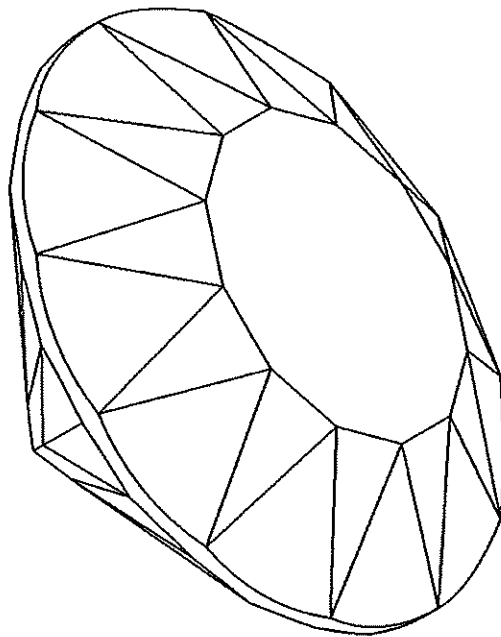
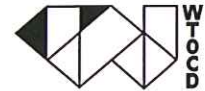


## Sun of Namibia





## Introduction

In January 2006 WTOCD was approached to make a study of the optical performance of the “Sun of Namibia” cut created and developed by Hardstone Processing (HSP).

## WTOCD

Wetenschappelijk en Technisch Onderzoeks-Centrum voor Diamant stands for: Scientific and Technical Research Center for Diamond. It was founded in 1977 by the Belgian gem diamond manufacturers. The main goal was to give technical support and to develop machinery and devices for diamond manufacturing. The first projects focused on abrasive sawing, bruting and yield optimisation of diamond.

In the field of yield optimisation WTOCD played a pioneering roll. From the start there was a joined project on optimisation techniques together with the University of Namur, supported by the government. Afterwards the focus shifted to 3D reconstruction of rough diamonds with the aid of image processing. This led to several products containing the results of these ongoing studies, namely, Solid, Merlin and AutoMark.

In the field of laser machining first the expertise was built on the physical process of laser interaction with diamonds. In the early 90's the idea grew to combine the efforts of the rough analysis team together with the laser knowledge into a 3D laser machine for diamonds. The result was Solid, an acronym for Scanning and Optimising Laser Integrated Device. Today this is still, worldwide, the only laser machine capable of real 3D-machining.

WTOCD was one of the co-designers of the Flanders Brilliant. We improved the look of the model and improved the accuracy of the cutting process by rearranging the order in which the facets were polished. More recent work is kept confidential because of patent issues.

The focus in all projects is moved to intelligent software. There is a continuous growth of software-integrated devices. Besides embedded software development there is also desktop software development. The topics are simulation of the cutting process, custom model designer, brilliant cut properties and several others.

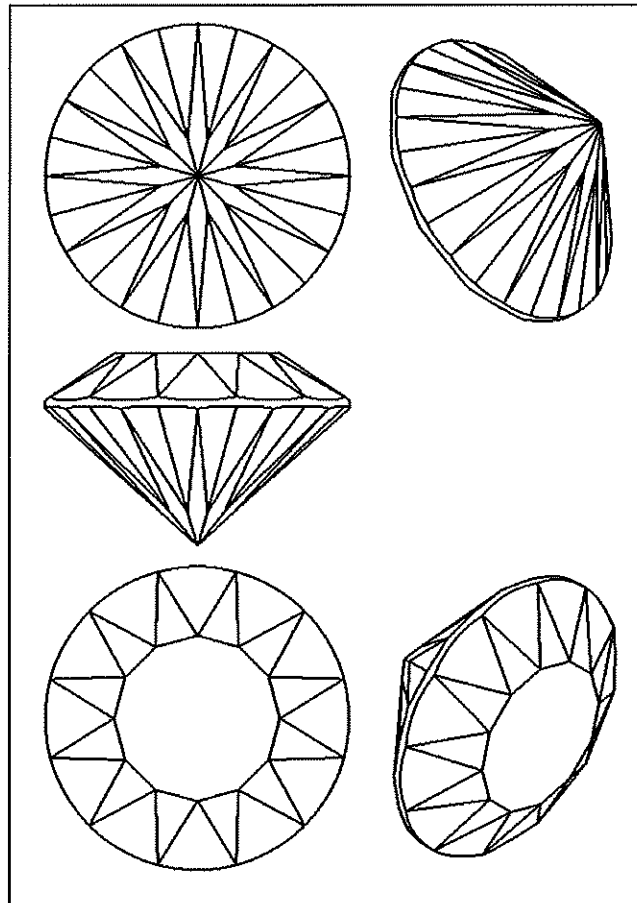
Please visit our website at [www.wto.cd.be](http://www.wto.cd.be) for more information.

