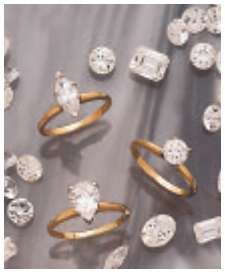

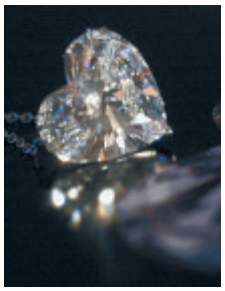

DIAMOND ESSENTIALS

Cut and Value

DIAMOND ESSENTIALS

4

GIA
Gemological Institute of America®

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Facing page: Diamonds can be cut in a wide variety of exciting shapes and styles.

Carin Krasner/Gettyone

Cut and Value

Janet Lee was getting discouraged. Her customer, John McDowell, was shopping for a twentieth anniversary present for his wife. Janet had shown him every anniversary ring in her inventory, but nothing appealed to him. She couldn't think of another item in the regular inventory that would fit his needs.

John was frustrated, too. This was the third jewelry store he had visited. He wanted to give his wife a distinctive piece of jewelry, but with one son in college and another headed there next year, he was on a tight budget. Janet had explained the significance of anniversary rings, and she had shown him some really nice ones. But nothing met his double requirement of something noteworthy that also fit within his budget.

Janet finally hit on a solution to the problem.

Eric Welch/GIA

A bench jeweler can help when a customer likes a particular style of jewelry but wants to choose the diamonds it contains.

Similar jewelry designs can look entirely different with just a change of diamond shape. A three-stone anniversary ring set with round brilliant diamonds has a traditional look (top). Set with oval diamonds, a similar setting looks more modern and distinctive (bottom).

"I have an idea you might like," she said as she pulled a three-stone anniversary ring that she had shown him earlier out of the display case. All three diamonds were round brilliants, and all were H-color, VS_2. "You seemed to like this ring the best of all the ones that you've seen so far, right?" she asked.

"It's the closest thing I've seen to what I want," John said. "But it costs a bit too much, and it still isn't exactly right."

"We can set it with different diamonds that weigh just a little less—that will help bring the price down. And to give it a more distinctive look, we can set it with oval-cut diamonds instead of round ones. Ovals are brilliant and fiery, and they tend to look larger than rounds of the same weight. What do you think?" Janet asked.

John looked at the ring, trying to imagine what it would look like with oval diamonds. After a minute, he said, "It sounds interesting, but I just can't visualize it."

"How about this," asked Janet. "I have a copy of this ring in stock that hasn't been set with diamonds yet. And I know we've got some nice oval diamonds that are the same quality as the ones in this ring. I'll have our bench jeweler set the ring with the three oval diamonds. Can you come back tomorrow and see it? No obligation—if you don't like it, I'll put it in the regular inventory."

John was interested enough to make an appointment for the next day.

Janet was waiting for John with the ring when he returned. She was beaming. "I think you're really going to like this," she said, opening a ring box and placing it on the counter. "The oval stones really complement the

George Shelley/Corbis Stock Market

By helping your customer select the perfect piece for an important occasion, you can promote the joy that diamond jewelry purchases often represent.

design—they give the ring a completely different look than the round diamonds did."

John picked the ring up and held it out at arm's length. After looking at it he asked, "Is it really the same design? It looks so much better like this. But you said you'd put in smaller diamonds. These don't look any smaller."

"That's one of the benefits of oval diamonds—they can look larger than rounds of comparable weight. By using these ovals, we reduced the total weight enough to lower the price without sacrificing quality. These diamonds have the same color and clarity as the round ones you looked at yesterday. Isn't the ring beautiful?" Janet asked.

John didn't answer right away. He looked at the ring again. While he didn't say so, he was mentally comparing it to a ring he saw in a different jewelry store—one he visited after leaving Janet's store the day before. He liked Janet's ring better—the diamonds she chose were brighter and had nicer flashes of color than the diamonds in the competitor's ring. But the competitor's ring cost several hundred dollars less than Janet's, so it was within the budget he had set for the present. Janet's ring was still more than he'd planned to spend.

Janet didn't know about the other ring, of course, but she correctly interpreted his silence to mean that he still wasn't completely sold on the ring, and that he was still concerned with price.

"These oval diamonds are cut to exacting standards, so they're very brilliant—see how light blazes out of them?" Janet asked. "Ovals that aren't cut this well aren't as brilliant—some even have little dark spots in their centers. These are gorgeous, well-cut stones.

Key Concepts

Cut isn't only about shape: It affects many aspects of a diamond's appearance.

Eric Welch/GIA

The way a diamond is cut makes an essential contribution to its interaction with light. Skilled cutting gives a diamond incredible brightness, fire, and sparkle.

CUT

"In fact, their cut, combined with their color and clarity, makes these diamonds really outstanding. When you give this ring to your wife, you can point out how the shape and fine cut of the oval diamonds makes them exceptional. And you can tell her we selected the diamonds just for her. I think she'll love that—don't you?"

"Yes, I do," John said.

"John, this is the ring you should give your wife. How would you prefer to pay?" Janet asked.

John was silent for a moment. He was still hesitant about the price, but he liked what Janet had just said. He could see how delighted his wife would be when she opened the ring box, and how much she would like the overall look of the ring. And he knew that she would adore the fact that the diamonds were oval, and how unique that made them. Then it dawned on him that the difference between his budget and the ring's actual cost was very small compared to their 20 years of happiness.

"You can put it on my credit card," he said, reaching into his coat pocket.

At first, the subject of cut might seem pretty straightforward. To most people, it simply means the shape of the diamond. As you've just seen, shape is certainly important. But there's more to cut than that.

The way a diamond is cut can affect its clarity, and even its color. Cut governs the interaction between a diamond and the light around it, and that interaction determines the diamond's overall appearance. Despite its importance, many salespeople overlook cut when they present diamond jewelry. They're missing an important sales tool.

Cutting style is an important aspect of cut. You can use your knowledge of cut to help a customer who wants something other than a traditional round brilliant. Some people prefer step cuts, for example. By explaining a little about how cut and cutting style influence a diamond's optical properties, you can increase your customer's appreciation for the quality of the diamond you're showing.

In this assignment, you'll learn that the angles and relative measurements of a diamond—its *proportions*—have a dramatic effect on how light performs when it strikes the diamond. This aspect of cut is an increasingly important topic in today's jewelry industry. You'll also learn about *finish*: the details and final touches that make a diamond shine. Even if it's well proportioned, a diamond with poor finish won't live up to its optical potential.

Combined, proportions and finish constitute a diamond's *make*. So, when you hear a diamond described as having a "good make," you know that it's probably well proportioned with a good finish. The quality of a diamond's make is critical to its beauty and appeal because a well-made diamond creates a dazzling display of light.

Joel Beeson/GIA

Round brilliants are very popular, but some customers prefer the elegant look of step cuts like this lovely emerald-cut trio.

Proportions—The angles and relative measurements of a polished gem, and the relationships between them.

Finish—The quality of the polish and precision of the cut of a fashioned gemstone.

Make—The qualities of a faceted diamond's proportions and finish.

Light, Proportions, and Finish

- How does light interact with a diamond?
- What proportions are critical to maximum light performance?
- How does finish affect a diamond's overall beauty?

Understanding what happens when light strikes a fashioned diamond is critical to knowing why diamonds show brightness, fire, and scintillation. A diamond's proportions determine how it interacts with the light around it. And its finish allows a diamond to show off its beauty to the fullest.

Key Concepts

Proportions play a key role in a diamond's appearance.

A Little About Light Performance

When a light ray strikes a diamond, it either reflects off the surface or enters the diamond. If it reflects off the surface, you see it as a flash of white light, which is part of the diamond's brightness—also called brilliance.

Valerie Power/GIA

Refraction makes this straw appear to bend in the water, when it's actually the light that's slowing and bending. Air and water have different RIs, so the light strikes the straw differently in each material. Refraction also helps to create a diamond's dazzling light display.

