



*Vandenbergs*  
*Diamond College*

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*Learn more about diamonds and  
how to choose one that's perfect for you.*

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# Cut

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Diamonds begin life as little more than a water-worn rock that you would walk past if you saw it on the road. But in the hands of a master cutter, it can be transformed into one of nature's most spectacular light shows. We say 'can' because it isn't usually the case. As you'll learn later, most diamonds are cut to maximize weight, not beauty.

The experience of the cutter and the time, effort, and care taken in fashioning the polished stone from the rough will determine how brilliant the cut diamond will be. The result of the craftsman's touch is what we call the cut. The cut determines the quantity and quality of light that reflects and refracts from a stone. There are three factors that make up the cut of a diamond; the proportions or dimensions, the polish or finish, and the symmetry.

What we refer to as the proportions of a stone are really the dimensions of the stone; how wide, how deep, the angles of the crown (top) and pavilion (bottom) and how they interrelate. In 1918, Marcel Tolkowski mathematically determined the optimal combinations of angles and dimensions that would yield the maximum brilliance from a polished diamond. This set of proportions became known as the 'Ideal' cut and has been recognized as the best set of cut proportions ever since.

Unfortunately, for a number of reasons, the vast majority of diamonds are not cut to ideal proportions. The primary reason is that, typically, ideal proportions yield far less weight from the rough diamond than standard proportions. If we take, for example, a 2.0 carat rough diamond and we cut it to ideal proportions to maximize brilliance, more than half the diamond's weight is lost and the result is a finished stone weighing less than 1 carat. However, if we were to cheat on the angles a bit and leave a little more stone on the bottom, top, or middle, we can make a stone that weighs 1.10 or 1.20 carats or more. The clarity, colour, diameter (size) and price would be the same, the cut diamond would just weigh 15 to 20% more. This 'heavy' stone would sound like a better deal, but is it?

## **POLISH/FINISH**

This is perhaps the least understood of the factors that affect brilliance, yet it may be the most important. One of the properties that make diamonds unique is their incredible hardness and they are by far the hardest substance on earth. This hardness allows us to polish the surfaces of a diamond to a perfection unmatched by even the finest mirrors or lenses, even those polished surfaces used in multi-million dollar telescopes and observatories. What this means is when light strikes the surface (internal or external) of a perfectly polished diamond, all of the light is completely reflected or refracted. The intensity of the light is not diminished in any way.

When light is reflected off the surface of a perfectly polished diamond, it is as intense as if you were looking at the source of light itself. Or, when light enters the diamond and reflects and refracts out of the stone and breaks up into the colours of the spectrum we refer to as 'fire', the colours are strong, distinct and pure – they aren't blended together or fuzzy as they are with a poorly polished stone. The polish dramatically affects the intensity of the light that is reflected and refracted back to the viewer.

# Cut

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## **SYMMETRY**

the facets are tilted with respect to each other or cut out of alignment, the light will not reflect properly. A phenomena called 'hearts and arrows' refers to being able to see, with the aid of a special viewer, a series of hearts around the pavilion or bottom of the diamond when viewed from the bottom, and a series of arrows when viewing the stone from the top.



It is important to understand the hearts and arrows effect is not an indication of ideal proportions, but rather of near perfect to perfect symmetry. All ideal cut diamonds will have some form of hearts and arrows pattern, but all diamonds showing hearts and arrows will not necessarily be ideal cut.

## **GRADING FOR CUT**

Although it has been long recognized that cut is a major factor in the beauty of a diamond, grading for cut is a relatively new consideration. The first major lab to assign cut grades to diamonds was the American Gem Society (AGS). The AGS created a scale from zero to ten, where zero was ideal cut to Tolkowsky's proportions and ten was a very poor cut. In early 2006, the Gemological Institute of America (GIA) followed suit and created a system that numbers from 1 (excellent) to 5 (poor). Other labs have made attempts at cut grading as well, but use inaccurate and confusing terms like 'commercial', 'promotional', 'poor', 'fair', 'good', 'very good', 'excellent', and 'ideal'. We've even seen 'ideal plus' on a diamond certificate.

