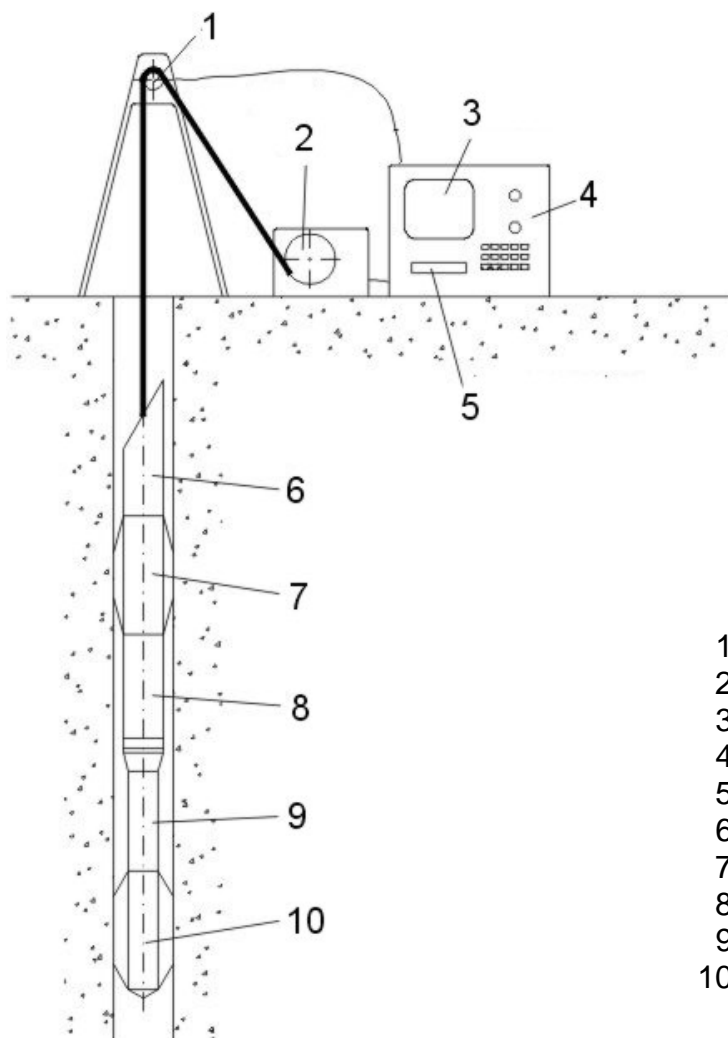




The optical borehole televiewer probe ETIBS® (Ettlinger Total Image Borehole System) is applied for optic control of geological exploratory drillings or cased well borings. This entails a recording of the borehole wall with a CCD camera by way of a truncated cone mirror. The truncated cone images that are taken when monitoring the borehole give a deformed reproduction, joined together in cross stripes, – that's why the probe is called optical borehole televiewer probe. Its depth position is determined by an electric depth meter over which the cable runs into the borehole. Fig. 1 shows the principle of the monitoring device.



- 1 Deflection pulley
- 2 Winch with depth meter
- 3 Monitor
- 4 Computer
- 5 Data recorder
- 6 Connection device
- 7 Center device
- 8 Compass module
- 9 Camera module
- 10 Center device

Fig. 1 Principle of the monitoring device with the optical borehole televiewer probe ETIBS®



By means of an arithmetical rectification of the images with the help of geometric relations a continuous image of the borehole wall is created on the screen. By simultaneously measuring the azimuth, probe related, and the inclination of the drilling the spatial position of the reproduction is known and the continuous image can be provided with geographical coordinates.

The structural elements as jointing, bedding, schistosity, etc. are also represented as intersection lines with the cylindrical drilling. From their graph resp. from the position of the inflection points of these curves the direction and the angle of incidence of the structural elements can be calculated with a special software and the width of fissure openings can be measured. The RQD-values, determined with the help of the drill cores, can be checked with the scanner recordings as drill-related core ruptures can be identified.

