



# AVALON+

The ultimate **'smoothness'**  
**check** while polishing



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### Introduction

The 'smoothness' of a facet is the degree in which polishing lines are visible. It is therefore an important aspect of the finish grade of a diamond's facet.

Because of the constantly increasing quality demands placed on polished diamond, smoothness becomes increasingly an important diamond quality feature.

### Detection methods

#### The loupe

Many polishers evaluate 'smoothness' with a loupe (magnification 10x). The facet is observed under a small angle. The difficulty of this method lies in the positioning of the stone in relation to a light source, in order to put the facet in reflection (known as 'scheerlicht'). Varying the light intensity by tilting the stone makes the polishing lines visible.

#### The microscope

The evaluation of 'smoothness' with a microscope is done in the same way as with the loupe, or through the stone. However, by using a microscope, one has better control of lighting conditions and stone manipulations. The availability of higher magnification is an additional improvement.

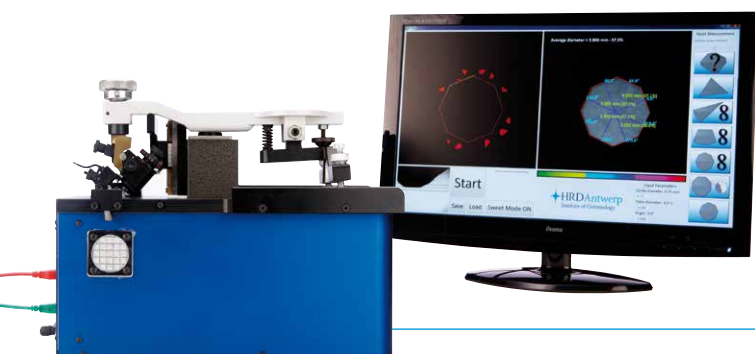
#### Avalon

By using a special light source, Avalon visualises the surface finish of a facet with very high contrast. This requires the facet to be positioned perpendicularly to the optical axis of the measuring tool, which can easily be achieved when the stone is still in the tang. This brings us to the essence of the device. 'Smoothness' can be observed by the polisher (during the polishing process and without having to remove the stone from the tang) and allows him to intervene immediately when necessary. The polisher will be able to visualise smoothness without any difficulty, whereas a later examination of the stone can only be completed with traditional and less user-friendly tools.

The result is an increased efficiency.

To minimise the polisher's subjectivity when assessing a diamond's smoothness, WTOCD developed an upgrade of the Avalon: the **Avalon plus** or **Avalon+**.

This upgrade allows facet's smoothness to be objectively measured and colour graded according to the HRD Antwerp standards for polish grade.



### Avalon+: surface morphology of diamond

#### Description

Polishers and graders evaluate the polished surface in a different way because of the different viewing conditions. This can lead to inconsistencies in the evaluation of the polish grade and to discussions between graders and polishers.

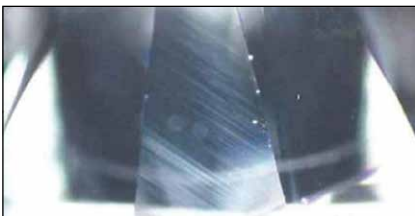
Intelligent automation can provide accurate and consistent information on the polish grade. The 'Avalon+'

has been developed to help polishers in meeting the requirements of today's diamond grading.

The Avalon+ can be used for:

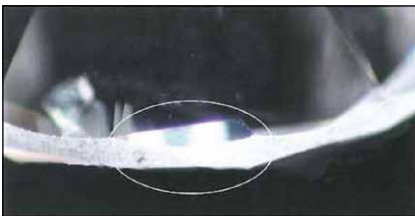
- detection, measurement and grading of the polished quality of a facet;
- absolute and relative measurements of the facet geometry.

#### What can be detected?



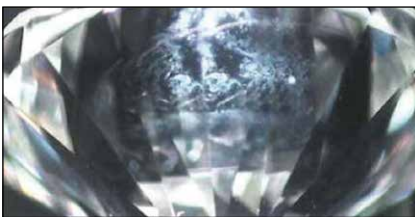
##### Polishing lines

The picture shows an image of polishing lines on a pavilion half. Heavy polishing lines are clearly visible as a pattern of white stripes under oblique light. The polish grade will depend on the visibility of the polishing lines.



