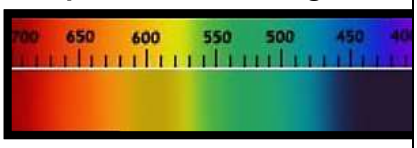
Attention: this version has been completed with Google Translate , it certainly contains errors or inaccuracies.

Technical sheet - general: Coral (Common and Precious)

<table>
<tr><td>Gemma – names</td><td>(Italian - Corallo)
(english -coral) _
(French - corail)
(Spanish - coral)
(Portuguese - Coral)
(Thai - ปะการัง pakār ạ ng)</td><td>(German - Koralle)
(Arabic - المرجان almarjan)
(Russian - Corallovy Korallovyy)
(Mandarin -珊瑚 shānhú) _ _ _
(Swahili -Matumbawe) _
(Hindi - मूंगा moonga)</td><td>photo
  </td></tr>
<tr><td>Colors (GIA)</td><td colspan="2">The coral has a tree-like branching shape, which has branches that are around 20-40 cm long and up to 6 cm thick. This structure built by marine animals/ small polyps that live in colonies and are found in seas and oceans from freezing polar regions to equatorial reefs and at all depths. Of the more than 7,300 coral species , only a handful are used in jewelry and termed precious corals in industry nomenclature standards. Fine corals show various colors.
The deeper its red color, the more prized this gem of the sea is. The skeletons of these formations vary from bright red to dark red , orange - red and pink , but there are also chromatic variations such as gold , black , blue and the white . Each variety of coral has a different amount of translucency.</td></tr>
<tr><td>Cause of Color</td><td colspan="3">Precious coral is "built" from a tiny red octopus . Once solidified, its "house" takes on the most precious form of this type of jewelery formations. The red, pink, white, and blue color varieties (also known as Akori) consist of a substance, composed mainly of calcium carbonate, similar to that of pearls . Blue Akòri , or blue corals , are mainly used to make beads. The black variety (also known as Akabar) and the golden one they are made of a mineral called Conchiolin , an organic substance similar to horn.
Being an organic gem, the classification of coral does not follow that of the mineral world , but that of the animal world . Therefore, the various species that are used for the creation of necklaces, earrings, etc., are classified according to different criteria than most gems. Precious coral is obtained from an organism
Phylum: Cnidaria (containing over 10,000 species of animals), Class: Anthozoa , Subclass: Octocorallia , Order: Alcyonacea , Suborder: Scleraxonia , and Family Coralliidae in zootaxis . The Coralliidae family includes about 30 species, however, among these, Corallium rubrum, Corallium japonicum and Corallium elatius , are those who supply the material for jewelry and the gem market.
Coral color is mainly determined by the presence of pigments, small particles of color within the coral tissue. Some of the causes of coral color include:
Zooxanthellae : These are small photosynthetic organisms that live inside coral tissue and provide them with energy through photosynthesis. Zooxanthellae can be of different colors, such as brown, yellow or green, and their color affects the color of the host coral.
Organic Pigments : Some corals contain organic pigments that are responsible for their vibrant colors, such as red, blue, or green. These pigments are produced by the tissue cells of the coral itself.
Minerals: Some corals get their color from minerals in their tissue. For example, calcite is a mineral that can give coral a white color, while aragonite can give it a pink or red color.
Light Reflection and Refraction : The structure of coral tissue can affect the reflection and refraction of light, creating color effects. For example, some corals may appear blue or green due to the refraction of light through their microscopic structures.
Environmental Conditions : Environmental conditions, such as temperature, light, and water chemistry, can affect coral color. For example, coral can bleach due to heat stress or other environmental factors, while exposure to certain minerals or chemicals in the water can alter its color.</td></tr>
</table>

<table>
<tr><td></td><td colspan="4">It is important to note that coral color can vary greatly even within the same species due to genetic, environmental and coral health factors.
Organic Gem</td></tr>
<tr><td>Classification</td><td colspan="2">Animal class
Filum : Cnidaria
Class: Anthozoa ,
subclass: Octocorallia ,</td><td>Species – Group (mineral)
Miscellaneous - Coralliidae</td><td>Variety
Look down</td></tr>
<tr><td rowspan="2">Optical properties</td><td>Specific Gravity:
2.60 to 2.70
Municipality: 2.65
C. japonicum 2.55- 2.65,
C. elatius 2.68–2.70
C. rubrum . 2.65–2.70</td><td colspan="2">RI: (from point) 1.486 to 1.658
Polariscope : DR
Birefringence: 0.160 to 0.172</td><td>Character optical
Uniaxial Negative</td><td>Pleochroism
NO</td></tr>
<tr><td colspan="3">Luster (gloss) – lustre of fracture
Glassy, waxy, or pearly - opaque</td><td colspan="2">Dispersion (fire)
NO</td></tr>
<tr><td>Light</td><td colspan="3">Fluorescence
SWUV extension (254 nm) : present in the red coral (Corallium rubrum) and in the pink coral (Corallium japonicum)
LWUV extension (365nm) : present in the red coral (Corallium rubrum) and in the pink coral (Corallium japonicum)</td><td colspan="2">Phosphorescence
Sometimes present in red and pink coral.</td></tr>
<tr><td>Form</td><td>Crystal clear dress
Characteristic parallel wavy fibrous structure
Melting point: NA</td><td>Phenomenal optical effects
NO</td><td colspan="2">crystalline system
Trigonal
Crystal class</td></tr>
<tr><td>Chemical formula</td><td colspan="3">Calcium carbonate
$CaCO_3$</td><td>Spectrometer image
 
