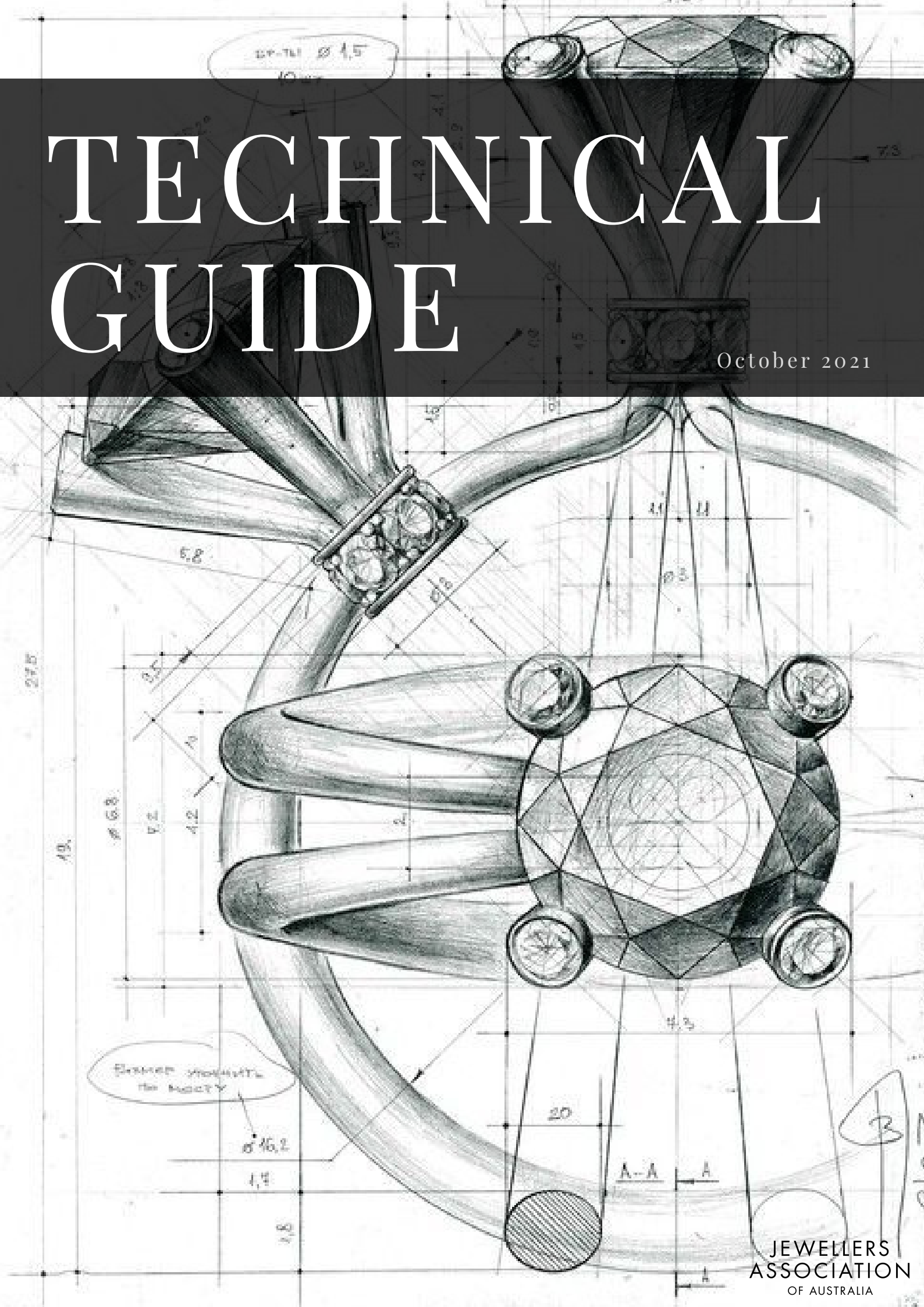
TECHNICAL GUIDE

October 2021



JEWELLERS ASSOCIATION OF AUSTRALIA

JAA Technical Guide

This document is intended to set standards, and to give guidance to the industry on technical and other jewellery and related products.

This Guide will also represent a reference document for the JAA Industry Code of Conduct.

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1. PRECIOUS METALS

There are six commonly used metals in the precious metal group, also referred to as noble metals because of their ability to withstand corrosion and decolourisation.

1. Gold:	chemical symbol	Au — a yellow metal
2. Silver:	chemical symbol	Ag — a white metal
3. Platinum:	chemical symbol	Pt — a bright white metal
4. Rhodium:	chemical symbol	Rh — a white metal
5. Palladium:	chemical symbol	Pd — a silver grey metal
6. Ruthenium:	chemical symbol	Ru — a bright white metal

a. Precious Metal Specifications

Gold

Gold has always been highly valued for jewellery production due to its density and the fact that it is malleable and ductile.

Fine gold is refined to a purity of 999.9 or 24 carat and is resistant to corrosion and discolouration by all single acids, but does dissolve in a mixture of nitric and hydrochloric acid called aqua regia. Commonly used gold alloys in Australia are 9ct and 18ct. USA and Asia often use 14ct and Europe 18ct. Many Asian and Arabic countries prefer 20ct and above.

18 carat means that the alloy contains a ratio 18 fine gold to 6 parts of other metal. 18/24 gold and current production are stamped 750 (3/4=18/24) and mean that the item contains 750/1000 of fine gold. 750 is called the standards or millesimal mark.

9 carat contains 9 parts of fine gold out of 24, which is equivalent to 375/1000 fine gold and 675 parts alloy. 375 is called the standards or millesimal mark.

All fine gold is yellow, but the colour of a gold alloy can be changed by varying the alloy metals added.

As18 carat must have 750 parts of fine gold. If an equal amount of silver and copper is used to make up the 250 parts of the alloy component, the resultant 18 carat gold will have a yellow colour. Similarly, if the proportion of the alloy material is rich in copper the gold is pink, sometimes referred to as rose gold. 18 carat white gold alloys usually also contain a percentage of palladium as well as silver and platinum and the addition of palladium results in an 18 carat white alloy, more expensive than the yellow.

As the amount of gold is reduced in the mixture, so the resultant alloy becomes more prone to discolouration. White gold jewellery is often rhodium plated and customers should be warned that over time this wears away and the item will need to be re-plated.

Lower caratage gold alloys contain more oxidizable metals. Silver reacts to sulphur and copper with ammonia. These oxidizing substances are in sweat and certain skin creams, soaps, perfumes and fabrics.

Old Caratage	International symbol (parts per 1000 fine gold)	Other metals
24	999	Nil
22	916	2 parts of alloy
18	750	6 parts of alloy
14	585	10 parts of alloy
9	375	15 parts of alloy

Gold metal content is expressed in parts per thousand with the bifoil border denoting the pure gold in the alloy in accordance with Australian Standards AS-2140-2008.

Common gold marking by region:

England, Australia and New Zealand	9ct (375), 14ct (585), 18ct (750)
Europe	10kt (417), 14kt (585), 18kt (750)
North America	10kt (417), 14kt (585), 18kt (750)
Asia	14K (585), 18K (750), 22K (916)

Silver

Silver is a soft, noble metal, slightly less malleable and ductile than gold. As it is less dense than gold, a similar article in silver will be lighter.

Silver tarnishes in contact with sulphur, and needs to be cleaned regularly.

Silver has five recognised different Finesse Marks: 800 parts per 1000, 835, 925 (accepted as sterling silver) 958 (known as Britannia silver) and 999 (Fine Silver) parts per thousand.

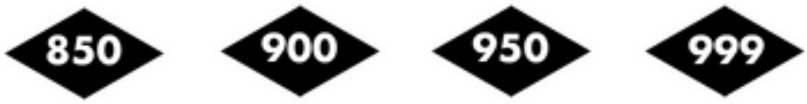
Silver metal content, expressed in parts per thousand with an oval border denoting the parts per thousand of pure silver in the alloy in accordance with Australian Standards AS-2140-2008.

Platinum

Platinum is a dense, white, noble metal with a high resistance to chemical attack and mechanical scratching.

The Australian standard for platinum is 950/1000. CIBJO recognises the Pt mark on product over 850/1000.

Platinum metal content, expressed in parts per thousand with a lozenge border denoting the parts per thousand of pure platinum in the alloy in accordance with Australian Standards AS-2140-2008.



Rhodium

Chemical symbol Rh — Rhodium is a hard, silvery metal with a high lustre, usually used to provide a tarnish resistant layer on silver and gold and to improve the colour of white gold jewellery.

Palladium

Chemical symbol Pd — Palladium is a lustrous, relatively brittle, silver grey white metal It is the least dense of the platinum group of metals.

In 2010 the British assay office introduced a palladium mark for the purity grades 500, 950 and 999/1000.

Palladium metal content, expressed in parts per thousand with a cone border denoting the parts per thousand of pure palladium in the alloy in accordance with Australian Standards AS-2140-2008.

Ruthenium

Chemical symbol Ru — Ruthenium is a rare precious metal belonging to the Platinum Group, generally mixed into platinum and palladium alloys to improve their hardness while maintaining their colour.

When electroplated it generates a jet black or gunmetal grey colour coat.

b. Specific Gravity Chart

Weight conversion between metals:

		METAL YOU WANT TO MAKE							
		Wax	Silver	9ct	14ct	18ct	22ct	24ct (fine)	Platinum
ITEM IN YOUR HAND	Wax	x 1.00	x 10.49	x 11.30	x 12.90	x 15.10	x 17.60	x 19.32	x 21.45
	Silver	x 0.10	x 1.00	x 1.08	x 1.23	x 1.44	x 1.68	x 1.84	x 2.04
	9ct	x 0.09	x 0.93	x 1.00	x 1.14	x 1.34	x 1.56	x 1.71	x 1.90
	14ct	x 0.08	x 0.81	x 0.88	x 1.00	x 1.17	x 1.36	x 1.50	x 1.66
	18ct	x 0.07	x 0.69	x 0.75	x 0.85	x 1.00	x 1.16	x 1.28	x 1.42
	22ct	x 0.06	x 0.60	x 0.64	x 0.73	x 0.86	x 1.00	x 1.10	x 1.22
	24ct (fine)	x 0.05	x 0.54	x 0.58	x 0.67	x 0.78	x 0.91	x 1.00	x 1.11
	Platinum	x 0.04	x 0.49	x 0.53	x 0.60	x 0.70	x 0.82	x 0.90	x 1.00

Formula:

1. Weigh the item in your hand
2. Find the metal in the left column
3. Find the number in the same horizontal row under the vertical
   column of the metal you want to use
4. Multiply the weight of the item by the number.

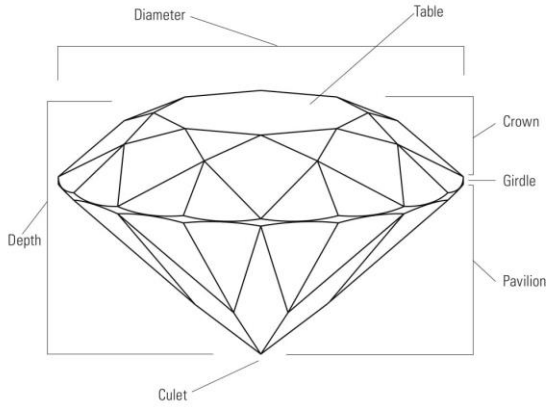
Example: You have a 9ct ring weighing 8 grams. What will it weigh in 18ct?

1. Along the horizontal row marked "9ct", and in the vertical column under the heading "18ct" find the factor 1.34
2. 8 grams x 1.34 = 10.72grams in 18ct.

2. DIAMONDS

A diamond is composed of the element carbon, which crystallises in in the cubic crystal system and has a dodecahedral shape. It is the hardest natural substance known to man, 58 times harder than anything else in nature. A natural diamond is identified by the single word 'diamond'.

a. The Four Cs

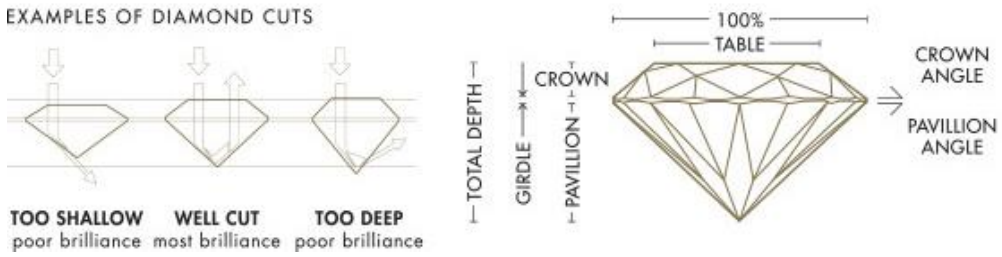


The 4 Cs are basic considerations when assessing a faceted diamond and help determine the value of each individual diamond.

Once rough diamonds are mined and sorted, the diamond cutter plans the best shape to achieve the greatest yield with the fewest inclusions and least wastage.

Cut

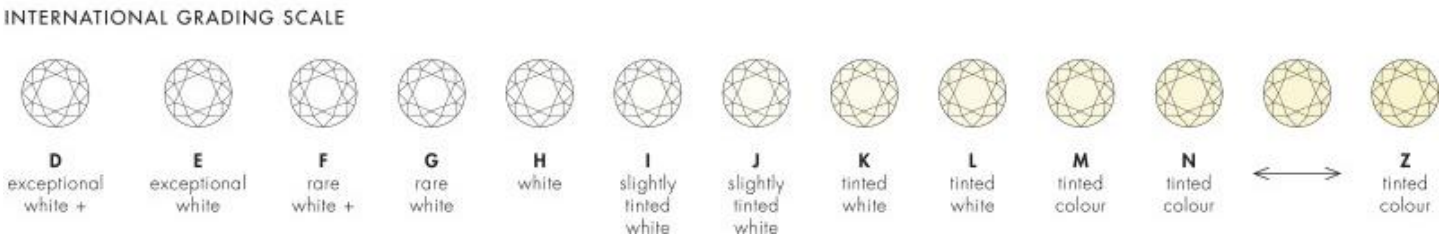
Cut (proportions, symmetry and polish) is a measure of how light travels through the faceted stone. The facets are rated from Excellent to Poor, regardless of the stone's shape. Jewellers often use the term 'cut' to describe the shape of a diamond, as well as the quality of workmanship. The round brilliant cut is the most popular for engagement rings. In simple terms, diamond graders looking at a round brilliant cut stone take into consideration the diameter, the table, the crown angle, the girdle and the pavilion length and angle.



Colour

The less body colour, the higher the grade. Diamonds are graded for colour on a scale from D, or colourless, to Z, or dark yellow. A chemically pure, structurally perfect diamond is completely transparent with no hue or colour. Colour may be affected by chemical impurities and structural defects in the crystal lattice.

A D colour diamond is the highest grade possible. Deeper tones, up to H, are considered near colourless. The hue and intensity of a diamond's colouration enhances or detracts from its value. Rare deep yellow, pink and other significantly coloured diamonds are especially prized and described as Fancy Yellow, Fancy Pink, etc.



Clarity

Flaws inside a diamond are referred to as inclusions. Clarity grades assess the number, size, type, position and visibility of inclusions and blemishes. These may be crystals of a foreign material, another diamond crystal, or structural imperfections (tiny cracks that can appear whitish or cloudy). Diamonds are graded from 'flawless' (FL grade) to grades of VVS, VS, SI and 'included' (I or P grade).

