

# Enduro™ Hinge Knee System

Featuring Advanced Surface Technology



Aesculap Orthopaedics

**AESCULAP**  
Implant Systems

# EnduRo™ Hinge Knee System

Stability. Mobility. Longevity.

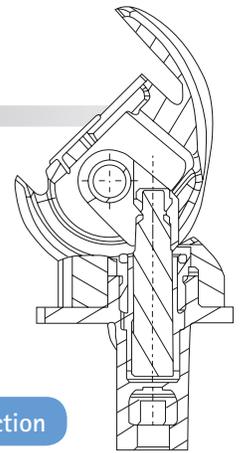
*Knee revision and complex primary arthroplasty cases can be particularly problematic. Ensure your treatment plan for long-term success and high patient satisfaction with the EnduRo Hinge Knee System. Designed for patients that present with severe ligament instability and/or bone deficiency, the EnduRo System addresses the issues plaguing conventional hinge designs. With a rotating platform, the system features an innovative hinge mechanism for subluxation stability while minimizing bone resections.*

- Accommodates 12° of internal/external rotation
- Accommodates 140° of flexion

## Achieve Stability

When soft tissues are compromised, adequate stability is needed in cases of mild to moderate distraction to avoid dislocation.<sup>1</sup> The EnduRo Hinge Knee System employs a morse-taper junction which combines with a locking nut affixed within the hinge ring. This secure connection of the femur and tibia provides security against subluxation and enables stable distraction.<sup>1</sup>

Up to 3 mm of distraction

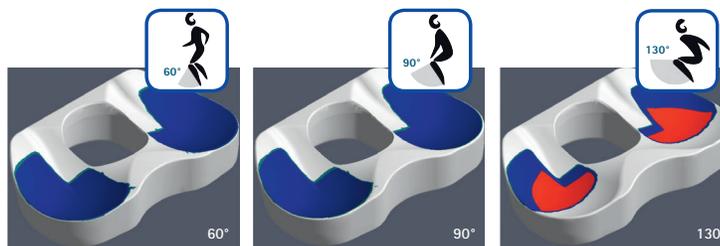


## Kinematic Loading

The EnduRo Hinge Knee System utilizes condylar loading, positioning the rotation center close to the hinge axis. This design removes stresses from the hinge pin, reduces stress at the cement/bone interface and produces a more natural kinematic motion. Conventional systems, however, position the hinge posteriorly, which can cause stress loads at both the hinge pin and the cement/bone interface.

