



Gemmology Corner

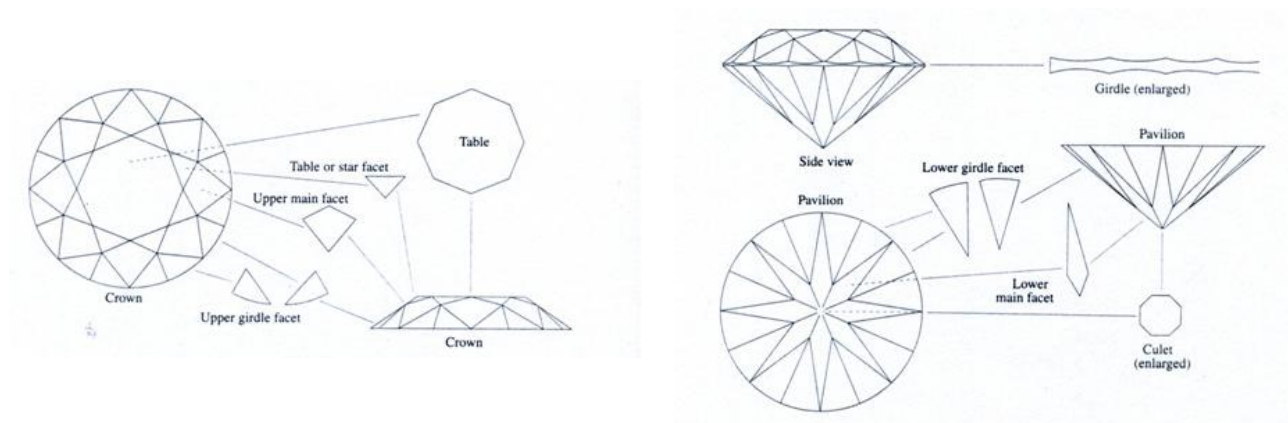
The Brilliant Cut – Chapter 2: The Modern Brilliant Cut

The Modern Brilliant Cut

The modern round brilliant cut is the most popular diamond cut and is considered ideal for colourless (white) or slightly tinted diamonds because it dissipates almost completely the yellow, brown or grey shades present in almost all diamonds. But, for this same reason, this cut is hardly suitable for Natural Fancy Coloured Diamonds, as in their case, the goal is to accentuate those very same diamond colours as intensely as possible.

The name "brilliant", from the French word "brillant" meaning shiny or bright, is today closely linked to the mineral that is a diamond. Nevertheless, the term brilliant refers, in fact, to a specific cut and describes, in our case, a round cut gemstone with 57 facets (58 if the culet is visible). To be entirely accurate, we would have to speak of a brilliant cut diamond.

The facets of a brilliant cut diamond are designated as follows: On the crown of the diamond are the table, 8 table facets, 8 upper main facets and 16 upper girdle facets. The diamond's pavilion includes 8 lower main facets, 16 lower girdle facets, and the culet. The following illustrations show the position and shape of the table, the facets, and the culet.



The facets of a brilliant. Diamond Grading ABC, p. 186

"Life" and "Fire" in a Diamond

To create a beautiful stone, it is not enough to simply give a rough diamond a round shape and provide it with 57 facets. Of course, the number of facets, the way they are arranged on the crown and the pavilion, and their angles to the girdle fundamentally affect the diamond's appearance. What is also important, however, is the ratio between the crown and the pavilion and the size of the



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table compared to the height of the crown. The angles and the ratios of a diamond's dimensions are what we call its proportions. In turn, the "life" and "fire" of a diamond depend on its proportions.

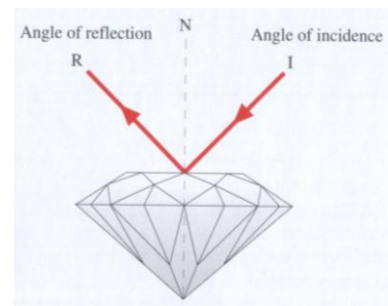
The "Life" of a Diamond

A diamond's "life" refers to its brilliance. The term brilliance involves several distinct optical processes in the diamond including external brilliance, internal brilliance, and scintillation brilliance.