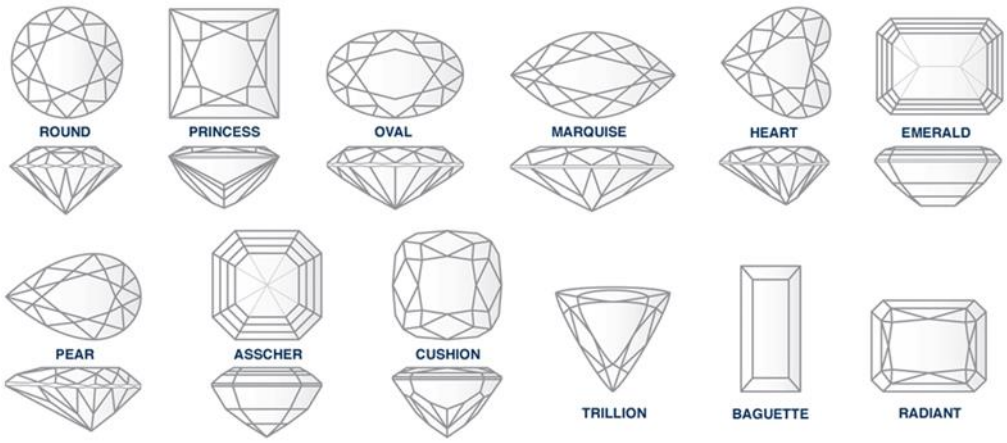
Carat

The carat weight measures the mass or size of a diamond. One carat equals 200 milligrams. The value of a diamond increases exponentially in relation to carat weight, since larger diamonds of gem quality are rare.

**A carat is a weight, not a geometric measurement. The above diagrams are approximate only.*

b. Common Diamond Shapes

The round brilliant cut is by far the most popular cut for diamonds. Princess, emerald, pear, marquise and oval are among the many other shapes available.



c. Synthetic and Treated Diamonds

Scientific and technological advances in the jewellery industry have made it possible for synthetic diamonds to be manufactured and laboratory-created.

A synthetic diamond has the same physical, chemical and optical properties as a natural diamond and is cut like one, but it is created by a machine, not by Nature. Synthetic diamonds are not imitation diamonds.

When referring to synthetic diamonds:

- Use one of the following authorised qualifiers: 'synthetic', 'laboratory-grown' or "laboratory-created'.
- Do not use abbreviations such as 'lab-grown' or 'lab-created'.
- Do not use the following terms: 'cultured diamonds' or 'cultivated diamonds', as 'cultured' and 'cultivated' refer exclusively to organic/biogenic products.
- Do not use the following terms: 'real', 'genuine', 'precious', 'authentic' or 'natural' as those apply exclusively to natural minerals and gemstones.

Synthetic/laboratory created/man made diamonds are less expensive than their natural counterparts.

Treatments

Treatment or enhancements to natural diamonds do exist and have a place in the jewellery world, provided the consumer is fully informed. Treated diamonds are a way for consumers to own lovely jewellery at affordable prices, but some treatments are less durable than others, and the appearance of the diamond may change over time.

Laser Drilling

This treatment reduces or eliminates dark flaws or inclusions in natural diamonds. A laser beam drills a narrow path that looks like a fine white thread, starting at the surface and travelling to the inclusion. The effects of the laser treatment are permanent and the diamond does not need special care. A laser-drilled diamond is an affordable alternative to a natural, untreated diamond.

Fracture Filling

Fracture filling improves the appearance of a natural diamond. Surface fractures which reach the surface of a diamond, are filled with a high refractive index glass, which does not remove the fractures, but makes them less visible. This is not a permanent treatment since the heat of a jeweller's torch as well as ultrasonic cleaning may affect the filler and so it can dry out over time and the original flaws reappear. Heat must never be applied to a fracture filled diamond and it should always be removed from the setting before any repair work is carried out. When selling a fracture filled diamond, the jeweller must fully disclose and explain the treatment, and any special care requirements. The customer must advise their jeweller if any stones are treated before any work is carried out on a piece of jewellery. Any diamond-set piece of jewellery brought in for repairs should be carefully inspected before being accepted. Alerting the customer to any potential difficulty enhances the professional image of the jeweller and avoids embarrassing arguments as to who is at fault if the diamond is damaged while in the jeweller's possession.

d. Diamond Imitations

The many diamond look-alikes and imitations do not have the same chemical or physical properties as a diamond. Simulant, diamond simulant and simulated stones are imitations and should not be confused with synthetic diamonds. An imitation or diamond simulant may be made of glass, plastic or some other compound such as zirconium oxide, better known as CZ or cubic zirconia.

The latest imitation is moissanite, a man-made material not originally marketed as an imitation diamond but resembling a diamond in its sparkle and brilliance. It is composed of a silicon

carbide and was originally a near colourless material measuring I-J on the diamond colour scale, but more recently colours range from D to H.

Its composition tricks the older diamond probes, which were effective in telling a diamond from cubic zirconia. Special moissanite testers have been developed, but are not reliable, although a trained diamond grader can easily tell a moissanite from a diamond.

Another new development is coating cubic zirconia with a very fine layer of diamond, which lasts longer than normal cubic zirconia, but a diamond probe will still show that it is not a diamond.

Sellers of imitation diamonds often use names that mislead consumers. Diamond simulants or alternatives should always be described by the appropriate internationally recognised terminology or declarations.

For example, 'Royal Diamond' or 'the same as a real diamond' or 'just like a real diamond' are misleading descriptions and must not be used. Only a natural diamond may be identified by using only the word 'diamond'. No other description is needed.

e. Diamond Laboratories

A Diamond Grading Report describes a diamond's unique characteristics so that any diamond can be identified based on its own diamond grading report. Grading can only be carried out on an unset diamond. Although it does not give any value for a diamond, it is an independent tool used to sell and value diamonds in the marketplace.

Laboratories issuing Diamond Grading Reports follow internationally recognised standards. Nowadays a graded diamond is usually laser etched on the girdle with a number corresponding to the report of that diamond.

The JAA recognises independent grading laboratories that work to internationally recognised and respected grading rules and guidelines. All diamond grading laboratories must be independent of the diamond selling process, thereby transparent and free of conflict of interest.

The JAA recognises the following diamond grading laboratories*:

1. Gemmological Institute of America (GIA)
2. American Gem Society Laboratories (AGS)
3. Australian Diamond Grading Laboratory (ADGL)
4. Diamond Certification Laboratory of Australia (DCLA)
5. Gem Studies Laboratory (GSL)
6. HRD Antwerp (HRD)
7. Independent Gemmological Laboratory (IGL)
8. International Gemological Institute (IGI)
9. International Institute of Diamond Grading & Research (IIDGR)
10. Scientific Gem Testing Laboratories (Auscert)

* Due to ongoing monitoring of Diamond Grading laboratories, this list is subject to change and regularly updated. JAA recognition is based on information currently available, however it advises consumers to do their own research. A laboratory is only deemed independent if it is not in any way involved in the sale of diamonds. Last updated 19 January 2015.

Grading Reports

A full grading certificate should include:

- A statement that the diamond is a natural diamond
- A report number

- Laser inscription (if applicable)
- The accurate carat weight
- The shape and measurements
- The colour grade
- The clarity grade
- The cut grade (not applicable on fancy shapes)
- The polish grade
- The symmetry grade
- The fluorescence
- The plot to show where inclusions are located and the type of inclusion
- Any relevant comments.

A grading report is an abridged critique of a diamond and does not contain of all the above.

Laser Inscriptions

Most JAA recognised laboratories offer laser inscription services. Laser inscription is the report number, grading company's logo or other minute writing not visible to the naked eye applied on the girdle of the diamond. The purpose is to be able to match the diamond to the grading certificate or report. This is a security feature and minimises the possibility of your diamond ever being switched. Laser inscription does not damage the diamond and has no effect on the grading of the stone.

Laser inscriptions may also convey special messages displayed on the girdle of the diamond, such as birth dates or words of love.

3. COLOURED GEMSTONES

a. Common Gemstone Colour Groupings

Black	Blue	Brown	Green	Pink
Coral Diamonds Jet Onyx Tahitian Pearl Tourmaline (schorl)	Agate – Blue lace Apatite Aquamarine Diamonds Iolite Lapis Lazuli Sapphire Spinel Tanzanite Topaz Tourmaline Turquoise Zircon	Diamonds Smoky Quartz Jadeite Nephrite Topaz Zircon	Amethyst Chrome Diopside Chrysoprase Diamonds Emerald Jadeite (Fei Cui) Nephrite Jade Malachite Peridot Sapphire Turquoise Tourmaline Tsavorite Garnet	Coral Diamond Kunzite Morganite Rose Quartz Sapphire Spinel Tourmaline
Purple/Violet	**Red**	**Yellow/Orange**	**White/Colourless**	**Colour Change**
Amethyst Iolite Jadeite Kunzite Kyanite Rhodolite Garnet Tanzanite Tourmaline	Carnelian Coral Diamond Almandine Garnet Pyrope garnet Ruby Rubelite Tourmaline Spinel	Amber Apatite Heliodor Citrine Diamond Fire Opal Hessonite Garnet Jadeite Spessartite Garnet Sapphire Tiger's Eye Topaz Tourmaline Zircon	Coral Diamond Jadeite Nephrite Jade Moonstone Pearls Sapphire Topaz Zircon	Chrysoberyl (Alexandrite – red/green) Sapphire Garnet (re/green)

b. Estimated Weights

Size (mm)	AMETHYST CITRINE	PERIDOT	BLUE TOPAZ	GARNET	TOURMALINE	IOLITE	TANZANITE	EMERALD AQUA
ROUND								
1.25	0.01	-	-	0.02	-	-	-	-
1.50	0.015	-	-	0.03	-	-	-	-
1.75	0.02	-	-	0.04	-	-	-	-
2.00	0.03	0.05	0.05	0.05	0.03	0.02	0.04	0.03
2.25	0.05	0.07	0.06	0.06	0.04	0.03	0.06	0.05
2.50	0.06	0.09	0.07	0.08	0.05	0.05	0.08	0.06
2.75	0.08	0.11	-	0.09	0.08	0.07	0.10	0.08
3.00	0.10	0.13	0.15	0.10	0.12	0.08	0.12	0.10
3.50	0.18	0.20	0.24	0.20	0.13	0.15	0.17	0.15
4.00	0.24	0.30	0.30	0.32	0.27	0.22	0.28	0.23
4.50	0.35	0.40	0.45	0.37	0.39	0.30	0.36	0.32
5.00	0.45	0.52	0.60	0.56	0.49	0.41	0.52	0.44
5.50	0.57	0.70	0.88	0.66	0.70	0.53	-	0.53
6.00	0.80	0.90	1.10	1.03	0.90	0.66	0.85	0.73
7.00	1.25	-	1.80	1.45	-	1.06	1.35	-
8.00	1.90	-	2.55	1.83	-	1.50	2.35	-
10.00	3.78	-	5.10	3.15	-	-	4.90	-
12.00	6.50	-	-	-	-	-	6.00+	-
OVAL								
4 x 3	0.18	0.20	0.20	0.20	0.16	0.12	0.20	0.13
5 x 3	0.24	0.27	0.30	0.29	0.28	0.19	0.26	0.22
5 x 4	0.33	0.35	0.55	0.37	0.35	0.32	0.35	0.29
6 x 4	0.45	0.52	0.70	0.45	0.50	0.41	0.45	0.42
7 x 5	0.75	1.05	1.00	0.79	0.88	0.65	0.90	0.65
8 x 6	1.40	1.40	1.60	1.27	1.30	1.00	1.45	1.00
9 x 7	1.80	2.20	2.30	1.83	2.00	1.33	2.24	1.47
10 x 8	2.50	3.20	3.10	2.35	2.85	2.28	3.00	1.92
11 x 9	3.70	-	4.50	4.55	-	-	3.75	-
12 x 10	4.10	-	5.85	-	-	-	-	-
14 x 10	5.40	-	7.05	-	-	-	-	-
PEAR								
4 x 3	0.15	0.18	0.18	0.18	-	-	-	0.13
5 x 3	0.22	0.23	0.25	0.25	0.23	0.17	0.24	0.18
5 x 4	0.28	0.34	0.45	0.39	0.30	0.28	0.45	0.25
6 x 4	0.35	0.45	0.55	0.66	0.45	0.34	0.45	0.35
7 x 5	0.65	0.70	0.90	0.82	0.75	0.54	0.69	0.56
8 x 5	0.90	0.90	1.05	1.44	0.90	0.95	1.12	0.96
9 x 6	1.30	1.80	1.45	1.60	1.34	1.14	1.86	-
10 x 7	1.65	2.30	2.50	1.90	1.86	2.00	2.13	-
12 x 8	2.55	-	3.75	-	-	-	-	-
14 x 9	3.55	-	5.40	-	-	-	-	-
EMERALD CUT								
5 x 3	0.28	0.30	0.35	0.32	0.30	0.22	0.30	0.25
5 x 4	0.44	0.50	0.50	0.55	0.50	0.30	0.45	0.40
6 x 4	0.55	0.60	0.75	0.70	0.60	0.43	0.57	0.50
7 x 5	1.00	1.10	1.30	1.14	1.10	0.66	0.99	0.80
8 x 6	1.50	1.75	1.90	1.60	1.67	1.28	1.51	2.00
9 x 7	2.20	2.60	2.70	2.36	2.40	1.88	2.46	-
10 x 8	3.00	3.65	3.80	3.25	3.50	2.55	2.87	-
12 x 10	5.50	-	7.50	-	-	-	-	-
14 x 12	-	-	-	-	-	-	-	-
MARQUISE								
4.0 x 2.0	0.08	0.10	0.15	0.07	0.09	0.07	-	0.07
5.0 x 2.5	0.15	0.16	0.20	0.17	-	0.13	-	0.12
6.0 x 3.0	0.25	0.28	0.35	0.24	0.26	0.21	-	0.20
7.0 x 3.5	0.34	0.45	0.45	0.43	-	0.30	-	0.32
8.0 x 4.0	0.50	0.60	0.70	0.50	0.55	0.50	-	0.42
10.0 x 5.0	1.00	1.16	1.35	1.08	1.16	0.85	-	-
12.0 x 6.0	1.70	-	2.30	-	-	-	-	-

Image credit: Compliments of Bolton Gems Blue Book

c. Mohs Hardness Table

The Mohs scale of mineral hardness was an attempt by an Austrian mineralogist to set up a comparative scale of scratch resistance. According to the scale, talc is the softest mineral as it can be scratched by all other materials. No other mineral can scratch diamond, making it the hardest.

The Mohs scale is not a linear table of hardness. For example, diamond which is 10 on the Mohs scale, is in fact four times as hard as corundum (ruby and sapphire), which is 9 on the Mohs scale.

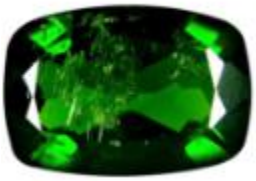
The minerals were selected on the basis that there are only minor differences between various samples. The Mohs scale has limitations but remains a useful tool in the fields of gemmology and jewellery manufacturing.

