



Years of  
Passion for Dental  
Excellence



**CONTEC**

THE BASIS FOR LONG  
LASTING RESTORATIVE  
STABILITY

**CYTEC**

**EXATEC**



**FOR 30 YEARS, HAHNENKRATT HAS BEEN AN INNOVATOR  
IN DENTAL FIBER COMPOSITE TECHNOLOGY**

**1995:** 1. ROOT POST MADE OF HT CARBON FIBER

**1998:** 1. ROOT POST MADE OF QUARTZ FIBER

**2001:** 1. ROOT POST MADE OF HT GLASS FIBER



Fiber composite material from nature  
Source: Cap Lardier, Mediterranean

# OVERVIEW OF THE BENEFITS

CONTEC <sup>pro</sup> AND CYTEC <sup>pro</sup> , <sup>pro</sup> LightTransmitting	04
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# CONTEC**pro** CYTEC**pro** **pro** LightTransmitting

The new translucent **pro** root posts are an excellent addition to the CONTEC and CYTEC root posts made of white opaque HT glass fiber, which have been proven in clinical use worldwide for more than 20 years.

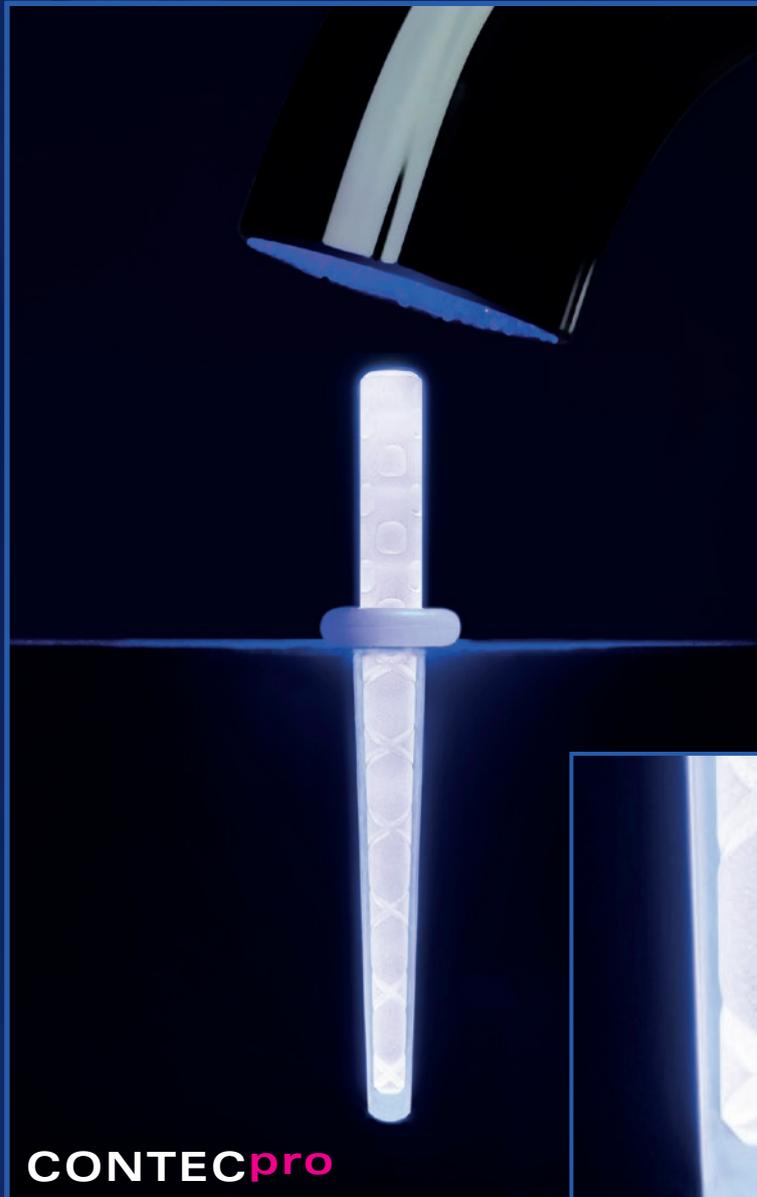
**pro** LightTransmitting extends across the entire apical post area, enabling an optimized and simultaneously shortened primary curing of the composite right up to the apical tip of the root post.