Not indicative</td></tr>
<tr><td>Fracture</td><td>Cleavage
NO</td><td>Breaking- Parting
NO</td><td colspan="2">Fracture
Conchoidal, irregular, splintered</td></tr>
<tr><td>Durability</td><td>Hardness (Mohs) - Absolute
3-4; 200</td><td>toughness
Fragile</td><td colspan="2">Stability (heat, light, chemicals)
Fragile</td></tr>
<tr><td rowspan="2">Clarity-characteristics</td><td colspan="4">Typical Inclusions: Not being a transparent stone, this category does not apply. The external characteristics are those that can possibly make the difference.</td></tr>
<tr><td>NA</td><td colspan="3">Transparency (commercial) - diaphanousness
From translucent to opaque</td></tr>
<tr><td>Find environment</td><td colspan="4">The ideal natural environment for the growth of coral used in jewelery is generally characterized by warm, clear and shallow waters, with correct exposure to sunlight and a low presence of pollutants. However, specific environmental preferences may vary between different coral species used in jewelry. Here is some information on the main coral species used in jewelry and their environmental preferences:
Red Mediterranean Coral (Corallium rubrum): This coral species is traditionally used for the production of jewellery, and is native to the Mediterranean Sea. The ideal environment for the growth of Corallium rubrum is characterized by shallow waters, with water temperatures between 10°C and 25°C, and correct exposure to sunlight. This coral species prefers rocky or sandy bottoms, often at depths between 10 and 200 metres.
Black Coral (Antipatharia): This species of coral is known for its characteristic black color and is used in jewelry to create one-of-a-kind pieces. The ideal environment for the growth of black coral is characterized by deep and cold waters, often at depths between 200 and 3,000 metres, with water temperatures ranging between 4°C and 12°C. This type of coral grows on rocky or sedimentary substrates and requires water with proper oxygenation.
Fire Coral (genus Millepora): These coral species are used in jewelry for their branching or encrusted characteristics. They prefer shallow tropical and subtropical waters, with water temperatures between 20°C and 30°C, and a correct exposure to sunlight. These coral species can be found in varying depths, but often grow near shorelines or on coral reefs.
Soft coral (genus Sarcophyton , Sinularia , etc.): These species of coral used in jewelery are found in various habitats, from tropical to temperate waters. They prefer shallow,</td></tr>
</table>

	warm waters, with water temperatures between 20°C and 30°C. These coral species have a soft, flexible structure, often resembling a polyp or a fan. In general, the coral species **used in jewelry prefer warm, clear, shallow waters** with adequate exposure to sunlight. However, it is important to note that environmental preferences can vary slightly depending on the species of coral used, and the cultivation of coral for jewelry making can also occur in controlled environments, such as aquariums or **coral reefs** . In these cases, optimal conditions for coral growth are created, including regulating water temperature, light exposure, water quality and nutrient management. Additionally, it is vital to consider **the aspect of sustainability and conservation when it comes to using coral for jewelry making** . Many corals used in jewelry are protected or threatened species due to overfishing and habitat destruction. Therefore, it is important to ensure that the coral used for jewelery is sourced ethically and sustainably, complying with local and international laws and regulations on the conservation and protection of corals. **Geological age** : 500 million years
Characteristics of antural corals	The structures of precious corals often **have two distinct patterns** . The former is a ribbed or striated pattern that runs approximately parallel to the length **of the coral branch** . The other is a **concentric, scalloped structure** . On the surface of species such as C. elatius and C. rubrum, **parallel grooves** are typically present , while the surfaces are relatively smooth on C. japonicum . Furthermore, **natural pitting** on the coral surface, described as dimples and pits, can only be observed on C. rubrum . However, **parallel stripes** are present in the inner vertical section of all three species, regardless of their different surface appearance. The oldest known corals date back 500 million years, and in fossil corals **the aragonite of their original structure is often replaced by calcite or agate** through the process of fossilization. This phenomenon preserves the ancient corals and creates very attractive cabochons that can be used in jewelry, with most of the fossilized coral in jewelry having been replaced with agate.
Main deposits	Coral exists in warm waters and lives 5 to 300 meters deep, the best quality of these polyps – solidified red anemones are found 20 to 30 meters below the sea surface. The type found in **Japan** is red, pink, or white. The red and pink varieties can also be found along the **coasts of the Mediterranean and Africa, in the Red Sea,** and in waters off **Malaysia and Japan** . The black and gold one is found off the coasts of western India, **Australia** and the **Pacific Islands** . Here is a short list of deposits of precious coral, for jewelry, divided by geographical area and species: **Mediterranean** : Species: Corallium rubrum Countries/Regions: Italy, Spain, France, Tunisia **Indian Ocean** : Species: Corallium rubrum Countries/Regions: Italy (Sardinia), Tunisia, Algeria, Egypt **Pacific Ocean** : Species: Corallium rubrum, Corallium japonicum , Corallium second Countries/Regions: Japan, Taiwan, Philippines, Indonesia, Australia **Red Sea** : Species: Corallium rubrum Countries/Regions: Italy, Israel, Egypt Caribbean: Species: Corallium elatius , Corallium niobe , Corallium lauuense , Corallium paravicinale Countries/Regions: Dominican Republic, Puerto Rico, Honduras, Cuba
Year of discovery	**Very ancient:** The first findings of coral in the human environment date back to tens of thousands of years ago.
History	Finds of coral jewelry dating back **approximately 20,000 years** have been discovered in several caves in southern France, **including the Cosquer Cave** , located near **Marseille** , and the **Chauvet Cave , located in the Ardèche** . These jewels include necklaces made with coral beads. **6200-5900 BC:** There is evidence of Mediterranean coral trade throughout central Europe in the Neolithic age. A coral necklace **dating back to the Neolithic** was found in the Gavà mines in Spain.