Hardness	Mineral	Gemstone	Gem Hardness
1	Talc		
2	Gypsum		
3	Calcite	Pearl Coral	3.5 3.75
4	Fluorite		
5	Apatite	Sphene Window glass (not a gemstone) Opal	5 5.5 5.5 – 6.0
6	Orthoclase Feldspar	Silica glass Turquoise Lapis lazuli Peridot Nephrite (Jade) Chalcedony	6 6 6 6.5 6.5 6.5
7	Quartz	Tourmaline Jadeite Garnet (most types) Zircon (most types) Beryl	7 7 7.0 – 7.5 7.0 – 7.5 7.0 – 7.5
8	Topaz	Spinel Chrysoberyl Synthetic cubic zirconia	8 8.5 8.5
9	Corundum	Ruby Sapphire	9 9
10	Diamond		10

Note: A scratch test should never be performed on a cut gem as it will damage its surface. The scale does provide a guide as to the suitability of using a gem in a piece of jewellery.

d. Coloured Gemstone Specifications

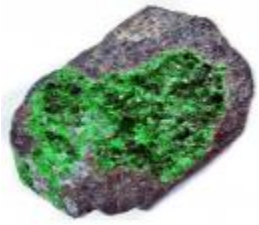
Agate				
	**Colour**	Brown, black, blue, white, red, orange, grey, purple	**Lustre**	Waxy - dull
	Mohs Hardness	7	**Ultrasonic**	Never
	Refractive Index	1.530 – 1.540	**Steam Clean**	Never
	Specific Gravity	2.58 – 2.64	**Special Advice**	Brittle, handle with care
	Treatments	Dyed	**Gemstone Family**	Chalcedony
	Transparency	Translucent to opaque	**Type**	Ornamental
Alexandrite				
	**Colour**	Blue-green to red	**Lustre**	Vitreous
	Mohs Hardness	8.5	**Ultrasonic**	Usually safe
	Refractive Index	1.745 – 1.759	**Steam Clean**	Usually safe
	Specific Gravity	3.71 – 3.75	**Special advice**	
	Treatments	Laser (rare)	**Gemstone Family**	Chrysoberyl
	Transparency	Transparent to opaque	**Type**	Precious
Amazonite				
	**Colour**	Green, blue, grey	**Lustre**	Vitreous
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.522 – 1.530	**Steam Clean**	Never
	Specific Gravity	2.56 – 2.58	**Special advice**	
	Treatments	Dyed	**Gemstone Family**	Feldspar
	Transparency	Translucent to opaque	**Type**	Ornamental
Amber				
	**Colour**	Honey brown, yellow, green, blue	**Lustre**	Resinous
	Mohs Hardness	2 – 3	**Ultrasonic**	Never
	Refractive Index	1.539 – 1.545	**Steam Clean**	Never
	Specific Gravity	1.02 – 1.12	**Special advice**	Soft – wear with care
	Treatments	Heated	**Gemstone Family**	Organic
	Transparency	Transparent to opaque	**Type**	Ornamental
Amethyst				
	**Colour**	Purple	**Lustre**	Vitreous
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.544 – 1.553	**Steam Clean**	Avoid
	Specific Gravity	2.6 – 2.7	**Special advice**	
	Treatments	Heated	**Gemstone Family**	Quartz
	Transparency	Transparent to translucent	**Type**	Precious
Ametrine				
	Colour	Purple and yellow	**Lustre**	Vitreous

	**Mohs Hardness**	7	**Ultrasonic**	Usually safe
	Refractive Index	1.544 – 1.553	**Steam Clean**	Avoid
	Specific Gravity	2.65	**Special advice**	
	Treatments	Heated	**Gemstone Family**	Quartz
	Transparency	Transparent	**Type**	Precious
Apatite				
	**Colour**	Bright blue-green, green	**Lustre**	Vitreous
	Mohs Hardness	5	**Ultrasonic**	Never
	Refractive Index	1.630 – 1.640	**Steam Clean**	Never
	Specific Gravity	3.16 – 3.22	**Special advice**	Avoid thermal shock
	Treatments	Heated	**Gemstone Family**	Phosphate
	Transparency	Transparent to translucent	**Type**	Precious
Aquamarine (Beryl)				
	**Colour**	Light greenish-blue	**Lustre**	Vitreous
	Mohs Hardness	7.5 – 8	**Ultrasonic**	Unsafe
	Refractive Index	1.563 – 1.582	**Steam Clean**	Avoid
	Specific Gravity	2.68 – 2.80	**Special advice**	
	Treatments	Heated	**Gemstone Family**	Beryl
	Transparency	Transparent to opaque	**Type**	Precious
Aventurine				
	**Colour**	Green, red, brown	**Lustre**	Vitreous, dull
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.540 – 1.550	**Steam Clean**	Usually safe
	Specific Gravity	2.64 – 2.69	**Special advice**	
	Treatments	None	**Gemstone Family**	Quartz
	Transparency	Translucent to opaque	**Type**	Ornamental
Carnelian				
	**Colour**	Orangy-red	**Lustre**	Vitreous
	Mohs Hardness	6.5	**Ultrasonic**	Never
	Refractive Index	1.540 – 1.550	**Steam Clean**	Avoid
	Specific Gravity	2.82	**Special advice**	Avoid impact
	Treatments	Heated, dyed	**Gemstone Family**	Quartz
	Transparency	Semi-opaque	**Type**	Ornamental
Chrome Diopside				
	**Colour**	Green, brown, black	**Lustre**	Vitreous to dull
	Mohs Hardness	5.5 – 6	**Ultrasonic**	Never
	Refractive Index	1.664 – 1.721	**Steam Clean**	Never
	Specific Gravity	3.22 – 3.39	**Special advice**	Avoid impact
	Treatments	None	**Gemstone Family**	Diopside
	Transparency	Transparent	**Type**	Precious

Chrysoprase				
	**Colour**	Mint apple green	**Lustre**	Vitreous to waxy
	Mohs Hardness	6.5 – 7	**Ultrasonic**	Usually safe
	Refractive Index	1.530 – 1.540	**Steam Clean**	Avoid
	Specific Gravity	3.97 – 4	**Special advice**	Beware of heat
	Treatments	None	**Gemstone Family**	Quartz
	Transparency	Translucent to opaque	**Type**	Ornamental
Citrine				
	**Colour**	Yellow to golden yellow	**Lustre**	Vitreous
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.544 – 1.553	**Steam Clean**	Never
	Specific Gravity	2.65	**Special advice**	
	Treatments	Heated	**Gemstone Family**	Quartz
	Transparency	Transparent	**Type**	Precious
Coral				
	**Colour**	Red, pink, white	**Lustre**	Vitreous, waxy
	Mohs Hardness	3.5 – 4	**Ultrasonic**	Never
	Refractive Index	1.486 – 1.658	**Steam Clean**	Never
	Specific Gravity	2.6 – 2.7	**Special advice**	Avoid chemicals and heat
	Treatments	Dyed	**Gemstone Family**	Organic
	Transparency	Transparent to opaque	**Type**	Ornamental
Chrysoberyl				
	**Colour**	Yellow, brown, green	**Lustre**	Vitreous
	Mohs Hardness	8.5	**Ultrasonic**	Usually safe
	Refractive Index	1.744 – 1.755	**Steam Clean**	Usually safe
	Specific Gravity	3.7 – 3.8	**Special advice**	Avoid open flame
	Treatments	Rarely	**Gemstone Family**	Chrysoberyl
	Transparency	Transparent to translucent	**Type**	Precious
Diamond				
	**Colour**	Red, blue, green, yellow, pink, orange, white	**Lustre**	Adamantine
	Mohs Hardness	10	**Ultrasonic**	Usually safe
	Refractive Index	2.42	**Steam Clean**	Usually safe
	Specific Gravity	3.51	**Special advice**	
	Treatments	Laser drilling, fracture filled, heat treatment	**Gemstone Family**	Diamond
	Transparency	Transparent to opaque	**Type**	Precious

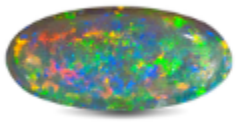
Emerald				
	**Colour**	Green	**Lustre**	Vitreous
	Mohs Hardness	7.5 – 8	**Ultrasonic**	Never
	Refractive Index	1.585 – 1.6	**Steam Clean**	Never
	Specific Gravity	2.67 – 2.76	**Special advice**	Avoid sudden temperature changes
	Treatments	Oiled	**Gemstone Family**	Beryl
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Almandine				
	**Colour**	Deep red	**Lustre**	Vitreous
	Mohs Hardness	7.0 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.750 – 1.830	**Steam Clean**	Never
	Specific Gravity	3.95 – 4.30	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Andradite				
	**Colour**	Brown, orange, green, red, yellow, black, grey	**Lustre**	Vitreous, adamantine
	Mohs Hardness	6.5 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.888 – 1.889	**Steam Clean**	Never
	Specific Gravity	3.8 – 3.9	**Special advice**	Avoid heat
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Demantoid				
	**Colour**	Yellowish to dark green	**Lustre**	Vitreous, adamantine
	Mohs Hardness	6.5 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.888 – 1.940	**Steam Clean**	Never
	Specific Gravity	3.70 – 4.10	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Grossular				
	**Colour**	Green, brown, red, yellow	**Lustre**	Vitreous
	Mohs Hardness	6.5 - 7	**Ultrasonic**	Usually safe
	Refractive Index	1.738 – 1.745	**Steam Clean**	Never
	Specific Gravity	3.61	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Translucent to transparent	**Type**	Precious
Garnet- Hessonite				

	**Colour**	Yellow-orange, red-orange	**Lustre**	Vitreous
	Mohs Hardness	7.0 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.742 – 1.748	**Steam Clean**	Never
	Specific Gravity	3.65	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet- Pyrope				
	**Colour**	Red to brownish-red	**Lustre**	Vitreous
	Mohs Hardness	7.0 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.720 - 1.760	**Steam Clean**	Never
	Specific Gravity	3.5 - 3.6	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to translucent	**Type**	Precious
Garnet – Rhodolite				
	**Colour**	Rose to lavender	**Lustre**	Vitreous
	Mohs Hardness	7.0 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.745 – 1.780	**Steam Clean**	Never
	Specific Gravity	3.79 – 3.95	**Special advice**	Avoid thermal shock
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Spessartite				
	**Colour**	Yellowish-orange, orange, red, reddish-brown, brown	**Lustre**	Vitreous
	Mohs Hardness	7 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.79-1.83	**Steam Clean**	Never
	Specific Gravity	3.80-4.25	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet – Tsavorite				
	**Colour**	Bright green	**Lustre**	Vitreous
	Mohs Hardness	7.0 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.738 – 1.745	**Steam Clean**	Never
	Specific Gravity	3.57 – 3.68	**Special advice**	Avoid sudden temperature change
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to opaque	**Type**	Precious
Garnet - Uvarovite				
	Colour	Green	**Lustre**	Vitreous

	**Mohs Hardness**	6.5 -7	**Ultrasonic**	Usually safe
	Refractive Index	1.865	**Steam Clean**	Never
	Specific Gravity	3.77 – 3.81	**Special advice**	
	Treatments	None	**Gemstone Family**	Garnet
	Transparency	Transparent to translucent	**Type**	Precious
Heliodor (Beryl)				
	**Colour**	Yellow, golden yellow	**Lustre**	Vitreous
	Mohs Hardness	7.5 - 8	**Ultrasonic**	Usually safe
	Refractive Index	1.570 – 1.580	**Steam Clean**	Avoid
	Specific Gravity	2.6 – 2.8	**Special advice**	
	Treatments	Heated, irradiated	**Gemstone Family**	Beryl
	Transparency	Translucent to transparent	**Type**	Precious
Hematite				
	**Colour**	Black, black-grey, brown-red	**Lustre**	Metallic
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	2.940 – 3.220	**Steam Clean**	Usually safe
	Specific Gravity	5.26	**Special advice**	
	Treatments	None	**Gemstone Family**	Metallic
	Transparency	Opaque	**Type**	Ornamental
Iolite				
	**Colour**	Blue, purple-blue	**Lustre**	Vitreous
	Mohs Hardness	7 – 7.5	**Ultrasonic**	Never
	Refractive Index	1.537 – 1.551	**Steam Clean**	Never
	Specific Gravity	2.58 – 2.66	**Special advice**	
	Treatments	None	**Gemstone Family**	Cordierite
	Transparency	Transparent to translucent	**Type**	Precious
Jadeite				
	**Colour**	Brown, blackish, violet, green, white, red, yellow	**Lustre**	Waxy, greasy
	Mohs Hardness	6.5 – 7	**Ultrasonic**	Never
	Refractive Index	1.64 – 1.68	**Steam Clean**	Never
	Specific Gravity	3.30 – 3.58	**Special advice**	
	Treatments	Bleached, dyed,	**Gemstone Family**	Jade
	Transparency	Opaque to translucent	**Type**	Ornamental
Nephrite Jade				
	**Colour**	Green, white, grey, red, brown, yellow, spotted, black	**Lustre**	Vitreous
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.600 – 1.627	**Steam Clean**	Never
	Specific Gravity	2.90 – 3.02	**Special advice**	

	Treatments	Dyed, coated or impregnated	**Gemstone Family**	Jade
	Transparency	Translucent to opaque	**Type**	Ornamental
Jasper				
	**Colour**	All colours, mostly striped or spotted	**Lustre**	Dull, vitreous
	Mohs Hardness	6.5 – 7	**Ultrasonic**	Avoid
	Refractive Index	1.540	**Steam Clean**	Avoid
	Specific Gravity	2.58 – 2.91	**Special advice**	
	Treatments	Dyed	**Gemstone Family**	Quartz
	Transparency	Opaque	**Type**	Ornamental
Kunzite				
	**Colour**	Pink, violet	**Lustre**	Vitreous
	Mohs Hardness	6.5 – 7	**Ultrasonic**	Never
	Refractive Index	1.600 – 1.681	**Steam Clean**	Never
	Specific Gravity	3.15 – 3.21	**Special advice**	Avoid sunlight
	Treatments	Irradiated	**Gemstone Family**	Spodumene
	Transparency	Transparent	**Type**	Precious
Kyanite				
	**Colour**	Indigo blue, white	**Lustre**	Vitreous
	Mohs Hardness	4.5 - 7	**Ultrasonic**	Never
	Refractive Index	1.710 – 1.730	**Steam Clean**	Never
	Specific Gravity	3.5 - 3.7	**Special advice**	Brittle, prone to splitting
	Treatments	None	**Gemstone Family**	Silicate
	Transparency	Transparent to translucent	**Type**	Precious
Labradorite				
	**Colour**	Purple, grey, blue, yellow	**Lustre**	Vitreous, pearly, iridescent
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.559 - 1.570	**Steam Clean**	Never
	Specific Gravity	2.68 to 2.72	**Special advice**	
	Treatments	None	**Gemstone Family**	Feldspar
	Transparency	Translucent to transparent	**Type**	Precious
Lapis Lazuli				
	**Colour**	Lazur blue, gold flecks	**Lustre**	Vitreous, greasy to dull
	Mohs Hardness	5 – 6	**Ultrasonic**	Never
	Refractive Index	1.500	**Steam Clean**	Never
	Specific Gravity	2.50 – 3.0	**Special advice**	Avoid chemicals
	Treatments	Can be dyed	**Gemstone Family**	Lazurite
	Transparency	Opaque	**Type**	Ornamental

Larimar				
	**Colour**	Light blue, white, green	**Lustre**	Sub-vitreous, silky
	Mohs Hardness	4.5 - 5	**Ultrasonic**	Never
	Refractive Index	1.590 – 1.650	**Steam Clean**	Never
	Specific Gravity	2.84 – 2.90	**Special advice**	Avoid sunlight
	Treatments	None	**Gemstone Family**	Pectolite
	Transparency	Translucent to opaque	**Type**	Ornamental
Malachite				
	**Colour**	Light-green to black-green, banded	**Lustre**	Weak vitreous, matte
	Mohs Hardness	3.5 – 4	**Ultrasonic**	Never
	Refractive Index	1.655 – 1.909	**Steam Clean**	Never
	Specific Gravity	3.25 – 4.10	**Special advice**	Avoid chemicals and knocks
	Usual treatment	None	**Gemstone family**	Carbonate
	Transparency	Translucent to opaque	**Type**	Ornamental
Moonstone				
	**Colour**	Colourless, yellow, pale sheen	**Lustre**	Vitreous to pearly
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.522 – 1.530	**Steam Clean**	Never
	Specific Gravity	2.56 – 2.58	**Special advice**	Sensitive to pressure – wear with care
	Usual treatment	None known	**Gemstone family**	Feldspar
	Transparency	Transparent to translucent	**Type**	Ornamental
Morganite (Beryl)				
	**Colour**	Orangy-pink, pink	**Lustre**	Vitreous
	Mohs Hardness	7.5 - 8	**Ultrasonic**	Usually safe
	Refractive Index	1.572 - 1.600	**Steam Clean**	Usually safe
	Specific Gravity	2.71 - 2.90	**Special advice**	
	Usual treatment	Irradiated, heated	**Gemstone family**	Beryl
	Transparency	Translucent to transparent	**Type**	Precious
Onyx				
	**Colour**	Black, white, red	**Lustre**	Vitreous, silky
	Mohs Hardness	6.5 - 7	**Ultrasonic**	Never
	Refractive Index	1.530 – 1.543	**Steam Clean**	Never
	Specific Gravity	2.55 – 2.70	**Special advice**	Avoid heat
	Usual treatment	Dyed, heated	**Gemstone family**	Chalcedony
	Transparency	Opaque to translucent	**Type**	Ornamental
Opal – Precious				
	Colour	All colours	**Lustre**	Waxy, resinous
	Mohs Hardness	5.5 – 6.5	**Ultrasonic**	Never

