046	AEQUALIS™ Pyrocarbon Humeral Head	46 mm	17 mm	1.5 mm	
DWH048	AEQUALIS™ Pyrocarbon Humeral Head	48 mm	18 mm	1.5 mm	
DWH050	AEQUALIS™ Pyrocarbon Humeral Head	50 mm	16 mm	1.5 mm	
DWH139	AEQUALIS™ Pyrocarbon Humeral Head	39 mm	14 mm	3.5 mm	High
DWH141	AEQUALIS™ Pyrocarbon Humeral Head	41 mm	15 mm	3.5 mm	
DWH143	AEQUALIS™ Pyrocarbon Humeral Head	43 mm	16 mm	3.5 mm	
DWH146	AEQUALIS™ Pyrocarbon Humeral Head	46 mm	17 mm	4 mm	
DWH148	AEQUALIS™ Pyrocarbon Humeral Head	48 mm	18 mm	4 mm	
DWH150	AEQUALIS™ Pyrocarbon Humeral Head	50 mm	16 mm	4 mm	

* Available upon request. ** Available upon registration in countries.

AEQUALIS ASCEND™ Flex Reversed Insert

Reference	Description	Diameter	Thickness	Angle	
*DWF356A	Reversed Insert	33 mm	(+) 6	A-17.5	
*DWF357A	Reversed Insert	33 mm	(+) 9	A-17.5	
*DWF361A	Reversed Insert	36 mm	(+) 6	A-17.5	
*DWF362A	Reversed Insert	36 mm	(+) 9	A-17.5	A
*DWF391A	Reversed Insert	39 mm	(+) 6	A-17.5	
*DWF392A	Reversed Insert	39 mm	(+) 9	A-17.5	
*DWF421A	Reversed Insert	42 mm	(+) 6	A-17.5	
*DWF422A	Reversed Insert	42 mm	(+) 9	A-17.5	
DWF356B	Reversed Insert	33 mm	(+) 6	B-12.5	
DWF357B	Reversed Insert	33 mm	(+) 9	B-12.5	
DWF361B	Reversed Insert	36 mm	(+) 6	B-12.5	
DWF362B	Reversed Insert	36 mm	(+) 9	B-12.5	B
DWF391B	Reversed Insert	39 mm	(+) 6	B-12.5	
DWF392B	Reversed Insert	39 mm	(+) 9	B-12.5	
DWF421B	Reversed Insert	42 mm	(+) 6	B-12.5	
DWF422B	Reversed Insert	42 mm	(+) 9	B-12.5	
*DWF356C	Reversed Insert	33 mm	(+) 6	C-7.5	
*DWF357C	Reversed Insert	33 mm	(+) 9	C-7.5	
*DWF361C	Reversed Insert	36 mm	(+) 6	C-7.5	
*DWF362C	Reversed Insert	36 mm	(+) 9	C-7.5	C
*DWF391C	Reversed Insert	39 mm	(+) 6	C-7.5	
*DWF392C	Reversed Insert	39 mm	(+) 9	C-7.5	
*DWF421C	Reversed Insert	42 mm	(+) 6	C-7.5	
*DWF422C	Reversed Insert	42 mm	(+) 9	C-7.5	
*DWF358A	Retentive Reversed Insert	33 mm	(+) 6	A-17.5	
*DWF359A	Retentive Reversed Insert	33 mm	(+) 9	A-17.5	
*DWF364A	Retentive Reversed Insert	36 mm	(+) 6	A-17.5	
*DWF365A	Retentive Reversed Insert	36 mm	(+) 9	A-17.5	A
*DWF394A	Retentive Reversed Insert	39 mm	(+) 6	A-17.5	
*DWF395A	Retentive Reversed Insert	39 mm	(+) 9	A-17.5	
*DWF424A	Retentive Reversed Insert	42 mm	(+) 6	A-17.5	
*DWF425A	Retentive Reversed Insert	42 mm	(+) 9	A-17.5	
DWF358B	Retentive Reversed Insert	33 mm	(+) 6	B-12.5	
DWF359B	Retentive Reversed Insert	33 mm	(+) 9	B-12.5	
DWF364B	Retentive Reversed Insert	36 mm	(+) 6	B-12.5	
DWF365B	Retentive Reversed Insert	36 mm	(+) 9	B-12.5	B
DWF394B	Retentive Reversed Insert	39 mm	(+) 6	B-12.5	
DWF395B	Retentive Reversed Insert	39 mm	(+) 9	B-12.5	
DWF424B	Retentive Reversed Insert	42 mm	(+) 6	B-12.5	
DWF425B	Retentive Reversed Insert	42 mm	(+) 9	B-12.5	
*DWF358C	Retentive Reversed Insert	33 mm	(+) 6	C-7.5	
*DWF359C	Retentive Reversed Insert	33 mm	(+) 9	C-7.5	
*DWF364C	Retentive Reversed Insert	36 mm	(+) 6	C-7.5	
*DWF365C	Retentive Reversed Insert	36 mm	(+) 9	C-7.5	C
*DWF394C	Retentive Reversed Insert	39 mm	(+) 6	C-7.5	
*DWF395C	Retentive Reversed Insert	39 mm	(+) 9	C-7.5	
*DWF424C	Retentive Reversed Insert	42 mm	(+) 6	C-7.5	
*DWF425C	Retentive Reversed Insert	42 mm	(+) 9	C-7.5	