### Highly-Congruent Condylar Loading\*

#### EnduRo Hinge Knee System Load Testing\*



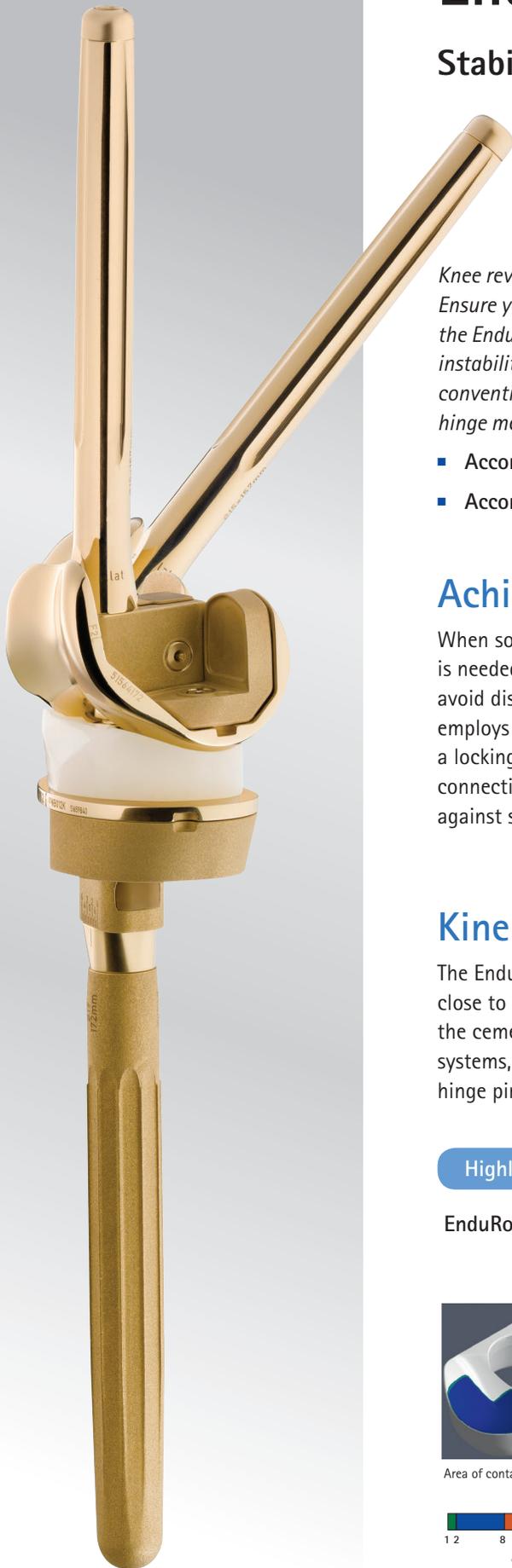
Area of contact: 1050 mm<sup>2</sup>

Area of contact: 1046 mm<sup>2</sup>

Area of contact: 681 mm<sup>2</sup>



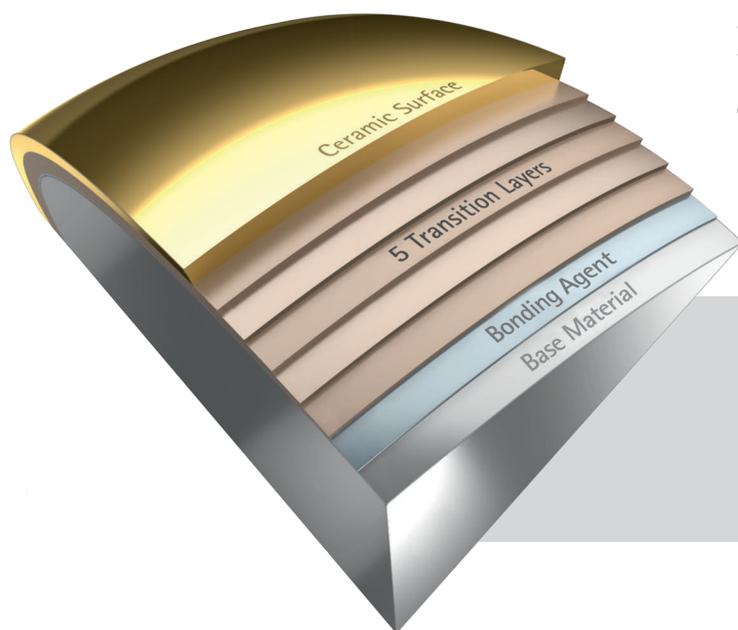
\*1 MPa = 1 N/mm<sup>2</sup> = 145 psi



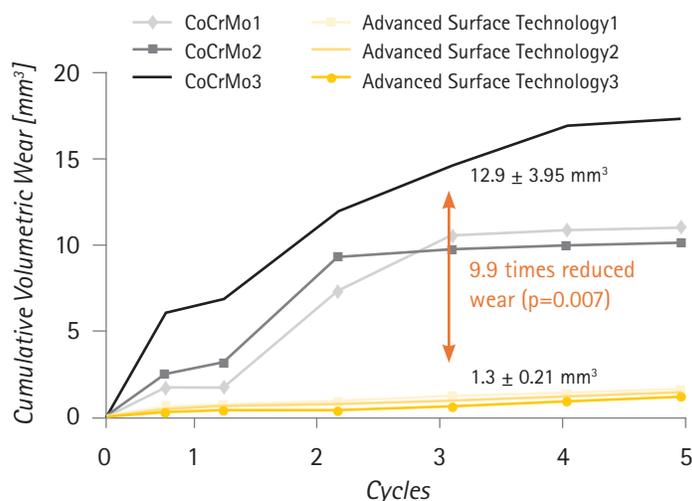
## Technology for Endurance

The EnduRo Hinge Knee System employs flanges and an axle bushing made of carbon fiber reinforced poly-ether-ether-ketone (CFR-PEEK) for its favorable mechanical properties such as high creep and wear resistance. This system, featuring Advanced Surface Technology and CFR-PEEK, demonstrated a significant reduction in wear compared to a traditional CoCrMo system.<sup>2\*</sup> Conventional systems, however, exhibited increased wear on the polyethylene bushing axle.