	**Refractive Index**	1.370 – 1.52	**Steam Clean**	Never
	Specific Gravity	1.98 – 2.50	**Special advice**	Avoid heat and pressure
	Treatments	Dyed	**Gemstone family**	Opal
	Transparency	Transparent to opaque	**Type**	Precious
Opal – Fire				
	**Colour**	Orange-yellow, red, iridescent	**Lustre**	Vitreous, waxy, resinous
	Mohs Hardness	5 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.370 – 1.45	**Steam Clean**	Never
	Specific Gravity	2.15	**Special advice**	Avoid heat, chemicals and pressure
	Usual treatment	None known	**Gemstone family**	Opal
	Transparency	Transparent to opaque	**Type**	Precious
Pearl				
	**Colour**	White, pink, silver, blue, black, cream, golden	**Lustre**	Pearly
	Mohs Hardness	2.5 – 4.5	**Ultrasonic**	Never
	Refractive Index	1.520 – 1.660 Black: 1.530 – 1.690	**Steam Clean**	Never
	Specific Gravity	2.60 – 2.85	**Special advice**	Avoid abrasion and chemicals
	Usual treatment	Bleached	**Gemstone family**	Organic
	Transparency	Translucent to opaque	**Type**	Precious
Pearl - Mother of Pearl				
	**Colour**	White, grey, pink, red silver, yellow, blue, green, black	**Lustre**	Pearly
	Mohs Hardness	2.5 – 4.5	**Ultrasonic**	Never
	Refractive Index	1.530 – 1.690	**Steam Clean**	Never
	Specific Gravity	2.60 – 2.87	**Special advice**	
	Usual treatment	None known	**Gemstone family**	Organic
	Transparency	Translucent to opaque	**Type**	Ornamental
Pearl - Paua Shell				
	**Colour**	Blue-green iridescent	**Lustre**	Pearly
	Mohs Hardness	3.5	**Ultrasonic**	Never
	Refractive Index	1.530 - 1.685	**Steam Clean**	Never
	Specific Gravity	2.70-2.89	**Special advice**	
	Usual treatment	None	**Gemstone family**	Organic
	Transparency	Translucent to opaque	**Type**	Ornamental
Peridot				
	**Colour**	Green, yellow-green	**Lustre**	Vitreous, greasy
	Mohs Hardness	6.5 – 7	**Ultrasonic**	Never
	Refractive Index	1.635 – 1.710	**Steam Clean**	Never
	Specific Gravity	3.3 – 3.4	**Special advice**	Avoid heat
	Usual treatment	None	**Gemstone family**	Quartz

	Transparency	Transparent	**Type**	Precious
Prehnite				
	**Colour**	Yellow-green, brown-yellow	**Lustre**	Vitreous to pearly
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Never
	Refractive Index	1.611 – 1.669	**Steam Clean**	Never
	Specific Gravity	2.82 – 2.94	**Special advice**	
	Usual treatment	None known	**Gemstone family**	Prehnite
	Transparency	Transparent to opaque	**Type**	Ornamental
Prasiolite				
	**Colour**	Pale green	**Lustre**	Vitreous
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.540 – 1.550	**Steam Clean**	Never
	Specific Gravity	2.65	**Special advice**	
	Usual treatment	Irradiated, heated	**Gemstone family**	Quartz
	Transparency	Transparent	**Type**	Ornamental
Quartz – Rose				
	**Colour**	Pink	**Lustre**	Vitreous
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.544 – 1.553	**Steam Clean**	Never
	Specific Gravity	2.65	**Special advice**	
	Usual treatment	Sometimes dyed	**Gemstone family**	Quartz
	Transparency	Translucent	**Type**	Precious
Quartz – Rutilated				
	**Colour**	Clear to smoky with rutile needles (golden, black, red-pink)	**Lustre**	Vitreous
	Mohs Hardness	6 – 6.5	**Ultrasonic**	Usually safe
	Refractive Index	1.54 – 1.55	**Steam Clean**	Avoid
	Specific Gravity	2.63 – 2.70	**Special advice**	
	Usual treatment		**Gemstone family**	Quartz
	Transparency	Transparent to translucent	**Type**	Ornamental
Quartz – Smoky				
	**Colour**	Brown to black, smoky grey	**Lustre**	Vitreous
	Mohs Hardness	7	**Ultrasonic**	Usually safe
	Refractive Index	1.544 – 1.553	**Steam Clean**	Avoid
	Specific Gravity	2.65	**Special advice**	
	Usual treatment	Dyed	**Gemstone family**	Quartz
	Transparency	Transparent to translucent	**Type**	Precious
Ruby				
	**Colour**	Red	**Lustre**	Vitreous
	Mohs Hardness	9	**Ultrasonic**	Usually safe
	Refractive Index	1.760 – 1.778	**Steam Clean**	Usually safe
	Specific Gravity	3.80 – 4.05	**Special advice**	

	Usual treatment	Heated	**Gemstone family**	Corundum
	Transparency	Transparent to opaque	**Type**	Precious
Sapphire				
	**Colour**	Blue	**Lustre**	Vitreous
	Mohs Hardness	9	**Ultrasonic**	Usually safe
	Refractive Index	1.760 – 1.774	**Steam Clean**	Usually safe
	Specific Gravity	3.99 – 4.01	**Special advice**	
	Usual treatment	Heated	**Gemstone family**	Corundum
	Transparency	Transparent to opaque	**Type**	Precious
Sodalite				
	**Colour**	Deep blue, white	**Lustre**	Vitreous to greasy
	Mohs Hardness	5.5 – 6	**Ultrasonic**	Never
	Refractive Index	1.480	**Steam Clean**	Never
	Specific Gravity	2.24	**Special advice**	Dyed material may fade
	Usual treatment	Dyed	**Gemstone family**	Sodalite
	Transparency	Transparent to opaque	**Type**	Ornamental
Spinel				
	**Colour**	Black, blue, pink, red, purple, violet	**Lustre**	Vitreous
	Mohs Hardness	8	**Ultrasonic**	Usually safe
	Refractive Index	1.712 – 1.762	**Steam Clean**	Usually safe
	Specific Gravity	3.54 – 3.63	**Special advice**	
	Usual treatment	None	**Gemstone family**	Spinel
	Transparency	Transparent to opaque	**Type**	Ornamental
Tanzanite				
	**Colour**	Blue, purple, green, brown (unheated)	**Lustre**	Vitreous
	Mohs Hardness	6 – 7	**Ultrasonic**	Never
	Refractive Index	1.692 – 1.700	**Steam Clean**	Never
	Specific Gravity	3.35	**Special advice**	Avoid heat and knocks
	Usual treatment	Heated	**Gemstone family**	Zoisite
	Transparency	Transparent to translucent	**Type**	Precious
Tiger's Eye				
	**Colour**	Brown with golden and/or yellow bands	**Lustre**	Silky
	Mohs Hardness	7	**Ultrasonic**	Never
	Refractive Index	1.550	**Steam Clean**	Never
	Specific Gravity	2.58 – 2.64	**Special advice**	
	Usual treatment	None	**Gemstone family**	Quartz
	Transparency	Opaque	**Type**	Ornamental
Topaz				

	**Colour**	White, brown, yellow, orange, blue, pink	**Lustre**	Vitreous
	Mohs Hardness	8	**Ultrasonic**	Never
	Refractive Index	1.609 – 1.620	**Steam Clean**	Never
	Specific Gravity	3.56 – 3.57	**Special advice**	Avoid thermal shock
	Usual treatment	Heated; pink can be coated but rare	**Gemstone family**	Topaz
	Transparency	Transparent to translucent	**Type**	Precious
Tourmaline				
	**Colour**	Green, blue, red, pink, orange, yellow, purple, black	**Lustre**	Vitreous to resinous
	Mohs Hardness	7 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index		**Steam Clean**	Never
	Specific Gravity	3.06	**Special advice**	Avoid thermal shock
	Usual treatment	None	**Gemstone family**	Tourmaline
	Transparency	Opaque to transparent	**Type**	Precious
Turquoise				
	**Colour**	Blue	**Lustre**	Waxy, matt
	Mohs Hardness	5 – 6	**Ultrasonic**	Never
	Refractive Index	1.610 – 1.650	**Steam Clean**	Never
	Specific Gravity	2.60 – 2.9	**Special advice**	Avoid heat
	Usual treatment	Can be dyed	**Gemstone family**	Aluminium Phosphate
	Transparency	Translucent, opaque	**Type**	Ornamental
Zircon				
	**Colour**	Colourless, yellow, red, brown, orange, green, blue, violet	**Lustre**	Vitreous
	Mohs Hardness	6.5 – 7.5	**Ultrasonic**	Usually safe
	Refractive Index	1.810 – 2.024	**Steam Clean**	Never
	Specific Gravity	3.93 – 4.73	**Special advice**	Avoid heat
	Usual treatment	Heated	**Gemstone family**	Zircon
	Transparency	Transparent to translucent	**Type**	Precious

Note: All gemstones need to be checked for treatments, traditional, permitted and disclosable. All crystalline quartz stones must be worn with care as knocking the stone may cause chipping or breakage.

e. Pearls

Natural Pearls

Natural pearls are defined as all pearls formed in saltwater and freshwater molluscs from an irritant embedded between the bivalve and the inside of the shell. The pearl is formed without human intervention — there is no implanted nucleus. Originally all pearls were natural pearls, however the ocean's own supply of pearls was seriously depleted around a century ago and today natural pearls are rare.

Cultured Pearls

Cultured pearls are formed when humans intentionally introduce an irritant into the oyster. Most of today's pearls are cultured pearls. To produce a cultured pearl, a skilled technician implants foreign matter or a bead in a healthy, mature oyster or mussel. To protect itself from this irritant, the oyster produces cells that secrete multiple layers of nacre, which eventually coat the foreign matter to become the cultured pearl. After the insertion, the oysters are placed in wire mesh baskets for protection and hung from floating rafts in the sea. The shape and size of the resulting pearls depends to a large degree on the shape and size of the implanted irritant. The pearls are

harvested after one to three years. This requires luck as well as skill. Few gem quality pearls are harvested.

There are three main groups of cultured pearls*:

- Akoya pearls
- White, black and gold South Sea pearls
- Freshwater pearls.

*It should be noted that Keshi pearls are a by-product of any of the above groups.

Akoya Pearls

The term Akoya refers to nucleated saltwater pearls cultivated in the Akoya *Pinctada fucata (martensii)* oyster. The first pearls were cultured in Japan over 100 years ago.

Only one pearl can grow in the Akoya oyster, and the period of cultivation is between eight months and two years.

The Akoya shell is no bigger than the palm of a hand, and found mainly in Japan, Korea and China. Its pearls grow from 2mm to 9mm or, rarely, 10mm.

Although most Akoya pearls are round, shapes such as baroque, button, oval, drop, etc., are also found.

White South Sea Pearls

White South Sea pearls are farmed in the Southern Ocean, mainly off the coast of Western Australia, Indonesia, the Philippines and Myanmar. They are grown in the *Pinctada Maxima* oyster, the biggest oyster of all species (size 20-30cm).

The 'yellow-lip' (mainly in the Philippines and Indonesia) and the 'silver-lip' (mainly in Australia and some parts of Indonesia) Pinctada Maxima oysters each produce a slightly different colour of pearl.

The pearls range in size from 9 to 20mm, although the largest cultured South Sea pearl may be 24mm.

Most harvested pearls are oval, drop, button or baroque in shape.

White South Sea pearls range in colour from white to silver blue, and from cream to golden. The more rare and expensive colours are silver white, white rose and dark gold. Cream, yellow, blue, grey and champagne are more affordable.

Note: There are now larger freshwater pearls, from 9–15mm.

Black South Sea Pearls

Black South Sea pearls are cultured using a *Pinctada Margaritifera* or 'black lip' oyster. This mollusc is indigenous to the lagoons and atolls of French Polynesia and the surrounding South Pacific area – Tahiti, Cook and the Fijian Islands.
They are also grown in small quantities in Shark Bay and the Abrolhos Islands off the Western Australian coast.

Tahitian oysters love pristine lagoon waters, where temperatures are between 24-29 degrees. They usually range in size from 8-16mm.
Their colours range from gold through greens to aubergine or purple, and to quite a dark black. Generally, the darker the pearl, the more valuable. True peacock black pearls are more expensive. Some pearls are round, but most are off round, oval, drop, button, baroque or circle.

Gold South Sea Pearls

Gold South Sea pearls are cultured using a *Pinctada Maxima*, or silver or gold-lipped pearl oyster.

They come from the waters off Australia, Indonesia, Myanmar and the Philippines, and are also grown in small quantities off Vietnam, China and Papua New Guinea.

Freshwater Pearls

Freshwater pearls grow in the mussels *Hyriopsis Schlegel* and *Hyriopsis cumingii*. These mussels are not rare and are mainly found in rivers, lakes and ponds in China and Japan, but also in Europe, Russia and America. They are propagated in water tanks and ponds.

Freshwater pearls have an endless variety of shapes, sizes and colours, from lilac to purple, orange, brown, rose, grey, gold, champagne and white.

Keshi Pearls

Keshi means poppy seed in Japanese and these pearls are also called seed pearls, an old Japanese trade name for small saltwater natural or non-beaded cultured pearls, essentially baroque in shape. There is a classification controversy as to whether Keshi are natural or cultured pearls. It is impossible to determine the difference in the laboratory.

If the oyster has been seeded by human intervention and an additional pearl by-product created through the provocation of any substance, the pearl is considered cultured and therefore called a Keshi, but is 100% nacre.

They are generally small in size; shapes vary considerably and they come in many colours, mainly with high lustre. Most available today are South Sea and Tahitian Keshi pearls.

Biwa Cultured Pearls

A freshwater beaded or non-beaded cultured pearl produced in Lake Biwa, Japan, using the freshwater bivalve mollusc *Hyriopsis Schlegeli.*

Imitation Pearls

Imitation or simulated pearls are entirely man made, usually manufactured from beads of glass, plastic or polished shell coated with a varnish traditionally made from finely ground fish scales, but more recently from reconstructed mother of pearl.

Pearl Quality

There is no universal international standard of quality used when judging the quality of pearls, although various systems have been developed for grading them. Beauty is the most important criteria, but there are certain grading characteristics for judging the quality of pearls, which include colour, lustre, shape, size and surface finish.

As well as the above, the most important factor in determining the value of pearls is the match. No two pearls are alike and it is difficult to match pearls for earrings or a necklace.

Helpful tips for judging the quality of pearl strands:

- Examine the strands on a flat white surface, i.e. white cloth, board or paper. Lustre and colour are hard to judge when pearls are suspended in the air or lying against a dark surface.
- Examine the pearls directly under a bare light to bring out their lustre and true colour.
- Contrast the darkest and brightest areas of the pearls. Then lower the contrast and the milkier the pearl, the lower its lustre.
- Examine the reflection of light on the pearls. The less sharp and intense the reflection, the lower the lustre, although a lack of sharpness in reflections may be due to surface flaws rather than overall lustre.
- Compare the lustre, colour and blemishes of individual pearls within a strand. The quality of a strand is determined by its overall appearance.
- Roll the pearls to see their entire surface as the lustre, colour and surface imperfections vary from pearl to pearl as well as on each individual pearl.
- Check the regularity of size and shape, especially in graduated strands.
- If possible, compare lustre and colour to other strands.