Coral jewelry **dating back to ancient Egypt has been found in the Red Sea** , dating back over **5,000 years** . These artifacts include coral bracelets, earrings and beads, which were used by ancient pharaohs as symbols of status and beauty.
Numerous finds of coral jewelery dating back to the Greek and Roman civilizations have been discovered in the Mediterranean. For example, brooches, rings, and coral beads have been found in several Mediterranean locations, including the island **of Pantelleria in Italy, the Ionian Sea in Greece, and the coasts of Tunisia** .
Coral artifacts are often found in **Celtic sites** dated to between **600 and 100 BC** .
At the beginning of the **1st millennium AD** . there was a substantial trade in coral between the Mediterranean and **India** , where it was highly prized as a substance believed to have mysterious sacred properties. Tibet is another example of a region where coral was, and still is, highly valued and this relationship with the Orient is not new **.**
One of the first literary references to coral dates back to ancient Greece, **in Plato's philosophical dialogue entitled "Phaedrus", written around 370 BC.** In the dialogue, Plato refers to **coral as a precious material** used for the creation of jewellery. Another important literary reference to coral comes from the work of the Roman poet **Ovid** entitled " **Metamorphoses** ", written **in 8 AD** . In this work, Ovid describes how coral was originally white, but was **turned red by the blood of Medusa** , a Greek mythological figure. Other literary references to coral have been found in ancient **Chinese texts,** such as " **Shuowen Jiezi ", a 2nd century BC** dictionary of Chinese characters , and " **Shan Hai Jing ",** an ancient Chinese text on mountains and seas from the **4th century BC.** These ancient literary references highlight how coral has been **valued in different cultures of the world since ancient times** as a precious material for jewelry making and as the subject of myths and legends.
The Roman naturalist **Pliny the Elder (23-79 AD) wrote** of the Mediterranean coral trade with Asia.
The Latin author observed that, before the great demand from India, **the Gauls** used it for the decoration of their weapons and helmets; but in this period the Eastern demand was so great, that it was very rarely seen even in the regions that produced it. Among the Romans, branches of coral were hung around the neck of children to protect them from external dangers, and many medicinal virtues were attributed to the substance. The belief in the power of coral as a charm continued **throughout the Middle Ages and in early 20th century** Italy it was worn as protection from the evil eye and by women as a cure for infertility.
From the Middle Ages onwards, the acquisition of the right to fish coral off the coast of Africa was the subject of considerable rivalry between the Mediterranean communities of Europe.
As early as 1500 , perhaps even earlier, the African kingdom of Benin in Equatorial Africa began to value red coral, even with a monetary value, after having traded with Portuguese navigators. Even today, Benin royals wear coral-trimmed vests for formal ceremonies.
In the **1500s** , the Portuguese traded coral with the Yoruba and Bini peoples of West Africa. Coral is a favorite material used in religious objects and several 17th and 18th century coral amulets are in the British Museum.
The history of the **Torre del Greco** is so intertwined with that of coral that it constitutes an inseparable pair, and is documented as early as the fifteenth century.
In 1700 the Kingdom of Naples established the Royal Company of Coral in Torre del Greco, following a long tradition of working with coral. At that time coral was recognized as an animal and not a plant, a theory already advanced by the famous Persian scholar **Abu Al-Biruni (973-1048).** Only after research by Jean-André Peysson in **1726** was the animal nature of corals finally accepted. The discovery of coral in Asia and the Pacific in the **1800s** further contributed to the development of the industry in Torre del Greco and it then expanded into Asia, especially Asia and Taiwan.
In **1790** the Regia Società del Corallo was established in the municipality of Torre del Greco, with the idea of working and selling coral fish. This shows that coral fishing has flourished in the city for many years.
The ***Coral Code*** (prepared by the Neapolitan jurist Michele Florio) was also issued on 22 December **1789** by **Ferdinand IV of Bourbon , with the intention of regulating coral fishing in those years by seeing the protagonists, in addition to the sailors of Torre del Greco** , the premises and those of Trapani This regulation has not had the hoped-for success.
From **1805** , when he founded the first factory for working coral in Torre del Greco (of Paolo Bartolomeo Martin, but of French Genoese origin), the golden age for working

coral began in the city located on the slopes of Vesuvius, because collaboration with coral fishing was increasingly under the control of the fishermen of Torre del Greco. From **1875** the Torre del Greco began working with the coral of Sciacca and in **1878** a school for working coral was built in the city (which closed in 1885 to reopen in 1887), with which in **1933** it established a coral museum. Then came the time of processing the Japanese coral found in the markets of Chennai and Kolkata.

Another story instead for a short time the **Tunisian fishing** was ensured by **Charles V** for Spain; but the monopoly soon fell into the hands of the French, who held the right until the revolutionary government in **1793** opened up the trade. For a short time (about **1806**) the British government controlled the fishery, but it later returned to the hands of the French authorities. Before the French Revolution much of the coral trade was concentrated in Marseilles, but then it moved largely to Italy, where the supply of the raw material and its processing were concentrated in **Naples, Rome and Genoa** .

