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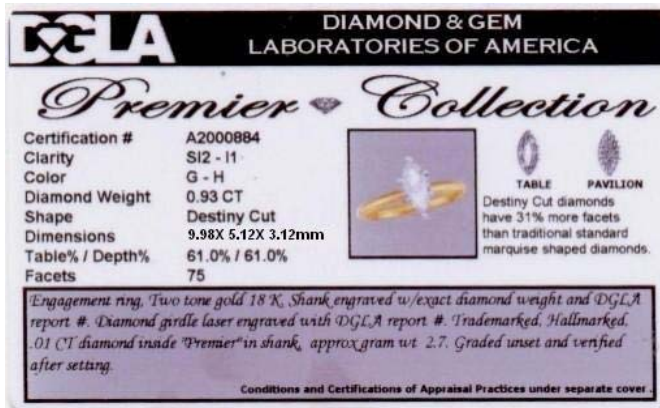
DGLA AND IMAGEM COLLABORATE IN DELIVERING MAJOR DIAMOND JEWELRY PROGRAM ON TIME AND ON BUDGET

Diamond and Gem Laboratories of America (DGLA) collaborated with ImaGem, Inc. to deliver light behavior services to a major US jeweler for stones supplied by a sightholder. The jewelry chain wanted to provide an accurate and repeatable measure of light behavior on its reports for its best quality diamond jewelry. They considered the alternatives available and chose the proposal by DGLA and ImaGem because of the cost, high speed processing and ability to meet a tight delivery schedule.

Cost and high speed processing are related. ImaGem's proprietary VeriGemTM unit completely processes a stone in under 30 seconds and captures all the information needed to qualify a stone and compile the report. The services were delivered on site at the sightholder's

manufacturing plant in Mumbai, India. According to Chuck Cassar of DGLA, "This arrangement allowed for lower labor cost and importantly lower manufacturing costs because being on site prevented rejects from reaching the US and the retail jewelry client. The client got a very saleable product on time and on budget, and the consumer acceptance has been strong".

The tight delivery requirement, not uncommon on major programs, came about from a final approval to proceed by the retail client in December 2005 with a delivery of thousands of items to the US due by mid March 2006. The sightholder had the stone inventory and the client's jewelry settings. DGLA recruited and trained additional personnel to help meet the tight delivery schedule. The VeriGem unit and peripheral equipment had to be delivered from the US and installed on site in Mumbai. ImaGem developed and tested computer programs for creating the nomenclature for each SKU, processing the stones and creating reports on plastic cards (shown below). These images are two sides of the plastic card reports generated in this program. To the left is front side of the report with an image of the jewelry and to the right, a brilliancy image of the stone with its light behavior measures and overall light behavior grade. The contents of the plastic cards were customized by ImaGem in record time. Quality control was facilitated not only on site but also through a link to ImaGem's research center in Philadelphia.



DGLA DIAMOND & GEM LABORATORIES OF AMERICA

Premier Collection

Certification # A2000884
 Clarity SI2 - I1
 Color G - H
 Diamond Weight 0.93 CT
 Shape Destiny Cut
 Dimensions 9.98X 5.12X 3.12mm
 Table% / Depth% 61.0% / 61.0%
 Facets 75

TABLE PAVILION
 Destiny Cut diamonds have 31% more facets than traditional standard marquise shaped diamonds.

Engagement ring, Two tone gold 18 K, Shank engraved w/exact diamond weight and DGLA report #. Diamond grille laser engraved with DGLA report #. Trademarked, Hallmarked. .01 CT diamond inside "Premier" in shank, approx gram wt 2.7. Graded unset and verified after setting.

Conditions and Certifications of Appraisal Practices under separate cover.