Peter Johnston/GIA

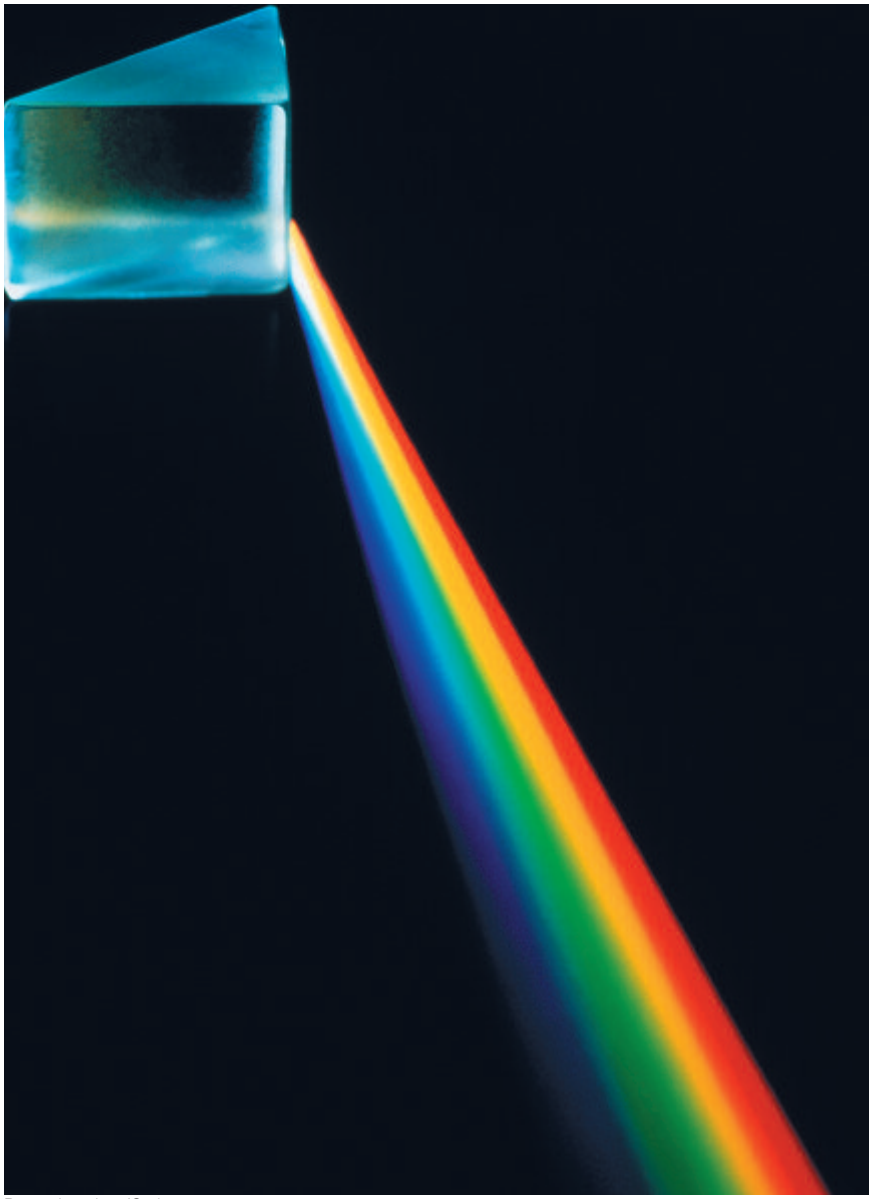
White light that enters a diamond is dispersed into its spectral hues. The separated rays bounce off the diamond's internal surfaces and return to the eye as fire.

Refraction—The change in speed and possible change in direction of light as it travels from one transparent material to another.

Refractive index (RI)—A measure of the change in the speed and angle of light as it passes from one material to another.

As a light ray travels from the air into a diamond, it slows down. If the ray enters at an angle, it also bends: This is called *refraction*. The light ray, now moving more slowly and at a different angle, travels through the diamond and strikes an interior surface. One of two things will happen next. It will continue to reflect off the inside surfaces of the diamond until it finally exits, or it will exit the diamond right away. A measure of a diamond's capacity to slow and bend light is called its *refractive index*, and it's abbreviated "RI."

Some of the light that leaves the diamond is bright white light, which adds to the diamond's brightness. Other white light rays divide into colored flashes



Roger Antrobus/Corbis

Dispersion occurs when white light passes through a prism and separates into its spectral colors.

Eric Welch/GIA

Robert Weldon/GIA

In diamond, dispersion causes beautiful flashes of rainbow colors called fire (top). Different diamond shapes and proportion variations result in differing amounts of visible fire (bottom).

that are commonly called fire. Fire is the result of *dispersion*, which is the separation of white light into its spectral colors. The spectral colors are the colors of the rainbow: red, orange, yellow, green, blue, and violet.

When the diamond, the light source, or the observer moves and the diamond catches the light around it, it sparkles with flashes of white and spectral-colored light. The sparkle is called scintillation.

There are many other influences over light performance in a diamond, which you'll learn about in detail in the *Diamonds & Diamond Grading* course.

Dispersion—The separation of white light into spectral colors.

A Brief History of Diamond Cutting

There was a time when people believed that diamonds had magical qualities. They thought that rough diamonds had the power to ward off evil spirits, cure all kinds of ailments, and make the wearer as indestructible as the gem. They also believed that altering a rough diamond took away those powers.

When people became less influenced by magic and superstition, diamonds began to lose their appeal. After all, other than perfectly formed octahedrons with clear, glassy surfaces, diamonds aren't very attractive in their rough state. The irregular surfaces of most rough diamond crystals hide their wonderful optical qualities.

Things began to change in the fourteenth and fifteenth centuries, when polishing techniques began to develop in India and Europe. While they still hadn't found a way to shape a diamond, the earliest polishers discovered that they could use diamond powder to remove roughness and make the natural surfaces more transparent. They called the resulting polished octahedrons point-cut stones.

In the sixteenth century, polishers were able to shape a diamond by grinding away the upward-facing point, creating a flat table facet. The result was called a table cut. In the early seventeenth century, the grinding process advanced a little further: Polishers used it to create rose-cut diamonds, with flat bottoms and faceted tops that came to a point. While this process did produce a more finished-looking diamond, it resulted in the loss of a lot of the original rough's weight.

People began to split, or cleave, diamonds in the seventeenth century. At last, they were able to derive a basic shape from the rough before polishing. Because they no longer had to grind a diamond down in order to shape it, this resulted in less weight loss.

The rotary diamond saw, introduced around 1900, and lasers, introduced in the 1970s, give modern cutters an even greater ability to shape rough diamonds into glittering gems.

Modern diamond cutting consists of three or four steps: cleaving or sawing (sometimes both), bruting, and polishing. The steps and procedures in diamond cutting—often called diamond manufacturing—are covered in greater detail in the diamond-cutting assignment of the *Diamonds & Diamond Grading* course.

Christie's Images Inc.

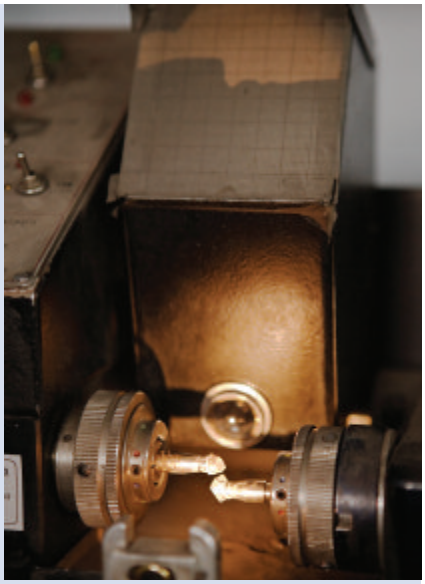
Diamond-cutting methods have improved dramatically since the eighteenth century, but beautiful rose-cut diamonds from that period still appear at auctions and estate sales.

Diamond Manufacturing

The combined skills of planners, cutters, and polishers are required to unlock the beauty within a rough diamond crystal. Every step requires precision and careful consideration.

The planner determines where a piece of rough diamond should be sawn, and makes an ink line to mark the proper location (top left). He determines how to get the best yield from the rough by inspecting the diamond's structure and interior features (top right). A sawing machine (center) divides the rough according to the planner's markings. The sawing factory's rows of sawing machines (bottom) can process many diamonds at once.

All by Eric Welch/GIA



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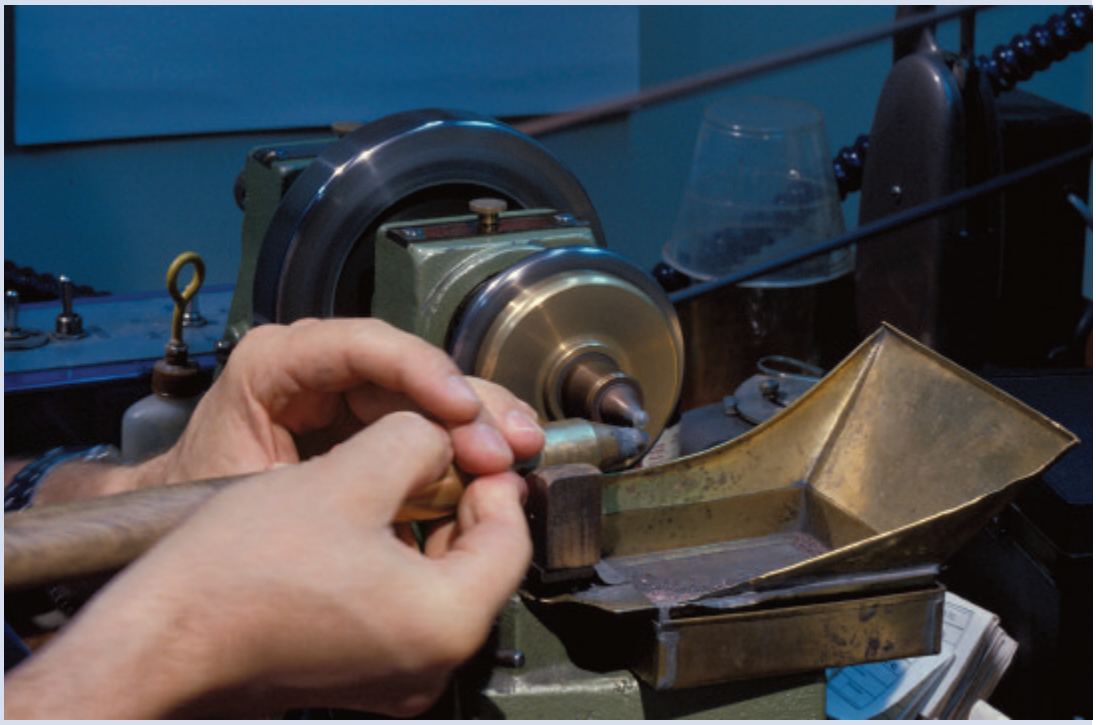
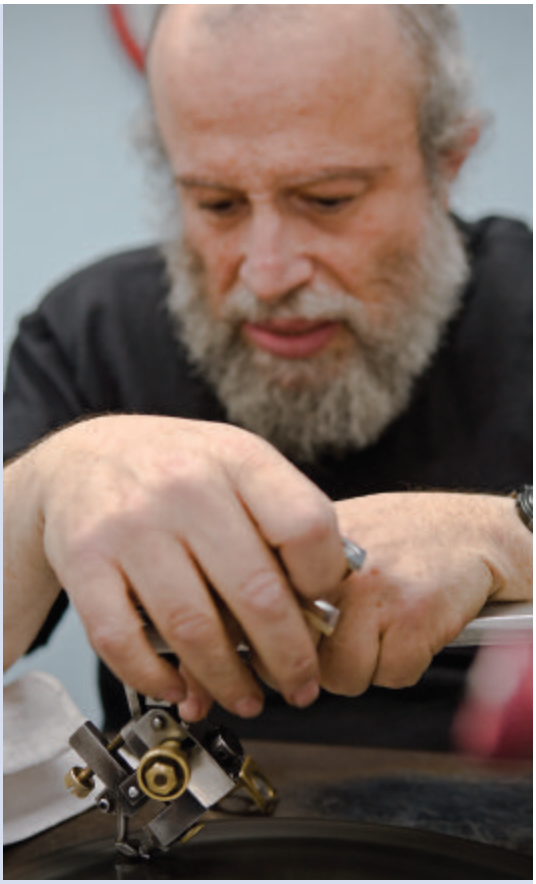