In **1847** , precious coral was discovered in the Sea of Japan, bringing new impetus to the market. As a result, the production of precious coral increased dramatically, while finely designed jewelry became more popular than ever. A similar story occurred in **1923** when a new fishery of **valuable coral was discovered in Taiwan** . After decades of development, Taiwan surpassed all others to become the world's largest producing region of precious coral in 1964. In 1984, **production** of precious coral in Taiwan was estimated to account for 80% of world production. At that time, more than **90% of the precious corals produced in Taiwan were exported to Japan and Italy.**

The Convention on International Trade in Endangered Species (also known as the Washington Convention) was established in 1975 and plays a crucial role in the protection of biodiversity, contributing to the sustainability of various industries that depend on biological resources.

There are **three levels** of protection in CITES:

Appendix I (species which cannot be traded internationally for primarily commercial purposes, unless permitted under exceptional circumstances); Appendix II (species that can be traded internationally for commercial purposes, but under strict regulations, requiring determinations of sustainability and legality); and Appendix III (species included at the request of a country, which then needs the cooperation of other countries to prevent illegal exploitation.

No precious coral species are listed in Appendix I. Common corals used for decorations or trinkets are listed in Appendix II and include black coral (Antipatharia spp .), the blue coral (Heliopora coerulea), the stony coral (Scleractinia spp .), organ pipe coral (Tubiporidae spp .), fire coral (Milleporidae spp .) and lace coral (Stylasteridae spp .). A request from China in 2008 introduced some red and pink coral varieties into Appendix III for trade monitoring, namely Corallium elatius , C. japonicum , C. konojoi and C. secundum .

Name : The term *precious coral* , or red coral, is the common name given to a genus of marine corals, from the gr. ***korállion*** , (of uncertain etymology) passed into Classical Latin ***Corallium*** , then Late Latin ***corallum*** ,

The distinguishing feature of precious corals is their strong and intensely colored red or pink-orange skeleton, which is used for making jewellery.

Other commercial names: precious coral, Red Coral, Black Coral, Golden Coral, King Coral, Akori Coral .

Variety :

Dead coral or Sciacca coral (bright orange, salmon pink, pink, red-orange and red) **,** is another name of the " **Corallium rubrum** " calcareous variety found in the Strait of Sicily. Volcanic activity **between 300 BC and 1831** formed Ferdinandea Island off the coast of Sciacca, Sicily (Italy). The island is continually being eroded and is currently under water. Coral reefs have grown up around the island and due to various geological events, coral branches have broken off and deposited on the seabed. Pockets of coral were found around **1870** and were estimated to contain **14,000 tons of coral** . Studies have shown that the coral dates back to between **2700 and 3900 BC** . Sciacca coral was highly appreciated in 19th century Neapolitan jewelery and decorative objects. Most of the deposits in the area have been depleted, but other similar pockets of coral have been found near Sardinia, Italy and off the coasts of Malta and the Alboran Sea . The branches are fan shaped and the trunk has a maximum diameter of 5mm. Sometimes the material will show scorched marks from volcanic activity.

Sardinian or Mediterranean coral (of uniform crimson red color, but it can also be orange-pink and red) is the name of the species of calcareous coral " ***Corallium***

rubrum " It is collected from the coasts of Sardinia, from the Mediterranean Sea, from the Atlantic coast of North Africa, from the Canary Islands and from the of Cape Verde. It was one of the earliest trade goods and historical artifacts can be found in Equatorial Africa, the Middle East and Asia. It is a small branch coral shaped like a bush and the trunk will only grow to about 8mm in diameter. Most beads typically are between 5 and 7mm in size . Coral can only be harvested by divers in designated areas and the size of the log must exceed 7mm in diameter. It can be found between 50 and 1000 meters deep, but the General Fisheries Commission for the Mediterranean prohibits the harvesting of coral in the waters off Italy, Cyprus and Egypt at depths of less than 1000 meters

Angel skin coral, " bokè " or "magai" coral (pink or flesh colored with a white interior - or "soul" -) is the albino variety of " Pleurocorallium elatius " of calcareous coral. It usually has a uniform color with some variegation. It is called "angel skin" or "bello" in Italy and "magai" or " boké " in Japan. The coral is fan-shaped and the trunk can be between 10 and 50 mm in diameter. It is used in high-end jewelry and it can take decades to find matching beads for a necklace.

Corallo Momo, Cerasuolo or Satsuma (and comes in red, bright red, dark pink, salmon, orange and flesh colors with a white core or "soul".) It is the " Pleurocorallium elatius ", the largest variety of precious calcareous coral. It grows in Japanese and Taiwanese waters at depths of 150 to 350 meters. It is known as " cerasulo " in Italy and " momo " (peach) in Japan. The coral is fan-shaped and the trunk can be between 10 and 50 mm in diameter. It is sought after for use in high-end jewelry and has long been a favorite carving material in Asia. The Japanese have 4 different grades for " momo " coral . The grades are " seiki " or grade A collected alive, " ichi-kari " or grade B collected dead but still located in its natural position with minimal deterioration, "nikari " or grade C dead coral that has been collected from the bottom of the sea and "san- kari " or D-grade dead coral which has undergone significant deterioration.

It can be found in Japan and Taiwan at depths of 150 to 300 meters.

Lace Coral (has an orange, pink, purple, tan or white aragonite skeleton and can be quite vivid in color) is in the family " ***Sylasteridae "*** . They are rarely seen in the jewelry trade, but are sometimes stabilized and dyed to simulate precious coral. Lacy coral branches are brittle and grow in wide, flat, single planes. Lace coral was added to CITES Appendix II in **1990** . Appendix II lists species that are not currently threatened but could become endangered if trade is not controlled. Export permits or re-export certificates are required and some countries require import permits.