## Description of the cut.

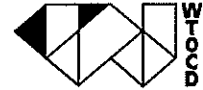
The “Sun of Namibia” cut is based on a classic brilliant cut. Crown and pavilion side differ from the brilliant cut:

- The pavilion side is a classic brilliant cut with pavilions and halves but 12-fold instead of the classic 8-fold symmetry.
- The crown side has also a 12-fold symmetry. There are no halves and the stars reach from table to girdle.

The total number of facets is 61 (24 crown facets / 36 pavilion facets / 1 table). The 12-fold symmetry represents the “Sun of Namibia” of the Namibian flag. The different views of the cut are represented in figure 1. Table 1 shows the angles of the different facets of the “Sun of Namibia” cut. Figure 2 shows the main dimensions.



*Figure 1: Different views of the “Sun of Namibia” cut.*



| Facet    | Number | Angle (°) |
|----------|--------|-----------|
| Table    | 1      | 0.0       |
| Bezel    | 12     | 34.0      |
| Star     | 12     | 31.0      |
| Pavilion | 12     | 42.0      |
| Halves   | 24     | 42.9      |

Table 1: Angles of the different facets of the "Sun of Namibia" cut

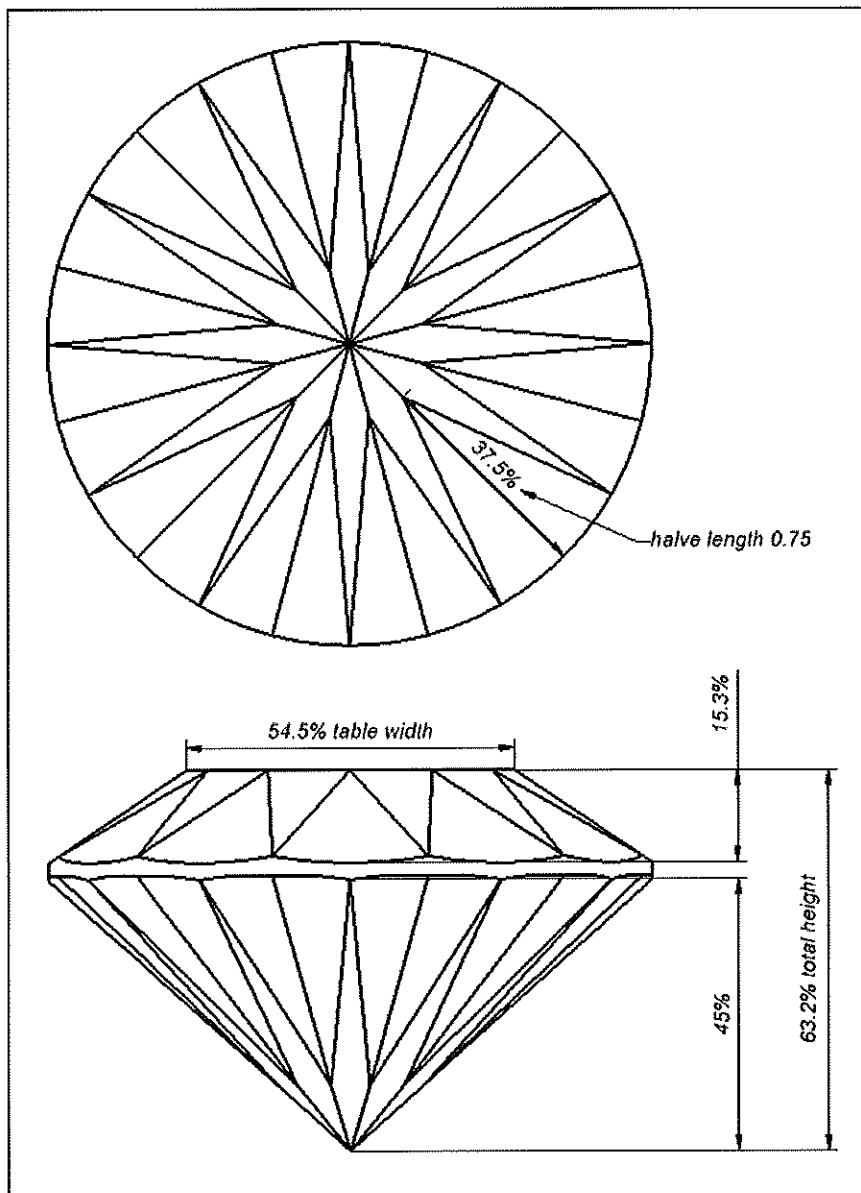


Figure 2: Main dimensions

### Visual evaluation.

For the visual evaluation of the cut Octonus-software DiamCalc is used. The 3D-model of the cut was drawn in Autodesk Inventor and imported as a DXF-file in DiamCalc. The result is shown in figure 3. The DiamCalc-software gives us the possibility to render the 3D-model of a cut in *Photoreal representation*. Figure 4 shows the rendered picture of the “Sun of Namibia” (looking perpendicular to the table).

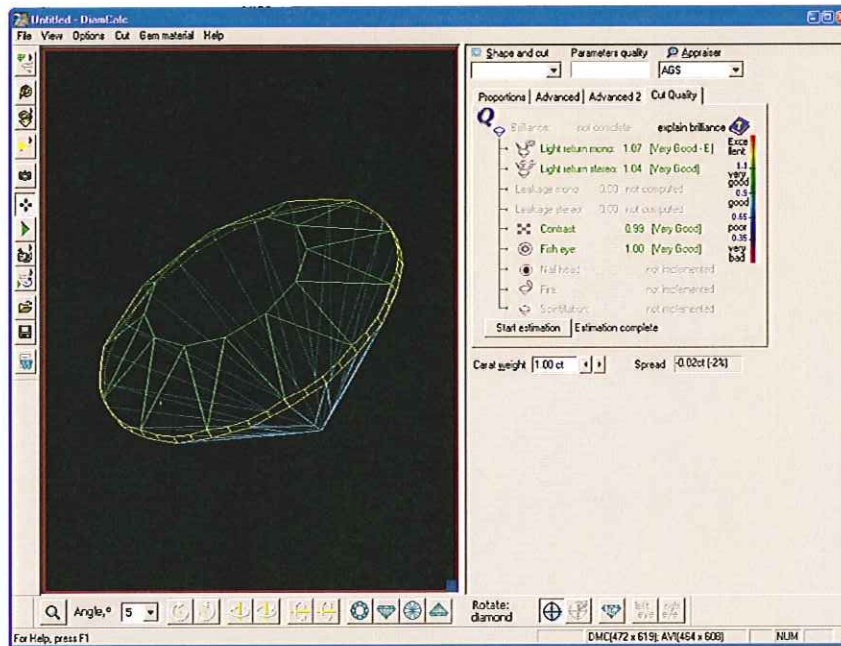


Figure 3: “Sun of Namibia” as wire frame in DiamCalc.