External Brilliance (Lustre)

The external brilliance of a diamond is produced by the reflection of light from the surface of its facets. A ray of light which falls on the surface of the diamond is split into two rays.

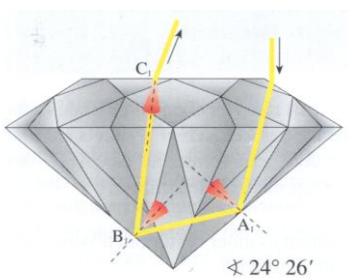
While one part of the ray enters the diamond, the remaining light component is reflected back from the surface of the stone. The term lustre means the totality of the light reflected at the surface. This phenomenon, very marked in diamonds, is described as "adamantine".



Reflexion of light on the surface of a stone.
Diamond Grading ABC, p. 177

Internal Brilliance

A high refractive index in a diamond and a total reflexion of light by the lower main facets cause the internal brilliance. The following diagram illustrates this process:

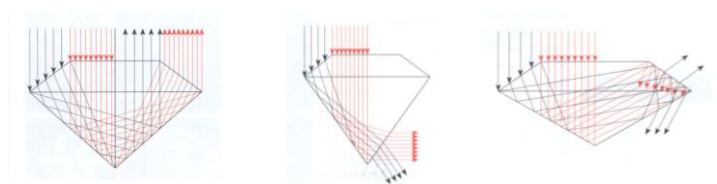


Light refraction and total reflection.
Diamond Grading ABC, p. 181

The light enters the diamond and is refracted and reflected twice by the lower main facets inside the stone. For optimal brilliance, it is crucial that the light be reflected and redirected up and out of the crown, towards the observer.

A certain base angle - the angle between the girdle and the lower main facets - is necessary to reflect the light from the lower main facets.

If the pavilion is too deep, the light that enters the diamond is refracted out through its base, and if the pavilion is too flat, the light is reflected out through the sides.



Pavilion depth and Light Refraction. Diamond Grading ABC, p. 211



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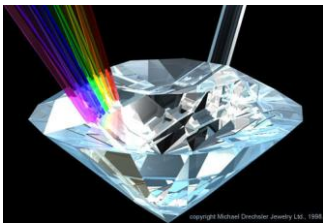
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Scintillation Brilliance

The different light reflections that occur if a diamond or the light source is moved cause a diamond to sparkle. Scintillation brilliance is caused by the number and arrangement of light reflections. The extent to which a diamond reflects light in movement depends on the symmetrical arrangement, the number and the size of the facets, as well as the quality of the polishing and the materials used.



Dispersion.
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The "Fire" of a Diamond

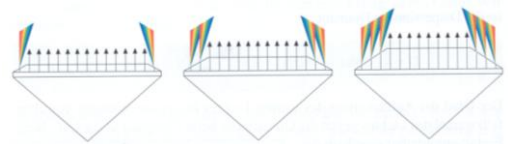
A diamond's "fire" refers to the dispersion of the colours contained in white light. If, for example, a white light passes through a prism, it is not only broken, but split into spectral colours. This effect is called dispersion.

Since the breakdown of colours in diamonds is particularly great, sometimes a play of colours can be observed. Clearly, however, this is only true for colourless or slightly tinted stones. This effect is almost never observed in Natural Fancy Coloured Diamonds.

The size of the diamond's table plays a crucial role because a larger table may indeed increase the brilliance, but will at the same time decrease the "fire". In contrast, a smaller table will increase the diamond's "fire", but reduce its brilliance.

By using findings on the optical and physical properties of diamonds, it became possible to determine the appropriate proportions and symmetry conditions for optimum brilliance.

The purpose of the brilliant cut is to achieve a "balance" between "life" (brilliance) and "fire", even if what is considered to be "balanced" proportions may well vary from one culture to another.



Impact of the crown facet size on dispersion.
Diamond Grading ABC, p. 184

Source:
Diamond Grading ABC - The Manual. Verena Pagel-Theisen, 2007.