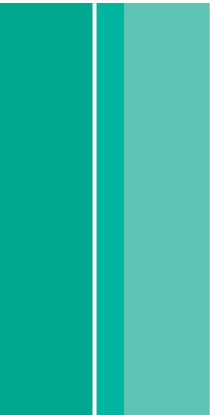


# Aesculap® S4® Spinal System Screws



Aesculap Spine



Excellence in Spine Surgery – S4® Spinal System

# S4<sup>®</sup> Spinal System – Platform Technologies

## Pressure Vessel Effect

The S4<sup>®</sup> Spinal System features a special closure mechanism that enhances interconnection strength by pulling the screw head into the smaller diameter screw body creating a pressure vessel effect. As torque increases to lock the set screw, it's base conforms to the rod while the softer Commercially Pure Titanium (CPT) insert contours around it enhancing the rod grip.

## Interlocking Thread Design

The small volume and low profile design of the S4<sup>®</sup> Spinal System implants improves distraction and compression maneuvers, especially in narrow conditions, and enhances the surgeon's ability to place interbody fusion spacers when distracting off pedicle screws.

## Lock-On-Top Technology

The top-loading, inner set screw of the S4<sup>®</sup> Spinal System features an exclusive undercut thread design that virtually eliminates cross threading. This special undercut thread actually directs the forces inward to prevent splaying of the body, which ultimately results in improved force transmission and efficiency throughout the rod screw construct.

## 3D Steady Fuse

By combining the S4<sup>®</sup> Spinal System with the complementary interbody fusion spacers and fracture management modules, Aesculap offers a true three-column stabilization portfolio, capable of providing the patient a reliable long-term fusion and the surgeon all it takes to operate in spine surgery!



# S4<sup>®</sup> Spinal System – Screw Features

## Screw Body

- **Patented Interlocking Thread Design:**  
Anatomically friendly self-tapping thread design reduces splaying of screw body. The blunt tip allows atraumatic screw insertion.
- **High biomechanical strength:**  
The asymmetrical thread profile and the thread pitch allow for even distribution of force and improved engagement within the pedicle and vertebral body.
- **Single-start thread:**  
Enables tactile feedback for precise screw insertion with less force.

## Screw Head

- **Lock-On-Top-Technology:**  
The undercut thread enhances the homogeneous distribution of anchoring pressure within the screw.
- **Extended Guiding Tabs:**  
Increased rod capture distance of the screw, virtually eliminating need for extra instrumentation (i.e. rocker or rod persuader). Additional support for axial guidance of the set screw, in order to prevent cross threading.
- **In-situ rod adaption:**  
An in-situ rod positioning can be performed, in order to adapt the rod to the individual patient anatomy.
- **Low Profile Screw Head:**  
Reduces anatomical interference and facet joint impingement.



## Set Screw

- **Lock-On-Top Technology:**  
The undercut thread design promotes inward force vectors which normally exert on the walls of the Screw Body, in order to prevent head splay.
- **Versatility:**  
One Set Screw size fits all S4® Spinal System Screws.
- **Self-centralizing:**  
Promotes easy introduction and reduces cross threading.

## Screw Seat

- **Integrated Design:**  
The contoured design of the Screw Seat conforms to the Screw Head for enhanced surface contact.
- **Pressure Vessel Effect:**  
Special set screw locking technology transfers energy throughout the entire polyaxial screw construct. Through this the Screw Seat adapts to the spherical microcontoured ridges on the screw head, transforming the polyaxial screw construct into a solid monoaxial construct.



# S4<sup>®</sup> Spinal System – Solid Screws

## Features

- Solid pedicle screws, available as polyaxial and monoaxial screws.
- 42 degree three dimensional polyaxiality enhances the range of the screw body to ease rod capture.
- Constant outer diameter and cylindrical shaped core give the standard screws a high pull-out resistance and low insertion torque.
- Patented Interlocking Thread Design enhances engagement of the screw within the pedicle and vertebral body.
- Mainly indicated in the treatment of fractures/trauma, degenerative spine diseases (DDD) and spondylolisthesis in combination with open, mini-open and minimally invasive approaches.

## Screws sizes

- The standard screws are available in a comprehensive range of sizes:

Diameter	Lengths
4.5 mm	25-50 mm
5.0 mm	
6.0 mm	25-60 mm
7.0 mm	
8.0 mm	30-60 mm
9.0 mm	
10.0 mm	



# S<sup>4</sup>® Spinal System – Cannulated Screws

## Features

- I Cannulated pedicle screws, available as polyaxial and mono-axial screws.
- I 42 degree three dimensional polyaxiality enhances the range of the screw body to ease rod capture.
- I Constant outer diameter and conical shaped core reflects the load bearing characteristics of the screw, giving it a high pull-out resistance and stability in steady load<sup>1</sup>.
- I Patented Interlocking Thread Design enhances engagement of the screw within the pedicle and vertebral body.
- I Mainly indicated in the treatment of fractures/trauma and degenerative spine diseases (DDD) in combination with minimally invasive surgery.