Important Note:

Diameter 33 and 39 Reversed inserts are only compatible with AEQUALIS™ Reversed II sphere.

* Available upon request.

AEQUALIS ASCEND™ Flex Reversed Trays

Reference	Description	Thickness	Offset	
DWF500	Reversed Tray	(+) 0	0.0 mm	
DWF501	Reversed Tray	(+) 6	0.0 mm	
DWF502	Reversed Tray	(+) 12	0.0 mm	
DWF510	Reversed Tray	(+) 0	1.5 mm	
DWF511	Reversed Tray	(+) 6	1.5 mm	Low
DWF512	Reversed Tray	(+) 12	1.5 mm	
DWF520	Reversed Tray	(+) 0	3.5 mm	
DWF521	Reversed Tray	(+) 6	3.5 mm	High
DWF522	Reversed Tray	(+) 12	3.5 mm	

* Available upon request.

Flex AEQUALIS™ Humeral Heads with AEQUALIS™ PerFORM Glenoid

AEQUALIS ASCEND™ Flex Shoulder System
Combinations CrCo & Ti6A14V Heads/Glenoids

Diametrical Mismatch in mm

Size	Heads	37x13.5	39x14	41x15	43x16	46x17	48x18	50x16	50x19	52x19	52x23	54x23	54x27
Glenoid	Diameter of Curvature	39	41.2	43	45	48	50	55	52	54.6	52.4	54.7	54
Small	55.4	16.4	14.2	12.4	10.4	7.4	5.4	0.4	3.4	0.8	3	0.7	1.4
Medium	59.6	20.6	18.4	16.6	14.6	11.6	9.6	4.6	7.6	5	7.2	4.9	5.6
Large	63.6	24.6	22.4	20.6	18.6	15.6	13.6	8.6	11.6	9	11.2	8.9	9.6
XL	67.8	28.8	26.6	24.8	22.8	19.8	17.8	12.8	15.8	13.2	15.4	13.1	13.8

123: **Cleared Mismatches**
The cleared range for this combination is 1 to 24.8 mm

Proper surgical procedures and techniques are the responsibility of the medical professional. The following guidelines are furnished for information purposes only as techniques used by the design surgeons. Each surgeon must evaluate the appropriateness of the procedures based on his or her personal medical training and experience. Prior to use of the system, the surgeon should refer to the product package insert for complete warnings, precautions, indications, contraindications and adverse effects. Package inserts are also available by contacting Wright Medical Technology, Inc. Contact information can be found on the back of this surgical technique, and the package insert is available at www.wmt.com.

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AEQUALIS ASCEND™ Flex UDTJ161 Brazil May-2016