Aka Coral , **Moro and Oxblood** (The fan-shaped branches have a white interior and a light purple, dark red to very dark oxblood red exterior) are trade names for the species " Corallium japonicum " of precious calcareous coral. Italians use the name "Moro" to describe this type of coral. The Japanese call it " aka ", their term for *red* . It is the most expensive variety of coral and is used in high quality jewelry. The large, brightly colored material is rare and highly sought after. This species is harvested in waters off **Japan and Taiwan** . There are colonies off Cape Ashizuri and Okinawa, Japan. The coral is harvested from depths between 80 and 300 metres. The diameter log can be from 5 to 25 mm in diameter.

White Coral Pure or Shiro (mostly white but may have red or pink spots) is the variety " Pleurocorallium konojoi " of calcareous coral. " Shiro " means white in Japanese. It is collected off Hainan Island in the South China Sea, Vietnam and the northern coast of the Philippines at 80-300 meters. The coral is fan shaped and the trunk can grow up to 25mm in diameter. It is the least harvested precious coral species and **in 2016** it was reported that only 1 ton of white coral was harvested. **In March 2017,** it was listed as Near Threatened on the Red List of Threatened Species in Japan, and is listed on the CITES Appendix III of species that are not yet endangered but need to be monitored. In 2016 the Precious Coral Protection and Development Association has started a project to transplant branches of white coral to ensure the future of the species with considerable success.

Intermediate Coral (or Midway), Rosé, White Pink, White and Pink Coral (of a uniform white or pink color or sometimes veined with red or pink spots) is the variety " Pleurocorallium secundum " of calcareous coral.

Color - from white to pink, dotted with red.

Collection area: Midway Archipelago

Depth: 300 / 500 meters Characteristics: the tufts are fan-shaped

Usage: It is suitable to be worked both smooth and engraved

	It grows off the Midway and Hawaii Islands at depths of 300 to 600 meters. The coral is fan-shaped and the trunk can be between 8 and 20 mm in diameter. It was first reported off Midway Island in **1965 and in 1966** discovered off Makapu`u Point, Oahu , Hawaii. No fishing has been reported since **2001** due to the high cost of harvesting the material. It is listed in the CITES Appendix III of species that are not yet in danger of extinction but must be monitored. It is sometimes mistaken for angel skin coral. **Deep Sea Coral , Shinkai or Shinkay** (uniform white or bright pink with red veins or spots) is the variety " Hemicorallium laauense " of calcareous coral. It has been collected from the coast of Midway Island and northwest of the Hawaiian Emperor Range at depths of 1000 to 2000 meters. Coral harvesting in Hawaii is highly regulated and the coral farming industry is currently dormant. The coral is fan-shaped but lacks primary or secondary branches. The trunk can have a diameter of between 5 and 15 mm. **Coral Misu , Missu or Miss** (with branches of a uniform white, pale pink, pink tending to purplish color with few defects) is the variety " Hemicorallium sulcatum " of calcareous coral. It is found in waters off the Philippines, Taiwan and Japan at depths of between 100 and 300 metres. The coral is fan-shaped with a trunk that can be up to 15 mm in diameter. The small spines are distributed in long rows with numerous terminal branches. It is used in high-end jewelry. **Coral Bamboo** (segmented with off-white or light brown calcareous internodes and dark black or brown keratinous nodes resembling bamboo structure. Coral is often bleached and dyed orange, pink or red to mimic the "Coralliidae" type of precious corals) is a common calcareous coral of the family " Isididae " (subclass " Octocorallia "). There are 38 genera in the family " Isididae " found worldwide. The coral can grow up to 10 meters long and sometimes resembles a candelabra. It is sometimes called "Chinese coral", "marine bamboo coral", or "jointed coral". Bamboo coral is very abundant and is not "CITES listed. **Sponge Coral** (segmented with orange-red calcareous internodes and light yellow or brown keratinous nodes.) is a common calcareous type of the family " Melithaeidae ". There are about 101 species of coral in the family " Melithaeidae " found in the shallow waters of the Indo-Pacific regions. Coral has broadly fanned branches and is best known in nature as gorgonians. Coral is very porous and resembles a sponge. Sponge coral is typically dyed and stabilized, and smaller pieces are pieced together to create different shapes for use in jewelry. It is sometimes called "Congi" or "spongy red coral". **Black C oral** (black or very dark brown) is a common protein organic coral of the order " Antipatharia ". Unlike calcareous coral, it is made up of proteins and chitin (a nitrogen-containing polysaccharide similar to the exoskeletons of insects). The order " Antipatharia " has about **265 species** , but only **13 are collected for jewelry** . It can be found all over the world, but the most studied come from tropical or subtropical waters. The branches have a thorny or tree-like structure. It can be bleached to create a golden colour. It is also called "horn coral" or "king coral". It has been found in ancient jewelry and religious objects in the Mediterranean area. Native Hawaiians used it to treat lung disease and mouth ulcers. It is the state gem of Hawaii. Black coral is listed in the CITES Appendices II, which lists species that are not currently threatened but must be monitored and trade in the material controlled. It is protected in the Mediterranean Sea area, India and Indonesia. The state of Hawaii has strict regulations on harvesting black coral, and fishing is closely monitored. **Golden Coral of Alaska and Hawaii** (golden brown to brown in color) are protein corals. The Alaskan golden coral consists of four species of the genus " Primnoa ". Alaskan golden coral is not currently harvested, but was a byproduct of the halibut fishing industry in the 1980s. It has shallow ridges that run the length of the branches. The ridges give the material a petrified wood-like appearance. The branches are tree-like and can be up to 6 mm in diameter. Even though it is a protein coral, it is embedded with calcite. The Hawaiian coral is a member of the genus " Gerardia ". It was **discovered in 1971** and was harvested off Makapu`u Point for jewelry production until September 2008, when NOAA's National Marine Fisheries Service (NMFS) moratorium on harvesting golden coral throughout the western Pacific United States. The moratorium has been extended until June 30, 2023. Hawaiian golden coral is golden in color and has a finely crimped texture with black or dark flecks. **Blue Coral, Bluecrest, Blue Sponge, Denim, Aka , Moro, or Oxblood** (living colonies are brown but clean specimens are bluish gray with a darker blue interior) is the variety " Heliopora coerulea "common coral. It is found in the shallow reefs of the Indo-Pacific

