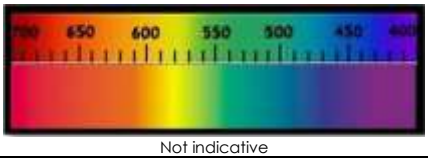
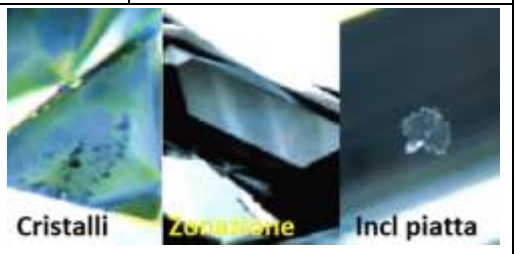
Warning: this version has been completed with Google Translate , it certainly contains errors or inaccuracies.

Technical details - general: Blue and gray diamond

<table>
<tr><td>Gemma - names</td><td>(Italian - Diamante)
(English - Diamond)
(French - Diamant)
(Spanish - Diamante)
(Portuguese - Diamante)
(Thai - เพชร phechr)</td><td>(German - Diamant)
(Arabic - الماس almas)
(Russian - Алмаз Almaz)
(Mandarin -钻石 zu à nsh í)
(Swahili - Almasi)
(Hindi - हीरा heera)</td><td>photo
  </td></tr>
<tr><td>Colors (GIA)</td><td colspan="2">blue diamonds are classified using the following terms: Very Light Blue (2% of the total, GIA data), Light Blue (6%), Fancy Light Blue (10%), Fancy Blue (49%), Fancy Intense Blue (18%), Fancy Vivid Blue (1%), Fancy Deep Blue (10%) and Fancy Dark Blue (2%). Most blue diamonds also have a secondary hue (green or gray).
Gray diamonds: Once the color intensity of gray diamonds reaches the equivalent of grade K, they are classified as gray diamonds , not colorless diamonds. Diamonds with a color intensity of KM will be called Faint gray (gray) , that of NR will be called Very diamonds Light gray . Diamonds from S to Z are called Light Gray . The light gray fancy / fancy diamonds start beyond the Z. If the gray tone becomes darker they are classified as Fancy Gray and therefore Fancy Dark Gray . Gray diamonds can also have a secondary hue , most commonly green-gray, greenish-yellow gray, blue-gray, and purple-gray.</td></tr>
<tr><td>Cause of Color</td><td colspan="3">Some blue gems are famous which owe their color to the presence of boron atoms (generally 0.1 to 2.0 PPM, but 8 PPM in Hope Diamond). Boron replaces carbon in the crystal lattice and when this occurs the gems are classified as type IIb / two B. Boron is not, however, the only factor determining the blue appearance of certain diamonds, but selective absorption. that determines this color can be traced to a variety of causes:
1. Boron (36% of the total) gives a blue tint (or gray, when blue is desaturated) to diamonds if no other elements are present. Boron also creates intense red (peak at 660 nm) or blue (peak at 500 nm) phosphorescence or both, as seen in Hope diamond. Many of these stones nowadays come from the Cullinan mine in South Africa .
2. Hydrogen , with a high presence of nitrogen (31% of the total), and absorption bands at 551 nm and 835 nm (frequently from the Argyle mine in Australia). A very limited number of these gems even have the so-called " Alexandrite Effect" (not to be confused with chameleon diamonds) , an optical phenomenon for which the gem changes color slightly depending on the light source: gray in sunlight (fluorescent) and violet / plum to in the incandescent light.
3. GR1 groups - 1 vacant atomic space - (26% of the total) which typically give rise to green-blue colored gems.
4. Inclusions (7% of the total), usually gray and white (or of a very low saturation blue), peaking at N3 (415 nanometers or nm).
5. There are very few blue-green diamonds from a small Brazilian mine that are colored by natural radiation . This process is the same used to artificially produce this color and makes the separation of these stones, from the treated ones, very complicated, sometimes impossible, even by laboratories with more advanced equipment.
Blue diamonds comprise only 0.02% of all diamonds found.
Allochromatic Gem</td></tr>
<tr><td>Classification</td><td>Mineral class
Native non-metallic, mineral</td><td>Species - Group (mineral)
Diamond</td><td>Variety
Blue / gray diamond</td></tr>
</table>