After the diamond rough is divided, the next step is to prepare it for bruting by attaching it to a holder, called a dop (top left). The bruting process can be automated (top right) or manual (bottom), and traditionally involves forcing one diamond against another. It results in a roughly shaped outline of the future finished diamond.

All by Eric Welch/GIA

A skilled cutter can set up several diamonds in holders and pull them in to work on them one at a time (top). The operation might also be automated, with several machines monitored by a single operator (bottom left). This is the blocking stage, during which the diamond gets its first 17 or 18 facets (bottom right). This stage establishes the gem's basic symmetry.



Both by Eric Welch/GIA

Eric Welch/GIA

Robert Weldon/GIA

During the cutting process, a cutter checks the diamond's pavilion angle (top left). A specialist called a brillianteer polishes the final facets on the diamond (top right). One of the last steps is the polishing or faceting of the diamond's girdle. This is often an automated process (bottom left). The end result of the manufacturing process is a diamond's spectacular display of brightness, fire, and scintillation (bottom right).

Robert Weldon/GIA

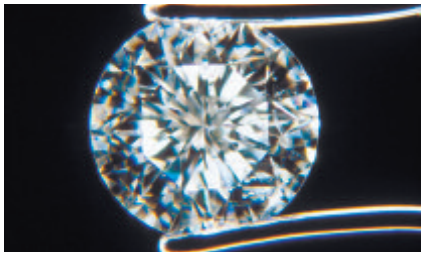
Some combinations of diamond proportions result in superior displays of brightness, fire, and scintillation.

Proportion Variations

A finished diamond's proportions affect its light performance, which in turn affects its beauty and overall appeal. If light enters through the crown of a poorly proportioned diamond, it might exit through the pavilion, making the diamond look dark and unattractive. Diamonds with good proportions, symmetry, and polish make better use of light, and will be bright, fiery, and sparkling.

The elements of diamond proportions are:

- Girdle outline
- Table size (table percentage)
- Crown angle
- Girdle thickness
- Pavilion depth percentage (or pavilion angle)
- Total depth percentage
- Culet size
- Length-to-width ratio (fancy shapes)



A round brilliant's girdle outline should be symmetrical (top). A diamond that is noticeably out-of-round (bottom) can be unattractive and also difficult to set.

The diamond industry has long known that some proportion combinations make light perform better than others. In recent years, however, scientists in the GIA Research department and the GIA Laboratory have shown that there are many possible variations and combinations of proportions that will maximize brightness and fire in round brilliant diamonds. This research led to the development of the GIA cut grade for round brilliants, introduced in early 2006. The cut-grading process involves a combination of visual observation and careful, computer-based measurements.

Girdle Outline

A diamond's face-up shape is called its *girdle outline*. Girdle outline usually doesn't affect the appearance of a round brilliant unless it's really irregular. Round brilliants generally have balanced outlines, and usually deliver attractive brightness, fire, and scintillation.

With fancy shapes—all shapes other than round—not all stones of a given shape are equally attractive. Table size, crown angle, and pavilion depth have something to do with this, of course, but it also depends on how pleasing the shape's girdle outline is.

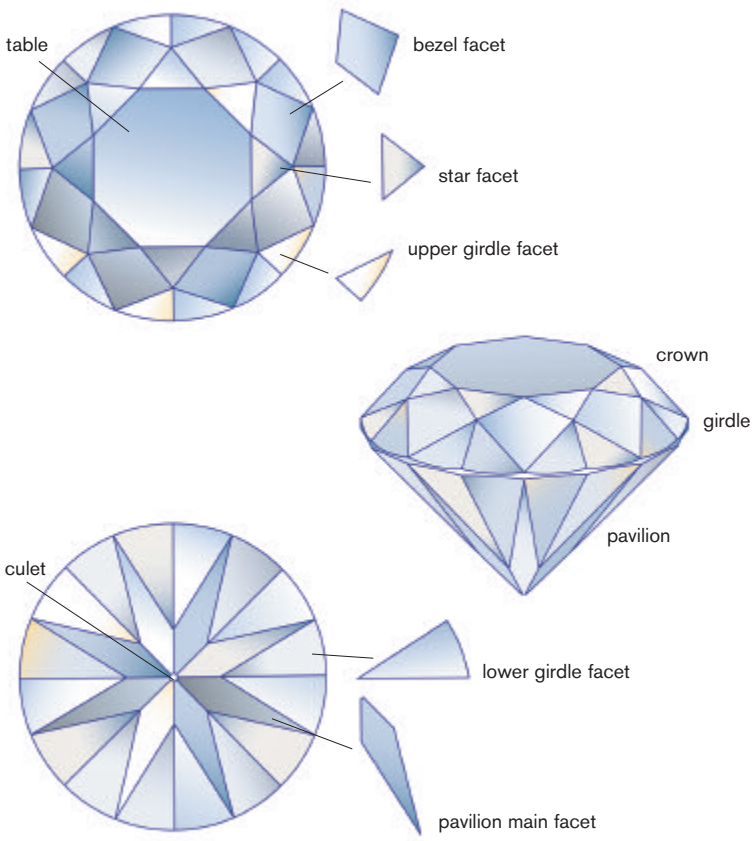
An evaluation of girdle outline also involves other, more practical considerations. For example, shape itself can make a difference: A bench jeweler might have a difficult time setting a stone with an unusual shape.

Visual appeal and practical considerations often work together to result in a diamond that's both beautiful and durable. Rectangular cuts, for example, have beveled corners for a variety of reasons. First, beveled corners add

Key Concepts

Round brilliants usually deliver excellent brightness, fire, and scintillation.

Parts of a Round Brilliant Diamond



Peter Johnston/GIA

A round brilliant diamond's light performance is governed by the symmetry of its facets and planes. A knowledge of the names of those facets and planes will help you present diamonds professionally.

In emerald cuts, smoothly beveled corners add visual appeal and provide a secure setting area for prongs.

Tino Hammid/GIA

Pears should have gently rounded shoulders and wings for an appealing girdle outline.

visual appeal: They give a dynamic quality to what would otherwise be a plain rectangle. They're also practical: They provide a secure setting area for prongs and make the stone less vulnerable to chipping. The size of the beveled corners matters, too. If they're too narrow, they give the stone an odd look and make it difficult to set.

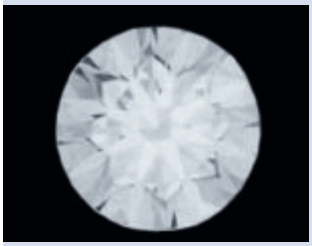
Shoulders are located near both ends of oval shapes and near the rounded end of pear shapes. They should be gently and evenly rounded. Squaring the shoulders makes the diamond weigh more, but it makes pears look triangular and ovals look chunky. In the same way, a distorted curve on the lobes of a heart can make it look squashed or flat.

On marquises, pears, and hearts, the sides near the points are called *wings*. They should form attractive arches. If they're too flat, they make the stone look too narrow. If they're too rounded, they make it look short and stubby.

Girdle outline—Face-up shape of a polished gem.

Shoulder—One of the two sides adjacent to the rounded end of a pear or oval shape.

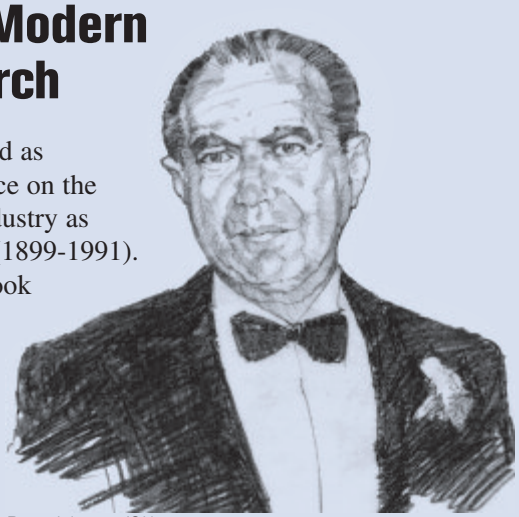
Wing—One of the two sides near the point of a marquise, pear, or heart shape.



