

Cut Uncovered

GIA's new round brilliant cut grading system sheds light on diamond's overall appearance

By Amanda J. Luke

Ask any consumer what they think the most important characteristic of their diamond is and they're likely to say it's the "Wow" factor. They want people to stop, stare and admire the stone dancing on their finger.

Carat weight, color, clarity, the overall shape, and let's face it, price, has helped them decide on their purchase, but they likely didn't talk much about cut. That's because it has always been difficult for retailers to quantify GIA's fourth C.

In fact, even GIA scientists struggled to do so. Until now – or, more accurately, later this year – when GIA officially announces its cut grading system for round brilliant diamonds.

The result of 15 years and millions of dollars worth of research, it will give the trade and public the resources to talk about how a stone's cut affects its overall appearance – its "Wow" factor.

"The beauty of having a systematic way of looking at cut is that we're providing concrete information to the trade and public – just as we did with color and clarity – as a tool to make choices," says GIA President William E. Boyajian.

One of the most important conclusions GIA scientists came to in their research is the discovery that historically recognized proportion sets (such as those used for "ideal cut" diamonds)

Why is GIA Providing a Cut Grading System for Round Brilliants?

- The lack of agreed upon cut standards has caused confusion in the marketplace.
- The industry has expressed interest in a cut grading system that is objective, practical and scientifically based.
- GIA firmly believes the public interest is best served by an unbiased and independent cut grading system that properly identifies well-made diamonds.
- GIA's cut grading system will provide more flexibility to retailers and greater consumer confidence.

are just some of many sets that will result in appealing diamonds. This revelation translates to more options for diamond buyers, retailers and manufacturers.

"But it's up to the customer, after they've considered all of their options, to pick the one that they like the best," Boyajian says.

Retailers are eager to be able to share more information about the fourth C.

"I am looking forward to talking about cut with our customers," says Lee Michael Berg, president of Lee Michaels Fine Jewelry. "This will enable us to go over all of the important qualities of a diamond's appearance with them."

The new cut grading system will also benefit the trade since GIA's findings identify more combinations of diamond proportions and appearances in well-cut categories.

"Diamond manufacturers will be able to cut round brilliants to a wider range than the current norm and still achieve top-grade, great-looking diamonds," said Thomas C. Yonelunas, CEO of the GIA Gem Laboratory. "These findings will potentially allow for greater yield and weight retention from the rough."

The most recent installment of GIA's research results, featured in the Fall 2004 issue of *Gems & Gemology* ("A Foundation for Grading the Overall Cut Quality of Round Brilliant Cut Diamonds" by T.M. Moses et al.), is the culmination of work first introduced in previous *G&G* articles (Fall 1998, Fall 2001).

GIA scientists began to look at cut in 1989 with the development of a computer-generated "virtual" diamond used in ray-tracing experiments to develop mathematical measurements, or metrics, for brightness and fire. Researchers modeled more than 1 million

These three diamonds show differences in their face-up appearance, which means they will each receive a different cut grade.

Of the five possible grades, they represent (left to right) the first, third and fifth categories.

Photos by Al Gilbertson and Barak Green/GIA



proportion sets to explore these components.

This was followed by more than 70,000 human observations of nearly 2,300 diamonds to validate and fine tune the metrics. GIA created a standardized lighting and viewing environment that incorporated the common elements found in dealers' offices and retail stores for these observations. This was important because, much like in color grading, standardized conditions provide more consistent assessment results.

The undertaking was the largest sampling of this type ever made, said Thomas M. Moses, vice president of Identification and Research Services.

The newest *G&G* article reports on researchers' scintillation findings and describes how the three elements of brightness, fire and scintillation contribute to a round brilliant's face-up appearance. Researchers also confirmed that a diamond's weight and durability (e.g., "over-weight" diamonds and those with extremely thin girdles) and craftsmanship (as seen in a

diamond's polish and symmetry) play an important role in its overall cut quality and final cut grade.

"Through years of research we have determined that individual proportions must not be assessed on their own," Moses said. "It is the complex interrelationship of individual proportions that matters most in the face-up appearance and overall cut quality of a diamond."

Manufacturers, retailers and the public will be able to learn about the specific effect of proportion sets on diamond cut quality when they use GIA's new diamond cut reference software, which will be released later this year. It is designed to predict estimated overall cut grades based on the input of several proportion parameters (such as table size, crown angle and pavilion angle), and quality factors (such as finish).

The cut grading system will consist of five grades for overall cut quality when it is added
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GIA researchers found that a diamond should not weigh more than its appearance warrants as in the diamond on the right, which contains extra, or "hidden," weight located in the thickness of the girdle (compared to the normal girdle of the diamond on the left). For this reason, the diamond on the right would receive a lower overall cut grade.

Photos by Al Gilbertson and Maha Tannous/GIA

Essential Findings from GIA's Research

- Proportions need to be considered in an interrelated manner. The combination of proportions is more important than any individual proportion value.
- Attractive diamonds can be manufactured in a wider range of proportions than was suggested by historical practice or traditional trade perception.
- The quantity of brightness and fire are only part of overall diamond appearance. The pattern of bright and dark areas within a diamond (the basis of scintillation) must also be considered.
- A thorough cut grading system needs to consider the design of a polished diamond (as evidenced by its weight ratio and durability) and its craftsmanship (as evidenced by its polish and symmetry).
- Viewing environment plays an important role in diamond appearance: to be attractive, a diamond should look good in realistic environments.
- Individuals need to look at the diamond itself, not just its grade, to choose the one they like best.