<table>
<tr><td rowspan="2">Optical properties</td><td>Specific Gravity:
3,516-3,525
Common: 3.52</td><td colspan="2">RE: 2.417
Polariscope : SR
Birefringence: The birefringence of polarized light is normally present in diamonds</td><td>Character optical
Isotropic</td><td>Pleochroism
NO</td></tr>
<tr><td colspan="3">Luster (luster) - luster of the fracture
Diamantina - adamantine</td><td colspan="2">Dispersion (fire)
0.044</td></tr>
<tr><td>Light</td><td colspan="3">Fluorescence
SWUV (254 nm) : rare (<10%) red, orange, less common blue-green
LWUV (365nm) : rare (<5%) bluish</td><td colspan="2">Phosphorescence
Blue, green, red
(can be strong)</td></tr>
<tr><td>Form</td><td>Crystalline dress
Octahedral, dodecahedral, cube-octahedral, spherical or cubic
Melting point: 4.027 ° C, Burns above 700 ° C in air.</td><td colspan="2">Phenomenal optical effects
/</td><td colspan="2">Crystalline system
Cubic
Monometric
Crystal class</td></tr>
<tr><td>Chemical formula</td><td colspan="3">Carbon (typically 99.95%)
C.</td><td colspan="2">Spectrometer image
 
Not indicative</td></tr>
<tr><td>Fracture</td><td>Flaking
Distinta - octahedral (4 directions)</td><td colspan="2">Breaking- Parting
. Twinning law of the common Spinel (which produces "macle")</td><td colspan="2">Fracture
Complex, irregular</td></tr>
<tr><td>Durability</td><td>Hardness (Mohs) - Absolute
10; 1600
(with variations in directional hardness)</td><td colspan="2">Toughness
Fair-good</td><td colspan="2">Stability (heat, light, chemicals)
Excellent</td></tr>
<tr><td rowspan="2">Clarity - characteristics</td><td colspan="5">Typical Inclusions: Blue diamonds often appear clear or have few internal characteristics. Among those that can sometimes be found are solid crystals, fractures and cracks, dark inclusions (sulphide or graphite) and sometimes even color zoning.
 
</td></tr>
<tr><td>Guy:
NA</td><td colspan="4">Transparency (commercial) - transparency
Transparent</td></tr>
<tr><td>Deposits - types of rocks</td><td colspan="5">Blue diamonds, for the most part also known as type IIb diamonds, derive their color from small amounts of boron. They come from depths reaching and exceeding 660 km in the lower mantle of the Earth, where boron is in short supply. Their mineral inclusions show that they formed in deeply subducted ocean plates . A hypothesis not yet confirmed by sufficient experimental evidence would suggest that the blue color of the diamonds may have originated in ancient sea beds that were transported to the interior of the Earth. This is scientifically important because it shows how elements, such as boron, from the surface of the Earth can be recycled deep into the mantle by plate tectonics.
Geological age :
Type II (two): Type II diamonds are in turn divided into two subgroups: IIa (absence of trace elements) and IIb (presence of B). Type II diamonds are significantly rarer in nature. They are formed at greater depths and can be large (almost all very large colorless diamonds are type IIa). In some classifications, type IIaAB diamonds (sometimes referred to as IIc) are found, i.e. those containing measurable quantities of hydrogen (H).</td></tr>
<tr><td>Characteristics of rough stones</td><td colspan="5">Type IIb blue diamonds are of super-deep origin (over 600 km from the surface). One of the characteristics of these crystals is that they are very irregular. Unlike the stones that form close to the surface, those of type II (IIB if they contain boron) never present themselves with the typical regular octahedral (or cubic or dodecahedral) shape (type IIb). The perfect blue octahedra you see on some photos are fake.</td></tr>
<tr><td>Main deposits</td><td colspan="5">The main source of diamonds fantasy blue is the Cullinan mine in South Africa, but these stones are also occasionally found in Brazil, India, Indonesia, Sierra Leone, and other deposits in South Africa. Fancy gray diamonds are found in more or less the same fields</td></tr>
</table>