DIAMOND & GEM LABORATORIES OF AMERICA

IMAGEM *DiamondLightTM Index*

Certification #: A2000884

	CM	FR	GF	GD	VG	EX
Brilliance				118		
Sparkle					47	
Intensity						133

Soitaire Weight: 0.93 Carat
 Brilliance: Good 118
 Sparkle: Very Good 47
 Intensity: Very Good 133

Overall Grade: Very Good

EX=Excellent, VG=Very Good, GD=Good, GF=Good to Fair, FR=Fair, CM=Commercial

ImaGem observes that other suppliers of light performance services do not operate at the speed of the VeriGem unit and are not designed to handle stones as small as .05 ct. Moreover the major labs do not measure light behavior directly, but predict it through complex models. ImaGem measures each diamond's light performance directly just as a digital scale weighs a diamond when it is placed on the

weighing pan. How then does ImaGem claim to benefit labs and manufacturers who adopt this VeriGem system? Dr. Lalit Aggarwal, Chairman of ImaGem, points to the value to buyers and sellers of improved accuracy and repeatability, as well as the demonstrable operational advantages of reduced costs, range of stone sizes handled and higher throughput. VeriGem technology also measures light behavior of different shapes and branded cuts. To complete the program for the US retailer, for example, the VeriGem unit was used to directly measure light behavior of round, princess and marquise shapes. Also the operational efficiency of ImaGem's Lab Information System was successfully deployed to process solitaires as well as settings with multiple stones. The Mumbai on site application proved beneficial to all parties - the sightholder, the retailer and the two collaborators, DGLA and ImaGem. Looking beyond this program, both DGLA and ImaGem are engaged with diamond manufacturers who are designing, producing and marketing branded stones.

Direct measurement of light behavior is a key factor in the success of this program. The retailer was able to sell and get premium price for its product line. ImaGem and DGLA offer services to manufacturers, wholesalers or retailers who wish to take advantage of the direct measurement of light behavior.

Businesses/individuals can purchase the VeriGem unit and peripheral equipment for \$19,000 plus a per stone processing fee based on volume. For inquiries and further information about light behavior and the VeriGem unit, go to www.imageminc.com; to reach DGLA go to www.dglaservices.com.

QUESTIONS TO ASK WHEN SELECTING GEM GAUGING EQUIPMENT (Part II, Analysis)

In the June issue, Part I of this article was published. That article discussed the importance for the diamond industry to define and use accuracy and repeatability in a consistent manner to evaluate different equipment and grading services. In Part II hardware and software characteristics of different systems are discussed in respect to accuracy and repeatability that are achievable.

One must consider whether a system allows a direct view of the outline of a stone and the image of a table. This is important since gauging obtained from processing images of direct views of the table and the girdle will have higher accuracy and repeatability than images from the profile view, other things being equal. For example, the following stone with a slightly flat or indented girdle was processed on a machine which viewed the stone from the profile only as well as on a system that had a direct view of the girdle. Readings from the two systems were as follows:



	Profile view	Direct view
Average girdle diameter	3.62mm	3.615mm
Minimum girdle diameter	3.55mm	3.513mm
Maximum girdle diameter	3.65mm	3.670mm

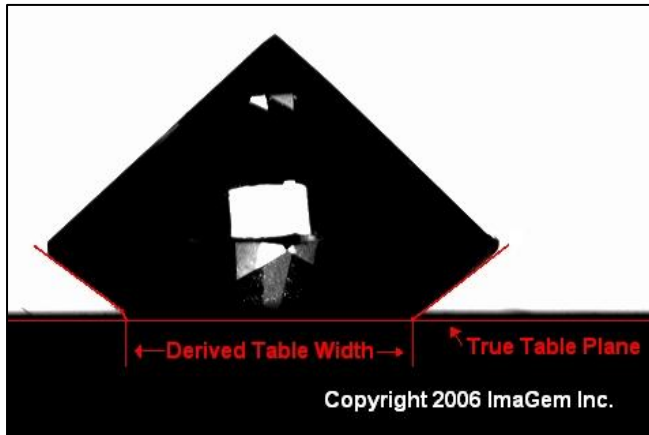
What can explain the differences in readings between the two systems? In a system that relies on the profile view only, the degree of rotational resolution directly impacts the accuracy and repeatability of the maximum girdle diameter. Rotational resolution is measured in terms of smallest degree of rotation a system is capable of achieving. For example, a system which rotates the stone at 1.8 degrees resolution has a higher probability of missing the maximum diameter than a system that rotates at 0.9 degree resolution. In a system that uses the direct view of the girdle, the rotational resolution is not a