In a tightly scheduled procedure, every second counts. These saved seconds allow the dentist to proceed to the next step without any time loss.

The new **pro** modules feature the same outstanding properties as the CONTEC and CYTEC posts, which have been trusted in practice for over 20 years, in particular:

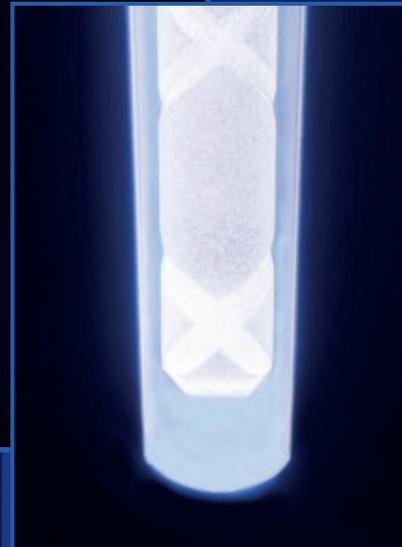
- ▶ **Maximum Flexural Strength**
- ▶ **Highest Fatigue and Fracture Resistance**
- ▶ **Homogeneity through Dentin-like Modulus of Elasticity**
- ▶ **Strong adhesive bond due to the microporous, micro-retentive structure of the root post surface.**
- ▶ **High Radiopacity**





**CONTEC**pro

pro LightTransmitting



# MAXIMUM FLEXURAL STRENGTH

## FOR OPTIMIZED FATIGUE AND FRACTURE RESISTANCE

### Flexural Strength According to DIN EN ISO 178 Plastics – Determination of Flexural Properties

This standard, DIN EN ISO 178, is frequently cited in scientific literature.

At the Leibniz Institute for Composite Materials at Kaiserslautern University of Technology, we commissioned three-point bending tests on our CYTECpro and CYTEC root posts, as well as on root posts from five competitors.<sup>1)</sup>

#### Test Setup

Determination of Flexural Properties of Root Posts According to DIN EN ISO 178

Material:	Root posts made of glass fiber, round
Diameter:	approx. 1.5 mm
Number of Test Series:	7
Number of Samples per Series:	4

#### Setup

Testing Machine:	Zwick Retroline
1445 Load Cell:	10 kN
Pre-load:	0.1 N
Test Speed:	2 mm/min
Span Length:	12 mm
Temperature:	Room temperature
Relative Humidity:	50 %rH

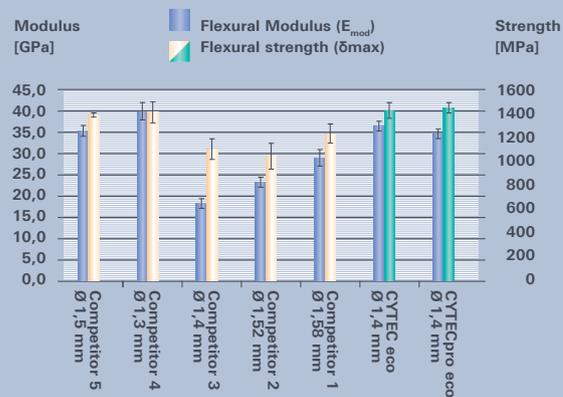
The two HAHNENKRATT root posts achieve nearly identical flexural strength with the following values:

1.400 MPa – CYTEC eco

1.430 MPa – CYTECpro eco



**FIGURE 1 FLEXURAL STRENGTH**



Tests conducted in October 2025 at the Leibniz Institute for Composite Materials, Technical University of Kaiserslautern<sup>1)</sup>