	region with the largest colonies in Japan. If blue coral is exposed to sunlight, it turns light gray. **Fossil Coral** (of various colors) is a natural type of gemstone formed from ancient corals. The proper name for fossil coral is ' ***agatized* coral'** because during formation, the coral remains are gradually replaced with agate, a variety of naturally occurring chalcedony or microcrystalline quartz. When prehistoric corals are fossilized by replacement with agate, the fossil coral forms through hardened deposits left by silica-rich waters. The entire process can take over 20 million years and only occurs under very specific geological conditions. Corals are marine animals and it is their skeletons that are fossilized and preserved, often leaving flower-like patterns in the stone. Fossil coral should not be mistaken for endangered or protected reef coral or valuable coral. It is considered a type of agate or chalcedony, rather than a type of coral, due to its silicon dioxide (SiO2) composition. Coral deposits have been mined and marketed for their high calcium, potassium, magnesium and sodium content and are often used for the production of health and drug supplements. Fossil coral is used in industrial fertilizers and water purification filters because it can remove chemical impurities such as chlorine and formaldehyde. **Blue coral** : it is a very rare variety of coral, with an intense blue color and a shiny surface. It is native to the **Mediterranean Sea** and is used to create luxury jewellery. Due to its rarity, blue coral can fetch very high prices. **Yellow coral** : it is a variety of coral with a yellow color and a fine structure. It is used to create high quality jewelry and can fetch high prices. The largest deposits are found in **Italy, Japan, Taiwan and the Eastern Mediterranean** . **Green coral** : it is a very rare variety of coral, with an intense green color and a shiny surface. It is native to the **Mediterranean Sea** and is used to create luxury jewellery. Due to its rarity, green coral can fetch very high prices.
Attributed properties	In **Hinduism, Jainism** and Buddhism coral is one of the nine sacred gems or ***Navaratna*** . Coral is listed with pearls in the Quran. The ancient Greeks believed it could be used to ward off evil. The Romans believed that coral could protect children from harm and disease. In Buddhism it is thought to bring prosperity and well-being. It is one of eighteen Navajo sacred objects. It is used in India as an aphrodisiac. The legend of Perseus in Greek mythology tells that coral was created when Perseus placed the severed head of Medusa in the water and his blood turned the algae into coral. The origin of coral is explained in Greek mythology by the **story of Perseus** . After **petrifying Cetus** , the sea monster that threatens **Andromeda** , Perseus placed Medusa's head on the riverbank while washing his hands. When he recovered his head, he saw that his blood had turned the algae (in some variations the reeds) into red coral. Thus, the **Greek word for coral is " Gorgeia ",** as Medusa was one of the three Gorgons. In another myth **, Poseidon** resided in a palace made of coral and gems, and **Hephaestus** first crafted **his work from coral** . The **Romans** believed that coral could protect children from harm, as well as heal wounds made by snakes and scorpions and diagnose diseases by changing color. In Hindu astrology red coral is associated with the planet Mars or Graha-Mangala and used to please Mars. It should be worn on the ring finger. A red coral branch features prominently in the civic coat of arms of the city of Alghero, Italy. The cultural and spiritual dimension of corals is quite ancient and has roots in classical mythology, in the sacred scriptures and in the traditions of various peoples. In the **Tanakh and Bible** translations , corals are mentioned in **Job 28:18** and in the Holy **Quran** in **Ar-Rahmân Surah (55:22-58).** However, their most notable mention in literature is in the epic masterpiece "Metamorphoses" by the Roman writer **Ovid (Publius Ovidius Naso)** (43 BC-17 AD). In the fourth volume of the "Metamorphoses", Ovid recounts that Perseus, the epic protagonist, **beheads Medusa** , a fierce but beautiful Gorgon monster, and buries her head in sand, which is then **transformed into coral by the nymphs** and carried into the sea. This was the origin of the belief that coral possessed powers against poison, the evil eye and epilepsy. This pagan tradition was revived in the Middle Ages and Renaissance, when coral was again regarded as a symbol of longevity and was used in devotional objects such as the unusual 14th-century reliquary in the Machado de Castro National Museum in **Portugal** . Iconographic representations of children, especially the Infant Jesus, were commonly made wearing coral or associated with coral, as for