There are five physical characteristics by which all fine pearls are graded:

Lustre/Orient

Lustre is the most important characteristic of a pearl. A pearl consists of countless layers of pearlescent organic material called nacre. Lustre is caused by the interaction of light with these layers of nacre. Refraction produces delicate shades of iridescent colours, referred to as Orient, which is an optical phenomenon caused by the interference and diffraction of light from within the surface of some nacreous pearls. Pearls are the only precious gems with lustre, and this gives them their singular beauty.

The radiance and iridescence of Australian South Sea pearls is attributable to the high quality and thickness of the nacre produced by the wild *Pinctada Maxima* oyster, and these factors result in an incomparable lustre.

A pearl with deep and radiant natural lustre is desirable and valuable, whatever its shape, colour or size and despite any surface imperfections. Natural lustre is everlasting and should not be confused with the superficial metallic shine of treated pearls that may diminish over time.

There are four categories of lustre:

- Excellent – reflections are bright, sharp and distinct.
- Good – reflections are bright, but not sharp and they are slightly hazy around the edges.
- Fair – reflections are weak, hazy and/or blurred.
- Poor – reflections are dim and diffused.

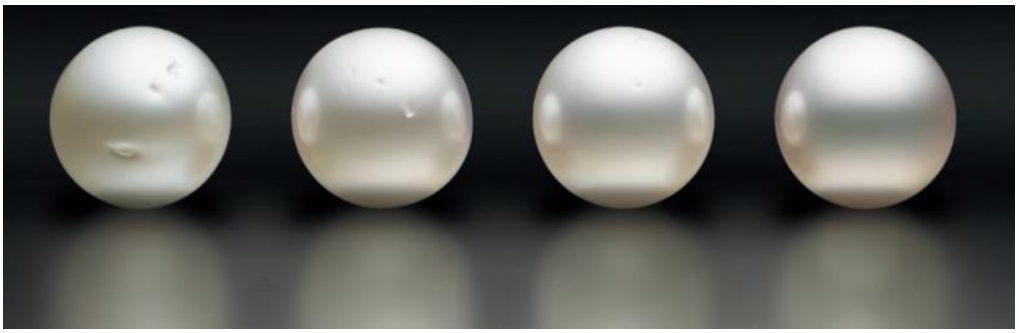
Surface Blemishes

A pearl with a flawless surface is extremely rare. As living organisms produce pearls, nearly all pearls have minor bumps, pits or uneven colour imperfections known as blemishes.

Quality depends on the number and size of imperfections, and their degree of visibility. Clearly noticeable imperfections compromise a pearl's allure and value, and may include cracks, patches of missing nacre, prominent flaws and obvious discolouration.

Blemishes come in four categories:

- Clean
- Lightly blemished
- Moderately blemished
- Heavily blemished.



Shape

A pearl's shape does not affect its quality, although the demand for particular shapes has a bearing on price. Round is the most valuable shape for a pearl, but teardrop and oval are also especially sought after.

Other shapes, such as circle, with one or more grooved rings around the pearl, and baroque have an appealing individuality. These organic, irregular, free-form shapes can be very beautiful and lend themselves to exciting and creative designs.

Pearls are classified into nine shape categories:

- Round – perfectly spherical and highly desirable
- Near round – Slightly flattened or elongated
- Semi-round – less round, but with an overall round shape
- Oval – narrower at the ends than in the centre
- Button – flattened to some degree, and resembling a button or disk. Often used in earrings.
- Drop –pear or teardrop shaped and also triangular: good for earrings or pendants.
- Circle (ringed) – Has one or more parallel grooves around the circumference of a pearl of any shape.
- Baroque – non-symmetrical and irregular, either abstract or resembling a cross, stick, animal, etc.
- Semi-baroque –slightly irregular in shape such as an asymmetrical oval or button shape.

Colour

Australian South Sea pearls are available in a wide range of natural colours mirroring the overtones of the *Pinctada Maxima* shell in which they form and the environment where they are grown.

Three elements of the shell can affect colour – the colour of the mollusc's lip, microscopic pigments inside the conchiolin layer, and the arrangement of aragonite platelets on the prismatic surface of the pearl itself.

Colour is a personal choice, but the popularity of a particular colour influences a pearl's price. Australian South Sea pearls are predominantly white or silver and may have multi-hued overtones including pink, blue, gold and green.

A pearl's hue can be broken down into three categories:

- Hue – the colour's first impression
- Tone – its lightness or darkness
- Saturation – its strength or intensity.

A pearl's colour has three main characteristics along with the hue:

- Body colour – overall body colour of the pearl
- Overtone – one or more translucent colours that appear over a pearl's body colour
- Orient-iridescent – the rainbow colours shimmering on or just below the surface of the pearl.

Size

Australian South Sea pearls are the largest of all pearls, generally ranging from 11-16mm in diameter. Highly prized pearls of up to 20mm and above are occasionally found but are exceedingly rare.

South Sea Pearls typically take 1-3 years to grow, depending on the desired size.

Trade Names for Natural Pearls

Trade term	*Colour*	*Treatment type*	*Frequency*
Conch pearl	All colours	Oiled	Rare
Abalone pearl	All colours	Oiled	Rare
		Filled	Occasional
Blister pearl	All colours	Oiled	Rare
		Dyed	Rare
		Filled	Common
Saltwater pearl	All colours	Oiled	Rare
		Dyed	Rare
		Filled	Rare
Blister pearl	White, pink to purple	Oiled	Rare
Freshwater pearl	White, pink to purple	Oiled	Rare
	All colours	Dyed	Rare
	Grey to black	Irradiated	Rare
Freshwater blister pearl	White, pink to purple	Oiled	Rare
	All colours	Dyed	Rare
	All colours	Filled	Rare
	Grey to black	Irradiated	Rare

Trade Names for Cultured Pearls

Trade term	*Colour*	*Treatment type*	*Frequency*
Mabe pearl	White	Bleached	Common
	All colours	Dyed	Common
Freshwater cultured pearl (beaded)	White	Coated	Rare
Freshwater cultured pearl (non-beaded)	White	Bleached	Common
	All colours	Dyed	Common
	Grey to black	Irradiated	Occasional
Keshi saltwater cultured pearl (non-beaded)	White to yellow and grey to black	Dyed	Rare
Saltwater cultured pearl (beaded)	All colours	Bleached	Common
- Akoya cultured pearl			*(Pinctada fucata)*
- South Sea cultured pearl			
- Tahitian cultured pearl	White	Bleach	Uncommon *(Pinctada Maxima)* Rare *(Pinctada Margaritifera)*
		Dyed	Occasional
	All colours	Dyed	*(Pinctada fucata)* Occasional
		Coated	*(Pinctada fucata)*
		Filled	Rare
	Grey to black	Oiled	Rare
		Irradiated	Occasional
			Occasional *(Pinctada fucata)*

f. Opals

Precious opal is a gemstone showing a special phenomenon known as play-of-colour (POC). Small colour patches or colour grains are arranged and distributed over the surface of the gemstone and change in colour when it is moved or rotated.

The play-of-colour arises from the refraction of light off regularly shaped silica spheres. The small spheres causing the blues and the larger the spheres moving through the visible spectrum colours to red.

Natural precious opal is classified under four separate types, Opal, Boulder opal, Matrix opal and Hydrophane opal. There are two distinct types of opal that form under similar but different chemical and geological environments. Most Australian precious opal forms near or within the Great Australian, or Great Artesian, Basin (GAB). In this sedimentary environment, the weathering of the rocks has provided a suitable chemical situation for the formation of the silica and water solution allowing the development of the silica spheres that can create opal.

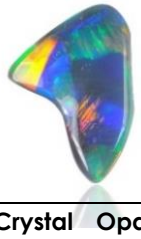
Types of Opals

Natural Opal (Type 1) — is opal presented in one piece in its natural state apart from cutting or polishing and is substantially homogenous in chemical composition.

Natural Opal (Type 2) (opal and rock) — is opal presented in one piece where the opal is naturally attached to the host rock in which it was formed, and the host rock is of a different chemical composition. This is known as *boulder opal*.

Natural Opal (Type 3) (opal in rock) — is opal presented in one piece where the opal is intimately diffused as infillings of pores or holes or between grains of the host rock in which it was formed. This is known as *matrix opal*.

Until recently Australia produced about 95 per cent of the world's precious opal gemstones, however during the last 10 years large deposits of precious opal have been discovered and mined in Ethiopia. Ethiopian precious opal is different to the Australian in many aspects, and has different gemmological constants. Much of the new Ethiopian material is known as hydrophane opal because it is porous and can absorb water and other fluids. Precious hydrophane opal is also Type 1, as the material is all opal. It is distinguished in the nomenclature by a definition noting its porous nature.

Black Opal is the family of opal showing play-of-colour within or on a black body tone when viewed face up, and may be designated N1, N2, N3 or N4 on the Scale of Body Tone. It comes mostly from Lightning Ridge (NSW) and high quality stones are very rare.	**Black Crystal** is the family of opal showing a degree of transparency. The colours are often brilliant and may appear to come from deep inside the gemstone. Good black crystal opals are very rare and are mainly mined at Lightning Ridge (NSW).	**Dark Opal** is the family of opal showing play-of-colour within or on a dark body tone when viewed face up, and may be designated N5 or N6 using the Scale of Body Tone. It comes mainly from Mintabie (SA) and Lightning Ridge (NSW).
		
Light Crystal Opal is the family of opal showing a play-of-colour within or on a light body tone when viewed face up and may be designated N7, N8 or N9 on the Scale of Body Tone. The N9 category is referred to as white opal and these are mainly	**Crystal Opal** is transparent, semi-transparent or translucent which is known as the 'diaphaneity' of the stone. Better quality stones show a distinct and very bright play-of-colour. They are found in most Australian opal fields in the	**Boulder Opal** is the family of opal naturally occurring on its host rock. It is easily identified because, when cut, the host rock brown ironstone is left on the back of the opal. Boulder opal may be light, dark or black. In the last 20 years these

mined in the South Australian fields of Mintabie, Coober Pedy and Andamooka, although the first material was mined in 1890 in White Cliffs, when the first mining leases where granted.	same places white and black opal is found. Mines in South Australian and White Cliffs in new South Wales are known for yielding good quantities of high-quality crystal opal.	opals have become extremely popular as they can display the same darkness and brilliance as a high-quality black opal. Yowah and Yowah Nut opal also come from the Queensland mines.
		

Opal with a distinctly coloured body such as yellow, orange, red or brown should be classified as black, dark or light opal by reference to the Scale of Body Tone, and its distinctive hue should be appended to its determined body tone.

Precious Opal Qualities

Precious opal is often classified or graded by its body colour or body tone. This grading is a neutral scale from black to white as listed in the chart below.

Black Opal **Dark Opal** **Light Opal**

Mexican Opal

The main opal gemstone material produced by the Mexican opal fields is commercially traded as Mexican Fire opal. Fire opal describes transparent to semi-transparent orange to dark red colours of common opal, often faceted into orange and red gemstones.

The precious opal found in the Mexican opal fields is distinctly different to Australian precious opal. Mexican precious opal shows a play-of-colour within a vivid orange body-coloured gemstone. This material can vary from a bright orange body colour through to a 'crystal' or transparent variety with almost no body colour, although it is usually pale yellowish and cabochon cut to show the play-of-colour.

Sometimes a variety of Mexican boulder opal shows precious opal within or on a light rhyolite rock. This material is very different from Queensland boulder opal, which typically has an ironstone component.

Mexican fire opal and Mexican precious opal are distinguishable from Australian precious opal not only by their orange body colour, but also by their gemmological constants and attributes.

Opal Value Factors

The three major factors of value for precious opal are: the blackness or darkness of the body colour, the brightness or brilliance of the play-of-colour, and the amount of red in the spectral play-of-colour. When you add to these factors the element of the pattern (the way in which the colour grains are arranged) and whether it is a regular or a consistent or a directional pattern, the difficulty in giving a price can readily be seen. This is highlighted by the fact that every precious opal is different in its play-of-colour. No two opals are exactly the same.

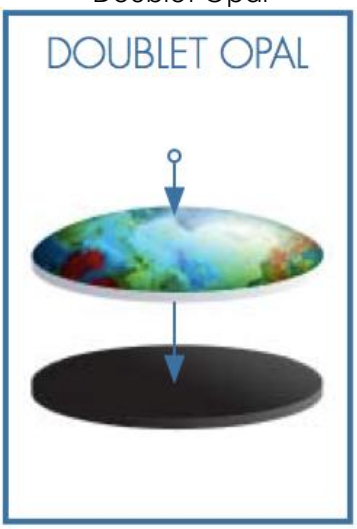
Opal Cutting

Most precious opal is cut en cabochon, usually in oval shapes; however, boulder opal, and especially Queensland Ironstone boulder opal, is often cut in freeform shapes with an undulating surface, because the opal is usually a very thin layer on the top of the ironstone rock from which it is cut. Recently more precious opal has been carved and shaped into different freeform shapes and abstract figures.

Composite Opals

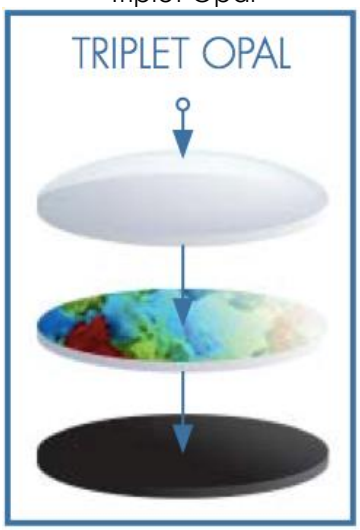
Composite opals are manufactured items of either two (doublet opals) or three (triplet opals) pieces. They appear in jewellery manufactured from either natural or synthetic opal laminates, as illustrated in the diagrams below. Sometimes small opal tiles are joined to a substrate in fitted pieces to form an opal mosaic. Recently new designs of opal jewellery have been manufactured where the precious opal is inlaid flush to the surface of the piece, and this opal may be natural or synthetic/imitation. Imitation opal in silver jewellery is now quite usual.

Doublet Opal



A composite of two pieces where a slice of natural opal is cemented to a base material.

Triplet Opal



A composite of three pieces where a thin slice of natural opal is cemented between a dark base material and a transparent top layer, usually quartz or glass.

Mosaic and Inlaid Opal

A composite of small, flat or irregularly shaped pieces of natural opal cemented as mosaic tile on a dark base material or encompassed in a resin.

Synthetic/Imitation Opal

Like many other gemstones, a man-made opal material has been produced and offered for sale in jewellery items. Imitations/synthetic opals are abundant overseas, and especially in Southeast Asian and Chinese markets. Much this product is made into bead necklaces.

Opal Treatments

The best-known and most common opal treatment is the dyeing or carbonising treatment of sugar and acid applied to Andamooka Matrix opal. The lighter coloured matrix opal is given a black or dark background in order to imitate precious black opal. A substantial amount of Queensland boulder matrix opal has been treated in a similar fashion and at least one product, known as fairy stone, has been used to produce bead necklaces.

Large quantities of Ethiopian hydrophane opal coloured black, usually by a process of smoke treatment, are found on the internet and in overseas markets.

g. Gemstone Treatments and Care

Enhancement of gemstones refers to treatments or processes that improve the appearance, durability or value of a gemstone. Today many gemstones have been enhanced to improve their natural properties. Some gemstone enhancements are less durable that others, so that the appearance of the gem may change over time.

Types of enhancements are, but are not limited to, bleaching, coating, dyeing, filling, flux heating, heating, impregnation, lasering, oil/resin infusion, irradiation and waxing/oiling.

Light and Heat

Just as the sun's harmful rays can damage our skin, light and heat can affect a coloured gemstone's durability and colour. Over time, and in excess, they can also fade or damage some gemstones, such as amethyst, kunzite, topaz and shell cameos. Pearls and other delicate materials, such as ivory, will bleach under extreme exposure to light. Other gems, especially amber, can darken over time when exposed to too much light.