The resolution along the borehole axis amounts to 0.2 mm, the borehole circumference is resolved with 1200 points per line. Due to the digital recording of the images a manifold of user-specific presentations is possible, furthermore the user itself can compile and transform the images in PDF form using standard software. The image data are available on compact disc to duplicate them without degradation.

By comparing the recording with a colour standard you can check the retention of the rock colour. By touching up the bitmaps the colour can also be matched additionally according to a standard colour scale.

Our experience with the borehole probe ETIBS® has shown that the used probe must be adapted to the diameter of the borehole to be explored.

The annular gap between probe and borehole wall should be as small as possible to obtain an optimum image of the borehole wall. This is especially important when monitoring underneath the groundwater level. Only this guarantees that the water filled annular gap can be penetrated by the light of the probe, even if the water is troubled by floating particles.



Several borehole probes ETIBS® are available which have been designed for drilling diameters from 75 up to 300 mm. The borehole probe ETIBS® 97 is entirely used in vertical exploration drillings. Due to their light construction the borehole probes ETIBS® 76 and ETIBS® with interchangeable head are also ideal for inclined or overhead boreholes because they can be pushed into boreholes of this type by means of slide rods.

Technical Data ETIBS^Ø 96

General conditions

- Exploration of geological drillings down to a max. depth of 300 m,
- pressure-water-tight up to 30 bar,
- borehole diameter of up to 200 mm.

Dimensions

Camera module	l = 810 mm, Ø = 96 mm
Center device	l = 390 mm, Ø 100 - 147 mm
Connection device	l = 125 mm, Ø = 96 mm
Probe complete	l = 1325 mm
Truncated cone mirror	Ø 80 x Ø 30 x 25 mm

Weight

Probe complete	approx. 25 kg
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Lens

Max. resolution along borehole axis	0.2 mm (dependent on the difference between borehole and mirror diameter)
Resolution along borehole circumference	approx. 1200 points

Compass

Resolution	± 0.5 °
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Technical Data ETIBS⁰ with interchangeable head

General conditions

- Exploration of geological drillings down to a max. depth of 300 m,
- pressure-water-tight up to 30 bar (starting from camera head 96),
- borehole diameter of up to 300 mm.

Dimensions

Camera head 70	l = 195 mm, Ø = 70 mm
Camera head 96	l = 210 mm, Ø = 96 mm
Camera head 142	l = 370 mm, Ø = 142 mm
Camera module	l = 500 mm, Ø = 70 mm
Center device	l = 700 mm, Ø 75 - 300 mm
Connection device	l = 125 mm, Ø = 70 mm
Probe complete	l = 1875 up to 2006 mm depending on camera head

Weight

Probe complete approx. 24 kg

Lens

Max. resolution along borehole axis 0.2 mm (dependent on the difference between borehole and mirror diameter)