factor in determining the accuracy and repeatability of the system. Instead the system's performance can be increased to any level desired by increasing the number of cross-sectional scans of the girdle image. In addition to the rotational resolution there is one more reason why a profile view may not accurately measure the minimum girdle diameter. All gauging systems on the market use a telecentric lens to capture the profile image of a stone. It is a property of a telecentric lens that it will miss an indented spot on the girdle when viewed in the profile position, and hence minimum girdle diameter measurement will be inaccurate. This problem is removed by finding the minimum girdle diameter from the direct girdle image. **In summary, a direct image of a girdle will provide more accurate assessment of the average, minimum and maximum girdle diameters. Another benefit of gauging a direct image of a girdle is that it permits an accurate assessment of the symmetry and shape of a stone. This property of a system is extremely important to gauging fancy shapes.**

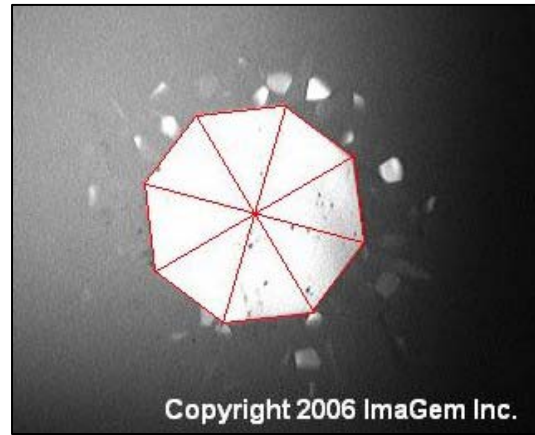
Gauging of the table is particularly difficult in systems which view a stone from the profile. The stage on which a stone is placed for imaging isn't perfectly flat. There is also optical interference where table of

a stone rests on the rotating stage. Optical interference and lack of flatness introduce noise in the image. To deal with this problem, most systems will superimpose on the image a flat plane near where a stone rests on the rotating stage. The size of the table is predicted, not measured by fitting lines to the bezel facets and extending these lines to where they meet an imaginary line representing the top of the stage. Depending on the number of readings taken over a full 360 degree rotation (i.e. rotational resolution), predicted value of the table can vary substantially. **A system which uses a direct image of the table will be more accurate and will have higher precision because actual measurements of the table can be made instead of predicting the location of the corner points, see the following figures.**

Predicting table from profile view



Measuring table directly



A gauging system should be evaluated for internal consistency as well. Total depth should equal the sum of pavilion height, girdle thickness, and crown height in an accurate and a highly repeatable system. A system which lacks in this regard may have problems with calculating other important measurements of a stone.

A serious problem may be observed in the reporting of crown and pavilion angles and proportions. Crown and pavilion angles and proportions are derived from certain key measurements such as average girdle diameter, table width, crown height, girdle thickness and pavilion height. **The repeatability of derived measures is not constant, instead it varies depending on the repeatability of the key linear measurements and the size of a stone.** The following table shows the repeatability of crown and pavilion angles and proportions for different size stones for a system which has a linear precision of plus or minus 20 microns (in the following calculations the average girdle diameter was kept constant to manage complexity of the impact of linear precision).