Excessive heat and sudden temperature changes may also fracture some gems. Heat can easily remove the natural moisture these gems need to keep their beauty. Pearls, for instance, can dry out, crack and discolour. Opals can turn white or brown, develop tiny cracks, and might lose their play-of-colour.

Chemicals and Solvents

Exposure to chemicals can damage or discolour precious metals – gold, silver and platinum – and may harm some coloured gems. Even everyday substances like hairspray, lotion, perfume or other cosmetics can contain chemicals that will permanently damage the surface of your pearls and other delicate or porous gems (like turquoise). Fine jewellery should be removed before diving into a chlorinated swimming pool or before using household cleaners. Many of these cleaners contain ammonia, which can be too harsh for delicate gems or vintage jewellery. Chlorine bleach, another common household solvent, can pit or damage gold alloys.

Treated Gems

Many coloured gemstones are routinely treated to improve the appearance of colour and clarity. These treatments can be negatively affected by heat, solvents, steam and ultrasonic cleaners. Knowing whether a gem has been treated is the first step to knowing how to care for it. Refer to 3.a Gemstone Specifications and Care Chart for more information.

Ultrasonic Cleaners

Caution must be exercised when cleaning or using ultrasonic cleaners. Excessive cleaning and the use of ultrasonics may affect the treatment that has been applied to certain gemstones. For example, most emeralds are oil or resin impregnated, and the use of ultrasonics may remove this treatment or expand existing fractures. Organic porous gemstones such as opals and pearls should under no circumstances be exposed to ultrasonics. If unsure whether a gemstone should be cleaned in an ultrasonic, do not.

Ultrasonic cleaners should not be used to clean:

1. Gemstones with surface-reaching breaks that have been filled with a substance such as oil, resin or a glass-like material
2. Organic gem materials such as pearls, coral, ivory, or amber
3. Gems that have been coated with a non-permanent substance like plastic or wax
4. Some heat-treated gemstones
5. Gems that are susceptible to heat and temperature changes whether they are treated or not. Some of these gems include tanzanite, feldspar (sunstone and

moonstone), fluorite, iolite, kunzite, lapis lazuli, malachite, opal, topaz, turquoise, zircon and others

6. What's more, the vibration generated by the machine can sometimes shake gems loose or chip gems that are set with their girdles touching.

Safe Cleaning Methods

Most coloured gems can be cleaned with warm water, mild dish soap (no detergents) and a soft brush. A pulsed-water dental cleaning appliance and a soft, lint-free cloth can also be used. Be sure to rinse jewellery in a glass of water to remove cleaning solutions since there is a risk of losing loose stones – or even an entire piece of jewellery - if it is rinsed directly in the sink.

Soft gems, such as pearls, on the other hand, can easily scratch. Use a new, clean makeup brush and warm, soapy water to softly clean them. Lay a strand of pearls on a towel to dry. The wet silk thread can stretch and attract dirt− so don't touch the strand until it is completely dry. Pearls worn often should be restrung once a year.

Jewellery Storage

Proper jewellery storage is often overlooked. Jewellery should never be tossed into a drawer or on top of a dresser as there is a higher risk of scratches and damaged gems.

Most jewellery pieces come in a box or pouch from the store, which is a perfect place to keep them. Sterling silver, for example, should be kept in an anti-tarnish bag or cloth. Jewellery boxes that feature individually padded slots for rings and posts for hanging necklaces and bracelets are also ideal.

Pearls and opals draw moisture from the air, so storing opal or pearl jewellery in a dry area, such as a safe deposit box, can sometimes do more harm than good.

When traveling, protect jewellery pieces from scratches or other impact damage by padding it in a separate box or case.

Jewellery should be checked every six months and cleaned frequently.

h. Birthstones

Tradition has it that each month has a gemstone which some people believe is lucky for anyone born in that month. Myths and legends have grown over the years that make claims for certain stones having special healing powers.

January	Garnet		**July**	Ruby
February	Amethyst		**August**	Peridot
March	Aquamarine		**September**	Sapphire
April	Diamond		**October**	Opal or Tourmaline
May	Emerald		**November**	Topaz or Citrine
June	Pearl or Alexandrite		**December**	Tanzanite, Zircon or Turquoise

It is believed that the origin of this tradition goes back to biblical times and is associated with the 12 stones that the Bible tells us were affixed to the breastplate of Aaron the High Priest, one for each of the 12 tribes.

Over time, these gems came to be associated with the twelve months of the Gregorian calendar which was introduced by Pope Gregory XIII in October of 1582 as a correction to previous calendars such as the Julian calendar.

i. Wedding Anniversary Stones

1st	Gold or Peridot	**11th**	Turquoise, Citrine Yellow Zircon	**21st**	Iolite	**55th**	Alexandrite
2nd	Garnet	**12th**	Jade or Opal	**22nd**	Spinel	**60th**	Diamond Star Ruby
3rd	Pearl or Jade	**13th**	Citrine, Moonstone Hawk's eye Quartz	**23rd**	Imperial Topaz	**65th**	Blue Spinel
4th	Blue Topaz Blue Zircon	**14th**	Opal Agate Bloodstone	**24th**	Tanzanite	**70th**	Sapphire Smoky Quartz
5th	Sapphire or Pink Tourmaline	**15th**	Ruby Rhodolite Garnet Alexandrite	**25th**	Silver Tsavorite garnet	**80th**	Ruby
6th	Amethyst or Turquoise	**16th**	Peridot or Red Spinel	**30th**	Pearl		
7th	Onyx Yellow Sapphire Golden Beryl	**17th**	Watches Carnelian	**35th**	Emerald		
8th	Tourmaline Tanzanite	**18th**	Cat's eye Chrysoberyl Aquamarine	**40th**	Ruby		
9th	Lapis lazuli Amethyst Green Spinel	**19th**	Aquamarine Almandine Garnet	**45th**	Sapphire Cat's eye		
10th	Diamond Blue Sapphire	**20th**	Emerald Yellow Diamond	**50th**	Gold Imperial Topaz		

4. JEWELLERY PRODUCT KNOWLEDGE

a. Historical periods

Modern	Present to 30 years old
Vintage	30 years to 100 years old
Antique	100 plus years old

Retro	1950-65
Art Deco	1920-45
Art Nouveau	1880-1920
Edwardian	1901-1914 (beginning of WW1)
Victorian	1880-1901 (late era), 1865-1880 (mid era), 1837-1865 (early era)

b. Types of Jewellery

Rings

Some rings have special significance: for example, when most people could not sign their own names seal or signet rings imprinted into wax bore testimony to the authenticity of a document. Chiefs and kings would send an emissary with their seal ring to negotiate agreements.

Later on wedding bands, which were consecrated in a religious ceremony, indicated a person's marital status.

The significance of the ring carries on to this day with promise and engagement rings preceding a marriage, and eternity (sometimes called anniversary) rings following.

Traditional

Euro-Style

Straight

Tapered

Reverse Tapered

Pinched

Flair

Bypass

Split

Freeform

Cathedral

Basket

Peg Head

Decorative

Bezel

Half-Bezel

Bar/Channel

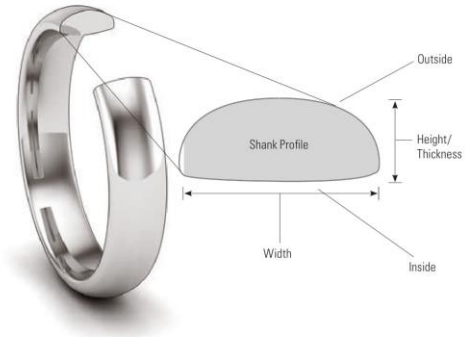
Bright-Cut

Bridge Accent

Illusion

Channel

Trellis



OUTSIDE PROFILES

Flat Half-Round Knife-Edge Half-Round Edge

INSIDE PROFILES

Light Comfort-Fit Comfort-Fit Heavy Comfort-Fit Scooped

Single

Double

Triple

V-Prong/Chevron

Decorative Double

PRONG COUNT

Four (Standard)

Six

Two (Vertical)

Four (Diagonal)

Eight

Two (Horizontal)

Channel

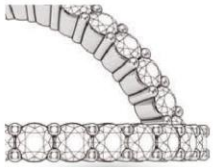
Bead and Bright-Cut/Pinpoint

Scallop

Fishtail

Surface Prong

Pavé



Shared Prong

Bar

Bezel

Gypsy/Flush

Earrings

Earrings can be for both pierced and non-pierced ears. They are worn on the lobe in various styles and lengths.

Chains

Stud

Chandelier

Cluster

Jackets (with studs)

Hoops

Hinged/Huggie

Drop

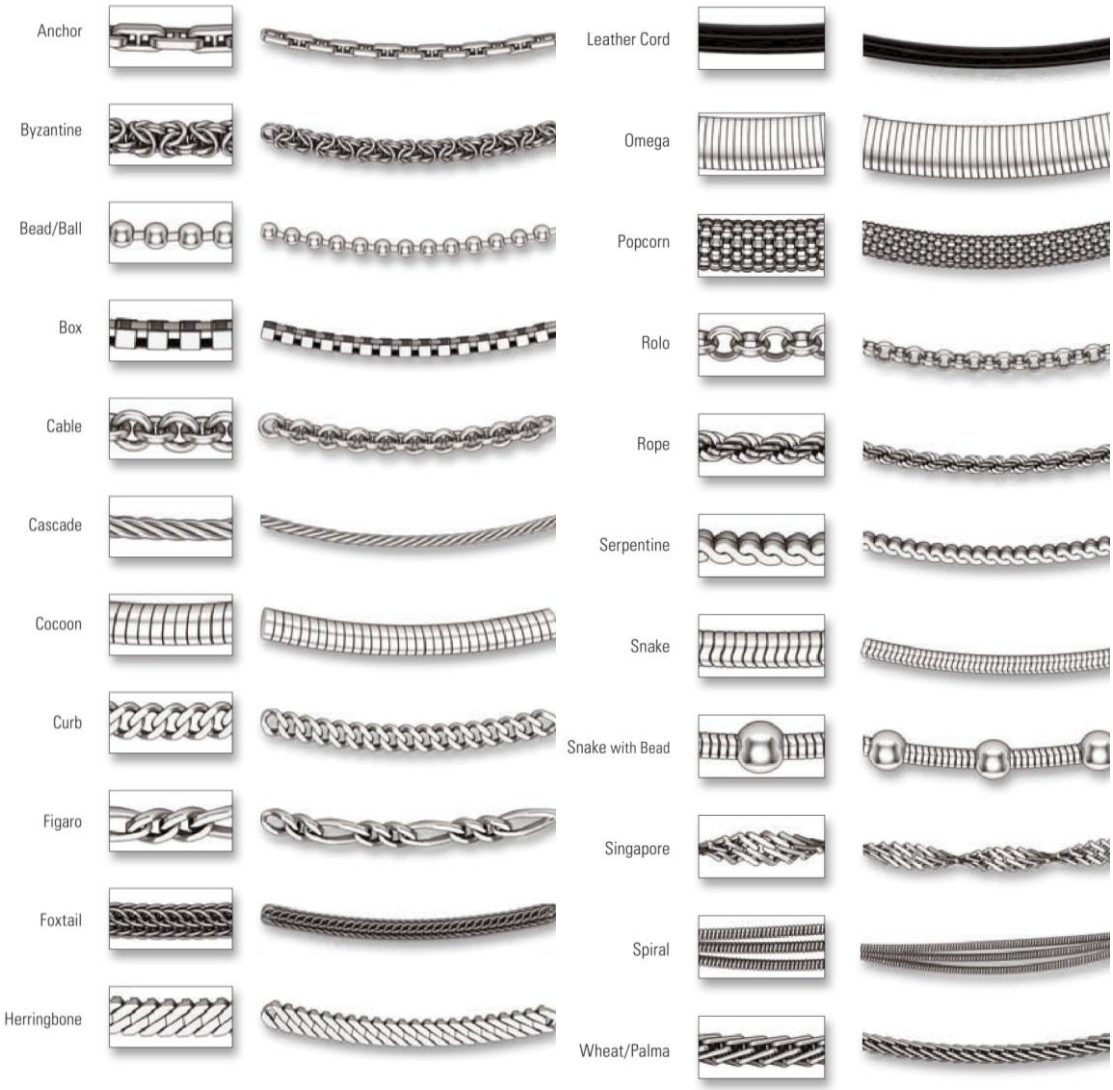
Dangle

Ear Trim

Jewellery typically worn around the neck in the form of a necklace. They can vary in length and style and contain clasps or accessories such as pendants or charms

The table below sets out the descriptive terms associated with chain and pearl strand lengths:

Collar	Approximately 25-35 cm long
Choker	Approximately 35-40 cm long
Pendant	Approximately 45cm long
Matinee	Approximately 50 to 60cm long
Opera	Approximately 70cm or longer
Sautoir	Approximately 70-90cm long
Rope/lariat	Approximately 115cm long



Necklaces

Necklaces vary widely in style. They can be plain, set with gemstones, or decorated with other objects.