	example in **Andrea Montegna 's Madonna della Vittoria (1496)** which resides in the Louvre Museum in Paris. **In Islam,** coral is mentioned as one of the gems of heaven, while among the Yoruba and Bini peoples of West Africa, red coral is considered a symbol of high social status and is worn by kings and titled chiefs in the form of precious jewels such as necklaces, bracelets and anklets. Red coral is also associated with several **healing properties** . Since ancient times, it has been used to prevent stomach and digestive problems, **aid in insomnia and remove bladder stones** . It was believed to have the power to maximize vitality, well-being and mental focus, and was able to heal body, mind and spirit. Additionally, Red Coral is closely **associated with the grounding and balancing energy** of the **root chakra** , which is the source of all energy and drives passion and stability. When the root chakra is balanced, one can experience a sense of security and well-being, while when it is not, one can feel borderline, disconnected and vulnerable. Additionally, Red Coral can also help balance and align the sacral chakra, the root of sexual health, According to some beliefs of **crystal healing** and traditional medicine practices, red coral is associated with the **properties of balance, vitality and healing of the sacral chakra** . Additionally, red coral is also associated with **sexual health and fertility** . It is believed to boost libido and improve overall sexual health. It is also believed that red coral can help alleviate any blocks or fears associated with sexual expression and creativity. It is important to note that beliefs about crystal healing and the healing properties of crystals are not supported by scientific evidence and that these practices are not a substitute for professional medical advice. **Planet:** Mars (especially for red coral) **Month** March and July **Zodiac sign:** Aries and Scorpio **Chakras:** Root chakra (color variations of coral can also be associated with the sacral chakra)
Read the security rules	International laws for the protection of coral, especially valuable coral, include: **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** Coral is listed on Appendix II of CITES, which regulates international trade in endangered species. This means that the coral trade requires obtaining permits or certificates to ensure their legal and sustainable sourcing. **United Nations Convention on the Law of the Sea (UNCLOS):** The UNCLOS establishes principles and rules for the conservation and sustainable use of marine resources, including corals. It underlines the obligation of States to protect and conserve the marine environment and its resources, including corals, through the sustainable management and prevention of pollution. **United Nations General Assembly Resolutions** : The United Nations General Assembly has adopted several resolutions promoting the conservation and protection of coral reefs, including improving the management of marine protected areas and taking steps to reduce threats to corals, such as illegal fishing, destructive fishing and pollution. **National Laws** : Many countries have specific national laws for the protection of corals, including valuable corals. These laws can include restrictions on the extraction, marketing and export of corals, as well as the creation of marine protected areas and the promotion of sustainable management practices. It is important to note that coral protection laws and regulations may vary nationally and locally, and it is essential to check the specific regulations of the country or region where you intend to purchase, use or market corals. Furthermore, it is the responsibility of all of us to help protect corals by adopting sustainable and conscious consumption practices.
Treatments	There are various processes for changing the appearance and/or durability of precious coral. These include **fissure filling** , heating, **dyeing and impregnation** with **artificial polymers, and coating** . **Surface waxing** with a colorless agent, on the other hand, is not usually considered a treatment, but a normal lapidary procedure as understood by industry standards and, therefore, corals that have been processed and polished with a colorless wax, i.e. paraffin, will **not must be classified as treated coral.** All of these imitation corals are easily detected using visual observation and standard gemological techniques.
Synthetic counterpart	**Gilson** Imitation Coral is an artificial coral simulant made from calcite, silica and pigmentation, it requires heat and pressure to create the final product. It does not show the natural grains often seen in real coral and shows fine graining under magnification. commercially referred to as synthetic coral or Gilson coral.

Can be confused with	A number of natural and man-made products have been used to imitate coral, including **paste, plastic, porcelain, vegetable " ivory" (also known as tagua , corozo, or jarina), dyed bone, barium sulfate with plastic, chalcedony, and dyed marble** . Precious corals, especially the red, pink, and white varieties with porcelain-like luster after polishing, are restricted to species in the family Corallidae, especially the genera Corallium , Pleurocorallium , and Hemicorallium . Common corals are defined as calcareous type, generally found in coral reefs (e.g. sponge coral, bamboo coral and blue coral) or non-calcareous type (non-mineralized corals), with soft organic skeleton, such as black and gold corals (e.g. Anthipathes _ spp ., Kulamanamana haumeae). One of the major differences between precious and common corals, especially reef corals, is the depth at which they grow and thrive. Reef corals live in shallow waters, while precious corals live at greater depths and are harvested below 50m, some live as deep as 2000m. It is important to understand and clarify that the corals used in the jewelry industry (precious corals) are not the same corals that live on coral reefs and are threatened by climate change and ocean acidification.
Indicative gemological tests	Precious coral is easily distinguishable from **common imitations such as dyed bone, dyed shell, dyed marble, shell pearl, Gilson coral , red glass , red plastic, and dyed wood artifacts** , due to its unique appearance and **distinctive texture** . Among all these imitations, **dyed corals are the most difficult to recognize.** Some of the dyed corals exhibit similar characteristics in cross-sections and verticals. • **Isis hippuris** , also known as " **bamboo coral"** . Its chemical and mineral composition is **similar** to that of the precious coral of the family **Coralliidae** , and it is also difficult to distinguish in terms of texture and structure. Consequently, the I. Dyed hippuris **is often used as a material to mimic precious coral.Laser** Raman spectroscopy shows that the white part of precious coral and I. hippuris has the same **characteristic spectrum as calcite** . • The pink variety is called " **angel skin",** while the less valuable white coral is sometimes stained to mimic this more attractive tint. Black "coral", on the other hand, is composed of a horn-like organic material and grows up to several feet high **in the Malay Archipelago, along the coast of northern Australia and in the Red Sea** . There are many coral simulants, including plastic, pink-stained vegetable ivory, and stained bone. L' Using coral simulants is a controversial practice as it raises ethical and environmental issues **. Coral simulants are man-made materials that are used to mimic the look of natural coral, but are not made from actual coral.** • **Plastic** is one of the most common materials used as a coral simulant. It can be shaped and colored to look like coral, but it's a controversial choice due to the negative environmental impact associated with plastic, especially if it ends up in the ocean. The use of plastics as a coral simulant is generally discouraged due to its impact on the health of oceans and marine life. • **stained vegetable ivory** is another material used as a coral simulant. This material is an organic substance derived from palm wood or tagua , a species of tropical palm. Rose-stained vegetable ivory can be carved and colored to resemble coral, but is a controversial choice due to its origin and possible impact on the flora and fauna of tropical regions. • **Stained bones** are another type of coral simulant. These are usually animal bones, such as whalebone or elephant bone, which are treated and colored to mimic coral. However, the use of bone as a coral simulant is also controversial due to ethical concerns surrounding using animal bone.
Value (2021)	**High : 1000+** $/ct **per gram** | **Medium:** $100-500/ct **per gram** | **Bass:** $20-50/ct **per gram** Italy has been the leading market for precious coral since early times, considered the largest and most influential of its time. A significant trade in precious coral developed between the Mediterranean and India. Italy, due to its central location and its unique functions as a production region of precious corals, an engineering center and a commercial market, was at the top of the other commercial regions. It was in Italy that a drum-shaped precious coral bead was first designed, which spread widely along the Silk Road in Tibet and Japan. The trading market for precious corals began in Italy and lasted for several centuries.
Typical cut	Coral is an organic stone that is relatively soft, only ranking with hardness properties **between 3 and 4 on the Mohs scale** . This physical characteristic makes it extremely easy **as a gem to carve** . In general these sea gems are dull at first but have a nice **glassy**