Measures	0.25 carat size	0.50 carat size	1 carat size
Crown Angle	+/- 0.92 degrees	+/- 0.72 degrees	+/- 0.58 degrees
Pavilion Angle	+/- 0.32 degrees	+/- 0.25 degrees	+/- 0.2 degrees
Crown percentage	+/- 0.49 %	+/- 0.385 %	+/- 0.31 %
Pavilion percentage	+/- 0.49 %	+/- 0.385 %	+/- 0.31 %
Girdle Thickness	+/- 0.49 %	+/- 0.385 %	+/- 0.31%
Total depth	+/- 0.49 %	+/- 0.385 %	+/- 0.31%
Table size	+/- 0.49 %	+/- 0.385 %	+/- 0.31%

Notice that the range of repeatability of pavilion and crown angles increases with a decrease in the size of the stone. Yet most systems report the repeatability to be constant regardless of the size of a stone. How is this feat accomplished? Systems which report the precision for crown and pavilion angles and proportion to remain the same for all size stones may **dummy down** the data or may use some other mathematical convenience. Regardless of how constant repeatability of derived measures is obtained, it may not use the actual measurement exactly ([Click here to use the calculator for measuring repeatability of derived characteristics](#) or check <http://www.imageminc.com/demos/consistencycalculator.html>). Systems with increasing errors in repeatability (plus or minus 40 microns) for larger highly valuable stones will invariably have less precision on all measures.

Some labs have introduced models for estimating light performance based on linear measurements. As manufacturers, wholesalers and retailers, you should ask your gauging equipment suppliers or the lab you use about exactly how these light performance estimates are made and what the levels of repeatability are. For ImaGem's light behavior performance see "Readers Ask" below.

Readers ask...What are the performance specifications of ImaGem's light behavior measurements?

ImaGem's light behavior measurement has a repeatability of plus/minus 2% for brilliance and sparkle and plus/minus 4% for intensity. All repeatability measures are based on a 2 sigma probability. Processing time per stone for 4 readings is 13 seconds, 6 readings (Marquise cut) is 21 seconds and 8 readings is 31 seconds. Shapes and sizes processed currently are Round cut up to 3 carats (approximately 9mm), Princess cut approximately 9mm square; 8mm X 11mm and Marquise cut approximately 5.5mm X 11mm. Other standard cuts are available and branded cuts are supported.



64% OF VOTERS PREFER HIGHEST REPEATABILITY AND ACCURACY IN MEASURING DIAMONDS LARGER THAN 6.3MM

In a recently conducted poll on a reputed trade website, **64% of the voters chose to have highest repeatability and accuracy in measuring diamonds 6.3mm and larger. 23 % preferred highest repeatability and accuracy in measuring diamonds smaller than or equal to 6.3mm and 7 % were undecided.**

ImaGem plans to provide grading services in Delhi, Bangalore, Chennai, Antwerp, Dubai and Australia. Interested parties, please contact Sukesh Jain at ImaGem Inc. at 1-215-477-9920 (9am – 6pm EST) or srjain@imageminc.com.

EVENTS

Join ImaGem Inc. and Diamond and Gem Laboratories of America for a **demonstration of the new VeriGem device and ImaGem's services at Dilli Haat, Sri Aurobindo Marg, Opp. INA Market, New Delhi, India on September 30 and October 1, 2006 between 11.00 am - 9.00 pm**

Dr. Aggarwal, Chairman of ImaGem Inc., and David Atlas, partner in DGLA and Principal in Accredited Gem Appraisers will be at the Haat to meet with guests and discuss service offerings. To schedule an exclusive demonstration contact Sandeep or Kaushal at 261-3266677 or 261-2540411.

ImaGem Inc. and Diamond and Gem Laboratories of America invite you to a **demonstration of the new VeriGem device at JCK New Delhi, India at Hall # 11, Booth # 1212/1236, Pragati Maidan Exhibition Center, New Delhi, India on September 28-30, 2006, 10.00 am - 6.00 pm**

David Atlas and Chuck Cassar, partners in DGLA will be at the Show to meet with attendees and discuss how DGLA and ImaGem can help grow your business. Contact ImaGem at info@imageminc.com to request a demonstration.

We welcome your comments and suggestions. We will be happy to work with you and meet your business needs. For more information contact us at info@imageminc.com or call our Philadelphia office at 1-215-477-9920.

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