Resolution along borehole circumference approx. 1200 points

Compass

Resolution ± 0.5 °

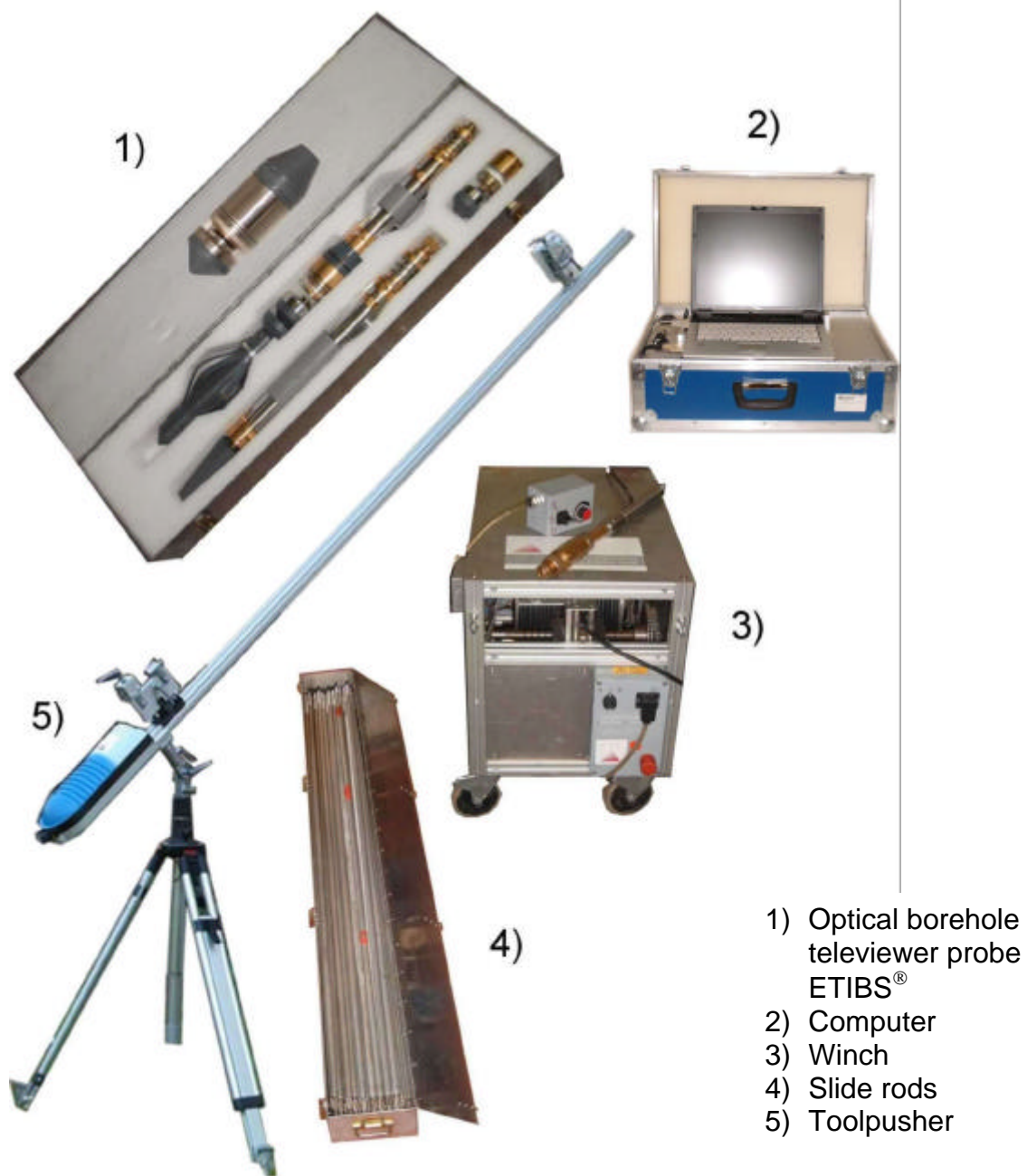


Fig. 2 Components of the Optical Borehole Televiwer Probe ETIBS®



Sales Information and Prices

12.2.1	Probe for interchangeable camera heads with integrated compass	8.925,00
12.2.2	Interchangeable camera head 70	6.825,00
12.2.3	Interchangeable camera head 96	8.085,00
12.2.4	Interchangeable camera head 142	10.185,00
12.2.5	Center device for interchangeable camera head 70 and 96 in vertical drillings	3.485,00
12.2.6	Center device for interchangeable camera head 70 and 96 in inclined drillings, please indicate desired borehole diameter	2.600,00
12.2.7	Center device for interchangeable camera head 142 in vertical drillings	2.485,00
12.2.8	Probe cable per m	18,20
12.2.9	Tripod with 2 deflection pulleys	2.080,00
12.2.10	Winch with depth meter and cable guidance	15.382,00
12.2.11	Slide rods consisting of individual lengths of 2 m	167,00
12.2.12	Slide and pull device (Tool Pusher)	11.340,00
12.2.13	Data recording and data readout unit	10.284,00
12.2.14	Evaluation program with 1 day instruction at GIF	4.900,00

All prices in EUR plus V.A.T.
 Plus costs for packing and transport
 Our General Conditions of 2004-04-29 are valid