Vincent Cracco/GIA

Advances in technology have brought diamond cut research to a new level. Researchers today use three-dimensional computer models of "virtual diamonds" to simulate the impact that cut and proportion variations have on a diamond's appearance. The virtual diamond's profile (top) and face-up views (center) can be matched with images of actual diamonds (bottom) to confirm the research results.

Marcel Tolkowsky—Father of Modern Cut Research



Peter Johnston/GIA

Marcel Tolkowsky played an important early role in diamond cut research.

Few people have had as dramatic an influence on the diamond cutting industry as Marcel Tolkowsky (1899-1991). He wrote a small book called *Diamond Design* in 1919, based on research he did while earning an advanced engineering degree. In that work, Tolkowsky produced a mathematical study of the way light performed within a round brilliant diamond. His findings influenced diamond cutting for decades.

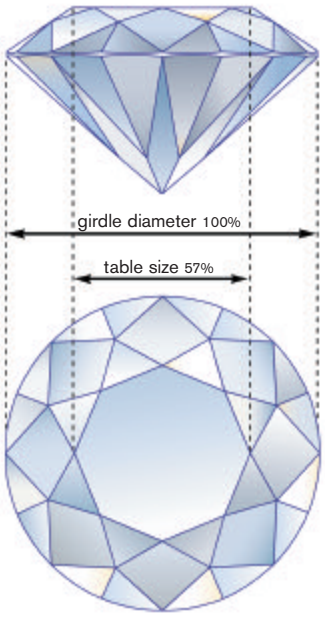
Tolkowsky's two-dimensional mathematical model made an attempt to derive the "best" table size, pavilion angle, and crown angle for a round brilliant. Tolkowsky argued that certain values for these three proportions produced "the most fire and greatest brilliancy." The modern ideal cut evolved from his work.

As important as his findings were, though, they were not the final answer. Today's scientists have the benefit of advanced equipment that wasn't even dreamed of in Tolkowsky's day. Using computers, they can create three-dimensional models of a diamond. This allows them to analyze the complex ways light behaves when it strikes and enters a diamond.

While there's still a lot for modern researchers to learn about the way a diamond's proportions affect light performance, there's one thing for certain: They owe Marcel Tolkowsky a debt of gratitude for paving the way. They can build on his work to develop a whole new way of evaluating and discussing diamond cut.

Table Size

The size of the table is important because it helps determine how much light enters and leaves the diamond. *Table size* or *table percentage* indicates how large the table is in relation to the diameter of the stone. In a round brilliant, it's expressed as a percentage of the *average girdle diameter*, which is determined by measuring the girdle in several directions and then adding the smallest and largest measurements and dividing by two. The average girdle diameter is an important figure: It's used as a basis of comparison for many other diamond dimensions.



Peter Johnston/GIA

When a diamond grader expresses a round brilliant diamond's table size, it's usually as a percentage of its average girdle diameter.

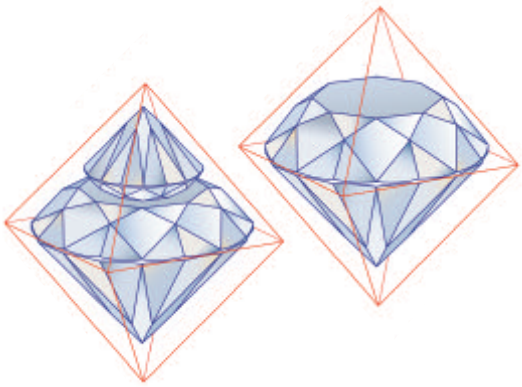
Table percentage (size)—Table size expressed as a percentage of a round brilliant's average girdle diameter.

Average girdle diameter—The result achieved by adding the smallest and largest girdle measurements of a round brilliant and dividing by two.

Before the invention of the rotary diamond saw, table percentages were as small as 40 to 50 percent. This was mostly because grinding was the only way to shape a diamond. Cutters were forced to form each piece of rough into a single finished stone. A small table allowed the cutter to keep more of the diamond's rough weight.

When the rotary diamond saw came into use in the early 1900s, cutters found they could get two stones from one well-formed rough crystal. They were able to cut large tables and still retain a high percentage of the original rough weight. After that, cutters began cutting larger and larger tables. Eventually, many diamonds were cut with tables so large that they caused a reflection that overpowered the light from the other facets.

Today, most round brilliant table sizes are in a range that reflects a compromise between weight retention and optical beauty—somewhere between 50 and 66 percent. This may seem like a wide range, but in a 1-ct. stone, it's a difference of less than one millimeter.

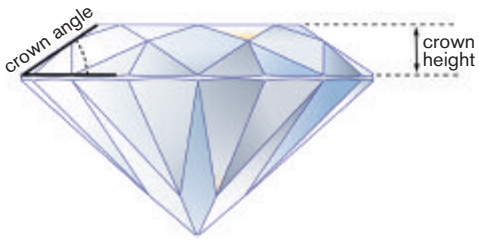


Peter Johnston/GIA

The invention of the diamond saw allowed cutters to divide diamond rough into two or more sections. Before that, the top of an octahedron had to be ground away, yielding just one stone per piece of rough.

All by John Koivula/GIA

Table size influences the amount of light that enters and exits a diamond. On round brilliants, tables under 50 percent are sometimes considered too small (left) because they diminish brightness. Diamonds with medium-sized tables–between 50 and 66 percent–are usually the most attractive (center). Tables over 66 percent can create a flash of brightness that overpowers a diamond's other features (right).



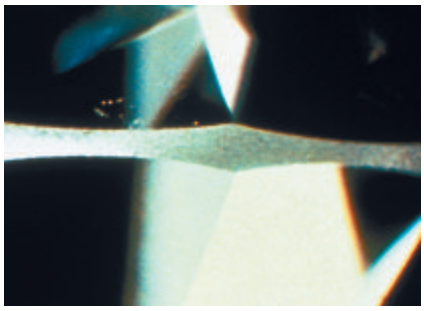
Peter Johnston/GIA

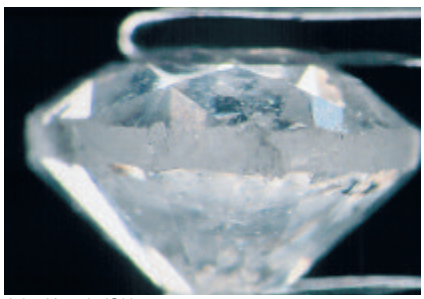
The crown angle is measured where the bezel facets meet the girdle plane.

Crown angle—The angle formed by the bezel facets and the girdle plane.

Andrew McKinney

The bezel setting is used in many attractive and interesting jewelry designs. It's also a protective setting because it completely surrounds a stone with precious metal.





John Koivula/GIA

A diamond's girdle should be uniform and not too thick. If the girdle is bruted, it should look frosted or waxy (top). Girdles that are too thick add unnecessary weight, trap dirt, and cause the stone to look dark (bottom).

Crown Angle

The *crown angle* is the angle that's formed where the bezel facets meet the girdle plane. It's related to crown height: The higher the crown, the greater the crown angle. Most diamonds have crown angles between 25° and 35°. Diamonds with crown angles shallower than 25° can be quite bright, but they are more susceptible to damage than stones with higher crowns.

Diamonds with shallow crowns should be set in mountings that protect the girdle area, like bezel settings, which surround the stone with a rim of precious metal. Shallow diamonds are better suited for use in jewelry where they're less vulnerable to damage, like earrings and pendants.

Stones cut from shallow rough are a challenge for the cutter who tries to get the largest girdle diameter and the highest possible weight retention. As a result, they're usually cut with shallow crowns and pavilions. They also tend to have larger table percentages and thin girdles.

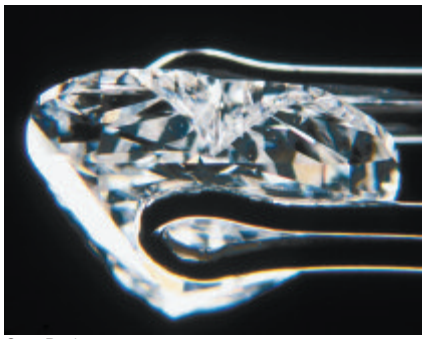
Girdle Thickness

While you can measure girdle thickness and express it as a percentage of average girdle diameter, most people judge it by eye. Much of its influence depends on the size of the stone. A thick girdle can create unattractive, large, fuzzy, gray reflections in the stone. If it's too thick, it can make the entire stone look darker. On the other hand, a thick girdle might actually enhance the face-up color of a fancy-color diamond.

Uniformity is another consideration. On a step cut or a rectangular brilliant, the girdle should be the same thickness all the way around. On a round, oval, or cushion-shaped brilliant, it should be slightly thinner between pairs of

mains and girdle facets, and thicker where the points of crown and pavilion main facets meet.

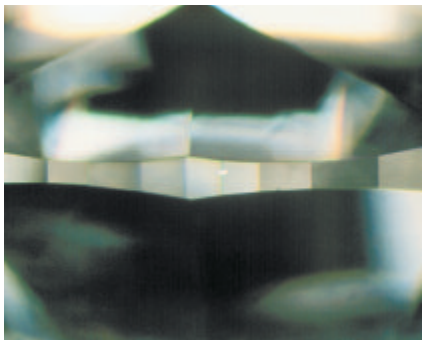
Extreme variations in girdle thickness can cause problems when the stone is set. But sometimes the variations are intentional. The girdles of marquises, pears, and hearts are often slightly thicker at the points to reduce the possibility of chipping. Hearts have thicker girdles in the clefts, too.