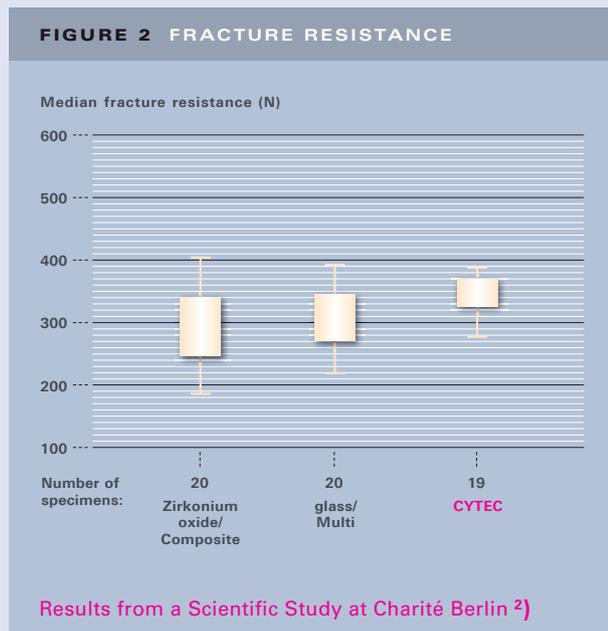
# HIGHEST FATIGUE AND FRACTURE RESISTANCE

## FOR OPTIMIZING THE STRENGTH OF A ROOT POST RESTORATION

The very high flexural strength of our materials results in exceptional fatigue and fracture resistance. These findings are supported by comparative scientific studies, as demonstrated in the following example:

Study at Charité Berlin on the mechanical load-bearing capacity and fracture pattern of various post-and-core systems after artificial aging. Results of an in vitro study under standardized conditions.<sup>2)</sup>

### Highest Fracture Resistance for CYTEC



Study at the University of Regensburg: Specimens with CYTEC achieved an even higher fracture resistance of **509 N (median)**, although the initial specimens—regarding the bonding of composite cement to the tooth (transition cement-tooth)—showed only 72% »Perfect Margin before TCML«.

This value of 509 N was determined after a simulated service period of 5 years (TCML 6000 x 5°C/55°C, each 2 min,  $1.2 \cdot 10^6$  x 50 N) ermittelt. These specimens were additionally restored with a ceramic crown (ferrule effect).<sup>3)</sup>

For comparison:

Scientific studies report occlusal loads of 30–80 N for premolars and canines, and 150–250 N for incisors.

# HOMOGENEITY THROUGH DENTIN-LIKE MODULUS OF ELASTICITY

FOR REDUCING STRESS TRANSMISSION AND THE ASSOCIATED RISK OF ROOT FRACTURES

According to Prof. Dr. Wintermantel from the Chair of »Biocompatible Materials and Designs« at ETH Zurich, the following applies to load-bearing implants: »A key requirement for the structural compatibility of load-bearing implants is their homoelasticity, which refers to the approximation of an implant's elastic deformation behavior to that of the surrounding tissue.«<sup>4)</sup> This principle also applies to root posts.

Our HT glass fiber posts have a dentin-like modulus of elasticity, unlike titanium or zirconia. This allows for an approximation of the required homoelasticity. A more homogeneous root restoration reduces the risk of root fractures and supports the stability of the restoration.

With the same modulus of elasticity, homogeneity is achieved, and there is no transfer of forces – for example, this is why a wooden peg cannot be hammered into wood.

Bionics provides guidance for the technical implementation of constructions inspired by biological systems. Millions of years ago, nature created fiber-reinforced »structures,« long before humans conceived the idea of developing fiber-reinforced materials.

The SEM image shows the micro-retentive structure of the CYTEC post surface.

## E-MODULUS COMPARISON:

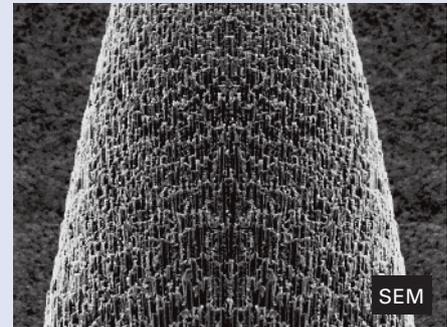
**HAHNENKRATT HT-Glass Fiber** ≈ 35,0 GPa

Modulus of Elasticity (Flexural Modulus) Determined According to DIN EN ISO 178: Plastics – Determination of Flexural Properties

**Dentin** ≈ 18,6 GPa

**Titanium** 117,0 GPa

**Zirconia** 190,0 GPa



# STRONG ADHESIVE BOND

FOR MINIMIZING THE RISK OF  
RETENTION LOSS OR RE-INFECTION

EXATEC, CYTEC AND CONTEC have a **microporous** surface. Under SEM, the **micro-retentive** structure of the glass fiber can be seen, which optimizes adhesion to the composite.