Riviera

Collar

Chain Pendant

Choker

Station Lariat

Standard Rabbit Ear Decorative

Pendant with Bail Solitaire

Slide Hidden Bail

Locket Roundel/Rondelle

Charm

Line/Tennis

Link

Cuff

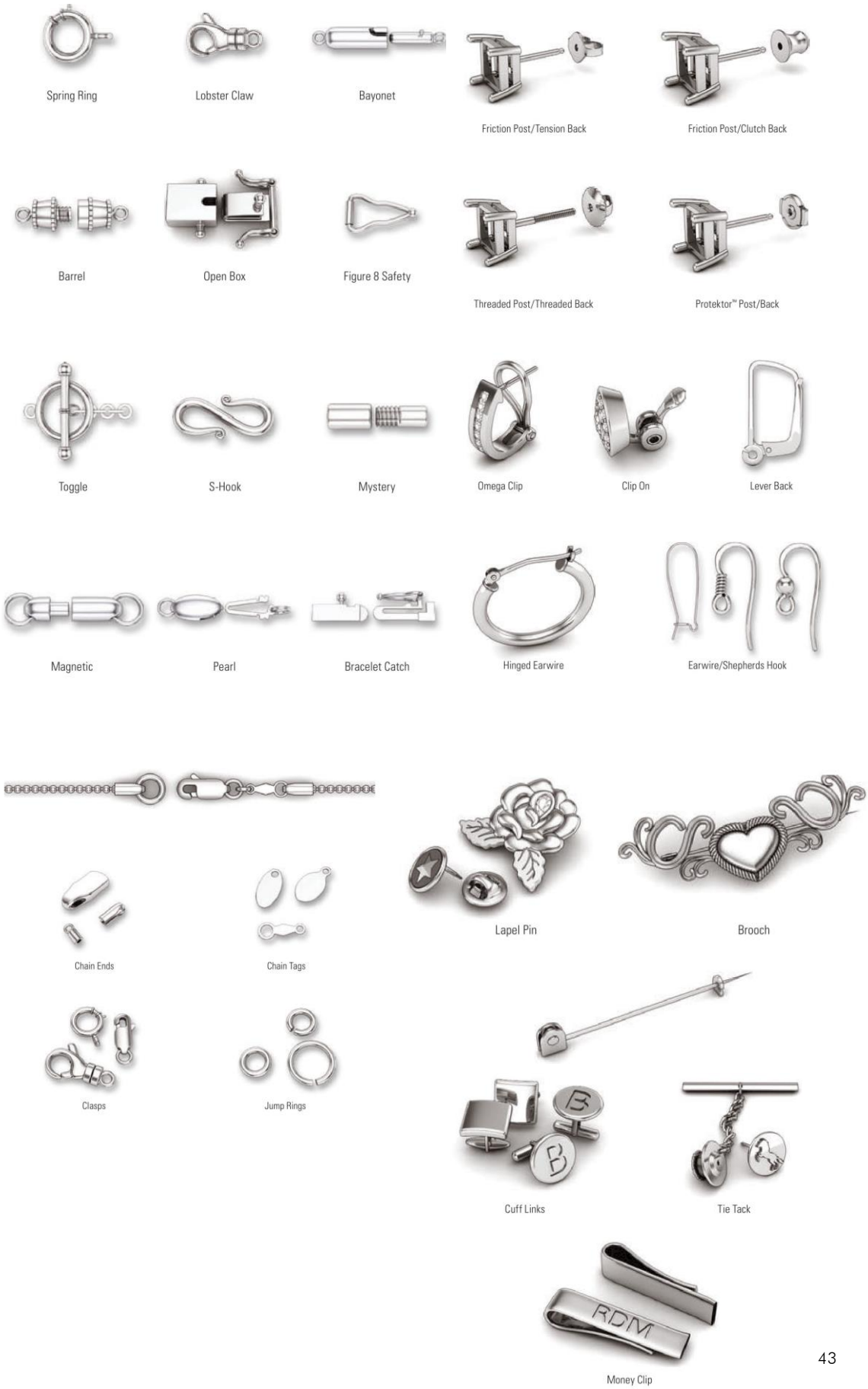
Bracelet Slide

Bangle

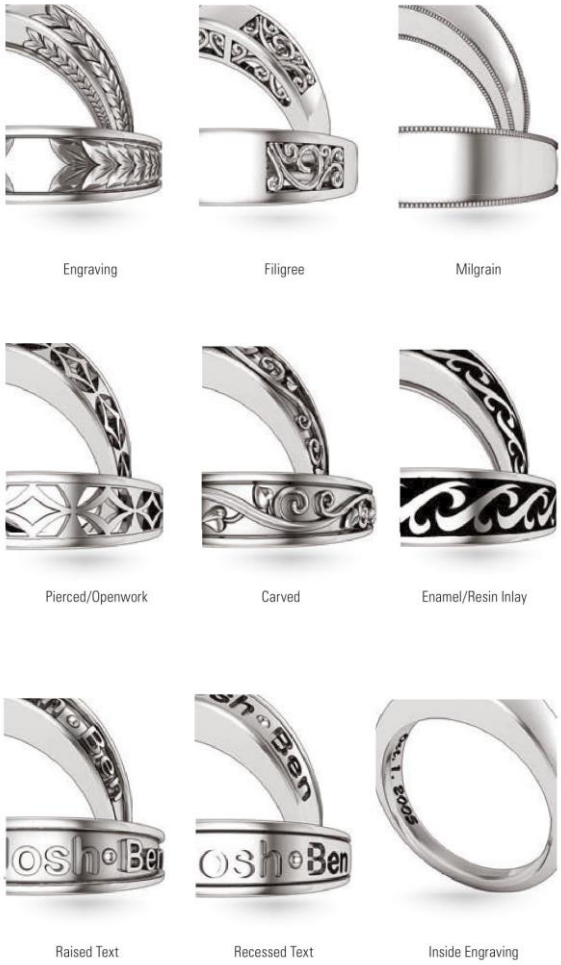
Beads

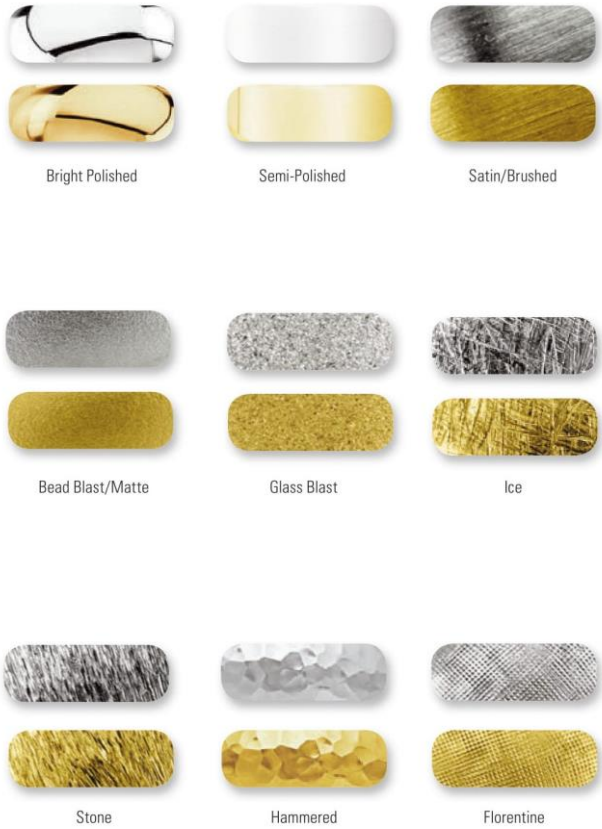
c. Findings

Findings are a collection of often used components manufactured by specialist suppliers in a variety of carat golds, silver and base metals. They are often used in jewellery repairs.



d. Engravings and Finishes





5. WATCHES AND CLOCKS

a. Watch and Clock Types

Term	Definition
Alarm clock	Clock with alarm function
Analogue quartz time keeping instrument	Quartz timepiece whose indicating devices (dial, hands, etc.) have a mechanical construction
Automatic chronograph	Chronograph equipped with an automatic winding device
Braille watch or clock	Timepiece that tells time using voice or by touching it with the fingers
Carousel watch	Watch with a mechanism similar to the tourbillon, but with the cage rotating around the third instead of the fourth wheel
Chronograph	Timepiece that can measure time besides the time indication function
Chronometer	Name of a precision-tested mechanical watch certified by an official body managed by the Chronometer Control International Council (CICC) The test program and minimum requirements are defined by ISO 3159 - Wrist-chronometers with spring balance oscillator.
Complication	An additional indication, which differs from the simple timekeeping function. The chronograph, striking-mechanisms, repeaters, perpetual calendars, phases of the moon and multiple time zones are examples of complications.
Cuckoo clock	Clock that indicates each hour or fixed times through the song of a bird
Desk or Table clock	Stationary clock placed on a desk or a table
Digital quartz timekeeping instrument	Quartz timepiece with electronic display (LCD, LED, etc.)
Electric timekeeping instrument	Timepiece using electrical power source, but mechanical time source elements and indicating devices.
Hall clock	Large, tall, indoor clock
Marionette or Carillon clock	Clock that plays a melody and activates the dial or a marionette at fixed hours
Mechanical timekeeping instrument	Timepiece whose power source, time source elements and indicating devices have a mechanical construction
Multi-function timekeeping instrument	Timepiece equipped with functions such as time counter or alarm besides time display. Mechanical watches with many functions are also called complicated watches.
Pocket watch	Portable watch that can be worn on clothes or in a pocket
Radio-controlled watch or clock	Watch or clock equipped with a function to automatically adjust the time and date using standard time radio signals
Satellite radio-controlled watch and/or clock	Watch or clock equipped with a function to automatically adjust the time and date using radio signals received from a GNSS including GPS (Global Positioning System)
Skeleton watch or clock	Watch or clock whose movement's skeleton can be seen through the case or the dial

Solar-powered watches or clock Solar cell timekeeping instrument	Timepiece equipped with solar cells so as to use the energy of light as power source
Stopwatch	Portable time counter

Talking watch or clock	Watch or clock that uses audio messages to indicate time, etc.
Tourbillon watch	Watch whose escapement and the regulator at its centre are placed in a rotating cage. The escape wheel pinion rotates around the fixed fourth wheel. The cage generally rotates one turn per minute and adjusts to minimize changes in the vertical position.
Wall clock	Clock that is fixed to a wall or a column
Wristwatch	Watch worn on the wrist using a band.

Quartz Watches

In a quartz watch, the heart of the watch consists of the integrated circuit. The division of time is effected by a quartz oscillator, vibrating under the effect of electrical energy supplied by a battery. The energy source is a miniaturised battery with a lifespan of several years.

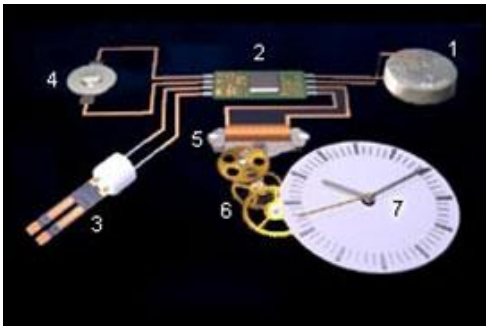
Quartz watches are extremely accurate, thanks to a high frequency of vibration (32 kHz). Their annual variation is consequently very low — in the order of one minute per year, which is less than a second a day.

Quartz watches have two types of display. The more common is the analogue, i.e. with hands. Watches with a digital display contain liquid crystals, which receive the impulses they need to display the time directly from the integrated circuit. Therefore, there is no mechanical transmission of energy.

These two displays may be combined to provide a range of indications, such as the time of day and short, measured times.

Diagram of a quartz watch

1. Battery
2. Integrated circuit
3. Quartz
4. Trimmer regulating the frequency
5. Stepping motor
6. Gear train
7. Analogue display.



Mechanical Watches

A standard mechanical watch has around 130 components in three sub-assemblies: the energy source, the regulating parts and the display. The energy supplied by the spring is transmitted by the gear train. The escapement transmits impulses, while the balance divides the time. Winding, either manual or automatic via the rotor, tightens the spring.

Diagram of a mechanical watch

1. Mainspring
2. Gear train
3. Escapement
4. Oscillating balance
5. Winding stem
6. Rotor
7. Analogue display.

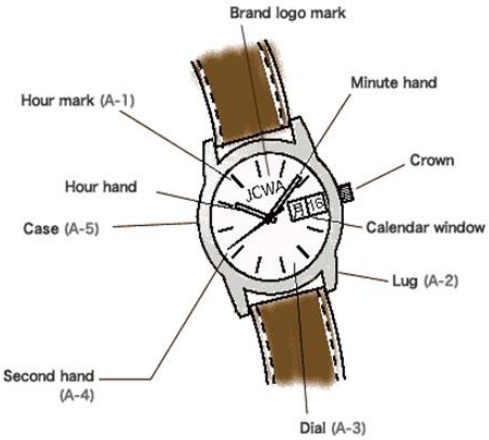
Automatic Quartz Watches

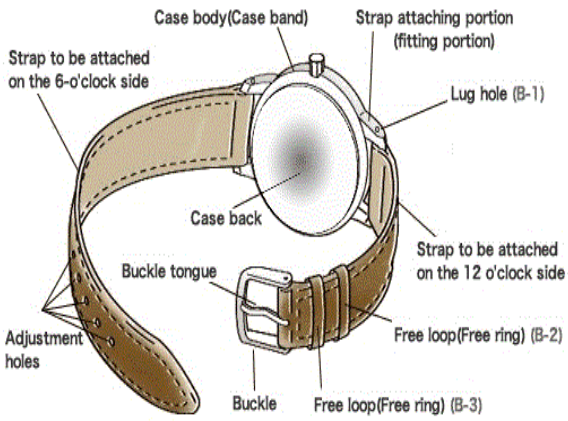
Swiss watchmakers have overcome the challenge of combining these two types of technology by creating a watch movement which operates as a quartz movement, but recharges like a mechanical movement, thereby obtaining an automatic watch with the accuracy of quartz.

The operating principle is simple, but nonetheless revolutionary: an automatic recharging mechanism (oscillating weight) tightens the mainspring, which when released starts up a mini-generator able to convert mechanical energy into electrical energy. This energy is accumulated in a capacitor. Thereafter the system behaves like a traditional quartz watch, with the integrated circuit controlling the distribution of energy and providing the impulses required to drive the stepping motor.

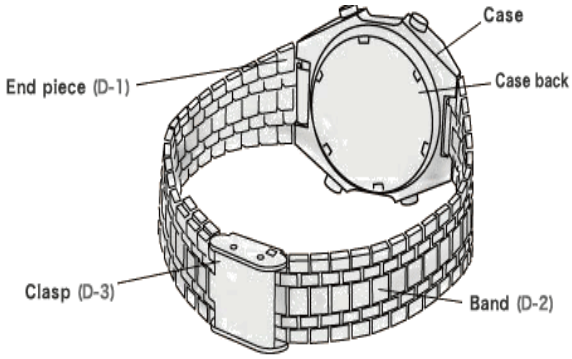
b. Watch Part Names

An example of a typical analogue watch with a leather strap





An example of a digital watch with a metallic band



The Swiss watch industry produces essentially two types of watch: electronic quartz watches and mechanical watches. Three in every four watches are electronic. Nevertheless, despite being produced in smaller numbers, mechanical watches represent more than 75 per cent of total sales value.

Watch Jewels

A mechanical movement contains watchmaker's stones that reduce friction and wear to a minimum. The rubies that were originally used have long since been replaced by synthetic sapphires.

In principle, a standard mechanical watch displaying hours, minutes and seconds should contain at least 15 jewels located in the places most subject to wear caused by friction. It must be fitted with a shock-absorbing system containing a jewel on the balance.

Unidirectional Bezels

A bezel is a ring fitted over the case band of the watch case. It is used to record additional data, such as the duration of a phenomenon, and rotates in both directions.

The unidirectional bezel only turns one way. This technical constraint prevents any danger when measuring a diving time for example, since even if the bezel is knocked and moved it will indicate that the diver has less air or decompression time rather than more.

c. Watch Water Resistance

Water Resistant is a quality specification for watches, based on the description of JIS (Japan Industrial Standards) and ISO (International Organization for Standardization).

"WATER RESIST" and "W.R." are the abbreviated forms of *Water Resistant*.
The water resistance for daily use is indicated by 'bar' (atmospheres) and the water resistance for diving is indicated by 'm' (metres). Water-resistant indications shown in this table may be found either on the dial or on the case back.

It is important to read the instruction manual carefully and to understand the handling instructions and precautions before use, regardless of the degree of water resistance of the watch.

Water Resistance Table

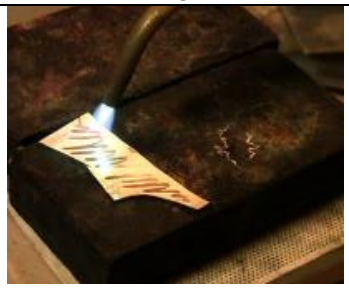
Name	Specifications	Examples of water-resistant indications	Uses/precautions in handling

Watch for mixed-gas diving	200m-1000m Water resistant	HE-GAS DIVER'S 300m	High water resistance as it can withstand diving to the depth of water indicated (example: 300m). This watch is equipped with devices for measuring diving time and decompression time, such as a rotating bezel, and can be used for deep-sea diving (mixed-gas diving) using a mixed gas of helium and oxygen for respiration.
Watch for air diving	100m-200m Water resistant	AIR DIVER'S 100m	High water resistance as it can withstand the pressure to the depth of water indicated (example: 100m) and extended underwater use. This watch is equipped with devices for measuring diving and decompression times, such as a rotating bezel, and can be used for shallow-water diving (scuba diving, etc.) with compressed air in a cylinder for respiration. It cannot be used for mixed-gas diving.
Enhanced water resistant watch for daily use	Water resistant to 20 bars	WATER RESIST 20 BAR WATER 20BAR RESIST W.R.20BAR	This can be used for water sports such as swimming, sailing, fishing, skin diving, etc. Do not use for mixed-gas diving or air diving.
	Water resistant to 10 bars	WATER RESIST 10 BAR WATER 10BAR RESIST W.R.10BAR	
	Water resistant to 5 bars	WATER RESIST 5 BAR WATER 5BAR RESIST W.R.5BAR	This can be used by people who often touch water (in fishery, agriculture, car washing, restaurants, etc.) and for water sports (swimming, sailing, fishing, etc.). Do not use for skin diving, mixed-gas diving or air diving. Even if the water resistance is 5 bars or more, avoid directly showering or applying tap water under high pressure.
Water resistant watch for daily use	Water resistant to 2-3 bars	WATER RESIST W.R.	Can withstand perspiration, water drops, rain, etc., in daily life, but cannot be used for water-using work, water sports, skin diving or other types of diving. Do not use under conditions when the water pressure changes sharply.
Non-water resistant watch	In the case of NO marking of water resistant on the case back, avoid direct contact with water.		