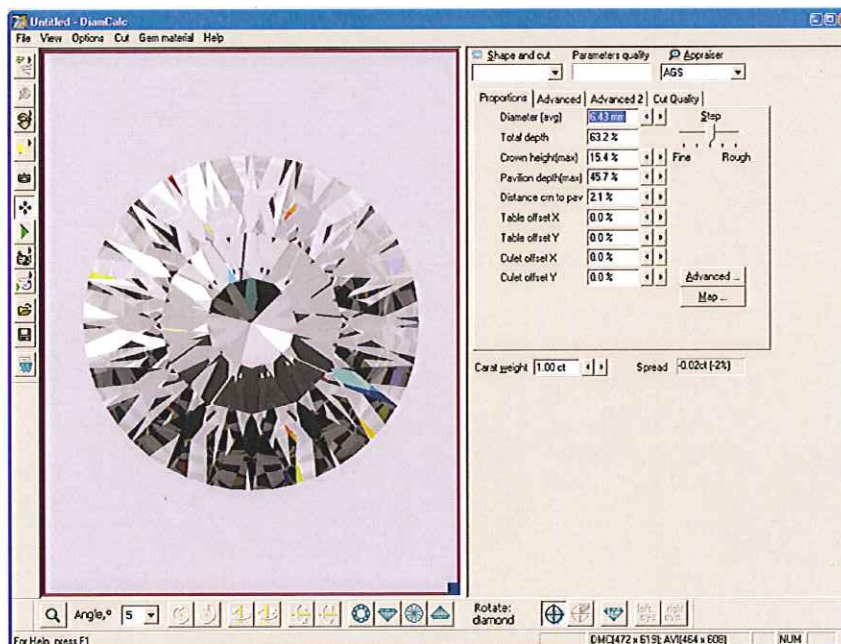


Figure 4: rendered image of the “Sun of Namibia”.



## Calculation of the light return and contrast.

The Octonus software gives us also the possibility to calculate two optical performance or cut quality parameters *light return and contrast*.

All cut quality parameters, including contrast, are normalized to the values of the parameters determined for the round brilliant cut with the modern Tolkowsky parameters. The diameter of the ideal round cut is taken the same as the analyzed cut diameter.

The results are not absolute, but relative. If the decrease of mass of the cut causes an increase of contrast, it doesn't always mean that the absolute contrast of this cut has increased. It could mean that the contrast of the ideal round brilliant cut has decreased more significantly than the contrast of the analyzed cut.

The *light return* is defined as the light returned from the stone to the observer compared with the modern Tolkowsky brilliant cut. The rest is leakage and consists of:

- Light leaving the stone through the pavilion side
- Light leaving the stone through the crown side but not in the direction of the observer

Leakage results in dark areas in the stone.

The *contrast* of a stone is evaluated corresponding to the number of bright and dark areas and the variation of both.

Table 2 shows the calculated optical performance for a HRD VG brilliant and the “Sun of Namibia” cut, both 1ct. We can conclude that the light return mono is 8% higher than the VG brilliant. The light return stereo is 5% higher and even the contrast is 1% higher. The higher light return is clearly visible in figure 5.

|                | Light Return Mono (1ct) | Light Return Stereo (1ct) | Contrast (1ct) |
|----------------|-------------------------|---------------------------|----------------|
| Brilliant VG   | 0.99                    | 0.99                      | 0.98           |
| Sun of Namibia | 1.07                    | 1.04                      | 0.99           |

Table 2: optical performance for a brilliant VG and “Sun of Namibia” cut.



Figure 5: rendered images of the “Sun of Namibia” cut (left) and a Brilliant VG (right).



## Conclusion

The “Sun of Namibia” is a cut with 61 facets based on a classic brilliant model.

The light return (mono) of this cut is 8% higher than a Very Good brilliant cut and has a comparable contrast (+1%).

The light return (stereo) is 5% higher.

A handwritten signature in blue ink, which appears to read 'van Goethem', is written over a horizontal line.

G. Van Goethem  
WTOCD