88% Reduction in Wear\*



EnduRo Hinge Knee System Wear Testing\*



## Advanced Surface Technology

The EnduRo knee features the patented seven-layer Advanced Surface Technology, offering enhanced protection against the top prostheses-related reasons for implant failure and revision: metal ion release and wear.\*



## Minimal Bone Resections

The EnduRo Hinge Knee System accommodates a minimal box resection due to its narrow femoral box width. Conventional systems, on the other hand, contain a bulky hinge that requires a substantial amount of bone resection.

23 mm box width comparable to PS implants

\*The results of in vitro wear simulation testing have not been proven to quantitatively predict clinical performance.

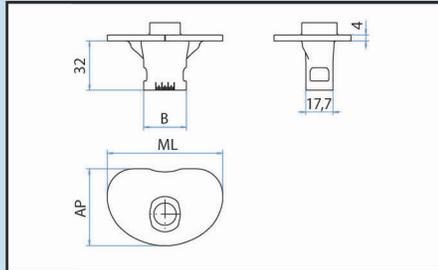
### References

- 1) Ward, W., et al. (2005). Dislocation of Rotating Hinge Knee Prosthesis. J Bone Joint Surg. May 87(5), 1108-1112. Doi:10.2106/JBJS.008377pp.
- 2) Grupp, T.M., et al. (2013) Biotribology of a New Bearing Material Combination in a Rotating Hinge Knee Articulation. Acta Biomaterials. <http://dx.doi.org/10.1016/j.actbio.2013.02.030>.

# DESIGN ELEMENTS

## TIBIA

- Symmetric design
- Cement pockets 1 mm deep
- M/L Offset  $\pm 6$  mm (T1 accommodates  $\pm 4$  mm)

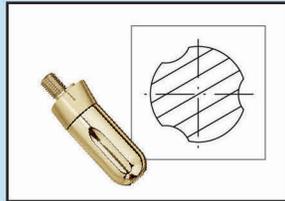


Size	ML	AP	AP/ML	B
T1	67.0	44.0	2/3	23.7
T2	75.0	50.0	2/3	27.7
T3	83.0	56.0	2/3	27.7

## TIBIAL STEMS

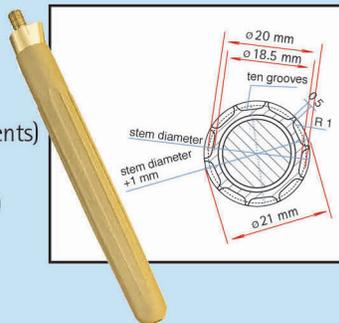
### Cemented

- Cemented: no angle
- Length: 52, 92 mm
- Diameter: 12, 15, 18 mm
- Cylindrical and polished
- Three fluted grooves to reduce the risk of embolism
- Asymmetric "collar" for increased stability



### Pressfit

- Pressfit: no angle
- Length: 92, 172 mm
- Diameter: 11-20 mm (1 mm increments)
- Slightly tapered
- 10 fluted grooves (Wagner Profile)
- Asymmetric "collar" for increased stability

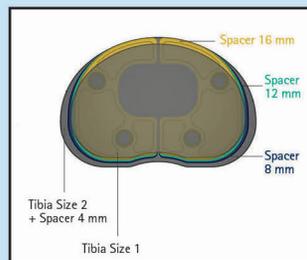


## TIBIAL AUGMENTS

- Cemented pockets 1 mm deep
- Fixated with a screw on the underside of the tibia
- Tibial augment heights: 4, 8, 12, 16 mm
- Anatomical medial or lateral design