Gary Roskin

Girdle thickness can be increased in certain locations on some fancy shapes. This heart's cleft is much thicker than the rest of its girdle.

The girdle on a diamond can be unpolished, which is called a bruted girdle. A bruted girdle should look frosted or waxy. If the girdle-shaping process is done incorrectly, the girdle will have a rough, granular surface. A rough girdle can trap oil and dirt, and it can eventually get so dirty that the stone will look dark.



The development of mechanized cutting techniques made faceted girdles more common. Faceting can make the girdle less obvious and brighten its reflections.

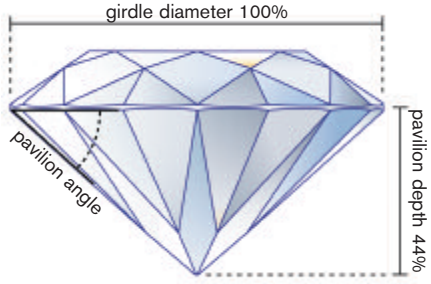
The girdle might also be polished or faceted. A polished girdle has a smooth surface, while a faceted girdle has a series of smooth, flat facets. Polishing or faceting a thick girdle can make it less obvious, and also make the girdle reflections brighter. When you judge girdle thickness, it doesn't matter whether the girdle is bruted, polished, or faceted.

Pavilion Depth Percentage

Pavilion depth percentage is the distance from the bottom of the girdle plane to the culet. It's expressed as a percentage of average girdle diameter, and it can be judged visually, or measured and calculated. While diamond cutters have long known that pavilion depth percentage is important to brightness, GIA researchers have found that it's critical to fire, too.

When you look at a face-up view of a diamond with a pavilion depth of around 40 percent, part of the girdle often reflects through the table, especially if you tilt the diamond slightly.

In many round brilliants with pavilions shallower than 38 percent, the girdle reflection forms an unattractive gray ring under the table. The ring might also appear in stones that have both a pavilion depth around 40 percent and a large table. The effect is called a fisheye. It gives the stone a dull, flat look.



Peter Johnston/GIA

On a round brilliant, pavilion depth is measured from the girdle to the culet, then expressed as a percentage of average girdle diameter.

Pavilion depth percentage—The distance from the bottom of the girdle plane to the culet, expressed as a percentage of the average girdle diameter.

In the US, FTC guidelines can help you describe diamonds accurately and ethically. The FTC considers it unfair and deceptive not to describe uncut or unfaceted diamonds as "rough."

Cut and the FTC

The FTC *Guides for the Jewelry, Precious Metals, and Pewter Industries* addresses several aspects of cut. It starts by making cut an essential part of the definition of diamond itself.

Section 23.11 Definition and misuse of the word "diamond."

(a) A diamond is a natural mineral consisting essentially of pure carbon crystallized in the isometric system. It is found in many colors. Its hardness is 10; its specific gravity is approximately 3.52; and it has a refractive index of 2.42.

(b) It is unfair or deceptive to use the unqualified word "diamond" to describe or identify any object or product not meeting the requirements specified in the definition of diamond provided above, or which, though meeting such requirements, has not been symmetrically fashioned with at least seventeen (17) polished facets.

Note 1 to paragraph (b): It is unfair or deceptive to represent, directly or by implication, that industrial grade diamonds or other non-jewelry quality diamonds are of jewelry quality.

(c) The following are examples of descriptions that are not considered unfair or deceptive:

(1) The use of the words "rough diamond" to describe or designate uncut or unfaceted objects or products satisfying the definition of diamond provided above; or

(2) The use of the word "diamond" to describe or designate objects or products satisfying the definition of diamond but which have not been symmetrically fashioned with at least seventeen (17) polished facets when in immediate conjunction with the word "diamond" there is either a disclosure of the number of facets and shape of the diamond or the name of a type of diamond that denotes shape and that usually has less than seventeen (17) facets (e.g., "rose diamond").

Later in the *Guides*, the FTC goes into more detail on the use of cutting terms as well as specific facet requirements:

Section 23.15 Misuse of the term "properly cut," etc.

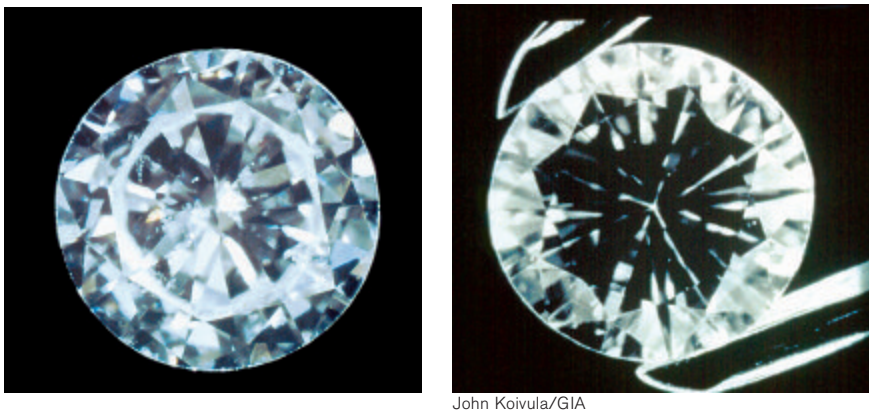
It is unfair or deceptive to use the terms "properly cut," "proper cut," "modern cut," or any representation of similar meaning to describe any diamond that is lopsided, or is so thick or so thin in depth as to detract materially from the brilliance of the stone.

Note to Section 23.15: Stones that are commonly called "fisheye" or "old mine" should not be described as "properly cut," "modern cut," etc.

Section 23.16 Misuse of the words "brilliant" and "full cut."

It is unfair or deceptive to use the unqualified expressions "brilliant," "brilliant cut," or "full cut" to describe, identify, or refer to any diamond except a round diamond that has at least thirty-two (32) facets plus the table above the girdle and at least twenty-four (24) facets below.

Note to Section 23.16: Such terms should not be applied to single or rose-cut diamonds. They may be applied to emerald-(rectangular) cut, pear-shaped, heart-shaped, oval-shaped, and marquise-(pointed oval) cut diamonds meeting the above-stated facet requirements when, in immediate conjunction with the term used, the form of the diamond is disclosed.



John Koivula/GIA

A round brilliant diamond with a shallow pavilion might show an unattractive gray ring under its table (left). This is called the fisheye effect. When the pavilion is too deep, a diamond can look dark in the center (right). This is called a nailhead.

With some fancy shapes, variations in the pavilion angle often cause a dark bow-tie to appear across the width of the diamond.

Pavilion angle—The angle formed by the pavilion main facets and the girdle plane.

Pavilion bulge—Larger-than-usual pavilion angles on the middle tier of facets, designed to add weight to a step-cut stone.

Total depth percentage—Table-to-culet depth, expressed as a percentage of average girdle diameter.

Most stones with pavilions deeper than 49 percent look dark in the center. A pavilion depth of 50 percent or more can produce a dark area under the entire table. This is sometimes called a nailhead.

To put this into perspective, it helps to remember that the difference between a pavilion that's too shallow and one that's too deep is about 10 percent. On a round brilliant, this corresponds to a difference of only a few degrees in the *pavilion angle*, which is the angle between the pavilion main facets and the girdle plane.

Some people use the pavilion angle instead of the pavilion depth percentage when they evaluate a diamond's proportions. Pavilion depth percentage and pavilion angle are two different ways of looking at the same thing: The steeper the angle, the greater the depth percentage.

Round diamonds have almost the same pavilion angle all around, so they also have the most even light display. On fancy shapes, though, pavilion angles are more variable from one part of the stone to another. This causes variations in light display. One of the most common effects, especially in marquises, ovals, and pears, is the dark bow-tie, which looks just like its name. A cutter can balance light display in a fancy shape by cutting an elongated culet or changing the angle of its pavilion facets.

To increase the weight of finished emerald-cut diamonds, some cutters increase the pavilion angles of the middle tier of facets, and cut a larger pavilion. This changes the overall profile of the diamond. The result is called *pavilion bulge*. Its disadvantage is that it often reduces the diamond's brilliance. A large bulge can make a diamond difficult to set, and it adds to the weight—and the cost—without adding to the diamond's beauty.

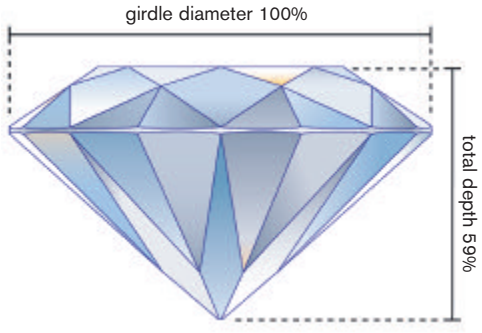
Total Depth Percentage

Total depth percentage is the diamond's table-to-culet depth. On a round brilliant, it's expressed as a percentage of the diamond's average girdle diameter.

To many people, a 60 percent total depth percentage means that the stone is well proportioned, but this isn't necessarily true. The total depth percentage combines crown height percentage, girdle thickness percentage, and pavilion depth percentage, so it's meaningless if any of those three percentages fall outside the "normal" range. Examples would be a diamond with an extremely thick girdle, or one with a very shallow crown and an overly deep pavilion.

If total depth percentage is less than 55 percent, the stone probably has a shallow crown or pavilion, along with a large table, shallow crown angles, or a combination of these features. If it's more than 65 percent, the crown or pavilion might be deep, and the girdle is probably thick. In either case, the proportion variations might affect the diamond's beauty.