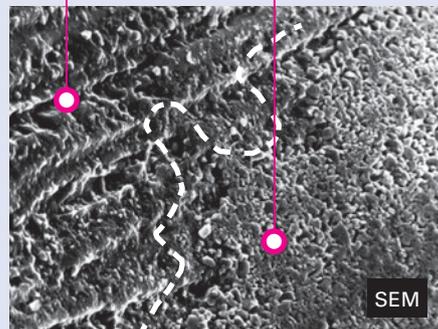
The **special mesh structure of the post surface** enhances retention and thereby optimizes the adhesive connection between the post and the resin (bonder/composite). The result is a strong adhesive bond – simply and efficiently, **without the use of silane**.

On the following pages, we present results from various scientific studies that demonstrate this effect through pull-out tests.

The retention grooves in the crown area also provide an optimal connection for composite build-ups with a high filler content.

Root Post with Bonder –  
Fiber Structure still visible

Root Post with  
Bonder + Composite

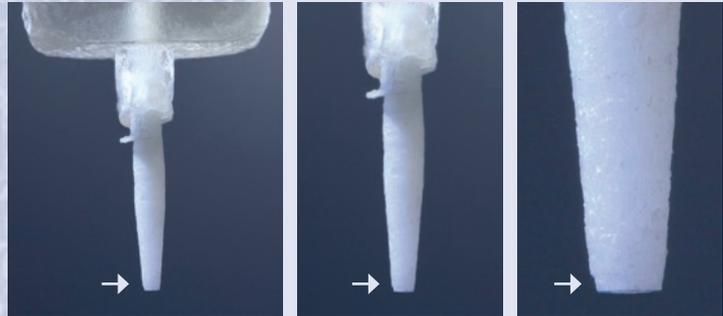
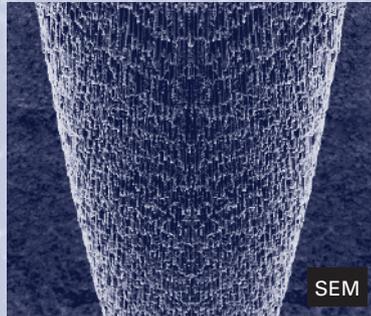


# STRONG ADHESIVE BOND

## SCIENTIFIC STUDIES

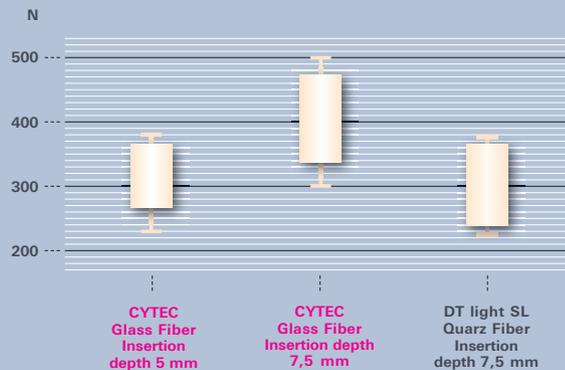
Status after Pull-Out Test: The nearly complete bonding with Panavia F 2.0 demonstrates the high adhesion strength to the CYTEC post surface **without** the use of silane.

Reliable adhesion through a micro-retentive surface.