Unfortunately, there is no correlation or consistency between these grading systems, and what can be graded as 'good' to one lab, can be graded as 'ideal' with another. Even the top labs, where they publish the criteria for their grades, a GIA #1 (top) grade can earn an AGS #3 (4th) grade, while an AGS #0 (top) grade can earn a GIA #2 (2nd) grade. It's all been very confusing until now as we have an instrument capable of assessing and ensuring the quality of our cut diamonds.

# Colour

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When we refer to colour in a diamond, we're talking about the appearance, or 'body colour' of the stone. To better understand this, let's first talk about and understand light. The light we see is called the visible spectrum and it is comprised of all the colours of a rainbow, from red to violet. What makes things colourful is how they react to the light that strikes them. For example, a stained glass window appears blue because it absorbs all the colours of the spectrum except the blue light that is allowed to refract or pass through the glass and into our eyes. In a similar way, a ripe tomato is bright red because it absorbs every colour but the red light that is reflected off of it and back to our eyes. This is how virtually all things achieve colour.

In nature, there are very few things that are, or can be, completely colourless or transparent and don't absorb colour so they appear clear or white to our eyes. One of these is a diamond. When diamond is pure or 100% carbon, it is fully transparent so all the light that hits it can be reflected and refracted back to the viewer. Unfortunately, nature seldom makes diamond pure as there are usually trace impurities of other elements, such as nitrogen, boron and other elements, within the diamond. These impurities cause the diamond to absorb light,



making it appear coloured. The most common impurity in diamond is nitrogen, which causes it to absorb all colours except yellow. The more nitrogen in the stone, the darker yellow the stone appears.

It can be very desirable when a stone is saturated with nitrogen and appears a beautiful canary yellow. However, the vast majority of stones fall somewhere in between white and yellow with a tint of colour but not enough to be attractive. The GIA created a relative scale that allows us to quantify the colour of diamonds and the scale starts at 'D' for a fully colourless stone and continues through to 'Z' for a deep yellow stone. The GIA prepared a master set of diamonds that represent these grades, and all diamonds that are graded are compared to this master set.

Stones with ratings from 'D' to 'F' are considered colourless and the differences between these stones is difficult to view even to a trained eye. Stones with ratings from 'G' to 'J' are considered to be near colourless. We believe the separation point is really between the 'H' and the 'I' where you can't really see the yellow in 'H' or above but you can in 'I' and below. Stones from 'K' to 'M' are considered to be faint yellow in appearance and 'N' and below are considered noticeably yellow. The colour of a diamond is very important for the overall brilliance and beauty of the stone. While we've learned the cut of a diamond is directly responsible for the quantity of light that returns to the viewer, the colour is directly responsible for the quality of light that is returned. The higher the colour grade, the purer the light that is reflected and refracted back to the viewer.

# Colour

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Another factor that is directly affected by the colour of a diamond is its 'fire'. The term fire refers to the flashes of colour that radiate from a polished diamond. These are the reds, blues, greens and all other colours of the spectrum that are refracted from a stone. When a diamond is pure carbon (D colour) and absorbs no light at all, colours emerge from the stone pure and bright and with full intensity. As the stone has more nitrogen in it, making the diamond more yellow, it absorbs many of these colours and the emerging light becomes softer.

Second only to cut in its effect on the beauty of a diamond, we put a high degree of emphasis on a stone's colour. Because of this, only stones with a rating of 'H' or better can be considered to become a Vandenberg's Signature Series Diamond.

# Clarity

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Certainly the most talked about but arguably the least important in terms of beauty is the clarity of a diamond. We say least important as the majority of the categories in which we grade diamonds, the best trained eye in the world is incapable of separating them without some form of magnification. So, in real terms, with the exception of the lowest third of grades, clarity really refers to the rarity of the stone and has little to do with its beauty.

Most diamonds will develop inclusions while they form deep within the earth. The nature, size and location of these inclusions all affect the clarity grade that the stone earns. These inclusions can be other mineral or diamond crystals, fingerprints of small impurities or small cracks and fissures known as feathers, and others. The scale that we use to grade diamonds was created by the Gemological Institute of America (GIA).