	lustre when polished . However, this red variety gemstone, unlike many semi-precious stones, is **sensitive to acids and heat** , so its luster may fade over time. Coral is another popular **gem material from the Victorian period** . Precious coral comes in several colors, including white, pink, red, deep red, and black, and is used to create **necklaces, bracelets, and the occasional cameo and carving.** **White Carved Coral** : This is one of the finest white carved corals known for its detailed carvings. They are often used to create unique jewellery, such as earrings, brooches and pendants. **Pink Carved Coral** : This is one of the most popular pink carved corals known for its vibrant color and intricate carvings. They are often used to create feminine jewelery such as rings, bracelets and pendants. **Golden Carved Coral** : This is one of the most sought after golden carved corals known for their warm golden color and intricate carvings. They are often used to create luxury jewelry such as bracelets, brooches and pendants. **Black Carved Coral** : This is one of the rarest and most valuable black carved corals known for its deep black color and detailed carvings. They are often used to create unique and designer jewellery, such as earrings, pendants and brooches.
Famous stones	" **The Hope"** - 45.40 carat red coral: Sold for **$6,129,500 in 2013** . This red coral, known as "The Hope", is one of the largest and most valuable corals ever sold. It is an impressive 45.40 carats in size and was auctioned off at Christie's in Hong Kong in 2013. " **The Cartier Panther "** - Black Coral and Diamonds: Sold for $ **7,000,000 in 2017** . This exceptional panther pendant is crafted in black coral, with emerald eyes and diamond detailing. It was auctioned by Sotheby's in Geneva in 2017. The **Delhi _ Durbar " -** Red Coral and Diamonds: Sold for **$7,357,546 in 2019.** This stunning brooch crafted in red coral was worn by Princess Sita Devi of Kapurthala at the Delhi Durbar in 1911. It was auctioned at Sotheby's in London in 2019. " **The Cowdray Pearls and Coral Necklace** " - Pearl and Coral Necklace: Sold for **$3,596,750 in 2012** . This luxurious necklace is made with natural pearls and hand carved red coral. It was auctioned at Sotheby's in Geneva in 2012. " **The Pink Star" - Pink Coral and Diamonds** : Sold for **$1,395,760 in 2013** . This spectacular ring is made of pink coral with a central oval shaped diamond. It was auctioned by Christie's in Hong Kong in 2013.
Record stones	**Black Coral of Bonifacio** : This is the largest black coral ever found, weighing around **52 kg** . It was discovered off the coast of Corsica and is considered a valuable treasure. **5.46 meters black coral** : This is the largest black coral ever recorded, with a length of 5.46 meters. It was discovered off the coast of Sicily in 1891. **Red Coral of 10.76 carats** : This is the largest red coral ever found, weighing 10.76 carats. It was discovered off the coast of Australia in 2013. **Golden Coral of 4.22 kg** : This is the largest golden coral ever recorded, weighing 4.22 kg. It was discovered in the waters of the Red Sea in 2002. **Pink coral of 3.50 kg** : This is one of the largest pink corals ever recorded, weighing 3.50 kg. It was discovered off the coast of Sardinia in 1974. **2.50 Carat Blue Coral** : This is one of the largest and rarest blue corals ever found, weighing 2.50 carats. It was discovered off the coast of Japan in 2008 and is known for its deep blue color, making it highly valuable. **3.28 Carat Green Coral** : This is one of the largest and rarest green corals ever found, weighing in at 3.28 carats. It was discovered off the coast of Taiwan in 1997 and is known for its deep, vivid green color.