##### Extra facets

The picture also shows extra facets. These appear by accident or to mask remainders of the rough diamond. In both cases, they lead to a downgrade of the polish grade.



##### Burn marks

Burn marks look like faint oil stains on the facet. These marks can be more obvious when looking at the defect through the diamond from the opposite side. The cause of burn marks is oxidation of the surface due to overheating the diamond during the polishing process.



##### Fine Scratches

Fine scratches can lead to a downgrade of the polish grade. This depends on the visibility. According to the internationally recognized grading rules, diamond grading has to be performed when viewing the diamond from the crown side with a loupe 10x. Graders often tend to look at scratches on the table, through the pavilion side. This can lead to discussions between grading labs and polishers about the correct polish grade. Very fine 'naat' lines and structure failures on the facet surface are also visible and can lead to the same discussions.

All these 'defects' are seen and measured by Avalon+.

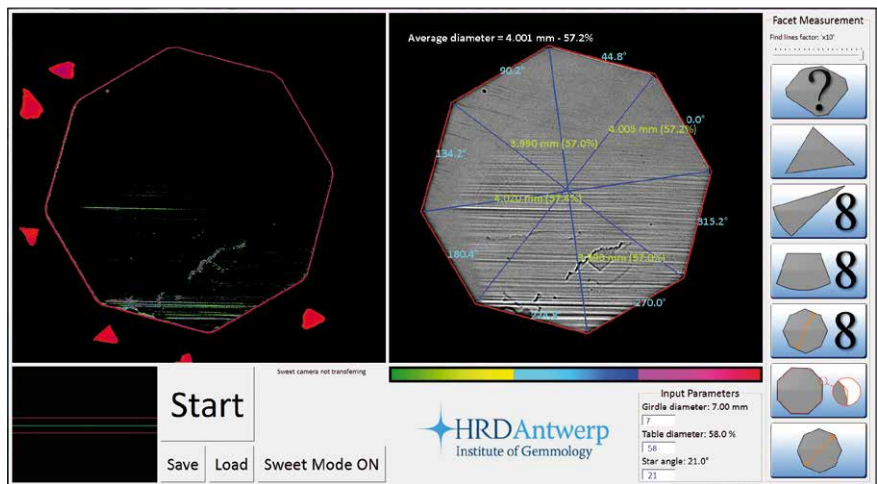
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## Facet geometry

This instrument can also perform facet measurements, through the girdle as reference for its measurements. This implies that the girdle has to be perfectly round and parallel to the table. Unlike other measuring tools, the Avalon+ uses a plane

- Measurement of the table (totally finished, or in eight or partial polished).
  - Input of the diameter of the stone is required
  - Results: - absolute dimensions edge to edge
    - proportional table size (in relation to the diameter)



- Dimensions of any facet, like for fancy shapes, can be measured.



## AVALON+

### Colour coded visibility grading of polishing lines

## What you need to know about your Avalon+

### The benefits of Avalon+

- A sharp and high resolution image
- Minor internal reflections disturbing the image
- No dust on the optical system, because an airflow is created inside-out
- A colour coded evaluation of the visibility grade of polishing lines
- Extra facet measurements to improve production
- The polisher can rely on the images:
  - The stone can stay in the tang until the surface is polished to the required quality
  - Corrections can be done immediately
  - No waste of production time due to insufficient 'zoeting'
  - Less rejects from the grading department
- Excellent tool for training and educational purposes

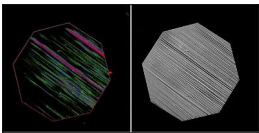


Figure 1: FT-IR spectra of a natural diamond (blue curve), cubic zirconia (green curve) and moissanite (red curve).

### Avalon+ characteristics

- No limits in size for polishing grading
- Two versions for facet measurements:
  - Model 1 for stones up to 10 ct
  - Model 2 for stones up to 1 ct
- PC required with NVidia graphic card (minimum Geforce to be specified)
- Flat screen required Full HD (1920 x 1080) (min. size: 21,5")
- Can be built-in in Pendragon-bench

Dimensions: 332 x 147 x 142 mm

Weight: ± 10 kg

Power supply: 230 V, 50/60 Hz



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**HRD ANTWERP IS BASED IN ANTWERP,  
DIAMOND CAPITAL OF THE WORLD.**

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