Flawless diamonds are incredibly rare. In order for a stone to earn this grade, it can have no imperfections or inclusions visible to a trained eye under 10X magnification. This is an amazing feat for both nature and the cutter. From there, when you have the smallest pinpoint inclusion that is just barely visible to the grader, it falls into the VVS categories. When inclusions are fairly easy for the trained eye to see under 10X magnification, they earn a VS grade. When stones have inclusions that are easy to see under 10X magnification but still can't be seen with the naked eye, these fall into the SI categories. Sometimes, when the inclusions are visible to the trained eye from behind on a white piece of paper, stones can be of the SI2 category, but the inclusion should still not be visible to the naked eye when viewed face up. Lastly, when inclusions are easily visible they earn the I grades. Inclusions can be so large as to weaken the stone and in these cases, the lower grades of I2 and I3 are used.

The important thing to remember is that if other factors are present, both excellent cut and colour, diamonds with a clarity rating of SI1 or better will all look simply amazing. Stones with SI1 or better clarity ratings can be considered to become a Vandenberg's Signature Series Diamond.

# Carat Weight

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This term refers to the weight of the stone. A metric carat weighs 0.2 grams and there are 5 carats in 1 gram. The carat is further broken down into 100 points; this refers to the portion of 1 carat. For example, a 50 point stone can be written as 0.50 ct. and weighs 1/2 a carat. It's important to note that diamonds get far rarer as they get larger so the cost per carat increases. A one carat diamond is worth more than two 1/2 carat stones.

Diamonds are rare and large diamonds are amazingly rare. In an average diamond mine where, theoretically, the concentration of diamonds is highest, the ratio of diamond to earth is about 1 part per 4.5 million. That translates to roughly 1 carat of diamond per tonne of earth, and this is for all sizes and qualities of diamond the mine produces. Since stones large enough to cut a quality diamond of 1 carat or larger comprise only a very small portion of this total production, it's clear diamonds are indeed exceedingly rare.

# The Kimberley Process

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The Kimberley Process is a joint government, industry and civil society initiative to stem the flow of 'conflict diamonds'. Conflict diamonds are rough diamonds used by corrupt government officials and drug cartels to launder money, and by rebel movements to finance wars against legitimate governments.

In January of 2003, the Kimberley Process Certification was implemented. The Kimberley Process is an import-export certification process that requires participating governments to certify the origin of rough diamonds, and put in place effective controls to prevent conflict stones from entering the supply chain.



Participant countries must enact domestic legislation to implement the certification, and can only trade rough diamonds with other members. This creates a strong incentive for countries that want to produce, trade or process uncut stones to join the process.

The Kimberley Process is open to all countries that are willing and able to implement its stringent requirements. As of August 2013, the Kimberley Process had 54 participants, representing 81 countries, with the European Union and its 28 member states counting as a single participant, and represented by the European Commission. Kimberley Process members account for approximately 99.8% of the global production of rough diamonds.

At Vandenberg's, we are diligent to ensure that all of our diamonds are conflict free and are sourced from reliable suppliers.

# Canadian Diamonds

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Diamond exploration in Canada began in secrecy as early as the 1960's. But it was through the tenacity of Chuck Fipke and his partner, Stu Blusson, that they were finally found in the Lac de Gras region of Canada's Northwest Territories in the late 1980's. This historic find resulted in Canada's first diamond mine, the Ekati mine. Through a joint partnership between Chuck, Stu, their junior mining company, DiaMet, and a major mining company, BHP, Ekati opened in October of 1998.

With the addition of two other mines, and soon a fourth mine involving majors like DeBeers and RTZ, Canada has taken its rightful place among the world's major diamond producers. With production hovering around 12 million carats per year, Canada ranks third in the world by value behind Botswana and Russia.

Shortly after the turn of the century, and with the assistance of the Northwest Territories' government, a fledgling diamond cutting industry was forged in Yellowknife. It has been a difficult journey for this industry and it's been troubled with closures and inconsistent cut qualities. Finding it hard to compete with India and China, diamond industry insiders question the future of cutting in Canada.

Always wanting to support Canadian endeavours, Vandenberg's is constantly on the look for Canadian diamonds. We acknowledge that 95% of Canada's rough diamonds are sold on the world market, so we actively seek polished Canadian diamonds all over the globe. Like all diamonds we sell, they must meet our strictest cut quality guidelines. While this is not easy, we do try to always have Canadian diamonds in stock that meet our quality expectations.

If there is a particular size and quality of Canadian diamond you wish, we'd be pleased to search the world for it.