## Screws sizes

- I The standard screws are available in a comprehensive range of sizes:

Diameter	Lengths
4.5 mm	25-50 mm
5.5 mm	
6.5 mm	25-80 mm
7.5 mm	
8.5 mm	30-80 mm



<sup>1</sup> Beutler, M.D., Peppelman W, M.D., Grupp T, Schilling C, Schumacher J. Evaluation of the endurance properties of the cannulated Ø 4.5 mm and Ø 7.5 mm polyaxial screw for the Aesculap® S<sup>4</sup> Spinal internal fixator system in a single component test setup according to ASTM F2193-02 and ISO 6475:1993 (E) Part 1 [biomechanical test]. 2007 April 6; Thansau / Rosenheim, Germany; Test No. V887.

# S<sup>4</sup>® Spinal System – Augmentation Screws

## Features

- I Cannulated pedicle screws, available as polyaxial and mono-axial screws.
- I 42 degree three dimensional polyaxiality enhances the range of the screw body to ease rod capture.
- I Constant outer diameter and conical shaped core reflects the load bearing characteristic of the screw, which gives the S<sup>4</sup>® Augmentation Screws a high Pull-Out resistance and more stability in steady load<sup>2</sup>.
- I Indicated in the treatment of fractures/trauma, in presence of poor bone quality, in combination with all surgical approaches.

## Screws sizes

- I The standard screws are available in a comprehensive range of sizes:

Diameter	Lengths
5.5 mm	35–50 mm
6.5 mm	35–80 mm
7.5 mm	



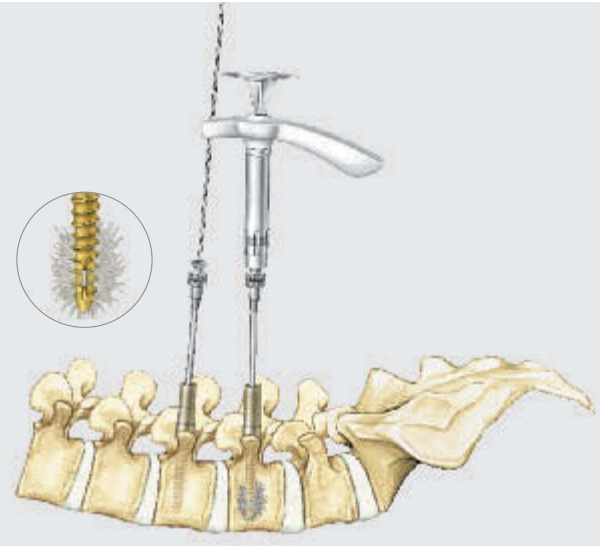
<sup>2</sup> Beutler, M.D., Peppelman W, M.D., Grupp T, Schilling C, Schumacher J. Evaluation of the endurance properties of the cannulated Ø 4.5 mm and Ø 7.5 mm polyaxial screw for the Aesculap® S<sup>4</sup> Spinal internal fixator system in a single component test setup according to ASTM F2193-02 and ISO 6475:1993 (E) Part 1 [biomechanical test]. 2007 April 6; Thansau / Rosenheim, Germany; Test No. V887.



## Features

- I The lateral outlet slots and the conical shaped screw core enable a targeted and homogeneous distribution and sheathing of cement around the augmentation screw. Clinical studies have shown that the slotted screws are superior to common perforated augmentation screws<sup>3</sup>.
- I Application Cannula:  
The harmonized interface between the augmentation screw and Application Cannula is closed to cement, but simultaneously permeable to air. Due to this combination the air can escape during the augmentation, with which a penetration of air in the vertebral body can be counteracted.

<sup>3</sup> Kafchitas K, Geiger F, Rauschmann M, Schmidt S. Zementverteilung bei Vertebroplastieschrauben unterschiedlichen Designs. *Der Orthopäde* 2010. 39:679-686.



# S4<sup>®</sup> Spinal System – SRI Module

## Features

- The S4<sup>®</sup> SRI is a mechanical apparatus that attaches to the pedicle screws and allows precise control of all facets of the reduction, providing a gradual and reliable reduction.
- The design of the S4<sup>®</sup> SRI facilitates simultaneous correction of translation and slip angle via the mechanism of levered derotation.
- Reduces the listhetic vertebral body along the same curved displacement route, reducing interference with anatomical structures and eliminating neurological deficits that typically result from initial over-distraction of an already stretched nerve root.
- The system allows reduction of spondylolisthesis with single level fusion, leaving adjacent levels intact if desired.



# S4® Spinal System – FRI Module

## Features

- The S4® FRI was designed to correct deformities of the spine caused by severe trauma.
- With precision and control, the FRI provides the potential to limit neurological injury, restore sagittal balance, reduce loss of function and facilitate a more rapid rehabilitation for your patient population.
- The S4® FRI allows the performance of three fracture reduction functions either individually or in combination:
  - Distraction
  - Compression
  - Restoration of the original lordosis
- The S4® FRI Module can be used in an open, mini open, and percutaneous approach in conjunction with the S4® Spinal System.





Homepage:  
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Brochure No. 076002

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