	as blue ones: in Australia, South Africa, India, Russia and Brazil. Although known for its pink diamonds, Australia's Argyle mine also produces gray diamonds, including the light gray colors known as ***Silvermist gray diamonds*** .
Year of discovery	**Uncertain:** the first citations on documents that can be consulted date back to the 17th century.
History	Blue diamonds (even gray ones) were not among the colored ones dedicated to some Indian castes (such as yellow or red ones. The first blue diamond that is known for certain is **the Hope** . The traveler, a merchant Tavernier, gave news of it, who sold it to King Louis XIV of France in 1668 (with another 14 diamonds). In 1673, the stone was cut out by Sieur Pitau , the court jeweler, its color was described as an intense steel blue and the stone became known as the "Blue Crown Diamond" or the "French Blue". Another diamond dating from the same era is the **Wittelsbach Blu (now known as the Graff Blu, after L.** It comes from the famous mines of the ancient Indian kingdom of Golconda. The rumor that the king of Spain Philip IV bought it in **1664** to give it as a dowry to his daughter Maria Teresa proved to be a fake. The earliest date on which it is certain that the diamond was found in Europe is around **1710** , when it was in Vienna in the possession of the Habsburg Crown. It was brought to Munich in 1722, when Maria Amalia married Charles Albert of Bavaria, member of the Wittelsbach family . In 2008 the English jeweler Laurence Graff bought the Wittelsbach diamond at a price of 16.4 million pounds (equal to about 21 million euros). Two years later Graff announced that he had had it cut, reducing its weight to 31.06 carats Since then the diamond has taken on the name of **Wittelsbach - Graff.** Premiere (today Cullinan) mine was discovered and opened , at the present time the most constant source of blue gems. **In the 1950s** , irradiation and annealing of "off-color" diamonds began to be used commercially for the color treatment of diamonds, some of which turned blue. As a result, concerns quickly emerged in the trade about how a treated blue colored diamond could be identified by jewelers. Blue colored diamonds are rarely found with a pure and homogeneous blue color. They often contain different shades of color. The most common secondary shades found with blue diamonds are blue **gray or blue green** . **Name** : The name diamond comes from the ancient Greek ἀ δάμ ας (adámas), "unalterable", "indestructible", "indomitable", from ἀ - (a-), "un-" + δα μdam (damáō), "I overwhelm ", or I" tame ". In India and its surroundings: Etymology: Vai = Mouth, Ra = Light, Vaira = Portal of Light. In Sanskrit it also took on the meaning of diamond club or scepter. The term vajra indicated 2 distinct things: the "diamond" or the "lightning bolt". It also referred to a kind of battle weapon used by the god Indra . In Tibetan Buddhism this same object-stone-weapon is indicated by the name of Dorje . **Other trade names: /** **Variety** : /
Property attributed	Blue diamonds are sometimes used to **repair clogging** , to maintain pee and, as a rule, all organs concerned with expelling waste from the body. It is assumed that the application of a diamond to the kidneys accelerates the departure of the stones. Since the impact will continue after it is evacuated, it is prescribed to continue in short five-minute sessions. They bring a feeling of brilliance, a **vitality** that fills the void with immaculateness and Light. It unites with the Divine, and as the required progress and development manifest within the heart, **it allows the light of the spirit to shine** and be imparted to other people. Although Blue Diamonds do not work directly on the passionate body, their extraordinary vitality can intensify the intensity of any state of excitement, from ecstasy to abandonment, and should be worn with care. Blue Diamonds **imbue** all degrees of the enthusiastic self with Light and could be used as a remedy to strengthen and "consume" intense core arguments, allowing you to feel lighter, progressively cheerful and increasingly aligned with Spirit. **Optical and Physical Properties:** Blue diamonds are normally **electrically conductive** , unlike colorless ones which are insulating. **Planet:** NA **Month: Zodiac sign:** Libra **Chakra:** Crown
Treatments	**Gamma-ray** bombardment by exposure to cobalt-60 (rare), although it is the safest and cheapest method of irradiation, effective treatment can take several months. The color