While total depth percentage is a good indication of a diamond's proportions, it can't tell the whole story. It's no substitute for careful inspection and analysis of the relationship between a diamond's proportions.



Peter Johnston/GIA

Total depth percentage is the diamond's depth from table to culet, expressed as a percentage of its average girdle diameter.

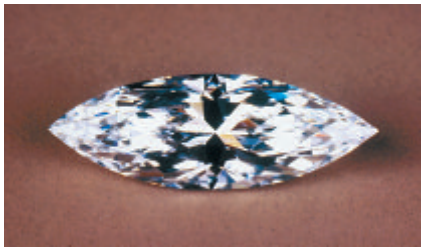
Culet Size

Most fancy cuts have culets, while many rounds don't. The culet's primary purpose is to protect the bottom of a gem against accidental chipping or abrasion.

Most diamond graders estimate culet size visually. You can see a medium culet through the table with 10X magnification, but not with the unaided eye. A large culet, on the other hand, is easy to spot through the table without magnification. And the octagonal outline of a very large culet is clearly visible. Many old-style cuts have extremely large culets by today's standards.

Eric Welch/GIA

Large culets, like the one seen through the table of this old-style cut, were common in stones cut in the nineteenth century.



Fancy shapes have certain proportions that are commonly considered more attractive than others. This oval has a length-to-width ratio that is visually pleasing (top), but the marquise falls outside the preferred ratio for its shape (bottom).

Andrew McKinney

The unusually elongated pear-shaped diamond and the triangle cut are both enhanced by custom mountings.

Length-to-width ratio— Comparison of the length to the width of marquise, emerald, pear, heart, oval, and princess cuts.

Length-to-width Ratio

The *length-to-width ratio* is an important proportion consideration for marquise, emerald, princess, pear, heart, and oval cuts. You calculate it by dividing the diamond's length by its width. Then, you assign a value of one to the width and state the relationship as a ratio. If an emerald cut measures 4 mm × 2 mm, for example, its length-to-width ratio would be 2:1, and stated as "two to one."

Some length-to-width ratios are more visually pleasing than others. And each shape has its own "preferred" ratios. Marquises are most popular in length-to-width ratios between 1.75:1 and 2.25:1. People tend to prefer ovals between 1.33:1 and 1.66:1. Emerald cuts, rectangular cushions, and pears are most popular in length-to-width ratios between 1.50:1 and 1.75:1. And hearts are generally considered most attractive at 1:1. A stone with a length-to-width ratio that falls outside these ranges is still marketable, but would probably sell at a lower price.

Length-to-width ratios might affect durability and practicality. A long, thin stone, for example, might break easily, especially if it has points, like a marquise or a pear. Stones with unusual length-to-width ratios often require custom mountings like the ones found in high-end jewelry.

Appealing Proportions

For round brilliants, most table percentages are between 50 percent and 66 percent, most crown angles are between 25° and 35°, and most pavilion depths are between 42 percent and 44 percent.

In small stones, the primary optical goals are brightness and scintillation, so there's not much concern about subtle proportion variations. Deep pavilions are common, and very small, round diamonds might carry 10 percent of their weight in extra girdle thickness.

With fancy shapes, there's less of a consensus about appealing proportions, and the variations are greater. Emerald cuts with tables over 70 percent and pavilion depths of 50 percent or more are common. So are marquises, ovals, and pears with shallow crown and pavilion angles. The variations in shoulders, wings, bellies, and bulges are endless.

A diamond's proportions can provide a way for appraisers and other diamond professionals to estimate its weight if it's mounted. This involves the use of a series of mathematical formulas, along with the proportions that can be measured within the limitations imposed by the mounting. Gem professionals often get fairly accurate results, but proportion variations can affect weight estimations.

A thick girdle, for example, represents a significant amount of weight because it's located at the diamond's widest point. Small stones and fancy shapes are most likely to have thick girdles in order to save weight. Experienced jewelers know they have to account for this when they're estimating weight.

Eric Welch/GIA

After examining the rough carefully, a cutter might intentionally introduce proportion variations to save weight or remove clarity characteristics that might lower a diamond's value.

Without the special formulas and correction tables that exist to help adjust for proportion variations, an estimate of a diamond's weight might be off by 25 percent or more. This means an estimate on a 2.00-ct. stone might be as low as 1.50 cts. or as high as 2.50 cts. This could translate into a difference of thousands of dollars.

Proportion variations can also greatly affect appearance, which can make a difference in a diamond's value. Stones of comparable color and clarity can weigh about the same and cost about the same, but proportion differences alone can make one look larger, another brighter, and give still another more fire.

A cutter might intentionally introduce a proportion variation to save weight or to remove a clarity characteristic. Every extra point of retained weight and every step up the clarity grading scale can translate into an increase in value.

Here's an example: Say a cutter examines a piece of rough and determines that shaping a diamond with a 57 percent table, 34.5° crown angle, 43 percent pavilion depth, and a medium girdle will result in a finished diamond that weighs 0.99 cts.

As you'll learn in the next assignment, if all other value factors are equal, there is a dramatic difference between the value of a 0.99-ct. diamond and one that weighs 1.01 cts. So the value of this diamond will increase significantly if the cutter can squeeze an extra two points (0.02 cts.) out of the rough. Making the girdle just a little thicker can accomplish that goal.

When cutters vary proportions to increase weight or to avoid inclusions and blemishes, they have to be careful to work within a very tight range. A noticeable variation will lower the value of the diamond, not raise it.

Ralph Gabriner/Michael David Designs, Ltd.

Designers use very small round diamonds to create jewelry with a lot of brightness and scintillation. Minor proportion variations in the tiny diamonds have little effect on the overall appearance, as long as they're well matched.

Tom Stewart/Corbis Stock Market

Regardless of a diamond's exact proportions, its beauty and the feelings it inspires are what really matter.

Although there's no single definition of what constitutes an "ideal cut" diamond, manufacturers today use the concept to market their particular brands of diamonds.

Ideal Cuts

Many manufacturers and retailers promote the concept of "ideal-cut" round brilliants, claiming that their specific proportions create the right balance between brilliance and fire. Consumers who need reassurance like the idea of evaluating a diamond's cut based on specific standards.

Unfortunately, there's no positive proof that any one set of proportions is truly "ideal." Cut research results suggest that many different proportion combinations succeed equally well.

Currently, manufacturers who classify diamonds as ideal cuts use proportions within certain limits. But ultimately, consumers decide which set of proportions looks best to them. The modern round brilliant remains popular among consumers, even though its table is usually larger and its crown height shallower than those of the various ideal cuts.

Partly because of the active marketing of ideal cuts, today's diamond customers are more knowledgeable about differences in diamond proportions.

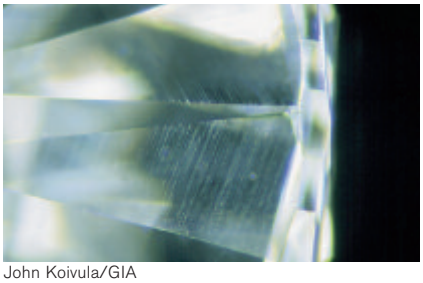
Advanced gemological equipment lets jewelers show customers how one diamond cut compares to another. Countertop diamond imaging systems, such as The Brilliant Eye, can help educate consumers about cut. A sales associate can use a diamond imaging system to display a diamond's dimensions and print a report. The report adds authenticity to the diamond and credibility to the sales presentation.

Many diamond experts contend that proportions don't tell the whole story when it comes to light performance and appeal. In the end, the perceived beauty of the diamond is what really counts.

Finish

A diamond's finish consists of two qualities: *polish* and *symmetry*. Polish is the overall condition of the facet surfaces of a finished diamond. Symmetry includes the precision of its proportions and the balanced placement of its facets from one side to the other.

Individual finish characteristics might be difficult to detect, but they make the difference between good and superb cutting. It takes a considerable investment of time and money to produce diamonds with superb polish and symmetry. Large, high-quality stones are worth that investment, so they usually have the best finish.



John Koivula/GIA

The polishing process can leave marks on a diamond. White polish lines across facet surfaces are commonly seen.

Polish

Because of its hardness, diamond will take and keep the best polish of any gem. Good polish is essential for maximum brilliance, fire, and scintillation. The factors that enter into an evaluation of a diamond's polish are:

- Abrasions
- Lizard skin
- Nicks
- Pits
- Polish lines
- Burn marks
- Rough girdle
- Scratches

Diamond graders describe the quality of a diamond's polish as excellent, very good, good, fair, or poor, based on many possible combinations of these characteristics.

In polish, excellent means "superior," not "perfect," so—for example—a diamond with just a few very hard-to-find polish lines or tiny blemishes would be rated excellent.

If a stone has only faint polish lines or insignificant blemishes in inconspicuous places, its polish is very good.

When transparent polish lines on the crown are visible through the pavilion, when only a few facets show burn marks, or when there are several small blemishes, the polish is good.

Obvious polish lines, burn marks on several facets, or noticeable blemishes put a stone in the fair category.

Polish lines, burn marks, or blemishes that reduce transparency call for a poor rating. You'll usually see a poor finish rating on diamonds with low clarity.

Polish—The overall condition of the facet surfaces of a finished diamond.

Symmetry—The precision and balance of a finished gem's cut.

When graders evaluate the symmetry of fancy-shaped diamonds, they look for things like balanced shoulders, facet alignment, and culet placement. This pear has uneven shoulders and a culet that's placed too low.