Cut Study Terms

Brightness

The appearance, or extent, of internal and external reflections of "white" light seen in a face-up polished diamond.

Computer model

A computer program that re-creates the properties and characteristics of an object, and key factors in its interaction with specific aspects of its environment.

Craftsmanship

The level of care that went into cutting a polished diamond, as seen in its finish (polish and symmetry).

Design

Decisions made during the fashioning process that determine a diamond's physical shape, as seen in its proportions, weight ratio and durability.

Durability

The risk of damage inherent in a polished diamond's proportions (i.e., the risk of chipping in a diamond with an extremely thin girdle).

Face-up appearance

The sum appearance (brightness, fire and scintillation) of a polished diamond when viewed in the face-up position. This includes what is seen when the diamond is "rocked" or "tilted."

Fire

The appearance, or extent, of light dispersed into spectral colors seen in a face-up polished diamond.

Metric

A calculated numerical result obtained through computer modeling; for the GIA diamond cut research project, metrics were calculated for brightness and fire for hypothetical and actual diamonds.

Overall cut appearance and quality

A description of a polished diamond that includes the face-up appearance, design and craftsmanship.

Scintillation

The appearance, or extent, of spots of light that flash as a face-up polished diamond, the observer or light source moves (sparkle); and the relative size, arrangement and contrast of bright and dark areas that result from internal and external reflections when a face-up polished diamond is still or moving (pattern).

Weight ratio

A description of a diamond's overall weight in relation to its diameter.



A diamond's face-up appearance can look different depending on the type and position of lighting used. Here, the same diamond was photographed in diffused lighting (top), mixed lighting (center) and spot lighting. Photos by Al Gilbertson/GIA

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to GIA Diamond Grading Reports and Diamond Dossiers®. The grades assess seven separate components: brightness, fire, scintillation, weight ratio, durability, polish and symmetry. Each of these new Reports will contain an overall cut grade, expanded proportion information in the form of a new diamond graphic and a brief explanation of the Four Cs.

“Ultimately, the new GIA diamond cut grading system will provide answers to the long-debated questions about the fourth C in diamond grading,” Boyajian said. “Retailers will be able to better serve their clients and customers will have access to information that was heretofore either nonexistent or unavailable as an international standard.”

CutFAQ

When does GIA plan to include diamond cut grades on its reports?

GIA plans to include this information later this year.

Which diamonds will receive GIA diamond cut grades?

All round brilliant diamonds in the GIA D-to-Z range of color, from Flawless to I₃ clarities, with standard facet arrangements, that currently receive a GIA Diamond Grading Report or GIA Diamond Dossier®.

Does GIA plan to expand its cut system to include other kinds of polished diamonds?

Research is currently underway on fancy shape (including round modified brilliant diamonds) and fancy colored diamonds.

How does GIA plan to incorporate the new cut grade information on its GIA Diamond Grading Reports and GIA Diamond Dossiers®?

These new GIA Reports will contain a single cut grade that assesses the overall cut quality of each standard round brilliant diamond. They will also include expanded information that details the proportion information of each diamond. This will be presented in an easy-to-read graphic illustration that represents the diamond being graded.

Does GIA plan to release any tools to help diamond cutters, dealers and retailers learn which specific sets of proportions lead to “better looking” round brilliant diamonds?

GIA is developing software and Web-based tools, including software integrated into optical measuring devices, for this purpose. GIA is also developing standardized viewing environments and other measurement-related tools.

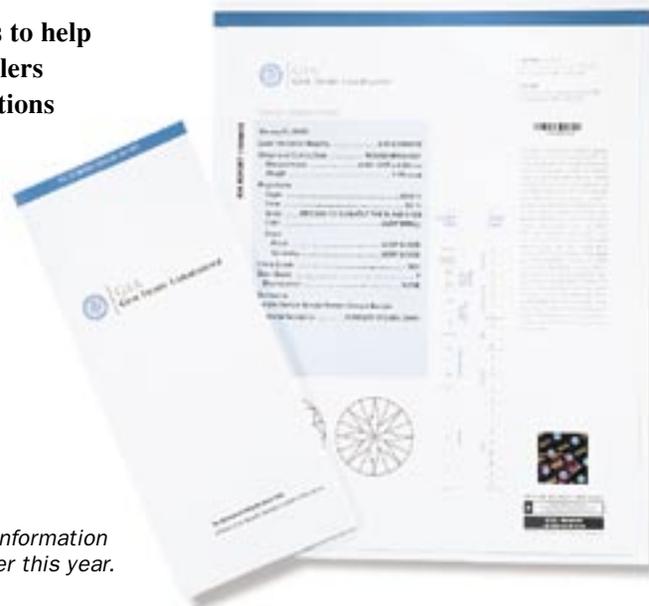
GIA Reports will include cut information for all round brilliants later this year.



Photo by Melissa Jacobs

Where can I find more information about GIA's new diamond cut grading system for round brilliants?

The Fall 2004 issue of Gems & Gemology contains the most complete summary of GIA's research on diamond cut and the main components and foundation of its new diamond cut grading system. Information on the new cut grading system will also be included in Education courses and at Alumni and Research presentations. Informational brochures will be available later this year. For the latest information, go to www.gia.edu.



GIA file photo