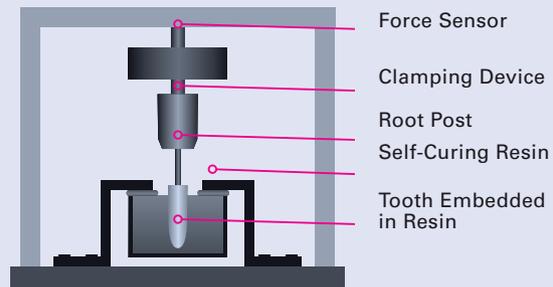
### SCIENTIFIC STUDY AT CHARITÉ BERLIN

**FIGURE 3 PULL-OUT TEST AT VARIOUS INSERTION DEPTHS**



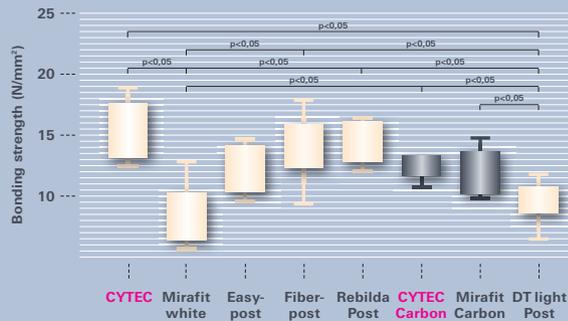
Results from a Scientific Study at Charité Centrum 3, Berlin, Clinic and Polyclinic for Dentistry, Oral and Maxillofacial Medicine, Department of Restorative Dentistry. Published in Endodontie Journal 2/2009 <sup>5)</sup>

This scientific study, published in the Endodontie Journal 2/2009 <sup>5)</sup>, shows that even with adhesive cementation using composites, retention is significantly influenced by the insertion depth. The comparatively higher retention values for Cytec at the same insertion depth suggest that the **mesh-like structure of the post surfaces** – in addition to the micro-retentive surface of the HT glass fiber – positively affects retention and increases the values.



SCIENTIFIC STUDY AT  
THE UNIVERSITY OF ROSTOCK

**FIGURE 4** PRESENTATION OF THE DETERMINED BOND STRENGTH VALUES AND THEIR SIGNIFICANCE



Published in BiomedTech 2009  
Scientific Study at the University of Rostock <sup>6)</sup>

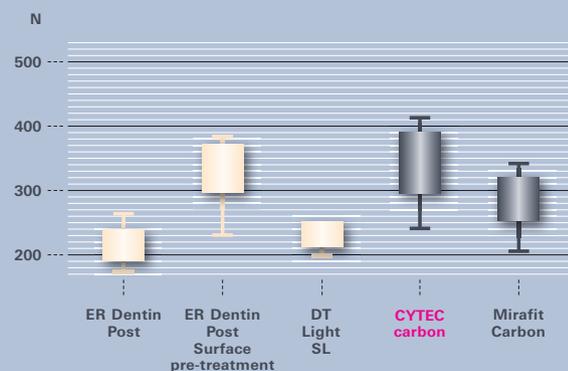
This scientific study was conducted in collaboration between the »Clinic for Dental Prosthetics« and the »Institute of Biomedical Engineering« at the University of Rostock.

The study investigated »The influence of macro- and microstructure on the wetting and retention properties of root canal posts in vitro.« The bond strength values and significances of the fiber posts, as shown in *Figure 4*, were determined for comparison. <sup>6)</sup>

◀ CYTEC blanco achieves the highest bond strength in comparison. This demonstrates that the unique surface structure of our root posts supports micro-retentive adhesion and leads to optimized bonding between the post and the adhesive cement.

SCIENTIFIC STUDY AT  
HANNOVER MEDICAL SCHOOL

**FIGURE 5** PULL-OUT TESTS



Results from a Scientific Study at Hannover Medical School, Department of Dental Prosthetics <sup>3)</sup>

Specimens with CYTEC Carbon root posts – without silanization – achieved higher pull-out values of 322.94 N (median) in this in vitro study, demonstrating significantly better adhesion compared to the so-called »safety lock« (SL) coated quartz fiber root posts.

Within the group of glass fiber root posts, which – unlike CYTEC Carbon – were silanized on the coronal side, the best specimens from competitors achieved a pull-out force of only 305 N (median). This value is still 5.5% lower than the 322.94 N achieved with CYTEC Carbon. <sup>7)</sup>

◀ The high retention values for CYTEC Carbon demonstrate that translucency of the post is not necessary for achieving a **final**, optimal adhesive bond between the post and the resin. Dual-cure bonding agents or composites cure optimally – even in the depths of the root canal – without light activation.

# HIGH RADIOPACITY OF HT GLASS FIBER FOR EXCELLENT X-RAY CONTRAST WITH DENTIN

As part of the preparation of the MDR Technical Documentation, tests were conducted to verify radiopacity in accordance with DIN EN ISO 13116: Dentistry – Test Methods for Determining the Radiopacity of Materials.