Symmetry

A symmetrical diamond has an even display of brilliance, fire, and scintillation. Symmetry variations, which result from the way a diamond is cut, include:

- Table or culet off-center
- Girdle outline out-of-round
- Table and girdle not parallel
- Wavy girdle
- Facets that fail to point properly
- Misaligned crown and pavilion facets
- Table not a regular octagon
- Misshapen facets
- Extra facets
- Uneven bulge on step cuts
- Uneven corners and non-parallel sides on rectangular and square cuts
- Uneven wings on pears, marquises, and hearts
- Uneven lobes on hearts
- Uneven shoulders on pears and ovals
- Culets that are too high or too low in pears and hearts

Most diamonds have some symmetry variations. There are essentially no perfectly round diamonds, not all tables are absolutely parallel to the girdle plane, and not every corner, wing, or lobe is precisely the same size and shape as the one opposite it.

Diamonds are examined for symmetry variations under 10X magnification. Like polish, graders use five terms to describe symmetry: excellent, very good, good, fair, and poor.

Diamonds with excellent symmetry might have one or two tiny, inconspicuously placed extra facets, a few very slightly misshapen facets, or a few facets that do not point precisely.

If a stone has a few small extra or misshapen facets, slight pointing problems, or very slight misalignment between the crown and pavilion, its symmetry is very good.

If a diamond has a table or culet that's very slightly off-center, several extra facets, minor facet shape and pointing problems, and crown-to-pavilion misalignment, its symmetry is good.

When the table or culet is slightly off-center, the girdle is slightly wavy, there are a number of extra facets, misshapen facets and pointing problems are noticeable, or crown-to-pavilion misalignment is fairly easy to see, the symmetry is only fair.

If any—or all—of these symmetry variations are very easy to see under 10X, the diamond gets a poor rating. But this is extremely rare today, with the new consumer awareness of cut and the presence of new cutting technologies.

A Round Brilliant Diamond's Cut Grade

The GIA cut-grading system gives you an easy-to-understand way of explaining why a diamond looks the way it does. It applies to the most important commercial cut—the standard round brilliant—in all clarities across the D-to-Z color range. There are five cut grades: Excellent, Very Good, Good, Fair, and Poor.

Cut-grading Factors

A GIA grader must consider several of a round brilliant diamond's features together before arriving at a cut grade. The major contributors to the cut grade are average girdle diameter, table percentage, crown angle, and pavilion angle.

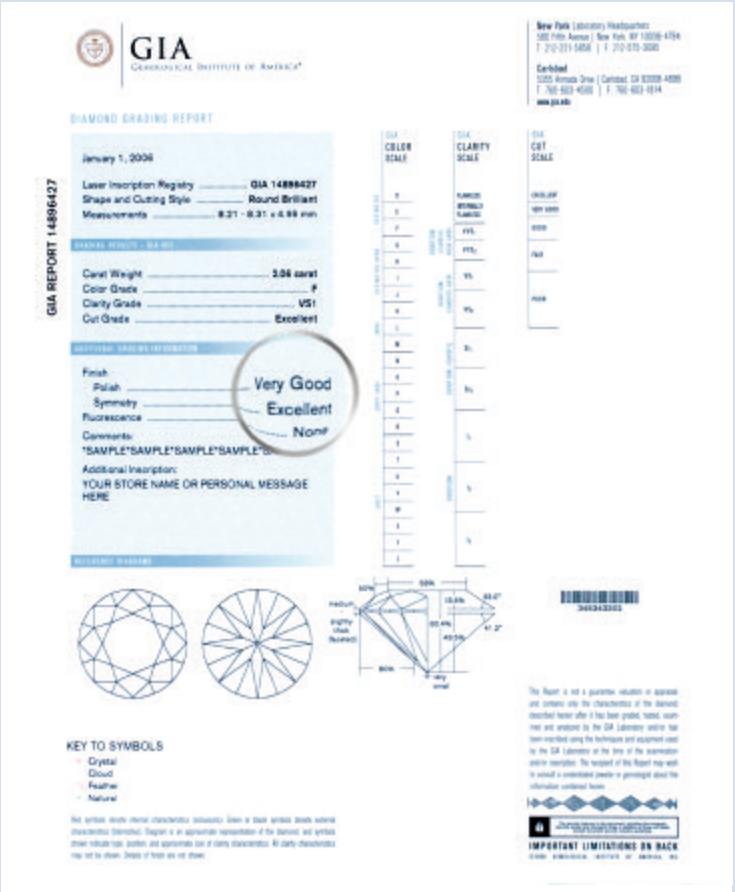
Besides proportions, the cut grade also includes appearance considerations. These include the traditional factors of brightness, fire, and scintillation. Other appearance factors fall into categories called *design* and *craftsmanship.*

Design is determined during the fashioning stage. It's a diamond's physical shape, including its proportions and durability. The category also includes a judgment of the diamond's weight as it relates to its proportions. A grader might consider a diamond "overweight" if it weighs more than its face-up appearance would suggest.

Craftsmanship is the care that goes into the fashioning of a diamond during the polishing stages. Ratings for polish and symmetry are included in this category.

The Diamond Report

The newest GIA diamond grading report lists the cut grade and ratings for polish and symmetry along with other grading factors. A scaled illustration also displays the diamond's essential proportions. The diamond report can be a valuable tool to help you identify an individual diamond and also explain its qualities and value to a customer.



Graders rate a diamond's polish and symmetry under Finish on a diamond-grading report. "Excellent" ratings can mean high value, especially with diamonds of exceptional color and clarity.

Design—A diamond's physical shape, including its proportions and durability, determined by decisions made during the fashioning process.

Craftsmanship—The care that goes into the fashioning of a polished diamond, as confirmed by its finish.

Key Concepts

An excellent/excellent polish and symmetry rating adds maximum value to a well proportioned diamond.

Excellent/Excellent Ratings

As you've learned, diamond graders use the same five terms to describe a diamond's polish and symmetry. These terms appear on many diamond-grading reports, including those from the GIA Laboratory.

Starting in the mid-1990s, buyers and sellers started paying more attention to these terms because a rating of excellent/excellent for polish and symmetry meant an increase in value.

For the same reason, cutters and manufacturers pay extra attention to polish and symmetry details on high-clarity and high-color stones. Paying extra attention to these small details can mean a dramatic jump in value.

Selling Cut

- What should you stress in a sales presentation?
- What are the benefits of different diamond shapes?
- Who should decide what makes a well-cut diamond?

Designers can combine several diamond shapes to create one unique piece of jewelry. This ring features a beautiful mix of baguettes and square and triangular brilliants.

Christie's Images Inc.

Many people think that large diamonds look best as fancy shapes. These earrings feature a 10.93-ct. colorless diamond and an 11.54-ct. Fancy Intense blue diamond. Both pear shapes hang gracefully from smaller oval cuts.

You won't sell much diamond jewelry by giving lectures on the relationship between crown angle and brightness. But you can use what you've learned to help your customers understand that diamonds are cut to exacting standards. Precision is necessary because diamonds are valuable, and every point of saved weight means more value. More important, exacting standards lead to breathtaking displays of brightness, fire, and scintillation.

Be prepared to match the benefits of specific cuts to help your customers find just the right piece of diamond jewelry. There are some things to keep in mind when you're helping match a diamond's cut to a customer's needs.

The round brilliant offers an excellent display of light performance. It's a classic that's always in fashion. It's the shape everyone thinks of when they picture a diamond. The facet arrangement hides inclusions. And there are generally more sizes to choose from than there are for any other shape.

Triangular brilliants also offer good light performance. They're a nice alternative to a traditional round brilliant for people who want something different. In smaller sizes, triangular brilliants make nice side stones.

Ovals can look larger than round diamonds of equal weight. They're good alternatives to the round without being too flashy or unconventional.

Pear shapes look graceful and stylish without being trendy. They're beautiful for drop pendants and earrings. Their graceful, tapered shape can be flattering to the finger and hand. They're often the shape of choice for large diamonds, which tend to look heavy when they're fashioned as rounds.

Fancy shapes such as marquises find their way into a variety of attractive jewelry designs. A marquise can complement a long finger. Like other fancy shapes, marquises can appear larger to the eye than round brilliants of equivalent weight.

Heart shapes reflect the romantic sentiments of the people who wear them. They look particularly nice in solitaire pendants. Heart-shaped diamonds have a very bright look.

Princess cuts are excellent alternatives to emerald cuts for people who like square or rectangular shapes, but want the look of a brilliant cut. They have great optical effects, and look flashy but solid. They're especially good for men's jewelry or channel settings. Some proprietary square and rectangular cuts are called Radiants and Quadrillions.

Many people associate emerald cuts with elegance. Their simplicity of design and bold, geometric symmetry emphasize diamond's transparency.

It's important to be able to explain the benefits of all the diamonds in your inventory, no matter how they're cut. It's also important to remember that different customers will find different aspects of diamond cut important. Some customers are more interested in the carat weight of a diamond than in its optical performance. Your job is to help your customers go home happy, with the diamond that, to them, is the most beautiful and well cut.