	produced ranges from **blue to blue-green** which penetrates the entire stone. These diamonds are not heated. The treated blue color can sometimes approach that of natural type IIb diamonds. As with many of the irradiated diamonds, most of those treated with gamma rays were originally **yellowish in color** . Diamonds that are blue before treatment therefore have a **greenish tinge** . Neutron bombardment is one of the two most common irradiation processes, this process produces a green to black color that penetrates the entire stone and heating these stones from 500–900 ° C produces an orange, yellow, brown or rose. **Blue to blue-green** stones that are not heated are separated from natural stones in the same way as gamma-treated stones. Electronic bombardment via Van de Graaff generators is the other common process that produces **a blue, blue-green or green color** that only penetrates to a depth of **about 1 millimeter** . Heating these stones from a temperature of **500–1200 ° C produces orange, yellow, brown or pink colors.** Irradiated **diamonds** are often subjected to low temperature annealing after irradiation to "stabilize" defects. The **HPHT treatment** (at high temperature and pressure) can be used to reduce the brown component in gray or brownish type IIb natural diamonds (containing boron), thus increasing the underlying blue color. This type of surgery can be difficult to detect with standard gemological instruments, but if irregular-looking graphitization around an inclusion and the appearance of moderate to high order interference colors under crossed polarizers are detected, these 2 clues may increase. in the identification of the treatment.		
Synthetic counterpart	There are 2 types of single crystal synthetic diamonds: **CVD** (chemical vapor deposition) diamond and **HPHT** (high pressure and high temperature) diamond.		
It can be confused with	**Moissanite synthetic (separable through: doubling, dispersion, inclusions), Zircon blue** (separable through: double refractive), **Cubic Zirconium / CZ** (separable through: optical character, spectrum, splitting), **YAG** . (separable through: SG, dispersion), **GGG** (separable through: SG, gloss), **Doublets / triplets** (separable through: inclusions, gloss).		
Indicative gemological tests	The properties and appearance of type IIb blue diamonds **do not typically overlap with those of treated blues and type IIb synthetic ones** . Natural-colored blue diamonds show electrical conductivity with an efficiency capacity between that of a conductor (such as copper) and a non-conductor (such as glass or typical almost colorless diamonds); this capability is referred to as semiconductivity. Due to their electrical conductivity and their lack of substantial nitrogen, and because they exhibit a mid-infrared spectrum that is quite different from the spectra of other diamonds, these semiconductor blue diamonds have been designated as type IIb. Based on this electrical conductivity, **cooperation between GIA and De Beers soon** led to the development of a simple conductometer in **1959** . This has proved very effective in distinguishing natural colored type IIb blue diamonds from treated colored blue diamonds of other types. Recently, gemological researchers have recognized the existence of two other categories of natural-colored blue diamonds: IIa blue to blue green diamonds which owe their color to exposure to natural radiation; And (2) gray-blue to gray-purple type Ia diamonds, where the color is associated with the presence of hydrogen. These other two groups of natural colored blue diamonds are not electrically conductive and their gemological properties differ from those of type IIb diamonds. However, it should be added that the tests on these stones are conducted almost exclusively by specialized tests. Even the tools used to separate synthetic from natural stones do not include this type of color. As for gray gems, they are quite rare on the market. Also in this case it is better to rely on a reliable laboratory for this type of examination.		
Value (2021)	**High : BI** 4 + M $ / ct **Gr:** 10,000 + / ct **10 carat +**	**Medium: BI $** 500,000 / ct / **Gr:** 5.000 + / ct **1-2 carats**	**Low:** $ 100,000 / ct / **Gr:** 1.000 + / ct **below the carat**
	According to a study, the price of these gems **increased by 77%, on average, between 2010 and 2020** . According to another research, the increase would have been much higher, ie **330%, between 2005 and 2020** .		
Typical cut	Blue diamonds are offered with cuts determined by the type of rough. Each lost carat point can amount to thousands of dollars / euros.		

	Unlike colorless diamonds, which are often cut in round brilliant cuts, **gray diamonds** are most often found in fanciful shapes such as oval, cushion, radiant, pear or emerald cuts. This is because the round brilliant cut tends to dilute the color of gray diamonds.
Famous stones	the **Hope Diamond** , 45.52 carats; the 31.06 carat **Wittenbach Blue ;** the **Oppenheimer Blue** , 14.62 carats. The 43.38-carat (8.676g) **Nassak diamond** (or Nassac or **Eye of the Idol) once the ornament in the** Trimbakeshwar Shiva temple, near Nashik , Maharashtra state , India, between 1500 and 1817. Other famous gems: the **Tereschenko Blue** , the **Farnese Blue** , the **Graff Blue** , the **Marie Antoniette Blue** , the **Heart of Boroda Blue** , the **Mouwad Blue** , the **Copenhagen Blue** , the **Graff Imperial Blue** , the **Sultan of Morocco** , The **North Star** , the **Blue Lili** , **Transvaal Blue** , **Howeson Blue** , **Begum Blue** , **Brunswick Blue** , **Zoe Blue** , **Apollo Blue** , **Oppenheimer Blue** , **Baby Hope Blue** (Kalimantan) and **Okavango Blue** . There are no noteworthy gray diamonds simply because they barely exist. However, two of the most famous diamonds in the world are blue diamonds with a gray modifier (blue gray diamonds): the Hope Diamond and the Wittelsbach Diamond (until Graff polished it back to a pure blue).
Record stones	The **Blue Moon Josephine** , a 12.03 carat stone with the **highest price per carat** ever paid: 48, 4 million dollars or over **4 million dollars.** The largest is the **Brazilia** with its 176.2 carats (a rather mysterious gem, however, it also appears on some GIA studies).