Dentin has a radiopacity equivalent to that of aluminum and is defined in the standard as 100% Al.

Root Post	Diameter	Röntgensichtbarkeit (Mittelwert) % Al
CONTECpro	0.70 – 1.10 mm	195 % Al
CONTECpro	0.85 – 1.30 mm	201% Al
CYTECpro	0.52 – 1.00 mm	218% Al
CYTECpro	0.82 – 1.40 mm	224% Al
Competitor VDW Dentsply DT Light Posts	0.80 – 1.25 mm	187% Al

The tests conducted show that even the root posts with the smallest diameters exhibit high radiopacity, with 195.5% Al (CONTECpro) and 218% Al (CYTECpro). This results in excellent X-ray contrast of our root posts compared to dentin, which has a radiopacity of 100% Al.

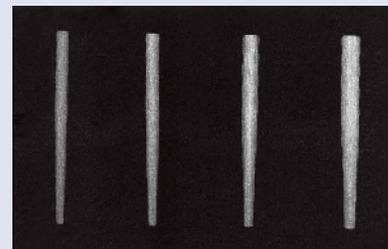


◀ CONTECpro  
LightTransmitting  
Ø 1.5 mm

Tooth 24  
Mesial radiographic view

The tooth was extracted prior to post placement due to periodontitis with associated bone loss and mobility grade III.

CONTEC:  
Ø 1,3 / 1,5 / 1,75 / 2,0 mm



▲ Radiopacity increases with the diameter of the root posts.

# EFFICIENT AND SHARP CUTTING INSTRUMENTS

## FOR THE MOST DENTIN-CONSERVING ROOT CANAL PREPARATION

The stability of the root post restoration is optimized by the precise fit between the drill hole and the root post. In addition to the high quality of the fiber composite materials, the high quality of the drilling instruments is therefore also crucial.

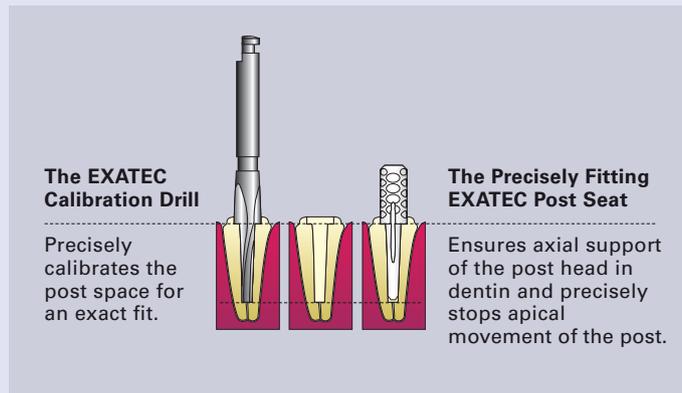
Our calibration drills feature four cutting edges, ensuring smooth operation. A refined cutting geometry and honed edges provide efficient preparation while preserving dentin.

State-of-the-art measurement technology ensures consistently high quality at the micrometer level.



▲ CONTEC, with its »Double Taper Design,« is designed for more conical roots, while Cytec is intended for more cylindrical roots.

EXATEC is indicated for coronal defects with a large post head.



# SCIENTIFICALLY TESTED AND CLINICALLY PROVEN SINCE 2001

GIVES YOU THE CONFIDENCE OF SAFETY

In 1995, HAHNENKRATT was the first company in Germany to launch a carbon fiber root post, setting a new development trend in dentistry.

In 1998, quartz fiber root posts followed. In 2001, Exatec and Cytec became the first root posts made from HT carbon fiber and HT glass fiber. In 2007, Contec was introduced with the »Double Taper Design.«

Scientific studies have demonstrated the superior quality of the materials we use and the excellence of our root posts.

A selection of these studies and their results was presented on the preceding pages.