Martial Trezzini/Keystone/AP Wide World Photos

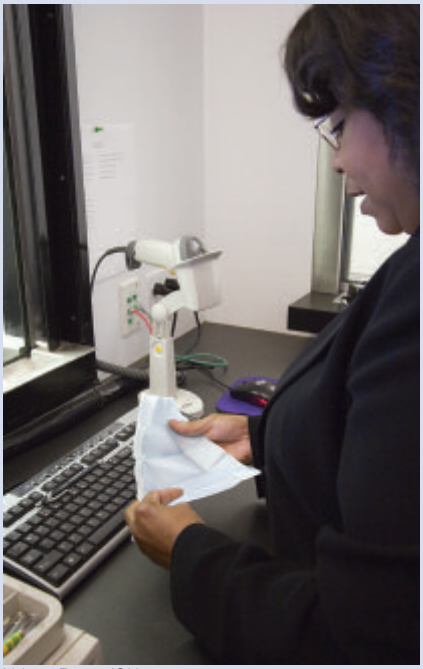
Heart shapes are the most romantic of diamonds. They can be particularly striking when set in solitaire pendants. This exceptional 28.03-ct. Internally Flawless heart sold at an auction in 2001 for over US$1.5 million.

Linda Urban/Mira

You can use your knowledge of cut and proportions as a sales tool. It can help you explain how these factors influence a diamond's beauty.

How GIA Grades Diamonds

Eric Welch/GIA

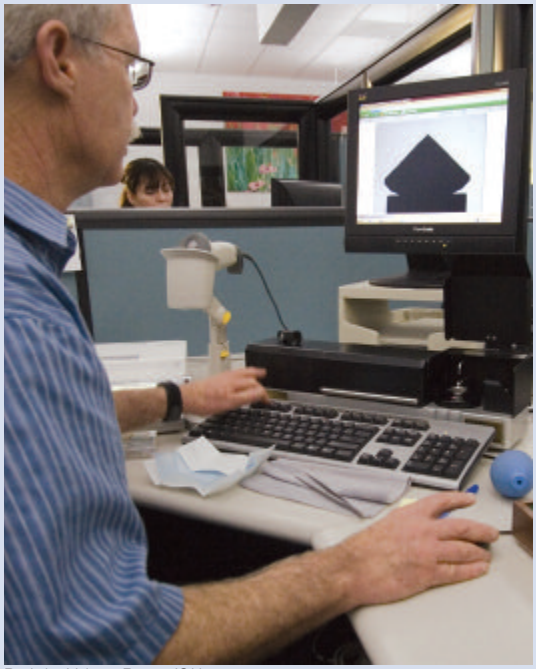


Valerie Power/GIA

Every diamond submitted to the GIA Laboratory is handled carefully and securely every step of the way. The grading process begins when a diamond arrives at the lab. It might be delivered from anywhere in the world by courier or submitted personally by a client (left). A member of the Client Services Staff accepts client submissions through a secured booth (right).

Both by Valerie Power/GIA

Each diamond is assigned its own tracking number and placed into a transparent storage case (left). This assures good visibility of the diamond as well as the client's anonymity. The tracking number helps identify the diamond as it makes its way through the grading process. The first step is for the diamond to be carefully weighed (above) and measured.



Both by Valerie Power/GIA

Precision instruments determine the diamond's measurements, proportions, and facet angles (left). A screening device (right) detects characteristics that indicate the submitted gem might be a synthetic diamond or a simulant, or if the diamond's color is lab-induced rather than natural. If necessary, it might be sent for further testing to determine its identity and origin of color.

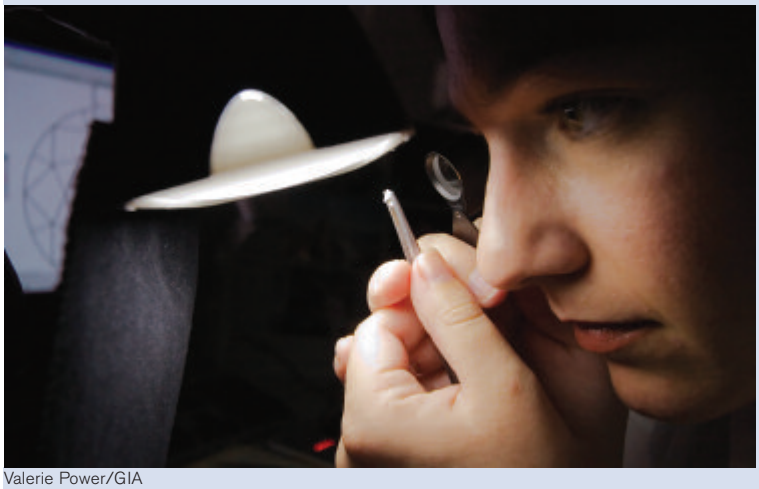
Valerie Power/GIA

At the client's request, the diamond can be laser-inscribed with its unique GIA report number or even with the client's choice of text or symbols.

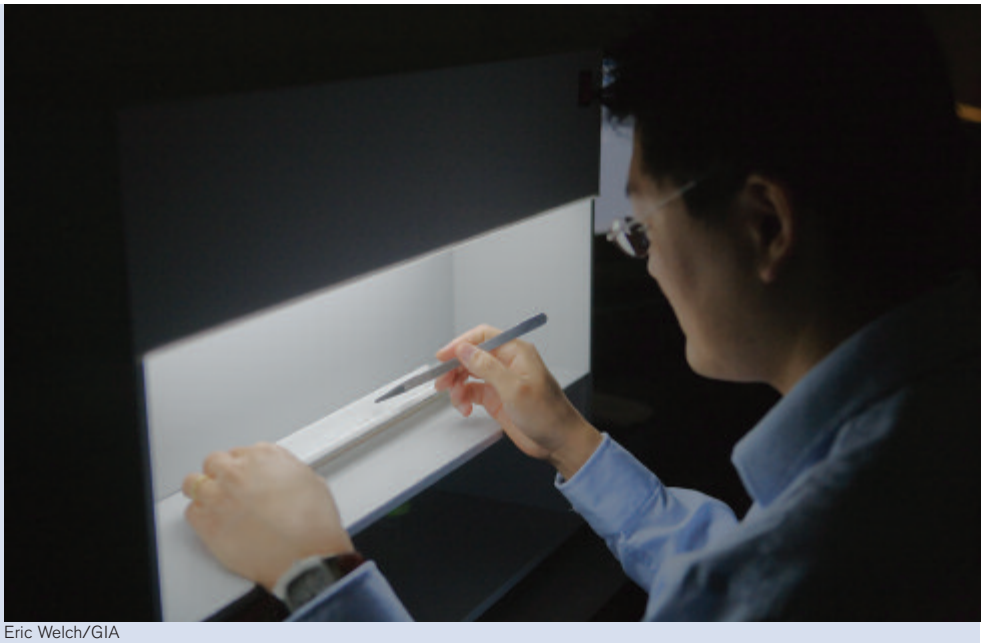
Visual Assessment

A diamond's clarity and finish are graded under 10X magnification and standard viewing conditions. To get the most complete picture of these factors, the grader examines it with both a gemological microscope (right) and a loupe (below). At this stage, the grader also checks for treatments such as laser drilling and fracture filling. This stage also includes a visual assessment of the diamond's culet size and girdle thickness. Along with finish and proportions, these factors help determine the diamond's cut grade.

Eric Welch/GIA



Valerie Power/GIA



Eric Welch/GIA

A neutral background and controlled lighting conditions provide the lab grader with an ideal color-grading setup. The grader makes an independent determination of a diamond's color, clarity, and finish. As the diamond moves through the grading process, additional graders examine it until a final grade is determined.

Both by Valerie Power/GIA

After a diamond's grading process is complete, GIA issues its individual diamond report. This might be a full grading report or a Diamond Dossier, designed for diamonds that weigh 0.99 ct. or less. The report is printed (above) and enclosed in a protective sleeve (right) that's returned to the client along with the diamond.

Key Concepts

Cut isn't only about shape: It affects many aspects of a diamond's appearance.

Proportions play a key role in a diamond's appearance.

Round brilliants usually deliver excellent brightness, fire, and scintillation.

An excellent/excellent polish and symmetry rating adds maximum value to a well proportioned diamond.

Key Terms

Average girdle diameter—The result achieved by adding the smallest and largest girdle measurements of a round brilliant and dividing by two.

Craftsmanship—The care that goes into the fashioning of a polished diamond, as confirmed by its finish.

Crown angle—The angle formed by the bezel facets and the girdle plane.

Design—A diamond's physical shape, including its proportions and durability, determined by decisions made during the fashioning process.

Dispersion—The separation of white light into spectral colors.

Finish—The quality of the polish and precision of the cut of a fashioned gemstone.

Girdle outline—Face-up shape of a polished gem.

Length-to-width ratio—Comparison of the length to the width of marquise, emerald, pear-shape, oval, and princess cuts.

Make—The qualities of a faceted diamond's proportions and finish.

Pavilion angle—The angle formed by the pavilion main facets and the girdle plane.

Pavilion bulge—Larger-than-usual pavilion angles on the middle tier of facets, designed to add weight to a step-cut stone.

Pavilion depth percentage—The distance from the bottom of the girdle plane to the culet, expressed as a percentage of the average girdle diameter.

Polish—The overall condition of the facet surfaces of a finished diamond.

Proportions—The angles and relative measurements of a polished gem, and the relationships between them.

Refraction—The change in speed and possible change in direction of light as it travels from one transparent material to another.

Refractive index (RI)—A measure of the change in the speed and angle of light as it passes from one material to another.

Shoulder—One of the two sides adjacent to the rounded end of a pear or oval shape.

Symmetry—The precision and balance of a finished gem's cut.

Table percentage (size)—Table size expressed as a percentage of a round brilliant's average girdle diameter.

Total depth percentage—Table-to-culet depth, expressed as a percentage of average girdle diameter.

Wing—One of the two sides near the point of a marquise, pear, or heart shape.

PHOTO COURTESIES

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