	Tibia 1	Tibia 2	Tibia 3
Original ML	67	75	83
Original AP	75.0	50.0	2/3
4 mm ML*	67	75	83
4 mm AP*	44	50	56
8 mm ML*	61	69	77
8 mm AP*	42	48	54
12 mm ML*	58.5	66.5	74.5
12 mm AP*	41.5	47.5	53.5
16 mm ML*	55.5	63.5	71.5
16 mm AP*	40.5	46.5	52.5



\*with 2 tibia spacers

## POLYETHYLENE INSERT

- Size is based on femur size
- Heights: 10-18 (2 mm increments)

# DESIGN ELEMENTS

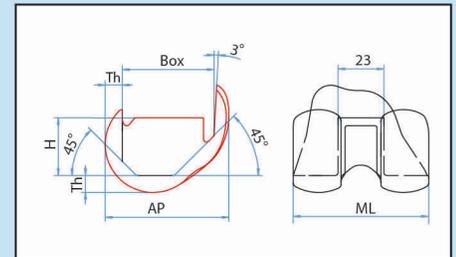
## Femur/Tibia Compatibility Chart

Sizes	F1	F2	F3
T1			
T2			
T3			

- Ideal combination for optimal performance
- Not compatible

## FEMUR

- Single-radius design
- Cement pockets 1mm deep
- Hyperextension stops at 3° for all sizes
- A/P Offset  $\pm 2$ mm

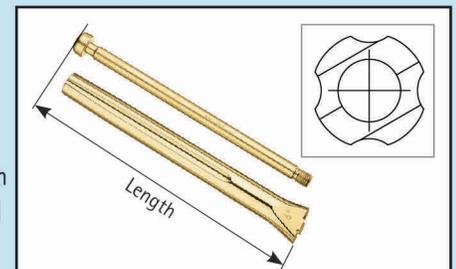


Size	ML	AP	Box	H	Trochlear depth	Th
F1	60.0	54.0	40.0	26.5	4.0	7.0
F2	68.0	62.1	46.7	29.0	5.0	8.5
F3	76.0	70.0	52.0	31.5	5.5	10.0

## FEMORAL STEMS

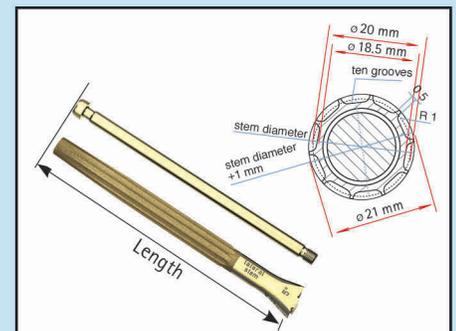
### Cemented

- Cemented: 6° angle
- Length: 77, 157 mm
- Diameter: 12, 15, 18 mm
- Cylindrical and polished
- Four fluted grooves to reduce the risk of embolism



### Pressfit

- Pressfit: 5°, 7° angle
- Length: 117, 177 mm
- Diameter: 12-20 mm (1mm increments)
- Slightly tapered
- 10 fluted grooves (Wagner Profile)



## FEMORAL AUGMENTS

- Cemented pockets 1 mm deep
- Fixated with a distal screw on the backside of the femur
- Distal augment heights: 4, 8, 12 mm
- Posterior/distal augment heights: 4, 8, 12 mm



All rights reserved. Technical alterations are possible. This leaflet may be used for no other purposes than offering, buying and selling of our products. No part may be copied or reproduced in any form. In the case of misuse we retain the rights to recall our catalogs and price lists and to take legal actions.

©2018 AESCULAP. ALL RIGHTS RESERVED. PRINTED IN THE USA.  
Aesculap is an equal opportunity employer

Aesculap Implant Systems, LLC | 3773 Corporate Parkway | Center Valley, PA | 18034  
Phone 866-229-3002 | Fax 610-984-9096 | [www.aesculapimplantsystems.com](http://www.aesculapimplantsystems.com)

Aesculap Implant Systems, LLC - a B. Braun company

DOC1057 Rev A 750 1/18