## QUINTESSENCE

BA's early as 1994, A. Stiefenhofer et al. wrote in their scientific work »Biomechanical Investigations of Post Restorations Using Finite Element Analysis« about metal root posts: »... post crowns exhibited a failure rate of 5.2–13.6% ... Failures of post anchorage can generally be categorized into **retention loss, post fractures, and tooth fractures.** «<sup>8)</sup>

The quintessence of scientific findings as well as long-term clinical experience – for example, since 2003 at the Polyclinic for Dental Prosthetics, ZZMK Carolinum, Frankfurt am Main<sup>9)</sup> – demonstrate the decisive advantages of our root post systems. These advantages allow the successful mitigation of the three risks identified by A. Stiefenhofer et al., which are addressed by the following three key properties:

- ▶ **Micro-retentive structure of the post surface**  
**Reduces the risk of retention loss or reinfection.**
- ▶ **Optimized flexural strength**  
**Reduces the risk of post fracture.**
- ▶ **Dentin-like modulus of elasticity**  
**Reduces the risk of tooth fracture.**

**With these three advantages, CONTEC, CYTEC, and EXATEC provide you with the best foundation for a long-lasting, highly stable restoration.**

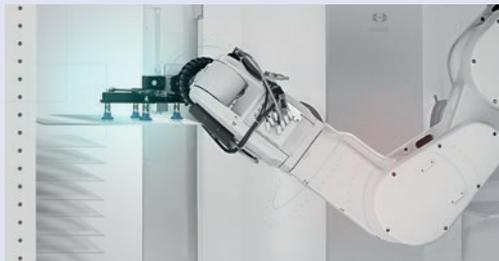
# MADE IN KÖNIGSBACH-STEIN

QUALITY CREATES TRUST – FOR OVER 90 YEARS  
100% MADE IN GERMANY

Since 1932, dentists worldwide in over 120 countries have successfully worked with HAHNENKRATT dental instruments, demonstrating their trust in our products.

Innovative strength, the targeted use of high-tech solutions in development and production, and a collaborative team spirit form the foundation for the consistently high quality of our dental products.

Our in-house development and specialized machine construction are at the heart of our success story – now in its fourth generation.



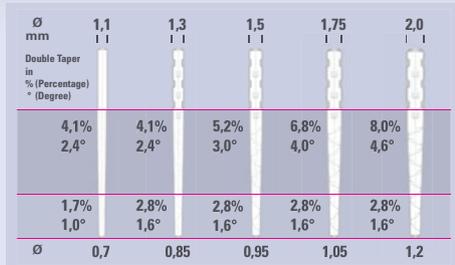
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# PRODUCT OVERVIEW

## ROOT POST SYSTEMS

### CONTEC



REF 44 600 CONTEC, Standard Set

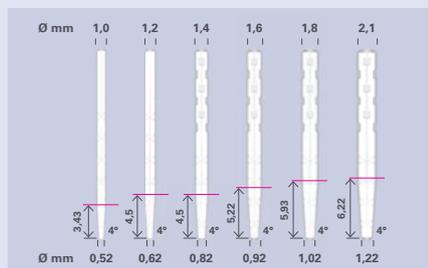
All sets are delivered in a shipping box.



Refill Pack

CONTEC Root Post System	universal	1.1 mm	1.3 mm	1.5 mm	1.75 mm	2.0 mm
Code	–	red	white	yellow	blue	black

### CYTEC



REF 43 600 CYTEC, Standard Set

All sets are delivered in a shipping box.



Refill Pack

CYTEC Root Post System	universal	1.0 mm	1.2 mm	1.4 mm	1.6 mm	1.8 mm	2.1 mm
Code	–	red	white	yellow	green	blue	black



Years of  
Passion for Dental  
Excellence



## EXATEC



REF 42 600 EXATEC, Standard Set  
All sets are delivered in a shipping box.

Refill Pack

EXATEC Root Post System	Pin head Ø	universal	2.6	2.7	2.8	2.2
	Apical post length		6.6	8.0	9.7	–
	Apical post Ø ▲		1.461	1.559	1.681	–
	Apical post Ø ▼		0.98	0.98	0.98	0.98
	mm		mm	mm	mm	mm
	Code	–	white	yellow	blue	green

## SYSTEMBOX



Example:  
CONTEC System Box  
REF 10 002 (empty)



REF 10004 (empty) + 10100

Information and  
Inspiration  
[www.hahnenkratt.com](http://www.hahnenkratt.com)





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