6. JEWELLERY PRODUCTION METHODS

a. Traditional Bench Manufacturing

The traditional method for manufacturing jewellery uses rolled and drawn gold alloys, shaping by hand, and cutting and soldering parts together before setting stones and polishing.

		
Jewellers Bench	Gold Alloy Granules	Gold Wire
		
Gold Sheet	Rolling Mill	Drawing Gold Wire
		
Saw Piercing	Annealing	Assembly
		
Soldering	Emerying	Stone Setting

Polishing

b. Lost Wax Casting

Prototype model is carved from wax

Finished prototype wax model

Wax model spruced on flask bottom

Investment poured into the flasks

Flasks placed in a kiln at approx.. 750 degree to burn out wax

Flasks quenched after removal from the kiln

Metal alloy heated in crucible to be poured into the flasks

Molten metal poured into flask

Once cooled, cast metal objects are removed from the investment

A cast jewellery item ready to be polished and stone set

c. Laser Welding

Laser welding technology allows the jeweller to undertake repair work using very little heat and to achieve fine detailed work.

One of the advantages of using a laser is that the metal used for the repair is the same as the metal used to manufacture the item, therefore no solder is used, the caratage remains the same and there is no colour difference.
Many repairs can use the laser, avoiding the need to remove stones, which reduces the risk of stone breakage.

		
A laser engraving machine	A jeweller using a machine	The laser engraving process

d. Laser Engraving

Laser engraving technology allows decorative patterns and customer logos and inscriptions to be engraved onto the surface of designs, allowing complex patterns to be created with very fine detail.

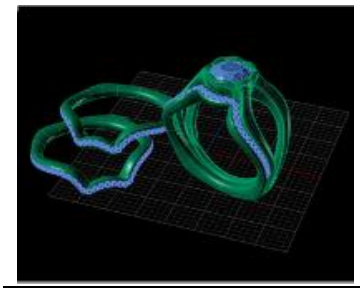
		
A laser engraving machine	A ring being laser engraved	A laser engraved ring ready for sale

e. CAD/CAM

CAD/CAM is an acronym for Computer Aided Design / Computer Aided Manufacturing.

CAD is the software tool used by jewellery designers to create a 3-dimensional graphic representation of the design to be made. When completed, the 3D design can be rendered to produce a photo-realistic representation of how it will look when made up.
This visualisation allows the customer to see the bespoke design before any major expense in manufacture has been made. Modifications can easily be made to the CAD drawing to ensure the design meets the customer's expectations. When the design is approved, the CAD file is exported as a surface mesh (STL, SLC, SLF), which can be used by the CAM software to create the tool paths required for the machine

to make the physical model. By creating a 3D model, the design is coded for a machine to 'print' using wax, UV resin or other substrates.

		
3D CAD model of a ring	A CAD program in use	A completed ring show with 3D CAD images

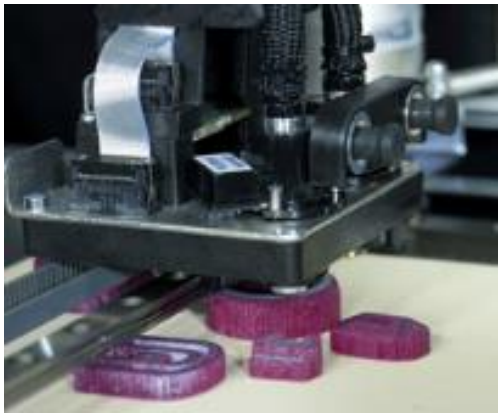
CAM

CAM is the process used to convert the 3D design into a physical item with a commercially available printer. Printers use either a subtractive or additive process to produce the physical final piece.

a. Once the design has been saved as a surface mesh, the file is imported into software that slices the surface mesh into layers and creates the tool paths for each layer specific to the machine being used. The printer will take this sliced model file and build the design, layer by layer.
b. The subtractive process involves the removal of material from a block, typically using a milling process. This process is restricted for jewellery applications due to the limited ability of the tools to mill undercut and hollow parts of the item.

	
Wax milling	A wax milled design

c. The additive process uses different materials such as wax, UV resin and metal powders to progressively build the design layer by layer. The process allows for very complex designs with no limitations on the shape of the item.

	
Wax printing	Wax printed designs
	
UV resin printing	Metal powder printing

f. Platings and Coatings

Gold plating is an electro-galvanic process whereby ions of metal in a solution are deposited on the item being plated. The item to be coated is suspended in a gold solution at the cathode, and an anode is suspended in the solution. The thickness of the deposit is expressed in microns.

Items covered by less than the Australian standard referred to in AS-2140-2008 should not be referred to as gold plated.

Rolled Gold

Rolled gold is a mechanical application of gold onto a base metal by means of pressure through a roller or a press. The quality standard of rolled gold is usually expressed as a percentage of the total mass, so the mark says 1/10th 9ct gold or 1/10th 375 gold.

Ion plating is a modern process, which deposits a low level of metal on an article, well below the Australian standard for gold plating. The covering is durable as, after coating with precious metal, a hard-wearing ceramic coating is applied.

The quality of a silver-plated item is measured by the micron thickness of the silver coating.

Plating (Decorative)

Electroplating jewellery is the process of depositing a bright and colourful surface coating to finished items, to produce a mirror finish and change the original appearance. Once the item is chemically cleaned, it is placed in a solution that contains the metal to be plated, and an

electrical current is passed through the item, which causes the metal in the solution to be deposited (plated) onto its surface.

If two or more colours are required, the item is painted with a masking lacquer to prevent the areas not requiring plating from being changed. The colour of the item after plating is dependent on the chemical composition of the solution in the plating bath.

The most common metals plated are gold, silver and rhodium.

Silver Plating

Silver plating is used to give silver items a very white finish after polishing. This is typically found in trophies, cutlery, plate ware, and similar items.

Rhodium Plating

A quality rhodium plated finish should be standard procedure on all white gold mountings, but how does one get a good rhodium plated finish? First and foremost, the piece needs to be polished to a bright finish. If the piece is not clean, it will not plate.

Rhodium plating procedure:

1. Polish to a brilliant high finish.
2. Clean thoroughly in an ultrasonic cleaner.
3. Rinse in distilled water.
4. Steam clean.
5. Electro clean: 120°F, four volts for two minutes in a stainless beaker with the positive lead attached to the beaker, negative attached to the piece being plated. Or 120°F, four volts for two minutes in a glass beaker with a stainless steel anode, positive lead attached to the stainless anode, negative attached to the piece being plated.
6. Rinse in clean distilled water.
7. Activator: room temperature, no voltage, 30 seconds.
8. Rinse in clean distilled water.
9. Dip in fresh distilled water. When plating silver, use nickel mirror or palladium solution 120°F, two volts, for two minutes using a nickel anode. Palladium is recommended because so many people have allergic reactions to nickel.
10. Rhodium plate: Room temperature, 4.5 volts, 20-30 seconds, negative lead attached to piece being plated, positive lead to platinized titanium anode.
11. Rinse in clean distilled water.
12. Steam clean, then dry. Use a blow dryer to heat dry the piece when it has cooled down.

Gold Plating

Gold plating is a method of depositing a thin layer of gold onto the surface of another metal, most often copper or silver (to make silver-gilt), by chemical or electrochemical plating.

Gold plating procedure is like the rhodium plating procedure, with the follow minor differences:

- A Pyrex beaker is used instead of a glass beaker
- A 24ct anode is used
- 14ct yellow gold plating solution is used

7. BASIC JEWELLERY KNOWLEDGE

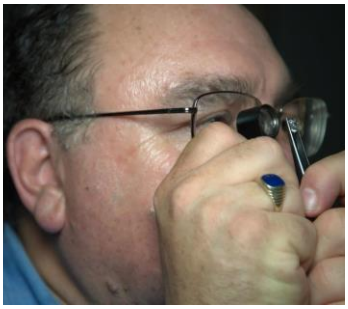
a. How to Use a Jewellers Loupe

The standard loupe for the jewellery and gem industry is a 10-x magnification triplet loupe which is corrected for colour (described as achromatic) and spherical aberration (aplanatic). Spherical aberration results in objects being out of focus at the edge of the field of vision.

Buy the best quality you can afford, especially if you plan to use your loupe to later study gemmology. Most manuals recommend a loupe with a black housing to prevent reflected light causing a distraction when examining a gemstone or diamond.

Using a Loupe:

1. Establish which your dominant eye is.
   Most people usually see better through one eye than the other. The right eye of most right-handed people is usually their dominant eye. Use your dominant eye for viewing through the loupe but remember to keep both eye open to prevent fatigue and eye strain. With practice you will become experienced in focusing through the eye with the loupe only. It may feel odd in the beginning but persevere.
2. Grip the loupe between your thumb and forefinger, though some texts suggest putting your finger through the loupe cover. Do what feels comfortable to you.
3. Bring the loupe up close to your dominant eye. If you wear glasses, you can even rest the loupe against your spectacles. Rest your hand against your cheek or nose to form a stable platform. The focal point of a 10-x loupe is about 2.5 centimetres from the front of the lens.
4. To establish the working area of your loupe, look at a piece of graph paper through the loupe.
   Less expensive lower quality lenses will show distinct bending at the edges. (often only the central 80% of the lens is usable.). The lens may also show colour distortion at the edge if not corrected.
5. When viewing a stone held in a tweezers, bring the top of hand holding the tweezers to rest against the bottom of the hand holding the loupe so as to bring the item into focus. (The same goes when viewing a piece of jewellery without the tweezers).
6. You can now use the lower hand to "swivel" back and forth (with a wrist action) to bring the stone in the tweezers into clear focus - think of this as the fine adjustment. If the fingers of the two hands do not touch the item being viewed will move about and not stay optimally focused.



Correct viewing position

Close up view of hand positions

Stable ergonomic work position

Lighting position

Note: Loupe hand held close to eye, supported against cheek. Tweezer hand held against loupe hand to create stable platform.

When viewing a large number of items, it is best to be seated at a workbench where you can support your elbows on the bench top to help form a stable position and to prevent muscle strain

and fatigue. If you are viewing an item in the standing position, tuck your arms in to your sides for support and stability. Keeping a stable viewing platform is essential.

Use an adjustable desk lamp with a solid shade as your light source. It is important that the light from the lamp does not shine directly into your eyes.

You want the light to angle into the side of the stone to illuminate the internal features so that they appear brightly lit and clearly visible against the dark background of the stone. This creates what is known as a dark field illumination.

b. Finger Size Comparison Chart

Australian/UK/South Africa	A				B			C		
USA			1				1.5			2
Europe		38		39		40			41	
Inside diameter (mm)	12.07	12.10	12.34	12.41	12.46	12.73	12.75	12.85	13.05	13.16
Outside diameter (mm)	37.90	38.00	38.75	38.97	39.12	39.97	40.04	40.35	40.98	41.32

D			E				F			G			H
		2.5			3				3.5			4	
	42			43		44		45			46		
13.25	13.37	13.56	13.64	13.69	13.97	14.01	14.03	14.32	14.38	14.42	14.64	14.78	14.82
41.61	41.98	42.58	42.83	42.99	43.87	43.99	44.05	44.96	45.15	45.28	45.97	46.41	46.53

		I			J		K		L		M		
	4.5			5			5.5		6			6.5	
47			48	49		50		51		52			53
14.96	15.19	15.22	15.28	15.60	15.61	15.92	16.00	16.23	16.40	16.55	16.79	16.82	16.87
46.97	47.70	47.79	47.98	48.98	49.02	49.99	50.24	50.96	51.50	51.97	52.72	52.81	52.97

N				O			P			Q			R
		7			7.5			8			8.5		
	54		55			56			57			58	
17.18	17.19	17.22	17.51	17.58	17.63	17.83	17.97	18.03	18.14	18.36	18.45	18.46	18.76
53.95	53.98	54.07	54.98	55.20	55.36	55.99	56.43	56.61	56.96	57.65	57.93	57.96	58.90

			S			T			U			V	
	9			9.5				10			10.5		
59		60			61		62			63			64
18.78	18.87	19.10	19.15	19.28	19.42	19.55	19.74	19.76	19.94	20.05	20.17	20.33	20.37
58.97	59.25	59.97	60.13	60.54	60.98	61.39	61.98	62.05	62.61	62.96	63.33	63.84	63.96

		W		X			Y			Z		
11			11.5			12			12.5			13
	65		66		67			68			69	
20.60	20.69	20.73	21.01	21.12	21.33	21.41	21.51	21.65	21.82	21.91	21.96	22.23
64.68	64.97	65.09	65.97	66.32	66.98	67.23	67.54	67.98	68.51	68.80	68.95	69.80

c. Jewellery Cleaning and Care

Avoid Light and Heat

Just as the sun's harmful rays can damage our skin, light and heat can affect a coloured gemstone's durability and colour. Over time, and in excess, they can also fade or damage some gemstones, such as amethyst, kunzite, topaz and shell cameos. Pearls and other delicate materials, such as ivory, will bleach under extreme exposure

to light. Other gems, especially amber, can darken over time when exposed to too much light.

Excessive heat and sudden temperature changes may also fracture some gems. Heat can easily remove the natural moisture these gems need to keep their beauty. Pearls, for instance, can dry out, crack and discolour. Opals can turn white or brown, develop tiny cracks, and might lose their play-of-colour.

Avoid Chemicals

Exposure to chemicals can damage or discolour precious metals and may harm some coloured gems. Everyday substances like hairspray, lotion, perfume or other cosmetics can contain chemicals that may permanently damage fine jewellery. Chlorine bleach ammonia, and other common household solvents can pit or damage gold alloys.

Treated Gems

Many coloured gemstones are routinely treated to improve the appearance of colour and clarity. These treatments can be negatively affected by heat, solvents, steam and ultrasonic cleaners. Knowing whether a gem has been treated is the first step to knowing how to care for it.

Ultrasonic Cleaners

Be aware that not all gems and jewellery can be safely cleaned in an ultrasonic cleaner.

Ultrasonic cleaners should not be used to clean:

1. Gemstones with surface-reaching breaks that have been filled with a substance such as oil, resin or a glass-like material
2. Organic gem materials such as pearls, coral, ivory, or amber
3. Gems that have been coated with a non-permanent substance like plastic or wax
4. Some heat-treated gemstones
5. Gems that are susceptible to heat and temperature changes whether they are treated or not. Some of these gems include tanzanite, feldspar (sunstone and moonstone), iolite, kunzite, lapis lazuli, malachite, opal, topaz, turquoise, zircon and others
6. The vibration generated by the machine can sometimes shake gems loose or chip gems that are set with their girdles touching.

Most coloured gems can be cleaned with warm water, mild dish soap (no detergents) and a soft brush. A pulsed-water dental cleaning appliance and a soft, lint-free cloth can also be used. Be sure to rinse jewellery in a glass of water to remove cleaning solutions since there is a risk of losing loose stones – or even an entire piece of jewellery - if it is rinsed directly in the sink.

Soft gems, such as pearls, on the other hand, can easily scratch. Use a new, clean makeup brush and warm, soapy water to softly clean them. Lay a strand of pearls on a towel to dry. The wet silk thread can stretch and attract dirt− so don't touch the strand until it is completely dry. Pearls worn often should be restrung once a year.

Jewellery Storage

Proper jewellery storage is often overlooked. Jewellery should never be tossed into a drawer or on top of a hard surface as there is a higher risk of scratches and chipping.

Pearls and opals draw moisture from the air, so storing opal or pearl jewellery in a dry area can sometimes do more harm than good.

When traveling, protect jewellery pieces from scratches or other impact damage by padding it in a separate box or case.

Jewellery should be checked every six months and cleaned frequently.